

Surface Water Supply of the United States 1960

Part 4. St. Lawrence River Basin

Prepared under the direction of E. L. HENDRICKS, Chief, Surface Water Branch

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1707

Prepared in cooperation with the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Vermont, and Wisconsin, and with other agencies



UNITED STATES DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, *Secretary*

GEOLOGICAL SURVEY

Thomas B. Nolan, *Director*

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PREFACE

This report was prepared by the Geological Survey in cooperation with the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Vermont, and Wisconsin, and with other agencies, by personnel of the Water Resources Division, L. B. Leopold, chief, under the general direction of E. L. Hendricks, chief, Surface Water Branch, and F. J. Flynn, chief, Basic Records Section.

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CALENDAR FOR WATER YEAR 1960

OCTOBER 1959

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NOVEMBER 1959

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JANUARY 1960

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JULY 1960

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AUGUST 1960

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SEPTEMBER 1960

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SURFACE WATER SUPPLY OF ST. LAWRENCE RIVER BASIN, 1960

SCOPE OF WORK

This volume is one of a series of 20 reports presenting records of stage, discharge, and content, of streams, lakes, and reservoirs in the United States during the 1960 water year. Since 1888, when the United States Geological Survey first studied streamflow in relation to problems of irrigation, similar records have been obtained at more than 15,500 gaging stations in the 50 States. On September 30, 1960, the Geological Survey and cooperating organizations were maintaining 7,300 gaging stations. Partial-record stations for low flow or for flood flow have been operated at many other points. In addition, discharge measurements are made at miscellaneous sites. The records for the 1960 water year at gaging stations, partial-record stations, and miscellaneous sites in the St. Lawrence River basin are given in this report.

COOPERATION

Many State, municipal, and private organizations have cooperated with the Geological Survey in this work by either furnishing or helping to collect data. Organizations that supplied data are acknowledged in station descriptions, and organizations that assisted in the collection of data through cooperative agreements with the Survey are:

Illinois: State Department of Public Works and Buildings, E. A. Rosenstone, director, through Division of Waterways, T. B. Casey, chief engineer; and Department of Highways, Cook County, W. H. Erickson, president of the Board of County Commissioners and W. J. Mortimer, superintendent.

Indiana: State Department of Conservation, E. K. Marlin, director, through Division of Water Resources, C. H. Bechert, director; State Highway Commission, John Peters, chairman, and C. E. Vogelgesang, chief engineer; Indiana Flood Control and Water Resources Commission, Anton Hulman, Jr., chairman, and J. I. Perrey, chief engineer; State Board of Health, Dr. A. C. Offutt, commissioner, and B. A. Poole, director, Bureau of Sanitary Engineering; and city of Fort Wayne Filtration Plant, L. R. Matthews, superintendent.

Michigan: State Department of Conservation, G. E. Eddy, director, through Geological Survey Division, W. L. Daoust, State geologist, Fish and Fisheries Division, A. B. Cook, Jr., chief; Administrative Services, G. A. Walker, chief, and Parks and Recreation Division, A. C. Elmer, chief; State Water Resources Commission, M. P. Adams, executive secretary; and State Highway Department, J. C. Mackie, commissioner.

Minnesota: State Department of Conservation, Division of Waters, S. A. Frellsen, director; State Department of Highways, L. P. Zimmerman, commissioner; and Minnesota State Iron Range Resources and Rehabilitation Commission, K. J. Otava, commissioner.

New York: State Conservation Department, H. G. Wilm, commissioner; State Department of Health, Water Pollution Control Board, H. E. Hilleboe, commissioner; State Department of Public Works, J. B. McMorran, superintendent; Board of Hudson River-Black River Regulating District, L. P. Gaylord, assistant chief engineer; Oswegatchie River-Cranberry Reservoir Commission, A. E. Boughner, commissioner; Onondaga County

Water Authority, T. H. Dyer, chairman; city of Auburn, G. F. Train, city manager; city of Rochester, Brighton Sewer District, L. A. Platt, chairman; and Onondaga Public Works Commission, E. A. Dollard, chairman.

Ohio: State Department of Natural Resources, H. B. Eagon, director.

Pennsylvania: State Department of Forests and Waters, M. K. Goddard, secretary, through Bureau of Waters, B. D. Murphy, chief engineer.

Vermont: Water Conservation Board, R. W. Thieme, commissioner.

Wisconsin: Public Service Commission of Wisconsin, G. P. Steinmetz, chairman, succeeded by Leonard Bessman, and Warren Oakey, chief engineer, succeeded by G. P. Steinmetz; and Wisconsin Committee on Water Pollution, T. F. Wisniewski, director.

Assistance in the form of funds or services was given by the Corps of Engineers, Department of the Army, in collecting records published herein for 76 gaging stations, of which 3 were in Indiana, 29 in Michigan, 2 in Minnesota, 20 in New York, 13 in Ohio, 3 in Vermont, and 6 in Wisconsin.

Assistance was also furnished by the Weather Bureau of the United States Department of Commerce, Fish and Wildlife Service of the United States Department of the Interior, Soil Conservation Service of the United States Department of Agriculture, and the United States Department of State.

On waters adjacent to the international boundary, certain gaging stations are maintained by the United States (or Canada) under agreement with Canada (or the United States), and the records are obtained and compiled in a manner equally acceptable in both countries. These stations are designated herein as "International gaging stations."

The following organizations aided in collecting records:

Indiana: Indiana & Michigan Electric Co.; Sanitary District of Chicago; and city of Hammond.

Michigan: Macomb County Board of Supervisors; Macomb County Road Commission; Oakland County Department of Public Works; Oakland County Drain Commission; Wayne County Road Commission; Huron-Clinton Metropolitan Authority; Southeastern Oakland Co. Sewage Disposal District; cities of Adrian, Allegan, Dearborn, Detroit, and Kalamazoo; Cleveland-Cliffs Iron Co.; Consumers Power Co.; Detroit Edison Co.; Hanna Coal and Ore Corp.; Michigan Gas & Electric Co.; Wisconsin-Michigan Power Co.; and Upper Peninsula Power Co.

New York: Municipalities of Batavia, Canandaigua, Oneida, Plattsburgh, Rochester, Rome, and Syracuse; villages of Lancaster and Williamsville; Cornell University; New York State Electric & Gas Corp.; Niagara Mohawk Power Corp.; and Rochester Gas & Electric Corp.

Wisconsin: State Conservation Department; Lake Superior District Power Co.; Wisconsin-Michigan Power Co.; and Wisconsin Public Service Corp.

DIVISION OF WORK

The stream-gaging work was done by the Water Resources Division of the Geological Survey, under the direction of personnel shown in the preface. The data for stations in the several States were collected and prepared for publication in the district offices listed below.

| <u>State</u> | <u>District office</u> | <u>Address</u> |
|---------------|------------------------|------------------------|
| Illinois..... | Champaign..... | 605 South Neil Street. |
| Indiana..... | Indianapolis..... | 611 North Park Avenue. |

Data for stations in the several States collected and prepared for publication in the district offices--Continued.

| <u>State</u> | <u>District office</u> | <u>Address</u> |
|-------------------|------------------------|--------------------------------------|
| Michigan a/..... | Lansing..... | 407 Capitol Savings & Loan Building. |
| Minnesota..... | St. Paul..... | 1610 Post Office Building. |
| New York..... | Albany..... | 343 Federal Building. |
| Ohio..... | Columbus..... | 1509 Hess Street. |
| Pennsylvania..... | Harrisburg..... | 490 Education Building. |
| Vermont..... | Boston, Mass..... | 141 Milk Street. |
| Wisconsin b/..... | Madison..... | 699 State Office Building. |

a Except Menominee River below Koss but including Brule and Menominee Rivers near Florence, Wis.
b Except Brule and Menominee Rivers near Florence but including Menominee River below Koss, Mich.

Information of a more detailed nature than that published for most of the gaging stations given in this report is on file in the district offices listed on pages 2 and 3. All gaging-station records for Indiana and some for Illinois, New York, and Vermont have been analyzed by electronic computer to give: (1) the number of days in each year that the daily discharge was between selected limits (duration tables); and (2) the lowest mean discharge for selected numbers of consecutive days in each year. In addition, the records for Illinois and Vermont give the highest mean discharge for selected numbers of consecutive days in each year. Provisional records of discharge, information on the availability of electronic computer results, and other unpublished data concerning the gaging-station records may generally be obtained from the district offices.

DEFINITION OF TERMS AND ABBREVIATIONS

The terms of streamflow and other hydrologic data, as used in this report, are defined as follows:

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained. When used in connection with a discharge record, the term is applied herein only to those gaging stations where a continuous record of discharge is obtained.

Partial-record station is a particular site where limited streamflow data are collected systematically over a period of years for use in hydrologic analyses.

Cubic foot per second (cfs) is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Cubic feet per second per square mile (cfs/m) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Runoff in inches (in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Acre-foot (ac-ft) is the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

Stage-discharge relation is the relation between gage height and the amount of water flowing in a channel, expressed as volume per unit of time.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, a long reach of the channel, or an artificial structure.

Contents is the volume of water in a reservoir. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

The drainage area of a stream at a specified location is that area, measured in a horizontal plane, which is so enclosed by a topographic divide that direct surface runoff from precipitation normally would drain by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

DOWNSTREAM ORDER AND STATION NUMBERS

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing gaging-station records was changed. In this report, in a downstream direction along the main stem, all stations on a tributary entering above a main-stem station are listed before that station. If a tributary enters between two main-stem stations, it is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. To indicate the rank of any tributary on which a gaging station is situated and the stream to which it is immediately tributary, each indention in the listing of gaging stations in the table of contents of this report represents one rank. This downstream order and system of indention show which gaging stations are on tributaries between any two stations on a main stem and the rank of the tributary on which each gaging station is situated.

The order of listing used before the publication of the 1951 report listed first all stations on the main stem from headwaters toward mouth, then all stations on the uppermost tributary to the main stem from the tributary's source to mouth, and then all stations from source to mouth of the uppermost tributary to the tributary.

As an added means of identification, each gaging station and partial-record station has been assigned a station number. The numbers have been assigned in the same downstream order used in this report. In assigning station numbers, no distinction is made between partial-record stations and regular gaging stations, so that the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the numbers to allow for new stations that may be established; hence the numbers are not consecutive. The complete number for each station includes the part number, but the station number as shown in this report, just to the left of the station name, consists of only the essential digits of the complete number. For example, for a station with the complete number 04-0405.00, the station number shown in this report is 405. The notation to the left of the hyphen is the part number; it is 4 for all stations in this report and is therefore omitted.

EXPLANATION OF DATA

The base data collected at gaging stations consist of records of stage and measurements of discharge. In addition, observations of factors affecting the stage-discharge relation, weather records, and other information are used to supplement base data in determining the daily flow. The records of stage are obtained either from direct readings on a nonrecording gage or from a water-stage recorder that gives a continuous record of fluctuations. Measurements of discharge are made with a current meter by the general methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in Water-Supply Paper 888 and are also outlined in standard textbooks on the measurement of stream discharge.

Rating tables giving the discharge for any stage are prepared from stage-discharge relation curves defined by discharge measurements. If extensions to the rating curves are necessary to define the extremes of discharge, they are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, computation of flow over dams or weirs, and by other methods), velocity-area studies, and logarithmic plotting. The application of the daily mean gage height to those rating tables gives the daily mean discharge, from which the monthly and the yearly mean discharge are computed. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes by engineers and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is essentially the shifting-control method.

At some gaging stations the stage-discharge relation is affected by backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in determining discharge. Information requisite for determining the slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage. If so, the rate of change in stage is used as a factor in the determination of discharge.

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 of the stream. Records are published for the water year which begins on October 1 and ends on September 30. A calendar for the 1960 water year 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. The references to "datum of

1929" and adjustments of other years are to the datum and adjustments of the United States Coast and Geodetic Survey. 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 gage, 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 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 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. It should be noted that for all stations for which cubic feet per second per square mile and runoff in inches are published, a revision of the drainage area necessitates corresponding revision of all figures based on the drainage area. Revised figures of cubic feet per second per square mile and runoff in inches resulting from a revision of the drainage area only are usually not published in the annual series of reports.

Skeleton rating tables are published for all stations except those at which the daily discharge for the greater part of the open-water period was determined by the shifting-control method, the slope method, or other special methods involving an equivalent adjustment to the gage height of more than one-tenth foot. Skeleton rating tables are generally not published for stations on canals.

For stations equipped with water-stage recorders, except those on streams subject to sudden or rapid fluctuation, the daily table gives the discharge corresponding to the daily mean gage height. For stations subject to such fluctuation, the daily mean gage

height may not indicate the true daily mean discharge, which must be obtained by averaging the discharge for parts of the day or by using the discharge integrator, an instrument for obtaining the daily mean discharge from a continuous gage-height graph and containing, as an essential element, a curve representing the stage-discharge relation at the station. For stations equipped with nonrecording gages, the table of daily discharge gives the discharge corresponding to once-daily readings of the gage, or to the mean of twice-daily readings, or to the mean gage height determined from gage-height graphs based on gage readings. For periods of rapidly changing stage, the daily mean discharge is determined from gage-height graphs based on gage readings, the frequency of which is stated in the station description.

In the table of daily discharge, the figures for the maximum day and the minimum day for each month are underlined. If the figure is repeated, it is underlined only on the first day of its occurrence.

In the monthly summary below the daily table, the line headed "Total" gives the sum of the daily figures; it is the total cfs-days for the month. The line headed "Mean" gives the average flow in cubic feet per second during the month. Discharge for the month may be expressed in cubic feet per second per square mile (line headed "Cfsm"), or in inches (line headed "In."), or in acre-feet (line headed "Ac-ft"). Figures for cubic feet per second per square mile and runoff in inches are omitted if the drainage area includes large noncontributing areas, or if the average annual rainfall over the drainage basin is usually less than 20 inches.

In the yearly summary below the monthly summary, the figures of maximum are the maximum daily discharges, not the momentary discharges when the water was at crest stage. Likewise, the minimums in this summary are the minimum daily discharges.

Peak discharges and the times of their occurrence and corresponding gage heights of most stations are listed below the table of daily and monthly discharge. All independent peaks above the selected base are given. The base discharge, which is given in parentheses, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for canals, ditches, drains, or for any stream for which the peaks are subject to substantial control by man.

Footnotes to the table of daily discharge indicate periods when discharge was computed or estimated by unusual or special methods during periods of no gage-height record and ice effect, or by other effects that reduce the degree of accuracy of the records. Days on which discharge measurements were made are indicated by asterisk and footnote unless they were made at frequent regular intervals, in which instance the general frequency of discharge measurements is given under "Remarks" in the station description.

For most gaging stations on lakes and reservoirs the data presented comprise a description of the station and a monthly summary table of stage and contents. For some reservoirs a table showing daily contents or stage is given. A skeleton table of capacity at given stages is published each year for all reservoirs for which records are published on a daily basis, but is not published for reservoirs for which only monthly data are given.

At many gaging stations water samples are collected from the streams for the purpose of making chemical analyses, computing dissolved solids, suspended sediment loads, and particle-size distribution, or measuring water temperatures. For most of these samples the results are published in an annual series of water-supply papers entitled "Quality of Surface Waters of the United States" which is issued in four volumes. In this report

under "Remarks" a reference is made to quality-of-water records collected at gaging stations on a regular basis and published in the quality-of-water reports. At many other gaging stations quality-of-water data are obtained at irregular intervals and published as "miscellaneous analyses" in quality-of-water reports; such records are not referred to in "Remarks" paragraph in this report. At many gaging stations water temperature is obtained also at the time a discharge measurement is made; such temperature readings are not reported in the quality-of-water annual reports.

Data collected at partial-record stations and at miscellaneous sites are given at the end of each report. Partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements at miscellaneous sites are given in a third table. Occasionally, a series of discharge measurements are made within a short time period to investigate the seepage gains or losses along a reach of a stream or to determine the low-flow characteristics of an area. Such measurements are given in special tables after the list of measurements at miscellaneous sites.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretation of records.

The station description states the degree of accuracy of the records. "Excellent" indicates that, in general, the error in the daily records is believed to be less than 5 percent; "good," less than 10 percent; "fair," less than 15 percent; and "poor," probably more than 15 percent. The records of monthly and yearly mean discharge and runoff are, in general, more nearly accurate than the daily records.

Discharge at some stations, as indicated by the monthly mean, may vary widely from natural runoff, owing to diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff in inches are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur when relatively large negative adjustments are made or when evaporation is large in comparison with the observed discharge.

Many gaging stations on streams in the irrigated areas of the United States are situated above most of the diversions from those streams, and therefore the discharge recorded does not actually show the water supply available at the stations for further development, because water must first be supplied to existing irrigation systems.

PUBLICATIONS

Basic data for gaging stations are published in an annual series of reports consisting of 20 volumes, including one each for the States of Alaska and Hawaii. The area of the other 48 States is divided into 14 parts whose boundaries coincide with certain natural

drainage lines. Formerly, the annual series of reports on surface-water supply consisted of 14 volumes, one for each of the 14 parts. Beginning with the reports for 1951, the records for the 48 States were published in 18 volumes, there being 2 volumes each for Parts 1, 2, 3, and 6. The boundaries of the various parts are indicated by the following list and the map in Figure 1.

- 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 pages 2 and 3.

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. 2 |do..... | 1884 to June 30, 1891. |
| 13th A, pt. 3 |do..... | 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. |
| 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..... | 1898. |
| 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 in the table 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 St. Lawrence River basin, 1899-1960

| Year | WSP | Year | WSP | Year | WSP | Year | WSP | Year | WSP |
|--------|-------|---------|-----|------|-----|------|------|------|------|
| 1899 | 36 | 1912 | 324 | 1925 | 604 | 1937 | 824 | 1949 | 1144 |
| 1900 | 49 | 1913 | 354 | 1926 | 624 | 1938 | 854 | 1950 | 1174 |
| 1901 | 65,75 | 1914 | 384 | 1927 | 644 | 1939 | 874 | 1951 | 1207 |
| 1902 | 82,83 | 1915 | 404 | 1928 | 664 | 1940 | 894 | 1952 | 1237 |
| 1903 | 97 | 1916 | 434 | 1929 | 684 | 1941 | 924 | 1953 | 1277 |
| 1904 | 129 | 1917 | 454 | 1930 | 699 | 1942 | 954 | 1954 | 1337 |
| 1905 | 170 | 1918 | 474 | 1931 | 714 | 1943 | 974 | 1955 | 1387 |
| 1906 | 206 | 1919-20 | 504 | 1932 | 729 | 1944 | 1004 | 1956 | 1437 |
| 1907-8 | 244 | 1921 | 524 | 1933 | 744 | 1945 | 1034 | 1957 | 1507 |
| 1909 | 264 | 1922 | 544 | 1934 | 759 | 1946 | 1054 | 1958 | 1557 |
| 1910 | 284 | 1923 | 564 | 1935 | 784 | 1947 | 1084 | 1959 | 1627 |
| 1911 | 304 | 1924 | 584 | 1936 | 804 | 1948 | 1114 | 1960 | 1707 |

a Lake Ontario and tributaries to St. Lawrence River proper.

A compilation of records for the area covered by this report through September 1950 has been published as Water-Supply Paper 1307. 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 tables contain the customary record 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 list gives the numbers and titles of these reports:

| <u>Report</u> | <u>Issued by</u> |
|--|---------------------------------------|
| WSP 147: Destructive floods in the United States in 1904. | U. S. Geological Survey. |
| WSP 162: Destructive floods in the United States in 1905. | Do. |
| WSP 636-C: The New England flood of November 1927. | Do. |
| WSP 771: Floods in the United States, magnitude and frequency. | Do. |
| WSP 773-E: The New York State flood of July 1935. | Do. |
| WSP 798: The floods of March 1936, part 1, New England Rivers. | Do. |
| WSP 799: The floods of March 1936, part 2, Hudson River to Susquehanna River region. | Do. |
| WSP 847: Maximum discharges at stream-measurement stations through September 1938. | Do. |
| WSP 867: Hurricane floods of September 1938. | Do. |
| WSP 1137-G: Floods of 1950 in the Upper Mississippi River and Lake Superior basins in Minnesota. | Do. |
| WSP 1137-I: Summary of floods in the United States during 1950. | Do. |
| WSP 1227-D: Summary of floods in the United States during 1951. | Do. |
| WSP 1260-F: Summary of floods in the United States during 1952. | Do. |
| WSP 1320-E: Summary of floods in the United States during 1953. | Do. |
| WSP 1370-B: Floods of October 1954 in the Chicago area, Illinois, and Indiana. | Do. |
| WSP 1370-C: Summary of floods in the United States during 1954. | Do. |
| Cir. 418: Floods of January-February 1959 in Ohio. | Do. |
| Bull. 1: Magnitude and frequency of floods in Minnesota. | Minnesota Division of Waters. |
| Bull. 32: Floods in Ohio, magnitude and frequency. | Ohio Department of Natural Resources. |
| Bull. 14: Local floods in Ohio during 1947. | Ohio Water Resources Board. |

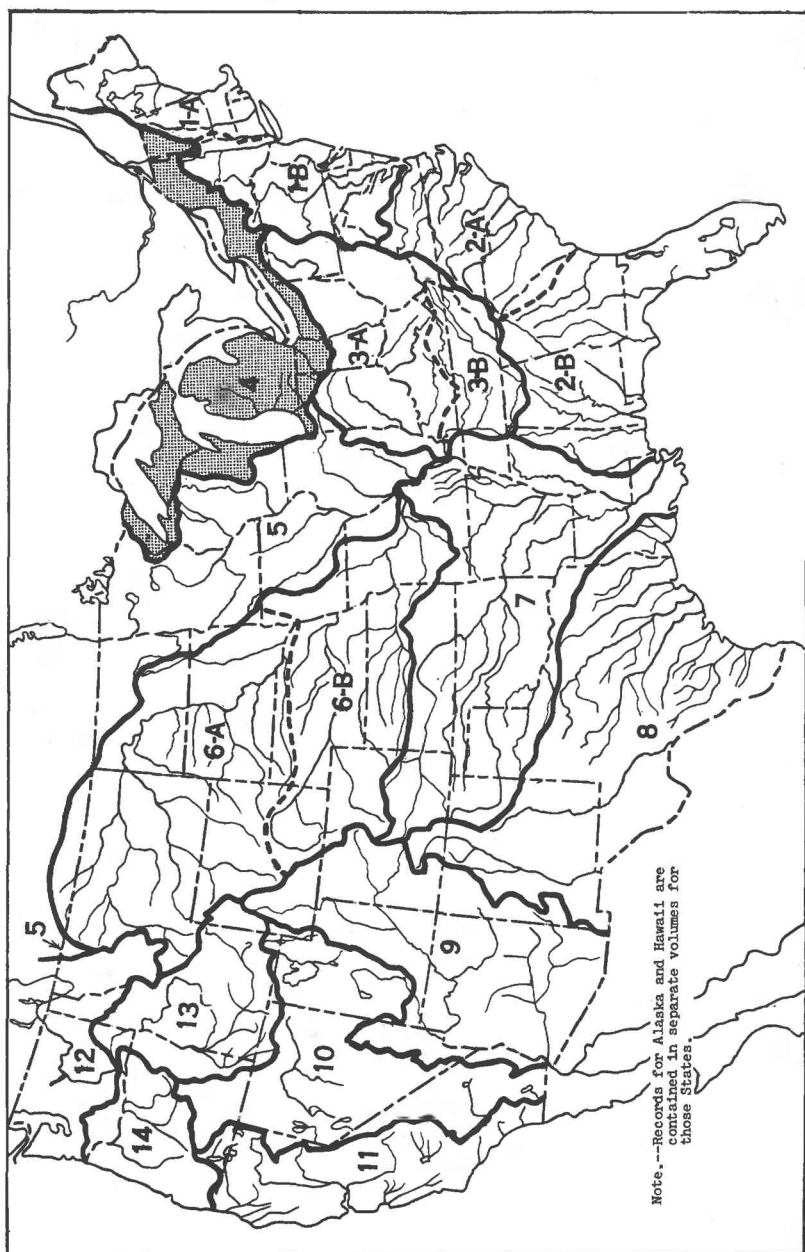


Figure 1.--Map of the conterminous United States showing areas covered by 18 of the 20 volumes on surface water supply. The area covered by this report is shaded.

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 1960 water year by agencies other than the Geological Survey. The records of these stations are not contained in publications of the Geological Survey.

| Records of discharge collected by agencies other than the Geological Survey | | | |
|---|---------------------------------|---------|--|
| Stream | Location | Period | Collected by |
| Cayuga Lake Outlet... | Lock 1 (Mud lock), N. Y..... | 1926-60 | State Department of Public Works, Syracuse, N. Y. |
| Clyde River..... | Clyde, N. Y..... | 1924-60 | Do. |
| Indian River..... | Theresa, N. Y..... | 1934-60 | Niagara Mohawk Power Corporation, Syracuse, N. Y. |
| Oswegatchie River, East Branch. | Brown Falls, N. Y..... | 1934-60 | Do. |
| Oswego River..... | Dam O-5, Minetto, N. Y..... | 1928-60 | State Department of Public Works, Syracuse, N. Y. |
| Do..... | Lower Dam, Fulton, N. Y..... | 1928-60 | Oswego River Watershed Corporation, Fulton, N. Y. |
| Do..... | High Dam, Oswego, N. Y..... | 1940-60 | Niagara Mohawk Power Corporation, Syracuse, N. Y. |
| Raquette River..... | Colton, N. Y..... | 1934-60 | Do. |
| St. Regis River, West Branch. | Parishville, N. Y..... | 1934-60 | Do. |
| Salmon River..... | Bennetts Bridge, Altmar, N. Y.. | 1934-60 | Do. |
| Saranac River..... | Kents Falls, N. Y..... | 1934-60 | System Properties, Inc., Cadyville, N. Y. |
| Seneca River..... | Seneca Falls, N. Y..... | 1931-60 | New York State Electric & Gas Corp., Geneva, N. Y. |
| Do..... | Waterloo, N. Y..... | 1931-60 | Do. |
| Skaneateles Lake Outlet. | Skaneateles, N. Y..... | 1922-60 | City of Syracuse, N. Y. |

Note.--Records for the stations given in the above table are unpublished but are available at the office of the organization by which the station was operated. In addition to the records listed in the above table, the Agricultural Research Service of the U. S. Department of Agriculture (beginning in 1941) has collected records of runoff from 3 areas of less than 2 acres each near East Lansing, Mich.

HYDROLOGIC CONDITIONS

In the area covered by this report streamflow was excessive during October, November, and December. Monthly mean discharge was record-high for the month at one or more key gaging stations in Michigan during October, November, January, February, and April. Floods, caused largely by rains and snowmelt, occurred in Michigan in April and May, in New York in April, and in Wisconsin in March, April, and May. The April and May peaks were record-high at several gaging stations having 20 to 45 years of record.

The only deficient streamflow during the year was in New York in March and in the northern half of the Lower Peninsula of Michigan in March and September.

Figure 2, on page 13, for which records of three long-term representative gaging stations were used, shows a comparison of the monthly and yearly mean discharges during the 1960 water year with the median discharge for the period 1931-60.

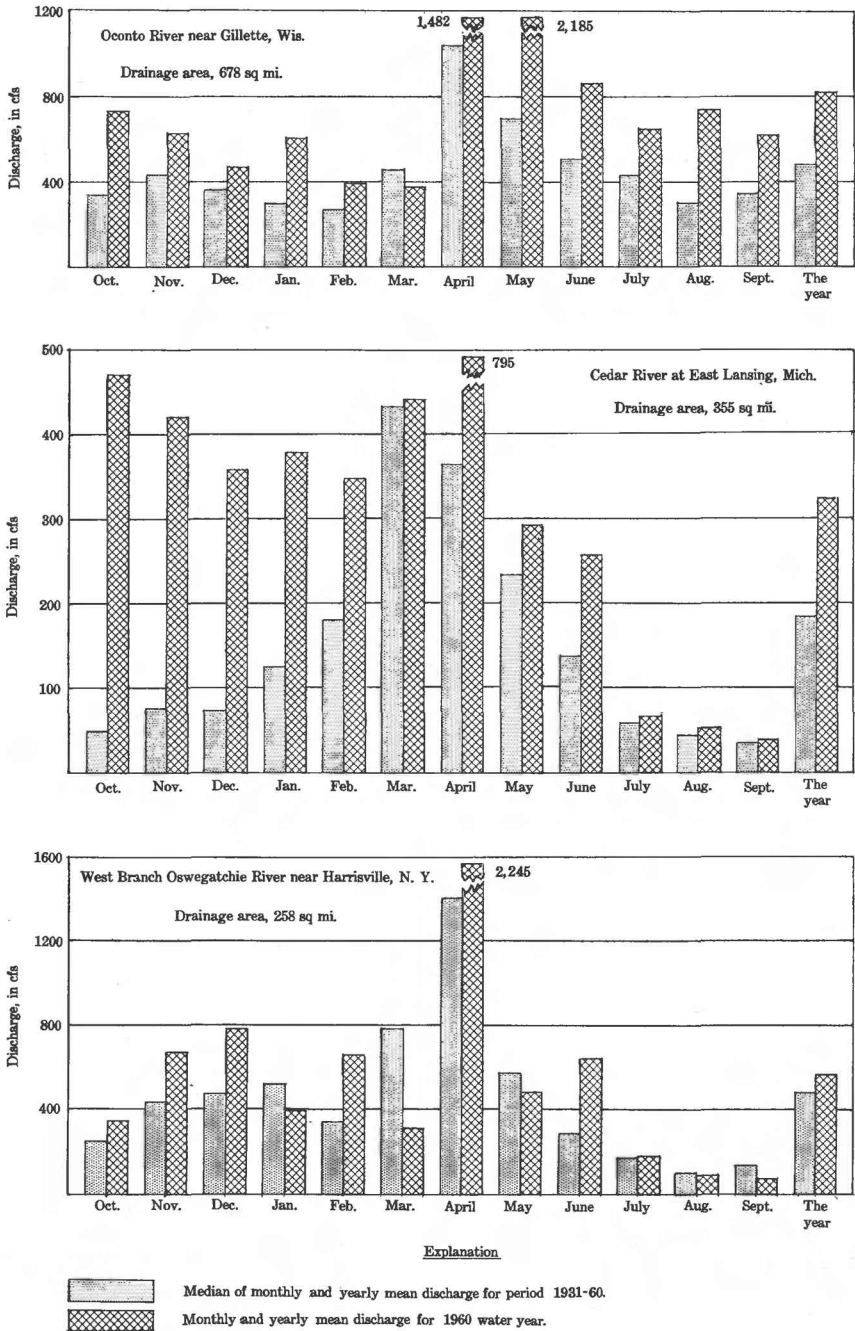


Figure 2. Comparison of discharge at three long-term representative gaging stations during 1960 water year with median discharge for period 1931-60.

STREAMS TRIBUTARY TO LAKE SUPERIOR

105. 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 $\frac{1}{4}$ miles downstream from International Bridge.

Drainage area.--600 sq mi.

Records available.--June to October 1921, April to November 1922, March 1923 to September 1960. Published as "at International Bridge" April 1924 to September 1940. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 789.58 ft above mean sea level, datum of 1929. Prior to Sept. 2, 1936, staff gage and Sept. 2, 1936, to Sept. 30, 1940, wire-weight gage at International Bridge, 5 $\frac{1}{2}$ miles upstream at datum 100.24 ft higher.

Average discharge.--37 years (1923-60), 486 cfs.

Extremes.--Maximum discharge during year, 3,140 cfs Apr. 25 (gage height, 6.35 ft); minimum, 95 cfs Sept. 19-22 (gage height, 0.74 ft).

1923-60: Maximum discharge, 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.

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

Reviews (water years).--WSP 744: 1927-28. WSP 804: 1934(M). WSP 974: Drainage area. WSP 1337: 1924(M), 1925, 1926-28(M), 1931(M), 1936(M), 1941(M), 1945-46(M), 1947, 1948(M), 1950(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 11

Apr. 12 to Sept. 30

| | | | | | |
|-----|-------|-----|-----|-----|-------|
| 1.0 | 161 | 0.7 | 90 | 4.0 | 1,260 |
| 1.5 | 291 | 1.0 | 137 | 5.0 | 1,940 |
| 2.0 | 444 | 2.0 | 414 | 7.0 | 3,910 |
| 3.0 | 810 | 3.0 | 775 | | |
| 4.0 | 1,320 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 507 | 327 | 220 | 185 | 116 | 84 | 124 | 1,250 | 753 | 255 | 151 | 124 |
| 2 | 478 | 321 | 218 | 182 | 114 | 84 | 130 | 1,170 | 749 | 258 | 148 | 120 |
| 3 | 549 | 306 | 212 | 179 | 112 | 85 | 140 | 1,140 | 706 | 344 | 142 | 120 |
| 4 | 510 | 303 | 203 | 172 | 110 | 85 | 150 | 1,710 | 650 | 359 | 133 | 118 |
| 5 | 450 | 276 | 200 | 165 | 108 | 85 | 160 | 2,600 | 596 | 344 | 131 | 116 |
| 6 | 404 | 240 | 192 | 162 | 107 | 84 | 170 | 2,240 | 561 | 326 | 131 | 115 |
| 7 | 373 | 294 | 190 | 160 | 106 | 84 | 188 | 1,850 | 524 | 311 | 151 | 115 |
| 8 | 354 | 306 | 183 | 155 | 103 | 85 | 207 | 1,500 | 487 | 308 | 160 | 112 |
| 9 | 1,030 | 256 | 182 | 152 | 101 | 85 | 225 | 1,310 | 458 | 303 | 155 | 109 |
| 10 | 1,120 | 276 | 182 | 150 | 100 | 85 | 250 | 1,180 | 445 | 300 | 153 | 108 |
| 11 | 833 | 265 | 181 | 150 | 97 | 85 | 275 | 1,100 | 458 | 288 | 151 | 110 |
| 12 | 682 | 235 | 180 | 148 | 95 | 85 | 300 | 1,020 | 458 | 280 | 153 | 108 |
| 13 | 533 | 215 | 180 | 147 | *92 | 86 | 494 | 968 | 442 | 269 | 153 | 104 |
| 14 | 507 | 202 | 179 | 146 | 91 | 87 | 960 | 919 | 398 | 258 | 148 | 103 |
| 15 | 472 | 200 | 177 | 145 | 90 | 88 | 1,370 | 883 | 411 | 250 | 144 | 100 |
| 16 | 606 | 200 | 175 | 145 | 89 | *90 | 1,350 | 852 | 386 | 247 | *142 | 99 |
| 17 | 654 | 201 | 173 | 143 | 88 | 90 | 1,440 | 816 | 368 | 239 | 142 | 99 |
| 18 | 569 | *207 | 172 | 143 | 87 | 91 | 1,780 | 780 | 356 | 236 | 142 | 96 |
| 19 | 526 | 212 | 170 | 142 | 86 | 91 | 1,570 | 753 | 358 | 231 | 153 | 95 |
| 20 | 481 | 220 | 169 | 140 | 85 | 92 | *1,760 | 749 | 344 | *223 | 156 | 95 |
| 21 | *447 | 220 | 166 | 140 | 85 | 93 | 2,280 | 788 | 329 | 196 | 146 | *95 |
| 22 | 435 | 225 | 158 | 138 | 84 | 94 | 2,770 | 1,060 | *323 | 173 | 139 | 108 |
| 23 | 435 | 220 | 170 | 137 | 84 | 95 | 2,670 | 1,160 | 317 | 160 | 135 | 104 |
| 24 | 425 | 220 | 178 | 136 | 84 | 97 | 2,700 | 973 | 308 | 155 | 129 | 106 |
| 25 | 404 | 218 | 185 | 132 | 83 | 98 | 2,960 | 856 | 297 | 155 | 133 | 114 |
| 26 | 376 | 212 | 195 | 131 | 84 | 101 | 2,400 | *784 | *286 | 163 | 144 | 116 |
| 27 | 354 | 215 | 201 | 128 | 84 | 102 | 1,970 | 802 | 280 | 155 | 146 | 112 |
| 28 | 339 | 218 | 201 | 125 | 84 | 106 | 1,690 | 854 | 269 | 153 | 144 | 106 |
| 29 | 333 | 218 | 200 | 122 | 84 | 110 | 1,510 | 788 | 269 | 148 | 135 | 103 |
| 30 | 327 | 220 | *194 | 120 | ----- | 114 | 1,400 | 852 | 263 | 153 | 129 | 100 |
| 31 | 327 | ----- | 190 | 116 | ----- | 120 | ----- | 820 | ----- | 148 | 126 | ----- |
| Total | 15,840 | 7,248 | 5,786 | 4,538 | 2,733 | 2,861 | 35,393 | 34,507 | 12,847 | 7,388 | 4,447 | 3,230 |
| Mean | 511 | 242 | 187 | 146 | 94.2 | 92.3 | 1,180 | 1,113 | 428 | 236 | 143 | 108 |
| Cfs/m | 0.852 | 0.403 | 0.312 | 0.243 | 0.157 | 0.154 | 1.97 | 1.86 | 0.713 | 0.397 | 0.238 | 0.180 |
| In. | 0.98 | 0.45 | 0.36 | 0.28 | 0.17 | 0.18 | 2.19 | 2.14 | 0.80 | 0.46 | 0.28 | 0.20 |

Calendar year 1959: Max 2,110 Min 68 Mean 394 Cfs/m 0.657 In. 8.92
 Water year 1959-60: Max 2,960 Min 83 Mean 374 Cfs/m 0.623 In. 8.49

Peak discharge (base, 3,000 cfs).--Apr. 25 (1 a.m.) 3,140 cfs (6.35 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 12 to Dec. 9, Dec. 11-20, Dec. 22 to Apr. 11.

125. Poplar River at Lutsen, Minn.

Location.--Lat 47°38'23", long 90°42'31", in SW¼ sec. 33, T.60 N., R.3 W., or right bank 350 ft upstream from concrete bridge on U. S. Highway 61 at Lutsen and 1,650 ft upstream from mouth.

Drainage area.--114 sq mi.

Records available.--May to November 1911 and August to September 1912 (gage heights only, published as "at mouth"), October 1912 to September 1917, July 1928 to September 1947, August 1952 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder and concrete control. Datum of gage is 697.89 ft above mean sea level. May 6 to Nov. 4, 1911, staff gage at site 1,250 ft downstream and Aug. 22, 1912, to Sept. 30, 1917, at site 900 ft downstream at different datum. July 17, 1928, to Mar. 30, 1937, chain gage at site 150 ft downstream at datum 6.90 ft lower.

Average discharge.--32 years (1912-17, 1928-47, 1952-60), 104 cfs.

Extremes.--Maximum discharge during year, 1,050 cfs Apr. 25 (gage height, 5.24 ft); maximum gage height, 5.96 ft Jan. 4 (backwater from ice); minimum discharge, 3.9 cfs Nov. 5 (gage height, 1.96 ft), result of freezeup.
1912-17, 1928-47, 1952-60: Maximum discharge, 1,880 cfs May 1, 1954 (gage height, 6.23 ft); minimum, 2.3 cfs Dec. 3, 1939 (gage height, 1.73 ft).

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

Revisions (water years).--WSP 694: 1938-39. WSP 974: Drainage area. WSP 1337: 1914(M), 1928, 1930-35, 1936(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.1 | 7.5 | 4.0 | 276 |
| 2.5 | 30 | 4.5 | 512 |
| 2.8 | 53 | 5.0 | 870 |
| 3.1 | 91 | 5.5 | 1,250 |
| 3.5 | 158 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|-------|-------|-----------|------------|-----------|-------|-------|-------|
| 1 | 103 | 94 | 52 | 43 | 23 | 14 | 21 | 525 | 276 | 78 | 36 | 25 |
| 2 | 102 | 94 | 52 | 42 | 22 | 14 | 22 | 482 | 260 | 80 | 34 | 26 |
| 3 | 118 | 92 | 52 | 41 | 22 | 14 | 24 | 451 | 260 | 80 | 32 | 24 |
| 4 | 108 | 92 | 52 | 40 | 21 | 14 | 26 | 684 | 245 | 110 | 28 | 23 |
| 5 | 100 | 77 | 51 | 39 | 21 | 14 | 28 | 892 | 204 | 110 | 27 | 21 |
| 6 | 98 | 94 | 50 | 38 | 21 | 14 | 30 | 832 | 230 | 90 | 24 | 20 |
| 7 | 96 | 100 | 50 | 37 | 20 | 14 | *34 | 648 | 210 | 75 | 65 | 20 |
| 8 | 114 | 98 | 50 | 36 | 20 | 14 | 44 | 525 | 200 | 62 | 57 | 20 |
| 9 | 235 | 90 | 50 | 36 | 20 | 14 | 58 | 500 | 190 | 57 | 42 | 18 |
| 10 | 204 | 92 | 48 | 35 | 19 | 14 | 75 | 451 | 180 | 52 | 35 | 16 |
| 11 | 149 | 85 | 47 | 34 | 19 | 14 | 104 | 413 | 180 | 48 | 30 | 18 |
| 12 | 126 | 75 | 47 | 34 | 19 | 14 | 130 | 379 | 170 | 45 | 27 | 18 |
| 13 | 109 | 66 | 46 | 33 | 18 | 14 | 151 | 351 | 160 | 42 | 26 | 18 |
| 14 | 102 | 61 | 46 | 32 | 18 | 14 | 248 | 331 | 160 | 40 | 23 | 16 |
| 15 | 98 | 58 | 46 | 32 | 17 | 14 | 319 | 319 | 150 | 38 | 20 | 14 |
| 16 | 149 | 58 | 46 | 31 | 17 | 14 | 304 | 311 | 140 | 35 | *19 | 13 |
| 17 | 151 | 58 | 45 | 31 | 17 | 14 | 330 | 294 | 130 | 33 | 18 | 14 |
| 18 | 128 | 57 | 45 | 30 | 17 | 14 | 355 | 276 | 120 | 32 | 18 | 11 |
| 19 | 120 | 57 | 45 | 30 | 16 | 14 | 380 | 267 | 118 | 32 | 23 | 11 |
| 20 | *113 | 57 | 44 | 29 | 16 | 15 | *424 | 273 | 115 | *34 | 23 | 11 |
| 21 | 100 | 57 | 43 | 28 | 16 | 15 | 480 | 463 | *111 | 33 | 22 | *12 |
| 22 | 102 | 56 | 43 | 28 | 16 | 15 | 580 | 475 | 105 | 34 | 19 | 19 |
| 23 | 114 | 55 | 43 | 27 | 16 | 16 | 700 | 424 | 100 | 32 | 19 | 20 |
| 24 | 113 | 54 | 44 | 28 | 15 | 16 | 850 | 339 | 95 | 30 | 19 | 26 |
| 25 | 103 | 54 | 45 | 28 | 15 | 16 | 983 | 300 | 90 | 40 | 26 | 47 |
| 26 | 98 | 53 | 46 | 25 | 15 | 17 | 832 | *276 | 86 | 44 | 55 | 36 |
| 27 | 97 | 52 | 47 | 25 | 15 | 17 | 758 | 319 | 82 | 38 | 42 | 27 |
| 28 | 96 | 52 | 47 | 25 | 15 | 18 | 670 | 323 | 83 | 33 | 38 | 24 |
| 29 | 96 | 52 | 47 | 24 | 15 | 19 | 606 | 311 | 83 | 31 | 34 | 23 |
| 30 | 96 | 52 | 45 | 24 | ----- | 19 | 578 | 339 | 82 | 46 | 28 | 22 |
| 31 | 84 | ----- | 44 | 23 | ----- | 20 | ----- | 304 | ----- | 41 | 26 | ----- |
| Total | 3,628 | 2,092 | 1,458 | 984 | 521 | 469 | 10,144 | 13,077 | 4,815 | 1,583 | 935 | 615 |
| Mean | 117 | 69.7 | 47.0 | 31.7 | 18.0 | 15.1 | 338 | 422 | 154 | 51.1 | 30.2 | 20.5 |
| Cfsm | 1.03 | 0.611 | 0.412 | 0.278 | 0.158 | 0.132 | 2.96 | 3.70 | 1.35 | 0.448 | 0.265 | 0.180 |
| In. | 1.18 | 0.86 | 0.48 | 0.32 | 0.17 | 0.15 | 3.31 | 4.27 | 1.51 | 0.52 | 0.31 | 0.20 |
| Calendar year 1959: Max | 830 | | | Min 21 | | | Mean 82.6 | Cfsm 0.725 | In. 9.84 | | | |
| Water year 1959-60: Max | 983 | | | Min 11 | | | Mean 110 | Cfsm 0.965 | In. 13.10 | | | |

Peak discharge (base, 500 cfs).--Apr. 25 (9:45 a.m.) 1,050 cfs (5.24 ft); May 5 (3:30 a.m.) 998 cfs (5.17 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 9 to Dec. 25, Dec. 31 to Jan. 5, Apr. 6. No gage-height record Dec. 26-30, Jan. 6 to Apr. 5, Apr. 8-12, 17-19, 21-24, June 6-20, June 22 to July 19; discharge estimated on basis of weather records and records for Baptism River near Beaver Bay and Pigeon River at Middle Falls below International Bridge.

145. Baptism River near Beaver Bay, Minn.

Location.--Lat 47°20'15", long 91°12'00", in SE¹/₄NE¹/₄ sec.15, T.56 N., R.7 W., on right bank 260 ft upstream from bridge on U. S. Highway 61, 0.2 mile upstream from mouth, 4 miles northeast of Silver Bay, and 7 miles northeast of village of Beaver Bay.

Drainage area.--140 sq mi.

Records available.--October 1927 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 609.97 ft above mean sea level (Corps of Engineers bench mark). Prior to Oct. 5, 1934, staff gage at same site and datum.

Average discharge.--33 years, 160 cfs.

Extremes.--Maximum discharge during year, 3,040 cfs Apr. 24 (gage height, 5.43 ft); minimum, 9.2 cfs Sept. 20 (gage height, 1.86 ft).

1927-60: Maximum discharge recorded, 9,350 cfs Aug. 9, 1939 (gage height, 8.11 ft), from rating curve extended above 4,000 cfs; minimum daily, 0.4 cfs Jan. 5, 6, 1940.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 894: 1939. WSP 1337: 1933-34(M), 1935.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 12-30)

| | | | |
|-----|-----|-----|-------|
| 1.8 | 7.6 | 3.5 | 357 |
| 2.0 | 13 | 4.0 | 771 |
| 2.3 | 30 | 4.5 | 1,380 |
| 2.6 | 56 | 5.0 | 2,120 |
| 2.9 | 95 | 5.5 | 2,910 |
| 3.1 | 148 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 86 | 130 | 41 | 35 | 21 | 12 | 14 | 609 | 227 | 66 | 52 | 37 |
| 2 | 100 | 106 | 41 | 34 | 21 | 12 | 15 | 549 | 193 | 56 | 42 | 32 |
| 3 | 113 | 109 | 40 | 33 | 20 | 11 | 17 | 492 | 160 | 49 | 33 | 27 |
| 4 | 95 | 97 | 39 | 32 | 20 | 11 | 20 | 1,410 | 133 | 40 | 26 | 22 |
| 5 | 81 | 80 | 37 | 31 | 19 | 11 | 25 | 1,660 | 116 | 33 | 21 | 19 |
| 6 | 74 | 69 | 36 | 31 | 18 | 11 | *28 | 1,080 | 100 | 28 | 20 | 18 |
| 7 | 63 | 76 | 35 | 30 | 18 | 10 | 35 | 682 | 88 | 23 | 85 | 17 |
| 8 | 116 | 80 | 34 | 30 | 17 | 10 | 42 | 500 | 76 | 20 | 46 | 16 |
| 9 | 533 | 71 | 33 | 29 | 17 | 9.9 | 50 | 425 | 67 | 18 | 37 | 14 |
| 10 | 485 | 78 | 32 | 28 | 17 | 9.7 | 66 | 344 | 68 | 15 | 28 | 12 |
| 11 | 384 | 72 | 31 | 28 | 17 | 9.6 | 160 | 294 | 78 | 15 | 22 | 12 |
| 12 | 288 | 65 | 31 | 27 | 16 | 9.5 | 398 | 254 | 74 | 15 | 20 | 12 |
| 13 | 227 | 56 | 31 | 27 | 16 | 9.5 | 663 | 227 | 66 | 13 | 21 | 11 |
| 14 | 184 | 52 | 31 | 27 | *16 | 9.5 | 840 | 208 | 62 | 13 | 13 | 10 |
| 15 | 164 | 48 | 31 | 27 | 16 | *9.5 | 1,160 | 188 | 68 | 20 | 12 | 10 |
| 16 | 344 | 47 | 31 | 27 | 16 | 9.5 | 1,160 | 176 | 63 | 52 | *11 | 9.9 |
| 17 | 358 | 46 | 30 | 26 | 15 | 9.5 | 1,050 | 168 | 59 | 50 | 10 | 9.9 |
| 18 | 271 | 46 | 29 | 26 | 15 | 9.5 | 793 | 156 | 69 | 77 | 11 | 9.4 |
| 19 | 227 | *46 | 28 | 26 | 15 | 9.5 | *751 | 152 | 72 | 66 | 19 | 9.4 |
| 20 | *198 | 46 | 26 | 25 | 15 | 9.5 | 782 | 274 | 61 | *50 | 28 | *9.2 |
| 21 | 164 | 46 | 26 | 25 | 15 | 9.5 | 804 | 600 | *54 | 146 | 21 | 9.7 |
| 22 | 184 | 46 | 26 | 25 | 14 | 9.6 | 836 | 627 | 57 | 78 | 16 | 13 |
| 23 | 212 | 45 | 27 | 24 | 14 | 9.6 | 869 | 516 | 55 | 43 | 14 | 13 |
| 24 | 198 | 44 | 28 | 24 | 14 | 9.7 | 2,250 | 425 | 51 | 30 | 15 | 22 |
| 25 | 168 | 43 | 29 | 24 | 13 | 9.8 | 2,260 | *351 | 44 | 105 | 34 | 25 |
| 26 | 156 | 42 | 32 | 24 | 13 | 9.9 | 1,440 | 271 | 38 | 100 | 109 | 20 |
| 27 | 152 | 41 | 33 | 23 | 13 | 10 | 1,040 | 266 | 35 | 62 | 92 | 17 |
| 28 | 116 | 41 | 38 | 23 | 12 | 10 | 815 | 237 | 36 | 45 | 73 | 16 |
| 29 | 108 | 41 | 38 | 22 | 12 | 11 | 741 | 260 | 95 | 36 | 61 | 15 |
| 30 | 116 | 41 | 37 | 22 | 12 | 12 | 722 | 332 | 92 | 69 | 48 | 15 |
| 31 | 139 | ----- | *37 | 22 | ----- | 13 | ----- | 277 | ----- | 64 | 39 | ----- |
| Total | 6,078 | 1,850 | 1,021 | 837 | 465 | 316.8 | 19,946 | 14,010 | 2,457 | 1,497 | 1,079 | 482.5 |
| Mean | 196 | 61.7 | 32.9 | 27.0 | 16.0 | 10.2 | 665 | 452 | 81.9 | 48.3 | 34.8 | 16.1 |
| Cfs/m | 1.40 | 0.441 | 0.235 | 0.193 | 0.114 | 0.073 | 4.75 | 3.23 | 0.585 | 0.345 | 0.249 | 0.115 |
| In. | 1.61 | 0.49 | 0.27 | 0.22 | 0.12 | 0.08 | 5.30 | 3.72 | 0.65 | 0.40 | 0.29 | 0.13 |
| Calendar year 1959: Max | 607 | | | Min | 6.7 | Mean | 105 | Cfs/m | 0.750 | In. | 10.14 | |
| Water year 1959-60: Max | 2,260 | | | Min | 9.2 | Mean | 137 | Cfs/m | 0.979 | In. | 13.28 | |

Peak discharge (base, 1,300 cfs).--Apr. 14 (7 p.m.) 1,340 cfs (4.29 ft); Apr. 24 (9 p.m.) 3,040 cfs (5.43 ft); May 5 (1:30 a.m.) 1,860 cfs (4.79 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 10 to Dec. 6, Dec. 11-20, Jan. 22 to Apr. 11.

155. Second Creek near Aurora, Minn.

Location.--Lat 47°31'25", long 92°11'35", in SW¹/₄ sec.12, T.58 N., R.15 W., on left bank 0.1 mile downstream from First Creek, 0.4 mile upstream from mouth, and 2.1 miles east of Aurora.

Drainage area.--26.3 sq mi.

Records available.--March 1955 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,410.36 ft above mean sea level, datum of 1929 (levels by Erie Mining Co.).

Average discharge.--5 years, 16.7 cfs.

Extremes.--Maximum discharge during year, 129 cfs Apr. 25 (gage height, 4.94 ft); maximum gage height, 4.96 ft Mar. 26 (backwater from ice); minimum daily discharge, 4.0 cfs Nov. 20-24; minimum gage height, 3.36 ft Nov. 20.
1955-60: Maximum discharge, 208 cfs Apr. 21, 1957; maximum gage height, 5.75 ft Mar. 28, 1957 (backwater from ice); minimum discharge, 1.9 cfs Aug. 3, 1956 (gage height, 3.18 ft).

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

Cooperation.--Two discharge measurements furnished by Oliver Iron Mining Division, United States Steel Corp.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 3.3 | 4.4 | 4.0 | 36 |
| 3.5 | 9.6 | 4.5 | 81 |
| 3.7 | 19 | 5.0 | 136 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 19 | 15 | 4.6 | 9.5 | 9.2 | 6.4 | 15 | 44 | 71 | 13 | 20 | 16 |
| 2 | 19 | 15 | 4.8 | 9.6 | 9.2 | 6.4 | 15 | 39 | 59 | 12 | 18 | 17 |
| 3 | 20 | 12 | 4.9 | *9.6 | 9.3 | 6.4 | 16 | 36 | 48 | 11 | 17 | 14 |
| 4 | 17 | 11 | 5.1 | 9.3 | 9.3 | 6.3 | 17 | 60 | 39 | 10 | 15 | 12 |
| 5 | 16 | 10 | 5.3 | 9.0 | 9.3 | 6.3 | 17 | 104 | 33 | 9.0 | 14 | 12 |
| 6 | 15 | 9.5 | 5.5 | 9.0 | 9.3 | 6.3 | 18 | 95 | 29 | 9.3 | 13 | 11 |
| 7 | 13 | 8.9 | 5.7 | 8.9 | 9.1 | 6.2 | 18 | 73 | 27 | 9.3 | 13 | 11 |
| 8 | 13 | 8.0 | 6.0 | 8.9 | 9.0 | 6.2 | 19 | 56 | 24 | 10 | 20 | 12 |
| 9 | 18 | 7.4 | 6.3 | 8.9 | 8.7 | 6.2 | *20 | 44 | 24 | 9.6 | 18 | 16 |
| 10 | 19 | 6.9 | 6.5 | 9.0 | 9.1 | *6.2 | 20 | 38 | 25 | 9.3 | 16 | 15 |
| 11 | 13 | 6.4 | 6.8 | 9.1 | 9.3 | 6.2 | 23 | 33 | 28 | 9.3 | 14 | 15 |
| 12 | 13 | 6.0 | 7.0 | 9.2 | 9.0 | 6.2 | 27 | 28 | 28 | 9.6 | 12 | 15 |
| 13 | 18 | 5.7 | 7.3 | 9.3 | 7.9 | 6.2 | 51 | 27 | 27 | 11 | 11 | 15 |
| 14 | 17 | 5.4 | 7.7 | 9.3 | 7.0 | 6.4 | 76 | 25 | 24 | 8.4 | 10 | 14 |
| 15 | 17 | 4.9 | 8.0 | 9.4 | *7.0 | 6.6 | 76 | 26 | 24 | 10 | 9.6 | 14 |
| 16 | 22 | 4.7 | 8.2 | 9.4 | 7.0 | 7.0 | 66 | 27 | 24 | 20 | 9.3 | 13 |
| 17 | 23 | 4.4 | 8.5 | 9.5 | 7.0 | 7.8 | 55 | 26 | 21 | 19 | 9.6 | 13 |
| 18 | 22 | 4.2 | 8.7 | 9.5 | 7.0 | *9.5 | 42 | 23 | 26 | 18 | 9.6 | 15 |
| 19 | 19 | 4.1 | 9.0 | 9.5 | 7.0 | 9.2 | 37 | a22 | 24 | 16 | 11 | 14 |
| 20 | 18 | *4.0 | 9.2 | 9.5 | *7.0 | 9.7 | 36 | a24 | 20 | 13 | 12 | 13 |
| 21 | 18 | 4.0 | 9.3 | 9.5 | 6.9 | 10 | 37 | a30 | 16 | 10 | 10 | 12 |
| 22 | 18 | 4.0 | 9.5 | 9.4 | 6.9 | 11 | *38 | a36 | 19 | 9.6 | 10 | 11 |
| 23 | 18 | 4.0 | 9.7 | 9.4 | 6.8 | 11 | 38 | a42 | 19 | 9.0 | *10 | 10 |
| 24 | 17 | 4.0 | 9.8 | 9.4 | 6.8 | 11 | 91 | a44 | 20 | 8.4 | 11 | 12 |
| 25 | *16 | 4.1 | 10 | 9.3 | 6.7 | 11 | 123 | a36 | *17 | 33 | 12 | 12 |
| 26 | 14 | 4.2 | 10 | 9.3 | 6.7 | 11 | 114 | a34 | 14 | 26 | 14 | *10 |
| 27 | 13 | 4.2 | 10 | 9.3 | 6.7 | 12 | 95 | a40 | 13 | *29 | 15 | 9.6 |
| 28 | 12 | 4.3 | 9.9 | 9.3 | 6.6 | 12 | 78 | a50 | 12 | 24 | 14 | 10 |
| 29 | 12 | 4.4 | 9.8 | 9.2 | 6.5 | 12 | 67 | *62 | 16 | 22 | 14 | 12 |
| 30 | 15 | 4.5 | 9.6 | 9.2 | ----- | 13 | 55 | 85 | 13 | 24 | 14 | 12 |
| 31 | 18 | ----- | 9.3 | 9.2 | ----- | 14 | ----- | 81 | ----- | 23 | 14 | ----- |
| Total | 522 | 193.2 | 242.0 | 287.9 | 227.3 | 264.7 | 1,400 | 1,410 | 784 | 454.8 | 410.1 | 387.6 |
| Mean | 16.8 | 6.44 | 7.81 | 9.29 | 7.64 | 8.54 | 46.7 | 45.5 | 26.1 | 14.7 | 13.2 | 12.9 |
| Cfs/m | 0.639 | 0.245 | 0.297 | 0.353 | 0.298 | 0.325 | 1.78 | 1.73 | 0.992 | 0.559 | 0.502 | 0.490 |
| In. | 0.74 | 0.27 | 0.34 | 0.41 | 0.32 | 0.37 | 1.98 | 1.99 | 1.11 | 0.64 | 0.58 | 0.55 |

Calendar year 1959: Max 66 Min 2.4 Mean 15.7 Cfs/m 0.597 In. 8.07
Water year 1959-60: Max 123 Min 4.0 Mean 18.4 Cfs/m 0.684 In. 9.30

Peak discharge (base, 60 cfs).--Apr. 15 (8 a.m.) 109 cfs (4.77 ft); Apr. 25 (1 a.m.) 128 cfs (4.94 ft); May 5 (2 p.m.) 105 cfs (4.74 ft); May 30 (1 p.m.) 88 cfs (4.57 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Partridge River near Aurora.

Note.--Stage-discharge relation affected by ice Nov. 4 to Dec. 9, Dec. 11-24, 26-30, Jan. 1-4, 6-27, Jan. 29 to Feb. 5, Feb. 7, 8, 10-12, Feb. 15 to Mar. 21, Mar. 23 to Apr. 9.

160. Partridge River near Aurora, Minn.

Location.--Lat 47°31'02", long 92°11'24", in SE1SW1 sec.12, T.58 N., R.15 W., on right bank at upstream side of highway bridge, 1,000 ft downstream from Second Creek, 2½ miles east of Aurora, and 2½ miles upstream from mouth.

Drainage area.--156 sq mi.

Records available.--August 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,402.30 ft above mean sea level, datum of 1929. Aug. 5, 1942, to Aug. 25, 1944, staff gage and Aug. 26, 1944, to July 1, 1956, water-stage recorder at site 45 ft downstream at same datum.

Average discharge.--18 years, 127 cfs (adjusted for storage and diversion).

Extremes.--Maximum discharge during year, 823 cfs Apr. 29 (gage height, 4.79 ft); minimum daily, 7.0 cfs Feb. 29 to Mar. 12; minimum gage height, 1.45 ft Mar. 23. 1942-60: Maximum discharge, 3,230 cfs May 10, 1950 (gage height, 7.86 ft); minimum, 3.1 cfs Sept. 22, 23, 1948 (gage height, 0.77 ft).

Remarks.--Records good except those for period of ice effect, which are poor. Flow regulated at times by storage in off-channel Partridge Reservoir, formerly known as White-water Lake. Reservoir formed from lake by levees around marsh areas and natural outlet. Available capacity, 20,000 acre-ft between elevations 1,410 ft (natural lake level) and 1,440 ft. Storage began Apr. 9, 1955. Storage in reservoir obtained from Colby Lake during periods of high flow; release from storage returned to Colby Lake to maintain lake elevation during diversion for iron-ore processing. Diversion began Feb. 7, 1956. Some seepage losses from reservoir bypass station.

Cooperation.--One discharge measurement furnished by Oliver Iron Mining Division, United States Steel Corp.

Revisions (water years).--WSP 974: 1942. WSP 1307: 1943(M).

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 23-30)

| | | | |
|-----|-----|-----|-----|
| 1.0 | 8.3 | 3.0 | 130 |
| 1.4 | 12 | 3.5 | 240 |
| 1.8 | 22 | 4.0 | 407 |
| 2.2 | 39 | 4.5 | 640 |
| 2.6 | 73 | 5.0 | 970 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|-------|-------|-------|-------|--------|-------|-------|------|-------|
| 1 | 58 | 78 | 25 | 16 | 8.4 | 7.0 | 10 | 815 | 433 | 40 | 46 | 28 |
| 2 | 60 | 75 | 25 | 15 | 8.4 | 7.0 | 11 | 542 | 416 | 40 | 40 | 28 |
| 3 | 58 | 69 | 24 | 15 | 8.3 | 7.0 | 13 | 407 | 380 | 38 | 32 | 27 |
| 4 | 58 | 65 | 23 | 15 | 8.3 | 7.0 | 14 | 468 | 328 | 36 | 32 | 24 |
| 5 | 54 | 63 | 23 | 14 | 8.2 | 7.0 | 15 | 590 | 263 | 35 | 35 | 24 |
| 6 | 51 | 62 | 22 | 14 | 8.1 | 7.0 | 16 | 682 | 200 | 35 | 35 | 23 |
| 7 | 49 | 59 | 22 | 14 | 8.1 | 7.0 | 18 | 756 | 185 | 33 | 44 | 23 |
| 8 | 50 | 55 | 21 | 14 | 8.0 | 7.0 | 22 | 742 | 152 | 32 | 41 | 24 |
| 9 | 58 | 52 | 21 | 14 | 7.8 | 7.0 | *29 | 664 | 135 | 30 | 43 | 24 |
| 10 | 56 | 49 | 21 | 14 | 7.7 | *7.0 | 31 | 556 | 125 | 28 | 40 | 22 |
| 11 | 58 | 46 | 20 | 14 | 7.7 | 7.0 | 37 | 450 | 124 | 28 | 34 | 23 |
| 12 | 55 | 43 | 20 | 14 | 7.7 | 7.0 | 43 | 357 | 111 | 26 | 36 | 22 |
| 13 | 55 | 40 | 20 | 14 | 7.6 | 7.1 | 79 | 284 | 100 | 25 | 34 | 22 |
| 14 | 56 | 38 | 20 | 13 | 7.6 | 7.1 | 106 | 237 | 95 | 22 | 28 | 21 |
| 15 | 58 | 36 | 19 | 13 | 7.6 | 7.1 | 116 | 203 | 89 | 24 | 29 | 21 |
| 16 | 66 | 35 | 19 | 13 | 7.6 | 7.1 | 104 | 190 | 85 | 38 | 29 | 20 |
| 17 | 69 | 33 | 19 | 12 | 7.6 | 7.1 | 86 | 165 | 80 | 35 | 29 | 20 |
| 18 | 71 | 32 | 19 | 12 | 7.6 | 7.1 | 73 | 146 | 86 | 33 | 29 | 21 |
| 19 | 73 | 31 | 19 | 12 | 7.5 | 7.1 | 76 | 133 | 79 | 31 | 30 | 20 |
| 20 | 74 | 31 | 18 | 11 | 7.5 | 7.1 | 52 | 154 | 72 | 36 | 29 | 18 |
| 21 | 78 | 30 | 18 | 11 | 7.5 | 7.1 | 64 | 190 | 85 | 43 | 27 | 17 |
| 22 | 78 | 31 | 18 | 10 | 7.5 | 7.1 | *79 | 229 | 68 | 35 | 26 | 16 |
| 23 | 79 | 31 | 18 | 10 | 7.5 | 7.1 | 81 | 249 | 65 | 39 | *25 | 14 |
| 24 | 75 | 31 | 18 | 9.7 | 7.4 | 7.1 | 130 | 254 | 60 | 36 | 25 | 16 |
| 25 | *76 | 30 | 17 | 9.5 | 7.3 | 7.2 | 208 | 229 | *54 | 63 | 26 | 16 |
| 26 | 76 | 29 | 17 | 9.2 | 7.2 | 7.3 | 257 | 193 | 48 | 48 | 27 | *14 |
| 27 | 75 | 28 | 17 | 9.0 | 7.1 | 7.4 | 403 | 186 | 44 | *55 | 27 | 14 |
| 28 | 74 | 27 | 17 | 8.8 | 7.1 | 7.7 | 736 | 193 | 41 | 48 | 26 | 14 |
| 29 | 75 | 26 | 17 | 8.6 | 7.0 | 8.1 | 809 | *256 | 44 | 40 | 25 | 15 |
| 30 | 74 | 26 | 17 | 8.5 | ----- | 8.5 | 724 | 303 | 40 | 49 | 25 | 16 |
| 31 | 79 | ----- | 16 | 8.4 | ----- | 8.1 | 403 | ----- | 44 | 44 | 24 | ----- |
| Total | 2,024 | 1,279 | 610 | 375.7 | 222.9 | 224.5 | 4,442 | 10,985 | 4,063 | 1,145 | 980 | 607 |
| Mean | 65.3 | 42.6 | 19.7 | 12.1 | 7.89 | 7.24 | 148 | 354 | 135 | 36.9 | 31.6 | 20.2 |
| (†) | +9.6 | +2.7 | -1.0 | -1.1 | -0.12 | -0.01 | +107 | +38.9 | +10.7 | +19.0 | +9.6 | -0.8 |

Adjusted for storage and diversion

| Mean | 74.9 | 45.3 | 18.7 | 11.0 | 7.57 | 7.23 | 255 | 393 | 148 | 55.9 | 41.2 | 19.4 |
|-------|-------|-------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|
| Cfs/m | 0.480 | 0.290 | 0.120 | 0.071 | 0.049 | 0.046 | 1.63 | 2.52 | 0.936 | 0.358 | 0.284 | 0.124 |
| In. | 0.55 | 0.32 | 0.14 | 0.08 | 0.05 | 0.05 | 1.82 | 2.90 | 1.04 | 0.41 | 0.30 | 0.14 |

Observed

Adjusted

| Calendar year 1959: | Max 451 | Min 8.0 | Mean 71.7 | Max 84.7 | Cfs/m 0.543 | In. 7.37 |
|---------------------|---------|---------|-----------|----------|-------------|----------|
| Water year 1959-60: | Max 809 | Min 7.0 | Mean 73.7 | Max 89.8 | Cfs/m 0.576 | In. 7.80 |

* Discharge measurement made on this day.

† Change in contents in Partridge Reservoir and diversion to iron-ore processing plant, equivalent in cubic feet per second; furnished by Erie Mining Co.

Note.--Stage-discharge relation affected by ice Nov. 10 to Apr. 8 (no gage-height record Feb. 24 to Mar. 9, Mar. 11-17; discharge estimated on basis of weather records and records for Second Creek near Aurora).

165. St. Louis River near Aurora, Minn.

Location.--Lat 47°29'30", long 92°14'20", in SW $\frac{1}{4}$ sec.22, T.58 N., R.15 W., on left bank at upstream side of highway bridge, three-quarters of a mile downstream from Partridge River and $\frac{1}{2}$ miles south of Aurora.

Drainage area.--312 sq mi.

Records available.--August 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,371.24 ft above mean sea level, datum of 1929. Prior to Aug. 26, 1944, chain gage at same site and datum.

Average discharge.--18 years, 244 cfs (adjusted for storage and diversion).

Extremes.--Maximum discharge during year, 1,340 cfs May 6 (gage height, 4.15 ft); minimum, 32 cfs Sept. 23, 27, 28; minimum gage height, 0.77 ft Sept. 23.

1942-60: Maximum discharge, 5,380 cfs May 14, 1950 (gage height, 8.37 ft); minimum, 4.0 cfs Oct. 2, 3, 1948 (gage height, 0.30 ft).

Remarks.--Records good except those for periods of ice effect, which are poor. Flow regulated at times by storage in off-channel Partridge Reservoir, formerly known as White-water Lake. Reservoir formed from lake by levees around marsh areas and natural outlet. Available capacity, 20,000 acre-ft between elevations 1,410 ft (natural lake level) and 1,440 ft. Storage began Apr. 9, 1955. Storage in reservoir obtained from Colby Lake during periods of high flow; release from storage returned to Colby Lake to maintain lake elevation during diversion for iron-ore processing. Diversion began Feb. 7, 1956. Some seepage losses from reservoir enter above station.

Cooperation.--Two discharge measurements furnished by Oliver Iron Mining Division, United States Steel Corp.

Revisions (water years).--WSP 1337: 1950.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.7 | 26 | 3.0 | 661 |
| 1.0 | 52 | 4.0 | 1,240 |
| 1.5 | 124 | 5.0 | 2,000 |
| 2.0 | 248 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 139 | 191 | 95 | 83 | 54 | 48 | 57 | 992 | 754 | 141 | 128 | 66 |
| 2 | 147 | 188 | 95 | 82 | *54 | 48 | 59 | 909 | 895 | 145 | 121 | 68 |
| 3 | 143 | 178 | 94 | 82 | 54 | 48 | 60 | 821 | 642 | 135 | 107 | 65 |
| 4 | 143 | 168 | 94 | 82 | 54 | 47 | 61 | 1,040 | 570 | 126 | 101 | 62 |
| 5 | 137 | 147 | 92 | 82 | 54 | 47 | 62 | 1,270 | 482 | 119 | 99 | 57 |
| 6 | 132 | 146 | 92 | 82 | 54 | 46 | 63 | 1,350 | 424 | 110 | 101 | 54 |
| 7 | 130 | 142 | 92 | 82 | 53 | 46 | 65 | 1,300 | 393 | 102 | 119 | 52 |
| 8 | 132 | 140 | 91 | 82 | 52 | 45 | 66 | 1,270 | 359 | 96 | 112 | 52 |
| 9 | 145 | 158 | 90 | 82 | 52 | 45 | *68 | 1,150 | 322 | 91 | 112 | 51 |
| 10 | 149 | 155 | 89 | 81 | 52 | 45 | 74 | 1,000 | 311 | 85 | 116 | 48 |
| 11 | 151 | 132 | 89 | 80 | 51 | 45 | 81 | 892 | 304 | 79 | 107 | 46 |
| 12 | 145 | 129 | 88 | 80 | 51 | 45 | 99 | 784 | 276 | 75 | 104 | 45 |
| 13 | 145 | 128 | 88 | 79 | 51 | 45 | 188 | 695 | 251 | 70 | 97 | 43 |
| 14 | 145 | 124 | 87 | 77 | 51 | 46 | 248 | 627 | 232 | 68 | 84 | 42 |
| 15 | 149 | 121 | 86 | 75 | 51 | 46 | 329 | 570 | 219 | 76 | 82 | 42 |
| 16 | 174 | 118 | 85 | 72 | 51 | 46 | 322 | 527 | 205 | 112 | 82 | 41 |
| 17 | 178 | 116 | 84 | 69 | 51 | 46 | 282 | 478 | 191 | 96 | 79 | 41 |
| 18 | 183 | 112 | 83 | 68 | 51 | 46 | 245 | 440 | 199 | 96 | 79 | 40 |
| 19 | 188 | 110 | 82 | 67 | 51 | 46 | 229 | 412 | 183 | 93 | 78 | 39 |
| 20 | 183 | 108 | 82 | 66 | 51 | 46 | 199 | 448 | 174 | 121 | 76 | 38 |
| 21 | 188 | 106 | 82 | 65 | 51 | 46 | 208 | 504 | 160 | 147 | 72 | 38 |
| 22 | 191 | 104 | 83 | 63 | 51 | 46 | *238 | 532 | 164 | 137 | *69 | 35 |
| 23 | 194 | 103 | 84 | 62 | 50 | 46 | 272 | 537 | 158 | 130 | 69 | 32 |
| 24 | 194 | 102 | 84 | 61 | 50 | 46 | 565 | 523 | *151 | 121 | 68 | 36 |
| 25 | *196 | 100 | 86 | 59 | 50 | 47 | 821 | 491 | 139 | 181 | 69 | 37 |
| 26 | 196 | 100 | 87 | 57 | 49 | 47 | 832 | 448 | 128 | 154 | 70 | 34 |
| 27 | 191 | 99 | 88 | 56 | 49 | 48 | 870 | 440 | 116 | *158 | 66 | 32 |
| 28 | 186 | 98 | 88 | 55 | 48 | *50 | 1,000 | 448 | 110 | 156 | 65 | 33 |
| 29 | 186 | 97 | 88 | 54 | 48 | 51 | 1,160 | 537 | 134 | 139 | 63 | *34 |
| 30 | 188 | 96 | 85 | 54 | ----- | 54 | 1,090 | *699 | 126 | 143 | 60 | 36 |
| 31 | 191 | ----- | 84 | 54 | ----- | 55 | ----- | 743 | ----- | 132 | 59 | ----- |
| Total | 5,139 | 3,774 | 2,717 | 2,193 | 1,469 | 1,458 | 10,013 | 22,837 | 8,552 | 3,632 | 2,714 | 1,359 |
| Mean | 166 | 126 | 87.6 | 70.7 | 51.3 | 47.0 | 334 | 757.0 | 285 | 117 | 87.5 | 44.6 |
| (+) | +9.6 | +2.7 | -1.0 | -1.1 | -0.1 | 0 | +107 | +38.9 | +10.7 | +19.0 | +9.6 | -0.8 |

Adjusted for storage and diversion

| Mean | 176 | 129 | 86.8 | 69.6 | 51.2 | 47.0 | 441 | 776 | 298 | 136 | 97.1 | 43.8 |
|---------------------|-------|-------|-------|-------|-------|----------|------|------|-------|-------|-------|-------|
| Cfsm | 0.564 | 0.413 | 0.278 | 0.223 | 0.164 | 0.151 | 1.41 | 2.49 | 0.949 | 0.436 | 0.311 | 0.140 |
| In. | 0.65 | 0.46 | 0.32 | 0.28 | 0.18 | 0.17 | 1.57 | 2.87 | 1.06 | 0.50 | 0.36 | 0.16 |
| Observed | | | | | | Adjusted | | | | | | |
| Calendar year 1959: | Max | 805 | Min | 26 | Mean | 168 | Mean | 181 | Cfsm | 0.580 | In. | 7.86 |
| Water year 1959-60: | Max | 1,530 | Min | 32 | Mean | 180 | Mean | 196 | Cfsm | 0.628 | In. | 8.56 |

* Discharge measurement made on this day.

† Change in contents in Partridge Reservoir and diversion to iron-ore processing plant, equivalent in cubic feet per second; furnished by Erie Mining Co.

Note.--Stage-discharge relation affected by ice Nov. 8-16, Nov. 18 to Apr. 11.

170. Embarrass River at Embarrass, Minn.

Location.--Lat 47°39'24", long 92°11'51", in NW¼ sec.25, T.60 N., R.15 W., on left bank at Embarrass, 30 ft upstream from highway bridge and 100 ft upstream from railroad bridge.

Drainage area.--93.8 sq mi.

Records available.--August 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,410.36 ft above mean sea level, datum of 1929. Prior to Aug. 28, 1944, chain gage at same site and datum.

Average discharge.--18 years, 68.3 cfs.

Extremes.--Maximum discharge during year, 376 cfs May 7 (gage height, 6.07 ft); minimum, 2.4 cfs Sept. 19; minimum gage height, 0.69 ft Mar. 26, 27, Sept. 19.
1942-60: Maximum discharge, 1,740 cfs May 8, 9, 1950; maximum gage height, 10.92 ft May 9, 1950; minimum daily discharge, 1.9 cfs Mar. 15-22, 1949; minimum gage height, 0.67 ft Mar. 20, 21, 1949.

Remarks.--Records good except those for periods of ice effect, which are fair.

Cooperation.--Two discharge measurements furnished by Oliver Iron Mining Division, United States Steel Corp.

Revisions (water years).--WSP 1307: 1947(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 29 to June 1)

| | | | | | |
|------|-----|-----|-----|-----|-----|
| 0.68 | 2.5 | 1.2 | 21 | 3.5 | 191 |
| .7 | 2.7 | 1.4 | 36 | 4.0 | 226 |
| .8 | 4.2 | 1.6 | 55 | 5.0 | 296 |
| .9 | 6.8 | 2.0 | 85 | 6.0 | 370 |
| 1.0 | 10 | 2.5 | 124 | 7.0 | 466 |
| 1.1 | 15 | 3.0 | 159 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|
| 1 | 43 | 48 | 11 | 9.3 | 6.2 | 4.5 | 6.7 | 311 | 261 | 16 | 21 | 3.8 |
| 2 | 40 | 42 | 11 | 9.1 | 6.2 | 4.5 | 7.5 | 284 | 265 | 16 | 16 | 4.0 |
| 3 | 45 | 41 | 10 | 9.0 | 6.0 | 4.5 | 8.2 | 253 | 247 | 16 | 14 | 4.2 |
| 4 | 41 | 36 | 10 | 8.8 | 6.0 | 4.5 | 9.6 | 267 | 219 | 14 | 12 | 4.0 |
| 5 | 36 | 34 | 10 | 8.8 | 6.0 | 4.2 | 10 | 294 | 187 | 13 | 10 | 3.6 |
| 6 | 34 | 32 | 10 | 8.8 | 6.2 | 4.5 | 12 | 335 | 155 | 11 | 8.1 | 3.6 |
| 7 | 32 | 29 | 10 | 8.8 | 6.2 | 4.2 | 18 | 371 | 124 | 10 | 11 | 3.4 |
| 8 | 30 | 28 | 10 | 8.8 | 6.2 | 4.2 | *18 | 366 | 98 | 9.2 | 18 | 3.1 |
| 9 | 46 | 26 | 10 | 8.8 | 6.2 | 4.2 | 12 | 334 | 80 | 8.1 | 16 | 2.7 |
| 10 | 61 | 24 | 10 | 8.9 | 6.2 | 4.2 | 10 | 294 | 79 | 7.1 | 12 | 2.6 |
| 11 | 61 | 22 | 9.8 | 8.9 | 6.2 | 4.2 | 12 | 250 | 95 | 6.8 | 10 | 2.7 |
| 12 | 61 | 21 | 9.8 | 8.9 | 6.2 | 4.2 | 18 | 214 | 88 | 6.2 | 8.4 | 2.7 |
| 13 | 59 | 20 | 9.7 | 8.9 | 6.2 | 4.2 | 55 | 188 | 75 | 5.8 | 7.1 | 2.8 |
| 14 | 55 | 18 | 9.7 | 8.9 | 6.2 | 4.2 | 120 | 164 | 64 | 5.0 | 5.8 | 2.8 |
| 15 | 55 | 16 | 9.7 | 8.8 | 6.2 | 4.2 | 163 | 145 | 58 | 5.2 | 5.2 | 2.8 |
| 16 | 74 | 15 | 9.6 | 8.6 | *5.8 | 4.2 | 169 | 131 | 50 | 14 | 4.5 | 2.8 |
| 17 | 89 | 15 | 9.6 | 8.5 | 5.5 | 4.2 | 161 | 119 | 46 | 22 | 4.2 | 2.8 |
| 18 | 81 | 14 | 9.5 | 8.2 | 5.5 | 4.2 | 146 | 103 | 45 | 26 | *4.2 | 2.8 |
| 19 | 73 | 14 | 9.3 | 8.0 | 5.5 | 4.2 | 129 | 92 | 47 | 29 | 4.2 | 2.8 |
| 20 | 67 | 13 | 9.2 | 7.8 | 5.5 | 4.2 | 118 | 99 | 40 | 25 | 4.5 | 2.5 |
| 21 | 61 | 13 | 9.1 | 7.8 | 5.5 | 4.2 | *119 | 166 | 34 | 21 | 4.5 | 2.6 |
| 22 | 59 | 13 | 8.9 | 7.8 | 5.5 | 4.2 | 120 | 197 | 36 | *19 | 4.0 | 2.6 |
| 23 | 65 | 13 | 8.7 | 7.4 | 5.2 | 4.2 | 122 | 194 | 36 | 16 | 3.6 | *2.7 |
| 24 | 68 | 14 | 8.8 | 7.1 | 5.2 | 4.2 | 135 | 178 | *35 | 14 | 3.6 | 2.8 |
| 25 | 63 | 14 | 8.9 | 6.8 | 5.2 | 4.2 | 270 | 162 | 30 | 19 | 4.0 | 2.9 |
| 26 | *59 | 13 | 9.2 | 6.5 | 5.0 | 4.2 | 304 | 144 | 26 | 31 | 5.2 | 2.9 |
| 27 | 55 | 12 | 9.4 | 6.2 | 4.8 | 5.8 | 336 | 141 | 24 | 26 | 5.2 | 2.8 |
| 28 | 50 | 12 | 9.5 | 6.2 | 4.8 | *5.2 | 350 | 141 | 20 | 19 | 5.2 | 2.9 |
| 29 | 47 | 12 | 9.6 | 6.2 | 4.5 | 5.5 | 347 | 174 | 19 | 17 | 5.0 | 3.0 |
| 30 | 50 | 11 | 9.6 | 6.0 | 5.7 | 5.7 | 333 | *212 | 17 | 22 | 4.2 | 3.4 |
| 31 | 51 | ----- | 9.5 | 6.2 | ----- | 6.1 | ----- | 241 | ----- | 26 | 4.0 | ----- |
| Total | 1,709 | 635 | 299.1 | 248.8 | 165.9 | 139.0 | 3,697.0 | 6,563 | 2,599 | 495.4 | 244.7 | 90.8 |
| Mean | 55.1 | 21.2 | 9.65 | 8.03 | 5.72 | 4.48 | 123 | 212 | 86.6 | 16.0 | 7.89 | 3.03 |
| Cfs/m | 0.587 | 0.226 | 0.103 | 0.086 | 0.061 | 0.048 | 1.31 | 2.26 | 0.923 | 0.171 | 0.084 | 0.032 |
| In. | 0.68 | 0.25 | 0.12 | 0.10 | 0.07 | 0.06 | 1.47 | 2.60 | 1.03 | 0.20 | 0.10 | 0.04 |

Calendar year 1959: Max 222 Min 2.8 Mean 42.4 Cfs/m 0.452 In. 6.13
Water year 1959-60: Max 371 Min 2.5 Mean 46.1 Cfs/m 0.491 In. 6.72

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 5, 6, Nov. 10 to Jan. 19, Mar. 22, 24, 25, Mar. 29 to Apr. 3.

180. Embarrass River near McKinley, Minn.

Location.--Lat 47°27'10", long 92°23'00", in NW¼ sec.4, T.57 N., R.16 W., on left bank 40 ft upstream from highway bridge, 0.9 mile downstream from outlet of Esquema Lake, and 4½ miles southeast of McKinley.

Drainage area.--171 sq mi.

Records available.--October 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,338.65 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 109 cfs.

Extremes.--Maximum discharge during year, 580 cfs May 5 (gage height, 8.42 ft); minimum, 14 cfs Oct. 8 (gage height, 2.75 ft).
1953-60: Maximum discharge, 1,690 cfs Apr. 20, 1954 (gage height, 11.72 ft); minimum, 11 cfs Sept. 7, 1955; minimum gage height, 2.66 ft June 26, 1959.

Remarks.--Records good except those for periods of ice effect, which are poor.

Cooperation.--One discharge measurement furnished by Oliver Iron Mining Division, United States Steel Corp.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 9-11)

Oct. 1 to Apr. 8

Apr. 9 to Sept. 30

| | | | |
|-----|-----|-----|-----|
| 2.7 | 13 | 3.1 | 30 |
| 3.0 | 24 | 3.5 | 60 |
| 3.5 | 54 | 4.0 | 103 |
| 4.0 | 95 | 6.0 | 308 |
| 6.0 | 308 | 9.0 | 672 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| 1 | 214 | 100 | 41 | 32 | 28 | 26 | a39 | 539 | 451 | 83 | 64 | 51 |
| 2 | 234 | 95 | 40 | a32 | 28 | 25 | a43 | 541 | 448 | 84 | 62 | 59 |
| 3 | 222 | 90 | 39 | 33 | 28 | 25 | a48 | 540 | 451 | 80 | 57 | 64 |
| 4 | 157 | 90 | 38 | 33 | 28 | 25 | a5C | 560 | 451 | 76 | 56 | 62 |
| 5 | 134 | 86 | 38 | 33 | 29 | 25 | a59 | 576 | 446 | 72 | 64 | 56 |
| 6 | 107 | 78 | 37 | 33 | 29 | 25 | a65 | 574 | 428 | 68 | 65 | 53 |
| 7 | 98 | 77 | 36 | 33 | 29 | 25 | a66 | 565 | 404 | 63 | 92 | 48 |
| 8 | 48 | 75 | 36 | 33 | 29 | 25 | a69 | 554 | 371 | 61 | 88 | 49 |
| 9 | 19 | 73 | 36 | 34 | 29 | 25 | *71 | 548 | 333 | 58 | 77 | 54 |
| 10 | 20 | 71 | 36 | 34 | 29 | 25 | 67 | 544 | 316 | 56 | 73 | 44 |
| 11 | 31 | 69 | 35 | 34 | 29 | 25 | 71 | 536 | 285 | 56 | 67 | 42 |
| 12 | 38 | 69 | 35 | 34 | *29 | 26 | 76 | 522 | 252 | 53 | 61 | 40 |
| 13 | 42 | 63 | 35 | 33 | 29 | 26 | 115 | 503 | 230 | 49 | 56 | 38 |
| 14 | 58 | 60 | 35 | 33 | 29 | 26 | 156 | 477 | 213 | 45 | 53 | 37 |
| 15 | 75 | 57 | 34 | 33 | 29 | 26 | 182 | 448 | 202 | 57 | 49 | 36 |
| 16 | 104 | 55 | 34 | 33 | 29 | 26 | 201 | 418 | 186 | 108 | 46 | 33 |
| 17 | 108 | 53 | 34 | 33 | 29 | 26 | 222 | 387 | 169 | 94 | 45 | 34 |
| 18 | 110 | 52 | 33 | 33 | 29 | 26 | 236 | 356 | 167 | 84 | 47 | 33 |
| 19 | 111 | 51 | 33 | 32 | 29 | 26 | 251 | 331 | 158 | 72 | *49 | 32 |
| 20 | 116 | 50 | 32 | 32 | 28 | 26 | 265 | 320 | 146 | 64 | 46 | 32 |
| 21 | 116 | 50 | 32 | 32 | 28 | 26 | 275 | 327 | 136 | 58 | 45 | 32 |
| 22 | 121 | 48 | 32 | 32 | 28 | 26 | 284 | 321 | 137 | 57 | 45 | 32 |
| 23 | 127 | 49 | 32 | 31 | 28 | 26 | 293 | 316 | 137 | 56 | 42 | 30 |
| 24 | 127 | 49 | 32 | 31 | 27 | 27 | 341 | 315 | 132 | 53 | 40 | 32 |
| 25 | 120 | 49 | 32 | 31 | 27 | 28 | 402 | 312 | *122 | 91 | 44 | 32 |
| 26 | *118 | 48 | 33 | 30 | 27 | 29 | 437 | 191 | 114 | 87 | 46 | 31 |
| 27 | 113 | 46 | 33 | 30 | 26 | 30 | *468 | 230 | 108 | *75 | 45 | 31 |
| 28 | 109 | 46 | 34 | 29 | 26 | 31 | 493 | 314 | 105 | 70 | 45 | 32 |
| 29 | 108 | 45 | 34 | 28 | 26 | 33 | 514 | 382 | 101 | 69 | 41 | *35 |
| 30 | 108 | 43 | 34 | 28 | 26 | 34 | 529 | *454 | 93 | 72 | 41 | 32 |
| 31 | 104 | 33 | 33 | 28 | 26 | a36 | 458 | 458 | 66 | 40 | 40 | 32 |
| Total | 3,307 | 1,887 | 1,078 | 990 | 818 | 636 | 6,393 | 13,457 | 7,292 | 2,137 | 1,691 | 1,214 |
| Mean | 107 | 62.9 | 34.8 | 31.9 | 28.2 | 27.0 | 213 | 434 | 243 | 68.9 | 54.5 | 40.5 |
| Cfsm | 0.626 | 0.368 | 0.204 | 0.187 | 0.165 | 0.158 | 1.25 | 2.54 | 1.42 | 0.403 | 0.319 | 0.237 |
| In. | 0.72 | 0.41 | 0.23 | 0.22 | 0.18 | 0.18 | 1.39 | 2.93 | 1.59 | 0.46 | C.37 | 0.26 |

Calendar year 1959: Max 352 Min 13 Mean 89.8 Cfsm 0.525 In. 7.11
Water year 1959-60: Max 576 Min 19 Mean 112 Cfsm 0.655 In. 8.94

Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Stony River near Isabella.

Note.--Stage-discharge relation affected by ice Nov. 16-18, 25, Dec. 6-8, 19-30, Jan. 3-12, Jan. 15 to Mar. 30.

190. West Two River near Iron Junction, Minn.

Location.--Lat 47°24'05", long 92°42'10", in SW¹/₄SW¹/₄ sec.24, T.57 N., R.19 W., on right bank 40 ft upstream from bridge on State Highway 216, 5 miles southwest of Iron Junction, and 9¹/₂ miles upstream from St. Louis River.

Drainage area.--68.4 sq mi.

Records available.--October 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,322.05 ft above mean sea level, datum of 1929 (Minnesota Highway Department bench mark).

Average discharge.--7 years, 45.0 cfs.

Extremes.--Maximum discharge during year, 532 cfs Apr. 15 (gage height, 8.01 ft); minimum, 4.8 cfs July 14 (gage height, 2.35 ft).

1953-60: Maximum discharge, 916 cfs Apr. 17, 1954 (gage height, 9.85 ft); minimum daily, 3.0 cfs Jan. 22 to Feb. 6, 1957; minimum gage height, that of July 14, 1960.

Remarks.--Records good except those for period of ice effect, which are poor.

Cooperation.--One discharge measurement furnished by Oliver Iron Mining Division, United States Steel Corp.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 2.3 | 3.7 | 4.0 | 110 |
| 2.4 | 6.0 | 6.0 | 275 |
| 2.6 | 18 | 8.0 | 530 |
| 3.0 | 42 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|-----------|-------------|----------|-------|-------|-------|-------|
| 1 | 30 | 27 | 16 | 12 | 7.7 | 7.0 | 8.0 | 114 | 387 | 15 | 20 | 19 |
| 2 | 28 | 26 | 15 | 12 | 7.8 | 7.0 | 8.8 | 88 | 259 | 14 | 18 | 51 |
| 3 | 27 | 23 | 15 | 12 | 7.5 | 7.0 | 10 | 73 | 168 | 12 | 16 | 86 |
| 4 | 26 | 23 | 15 | 12 | 7.4 | 7.0 | 11 | 161 | 114 | 8.2 | 15 | 88 |
| 5 | 24 | 23 | 15 | 12 | 7.2 | 7.0 | 13 | 262 | 80 | 7.3 | 13 | 46 |
| 6 | 22 | 22 | 15 | 12 | 7.0 | 7.0 | 16 | 309 | 60 | 6.9 | 13 | 36 |
| 7 | 21 | 22 | 15 | 11 | 6.9 | 7.0 | 20 | 236 | 49 | 6.4 | 15 | 31 |
| 8 | 21 | 21 | 15 | 11 | 6.9 | 7.0 | 28 | 156 | 34 | 6.0 | 21 | 27 |
| 9 | *30 | 20 | 15 | 11 | 6.9 | 7.0 | 33 | 106 | 35 | 6.0 | 22 | 24 |
| 10 | 39 | 20 | 14 | 11 | 7.0 | 7.0 | 40 | 79 | 39 | 6.0 | 19 | 21 |
| 11 | 46 | 19 | 14 | 10 | 7.0 | 7.0 | *64 | 61 | 46 | 6.0 | 17 | 20 |
| 12 | 46 | 18 | 14 | 10 | 7.0 | 7.0 | 100 | 50 | 42 | 5.8 | 15 | 19 |
| 13 | 42 | 18 | 14 | 10 | 7.0 | 7.1 | 210 | 42 | 33 | 5.3 | 13 | 18 |
| 14 | 39 | 17 | 14 | 10 | 7.0 | 7.1 | *357 | 35 | 28 | 5.1 | 12 | 16 |
| 15 | 38 | 17 | 14 | 9.7 | 7.0 | 7.1 | 514 | 31 | 25 | 5.3 | 10 | 15 |
| 16 | 60 | 17 | 14 | 9.5 | 7.0 | 7.1 | 482 | 28 | 22 | 22 | 9.9 | 14 |
| 17 | 80 | 16 | 14 | 9.4 | 7.0 | 7.1 | 318 | 26 | 19 | 37 | 9.4 | 14 |
| 18 | 79 | 16 | 14 | 9.2 | 7.0 | 7.1 | 213 | 24 | 19 | 34 | 13 | 13 |
| 19 | 65 | 16 | 14 | 9.1 | 7.0 | 7.1 | 143 | 23 | 19 | 28 | 15 | 13 |
| 20 | 54 | 16 | 13 | 8.9 | 7.0 | 7.1 | 119 | 29 | 18 | 26 | 16 | *13 |
| 21 | 45 | 16 | 13 | 8.8 | 7.0 | 7.1 | 118 | 50 | 16 | 21 | 16 | 12 |
| 22 | 43 | 16 | 13 | 8.7 | 7.0 | 7.1 | 114 | 59 | 18 | 18 | 13 | 11 |
| 23 | 45 | 16 | 13 | 8.5 | *7.0 | 7.1 | 108 | 51 | 23 | 15 | 12 | 11 |
| 24 | 46 | 17 | 13 | 8.3 | 7.0 | 7.1 | 235 | 39 | 46 | 13 | *15 | 12 |
| 25 | 42 | 17 | 13 | 8.2 | 7.0 | 7.1 | 404 | 30 | 45 | 36 | 15 | 12 |
| 26 | 37 | 16 | 13 | 8.0 | 7.0 | 7.1 | 497 | 27 | 34 | 67 | 18 | 12 |
| 27 | 34 | 16 | 13 | 8.0 | 7.0 | 7.1 | *408 | 35 | 28 | *35 | 18 | 12 |
| 28 | 32 | 16 | 13 | 8.0 | 7.0 | 7.2 | 288 | 41 | *24 | 41 | 17 | 12 |
| 29 | 30 | 16 | 13 | 7.9 | 7.0 | 7.3 | 197 | 114 | 21 | 31 | 15 | 12 |
| 30 | 29 | 16 | 13 | 7.9 | 7.0 | 7.5 | 151 | 293 | 18 | 27 | 14 | 11 |
| 31 | 28 | ----- | 13 | 7.2 | ----- | 7.7 | ----- | *367 | ----- | 23 | 14 | ----- |
| Total | 1,228 | 559 | 432 | 301.9 | 205.1 | 220.2 | 5,199.8 | 3,039 | 1,779 | 617.3 | 467.3 | 681 |
| Mean | 39.6 | 18.6 | 13.9 | 9.74 | 7.07 | 7.10 | 173 | 98.0 | 59.3 | 19.9 | 15.1 | 22.7 |
| Cfs/m | 0.579 | 0.272 | 0.203 | 0.142 | 0.103 | 0.104 | 2.53 | 1.43 | 0.887 | 0.291 | 0.221 | 0.332 |
| In. | 0.67 | 0.30 | 0.23 | 0.16 | 0.11 | 0.12 | 2.83 | 1.65 | 0.97 | 0.34 | 0.25 | 0.37 |
| Calendar year 1959: Max | 374 | | | | Min 7.2 | Mean 41.7 | Cfs/m 0.610 | In. 8.27 | | | | |
| Water year 1959-60: Max | 514 | | | | Min 5.1 | Mean 40.2 | Cfs/m 0.588 | In. 8.00 | | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 5 to Apr. 13.

195. East Swan River near Toivola, Minn.

Location.--Lat 47°16'55", long 92°50'05", in NE¼NE¼ sec.2, T.55 N., R.20 W., on left bank 350 ft downstream from bridge on St. Louis County Road 442, 4.8 miles upstream from confluence with West Swan River, 8 miles northwest of Toivola, and 8½ miles upstream from St. Louis River.

Drainage area.--112 sq mi.

Records available.--September 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,260.46 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 89.8 cfs.

Extremes.--Maximum discharge during year, 949 cfs May 30 (gage height, 14.11 ft); minimum daily, 22 cfs Feb. 5 to Mar. 25; minimum gage height, 3.41 ft July 15, 24.

1953-60: Maximum discharge, 1,690 cfs Apr. 15, 1956 (gage height, 17.94 ft); maximum gage height, 18.45 ft Apr. 12, 1954 (backwater from ice); minimum daily discharge, 13 cfs Jan. 28 to Feb. 3, 1955; minimum gage height, 3.24 ft Nov. 10, 1954.

Flood in May 1950 reached a stage of about 20.0 ft, from information by local residents.

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

Cooperation.--One discharge measurement furnished by Oliver Iron Mining Division, United States Steel Corp.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 22-30)

| Oct. 1 to Apr. 14, June 6 to Sept. 30 | | | | Apr. 15 to June 5 | | | |
|--|----|-----|-----|-------------------|-----|------|-----|
| 3.4 | 24 | 5.0 | 88 | 4.9 | 76 | 8.0 | 320 |
| 3.5 | 27 | 6.0 | 145 | 5.1 | 86 | 10.0 | 482 |
| 3.7 | 32 | 8.0 | 284 | 5.5 | 108 | 14.0 | 935 |
| 4.0 | 43 | | | 6.0 | 141 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 72 | 76 | 40 | 32 | 23 | 22 | 30 | 240 | *591 | 58 | 34 | 39 |
| 2 | 67 | 70 | 40 | 32 | 23 | 22 | 33 | 202 | 440 | 70 | 32 | 124 |
| 3 | 74 | 66 | 40 | 31 | 23 | 22 | 36 | 178 | 336 | 68 | 30 | 138 |
| 4 | 70 | 64 | 40 | 31 | 23 | 22 | 40 | 401 | 261 | 57 | 30 | 144 |
| 5 | 63 | 62 | 39 | 30 | 22 | 22 | 45 | 637 | 206 | 49 | 31 | 96 |
| 6 | 59 | 60 | 38 | 30 | 22 | 22 | 52 | 533 | 162 | 45 | 31 | 76 |
| 7 | 57 | 58 | 38 | 29 | 22 | 22 | 61 | 381 | 156 | 42 | 62 | 62 |
| 8 | 56 | 56 | 38 | 28 | 22 | 22 | 75 | 283 | 120 | 39 | 125 | 53 |
| 9 | *88 | 54 | 38 | 27 | 22 | 22 | 95 | 218 | 100 | 36 | 157 | 49 |
| 10 | 116 | 52 | 37 | 27 | 22 | 22 | *132 | 181 | 102 | 34 | 104 | 46 |
| 11 | 129 | 50 | 37 | 27 | 22 | 22 | 170 | 150 | 140 | 33 | 73 | 41 |
| 12 | 121 | 48 | 37 | 27 | 22 | 22 | 250 | 130 | 130 | 31 | 56 | 40 |
| 13 | 104 | 46 | 37 | 27 | 22 | 22 | 370 | 117 | 110 | 30 | 46 | 40 |
| 14 | 92 | 45 | 37 | 27 | 22 | 22 | *690 | 107 | 90 | 27 | 38 | 38 |
| 15 | 90 | 44 | 37 | 26 | 22 | 22 | 840 | 101 | 77 | 25 | 34 | 36 |
| 16 | 138 | 43 | 37 | 26 | 22 | 22 | 604 | 90 | 70 | 45 | 33 | 36 |
| 17 | 169 | 41 | 37 | 26 | *22 | 22 | 478 | 84 | 63 | 55 | 32 | 35 |
| 18 | 152 | 41 | 36 | 25 | 22 | 22 | 302 | 78 | 58 | 42 | 35 | 37 |
| 19 | 125 | 41 | 36 | 25 | 22 | 22 | 217 | 79 | 54 | 36 | 39 | 38 |
| 20 | 106 | 41 | 36 | 25 | 22 | 22 | 201 | 97 | 50 | 32 | 40 | 38 |
| 21 | 92 | 41 | 35 | 24 | 22 | 22 | 212 | 188 | 55 | 30 | 39 | 34 |
| 22 | 93 | 42 | 34 | 24 | 22 | 22 | 211 | 193 | 150 | 28 | 37 | 35 |
| 23 | 116 | 42 | 34 | 24 | 22 | 22 | 202 | 151 | 295 | 26 | 34 | 35 |
| 24 | 113 | 42 | 33 | 23 | 22 | 22 | 449 | 115 | 315 | 26 | 32 | 35 |
| 25 | 102 | 42 | 33 | 23 | 22 | 22 | *604 | 97 | 280 | 48 | *37 | 43 |
| 26 | 91 | 41 | 33 | 23 | 22 | 23 | 713 | 87 | 200 | 75 | 39 | 41 |
| 27 | 88 | 40 | 33 | 23 | 22 | 23 | 543 | 161 | 150 | *58 | 36 | 36 |
| 28 | 76 | 40 | 33 | 23 | 22 | 24 | 451 | 178 | 115 | 49 | 34 | *33 |
| 29 | 72 | 40 | 33 | 23 | 22 | 25 | 359 | 366 | *76 | 41 | 34 | 34 |
| 30 | 73 | 40 | 33 | 23 | ----- | 26 | 288 | 871 | 64 | 41 | 32 | 35 |
| 31 | 78 | ----- | 33 | 23 | ----- | 28 | ----- | 860 | ----- | 37 | 31 | ----- |
| Total | 2,942 | 1,468 | 1,122 | 814 | 642 | 699 | 8,953 | 7,554 | 5,016 | 1,313 | 1,447 | 1,627 |
| Mean | 94.9 | 48.9 | 36.2 | 26.3 | 22.1 | 22.5 | 298 | 244 | 167 | 42.4 | 46.7 | 54.2 |
| Cfsm | 0.847 | 0.437 | 0.323 | 0.235 | 0.197 | 0.201 | 2.66 | 2.18 | 1.49 | 0.379 | 0.417 | 0.484 |
| In. | 0.88 | 0.49 | 0.37 | 0.27 | 0.21 | 0.23 | 2.97 | 2.51 | 1.67 | 0.44 | 0.48 | 0.54 |

Calendar year 1959: Max 783 Min 18 Mean 87.3 Cfsm 0.779 In. 10.59
Water year 1959-60: Max 871 Min 22 Mean 91.8 Cfsm 0.820 In. 11.16

Peak discharge (base, 400 cfs).--Apr. 15 (7 a.m.) 910 cfs (13.81 ft); Apr. 25 (6 p.m.) 857 cfs (15.40 ft); May 5 (4:30 p.m.) 669 cfs (11.81 ft); May 30 (11 p.m.) 949 cfs (14.11 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 6 to Apr. 15. No gage-height record June 8-28; discharge estimated on basis of weather records and records for Swan River near Toivola and West Two River near Iron Junction.

200. Swan River near Toivola, Minn.

Location.--Lat 47°15'02", long 92°48'36", in NE¹/₄ sec. 13, T. 55 N., R. 20 W., on left bank at upstream side of bridge on St. Louis County Highway 5, 0.4 mile downstream from confluence of East Swan and West Swan Rivers, 3½ miles upstream from mouth, and 5¼ miles north of Toivola.

Drainage area.--254 sq mi.

Records available.--October 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,251.78 ft above mean sea level, datum of 1929.

Average discharge.--8 years, 175 cfs.

Extremes.--Maximum discharge during year, 1,610 cfs May 30 (gage height, 11.81 ft); minimum daily, 32 cfs Feb. 10-25.

1952-60: Maximum discharge, 2,980 cfs Apr. 13, 1954 (gage height, 17.17 ft, back-water from ice); minimum, 20 cfs Nov. 13, 1952, Jan. 5 to Feb. 5, 1957; minimum gage height, 2.33 ft July 26, 1954.

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.--One discharge measurement furnished by Oliver Iron Mining Division, United States Steel Corp.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 2.4 | 27 | 6.0 | 440 |
| 2.6 | 40 | 9.0 | 985 |
| 3.0 | 71 | 12.0 | 1,650 |
| 4.0 | 180 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 113 | 154 | 62 | 49 | 34 | 33 | 50 | 533 | *1,260 | 90 | 47 | 54 |
| 2 | 110 | 125 | 62 | 48 | 34 | 33 | 54 | 443 | 1,020 | 100 | 45 | 143 |
| 3 | 114 | 116 | 62 | 47 | 34 | 33 | b62 | 390 | 828 | 100 | 44 | 248 |
| 4 | 111 | 114 | 60 | 46 | 34 | 33 | b72 | 755 | 572 | 89 | 45 | 192 |
| 5 | 110 | 110 | 60 | 45 | 34 | 33 | b84 | 1,110 | 426 | 75 | 46 | 130 |
| 6 | 111 | 105 | 60 | 44 | 33 | 33 | b100 | 1,040 | 345 | 67 | 48 | 103 |
| 7 | 111 | 100 | 58 | 44 | 33 | 33 | b120 | 843 | 293 | 63 | 63 | 87 |
| 8 | 111 | 95 | 58 | 42 | 33 | 33 | b160 | 697 | 252 | 59 | 186 | 72 |
| 9 | *126 | 90 | 58 | 42 | 33 | 33 | b230 | 540 | 216 | 54 | 233 | 62 |
| 10 | 175 | 87 | 56 | 41 | 32 | 33 | *b320 | 422 | 222 | 55 | 167 | 58 |
| 11 | 196 | 83 | 56 | 40 | 32 | 33 | b302 | 361 | 313 | 53 | 113 | 53 |
| 12 | 194 | 80 | 56 | 40 | 32 | 33 | 280 | 517 | 283 | 52 | 86 | 50 |
| 13 | 178 | 76 | 56 | 40 | 32 | 33 | b443 | 278 | 229 | 45 | 67 | 50 |
| 14 | 156 | 74 | 56 | 39 | 32 | 33 | *b945 | 252 | 188 | 40 | 55 | 48 |
| 15 | 149 | 71 | 56 | 39 | 32 | 33 | b1,220 | 233 | 162 | 37 | 49 | 47 |
| 16 | 206 | 69 | 56 | 39 | 32 | 33 | 979 | 214 | 140 | 65 | 45 | 47 |
| 17 | 271 | 66 | 56 | 38 | *b32 | 33 | 817 | 197 | 125 | 80 | 43 | 44 |
| 18 | 256 | 65 | 55 | 38 | 32 | 33 | 627 | 184 | 117 | 65 | 44 | 46 |
| 19 | 216 | 64 | 55 | 37 | 32 | 33 | 484 | 178 | 107 | 54 | 51 | 47 |
| 20 | 187 | 63 | 54 | 36 | 32 | 33 | 408 | 206 | 100 | 47 | 53 | 48 |
| 21 | 163 | 63 | 53 | 36 | 32 | 33 | 412 | 352 | 95 | 42 | 51 | 44 |
| 22 | 158 | 64 | 52 | 36 | 32 | 33 | 413 | 391 | 92 | 40 | 43 | 45 |
| 23 | 190 | 65 | 51 | 35 | 32 | 33 | 406 | 352 | 157 | 38 | 41 | 46 |
| 24 | 192 | 65 | 51 | 35 | 32 | 34 | 832 | 295 | 458 | 45 | 40 | 46 |
| 25 | 178 | 65 | 51 | 35 | 32 | 34 | 1,340 | 230 | 476 | 85 | *47 | 52 |
| 26 | 158 | 63 | 51 | 35 | 33 | 35 | 1,340 | 214 | 391 | 100 | 49 | 55 |
| 27 | 145 | 62 | 50 | 35 | 33 | 37 | *1,160 | 317 | 284 | *83 | 50 | 50 |
| 28 | 132 | 62 | 50 | 35 | 33 | 38 | 1,020 | 334 | 222 | 70 | 45 | *45 |
| 29 | 124 | 62 | 49 | 35 | 33 | 40 | 828 | 668 | *185 | 60 | 43 | 44 |
| 30 | 125 | 62 | 49 | 34 | ----- | 43 | 660 | 1,540 | 125 | 55 | 40 | 45 |
| 31 | 136 | ----- | 49 | 34 | ----- | 46 | ----- | 1,540 | ----- | 52 | 39 | ----- |
| Total | 4,900 | 2,420 | 1,708 | 1,219 | 946 | 1,066 | 16,188 | 15,426 | 9,683 | 1,960 | 2,018 | 2,101 |
| Mean | 158 | 80.7 | 55.1 | 39.3 | 32.6 | 34.4 | 539 | 498 | 323 | 63.2 | 65.1 | 70.0 |
| Cfs | 0.622 | 0.318 | 0.217 | 0.155 | 0.128 | 0.135 | 2.12 | 1.96 | 1.27 | 0.249 | 0.256 | 0.276 |
| In. | 0.72 | 0.35 | 0.25 | 0.18 | 0.14 | 0.16 | 2.37 | 2.26 | 1.42 | 0.29 | 0.30 | 0.31 |

Calendar year 1959: Max 1,400 Min 30 Mean 159 Cfsm 0.626 In. 8.51
Water year 1959-60: Max 1,540 Min 32 Mean 163 Cfsm 0.642 In. 8.75

Peak discharge (base, 900 cfs).--Apr. 15 (1 p.m.) 1,290 cfs (10.40 ft); Apr. 26 (12:30 a.m.) 1,420 cfs (11.00 ft); May 5 (7 p.m.) 1,140 cfs (9.75 ft); May 30 (11:30 p.m.) 1,610 cfs (11.81 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Nov. 5-19, Nov. 21 to Feb. 16, Feb. 18 to Apr. 2, June 16-22, June 30 to July 26, July 28 to Aug. 6, Aug. 16, 17, 23, 24, 28-30, Sept. 1, 5-8; discharge estimated on basis of weather records and records for East Swan River near Toivola or West Two River near Iron Junction.

240. St. Louis River at Scanlon, Minn.

Location.--Lat 46°42'12", long 92°25'07", in NW $\frac{1}{4}$ sec.30, T.49 N., R.16 W., on right bank 25 ft downstream from lower bridge on U. S. Highway 61 at Scanlon, 0.6 mile downstream from Minnesota Power & Light Co. powerplant, 3 miles upstream from Thomson Reservoir, and 3.2 miles upstream from Midway River.

Drainage area.--3,430 sq mi, approximately.

Records available.--January 1908 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "near Thomson" 1908-50.

Gage.--Water-stage recorder. Datum of gage is 1,101.23 ft above mean sea level, datum of 1929. Oct. 5, 1909, to Sept. 5, 1914, chain gage 3 miles downstream and 50 ft below powerplant at datum about 420 ft lower. Sept. 6, 1914, to Aug. 4, 1953, powerplant record at Thomson hydroelectric plant.

Average discharge.--52 years, 2,202 cfs (unadjusted).

Extremes.--Maximum discharge during year, 16,500 cfs Apr. 26 (gage height, 9.41 ft); minimum, 439 cfs Sept. 28 (gage height, 2.38 ft).

1908-60: Maximum daily discharge, 37,900 cfs May 9, 1950; maximum gage height, 15.8 ft May 9, 1950, from Minnesota Highway Department (discharge uncertain); minimum daily discharge, 109 cfs Feb. 7, 1924.

Remarks.--Records good. Diurnal fluctuation caused by powerplant upstream. Flow regulated by Whiteface Reservoir and Boulder, Island, Rice and Fish Lakes (combined capacity, 332,160 acre-ft).

Revisions (water years).--WSP 1337: 1911-12.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 2.7 | 670 | 5.0 | 3,850 |
| 3.0 | 940 | 6.0 | 5,940 |
| 3.5 | 1,500 | 8.0 | 11,800 |
| 4.0 | 2,220 | 10.0 | 18,600 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|--------|--------|
| 1 | 1,450 | 1,560 | 850 | 1,170 | 1,180 | 1,140 | 1,900 | 8,410 | *10,800 | 1,390 | 791 | 1,000 |
| 2 | 1,380 | 1,570 | 890 | 1,280 | 1,210 | 1,180 | 1,520 | 7,050 | 9,370 | 1,280 | 809 | 1,090 |
| 3 | 1,410 | 1,520 | 1,000 | 1,360 | 1,170 | 1,170 | 1,230 | 6,290 | 8,320 | 1,410 | 782 | 2,880 |
| 4 | 1,440 | 1,360 | 1,380 | 1,200 | 1,120 | 1,140 | 1,250 | 10,200 | 7,130 | 1,620 | 902 | 2,350 |
| 5 | 1,500 | 1,330 | 1,350 | 1,050 | 1,230 | 1,100 | 1,290 | 15,000 | 5,890 | 1,520 | 990 | 1,820 |
| 6 | 1,340 | 1,120 | 1,400 | 1,080 | 1,200 | 1,080 | 1,480 | 14,400 | 4,950 | 1,480 | 970 | 1,390 |
| 7 | 1,270 | 930 | 1,480 | 1,210 | 1,140 | 1,110 | 1,780 | 12,500 | 4,010 | 1,450 | 990 | 1,180 |
| 8 | 1,280 | 960 | 1,570 | 1,330 | *1,100 | 1,100 | 1,880 | 10,800 | 3,390 | 1,450 | 1,090 | 950 |
| 9 | 1,380 | 1,060 | 1,560 | 1,190 | 1,100 | 1,080 | 1,740 | 9,160 | 3,190 | 1,410 | 1,410 | 883 |
| 10 | 1,410 | 1,290 | 1,550 | 1,290 | 1,130 | 1,110 | 1,610 | 7,630 | 2,830 | 1,290 | 1,290 | 730 |
| 11 | 1,650 | 1,300 | 1,550 | 1,390 | 1,120 | 1,140 | 1,470 | 6,520 | 2,750 | 1,230 | 1,100 | 704 |
| 12 | 1,670 | 930 | 1,560 | 1,410 | 1,020 | 1,120 | 1,380 | 5,590 | 2,820 | 1,280 | 960 | 738 |
| 13 | 1,610 | 940 | 1,560 | 1,420 | 1,040 | 1,210 | 1,780 | 4,930 | 2,560 | 1,210 | 827 | 864 |
| 14 | 1,550 | 850 | 1,560 | 1,330 | 1,060 | 1,160 | 4,710 | 4,550 | 2,250 | 1,140 | 678 | 764 |
| 15 | 1,410 | 770 | 1,560 | 1,350 | 1,060 | *1,120 | *5,860 | 3,990 | 2,040 | 1,140 | 874 | 902 |
| 16 | 1,410 | 810 | 1,560 | 1,280 | 1,100 | 1,130 | 5,920 | 3,700 | 1,760 | 1,330 | 1,100 | 809 |
| 17 | 1,710 | *770 | 1,560 | 1,290 | 1,130 | 1,190 | 4,850 | 3,390 | 1,620 | 1,410 | 1,050 | 818 |
| 18 | 2,080 | 760 | 1,600 | 1,280 | 1,160 | 1,200 | 4,260 | 3,120 | 1,650 | 1,840 | 1,070 | 800 |
| 19 | *1,980 | 840 | 1,550 | 1,350 | 1,080 | 1,190 | 3,650 | 2,960 | 1,710 | 1,620 | 1,090 | 791 |
| 20 | 1,840 | 940 | 1,470 | 1,290 | 1,030 | 1,220 | 3,270 | 3,240 | 1,670 | 1,350 | 1,040 | 791 |
| 21 | 1,670 | 900 | 1,480 | 1,210 | 1,070 | 1,220 | 3,200 | 5,240 | 1,740 | 1,180 | 960 | 730 |
| 22 | 1,610 | 850 | 1,470 | 1,240 | 1,160 | 1,080 | 3,240 | 6,910 | 1,750 | 1,180 | 930 | 827 |
| 23 | 1,620 | 910 | 1,450 | 1,180 | 1,080 | 1,070 | 3,730 | 6,160 | 1,710 | 1,060 | 902 | 791 |
| 24 | 1,610 | 920 | 1,480 | 1,180 | 1,050 | 1,060 | 7,840 | 5,120 | 2,410 | 970 | 892 | 704 |
| 25 | 1,780 | 860 | 1,510 | 1,230 | 1,070 | 1,040 | 14,500 | 4,350 | 2,980 | 912 | 960 | 809 |
| 26 | 1,680 | 840 | 1,570 | 1,230 | 1,100 | 1,070 | 15,600 | 3,900 | 2,690 | 970 | *1,010 | 800 |
| 27 | 1,680 | 860 | 1,640 | 1,140 | 1,140 | 1,040 | 14,400 | 4,100 | *2,220 | 1,050 | 980 | 791 |
| 28 | 1,560 | 850 | 1,800 | 1,120 | 1,160 | 1,100 | 12,700 | 4,570 | 1,930 | *1,200 | 800 | 678 |
| 29 | 1,410 | 780 | *1,510 | 1,180 | 1,180 | 1,170 | 11,200 | 5,120 | 1,650 | 1,120 | 784 | 818 |
| 30 | 1,480 | 800 | 1,400 | 1,210 | ----- | 1,290 | 9,640 | 8,890 | 1,570 | 990 | 980 | *730 |
| 31 | 1,570 | ----- | 1,340 | 1,140 | ----- | 1,900 | ----- | 11,700 | ----- | 836 | 883 | ----- |
| Total | 48,640 | 30,180 | 45,210 | 38,610 | 32,390 | 35,930 | 149,280 | 209,490 | 101,360 | 39,318 | 27,874 | 29,912 |
| Mean | 1,569 | 1,006 | 1,458 | 1,245 | 1,117 | 1,159 | 4,976 | 6,758 | 3,379 | 1,268 | 964 | 997 |
| (†) | +438 | +14 | -1,100 | -821 | -669 | -781 | +2,088 | +1,860 | +136 | -15 | -414 | -258 |

Adjusted for change in reservoir contents

| Mean | 2,007 | 1,020 | 358 | 424 | 448 | 378 | 7,064 | 8,618 | 3,515 | 1,253 | 550 | 739 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cfsm | 0.585 | 0.297 | 0.104 | 0.124 | 0.131 | 0.110 | 2.06 | 2.51 | 1.02 | 0.365 | 0.160 | 0.215 |
| In. | 0.67 | 0.33 | 0.12 | 0.14 | 0.14 | 0.13 | 2.30 | 2.90 | 1.14 | 0.42 | 0.18 | 0.24 |

Observed

Adjusted

| | | | | | | | | | | | | |
|---------------------|-----|--------|-----|-----|------|-------|------|-------|------|-------|-----|------|
| Calendar year 1959: | Max | 13,800 | Min | 746 | Mean | 1,874 | Mean | 1,860 | Cfsm | 0.527 | In. | 7.15 |
| Water year 1959-60: | Max | 15,600 | Min | 678 | Mean | 2,159 | Mean | 2,199 | Cfsm | 0.61 | In. | 8.71 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Whiteface Reservoir and Boulder, Island, Rice, and Fish lakes; records furnished by Minnesota Power and Light Co.

Note.--Stage-discharge relation affected by ice Nov. 12 to Dec. 3.

245. Amnicon Lake near South Range, Wis.

Location.--Lat 46°29'00", long 92°04'05", in sec.12, T.46 N., R.14 W., in northwest corner of lake, 15 miles southwest of South Range.

Drainage area.--5 sq mi, approximately.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Staff gage. Datum of gage is 1,188.00 ft above mean sea level (State Highway Commission levels). Gage readings have been reduced to elevations above mean sea level.

Extremes.--Maximum elevation observed during year, 1,197.45 ft Apr. 30; minimum observed, 1,196.34 ft Aug. 4.
1936-60: Maximum elevation observed, 1,199.32 ft May 9, 1950; minimum observed, 1,195.82 ft Oct. 28, 1948.

Remarks.--Lake has natural outlet. Lake was ice covered Nov. 8 to Apr. 20.

Revisions (water years).--WSP 854: 1937.

| Elevation, in feet, water year October 1959 to September 1960 | | | | | | | | | | | | |
|---|-------|------|------|------|------|------|------|------|------|------|------|-------|
| Day | Oct.. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
| 1 | - | - | | | | | - | - | - | - | 6.38 | - |
| 2 | - | - | | | | | - | 7.39 | - | - | - | - |
| 3 | 6.96 | - | | | | | - | - | - | - | - | 6.48 |
| 4 | - | 6.78 | | | | | - | - | 6.98 | 6.70 | 6.34 | - |
| 5 | - | - | | | | | - | 7.43 | - | - | - | - |
| 6 | - | - | | | | | - | - | - | - | - | 6.46 |
| 7 | 6.96 | 6.76 | | | | | - | 7.33 | - | 6.70 | - | - |
| 8 | - | - | | | | | - | - | - | - | - | - |
| 9 | - | - | | | | | - | - | 6.92 | - | - | - |
| 10 | 6.96 | - | | | | | - | - | - | - | - | 6.44 |
| 11 | - | 6.74 | | | | | - | - | - | - | 6.40 | 6.42 |
| 12 | - | - | | | | | - | 7.19 | - | - | - | - |
| 13 | - | - | | | | | - | - | - | - | - | - |
| 14 | 6.96 | - | | | | | - | 7.14 | - | - | - | - |
| 15 | - | - | | | | | - | - | 6.78 | - | - | 6.40 |
| 16 | - | - | | | | 6.62 | - | 7.10 | - | 6.62 | - | 6.38 |
| 17 | 6.96 | - | | | | | - | - | - | - | 6.40 | - |
| 18 | - | - | | | | | - | 7.00 | 6.72 | - | - | - |
| 19 | - | - | | | | | - | - | - | - | - | 6.36 |
| 20 | - | - | | | | | - | - | 6.72 | 6.56 | 6.38 | - |
| 21 | 6.94 | - | | | | | - | 7.08 | - | - | - | - |
| 22 | - | - | | | | | - | - | - | 6.56 | - | 6.36 |
| 23 | - | - | | | | | - | - | - | - | 6.36 | - |
| 24 | 6.92 | - | | | | | 7.25 | - | 6.78 | - | - | - |
| 25 | - | - | | | | | - | 7.06 | - | - | - | - |
| 26 | - | - | | | | | - | - | - | - | 6.44 | - |
| 27 | - | - | | | | | 7.41 | - | - | 6.50 | - | - |
| 28 | 6.86 | - | | | | | - | 7.02 | - | - | - | 6.38 |
| 29 | - | - | | | | | - | - | 6.62 | - | - | - |
| 30 | - | - | | | | | 7.45 | 7.08 | - | 6.42 | 6.48 | - |
| 31 | 6.80 | - | | | | | - | - | - | - | - | - |

Note.--Add 1,190 ft to obtain elevation above mean sea level.

255. Bois Brule River at Brule, Wis.

Location.--Lat 46°32'15", long 91°35'45", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.23, T.47 N., R.10 W., or right bank 1.4 miles southwest of Brule Post Office, 1.4 miles downstream from Nebagamor Creek, and 1.7 miles upstream from Little Brule River.

Drainage area.--113 sq mi.

Records available.--October 1942 to September 1960. Prior to January 1943 monthly discharge only, published in WSP 1307.

Gage.--Chain gage read once daily supplemented by recorder record in summer. Datum of gage is 948.49 ft above mean sea level, datum of 1929.

Average discharge.--18 years, 173 cfs.

Extremes.--Maximum discharge during year, 1,020 cfs Apr. 23 (gage height, 4.20 ft, from graph based on gage readings); minimum daily, 110 cfs Feb. 10-14, Feb. 21 to Mar. 14. 1942-60: Maximum discharge, 1,520 cfs June 5, 1944 (gage height, 5.2 ft, from graph based on gage readings), from rating curve extended above 750 cfs; minimum observed, 67 cfs Mar. 13, 1943.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1207: Drainage area. WSP 1337: 1943(M), 1944, 1945-50(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.4 | 111 | 2.4 | 322 |
| 1.6 | 140 | 2.8 | 440 |
| 1.8 | 175 | 3.2 | 580 |
| 2.0 | 219 | 4.0 | 923 |
| 2.2 | 269 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 150 | 146 | 120 | 135 | 115 | 110 | 140 | 400 | 274 | 146 | 119 | 150 |
| 2 | 153 | 143 | 125 | 135 | 120 | 110 | 137 | 370 | 269 | 143 | 119 | 208 |
| 3 | 175 | 143 | 131 | 130 | 120 | 110 | 138 | 347 | 264 | 144 | 119 | 190 |
| 4 | 170 | 140 | 131 | 130 | 120 | 110 | 140 | 368 | 219 | 145 | 119 | 166 |
| 5 | 164 | 137 | 131 | 125 | 120 | 110 | 146 | 376 | 201 | 138 | 117 | 154 |
| 6 | 156 | 140 | 125 | 125 | 120 | 110 | 160 | 356 | 196 | 132 | 117 | 148 |
| 7 | 150 | 140 | 125 | 125 | 120 | 110 | 171 | 328 | 183 | 132 | 125 | 138 |
| 8 | 150 | 140 | 125 | 125 | 115 | 110 | 188 | 306 | 179 | 150 | 119 | 148 |
| 9 | 160 | 140 | 125 | 125 | 115 | 110 | 188 | 274 | 171 | 150 | 164 | 142 |
| 10 | 160 | 140 | 128 | 125 | 110 | 110 | 201 | 264 | 175 | 126 | 167 | 138 |
| 11 | 153 | *132 | 131 | 125 | 110 | 110 | 210 | 243 | 163 | 126 | 142 | 136 |
| 12 | 150 | 125 | 131 | 125 | 110 | 110 | 229 | *231 | 171 | 126 | 128 | 132 |
| 13 | 146 | 120 | 131 | 130 | 110 | 110 | 391 | 224 | 167 | 124 | 128 | 132 |
| 14 | 140 | 120 | 131 | *135 | 110 | 110 | 428 | 214 | 164 | *124 | 125 | 132 |
| 15 | 143 | 120 | 128 | 135 | 115 | 115 | 367 | 205 | 160 | 124 | 124 | 130 |
| 16 | 146 | 120 | 131 | 130 | 115 | *122 | 344 | 201 | 153 | 137 | 122 | 130 |
| 17 | 146 | 120 | 119 | 130 | 115 | 125 | 311 | 196 | 150 | 136 | 119 | 132 |
| 18 | 143 | 120 | 115 | 125 | 115 | 122 | 272 | 192 | 153 | 134 | 119 | 132 |
| 19 | 143 | 120 | 115 | 120 | 115 | 122 | 261 | 188 | 153 | 126 | 142 | 132 |
| 20 | 140 | 120 | 115 | 120 | 115 | 117 | 251 | 210 | 146 | 124 | 167 | 130 |
| 21 | 137 | 120 | 115 | 115 | 110 | 117 | 246 | 248 | 143 | 124 | 158 | 130 |
| 22 | 140 | 125 | 115 | 115 | 110 | 125 | 236 | 298 | 146 | 121 | 150 | 132 |
| 23 | 143 | 125 | 115 | 115 | 110 | 122 | 580 | 290 | 153 | 121 | 137 | 132 |
| 24 | 143 | 125 | 115 | 115 | 110 | 117 | 854 | 259 | 205 | 121 | 134 | 153 |
| 25 | 143 | 120 | 120 | 115 | 110 | 118 | 625 | 229 | 190 | 121 | 134 | *162 |
| 26 | 140 | 120 | 125 | 115 | 110 | 119 | 588 | 210 | 175 | 126 | 143 | 153 |
| 27 | 137 | 115 | 130 | 115 | 110 | 117 | 528 | 229 | 160 | 121 | 146 | 143 |
| 28 | 137 | 115 | 140 | 115 | 110 | 119 | 466 | 224 | 160 | 118 | 162 | 137 |
| 29 | 137 | 115 | 140 | 115 | 110 | 128 | 466 | 224 | 160 | 121 | 171 | 140 |
| 30 | 143 | 115 | 140 | 115 | 110 | 143 | 440 | 300 | 150 | 122 | 160 | 137 |
| 31 | 146 | ----- | 140 | 115 | ----- | 143 | ----- | 300 | ----- | 121 | 150 | ----- |
| Total | 4,584 | 3,821 | 3,908 | 3,820 | 3,295 | 3,631 | 9,705 | 8,324 | 5,373 | 3,984 | 4,246 | 4,319 |
| Mean | 146 | 127 | 126 | 123 | 114 | 117 | 324 | 269 | 179 | 129 | 137 | 144 |
| Cfs/m | 1.31 | 1.12 | 1.12 | 1.09 | 1.01 | 1.04 | 2.87 | 2.38 | 1.58 | 1.14 | 1.21 | 1.27 |
| In. | 1.51 | 1.26 | 1.29 | 1.26 | 1.08 | 1.20 | 3.19 | 2.74 | 1.77 | 1.31 | 1.40 | 1.42 |

Calendar year 1959: Max 303 Min 103 Mean 143 Cfs/m 1.27 In. 17.13
 Water year 1959-60: Max 854 Min 110 Mean 161 Cfs/m 1.42 In. 19.43

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 6 to Dec. 2, Dec. 6-9, 12, 13, 18-27, Dec. 29 to Mar. 15, Mar. 25 (no gage heights Nov. 7, 8, Dec. 6, 12, 13, 19, 20, 25-27, Dec. 31 to Jan. 3, Jan. 9, 10, 16, 17, 30, 31, Feb. 6, 7, 14, 20, 21, 27, 28).

270. Bad River near Odanah, Wis.

Location.--Lat 46°29'15", long 90°41'45", in SE $\frac{1}{4}$ sec.2, T.46 N., R.3 W., at downstream end of center pier of Elm Hoist Bridge, 5.0 miles downstream from Potato River, 8.5 miles south of Odanah, and 23 miles from mouth.

Drainage area.--611 sq mi.

Records available.--July 1914 to December 1922, May 1948 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage. Altitude of gage is 680 ft (from river-profile map). May 17, 1948, to Nov. 6, 1959, water-stage recorder at same site and datum. Prior to Nov. 11, 1922, water-stage recorder at site 2 miles downstream at different datum.

Average discharge.--20 years (1914-22, 1948-60), 622 cfs.

Extremes.--Maximum discharge during year, 27,700 cfs Apr. 24 (gage height, 21.7 ft, from floodmark), from rating curve extended above 12,000 cfs and comparison with contracted-opening measurement of peak flow (45,600 cfs) at Odanah, drainage area 970 sq mi, approximately; minimum daily, 100 cfs Aug. 17, 18, 1914-22, 1948-60: Maximum discharge, that of Apr. 24, 1960; minimum, 50 cfs Nov. 29, 1948 (gage height, 2.02 ft).
Flood of June 24, 1946, reached a stage of at least 22.2 ft (top of bridge submerged), from information by Indian Service.

Remarks.--Records good Oct. 1 to Nov. 5 and poor thereafter.

Revisions (water years).--WSP 1207: Drainage area. WSP 1337: 1922.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|--------|-------|-------|---------|--------|--------|-------|--------|--------|
| 1 | 520 | 385 | 240 | 700 | 220 | 190 | 2,500 | 2,550 | 460 | 340 | 229 | 1,300 |
| 2 | 520 | 372 | 240 | 640 | 220 | 190 | 2,000 | 2,000 | 420 | 322 | 190 | 3,000 |
| 3 | 1,060 | 349 | 240 | 580 | 220 | 190 | 2,400 | 1,660 | 400 | 358 | 160 | 4,220 |
| 4 | 1,190 | 331 | 250 | 540 | 220 | 180 | 2,600 | 1,700 | 480 | 300 | 150 | 2,500 |
| 5 | 996 | 313 | 250 | 480 | 230 | 180 | 3,160 | 1,840 | 440 | 250 | 140 | 1,500 |
| 6 | 804 | 300 | 240 | 440 | 230 | 170 | 3,500 | 1,500 | 340 | 204 | 130 | 1,200 |
| 7 | 660 | 320 | 230 | 400 | 230 | 170 | 3,000 | 1,300 | 308 | 189 | 250 | 900 |
| 8 | 570 | 350 | 220 | 370 | 230 | 160 | 2,480 | 1,100 | 272 | 180 | 230 | 800 |
| 9 | 535 | 310 | 220 | 350 | 230 | 160 | 1,740 | 998 | 259 | 170 | 216 | 900 |
| 10 | 630 | 350 | 220 | 330 | 220 | 160 | 960 | 940 | 280 | 160 | 500 | 800 |
| 11 | 610 | 450 | 220 | 310 | 220 | 160 | 1,520 | 940 | 340 | 150 | 380 | 698 |
| 12 | 555 | 428 | 230 | 300 | 220 | 150 | 2,570 | 960 | 350 | 140 | 280 | 560 |
| 13 | 502 | 340 | 240 | 290 | 220 | 150 | 4,000 | *926 | 322 | 140 | 174 | 448 |
| 14 | 462 | 300 | 250 | 280 | 210 | 150 | 5,000 | 300 | 140 | 140 | 380 | 380 |
| 15 | 439 | 280 | 250 | *274 | 210 | 150 | 4,500 | 686 | 280 | 130 | 120 | 330 |
| 16 | 421 | 270 | 250 | 270 | 200 | 150 | 5,000 | 698 | 330 | *37 | 110 | 300 |
| 17 | 416 | 260 | 250 | 260 | 200 | *154 | 4,000 | 720 | 460 | 208 | 100 | 280 |
| 18 | 408 | 250 | 250 | 260 | 210 | 150 | 3,170 | 760 | 620 | 190 | 100 | 268 |
| 19 | 385 | 246 | 240 | 250 | 210 | 150 | 2,300 | 760 | 600 | 160 | 110 | 300 |
| 20 | 362 | 240 | 230 | 250 | 210 | 140 | 1,800 | 740 | 580 | 140 | 200 | 270 |
| 21 | 322 | 230 | 210 | 250 | 200 | 140 | 1,300 | 800 | 530 | 130 | 364 | 250 |
| 22 | 318 | 240 | 200 | 240 | 200 | 140 | 1,000 | 1,200 | 460 | 300 | 500 | 250 |
| 23 | 313 | 250 | 190 | 240 | 200 | 130 | 7,000 | 1,100 | 403 | 700 | 350 | 300 |
| 24 | 358 | 260 | 180 | 240 | 200 | 130 | 22,000 | 1,000 | 939 | 400 | 270 | 700 |
| 25 | 540 | 260 | 180 | 240 | 200 | 130 | *12,500 | 860 | 1,500 | 277 | 240 | 991 |
| 26 | 560 | 260 | 190 | 230 | 190 | 130 | 8,960 | 720 | 1,100 | 500 | 320 | *870 |
| 27 | 502 | 260 | 300 | 230 | 190 | 130 | 5,640 | 640 | 700 | 894 | 1,000 | 720 |
| 28 | 439 | 260 | 600 | 230 | 190 | 260 | *3,500 | 600 | 500 | 1,000 | 800 | 580 |
| 29 | 398 | 250 | 1,000 | 220 | 190 | 440 | 2,500 | 610 | 420 | 800 | 2,500 | 460 |
| 30 | 372 | 240 | 900 | 220 | ----- | 1,400 | 3,000 | 630 | 370 | 560 | 2,200 | 400 |
| 31 | 367 | ----- | 800 | 220 | ----- | 3,500 | ----- | 560 | ----- | 360 | 1,800 | ----- |
| Total | 16,534 | 8,932 | 9,510 | 10,134 | 6,120 | 9,784 | 125,600 | 32,298 | 14,763 | 9,929 | 14,193 | 26,475 |
| Mean | 533 | 298 | 307 | 327 | 211 | 316 | 4,187 | 1,042 | 492 | 320 | 458 | 892 |
| Cfs/m | 0.872 | 0.488 | 0.502 | 0.535 | 0.345 | 0.517 | 6.85 | 1.71 | 0.805 | 0.524 | 0.750 | 1.44 |
| In. | 1.01 | 0.54 | 0.58 | 0.62 | 0.37 | 0.60 | 7.65 | 1.97 | 0.90 | 0.60 | 0.86 | 1.61 |

Calendar year 1959: Max 3,100 Min 72 Mean 501 Cfs/m 0.820 In. 11.11
Water year 1959-60: Max 22,000 Min 100 Mean 777 Cfs/m 1.27 In. 17.31

Peak discharge (base, 3,000 cfs).--Mar. 31 (time and discharge unknown); Apr. 6 (time and discharge unknown); Apr. 14 (time and discharge unknown); Apr. 24 (about 4 p.m.) 27,700 cfs (21.7 ft); Sept. 3 (time and discharge unknown).

* Discharge measurement made on this day.

Note.--Discharge for periods Nov. 6-24, Apr. 5 to Sept. 30 estimated on basis of about twice-weekly wire-weight-gage readings, 5 discharge measurements, weather records, record of generation at Mellen powerplant, and records for nearby stations. Stage-discharge relation affected by ice Nov. 25 to Apr. 4 (gage heights available once weekly).

275. White River near Ashland, Wis.

Location.--Lat 46°29'50", long 90°54'15", in sec.6, T.46 N., R.4 W., at downstream end of powerplant of Lake Superior District Power Co., 0.3 mile downstream from bridge on State highway over dam and 4.5 miles south of Ashland city limits.

Drainage area.--269 sq mi.

Records available.--May 1948 to September 1960.

Gage.--Chain gage read twice daily or more often when plant load is changed. Datum of gage is 660.15 ft above mean sea level, datum of 1929 (Lake Superior District Power Co. bench mark).

Average discharge.--12 years, 313 cfs.

Extremes.--Maximum discharge observed during year, 4,630 cfs Apr. 24 (gage height, 6.40 ft); minimum observed, 70 cfs Dec. 8, 20 (gage height, 0.64 ft).
1948-60: Maximum discharge, 6,270 cfs July 1, 1953 (gage height, 7.90 ft), from rating curve extended above 3,000 cfs; minimum, 3.1 cfs Apr. 28-30, 1949 (gage height, 0.09 ft).

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by powerplant at gage.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.7 | 84 | 2.5 | 898 |
| 1.0 | 158 | 3.0 | 1,270 |
| 1.3 | 256 | 4.0 | 2,160 |
| 1.6 | 388 | 5.1 | 3,260 |
| 2.0 | 585 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|--------|
| 1 | 198 | 188 | 219 | 240 | 200 | 165 | 439 | 312 | 472 | 228 | 152 | 463 |
| 2 | 258 | 191 | 188 | 210 | 205 | 175 | 553 | 810 | 374 | 220 | 174 | 2,800 |
| 3 | 454 | 182 | 182 | 200 | 170 | 165 | 585 | 713 | 312 | 248 | 188 | 1,920 |
| 4 | 368 | 182 | 165 | 190 | 175 | 155 | 580 | 652 | 290 | 225 | 174 | 1,740 |
| 5 | 295 | 171 | 178 | 150 | 200 | 175 | 711 | 611 | 246 | 207 | 146 | 1,740 |
| 6 | 249 | 171 | 165 | 170 | 178 | 170 | 772 | 497 | 246 | 213 | 174 | 1,470 |
| 7 | 217 | 144 | 133 | 210 | 206 | 170 | 777 | 448 | 267 | 210 | 210 | 1,130 |
| 8 | 219 | 202 | 100 | 210 | 175 | 180 | 688 | 361 | 234 | 199 | 214 | 817 |
| 9 | 214 | 154 | 126 | 210 | 205 | 170 | 624 | 350 | 270 | 199 | 217 | 526 |
| 10 | 216 | 208 | 198 | 210 | 175 | 175 | 569 | 325 | 232 | 199 | 217 | 458 |
| 11 | 214 | 198 | 192 | 220 | 150 | 180 | 607 | 350 | 240 | 279 | 233 | 388 |
| 12 | 202 | 160 | 198 | 210 | 205 | 180 | 665 | 317 | 291 | 199 | 191 | 330 |
| 13 | 198 | *160 | 171 | 190 | 170 | 185 | 1,480 | 299 | 278 | 182 | 181 | 299 |
| 14 | 198 | 165 | 198 | 220 | 175 | 175 | 968 | 266 | 259 | 187 | 152 | 278 |
| 15 | 198 | 144 | 171 | 210 | 178 | 170 | 1,120 | 248 | 259 | *167 | 181 | 260 |
| 16 | 196 | 182 | 171 | *170 | 185 | 170 | 961 | 242 | 240 | 203 | 197 | 255 |
| 17 | 191 | 144 | 198 | 170 | 200 | *180 | 771 | 253 | 297 | 210 | 175 | 245 |
| 18 | 188 | 96 | 165 | 180 | 190 | 175 | 591 | 260 | 352 | 197 | 175 | 256 |
| 19 | 191 | 188 | 182 | 170 | 150 | 180 | 472 | 248 | 332 | 186 | 181 | 235 |
| 20 | 182 | 191 | 96 | 200 | 200 | 180 | 402 | 253 | 293 | 180 | 186 | 228 |
| 21 | 188 | 191 | 132 | 150 | 160 | 180 | 356 | 355 | 266 | 180 | 210 | 228 |
| 22 | 188 | 188 | 152 | 200 | 165 | 180 | 334 | 745 | 266 | 196 | 197 | 227 |
| 23 | 188 | 214 | 158 | 170 | 180 | 180 | 2,960 | 694 | 260 | 194 | 180 | 251 |
| 24 | 202 | 191 | 202 | 200 | 185 | 175 | 3,250 | 647 | 370 | 187 | 186 | 319 |
| 25 | 182 | 171 | 176 | 170 | 165 | 185 | *2,000 | 569 | 453 | 195 | 308 | 537 |
| 26 | 182 | 144 | 208 | 250 | 180 | 175 | 1,980 | 379 | 384 | 210 | 1,230 | 429 |
| 27 | 182 | 131 | 261 | 120 | 180 | 200 | 1,640 | 368 | 271 | 246 | 660 | *384 |
| 28 | 165 | 125 | 453 | 170 | 185 | 210 | 1,340 | 406 | 271 | 206 | 830 | 317 |
| 29 | 171 | 131 | 219 | 150 | 180 | 325 | 1,170 | 402 | 268 | 195 | 700 | 274 |
| 30 | 182 | 165 | 229 | 200 | ----- | 635 | 1,150 | 513 | 228 | 184 | 624 | 253 |
| 31 | 188 | ----- | 252 | 180 | ----- | 512 | ----- | 492 | ----- | 184 | 553 | ----- |
| Total | 6,684 | 5,072 | 5,858 | 5,900 | 5,272 | 6,432 | 30,515 | 13,943 | 8,821 | 6,315 | 9,396 | 19,037 |
| Mean | 216 | 169 | 188 | 190 | 182 | 207 | 1,017 | 450 | 294 | 204 | 303 | 635 |
| Cfsm | 0.803 | 0.628 | 0.699 | 0.706 | 0.677 | 0.770 | 3.78 | 1.67 | 1.09 | 0.758 | 1.13 | 2.36 |
| In. | 0.92 | 0.70 | 0.81 | 0.82 | 0.73 | 0.89 | 4.22 | 1.93 | 1.22 | 0.87 | 1.30 | 2.63 |

Calendar year 1959: Max 804 Min 96 Mean 232 Cfsm 0.862 In. 11.70
Water year 1959-60: Max 3,250 Min 96 Mean 337 Cfsm 1.25 In. 17.0^A

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 1 to Feb. 5, Feb. 8-14, Feb. 16 to Mar. 28.

300. Montreal River near Saxon, Wis.

Location.--Lat 46°32'45", long 90°24'05", in NW $\frac{1}{4}$ sec. 23, T.48 N., R.49 W., on right bank 2 miles upstream from mouth and 3.5 miles north of Saxon.

Drainage area.--262 sq mi (revised).

Records available.--September 1938 to September 1960.

Gage.--Water-stage recorder. Altitude of gage 760 ft (from power company data).

Average discharge.--22 years, 333 cfs.

Extremes.--Maximum discharge during year, 6,600 cfs Apr. 24 (gage height, 7.50 ft); minimum, 10 cfs July 20, 21 (gage height, 1.23 ft).
1938-60: Maximum discharge, that of Apr. 24, 1960; minimum, 2 cfs Sept. 21, Oct. 8, 1939.

Remarks.--Records good except those for period of ice effect, which are fair. Diurnal fluctuation caused by Saxon Falls powerplant 1.5 miles upstream. Flow regulated by Gile Reservoir on West Branch Montreal River (capacity, 1,290,000,000 cu ft) since April 1941.

Revisions (water years).--WSP 894: 1938-39. WSP 924: 1939-40. WSP 1307: 1948(M).
WSP 1627: 1958.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.4 | 21 | 3.0 | 593 |
| 1.6 | 40 | 3.5 | 990 |
| 1.8 | 73 | 4.0 | 1,520 |
| 2.0 | 121 | 5.0 | 2,870 |
| 2.3 | 226 | 6.0 | 4,350 |
| 2.6 | 357 | 7.2 | 6,150 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|--------|----------|--------|-------------|-----------|-------|-------|-------|
| 1 | 187 | 187 | 173 | 210 | 175 | 180 | 900 | 1,290 | 210 | 203 | 218 | 303 |
| 2 | 195 | 180 | 173 | 185 | 175 | 180 | 800 | 701 | 173 | 199 | 206 | 403 |
| 3 | 352 | 173 | 173 | 175 | 175 | 180 | 800 | 963 | 226 | 195 | 195 | 431 |
| 4 | 377 | 173 | 173 | 173 | 175 | 180 | 700 | 963 | 199 | 173 | 191 | 280 |
| 5 | 303 | 173 | 173 | 173 | 175 | 180 | 600 | 963 | 214 | 101 | 214 | 203 |
| 6 | 247 | 180 | 173 | 173 | 175 | 180 | 600 | 547 | 203 | 140 | 239 | 203 |
| 7 | 208 | 222 | 173 | 173 | 175 | 180 | 520 | 490 | 176 | 166 | 226 | 260 |
| 8 | 180 | 173 | 173 | 173 | 170 | 180 | 460 | 471 | 176 | 166 | 166 | 206 |
| 9 | 187 | 173 | 173 | 173 | 160 | 180 | 420 | 586 | 206 | 170 | 180 | 260 |
| 10 | 203 | 173 | 173 | 173 | 170 | 180 | 333 | 414 | 230 | 180 | 206 | 214 |
| 11 | 187 | 155 | 173 | 173 | 175 | 180 | 547 | 614 | 180 | 170 | 239 | 191 |
| 12 | 180 | *146 | 173 | 173 | 175 | 180 | 981 | 635 | 176 | 170 | 203 | 234 |
| 13 | 176 | 173 | 173 | 173 | 175 | 180 | 1,890 | 496 | 176 | 222 | 180 | 247 |
| 14 | 176 | 173 | 173 | 173 | 175 | 180 | 2,490 | 436 | 184 | 199 | 203 | 218 |
| 15 | 176 | 173 | 173 | *173 | 185 | 180 | 2,200 | 408 | 226 | 206 | 199 | 191 |
| 16 | 176 | 173 | 173 | 155 | 200 | 182 | 1,980 | 372 | 272 | *180 | 184 | 184 |
| 17 | 218 | 173 | 173 | 160 | 195 | 183 | 1,580 | 419 | 403 | 166 | 195 | 199 |
| 18 | 180 | 173 | 173 | 170 | 185 | *183 | 1,150 | 448 | 330 | 162 | 199 | 210 |
| 19 | 173 | 173 | 173 | 172 | 180 | 183 | 833 | 393 | 299 | 182 | 210 | 210 |
| 20 | 173 | 173 | 173 | 175 | 180 | 180 | 656 | 368 | 218 | 42 | 199 | 199 |
| 21 | 173 | 173 | 173 | 175 | 180 | 175 | 649 | 459 | 173 | 26 | 191 | 195 |
| 22 | 173 | 173 | 173 | 175 | 180 | 155 | 614 | 1,120 | 214 | 135 | 184 | 206 |
| 23 | 170 | 173 | 173 | 175 | 180 | 150 | 2,260 | 1,170 | 214 | 247 | 176 | 210 |
| 24 | 234 | 173 | 173 | 175 | 180 | 135 | 6,080 | 621 | 187 | 226 | 166 | 234 |
| 25 | 414 | 173 | 173 | 175 | 180 | 100 | 4,580 | 330 | 234 | 184 | 166 | 203 |
| 26 | 339 | 173 | 173 | 175 | 180 | 80 | *2,930 | 230 | 191 | 184 | 166 | *226 |
| 27 | 272 | 173 | 185 | 175 | 180 | 76 | 2,220 | 210 | 180 | 251 | 162 | 222 |
| 28 | 230 | 173 | 280 | 175 | 180 | 100 | 1,590 | 243 | 195 | 206 | 173 | 187 |
| 29 | 203 | 173 | 275 | 175 | 180 | 150 | 1,590 | 199 | 218 | 203 | 403 | 214 |
| 30 | 191 | 173 | 260 | 175 | ----- | 350 | 1,530 | 191 | 264 | 187 | 527 | 230 |
| 31 | 187 | ----- | 235 | 175 | ----- | 850 | ----- | 239 | ----- | 176 | 465 | ----- |
| Total | 6,838 | 5,224 | 5,733 | 5,403 | 5,170 | 5,932 | 44,523 | 17,009 | 6,547 | 5,397 | 6,651 | 6,983 |
| Mean | 221 | 174 | 185 | 174 | 178 | 191 | 1,484 | 548 | 218 | 174 | 220 | 233 |
| Cfs/m | 0.844 | 0.664 | 0.708 | 0.664 | 0.679 | 0.729 | 5.66 | 2.10 | 0.832 | 0.664 | 0.840 | 0.889 |
| In. | 0.97 | 0.74 | 0.81 | 0.77 | 0.73 | 0.84 | 6.32 | 2.41 | 0.93 | 0.77 | 0.97 | 0.99 |
| Calendar year 1959: Max | 1,620 | | | | Min 25 | Mean 237 | | Cfs/m 0.905 | In. 12.26 | | | |
| Water year 1959-60: Max | 6,060 | | | | Min 26 | Mean 332 | | Cfs/m 1.27 | In. 17.25 | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 9 to Apr. 9.

310. Black River near Bessemer, Mich.

Location.--Lat 46°30'55", long 90°04'10", in SE $\frac{1}{4}$ sec. 32, T. 48 N., R. 46 W., on right bank 450 ft downstream from bridge on county highway, 500 ft downstream from Powder Mill Creek, and 2 $\frac{1}{2}$ miles north of Bessemer.

Drainage area.--202 sq mi.

Records available.--October 1954 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,150 ft (from topographic map).

Average discharge.--6 years, 225 cfs.

Extremes.--Maximum discharge during year, 14,800 cfs Apr. 24 (gage height, 14.27 ft, from floodmark), from rating curve extended above 4,700 cfs on basis of slope-area measurement of peak flow; minimum, 28 cfs July 14, 20 (gage height, 1.22 ft).
1954-60: Maximum discharge, that of Apr. 24, 1960; minimum, 15 cfs Aug. 21, 22, 23, 1957 (gage height, 0.91 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Some ground water pumped from mines at Bessemer. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 24

Apr. 25 to Sept. 30

| | | | | | | | |
|-----|-------|------|--------|-----|-----|------|-------|
| 1.1 | 40 | 8.0 | 3,330 | 1.2 | 25 | 6.0 | 2,020 |
| 1.5 | 124 | 10.0 | 5,480 | 1.5 | 79 | 8.0 | 3,330 |
| 2.0 | 250 | 12.0 | 8,900 | 2.0 | 218 | 10.0 | 5,480 |
| 3.0 | 594 | 14.0 | 14,000 | 3.0 | 560 | 11.0 | 7,000 |
| 6.0 | 2,020 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|---------|--------|-------|-------|-------|-------|
| 1 | 206 | 214 | 105 | 90 | 55 | *50 | 284 | 1,050 | 105 | 76 | 100 | 353 |
| 2 | 221 | *185 | 100 | 80 | 55 | 50 | 330 | 822 | 100 | 68 | *84 | 481 |
| 3 | 437 | 170 | *96 | 86 | *54 | 50 | 380 | 692 | 100 | 61 | 75 | 448 |
| 4 | 364 | 153 | 91 | 87 | 54 | 50 | 422 | 708 | 95 | 58 | 69 | 319 |
| 5 | *293 | 150 | 89 | *86 | 55 | 50 | 415 | 640 | 91 | *52 | 63 | 236 |
| 6 | | 145 | 87 | 83 | 55 | 50 | 388 | 531 | *84 | 54 | 55 | *182 |
| 7 | 214 | 150 | 85 | 82 | 56 | 50 | 354 | 463 | 76 | 50 | 90 | 135 |
| 8 | 188 | 155 | 84 | 80 | 56 | 50 | 324 | 448 | 70 | 46 | 93 | 155 |
| 9 | 203 | 160 | 82 | 78 | 56 | 50 | 296 | 452 | 63 | 41 | 105 | 170 |
| 10 | 227 | 160 | 82 | 76 | 56 | 50 | 272 | 470 | 58 | 41 | 146 | 135 |
| 11 | 201 | 165 | 82 | 75 | 56 | 50 | 398 | 535 | 66 | 39 | 124 | 113 |
| 12 | 190 | 160 | 82 | 73 | 56 | 49 | 830 | 477 | 82 | 38 | 110 | 100 |
| 13 | 155 | 155 | 82 | 72 | 55 | 49 | 1,860 | 434 | 57 | 36 | 97 | 86 |
| 14 | 146 | 145 | 82 | 71 | 55 | 49 | 2,670 | 363 | 51 | 38 | 88 | 77 |
| 15 | 138 | 140 | 82 | 69 | 55 | 49 | *3,250 | 329 | 47 | 43 | 75 | 71 |
| 16 | 170 | 135 | 87 | 67 | 55 | 48 | 2,940 | 274 | 80 | 48 | 65 | 65 |
| 17 | 175 | 130 | 89 | 66 | 56 | 48 | 2,220 | 430 | 320 | 46 | 59 | 65 |
| 18 | 155 | 130 | 89 | 65 | 56 | 48 | 1,560 | 400 | 280 | 45 | 63 | 59 |
| 19 | 143 | 125 | 86 | 64 | 57 | 47 | 1,180 | 330 | 220 | 41 | 102 | 57 |
| 20 | 131 | 125 | 84 | 63 | 57 | 47 | 962 | 260 | 150 | 38 | 90 | 55 |
| 21 | 119 | 125 | 83 | 61 | 56 | 48 | 926 | 240 | 115 | 38 | 77 | 59 |
| 22 | 122 | 125 | 81 | 60 | 55 | 48 | 800 | 215 | 95 | 258 | 65 | 54 |
| 23 | 136 | 125 | 80 | 60 | 55 | 49 | 2,900 | 190 | 105 | 161 | 48 | 52 |
| 24 | 369 | 125 | 80 | 59 | 54 | 50 | *12,700 | 175 | 120 | 100 | 52 | 75 |
| 25 | 415 | 120 | 81 | 58 | 53 | 50 | 6,230 | 160 | 140 | 131 | 48 | 170 |
| 26 | 350 | 115 | 83 | 58 | 52 | 51 | 3,270 | 150 | 115 | 584 | 48 | 146 |
| 27 | 296 | 115 | 89 | 58 | 52 | 51 | 2,100 | 135 | 95 | 387 | 46 | 124 |
| 28 | 253 | 115 | 97 | 57 | 51 | 55 | 1,320 | 125 | 84 | 283 | 350 | 107 |
| 29 | 227 | 115 | 110 | 56 | 51 | 170 | 1,320 | 115 | 86 | 191 | 700 | 100 |
| 30 | 211 | 110 | 105 | 56 | ----- | *240 | *1,360 | 110 | 82 | 146 | 572 | 90 |
| 31 | 219 | ----- | 100 | 56 | ----- | 260 | ----- | 110 | ----- | 121 | 423 | ----- |
| Total | 6,924 | 4,242 | 2,734 | 2,152 | 1,589 | 2,056 | 54,241 | 11,853 | 3,192 | 3,357 | 4,182 | 4,339 |
| Mean | 223 | 141 | 88.2 | 69.4 | 54.8 | 66.3 | 1,808 | 382 | 106 | 108 | 135 | 145 |
| Cfsm | 1.10 | 0.698 | 0.437 | 0.344 | 0.271 | 0.328 | 8.95 | 1.89 | 0.525 | 0.535 | 0.668 | 0.718 |
| In. | 1.27 | 0.78 | 0.50 | 0.40 | 0.29 | 0.38 | 9.99 | 2.18 | 0.59 | 0.62 | 0.77 | 0.80 |

Calendar year 1959: Max 1,780 Min 27 Mean 189 Cfsm 0.936 In. 12.74
Water year 1959-60: Max 12,700 Min 36 Mean 276 Cfsm 1.37 In. 18.57

Peak discharge (base, 1,500 cfs).--Apr. 15 (2 to 3 a.m.) 3,650 (8.35 ft); Apr. 24 (about 10 a.m.) 14,800 cfs (14.27 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 5 to Dec. 11, Dec. 19 to Mar. 19, Mar. 21, 22, 24-26, 28-31, Apr. 3. No gage-height record May 17 to July 4; discharge estimated on basis of weather records, recorded range in stage, and records for nearby stations.

315. Presque Isle River at Marenisco, Mich.

Location.--Lat 46°22', long 89°41', in NW $\frac{1}{4}$ sec. 21, T. 46 N., R. 43 W., on left bank a quarter of a mile upstream from highway bridge in Marenisco and $\frac{1}{4}$ mile downstream from confluence of East and West Branches of Presque Isle River.

Drainage area.--175 sq. mi.

Records available.--February 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,489.30 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to May 27, 1949, wire-weight gage at site a quarter of a mile downstream at different datum.

Average discharge.--15 years, 178 cfs.

Extremes.--Maximum discharge during year, 3,520 cfs Apr. 25 (gage height, 11.25 ft); minimum, 40 cfs Aug. 23 (gage height, 3.18 ft).

1945-60: Maximum discharge, that of Apr. 25, 1960; minimum observed, 13 cfs Sept. 30, 1948 (gage height, 2.25 ft, site and datum then in use).

Remarks.--Records excellent except those above 1,000 cfs, which are good, and those for periods of ice effect, which are fair. Occasional regulation for lake or pond level control at several places above station.

Revisions.--Revised figures of discharge, in cubic feet per second, for the water year 1954, superseding those published in WSP 1337, are given herewith:

| 1954 | 1954-Con. |
|------------------|-----------------|
| July 15..... 145 | July 21..... 90 |
| 16..... 130 | 22..... 85 |
| 17..... 115 | 23..... 82 |
| 18..... 105 | 24..... 78 |
| 19..... 98 | 25..... 75 |
| 20..... 92 | 26..... 72 |

| Month | Cfs-days | Maximum | Minimum | Mean | Per square mile | Runoff in inches |
|-------------------------|----------|---------|---------|------|-----------------|------------------|
| July 1954..... | 4,771 | 320 | 72 | 154 | 0.887 | 1.01 |
| Water year 1953-54..... | - | 1,560 | 42 | 224 | 1.28 | 17.37 |
| Calendar year 1954..... | - | 1,560 | 61 | 255 | 1.46 | 19.75 |

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.1 | 35 | 6.0 | 520 |
| 3.4 | 57 | 7.0 | 880 |
| 4.0 | 127 | 9.0 | 2,000 |
| 5.0 | 280 | 11.0 | 3,340 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|------|
| 1 | 458 | 250 | 130 | 125 | 89 | *79 | 165 | 1,000 | 233 | 148 | 75 | 263 | |
| 2 | 450 | *237 | 125 | 115 | 88 | 78 | 190 | 935 | 233 | 137 | 67 | 274 | |
| 3 | 442 | 227 | 100 | 115 | 87 | 78 | 215 | 844 | 230 | 130 | *62 | 332 | |
| 4 | 458 | 217 | *47 | 110 | *66 | 77 | 225 | 788 | 219 | 123 | 60 | 294 | |
| 5 | 428 | 211 | 46 | 110 | 87 | 77 | 225 | 740 | 201 | 112 | 59 | 247 | |
| 6 | | *375 | 198 | 46 | *110 | 89 | 77 | 225 | 748 | *186 | 103 | 54 | *211 |
| 7 | 326 | 205 | 46 | 115 | 90 | 76 | 214 | 772 | 176 | *96 | 72 | 192 | |
| 8 | 298 | 210 | 62 | 120 | 91 | 76 | 198 | 744 | 166 | 91 | 65 | 235 | |
| 9 | 310 | 215 | 72 | 120 | 91 | 75 | 186 | 700 | 156 | 85 | 75 | 276 | |
| 10 | 292 | 216 | 82 | 115 | 90 | 74 | 183 | 631 | 152 | 82 | 88 | 261 | |
| 11 | | 276 | 213 | 92 | 115 | 88 | 74 | 201 | 648 | 166 | 80 | 80 | 221 |
| 12 | 261 | 210 | 100 | 115 | 88 | 74 | 248 | 684 | 165 | 65 | 72 | 195 | |
| 13 | 247 | 205 | 105 | 115 | 87 | 74 | 412 | 656 | 156 | 45 | 65 | 173 | |
| 14 | 232 | 200 | 110 | 115 | 86 | 73 | 696 | 589 | 146 | 52 | 55 | 160 | |
| 15 | 217 | 190 | 115 | 110 | 87 | 73 | *1,030 | 517 | 139 | 56 | 57 | 145 | |
| 16 | 222 | 180 | 120 | 110 | 89 | 73 | 1,320 | 458 | 145 | 64 | 48 | 136 | |
| 17 | 217 | 175 | 120 | 110 | 90 | 73 | 1,360 | 475 | 135 | 69 | 46 | 128 | |
| 18 | 200 | 170 | 120 | 110 | 91 | 73 | 944 | 502 | 219 | 69 | 49 | 119 | |
| 19 | 189 | 170 | 120 | 105 | 91 | 72 | 720 | 475 | 217 | 64 | 51 | 112 | |
| 20 | 174 | 175 | 115 | 105 | 90 | 72 | 659 | 442 | 188 | 63 | 47 | 104 | |
| 21 | 167 | 175 | 110 | 105 | 88 | 72 | 617 | 415 | 166 | 64 | 44 | 96 | |
| 22 | 162 | 175 | 110 | 100 | 87 | 72 | 550 | 402 | 160 | 126 | 42 | 84 | |
| 23 | 169 | 170 | 110 | 100 | 86 | 72 | 874 | 390 | 149 | 152 | 40 | 80 | |
| 24 | 237 | 170 | 110 | 100 | 84 | 72 | 2,890 | 358 | 195 | 131 | 42 | 108 | |
| 25 | 330 | 160 | 110 | 99 | 83 | 73 | *3,300 | 332 | 213 | 123 | 43 | 141 | |
| 26 | 346 | 150 | 115 | 98 | 83 | 74 | *2,540 | 302 | 190 | 227 | 54 | 146 | |
| 27 | 332 | 145 | 125 | 94 | 82 | 75 | 1,920 | 284 | 170 | 206 | 57 | 140 | |
| 28 | 324 | 140 | 135 | 94 | 81 | 78 | *1,480 | 267 | 160 | 64 | 278 | 132 | |
| 29 | 282 | 135 | 145 | 93 | 80 | *100 | 1,010 | 257 | 160 | 69 | 400 | 128 | |
| 30 | 267 | 130 | 140 | 92 | ----- | 120 | 945 | 256 | 157 | 80 | 354 | 120 | |
| 31 | 257 | ----- | 130 | 91 | ----- | 140 | ----- | 248 | ----- | 80 | 318 | ----- | |
| Total | 8,945 | 5,624 | 3,213 | 3,331 | 2,529 | 2,446 | 25,742 | 16,859 | 5,416 | 3,056 | 2,919 | 5,253 | |
| Mean | 289 | 187 | 104 | 107 | 87.2 | 78.9 | 858 | 544 | 181 | 98.6 | 94.2 | 175 | |
| Cfs/m | 1.65 | 1.07 | 0.594 | 0.611 | 0.498 | 0.451 | 4.90 | 3.11 | 1.03 | 0.563 | 0.538 | 1.00 | |
| In. | 1.90 | 1.19 | 0.68 | 0.70 | 0.54 | 0.52 | 5.47 | 3.58 | 1.15 | 0.65 | 0.62 | 1.12 | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 7-9, Nov. 12 to Apr. 6.

320. Presque Isle River near Tula, Mich.

Location.--Lat 46°33', long 89°46', in sec.23, T.48 N., R.44 W., on downstream handrail of bridge on State Highway 28, 2 miles east of Tula, 5 miles downstream from Little Presque Isle River, and 7 miles southwest of Merriweather.

Drainage area.--260 sq mi.

Records available.--February 1945 to September 1960.

Gage.--Wire-weight gage, read twice daily, and crest-stage gage. Datum of gage is 1,299.66 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--15 years, 276 cfs.

Extremes.--Maximum discharge during year, 4,640 cfs Apr. 25 (gage height, 14.04 ft); minimum, 49 cfs Aug. 24, 25 (gage height, 4.48 ft).

1945-60: Maximum discharge, that of Apr. 25, 1960; minimum, 22 cfs Oct. 5, 6, 1948 (gage height, 4.22 ft).

Revisions.--The figures of minimum discharge for some water years have been revised, as shown in the following table. They supersede figures published in the water-supply papers indicated.

| WSP | Water year | Date | Discharge (cfs) | Gage height (feet) |
|------|------------|-----------------------------------|-----------------|--------------------|
| 1277 | 1953 | Nov. 5, 1952, Sept.23,24, 1953 | 67 | - |
| 1337 | 1954 | Nov. 6, 1953 | 48 | 4.52 |
| 1387 | 1955 | Sept.15, 1955 | 44 | 4.48 |

Remarks.--Records good except those for periods of ice effect, which are fair. Occasional regulation for lake or pond level control at several places above station at Marenisco.

Revisions (water years).--WSP 1387: 1945. Revised figures of discharge, in cubic feet per second, for the water years 1953-55, superseding those published in WSP 1277, 1337, and 1387, are given herewith:

| Date | Discharge | Date | Discharge | Date | Discharge | Date | Discharge |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1953 | | 1953-Con. | | 1954-Con. | | 1955-Con. | |
| July 20 | 181 | Oct. 10 | 70 | July 29 | 109 | July 3 | 65 |
| 21 | 164 | 11 | 65 | 30 | 94 | 10 | 85 |
| 22 | 162 | 12 | 61 | 31 | 97 | 11 | 76 |
| 23 | 168 | 13 | 58 | Aug. 1 | 105 | 12 | 72 |
| 24 | 147 | 14 | 56 | 2 | 116 | 13 | 86 |
| Aug. 1 | 178 | 15 | 61 | 3 | 118 | 14 | 61 |
| 17 | 170 | 16 | 57 | 4 | 109 | 15 | 62 |
| 18 | 150 | 17 | 54 | 5 | 95 | 16 | 72 |
| 19 | 136 | 18 | 54 | 6 | 87 | 17 | 68 |
| 20 | 122 | 19 | 54 | 7 | 84 | 18 | 64 |
| 21 | 114 | 20 | 52 | 8 | 82 | 19 | 57 |
| 22 | 109 | 21 | 53 | 9 | 85 | 20 | 53 |
| 23 | 102 | 22 | 49 | 10 | 90 | 21 | 49 |
| 24 | 92 | 23 | 52 | 11 | 88 | 22 | 61 |
| 29 | 202 | 24 | 52 | 12 | 79 | 23 | 73 |
| 30 | 176 | 25 | 55 | 13 | 74 | 24 | 64 |
| Sept. 2 | 198 | 26 | 58 | 14 | 78 | 25 | 57 |
| 3 | 160 | 27 | 60 | 16 | 106 | 26 | 53 |
| 4 | 138 | 28 | 60 | 17 | 82 | 27 | 74 |
| 5 | 119 | 29 | 58 | 18 | 74 | 28 | 84 |
| 6 | 105 | 30 | 60 | 19 | 70 | 29 | 85 |
| 7 | 92 | 31 | 57 | 20 | 66 | Aug. 15 | 100 |
| 8 | 87 | Nov. 1 | 58 | 21 | 64 | 16 | 90 |
| 9 | 85 | 2 | 60 | 22 | 62 | 17 | 80 |
| 10 | 84 | 3 | 64 | 23 | 104 | 18 | 76 |
| 11 | 84 | 4 | 61 | 24 | 109 | 19 | 72 |
| 12 | 85 | 5 | 53 | 25 | 94 | 20 | 79 |
| 13 | 83 | 6 | 48 | 28 | 111 | 21 | 85 |
| 14 | 82 | 7 | 52 | 29 | 105 | 22 | 76 |
| 15 | 80 | 8 | 52 | 30 | 94 | 23 | 65 |
| 16 | 79 | 9 | 52 | 31 | 85 | 24 | 69 |
| 17 | 78 | 10 | 52 | Sept. 1 | 82 | 25 | 66 |
| 18 | 78 | 11 | 54 | 2 | 76 | 26 | 74 |
| 19 | 79 | 12 | 57 | 3 | 72 | 27 | 92 |
| 20 | 78 | 13 | 57 | 4 | 80 | 28 | 97 |
| 21 | 76 | 14 | 58 | 5 | 92 | 29 | 102 |
| 22 | 73 | 15 | 60 | 6 | 94 | Sept. 2 | 113 |
| 23 | 67 | 16 | 64 | 7 | 94 | 3 | 95 |
| 24 | 67 | 17 | 64 | 8 | 90 | 4 | 88 |
| 25 | 78 | 18 | 64 | 9 | 102 | 5 | 80 |
| 26 | 80 | 19 | 69 | | | 6 | 72 |
| 27 | 90 | | | 1955 | | 7 | 60 |
| 28 | 87 | 1954 | | June 21 | 102 | 8 | 56 |
| 29 | 79 | July 18 | 110 | 22 | 95 | 9 | 56 |
| 30 | 76 | 19 | 104 | 23 | 87 | 10 | 55 |
| Oct. 1 | 69 | 20 | 97 | 24 | 80 | 11 | 55 |
| 2 | 65 | 21 | 90 | 25 | 74 | 12 | 55 |
| 3 | 64 | 22 | 84 | 28 | 69 | 13 | 49 |
| 4 | 62 | 23 | 82 | 27 | 64 | 14 | 50 |
| 5 | 61 | 24 | 80 | 28 | 61 | 15 | 44 |
| 6 | 88 | 25 | 76 | 29 | 61 | 16 | 45 |
| 7 | 94 | 26 | 72 | 30 | 60 | | |
| 8 | 82 | 27 | 72 | July 1 | 61 | | |
| 9 | 74 | 28 | 84 | 2 | 61 | | |

320. Presque Isle River near Tula, Mich.--Continued

Revised figures of monthly discharge, in cubic feet per second, 1953-55

| Month | Cfs-days | Maximum | Minimum | Mean | Per square mile | Runoff in inches |
|-------------------------|----------|---------|---------|------|-----------------|------------------|
| July 1953..... | 13,395 | 1,290 | 147 | 432 | 1.66 | 1.91 |
| August..... | 11,626 | 1,140 | 95 | 375 | 1.44 | 1.66 |
| September..... | 2,895 | 248 | 67 | 96.5 | .371 | .41 |
| Water year 1952-53..... | - | 1,650 | 67 | 337 | 1.30 | 17.55 |
| October 1953..... | 1,915 | 94 | 49 | 61.8 | .238 | .27 |
| November..... | 3,459 | 350 | 48 | 115 | .442 | .49 |
| Calendar year 1953..... | - | 1,650 | 48 | 341 | 1.31 | 17.76 |
| July 1954..... | 5,624 | 635 | 72 | 181 | .696 | .80 |
| August..... | 2,885 | 125 | 62 | 93.1 | .358 | .41 |
| September..... | 6,703 | 450 | 72 | 223 | .858 | .96 |
| Water year 1953-54..... | - | 2,810 | 48 | 358 | 1.38 | 18.65 |
| Calendar year 1954..... | - | 2,810 | 62 | 404 | 1.55 | 21.07 |
| June 1955..... | 4,346 | 313 | 60 | 145 | .558 | .62 |
| July..... | 3,290 | 649 | 49 | 106 | .408 | .47 |
| August..... | 8,312 | 812 | 65 | 268 | 1.03 | 1.19 |
| September..... | 4,342 | 583 | 44 | 145 | .558 | .62 |
| Water year 1954-55..... | - | 2,550 | 44 | 284 | 1.09 | 14.83 |
| Calendar year 1955..... | - | 2,550 | 44 | 256 | .985 | 13.40 |

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 4.4 | 38 | 10.0 | 1,700 |
| 5.0 | 134 | 12.0 | 2,850 |
| 6.0 | 352 | 14.0 | 4,600 |
| 8.0 | 900 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|-------|-------|--------|-------|----------|--------|------------|-----------|-------|-------|-------|
| 1 | 534 | 350 | 166 | 170 | 125 | 105 | 310 | 1,300 | 275 | 160 | 116 | 366 |
| 2 | 495 | 328 | *165 | 160 | *125 | *105 | 390 | 1,120 | 264 | 154 | 104 | 335 |
| 3 | 549 | *309 | 160 | 155 | 125 | 100 | 460 | 990 | 267 | 140 | *89 | 338 |
| 4 | 600 | 286 | 143 | 145 | 125 | 100 | 526 | 915 | 258 | 130 | 80 | 330 |
| 5 | 569 | 249 | 106 | *140 | 125 | 100 | 549 | 888 | 230 | 125 | 77 | 300 |
| 6 | *508 | 251 | 105 | 140 | 130 | 100 | 558 | 828 | 209 | 116 | 75 | 264 |
| 7 | 446 | 253 | 101 | 145 | 130 | 100 | 544 | 816 | *196 | *109 | 100 | *227 |
| 8 | 386 | 260 | 99 | 145 | 130 | 100 | 484 | 800 | 181 | 102 | 118 | 258 |
| 9 | 376 | 275 | 101 | 145 | 125 | 98 | 436 | 774 | 168 | 99 | 138 | 318 |
| 10 | 383 | 280 | 97 | 145 | 125 | 98 | 400 | 756 | 166 | 94 | 205 | 328 |
| 11 | 360 | 280 | 102 | 145 | 120 | 98 | 446 | 783 | 185 | 88 | 166 | 280 |
| 12 | 350 | 275 | 113 | 145 | 120 | 98 | 542 | 837 | 180 | 86 | 129 | 245 |
| 13 | 338 | 285 | 125 | 145 | 115 | 98 | 834 | 849 | 172 | 67 | 108 | 212 |
| 14 | 316 | 253 | 138 | 145 | 115 | 98 | 1,820 | 789 | 158 | 54 | 90 | 187 |
| 15 | 293 | 240 | 141 | 145 | 115 | 98 | *2,510 | 700 | 150 | 61 | 77 | 166 |
| 16 | 300 | 230 | 152 | 140 | 120 | 96 | 2,680 | 611 | 196 | 70 | 72 | 152 |
| 17 | 314 | 225 | 152 | 140 | 120 | 96 | 2,500 | 622 | 340 | 76 | 66 | 145 |
| 18 | 290 | 214 | 154 | 140 | 125 | 96 | 2,010 | 653 | 342 | 78 | 62 | 140 |
| 19 | 271 | 215 | 154 | 140 | 125 | 96 | 1,450 | 616 | 310 | 77 | 66 | 129 |
| 20 | 247 | 223 | 150 | 135 | 125 | 96 | 1,170 | 574 | 269 | 69 | 67 | 121 |
| 21 | 225 | 231 | 141 | 135 | 125 | 94 | 1,040 | 539 | 220 | 78 | 60 | 114 |
| 22 | 214 | 225 | 138 | 135 | 120 | 96 | 963 | 520 | 203 | 318 | 55 | 104 |
| 23 | 216 | 225 | 141 | 135 | 120 | 96 | 1,020 | 495 | 183 | 405 | 51 | 96 |
| 24 | 335 | 225 | 148 | 130 | 120 | 98 | 2,900 | 456 | 201 | 280 | 49 | 111 |
| 25 | 500 | 198 | 145 | 130 | 115 | 98 | 4,370 | 422 | 247 | 227 | 49 | 200 |
| 26 | 614 | 190 | 143 | 130 | 110 | 100 | 3,560 | 381 | 220 | 451 | 54 | 238 |
| 27 | 552 | 185 | 150 | 130 | 110 | 100 | 2,830 | 350 | 196 | 510 | 62 | 205 |
| 28 | 477 | 180 | 160 | 130 | 110 | 110 | 2,240 | 350 | 176 | 514 | 350 | 181 |
| 29 | 422 | 170 | 170 | 125 | 110 | 130 | 1,810 | 310 | 192 | 376 | 468 | 164 |
| 30 | 381 | 166 | 180 | 125 | ----- | 180 | 1,560 | 300 | 185 | 145 | 490 | 154 |
| 31 | 364 | ----- | 180 | 125 | ----- | 250 | ----- | 293 | ----- | 130 | 214 | ----- |
| Total | 12,225 | 7,256 | 4,320 | 4,340 | 3,505 | 3,328 | 42,912 | 20,617 | 6,537 | 4,989 | 4,108 | 6,388 |
| Mean | 394 | 242 | 139 | 140 | 121 | 107 | 1,430 | 665 | 218 | 161 | 133 | 213 |
| Cfsm | 1.52 | 0.931 | 0.535 | 0.538 | 0.465 | 0.412 | 5.50 | 2.58 | 0.838 | 0.619 | 0.512 | 0.819 |
| In. | 1.75 | 1.04 | 0.62 | 0.62 | 0.50 | 0.48 | 6.14 | 2.95 | 0.94 | 0.71 | 0.59 | 0.91 |
| Calendar year 1959: Max | 1,120 | | | Min 51 | | Mean 231 | | Cfsm 0.888 | In. 12.04 | | | |
| Water year 1959-60: Max | 4,370 | | | Min 49 | | Mean 329 | | Cfsm 1.27 | In. 17.25 | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 8-13, 16, 19, 26-29, Dec. 2, 3, Dec. 27 to Apr. 3. No gage-height record Sundays and holidays; discharge interpolated.

330. Middle Branch Ontonagon River near Paulding, Mich.

Location.--Lat 46°21'30", long 89°04'40", in sec.29, T.46 N., R.38 W., on right bank 25 ft downstream from highway bridge, 2½ miles upstream from Bond Falls Reservoir, and 5½ miles southeast of Paulding.

Drainage area.--About 175 sq mi.

Records available.--June 1942 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 1,485.66 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Sept. 28, 1942, reference point on downstream side of bridge at same datum.

Average discharge.--18 years, 175 cfs.

Extremes.--Maximum discharge during year, 1,700 cfs Apr. 25 (gage height, 10.07 ft); minimum daily, 91 cfs Mar. 11-13; minimum gage height, 3.69 ft Aug. 6, 9.
1942-60: Maximum discharge, 2,050 cfs Apr. 30, 1951 (gage height, 10.0 ft, from high-water mark); minimum, 27 cfs Nov. 22, 1946 (result of freezeup); minimum gage height, 2.96 ft Nov. 26, 1942 (result of freezeup).

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.6 | 81 | 7.0 | 784 |
| 4.0 | 139 | 10.0 | 1,680 |
| 5.0 | 318 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 420 | 302 | 145 | 135 | 100 | 100 | 195 | 661 | 240 | 190 | 120 | 214 |
| 2 | 380 | 280 | *140 | 130 | *100 | 100 | 180 | 598 | 253 | 171 | *114 | 215 |
| 3 | 360 | 255 | 140 | 120 | 100 | *98 | 168 | 533 | 251 | 165 | 111 | 195 |
| 4 | 365 | *233 | 135 | 120 | 100 | 98 | 152 | 467 | 231 | 155 | 107 | 174 |
| 5 | *320 | 219 | 130 | *115 | 100 | 97 | 139 | 462 | 207 | *145 | 104 | 160 |
| 6 | 280 | 190 | 130 | 115 | 99 | 97 | 137 | 591 | 195 | 139 | 101 | 152 |
| 7 | 246 | 180 | 130 | 115 | 98 | 96 | 134 | 670 | *186 | 131 | 123 | 145 |
| 8 | 222 | 200 | 125 | 115 | 97 | 95 | 131 | 646 | 178 | 126 | 129 | *176 |
| 9 | 246 | 210 | 125 | 115 | 96 | 94 | 128 | 591 | 168 | 122 | 128 | 195 |
| 10 | 244 | 210 | 120 | 115 | 95 | 92 | 122 | 558 | 163 | 118 | 141 | 168 |
| 11 | 222 | 208 | 120 | 120 | 95 | 91 | 136 | 552 | 180 | 118 | 128 | 150 |
| 12 | 217 | 183 | 120 | 120 | 95 | 91 | 168 | 582 | 178 | 116 | 116 | 139 |
| 13 | 214 | 200 | 120 | 120 | 96 | 91 | 278 | 608 | 165 | 117 | 112 | 134 |
| 14 | 203 | 188 | 120 | 120 | 96 | 92 | *413 | 579 | 157 | 123 | 117 | 128 |
| 15 | 190 | 176 | 125 | 115 | 98 | 92 | 627 | 515 | 152 | 118 | 112 | 122 |
| 16 | 196 | 202 | 125 | 115 | 100 | 92 | 857 | 439 | 165 | 120 | 104 | 117 |
| 17 | 202 | 142 | 125 | 115 | 100 | 94 | 918 | 627 | 226 | 120 | 101 | 117 |
| 18 | 190 | 170 | 120 | 110 | 100 | 94 | 804 | 740 | 217 | 116 | 104 | 117 |
| 19 | 183 | 180 | 115 | 110 | 100 | 93 | 651 | 680 | 200 | 112 | 120 | 114 |
| 20 | 174 | 180 | 110 | 110 | 100 | 92 | 570 | 584 | 176 | 108 | 116 | 111 |
| 21 | 165 | 175 | 110 | 110 | 99 | 92 | 554 | 543 | 183 | 108 | 108 | 110 |
| 22 | 159 | 170 | 110 | 110 | 98 | 92 | 554 | 522 | 163 | 195 | 102 | 108 |
| 23 | 166 | 165 | 110 | 105 | 98 | 95 | 639 | 426 | 158 | 207 | 101 | 108 |
| 24 | 314 | 160 | 110 | 105 | 98 | 94 | 1,290 | 363 | 253 | 160 | 101 | 122 |
| 25 | 531 | 147 | 115 | 105 | 98 | 98 | 1,880 | 326 | 251 | 141 | 101 | 178 |
| 26 | 526 | 140 | 120 | 105 | 98 | 110 | 1,460 | 298 | 200 | 207 | 105 | 161 |
| 27 | 469 | 135 | 125 | 105 | 99 | 120 | *1,120 | 284 | 180 | 181 | 105 | 141 |
| 28 | 391 | 140 | 135 | 105 | 100 | 135 | 860 | 268 | 226 | 152 | 240 | 129 |
| 29 | 338 | 145 | 145 | 105 | 100 | 160 | 716 | 250 | 255 | 139 | 372 | 128 |
| 30 | 312 | 150 | 145 | 105 | ----- | *185 | 701 | 270 | 220 | 150 | 315 | 126 |
| 31 | 306 | ----- | 140 | 100 | ----- | 200 | ----- | 263 | ----- | 131 | 242 | ----- |
| Total | 8,750 | 5,635 | 3,885 | 3,510 | 2,853 | 3,268 | 16,462 | 15,499 | 5,957 | 4,401 | 4,201 | 4,354 |
| Mean | 282 | 188 | 125 | 113 | 98.4 | 105 | 549 | 500 | 199 | 142 | 136 | 145 |
| Cfs/m | 1.61 | 1.07 | 0.714 | 0.646 | 0.562 | 0.600 | 3.14 | 2.86 | 1.14 | 0.811 | 0.777 | 0.829 |
| In. | 1.66 | 1.19 | 0.82 | 0.74 | 0.61 | 0.69 | 3.50 | 3.30 | 1.27 | 0.94 | 0.90 | 0.92 |

Calendar year 1959: Max 543

Min 61

Mean 150

Cfs/m 0.857

In. 11.65

Water year 1959-60: Max 1,680

Min 91

Mean 215

Cfs/m 1.23

In. 16.74

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 6-10, 13, 18-22, Nov. 26 to Apr. 2. No gage-height record Oct. 1-3, Dec. 27-29, Jan. 1-5; discharge estimated on basis of 1 discharge measurement, weather records, and records for nearby stations.

335. Bond Falls Canal near Paulding, Mich.

Location.--Lat 46°24'10", long 89°09'00", in sec.11, T.46 N., R.39 W., on left bank 40 ft upstream from intake to pipeline No. 2, 1.4 miles southeast of Paulding, and 1.5 miles downstream from Bond Falls Reservoir on Middle Branch Ontonagon River.

Records available.--July 1942 to September 1960.

Gage.--Staff gage and concrete control; gage read once daily. Datum of gage is 1,444.59 ft above mean sea level, datum of 1929.

Average discharge.--18 years, 132 cfs.

Extremes.--Maximum discharge during year, 373 cfs Sept. 23 (gage height, 3.17 ft); minimum daily, 2.5 cfs Oct. 1-8, Aug. 8, 9, Sept. 30; minimum gage height observed, -1.80 ft Oct. 5 (two drain holes in weir open and canal gate closed).

1942-60: Maximum discharge, that of Sept. 23, 1960; minimum daily, 0.3 cfs Aug. 28 to Sept. 5, 1959; minimum gage height observed, -2.70 ft Sept. 1, 1959 (two drain holes in weir open and canal gate closed).

Remarks.--Records excellent except those below 20 cfs, which are poor. Canal diverts water from Bond Falls Reservoir to South Branch Ontonagon River; water is used for power production at Victoria Dam near Rockland.

Rating table, water year 1959-60, except periods of ice effect, indefinite stage-discharge relation, or when water surface is below weir crest (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 0.1 | 1.3 | 1.0 | 56 |
| .2 | 4.0 | 1.5 | 109 |
| .3 | 7.8 | 2.0 | 174 |
| .5 | 18 | 3.2 | 379 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|---------|-------|-------|---------|-------|----------|---------|---------|-------|---------|---------|-------|
| 1 | 2.5 | 339 | 210 | 239 | 284 | 185 | 33 | 334 | 255 | 296 | 217 | 230 |
| 2 | 2.5 | 175 | 210 | 239 | *280 | 175 | 33 | 321 | 253 | 296 | 215 | 230 |
| 3 | 2.5 | *e12 | 210 | 239 | 280 | *140 | 33 | 305 | 251 | 294 | 215 | 230 |
| 4 | 2.5 | e12 | 210 | 239 | 280 | 140 | 33 | 344 | 220 | 294 | 60 | 230 |
| 5 | *2.5 | 118 | 188 | 251 | 280 | 140 | 33 | 368 | 201 | *294 | 5 | 252 |
| 6 | 2.5 | 149 | 171 | 292 | 280 | 135 | 33 | 190 | 201 | 345 | 4 | 263 |
| 7 | 2.5 | 83 | 171 | 312 | 275 | 135 | 35 | 83 | 201 | 334 | 3 | 283 |
| 8 | 2.5 | 197 | 184 | 312 | 275 | 135 | 34 | 83 | 257 | 312 | 2.5 | 282 |
| 9 | e5 | 305 | 183 | 312 | 275 | 135 | 34 | 118 | 305 | 312 | 2.5 | 282 |
| 10 | e8 | 328 | 170 | 312 | 270 | 135 | 34 | 270 | 305 | 312 | 90 | 260 |
| 11 | e8 | 341 | 170 | 312 | 270 | 135 | 34 | 270 | 305 | 312 | 209 | 258 |
| 12 | e8 | 341 | 170 | 310 | 270 | 225 | 34 | 270 | 305 | 309 | 223 | 256 |
| 13 | e8 | 254 | 170 | 310 | 285 | 337 | 19 | 267 | 305 | 260 | 223 | 255 |
| 14 | e8 | 168 | 168 | 309 | 285 | 330 | 6.5 | 249 | 305 | 286 | 223 | 255 |
| 15 | e8 | 145 | 168 | 307 | 260 | 346 | 5.1 | 154 | 305 | 230 | 223 | 255 |
| 16 | e8 | 145 | 168 | 305 | 260 | 360 | 5.1 | 136 | 305 | 220 | 228 | 253 |
| 17 | e8 | 143 | 167 | 305 | 260 | 358 | 4.8 | 12 | 305 | 218 | 236 | 251 |
| 18 | e8 | 143 | 166 | 301 | 260 | 322 | 4.8 | 11 | 303 | 217 | 236 | 250 |
| 19 | e8 | 200 | 176 | 298 | 255 | 305 | 4.8 | 11 | 301 | 217 | 236 | 248 |
| 20 | e8 | 234 | 186 | 294 | 255 | 294 | 4.8 | 11 | 301 | 220 | 236 | 248 |
| 21 | e31 | 233 | 186 | 242 | 250 | 291 | 4.4 | 11 | 301 | 220 | 233 | 248 |
| 22 | 80 | 233 | 222 | 209 | 250 | 291 | 4.0 | 11 | 301 | 220 | 233 | 288 |
| 23 | 99 | 204 | 243 | 205 | 220 | 291 | 5.1 | 11 | 300 | 220 | 233 | 295 |
| 24 | 64 | 180 | 243 | 205 | 190 | 247 | 7.0 | 11 | 300 | 220 | 233 | 140 |
| 25 | e11 | 183 | 243 | 205 | 190 | 223 | 6.3 | 210 | 300 | 220 | 231 | 19 |
| 26 | e11 | 180 | 243 | 205 | 190 | 220 | 6.3 | 319 | 298 | 220 | 230 | 6.3 |
| 27 | e11 | 180 | 241 | 205 | 185 | 236 | 95 | 240 | 298 | 220 | 230 | 5 |
| 28 | 109 | 178 | 241 | 250 | 185 | 226 | 248 | 200 | 298 | 220 | 230 | 4 |
| 29 | 304 | 198 | 241 | 287 | 185 | 154 | 327 | 200 | 298 | 218 | 230 | 3 |
| 30 | 339 | 212 | 241 | 287 | ----- | 33 | 334 | 221 | 298 | 218 | 230 | 2.5 |
| 31 | 339 | ----- | 241 | 287 | ----- | 33 | ----- | 255 | ----- | 217 | 230 | ----- |
| Total | 1,511.0 | 5,811 | 6,201 | 8,385 | 7,244 | 6,722 | 1,490.8 | 5,496 | 8,481 | 5,630.0 | 6,021.8 | |
| Mean | 48.7 | 194 | 200 | 270 | 250 | 217 | 49.7 | 177 | 283 | 256 | 182 | 201 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 341 | | | Min 0.3 | | Mean 111 | | Cfs/m - | | In. - | | |
| Water year 1959-60: Max | 368 | | | Min 2.5 | | Mean 194 | | Cfs/m - | | In. - | | |

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge estimated on basis of 1 discharge measurement and records of stage.

Note.--Stage-discharge relation affected by ice Jan. 8-10, 23-28, Feb. 2-5, Feb. 7 to Mar. 12. Water surface below weir crest Oct. 1-9, Aug. 4-10, Sept. 27-30; discharge estimated on the basis of 1 discharge measurement, engineers' and observer's notes.

340. Bond Falls Reservoir near Paulding, Mich.

Location.--Lat 46°24'29", long 89°07'42", in SW $\frac{1}{4}$ sec.1, T.46 N., R.39 W., at Bond Falls Dam on Middle Branch Ontonagon River, 2 $\frac{1}{4}$ miles east of Paulding.

Drainage area.--About 210 sq mi.

Records available.--June 1942 to September 1960. Prior to October 1950, published in WSP 1307.

Gage.--Staff gage read once daily. Datum of gage is 1,335.59 ft above mean sea level, datum of 1929.

Remarks.--Reservoir is formed by earthfill and concrete dam with one taintor gate; dam completed in 1937. Usable capacity, 1,730,000,000 cu ft between gage heights of 121 ft (maximum drawdown) and 141 ft (full pond). Dead storage unknown. Water diverted to South Branch Ontonagon River through Bond Falls Canal; water used for power production at Victoria Dam near Rockland.

Cooperation.--Gage-height record furnished by Upper Peninsula Power Co.

Month-end gage height and contents, water year October 1959 to September 1960

| Date | Gage height (feet) [†] | Contents (millions of cubic feet) | Change in contents (millions of cubic feet) |
|-------------------------|------------------------------------|---|---|
| Sept. 30..... | 134.66 | 1,180 | - |
| Oct. 31..... | 140.79 | 1,780 | +600 |
| Nov. 30..... | 139.47 | 1,640 | -140 |
| Dec. 31..... | 136.74 | 1,360 | -280 |
| Calendar year 1959..... | - | - | +610 |
| Jan. 31..... | 131.84 | 902 | -458 |
| Feb. 29..... | 126.65 | 485 | -417 |
| Mar. 31..... | 121.64 | 105 | -380 |
| Apr. 30..... | 139.25 | 1,610 | +1,503 |
| May 31..... | 141.00 | 1,800 | +190 |
| June 30..... | 138.07 | 1,500 | -300 |
| July 31..... | 133.87 | 1,100 | -400 |
| Aug. 31..... | 131.58 | 902 | -198 |
| Sept. 30..... | 129.33 | 709 | -193 |
| Water year 1959-60..... | - | - | -471 |

[†] Gage height at about 8:30 a.m.

345. Middle Branch Ontonagon River near Trout Creek, Mich.

Location.--Lat 46°28'45", long 89°05'25", in sec.8, T.47 N., R.38 W., on right bank 0.1 mile upstream from State Highway 28, 3½ miles west of village of Trout Creek, and 6½ miles downstream from Bond Falls Reservoir.

Drainage area.--About 225 sq mi.

Records available.--June 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,132.03 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Nov. 4, 1942, staff gage at same site and datum.

Average discharge.--18 years, 81.6 cfs.

Extremes.--Maximum discharge during year, 782 cfs May 11 (gage height, 3.78 ft); minimum, 38 cfs Apr. 10 (gage height, 1.55 ft).

1942-60: Maximum discharge, 1,750 cfs Nov. 7, 1951 (gage height, 5.05 ft); minimum, 14 cfs sometime during period Jan. 23 to Feb. 13, 1947 (gage height, 1.14 ft, from recorded range in stage), caused by ice jams upstream.

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are good. Flow regulated by Bond Falls Reservoir (see preceding page). Diversion to South Branch Ontonagon River by Bond Falls Canal (see p. 36).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 1.6 | 43 | 1.6 | 43 | 3.0 | 418 |
| 2.0 | 116 | 2.0 | 116 | 3.8 | 792 |
| | | 2.5 | 240 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|-------|-----------|--------|--------|-------|-------|-------|-------|
| 1 | 50 | 76 | 49 | 48 | a49 | b49 | 49 | 63 | 60 | 55 | 54 | 52 |
| 2 | 52 | 67 | *49 | b50 | a49 | b49 | 50 | 60 | 58 | 55 | 54 | 48 |
| 3 | 62 | 72 | 49 | 50 | *a50 | 49 | 54 | 58 | 60 | 55 | *54 | 49 |
| 4 | 55 | 72 | 50 | b50 | 50 | b49 | 52 | 65 | 58 | 55 | 54 | 44 |
| 5 | *52 | 74 | 50 | b50 | 49 | b49 | 50 | 86 | 58 | *55 | 54 | 44 |
| 6 | 54 | 74 | 50 | *b50 | 49 | b49 | 52 | 193 | 58 | 55 | 54 | 44 |
| 7 | 52 | 74 | 50 | b50 | 49 | b49 | 50 | 360 | *58 | 55 | 60 | *46 |
| 8 | 54 | 74 | 49 | 50 | 49 | b49 | 50 | 544 | 56 | 55 | 55 | 49 |
| 9 | 58 | 74 | 49 | b50 | 48 | b48 | 49 | 722 | 56 | 55 | 56 | 49 |
| 10 | 54 | 74 | 49 | 50 | 48 | b48 | 48 | 767 | 58 | 55 | 55 | 48 |
| 11 | 54 | 76 | 50 | b49 | 46 | b48 | 54 | 757 | 58 | 55 | 55 | 48 |
| 12 | 54 | 74 | 50 | 49 | 46 | b48 | 62 | 742 | 58 | 54 | 54 | 46 |
| 13 | 52 | 74 | 50 | 49 | b47 | 48 | 94 | 564 | 56 | 55 | 54 | 48 |
| 14 | 50 | b66 | 50 | 49 | b48 | b48 | 116 | 358 | 56 | 55 | 54 | 48 |
| 15 | 50 | b54 | 49 | 48 | 49 | b48 | 92 | 272 | 56 | 54 | 54 | 48 |
| 16 | 54 | b50 | 49 | 48 | 49 | b48 | 78 | 191 | 62 | 54 | 52 | 49 |
| 17 | 52 | b50 | 49 | 46 | 49 | 49 | 63 | 526 | 58 | 54 | 52 | 48 |
| 18 | 52 | b50 | 49 | 50 | b49 | 50 | 55 | 742 | 58 | 54 | 58 | 48 |
| 19 | 50 | b50 | 48 | 49 | 49 | 48 | 54 | 737 | 58 | 54 | 58 | 48 |
| 20 | 50 | 50 | 48 | 48 | 49 | 48 | 54 | 737 | 56 | 54 | 55 | 48 |
| 21 | 49 | b50 | 48 | 46 | 48 | b48 | 54 | 737 | 56 | 55 | 54 | 48 |
| 22 | 50 | b50 | 48 | 48 | 49 | 49 | 54 | 678 | 56 | 62 | 54 | 48 |
| 23 | 52 | 50 | 50 | 48 | 49 | b48 | 137 | 472 | 56 | 56 | 54 | 48 |
| 24 | 96 | 50 | 50 | 48 | b49 | 48 | 200 | 355 | 60 | 55 | 54 | 52 |
| 25 | 88 | 50 | 52 | a49 | 49 | b48 | 88 | 222 | 56 | 56 | 54 | 50 |
| 26 | 63 | 50 | 54 | a49 | 49 | 48 | 74 | 84 | 56 | 56 | 54 | 49 |
| 27 | 56 | 50 | 52 | a49 | 49 | 48 | 63 | 62 | 56 | 55 | 54 | 49 |
| 28 | 55 | 50 | 52 | a49 | b49 | 49 | 58 | 62 | 56 | 54 | 72 | 48 |
| 29 | 62 | 50 | 50 | a49 | b49 | 50 | 71 | 62 | 56 | 54 | 58 | 49 |
| 30 | 76 | 49 | 49 | a49 | ----- | 54 | 74 | 62 | 55 | 55 | 55 | 49 |
| 31 | 76 | ----- | 48 | a49 | ----- | 50 | ----- | 60 | ----- | 54 | 54 | ----- |
| Total | 1,784 | 1,824 | 1,539 | 1,516 | 1,411 | 1,511 | 2,099 | 11,401 | 1,718 | 1,705 | 1,713 | 1,441 |
| Mean | 57.5 | 60.8 | 49.6 | 48.9 | 48.7 | 48.7 | 70.0 | 368 | 57.3 | 55.0 | 55.3 | 48.0 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 103 | | | Min 43 | | Mean 53.2 | Cfsm - | In. - | | | | |
| Water year 1959-60: Max | 767 | | | Min 44 | | Mean 81.0 | Cfsm - | In. - | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of 1 discharge measurement and records of released flow from Bond Falls Dam.

b Stage-discharge relation affected by ice.

350. East Branch Ontonagon River near Mass, Mich.

Location.--Lat 46°41'20", long 89°04'20", on line between secs. 32 and 33, T.50 N., R.38 W., on right bank 700 ft downstream from highway bridge, 1,000 ft downstream from Adventure Creek, 5 miles south of Mass, and 6½ miles upstream from mouth.

Drainage area.--265 sq mi.

Records available.--July 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 873.55 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Oct. 1, 1949, wire-weight gage at bridge 700 ft upstream at same datum.

Average discharge.--18 years, 263 cfs.

Extremes.--Maximum discharge during year, 4,410 cfs Apr. 24 (gage height, 10.65 ft); minimum, 111 cfs Aug. 5, 6, 7 (gage height, 3.51 ft).

1942-60: Maximum discharge, 4,590 cfs July 1, 1953 (gage height, 10.57 ft); maximum gage height, that of Apr. 24, 1960; minimum discharge, 60 cfs Aug. 25, 1948 (gage height, 3.55 ft, from graph based on gage readings, site then in use).

Remarks.--Records excellent except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.5 | 109 | 7.0 | 1,450 |
| 4.0 | 212 | 9.0 | 2,880 |
| 5.0 | 515 | 10.7 | 4,460 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 339 | 354 | 180 | 130 | 145 | 140 | 450 | 757 | 282 | 207 | 127 | 231 |
| 2 | 279 | 328 | 185 | 140 | 150 | *135 | 600 | 631 | 290 | 186 | 125 | 234 |
| 3 | 523 | *290 | *190 | 150 | *155 | 135 | 660 | 555 | 322 | 181 | *122 | 198 |
| 4 | 478 | 265 | 190 | 130 | 155 | 130 | 700 | 673 | 313 | 177 | 114 | 168 |
| 5 | 351 | 252 | 190 | 120 | 155 | 130 | 550 | 664 | 259 | 166 | 113 | 150 |
| 6 | *279 | 226 | 190 | *130 | 155 | 130 | 420 | 828 | 231 | *156 | 111 | 140 |
| 7 | 239 | 224 | 190 | 140 | 150 | 130 | 360 | 868 | 217 | 148 | 144 | *135 |
| 8 | 222 | 270 | 190 | 145 | 145 | 150 | 502 | 792 | *205 | 144 | 181 | 166 |
| 9 | 252 | 259 | 190 | 145 | 140 | 125 | 259 | 740 | 193 | 142 | 162 | 210 |
| 10 | 236 | 270 | 190 | 140 | 135 | 125 | 246 | 908 | 186 | 140 | 154 | 186 |
| 11 | 219 | 290 | 195 | 140 | 130 | 125 | 313 | 944 | 200 | 138 | 142 | 156 |
| 12 | 236 | 270 | 195 | 140 | 130 | 125 | *770 | 757 | 214 | 138 | 129 | 146 |
| 13 | 236 | 249 | 195 | 140 | 130 | 125 | 1,740 | 639 | 200 | 133 | 123 | 138 |
| 14 | 219 | 226 | 190 | 140 | 130 | 125 | *2,350 | 531 | 186 | 136 | 129 | 135 |
| 15 | 200 | 193 | 195 | 140 | 135 | 125 | 2,030 | 441 | 177 | 142 | 142 | 131 |
| 16 | 290 | 230 | 200 | 140 | 140 | 120 | 1,830 | 373 | 217 | 148 | 127 | 129 |
| 17 | 310 | 215 | 195 | 135 | 140 | 120 | 1,210 | 955 | 319 | 148 | 120 | 129 |
| 18 | 262 | 200 | 190 | 135 | 145 | 120 | 801 | 974 | 290 | 146 | 157 | 129 |
| 19 | 226 | 205 | 170 | 135 | 150 | 120 | 643 | 673 | 270 | 140 | 589 | 129 |
| 20 | 205 | 215 | 160 | 130 | 150 | 120 | 595 | 539 | 222 | 135 | 207 | 127 |
| 21 | 188 | 220 | 180 | 130 | 150 | 120 | 689 | 464 | 195 | 212 | 154 | 125 |
| 22 | 179 | 225 | 160 | 130 | 150 | 120 | 557 | 489 | 195 | 214 | 153 | 123 |
| 23 | 188 | 220 | 165 | 130 | 150 | 120 | 1,370 | 420 | 207 | 202 | 125 | 123 |
| 24 | 756 | 215 | 170 | 130 | 150 | 120 | 3,890 | 367 | 226 | 164 | 122 | 150 |
| 25 | 1,430 | 210 | 175 | 130 | 150 | 120 | 2,900 | 322 | 338 | 158 | 122 | 252 |
| 26 | 841 | 205 | 180 | 135 | 145 | 130 | 1,440 | 293 | 257 | 195 | 122 | 244 |
| 27 | 639 | 195 | 210 | 135 | 145 | 150 | 980 | 270 | 210 | 175 | 123 | 195 |
| 28 | 478 | 185 | 250 | 140 | 145 | 170 | 711 | 257 | 219 | 152 | 436 | 164 |
| 29 | 375 | 180 | 250 | 140 | 140 | 200 | 852 | 249 | 249 | 158 | 511 | 158 |
| 30 | 331 | 180 | 200 | 140 | ----- | 250 | 944 | 293 | 249 | 135 | 334 | 158 |
| 31 | 351 | ----- | 160 | 145 | ----- | 320 | ----- | 322 | ----- | 131 | 236 | ----- |
| Total | 11,355 | 7,066 | 5,630 | 4,230 | 4,190 | 4,355 | 31,152 | 17,988 | 7,134 | 4,927 | 5,636 | 4,861 |
| Mean | 366 | 236 | 188 | 138 | 144 | 140 | 1,038 | 580 | 238 | 159 | 182 | 162 |
| Cfsm | 1.38 | 0.891 | 0.709 | 0.513 | 0.543 | 0.528 | 3.92 | 2.19 | 0.898 | 0.600 | 0.687 | 0.611 |
| In. | 1.59 | 0.99 | 0.82 | 0.59 | 0.59 | 0.61 | 4.37 | 2.52 | 1.00 | 0.69 | 0.79 | 0.68 |

Calendar year 1959: Max 1,430 Min 87 Mean 246 Cfsm 0.928 In. 12.57
 Water year 1959-60: Max 3,890 Min 111 Mean 297 Cfsm 1.12 In. 15.24

Peak discharge (base, 1,400 cfs).--Oct. 25 (2 a.m.) 1,780 cfs (7.53 ft); Apr. 14 (8:30 p.m.) 2,840 cfs (8.95 ft); Apr. 24 (6 a.m.) 4,410 cfs (10.65 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 8, 11, 12, Nov. 16 to Apr. 5.

355. Middle Branch Ontonagon River near Rockland, Mich.

Location.--Lat 46°41'57", long 89°09'36", in SE¹ sec.27, T.50 N., R.39-W., on downstream side of bridge on U. S. Highway 45, 700 ft downstream from East Branch and 2.8 miles southeast of Rockland.

Drainage area.--670 sq mi, approximately

Records available.--July 1942 to September 1960.

Gage.--Wire-weight gage read once daily. Datum of gage is 661.1 ft above mean sea level, datum of 1929. Prior to Apr. 1, 1959, at site 400 ft upstream at same datum.

Average discharge.--18 years, 543 cfs.

Extremes.--Maximum discharge during year, 16,100 cfs Apr. 24 (gage height, 15.44 ft, from floodmark), from rating curve extended above 5,300 cfs by logarithmic plotting; minimum daily, 200 cfs Mar. 16-25.
1942-60: Maximum discharge, 27,000 cfs Aug. 22, 1942 (gage height, 21.2 ft, from floodmarks), from rating curve extended above 7,500 cfs on basis of slope-area measurement of peak flow; minimum observed, 157 cfs Dec. 1, 1948.

Remarks.--Records good except those for periods of ice effector no gage-height record, or those above 2,000 cfs, which are fair. Flow regulated by Bond Falls Reservoir (see p. 36). Diversion to South Branch Ontonagon River by Bond Falls Canal (see p. 36).

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 23

Apr. 24 to Sept. 30

| | | | | | | | |
|-----|-----|------|-------|-----|-------|------|--------|
| 4.0 | 165 | 7.0 | 2,900 | 4.3 | 160 | 13.0 | 11,800 |
| 4.5 | 440 | 10.0 | 7,000 | 5.0 | 755 | 15.0 | 15,300 |
| 5.0 | 780 | | | 7.0 | 2,900 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------------|------------|------------|-------|------------|------------|---------------|--------------|------------|------------|-------|
| 1 | 536 | a560 | 320 | 270 | 235 | 230 | 850 | 1,540 | 424 | 348 | 252 | a410 |
| 2 | 446 | 548 | 320 | 240 | 240 | *230 | 1,210 | 1,120 | 424 | 275 | 252 | a400 |
| 3 | 1,280 | 494 | *320 | 225 | *240 | 225 | 1,840 | 950 | 450 | 298 | *245 | a340 |
| 4 | 951 | *402 | 320 | 215 | 240 | 225 | 1,550 | 1,150 | 450 | 268 | 252 | a300 |
| 5 | 595 | 407 | 320 | 205 | 240 | 220 | 1,170 | 1,330 | 407 | 260 | 238 | a260 |
| 6 | | *476 | 407 | a320 | *210 | 240 | a215 | 987 | 1,660 | 348 | *245 | 290 |
| 7 | | 412 | 396 | 310 | 220 | a235 | 215 | 789 | 1,850 | 356 | 275 | 260 |
| 8 | | 385 | a400 | 310 | 230 | 230 | 210 | 630 | 1,870 | *314 | 260 | 356 |
| 9 | | 524 | 412 | 310 | 240 | 225 | 210 | 548 | 2,250 | 339 | 268 | 305 |
| 10 | | 452 | 420 | 310 | a240 | 220 | 210 | <u>548</u> | <u>3,320</u> | <u>282</u> | 252 | 305 |
| 11 | | 407 | 430 | 320 | 235 | 215 | 210 | 825 | 3,320 | 330 | 260 | 275 |
| 12 | | 429 | 420 | 320 | 230 | 210 | 205 | *2,310 | 2,140 | 382 | 252 | 275 |
| 13 | | 434 | 400 | a330 | 230 | 210 | a205 | 5,260 | 1,670 | 314 | 252 | 268 |
| 14 | | 390 | 370 | 330 | 230 | a210 | 205 | *6,400 | 1,250 | 305 | 268 | 260 |
| 15 | | 363 | a350 | 330 | 230 | 220 | 205 | *4,560 | 950 | 290 | 268 | a250 |
| 16 | | 530 | 340 | 330 | 230 | 225 | 200 | 3,960 | 755 | 350 | 282 | 268 |
| 17 | | 588 | 330 | 330 | a230 | 235 | 200 | 2,420 | 3,200 | 511 | 275 | 245 |
| 18 | | 476 | 330 | 320 | 225 | 240 | 200 | 1,350 | 2,560 | 493 | 260 | a300 |
| 19 | | 412 | 340 | 300 | 220 | 245 | 200 | 1,120 | 1,830 | 432 | 252 | a300 |
| 20 | | 368 | 350 | a290 | 215 | <u>250</u> | 200 | 1,060 | 1,590 | 373 | 260 | a400 |
| 21 | | 352 | 360 | 290 | 215 | a250 | 200 | 1,290 | 1,450 | 339 | 305 | a300 |
| 22 | | <u>324</u> | a360 | <u>280</u> | 215 | 250 | 200 | 1,140 | 1,550 | 305 | <u>390</u> | a250 |
| 23 | | 336 | 360 | 290 | 215 | 250 | 200 | 5,190 | 1,350 | 339 | 373 | a240 |
| 24 | | 2,090 | 350 | 290 | a215 | 245 | 200 | <u>14,400</u> | 920 | 322 | 339 | a230 |
| 25 | | <u>3,600</u> | 340 | a300 | a215 | 240 | 200 | 4,560 | 831 | 464 | 282 | a230 |
| 26 | | 1,700 | a330 | 320 | a220 | 240 | 210 | *2,780 | 502 | 398 | 373 | a230 |
| 27 | | 1,100 | 330 | 350 | a220 | 240 | 240 | 1,870 | 424 | 330 | 356 | a240 |
| 28 | | 798 | <u>320</u> | 400 | a225 | a240 | 280 | 1,320 | 407 | 330 | 298 | a700 |
| 29 | | 616 | a320 | <u>420</u> | 230 | 235 | 330 | 1,870 | <u>339</u> | 348 | 252 | a900 |
| 30 | | 560 | 320 | 360 | 230 | ----- | 450 | 2,140 | 441 | 373 | 260 | a600 |
| 31 | | 581 | ----- | 310 | a235 | ----- | <u>500</u> | ----- | <u>464</u> | ----- | 260 | a450 |
| Total | 22,691 | 11,496 | 9,970 | 7,005 | 6,795 | 7,330 | 75,563 | 44,963 | 11,142 | 8,865 | 10,585 | 8,517 |
| Mean | 732 | 383 | 322 | 226 | 234 | 236 | 2,519 | 1,450 | 371 | 286 | 341 | 284 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 4,490 Min 170 Mean 473 Cfsm - In. -
Water year 1959-60: Max 14,400 Min 200 Mean 615 Cfsm - In. -

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records of discharge at Victoria Dam and nearby stations.

Note.--Stage-discharge relation affected by ice Nov. 10 to Apr. 1.

360. West Branch Ontonagon River near Bergland, Mich.

Location.--Lat 46°35'30", long 89°32'20", in sec.3, T.48 N., R. 42 W., on right bank a quarter of a mile downstream from dam at outlet of Gogebic Lake and 1 1/4 miles east of Bergland.

Drainage area.--160 sq mi.

Records available.--July 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,290.81 ft above mean sea level, datum of 1929. Prior to Nov. 5, 1942, staff gage a quarter of a mile upstream at different datum.

Average discharge.--18 years, 176 cfs.

Extremes.--Maximum discharge during year, 1,400 cfs Apr. 26 (gage height, 5.58 ft); minimum daily, 0.9 cfs Oct. 6-14.
1942-60: Maximum discharge, that of Apr. 26, 1960; minimum daily, that of Oct. 6-14, 1959; minimum gage height observed, 0.16 ft Oct. 6, 1959.

Remarks.--Records excellent except those below 20 cfs, which are poor. Flow regulated by Gogebic Lake (capacity, about 50,000 acre-ft).

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Apr. 26 | | | | | Apr. 27 to Sept. 30 | | | | |
|-------------------|-----|-----|-------|--|---------------------|-----|-----|-------|--|
| 0.1 | 0.3 | 2.0 | 82 | | 0.3 | 2.2 | 1.9 | 75 | |
| .2 | 1.4 | 2.5 | 150 | | .4 | 3.6 | 2.4 | 135 | |
| .3 | 2.8 | 3.0 | 255 | | .6 | 9.0 | 3.0 | 255 | |
| .5 | 6.6 | 4.0 | 565 | | .9 | 19 | 4.0 | 565 | |
| .8 | 15 | 6.0 | 1,410 | | 1.4 | 41 | 6.0 | 1,410 | |
| 1.5 | 46 | | | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|----------|--------|-------|---------|-------|-------|
| 1 | a1 | a16 | 176 | 255 | 262 | 150 | a75 | 1,260 | 250 | a46 | 93 | a58 |
| 2 | a1 | a16 | *214 | 232 | *255 | 147 | a5 | 1,210 | 230 | a2.5 | 83 | 138 |
| 3 | a1 | 58 | 188 | 214 | 248 | 143 | a5 | 1,150 | 228 | a2.5 | *78 | 138 |
| 4 | a1 | 147 | 174 | 212 | 213 | 142 | a5 | 1,120 | 150 | a58 | 74 | 123 |
| 5 | a1 | 203 | 168 | 219 | 224 | 140 | *a5 | 1,090 | 105 | 80 | 72 | 130 |
| 6 | *a.9 | 248 | 218 | 212 | 237 | 136 | a5 | 1,020 | 146 | 79 | 73 | 128 |
| 7 | a.9 | 273 | 253 | 225 | 234 | 118 | a5 | 960 | *169 | 97 | 159 | *123 |
| 8 | a.9 | 239 | 288 | 228 | 210 | 115 | a5 | 952 | 167 | 95 | 180 | a56 |
| 9 | a.9 | a123 | 281 | 219 | 223 | 114 | a5 | 912 | 165 | 92 | 186 | a74 |
| 10 | a.9 | 17 | 286 | 217 | 214 | 114 | a5 | 872 | 149 | 103 | 188 | 128 |
| 11 | a.9 | 20 | 315 | 221 | 212 | 118 | a7.5 | 888 | 129 | 100 | 156 | 107 |
| 12 | a.9 | 21 | 309 | 221 | 210 | 124 | a7.5 | 880 | 126 | 90 | 145 | 107 |
| 13 | a.9 | 19 | 234 | 221 | 203 | 122 | a3 | 840 | 120 | 61 | 135 | 99 |
| 14 | a.9 | 22 | 252 | 221 | 197 | 120 | a2 | 816 | 119 | 59 | 116 | 97 |
| 15 | a20 | 24 | 294 | 230 | 195 | 117 | a12 | 776 | 116 | 61 | 112 | 91 |
| 16 | 58 | 122 | 299 | 239 | 190 | 114 | 85 | 744 | 86 | 55 | 128 | 105 |
| 17 | 53 | 189 | 296 | 237 | 190 | 113 | 214 | 752 | 69 | 52 | 138 | 99 |
| 18 | 48 | 186 | 294 | 244 | 186 | 112 | 299 | 760 | 128 | 49 | 124 | 93 |
| 19 | 56 | 182 | 283 | 246 | 182 | 109 | 348 | 704 | 117 | 42 | 128 | 87 |
| 20 | 71 | 174 | 291 | 246 | 180 | 108 | 294 | 676 | 114 | 43 | 120 | 88 |
| 21 | 157 | 172 | 288 | 250 | 176 | 106 | 239 | 848 | 114 | 48 | 116 | 86 |
| 22 | 164 | 139 | 294 | 306 | 176 | 105 | 269 | 586 | 111 | 83 | 108 | 75 |
| 23 | 142 | 63 | 296 | 351 | 174 | 103 | 503 | 395 | 105 | a42 | 97 | a55 |
| 24 | a74 | 62 | 286 | 340 | 170 | 103 | 1,100 | 299 | 101 | a63 | 100 | a185 |
| 25 | a3 | 109 | 291 | 331 | 166 | 103 | 1,330 | 299 | 107 | a64 | 103 | 286 |
| 26 | a3.5 | 150 | 271 | 318 | 164 | 99 | 1,380 | 294 | 106 | a37 | 101 | 269 |
| 27 | a3.5 | 147 | 191 | 304 | 163 | 97 | *1,360 | 189 | 107 | 102 | 102 | 281 |
| 28 | a3.5 | 163 | 90 | 296 | 157 | 95 | 1,320 | 107 | 102 | 105 | 119 | 276 |
| 29 | a5 | 182 | a84 | 288 | 154 | 95 | 1,300 | 112 | 108 | 97 | 134 | 253 |
| 30 | a7 | 170 | 241 | 278 | | 101 | 1,270 | 138 | 92 | 96 | a76 | 244 |
| 31 | a16 | | 260 | 271 | | 101 | | 266 | | 100 | a3 | |
| Total | 897.6 | 3,666 | 7,705 | 7,892 | 5,765 | 3,584 | 11,463.0 | 21,715 | 3,936 | 2,102.0 | 3,547 | 4,079 |
| Mean | 29.0 | 122 | 249 | 255 | 199 | 116 | 382 | 700 | 131 | 67.8 | 114 | 136 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 512 Min 0.9 Mean 114 Cfsm 0.712 In. 9.67
Water year 1959-60: Max 1,380 Min 0.9 Mean 209 Cfsm 1.31 In. 17.83

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of discharge measurements, observer's notes, and records of stage at site 1/4 mile upstream.

375. Cisco Branch Ontonagon River at Cisco Lake Outlet, Mich.

Location.--Lat 46°15', long 89°27', in sec.32, T.45 N., R.41 W., on right bank 80 ft downstream from Cisco Lake Dam, 2½ miles upstream from Langford Lake Outlet, 4½ miles upstream from U. S. Highway 2, and 13 miles southwest of Watersmeet.

Drainage area.--50 sq mi, approximately.

Records available.--October 1944 to September 1960.

Gage.--Staff gage read once daily. Datum of gage is 1,676.69 ft above mean sea level, datum of 1929.

Average discharge.--16 years, 46.6 cfs.

Extremes.--Maximum daily discharge during year, 235 cfs Apr. 27, 28 (gage height, 1.86 ft); minimum daily, 0.9 cfs Aug. 5, 6, 22-27, 1944-60; Maximum discharge, 288 cfs May 1-4, 1951 (gage height, 2.10 ft); minimum daily, 0.2 cfs May 29 to June 17, 1948.

Remarks.--Records good. Flow regulated by Cisco Lake (usable capacity, 15,600 acre-ft).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 0.1 | 0.7 | 0.6 | 23 |
| .2 | 2.4 | .9 | 52 |
| .3 | 5.4 | 1.2 | 93 |
| .4 | 9.8 | 2.0 | 270 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|---------|-------|---------|
| 1 | 189 | 75 | 93 | 68 | 48 | *50 | 62 | 230 | 48 | 93 | 5.4 | 134 |
| 2 | 182 | *70 | 67 | 68 | 48 | 50 | 67 | 204 | 48 | 93 | 2.4 | 173 |
| 3 | 182 | 70 | 55 | 68 | 45 | 48 | 70 | 191 | 48 | 78 | 1.6 | 173 |
| 4 | 182 | 68 | *52 | 68 | *45 | 45 | 70 | 191 | 48 | 56 | *1.2 | 173 |
| 5 | 123 | 70 | 52 | 68 | 37 | 38 | *70 | 157 | 48 | 43 | .2 | 173 |
| 6 | *81 | 73 | 52 | 68 | 33 | 29 | 70 | 137 | *48 | 23 | .9 | *155 |
| 7 | 73 | 70 | 58 | *56 | 33 | 28 | 70 | 137 | 48 | *6.2 | 2.0 | 120 |
| 8 | 73 | 68 | 75 | 48 | 31 | 26 | 70 | 137 | 48 | 6.2 | 9.8 | 93 |
| 9 | 73 | 70 | 81 | 48 | 29 | 26 | 70 | 142 | 48 | 6.2 | 36 | 93 |
| 10 | 73 | 70 | 81 | 39 | 28 | 26 | 70 | 142 | 48 | 6.2 | 45 | 50 |
| 11 | 42 | 68 | 78 | 35 | 28 | 26 | 60 | 142 | 48 | 6.2 | 45 | 12 |
| 12 | 23 | 68 | 75 | 35 | 28 | 26 | 55 | 142 | 48 | 5.4 | 45 | 4.0 |
| 13 | 23 | 68 | 75 | 33 | 28 | 26 | 55 | 148 | 48 | 5.4 | 45 | 4.0 |
| 14 | 27 | 68 | 75 | 33 | 28 | 26 | 71 | 142 | 32 | 5.4 | 43 | 4.0 |
| 15 | 58 | 111 | 75 | 33 | 28 | 26 | *78 | 128 | 26 | 5.4 | 43 | 4.0 |
| 16 | 73 | 133 | 73 | 33 | 28 | 26 | 84 | 118 | 26 | 5.4 | 43 | 4.0 |
| 17 | 73 | 133 | 73 | 33 | 28 | 26 | 80 | 151 | 26 | 20 | 39 | 4.0 |
| 18 | 57 | 133 | 73 | 33 | 28 | 26 | 58 | 164 | 61 | 28 | 33 | 4.0 |
| 19 | 50 | 118 | 70 | 33 | 28 | 26 | 31 | 164 | 48 | 28 | 33 | 4.0 |
| 20 | 31 | 110 | 70 | 33 | 28 | 26 | 23 | 164 | 42 | 28 | 15 | 4.0 |
| 21 | 22 | 107 | 56 | 33 | 28 | 26 | 19 | 164 | 48 | 28 | 3.2 | 4.0 |
| 22 | 22 | 107 | 50 | 33 | 41 | 26 | 17 | 159 | 48 | 69 | .9 | 4.0 |
| 23 | 22 | 103 | 62 | 33 | 48 | 26 | 16 | 159 | 48 | 84 | .9 | 4.0 |
| 24 | 48 | 103 | 68 | 33 | 48 | 26 | 77 | 134 | 50 | 81 | .9 | 22 |
| 25 | 107 | 107 | 68 | 33 | 48 | 26 | 167 | 99 | 64 | 63 | .9 | 40 |
| 26 | 139 | 107 | 68 | 33 | 50 | 28 | 222 | 90 | 70 | 90 | .9 | 45 |
| 27 | 151 | 103 | 68 | 35 | 50 | 28 | 235 | 82 | 70 | 64 | .9 | 66 |
| 28 | 155 | 96 | 70 | 45 | 52 | 28 | 235 | 78 | 94 | 68 | 74 | 85 |
| 29 | 124 | 96 | 70 | 50 | 50 | 28 | 230 | 58 | 100 | 65 | 125 | 115 |
| 30 | 114 | 96 | 70 | 50 | ----- | 50 | 230 | 48 | 96 | 29 | 121 | 125 |
| 31 | 95 | ----- | 68 | 50 | ----- | 62 | ----- | 48 | ----- | 6.7 | 121 | ----- |
| Total | 2,687 | 2,737 | 2,121 | 1,361 | 1,072 | 980 | 2,732 | 4,244 | 1,571 | 1,235.7 | 938.8 | 1,895.0 |
| Mean | 86.7 | 91.2 | 68.4 | 43.9 | 37.0 | 31.6 | 91.1 | 137 | 52.4 | 39.9 | 30.3 | 63.2 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 255 | | | Min | 1.7 | Mean | 42.6 | Cfs/m | 0.852 | In. | 11.57 | |
| Water year 1959-60: Max | 235 | | | Min | 0.9 | Mean | 64.4 | Cfs/m | 1.29 | In. | 17.56 | |

* Discharge measurement made on this day.

395. South Branch Ontonagon River at Ewen, Mich.

Location.--Lat 46°32'05", long 89°16'30", in sec.26, T.48 N., R.40 W., on left bank on piers of old State Highway M28 bridge in Ewen.

Drainage area.--About 320 sq mi.

Records available.--April 1942 to September 1960.

Gage.--Staff gage, read twice daily, and crest-stage gage. Datum of gage is 1,113.04 ft above mean sea level, datum of 1929. Prior to Jan. 16, 1943, reference mark or chain gage on upstream side of bridge at same site and datum.

Average discharge.--18 years, 494 cfs.

Extremes.--Maximum discharge during year, 13,500 cfs Apr. 24 (gage height, 22.07 ft, from floodmark), from rating curve extended above 6,400 cfs on basis of contracted-opening measurement of peak flow; minimum, 123 cfs Aug. 6 (gage height, 1.18 ft).

1942-60: Maximum discharge, that of Apr. 24, 1960; minimum observed, 76 cfs Sept. 23, 1948, June 7, Aug. 9, 22, 1949 (gage height, 0.88 ft).

Revisions.--The minimum discharge for the water year 1954 has been revised to 224 cfs Nov. 7, 1953 (gage height, 2.23 ft), superseding figure published in WSP 1337.

Remarks.--Records good except those for periods of ice effect, which are fair. Some diversion from Middle Branch Ontonagon River by Bond Falls Canal (see p. 36). Some regulation at medium and low flows by Cisco Lake (usable capacity, 15,600 acre-ft).

Revisions (water years).--WSP 1307: 1942(M). Revised figures of discharge, in cubic feet per second, for the water year 1954, superseding those published in WSP 1337, are given herewith:

| Date | Discharge | Date | Discharge | Date | Discharge | Date | Discharge |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1954 | | 1954-Con. | | 1954-Con. | | 1954-Con. | |
| Mar. 18 | 340 | Mar. 23 | 280 | Mar. 28 | 300 | Apr. 2 | 250 |
| 19 | 340 | 24 | 280 | 29 | 290 | 3 | 250 |
| 20 | 330 | 25 | 290 | 30 | 280 | 4 | 250 |
| 21 | 310 | 26 | 300 | 31 | 270 | 5 | 290 |
| 22 | 300 | 27 | 300 | Apr. 1 | 260 | | |
| Month | | | | Cfs-days | Maximum | Minimum | Mean |
| March 1954..... | | | | 9,870 | 370 | 250 | 318 |
| April..... | | | | 50,284 | 4,370 | 250 | 1,676 |
| Water year 1955-54..... | | | | 220,599 | 4,370 | 232 | 604 |
| Calendar year 1954..... | | | | 243,654 | 4,370 | 204 | 666 |

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Rate of change in stage used as a factor Apr. 14-18, 24-27)

| | | | |
|------|-------|------|--------|
| 1.2 | 125 | 16.0 | 4,360 |
| 3.0 | 356 | 19.0 | 6,800 |
| 6.0 | 910 | 21.0 | 10,500 |
| 12.0 | 2,520 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 833 | 892 | 540 | 410 | 430 | 340 | 581 | 1,980 | 561 | 511 | 342 | 554 |
| 2 | 738 | 831 | 550 | 380 | 430 | 330 | 654 | 1,620 | 548 | 503 | 313 | 577 |
| 3 | 917 | *561 | 520 | 360 | 430 | 320 | 762 | 1,360 | 550 | 502 | 298 | 559 |
| 4 | 1,090 | 450 | 500 | 360 | 420 | 290 | 875 | 1,280 | 538 | 490 | 283 | 559 |
| 5 | 888 | 470 | 470 | *360 | 420 | 280 | 857 | 1,380 | 468 | 476 | 190 | 546 |
| 6 | *668 | 516 | 433 | 390 | 410 | 280 | 822 | 1,640 | 441 | *450 | 125 | 559 |
| 7 | 550 | 519 | 418 | 420 | 410 | 280 | 712 | 1,400 | *431 | 482 | 135 | *548 |
| 8 | 526 | 516 | 354 | 440 | 410 | 280 | 600 | 1,420 | 422 | 425 | 180 | 555 |
| 9 | 539 | 537 | 350 | 430 | 410 | 280 | 522 | 1,260 | 486 | 407 | 161 | 520 |
| 10 | 563 | 636 | 360 | 430 | 410 | 280 | 452 | 1,550 | 486 | 398 | 199 | 555 |
| 11 | 516 | 754 | 350 | 420 | 410 | 280 | *566 | 1,940 | 514 | 396 | 303 | 506 |
| 12 | 487 | 738 | 340 | 420 | 400 | 350 | 998 | 1,980 | 505 | 391 | 358 | 482 |
| 13 | 465 | 698 | 330 | 420 | 400 | 470 | 1,900 | 1,700 | 498 | 327 | 374 | 450 |
| 14 | 412 | 554 | 330 | 410 | 400 | 490 | *3,490 | 1,400 | 476 | 300 | 360 | 390 |
| 15 | 369 | 520 | 320 | 410 | 400 | 490 | 4,390 | 1,100 | 471 | 258 | 346 | 370 |
| 16 | 378 | 540 | 320 | 410 | 400 | 500 | 3,930 | 873 | 481 | 303 | 332 | 356 |
| 17 | 449 | 560 | 320 | 410 | 400 | 510 | 3,180 | 1,320 | 570 | 290 | 337 | 353 |
| 18 | 454 | 560 | 320 | 410 | 400 | 510 | 2,130 | 1,760 | 600 | 292 | 340 | 350 |
| 19 | 415 | 580 | 330 | 410 | 400 | 500 | 1,380 | 1,310 | 588 | 300 | 342 | 345 |
| 20 | 353 | 640 | 330 | 400 | 400 | 470 | 1,020 | 932 | 550 | 307 | 334 | 340 |
| 21 | 310 | 650 | 340 | 400 | 400 | 460 | 943 | 790 | 503 | 313 | 321 | 335 |
| 22 | 320 | 640 | 360 | 350 | 400 | 450 | 903 | 738 | 500 | 505 | 311 | 330 |
| 23 | 361 | 620 | 400 | 330 | 390 | 450 | 1,500 | 688 | 489 | 522 | 300 | 417 |
| 24 | 976 | 580 | 410 | 320 | 350 | 450 | *7,360 | 622 | 583 | 451 | 293 | 310 |
| 25 | 1,780 | 540 | 420 | 320 | 350 | 430 | 8,600 | 564 | 584 | 447 | 288 | 227 |
| 26 | 1,980 | 520 | 440 | 320 | 350 | 420 | 4,050 | 754 | 559 | 546 | 289 | 221 |
| 27 | 1,590 | 520 | 470 | 320 | 350 | 410 | 2,470 | 714 | 518 | 510 | 285 | 206 |
| 28 | 939 | 520 | 520 | 370 | 350 | 410 | 1,810 | 586 | 516 | 439 | 351 | 199 |
| 29 | 910 | 520 | 530 | 420 | 340 | 407 | 1,600 | 555 | 518 | 404 | 650 | 222 |
| 30 | 936 | 530 | 490 | 430 | ----- | 394 | 1,880 | 573 | 518 | 415 | 676 | 228 |
| 31 | 930 | ----- | 450 | 430 | ----- | 466 | ----- | 590 | ----- | 369 | 600 | ----- |
| Total | 22,442 | 17,732 | 12,595 | 12,110 | 11,470 | 12,277 | 60,937 | 36,337 | 15,446 | 12,709 | 10,014 | 12,239 |
| Mean | 724 | 591 | 406 | 391 | 396 | 396 | 2,031 | 1,172 | 515 | 410 | 323 | 408 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 2,120 | | | Min | 80 | Mean | 438 | Cfsm | - | In. | - | |
| Water year 1959-60: Max | 8,600 | | | Min | 125 | Mean | 646 | Cfsm | - | In. | - | |

Peak discharge (base, 2,000 cfs).--Oct. 26 (6 a.m.) 2,070 cfs (10.57 ft); Apr. 15 (2 p.m.) 4,460 cfs (16.16 ft); Apr. 24 (12 p.m.) 13,500 cfs (22.07 ft); May 1 (4 a.m.) 2,040 cfs (10.46 ft); May 11 (11 p.m.) 2,030 cfs (10.43 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 16 to Dec. 5, Dec. 9 to Mar. 28.

400. Ontonagon River near Rockland, Mich.

Location.--Lat 46°43'15", long 89°12'25", in sec.20, T.50 N., R.39 W., in downstream side of left pier of bridge on highway between Rockland and Victoria, $1\frac{1}{4}$ miles southwest of Rockland and 2.4 miles downstream from confluence of Middle and West Branches.

Drainage area.--1,290 sq mi, approximately.

Records available.--June 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 638.87 ft above mean sea level, datum of 1929. Prior to Nov. 23, 1943, wire-weight, chain, and staff gages on downstream side of bridge at same site and datum.

Average discharge.--18 years, 1,421 cfs.

Extremes.--Maximum discharge during year, 22,400 cfs Apr. 24 (gage height, 20.82 ft); minimum daily, 480 cfs Aug. 7.

1942-60: Maximum discharge, 42,000 cfs Aug. 22, 1942 (gage height, 28.6 ft, from floodmark), from rating curve extended above 14,000 cfs on basis of slope-area measurement of peak flow; minimum daily, 260 cfs Sept. 6, 1948.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated by Victoria powerplant on West Branch 5 miles above station, by Bond Falls Reservoir (see p. 36), and by Dogeblc and Cisco Lakes (combined usable capacity, about 65,600 acre-ft).

Revisions (water years).--WSP 1387: 1943, 1946-47.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 5.8 | 450 | 11.0 | 5,630 |
| 6.0 | 540 | 19.0 | 18,800 |
| 7.0 | 1,130 | 21.0 | 22,800 |
| 8.0 | 1,960 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 1,670 | 1,630 | 1,050 | 1,200 | 980 | 770 | 2,200 | 5,100 | 1,330 | 1,070 | 800 | 1,240 |
| 2 | 1,350 | 1,590 | 1,050 | 1,150 | 980 | 760 | 2,700 | 4,480 | 1,330 | 1,070 | 754 | 1,070 |
| 3 | 2,250 | 1,500 | 1,200 | 1,150 | 900 | 750 | 3,100 | 3,820 | 1,360 | 878 | *640 | 1,130 |
| 4 | 2,430 | *1,040 | 1,200 | 1,100 | 1,100 | 730 | 3,100 | 4,230 | 1,360 | 690 | 680 | 1,100 |
| 5 | 1,870 | 1,120 | 1,100 | 800 | 940 | 670 | 2,900 | 4,370 | 1,260 | 830 | 650 | 894 |
| 6 | *1,280 | 1,010 | 1,050 | 800 | 960 | 660 | 2,700 | 4,630 | 1,130 | *834 | 560 | 1,030 |
| 7 | 1,170 | 1,090 | 1,000 | 900 | 960 | 680 | 2,200 | 4,860 | 878 | 830 | 480 | *1,100 |
| 8 | 710 | 1,110 | 1,000 | 930 | 920 | 660 | 1,700 | 4,690 | *992 | 836 | 670 | 1,030 |
| 9 | 482 | 1,190 | 1,100 | 1,050 | 880 | 640 | 1,500 | 4,630 | 963 | 837 | 720 | 1,080 |
| 10 | 832 | 1,290 | 1,050 | 990 | 860 | 620 | 1,350 | 6,000 | 1,010 | 722 | 670 | 954 |
| 11 | 805 | 1,450 | 1,000 | 990 | 820 | 640 | 1,750 | 6,320 | 1,050 | 832 | 698 | 1,010 |
| 12 | 1,020 | 1,550 | 1,150 | 1,050 | 800 | 640 | 4,000 | 5,700 | 984 | 878 | 837 | 946 |
| 13 | 924 | 1,300 | 1,150 | 1,050 | 870 | 750 | 9,330 | 4,820 | 1,080 | 772 | 784 | 863 |
| 14 | 934 | 1,250 | 1,100 | 1,000 | 820 | 800 | 12,700 | 4,000 | 956 | 724 | 742 | 800 |
| 15 | 898 | 870 | 1,100 | 1,000 | 830 | 800 | *12,200 | 3,120 | 990 | 644 | 832 | 736 |
| 16 | 1,160 | 910 | 1,150 | 1,000 | 860 | 820 | 10,400 | 2,620 | 1,100 | 630 | 790 | 726 |
| 17 | 1,110 | 860 | 1,100 | 1,000 | 880 | 830 | 7,590 | 5,180 | 1,410 | 630 | 722 | 762 |
| 18 | 1,110 | 880 | 1,050 | 960 | 850 | 800 | 4,750 | 5,430 | 1,380 | 770 | 806 | 646 |
| 19 | 1,160 | 1,000 | 1,000 | 1,050 | 850 | 800 | 3,870 | 4,350 | 1,320 | 630 | 1,490 | 776 |
| 20 | 1,020 | 1,100 | 970 | 950 | 870 | 760 | 3,130 | 3,430 | 1,270 | 640 | 932 | 707 |
| 21 | 703 | 1,150 | 940 | 950 | 860 | 760 | 3,060 | 3,190 | 1,140 | 930 | 697 | 696 |
| 22 | 900 | 1,300 | 920 | 940 | 820 | 770 | 2,870 | 3,070 | 1,000 | 932 | 824 | 714 |
| 23 | 850 | 1,300 | 940 | 910 | 910 | 740 | 6,720 | 2,490 | 1,020 | 656 | 698 | 780 |
| 24 | 2,770 | 1,200 | 980 | 1,000 | 820 | 770 | 20,000 | 1,960 | 1,020 | 832 | 605 | 976 |
| 25 | 6,900 | 1,000 | 1,050 | 930 | 740 | 730 | 16,500 | 1,770 | 1,130 | 1,070 | 671 | 964 |
| 26 | 4,360 | 1,000 | 1,150 | 980 | 830 | 680 | 11,000 | 1,600 | 1,170 | 1,160 | 666 | 910 |
| 27 | 2,850 | 1,050 | 1,250 | 860 | 770 | 780 | 7,280 | 1,660 | 1,100 | 1,100 | 710 | 742 |
| 28 | 1,920 | 1,050 | 1,300 | 860 | 840 | 860 | 5,190 | 1,400 | 970 | 1,070 | 1,260 | 690 |
| 29 | 1,810 | 1,000 | 1,300 | 960 | 700 | 930 | 6,020 | 1,270 | 1,080 | 834 | 1,320 | 839 |
| 30 | 1,600 | 1,050 | 1,200 | 1,000 | ----- | 1,150 | 6,300 | 1,200 | 1,140 | 978 | 1,330 | 741 |
| 31 | 1,720 | ----- | 1,100 | 1,050 | ----- | 1,500 | ----- | 1,360 | ----- | 774 | 1,310 | ----- |
| Total | 50,348 | 34,840 | 33,700 | 30,560 | 25,220 | 24,270 | 177,910 | 113,370 | 33,923 | 26,193 | 26,248 | 26,652 |
| Mean | 1,624 | 1,161 | 1,087 | 986 | 870 | 783 | 5,930 | 3,657 | 1,131 | 845 | 847 | 888 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 7,490 Min 310 Mean 1,189 Cfs/m 0.922 In. 12.52
 Water year 1959-60: Max 20,000 Min 480 Mean 1,648 Cfs/m 1.28 In. 17.42

Peak discharge (base, 9,000 cfs).--Apr. 14 (11:30 p.m.) 15,200 cfs (16.98 ft); Apr. 24 (3:15 p.m.) 22,400 cfs (20.82 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice from Nov. 11 to about Apr. 1. No gage-height record Nov. 12 to Apr. 12; discharge estimated on the basis of weather records and records of discharge at Victoria Dam and nearby stations.

405. Sturgeon River near Sidnaw, Mich.

Location.--Lat 46°35', long 88°35', in sec.5, T.48 N., R.34 W., on right bank 40 ft downstream from highway bridge, 2 miles downstream from Rock River, 3½ miles northwest of Covington, 4 miles upstream from Perch River, and 9 miles northeast of Sidnaw.

Drainage area.--171 sq mi.

Records available.--October 1912 to September 1915, April 1943 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 1,214.40 ft above mean sea level, datum of 1929. October 1912 to September 1915, staff gage at site 200 ft upstream at different datum. Apr. 2, 1943, to Oct. 1, 1946, chain and staff gages at old timber bridge 20 ft upstream at present datum.

Average discharge.--20 years, 209 cfs.

Extremes.--Maximum discharge during year, 4,630 cfs Apr. 24 (gage height, 11.63 ft); minimum, 16 cfs Aug. 24, 25, 27; minimum gage height, 3.67 ft Aug. 27.
1912-15, 1943-60: Maximum discharge, that of Apr. 24, 1960; minimum, 4.6 cfs Oct. 8, 1948 (gage height, 3.47 ft).

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are fair.

Revisions.--WSP 1507: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.6 | 12 | 6.0 | 540 |
| 3.9 | 30 | 7.0 | 1,020 |
| 4.3 | 72 | 10.0 | 3,140 |
| 4.9 | 170 | 12.0 | 5,000 |
| 5.5 | 337 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 352 | 634 | 162 | 140 | 90 | 84 | 200 | 1,270 | 259 | 99 | 35 | 188 |
| 2 | 309 | 608 | 164 | 139 | 90 | 82 | 216 | 1,160 | 259 | 86 | 32 | 197 |
| 3 | 468 | 540 | 160 | 137 | 88 | 80 | 276 | 998 | 299 | 78 | 28 | 177 |
| 4 | 472 | 472 | 156 | 130 | 88 | 76 | 280 | 954 | 283 | 73 | 25 | 141 |
| 5 | 407 | 423 | 154 | 125 | 86 | 74 | 237 | 1,000 | 239 | 66 | 22 | 112 |
| 6 | 330 | 337 | 148 | 115 | 86 | 72 | 209 | 1,650 | 204 | 58 | 21 | 92 |
| 7 | 280 | 365 | 146 | 115 | 86 | 72 | 192 | 1,980 | 181 | 52 | 38 | 80 |
| 8 | 245 | 370 | *145 | 110 | *84 | *70 | 174 | 1,620 | 160 | 53 | 47 | 75 |
| 9 | 242 | 360 | 143 | 110 | 84 | 68 | 172 | 1,220 | 139 | 47 | 45 | 82 |
| 10 | 226 | 356 | 136 | 110 | 84 | 66 | 204 | 992 | 127 | 40 | 45 | 78 |
| 11 | 211 | 335 | 136 | *110 | 84 | 64 | 174 | 954 | 139 | 35 | 37 | 72 |
| 12 | 224 | 315 | 136 | 110 | 84 | 62 | 276 | 1,020 | 139 | 32 | 32 | 66 |
| 13 | 237 | 300 | 132 | 110 | 84 | 60 | 652 | 1,110 | 127 | 29 | 30 | 58 |
| 14 | 224 | 280 | 130 | 110 | 85 | 60 | 1,100 | 1,010 | 113 | 29 | 37 | 52 |
| 15 | 204 | 270 | 134 | 105 | 85 | 58 | 1,480 | 835 | 99 | 30 | 34 | a47 |
| 16 | 286 | 259 | 134 | 105 | 86 | 57 | *1,970 | 688 | 102 | 67 | 32 | a43 |
| 17 | 364 | 245 | 134 | 105 | 88 | 56 | 2,280 | 895 | 164 | 73 | 29 | a39 |
| 18 | 341 | 230 | 132 | 100 | 90 | 56 | 1,840 | 835 | 174 | 70 | 26 | a37 |
| 19 | 292 | 214 | 129 | 98 | 94 | 55 | *1,650 | 711 | 156 | 58 | 23 | a35 |
| 20 | 248 | 202 | 125 | 96 | 95 | 54 | 1,670 | 603 | 134 | 47 | 22 | a32 |
| 21 | 221 | 199 | 125 | 95 | 96 | 54 | 2,020 | 675 | 115 | 46 | 21 | a30 |
| 22 | 202 | 197 | 120 | 95 | 96 | 54 | 2,440 | 742 | 113 | 102 | 18 | a30 |
| 23 | 211 | 194 | 120 | 95 | 96 | *54 | 2,920 | 680 | 117 | 132 | 19 | a30 |
| 24 | 1,070 | 192 | 120 | 95 | 94 | 54 | 4,420 | 576 | 141 | 113 | 17 | a60 |
| 25 | 1,600 | *185 | 120 | 95 | 94 | 54 | *4,010 | 468 | 137 | 88 | 16 | a125 |
| 26 | 1,340 | 183 | 125 | 95 | *92 | 54 | 2,760 | 383 | 120 | 77 | 17 | a115 |
| 27 | 1,000 | 175 | 135 | 95 | 90 | 64 | 1,920 | *330 | 101 | 70 | 16 | a105 |
| 28 | 765 | 170 | 155 | *95 | 88 | 80 | 1,410 | 292 | 93 | *58 | 241 | a90 |
| 29 | *634 | 170 | 155 | 95 | 86 | 100 | 1,190 | 262 | 107 | 50 | *316 | *81 |
| 30 | 585 | 170 | *150 | 95 | ----- | 135 | *1,290 | 292 | *109 | 45 | 264 | 71 |
| 31 | 608 | ----- | 145 | 92 | ----- | *165 | ----- | 296 | ----- | 39 | 216 | ----- |
| Total | 14,198 | 8,950 | 4,306 | 3,322 | 2,573 | 2,194 | 39,632 | 26,501 | 4,640 | 1,942 | 1,801 | 2,440 |
| Mean | 458 | 298 | 139 | 107 | 88.7 | 70.8 | 1,321 | 855 | 155 | 62.6 | 58.1 | 81.3 |
| Cfsm | 2.68 | 1.74 | 0.813 | 0.626 | 0.519 | 0.414 | 7.73 | 5.00 | 0.906 | 0.368 | 0.340 | 0.475 |
| In. | 3.09 | 1.94 | 0.94 | 0.72 | 0.56 | 0.48 | 8.62 | 5.76 | 1.01 | 0.42 | 0.39 | 0.53 |

Calendar year 1959: Max 2,010 Min 26 Mean 240 Cfsm 1.40 In. 19.02
Water year 1959-60: Max 4,420 Min 16 Mean 307 Cfsm 1.80 In. 24.46

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for nearby stations.

Note.--Stage-discharge relation affected by ice Nov. 7-9, 11-15, 17, 18, 27, 28, Dec. 21-23, Dec. 25 to Jan. 1, Jan. 4 to Apr. 1.

415. Sturgeon River near Alston, Mich.

Location.--Lat 46°44', long 88°40', in SE $\frac{1}{4}$ sec.15, T.50 N., R.35 W., on right bank in powerhouse of Upper Peninsula Power Co. at Prickett Dam, 3 miles upstream from Clear Creek and 5 miles southeast of Alston.

Drainage area.--346 sq mi.

Records available.--February 1932 to June 1941, October 1942 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 670.3 ft above mean tide at New York City (levels by Corps of Engineers).

Average discharge.--26 years (1932-40, 1942-60), 421 cfs.

Extremes.--Maximum discharge during year, 7,360 cfs Apr. 24 (gage height, 53.09 ft); minimum daily, 1 cfs Aug. 14-19.
1932-41, 1942-60: Maximum discharge, that of Apr. 24, 1960; minimum daily, that of Aug. 14-19, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Flow regulated by powerplant at station.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 13

Apr. 14 to Sept. 30

| | | | | | | | |
|------|-----|------|-------|------|-----|------|-------|
| 43.0 | 9.0 | 44.5 | 370 | 43.0 | 6.0 | 44.4 | 225 |
| 43.1 | 18 | 45.0 | 590 | 43.1 | 12 | 45.0 | 450 |
| 43.4 | 60 | 46.0 | 1,110 | 43.4 | 37 | 46.0 | 1,030 |
| 43.9 | 170 | 49.0 | 3,400 | 43.9 | 105 | 53.0 | 7,270 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|--------|--------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 549 | 1,120 | 454 | 365 | 275 | 241 | 400 | 2,150 | 560 | 437 | 356 | 244 |
| 2 | 647 | 1,000 | 382 | 150 | 277 | 249 | 586 | 2,110 | 447 | 417 | 570 | 350 |
| 3 | 759 | 900 | 369 | 171 | 269 | 249 | 361 | 1,900 | 428 | 141 | 596 | 381 |
| 4 | 1,010 | a860 | 364 | 349 | 278 | 230 | 398 | 1,920 | 555 | 10 | 585 | 387 |
| 5 | 613 | a840 | 371 | 336 | 272 | 132 | 581 | 1,760 | 545 | 328 | 580 | 13 |
| 6 | 589 | a840 | 415 | 318 | 142 | 105 | 581 | 2,820 | 427 | 340 | 585 | 274 |
| 7 | 617 | a820 | 563 | 247 | 140 | 253 | 581 | 3,160 | 479 | 330 | 555 | 259 |
| 8 | 617 | a810 | 351 | 304 | 265 | 245 | 581 | 3,110 | 531 | 328 | 524 | 261 |
| 9 | 594 | a800 | 358 | 164 | 236 | 245 | 581 | 2,390 | 518 | 324 | 443 | 399 |
| 10 | 482 | a800 | 337 | 146 | 236 | 192 | 96 | 1,680 | 426 | 10 | 767 | 511 |
| 11 | 397 | 675 | 342 | 304 | 237 | 191 | 401 | 1,550 | 323 | 70 | 402 | 10 |
| 12 | 416 | 608 | 312 | 303 | 233 | 92 | 594 | 2,170 | 188 | 213 | 190 | 258 |
| 13 | 414 | 612 | 300 | 292 | 125 | 15 | 1,100 | 2,350 | 211 | 220 | a76 | 231 |
| 14 | 402 | 612 | 315 | 283 | 128 | 110 | 2,500 | 1,850 | 168 | 214 | a1 | 197 |
| 15 | 437 | 612 | 295 | 334 | 238 | 267 | 2,860 | 1,560 | 169 | 188 | a1 | 196 |
| 16 | 471 | 604 | 295 | 164 | 231 | 283 | 2,890 | 1,450 | 230 | 131 | a1 | 166 |
| 17 | 789 | 459 | 345 | 166 | 232 | 222 | *3,080 | 2,110 | 413 | 10 | a1 | 154 |
| 18 | 515 | 306 | 346 | 302 | 238 | 279 | 2,700 | 1,860 | 362 | 131 | a1 | 10 |
| 19 | 612 | 359 | 298 | 303 | 273 | 50 | *2,230 | 1,530 | 341 | 282 | a1 | 178 |
| 20 | 535 | 367 | 296 | 305 | 143 | 15 | 2,230 | 1,290 | 234 | 285 | a2 | 127 |
| 21 | 445 | 463 | 297 | 310 | 129 | 329 | 2,400 | 1,210 | 396 | 285 | a3 | 159 |
| 22 | 415 | 364 | 231 | 312 | 315 | 290 | 2,830 | 1,620 | 291 | 302 | a13 | 159 |
| 23 | 406 | 378 | 245 | 152 | 258 | *330 | 3,830 | 1,290 | 330 | 154 | a14 | 205 |
| 24 | 1,370 | *554 | 343 | 150 | 246 | 324 | 6,430 | 1,060 | 390 | 228 | a10 | 212 |
| 25 | a3,000 | 473 | 289 | 305 | *237 | 311 | *6,820 | *904 | 324 | 399 | a23 | 10 |
| 26 | a2,000 | 363 | 340 | 309 | 232 | 15 | *4,710 | 682 | 149 | *366 | a20 | 345 |
| 27 | a1,600 | 353 | 345 | *295 | 129 | 15 | 3,240 | 819 | 343 | 233 | 10 | 344 |
| 28 | *a1,300 | 368 | 345 | 254 | 129 | 263 | 2,440 | 892 | 405 | 180 | 10 | *280 |
| 29 | 1,000 | 366 | *334 | 259 | 242 | 325 | 2,510 | 580 | *345 | 183 | *10 | 257 |
| 30 | 977 | 365 | 367 | 163 | ----- | 296 | 2,260 | 560 | 431 | 142 | 39 | 277 |
| 31 | 957 | ----- | 379 | 162 | ----- | 358 | ----- | 560 | ----- | 60 | 75 | ----- |
| Total | 24,935 | 18,051 | 10,403 | 7,977 | 6,383 | 6,521 | 62,801 | 50,677 | 10,959 | 6,951 | 6,444 | 6,854 |
| Mean | 804 | 602 | 336 | 257 | 220 | 210 | 2,093 | 1,635 | 365 | 224 | 208 | 228 |
| Cfsm | 2.32 | 1.74 | 0.971 | 0.743 | 0.636 | 0.607 | 6.05 | 4.73 | 1.05 | 0.647 | 0.601 | 0.659 |
| In. | 2.68 | 1.94 | 1.12 | 0.86 | 0.69 | 0.70 | 6.75 | 5.45 | 1.17 | 0.75 | 0.69 | 0.74 |

Calendar year 1959: Max 3,070 Min 13 Mean 457 Cfsm 1.32 In. 17.94
Water year 1959-60: Max 6,820 Min 1 Mean 598 Cfsm 1.73 In. 23.54

* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of powerplant records and operators' notes.

425. Otter River near Elo, Mich.

Location.--Lat 46°52', long 88°37', in sec.34, T.52 N., R.34 W., on downstream side of highway bridge, 1½ miles southeast of old Elo school and 3 miles upstream from Otter Lake.

Drainage area.--165 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage read twice daily, and crest-stage gage. Datum of gage is 617.88 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--18 years, 219 cfs.

Extremes.--Maximum discharge during year, 3,160 cfs Apr. 24 (gage height, 12.08 ft); minimum, 77 cfs Aug. 16 (gage height, 2.85 ft).
1942-60. Maximum discharge, 4,540 cfs Apr. 19, 1952 (gage height, 13.52 ft); minimum observed, 68 cfs Nov. 18, 1947 (discharge measurement); minimum gage height, that of Aug. 16, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions.--WSP 1507: Drainage area.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 15

Apr. 16 to Sept. 30

| | | | | | | | |
|-----|-----|------|-------|-----|-----|------|-------|
| 3.2 | 98 | 8.0 | 1,140 | 2.8 | 72 | 8.0 | 1,140 |
| 4.0 | 210 | 10.0 | 1,870 | 3.5 | 158 | 10.0 | 1,870 |
| 5.0 | 389 | 11.0 | 2,390 | 5.0 | 400 | 12.0 | 3,090 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 158 | 212 | 160 | 120 | 110 | 110 | 285 | 600 | 198 | 102 | 83 | 93 |
| 2 | 156 | 197 | 160 | 130 | 110 | 110 | 320 | 453 | 226 | 100 | 85 | 98 |
| 3 | 301 | 182 | 155 | 140 | 110 | 110 | 330 | 385 | 210 | 103 | 80 | 89 |
| 4 | 269 | 173 | 155 | 135 | 110 | 110 | 315 | 472 | 174 | 97 | 80 | 89 |
| 5 | 200 | 168 | 155 | 125 | 110 | 110 | 300 | 511 | 154 | 95 | 79 | 85 |
| 6 | 168 | 163 | 155 | 125 | 105 | 105 | 285 | 457 | 140 | 91 | 78 | 84 |
| 7 | 153 | 144 | 150 | 130 | 105 | 105 | 236 | 396 | 128 | 91 | 91 | 82 |
| 8 | 143 | 165 | 150 | 130 | 105 | 105 | 223 | 434 | 123 | 89 | 96 | 82 |
| 9 | 147 | 170 | 150 | 130 | 105 | 105 | 207 | 430 | 118 | 89 | 86 | 92 |
| 10 | 147 | 167 | 150 | 130 | 105 | 105 | 173 | 680 | 116 | 89 | 85 | 86 |
| 11 | 139 | 185 | 150 | 125 | 105 | 105 | 240 | 742 | 161 | 88 | 82 | 84 |
| 12 | 161 | 200 | 155 | 120 | 105 | 105 | 582 | 528 | 149 | 86 | 81 | 91 |
| 13 | 156 | 190 | 155 | 120 | 105 | 105 | 1,180 | 410 | 128 | 85 | 80 | 80 |
| 14 | 143 | 180 | 155 | 115 | 105 | 105 | 1,780 | 333 | 118 | 88 | 81 | 82 |
| 15 | 137 | 175 | 155 | 115 | 110 | 105 | 2,270 | 291 | 112 | 86 | 78 | 82 |
| 16 | 210 | 175 | 160 | 110 | 110 | 100 | 2,580 | 254 | 142 | 89 | 78 | 80 |
| 17 | 247 | 175 | 160 | 110 | 110 | 100 | *2,080 | 392 | 270 | 92 | 79 | 80 |
| 18 | 205 | 175 | 160 | 110 | 115 | 100 | *1,090 | 356 | 200 | 89 | 83 | 86 |
| 19 | 179 | 175 | 155 | 105 | 115 | 100 | 840 | 287 | 164 | 86 | 140 | 82 |
| 20 | 161 | 180 | 145 | 105 | 115 | 100 | 1,040 | 262 | 134 | 84 | 98 | 84 |
| 21 | 144 | 185 | 130 | 105 | 120 | 100 | 1,300 | 330 | 121 | 116 | 91 | 80 |
| 22 | 139 | 190 | 135 | 105 | 120 | 100 | 1,320 | 347 | 128 | 122 | 89 | 82 |
| 23 | 144 | 190 | 140 | 105 | 120 | 105 | 1,260 | 281 | 123 | 100 | 86 | 81 |
| 24 | 373 | *190 | 145 | 105 | 115 | *110 | 2,770 | 239 | 123 | 95 | 84 | 93 |
| 25 | 748 | 185 | 150 | 105 | *115 | 115 | 2,180 | *214 | 112 | 90 | 85 | 160 |
| 26 | 454 | 180 | 155 | 105 | 115 | 120 | 1,130 | 197 | 105 | 108 | 85 | 114 |
| 27 | 327 | 175 | 170 | *105 | 115 | 130 | 778 | 184 | 108 | *93 | 84 | 95 |
| 28 | *248 | 170 | 185 | 105 | 115 | 140 | 565 | 179 | 146 | 89 | 116 | *93 |
| 29 | *216 | 165 | *190 | 110 | 115 | 170 | 690 | 167 | *123 | 86 | *136 | 93 |
| 30 | 213 | 160 | 135 | 110 | ----- | 215 | 908 | 287 | 109 | 85 | 97 | 92 |
| 31 | 216 | ----- | 125 | 110 | ----- | 240 | ----- | 243 | ----- | 83 | 93 | ----- |
| Total | 6,801 | 5,341 | 4,750 | 3,600 | 3,220 | 3,645 | 29,237 | 11,321 | 4,362 | 2,986 | 2,769 | 2,694 |
| Mean | 219 | 178 | 155 | 116 | 111 | 118 | 975 | 365 | 145 | 93.1 | 89.3 | 89.8 |
| Cfs/m | 1.33 | 1.08 | 0.927 | 0.703 | 0.673 | 0.715 | 5.91 | 2.21 | 0.879 | 0.564 | 0.541 | 0.544 |
| In. | 1.53 | 1.20 | 1.07 | 0.81 | 0.73 | 0.82 | 6.58 | 2.55 | 0.98 | 0.65 | 0.62 | 0.61 |

Calendar year 1959: Max 1,620 Min 75 Mean 204 Cfs/m 1.24 In. 16.75
Water year 1959-60: Max 2,770 Min 78 Mean 220 Cfs/m 1.33 In. 18.16

Peak discharge (base, 1,300 cfs).--Apr. 16 (8 a.m.) 2,820 cfs (11.65 ft); Apr. 24 (5 p.m.) 3,160 cfs (12.08 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 8, Nov. 11 to Apr. 6.

430. Sturgeon River near Arnheim, Mich.

Location.--Lat 46°56', long 88°33', in SE $\frac{1}{4}$ sec.1, T.52 N., R.34 W., on right bank a quarter of a mile downstream from Otter Lake, 3 miles northwest of Arnheim, and 8 $\frac{1}{2}$ miles northeast of Pelkie.

Drainage area.--703 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Staff gage read once daily. Datum of gage is 605.98 ft above mean tide at New York City (Corps of Engineers bench mark).

Average discharge.--18 years, 821 cfs.

Extremes.--Maximum discharge during year, 12,200 cfs Apr. 25 (gage height, 13.87 ft), from rating curve extended above 7,000 cfs by logarithmic plotting; minimum, 164 cfs Aug. 27 (gage height, 0.60 ft).

1942-60: Maximum discharge, 15,500 cfs Apr. 20, 1952 (gage height, 14.57 ft, from graph based on gage readings); minimum, that of Aug. 27, 1960.

Remarks.--Records good except those above 7,000 cfs, which are fair. Occasional slight regulation caused by Prickett Dam.

Revision (water years).--WSP 1387: 1943-45(M), 1950-52. WSP 1507: Drainage area.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Rate of change in stage used as a factor Oct. 26-31, Apr. 13 to May 24)

Oct. 1 to Apr. 12

Apr. 13 to Sept. 30

1.2 303
5.0 1,380
9.0 3,060

0.6 164
4.0 1,100
8.0 2,750

12.0 5,080
13.0 6,500
13.8 11,600

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 1,310 | 1,620 | 642 | 592 | 411 | 371 | 617 | 4,200 | 1,080 | 582 | 330 | 207 |
| 2 | 1,180 | 1,590 | 673 | 564 | 406 | 386 | 704 | 3,760 | 1,050 | 572 | 317 | 226 |
| 3 | 1,100 | 1,470 | 656 | 556 | 448 | b390 | 843 | 3,330 | 968 | 598 | 458 | 302 |
| 4 | 1,190 | 1,410 | 662 | 518 | 427 | b390 | 939 | 3,080 | 914 | 504 | 562 | 377 |
| 5 | 1,310 | 1,270 | 656 | 523 | 437 | b390 | 910 | 3,010 | 920 | 395 | 608 | 421 |
| 6 | 1,210 | 1,200 | 659 | b550 | 448 | b380 | 1,010 | 2,920 | 890 | 364 | 634 | 372 |
| 7 | 1,090 | 1,090 | b650 | b560 | 432 | 371 | 1,070 | 3,140 | 806 | 395 | 662 | 355 |
| 8 | 997 | 1,010 | 639 | b570 | 401 | 366 | 1,090 | 3,710 | 794 | 429 | 668 | 361 |
| 9 | 962 | 997 | 611 | b560 | 411 | 386 | 1,090 | 3,970 | 803 | 442 | 668 | 374 |
| 10 | 921 | 971 | 575 | b560 | 427 | 396 | 1,080 | 4,030 | 800 | 445 | 606 | 390 |
| 11 | 858 | 1,040 | 550 | b550 | 427 | 411 | 916 | 3,780 | 775 | 406 | 674 | 491 |
| 12 | 788 | 1,150 | 534 | 512 | 422 | 396 | 985 | 3,360 | 668 | 322 | 640 | 400 |
| 13 | 756 | 1,080 | 578 | 529 | 424 | 391 | 2,250 | 3,180 | 629 | 328 | 530 | 338 |
| 14 | 730 | 1,040 | 583 | 550 | 401 | 339 | 3,690 | 2,990 | 556 | 322 | 426 | 348 |
| 15 | 707 | 956 | 545 | 550 | 376 | 303 | 5,490 | 2,610 | 499 | 369 | 338 | 358 |
| 16 | 747 | 968 | 545 | 523 | 371 | 310 | 9,150 | 2,280 | 484 | 359 | 250 | 333 |
| 17 | 782 | 881 | 550 | 512 | 406 | 361 | 9,680 | 2,520 | 525 | 348 | 212 | 333 |
| 18 | 916 | 805 | 550 | 453 | 411 | 396 | *6,450 | 2,460 | 668 | 322 | 188 | 307 |
| 19 | 927 | 771 | 542 | 448 | 411 | 404 | 5,070 | 2,640 | 692 | 270 | 222 | 260 |
| 20 | 904 | 724 | 534 | 477 | 427 | 401 | *4,650 | 2,370 | 707 | 302 | 226 | 260 |
| 21 | 890 | 710 | 496 | 480 | 424 | 346 | 4,490 | 2,150 | 582 | 442 | 207 | 265 |
| 22 | 811 | 753 | 458 | 485 | 401 | 346 | 4,510 | 2,100 | 603 | 442 | 193 | 270 |
| 23 | 794 | 747 | 450 | 485 | 404 | b370 | 4,590 | 2,050 | 575 | 468 | 169 | 270 |
| 24 | 788 | *756 | 427 | 464 | b420 | *b390 | 5,870 | 1,880 | 577 | 426 | 169 | 369 |
| 25 | 1,450 | 814 | 480 | 452 | *b430 | b420 | 11,100 | *1,760 | 582 | 432 | 174 | 354 |
| 26 | 2,580 | 805 | 485 | 427 | b430 | b430 | 9,220 | 1,560 | 564 | 468 | 169 | 322 |
| 27 | 3,080 | 759 | 534 | *475 | b430 | b410 | *6,190 | 1,380 | 546 | *533 | 164 | 333 |
| 28 | *2,710 | 701 | 583 | 472 | b420 | 356 | 5,060 | 1,250 | 530 | 520 | 171 | *386 |
| 29 | 2,240 | 673 | *645 | 469 | 386 | 341 | 4,660 | 1,180 | *556 | 416 | 200 | 406 |
| 30 | 1,900 | 651 | 645 | 464 | ----- | 466 | 4,460 | 1,120 | 546 | 380 | *207 | 411 |
| 31 | 1,720 | ----- | 606 | 445 | ----- | 534 | ----- | 1,110 | ----- | 359 | 202 | ----- |
| Total | 38,328 | 29,412 | 17,743 | 15,735 | 12,069 | 11,947 | 117,814 | 80,880 | 20,887 | 12,980 | 11,244 | 10,168 |
| Mean | 1,236 | 980 | 572 | 508 | 416 | 385 | 3,927 | 2,609 | 696 | 418 | 363 | 339 |
| Cfs/m | 1.76 | 1.39 | 0.814 | 0.723 | 0.592 | 0.548 | 5.59 | 3.71 | 0.990 | 0.595 | 0.516 | 0.482 |
| In. | 2.03 | 1.55 | 0.94 | 0.83 | 0.64 | 0.63 | 6.24 | 4.28 | 1.10 | 0.69 | 0.59 | 0.54 |

Calendar year 1959: Max 4,380 Min 250 Mean 815 Cfs/m 1.16 In. 15.75
Water year 1959-60: Max 11,100 Min 164 Mean 1,036 Cfs/m 1.47 In. 20.06

* Discharge measurement made on this day.
b Stage-discharge relation affected by ice.

455. Tahquamenon River near Tahquamenon Paradise, Mich.

Location.-- Lat 46°34'30", long 85°16'10", in NE $\frac{1}{4}$ sec.11, T.48 N., R.8 W., on left bank 0.7 mile upstream from Tahquamenon (Big) Falls, 11.5 miles west of Tahquamenon Paradise, and 19 miles northeast of Newberry.

Drainage area.--790 sq mi.

Records available.--August 1953 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 697 ft (from river-profile map).

Average discharge.--7 years, 884 cfs.

Extremes.--Maximum discharge during year, 6,990 cfs May 10 (gage height, 10.26 ft); minimum, 201 cfs Aug. 26 (gage height, 3.13 ft).
1953-60: Maximum discharge, that of May 10, 1960; minimum, 157 cfs July 26, 1955 (gage height, 2.88 ft).

Remarks.--Records excellent except those for period of no gage-height record, which are good.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|-------|
| 3.1 | 210 | 6.0 | 1,700 |
| 3.5 | 334 | 8.0 | 3,760 |
| 4.0 | 522 | 9.0 | 5,100 |
| 5.0 | 1,030 | 10.3 | 7,050 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-------|--------|
| 1 | 1,650 | a3,000 | 696 | 755 | 482 | 431 | 506 | 4,740 | 1,280 | 700 | 442 | 601 |
| 2 | 1,590 | a2,900 | 678 | 715 | 482 | 427 | 548 | 4,810 | 1,300 | 656 | 419 | 614 |
| 3 | 1,510 | a2,800 | 664 | 673 | 470 | 419 | 624 | 4,500 | 1,350 | 655 | 393 | 610 |
| 4 | 1,440 | 2,650 | 660 | 646 | 458 | 419 | 730 | 4,500 | 1,420 | 664 | 368 | 682 |
| 5 | 1,340 | 2,550 | 660 | 614 | 454 | 415 | 790 | 4,400 | 1,430 | 637 | 354 | 770 |
| 6 | 1,250 | 2,450 | 660 | 574 | 450 | 412 | 833 | 4,540 | 1,420 | 606 | 341 | 822 |
| 7 | 1,160 | 2,320 | 619 | 526 | 442 | 400 | 872 | 5,740 | 1,400 | 574 | 324 | 828 |
| 8 | 1,080 | 2,180 | 632 | 498 | 436 | 397 | 904 | 6,090 | 1,330 | 535 | 318 | 833 |
| 9 | 1,110 | 2,040 | 624 | 474 | 431 | 390 | 940 | 6,270 | 1,240 | 506 | 328 | 922 |
| 10 | 1,110 | *1,930 | 596 | 458 | 431 | 379 | 970 | *6,820 | 1,130 | 486 | 318 | 988 |
| 11 | 1,200 | 1,840 | 578 | 450 | 434 | 375 | 1,020 | 6,810 | 1,010 | 474 | 312 | 1,020 |
| 12 | 1,310 | 1,760 | 565 | 446 | 423 | 368 | 1,180 | 6,700 | 899 | 442 | 296 | 1,040 |
| 13 | *1,390 | 1,640 | 565 | 470 | 412 | 361 | 1,510 | *6,540 | 790 | 427 | 296 | 1,050 |
| 14 | 1,420 | 1,520 | 552 | 506 | 415 | 354 | 1,920 | 6,340 | 696 | 427 | 283 | *1,050 |
| 15 | 1,410 | 1,410 | *552 | 535 | 419 | 348 | 2,670 | 6,090 | 619 | 419 | 299 | 1,010 |
| 16 | 1,430 | 1,350 | 592 | 561 | 419 | *341 | 3,630 | 5,820 | *583 | 393 | 305 | 964 |
| 17 | 1,440 | 1,190 | 646 | 570 | 423 | 341 | 4,350 | 5,500 | 838 | 397 | 296 | 916 |
| 18 | 1,470 | 1,110 | 682 | 570 | *427 | 341 | 4,610 | 5,220 | 1,040 | 404 | *286 | 877 |
| 19 | 1,490 | 1,050 | 691 | 574 | 427 | 337 | 4,750 | 4,850 | 1,100 | 397 | 273 | 838 |
| 20 | 1,440 | 994 | 673 | *574 | 427 | 337 | *4,740 | 4,530 | 1,140 | 390 | 264 | 811 |
| 21 | 1,420 | 940 | 646 | 570 | 431 | 344 | 4,780 | 4,220 | 1,150 | *390 | 258 | 790 |
| 22 | 1,380 | 888 | 619 | 556 | 434 | 344 | 4,780 | 3,890 | 1,110 | 412 | 249 | 725 |
| 23 | 1,330 | 860 | 598 | 548 | 434 | 344 | 4,740 | 3,540 | 1,070 | 462 | 240 | 682 |
| 24 | 1,520 | 850 | 561 | 535 | 434 | 344 | 4,810 | 3,220 | 1,050 | 470 | 240 | 682 |
| 25 | 2,230 | 844 | 535 | 526 | 434 | 344 | 4,940 | 2,930 | 1,070 | 454 | 234 | 715 |
| 26 | a2,700 | 828 | 522 | 514 | 434 | 344 | 5,050 | 2,610 | 1,050 | 431 | 222 | 760 |
| 27 | a3,000 | 806 | 588 | 502 | 434 | 341 | 5,020 | 2,270 | 994 | 427 | 222 | 760 |
| 28 | a3,100 | 780 | 705 | 494 | 434 | 344 | 4,920 | 1,970 | 916 | 434 | 237 | 760 |
| 29 | a3,200 | 750 | 785 | 480 | 434 | 361 | 4,770 | 1,710 | 828 | 419 | 328 | 720 |
| 30 | a3,200 | 720 | 795 | 486 | ----- | 400 | 4,670 | 1,490 | 750 | 408 | 470 | 691 |
| 31 | a,3100 | ----- | 790 | 486 | ----- | 466 | ----- | 1,370 | ----- | 438 | 565 | ----- |
| Total | 53,420 | 46,950 | 19,719 | 16,896 | 12,667 | 11,568 | 86,587 | 139,830 | 32,003 | 14,933 | 9,780 | 24,521 |
| Mean | 1.723 | 1.565 | 636 | 545 | 437 | 373 | 2,886 | 4,511 | 1,067 | 482 | 315 | 817 |
| Cfs/m | 2.18 | 1.98 | 0.805 | 0.690 | 0.553 | 0.472 | 3.65 | 5.71 | 1.35 | 0.610 | 0.399 | 1.03 |
| In. | 2.51 | 2.21 | 0.93 | 0.80 | 0.60 | 0.54 | 4.07 | 6.58 | 1.51 | 0.70 | 0.46 | 1.15 |

Calendar year 1959: Max 4,460 Min 204 Mean 1,035 Cfs/m 1.31 In. 17.73
Water year 1959-60: Max 6,820 Min 222 Mean 1,261 Cfs/m 1.62 In. 22.03

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

460. Black River near Garnet, Mich.

Location.--Lat 46°07'05", long 85°21'55", in SE $\frac{1}{4}$ sec.13, T.43 N., R.9 W., on right bank 10 ft upstream from highway bridge, 15 ft downstream from unnamed tributary entering from right, $3\frac{1}{2}$ miles upstream from Lake Michigan, and 4 miles southwest of Garnet.

Drainage area.--28 sq mi, approximately.

Records available.--September 1951 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 629.7 ft above mean sea level, datum of 1929.

Average discharge.--9 years, 27.6 cfs.

Extremes.--Maximum discharge during year, 860 cfs May 7 (gage height, 8.55 ft), from rating curve extended above 350 cfs by logarithmic plotting; minimum, 9.2 cfs Mar. 21, 23 (gage height, 2.27 ft).

1951-60: Maximum discharge, that of May 7, 1960; minimum, 4.9 cfs Mar. 11, 1956 (gage height, 2.10 ft).

Remarks.--Records good except those above 300 cfs, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Revisions.--Revised figures of discharge, in cubic feet per second, for the water year 1959, superseding those published in WSP 1627, are given herewith:

| Date | Discharge | Date | Discharge | Date | Discharge |
|---------|-----------|-----------|-----------|-----------|-----------|
| 1959 | | 1959-Con. | | 1959-Con. | |
| Apr. 20 | 146 | Apr. 28 | 112 | May 6 | 162 |
| 21 | 125 | 29 | 166 | 7 | 180 |
| 22 | 116 | 30 | 137 | 8 | 122 |
| 23 | 117 | May 1 | 106 | 9 | 90 |
| 24 | 104 | 2 | 110 | 10 | 72 |
| 25 | 97 | 3 | 106 | Sept. 23 | 114 |
| 26 | 89 | 4 | 133 | 24 | 82 |
| 27 | 80 | 5 | 125 | | |

| Month | Cfs-days | Maximum | Minimum | Mean | Per square mile | Runoff in inches |
|--|----------|---------|---------|------|-----------------|------------------|
| April 1959..... | 2,643 | 208 | 12 | 88.1 | 3.15 | 3.51 |
| May..... | 1,842 | 180 | 18 | 59.4 | 2.12 | 2.44 |
| September..... | 841.1 | 114 | 8.3 | 28.0 | 1.00 | 1.12 |
| Water year 1958-59..... | | 208 | 7 | 24.5 | .875 | 11.86 |
| Revised peak discharge.--1958-59: Apr. 28 (12 p.m.) 181 cfs (4.65 ft); May 7 (2 a.m.) 204 cfs (4.87 ft). | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 30 | 74 | 24 | 24 | 16 | 13 | 17 | 189 | 55 | 26 | 22 | 32 |
| 2 | 28 | 66 | 24 | 22 | 16 | 13 | 18 | 153 | 71 | 26 | 20 | 27 |
| 3 | 34 | 62 | 23 | 22 | 15 | 13 | 22 | 145 | 82 | 30 | 19 | 26 |
| 4 | 32 | 62 | 24 | 21 | 15 | 13 | 26 | 172 | 56 | 26 | 18 | 50 |
| 5 | 28 | 62 | 24 | 20 | 15 | 12 | 26 | 152 | 47 | 24 | 16 | 38 |
| 6 | 26 | 56 | 24 | 20 | 15 | 12 | 25 | 260 | 41 | 23 | 16 | 32 |
| 7 | 25 | 50 | 23 | 19 | 15 | 12 | 27 | 752 | 37 | 22 | 17 | 28 |
| 8 | 23 | 48 | 22 | 18 | 15 | 12 | 27 | 421 | 33 | 22 | 18 | 31 |
| 9 | 42 | 48 | 22 | 18 | 15 | 12 | 26 | *283 | 30 | 22 | 16 | 38 |
| 10 | 38 | *48 | 21 | 17 | 14 | 12 | 26 | *321 | 29 | 20 | 16 | 30 |
| 11 | 72 | 64 | 20 | 17 | 14 | 12 | 29 | 249 | 28 | 19 | 15 | 28 |
| 12 | 64 | 54 | 20 | 19 | 14 | 12 | 48 | 170 | 26 | 18 | 15 | 28 |
| 13 | 51 | 46 | 19 | 21 | 14 | 11 | 126 | 123 | 25 | 18 | 15 | 26 |
| 14 | *42 | 41 | 19 | 21 | 14 | 11 | 178 | 98 | 24 | 17 | 18 | *25 |
| 15 | 42 | 38 | *24 | 21 | 14 | 11 | 242 | 84 | 23 | 16 | 16 | 23 |
| 16 | 53 | 35 | 27 | 20 | 14 | *11 | *287 | 73 | *33 | 16 | 15 | 22 |
| 17 | 57 | 33 | 26 | 20 | 14 | 11 | *321 | 70 | 48 | 16 | 14 | 26 |
| 18 | 49 | 32 | 25 | 19 | *14 | 11 | 212 | 64 | 39 | 16 | *14 | 26 |
| 19 | 42 | 32 | 23 | 19 | 14 | 11 | 174 | 58 | 53 | 15 | 14 | 24 |
| 20 | 38 | 30 | 21 | *18 | 14 | 11 | *148 | 53 | 43 | 15 | 13 | 23 |
| 21 | 34 | 30 | 21 | 18 | 14 | 11 | 157 | 51 | 37 | *19 | 13 | 22 |
| 22 | 32 | 30 | 20 | 18 | 13 | 11 | 145 | 49 | 38 | 23 | 13 | 21 |
| 23 | 41 | 30 | 19 | 17 | 13 | 10 | 155 | 46 | 38 | 20 | 13 | 22 |
| 24 | 162 | 33 | 19 | 17 | 13 | 10 | 312 | 41 | 53 | 17 | 13 | 25 |
| 25 | 280 | 30 | 19 | 17 | 13 | 10 | 301 | 39 | 42 | 16 | 12 | 29 |
| 26 | 216 | 28 | 20 | 17 | 13 | 10 | 209 | 38 | 36 | 18 | 12 | 24 |
| 27 | 146 | 27 | 31 | 17 | 13 | 10 | 160 | 35 | 32 | 17 | 12 | 24 |
| 28 | 108 | 26 | 34 | 16 | 13 | 11 | 124 | 33 | 32 | 16 | 21 | 22 |
| 29 | 100 | 25 | 30 | 16 | 13 | 12 | 100 | 31 | 33 | 16 | 69 | 22 |
| 30 | 90 | 24 | 28 | 16 | 13 | 12 | 142 | 53 | 29 | 36 | 47 | 20 |
| 31 | 82 | 24 | 26 | 16 | 13 | 12 | 13 | 64 | 24 | 36 | 38 | |
| Total | 2,107 | 1,264 | 722 | 581 | 409 | 365 | 3,810 | 4,380 | 1,173 | 629 | 590 | 814 |
| Mean | 68.0 | 42.1 | 23.3 | 18.7 | 14.1 | 11.8 | 127 | 141 | 39.1 | 20.3 | 19.0 | 27.1 |
| Cfsm | 2.43 | 1.50 | 0.832 | 0.668 | 0.504 | 0.421 | 4.54 | 5.04 | 1.40 | 0.725 | 0.679 | 0.968 |
| In. | 2.80 | 1.67 | 0.96 | 0.77 | 0.54 | 0.49 | 5.06 | 5.81 | 1.56 | 0.84 | 0.78 | 1.08 |

Calendar year 1959: Max 280 Min 7 Mean 31.6 Cfsm 1.13 In. 15.29

Water year 1959-60: Max 752 Min 10 Mean 46.0 Cfsm 1.64 In. 22.36

Peak discharge (base, 120 cfs).--Oct. 25 (3 p.m.) 300 cfs (5.65 ft); Apr. 17 (7 a.m.) 340 cfs (5.76 ft); Apr. 24 (12:30 p.m.) 352 cfs (5.84 ft); Apr. 30 (11 p.m.) 212 cfs (4.78 ft); May 7 (10:30 a.m.) 860 cfs (8.55 ft).

* Discharge measurement made on this day.

495. Manistique River at Germfask, Mich.

Location.--Lat 46°14'00", long 85°55'40", in SE $\frac{1}{4}$ sec.4, T.44 N., R.13 W., on left bank 600 ft upstream from bridge on State Highway 77, 1 mile south of Germfask, $1\frac{1}{2}$ miles upstream from Grays Creek, and at mile 62.5.

Drainage area.--341 sq mi.

Records available.--March 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 662.40 ft above mean sea level (levels by Michigan Department of Conservation). Prior to Dec. 29, 1938, staff gage at site 600 ft downstream at different datum.

Average discharge.--22 years, 442 cfs.

Extremes.--Maximum discharge during year, 2,250 cfs May 10 (gage height, 8.64 ft); minimum, 209 cfs Aug. 27, 28 (gage height, 1.18 ft).
1938-60: Maximum discharge, that of May 10, 1960; minimum, 135 cfs July 25, 26, 1955 (gage height, 0.77 ft).

Remarks.--Records excellent except those for periods of ice effect, which are good. Since July 1948, slight regulation during summer low flow by dam on outlet of Manistique Lake.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | |
|-----|-------|
| 1.1 | 196 |
| 2.0 | 365 |
| 4.0 | 888 |
| 8.7 | 2,270 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------------|------------|------------|--------|------------|------------|--------------|--------------|------------|--------|-------|--------|
| 1 | 610 | 907 | 545 | 420 | 410 | 380 | 404 | 1,230 | 923 | 661 | 480 | 310 |
| 2 | 592 | 866 | 543 | 400 | 400 | 375 | 418 | 1,200 | 974 | 640 | 457 | 297 |
| 3 | 595 | 845 | 540 | 400 | 400 | 370 | 467 | 1,220 | 991 | 656 | 441 | 286 |
| 4 | 592 | 829 | 535 | 390 | 390 | 370 | 506 | 1,250 | 999 | 667 | 424 | 436 |
| 5 | 574 | 810 | 532 | 390 | 398 | 365 | 517 | 1,220 | 985 | 645 | 391 | 524 |
| 6 | 545 | 783 | 527 | 390 | 411 | 365 | 532 | 1,410 | 969 | 618 | 290 | 493 |
| 7 | 527 | 753 | 511 | 390 | 416 | 360 | 540 | 1,920 | 947 | 597 | 275 | 470 |
| 8 | 506 | 740 | 504 | 390 | 396 | 360 | 540 | 2,140 | 907 | 579 | 271 | 532 |
| 9 | 522 | 737 | 504 | 390 | 401 | 355 | 540 | *2,170 | 861 | 566 | 257 | 750 |
| 10 | 532 | 729 | 467 | 390 | 390 | 356 | 543 | <u>2,230</u> | 826 | 550 | 254 | 726 |
| 11 | 574 | *748 | 457 | 398 | 385 | 354 | 571 | *2,180 | 804 | 540 | 245 | 686 |
| 12 | 605 | 734 | 483 | 408 | 375 | 345 | 664 | 2,040 | 785 | 530 | 240 | 672 |
| 13 | 618 | 704 | 483 | 424 | <u>368</u> | 341 | 850 | 1,880 | 769 | 514 | 238 | *648 |
| 14 | *618 | 680 | 475 | 444 | 394 | 340 | 1,030 | 1,710 | 748 | 498 | 252 | 637 |
| 15 | 615 | 660 | 467 | 475 | 401 | 341 | 1,200 | 1,570 | 729 | 485 | 266 | 618 |
| 16 | 642 | 640 | *470 | 480 | 404 | 335 | *1,500 | 1,440 | 745 | 478 | 262 | 595 |
| 17 | 686 | 620 | 475 | 459 | 406 | *333 | <u>1,680</u> | 1,340 | *858 | 478 | *248 | 582 |
| 18 | 675 | 600 | 475 | 454 | 406 | 330 | 1,510 | 1,270 | 866 | 480 | 242 | 579 |
| 19 | 656 | 590 | 467 | 446 | *404 | 330 | 1,320 | 1,200 | 877 | 475 | 235 | 574 |
| 20 | 634 | 580 | 449 | 441 | 398 | 328 | 1,180 | 1,150 | 883 | 470 | 230 | 561 |
| 21 | 615 | 597 | 426 | *434 | 390 | 335 | 1,160 | 1,120 | 856 | 485 | 225 | 543 |
| 22 | 595 | 597 | 421 | 431 | 390 | <u>324</u> | 1,130 | 1,100 | 839 | *566 | 222 | 530 |
| 23 | 582 | 597 | 411 | 431 | 391 | 325 | 1,110 | 1,070 | 823 | 597 | 218 | 514 |
| 24 | 704 | 592 | 411 | 431 | 388 | 333 | 1,230 | 1,050 | 812 | 582 | 217 | 527 |
| 25 | 961 | 595 | <u>406</u> | 428 | 398 | 326 | 1,380 | 1,020 | 799 | 553 | 212 | 613 |
| 26 | 985 | 584 | 416 | 416 | 388 | 326 | 1,360 | 999 | 777 | 535 | 212 | 645 |
| 27 | 1,020 | 574 | 488 | 414 | 386 | 333 | 1,330 | 972 | 745 | 522 | 209 | 621 |
| 28 | 1,060 | 574 | <u>558</u> | 414 | 386 | 328 | 1,260 | 950 | 710 | 504 | 231 | 610 |
| 29 | <u>1,070</u> | 561 | 514 | 421 | 381 | 328 | 1,170 | 928 | 694 | 472 | 303 | 605 |
| 30 | 1,030 | <u>550</u> | 475 | 421 | ----- | <u>358</u> | 1,170 | 915 | <u>680</u> | 467 | 335 | 592 |
| 31 | 969 | ----- | 450 | 421 | ----- | <u>398</u> | ----- | 920 | ----- | 475 | 326 | ----- |
| Total | 21,509 | 20,366 | 14,895 | 13,041 | 11,441 | 10,748 | 28,612 | 42,814 | 25,181 | 16,888 | 8,698 | 16,778 |
| Mean | 694 | 679 | 480 | 421 | 395 | 347 | 960 | 1,381 | 839 | 545 | 281 | 559 |
| Cfsm | 2.04 | 1.99 | 1.41 | 1.23 | 1.16 | 1.02 | 2.82 | 4.05 | 2.46 | 1.60 | 0.824 | 1.84 |
| In. | 2.35 | 2.22 | 1.63 | 1.42 | 1.25 | 1.18 | 3.15 | 4.67 | 2.74 | 1.84 | 0.95 | 1.83 |

Calendar year 1959: Max 1,230 Min 190 Mean 473 Cfsm 1.39 In. 18.81
Water year 1959-60: Max 2,230 Min 209 Mean 632 Cfsm 1.85 In. 25.23

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-20, Dec. 30 to Jan. 10, Feb. 1-4, 10-12, 21, 22, Mar. 1-9, 14, 23.

550. Manistique River near Blaney, Mich.

Location.--Lat 46°05'05", long 86°03'35", in SE $\frac{1}{4}$ sec. 28, T. 43 N., R. 14 W., on left bank 40 ft downstream from logging bridge, half a mile downstream from Duck Creek, 7 miles southwest of Blaney, and at mile 34.5.

Drainage area.--704 sq mi.

Records available.--March 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 612.55 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to July 24, 1939, chain gage on downstream side of bridge 40 ft upstream at same datum.

Average discharge.--22 years, 826 cfs.

Extremes.--Maximum discharge during year, 8,610 cfs May 10-11 (gage height, 19.04 ft); minimum, 309 cfs Aug. 28 (gage height, 6.58 ft).
1938-60: Maximum discharge, 9,300 cfs Apr. 1, 1938 (gage height, 19.42 ft, from graph based on gage readings); minimum, 182 cfs July 26, 1955.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Since July 1949, slight regulation during summer low flow by dam on outlet of Manistique Lake.

Revisions (water years).--WSP 874: 1938. WSP 1387: 1945.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 10

Apr. 11 to Sept. 30

| | | | | | |
|------|-------|------|-------|------|-------|
| 7.4 | 500 | 6.6 | 312 | 17.0 | 3,600 |
| 13.0 | 1,830 | 10.0 | 1,060 | 18.0 | 5,040 |
| 16.0 | 2,850 | 15.0 | 2,450 | 19.0 | 8,420 |
| 17.0 | 3,380 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|
| 1 | 1,170 | 2,500 | 890 | 820 | 700 | 600 | 680 | 3,180 | 1,390 | 398 | 725 | 510 |
| 2 | 1,090 | 2,250 | 870 | 780 | 700 | 620 | 720 | 3,170 | 1,440 | 985 | 687 | 486 |
| 3 | 1,090 | 2,060 | 850 | 750 | 700 | 630 | 780 | 3,090 | 1,480 | 965 | 659 | 470 |
| 4 | 1,130 | 1,980 | 850 | 720 | 690 | 640 | 840 | 3,110 | 1,480 | 970 | 648 | 540 |
| 5 | 1,080 | 1,900 | 820 | 700 | 690 | 640 | 900 | 3,150 | 1,460 | 955 | 619 | 756 |
| 6 | 1,020 | 1,830 | 810 | 680 | 680 | 630 | 960 | 3,360 | 1,400 | 918 | 538 | 776 |
| 7 | 966 | 1,720 | 790 | 680 | 680 | 620 | 1,050 | 4,800 | 1,360 | 881 | 466 | 730 |
| 8 | 921 | 1,660 | 780 | 680 | 670 | 610 | 1,100 | 6,720 | 1,310 | 852 | 452 | 740 |
| 9 | 983 | *1,610 | 770 | 680 | 670 | 600 | 1,200 | 7,300 | 1,270 | 826 | 436 | 955 |
| 10 | 1,040 | 1,580 | 750 | 680 | 670 | 590 | 1,250 | 8,320 | 1,220 | 800 | 422 | 1,080 |
| 11 | 1,090 | 1,580 | 740 | 680 | 640 | 580 | 1,370 | *8,280 | 1,180 | 773 | 408 | 1,020 |
| 12 | *1,200 | 1,590 | 760 | 690 | 620 | 570 | 1,630 | 6,800 | 1,160 | 728 | 398 | 968 |
| 13 | 1,220 | 1,500 | 790 | 710 | 640 | 560 | 2,220 | 5,650 | 1,110 | 681 | 402 | *945 |
| 14 | 1,240 | 1,400 | *800 | 720 | 660 | 550 | 2,990 | 4,900 | 1,060 | 656 | 412 | 905 |
| 15 | 1,230 | 1,270 | 780 | 730 | 660 | *540 | 3,840 | 4,280 | *1,040 | 630 | 420 | 852 |
| 16 | 1,250 | 1,250 | 760 | 740 | 660 | 540 | 4,380 | 3,780 | 1,050 | 620 | 420 | 819 |
| 17 | 1,580 | 1,200 | 750 | 760 | 660 | 540 | 4,800 | 3,400 | 1,260 | 610 | *400 | 790 |
| 18 | 1,420 | 1,200 | 710 | 770 | 660 | 530 | *5,080 | 3,000 | 1,320 | 610 | 380 | 778 |
| 19 | 1,390 | 1,150 | 690 | *780 | *660 | 530 | 4,880 | 2,700 | 1,290 | 600 | 360 | 766 |
| 20 | 1,350 | 1,100 | 680 | 770 | 660 | 530 | 4,350 | 2,470 | 1,270 | *566 | 348 | 771 |
| 21 | 1,280 | 1,100 | 670 | 770 | 660 | 520 | 3,980 | 2,300 | 1,220 | 615 | 342 | 752 |
| 22 | 1,250 | 1,050 | 670 | 760 | 660 | 510 | 3,720 | 2,210 | 1,180 | 652 | 335 | 735 |
| 23 | 1,250 | 1,050 | 670 | 750 | 660 | 530 | 3,550 | 2,120 | 1,170 | 982 | 328 | 714 |
| 24 | 1,390 | 1,000 | 680 | 740 | 660 | 540 | 3,770 | 1,980 | 1,180 | 930 | 323 | 714 |
| 25 | 1,990 | 1,000 | 700 | 730 | 660 | 540 | 3,990 | 1,840 | 1,190 | 855 | 318 | 852 |
| 26 | 2,500 | 970 | 730 | 700 | 650 | 540 | 3,990 | 1,710 | 1,140 | 824 | 315 | 978 |
| 27 | 2,900 | 950 | 800 | 660 | 640 | 550 | 3,880 | 1,600 | 1,080 | 824 | 312 | 965 |
| 28 | 3,100 | 930 | 920 | 700 | 630 | 570 | 3,660 | 1,530 | 1,060 | 814 | 326 | 918 |
| 29 | 3,100 | 920 | 960 | 710 | 630 | 580 | 3,360 | 1,460 | 1,040 | 773 | 468 | 893 |
| 30 | 3,000 | 900 | 950 | 710 | ----- | 600 | 3,170 | 1,410 | 1,020 | 747 | 555 | 864 |
| 31 | 2,700 | ----- | 880 | 710 | ----- | 640 | ----- | 1,410 | ----- | 730 | 544 | ----- |
| Total | 47,720 | 42,200 | 24,230 | 22,460 | 19,220 | 17,770 | 82,090 | 111,030 | 36,830 | 24,570 | 13,766 | 24,062 |
| Mean | 1,539 | 1,407 | 782 | 725 | 663 | 573 | 2,736 | 3,582 | 1,228 | 793 | 444 | 802 |
| Cfsm | 2.19 | 2.00 | 1.11 | 1.03 | 0.942 | 0.814 | 3.69 | 5.09 | 1.74 | 1.13 | 0.631 | 1.14 |
| In. | 2.52 | 2.23 | 1.28 | 1.19 | 1.02 | 0.94 | 4.34 | 5.87 | 1.94 | 1.30 | 0.73 | 1.27 |

Calendar year 1959: Max 3,460 Min 270 Mean 910 Cfsm 1.29 In. 17.54
Water year 1959-60: Max 8,320 Min 312 Mean 1,273 Cfsm 1.81 In. 24.63

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 16 to Apr. 10. No gage-height record Oct. 26 to Nov. 2, Nov. 26 to Dec. 13, Jan. 5-11, July 15-19; discharge estimated on basis of weather records and records for nearby stations.

565. Manistique River near Manistique, Mich.

Location.--Lat 46°01'50", long 86°09'40". in SE $\frac{1}{4}$ sec.15, T.42 N., R.15 W., on left bank 1 mile downstream from West Branch, 6 miles northeast of Manistique, and at mile 19.5.

Drainage area.--1,100 sq mi, approximately.

Records available.--March 1938 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 608 ft (from river-profile map). Prior to July 15, 1939, chain gage at site 1,600 ft upstream at different datum.

Average discharge.--22 years, 1,360 cfs.

Extremes.--Maximum discharge during year, 16,900 cfs May 11 (gage height, 12.85 ft); minimum, 554 cfs Aug. 27 (gage height, 2.48 ft).

1938-60: Maximum discharge, that of May 11, 1960; minimum, 288 cfs Oct. 4, 1948; minimum gage height, 1.01 ft Aug. 23, 1941.

Remarks.--Records good except those for periods of ice effect, which are fair. Since July 1948, slight regulation during summer low flow by dam on outlet of Manistique Lake.

Revisions (water years).--WSP 1387: 1940-42(M), 1943, 1945. WSP 1627: 1938-39.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-26, Aug. 31 to Sept. 30)

| | | | |
|-----|-------|------|--------|
| 2.5 | 560 | 10.0 | 5,890 |
| 4.0 | 1,100 | 11.0 | 8,430 |
| 7.0 | 2,700 | 12.0 | 12,300 |
| 9.0 | 4,480 | 12.8 | 16,600 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 2,160 | 4,600 | 1,450 | 1,300 | 1,050 | 870 | 950 | 6,450 | 2,330 | 1,560 | 1,230 | 968 |
| 2 | 2,050 | 4,360 | 1,450 | 1,250 | 1,050 | 850 | 1,000 | 6,340 | 2,390 | 1,520 | 1,240 | 920 |
| 3 | 1,960 | 3,970 | 1,400 | 1,150 | 1,000 | 870 | 1,050 | 6,400 | 2,460 | 1,510 | 1,210 | 876 |
| 4 | 1,940 | 3,670 | 1,400 | 1,100 | 1,000 | 890 | 1,150 | 6,500 | 2,510 | 1,500 | 1,170 | 920 |
| 5 | 1,880 | 3,460 | 1,380 | 1,100 | 1,000 | 900 | 1,250 | 6,470 | 2,530 | 1,480 | 1,110 | 1,140 |
| 6 | 1,780 | 3,310 | 1,350 | 1,100 | 1,000 | 900 | 1,300 | 6,730 | 2,460 | 1,440 | 1,020 | 1,260 |
| 7 | 1,680 | 3,080 | 1,320 | 1,050 | 1,000 | 880 | 1,450 | 8,460 | 2,340 | 1,380 | 904 | 1,250 |
| 8 | 1,580 | 2,860 | 1,260 | 1,050 | 980 | 870 | 1,600 | 12,800 | 2,210 | 1,320 | 856 | 1,240 |
| 9 | 1,600 | *2,720 | 1,260 | 1,050 | 970 | 850 | 1,800 | 15,000 | 2,080 | 1,260 | 836 | 1,440 |
| 10 | 1,720 | 2,650 | 1,250 | 1,050 | 950 | 840 | 1,950 | 16,000 | 1,960 | 1,210 | 804 | 1,660 |
| 11 | 1,840 | 2,610 | 1,200 | 1,100 | 930 | 830 | 2,200 | 16,500 | 1,860 | 1,160 | 780 | 1,680 |
| 12 | *2,050 | 2,620 | 1,200 | 1,100 | 910 | 810 | 2,480 | *14,400 | 1,800 | 1,120 | 758 | 1,620 |
| 13 | 2,140 | 2,520 | 1,250 | 1,100 | 890 | 800 | 3,100 | 11,700 | 1,730 | 1,050 | 769 | *1,560 |
| 14 | 2,170 | 2,410 | *1,250 | 1,150 | 916 | 780 | 4,060 | 9,720 | 1,640 | 1,000 | 783 | 1,450 |
| 15 | 2,150 | 2,150 | 1,250 | 1,150 | 930 | *780 | 5,160 | 8,460 | *1,570 | 968 | 790 | 1,410 |
| 16 | 2,150 | 2,070 | 1,200 | 1,150 | 940 | 770 | 6,820 | 7,510 | 1,580 | 948 | 786 | 1,310 |
| 17 | 2,280 | 2,050 | 1,150 | 1,200 | *940 | 760 | 9,000 | 6,640 | 1,820 | 932 | *762 | 1,240 |
| 18 | 2,380 | 2,000 | 1,150 | 1,150 | 930 | 760 | 9,950 | 5,890 | 2,030 | 932 | 724 | 1,200 |
| 19 | 2,400 | 1,950 | 1,120 | *1,150 | 930 | 750 | *9,750 | 5,320 | 2,060 | 924 | 692 | 1,180 |
| 20 | 2,350 | 1,900 | 1,100 | 1,150 | 940 | 740 | 8,900 | 4,740 | 2,030 | *900 | 660 | 1,170 |
| 21 | 2,240 | 1,850 | 1,130 | 1,150 | 940 | 730 | 8,150 | 4,280 | 1,970 | 940 | 641 | 1,150 |
| 22 | 2,120 | 1,800 | 1,150 | 1,150 | 950 | 720 | 7,660 | 3,980 | 1,880 | 1,200 | 626 | 1,120 |
| 23 | 2,050 | 1,750 | 1,150 | 1,100 | 960 | 720 | 7,600 | 3,720 | 1,840 | 1,510 | 611 | 1,100 |
| 24 | 2,250 | 1,750 | 1,150 | 1,100 | 960 | 720 | 8,340 | 3,500 | 1,840 | 1,580 | 596 | 1,090 |
| 25 | 3,100 | 1,700 | 1,200 | 1,100 | 950 | 730 | 8,870 | 3,240 | 1,880 | 1,580 | 584 | 1,200 |
| 26 | 3,970 | 1,650 | 1,200 | 1,100 | 940 | 750 | 9,070 | 2,960 | 1,860 | 1,570 | 578 | 1,420 |
| 27 | 4,660 | 1,600 | 1,300 | 1,100 | 920 | 780 | 8,740 | 2,720 | 1,800 | 1,560 | 566 | 1,470 |
| 28 | 5,300 | 1,550 | 1,450 | 1,050 | 910 | 780 | 9,060 | 2,560 | 1,740 | 1,480 | 564 | 1,420 |
| 29 | 5,320 | 1,550 | 1,550 | 1,050 | 900 | 810 | 7,320 | 2,420 | 1,680 | 1,380 | 755 | 1,360 |
| 30 | 5,320 | 1,500 | 1,500 | 1,050 | ----- | 850 | 6,750 | 2,330 | 1,600 | 1,300 | 928 | 1,310 |
| 31 | 4,900 | ----- | 1,400 | 1,050 | ----- | 900 | ----- | 2,310 | ----- | 1,240 | 988 | ----- |
| Total | 81,690 | 73,660 | 39,570 | 34,600 | 27,880 | 24,970 | 155,480 | 215,850 | 59,480 | 39,454 | 25,341 | 38,164 |
| Mean | 2,635 | 2,455 | 1,276 | 1,116 | 954 | 805 | 5,183 | 6,963 | 1,983 | 1,273 | 817 | 1,272 |
| Cfs/m | 2.40 | 2.23 | 1.16 | 1.01 | 0.887 | 0.732 | 4.71 | 6.33 | 1.80 | 1.16 | 0.743 | 1.16 |
| In. | 2.77 | 2.49 | 1.34 | 1.16 | 0.94 | 0.84 | 5.26 | 7.30 | 2.01 | 1.34 | 0.86 | 1.29 |

Calendar year 1959: Max 6,800 Min 490 Mean 1,526 Cfs/m 1.39 In. 18.83
Water year 1959-60: Max 16,500 Min 566 Mean 2,229 Cfs/m 2.03 In. 27.60

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17 to Dec. 4, Dec. 10-18, Dec. 22 to Apr. 11. No gage-height record Nov. 18-21, Jan. 6-10, 12-17, 22-24, 26-28; discharge estimated on the basis of weather records and records for nearby stations.

570. Indian River near Manistique, Mich.

Location.--Lat 45°59'30", long 86°17'15", in NE $\frac{1}{4}$ sec.34, T.42 N., R.16 W., on shore of Indian Lake just upstream from highway bridge over outlet of Indian Lake, 2 miles northwest of Manistique.

Drainage area.--302 sq mi.

Records available.--March 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 608.66 ft above mean sea level (levels by Michigan Department of Conservation). Prior to July 9, 1942, chain gage at highway bridge 30 ft downstream at same datum. Since Jan. 18, 1944, auxiliary staff gage on right bank $\frac{1}{2}$ miles downstream at same datum, read twice daily.

Average discharge.--22 years, 377 cfs.

Extremes.--Maximum daily discharge during year, 2,030 cfs May 12; maximum gage height, 7.56 ft May 11; minimum daily discharge, 148 cfs Aug. 11; minimum gage height, 3.49 ft Mar. 27, 29.

1938-60: Maximum daily discharge, that of May 12, 1960; maximum gage height, 7.79 ft June 24, 1943; minimum daily discharge, about 20 cfs Nov. 23, 1946 (caused by ice jams at outlet of Indian Lake); minimum gage height, 2.22 ft Nov. 17, 1955 (ice jam at outlet of Indian Lake); almost no flow occasionally when ice jams form at lake outlet.

Remarks.--Records excellent except those below 200 cfs, which are fair. Indian Lake regulated by needles in gate section of concrete dam $\frac{1}{2}$ miles below gage.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | 530 | 673 | 449 | 370 | 336 | 304 | 290 | 1,170 | *945 | 586 | 484 | 458 |
| 2 | 517 | 673 | 443 | 372 | 334 | 302 | 299 | *1,190 | 945 | 580 | 479 | 447 |
| 3 | 525 | 665 | 438 | 372 | 329 | 300 | 318 | 1,200 | 931 | 578 | 471 | 462 |
| 4 | 520 | 658 | 434 | 372 | 329 | 300 | 332 | 1,210 | 897 | 565 | 460 | 471 |
| 5 | 512 | 658 | 429 | 370 | 327 | 297 | 339 | 1,230 | 873 | 555 | 460 | 467 |
| 6 | 501 | 668 | 427 | 365 | 329 | 295 | 343 | 1,290 | 843 | 550 | 452 | 465 |
| 7 | 492 | 658 | 421 | 361 | 327 | 295 | 353 | 1,460 | 822 | 540 | 454 | 465 |
| 8 | 489 | 650 | 416 | 361 | 327 | 292 | 363 | 1,630 | 793 | 538 | 440 | 470 |
| 9 | 503 | 631 | 414 | 350 | 325 | 290 | 371 | *1,780 | 764 | 532 | 432 | 486 |
| 10 | 486 | 621 | 399 | 350 | 320 | 290 | 377 | 1,880 | 739 | 527 | 373 | 503 |
| 11 | 498 | *619 | 390 | 347 | 325 | 288 | 382 | *2,000 | 719 | 515 | 148 | 507 |
| 12 | 481 | 616 | 387 | 353 | 320 | 285 | 393 | 2,030 | 700 | 507 | 174 | 497 |
| 13 | 472 | 603 | 385 | 358 | 313 | 285 | 415 | *1,980 | 681 | 491 | a180 | 497 |
| 14 | 472 | 593 | *383 | 358 | 311 | 283 | 456 | 1,900 | 653 | 487 | a180 | 493 |
| 15 | *464 | 565 | 383 | 358 | 309 | *281 | 503 | 1,830 | *627 | 479 | 179 | *480 |
| 16 | 481 | 560 | 380 | 358 | 306 | 278 | 570 | 1,740 | 616 | 469 | 191 | 473 |
| 17 | 472 | 549 | 378 | 356 | *314 | 278 | 647 | 1,670 | 626 | 185 | 212 | 471 |
| 18 | 473 | 524 | 375 | 353 | 313 | 278 | 721 | 1,590 | 619 | 184 | *240 | 473 |
| 19 | 468 | 511 | 370 | *353 | 313 | 278 | 750 | 1,510 | 616 | 191 | 498 | 465 |
| 20 | 460 | 495 | a365 | 350 | 311 | 278 | 784 | 1,450 | 611 | 202 | 494 | 463 |
| 21 | 453 | 497 | a360 | 353 | 311 | 278 | 809 | 1,390 | 604 | *470 | 483 | 460 |
| 22 | 450 | 499 | a355 | 350 | 311 | 288 | 834 | 1,360 | 597 | 487 | 479 | 456 |
| 23 | 455 | 497 | a350 | 350 | 314 | 283 | 889 | *1,300 | 599 | 484 | 467 | 446 |
| 24 | 465 | 493 | a350 | 350 | 314 | 281 | 992 | 1,240 | *818 | 482 | 455 | 448 |
| 25 | 519 | 485 | a350 | 350 | 309 | 278 | a1,100 | 1,180 | 616 | 482 | 445 | 464 |
| 26 | 546 | 477 | 348 | 348 | 309 | 276 | a1,150 | 1,130 | 616 | 495 | 447 | 472 |
| 27 | 586 | 477 | 356 | 346 | 309 | 274 | a1,150 | 1,100 | 613 | 492 | 442 | 460 |
| 28 | 621 | 472 | 363 | 341 | 306 | 274 | a1,150 | 1,060 | 611 | 487 | 434 | 462 |
| 29 | 642 | 462 | 368 | 341 | 304 | 274 | a1,150 | 1,020 | 611 | 487 | 467 | 451 |
| 30 | 658 | 456 | 370 | 339 | ----- | 285 | a1,150 | 1,000 | 594 | 495 | 462 | 447 |
| 31 | 688 | ----- | 370 | 339 | ----- | 288 | ----- | 973 | ----- | 484 | 458 | ----- |
| Total | 15,899 | 17,005 | 12,006 | 10,994 | 9,205 | 8,856 | 19,380 | 44,493 | 21,097 | 14,606 | 12,041 | 14,079 |
| Mean | 513 | 567 | 387 | 355 | 317 | 286 | 646 | 1,435 | 703 | 471 | 388 | 469 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 746 Min 107 Mean 369 Cfsm 1.22 In. 16.56
 Water year 1959-60: Max 2,030 Min 148 Mean 546 Cfsm 1.81 In. 24.64

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of weather records and gage-height records at 1 of 2 gages.

578. Middle Branch Escanaba River at Humboldt, Mich.

Location.--Lat 46°29'57", long 87°53'11", in SW $\frac{1}{4}$ sec.1, T.47 N., R.29 W., on left bank 15 ft upstream from county highway bridge, a quarter of a mile north of Humboldt, and $\frac{1}{2}$ miles downstream from Halfway Creek.

Drainage area.--46.7 sq mi.

Records available.--June 1959 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,521.20 ft above mean sea level (Cleveland-Cliffs Iron Co. bench mark). Prior to Sept. 1, 1960, wire-weight gage on upstream side of bridge at same datum.

Extremes.--1959: Maximum discharge during period June to September, 186 cfs Sept. 23 (gage height, 3.80 ft); minimum, 14 cfs June 24 (gage height, 1.15 ft).
1959-60: Maximum discharge during water year, 1,640 cfs Apr. 24 (gage height, 8.30 ft, from floodmark); minimum, 11 cfs Aug. 24 (gage height, 1.07 ft).

Remarks.--Records fair. Since July 1960, some diversion upstream from station for industrial use; figures of runoff adjusted since.

Rating table, June 24, 1959, to Sept. 30, 1960, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 27 to July 3, July 9-11, 15, July 20 to Oct. 4, 1959, Sept. 29, 1960)

| | | | |
|-----|-----|-----|-------|
| 1.0 | 8.0 | 4.0 | 250 |
| 1.3 | 21 | 5.0 | 450 |
| 2.0 | 62 | 7.0 | 1,110 |
| 3.0 | 134 | 8.0 | 1,520 |
| 3.5 | 180 | | |

Discharge, in cubic feet per second, June to September 1959

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|------|------|-------|-------|-------|------|-------|-------|-------|-------|-------|
| 1 | | | | | - | - | | | - | 26 | 27 | 66 |
| 2 | | | | | - | - | | | - | 31 | 21 | 55 |
| 3 | | | | | - | - | | | - | 24 | 27 | 48 |
| 4 | | | | | - | - | | | - | 20 | 61 | 45 |
| 5 | | | | | - | - | | | - | 17 | 40 | 40 |
| 6 | | | | | - | - | | | - | 16 | 31 | 37 |
| 7 | | | | | - | - | | | - | 18 | 88 | 60 |
| 8 | | | | | - | - | | | - | 16 | 100 | 66 |
| 9 | | | | | - | - | | | - | 24 | 75 | 60 |
| 10 | | | | | †11.3 | - | | | †25.2 | 20 | 55 | 121 |
| 11 | | | | | - | - | | | - | 19 | 40 | 108 |
| 12 | | | | | - | †12.7 | | | - | 17 | 43 | 80 |
| 13 | | | | | - | - | | | - | 16 | 35 | 60 |
| 14 | | | | | - | - | | | - | 18 | 45 | 50 |
| 15 | | | | | - | - | | | - | 18 | 46 | 49 |
| 16 | | | | | - | - | | | - | 17 | 41 | 52 |
| 17 | | | | | - | - | | | - | 17 | 36 | 57 |
| 18 | | | | | - | - | | | - | 17 | 34 | 52 |
| 19 | | | | | - | - | | | - | 17 | 27 | 48 |
| 20 | | | | | - | - | | | - | 18 | *27 | 43 |
| 21 | | | | | - | - | | | - | 18 | 42 | 107 |
| 22 | | | | | - | - | | | - | *28 | 65 | 157 |
| 23 | | | | | - | - | | | - | 29 | 80 | 184 |
| 24 | | | | | - | - | | | *14 | 38 | 56 | 145 |
| 25 | | | | | - | - | | | 15 | 26 | 46 | 97 |
| 26 | | | | | †10.1 | - | | | 16 | 22 | 49 | 110 |
| 27 | | | | | - | - | | | 35 | 20 | 76 | 120 |
| 28 | | | | | - | - | | †74.9 | 31 | 70 | *132 | 153 |
| 29 | | | | †12.2 | - | - | | | 24 | 76 | 140 | 126 |
| 30 | | | | | - | †27.9 | | | 20 | *52 | 110 | 95 |
| 31 | | | | | - | - | | | - | 35 | 79 | ----- |
| Total | | | | | | | | | - | 798 | 1,774 | 2,489 |
| Mean | | | | | | | | | - | 25.7 | 57.2 | 83.0 |
| Cfs/m | | | | | | | | | - | 0.550 | 1.22 | 1.78 |
| In. | | | | | | | | | - | 0.63 | 1.41 | 1.99 |

Calendar year : Max Min Mean Cfs/m In.
Water year : Max Min Mean Cfs/m In.

* Discharge measurement made on this day.

† Result of discharge measurement.

Note.--No gage-height record on weekends; discharge interpolated.

578. Middle Branch Escanaba River at Humboldt, Mich.--Continued

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|------|--------|-------|-------|-------|------|-------|
| 1 | *82 | 160 | 49 | 40 | 27 | 23 | 28 | 350 | 80 | 117 | 22 | 56 |
| 2 | 75 | 184 | 45 | 38 | b28 | 23 | 30 | 316 | 136 | 88 | 20 | 49 |
| 3 | 90 | 156 | 43 | 37 | 26 | 23 | 32 | 298 | 136 | 70 | 18 | 39 |
| 4 | 110 | 133 | 43 | 36 | 26 | 23 | 34 | 280 | 100 | 60 | 16 | 31 |
| 5 | 102 | 120 | 42 | 36 | 26 | 22 | 36 | 280 | 78 | 54 | 16 | 28 |
| 6 | 86 | 105 | 41 | 35 | 26 | 22 | 38 | *644 | 69 | 45 | 17 | 26 |
| 7 | 73 | 110 | b41 | 35 | 26 | 22 | 39 | 936 | 61 | 39 | 22 | 24 |
| 8 | 68 | 110 | 40 | 35 | *25 | b22 | 37 | 800 | 55 | 34 | 31 | 31 |
| 9 | 72 | 104 | *b40 | 35 | 25 | *b22 | 35 | 450 | 50 | 31 | 23 | 32 |
| 10 | 70 | 94 | b38 | 34 | 25 | b21 | 31 | 360 | 45 | 28 | 22 | 27 |
| 11 | 66 | *108 | 37 | *b34 | 25 | b21 | 31 | 334 | 44 | 26 | *18 | 24 |
| 12 | 61 | 120 | 36 | 34 | 25 | 21 | 55 | 332 | 44 | 23 | 16 | 22 |
| 13 | *58 | 100 | 36 | 34 | 25 | 21 | *100 | 344 | 45 | 21 | 16 | 20 |
| 14 | 53 | 85 | b35 | 33 | 25 | b21 | 174 | 342 | 39 | 22 | 30 | *21 |
| 15 | 42 | 76 | 34 | 33 | b25 | b20 | 268 | 300 | 35 | 22 | 27 | 18 |
| 16 | 65 | 72 | 34 | 33 | 25 | b20 | *470 | 255 | 49 | 22 | 20 | 16 |
| 17 | 90 | b68 | 34 | 33 | 26 | b20 | 702 | 230 | 63 | 22 | 17 | 16 |
| 18 | 86 | b66 | 33 | 33 | 26 | b20 | 530 | 232 | 54 | *21 | 16 | 16 |
| 19 | 72 | b64 | 33 | 32 | 26 | 20 | 432 | 198 | 47 | 18 | 15 | 18 |
| 20 | 62 | b64 | 32 | 32 | 26 | 20 | 418 | 161 | 45 | 18 | 14 | 15 |
| 21 | 55 | 63 | 32 | 32 | 26 | 20 | 521 | 215 | 38 | 87 | 13 | 15 |
| 22 | 53 | 62 | 32 | 31 | 25 | 20 | 748 | 290 | *41 | 186 | 12 | 15 |
| 23 | 58 | 61 | 32 | 31 | 25 | b20 | 1,100 | 271 | 55 | 117 | 14 | 15 |
| 24 | 140 | 58 | 34 | 30 | 25 | 20 | 1,400 | 196 | 68 | 70 | 11 | 36 |
| 25 | 210 | b57 | 37 | 30 | 25 | 20 | *1,160 | 170 | 56 | 45 | 12 | 86 |
| 26 | 300 | 55 | 40 | 29 | 24 | 20 | 678 | 150 | 45 | 50 | 13 | 65 |
| 27 | 320 | b54 | 47 | b28 | 24 | 21 | 450 | 114 | 40 | 40 | 17 | 48 |
| 28 | 217 | 52 | 58 | b28 | 24 | b22 | *352 | 105 | 244 | 34 | 70 | 35 |
| 29 | 165 | 51 | 60 | 28 | 24 | b23 | 320 | 100 | 390 | 28 | 166 | 32 |
| 30 | 146 | 49 | 51 | 27 | ----- | 24 | 310 | 95 | 283 | 45 | 89 | 31 |
| 31 | 140 | ----- | 43 | 27 | ----- | b26 | ----- | 86 | ----- | 33 | 46 | ----- |
| Total | 3,292 | 2,661 | 1,232 | 1,014 | 734 | 663 | 10,559 | 8,915 | 2,513 | 1,516 | 863 | 905 |
| Mean | 106 | 88.7 | 39.7 | 32.7 | 25.3 | 21.4 | 352 | 288 | 83.8 | 48.9 | 27.8 | 30.2 |
| (†) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.07 | 1.97 | 2.11 |

Adjusted for diversion

| | Mean | Cfsm | In. |
|------|------|------|-------|
| Mean | 106 | 88.7 | 39.7 |
| Cfsm | 2.27 | 1.90 | 0.850 |
| In. | 2.62 | 2.12 | 0.98 |

| | Observed | | | Adjusted | | |
|---------------------|-----------|--------|-----------|----------|-----------|-----------|
| Calendar year 1959: | Max - | Min - | Mean - | Max - | Cfsm - | In. - |
| Water year 1959-60: | Max 1,400 | Min 11 | Mean 95.3 | Max 95.7 | Cfsm 2.05 | In. 27.90 |

* Discharge measurement made on this day.

† Average monthly diversion, equivalent in cubic feet per second, for industrial use; furnished by Cleveland-Cliffs Iron Co.

b Stage-discharge relation affected by ice.

Note.--No gage-height record on weekends prior to Sept. 1 and for Dec. 19-30, Jan. 1-10, 12-26, Jan. 29 to Feb. 1, Feb. 10-14, Feb. 16 to Mar. 7, Mar. 19-22, 24-27 (stage-discharge relation affected by ice during most of these periods); discharge estimated on basis of weather records and records for station near Ishpeming.

580. Middle Branch Escanaba River near Ishpeming, Mich.

Location.--Lat 46°23'40", long 87°45'30", in NW¼SW¼ sec.12, T.46 N., R.28 W., on left bank half a mile downstream from County Highway 581, 6 miles southwest of Ishpeming, and 10 miles east of Republic.

Drainage area.--128 sq mi.

Records available.--June 1954 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,389.02 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--6 years, 142 cfs.

Extremes.--Maximum discharge during year, 2,680 cfs Apr. 25 (gage height, 12.55 ft); minimum, 33 cfs Aug. 26, 27 (gage height, 1.56 ft).
1954-60: Maximum discharge, that of Apr. 25, 1960; minimum, 12 cfs Aug. 21-23, 1957; minimum gage height, 1.17 ft Aug. 22, 23, 1957.

Remarks.--Records excellent except those above 1,200 cfs, which are good, and those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 25

Apr. 26 to Sept. 30

| | | | | | | | |
|-----|-----|------|-------|-----|----|------|-------|
| 1.7 | 50 | 9.0 | 1,330 | 1.5 | 28 | 6.0 | 700 |
| 2.0 | 87 | 13.0 | 2,900 | 1.7 | 47 | 9.0 | 1,330 |
| 6.0 | 700 | | | 2.0 | 83 | 12.0 | 2,460 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | *254 | 402 | 129 | 120 | 71 | 62 | 80 | 888 | 260 | 406 | 103 | 218 |
| 2 | 220 | 427 | 125 | 110 | 71 | 61 | 86 | 868 | 376 | 239 | 87 | 216 |
| 3 | 252 | 421 | 124 | 98 | 71 | 59 | 92 | 794 | 410 | 202 | 76 | 179 |
| 4 | 320 | 365 | 121 | 91 | 71 | 58 | 96 | 737 | 368 | 178 | 66 | 139 |
| 5 | 302 | 322 | 118 | 89 | 70 | 58 | 100 | 705 | 288 | 145 | 59 | 117 |
| 6 | 242 | 284 | 118 | 86 | 70 | 57 | 105 | 874 | 234 | 125 | 55 | 104 |
| 7 | 206 | 320 | 114 | 85 | 70 | 56 | 100 | *1,670 | 204 | 109 | 76 | 95 |
| 8 | 181 | 312 | 114 | 84 | 70 | 55 | 100 | 1,650 | 179 | 97 | 106 | 109 |
| 9 | 188 | 276 | *111 | 83 | *70 | *54 | 96 | 1,180 | 160 | 88 | 86 | 134 |
| 10 | 184 | 257 | 104 | 82 | 69 | 54 | 90 | 950 | 144 | 80 | 73 | 116 |
| 11 | 167 | *262 | 106 | 82 | 69 | 53 | 94 | 888 | 145 | 74 | *64 | 100 |
| 12 | 155 | 251 | 103 | *81 | 69 | 53 | 134 | 868 | 144 | 68 | 58 | 88 |
| 13 | 149 | 251 | 103 | 80 | 68 | 53 | 232 | 819 | 130 | 63 | 58 | 80 |
| 14 | *142 | 208 | 100 | 81 | 68 | 53 | 364 | 771 | 117 | 59 | 100 | *75 |
| 15 | 132 | 202 | 98 | 82 | 68 | 52 | 555 | 717 | 106 | 56 | 99 | 74 |
| 16 | 167 | 190 | 97 | 81 | 68 | 52 | *978 | 635 | 113 | 60 | 78 | 66 |
| 17 | 238 | 173 | 96 | 80 | 69 | 52 | 1,440 | 566 | 164 | 84 | 64 | 63 |
| 18 | 234 | 174 | 95 | 80 | 70 | 51 | 1,380 | 538 | 173 | *60 | 57 | 60 |
| 19 | 197 | 155 | 95 | 79 | 70 | 51 | 1,140 | 507 | 151 | 56 | 52 | 58 |
| 20 | 170 | 159 | 94 | 78 | 70 | 51 | *958 | 453 | 128 | 50 | 49 | 56 |
| 21 | 150 | 146 | 94 | 78 | 69 | 51 | 924 | 482 | 113 | 139 | 45 | 55 |
| 22 | 138 | 146 | 94 | 77 | 68 | 51 | 1,030 | 644 | *107 | 405 | 42 | 52 |
| 23 | 143 | 145 | 96 | 77 | 67 | 51 | 1,200 | 702 | 110 | 445 | 40 | 50 |
| 24 | 276 | 153 | 101 | 76 | 66 | 51 | 1,960 | 569 | 135 | 286 | 38 | 86 |
| 25 | 546 | 149 | 110 | 75 | 65 | 51 | 2,610 | 459 | 164 | 226 | 36 | 236 |
| 26 | 790 | 152 | 120 | 74 | 64 | 52 | *2,120 | 380 | 132 | 322 | 35 | 269 |
| 27 | 841 | 145 | 145 | 73 | 63 | 54 | 1,520 | 341 | 114 | 230 | 34 | 190 |
| 28 | 646 | 138 | 177 | 73 | 63 | 56 | *1,090 | 298 | 230 | 138 | 221 | 138 |
| 29 | 488 | 134 | 180 | 72 | 62 | 59 | 862 | 269 | 456 | 110 | 550 | 117 |
| 30 | 395 | 132 | 164 | 72 | 67 | 67 | 821 | 253 | 541 | 182 | 554 | 107 |
| 31 | 376 | ----- | 140 | 71 | ----- | 74 | ----- | 266 | ----- | 141 | 322 | ----- |
| Total | 8,889 | 6,851 | 3,586 | 2,550 | 1,979 | 1,712 | 22,357 | 21,771 | 6,096 | 4,903 | 3,383 | 3,447 |
| Mean | 287 | 228 | 116 | 82.3 | 68.2 | 55.2 | 745 | 702 | 203 | 158 | 109 | 115 |
| Cfs/m | 2.24 | 1.78 | 0.906 | 0.643 | 0.533 | 0.431 | 5.82 | 5.48 | 1.59 | 1.23 | 0.852 | 0.898 |
| In. | 2.58 | 1.99 | 1.04 | 0.74 | 0.57 | 0.50 | 6.49 | 6.32 | 1.77 | 1.42 | 0.98 | 1.00 |

Calendar year 1959: Max 1,010 Min 21 Mean 157 Cfs/m 1.23 In. 16.67
Water year 1959-60: Max 2,610 Min 34 Mean 239 Cfs/m 1.87 In. 25.40

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 15-21, Dec. 31 to Apr. 7, Apr. 10, 11 (no gage-height record Mar. 18-26).

585. East Branch Escanaba River at Gwinn, Mich.

Location.--Lat 46°17'10", long 87°26'00", in NE $\frac{1}{4}$ sec.21, T.45 N., R.25 W., on right bank in county park at Gwinn, 1 mile upstream from mouth.

Drainage area.--125 sq mi.

Records available.--October 1954 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,079.2 ft above mean sea level, datum of 1929.

Average discharge.--6 years, 107 cfs.

Extremes.--Maximum discharge during year, 1,920 cfs Apr. 25 (gage height, 14.44 ft); minimum daily, 46 cfs Mar. 11-20.

1954-60: Maximum discharge, that of Apr. 25, 1960; minimum, 23 cfs Aug. 22, 23, 1957 (gage height, 6.54 ft).

Remarks.--Records excellent except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 6.9 | 42 | 9.0 | 330 |
| 7.5 | 95 | 12.0 | 1,030 |
| 8.0 | 158 | 14.3 | 1,850 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | *113 | 344 | 110 | 103 | 88 | 55 | 85 | 889 | 208 | 131 | 106 | 125 |
| 2 | 111 | 348 | 109 | 94 | 67 | 54 | 88 | 865 | 591 | 117 | 91 | 130 |
| 3 | 141 | 314 | 108 | 88 | 66 | 53 | 100 | 582 | 644 | 130 | 81 | 188 |
| 4 | 193 | 279 | 105 | 84 | 61 | 52 | 111 | 529 | 487 | 111 | 74 | 144 |
| 5 | 177 | 261 | 106 | 80 | 64 | 51 | 112 | 525 | 340 | 103 | 70 | 115 |
| 6 | 139 | 225 | 108 | 78 | 64 | 50 | 110 | 743 | 263 | 94 | 66 | 97 |
| 7 | 120 | 234 | 105 | 76 | 63 | 49 | 110 | 1,210 | 220 | 88 | 89 | 88 |
| 8 | 106 | 233 | 100 | 74 | 63 | 48 | 110 | 1,000 | 194 | 82 | 85 | 106 |
| 9 | 109 | 220 | *100 | 72 | *62 | *47 | 103 | 780 | 175 | 76 | 78 | 115 |
| 10 | 114 | 210 | 98 | 71 | 60 | 47 | 100 | 834 | 161 | 71 | 69 | 105 |
| 11 | 114 | *234 | 94 | 71 | 53 | 46 | 113 | 943 | 166 | 68 | *66 | 90 |
| 12 | 107 | 231 | 91 | *71 | 62 | 46 | 148 | 949 | 166 | 67 | 62 | 82 |
| 13 | 97 | 215 | 90 | 71 | 68 | 46 | 243 | 928 | 151 | 63 | 65 | 76 |
| 14 | *87 | 185 | 88 | 72 | 66 | 46 | 360 | 871 | 139 | 61 | 84 | 73 |
| 15 | 86 | 180 | 87 | 73 | 64 | 46 | 672 | 706 | 130 | 60 | 80 | *69 |
| 16 | 103 | 171 | 87 | 74 | 63 | 46 | *1,210 | 635 | 143 | 66 | 68 | 65 |
| 17 | 141 | 160 | 86 | 74 | 63 | 46 | *1,480 | 531 | 212 | 68 | 62 | 63 |
| 18 | 135 | 150 | 84 | 73 | 63 | 46 | 1,110 | 487 | 191 | *64 | 59 | 61 |
| 19 | 113 | 143 | 82 | 72 | 63 | 46 | 824 | 434 | 171 | 61 | 56 | 60 |
| 20 | 100 | 135 | 81 | 72 | 62 | 46 | *696 | 384 | 148 | 59 | 53 | 60 |
| 21 | 95 | 132 | 80 | 72 | 62 | 47 | 754 | 418 | 131 | 148 | 52 | 58 |
| 22 | 87 | 131 | 78 | 70 | 61 | 47 | 994 | 578 | *125 | 322 | 51 | 56 |
| 23 | 87 | 131 | 77 | 71 | 61 | 48 | 920 | 545 | 124 | 308 | 50 | 55 |
| 24 | 307 | 131 | 78 | 71 | 60 | 48 | 1,280 | 402 | 161 | 178 | 49 | 76 |
| 25 | 994 | 129 | 79 | 71 | 60 | 49 | 1,850 | 328 | 171 | 125 | 49 | 139 |
| 26 | 1,010 | 130 | 82 | 70 | 58 | 50 | 1,410 | 287 | 139 | 134 | 46 | 158 |
| 27 | 665 | 125 | 97 | 68 | 57 | 53 | 941 | 258 | 120 | 212 | 48 | 123 |
| 28 | 452 | 125 | 127 | 70 | 57 | 58 | *670 | 236 | 155 | 143 | 117 | 100 |
| 29 | 354 | 120 | 148 | 70 | 56 | 63 | 509 | 220 | 201 | 112 | 220 | 82 |
| 30 | 306 | 115 | 132 | 70 | ----- | 70 | 542 | 212 | 166 | 125 | 256 | 75 |
| 31 | 314 | ----- | 115 | 69 | ----- | 80 | ----- | 204 | ----- | 125 | 184 | ----- |
| Total | 7,077 | 5,741 | 3,010 | 2,315 | 1,797 | 1,579 | 17,756 | 18,113 | 6,391 | 3,568 | 2,546 | 2,832 |
| Mean | 228 | 191 | 97.1 | 74.7 | 62.0 | 50.9 | 592 | 584 | 213 | 115 | 82.1 | 94.4 |
| Cfsm | 1.82 | 1.53 | 0.777 | 0.598 | 0.496 | 0.407 | 4.74 | 4.67 | 1.70 | 0.920 | 0.657 | 0.755 |
| In. | 2.10 | 1.71 | 0.90 | 0.69 | 0.53 | 0.47 | 5.29 | 5.38 | 1.90 | 1.06 | 0.76 | 0.84 |

| | | | | | | | | | |
|-------------------------|-------|-----|----|------|-----|------|-------|-----|-------|
| Calendar year 1959: Max | 1,010 | Min | 24 | Mean | 108 | Cfsm | 0.864 | In. | 11.69 |
| Water year 1959-60: Max | 1,850 | Min | 46 | Mean | 199 | Cfsm | 1.59 | In. | 21.63 |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 17, 18, 20, 26-29, Dec. 1, 4, 7-11, 14, 17-21, Jan. 2-20, Feb. 24 to Mar. 26, Mar. 30, 31, Apr. 6-8, 10.

590. Escanaba River at Cornell, Mich.

Location.--Lat 45°54'40", long 87°12'50", in sec.32, T.41 N., R.24 W., on right bank 50 ft downstream from highway bridge, half a mile downstream from Bobs' Creek, three-quarters of a mile northeast of Cornell, and 15 miles upstream from mouth.

Drainage area.--870 sq mi.

Records available.--August 1903 to December 1912, January 1913 to November 1915 (gage heights only), October 1950 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "near Escanaba" 1903-15.

Gage.--Water-stage recorder. Datum of gage is 749.26 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). August 1903 to November 1915 chain gage at site 11 miles downstream at different datum.

Average discharge.--19 years (1903-12, 1950-60), 951 cfs.

Extremes.--Maximum discharge during year, 10,500 cfs May 7 (gage height, 4.90 ft); minimum, 193 cfs July 17 (gage height, 1.34 ft).

1903-12, 1950-60: Maximum discharge, that of May 7, 1960; maximum gage height, 5.72 ft Apr. 7, 1956 (ice jam); minimum discharge observed, 90 cfs July 5, 1910 (gage height, 1.5 ft), but may have been less during extended periods of no gage-height record during winter seasons of 1903-12, or during period of ice effect in 1959.

Remarks.--Records excellent except those for periods of ice effect, which are fair. Diurnal fluctuation and occasional slight regulation caused by Boney Falls powerplant, 8 miles upstream from station, since 1950.

Revisions (water years).--WSP 1387: 1904.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 14

Apr. 15 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-------|-----|--------|
| 1.4 | 225 | 2.5 | 1,730 | 1.5 | 307 | 3.0 | 2,920 |
| 1.6 | 395 | 3.0 | 2,920 | 2.0 | 850 | 4.0 | 6,220 |
| 2.0 | 890 | 4.0 | 6,220 | 2.5 | 1,720 | 4.8 | 10,000 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 1,400 | 2,300 | 800 | 580 | 400 | 480 | 500 | 5,020 | 1,270 | 1,330 | 1,280 | 1,780 |
| 2 | 1,260 | 2,180 | 760 | 580 | 540 | 490 | 520 | 5,120 | 2,120 | 1,260 | 1,110 | 1,600 |
| 3 | 1,200 | 2,030 | 780 | 640 | 510 | 490 | 540 | 4,880 | 2,760 | 1,070 | 865 | 3,330 |
| 4 | 1,310 | 1,900 | 760 | 500 | 470 | 350 | 800 | 4,570 | 2,630 | 1,060 | 686 | 3,230 |
| 5 | 1,310 | 1,730 | 724 | 680 | 480 | 260 | 760 | 4,510 | 2,180 | 988 | 662 | 2,340 |
| 6 | 1,200 | 1,580 | 512 | 560 | 350 | 280 | 720 | 6,390 | 1,740 | 646 | 662 | 1,720 |
| 7 | 1,100 | 1,400 | 400 | 580 | 290 | 300 | 760 | 9,880 | 1,520 | 668 | 421 | 1,330 |
| 8 | 1,100 | 1,360 | 540 | 700 | 450 | 440 | 800 | 9,500 | 1,370 | 674 | 498 | 1,520 |
| 9 | 920 | 1,300 | 680 | 480 | *520 | 480 | 800 | 7,900 | 1,160 | 605 | 522 | 1,700 |
| 10 | 965 | 1,400 | 670 | 340 | 510 | 440 | 680 | 6,840 | 970 | 460 | 611 | 1,370 |
| 11 | 633 | 1,470 | *660 | 420 | 520 | 320 | 620 | 5,940 | 1,000 | 498 | 465 | 1,230 |
| 12 | 860 | *1,100 | 596 | 520 | 450 | 330 | 1,100 | 5,200 | 1,040 | 495 | 506 | 927 |
| 13 | 965 | 900 | 386 | 620 | 350 | 230 | 1,700 | 4,870 | 714 | 495 | 730 | 1,020 |
| 14 | 820 | 830 | 479 | 620 | 280 | 290 | 2,500 | 4,170 | 895 | 425 | 546 | 875 |
| 15 | 685 | 760 | 608 | 600 | 370 | 320 | 5,440 | 3,750 | 798 | 444 | 792 | 720 |
| 16 | 887 | 800 | 540 | 500 | 450 | 330 | 7,520 | 3,310 | 925 | 501 | *851 | 720 |
| 17 | 1,020 | 760 | 548 | 430 | 540 | 360 | *8,300 | 2,980 | 1,300 | 308 | 667 | 744 |
| 18 | 831 | 780 | 724 | 400 | 520 | *350 | 6,800 | 2,760 | 1,240 | 386 | 605 | 650 |
| 19 | 876 | 800 | 530 | 540 | 460 | 340 | 5,930 | 2,300 | 1,100 | *435 | 508 | 495 |
| 20 | 1,010 | 800 | 400 | 540 | 400 | 240 | 5,120 | 2,350 | 1,100 | 386 | 369 | 583 |
| 21 | 806 | 806 | 350 | 500 | 350 | 300 | 4,770 | 2,740 | *1,080 | 640 | 325 | *697 |
| 22 | 764 | 740 | 520 | 500 | 300 | 360 | 4,480 | 3,200 | 985 | 1,190 | 372 | 564 |
| 23 | 890 | 660 | 520 | 500 | 370 | 4,670 | 3,280 | 910 | 1,540 | 529 | 550 | |
| 24 | 1,630 | 780 | 530 | 460 | 380 | 6,880 | 3,000 | 955 | 1,460 | 485 | 616 | |
| 25 | 4,310 | 800 | 450 | *310 | 450 | 350 | 8,500 | 2,500 | 1,230 | 1,190 | 435 | 772 |
| 26 | 4,980 | 800 | 400 | 520 | 480 | 290 | 9,000 | 2,070 | 1,190 | 1,410 | 333 | 1,120 |
| 27 | *4,540 | 770 | 536 | 500 | 490 | 240 | 7,710 | 1,780 | 822 | 1,740 | 333 | 1,280 |
| 28 | 3,870 | 600 | 778 | 520 | 300 | 300 | 5,580 | 1,620 | 1,060 | 1,780 | 566 | 1,020 |
| 29 | 3,090 | 400 | 980 | 540 | 350 | 450 | 4,350 | 1,540 | 1,240 | 1,460 | 1,500 | 935 |
| 30 | 2,550 | 600 | 940 | 400 | ----- | 620 | 4,490 | 1,540 | 1,350 | 1,480 | 2,210 | 742 |
| 31 | 2,350 | ----- | 750 | 370 | ----- | 550 | ----- | 1,440 | ----- | 1,350 | 2,180 | ----- |
| Total | 50,132 | 33,126 | 18,991 | 15,860 | 12,540 | 11,330 | 112,330 | 126,710 | 38,654 | 28,434 | 22,614 | 36,180 |
| Mean | 1,617 | 1,104 | 613 | 512 | 432 | 365 | 3,744 | 4,087 | 1,288 | 917 | 729 | 1,206 |
| Cfsm | 1.86 | 1.27 | 0.705 | 0.589 | 0.497 | 0.420 | 4.30 | 4.70 | 1.44 | 1.05 | 0.838 | 1.39 |
| In. | 2.14 | 1.42 | 0.81 | 0.68 | 0.54 | 0.48 | 4.80 | 5.42 | 1.65 | 1.21 | 0.97 | 1.55 |

Calendar year 1959: Max 4,980 Min 100 Mean 837 Cfsm 0.962 In. 13.07
 Water year 1959-60: Max 9,880 Min 230 Mean 1,385 Cfsm 1.59 In. 21.67

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 7, 9, 10, 12-20, Nov. 24 to Dec. 4, Dec. 7-11, 16, 19-26, Dec. 29 to Apr. 14.

595. Ford River near Hyde, Mich.

Location.--Lat 45°45'20", long 87°12'05", in SW $\frac{1}{4}$ sec.19, T.39 N., R.23 W., on right bank 40 ft downstream from county highway bridge, 1.4 miles downstream from Tenmile Creek, and $\frac{1}{2}$ miles north of Hyde.

Drainage area.--450 sq mi.

Records available.--October 1954 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 677.9 ft above mean sea level, datum of 1929.

Average discharge.--6 years, 342 cfs.

Extremes.--Maximum discharge during year, 7,590 cfs May 7 (gage height, 8.27 ft); minimum, 86 cfs July 21 (gage height, 1.81 ft).
1954-60: Maximum discharge, that of May 7, 1960; minimum, 23 cfs Aug. 22, 23, 1957 (gage height, 1.39 ft).

Remarks.--Records excellent except those for period of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.8 | 84 | 5.0 | 2,180 |
| 2.3 | 216 | 6.0 | 3,240 |
| 2.8 | 405 | 7.0 | 4,740 |
| 3.5 | 640 | 8.1 | 7,100 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------------|--------------|------------|------------|------------|------------|--------|--------------|------------|------------|------------|--------------|
| 1 | 1,010 | <u>1,130</u> | 215 | <u>310</u> | <u>195</u> | 130 | 250 | 2,670 | 714 | 494 | 382 | 1,010 |
| 2 | 856 | <u>944</u> | 210 | <u>290</u> | 190 | 125 | 300 | 2,620 | 735 | 440 | 322 | 1,050 |
| 3 | 777 | 819 | 205 | 270 | 185 | 125 | 330 | 2,630 | <u>864</u> | 460 | 268 | <u>1,300</u> |
| 4 | 700 | 735 | 200 | 260 | 180 | 125 | 360 | 2,740 | <u>833</u> | 415 | 222 | <u>1,140</u> |
| 5 | 617 | 686 | 195 | 250 | 175 | 120 | 380 | 2,720 | 798 | 360 | 180 | 749 |
| 6 | 572 | <u>644</u> | 190 | 240 | 170 | 120 | 380 | 3,910 | 714 | 322 | 153 | 521 |
| 7 | 528 | 499 | 190 | 240 | 170 | 115 | 360 | <u>6,540</u> | 591 | 285 | 143 | 596 |
| 8 | 477 | 510 | 190 | 235 | 165 | 115 | 340 | 6,850 | 488 | 245 | 138 | 504 |
| 9 | 455 | <u>521</u> | 185 | 230 | 160 | 110 | 320 | <u>5,950</u> | 405 | 210 | 135 | 591 |
| 10 | 440 | <u>494</u> | 185 | 235 | 155 | 110 | 400 | 5,480 | 347 | 180 | 125 | 516 |
| 11 | 425 | 560 | *185 | 240 | 155 | 110 | 572 | 4,270 | 335 | 156 | 118 | 455 |
| 12 | 410 | *410 | 185 | 240 | *155 | 105 | 960 | 3,180 | 326 | 148 | 108 | 392 |
| 13 | 382 | 430 | 185 | 260 | 155 | 105 | 1,840 | 2,610 | 307 | 143 | 103 | 322 |
| 14 | 352 | <u>382</u> | 185 | 270 | 155 | 105 | *2,170 | 2,230 | 285 | 133 | 135 | 288 |
| 15 | 326 | 300 | 190 | 280 | 155 | <u>100</u> | 3,250 | 1,910 | <u>261</u> | 120 | *210 | 251 |
| 16 | 347 | 364 | 185 | 280 | 160 | 100 | 3,890 | 1,650 | 326 | 115 | 238 | 226 |
| 17 | 392 | 255 | 180 | 285 | 160 | 100 | *4,050 | 1,500 | 554 | 112 | 229 | 222 |
| 18 | 405 | 226 | 180 | 285 | 160 | *100 | 3,530 | 1,580 | 700 | 105 | 198 | 222 |
| 19 | 396 | 260 | 180 | 280 | 160 | 100 | 2,940 | 1,260 | 735 | *99 | 165 | 210 |
| 20 | 374 | 270 | 180 | 275 | 155 | 100 | 2,540 | 1,290 | 700 | <u>90</u> | 140 | 198 |
| 21 | 339 | 275 | 175 | 270 | 155 | 100 | 2,220 | 1,570 | *591 | 133 | 120 | *180 |
| 22 | <u>314</u> | 275 | 175 | 265 | 150 | 100 | 1,970 | 1,750 | 516 | 255 | 120 | 171 |
| 23 | <u>364</u> | 275 | 175 | 260 | 145 | 100 | 1,810 | 1,660 | 435 | 307 | 156 | 162 |
| 24 | 1,100 | 270 | 180 | 250 | 145 | 100 | 2,040 | 1,650 | 477 | 288 | 130 | 186 |
| 25 | 2,160 | 265 | 190 | *245 | 140 | 100 | 2,280 | 1,450 | 532 | 258 | 112 | 232 |
| 26 | <u>2,190</u> | 255 | 220 | *240 | 140 | 100 | 2,460 | 1,220 | 504 | 382 | 103 | 278 |
| 27 | 2,080 | 245 | 250 | 230 | <u>135</u> | 105 | 2,570 | 1,090 | 460 | <u>591</u> | <u>94</u> | 331 |
| 28 | *1,950 | 235 | 300 | 220 | <u>135</u> | 110 | 2,540 | 896 | 455 | 554 | 170 | 347 |
| 29 | 1,770 | 225 | 340 | 210 | 135 | 140 | 2,170 | 763 | 548 | 472 | 686 | 331 |
| 30 | 1,540 | <u>220</u> | 350 | 210 | ----- | 180 | 2,340 | 791 | 538 | 472 | 864 | 285 |
| 31 | 1,330 | ----- | <u>340</u> | <u>200</u> | ----- | <u>220</u> | ----- | <u>840</u> | ----- | <u>440</u> | <u>880</u> | ----- |
| Total | 25,376 | 12,979 | 6,495 | 7,855 | 4,595 | 3,575 | 51,362 | 76,970 | 16,054 | 8,784 | 7,147 | 13,066 |
| Mean | 819 | 433 | 210 | 253 | 158 | 115 | 1,712 | 2,483 | 535 | 283 | 231 | 436 |
| Cfs/m | 1.82 | 0.962 | 0.467 | 0.562 | 0.354 | 0.256 | 3.80 | 5.52 | 1.19 | 0.629 | 0.513 | 0.969 |
| In. | 2.10 | 1.07 | 0.54 | 0.65 | 0.33 | 0.30 | 4.24 | 6.35 | 1.33 | 0.73 | 0.59 | 1.08 |

Calendar year 1959: Max 2,190 Min 42

Water year 1959-60: Max 6,850 Min 90

Mean 384
Mean 640

Cfs/m 0.853
Cfs/m 1.42

In. 11.60
In. 19.37

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19 to Apr. 10 (no gage-height record Nov. 22 to Dec. 11, Dec. 26 to Jan. 24; discharge estimated on basis of 1 discharge measurement, weather records, and records for nearby stations).

605. Iron River at Caspian, Mich.

Location.--Lat 46°03'31", long 88°37'38", on line between SE $\frac{1}{4}$ and SW $\frac{1}{4}$ sec.1, T.42 N., R.35 W., on downstream side of highway bridge in Caspian, $\frac{5}{8}$ miles upstream from mouth.

Drainage area.--84 sq mi, approximately.

Records available.--March 1948 to September 1960.

Gage.--Wire-weight gage, read twice daily, and crest-stage gage. Datum of gage is 1,438.78 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 83.9 cfs.

Extremes.--Maximum discharge during year, 1,040 cfs Apr. 24 (gage height, 9.24 ft), from rating curve extended above 470 cfs by logarithmic plotting; minimum, 34 cfs Mar. 13 (gage height, 3.81 ft).
1948-60: Maximum discharge, 1,430 cfs July 2, 1953 (gage height, 10.20 ft); minimum observed, 29 cfs Mar. 13, 1954 (gage height, 3.41 ft).

Remarks.--Records fair prior to May 16, good thereafter. Flow regulated by ground water pumped from mines into river above station.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Apr. 12 | | Apr. 13 to Sept. 30 | |
|-------------------|-----|---------------------|-----|
| 3.8 | 33 | 4.0 | 58 |
| 5.0 | 116 | 5.0 | 134 |
| 6.0 | 210 | 7.0 | 384 |
| 7.0 | 340 | 9.0 | 940 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 185 | 108 | *80 | 75 | *57 | 48 | 64 | 291 | 110 | 92 | 72 | a110 |
| 2 | 160 | 93 | 76 | 71 | 60 | 46 | 60 | 254 | 132 | 92 | *71 | a105 |
| 3 | 150 | 95 | 76 | 64 | 46 | 48 | 68 | 230 | 129 | 89 | 68 | a92 |
| 4 | 140 | *92 | 76 | 66 | 63 | 46 | 62 | 226 | 118 | 84 | 68 | 83 |
| 5 | *130 | 91 | 77 | 66 | 56 | 44 | 66 | 277 | 106 | *80 | 68 | 76 |
| 6 | 125 | 90 | 76 | 66 | 54 | 43 | 66 | 366 | *100 | 79 | 75 | *75 |
| 7 | 120 | 90 | 75 | *65 | 54 | 43 | 64 | 454 | 94 | 78 | 80 | 71 |
| 8 | 120 | 90 | 74 | 64 | 54 | *42 | 66 | 405 | 91 | 77 | 71 | 89 |
| 9 | 125 | 90 | 74 | 63 | 54 | 41 | 61 | 336 | 89 | 79 | 79 | 92 |
| 10 | 125 | 90 | 74 | 62 | 53 | 40 | 66 | 300 | 83 | 76 | 75 | 82 |
| 11 | 115 | 90 | 74 | 62 | 53 | 40 | 68 | 257 | 89 | 75 | 72 | 79 |
| 12 | 110 | 90 | 74 | 63 | 52 | 39 | 80 | 209 | 88 | 76 | 69 | 73 |
| 13 | 105 | 88 | 72 | 63 | 53 | 38 | 243 | 171 | 82 | 79 | 69 | 73 |
| 14 | 99 | 87 | 69 | 64 | 54 | 39 | *434 | 173 | 79 | 88 | 76 | 70 |
| 15 | 100 | 86 | 66 | 64 | 54 | 43 | 548 | 160 | 78 | 80 | 71 | 72 |
| 16 | 116 | 85 | 64 | 64 | 54 | 46 | 609 | 184 | 97 | 82 | 67 | 71 |
| 17 | 110 | 83 | 68 | 64 | 53 | 45 | 624 | 264 | 112 | 79 | 69 | 73 |
| 18 | 108 | 82 | 73 | 63 | 52 | 45 | 606 | 264 | 101 | 77 | 66 | 71 |
| 19 | 92 | 80 | 71 | 63 | 51 | 45 | 578 | 207 | 105 | 75 | 68 | 69 |
| 20 | 90 | 74 | 67 | 62 | 50 | 46 | 468 | 192 | 93 | 73 | 66 | 69 |
| 21 | 85 | 81 | 66 | 62 | 50 | 46 | 277 | 196 | 91 | 73 | 75 | 69 |
| 22 | 87 | 73 | 72 | 62 | 50 | 46 | 218 | 185 | 92 | 130 | 65 | 65 |
| 23 | 96 | 76 | 71 | 63 | 50 | 46 | 468 | 169 | 86 | 104 | 62 | 58 |
| 24 | 148 | 75 | 71 | 63 | 50 | 46 | 912 | 154 | 126 | 85 | 64 | 80 |
| 25 | 220 | 65 | 72 | 64 | 49 | 47 | 651 | 142 | 107 | 79 | 64 | 89 |
| 26 | 200 | 76 | 68 | 64 | 49 | 48 | 555 | 131 | 96 | 85 | 65 | 82 |
| 27 | 180 | 76 | 70 | 64 | 48 | 50 | 434 | 124 | 88 | 79 | 61 | 78 |
| 28 | 150 | 80 | 74 | 63 | 47 | 54 | 342 | 124 | 85 | 78 | a160 | 73 |
| 29 | 135 | 80 | 77 | 63 | 47 | 59 | 291 | 116 | 120 | 79 | a210 | 74 |
| 30 | 120 | 80 | 77 | 62 | ----- | 64 | 278 | 129 | 102 | 78 | a160 | 72 |
| 31 | 110 | ----- | 76 | 60 | ----- | 66 | ----- | 123 | ----- | 73 | a130 | ----- |
| Total | 3,956 | 2,564 | 2,252 | 1,984 | 1,517 | 1,435 | 9,327 | 6,816 | 2,969 | 2,553 | 2,536 | 2,346 |
| Mean | 128 | 85.5 | 72.6 | 64.0 | 52.3 | 46.3 | 311 | 220 | 99.0 | 82.4 | 81.8 | 78.2 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 396

Water year 1959-60: Max 912

Min 41

Min 38

Mean 76.8

Mean 110

Cfsm -

Cfsm -

In. -

In. -

* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

Note.--Stage-discharge relation affected by ice Jan. 5-24, 26-31, Feb. 1, 8-14, 16-21, 23-27, 29, Mar. 2-12, 15-27.

610. Brule River near Florence, Wis.

Location.--Lat 45°57'30", long 88°15'55", in SE¼ sec.11, T.41 N., R.32 W., Michigan meridian, on left bank 40 ft upstream from highway bridge, 1 mile upstream from Paint River, 3½ miles north of Florence, and 6 miles upstream from confluence with Michigamme River.

Drainage area.--380 sq mi.

Records available.--January 1914 to February 1916, June 1944 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,210 ft (from topographic map). Prior to Aug. 29, 1944, wire-weight or chain gages at bridge 40 ft downstream at same datum.

Average discharge.--17 years (1914-15, 1944-60), 351 cfs.

Extremes.--Maximum discharge during year, 2,470 cfs Apr. 26 (gage height, 4.78 ft); maximum gage height, 8.01 ft Jan. 8 (ice jam); minimum daily discharge, 210 cfs Mar. 8-25; minimum gage height, 2.16 ft Aug. 17, 24.
1914-16, 1944-60: Maximum discharge, 4,700 cfs July 2, 1953 (gage height, 6.57 ft); maximum gage height, that of Jan. 8, 1960; minimum discharge, 155 cfs Aug. 16, 22, 1949; minimum gage height, 1.86 ft Aug. 27, Sept. 13, 1948.

Remarks.--Records good except those for period of ice effect, which are fair. Flow not adjusted for ground water pumped from mines into Iron River above station at Caspian, Mich.

Revisions (water years).--WSP 1387: 1914-16.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 12

Apr. 13 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.9 | 183 | 3.0 | 745 | 2.1 | 243 | 4.0 | 1,610 |
| 2.0 | 211 | 4.0 | 1,590 | 2.5 | 410 | 5.0 | 2,710 |
| 2.5 | 436 | | | 3.0 | 720 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | 885 | 464 | *280 | 290 | *280 | 230 | 310 | 1,100 | 622 | 495 | 307 | 454 |
| 2 | 696 | *442 | 270 | 280 | 280 | 225 | 315 | 1,010 | 707 | 454 | *296 | 448 |
| 3 | 689 | 425 | 270 | 270 | 270 | 220 | 315 | 916 | 688 | 443 | 288 | 421 |
| 4 | 675 | 410 | 270 | *260 | 270 | 220 | 320 | 860 | 616 | 410 | 280 | 376 |
| 5 | *592 | 415 | 270 | 250 | 270 | 220 | 315 | 900 | 551 | *381 | 284 | 353 |
| 6 | 533 | 400 | 270 | 245 | 270 | 215 | 310 | 1,320 | 501 | 362 | 300 | *332 |
| 7 | 492 | 390 | 270 | 240 | 260 | 215 | 300 | 1,920 | 477 | 355 | 296 | 315 |
| 8 | 470 | 390 | 275 | 235 | 260 | *210 | 290 | 1,700 | 454 | 340 | 296 | 345 |
| 9 | 481 | 400 | 275 | 225 | 260 | 210 | 280 | 1,400 | *432 | 332 | 296 | 405 |
| 10 | 481 | 410 | 280 | 225 | 250 | 210 | 280 | 1,250 | 421 | 328 | 315 | 367 |
| 11 | 442 | 420 | 280 | 225 | 250 | 210 | *320 | 1,180 | 448 | 332 | 300 | 336 |
| 12 | 420 | 410 | 285 | 230 | 250 | 210 | 450 | 1,160 | 448 | 328 | 284 | 311 |
| 13 | 404 | 410 | 285 | 230 | 240 | 210 | 790 | 1,100 | 428 | 328 | 280 | 300 |
| 14 | 388 | 400 | 285 | 230 | 240 | 210 | 1,230 | 1,000 | 405 | 358 | 284 | 296 |
| 15 | 373 | 400 | 290 | 230 | 240 | 210 | *1,610 | 876 | 396 | 345 | 280 | 292 |
| 16 | 394 | 390 | 290 | 235 | 240 | 210 | 1,860 | 797 | 465 | 323 | 269 | 284 |
| 17 | 394 | 380 | 285 | 235 | 240 | 210 | 2,060 | 832 | 636 | 319 | 265 | 288 |
| 18 | 378 | 370 | 280 | 240 | 240 | 210 | 1,950 | 1,000 | 590 | 311 | 269 | 288 |
| 19 | 358 | 370 | 280 | 240 | 240 | 210 | 1,250 | 932 | 564 | 303 | 273 | 284 |
| 20 | 348 | 360 | 275 | 245 | 240 | 210 | 956 | 860 | 495 | 292 | 273 | 284 |
| 21 | 333 | 360 | 280 | 245 | 240 | 210 | 876 | 868 | 454 | 328 | 273 | 284 |
| 22 | 333 | 360 | 285 | 250 | 240 | 210 | 846 | 832 | 438 | 416 | 276 | 284 |
| 23 | 373 | 360 | 290 | 260 | 240 | 210 | 839 | 748 | 426 | 454 | 269 | 280 |
| 24 | 636 | 360 | 305 | 260 | 240 | 210 | 1,380 | 681 | 558 | 396 | 265 | 345 |
| 25 | 1,010 | 355 | 315 | 270 | 240 | 210 | 2,170 | 629 | 544 | 353 | 269 | 570 |
| 26 | 885 | 350 | 320 | 275 | 230 | 215 | *2,360 | 584 | 489 | 471 | 273 | 432 |
| 27 | 717 | 335 | 320 | 280 | 230 | 230 | 1,840 | 558 | 443 | 421 | 276 | 315 |
| 28 | 592 | 320 | 320 | 280 | 230 | 260 | 1,540 | 544 | 426 | 362 | 668 | 332 |
| 29 | 533 | 310 | 315 | 280 | 230 | *285 | 1,060 | 519 | 539 | 372 | 972 | 319 |
| 30 | 504 | 300 | 305 | 280 | 230 | 300 | 1,130 | 570 | 603 | 349 | 741 | 307 |
| 31 | 481 | ----- | 300 | 280 | ----- | 310 | ----- | 648 | ----- | 319 | 551 | ----- |
| Total | 16,290 | 11,466 | 8,920 | 7,820 | 7,210 | 6,925 | 29,352 | 29,194 | 15,261 | 11,378 | 10,568 | 10,247 |
| Mean | 525 | 382 | 288 | 252 | 249 | 223 | 978 | 942 | 509 | 367 | 341 | 342 |
| Cfs/m | 1.58 | 1.01 | 0.758 | 0.663 | 0.655 | 0.587 | 2.57 | 2.48 | 1.34 | 0.966 | 0.897 | 0.900 |
| In. | 1.59 | 1.13 | 0.87 | 0.76 | 0.71 | 0.68 | 2.87 | 2.86 | 1.50 | 1.11 | 1.03 | 1.00 |
| Calendar year 1959: Max | 1,550 | | | | | | | | | | | |
| Water year 1959-60: Max | 2,360 | | | | | | | | | | | |
| Min | 165 | | | | | | | | | | | |
| Mean | 325 | | | | | | | | | | | |
| Cfs/m | 0.855 | | | | | | | | | | | |
| In. | 11.60 | | | | | | | | | | | |
| Cfs/m | 1.18 | | | | | | | | | | | |
| In. | 16.11 | | | | | | | | | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 6 to Apr. 12 (no gage-height record Jan. 18-31; discharge estimated on basis of weather records and records for nearby stations).

615. Paint River at Crystal Falls, Mich.

Location.--Lat 46°06'20", long 88°20'05", in SE $\frac{1}{4}$ sec. 20, T. 43 N., R. 32 W., on right bank 150 ft downstream from municipal powerplant at Crystal Falls and 13 miles upstream from mouth.

Drainage area.--616 sq mi.

Records available.--August 1944 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,306.1 ft above mean sea level (Wisconsin-Michigan Power Co. bench mark).

Average discharge.--16 years, 578 cfs.

Extremes.--Maximum discharge during year, 10,900 cfs Apr. 25 (gage height, 9.82 ft); minimum, 143 cfs sometime during period Feb. 28 to Mar. 8 (gage height, 1.85 ft, from recorded range in stage); minimum daily, 262 cfs Aug. 23-25.
1944-60: Maximum discharge, that of Apr. 25, 1960; minimum, 7.7 cfs Sept. 17, 1950 (gage height, 0.89 ft); minimum daily, 81 cfs Nov. 1, 1947.

Remarks.--Records excellent except those for period of no gage-height record, which are good. Diurnal fluctuation caused by powerplant immediately above station.

Revisions (water years).--WSP 1174: 1947-48(m).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|--------|
| 2.2 | 249 | 4.0 | 1,540 |
| 2.5 | 372 | 6.0 | 3,980 |
| 3.0 | 645 | 9.8 | 10,900 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | 1,500 | 942 | 421 | 417 | 372 | a315 | 420 | 2,580 | 845 | 734 | 359 | 554 |
| 2 | 1,220 | 888 | 434 | 410 | 330 | a310 | 425 | 2,420 | 1,220 | 678 | 342 | 570 |
| 3 | 1,200 | 888 | 428 | 420 | 334 | a310 | 461 | 2,020 | 1,250 | 614 | 324 | 523 |
| 4 | 1,240 | 812 | 426 | *414 | 326 | a305 | 493 | 2,020 | 1,180 | 568 | 312 | 454 |
| 5 | 1,150 | 797 | 421 | 395 | 330 | a305 | 493 | 2,050 | 1,000 | 496 | 306 | 418 |
| 6 | 1,030 | *657 | 404 | 370 | 394 | a305 | 476 | 3,130 | 844 | 460 | 324 | *426 |
| 7 | 942 | 536 | 401 | 365 | 312 | a300 | 471 | 3,970 | 804 | *430 | 331 | 334 |
| 8 | 837 | 734 | 394 | 391 | *344 | *a300 | 466 | 3,640 | 727 | 416 | 358 | 413 |
| 9 | 804 | 720 | 396 | 392 | 321 | 292 | 456 | 3,070 | *692 | 376 | 348 | 546 |
| 10 | 812 | 705 | 384 | 382 | 306 | 284 | 424 | 2,580 | 645 | 361 | 346 | 589 |
| 11 | 764 | 720 | 383 | 382 | 345 | 299 | 482 | 2,370 | 633 | 373 | 324 | 514 |
| 12 | 705 | 593 | 396 | 384 | 321 | 283 | 584 | 2,290 | 658 | 326 | 306 | 470 |
| 13 | 685 | 620 | 384 | 393 | 315 | 276 | 992 | 2,270 | 609 | 340 | 320 | 420 |
| 14 | 645 | 540 | 391 | 389 | 300 | 306 | 1,670 | 2,020 | 570 | 388 | 313 | 370 |
| 15 | 626 | 490 | 384 | 380 | 324 | 265 | 2,940 | 1,740 | 526 | 356 | 306 | 376 |
| 16 | 645 | 547 | 406 | 383 | 320 | 313 | *4,460 | 1,510 | 556 | 344 | 298 | 368 |
| 17 | 692 | 415 | 384 | 366 | 336 | 275 | 5,200 | 1,630 | 694 | 341 | 292 | 354 |
| 18 | 712 | 441 | 386 | 372 | 310 | 296 | 4,500 | 2,260 | 720 | 367 | 286 | 312 |
| 19 | 692 | 540 | 372 | 368 | 325 | 295 | 3,370 | 2,030 | 692 | 358 | 294 | 323 |
| 20 | 652 | 496 | 319 | 374 | 315 | 306 | 2,720 | 1,760 | 646 | 336 | 281 | 296 |
| 21 | 608 | 500 | 367 | 374 | 316 | 314 | 2,340 | 1,670 | 610 | 408 | 284 | 310 |
| 22 | 578 | 490 | 334 | 364 | 314 | 279 | 2,310 | 1,740 | 567 | 467 | 286 | 292 |
| 23 | 618 | 486 | 352 | 354 | 312 | 269 | 2,620 | 1,580 | 556 | 578 | 262 | 306 |
| 24 | 876 | 492 | 340 | 352 | 316 | 276 | 6,240 | 1,430 | 696 | 475 | 262 | 378 |
| 25 | 1,440 | 470 | 368 | 366 | 331 | 286 | 10,500 | 1,300 | 870 | 452 | 262 | 508 |
| 26 | 1,560 | 446 | 382 | 356 | 320 | 282 | 8,350 | 1,170 | 727 | 480 | 264 | 524 |
| 27 | 1,460 | 435 | 415 | 347 | 330 | 290 | 5,380 | 1,060 | 645 | 598 | 284 | 472 |
| 28 | 1,290 | 446 | 461 | 342 | a325 | 310 | 3,870 | 978 | 816 | 482 | 695 | 420 |
| 29 | 1,140 | 440 | 471 | 342 | a320 | 354 | 2,970 | 906 | 736 | 428 | 1,050 | 406 |
| 30 | 1,050 | 426 | 460 | 350 | ----- | 386 | 2,730 | 888 | 800 | 396 | 822 | 388 |
| 31 | 1,010 | ----- | 453 | 340 | ----- | 435 | ----- | 888 | ----- | 363 | 639 | ----- |
| Total | 29,183 | 17,712 | 12,317 | 11,654 | 9,394 | 9,421 | 78,813 | 61,140 | 22,334 | 13,789 | 11,480 | 12,634 |
| Mean | 941 | 590 | 397 | 376 | 324 | 304 | 2,627 | 1,972 | 744 | 445 | 370 | 421 |
| Cfs/m | 1.53 | 0.958 | 0.644 | 0.610 | 0.526 | 0.494 | 4.26 | 3.20 | 1.21 | 0.722 | 0.601 | 0.683 |
| In. | 1.76 | 1.07 | 0.74 | 0.70 | 0.57 | 0.57 | 4.75 | 3.69 | 1.35 | 0.83 | 0.69 | 0.76 |

Calendar year 1959: Max 3,190 Min 190 Mean 577 Cfs/m 0.937 In. 12.71
Water year 1959-60: Max 10,500 Min 262 Mean 792 Cfs/m 1.23 In. 17.46

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of kilowatt-hour output at powerplant above station.

625. Michigamme River near Crystal Falls, Mich.

Location.--Lat 46°06'50", long 88°12'55", in NW $\frac{1}{4}$ sec. 20, T. 43 N., R. 31 W., on right bank 400 ft upstream from highway bridge, $4\frac{1}{2}$ miles downstream from Michigamme Reservoir, 6 miles east of Crystal Falls, and 16 miles upstream from confluence with Brule River.

Drainage area.--670 sq mi.

Records available.--August 1944 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,300 ft (from topographic map).

Average discharge.--16 years, 700 cfs.

Extremes.--Maximum discharge during year, 7,260 cfs Apr. 28 (gage height, 10.73 ft); minimum daily, 152 cfs Aug. 31.

1944-60: Maximum discharge, that of Apr. 28, 1960; minimum daily, 71 cfs Nov. 26, 1950.

Remarks.--Records excellent. Flow regulated by powerplants and by Michigamme Reservoir (capacity, 119,950 acre-ft) 4.5 miles above station.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Apr. 27 | | | | Apr. 28 to Sept. 30 | | | |
|-------------------|-----|------|-------|---------------------|-----|------|-------|
| 2.0 | 121 | 5.0 | 1,220 | 2.1 | 149 | 5.0 | 1,220 |
| 2.5 | 192 | 7.0 | 2,720 | 2.5 | 208 | 7.0 | 2,720 |
| 3.0 | 304 | 10.5 | 6,940 | 3.0 | 313 | 10.4 | 6,800 |
| 4.0 | 685 | | | 4.0 | 685 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 1,180 | 1,850 | 1,140 | 750 | 1,080 | 998 | 595 | 4,940 | 1,160 | 1,070 | a665 | 172 |
| 2 | 1,180 | 1,580 | 1,140 | 750 | 1,080 | 982 | 600 | 5,550 | 1,200 | 785 | *562 | 168 |
| 3 | 1,180 | 1,240 | 1,140 | 745 | 1,080 | 980 | 595 | 2,250 | 1,210 | 780 | 662 | 162 |
| 4 | 1,180 | 1,230 | 1,150 | *745 | 1,090 | 975 | 582 | 2,520 | 1,210 | 780 | a660 | 158 |
| 5 | 1,270 | 1,350 | 1,140 | 745 | 998 | 965 | 564 | 3,090 | 1,210 | 780 | a655 | 153 |
| 6 | 1,390 | *1,600 | 1,140 | 745 | 712 | 960 | 640 | 5,070 | 1,210 | 775 | 649 | 465 |
| 7 | 1,310 | 1,550 | 1,140 | 745 | 712 | *945 | 795 | 6,790 | 1,200 | 775 | a650 | 644 |
| 8 | 974 | 1,370 | 1,140 | 745 | 880 | 930 | 775 | 6,480 | *1,200 | 775 | a650 | 640 |
| 9 | 815 | 1,200 | 1,130 | 745 | 1,010 | 920 | 726 | 6,280 | 1,180 | 770 | a650 | 473 |
| 10 | 815 | 1,200 | 904 | 745 | 1,020 | 910 | 530 | 5,230 | 1,150 | 770 | 649 | 158 |
| 11 | 815 | 1,200 | 760 | 745 | 1,080 | 900 | 494 | 2,950 | 946 | 770 | 649 | 163 |
| 12 | 815 | 1,200 | 755 | 745 | 1,130 | 827 | 618 | 1,700 | 780 | 770 | 644 | 162 |
| 13 | 815 | 1,190 | 755 | 745 | 1,120 | 608 | 895 | 1,700 | 780 | 770 | 399 | 469 |
| 14 | 1,020 | 1,170 | 755 | 740 | 1,110 | 742 | 573 | 2,110 | 775 | 770 | 168 | 640 |
| 15 | 1,170 | 1,160 | 755 | 740 | 1,100 | 781 | 264 | 2,600 | 775 | 770 | 495 | 640 |
| 16 | 1,170 | 1,160 | 755 | 740 | 1,090 | 600 | *293 | 1,860 | 795 | 765 | 636 | 640 |
| 17 | 1,170 | 1,170 | 755 | 740 | 1,090 | 590 | 250 | 1,470 | 592 | 765 | 628 | 636 |
| 18 | 952 | 1,150 | 755 | 740 | 1,080 | 586 | 196 | 1,680 | 205 | 765 | 636 | 636 |
| 19 | 1,020 | 1,150 | 755 | 737 | 984 | 582 | 182 | 2,190 | 401 | 765 | 636 | 636 |
| 20 | 1,150 | 1,140 | 755 | 734 | 694 | 564 | 175 | 2,880 | 805 | 760 | 636 | 631 |
| 21 | 1,150 | 1,140 | 965 | 740 | 690 | 550 | 174 | 3,760 | 931 | 780 | 636 | 631 |
| 22 | 1,150 | 1,130 | 1,110 | 740 | 873 | 534 | 508 | 2,780 | 1,090 | 780 | 636 | 631 |
| 23 | 1,150 | 1,130 | 1,110 | 740 | 839 | 530 | 856 | 1,600 | 1,130 | 716 | 631 | 427 |
| 24 | 1,020 | 1,140 | 1,060 | 735 | 680 | 445 | 1,800 | 1,590 | 1,150 | 667 | 631 | 165 |
| 25 | 1,050 | 1,140 | 750 | 952 | 676 | 534 | 3,340 | 1,830 | 958 | 672 | 631 | 186 |
| 26 | 1,390 | 1,150 | 750 | 1,120 | 676 | 510 | *5,980 | 2,040 | 790 | 672 | 631 | 184 |
| 27 | 2,140 | 1,160 | 750 | 1,120 | 676 | 494 | 6,940 | 1,830 | 785 | a670 | 554 | 178 |
| 28 | 1,520 | 1,150 | 637 | 1,110 | 676 | 486 | 4,680 | 1,560 | 785 | a670 | 191 | 175 |
| 29 | 1,210 | 1,150 | 578 | 1,110 | 858 | 478 | 1,670 | 1,560 | 785 | a670 | 184 | 175 |
| 30 | 1,520 | 1,150 | 750 | 1,110 | ----- | 538 | 2,920 | 1,560 | 977 | a665 | 269 | 173 |
| 31 | 1,870 | ----- | 750 | 1,100 | ----- | 595 | ----- | 1,380 | ----- | a665 | 152 | ----- |
| Total | 36,561 | 37,280 | 27,929 | 25,443 | 26,814 | 22,049 | 39,210 | 88,830 | 28,165 | 23,357 | 17,225 | 11,371 |
| Mean | 1,179 | 1,243 | 901 | 821 | 925 | 711 | 1,307 | 2,865 | 939 | 753 | 558 | 379 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max 2,140 Min 72 Mean 719 Cfsm - In. - | | | | | | | | | | | | |
| Water year 1959-60: Max 6,940 Min 152 Mean 1,050 Cfsm - In. - | | | | | | | | | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records of discharge at Way Dam power-plant.

630. Menominee River near Florence, Wis.

Location.--Lat 45°57'04", long 88°11'13", in NE $\frac{1}{4}$ sec.16, T.41 N., R.31 W., on left bank half a mile downstream from confluence of Brule and Michigamme Rivers and 3 $\frac{1}{2}$ miles northeast of Florence.

Records available.--July 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,120 ft (from topographic map).

Average discharge.--10 years, 1,879 cfs.

Extremes.--Maximum discharge during year, 19,500 cfs Apr. 26 (gage height, 14.15 ft); minimum, 40 cfs Sept. 13 (gage height, 1.19 ft); minimum daily, 782 cfs Mar. 27, 1950-60: Maximum discharge, that of Apr. 26, 1960; minimum, 40 cfs Jan. 14, 29, 1959, Sept. 13, 1960 (gage height, 1.19 ft); minimum daily, 220 cfs Feb. 4, 1951.

Revisions.--The maximum discharge for the water year 1953 has been revised to 18,800 cfs July 2 or 3, 1953 (gage height, 13.81 ft, from floodmarks), superseding figure published in WSP 1277.

Remarks.--Records excellent except those for periods of no gage-height record, which are good. Flow regulated by powerplants, and by Michigamme Reservoir (capacity, 119,950 acre-ft) and Peavy Pond (capacity, 33,860 acre-ft) on Michigamme River, and by many other smaller reservoirs on tributaries above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Mar. 6)

| | | | |
|-----|-------|------|--------|
| 3.0 | 760 | 9.0 | 8,800 |
| 4.0 | 1,530 | 14.0 | 19,200 |
| 6.0 | 3,780 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|------------|---------|---------|--------|--------|--------|--------|
| 1 | 3,570 | 3,470 | 1,800 | 1,370 | *1,850 | 1,660 | 1,780 | 8,460 | 3,050 | 2,500 | 1,570 | 1,660 |
| 2 | 3,060 | *3,530 | 1,800 | 1,490 | 1,870 | 1,720 | 1,930 | 8,590 | 3,130 | 1,910 | *1,190 | 1,620 |
| 3 | 3,630 | 3,210 | 2,010 | 1,560 | 1,730 | 1,640 | 1,810 | 5,790 | 3,290 | 1,900 | 1,360 | 1,140 |
| 4 | 3,330 | 2,870 | 2,190 | 1,700 | 1,720 | 1,680 | 1,910 | 5,630 | 2,950 | 1,760 | 1,410 | 890 |
| 5 | *3,040 | 2,820 | 2,060 | 1,440 | 1,620 | 1,000 | 1,980 | 5,870 | 2,760 | 1,920 | 1,420 | 790 |
| 6 | 2,970 | 2,810 | 1,940 | 1,450 | 1,690 | 1,100 | 1,970 | 11,000 | 2,930 | 2,000 | 1,170 | 1,150 |
| 7 | 3,130 | 2,890 | 2,150 | 1,590 | 1,660 | 1,750 | 1,930 | 15,000 | 2,830 | 1,900 | 1,130 | 1,320 |
| 8 | 2,910 | 1,500 | *2,020 | 1,640 | 1,570 | 1,800 | 1,940 | 14,000 | 2,650 | 1,950 | 1,240 | 1,360 |
| 9 | 2,700 | 2,800 | 1,770 | 1,590 | 1,780 | 1,830 | 1,470 | 12,000 | *2,550 | 1,750 | 1,280 | 1,200 |
| 10 | 2,240 | 2,600 | 1,770 | 1,590 | 1,780 | 1,950 | 1,440 | 11,000 | 2,460 | 1,300 | 1,230 | 905 |
| 11 | 1,470 | 2,500 | 1,880 | 1,580 | 1,620 | 1,990 | 1,460 | 6,200 | 2,430 | 1,570 | 1,150 | 970 |
| 12 | 1,680 | 2,400 | 1,790 | 1,690 | 1,660 | 1,680 | 1,700 | 4,500 | 1,670 | 1,850 | 1,120 | 1,230 |
| 13 | 2,320 | 2,300 | 1,620 | 1,690 | 1,740 | 1,800 | 1,420 | 4,500 | 1,830 | 1,420 | 1,080 | 1,270 |
| 14 | 2,510 | 2,000 | 1,640 | 1,760 | 1,400 | 1,550 | 1,440 | 5,400 | 1,850 | 1,380 | 1,140 | 1,330 |
| 15 | 2,220 | 1,700 | 1,700 | 1,620 | 1,800 | 1,590 | 2,280 | 5,600 | 1,890 | 1,410 | 1,280 | 1,370 |
| 16 | 2,320 | 2,200 | 1,630 | 1,500 | 1,750 | 1,570 | 4,480 | 4,700 | 2,140 | 1,170 | 1,250 | 1,430 |
| 17 | 2,250 | 2,100 | 1,590 | 1,490 | 1,610 | 1,570 | 6,700 | 4,200 | 2,310 | 1,130 | 1,300 | 1,270 |
| 18 | 1,810 | 2,000 | 1,580 | 1,570 | 1,670 | 1,620 | 6,560 | 5,000 | 1,440 | 1,400 | 1,260 | 1,120 |
| 19 | 2,220 | 2,200 | 1,470 | 1,530 | 1,760 | 1,470 | 4,330 | 5,660 | 1,440 | 1,360 | 1,280 | 1,340 |
| 20 | 2,070 | 2,500 | 1,360 | 1,570 | 1,750 | 1,150 | 3,520 | 6,330 | 2,210 | 1,270 | 1,180 | 1,330 |
| 21 | 2,050 | 2,100 | 1,470 | 1,620 | 1,200 | 1,390 | 3,600 | 7,780 | 2,080 | 1,460 | 929 | 1,390 |
| 22 | 2,000 | 1,700 | 1,540 | 1,660 | 1,730 | 1,430 | 3,740 | 6,120 | 2,300 | 1,720 | 1,270 | 1,520 |
| 23 | 2,240 | 2,200 | 1,640 | 1,640 | 1,430 | 1,270 | 4,090 | 3,930 | 2,130 | 1,840 | 1,130 | 1,510 |
| 24 | 3,070 | 2,000 | 1,060 | 1,610 | 1,410 | 1,260 | 8,180 | 4,060 | 2,280 | 1,710 | 1,150 | 1,340 |
| 25 | 3,990 | 1,900 | 1,060 | 1,710 | 1,550 | 1,290 | *15,700 | 4,370 | 2,170 | 1,760 | 1,320 | 1,310 |
| 26 | 4,200 | 2,000 | 1,570 | 1,950 | 1,500 | 806 | 18,100 | 3,740 | 2,140 | 1,860 | 1,280 | 1,490 |
| 27 | 4,580 | 2,100 | 1,350 | 2,060 | 1,600 | 782 | *16,000 | 3,940 | 2,070 | 1,870 | 1,240 | 1,600 |
| 28 | 5,560 | 2,100 | 1,720 | 2,030 | 1,160 | 1,220 | 10,000 | 3,020 | 2,250 | 1,830 | 1,110 | 1,890 |
| 29 | 2,980 | 1,800 | 2,040 | 1,980 | 1,670 | 1,470 | 5,200 | 3,290 | 2,120 | 2,050 | 2,510 | 1,830 |
| 30 | 3,290 | 1,900 | 1,840 | 1,880 | ----- | 1,520 | 8,000 | 3,340 | 2,300 | 1,750 | 2,150 | 1,340 |
| 31 | 3,320 | ----- | 1,720 | 1,800 | ----- | 1,630 | ----- | 3,320 | ----- | 1,620 | 1,780 | ----- |
| Total | 86,510 | 70,000 | 52,780 | 51,350 | 47,480 | 46,188 | 144,660 | 195,890 | 69,650 | 52,320 | 40,909 | 39,915 |
| Mean | 2,791 | 2,333 | 1,703 | 1,656 | 1,637 | 1,490 | 4,822 | 6,319 | 2,322 | 1,688 | 1,320 | 1,330 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 6,480 | | | Min 488 | | Mean 1,711 | | Cfsm - | | In. - | | |
| water year 1959-60: Max | 18,100 | | | Min 782 | | Mean 2,453 | | Cfsm - | | In. - | | |

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 8 to Dec. 1, Apr. 27-30, May 6-18; discharge estimated on basis of records for Brule and Peavy Falls powerplants.

645. Pine River at Pine River powerplant, near Florence, Wis.

Location.--Lat 45°49'40", long 88°14'55", in sec.28, T.39 N., R.18 E., at powerplant of Wisconsin-Michigan Power Co., 5.0 miles downstream from Popple River and 6.5 miles south of Florence.

Drainage area.--528 sq mi.

Records available.--October 1923 to September 1960.

Average discharge.--37 years, 422 cfs.

Extremes.--Maximum daily discharge during year, 3,220 cfs May 7; minimum daily, 156 cfs Mar. 17.

1923-60: Maximum daily discharge, 4,380 cfs Apr. 9, 1929; no flow at times during 1924, 1926-27, 1930-31, 1933, 1940.

Remarks.--Records good except those above 700 cfs, which are fair. Daily discharge determined from powerplant records. Flow regulated by powerplant at station, but pondage is small and monthly discharge is very nearly natural flow.

Cooperation.--Records of daily discharge computed by Wisconsin-Michigan Power Co., on basis of load-discharge rating of hydroelectric units as developed by Geological Survey and gate ratings based on theoretical formulas.

Revisions.--WSP 1237: Drainage area.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|-------|--------|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | 1,740 | 984 | 403 | 416 | 312 | 288 | 358 | 1,780 | 1,090 | 442 | 520 | 846 |
| 2 | 1,700 | 884 | 388 | 416 | 286 | 208 | 384 | 1,740 | 1,300 | 481 | 416 | 864 |
| 3 | 1,660 | 784 | 364 | 416 | 208 | 208 | 433 | 1,620 | 1,200 | 520 | 403 | 784 |
| 4 | 1,580 | 744 | 312 | 390 | 312 | 208 | 403 | 1,540 | 1,060 | 624 | 364 | 684 |
| 5 | 1,380 | 674 | 312 | 364 | 312 | 312 | 403 | 1,560 | 924 | 624 | 351 | 572 |
| 6 | 1,260 | 624 | 364 | 312 | 312 | 208 | 429 | 2,600 | 754 | 598 | 364 | 572 |
| 7 | 1,140 | 572 | 312 | 416 | 208 | 208 | 390 | 3,220 | 744 | 468 | 312 | 442 |
| 8 | 1,060 | 570 | 312 | 312 | 312 | 208 | 390 | 3,160 | 899 | 442 | 364 | 494 |
| 9 | 1,010 | 624 | 312 | 312 | 208 | 364 | 2,990 | 824 | 377 | 364 | 364 | 520 |
| 10 | 1,020 | 624 | 312 | 312 | 208 | 162 | 312 | 2,860 | 598 | 364 | 416 | 624 |
| 11 | 1,000 | 624 | 312 | 358 | 312 | 312 | 472 | 2,600 | 520 | 351 | 468 | 572 |
| 12 | 940 | 494 | 312 | 364 | 260 | 208 | 559 | 2,260 | 824 | 351 | 416 | 520 |
| 13 | 940 | 520 | 312 | 403 | 208 | 182 | 1,170 | 1,970 | 546 | 351 | 403 | 416 |
| 14 | 613 | 494 | 312 | 342 | 286 | 208 | 1,650 | 1,830 | 494 | 468 | 364 | 364 |
| 15 | 478 | 364 | 312 | 373 | 208 | 208 | 2,020 | 1,760 | 468 | 468 | 312 | 364 |
| 16 | 468 | 494 | 312 | 342 | 286 | 208 | 2,400 | 1,630 | 560 | 416 | 312 | 364 |
| 17 | 494 | 312 | 312 | 312 | 208 | 156 | 2,510 | 1,460 | 974 | 442 | 364 | 390 |
| 18 | 468 | 312 | 312 | 342 | 312 | 280 | 2,450 | 1,420 | 1,100 | 468 | 312 | 312 |
| 19 | 442 | 390 | 312 | 388 | 208 | 208 | 2,220 | 1,530 | 1,040 | 364 | 338 | 338 |
| 20 | 403 | 416 | 260 | 312 | 208 | 208 | 1,900 | 1,540 | 864 | 364 | 312 | 338 |
| 21 | 468 | 390 | 208 | 312 | 208 | 208 | 1,720 | 1,600 | 744 | 364 | 286 | 273 |
| 22 | 390 | 390 | 286 | 312 | 312 | 208 | 1,600 | 1,540 | 864 | 416 | 286 | 312 |
| 23 | 455 | 390 | 208 | 312 | 208 | 208 | 1,440 | 1,350 | 624 | 624 | 286 | 273 |
| 24 | 844 | 429 | 260 | 312 | 260 | 208 | 1,690 | 1,220 | 744 | 624 | 208 | 416 |
| 25 | 1,220 | 377 | 208 | 312 | 208 | 234 | 1,600 | 1,160 | 814 | 624 | 208 | 739 |
| 26 | 1,380 | 338 | 312 | 312 | 312 | 208 | 1,940 | 1,020 | 744 | 854 | 325 | 904 |
| 27 | 1,460 | 364 | 312 | 312 | 208 | 208 | 1,880 | 889 | 624 | 914 | 234 | 844 |
| 28 | 1,260 | 338 | 464 | 312 | 260 | 208 | 1,720 | 904 | 624 | 824 | 496 | 704 |
| 29 | 1,150 | 312 | 425 | 312 | 208 | 273 | 1,580 | 824 | 527 | 724 | 1,100 | 624 |
| 30 | 1,080 | 312 | 416 | 312 | ----- | 312 | 1,730 | 854 | 520 | 734 | 1,080 | 494 |
| 31 | 984 | ----- | 416 | 312 | ----- | 358 | ----- | 1,000 | ----- | 664 | 1,080 | ----- |
| Total | 30,487 | 15,124 | 9,974 | 10,634 | 7,462 | 7,007 | 38,317 | 53,511 | 22,812 | 16,329 | 13,044 | 16,083 |
| Mean | 983 | 504 | 322 | 343 | 257 | 226 | 1,277 | 1,726 | 760 | 527 | 421 | 535 |
| Cfsm | 1.86 | 0.955 | 0.610 | 0.650 | 0.487 | 0.428 | 2.42 | 3.27 | 1.44 | 0.999 | 0.797 | 1.01 |
| In. | 2.15 | 1.07 | 0.70 | 0.75 | 0.53 | 0.49 | 2.70 | 3.77 | 1.61 | 1.15 | 0.92 | 1.13 |
| Calendar year 1959: Max | 1,760 | | | Min | 80 | Mean | 433 | Cfsm | 0.820 | In. | 11.15 | |
| Water year 1959-60: Max | 3,220 | | | Min | 156 | Mean | 658 | Cfsm | 1.25 | In. | 16.97 | |

653. West Branch Sturgeon River near Randville, Mich.

Location.--Lat 46°00'45", long 87°58'41", in NE $\frac{1}{4}$ sec.30, T.42 N., R.29 W., on right bank 500 ft downstream from county highway bridge, 3 miles downstream from Tom Kires Creek, and 4 miles northeast of Randville.

Drainage area.--57.3 sq mi.

Records available.--August 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,170 ft (from topographic map).

Extremes.--Maximum discharge during year, 570 cfs May 7 (gage height, 6.40 ft); minimum, 2.6 cfs Apr. 10 (gage height, 1.43, result of freezeup).
1958-60: Maximum discharge, that of May 7, 1960; minimum, that of Apr. 10, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair. Since December 1958, some diversion upstream from station for industrial use; figures of runoff adjusted thereafter.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.7 | 12 | 5.0 | 280 |
| 3.0 | 100 | 6.0 | 462 |
| 4.0 | 177 | 6.3 | 540 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|-------|------|-------|-------|-------|-------|-------|-------|
| 1 | 63 | 53 | 21 | 26 | 18 | 18 | 33 | 226 | 55 | 65 | 40 | 56 |
| 2 | 54 | 48 | 22 | 26 | 19 | 18 | 36 | 222 | 68 | 49 | 28 | 58 |
| 3 | 59 | 42 | 23 | 25 | 18 | 18 | 38 | 189 | 89 | 54 | 23 | 50 |
| 4 | 59 | 39 | *22 | 24 | 18 | 19 | 40 | 155 | 71 | 50 | 22 | 37 |
| 5 | 52 | 38 | 23 | 23 | 18 | 19 | 41 | 152 | 56 | 38 | 20 | 32 |
| 6 | 45 | *41 | 23 | 23 | 18 | 18 | 42 | 274 | 48 | 35 | 21 | 27 |
| 7 | *40 | 39 | 22 | 22 | 19 | *18 | 42 | *523 | 44 | *38 | 24 | 23 |
| 8 | 37 | 36 | 22 | 22 | 18 | 18 | 41 | 457 | 38 | 32 | 24 | *28 |
| 9 | 45 | 34 | 21 | 22 | 17 | 18 | 39 | 303 | 38 | 29 | 23 | 36 |
| 10 | 45 | 32 | 20 | 22 | 17 | 19 | 38 | 243 | 34 | 27 | 22 | 29 |
| 11 | 38 | 34 | 21 | *21 | 17 | 17 | 41 | 213 | 38 | 25 | 21 | 25 |
| 12 | 34 | 33 | 22 | 22 | *16 | 17 | 77 | 182 | 38 | 25 | 18 | 23 |
| 13 | 31 | 31 | 21 | 24 | 15 | 18 | 147 | 141 | 34 | 23 | 16 | 21 |
| 14 | 29 | 30 | 20 | 24 | 15 | 16 | *243 | 113 | 32 | 27 | 22 | 19 |
| 15 | 28 | 29 | 21 | 23 | 15 | 17 | *351 | 95 | 30 | 24 | *20 | 21 |
| 16 | 36 | 28 | 22 | 22 | 16 | 16 | 345 | 81 | 45 | 22 | 16 | 19 |
| 17 | 42 | 25 | 20 | 21 | 17 | 17 | 302 | 84 | 109 | 22 | 16 | 21 |
| 18 | 36 | 27 | 21 | 20 | 17 | 17 | 221 | 67 | 96 | 22 | 16 | 21 |
| 19 | 32 | 27 | 19 | 20 | 17 | 18 | 146 | 78 | 79 | 20 | 15 | 21 |
| 20 | 29 | 27 | 21 | 21 | 17 | 17 | 114 | 91 | *61 | 18 | 14 | 21 |
| 21 | 27 | 27 | 20 | 19 | 17 | 16 | 97 | 113 | 49 | 28 | 15 | 20 |
| 22 | 27 | 27 | 20 | 19 | 17 | 18 | 92 | 158 | 45 | 46 | 14 | 21 |
| 23 | 32 | 26 | 20 | 19 | 17 | 18 | 98 | 144 | 41 | 42 | 14 | 19 |
| 24 | 90 | 26 | 20 | 18 | 17 | 17 | 175 | 107 | 59 | 27 | 14 | 37 |
| 25 | 187 | 25 | 21 | 18 | 17 | 15 | *275 | 90 | 62 | 22 | 14 | 35 |
| 26 | 200 | 24 | 22 | 18 | 18 | 17 | 248 | 72 | 47 | 29 | 14 | 85 |
| 27 | 149 | 23 | 25 | 19 | 18 | 19 | 196 | 65 | 38 | 32 | 14 | 54 |
| 28 | 101 | 22 | 29 | 18 | 18 | 21 | 144 | 62 | 70 | 25 | 90 | 38 |
| 29 | 75 | 21 | 32 | 18 | 19 | 24 | 113 | 56 | 94 | 56 | 157 | 33 |
| 30 | 64 | 21 | 31 | 19 | 27 | 27 | 146 | 63 | 106 | 86 | 154 | 30 |
| 31 | 57 | ----- | 30 | 18 | ----- | 30 | ----- | 62 | ----- | 62 | 86 | ----- |
| Total | 1,845 | 935 | 697 | 658 | 500 | 578 | 3,961 | 4,900 | 1,732 | 1,100 | 1,007 | 1,020 |
| Mean | 59.5 | 31.2 | 22.5 | 21.2 | 17.2 | 18.6 | 132 | 158 | 57.7 | 35.5 | 32.5 | 34.0 |
| (+) | 0.09 | 2.18 | 3.13 | 3.78 | 3.69 | 3.77 | 5.11 | 4.31 | 4.53 | 2.97 | 3.46 | 3.46 |

Adjusted for diversion

| Mean | 59.6 | 33.4 | 25.6 | 25.0 | 20.9 | 22.4 | 137 | 162 | 62.2 | 38.5 | 36.0 | 37.5 |
|------|------|-------|-------|-------|-------|-------|------|------|------|-------|-------|-------|
| Cfsm | 1.04 | 0.585 | 0.447 | 0.436 | 0.365 | 0.391 | 2.39 | 2.63 | 1.09 | 0.672 | 0.628 | 0.654 |
| In. | 1.20 | 0.65 | 0.52 | 0.50 | 0.39 | 0.45 | 2.67 | 3.26 | 1.22 | 0.77 | 0.72 | 0.73 |

| | Observed | | | | | Adjusted | | | | | | |
|---------------------|----------|-----|-----|----|------|----------|------|------|------|-------|-----|-------|
| Calendar year 1959: | Max | 228 | Min | 6 | Mean | 31.6 | Mean | 34.5 | Cfsm | 0.602 | In. | 8.17 |
| Water year 1959-60: | Max | 523 | Min | 14 | Mean | 51.7 | Mean | 55.1 | Cfsm | 0.962 | In. | 13.08 |

* Discharge measurement made on this day.

† Average monthly diversion, equivalent in cubic feet per second, for industrial use; furnished by M. A. Hanna Coal and Ore Corp.

Note.--Stage-discharge relation affected by ice Nov. 7-9, 12-14, Nov. 18 to Apr. 9.

655. Sturgeon River near Foster City, Mich.

Location.--Lat 45°54'30", long 87°45'15", in NW $\frac{1}{4}$ sec.36, T.41 N., R.28 W., on left bank 30 ft downstream from bridge on County Highway 569, 1 $\frac{1}{2}$ miles downstream from confluence of East and West Branches, and 4 miles south of Foster City.

Drainage area.--244 sq mi.

Records available.--October 1954 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 966.6 ft above mean sea level, datum of 1929.

Average discharge.--6 years, 172 cfs (adjusted for industrial diversion).

Extremes.--Maximum discharge during year, 2,570 cfs May 8 (gage height, 10.35 ft); minimum, 63 cfs Aug. 27 (gage height, 2.52 ft).

1954-60: Maximum discharge, that of May 8, 1960; minimum, 20 cfs Aug. 23, 1957 (gage height, 2.17 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Small diversions for irrigation. Since December 1958, some diversion upstream from station for industrial use; figures of runoff adjusted since. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 14

Apr. 15 to Sept. 30

2.6 69
3.0 121
4.0 282
7.0 950

2.5 60
3.0 135
4.0 310
8.0 1,220
9.0 1,580
10.4 2,620

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 527 | 422 | 125 | 165 | 105 | 89 | 145 | 897 | 305 | 263 | 310 | 470 |
| 2 | 448 | 361 | 125 | 150 | 105 | 88 | 155 | 962 | 376 | 238 | 227 | 338 |
| 3 | 398 | 316 | 120 | 140 | 105 | 86 | 170 | 1,010 | 418 | 242 | 167 | 328 |
| 4 | 359 | 286 | 120 | 135 | 105 | 85 | 180 | 1,010 | 410 | 220 | 128 | 258 |
| 5 | 318 | 269 | 120 | 130 | 105 | 84 | 190 | 998 | 384 | 189 | 118 | 205 |
| 6 | 235 | 257 | 115 | 125 | 105 | 83 | 190 | 1,250 | 346 | 157 | 112 | 167 |
| 7 | *269 | 227 | 115 | 125 | 105 | *82 | 190 | *2,140 | 299 | *135 | 112 | 152 |
| 8 | 248 | 228 | *115 | 120 | 105 | 81 | 185 | *2,560 | 249 | 123 | 115 | *147 |
| 9 | 252 | 233 | 115 | 120 | 105 | 80 | 180 | 2,340 | 210 | 110 | 112 | 171 |
| 10 | 261 | *215 | 115 | 120 | 100 | 80 | 180 | 1,840 | 189 | 100 | 110 | 174 |
| 11 | 261 | 235 | 115 | *120 | 100 | 79 | *240 | 1,420 | 183 | 93 | 105 | 152 |
| 12 | 249 | 210 | 115 | 120 | *98 | 78 | 359 | 1,160 | 181 | 90 | 98 | 126 |
| 13 | 230 | 200 | 115 | 135 | 98 | 78 | 575 | 992 | 176 | 87 | 93 | 108 |
| 14 | 211 | 190 | 115 | 140 | 97 | 77 | *853 | 849 | 160 | 90 | 135 | 100 |
| 15 | 195 | 180 | 115 | 140 | 98 | 77 | 1,130 | 726 | 144 | 90 | *132 | 94 |
| 16 | 205 | 175 | 115 | 135 | 100 | 77 | 1,340 | 622 | 164 | 87 | 120 | 87 |
| 17 | 235 | 170 | 115 | 130 | 105 | 77 | 1,420 | 567 | 354 | 86 | 107 | 87 |
| 18 | 242 | 160 | 110 | 125 | 105 | 77 | 1,308 | 552 | 406 | 84 | 94 | 87 |
| 19 | 235 | 155 | 110 | 120 | 105 | 77 | 1,090 | 510 | 422 | 80 | 87 | 86 |
| 20 | 218 | 150 | 105 | 120 | 100 | 77 | 877 | 476 | *388 | 76 | 80 | 84 |
| 21 | 197 | 150 | 105 | 115 | 100 | 77 | 732 | 528 | 334 | 79 | 73 | 83 |
| 22 | 184 | 155 | 110 | 115 | 98 | 77 | 635 | 679 | 281 | 110 | 70 | 80 |
| 23 | 189 | 155 | 110 | 115 | 97 | 76 | 587 | 697 | 238 | 140 | 70 | 80 |
| 24 | 329 | 150 | 110 | 110 | 95 | 76 | 728 | 686 | 278 | 130 | 70 | 88 |
| 25 | 754 | 150 | 115 | 110 | 95 | 76 | 960 | 622 | 318 | 113 | 69 | 140 |
| 26 | 901 | 140 | 130 | 110 | 92 | 80 | 1,070 | 528 | 292 | 200 | 69 | 231 |
| 27 | 903 | 135 | 150 | 105 | 91 | 88 | 1,140 | 452 | 252 | 267 | 64 | 254 |
| 28 | 890 | 135 | 170 | 105 | 91 | 98 | 1,030 | 404 | 247 | 247 | 120 | 222 |
| 29 | 754 | 130 | 190 | 105 | 90 | 110 | 866 | 358 | 261 | 206 | 388 | 188 |
| 30 | 591 | 125 | 185 | 105 | ----- | 120 | 816 | 326 | 261 | 342 | 523 | 152 |
| 31 | 492 | ----- | 175 | 105 | ----- | 130 | ----- | 318 | ----- | 384 | 528 | ----- |
| Total | 11,833 | 6,064 | 3,865 | 3,815 | 2,898 | 2,620 | 19,513 | 28,479 | 8,506 | 4,858 | 4,604 | 4,999 |
| Mean | 382 | 202 | 125 | 123 | 99.9 | 84.5 | 650 | 919 | 284 | 157 | 149 | 167 |
| (t) | 0.09 | 2.18 | 3.13 | 3.78 | 3.69 | 3.77 | 5.11 | 4.31 | 4.53 | 2.97 | 3.46 | 3.46 |

Adjusted for diversion

| Mean | 382 | 204 | 128 | 127 | 104 | 88.3 | 655 | 923 | 289 | 160 | 152 | 170 |
|------|------|-------|-------|-------|-------|-------|------|------|------|-------|-------|-------|
| Cfsm | 1.57 | 0.836 | 0.525 | 0.520 | 0.426 | 0.362 | 2.68 | 3.78 | 1.18 | 0.656 | 0.623 | 0.697 |
| In. | 1.81 | 0.93 | 0.61 | 0.60 | 0.46 | 0.42 | 2.99 | 4.36 | 1.32 | 0.76 | 0.72 | 0.78 |

Observed

Adjusted

| Calendar year 1959: | Max | 903 | Min | 26 | Mean | 189 | Mean | 192 | Cfsm | 0.787 | In. | 10.66 |
|---------------------|-----|-------|-----|----|------|-----|------|-----|------|-------|-----|-------|
| Water year 1959-60: | Max | 2,560 | Min | 64 | Mean | 279 | Mean | 282 | Cfsm | 1.16 | In. | 15.76 |

* Discharge measurement made on this day.

* Average monthly diversion, equivalent in cubic feet per second, for industrial use; furnished by M. A. Hanna Coal and Ore Corp.

Note.--Stage-discharge relation affected by ice Nov. 13 to Apr. 11. No gage-height record Mar. 8 to Apr. 11, Aug. 10-14; discharge estimated on basis of weather records, recorded range in stage, 1 discharge measurement, and records for nearby stations.

660. Menominee River near Pembine, Wis.

Location.--Lat 45°35'25", long 87°46'35", in sec.21, T.37 N., R.28 W., Michigan meridian, on left bank 700 ft upstream from Pemene Creek, 4 miles west of Nathan, Mich., 15 miles southeast of Pembine, and at mile 65.3.

Drainage area.--3,240 sq mi, approximately.

Records available.--October 1949 to September 1960. Prior to December 1949 monthly discharge only, published in WSP 1307.

Gage.--Water-stage recorder. Altitude of gage is 745 ft (from river-profile map).

Average discharge.--11 years, 3,076 cfs.

Extremes.--Maximum discharge during year, 26,900 cfs May 8 (gage height, 13.90 ft); minimum, 1,460 cfs Aug. 19 (gage height, 2.45 ft).
1949-60: Maximum discharge, that of May 8, 1960; minimum, 794 cfs Oct. 15, 1958 (gage height, 1.88 ft).

Remarks.--Records good except those for periods of ice effect and no gage-height record, which are fair. Flow regulated by powerplants and by Michigamme Reservoir (capacity, 119,950 acre-ft) and Peavy Pond (capacity, 33,860 acre-ft) on the Michigamme River, and by smaller reservoirs above station.

Revisions (water years).--WSP 1277: 1952.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 2.0 | 970 | 8.0 | 10,500 |
| 3.0 | 2,110 | 10.0 | 15,400 |
| 4.0 | 3,380 | 12.0 | 21,200 |
| 5.0 | 4,900 | 13.9 | 26,900 |
| 6.0 | 6,550 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|---------|---------|--------|-----------|--------|------------|---------|---------|---------|--------|--------|--------|
| 1 | 7,370 | 6,010 | 2,900 | 2,900 | 2,700 | 2,400 | 3,100 | 13,000 | 5,860 | 4,010 | 2,980 | 4,060 |
| 2 | 5,800 | 6,050 | 3,000 | 2,800 | 2,700 | 2,400 | 3,500 | 14,000 | 5,830 | 3,820 | 2,590 | 3,880 |
| 3 | 5,720 | 5,480 | 3,100 | 2,900 | 2,700 | 2,400 | 4,000 | 12,000 | 6,300 | 3,730 | 2,590 | 3,130 |
| 4 | 6,170 | 4,790 | 3,200 | 2,800 | 2,500 | 2,400 | 4,300 | 11,000 | 6,050 | 3,650 | 2,570 | 3,000 |
| 5 | 5,270 | 5,010 | 3,200 | 2,600 | 2,700 | 2,200 | 4,500 | 11,000 | 5,520 | 3,140 | 2,590 | 2,050 |
| 6 | 5,090 | 4,610 | 3,100 | 2,700 | 2,500 | 2,000 | 4,500 | 14,700 | 4,900 | 3,250 | *2,410 | 2,520 |
| 7 | *4,720 | 4,660 | 3,000 | 2,800 | 2,600 | 2,200 | 4,300 | 23,800 | 4,980 | 3,240 | 2,270 | 2,530 |
| 8 | 4,980 | 4,200 | 3,000 | 2,700 | 2,600 | 2,500 | 4,000 | 26,700 | 4,550 | 3,130 | 2,070 | 2,350 |
| 9 | 4,630 | 3,740 | 2,900 | 2,600 | 2,600 | 2,400 | 3,720 | 24,800 | 4,390 | 2,740 | 2,090 | 2,610 |
| 10 | 4,370 | 4,200 | 2,800 | 2,500 | *2,650 | 2,400 | 2,930 | 23,800 | 4,130 | 2,510 | 2,280 | 2,550 |
| 11 | 3,820 | 3,820 | 3,000 | 2,600 | 2,400 | 2,500 | 2,890 | 18,000 | 3,440 | 2,610 | 2,110 | 2,440 |
| 12 | 3,300 | 3,880 | 2,800 | 3,000 | 2,600 | 2,400 | 3,450 | 15,000 | 3,170 | 2,350 | 2,040 | 2,250 |
| 13 | 3,110 | 3,840 | 2,700 | 3,200 | 2,500 | 2,400 | *4,010 | 12,000 | 3,270 | 2,340 | 2,230 | 2,310 |
| 14 | 3,420 | 3,600 | 2,700 | 3,100 | 2,500 | 2,100 | 6,810 | 11,000 | 3,180 | 2,450 | 2,100 | 2,330 |
| 15 | 3,530 | 3,250 | 2,800 | 3,000 | 2,400 | 2,000 | 7,640 | 10,000 | *3,210 | 2,430 | 2,110 | 2,190 |
| 16 | 3,630 | 2,960 | 2,500 | 2,900 | 2,300 | 2,200 | 9,340 | 19,200 | 3,550 | 2,490 | 2,190 | 2,590 |
| 17 | 3,600 | 2,500 | 2,600 | 2,800 | 2,300 | 2,200 | 12,000 | 18,400 | 4,640 | 2,470 | 2,100 | 2,330 |
| 18 | 3,600 | 2,900 | 2,400 | 2,700 | 2,400 | 2,200 | 13,000 | 18,600 | 4,780 | 2,180 | 2,060 | 2,210 |
| 19 | 3,110 | 3,500 | 2,300 | 2,600 | 2,400 | 2,100 | 10,600 | 19,600 | 4,690 | 2,290 | 1,920 | 2,230 |
| 20 | 3,350 | 3,200 | 2,100 | 2,500 | 2,300 | 2,000 | 8,700 | 11,000 | 4,070 | 1,940 | 2,030 | 2,230 |
| 21 | 3,070 | 3,300 | 2,300 | 2,600 | 2,300 | 2,000 | 7,150 | 12,000 | 4,440 | 2,290 | 1,850 | 2,270 |
| 22 | 3,230 | 3,000 | 2,200 | 2,700 | 2,300 | 1,900 | 7,340 | 12,700 | 4,370 | 2,350 | 1,910 | 2,250 |
| 23 | 3,370 | 3,200 | 2,100 | 2,700 | 2,200 | 1,900 | 7,260 | 9,540 | 3,590 | 3,140 | 1,970 | 2,150 |
| 24 | 4,840 | 3,100 | 2,100 | 2,600 | 2,100 | 2,000 | 9,120 | 7,880 | 4,130 | 3,020 | 1,870 | 2,170 |
| 25 | 8,220 | 2,900 | 2,000 | 2,600 | 2,000 | 2,000 | 15,000 | 8,020 | 4,710 | 3,020 | 1,830 | 2,670 |
| 26 | 9,080 | 3,000 | 2,200 | 3,000 | 2,100 | 2,000 | 21,000 | 7,480 | 4,500 | 3,520 | 1,860 | 3,100 |
| 27 | 9,260 | 2,800 | 2,700 | 3,100 | 2,200 | 1,800 | 24,000 | 6,410 | 3,840 | 4,290 | 1,730 | 3,240 |
| 28 | 8,620 | 3,000 | 2,900 | 3,000 | 2,300 | 1,900 | 16,200 | 5,960 | 3,900 | 3,720 | 2,400 | 3,180 |
| 29 | 6,820 | 2,800 | 2,800 | 2,700 | 2,300 | 2,000 | 12,000 | 5,730 | 3,880 | 3,520 | 3,830 | 3,170 |
| 30 | 6,220 | 2,800 | 3,300 | 2,500 | ----- | 2,300 | 14,000 | 6,100 | 4,370 | 3,700 | 4,760 | 3,050 |
| 31 | 6,120 | ----- | 3,100 | 2,700 | ----- | 2,800 | ----- | 5,800 | ----- | 3,620 | 4,720 | ----- |
| Total | 157,440 | 112,100 | 83,600 | 85,700 | 70,150 | 67,800 | 250,360 | 375,220 | 132,220 | 92,960 | 73,860 | 79,040 |
| Mean | 5,079 | 3,737 | 2,697 | 2,765 | 2,419 | 2,187 | 8,345 | 12,100 | 4,407 | 2,999 | 2,383 | 2,635 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 9,310 | | | Min 1,110 | | Mean 2,905 | | Cfsm - | | In. - | | |
| Water year 1959-60: Max | 26,700 | | | Min 1,730 | | Mean 4,318 | | Cfsm - | | In. - | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of daily generation at chalk hills powerplant.
Note.--Stage-discharge relation affected by ice Nov. 17 to Apr. 8 (no gage-height record Jan. 6-11, 16-25, Jan. 26 to Feb. 6).

665. Pike River at Amberg, Wis.

Location.--Lat 45°29'50", long 87°59'40", in SW $\frac{1}{4}$ sec.15, T.35 N., R.20 E., on left bank 500 ft upstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, 0.2 mile south of Amberg, and 1.2 miles downstream from confluence of North and South Branches.

Drainage area.--253 sq mi.

Records available.--February 1914 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 865 ft above mean sea level (from survey level line along railroad). Prior to May 23, 1931, chain gage at railway bridge at datum 1 ft higher. May 23, 1931, to Aug. 4, 1934, chain gage at highway bridge three-quarters of a mile downstream at different datum. Aug. 5, 1934, to Oct. 6, 1946, staff gage at present site and datum.

Average discharge.--46 years, 219 cfs.

Extremes.--Maximum discharge during year, 2,290 cfs May 7 (gage height, 7.00 ft); minimum daily, 105 cfs Mar. 4-14, 23-25; minimum gage height, 1.95 ft Dec. 17 (result of freezeup).

1914-60: Maximum discharge, 2,800 cfs Apr. 10, 1922 (gage height, 7.8 ft, from graph based on gage readings, site and datum then in use), from rating curve extended above 1,100 cfs; minimum observed, 26 cfs Dec. 27, 1925 (gage height, 1.30 ft, site and datum then in use).

Remarks.--Records excellent except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 699: 1927, WSP 1207: Drainage area. WSP 1337: 1914(M), 1916-19(M), 1921-24(M), 1926(M), 1928(M), 1929, 1930(M), 1931, 1932-33(M), 1935, 1936-37(M), 1938, 1939-46(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-------|
| 1.8 | 105 | 3.0 | 432 | 2.0 | 133 | 4.0 | 749 |
| 2.0 | 144 | 4.0 | 760 | 2.5 | 257 | 5.0 | 1,170 |
| 2.5 | 279 | 4.4 | 923 | 3.0 | 407 | 6.8 | 2,170 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 318 | 351 | 180 | 250 | 150 | 110 | 320 | 719 | 376 | 392 | 274 | 266 |
| 2 | 275 | 324 | 190 | 250 | 150 | 110 | 286 | 768 | 426 | 340 | 249 | 246 |
| 3 | 275 | 303 | 180 | 230 | 150 | 110 | 289 | 797 | 438 | 358 | 226 | 240 |
| 4 | 267 | 294 | 175 | 210 | 150 | 105 | 316 | 844 | 395 | 334 | 202 | 224 |
| 5 | 246 | 288 | 178 | 190 | 155 | 105 | 346 | 883 | 367 | 295 | 187 | 207 |
| 6 | *232 | 285 | 178 | 180 | 160 | 105 | 361 | 1,320 | 340 | 266 | *182 | 192 |
| 7 | 217 | 279 | 170 | 170 | 160 | 105 | 349 | 2,040 | 316 | 240 | 197 | 184 |
| 8 | 217 | 273 | 160 | 165 | 160 | 105 | 340 | 2,130 | 298 | 229 | 197 | 216 |
| 9 | 249 | 258 | 160 | 165 | 160 | 105 | 316 | 1,630 | 280 | 213 | 197 | 283 |
| 10 | 240 | 252 | 160 | 160 | *158 | 105 | 298 | 1,330 | 274 | 202 | 224 | 263 |
| 11 | 223 | 258 | 160 | 160 | 150 | 105 | 349 | 1,170 | 277 | 197 | 213 | 224 |
| 12 | 208 | 240 | 160 | 180 | 145 | 105 | 486 | 943 | 277 | 194 | 192 | 205 |
| 13 | 193 | 235 | 160 | 190 | 140 | 105 | 832 | 756 | 269 | 190 | 180 | 190 |
| 14 | 190 | 220 | 160 | 200 | 135 | 105 | *1,240 | 654 | 257 | 210 | 197 | 177 |
| 15 | 190 | 210 | 160 | 200 | 135 | 110 | 1,240 | 580 | *246 | 202 | 197 | 170 |
| 16 | 201 | 190 | *158 | 190 | 130 | 110 | 1,080 | 526 | 301 | 192 | 184 | 168 |
| 17 | 212 | 180 | 155 | 180 | 125 | 110 | 947 | 553 | 464 | 197 | 172 | 175 |
| 18 | 188 | 180 | 155 | 175 | 125 | 110 | 794 | 584 | 522 | 200 | 163 | 175 |
| 19 | 183 | 185 | 150 | 170 | 120 | 115 | 651 | 580 | 473 | 190 | 161 | 177 |
| 20 | 178 | 190 | 140 | 165 | 120 | 115 | 543 | 636 | 385 | 177 | 156 | 175 |
| 21 | 176 | 196 | 130 | 160 | 120 | 110 | 496 | 753 | 328 | 182 | 156 | 172 |
| 22 | 170 | 198 | 130 | 160 | 120 | 110 | 464 | 805 | 301 | 197 | 152 | 170 |
| 23 | 208 | 198 | 130 | 155 | 120 | 105 | 441 | 723 | 295 | 213 | 152 | 172 |
| 24 | 460 | 196 | 130 | 155 | 115 | 105 | 492 | 616 | 419 | 197 | 150 | 190 |
| 25 | 745 | 185 | 130 | 155 | 115 | 105 | 526 | 529 | 451 | 192 | 150 | 274 |
| 26 | 906 | 175 | 140 | 160 | 115 | 110 | 516 | 473 | 401 | 239 | 150 | 346 |
| 27 | 727 | 170 | 160 | 160 | 110 | 120 | 509 | 448 | 343 | 310 | 148 | 340 |
| 28 | 591 | 165 | 190 | 160 | 110 | 150 | 460 | 432 | 352 | 232 | 192 | 280 |
| 29 | 485 | 165 | 230 | 160 | 110 | 200 | 429 | 413 | 407 | 239 | 367 | 246 |
| 30 | 410 | 170 | 240 | 160 | ----- | 250 | 536 | 398 | 419 | 331 | 368 | 224 |
| 31 | 373 | ----- | 250 | 155 | ----- | 290 | ----- | 388 | ----- | 313 | 334 | ----- |
| Total | 9,751 | 6,813 | 5,149 | 5,520 | 3,913 | 3,810 | 16,252 | 25,421 | 10,697 | 7,593 | 6,289 | 6,571 |
| Mean | 315 | 227 | 166 | 178 | 135 | 123 | 542 | 820 | 357 | 245 | 203 | 219 |
| Cfs/m | 1.25 | 0.897 | 0.656 | 0.704 | 0.534 | 0.486 | 2.14 | 3.24 | 1.41 | 0.938 | 0.802 | 0.866 |
| In. | 1.43 | 1.00 | 0.76 | 0.81 | 0.58 | 0.58 | 2.39 | 3.74 | 1.57 | 1.11 | 0.92 | 0.97 |

Calendar year 1959: Max 906 Min 74 Mean 192 Cfs/m 0.759 In. 10.27
 Water year 1959-60: Max 2,130 Min 105 Mean 294 Cfs/m 1.16 In. 15.84

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 13-20, Nov. 25 to Dec. 1, Dec. 3, 4, Dec. 7 to Apr. 1.

670. Menominee River below Koss, Mich.

Location.--Lat 45°21'50", long 87°39'20", in sec.9, T.34 N., R.27 W., Michigar meridian, on left bank at powerplant of Wisconsin Public Service Corp., 0.5 mile upstream from Little Cedar River, 3.6 miles southeast of Koss, and at mile 24.7.

Drainage area.--3,790 sq mi, approximately.

Records available.--July 1907 to March 1909 (published as "at Koss"), July 1913 to September 1960.

Gage.--Headwater and tailwater gages and generation data entered hourly in daily log sheet by company employees. Prior to June 1913, chain gage on railroad bridge 4 miles upstream.

Average discharge.--48 years (1907-8, 1913-60), 3,146 cfs.

Extremes.--Maximum daily discharge during year, 33,000 cfs May 10; minimum daily, 1,580 cfs Aug. 28.

1908, 1913-60: Maximum daily discharge, that of May 10, 1960; minimum daily, 162 cfs Sept. 15, 1931.

Remarks.--Records fair. Daily discharge computed on basis of average daily load and load-discharge rating of combined hydroelectric units. Flow regulated by powerplants, and by Michigamme Reservoir (capacity, 119,950 acre-ft) and Peavy Pond (capacity, 33,860 acre-ft) on Michigamme River, and by many smaller reservoirs above station.

Cooperation.--Records of daily discharge furnished by Wisconsin Public Service Corp.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|---------|---------|--------|--------|-----------|------------|---------|---------|---------|--------|--------|--------|
| 1 | 9,780 | 6,760 | 3,000 | 3,800 | 2,780 | 2,280 | 2,540 | 11,200 | 6,480 | 4,230 | 3,780 | 5,160 |
| 2 | 7,520 | 5,340 | 2,880 | 3,340 | 2,780 | 2,400 | 3,720 | 12,300 | 6,340 | 4,300 | 3,550 | 4,740 |
| 3 | 5,970 | 5,810 | 3,000 | 3,120 | 2,750 | 2,400 | 4,250 | 13,300 | 6,510 | 3,590 | 2,820 | 4,200 |
| 4 | 5,780 | 5,200 | 3,130 | 3,000 | 2,790 | 2,390 | 4,440 | 12,300 | 6,660 | 3,570 | 2,500 | 3,290 |
| 5 | 5,690 | 5,080 | 3,250 | 2,740 | 2,620 | 2,420 | 4,630 | 12,200 | 6,460 | 3,510 | 2,590 | 3,000 |
| 6 | 5,320 | 5,470 | 3,140 | 2,590 | 2,540 | 2,480 | 5,190 | 11,800 | 5,600 | 2,790 | 2,370 | 2,470 |
| 7 | 5,500 | 5,410 | 3,000 | 2,660 | 2,920 | 2,380 | 4,760 | 15,300 | 5,030 | 2,530 | 2,340 | 2,600 |
| 8 | 4,740 | 4,920 | 3,130 | 2,700 | 2,520 | 2,170 | 4,920 | 27,300 | 5,150 | 2,780 | 2,590 | 2,880 |
| 9 | 4,760 | 4,640 | 2,770 | 2,680 | 2,500 | 2,180 | 5,120 | 32,800 | 5,770 | 2,610 | 2,400 | 2,490 |
| 10 | 5,040 | 4,700 | 3,050 | 2,550 | 2,590 | 2,400 | 4,940 | 33,000 | 3,750 | 2,300 | 2,140 | 2,300 |
| 11 | 4,450 | 4,810 | 2,880 | 2,480 | 2,600 | 2,360 | 4,770 | 27,600 | 3,750 | 2,140 | 2,300 | 2,590 |
| 12 | 3,980 | 4,690 | 2,850 | 2,640 | 2,500 | 2,450 | 4,850 | 14,800 | 4,080 | 2,350 | 2,320 | 2,300 |
| 13 | 3,600 | 4,890 | 3,020 | 2,800 | 2,450 | 2,320 | 5,770 | 14,400 | 3,970 | 2,030 | 2,270 | 2,290 |
| 14 | 3,410 | 4,550 | 2,850 | 3,710 | 2,630 | 2,360 | 6,890 | 11,200 | 3,190 | 1,970 | 2,250 | 2,510 |
| 15 | 3,760 | 4,140 | 2,700 | 3,270 | 2,530 | 2,400 | 8,630 | 10,200 | 3,040 | 2,430 | 2,250 | 2,320 |
| 16 | 3,680 | 3,160 | 2,710 | 3,580 | 2,590 | 2,030 | 9,530 | 10,200 | 3,080 | 2,210 | 2,250 | 2,130 |
| 17 | 3,630 | 1,860 | 2,640 | 3,360 | 2,500 | 2,100 | 9,580 | 9,540 | 4,350 | 2,590 | 2,400 | 2,520 |
| 18 | 3,560 | 2,580 | 2,680 | 3,000 | 2,500 | 2,300 | 12,500 | 9,080 | 5,420 | 2,620 | 2,180 | 2,360 |
| 19 | 2,980 | 4,470 | 2,540 | 2,780 | 2,500 | 2,280 | 13,200 | 8,840 | 4,800 | 2,500 | 2,210 | 2,480 |
| 20 | 3,240 | 4,530 | 2,230 | 2,730 | 2,300 | 2,200 | 11,800 | 9,660 | 4,760 | 2,180 | 2,100 | 2,550 |
| 21 | 3,400 | 4,400 | 2,030 | 2,620 | 2,400 | 2,070 | 8,600 | 11,100 | 5,340 | 2,180 | 1,980 | 2,360 |
| 22 | 3,240 | 4,590 | 2,210 | 2,700 | 2,500 | 1,940 | 6,960 | 12,800 | 4,490 | 2,360 | 2,010 | 2,360 |
| 23 | 3,300 | 3,530 | 2,080 | 2,700 | 2,500 | 2,020 | 7,660 | 13,700 | 4,350 | 2,680 | 1,920 | 2,080 |
| 24 | 4,430 | 3,950 | 1,870 | 2,880 | 2,300 | 1,940 | 7,560 | 11,000 | 3,830 | 2,990 | 1,980 | 2,210 |
| 25 | 6,410 | 3,570 | 2,160 | 2,880 | 2,300 | 1,990 | 9,560 | 9,120 | 4,850 | 3,000 | 1,940 | 2,590 |
| 26 | 9,060 | 2,880 | 2,460 | 2,770 | 2,120 | 2,060 | 14,700 | 8,550 | 4,700 | 3,350 | 1,980 | 4,140 |
| 27 | 11,100 | 3,480 | 2,400 | 2,880 | 2,180 | 1,980 | 18,200 | 7,790 | 4,530 | 3,740 | 2,200 | 3,550 |
| 28 | 8,990 | 2,880 | 3,040 | 2,810 | 2,280 | 1,950 | 18,800 | 7,360 | 4,340 | 4,160 | 1,580 | 2,940 |
| 29 | 8,910 | 2,880 | 2,770 | 2,880 | 2,200 | 1,920 | 19,300 | 6,770 | 4,080 | 3,830 | 4,090 | 3,120 |
| 30 | 7,320 | 2,760 | 3,260 | 2,740 | 2,000 | 2,020 | 12,800 | 6,550 | 4,300 | 3,830 | 4,630 | 3,000 |
| 31 | 6,760 | ----- | 3,800 | 2,690 | ----- | 2,130 | ----- | 6,650 | ----- | 3,880 | 4,980 | ----- |
| Total | 169,310 | 128,930 | 85,550 | 90,080 | 72,690 | 68,310 | 256,350 | 408,610 | 143,000 | 91,230 | 78,900 | 85,530 |
| Mean | 5,462 | 4,298 | 2,760 | 2,905 | 2,507 | 2,204 | 8,545 | 13,180 | 4,767 | 2,943 | 2,545 | 2,651 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 11,100 | | | | Min 1,190 | Mean 3,062 | Cfsm - | In. - | | | | |
| Water year 1959-60: Max | 33,000 | | | | Min 1,580 | Mean 4,586 | Cfsm - | In. - | | | | |

675. Menominee River near McAllister, Wis.

Location.--Lat 45°19'20", long 87°39'40", in sec.17, T.33 N., R.23 E., on right bank 400 ft above highway bridge, 2 $\frac{1}{4}$ miles downstream from Little Cedar River, 2.9 miles east of McAllister, 14.5 miles east of Wausaukee, and at mile 22.3.

Drainage area.--4,020 sq mi, approximately.

Records available.--March 1945 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 630 ft (from river-profile map). Prior to May 15, 1945, wire-weight gage.

Average discharge.--15 years, 3,380 cfs.

Extremes.--Maximum discharge during year, 32,500 cfs May 9 (gage height, 20.0 ft); minimum, 1,520 cfs Aug. 28 (gage height, 8.30 ft); minimum daily, 1,650 cfs Aug. 28.
1945-60: Maximum discharge, that of May 9, 1960; minimum observed, 538 cfs Oct. 6, 1946 (gage height, 7.29 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated by powerplants, by Michigamme Reservoir (capacity, 119,950 acre-ft) and Peavy Pond (capacity, 33,860 acre-ft) on the Michigamme River, and by many smaller reservoirs above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1)

| | | | |
|------|-------|------|--------|
| 8.0 | 1,190 | 14.0 | 13,300 |
| 9.0 | 2,370 | 16.0 | 19,300 |
| 10.0 | 3,950 | 18.0 | 25,900 |
| 11.0 | 5,720 | 20.0 | 32,500 |
| 12.0 | 7,790 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|--------|--------|
| 1 | 11,200 | 7,850 | 3,600 | 4,500 | 3,200 | 2,700 | 3,800 | 17,900 | 7,090 | 5,250 | 4,460 | 6,340 |
| 2 | 8,880 | 7,420 | 3,500 | 4,200 | 3,300 | 2,800 | 5,000 | 16,800 | 7,170 | 5,070 | 4,090 | 5,500 |
| 3 | 7,260 | 7,280 | 3,700 | 3,700 | 3,200 | 2,900 | 5,200 | 18,000 | 7,350 | 4,430 | 3,420 | 4,950 |
| 4 | 6,920 | 6,440 | 3,750 | 3,400 | 3,300 | 2,800 | 5,800 | 17,200 | 7,490 | 4,530 | 2,780 | 3,830 |
| 5 | 6,420 | 6,020 | 3,730 | 3,100 | 3,200 | 2,800 | 6,000 | 15,100 | 7,150 | 4,550 | 2,900 | 3,640 |
| 6 | 6,120 | 6,280 | 3,600 | 3,200 | 3,000 | 2,900 | 6,000 | 15,900 | 6,360 | 3,920 | 2,580 | 3,040 |
| 7 | *6,120 | 5,610 | 3,600 | 3,200 | 3,400 | 2,800 | 5,600 | 22,300 | 5,870 | 3,760 | *2,660 | 2,820 |
| 8 | 5,670 | 5,800 | 3,500 | 3,200 | 3,100 | 2,600 | 5,800 | 29,200 | 5,780 | 3,750 | 3,020 | 3,490 |
| 9 | 5,970 | 5,520 | 3,600 | 3,200 | 3,000 | 2,500 | 6,000 | 31,800 | 5,800 | 3,700 | 2,820 | 2,960 |
| 10 | 5,560 | 4,820 | 3,600 | 3,000 | 3,000 | 2,900 | 6,200 | 31,300 | 4,800 | 3,270 | 2,520 | 2,650 |
| 11 | 5,200 | 5,130 | 3,400 | 3,100 | 3,100 | 2,800 | 5,700 | 28,800 | 4,930 | 2,870 | 2,580 | 3,090 |
| 12 | 4,640 | 45,500 | 3,280 | 3,300 | 2,900 | 2,900 | 6,020 | 25,100 | 4,930 | 3,100 | 2,660 | 3,250 |
| 13 | 4,140 | 45,800 | 3,310 | 3,700 | 3,100 | 2,800 | 8,200 | 17,300 | 4,680 | 2,820 | 2,520 | 2,450 |
| 14 | 3,920 | 84,900 | 3,170 | 4,000 | 3,100 | 2,800 | *8,840 | 14,400 | 4,040 | 2,510 | 2,320 | 2,740 |
| 15 | 4,220 | 4,270 | *3,220 | 4,300 | 3,000 | 2,800 | 12,000 | 13,000 | *3,920 | 2,800 | 2,580 | 2,760 |
| 16 | 4,380 | 3,700 | 3,500 | 4,000 | 3,100 | 2,400 | 12,600 | 12,400 | 3,900 | 2,740 | 2,510 | 2,370 |
| 17 | 4,500 | 3,000 | 3,400 | 4,300 | 3,000 | 2,600 | 13,700 | 12,100 | 5,220 | 2,940 | 2,650 | 2,800 |
| 18 | 4,410 | 4,000 | 3,180 | 4,000 | 3,000 | 2,700 | 16,200 | 10,700 | 6,690 | 2,960 | 2,490 | 2,720 |
| 19 | 4,240 | 5,000 | 3,000 | 3,600 | 3,000 | 2,700 | 16,400 | 11,000 | 5,740 | 2,880 | 2,470 | 2,470 |
| 20 | 3,760 | 5,000 | 2,600 | 3,400 | 2,800 | 2,600 | 14,400 | 12,400 | 5,580 | 2,640 | 2,320 | 2,450 |
| 21 | 4,040 | 5,000 | 2,500 | 3,300 | 2,900 | 2,500 | 11,500 | 14,100 | 5,290 | 2,610 | 2,130 | 2,550 |
| 22 | 3,860 | 4,500 | 2,700 | 3,300 | 2,900 | 2,300 | 9,560 | 16,000 | 5,220 | 2,640 | 2,220 | 2,510 |
| 23 | 3,930 | 3,930 | 2,400 | 3,300 | 2,900 | 2,400 | 9,320 | 16,700 | 5,070 | 3,220 | 2,140 | 2,370 |
| 24 | 5,360 | 4,240 | 2,700 | 3,400 | 2,800 | 2,300 | 9,160 | 13,300 | 4,710 | 3,390 | 2,360 | 2,590 |
| 25 | a7,600 | 4,260 | 3,200 | 3,400 | 2,700 | 2,400 | 11,600 | a11,400 | 5,450 | 3,380 | 2,070 | 2,880 |
| 26 | a9,800 | 3,500 | 3,000 | 3,200 | 2,600 | 2,400 | 18,400 | a10,100 | 5,670 | 3,780 | 2,040 | 4,120 |
| 27 | a13,000 | 3,640 | 2,910 | 3,400 | 2,700 | 2,500 | 20,400 | 9,460 | 5,400 | 4,530 | 2,330 | 3,750 |
| 28 | a12,000 | 3,400 | 3,600 | 3,400 | 2,700 | 2,300 | 22,900 | 8,510 | 5,000 | 4,800 | 1,650 | 3,630 |
| 29 | 11,000 | 3,400 | 3,500 | 3,400 | 2,700 | 2,200 | 23,200 | 7,530 | 4,980 | 4,570 | 4,480 | 3,520 |
| 30 | 8,780 | 4,000 | 3,900 | 3,100 | ----- | 2,400 | 15,000 | 6,980 | 5,070 | 4,530 | 6,240 | 3,660 |
| 31 | 8,150 | ----- | 4,500 | 3,200 | ----- | 2,700 | ----- | 7,500 | ----- | 4,750 | 6,200 | ----- |
| Total | 201,050 | 149,010 | 103,150 | 108,800 | 86,700 | 81,200 | 320,500 | 495,880 | 166,440 | 112,690 | 90,210 | 97,900 |
| Mean | 6,485 | 4,967 | 3,327 | 3,510 | 2,990 | 2,619 | 10,680 | 15,930 | 5,548 | 3,635 | 2,910 | 3,263 |
| Cfam | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 13,000 Min 1,300 Mean 3,511 Cfam - In. -
Water year 1959-60: Max 31,800 Min 1,650 Mean 5,496 Cfam - In. -

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of record for station below Koss.

Note.--Discharge computed from once-daily wire-weight-gage readings Nov. 15 to Apr. 21, Apr. 26 to May 15. Stage-discharge relation affected by ice Nov. 16-22, 26, Nov. 28 to Dec. 3, Dec. 6-11, 16, 17, 19-26, Dec. 28 to Apr. 11.

695. Peshtigo River at Peshtigo, Wis.

Location.--Lat 45°02'50", long 87°44'40", in NE $\frac{1}{4}$ sec.30, T.30 N., R.22 E., or left bank 75 ft downstream from Chicago and North Western Railway bridge, half a mile downstream from Wisconsin Public Service Corp. powerplant in Peshtigo, and 11 $\frac{1}{2}$ miles upstream from mouth.

Drainage area.--1,124 sq mi.

Records available.--June 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 584.64 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 839 cfs.

Extremes.--Maximum discharge during year, 9,790 cfs May 9 (gage height, 11.55 ft, from rating curve extended above 5,000 cfs on basis of computation of peak flow through dam gates; minimum, 138 cfs Mar. 28 (gage height, 1.56 ft); minimum daily, 408 cfs Dec. 14, 1953-60; Maximum discharge, that of May 9, 1960; minimum, 32 cfs Aug. 28, 1953 (gage height, 1.46 ft); minimum daily, 84 cfs Aug. 5, 1957.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by powerplant upstream.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 4 to Nov. 8)

| | | | |
|-----|-------|------|-------|
| 2.3 | 402 | 8.0 | 4,170 |
| 3.0 | 743 | 10.0 | 6,390 |
| 5.0 | 1,880 | 11.6 | 9,820 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|
| 1 | 2,880 | 2,390 | 708 | 2,200 | 620 | 760 | 2,090 | 3,510 | 1,860 | 1,680 | 814 | 1,420 |
| 2 | 2,580 | 1,550 | 840 | 2,000 | 740 | 840 | 2,080 | 3,550 | 1,910 | 1,600 | 814 | 1,320 |
| 3 | 2,490 | 1,570 | 830 | 1,900 | 840 | 780 | 2,840 | 3,440 | 1,830 | 1,260 | 942 | 1,460 |
| 4 | 2,450 | 1,580 | 757 | 1,800 | 760 | 760 | 3,070 | 3,510 | 1,950 | 1,030 | 809 | 1,370 |
| 5 | 1,900 | 1,690 | 642 | 1,600 | 680 | 800 | 2,780 | 3,580 | 1,320 | 1,100 | 1,090 | 962 |
| 6 | 1,540 | 2,160 | 631 | 1,600 | 593 | 700 | 2,360 | 4,150 | 1,310 | 1,090 | 865 | 898 |
| 7 | 1,320 | 1,680 | 689 | 1,500 | 837 | 480 | 2,180 | 6,650 | 1,400 | 1,210 | 1,500 | 947 |
| 8 | *1,260 | 1,000 | 813 | 1,400 | 656 | 800 | 2,460 | 8,830 | 1,510 | 930 | *1,850 | 833 |
| 9 | 1,280 | 990 | 884 | 1,300 | *609 | 920 | 2,050 | 9,600 | 1,390 | 803 | 1,610 | 902 |
| 10 | 1,250 | 1,230 | 766 | 1,300 | 760 | 860 | 2,040 | 8,660 | 1,150 | 592 | 1,700 | 1,080 |
| 11 | 790 | 1,340 | 726 | 1,200 | 960 | 880 | 1,780 | 7,790 | 1,020 | 418 | 1,630 | 1,090 |
| 12 | 823 | 1,230 | 714 | 1,100 | 700 | 720 | 2,310 | 8,760 | 1,150 | 660 | 1,310 | 968 |
| 13 | 841 | 1,190 | 588 | 1,600 | 500 | 538 | 3,270 | 5,190 | 858 | 729 | 1,200 | 803 |
| 14 | 976 | 1,360 | 409 | 1,600 | 640 | 602 | *4,040 | 3,690 | 1,180 | 747 | 1,180 | 773 |
| 15 | 828 | 568 | *766 | 1,500 | 500 | 767 | *4,530 | 3,690 | 1,200 | 741 | 949 | 723 |
| 16 | 951 | 822 | 749 | 1,300 | 600 | 655 | 4,240 | 3,570 | *1,290 | 654 | 1,080 | 703 |
| 17 | 1,120 | 636 | 851 | 1,100 | 768 | 504 | 4,280 | 4,120 | 1,370 | 725 | 907 | 880 |
| 18 | 955 | 615 | 828 | 1,000 | 766 | 781 | 4,100 | 4,210 | 1,820 | 638 | 1,010 | 644 |
| 19 | 571 | 827 | 833 | 940 | 648 | 984 | 4,070 | 4,070 | 1,750 | 830 | 905 | 660 |
| 20 | 723 | 940 | 500 | 900 | 780 | 607 | 4,400 | 4,590 | 1,680 | 830 | 953 | 1,090 |
| 21 | 691 | 806 | 450 | 880 | 740 | 477 | 3,710 | 5,860 | 1,560 | 956 | 860 | 878 |
| 22 | 824 | 820 | 450 | 820 | 642 | 632 | 2,670 | 6,020 | 1,450 | 762 | 630 | 653 |
| 23 | 1,290 | 828 | 450 | 820 | 860 | 603 | 2,350 | 5,250 | 1,510 | 753 | 692 | 862 |
| 24 | 2,060 | 879 | 450 | 780 | 760 | 644 | 2,420 | 3,900 | 1,550 | 1,110 | 688 | 966 |
| 25 | 1,550 | 850 | 500 | 760 | 672 | 787 | 2,660 | 3,460 | 1,670 | 627 | 654 | 725 |
| 26 | 1,040 | 754 | 700 | 800 | 920 | 618 | 2,810 | 3,170 | 1,980 | 1,030 | 715 | 880 |
| 27 | 1,210 | 590 | 978 | 860 | 900 | 479 | 2,550 | 5,060 | 1,550 | 1,420 | 693 | 1,200 |
| 28 | 1,500 | 647 | 2,100 | 880 | 800 | 461 | 2,140 | 2,920 | 1,550 | 828 | 613 | 1,450 |
| 29 | 1,750 | 763 | 2,730 | 840 | 470 | 308 | 2,010 | 2,560 | 1,940 | 1,290 | 660 | 1,240 |
| 30 | 2,120 | 540 | 2,580 | 840 | ----- | 1,870 | 2,350 | 2,230 | 1,890 | 1,480 | 1,430 | 1,180 |
| 31 | 2,290 | ----- | 2,350 | 680 | ----- | 2,080 | ----- | 2,210 | ----- | 1,590 | 1,330 | ----- |
| Total | 43,853 | 32,845 | 28,312 | 37,800 | 20,781 | 24,295 | 86,620 | 143,800 | 45,578 | 30,113 | 32,083 | 29,560 |
| Mean | 1,415 | 1,095 | 913 | 1,219 | 717 | 764 | 2,687 | 4,639 | 1,519 | 971 | 1,035 | 985 |
| Cfsm | 1.26 | 0.974 | 0.612 | 1.08 | 0.658 | 0.698 | 2.57 | 4.13 | 1.35 | 0.864 | 0.921 | 0.876 |
| In. | 1.45 | 1.09 | 0.94 | 1.25 | 0.69 | 0.80 | 2.87 | 4.76 | 1.51 | 1.00 | 1.06 | 0.98 |

Calendar year 1959: Max 3,950 Min 175 Mean 951 Cfsm 0.846 In. 11.49
Water year 1959-60: Max 9,600 Min 409 Mean 1,518 Cfsm 1.35 In. 18.40

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-26, Jan. 1 to Feb. 5, Feb. 10-16, 20, 21, 23, 24, Feb. 26 to Mar. 12.

700. Wheeler Lake near Lakewood, Wis.

Location.--Lat 45°19'05", long 88°29'00", in NW $\frac{1}{4}$ sec. 27, T.33 N., R.16 E., on west shore of lake at Arthur Anderken's cottage, 2 $\frac{1}{4}$ miles northeast of Lakewood. Prior to June 14, on southwest shore of lake.

Drainage area.--2 sq mi, approximately.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Staff gage. Prior to Apr. 19, 1939, gage was located at Chas. J. Voigt's on east shore of lake. Apr. 20, 1939, to June 13, 1960, gage was located on southwest shore of lake.

Extremes.--Maximum elevation observed during year, 95.94 ft Aug. 9; minimum observed, 94.12 ft Dec. 17.

1936-60: Maximum elevation observed, 96.50 ft Oct. 5, Nov. 9, 1943; minimum observed, 93.45 ft Feb. 5, 1950.

Remarks.--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. No outlet.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|-----|------|------|------|-------|
| 1 | | | | | | | | | - | - | - | - |
| 2 | | | | | | | | | - | - | 5.79 | - |
| 3 | | | | | | | | | - | - | - | - |
| 4 | | | | | | | | | - | - | - | - |
| 5 | | | | | | | | | - | 5.77 | 5.80 | - |
| 6 | 4.68 | | | | | | | | - | - | - | 5.84 |
| 7 | | | | | | | | | - | - | - | - |
| 8 | | | | | | | | | - | - | - | - |
| 9 | | | | | | | | | - | - | 5.94 | - |
| 10 | | | | | | | | | - | - | - | - |
| 11 | | | | | 4.65 | | | | - | - | - | - |
| 12 | | | | | | | | | - | 5.72 | - | - |
| 13 | | | | | | | 5.33 | | - | - | - | 5.74 |
| 14 | | | | | | | | | 5.76 | - | - | - |
| 15 | | | | | | | | | - | - | - | - |
| 16 | | | | | | | | | - | - | 5.86 | - |
| 17 | | | 4.12 | | | | | | - | - | - | - |
| 18 | | | | | | | | | - | - | - | - |
| 19 | | | | | | | | | - | 5.69 | - | - |
| 20 | | | | | | | | | - | - | - | 5.71 |
| 21 | | | | | | | | | 5.78 | - | - | - |
| 22 | | | | | | | | | - | - | - | - |
| 23 | | | | | | | | | - | - | 5.84 | - |
| 24 | | | | | | | | | - | - | - | - |
| 25 | | | | | | | | | - | - | - | - |
| 26 | | | | | | | | | - | 5.78 | - | - |
| 27 | | | | | | | | | - | - | - | 5.74 |
| 28 | | | | | | | | | 5.86 | - | - | - |
| 29 | | | | | | | | | - | - | - | - |
| 30 | | | | | | | | | - | - | 5.85 | - |
| 31 | | | | | | | | | - | - | - | - |

Note.--Add 90 ft to obtain elevation above datum assumed for this lake by the Public Service Commission of Wisconsin.

705. Boot Lake near Townsend, Wis.

Location.--Lat 45°16'20", long 88°37'55", in sec.9, T.32 N., R.15 E., on pier of Pine Ridge Lodge at north end of lake, 5½ miles southwest of Townsend and 6 miles southwest of Lakewood.

Drainage area.--1.5 sq mi, approximately.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Staff gage.

Extremes.--Maximum elevation observed during year, 96.40 ft Aug. 30; minimum observed, 94.82 ft Oct. 16, 1959.
1936-60: Maximum elevation observed, 98.25 ft June 28, 1943; minimum observed, 93.82 ft Oct. 6, 1949.

Remarks.--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. No outlet. Lake was ice covered Nov. 6 to Apr. 22.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | - | - | | | | | - | - | - | | - | - |
| 2 | - | - | | | | | - | - | - | | - | - |
| 3 | - | - | | | | | - | - | - | | - | - |
| 4 | - | - | | | | | - | 5.57 | - | | - | - |
| 5 | - | - | | | | | - | - | - | | 6.23 | - |
| 6 | 4.88 | - | | | | | - | - | - | | - | - |
| 7 | - | 5.02 | | | | | - | 5.80 | - | | - | - |
| 8 | - | - | | | | | - | - | - | | - | - |
| 9 | - | - | | | | | - | - | - | | - | - |
| 10 | 4.86 | - | | | | | - | - | - | | - | 6.22 |
| 11 | - | - | | | 5.22 | | - | - | - | | 6.32 | - |
| 12 | - | - | | | | | - | 5.79 | - | | - | 6.32 |
| 13 | - | - | | | | | 5.53 | - | - | | - | - |
| 14 | - | - | | | | | - | 5.82 | 6.21 | | - | - |
| 15 | - | - | | | | | - | - | - | | - | - |
| 16 | 4.82 | - | | | | | - | - | - | | 6.31 | 6.31 |
| 17 | - | - | 4.86 | | | | - | - | 6.30 | | - | - |
| 18 | - | - | - | | | | - | - | - | | - | - |
| 19 | - | - | - | | | | - | - | 6.28 | | - | - |
| 20 | - | - | - | | | | - | - | - | | - | - |
| 21 | - | - | - | | | | - | 5.99 | - | | - | - |
| 22 | - | - | - | | | | 5.14 | - | - | | 6.38 | - |
| 23 | - | - | - | | | | - | - | - | | - | 6.10 |
| 24 | - | - | - | | | | - | - | 6.27 | | - | - |
| 25 | - | - | - | | | | - | - | - | | - | 6.30 |
| 26 | - | - | - | | | | - | - | - | | 6.34 | - |
| 27 | - | - | - | | | | - | - | 6.26 | | - | - |
| 28 | - | - | - | | | | - | - | - | | - | - |
| 29 | - | - | - | | | | - | - | - | | - | - |
| 30 | - | - | - | | | | 5.56 | - | - | | 6.40 | - |
| 31 | - | - | - | | | | - | - | - | | - | - |

Note.--Add 90.00 ft to obtain elevation above datum for this lake by the Public Service Commission of Wisconsin.

710. Oconto River near Gillett, Wis.

Location.--Lat 44°51'55", long 88°18'00", in NW $\frac{1}{4}$ sec.34, T.28 N., R.18 E., on left bank just upstream from highway bridge, 2 miles upstream from Christy Brook, 2 miles south of Gillett, and at mile 29.

Drainage area.--678 sq mi.

Records available.--June 1906 to March 1909, October 1913 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Altitude of gage is 735 ft (from river-profile map). Prior to March 1909, chain gage on bridge at datum 4.0 ft lower. Jan. 6, 1914, to Aug. 24, 1938, chain gage on bridge at present datum.

Average discharge.--49 years (1906-8, 1913-60), 574 cfs.

Extremes.--Maximum discharge during year, 4,340 cfs May 10 (gage height, 6.37 ft); minimum daily, 300 cfs Mar. 18-26.

1906-9, 1913-60: Maximum discharge, 8,400 cfs Apr. 10, 1923 (gage height, 11.2 ft, from floodmarks), caused by failure of dam at Pulcifer 4 miles above station; minimum, 93 cfs Nov. 26, 1941 (gage height, 0.13 ft), flow retarded by anchor ice above station.

Remarks.--Records good except those for period of ice effect, which are fair.

Revisions (water years).--WSP 384: Drainage area. WSP 1207: 1922. WSP 1307: 1907-8(M), 1914-16(M), 1918-21(M), 1923-33(M), 1937-38(M), 1943(M).

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|-------|
| 1.0 | 350 | 3.0 | 1,440 |
| 1.5 | 572 | 4.0 | 2,230 |
| 2.0 | 828 | 5.0 | 3,110 |
| 2.5 | 1,110 | 6.3 | 4,280 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|----------|--------|------------|-----------|--------|--------|--------|
| 1 | 959 | 1,080 | 440 | 840 | 460 | 360 | 1,000 | 1,180 | 1,090 | 1,160 | 602 | 1,010 |
| 2 | 926 | 992 | 450 | 820 | 450 | 360 | 1,100 | 1,400 | 1,060 | 1,090 | 547 | 948 |
| 3 | 882 | 932 | 460 | 800 | 440 | 350 | 1,200 | 1,610 | 1,020 | 976 | 537 | 765 |
| 4 | 802 | 915 | 460 | 760 | 440 | 350 | 1,200 | 1,630 | 992 | 860 | 552 | 718 |
| 5 | 733 | 915 | 450 | 720 | 430 | 340 | 1,200 | 1,680 | 954 | 786 | 547 | 687 |
| 6 | 682 | 850 | 450 | 640 | 430 | 330 | 1,100 | 2,050 | 904 | 728 | 537 | 677 |
| 7 | 657 | 802 | 440 | 600 | 430 | 320 | 1,300 | 2,950 | 860 | 662 | *637 | 667 |
| 8 | *637 | 765 | 430 | 590 | 430 | 320 | 1,500 | 3,750 | 802 | 652 | 749 | 597 |
| 9 | 597 | 739 | 410 | 580 | *425 | 320 | 1,300 | 4,220 | 749 | 602 | 910 | 582 |
| 10 | 582 | 718 | 410 | 580 | 420 | 320 | 1,100 | 4,280 | 723 | 577 | 1,080 | 572 |
| 11 | 562 | 723 | 430 | 590 | 410 | 310 | 1,030 | 4,010 | *698 | 557 | 1,190 | 547 |
| 12 | 542 | 723 | 440 | 600 | 400 | 310 | 1,010 | 3,480 | 672 | 542 | 1,090 | 532 |
| 13 | 522 | 642 | 430 | 620 | 400 | 310 | 1,180 | 2,880 | 662 | 513 | 981 | 508 |
| 14 | 499 | 540 | *420 | 660 | 390 | 310 | 1,510 | 2,370 | 652 | 494 | 882 | 490 |
| 15 | 485 | 480 | 420 | 700 | 380 | 310 | *2,160 | 2,010 | 637 | 513 | 855 | 476 |
| 16 | 472 | 450 | 420 | 700 | 380 | 310 | 2,500 | 1,730 | 652 | 537 | 871 | 463 |
| 17 | 441 | 430 | 430 | 680 | 370 | 310 | 2,720 | 1,840 | 754 | 481 | 823 | 472 |
| 18 | 436 | 440 | 420 | 660 | 370 | 300 | 2,700 | 1,750 | 828 | 508 | 739 | 481 |
| 19 | 432 | 470 | 380 | 620 | 370 | 300 | 2,510 | 1,850 | 882 | 532 | 657 | 499 |
| 20 | 428 | 520 | 330 | 590 | 360 | 300 | 2,220 | 2,210 | 915 | 465 | 607 | 508 |
| 21 | 424 | 540 | 340 | 560 | 360 | 300 | 1,890 | 2,440 | 877 | 472 | 622 | 508 |
| 22 | 415 | 540 | 350 | 540 | 360 | 300 | 1,850 | 2,490 | 796 | 522 | 672 | 499 |
| 23 | 504 | 530 | 350 | 520 | 360 | 300 | 1,480 | 2,360 | 723 | 672 | 713 | 490 |
| 24 | 780 | 520 | 350 | 510 | 360 | 300 | 1,360 | 2,080 | 877 | 557 | 698 | 537 |
| 25 | 981 | 500 | 350 | 500 | 360 | 300 | 1,240 | 1,790 | 877 | 562 | 637 | 652 |
| 26 | 1,070 | 470 | 380 | 480 | 360 | 300 | 1,140 | 1,540 | 910 | 713 | 607 | 682 |
| 27 | 1,220 | 450 | 600 | 470 | 370 | 400 | 1,080 | 1,380 | 932 | 770 | 582 | 723 |
| 28 | 1,380 | 430 | 900 | 460 | 370 | 540 | 1,040 | 1,280 | 1,050 | 765 | 607 | 775 |
| 29 | 1,370 | 430 | 800 | 460 | 370 | 700 | 992 | 1,210 | 1,070 | 657 | 754 | 780 |
| 30 | 1,260 | 430 | 820 | 460 | 370 | 820 | 1,070 | 1,170 | 1,140 | 577 | 802 | 692 |
| 31 | 1,170 | ----- | 860 | 460 | ----- | 860 | ----- | 1,130 | ----- | 557 | 910 | ----- |
| Total | 22,850 | 18,966 | 14,620 | 18,770 | 11,455 | 11,660 | 44,472 | 67,730 | 25,758 | 20,139 | 22,997 | 18,537 |
| Mean | 737 | 632 | 472 | 605 | 395 | 376 | 1,482 | 2,165 | 859 | 650 | 742 | 618 |
| Cfsm | 1.09 | 0.932 | 0.696 | 0.892 | 0.582 | 0.555 | 2.19 | 3.22 | 1.27 | 0.949 | 1.09 | 0.911 |
| In. | 1.25 | 1.04 | 0.80 | 1.03 | 0.63 | 0.64 | 2.44 | 3.72 | 1.41 | 1.10 | 1.26 | 1.02 |
| Calendar year 1959: Max | 2,180 | | | Min 198 | | Mean 517 | | Cfsm 0.762 | In. 10.35 | | | |
| Water year 1959-60: Max | 4,280 | | | Min 300 | | Mean 814 | | Cfsm 1.20 | In. 16.34 | | | |

Peak discharge (base, 1,500 cfs).--Apr. 8, about 2,000 cfs; Apr. 17 (6 to 10 p.m.) 2,750 cfs (4.60 ft); May 10 (1 a.m.) 4,340 cfs (6.37 ft); May 22 (3:30 p.m.) 2,500 cfs (4.32 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 14 to Apr. 10.

725. Silver Lake at Portage, Wis.

Location.--Lat 43°33', long 89°29', in sec.6, T.12 N., R.9 E., in southeast end of lake at outlet culvert on Silver Lake Street in Portage.

Drainage area.--1 sq mi, approximately.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Staff gage.

Extremes.--Maximum elevation observed during year, 93.78 ft Sept. 26; minimum observed, 91.53 ft Oct. 5.
1936-60: Maximum elevation observed, that of Sept. 26, 1960; minimum observed, 90.42 ft Nov. 9, 1958.

Remarks.--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. Outlet flows intermittently. Lake covered by ice Nov. 19 to about Apr. 11.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | - | - | - | - | - | - | - | - | - | - | 8.34 | - |
| 2 | - | 7.01 | - | - | - | - | - | 8.23 | - | - | - | - |
| 3 | - | - | - | - | - | - | - | - | - | - | 8.52 | - |
| 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | 6.53 | - | - | - | - | - | - | - | - | 8.50 | - | 8.57 |
| 6 | - | - | - | - | - | - | - | - | 8.28 | - | - | - |
| 7 | - | - | - | - | - | - | - | - | - | - | - | - |
| 8 | - | - | - | - | 6.90 | - | - | - | - | - | 8.48 | - |
| 9 | - | 7.08 | 6.79 | - | - | - | - | - | - | - | - | - |
| 10 | - | - | - | - | - | - | - | 8.28 | - | - | - | - |
| 11 | - | - | - | - | - | - | 7.99 | - | - | 8.44 | - | - |
| 12 | 6.59 | - | - | - | - | - | - | - | - | - | - | 8.47 |
| 13 | - | - | - | - | - | - | - | - | 8.38 | - | - | - |
| 14 | - | - | - | - | - | - | - | - | - | - | - | - |
| 15 | - | - | - | - | - | - | - | - | - | - | 8.48 | - |
| 16 | - | 7.08 | - | - | - | - | - | 8.28 | - | - | - | - |
| 17 | - | - | - | - | - | - | - | - | - | - | - | - |
| 18 | - | - | - | - | - | - | 8.18 | - | - | 8.40 | - | - |
| 19 | 6.54 | - | - | - | - | - | - | - | - | - | - | 8.60 |
| 20 | - | - | - | - | - | - | - | - | 8.40 | - | - | - |
| 21 | - | - | - | - | - | - | - | - | - | - | - | - |
| 22 | - | - | - | - | - | - | - | - | - | - | 8.67 | - |
| 23 | - | 7.08 | - | - | - | - | - | 8.28 | - | - | - | - |
| 24 | - | - | - | - | - | - | - | - | - | - | - | - |
| 25 | - | - | - | - | - | - | - | - | - | 8.34 | - | - |
| 26 | 6.97 | - | - | - | - | - | 8.18 | - | - | - | - | 8.78 |
| 27 | - | - | - | - | - | - | - | - | 8.44 | - | - | - |
| 28 | - | - | - | - | - | - | - | - | - | - | - | - |
| 29 | - | - | - | - | - | - | - | - | - | - | 8.66 | - |
| 30 | - | 7.08 | - | - | - | - | - | 8.28 | - | - | - | - |
| 31 | - | - | - | - | - | - | - | - | - | - | - | - |

Note.--Add 85.00 ft to obtain elevation above datum assumed for this lake by Public Service Commission of Wisconsin.

730. Little Green Lake near Markesan, Wis.

Location.--Lat 43°44'10", long 88°58'25", in sec.32, T.15 N., R.13 E., 200 ft north of lake outlet and 2 miles north of Markesan.

Drainage area.--3.35 sq mi.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Staff gage. From Apr. 28, 1949, to Sept. 26, 1956, at site 0.5 mile north at same datum.

Extremes.--Maximum elevation observed during year, 97.36 ft July 23, 24; minimum observed, 95.20 ft Oct. 4, 5.
1936-60: Maximum elevation observed, that of July 23, 24, 1960; minimum observed, 94.02 ft Dec. 25-31, 1958.

Remarks.--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. Outlet flows intermittently. Lake ice covered Nov. 15 to about Apr. 15.

Revisions.--WSP 1437: Drainage area.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | 5.24 | 5.47 | 5.44 | 5.60 | | | | - | 6.30 | 6.30 | 7.00 | 6.12 |
| 2 | 5.22 | 5.46 | 5.44 | 5.60 | | | | - | 6.28 | 6.30 | 6.90 | 6.10 |
| 3 | 5.22 | 5.46 | 5.46 | - | | | | - | 6.28 | 6.28 | 6.94 | 6.10 |
| 4 | 5.20 | 5.52 | 5.46 | - | | | | - | 6.26 | 6.28 | 6.90 | 6.06 |
| 5 | 5.20 | 5.52 | 5.46 | - | | | | - | 6.30 | 6.26 | 6.80 | 6.04 |
| 6 | 5.30 | 5.52 | 5.46 | - | | | | - | 6.30 | 6.26 | 6.74 | 6.00 |
| 7 | 5.34 | 5.52 | 5.46 | - | | | | - | 6.28 | 6.26 | 6.70 | 5.98 |
| 8 | 5.34 | 5.50 | 5.46 | - | | | | - | 6.26 | 6.24 | 6.68 | 5.96 |
| 9 | 5.34 | 5.48 | 5.48 | - | | | | - | 6.26 | 6.24 | 6.68 | 5.92 |
| 10 | 5.34 | 5.48 | 5.48 | - | | | | - | 6.26 | 6.20 | 6.66 | 5.90 |
| 11 | 5.32 | 5.48 | 5.48 | 5.61 | | | | 6.34 | 6.26 | 6.18 | 6.60 | 5.40 |
| 12 | 5.30 | 5.48 | 5.50 | - | | | | 6.32 | 6.26 | 6.36 | 6.50 | 5.40 |
| 13 | 5.29 | 5.48 | 5.50 | - | | | | 6.30 | 6.26 | 6.36 | 6.50 | 5.60 |
| 14 | 5.28 | 5.48 | 5.50 | - | | | | 6.30 | 6.24 | 6.34 | 6.48 | 5.80 |
| 15 | 5.28 | 5.48 | 5.50 | - | | | | 6.30 | 6.24 | 6.32 | 6.40 | 5.80 |
| 16 | 5.27 | 5.48 | 5.48 | - | | | | 6.30 | 6.30 | 6.30 | 6.36 | 5.76 |
| 17 | 5.27 | 5.47 | 5.48 | - | | | | 6.30 | 6.30 | 6.38 | 6.30 | 5.78 |
| 18 | 5.26 | 5.47 | 5.48 | - | | | | 6.28 | 6.30 | 6.54 | 6.32 | 5.80 |
| 19 | 5.25 | 5.46 | 5.48 | - | | | | 6.28 | 6.30 | 6.52 | 6.42 | 5.92 |
| 20 | 5.24 | 5.46 | 5.48 | - | | | | 6.34 | 6.28 | 6.50 | 6.42 | 5.90 |
| 21 | 5.22 | 5.46 | 5.48 | - | | | | 6.34 | 6.26 | 6.48 | 6.36 | 5.98 |
| 22 | 5.22 | 5.44 | 5.48 | - | | | | 6.34 | 6.26 | 6.46 | 6.34 | 5.98 |
| 23 | 5.26 | 5.44 | 5.48 | - | | | | 6.34 | 6.26 | 7.36 | 6.30 | 5.96 |
| 24 | 5.30 | 5.44 | 5.48 | - | | | | 6.32 | 6.26 | 7.36 | 6.24 | 5.96 |
| 25 | 5.50 | 5.43 | 5.48 | - | | | | 6.32 | 6.26 | 7.32 | 6.20 | 6.00 |
| 26 | 5.50 | 5.42 | 5.48 | - | | | | 6.30 | 6.26 | 7.32 | 6.18 | 5.98 |
| 27 | 5.48 | 5.42 | 5.50 | - | | | | 6.30 | 6.24 | 7.30 | 6.16 | 5.96 |
| 28 | 5.48 | 5.42 | 5.58 | - | | | | 6.28 | 6.30 | 7.30 | 6.16 | 5.94 |
| 29 | 5.48 | 5.44 | 5.60 | - | 5.84 | | | 6.28 | 6.30 | 7.28 | 6.14 | 5.92 |
| 30 | 5.47 | 5.44 | 5.60 | - | | | | 6.30 | 6.30 | 7.28 | 6.14 | 5.90 |
| 31 | 5.47 | | 5.60 | - | | | | 6.30 | | 7.06 | 6.12 | |

Note.--Add 90.00 ft to obtain elevation above datum assumed for this lake by the Public Service Commission of Wisconsin.

735. Fox River at Berlin, Wis.

Location.--Lat 43°57'15", long 88°57'10", in NE $\frac{1}{4}$ sec.16, T.17 N., R.13 E., on left bank 0.3 mile downstream from government lock, 1 mile south of Huron Street Bridge in Berlin, 2.5 miles upstream from Barnes Creek, and at mile 89.0.

Drainage area.--1,430 sq mi, approximately.

Records available.--January 1898 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 744.52 ft above mean tide at New York City (by Corps of Engineers). Prior to Oct. 27, 1954, staff gage at site 0.3 mile upstream at same datum.

Average discharge.--62 years, 1,096 cfs.

Extremes.--Maximum discharge during year, 4,100 cfs May 10, 11 (gage height, 13.60 ft); minimum, 522 cfs Oct. 21 (gage height, 7.31 ft).
1898-1960: Maximum discharge observed, 6,900 cfs Mar. 17, 18, 1946 (gage height, 15.5 ft); minimum observed, 248 cfs Sept. 16, 1948 (gage height, 6.1 ft).

Remarks.--Records good except those for periods of ice effect or shifting-control, which are fair. About 20 cfs diverted into basin from the Wisconsin River at Portage Canal throughout most of the year.

Revisions (water years).--WSP 1337: 1910.

Rating tables, water year 1959-60, except periods of ice effect or shifting control (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Sept. 15 | | | | Sept. 16-30 | |
|--------------------|-----|------|-------|-------------|-------|
| 7.0 | 440 | 9.0 | 1,190 | 8.4 | 740 |
| 7.5 | 580 | 11.0 | 2,300 | 9.0 | 985 |
| 8.0 | 760 | 13.6 | 4,100 | 10.0 | 1,470 |
| | | | | 11.0 | 2,080 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|--------|------------|-------------|-----------|--------|--------|--------|
| 1 | 633 | 2,080 | 1,350 | 2,200 | 1,050 | 560 | 3,000 | 2,490 | 2,450 | 1,200 | 1,840 | 1,350 |
| 2 | 630 | 2,070 | 1,350 | 2,150 | 1,050 | 560 | 3,200 | 2,530 | 2,370 | 1,180 | 1,850 | 1,310 |
| 3 | 654 | 2,020 | 1,320 | 2,050 | 1,020 | 550 | 3,230 | 2,560 | 2,290 | 1,160 | 1,840 | 1,250 |
| 4 | 640 | 1,980 | 1,300 | 1,900 | 1,000 | 550 | 3,120 | 2,560 | 2,220 | 1,120 | 1,770 | 1,180 |
| 5 | 651 | 1,990 | 1,250 | 1,800 | 990 | 550 | 2,980 | 2,570 | 2,140 | 1,080 | 1,720 | 1,120 |
| 6 | 644 | 1,990 | 1,200 | 1,700 | 970 | 550 | 2,900 | 2,670 | 2,030 | 1,060 | 1,640 | 1,080 |
| 7 | 647 | 1,990 | 1,150 | 1,650 | 960 | 540 | 2,820 | 3,170 | 1,940 | 1,030 | 1,630 | 1,030 |
| 8 | 717 | 2,000 | 1,130 | 1,600 | 950 | 540 | 2,740 | 3,680 | 1,840 | 1,010 | 1,570 | 992 |
| 9 | 812 | 2,020 | 1,120 | 1,550 | 940 | 540 | 2,650 | 4,010 | 1,680 | 976 | 1,560 | 952 |
| 10 | 820 | 2,040 | 1,100 | 1,550 | 920 | 540 | 2,570 | 4,100 | 1,480 | 936 | 1,560 | 884 |
| 11 | 788 | 2,050 | 1,080 | *1,530 | 900 | 540 | 2,520 | *4,040 | 1,350 | *900 | 1,590 | 856 |
| 12 | 800 | 2,040 | 1,050 | 1,550 | 880 | 540 | 2,440 | 3,930 | 1,200 | 880 | 1,590 | 820 |
| 13 | 740 | 2,020 | 1,050 | 1,600 | 860 | 540 | 2,380 | 3,800 | 1,090 | 880 | 1,540 | 792 |
| 14 | 733 | 1,960 | 1,010 | 1,650 | 840 | 540 | 2,320 | 3,680 | 1,020 | 920 | 1,520 | 772 |
| 15 | 729 | 1,870 | 1,130 | 1,700 | 820 | 540 | 2,240 | 3,580 | 980 | 880 | 1,460 | 772 |
| 16 | 721 | 1,850 | 1,170 | 1,700 | 800 | 540 | 2,190 | 3,480 | 1,000 | 900 | 1,420 | 744 |
| 17 | 683 | 1,800 | 1,160 | 1,650 | 770 | 540 | 2,260 | 3,440 | 1,020 | 900 | 1,400 | *764 |
| 18 | 676 | 1,800 | 1,100 | 1,600 | 740 | 550 | 2,320 | 3,360 | 1,100 | 968 | 1,350 | 804 |
| 19 | 640 | 1,780 | 1,040 | 1,550 | 720 | 560 | 2,370 | 3,280 | 1,100 | 1,000 | 1,340 | 976 |
| 20 | *647 | 1,760 | 1,000 | 1,500 | 700 | 570 | 2,430 | 3,290 | 1,040 | 980 | 1,380 | 1,090 |
| 21 | 540 | 1,740 | 1,000 | 1,450 | 680 | 570 | 2,490 | 3,250 | 1,000 | 968 | 1,490 | 1,100 |
| 22 | 574 | 1,700 | 1,000 | 1,400 | 670 | 560 | 2,520 | 3,190 | 1,000 | 1,040 | 1,510 | 1,260 |
| 23 | 792 | 1,650 | 1,000 | 1,350 | 650 | 560 | 2,520 | 3,100 | 1,010 | 1,440 | 1,530 | 1,360 |
| 24 | 1,260 | 1,600 | 1,000 | 1,350 | 630 | 560 | 2,530 | 3,000 | 1,050 | 1,520 | 1,520 | 1,510 |
| 25 | 1,460 | 1,500 | 1,050 | 1,300 | 610 | 550 | 2,540 | 2,910 | 1,050 | 1,480 | 1,470 | 1,620 |
| 26 | 1,710 | 1,400 | 1,150 | 1,250 | 600 | 560 | 2,510 | 2,830 | 1,080 | 1,530 | 1,440 | 1,710 |
| 27 | 1,750 | 1,350 | 1,600 | 1,200 | 580 | 660 | 2,440 | 2,770 | 1,060 | 1,600 | 1,390 | 1,790 |
| 28 | 1,850 | 1,350 | 1,920 | 1,200 | 580 | 960 | 2,370 | 2,700 | 1,080 | 1,650 | 1,360 | 1,850 |
| 29 | 1,930 | 1,350 | 2,100 | 1,150 | *574 | 1,500 | 2,320 | 2,640 | 1,180 | 1,750 | 1,370 | 1,910 |
| 30 | 2,010 | 1,350 | 2,200 | 1,100 | ----- | 2,100 | 2,410 | 2,610 | 1,200 | 1,830 | 1,370 | 1,940 |
| 31 | 2,060 | ----- | 2,200 | 1,100 | ----- | 2,600 | ----- | 2,530 | ----- | 1,850 | 1,360 | ----- |
| Total | 29,941 | 54,100 | 39,280 | 48,030 | 23,454 | 22,120 | 77,350 | 97,750 | 42,050 | 36,698 | 47,380 | 35,588 |
| Mean | 966 | 1,803 | 1,267 | 1,549 | 809 | 714 | 2,578 | 3,153 | 1,402 | 1,184 | 1,528 | 1,186 |
| Cfs/m | 0.676 | 1.26 | 0.886 | 1.08 | 0.566 | 0.499 | 1.80 | 2.20 | 0.980 | 0.828 | 1.07 | 0.829 |
| In. | 0.78 | 1.41 | 1.02 | 1.25 | 0.61 | 0.58 | 2.01 | 2.54 | 1.09 | 0.95 | 1.23 | 0.93 |
| Calendar year 1959: Max | 3,660 | | | Min 300 | | | Mean 993 | Cfs/m 0.694 | In. 9.43 | | | |
| Water year 1959-60: Max | 4,100 | | | Min 540 | | | Mean 1,513 | Cfs/m 1.06 | In. 14.40 | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17 to Dec. 13, Dec. 20-27, Dec. 30 to Apr. 2. Shifting-control method used July 23 to Sept. 15.

755. Wolf River above West Branch Wolf River, Wis.

Location.--Lat 44°56'10", long 88°39'15", in E $\frac{1}{2}$ sec.3, T.28 N., R.15 E., near center of span on downstream side of highway bridge, half a mile upstream from West Branch Wolf River, 4 miles north of Keshena, and at mile 140.1.

Drainage area.--633 sq mi.

Records available.--October 1927 to September 1960. Prior to April 1928 monthly discharge only, published in WSP 1307.

Gage.--Wire-weight gage read once daily. Datum of gage is 856.57 ft above mean sea level (levels by Wisconsin Power and Light Co.). Prior to Sept. 21, 1956, chain gage at same site and datum.

Average discharge.--33 years, 565 cfs.

Extremes.--Maximum discharge during year, 3,120 cfs May 8 (gage height, 6.60 ft, from graph based on gage readings); minimum daily, 370 cfs Mar. 22-26.
1927-60: Maximum discharge, that of May 8, 1960; minimum observed, 199 cfs Feb. 20, 1936.

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

Revisions (water years).--WSP 1337: 1929-30(M), 1931, 1934-35(M), 1939(M), 1941(M), 1944-50(M).

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 16-20)

| | | | |
|-----|-----|-----|-------|
| 2.1 | 421 | 4.0 | 1,340 |
| 2.5 | 564 | 5.0 | 2,000 |
| 3.0 | 788 | 6.5 | 3,050 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|---------|----------|--------|------------|-----------|--------|--------|--------|
| 1 | 1,720 | 1,210 | 560 | 770 | 520 | 410 | 850 | 1,520 | 1,200 | 820 | a540 | 521 |
| 2 | al,650 | 1,160 | 570 | 740 | 510 | 410 | 880 | 1,450 | 1,150 | 754 | a530 | 548 |
| 3 | al,550 | 1,110 | 580 | 720 | 500 | 410 | 900 | 1,460 | 1,120 | 698 | a520 | 552 |
| 4 | al,450 | 1,100 | 580 | 700 | 500 | 400 | 940 | 1,460 | 1,060 | 696 | *510 | 572 |
| 5 | 1,350 | 1,070 | 560 | 670 | 500 | 400 | 960 | 1,530 | 996 | 652 | a500 | 576 |
| 6 | 1,280 | 990 | 550 | 650 | 510 | 400 | 920 | 1,890 | 948 | 639 | a450 | 631 |
| 7 | 1,230 | a950 | 530 | 630 | 500 | 400 | 880 | 2,710 | 928 | 635 | a640 | 618 |
| 8 | 1,170 | 892 | 510 | 630 | *489 | 390 | 850 | 2,990 | 918 | 590 | a840 | 564 |
| 9 | 1,210 | 1,060 | 500 | 630 | 490 | 390 | 840 | 2,720 | 867 | 533 | 808 | 544 |
| 10 | 1,150 | 948 | 500 | 640 | 490 | 390 | 860 | 2,520 | 842 | 525 | 783 | 521 |
| 11 | 1,090 | 954 | *510 | 650 | 480 | 390 | 920 | 2,360 | 817 | 518 | a840 | 544 |
| 12 | 1,040 | 842 | 520 | 660 | 470 | 380 | *984 | 2,230 | 778 | 503 | a820 | 702 |
| 13 | 985 | 648 | 520 | 680 | 470 | 380 | 1,300 | 2,070 | 754 | 474 | a780 | 740 |
| 14 | 933 | 640 | 520 | 700 | 460 | 380 | 1,630 | 1,940 | 754 | 518 | a800 | 721 |
| 15 | 907 | 640 | 510 | 710 | 460 | 380 | 1,740 | 1,780 | 680 | 541 | 822 | 618 |
| 16 | 887 | 630 | 500 | 680 | 460 | 380 | 1,780 | 1,780 | 788 | 529 | 721 | 702 |
| 17 | 862 | 620 | 500 | 660 | 460 | 380 | al,720 | 1,800 | *979 | 529 | a620 | 774 |
| 18 | 847 | 620 | 470 | 640 | 460 | 390 | 1,670 | 1,970 | 1,100 | 521 | a540 | 657 |
| 19 | 812 | 620 | 450 | 650 | 450 | 390 | 1,520 | *2,130 | 1,030 | 525 | a540 | 580 |
| 20 | 764 | 640 | 400 | 620 | 450 | 380 | al,450 | 2,260 | 954 | 537 | a560 | 618 |
| 21 | 702 | 640 | 390 | 600 | 450 | 380 | 1,350 | 2,150 | 902 | 544 | a660 | 648 |
| 22 | 750 | 640 | 380 | 600 | 440 | 370 | 1,290 | 2,030 | 822 | 644 | a680 | 580 |
| 23 | 887 | 640 | 380 | 590 | 440 | 370 | 1,250 | al,950 | 837 | 631 | a640 | 712 |
| 24 | al,130 | 640 | 380 | 580 | 430 | 370 | 1,180 | al,800 | 948 | 622 | a600 | 812 |
| 25 | 1,370 | 620 | 400 | 580 | 420 | 370 | 1,170 | al,650 | al,060 | a650 | a570 | 933 |
| 26 | 1,460 | 600 | 500 | 580 | 420 | 370 | 1,150 | 1,530 | al,020 | a700 | a570 | 837 |
| 27 | 1,390 | 580 | 780 | 570 | 420 | 380 | 1,130 | 1,490 | a950 | a640 | a580 | 778 |
| 28 | 1,340 | 560 | 820 | 560 | 410 | 410 | 1,110 | 1,430 | al,060 | 537 | a600 | 754 |
| 29 | 1,300 | 550 | 820 | 550 | 410 | 450 | 1,090 | al,560 | al,100 | 576 | a720 | 657 |
| 30 | 1,270 | 550 | 810 | 540 | ----- | 640 | 1,340 | al,300 | al,000 | 558 | a900 | 726 |
| 31 | 1,230 | ----- | 790 | 530 | ----- | 820 | ----- | 1,240 | ----- | a560 | a750 | ----- |
| Total | 35,716 | 23,364 | 16,790 | 19,690 | 13,469 | 12,760 | 35,714 | 58,500 | 28,372 | 18,409 | 20,434 | 19,740 |
| Mean | 1,150 | 779 | 542 | 635 | 464 | 412 | 1,190 | 1,890 | 946 | 574 | 659 | 658 |
| Cfsm | 1.82 | 1.23 | 0.856 | 1.00 | 0.733 | 0.651 | 1.88 | 2.99 | 1.49 | 0.958 | 1.04 | 1.04 |
| In. | 2.10 | 1.37 | 0.99 | 1.16 | 0.79 | 0.75 | 2.10 | 3.44 | 1.67 | 1.08 | 1.20 | 1.16 |
| Calendar year 1959: Max | 1,750 | | | | Min 246 | Mean 596 | | Cfsm 0.942 | In. 12.78 | | | |
| Water year 1959-60: Max | 2,990 | | | | Min 370 | Mean 828 | | Cfsm 1.31 | In. 17.81 | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of record at Keshena Falls.

Note.--Stage-discharge relation affected by ice Nov. 14 to Apr. 13 (no gage-height record Nov. 14 to Dec. 10, Dec. 16-23, Mar. 23-25; discharge estimated on basis of 3 discharge measurements, weather records, and records for station at Keshena Falls).

770. Wolf River at Keshena Falls, Wis.

Location.--Lat 44°53'30", long 88°39'20", in E½ sec.22, T.28 N., R.15 E., on right bank 500 ft downstream from Keshena Falls, 1.7 miles upstream from Keshena, 3.1 miles downstream from West Branch Wolf River, and at mile 136.4.

Drainage area.--812 sq mi.

Records available.--May 1907 to March 1909, October 1910 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "at Keshena" prior to April 1928.

Gage.--Water-stage recorder. Datum of gage is 820.0 ft above mean sea level (levels by Wisconsin Power and Light Co.). Prior to March 1909, staff gage and February 1911 to March 1928, chain gage, at bridge in Keshena 1.7 miles downstream at datum 4.03 ft lower.

Average discharge.--51 years (1907-8, 1910-60), 757 cfs.

Extremes.--Maximum discharge during year, 4,830 cfs May 7 (gage height, 9.67 ft), from rating curve extended above 2,500 cfs, instantaneous peak caused when earthfill wall near powerplant was dynamited to relieve pressure on dam; maximum discharge after flow stabilized, 4,430 cfs May 8 (gage height, 9.36 ft), from rating curve extended above 2,500 cfs; minimum daily, 470 cfs Mar. 25; minimum gage height, 5.57 ft Aug. 6. 1907-9, 1910-60: Maximum discharge observed, that of May 7, 1960; maximum gage height, 13.83 ft Nov. 17, 1943 (backwater from ice); minimum discharge, 91 cfs Dec. 22, 1939 (gage height, 4.67 ft), result of ice storage.

Remarks.--Records good except those for period of ice effect, which are fair. Diurnal fluctuation caused by powerplant upstream.

Revisions (water years).--WSP 664: Drainage area (site at Keshena). WSP 1337: 1914-15(M), 1918-19(M), 1921, 1923(M), 1926(M), 1928(M), 1933.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 28 to July 5)

| | | | |
|-----|-------|------|-------|
| 5.4 | 431 | 8.0 | 2,800 |
| 6.0 | 842 | 9.0 | 4,000 |
| 7.0 | 1,740 | 10.0 | 5,260 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 1,920 | 1,400 | 720 | 1,000 | 680 | 550 | 1,180 | 1,910 | 1,360 | 1,040 | 877 | 1,140 |
| 2 | 1,800 | 1,350 | 740 | 940 | 640 | 560 | 1,200 | 1,880 | 1,340 | 956 | 684 | 1,070 |
| 3 | 1,690 | 1,310 | 750 | 920 | 640 | 560 | 1,200 | 1,820 | 1,280 | 928 | 642 | 1,030 |
| 4 | 1,600 | 1,260 | 750 | 880 | 660 | 550 | 1,150 | 1,770 | 1,230 | 851 | *621 | 946 |
| 5 | 1,520 | 1,250 | 730 | 840 | 680 | 540 | 1,100 | 1,760 | 1,180 | 760 | 608 | 902 |
| 6 | 1,390 | 1,180 | 720 | 810 | 680 | 530 | 1,080 | 2,270 | 1,140 | 737 | 543 | 826 |
| 7 | 1,360 | 992 | 700 | 790 | 690 | 520 | 1,080 | 3,940 | 1,110 | 714 | 642 | 785 |
| 8 | 1,340 | 1,060 | 650 | 790 | *710 | 520 | 1,080 | 4,240 | 1,070 | 691 | 1,160 | 760 |
| 9 | 1,340 | 1,160 | 630 | 800 | 680 | 520 | 1,050 | 3,600 | 1,050 | 670 | 1,240 | 793 |
| 10 | 1,320 | 1,130 | *614 | 800 | 660 | 520 | 1,080 | 3,230 | 1,020 | 649 | 1,210 | 868 |
| 11 | 1,260 | 1,140 | 620 | 830 | 640 | 520 | 1,120 | 2,860 | 1,010 | 642 | 1,100 | 876 |
| 12 | 1,200 | 992 | 620 | 860 | 620 | 520 | *1,120 | 2,720 | 992 | 588 | 1,040 | 876 |
| 13 | 1,160 | 920 | 660 | 900 | 600 | 510 | 1,500 | 2,490 | 965 | 592 | 956 | 868 |
| 14 | 1,100 | 860 | 670 | 940 | 580 | 510 | 2,260 | 2,230 | 928 | 649 | 1,060 | 834 |
| 15 | 1,060 | 860 | 670 | 940 | 570 | 500 | 2,370 | 2,050 | 894 | 699 | 1,040 | 785 |
| 16 | 1,030 | 820 | 660 | 920 | 590 | 500 | 2,250 | 1,950 | 883 | 656 | 851 | 737 |
| 17 | 1,000 | 800 | 650 | 900 | 610 | 490 | 2,270 | 2,020 | *1,250 | 642 | 730 | 752 |
| 18 | 965 | 800 | 620 | 870 | 610 | 490 | 2,140 | 2,250 | 1,420 | 677 | 677 | 752 |
| 19 | 919 | 820 | 600 | 850 | 600 | 500 | 1,890 | *2,450 | 1,350 | 663 | 691 | 752 |
| 20 | 894 | 840 | 520 | 820 | 590 | 490 | 1,740 | 2,620 | 1,240 | 677 | 859 | 745 |
| 21 | 868 | 860 | 510 | 800 | 580 | 480 | 1,650 | 2,570 | 1,180 | 722 | 1,090 | 722 |
| 22 | 834 | 860 | 520 | 800 | 560 | 480 | 1,580 | 2,380 | 1,110 | 776 | 1,160 | 707 |
| 23 | 992 | 860 | 520 | 790 | 580 | 480 | 1,490 | 2,160 | 1,080 | 902 | 1,000 | 707 |
| 24 | 1,350 | 840 | 510 | 790 | 560 | 480 | 1,420 | 1,960 | 1,270 | 859 | 851 | 776 |
| 25 | 1,790 | 800 | 540 | 780 | 560 | 470 | 1,390 | 1,780 | 1,380 | 809 | 793 | 1,180 |
| 26 | 1,940 | 740 | 640 | 780 | 540 | 480 | 1,370 | 1,680 | 1,320 | 1,060 | 752 | 1,330 |
| 27 | 1,810 | 700 | 900 | 770 | 540 | 490 | 1,350 | 1,630 | 1,190 | 902 | 730 | 1,220 |
| 28 | 1,650 | 690 | 1,100 | 770 | 550 | 510 | 1,310 | 1,590 | 1,380 | 793 | 745 | 1,100 |
| 29 | 1,540 | 690 | 1,090 | 780 | 550 | 540 | 1,290 | 1,520 | 1,400 | 760 | 1,390 | 983 |
| 30 | 1,440 | 700 | 1,080 | 730 | ----- | 720 | 1,540 | 1,480 | 1,290 | 801 | 1,420 | 919 |
| 31 | 1,420 | ----- | 1,060 | 700 | ----- | 1,100 | ----- | 1,420 | ----- | 730 | 1,270 | ----- |
| Total | 41,502 | 28,704 | 21,814 | 25,870 | 17,730 | 16,630 | 44,270 | 70,230 | 35,372 | 23,585 | 28,422 | 26,741 |
| Mean | 1,339 | 957 | 704 | 835 | 611 | 536 | 1,476 | 2,265 | 1,179 | 761 | 917 | 891 |
| Cfsm | 1.65 | 1.18 | 0.867 | 1.03 | 0.752 | 0.660 | 1.82 | 2.79 | 1.45 | 0.937 | 1.13 | 1.10 |
| In. | 1.90 | 1.31 | 1.00 | 1.18 | 0.81 | 0.76 | 2.03 | 3.22 | 1.62 | 1.08 | 1.30 | 1.22 |

Calendar year 1959: Max 1,970

Min 293

Mean 723

Cfsm 0.890

In. 12.06

Water year 1959-60: Max 4,240

Min 470

Mean 1,041

Cfsm 1.28

In. 17.43

Peak discharge (base, 1,500 cfs).--Oct. 26 (7 a.m.) 1,980 cfs (7.24 ft); Apr. 15 (3 to 6 a.m.) 2,420 cfs (7.65 ft); May 7 (3 p.m.) 4,830 cfs (9.67 ft); May 20 (9 a.m. to 2 p.m.) 2,660 cfs (7.87 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 13 to Apr. 13.

785. Embarrass River near Embarrass, Wis.

Location.--Lat 44°43'30", long 88°44'10", in SW $\frac{1}{4}$ sec.18, T.26 N., R.15 E., on left bank 10 ft downstream from highway bridge, $1\frac{1}{4}$ miles downstream from Mill Creek, and 4 miles northwest of Embarrass.

Drainage area.--395 sq mi.

Records available.--June 1919 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 800 ft (from survey level line in vicinity). Prior to Aug. 23, 1938, chain gage on downstream side of bridge at same datum.

Average discharge.--41 years, 283 cfs.

Extremes.--Maximum discharge during year, 4,890 cfs May 7 (gage height, 9.72 ft); minimum, 106 cfs Oct. 23 (gage height, 2.83 ft).

1919-60: Maximum discharge, 6,920 cfs Apr. 10, 1922 (gage height, 11.6 ft, from graph based on gage readings), from rating curve extended above 2,800 cfs; minimum observed, 23 cfs Aug. 3, 6, 7, 1931.

Remarks.--Records good except those for periods of ice effect, which are fair. Slight diurnal fluctuation caused by powerplants above station.

Revisions (water years).--WSP 1337: 1920-26(M), 1928, 1929-30(M), 1933-34, 1936-37, 1938(M), 1940.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|-------|
| 2.8 | 108 | 6.0 | 1,710 |
| 3.0 | 158 | 7.0 | 2,420 |
| 3.5 | 345 | 8.0 | 3,240 |
| 4.0 | 585 | 9.1 | 4,260 |
| 5.0 | 1,110 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|-------|-------|--------|-------|-------|--------|--------|--------|-------|--------|-------|
| 1 | 615 | 474 | 180 | 800 | 210 | 140 | 760 | 1,120 | 404 | 499 | 153 | a600 |
| 2 | 469 | 474 | 177 | 560 | 210 | *157 | 793 | 1,220 | 435 | 398 | 153 | a500 |
| 3 | 358 | 426 | 174 | 560 | 200 | 150 | 830 | 1,110 | 469 | 286 | 167 | a600 |
| 4 | 282 | 384 | 174 | 500 | 190 | 130 | 824 | *978 | 455 | 265 | 145 | a450 |
| 5 | 261 | 390 | 174 | 450 | 190 | 150 | 747 | 903 | 376 | 257 | 142 | 368 |
| 6 | 257 | 366 | 180 | 400 | 190 | 150 | 712 | 1,540 | 341 | 246 | 145 | a300 |
| 7 | 246 | 356 | 190 | 380 | 190 | 130 | 742 | 3,920 | 306 | 217 | 200 | a240 |
| 8 | 235 | 302 | 180 | 360 | 180 | 150 | 727 | 4,180 | 294 | 210 | 261 | a200 |
| 9 | 203 | 350 | 190 | 340 | 180 | 150 | 671 | 3,050 | 269 | 186 | 306 | a210 |
| 10 | 186 | 356 | 180 | 330 | 170 | 130 | 565 | 2,160 | 261 | 177 | 311 | 231 |
| 11 | 261 | 332 | 161 | 320 | 170 | 150 | 529 | 1,640 | 250 | 161 | 341 | 192 |
| 12 | 246 | 324 | 158 | 340 | 170 | 150 | 620 | 1,270 | 242 | *142 | 298 | 183 |
| 13 | 235 | 286 | 170 | *369 | 160 | 140 | 850 | 1,000 | 242 | 150 | 242 | 137 |
| 14 | 217 | 290 | 164 | 400 | 170 | 120 | 1,110 | 824 | 224 | 164 | 217 | 148 |
| 15 | 137 | 290 | 174 | 380 | 150 | 150 | 1,220 | 717 | 228 | 167 | 203 | *174 |
| 16 | 224 | 231 | 183 | 360 | 160 | 140 | 1,200 | 625 | 261 | 158 | 189 | 164 |
| 17 | 137 | 230 | 186 | 340 | 140 | 130 | 1,200 | 671 | 372 | 170 | 180 | 132 |
| 18 | 186 | 220 | 192 | 320 | 140 | 140 | 1,140 | 830 | 460 | 210 | 155 | 177 |
| 19 | 137 | 220 | 180 | 300 | 160 | 130 | 1,020 | 945 | 440 | 315 | 132 | 220 |
| 20 | 158 | 242 | 190 | 280 | 140 | 120 | 856 | 1,020 | 368 | 230 | 336 | 242 |
| 21 | *150 | 224 | 170 | 260 | 160 | 140 | 712 | 861 | 298 | 196 | 435 | 239 |
| 22 | 183 | 224 | 150 | 250 | 160 | 120 | 590 | 747 | 246 | 210 | 399 | 217 |
| 23 | 140 | 208 | 200 | 240 | 160 | 130 | 585 | 645 | 254 | 217 | 302 | 206 |
| 24 | 412 | 210 | 190 | 230 | 170 | 120 | 560 | 539 | 324 | 200 | 242 | 220 |
| 25 | 918 | 220 | 160 | 230 | 160 | 110 | 514 | 469 | 422 | 203 | 196 | 524 |
| 26 | 1,160 | 250 | 170 | 220 | 150 | 130 | 474 | 435 | 417 | 242 | 174 | 819 |
| 27 | 1,140 | 220 | 180 | 220 | 140 | 250 | 440 | 399 | 354 | 231 | 174 | 742 |
| 28 | 989 | 200 | 800 | 220 | 150 | 400 | 426 | 354 | 372 | 206 | 203 | 580 |
| 29 | 798 | 190 | 1,320 | 210 | 160 | 560 | 417 | 368 | 544 | 177 | 605 | 440 |
| 30 | 620 | 180 | 1,250 | 210 | ----- | 700 | 615 | 390 | 590 | 161 | al,000 | 350 |
| 31 | 464 | ----- | 1,000 | 210 | ----- | 740 | ----- | 412 | ----- | 185 | a800 | ----- |
| Total | 12,044 | 8,657 | 9,147 | 10,689 | 4,880 | 6,207 | 22,449 | 35,342 | 10,518 | 6,854 | 8,806 | 9,805 |
| Mean | 369 | 269 | 295 | 345 | 168 | 200 | 748 | 1,140 | 351 | 221 | 264 | 327 |
| Cfs/m | 0.985 | 0.732 | 0.747 | 0.873 | 0.425 | 0.506 | 1.89 | 2.89 | 0.889 | 0.559 | 0.719 | 0.828 |
| In. | 1.13 | 0.82 | 0.86 | 1.01 | 0.46 | 0.58 | 2.11 | 3.33 | 0.99 | 0.85 | 0.83 | 0.92 |

Calendar year 1959: Max 1,610 Min 36 Mean 248 Cfs/m 0.628 In. 8.51
 Water year 1959-60: Max 4,180 Min 110 Mean 397 Cfs/m 1.01 In. 13.69

Peak discharge (base, 1,100 cfs).--Oct. 25 (12 p.m.) 1,240 cfs (5.24 ft); Dec. 28 (3 p.m.) 1,570 cfs (5.78 ft); Apr. 16 (1 a.m.) 1,260 cfs (5.26 ft); May 1 (11 p.m.) 1,300 cfs (5.34 ft); May 7 (8:30 p.m.) 4,890 cfs (9.72 ft); May 19 (8 p.m.) 1,110 cfs (5.00 ft); Aug. 30 (time unknown) 1,110 cfs (5.00 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations on nearby streams.

Note.--Stage-discharge relation affected by ice Nov. 17-19, 25-27, 29, 30, Dec. 6-10, 13, 19-28, Dec. 31 to Apr. 1.

790. Wolf River at New London, Wis.

Location.--Lat 44°23'30", long 88°44'25", in SE $\frac{1}{4}$ sec.12, T.22 N., R.14 E., on right bank 100 ft downstream from Pearl Street Bridge in New London, 0.2 mile downstream from Embarrass River, and at mile 56.3.

Drainage area.--2,240 sq mi, approximately.

Records available.--March 1896 to September 1960. Prior to October 1913 monthly discharge only, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 749.37 ft above mean sea level (levels by Corps of Engineers). Prior to Oct. 4, 1951, staff gage at same site and datum.

Average discharge.--64 years, 1,706 cfs.

Extremes.--Maximum discharge during year, 13,300 cfs May 12 (gage height, 10.52 ft); minimum daily, 820 cfs Mar. 24, 25.

1896-1960: Maximum daily discharge, 15,500 cfs Apr. 13, 1922; minimum daily, 150 cfs Mar. 1, 1900.

Maximum stage known, 11.6 ft Apr. 16, 1888, from information by Corps of Engineers.

Remarks.--Records good except those for period of ice effect, which are fair.

Revisions (water years).--WSP 1114: 1943(M). WSP 1337: 1931.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 15 to Sept. 30)

| | | | |
|-----|-------|------|--------|
| 1.0 | 775 | 8.0 | 5,640 |
| 3.0 | 1,560 | 9.0 | 7,840 |
| 5.0 | 2,500 | 10.0 | 11,200 |
| 7.0 | 4,210 | 11.0 | 15,200 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 2,330 | 3,660 | 1,700 | 3,400 | 1,400 | *930 | 4,200 | 4,270 | 4,330 | 2,510 | 1,400 | 2,200 |
| 2 | 2,560 | 3,690 | 1,700 | 3,500 | 1,500 | 920 | 4,600 | 4,450 | 4,120 | 2,540 | 1,360 | 2,260 |
| 3 | 2,380 | 3,650 | 1,700 | 3,500 | 1,500 | 920 | 4,800 | 4,630 | 3,840 | 2,540 | 1,280 | 2,340 |
| 4 | 2,360 | 3,570 | 1,600 | 3,500 | 1,500 | 920 | 5,000 | 4,710 | 3,800 | 2,480 | 1,280 | 2,320 |
| 5 | 2,330 | 3,540 | 1,600 | 3,000 | 1,300 | 900 | 5,000 | *4,650 | 3,640 | 2,400 | 1,230 | 2,290 |
| 6 | 2,300 | 3,490 | 1,600 | 2,800 | 1,200 | 890 | 5,030 | 5,560 | 3,480 | 2,320 | 1,190 | 2,270 |
| 7 | 2,320 | 3,380 | 1,600 | 2,600 | 1,200 | 880 | 4,960 | 7,290 | 3,290 | 2,220 | 1,190 | 2,220 |
| 8 | 2,330 | 3,290 | 1,600 | 2,400 | 1,200 | 880 | 5,000 | 9,200 | 3,120 | 2,020 | 1,220 | 2,110 |
| 9 | 2,510 | 3,190 | 1,500 | 2,200 | 1,200 | 870 | 4,910 | 10,800 | 2,940 | 1,790 | 1,320 | 1,980 |
| 10 | 2,500 | 3,120 | 1,500 | 2,100 | 1,150 | 870 | 4,670 | 12,200 | 2,780 | 1,600 | 1,480 | 1,810 |
| 11 | 2,320 | 3,080 | 1,400 | 2,000 | 1,150 | 870 | 4,480 | 13,000 | 2,650 | 1,500 | 1,620 | 1,660 |
| 12 | 2,210 | 2,980 | 1,400 | *1,930 | 1,150 | 870 | 4,230 | 13,000 | 2,480 | *1,400 | 1,710 | 1,560 |
| 13 | 2,140 | 2,860 | 1,400 | 2,000 | 1,100 | 860 | 4,040 | 12,200 | 2,340 | 1,350 | 1,760 | 1,520 |
| 14 | 2,080 | 2,720 | 1,400 | 2,100 | 1,100 | 860 | 3,960 | 10,900 | 2,220 | 1,310 | 1,780 | 1,480 |
| 15 | 2,000 | 2,570 | 1,400 | 2,100 | 1,100 | 850 | 3,890 | 9,580 | 2,080 | 1,240 | 1,760 | *1,420 |
| 16 | 1,920 | 2,440 | 1,400 | 2,100 | 1,100 | 840 | 3,910 | 8,500 | 2,000 | 1,220 | 1,700 | 1,380 |
| 17 | 1,830 | 2,290 | 1,400 | 2,100 | 1,050 | 840 | 4,100 | 7,920 | 2,020 | 1,210 | 1,660 | 1,370 |
| 18 | 1,760 | 2,170 | 1,400 | 2,100 | 1,050 | 840 | 4,440 | 7,340 | 2,090 | 1,240 | 1,620 | 1,370 |
| 19 | 1,640 | 2,070 | 1,300 | 2,000 | 1,050 | 840 | 4,880 | 7,020 | 2,200 | 1,360 | 1,510 | 1,450 |
| 20 | 1,580 | 2,000 | 1,300 | 1,900 | 1,000 | 840 | 5,340 | 6,890 | 2,240 | 1,490 | 1,420 | 1,510 |
| 21 | *1,500 | 2,000 | 1,200 | 1,900 | 1,000 | 840 | 5,640 | 6,770 | 2,220 | 1,530 | 1,460 | 1,540 |
| 22 | 1,460 | 2,000 | 1,150 | 1,800 | 1,000 | 830 | 5,710 | 6,800 | 2,210 | 1,490 | 1,680 | 1,540 |
| 23 | 1,570 | 1,900 | 1,150 | 1,700 | 980 | 830 | 5,610 | 6,840 | 2,120 | 1,480 | 1,790 | 1,510 |
| 24 | 2,020 | 1,900 | 1,150 | 1,700 | 980 | 820 | 5,440 | 6,820 | 2,210 | 1,480 | 1,860 | 1,730 |
| 25 | 2,610 | 1,900 | 1,150 | 1,600 | 960 | 820 | 5,250 | 6,640 | 2,270 | 1,450 | 1,980 | 2,000 |
| 26 | 2,960 | 1,800 | 1,200 | 1,600 | 960 | 840 | 4,920 | 6,370 | 2,290 | 1,550 | 1,880 | 2,220 |
| 27 | 3,120 | 1,800 | 1,300 | 1,500 | 940 | 940 | 4,590 | 6,010 | 2,290 | 1,640 | 1,820 | 2,410 |
| 28 | 2,330 | 1,800 | 2,400 | 1,500 | 940 | 1,400 | 4,280 | 5,640 | 2,340 | 1,730 | 1,710 | 2,470 |
| 29 | 3,330 | 1,700 | 3,000 | 1,400 | 940 | 2,000 | 4,040 | 5,260 | 2,370 | 1,730 | 1,770 | 2,530 |
| 30 | 3,440 | 1,700 | 3,200 | 1,400 | ----- | 3,000 | 4,070 | 4,940 | 2,450 | 1,610 | 1,960 | 2,560 |
| 31 | 3,540 | ----- | 3,300 | 1,400 | ----- | 3,800 | ----- | 4,620 | ----- | 1,540 | 2,090 | ----- |
| Total | 71,580 | 78,260 | 50,100 | 66,630 | 32,100 | 33,610 | 140,990 | 231,020 | 80,530 | 52,970 | 49,390 | 57,030 |
| Mean | 2,309 | 2,609 | 1,616 | 2,149 | 1,107 | 1,084 | 4,700 | 7,452 | 2,684 | 1,709 | 1,593 | 1,901 |
| Cfs/m | 1.03 | 1.16 | 0.721 | 0.959 | 0.494 | 0.484 | 2.10 | 3.33 | 1.20 | 0.763 | 0.711 | 0.849 |
| In. | 1.19 | 1.30 | 0.83 | 1.11 | 0.53 | 0.56 | 2.34 | 3.84 | 1.34 | 0.88 | 0.82 | 0.95 |
| Calendar year 1959: Max | 7,790 | Min | 500 | Mean | 1,652 | Cfs/m | 0.738 | In. | 10.01 | | | |
| Water year 1959-60: Max | 13,000 | Min | 820 | Mean | 2,580 | Cfs/m | 1.15 | In. | 15.69 | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 20 to Apr. 5 (no gage-height record Nov. 30 to Dec. 5).

800. Little Wolf River at Royalton, Wis.

Location.--Lat 44°24'45", long 88°51'55", in NW¼ sec. 1, T.22 N., R.13 E., on right bank 50 ft upstream from highway bridge in Royalton and 6 miles upstream from mouth.

Drainage area.--485 sq mi.

Records available.--January 1914 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 774.00 ft above mean sea level, datum of 1929. Prior to Aug. 20, 1915, chain gage at highway bridge at datum 0.75 ft lower. Aug. 20, 1915, to Apr. 23, 1934, staff gage at present site and datum.

Average discharge.--46 years, 398 cfs.

Extremes.--Maximum discharge during year, about 4,260 cfs May 8 (gage height, 5.82 ft); minimum, 96 cfs Oct. 21 (gage height, 0.93 ft).
1914-60: Maximum discharge, 6,950 cfs Mar. 30, 1943 (gage height, 8.00 ft), from rating curve extended above 3,500 cfs; maximum gage height, 11.95 ft Mar. 28, 1950 (backwater from ice); minimum discharge, 52 cfs Nov. 26, 1958 (gage height, 0.75 ft), result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are poor. Frequent fluctuation caused by powerplant 6 miles above station.

Revisions (water years).--WSP 1337: 1914-16(M), 1918-19(M), 1921-25(M), 1937(M), 1928-37, 1939(M), 1940, 1945-46(M), 1948(M), 1950(M). WSP 1507: 1943.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.0 | 110 | 2.5 | 930 |
| 1.2 | 167 | 3.0 | 1,300 |
| 1.4 | 246 | 4.0 | 2,230 |
| 1.6 | 350 | 5.0 | 3,300 |
| 1.8 | 466 | 5.7 | 4,120 |
| 2.0 | 591 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|-------|-------|--------|--------|--------|-------|-------|--------|
| 1 | 407 | 670 | 333 | 800 | 250 | *210 | 1,200 | 1,140 | 407 | 419 | 151 | 454 |
| 2 | 361 | 419 | 261 | 680 | 180 | 190 | 1,000 | 1,350 | 396 | 419 | 203 | 413 |
| 3 | 306 | 437 | 250 | 560 | 210 | 150 | 860 | 1,510 | 442 | 378 | 216 | 396 |
| 4 | 295 | 442 | 181 | 460 | 200 | 140 | 771 | 1,120 | 437 | 300 | 207 | 364 |
| 5 | 224 | 546 | 256 | 400 | 210 | 190 | 853 | *1,030 | 431 | 255 | 251 | 373 |
| 6 | 285 | 515 | 261 | 370 | 210 | 150 | 723 | 1,850 | 361 | 255 | 192 | 350 |
| 7 | 280 | 448 | 260 | 340 | 210 | 130 | 791 | 3,810 | 317 | 220 | 270 | 275 |
| 8 | 280 | 350 | 250 | 310 | 216 | 150 | 757 | 4,080 | 334 | 251 | 203 | 233 |
| 9 | 212 | 546 | 210 | 340 | 275 | 170 | 604 | 3,280 | 361 | 256 | 280 | 280 |
| 10 | 300 | 442 | 250 | 400 | 200 | 130 | 515 | 2,570 | 295 | 156 | 237 | 242 |
| 11 | 266 | 378 | 196 | 339 | 190 | 230 | 464 | 1,890 | 295 | 224 | 261 | 220 |
| 12 | 251 | 454 | 266 | 540 | 170 | 170 | 466 | 1,440 | 290 | *270 | 256 | 192 |
| 13 | 251 | 419 | 207 | 680 | 180 | 160 | 757 | 1,180 | 290 | 229 | 224 | 196 |
| 14 | 251 | 339 | 251 | 620 | 170 | 150 | 791 | 972 | 295 | 233 | 233 | 216 |
| 15 | 237 | 300 | 203 | 560 | 180 | 180 | 846 | 791 | 229 | 212 | 192 | *216 |
| 16 | 192 | 250 | 256 | 600 | 170 | 230 | 979 | 730 | 384 | 216 | 233 | 216 |
| 17 | 251 | 180 | 180 | 560 | 150 | 110 | 1,090 | 611 | 460 | 212 | 192 | 220 |
| 18 | 237 | 280 | 220 | 431 | 157 | 160 | 1,310 | 716 | 503 | 251 | 174 | 266 |
| 19 | 178 | 240 | 192 | 413 | 212 | 150 | 1,200 | 697 | 515 | 390 | 207 | 425 |
| 20 | *261 | 220 | 229 | 401 | 185 | 140 | 1,060 | 805 | 384 | 546 | 233 | 334 |
| 21 | 112 | 300 | 199 | 295 | 132 | 130 | 867 | 881 | 361 | 425 | 212 | 322 |
| 22 | 242 | 270 | 180 | 230 | 242 | 190 | 723 | 867 | 285 | 339 | 261 | 322 |
| 23 | 290 | 237 | 170 | 250 | 115 | 170 | 697 | 750 | 334 | 367 | 207 | 306 |
| 24 | 565 | 180 | 240 | 240 | 150 | 150 | 677 | 611 | 521 | 233 | 196 | 466 |
| 25 | 1,090 | 334 | 164 | 216 | 160 | 140 | 527 | 490 | 466 | 212 | 207 | 670 |
| 26 | 1,100 | 270 | 250 | 250 | 170 | 200 | 503 | 460 | 437 | 373 | 171 | 860 |
| 27 | 1,170 | 220 | 390 | 260 | 160 | 260 | 553 | 460 | 390 | 317 | 212 | 888 |
| 28 | 979 | 170 | 1,950 | 203 | 150 | 500 | 540 | 466 | 384 | 295 | 224 | 750 |
| 29 | 819 | 128 | 1,300 | 230 | 150 | 700 | 472 | 454 | 419 | 224 | 448 | 650 |
| 30 | 750 | 212 | 1,100 | 250 | ----- | 1,200 | 757 | 460 | 572 | 196 | 472 | 472 |
| 31 | 578 | ----- | 900 | 230 | ----- | 1,500 | ----- | 448 | ----- | 242 | 555 | ----- |
| Total | 13,000 | 10,306 | 11,475 | 12,458 | 5,354 | 8,430 | 23,353 | 37,699 | 11,595 | 8,985 | 7,590 | 11,587 |
| Mean | 419 | 344 | 370 | 402 | 185 | 272 | 778 | 1,216 | 386 | 290 | 245 | 386 |
| Cfsm | 0.864 | 0.709 | 0.763 | 0.829 | 0.381 | 0.561 | 1.60 | 2.51 | 0.796 | 0.598 | 0.505 | 0.796 |
| In. | 1.00 | 0.79 | 0.88 | 0.96 | 0.41 | 0.65 | 1.79 | 2.89 | 0.89 | 0.69 | 0.58 | 0.89 |

Calendar year 1959: Max 2,600 Min 55 Mean 309 Cfsm 0.637 In. 8.66

Water year 1959-60: Max 4,080 Min 110 Mean 442 Cfsm 0.911 In. 12.42

Peak discharge (base, 1,600 cfs).--Dec. 28 (9:30 a.m.) 2,750 cfs (4.50 ft); Mar. 31 (2 p.m.) about 2,500 cfs; May 8 (3 a.m.) 4,260 cfs (5.82 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 16-22, 27, 28, Dec. 3, 7-10, 17, 18, 22-24, 26, Dec. 29 to Jan. 10, Jan. 12-17, 22-24, 26, 27, Jan. 29 to Feb. 7, Feb. 10-17, Feb. 24 to Apr. 3.

810. Waupaca River near Waupaca, Wis.

Location.--Lat 44°19'50", long 88°59'45", on north line of sec.1, T.21 N., R.12 E., on right bank 10 ft downstream from highway bridge, half a mile southeast of Waupaca, 4 miles upstream from Weyauwega Lake dam, and about 5 miles downstream from Crystal River.

Drainage area.--305 sq mi.

Records available.--June 1916 to September 1960. Published as "near Weyauwega" June 1916 to October 1917.

Gage.--Water-stage recorder. Altitude of gage is 780 ft (from survey level line along railroad). Prior to Oct. 19, 1917, chain gage at site 1 mile downstream at different datum. Oct. 19, 1917, to Nov. 23, 1938, chain gage on bridge at present site and datum.

Average discharge.--44 years, 238 cfs.

Extremes.--Maximum discharge during year, 1,180 cfs Dec. 28 (gage height, 4.04 ft); minimum, 91 cfs Oct. 23 (gage height, 1.05 ft); minimum daily, 120 cfs Dec. 21-23, Mar. 2-15, 23-25.
1916-60: Maximum discharge, 2,520 cfs Mar. 20, 1948 (gage height, 6.90 ft); maximum gage height, 8.06 ft Mar. 28, 1950 (backwater from ice); minimum discharge, 38 cfs June 7, 1947; minimum daily, 50 cfs Jan. 22, 28, 1926.

Remarks.--Records good except those for periods of ice effect, which are fair. Considerable diurnal fluctuation caused by powerplants above station.

Revisions (water years).--WSP 1054: 1926(M). WSP 1084: 1919, 1922-24, 1938, 1940, 1942(M), 1944(M), 1945-46. WSP 1337: 1917-28(M), 1930, 1931-35(M), 1937-38(M), 1946, 1947(M), 1950(M). WSP 1507: 1949(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.1 | 108 | 3.0 | 760 |
| 1.5 | 202 | 3.4 | 920 |
| 2.0 | 367 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| 1 | 171 | 211 | 150 | 300 | 150 | *123 | 367 | 371 | 222 | 197 | 157 | 216 |
| 2 | 157 | 202 | 160 | 237 | 150 | 120 | 296 | 335 | 222 | 189 | 164 | 272 |
| 3 | 159 | 199 | 166 | 220 | 150 | 120 | 317 | 351 | 211 | 192 | 174 | 293 |
| 4 | 157 | 202 | 169 | 200 | 150 | 120 | 303 | 314 | 208 | 186 | 171 | 219 |
| 5 | 157 | 202 | 186 | 190 | 150 | 120 | 256 | *324 | 205 | 184 | 164 | 199 |
| 6 | 166 | 234 | 179 | 180 | 150 | 120 | 228 | 618 | 205 | 179 | 154 | 192 |
| 7 | 162 | 231 | 179 | 170 | 150 | 120 | 246 | 904 | 202 | 166 | 169 | 199 |
| 8 | 159 | 211 | 170 | 160 | 150 | 120 | 253 | 772 | 192 | 164 | 176 | 176 |
| 9 | 166 | 197 | 140 | 150 | 150 | 120 | 234 | 648 | 192 | 159 | 199 | 176 |
| 10 | 162 | 205 | 130 | 140 | 140 | 120 | 214 | 548 | 192 | 166 | 186 | 166 |
| 11 | 157 | 216 | 140 | 140 | 130 | 120 | 208 | 455 | 184 | *157 | 181 | 169 |
| 12 | 159 | 202 | 159 | *301 | 140 | 120 | 219 | 394 | 184 | 166 | 184 | 169 |
| 13 | 164 | 189 | 174 | 500 | 140 | 120 | 228 | 338 | 186 | 169 | 166 | 169 |
| 14 | 152 | 199 | 164 | 540 | 150 | 120 | 253 | 314 | 186 | 162 | 184 | 166 |
| 15 | 152 | 200 | 166 | 460 | 150 | 120 | 250 | 296 | 186 | 159 | 176 | 162 |
| 16 | 150 | 190 | 164 | 340 | 150 | 130 | 250 | 286 | 214 | 162 | 181 | *171 |
| 17 | 152 | 170 | 164 | 260 | 150 | 130 | 363 | 276 | 237 | 169 | 166 | 166 |
| 18 | 143 | 160 | 166 | 230 | 140 | 130 | 360 | 272 | 234 | 272 | 169 | 197 |
| 19 | 147 | 160 | 150 | 200 | 140 | 130 | 320 | 275 | 222 | 286 | 169 | 214 |
| 20 | *159 | 160 | 130 | 180 | 130 | 130 | 272 | 293 | 208 | 219 | 197 | 219 |
| 21 | 150 | 170 | 120 | 170 | 130 | 130 | 265 | 276 | 208 | 194 | 194 | 194 |
| 22 | 147 | 180 | 120 | 170 | 130 | 130 | 246 | 272 | 202 | 181 | 171 | 189 |
| 23 | 166 | 190 | 120 | 160 | 140 | 120 | 234 | 253 | 208 | 176 | 184 | 205 |
| 24 | 286 | 200 | 130 | 160 | 140 | 120 | 237 | 253 | 225 | 174 | 184 | 272 |
| 25 | 386 | 200 | 150 | 160 | 140 | 120 | 222 | 243 | 219 | 171 | 171 | 470 |
| 26 | 390 | 180 | 200 | 160 | 140 | 130 | 228 | 234 | 205 | 199 | 179 | 338 |
| 27 | 303 | 160 | 600 | 160 | 140 | 200 | 237 | 231 | 205 | 192 | 174 | 296 |
| 28 | 272 | 150 | 892 | 150 | 130 | 560 | 211 | 219 | 202 | 179 | 176 | 253 |
| 29 | 243 | 150 | 832 | 150 | 130 | 636 | 214 | 231 | 216 | 169 | 250 | 256 |
| 30 | 222 | 150 | 505 | 150 | ----- | 652 | 320 | 214 | 199 | 166 | 259 | 240 |
| 31 | 237 | ----- | 353 | 150 | ----- | 668 | ----- | 214 | ----- | 159 | 231 | ----- |
| Total | 5,953 | 5,670 | 7,228 | 6,838 | 4,130 | 5,919 | 7,851 | 11,002 | 6,181 | 5,663 | 5,660 | 6,623 |
| Mean | 192 | 189 | 233 | 221 | 142 | 191 | 262 | 355 | 206 | 183 | 183 | 221 |
| Cfs/m | 0.630 | 0.620 | 0.764 | 0.725 | 0.466 | 0.626 | 0.859 | 1.15 | 0.675 | 0.600 | 0.600 | 0.725 |
| In. | 0.73 | 0.69 | 0.98 | 0.83 | 0.50 | 0.72 | 0.96 | 1.34 | 0.75 | 0.69 | 0.69 | 0.81 |

Calendar year 1959: Max 1,200 Min 102 Mean 180 Cfs/m 0.590 In. 8.01
Water year 1959-60: Max 904 Min 120 Mean 215 Cfs/m 0.705 In. 9.55

Peak discharge (base, 670 cfs).--Dec. 28 (3 a.m.) 1,180 cfs (4.04 ft); Mar. 31 (2 p.m.) 766 cfs (3.04 ft); May 7 (4 a.m.) 980 cfs (3.55 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15 to Dec. 2, Dec. 8-11, 19-27, Jan. 1, Jan. 3 to Mar. 28.

825. Lake Winnebago at Oshkosh, Wis.

Location.--Lat 44°00'40", long 88°32'00", in sec.24, T.18 N., R.17 E., in mouth of the Upper Fox River at Chicago and North Western Railway bridge, 0.2 mile downstream from Main Street Bridge in Oshkosh and 18 miles up the lake from Menasha Dam and outlet.

Drainage area.--6,030 sq mi, approximately, at lake outlet at Menasha Dam.

Records available.--October 1938 to September 1960 in reports of Geological Survey. Records from 1857 to 1938 in files of Corps of Engineers. A report on Fox River by Corps of Engineers, published as House Document No. 146, 67th Congress, 2d session, contains semi-monthly records of inflow to Lake Winnebago for the period 1896-1917.

Gage.--Staff gage read once daily. Datum of gage is 745.05 ft above mean tide at New York City (levels by Corps of Engineers). Prior to 1882, lake levels were referred to Deuchman gage at lake outlet of Menasha Dam. Datum of Deuchman gage, which is still in existence, is 745.00 ft above mean tide at New York City.

Extremes.--Maximum gage height observed during year, 4.32 ft May 17; minimum observed, 1.12 Mar. 28.
1857-1960: Maximum gage height observed, 5.33 ft (Deuchman gage) Nov. 8, 1881; minimum observed, -2.00 ft (Deuchman gage) Nov. 28, 1891.

Remarks.--Lake elevations controlled by dams at Menasha and Neenah, which are operated in the interest of navigation. Crests of both dams are at elevation 746.73 ft. Present limits of regulation are from 21½ in. above the crest of Menasha Dam down to crest during navigation season, plus additional 18 in. below crest during winter. Oshkosh staff gage gives true level of lake, while Deuchman gage readings are affected by loss of head in the channel between lake and dam.

Cooperation.--Records furnished by Corps of Engineers.

Gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|-------|------|------|-------|------|-------|------|-------|------|------|-------|
| 1 | 2.20 | 2.70 | 2.86 | 2.90 | 2.20 | 1.69 | 1.58 | 3.40 | 3.45 | 3.29 | 3.20 | 3.10 |
| 2 | 2.24 | 2.72 | 2.92 | 2.90 | 2.16 | 1.67 | 1.68 | 3.50 | 3.45 | 3.29 | 3.31 | 3.10 |
| 3 | 2.12 | 2.74 | 2.90 | 2.88 | 2.13 | 1.66 | 1.68 | 3.42 | 3.30 | 3.25 | 3.28 | 3.08 |
| 4 | 2.15 | 2.80 | 2.92 | 2.96 | 2.10 | 1.66 | 1.81 | 3.48 | 3.22 | 3.32 | 3.23 | 3.07 |
| 5 | 2.40 | 2.88 | 2.90 | 2.98 | 2.02 | 1.66 | 1.91 | 3.42 | 3.18 | 3.28 | 3.20 | 3.05 |
| 6 | 2.44 | 2.93 | 2.91 | 2.98 | 2.10 | 1.66 | 2.00 | 3.48 | 3.12 | 3.28 | 3.21 | 3.03 |
| 7 | 2.46 | 2.90 | 2.90 | 3.00 | 2.09 | 1.64 | 2.08 | 3.72 | 3.18 | 3.25 | 3.21 | 3.00 |
| 8 | 2.48 | 2.90 | 2.90 | 3.00 | 2.06 | 1.62 | 2.20 | 3.85 | 3.14 | 3.27 | 3.22 | 2.99 |
| 9 | 2.50 | 2.98 | 2.90 | 2.90 | 2.00 | 1.59 | 2.27 | 3.90 | 3.14 | 3.25 | 3.25 | 2.98 |
| 10 | 2.50 | 3.00 | 2.90 | 2.87 | 1.98 | 1.57 | 2.35 | 4.02 | 3.12 | 3.23 | 3.27 | 2.98 |
| 11 | 2.48 | 3.01 | 2.90 | 2.85 | 1.96 | 1.56 | 2.40 | 4.08 | 3.15 | 3.20 | 3.24 | 2.98 |
| 12 | 2.40 | 3.06 | 2.84 | 2.84 | 1.92 | 1.55 | 2.48 | 4.04 | 3.17 | 3.18 | 3.23 | 2.98 |
| 13 | 2.40 | 3.03 | 2.85 | 2.82 | 1.90 | 1.50 | 2.52 | 4.10 | 3.18 | 3.26 | 3.24 | 2.98 |
| 14 | 2.40 | 2.90 | 2.74 | 2.80 | 1.88 | 1.45 | 2.60 | 4.10 | 3.18 | 3.20 | 3.24 | 2.97 |
| 15 | 2.45 | 2.92 | 2.72 | 2.80 | 1.86 | 1.44 | 2.62 | 4.10 | 3.19 | 3.26 | 3.25 | 2.95 |
| 16 | 2.42 | 2.92 | 2.74 | 2.80 | 1.82 | 1.45 | 2.72 | 4.12 | 3.30 | 3.22 | 3.20 | 2.96 |
| 17 | 2.44 | 2.90 | 2.70 | 2.78 | 1.79 | 1.34 | 2.80 | 4.32 | 3.20 | 3.19 | 3.14 | 2.97 |
| 18 | 2.45 | 2.87 | 2.68 | 2.76 | 1.77 | 1.31 | 2.89 | 4.15 | 3.29 | 3.15 | 3.15 | 2.93 |
| 19 | 2.44 | 2.82 | 2.70 | 2.74 | 1.72 | 1.30 | 2.99 | 4.10 | 3.26 | 3.20 | 3.12 | 2.90 |
| 20 | 2.40 | 2.75 | 2.70 | 2.72 | 1.75 | 1.29 | 3.04 | 4.18 | 3.23 | 3.18 | 3.19 | 2.90 |
| 21 | 2.40 | 2.90 | 2.62 | 2.70 | 1.76 | 1.28 | 3.00 | 4.20 | 3.20 | 3.12 | 3.22 | 2.90 |
| 22 | 2.38 | 2.90 | 2.60 | 2.68 | 1.70 | 1.26 | 3.10 | 4.10 | 3.19 | 3.20 | 3.29 | 2.98 |
| 23 | 2.42 | 2.90 | 2.62 | 2.68 | 1.74 | 1.24 | 3.19 | 4.08 | 3.18 | 3.25 | 3.31 | 3.10 |
| 24 | 2.52 | 2.75 | 2.64 | 2.68 | 1.72 | 1.20 | 3.26 | 4.00 | 3.12 | 3.22 | 3.27 | 3.10 |
| 25 | 2.46 | 2.72 | 2.47 | 2.52 | 1.72 | 1.17 | 3.55 | 3.98 | 3.18 | 3.19 | 3.29 | 3.10 |
| 26 | 2.44 | 3.12 | 2.47 | 2.50 | 1.72 | 1.16 | 3.40 | 3.96 | 3.20 | 3.20 | 3.20 | 3.11 |
| 27 | 2.44 | 3.12 | 2.50 | 2.48 | 1.71 | 1.14 | 3.38 | 3.80 | 3.23 | 3.17 | 3.20 | 3.12 |
| 28 | 2.49 | 3.14 | 2.72 | 2.46 | 1.71 | 1.12 | 3.39 | 3.75 | 3.32 | 3.21 | 3.19 | 3.12 |
| 29 | 2.50 | 3.14 | 2.74 | 2.40 | 1.70 | 1.17 | 3.30 | 3.70 | 3.49 | 3.25 | 3.18 | 3.12 |
| 30 | 2.52 | 2.94 | 2.79 | 2.32 | ----- | 1.40 | 3.36 | 3.60 | 3.42 | 3.20 | 3.18 | 3.12 |
| 31 | 2.52 | ----- | 2.80 | 2.22 | ----- | 1.49 | ----- | 3.50 | ----- | 3.20 | 3.17 | ----- |

840. Lake de Neveu near Fond du Lac, Wis.

Location.--Lat 43°44'10", long 88°23'45", in SW¼ sec.30, T.15 N., R.18 E., at bosthouse near north end of lake on farm of Nick Giebel, 3.9 miles southeast of the intersection of Main and Division Streets in Fond du Lac.

Drainage area.--0.9 sq mi, approximately.

Records available.--August 1936 to September 1960 (fragmentary).

Gage.--Reference point in lake bed.

Extremes.--Maximum elevation observed during year, 98.06 ft May 7; minimum observed, 97.30 ft Sept. 13.
1936-60: Maximum elevation observed, 98.32 ft Mar. 27, 1950; minimum observed, 96.90 ft Aug. 15, 1936.

Remarks.--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. Natural outlet. Lake ice covered Nov. 20 to Apr. 15.

Revisions.--WSP 1437: Drainage area.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | - | - | - | | | | - | - | - | 7.60 | - | - |
| 2 | - | - | - | | | | - | - | - | - | 7.63 | 7.43 |
| 3 | 7.39 | 7.50 | - | | | | - | 7.64 | 7.50 | - | - | - |
| 4 | - | - | - | | | | - | - | - | - | - | - |
| 5 | - | - | 7.39 | | | | - | - | - | 7.58 | 7.57 | - |
| 6 | 7.43 | 7.60 | - | | | | - | - | - | - | - | 7.39 |
| 7 | - | - | - | | | | 7.72 | 8.06 | 7.50 | - | - | - |
| 8 | - | - | - | | | | - | - | - | 7.54 | - | - |
| 9 | 7.53 | - | - | | | | - | - | - | - | 7.63 | 7.37 |
| 10 | - | - | - | | | | - | 8.03 | 7.45 | - | - | - |
| 11 | - | - | - | | | | - | - | - | - | - | - |
| 12 | - | - | - | | | | 7.59 | - | - | 7.50 | 7.57 | - |
| 13 | 7.42 | 7.48 | - | | 7.39 | | - | 7.80 | - | - | - | 7.30 |
| 14 | - | - | - | | | | - | - | 7.42 | 7.54 | - | - |
| 15 | - | - | - | | | | 7.58 | - | - | 7.53 | - | - |
| 16 | - | - | - | | | | - | - | - | - | 7.49 | - |
| 17 | 7.36 | - | - | | | | - | 7.66 | 7.38 | - | - | 7.31 |
| 18 | - | - | - | | | | - | - | - | - | - | - |
| 19 | - | - | - | | | | 7.61 | - | - | 7.62 | 7.44 | - |
| 20 | 7.45 | 7.41 | - | | | | - | 7.66 | - | - | - | 7.53 |
| 21 | - | - | - | | | | - | - | - | - | - | - |
| 22 | - | - | - | | | | 7.59 | - | - | - | - | - |
| 23 | 7.58 | - | - | | | | - | - | 7.48 | 7.57 | - | - |
| 24 | - | - | - | | | | - | 7.62 | 7.50 | - | 7.50 | 7.52 |
| 25 | - | - | - | | | | - | - | - | - | - | - |
| 26 | - | - | - | | | | 7.71 | - | - | 7.75 | 7.47 | - |
| 27 | 7.53 | - | - | | | 7.63 | - | 7.56 | - | - | - | 7.53 |
| 28 | - | - | 7.70 | | | | - | - | 7.60 | - | - | - |
| 29 | - | - | - | | | | - | - | - | 7.68 | - | - |
| 30 | 7.51 | - | - | | | | - | - | - | - | 7.44 | 7.47 |
| 31 | - | - | - | | | | - | 7.53 | - | - | - | - |

Note.--Add 90 ft to obtain elevation above datum assumed for this lake by Public Service Commission of Wisconsin.

845. Fox River at Rapide Croche Dam, near Wrightstown, W's.

Location.--Lat 44°19'00", long 88°11'50", in SE $\frac{1}{4}$ sec.4, T.21 N., R.19 E., at Rapide Croche Dam, 2 miles upstream from Wrightstown and 18 miles upstream from mouth.

Drainage area.--6,150 sq mi, approximately.

Records available.--March 1896 to September 1917 (monthly discharge only), October 1917 to September 1960.

Gage.--Recording headwater and tailwater gages and electric generation data taken each half hour are used to compute the discharge records.

Average discharge.--64 years, 4,171 cfs.

Extremes.--Maximum daily discharge during year, 23,600 cfs May 18, 20; minimum daily, 1,820 cfs Oct. 1.
1918-60: Maximum daily discharge, 24,000 cfs Apr. 18, 1952; minimum daily, 138 cfs Aug. 2, 1936.

Remarks.--Records good. Flow regulated by storage in Lake Winnebago (see p. 86). Daily discharge determined from records of flow through turbines, head, gate openings, and lockages through navigation canal. About 20 cfs diverted into basin from Wisconsin River at Portage Canal throughout most of the year.

Cooperation.--Figures of daily discharge furnished by Corps of Engineers. Records reviewed by Geological Survey.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 1,820 | 5,220 | 5,360 | 6,570 | 6,860 | 3,330 | 3,660 | 12,100 | 21,100 | 4,600 | 4,400 | 6,090 |
| 2 | 1,980 | 5,280 | 5,480 | 6,530 | 5,560 | 3,570 | 3,860 | 12,300 | 19,800 | 4,360 | 4,380 | 5,940 |
| 3 | 2,180 | 6,010 | 5,330 | 5,880 | 5,900 | 3,620 | 4,040 | 12,400 | 18,100 | 4,710 | 3,980 | 5,970 |
| 4 | 1,860 | 4,880 | 5,190 | 5,350 | 5,790 | 3,550 | 3,980 | 12,700 | 15,300 | 3,800 | 3,330 | 5,720 |
| 5 | 2,260 | 4,900 | 4,940 | 6,620 | 5,230 | 3,540 | 3,880 | 13,000 | 12,300 | 4,120 | 3,940 | 5,440 |
| 6 | 1,880 | 5,190 | 4,660 | 6,160 | 5,000 | 3,530 | 4,420 | 14,500 | 11,500 | 4,080 | 3,940 | 5,790 |
| 7 | 2,250 | 6,180 | 4,940 | 6,020 | 4,810 | 3,560 | 4,160 | 19,000 | 5,910 | 3,970 | 4,230 | 5,770 |
| 8 | 2,700 | 6,010 | 4,980 | 7,780 | 4,960 | 3,550 | 4,080 | 19,800 | 4,060 | 3,750 | 3,660 | 4,460 |
| 9 | 3,470 | 5,940 | 4,740 | 7,760 | 4,720 | 3,540 | 4,440 | 19,700 | 4,000 | 3,970 | 3,990 | 4,340 |
| 10 | 3,350 | 6,290 | 4,650 | 7,220 | 3,590 | 3,610 | 4,460 | 21,000 | 3,760 | 3,960 | 3,690 | 4,460 |
| 11 | 3,160 | 6,270 | 4,750 | 7,630 | 4,910 | 4,170 | 4,850 | 21,300 | 3,450 | 4,280 | 3,840 | 4,400 |
| 12 | 3,120 | 6,190 | 4,280 | 8,620 | 4,450 | 4,540 | 4,670 | 21,500 | 3,240 | 4,010 | 4,160 | 4,120 |
| 13 | 3,080 | 6,140 | 4,670 | 8,650 | 4,000 | 4,500 | 5,030 | 23,000 | 3,820 | 2,920 | 4,090 | 3,330 |
| 14 | 3,230 | 5,290 | 4,600 | 8,920 | 3,310 | 4,470 | 5,110 | 22,300 | 4,030 | 3,010 | 3,750 | 4,250 |
| 15 | 3,280 | 6,130 | 4,570 | 8,690 | 4,060 | 4,370 | 5,240 | 22,500 | 4,750 | 3,210 | 3,600 | 4,190 |
| 16 | 3,100 | 5,540 | 4,480 | 9,000 | 4,050 | 4,370 | 5,170 | 23,300 | 4,630 | 3,410 | 3,690 | 3,980 |
| 17 | 3,160 | 5,340 | 4,670 | 8,320 | 3,710 | 4,440 | 5,710 | 22,700 | 3,770 | 2,800 | 3,800 | 3,980 |
| 18 | 3,220 | 6,300 | 4,510 | 8,670 | 4,320 | 4,580 | 6,230 | 23,600 | 4,680 | 4,560 | 3,880 | 4,090 |
| 19 | 3,220 | 5,860 | 4,340 | 8,790 | 3,730 | 4,440 | 6,680 | 22,500 | 4,790 | 4,010 | 4,000 | 4,250 |
| 20 | 2,810 | 5,660 | 4,240 | 8,740 | 3,830 | 3,770 | 6,740 | 23,600 | 4,850 | 3,670 | 3,680 | 4,350 |
| 21 | 2,870 | 5,480 | 4,320 | 8,480 | 3,820 | 4,410 | 6,730 | 22,600 | 4,660 | 3,870 | 3,550 | 4,410 |
| 22 | 3,140 | 4,950 | 4,800 | 8,450 | 3,770 | 4,290 | 6,870 | 22,000 | 4,430 | 4,160 | 4,510 | 4,660 |
| 23 | 3,450 | 5,330 | 5,010 | 8,480 | 3,870 | 4,090 | 6,550 | 22,000 | 4,450 | 4,220 | 4,320 | 4,400 |
| 24 | 3,770 | 5,820 | 5,110 | 8,600 | 3,840 | 3,630 | 6,860 | 23,400 | 4,010 | 5,990 | 6,140 | 5,630 |
| 25 | 2,870 | 5,590 | 4,860 | 8,560 | 3,760 | 3,100 | 7,770 | 22,000 | 4,480 | 5,720 | 6,660 | 5,360 |
| 26 | 4,100 | 5,460 | 4,750 | 8,420 | 3,840 | 3,450 | 10,600 | 21,600 | 4,770 | 4,150 | 6,690 | 4,720 |
| 27 | 5,070 | 5,490 | 5,340 | 7,970 | 3,630 | 3,970 | 10,300 | 21,600 | 4,630 | 4,160 | 6,190 | 5,000 |
| 28 | 5,270 | 5,500 | 8,780 | 7,970 | 3,570 | 3,690 | 10,800 | 22,000 | 4,680 | 4,160 | 6,300 | 4,960 |
| 29 | 5,250 | 4,460 | 6,010 | 7,930 | 3,560 | 3,900 | 11,100 | 22,200 | 4,940 | 4,290 | 6,340 | 4,900 |
| 30 | 5,140 | 6,990 | 5,610 | 7,960 | ----- | 4,360 | 11,300 | 21,000 | 4,930 | 4,280 | 6,150 | 5,200 |
| 31 | 5,180 | ----- | 6,290 | 8,010 | ----- | 3,250 | ----- | 21,700 | ----- | 3,320 | 6,350 | ----- |
| Total | 101,240 | 169,690 | 156,240 | 242,750 | 126,450 | 121,190 | 185,470 | 625,000 | 203,820 | 125,510 | 141,230 | 144,780 |
| Mean | 3,268 | 5,658 | 5,040 | 7,831 | 4,360 | 3,909 | 6,182 | 20,160 | 6,794 | 4,049 | 4,556 | 4,825 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 11,600 | | | Min | 1,300 | Mean | 3,713 | Cfsm | - | In. | - | |
| Water year 1959-60: Max | 23,600 | | | Min | 1,820 | Mean | 6,403 | Cfsm | - | In. | - | |

855. Cedar Lake near Kiel, Wis.

Location--Lat 43°55'35", long 87°56'25", in SW¹ sec.24, T.17 N., R.21 E., at Cedar Lake Resort on narrows of lake, 5.8 miles east of Kiel.

Drainage area--1.33 sq mi.

Records available--August 1936 to September 1942; April 1945 to September 1960 (fragmentary).

Gage--Staff gage.

Extremes--Maximum elevation observed during year, 96.90 ft May 28, June 4; minimum observed, 94.33 ft Oct. 3, 22.

1936-42, 1945-60: Maximum elevation observed, 98.72 ft Mar. 9, 1946; minimum observed, 93.34 ft Oct. 4, Nov. 1, 1958, Jan. 17, 1959.

An elevation of 100.37 ft was observed May 20, 1929, by Public Service Commission of Wisconsin.

Remarks--Gage heights have been reduced to elevations above datum assumed for this lake by Public Service Commission of Wisconsin. Lake ice covered about Nov. 20 to about Apr. 15.

Elevation, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | - | - | - | 4.92 | - | - | 5.97 | - | - | 6.86 | - | - |
| 3 | 4.33 | - | - | - | - | 5.67 | - | 6.30 | - | - | - | 6.60 |
| 4 | - | - | - | - | - | - | - | - | 6.90 | - | - | - |
| 5 | - | - | 4.86 | - | - | 5.67 | - | - | - | - | - | - |
| 6 | - | - | - | - | 5.34 | - | - | - | - | - | 6.70 | - |
| 7 | - | 4.70 | - | - | - | - | - | 6.68 | - | - | - | - |
| 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| 9 | - | - | - | 5.22 | - | - | 5.97 | - | - | 6.78 | - | - |
| 10 | 4.45 | - | - | - | - | - | - | - | - | - | - | 6.58 |
| 11 | - | - | - | - | - | - | - | - | 6.86 | - | - | - |
| 12 | - | - | 4.86 | - | - | 5.87 | - | - | - | - | - | - |
| 13 | - | - | - | 5.24 | 5.36 | - | - | - | - | 6.76 | 6.78 | - |
| 14 | - | 4.80 | - | - | - | - | - | 6.80 | - | - | - | 6.61 |
| 15 | - | - | - | - | - | - | - | - | - | - | - | - |
| 16 | - | - | - | 5.24 | - | - | 5.97 | - | - | 6.80 | - | - |
| 17 | 4.43 | - | - | - | - | - | - | - | - | - | - | 6.56 |
| 18 | - | - | - | - | - | - | - | - | 6.88 | - | - | - |
| 19 | - | - | 4.86 | - | - | 5.87 | - | - | - | - | - | - |
| 20 | - | - | - | - | 5.46 | - | - | - | - | - | 6.70 | - |
| 21 | - | 4.80 | - | - | - | - | - | 6.86 | - | - | - | - |
| 22 | 4.33 | - | - | - | - | - | - | - | - | - | - | - |
| 23 | - | - | - | 5.24 | - | - | 5.97 | - | - | 6.74 | - | - |
| 24 | 4.51 | - | - | - | - | - | - | - | - | - | - | 6.72 |
| 25 | - | - | - | - | - | - | - | - | 6.86 | - | - | - |
| 26 | - | - | 4.86 | - | - | 5.87 | - | - | - | - | - | - |
| 27 | - | - | - | - | 5.46 | - | - | - | - | - | 6.70 | - |
| 28 | - | 4.80 | - | - | - | - | - | 6.90 | - | - | - | - |
| 29 | - | - | - | - | - | - | - | - | - | - | - | - |
| 30 | - | - | - | 5.32 | - | - | 5.97 | - | 6.86 | 6.72 | - | 6.72 |
| 31 | 4.53 | - | 4.88 | - | - | 5.93 | - | - | - | - | - | - |

Note--Add 90 ft to obtain elevation above datum assumed for this lake by the Public Service Commission of Wisconsin.

860. Sheboygan River at Sheboygan, Wis.

Location.--Lat 43°44'25", long 87°45'35", in E½ sec.29, T.15 N., R.23 E., on left bank 0.7 mile upstream from bridge on State Highway 28, near the west city limits of Sheboygan, and 4.2 miles upstream from mouth.

Drainage area.--432 sq mi.

Records available.--June 1916 to September 1924 (published as "near Sheboygan"), November 1950 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 584.00 ft above mean sea level, datum of 1929. June 1916 to June 1924 chain gage at site 0.7 mile downstream at different datum. November 1950 to June 1951 staff gage at site 0.3 mile downstream at datum 3.15 ft lower.

Average discharge.--17 years (1916-24, 1951-60), 232 cfs.

Extremes.--Maximum discharge during year, 6,300 cfs Mar. 30 (gage height, 10.65 ft); minimum, 33 cfs Dec. 23 (gage height, 1.71 ft), result of freezeup. 1916-24, 1950-60: Maximum discharge observed, 7,140 cfs Mar. 26, 1920 (gage height, 9.40 ft, datum then in use); minimum observed, about 1 cfs Aug. 27, 1922 (gage height, 1.48 ft, datum then in use), caused by shutdown of powerplants.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by numerous powerplants above station.

Revisions (water years).--WSP 1307: 1917(M), 1919(M), 1921(M), 1923(M). WSP 1557: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.7 | 32 | 5.0 | 1,020 |
| 2.0 | 64 | 6.0 | 1,620 |
| 2.5 | 149 | 8.0 | 3,170 |
| 3.0 | 256 | 10.0 | 5,460 |
| 4.0 | 575 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|--------|--------|----------|----------|------------|-----------|-------|-------|-------|--------|
| 1 | 50 | 124 | 105 | 881 | 85 | 76 | 2,050 | 1,520 | 278 | 120 | 82 | 108 |
| 2 | 49 | 117 | 110 | 785 | 90 | 78 | 1,870 | 1,050 | 261 | 103 | 86 | 108 |
| 3 | 49 | 110 | 115 | 669 | 100 | *78 | 2,050 | *794 | 237 | 113 | 88 | 110 |
| 4 | 49 | 144 | 120 | 492 | 110 | 76 | 1,790 | 685 | 204 | 93 | 81 | 108 |
| 5 | 72 | 584 | 120 | 550 | 115 | 74 | 1,620 | 611 | 183 | 67 | 76 | 91 |
| 6 | 104 | 715 | 115 | 600 | 122 | 72 | 1,400 | 1,180 | 135 | 61 | 66 | 89 |
| 7 | 232 | 506 | 105 | 500 | 127 | 72 | 1,240 | 3,080 | 108 | 60 | 66 | 91 |
| 8 | 244 | 346 | 100 | 400 | 115 | 70 | 1,100 | 2,170 | 82 | 54 | 67 | 81 |
| 9 | 206 | 261 | 90 | 300 | 100 | 70 | 933 | 1,980 | 84 | 54 | 131 | 88 |
| 10 | 157 | 251 | 85 | 200 | 90 | 70 | 763 | 1,950 | 79 | 48 | 193 | 93 |
| 11 | 113 | 232 | 85 | 170 | 85 | 68 | 715 | 1,660 | 72 | 43 | 189 | 81 |
| 12 | 88 | 195 | 85 | 750 | 85 | 68 | 711 | 1,340 | 66 | 43 | 166 | 78 |
| 13 | 76 | 162 | 90 | 1,000 | 90 | 68 | 656 | 1,190 | 67 | 63 | 136 | 81 |
| 14 | 82 | 99 | 95 | *821 | 95 | 68 | 587 | 1,070 | 74 | *99 | 151 | *74 |
| 15 | 70 | 92 | 105 | 575 | 90 | 68 | 563 | 952 | 86 | 86 | 193 | 64 |
| 16 | 63 | 90 | 110 | 403 | 85 | 68 | 525 | 830 | 113 | 60 | 164 | 96 |
| 17 | 52 | 90 | 110 | 350 | 85 | 68 | 933 | 876 | 239 | 55 | 131 | 82 |
| 18 | 50 | 95 | 105 | 300 | 80 | 68 | 1,350 | 790 | 185 | 88 | 115 | 104 |
| 19 | 47 | 100 | 95 | 250 | 80 | 68 | 1,220 | 685 | 136 | 183 | 104 | 852 |
| 20 | 39 | 105 | 85 | 200 | 80 | 68 | 923 | 1,260 | 111 | 219 | 99 | 1,400 |
| 21 | 40 | 111 | 70 | 180 | 80 | 68 | 803 | 1,080 | 101 | 144 | 106 | 952 |
| 22 | *38 | 120 | 60 | 160 | 78 | 68 | 720 | 909 | 99 | 106 | 131 | 763 |
| 23 | 130 | 126 | 50 | 150 | 76 | 68 | 644 | 741 | 101 | 86 | 129 | 776 |
| 24 | 467 | 130 | 40 | 130 | 76 | 68 | 571 | 615 | 127 | 74 | 103 | 952 |
| 25 | 488 | 130 | 50 | 120 | 76 | 68 | 631 | 529 | 122 | 60 | 91 | 1,280 |
| 26 | 376 | 125 | 95 | 105 | 76 | 68 | 728 | 461 | 99 | 118 | 99 | 1,020 |
| 27 | 275 | 120 | 160 | 100 | 76 | 150 | 681 | 434 | 81 | 206 | 99 | 732 |
| 28 | 228 | 110 | 3,600 | 90 | 76 | 1,350 | 579 | 397 | 142 | 170 | 103 | 525 |
| 29 | 181 | 100 | 2,800 | 85 | 76 | 2,200 | 525 | 370 | 157 | 144 | 108 | 409 |
| 30 | 162 | 100 | 1,660 | 80 | ----- | *5,300 | 1,200 | 334 | 155 | 122 | 124 | 382 |
| 31 | 126 | ----- | 1,100 | 80 | ----- | 3,450 | ----- | 317 | ----- | 93 | 124 | ----- |
| Total | 4,403 | 5,590 | 11,715 | 11,476 | 2,599 | 14,274 | 30,081 | 31,840 | 3,984 | 3,035 | 3,601 | 11,670 |
| Mean | 142 | 186 | 378 | 370 | 89.6 | 460 | 1,003 | 1,027 | 133 | 97.8 | 116 | 389 |
| Cfsm | 0.329 | 0.431 | 0.875 | 0.856 | 0.207 | 1.06 | 2.32 | 2.38 | 0.308 | 0.227 | 0.269 | 0.900 |
| In. | 0.38 | 0.48 | 1.01 | 0.99 | 0.22 | 1.23 | 2.59 | 2.74 | 0.34 | 0.26 | 0.31 | 1.00 |
| Calendar year 1959: Max | 4,330 | | | | Min 13.6 | Mean 247 | Cfsm 0.572 | In. 7.78 | | | | |
| Water year 1959-60: Max | 5,300 | | | | Min 38 | Mean 367 | Cfsm 0.850 | In. 11.55 | | | | |

Peak discharge (base, 1,500 cfs).--Dec. 28 (4 to 5 p.m.) 5,230 cfs (9.82 ft); Mar. 30 (3:30 p.m.) 6,300 cfs (10.65 ft); Apr. 30 (8 to 9 p.m.) 1,660 cfs (6.05 ft); May 7 (4 a.m.) 3,640 cfs (8.48 ft)

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-20, Nov. 24 to Dec. 27, Jan. 1-13, Jan. 17 to Feb. 4, Feb. 8 to Mar. 29.

865. Cedar Creek near Cedarburg, Wis.

Location.--Lat 43°19'25", long 87°58'50", on line between secs. 14 and 23, T.10 N., R.21 E., on upstream side of highway bridge, 2 miles north of Cedarburg and 6 miles upstream from mouth.

Drainage area.--121 sq mi.

Records available.--August 1930 to September 1960.

Gage.--Wire-weight gage read twice daily. Altitude of gage is 790 ft (from topographic map). Prior to June 11, 1958, chain gage read once daily.

Average discharge.--30 years, 62.7 cfs.

Extremes.--Maximum discharge during year, about 3,600 cfs Mar. 30 (gage height, 12.25 ft, from graph based on gage readings, backwater from ice); minimum, 9.0 cfs Oct. 3 (gage height, 5.24 ft).

1930-60: Maximum discharge observed, that of Mar. 30, 1960; minimum observed, 0.2 cfs Aug. 9-12, 1936.

Remarks.--Records good except those for periods of ice effect, which are poor.

Revisions (water years).--WSP 1307: 1932-34(M), 1937(M), 1939(M), 1945(M), 1948-49(M). WSP 1627: Drainage area.

Rating table, water year 1959-60, except for periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 5.2 | 7.0 | 6.5 | 314 |
| 5.3 | 12 | 7.0 | 500 |
| 5.4 | 20 | 8.0 | 1,000 |
| 5.5 | 33 | 10.0 | 2,320 |
| 5.7 | 72 | 11.0 | 3,140 |
| 6.1 | 182 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 10.5 | 33 | 20 | 214 | 32 | 21 | 1,290 | 217 | 70 | 124 | 82 | 40 |
| 2 | 10.0 | 30 | 23 | 180 | 33 | 21 | 772 | 195 | 65 | 99 | 74 | 36 |
| 3 | 9.0 | 29 | 25 | 140 | 35 | 21 | 577 | 164 | 61 | 74 | 192 | 33 |
| 4 | 10.0 | 52 | 26 | 100 | 36 | 21 | 476 | 135 | 61 | 61 | 336 | 29 |
| 5 | 33 | 102 | 27 | 86 | 38 | 21 | 372 | 132 | 59 | 52 | 314 | 28 |
| 6 | 50 | 113 | 26 | 70 | 38 | 20 | 325 | 233 | 52 | 45 | 220 | 28 |
| 7 | 50 | 99 | 24 | 60 | 39 | 20 | 273 | 670 | 50 | 40 | 146 | 28 |
| 8 | 45 | 79 | 22 | 52 | *38 | 20 | 236 | 627 | 48 | 35 | 96 | 28 |
| 9 | 42 | 68 | 21 | 47 | 37 | 20 | 198 | 560 | 48 | 32 | 107 | 30 |
| 10 | 36 | 48 | 20 | 45 | 35 | 20 | 182 | 472 | 45 | 30 | 158 | 28 |
| 11 | 35 | 43 | 20 | 44 | 32 | 20 | 167 | 411 | 45 | 28 | 132 | 29 |
| 12 | 30 | 36 | 21 | 180 | 30 | 20 | 164 | 314 | 45 | 29 | 94 | 25 |
| 13 | 26 | 38 | 22 | 450 | 28 | 20 | 176 | 240 | 45 | 40 | 68 | 25 |
| 14 | 16.8 | 32 | 23 | 604 | 27 | 20 | 179 | 170 | 45 | 50 | 65 | 25 |
| 15 | 15.2 | 29 | 23 | 422 | 25 | 20 | 170 | 135 | 42 | 40 | 61 | 25 |
| 16 | 13.6 | 26 | 24 | 307 | 25 | 20 | 176 | 118 | *45 | 33 | *54 | 28 |
| 17 | 12.8 | 25 | 24 | 230 | 24 | 20 | 372 | 152 | 68 | 30 | 50 | 40 |
| 18 | 12.0 | 25 | 24 | 160 | 23 | 20 | 568 | 146 | 77 | 38 | 45 | 47 |
| 19 | 11.0 | 25 | 23 | 120 | 23 | 20 | 484 | 192 | 61 | 59 | 40 | 614 |
| 20 | 11.0 | *28 | 22 | 100 | 23 | 20 | 339 | 273 | 50 | 52 | 70 | 879 |
| 21 | 12.0 | 26 | 21 | 84 | 23 | 20 | 249 | 283 | 48 | 45 | 176 | 735 |
| 22 | 24 | 27 | 20 | 70 | 22 | 19 | 179 | 246 | 61 | 40 | 164 | 604 |
| 23 | 36 | 29 | 18 | 62 | 22 | 19 | 149 | 188 | 54 | 33 | 102 | 542 |
| 24 | 52 | 30 | 17 | 54 | 21 | 19 | 158 | 146 | 102 | 32 | 79 | 542 |
| 25 | 59 | 29 | 16 | 47 | 21 | 19 | 158 | 144 | 82 | 30 | 57 | 508 |
| 26 | 59 | 27 | 16 | 44 | 21 | 19 | 168 | 121 | 63 | 45 | 59 | 408 |
| 27 | 52 | 25 | 35 | 39 | 21 | 19 | 164 | 96 | 57 | 59 | 48 | 287 |
| 28 | 47 | 23 | 350 | 36 | 21 | 180 | 135 | 89 | 77 | 158 | 43 | 227 |
| 29 | 42 | 21 | 415 | 34 | 21 | 600 | 121 | 91 | 198 | 141 | 50 | 173 |
| 30 | 38 | 20 | 273 | 32 | ----- | 2,600 | 168 | 84 | 158 | 124 | 50 | 130 |
| 31 | 35 | ----- | 227 | 32 | ----- | *2,090 | ----- | 86 | ----- | 96 | 43 | ----- |
| Total | 934.9 | 1,215 | 1,868 | 4,145 | 814 | 6,009 | 9,185 | 7,130 | 1,982 | 1,794 | 3,275 | 6,201 |
| Mean | 30.2 | 40.5 | 60.3 | 134 | 26.1 | 194 | 306 | 230 | 66.1 | 57.9 | 106 | 207 |
| Cfs/m | 0.250 | 0.335 | 0.498 | 1.11 | 0.232 | 1.60 | 2.53 | 1.90 | 0.546 | 0.479 | 0.876 | 1.71 |
| In. | 0.29 | 0.37 | 0.57 | 1.27 | 0.25 | 1.85 | 2.82 | 2.19 | 0.61 | 0.55 | 1.01 | 1.91 |

Calendar year 1959: Max 2,500 Min 3.2 Mean 68.5 Cfs/m 0.566 In. 7.68
 Water year 1959-60: Max 2,600 Min 9.0 Mean 122 Cfs/m 1.01 In. 13.69

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 14 to Dec. 28, Jan. 2-13, Jan. 17 to Mar. 31.

870. Milwaukee River at Milwaukee, Wis.

Location.--Lat 43°06'00", long 87°54'30", in NW $\frac{1}{4}$ sec.5, T.7 N., R.22 E., on left bank near north limits of Milwaukee, 2,000 ft downstream from Port Washington Road Bridge and 6 miles upstream from mouth.

Drainage area.--686 sq mi.

Records available.--April 1914 to September 1960. Published as "near Milwaukee" prior to 1936.

Gage.--Water-stage recorder. Datum of gage is 607.3 ft above mean sea level, adjustment of 1912. Prior to Apr. 6, 1929, staff or chain gage near present site at different datum. Apr. 6, 1929, to Jan. 8, 1934, chain gage at bridge half a mile upstream at different datum.

Average discharge.--46 years, 387 cfs.

Extremes.--Maximum discharge during year, 9,300 cfs Mar. 31 (gage height, 8.05 ft); minimum, 3.5 cfs Oct. 4 (gage height, 1.51 ft).

1914-60: Maximum discharge, 15,100 cfs Mar. 20, 1918, Aug. 6, 1924 (gage height, 9.00 ft, datum then in use, from floodmark for 1918, from graph based on gage readings for 1924); no flow Sept. 8, 1943.

Remarks.--Records good except those for periods of ice effect, which are fair, and those when discharge was below 30 cfs, which are poor. Occasional regulation caused by dams above station.

Revisions (water years).--WSP 564: 1918(M). WSP 924: 1940. WSP 1207: 1936(M). WSP 1337: 1915-17(M), 1918, 1919-21(M), 1922, 1923(M), 1924, 1925-33(M). WSP 1557: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | | | |
|-----|----|-----|-----|-----|-------|
| 1.5 | 2 | 2.0 | 75 | 3.5 | 1,080 |
| 1.6 | 7 | 2.2 | 144 | 4.0 | 1,630 |
| 1.7 | 17 | 2.4 | 238 | 5.0 | 3,040 |
| 1.8 | 31 | 2.7 | 417 | 6.0 | 4,840 |
| 1.9 | 50 | 3.1 | 710 | 8.0 | 9,180 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 114 | 305 | 210 | 1,690 | 225 | 160 | 7,730 | 1,310 | 556 | 437 | 639 | 347 |
| 2 | 372 | 293 | 230 | 1,240 | 230 | 160 | 6,190 | 1,310 | 542 | 385 | 762 | 311 |
| 3 | 108 | 244 | 244 | 960 | 230 | 155 | 4,270 | 1,160 | 520 | 329 | 1,670 | 288 |
| 4 | 4.0 | 786 | 271 | 500 | 230 | 150 | 2,950 | 995 | 492 | 254 | 881 | 276 |
| 5 | 563 | 837 | 260 | 300 | 235 | 150 | 2,130 | 828 | 437 | 223 | 752 | 223 |
| 6 | 398 | 947 | 250 | 260 | 240 | 150 | 1,760 | 1,700 | 366 | 203 | 631 | 198 |
| 7 | 331 | 937 | 210 | 240 | 250 | 150 | 1,470 | 2,770 | 353 | 175 | 564 | 223 |
| 8 | 437 | 735 | 190 | 230 | 276 | 150 | 1,240 | 3,120 | 366 | 166 | 417 | 218 |
| 9 | 359 | 810 | 180 | 220 | *288 | 150 | 1,060 | 3,180 | 411 | 153 | 868 | 218 |
| 10 | 323 | 542 | 180 | 210 | 223 | 150 | 919 | 3,170 | 329 | 144 | 594 | 193 |
| 11 | 238 | 528 | 185 | 200 | 213 | 150 | 956 | 2,770 | 305 | 373 | 670 | 193 |
| 12 | 157 | 357 | 190 | 1,090 | 205 | 150 | 890 | 2,180 | 254 | 291 | 670 | 223 |
| 13 | 166 | 411 | 195 | 2,000 | 190 | 150 | 828 | 1,790 | 198 | 225 | 556 | 179 |
| 14 | 166 | 329 | 200 | 1,470 | 180 | 150 | 819 | 1,410 | 319 | 213 | 520 | 170 |
| 15 | 148 | 188 | 210 | 1,000 | 175 | 150 | 784 | 1,060 | *136 | 276 | 437 | 170 |
| 16 | 140 | 170 | 215 | 680 | 170 | 150 | 778 | 975 | 299 | 254 | *437 | 184 |
| 17 | 133 | 160 | 200 | 520 | 170 | 150 | 1,590 | 1,490 | 203 | 213 | 437 | 184 |
| 18 | 114 | 155 | 180 | 450 | 170 | 150 | 2,080 | 909 | 238 | 238 | 424 | 283 |
| 19 | 110 | 160 | 160 | 420 | 170 | 150 | 2,080 | 1,180 | 311 | 223 | 559 | 1,600 |
| 20 | 117 | 180 | 150 | 380 | 170 | 150 | 1,740 | 1,420 | 299 | 288 | 736 | 2,100 |
| 21 | 100 | 200 | 135 | 350 | 165 | 150 | 1,250 | 1,530 | 293 | 293 | 686 | 1,790 |
| 22 | 106 | 210 | 125 | 330 | 165 | 150 | 1,330 | 1,370 | 353 | 293 | 571 | 1,570 |
| 23 | 353 | 210 | 110 | 320 | 160 | 140 | 1,020 | 1,380 | 411 | 266 | 578 | 1,510 |
| 24 | 451 | 210 | 105 | 300 | 160 | 140 | 727 | 1,210 | 485 | 238 | 578 | 1,550 |
| 25 | 513 | *201 | 110 | 280 | 160 | 130 | 578 | 896 | 411 | 260 | 556 | 2,010 |
| 26 | 578 | 190 | 140 | 270 | 160 | 130 | 727 | 670 | 353 | 686 | 510 | 1,800 |
| 27 | 556 | 180 | 346 | 260 | 160 | 150 | 768 | 735 | 323 | 471 | 471 | 1,510 |
| 28 | 492 | 170 | 2,080 | 250 | 160 | 600 | 655 | 702 | 329 | 647 | 417 | 1,260 |
| 29 | 437 | 165 | 2,570 | 240 | 160 | 1,930 | 655 | 586 | 458 | 663 | 451 | 985 |
| 30 | 391 | 175 | 2,290 | 230 | ----- | 6,460 | 1,280 | 571 | 478 | 631 | 379 | 663 |
| 31 | 353 | ----- | 2,060 | 225 | ----- | *8,770 | ----- | 571 | ----- | 608 | 372 | ----- |
| Total | 8,848.0 | 10,985 | 14,181 | 17,115 | 5,690 | 21,775 | 51,234 | 44,948 | 10,828 | 10,119 | 18,793 | 22,429 |
| Mean | 285 | 366 | 457 | 552 | 196 | 702 | 1,708 | 1,450 | 361 | 326 | 606 | 748 |
| Cfs/m | 0.415 | 0.534 | 0.666 | 0.805 | 0.286 | 1.02 | 2.49 | 2.11 | 0.526 | 0.475 | 0.883 | 1.09 |
| In. | 0.48 | 0.60 | 0.77 | 0.93 | 0.31 | 1.18 | 2.78 | 2.44 | 0.59 | 0.55 | 1.02 | 1.22 |

Calendar year 1959: Max 8,520 Min 3.4 Mean 424 Cfs/m 0.618 In. 8.38
Water year 1959-60: Max 8,770 Min 4.0 Mean 647 Cfs/m 0.943 In. 12.87

Peak discharge (base, 2,000 cfs).--Oct. 5 (8 a.m.) 3,250 cfs (5.13 ft); Dec. 29 (1 a.m.) 2,820 cfs (4.86 ft); Jan. 13 (1:30 a.m.) 3,010 cfs (4.98 ft); Mar. 31 (1 p.m.) 9,300 cfs (8.05 ft); Apr. 16 (11:30 p.m.) 2,960 cfs (4.95 ft); Apr. 22 (3 p.m.) 2,700 cfs (4.79 ft); Apr. 30 (10 a.m.) 2,820 cfs (4.86 ft); May 6 (3 p.m.) 4,920 cfs (6.04 ft); May 16 (11 p.m.) 2,800 cfs (4.85 ft); May 21 (2 p.m.) 2,340 cfs (4.54 ft); July 11 (6 a.m.) 2,240 cfs (4.47 ft); Aug. 3 (10:30 a.m.) 3,230 cfs (5.12 ft); Sept. 20 (2 a.m.) 2,210 cfs (4.45 ft); Sept. 25 (12 m.) 2,050 cfs (4.33 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 16 to Dec. 2, Dec. 5-26, Jan. 3-11, Jan. 15 to Feb. 7, Feb. 12 to Mar. 28.

875. Hart ditch at Munster, Ind.

Location.--Lat 41°33'40", long 87°28'50", in N $\frac{1}{2}$ sec. 20, T.36 N., R.9 W., on left bank at city limits of Munster, a quarter of a mile downstream from U.S. Highway 41 and 0.4 mile upstream from mouth.

Drainage area.--69.2 sq mi.

Records available.--September 1942 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 591.27 ft above mean sea level, datum of 1929 (levels by Indiana Flood Control and Water Resources Commission).

Average discharge.--18 years, 58.5 cfs.

Extremes.--Maximum discharge during year, 855 cfs Jan. 13 (gage height, 3.50 ft); minimum, 2.8 cfs Sept. 6 (gage height, 0.50 ft).
1942-60: Maximum discharge, 2,670 cfs Apr. 28, 1959; maximum gage height, 7.83 ft Oct. 11, 1954; minimum discharge, 1.2 cfs July 29, 1946; minimum gage height, 0.47 ft July 29, 1946, Sept. 2, 1948.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow from this ditch discharges into Little Calumet River near Munster. Practically all of this flow discharges into the Calumet Sag Channel or Grand Calumet River.

Revisions.--WSP 1337: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.5 | 3.9 | 1.5 | 192 |
| .6 | 12 | 2.0 | 348 |
| .8 | 35 | 4.0 | 1,030 |
| 1.0 | 70 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 18 | 51 | 31 | 62 | 62 | 28 | 348 | 68 | 24 | 22 | 6.4 | 3.9 |
| 2 | 15 | 48 | 29 | 57 | 59 | 26 | 207 | 46 | 21 | 21 | 6.4 | 3.9 |
| 3 | 13 | 40 | 30 | b48 | 48 | 25 | 143 | 37 | 19 | 200 | 16 | 7.8 |
| 4 | 12 | 332 | 30 | 41 | 41 | 24 | 114 | 32 | 18 | 102 | 16 | 8.0 |
| 5 | 13 | 445 | 35 | 35 | 82 | b23 | 96 | 30 | 19 | 55 | 10 | 3.9 |
| 6 | 42 | 207 | 51 | 30 | 445 | b23 | 78 | 31 | 18 | 37 | 9.6 | 3.9 |
| 7 | 85 | 121 | 49 | 29 | 266 | b22 | 66 | 34 | 18 | 29 | 12 | 3.9 |
| 8 | 55 | 85 | 38 | 28 | 138 | b22 | 55 | 35 | 18 | 24 | 8.7 | 3.9 |
| 9 | 35 | 64 | 29 | 26 | 112 | 22 | 46 | 41 | 17 | 20 | 8.7 | 3.9 |
| 10 | 33 | 53 | 24 | 25 | 475 | 22 | 41 | 40 | 17 | 21 | 8.7 | 3.9 |
| 11 | 116 | 43 | 61 | 25 | 715 | 22 | 40 | 38 | 17 | 20 | 8.0 | 3.9 |
| 12 | 76 | 38 | 222 | 427 | 380 | 22 | 43 | 34 | 28 | 18 | 7.2 | 3.9 |
| 13 | 46 | 46 | 126 | 820 | 189 | 26 | 43 | 29 | 220 | 17 | 7.2 | 3.9 |
| 14 | 34 | 102 | 83 | 478 | 107 | b26 | 44 | 28 | 380 | 14 | 10 | 3.9 |
| 15 | 28 | 93 | *68 | 445 | 85 | b28 | 154 | 25 | 511 | 14 | 9.6 | 5.8 |
| 16 | 22 | 87 | 57 | 252 | 83 | b35 | 136 | 29 | 252 | 13 | 8.0 | 5.1 |
| 17 | 19 | 70 | 49 | 138 | 76 | b44 | 438 | 76 | 380 | 12 | 7.2 | 7.2 |
| 18 | 17 | 51 | 45 | 107 | 70 | b45 | 478 | 89 | 222 | 10 | 7.2 | 5.5 |
| 19 | 16 | 40 | 40 | b70 | 64 | 46 | 222 | 59 | 116 | 10 | 11 | 21 |
| 20 | *15 | 35 | 35 | b52 | 49 | 46 | *131 | 51 | 78 | 9.6 | 17 | 10 |
| 21 | 14 | 35 | 32 | b45 | 46 | 45 | 107 | 51 | 72 | 8.7 | 8.7 | 7.2 |
| 22 | 13 | 37 | b25 | 41 | 41 | *43 | 87 | 57 | 100 | 12 | 8.0 | 5.8 |
| 23 | 46 | 45 | b24 | 34 | 38 | 43 | 66 | 55 | *80 | 19 | 8.7 | 5.8 |
| 24 | 72 | *83 | b25 | 31 | *40 | 43 | 59 | *45 | 57 | 9.6 | 7.2 | 5.8 |
| 25 | 96 | 107 | 26 | *28 | 38 | 41 | 51 | 37 | 43 | 9.6 | 7.2 | 5.8 |
| 26 | 68 | 68 | 41 | 26 | 35 | 41 | 46 | 30 | 35 | *12 | *8.4 | 5.8 |
| 27 | 60 | 49 | 172 | 30 | 34 | 194 | 43 | 29 | 30 | 8.7 | 5.8 | *5.1 |
| 28 | 49 | 41 | 348 | 38 | 32 | 610 | 38 | 26 | 30 | 8.0 | 5.8 | 4.5 |
| 29 | 41 | 32 | 222 | 45 | 29 | 610 | 38 | 24 | 29 | 8.0 | 5.8 | 5.1 |
| 30 | 38 | 32 | 121 | 57 | ----- | 645 | 53 | 32 | 25 | 7.2 | 6.4 | 5.8 |
| 31 | 46 | ----- | 83 | 59 | ----- | 610 | ----- | 29 | ----- | 6.4 | 5.8 | ----- |
| Total | 1,253 | 2,580 | 2,251 | 3,629 | 3,881 | 3,502 | 3,511 | 1,265 | 2,894 | 777.8 | 270.7 | 173.9 |
| Mean | 40.4 | 86.0 | 72.6 | 117 | 134 | 115 | 117 | 40.8 | 96.5 | 25.1 | 8.73 | 5.80 |
| Cfs/m | 0.584 | 1.24 | 1.05 | 1.69 | 1.94 | 1.63 | 1.69 | 0.590 | 1.39 | 0.363 | 0.126 | 0.084 |
| In. | 0.67 | 1.38 | 1.21 | 1.95 | 2.09 | 1.88 | 1.89 | 0.68 | 1.55 | 0.42 | 0.15 | 0.09 |

Calendar year 1959: Max 2,160 Min 4.5 Mean 88.5 Cfs/m 1.28 In. 17.34
Water year 1959-60: Max 820 Min 3.9 Mean 71.0 Cfs/m 1.03 In. 13.96

Peak discharge (base, 800 cfs).--Jan. 13 (11 a.m.) 855 cfs (3.50 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

876. Little Calumet River at Munster, Ind.

Location.--Lat 41°34'07", long 87°31'18", in NW¼ sec.13, T.36 N., R.10 W., on left bank 200 ft upstream from Hohman Street Bridge, a quarter of a mile south of intersection of Hohman Street and 173d Street, 0.4 mile upstream from Indiana-Illinois State line, 1 mile north of intersection of Hohman Street and Ridge Road, and 4.6 miles upstream from Thorn Creek.

Drainage area.--Indeterminate.

Records available.--June 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 580.72 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 778 cfs Jan. 13 (gage height, 10.60 ft); minimum, 7.1 cfs Sept. 10 (gage height, 2.91 ft).
1958-60: Maximum discharge, 1,510 cfs Apr. 28, 1959 (gage height, 13.67 ft); minimum, 6.0 cfs Oct. 6, 1958; minimum gage height, that of Sept. 10, 1960.

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

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 8-16, Nov. 21 to Dec. 11, Feb. 25, 26, June 20 to July 1)

| | | | |
|-----|-----|------|-----|
| 2.9 | 7.0 | 5.0 | 96 |
| 3.1 | 10 | 6.5 | 220 |
| 3.5 | 20 | 9.0 | 516 |
| 4.0 | 42 | 11.0 | 856 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|---------|-------|-----------|-------|---------|-------|---------|-------|-------|
| 1 | 20 | 54 | 44 | 64 | 78 | 35 | 448 | 64 | 28 | 26 | 9.5 | 8.3 |
| 2 | 16 | 52 | 44 | 59 | 74 | 34 | 304 | 46 | 23 | 29 | 9.2 | 8.0 |
| 3 | 14 | 42 | 46 | b52 | 63 | 32 | 200 | 36 | 20 | 280 | 34 | 17 |
| 4 | 17 | 254 | 46 | 45 | 54 | 31 | 138 | 30 | 30 | 143 | 27 | 14 |
| 5 | 21 | 474 | 54 | 40 | 102 | 30 | 109 | 28 | 39 | 62 | 14 | 8.6 |
| 6 | 75 | 316 | 67 | 36 | 424 | 29 | 84 | 34 | 24 | 42 | 11 | 8.2 |
| 7 | 90 | 154 | 56 | 35 | 364 | 28 | 72 | 36 | 20 | 30 | 12 | 8.2 |
| 8 | 59 | 102 | 46 | 34 | 210 | 28 | 62 | 36 | 18 | 26 | 11 | 8.0 |
| 9 | 36 | 78 | 39 | 30 | 146 | 28 | 52 | 44 | 18 | 22 | 10 | 8.0 |
| 10 | 40 | 70 | 36 | 28 | 466 | 28 | 46 | 44 | 18 | 26 | 11 | 7.5 |
| 11 | 109 | 59 | 68 | 28 | 740 | 28 | 46 | 42 | 18 | 23 | 9.5 | 7.6 |
| 12 | 90 | 52 | 190 | 376 | 600 | 28 | 49 | 34 | 133 | 20 | 9.2 | 7.5 |
| 13 | 54 | 62 | 146 | 742 | 350 | 31 | 42 | 28 | 319 | 19 | 8.8 | 7.8 |
| 14 | 36 | 109 | 90 | 622 | 190 | 35 | 54 | 26 | 516 | 17 | 12 | 7.5 |
| 15 | 30 | 109 | *72 | 502 | 110 | 40 | 162 | 23 | 654 | 15 | 12 | 9.5 |
| 16 | 24 | 96 | 62 | 400 | 90 | 47 | 133 | 37 | 424 | 14 | 10 | 8.6 |
| 17 | 22 | 80 | 54 | 240 | 82 | 47 | 442 | 123 | 424 | 13 | 9.5 | 12 |
| 18 | 20 | 65 | 49 | 154 | 74 | 47 | 544 | 90 | 304 | 13 | 9.3 | 11 |
| 19 | 18 | 52 | 44 | 120 | 67 | 47 | 328 | 64 | 154 | 12 | 14 | 55 |
| 20 | *17 | 46 | 39 | 92 | 61 | 47 | *170 | 70 | 96 | 12 | 38 | 16 |
| 21 | 15 | 46 | 36 | 72 | 56 | 45 | 123 | 72 | 96 | 11 | 12 | 11 |
| 22 | 15 | 46 | 30 | 58 | 51 | *44 | 90 | 84 | 116 | 29 | 10 | 9.2 |
| 23 | 55 | 56 | b28 | 50 | 46 | 44 | 70 | 64 | *84 | 42 | 10 | 9.0 |
| 24 | 90 | *78 | b27 | 43 | 48 | 44 | 59 | *49 | 67 | 14 | 8.8 | 8.6 |
| 25 | 96 | 116 | b27 | *37 | *46 | 44 | 49 | 42 | 52 | 13 | 8.8 | 8.3 |
| 26 | 75 | 78 | 44 | 35 | 46 | 44 | 44 | 36 | 42 | *17 | *8.3 | 8.2 |
| 27 | 64 | 62 | 149 | 52 | 43 | 129 | 39 | 34 | 36 | 13 | 8.5 | *8.2 |
| 28 | 54 | 54 | 364 | 54 | 40 | 544 | 32 | 30 | 34 | 11 | 8.2 | 7.8 |
| 29 | 46 | 44 | 280 | 59 | 36 | 590 | 34 | 26 | 34 | 11 | 8.0 | 8.5 |
| 30 | 42 | 46 | 138 | 72 | ----- | 638 | 64 | 52 | 28 | 11 | 8.8 | 9.0 |
| 31 | 54 | ----- | 84 | 72 | ----- | 622 | ----- | 32 | ----- | 9.7 | 8.8 | ----- |
| Total | 1,414 | 2,952 | 2,499 | 4,303 | 4,737 | 3,488 | 4,089 | 1,456 | 3,869 | 1,025.7 | 381.2 | 326.1 |
| Mean | 45.6 | 98.4 | 80.6 | 139 | 163 | 113 | 136 | 47.0 | 129 | 53.1 | 12.3 | 10.9 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 1,160 | | | Min 7.0 | | Mean 97.6 | | Cfs/m - | | In. - | | |
| Water year 1959-60: Max | 742 | | | Min 7.5 | | Mean 83.4 | | Cfs/m - | | In. - | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Nov. 17-20, Jan. 4-7, 19-26, Feb. 2, 3, 11-24, Feb. 27 to Mar. 26; discharge estimated on basis of weather records, fieldman's notes, discharge measurements, and records for Hart ditch at Munster and stations on nearby streams.

880. Thorn Creek at Glenwood, Ill.

Location.--Lat 41°31'50", long 87°36'20", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.9, T.35 N., R.14 E., on right bank 20 ft downstream from Baltimore & Ohio Chicago Terminal Railroad bridge, 0.7 mile north of Chicago Heights, 0.8 mile south of Glenwood, and 1 mile upstream from Deer Creek.

Drainage area.--24.6 sq mi (revised).

Records available.--May 1949 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 610.97 ft above mean sea level, datum of 1929.

Average discharge.--11 years, 32.0 cfs.

Extremes.--Maximum discharge during year, 661 cfs Jan. 12 (gage height, 8.44 ft); minimum daily, 14 cfs Sept. 25.
1949-60: Maximum discharge, 2,460 cfs July 13, 1957 (gage height, 11.14 ft); minimum daily, 6.0 cfs July 4, Aug. 21, Sept. 5, 11, 25, 1949.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Figures of discharge include about 6 cfs pumped from ground-water sources for municipal supply of Chicago Heights and undetermined amount of ground-water pumpage for industrial use above station.

Revisions (water years).--WSP 1437: 1955.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|----|-----|-----|
| 2.9 | 13 | 5.0 | 160 |
| 3.0 | 16 | 6.0 | 278 |
| 3.5 | 42 | 8.0 | 593 |
| 4.0 | 77 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|------|-------|-------|--------|-------|-----------|-------|--------|-------|-------|------|-------|
| 1 | 21 | 22 | 25 | 26 | 31 | b21 | 77 | 42 | 29 | 26 | 20 | 20 |
| 2 | 20 | 24 | *25 | 26 | 30 | b21 | 83 | 34 | 28 | 29 | 20 | 20 |
| 3 | 18 | 23 | 26 | 24 | 28 | b21 | 47 | 30 | 27 | 159 | 30 | 18 |
| 4 | 22 | 207 | 27 | b23 | 30 | b20 | 42 | 28 | 28 | 36 | 44 | 16 |
| 5 | 24 | 110 | 27 | b23 | 68 | b19 | 40 | 26 | 35 | 29 | 23 | 16 |
| 6 | 89 | 69 | 23 | b24 | 128 | b16 | 37 | 32 | 29 | 26 | 20 | 21 |
| 7 | 61 | 42 | 26 | 26 | 68 | b19 | 34 | 26 | 28 | 24 | 18 | 20 |
| 8 | 26 | 34 | 26 | 24 | 62 | b20 | 31 | 22 | 27 | 24 | 20 | 21 |
| 9 | 24 | 34 | 26 | 22 | 51 | b21 | 27 | 26 | 28 | 21 | 20 | 20 |
| 10 | 32 | 33 | 25 | 20 | 304 | 22 | 26 | 26 | 26 | 28 | 20 | 17 |
| 11 | 35 | 31 | 46 | *22 | 183 | 22 | 30 | 25 | 24 | 25 | 20 | 15 |
| 12 | 24 | 30 | 45 | 445 | b70 | 22 | 28 | 25 | 89 | 24 | 28 | 19 |
| 13 | 22 | 42 | 30 | 283 | b58 | 22 | 27 | 24 | 177 | 25 | 18 | 19 |
| 14 | 22 | 46 | 28 | 99 | b50 | 25 | 51 | 22 | 247 | 24 | 40 | 20 |
| 15 | 21 | 34 | 28 | 102 | b43 | 32 | 69 | 19 | 133 | 22 | *23 | 22 |
| 16 | *20 | b32 | 28 | 69 | 43 | 29 | 48 | 37 | 63 | 18 | 20 | 20 |
| 17 | 17 | b31 | 26 | 50 | 41 | 28 | 298 | 86 | 71 | 17 | 20 | 23 |
| 18 | 16 | b31 | 26 | 43 | *36 | 28 | 110 | *43 | 68 | 21 | 21 | 16 |
| 19 | 18 | *31 | 23 | b35 | b27 | 28 | 76 | 54 | 32 | *22 | 22 | 50 |
| 20 | 19 | 30 | 20 | b28 | b25 | 26 | *38 | 51 | *34 | 20 | 19 | 21 |
| 21 | 16 | 29 | 23 | b25 | b23 | 26 | 38 | 43 | 114 | 20 | 16 | 20 |
| 22 | 19 | 27 | 24 | b22 | b24 | 28 | 32 | 50 | 63 | 25 | 20 | 19 |
| 23 | 51 | 29 | 23 | b20 | b24 | 29 | 30 | 40 | 43 | 39 | 20 | 18 |
| 24 | 44 | 41 | 23 | b19 | b30 | 26 | 28 | 35 | 35 | 18 | 20 | 16 |
| 25 | 38 | 39 | 22 | b21 | b28 | 26 | 30 | 33 | 30 | 22 | 20 | a14 |
| 26 | 29 | 28 | 40 | b23 | b23 | 26 | 56 | 31 | 26 | 24 | 20 | a15 |
| 27 | 26 | 25 | 110 | 35 | b22 | 150 | 48 | 30 | 32 | 23 | 18 | a17 |
| 28 | 24 | 24 | 110 | 32 | b19 | 192 | 28 | 26 | 30 | 23 | 16 | a16 |
| 29 | 24 | 22 | 69 | 32 | b21 | 238 | 31 | 22 | 28 | 22 | 19 | a17 |
| 30 | 23 | 24 | 41 | 30 | ----- | 239 | 72 | 24 | 27 | 20 | 20 | a17 |
| 31 | 32 | ----- | 31 | 27 | ----- | 118 | ----- | 27 | ----- | 17 | 20 | ----- |
| Total | 881 | 1,224 | 1,073 | 1,700 | 1,588 | 1,560 | 1,612 | 1,039 | 1,661 | 873 | 667 | 583 |
| Mean | 28.4 | 40.8 | 34.6 | 54.8 | 54.8 | 50.3 | 53.7 | 33.5 | 55.4 | 28.2 | 21.5 | 19.4 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 707 | | | Min 13 | | Mean 40.5 | | Cfsm - | | In. - | | |
| Water year 1959-60: Max | 445 | | | Min 14 | | Mean 39.5 | | Cfsm - | | In. - | | |

Peak discharge (base, 450 cfs).--Jan. 12 (6 p.m.) 661 cfs (8.44 ft); Feb. 10 (6:30 p.m.) 528 cfs (7.65 ft); Apr. 17 (6 a.m.) 528 cfs (7.61 ft); June 14 (3:30 p.m.) 576 cfs (7.94 ft); July 5 (1 a.m.) 560 cfs (7.82 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for station at Thornton.

b Stage-discharge relation affected by ice.

885. Deer Creek near Chicago Heights, Ill.

Location.--Lat 41°31'15", long 87°35'25", 0.1 mile west of center of sec.14, T.35 N., R.14 E., on left bank at downstream side of bridge on Joe Orr Road, 0.4 mile east of Cottage Grove Avenue, 1 mile north of U. S. Highway 30, 1.5 miles northeast of Chicago Heights, and 1.6 miles west of Torrence Avenue.

Drainage area.--23.2 sq mi (revised).

Records available.--May 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 615.95 ft above mean sea level, datum of 1929. Prior to Jan. 11, 1949, wire-weight gage at same site and datum. Jan. 11, 1949, to Oct. 9, 1956, water-stage recorder at same site and datum. Oct. 10, 1956, to Sept. 24, 1957, staff gage at site 250 ft downstream at same datum. Sept. 25, 1957, to Aug. 12, 1958, wire-weight gage at present site and datum.

Average discharge.--12 years, 14.9 cfs.

Extremes.--Maximum discharge during year, 430 cfs Jan. 13 (gage height, 10.26 ft); minimum, 0.5 cfs Sept. 16.

1948-60: Maximum discharge, 1,380 cfs July 13, 1957 (gage height, 11.75 ft); no flow for several days in 1949, 1953, 1956.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Undetermined amount of flow diverted for irrigation.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|---------|---------|---------|-------|-------|-------|-------|-------|-------|
| 1 | 3.3 | 10 | 8.3 | 17 | 16 | a6.8 | 76 | 22 | 11 | 4.9 | 1.8 | 0.8 |
| 2 | 2.4 | | 8.0 | 14 | 15 | *b6.4 | 55 | 17 | 9.9 | 4.7 | 1.7 | .8 |
| 3 | 1.9 | 9.2 | 7.6 | b12 | 14 | b6.4 | 38 | 14 | 9.3 | 32 | 2.0 | .8 |
| 4 | 1.6 | 24 | *7.3 | b11 | 13 | b6.4 | 28 | 14 | 9.0 | 21 | 2.4 | .6 |
| 5 | 1.8 | *115 | 7.5 | b9.0 | 26 | b5.8 | 24 | 13 | 10 | 11 | 2.2 | .8 |
| 6 | 2.9 | 50 | 7.9 | b8.0 | 141 | b5.4 | 20 | 13 | 9.6 | 7.6 | 1.9 | .6 |
| 7 | 5.0 | 27 | 7.9 | 8.7 | 65 | b5.4 | 17 | 14 | 9.3 | 5.9 | 1.8 | .7 |
| 8 | 5.8 | 19 | 7.3 | 8.5 | 36 | b5.4 | 15 | 13 | 8.9 | 5.3 | 1.7 | .6 |
| 9 | 5.7 | 15 | 6.6 | 7.8 | 31 | b5.6 | 14 | 13 | 8.6 | 5.0 | 1.4 | .7 |
| 10 | 4.9 | 13 | 5.9 | 7.6 | 269 | b5.8 | 12 | 12 | 8.2 | 5.2 | 1.3 | .6 |
| 11 | 6.2 | 11 | 7.0 | 7.6 | 272 | b5.8 | 12 | 12 | 8.0 | 5.0 | 1.2 | .7 |
| 12 | 8.5 | 9.3 | 20 | 175 | a90 | b5.8 | 12 | 12 | 21 | 4.7 | 1.2 | .7 |
| 13 | 8.3 | 10 | 25 | 340 | b35 | b6.0 | 12 | 12 | 74 | 4.4 | 1.1 | .8 |
| 14 | 6.8 | 15 | 18 | 120 | a26 | b6.4 | 14 | 11 | 138 | 4.0 | 2.6 | .9 |
| 15 | 5.9 | 15 | 14 | 122 | a22 | b8.0 | 48 | 10 | 170 | 5.8 | *1.2 | .9 |
| 16 | *5.1 | b13 | 14 | 66 | a19 | b9.0 | 36 | 12 | 56 | 3.4 | 1.2 | .7 |
| 17 | 4.4 | b11 | 11 | 36 | a18 | b9.0 | 225 | *28 | 54 | 3.2 | 1.0 | 1.0 |
| 18 | 3.9 | b10 | 9.4 | 28 | a16 | b8.0 | *150 | 24 | 31 | *3.1 | .9 | 1.2 |
| 19 | 3.6 | 9.7 | 8.7 | 21 | a14 | b8.0 | 58 | 18 | 19 | 2.9 | 1.1 | 2.3 |
| 20 | 3.5 | 9.4 | 8.0 | *18 | b12 | b8.0 | 36 | 20 | 12 | 2.7 | 1.2 | 1.2 |
| 21 | 3.1 | 8.9 | 7.8 | b15 | a11 | b8.0 | 28 | 21 | 16 | 2.6 | 1.1 | .9 |
| 22 | 2.9 | 8.7 | 7.0 | b13 | a10 | b8.0 | 22 | 28 | 22 | 3.0 | 1.0 | .9 |
| 23 | 3.0 | 8.9 | 6.8 | b12 | a9.6 | b8.8 | 17 | 23 | 17 | 3.1 | 1.0 | .9 |
| 24 | 8.0 | 11 | 7.0 | b11 | a9.2 | b8.0 | 15 | 17 | 12 | 2.9 | 1.0 | 1.0 |
| 25 | 17 | 16 | 7.0 | b11 | b9.0 | b7.0 | 13 | 14 | 8.5 | 2.5 | .9 | 1.0 |
| 26 | 21 | 17 | 11 | 12 | a8.5 | b8.0 | 12 | 14 | 7.0 | 2.5 | .8 | 1.1 |
| 27 | 20 | b13 | 62 | 12 | b8.0 | 63 | 12 | 13 | 6.4 | 2.4 | .8 | .9 |
| 28 | 15 | b10 | 142 | 14 | a7.2 | 265 | 11 | 12 | 6.2 | 2.0 | .8 | .9 |
| 29 | 12 | 9.5 | 62 | 14 | a6.8 | 263 | 10 | 12 | 5.6 | 1.9 | .8 | .9 |
| 30 | 9.6 | 8.7 | 34 | 15 | ----- | 281 | 19 | 12 | 5.2 | 1.8 | .7 | 1.1 |
| 31 | 9.3 | ----- | 23 | 15 | ----- | 180 | ----- | 11 | ----- | 1.6 | .8 | ----- |
| Total | 212.4 | 517.1 | 579.0 | 1,181.2 | 1,229.3 | 1,251.2 | 1,060 | 481 | 782.7 | 166.3 | 40.6 | 26.8 |
| Mean | 6.85 | 17.2 | 18.7 | 38.1 | 42.4 | 39.7 | 35.3 | 15.5 | 26.1 | 5.36 | 1.31 | 0.89 |
| Cfsm | 0.295 | 0.741 | 0.806 | 1.64 | 1.83 | 1.71 | 1.52 | 0.668 | 1.12 | 0.231 | 0.056 | 0.038 |
| In. | 0.34 | 0.83 | 0.93 | 1.89 | 1.97 | 1.97 | 1.70 | 0.77 | 1.25 | 0.27 | 0.07 | 0.04 |

Calendar year 1959: Max 724 Min 0.4 Mean 21.7 Cfsm 0.935 In. 12.71
 Water year 1959-60: Max 340 Min 0.6 Mean 20.5 Cfsm 0.884 In. 12.03

Peak discharge (base, 250 cfs).--Jan. 13 (5 to 7 a.m.) 430 cfs (10.26 ft); Feb. 11 (1 a.m.) 420 cfs (10.21 ft); Mar. 30 (9 p.m.) 301 cfs (9.50 ft); Apr. 17 (6 p.m.) 312 cfs (9.60 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage when available, weather records, and records for stations in Thorn Creek basin.

b Stage-discharge relation affected by ice.

890. Butterfield Creek at Flossmoor, Ill.

Location.--Lat 41°32'25", long 87°38'55", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 8, T.35 N., R.14 E., on left bank at downstream side of Reigle Road Bridge at Homewood city limits, 0.1 mile north of Holbrook Road and three-quarters of a mile east of Flossmoor.

Drainage area.--23.4 sq mi (revised).

Records available.--May 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 616.80 ft above mean sea level, datum of 1929. Prior to Sept. 9, 1948, wire-weight gage at same site and datum.

Average discharge.--12 years, 16.1 cfs.

Extremes.--Maximum discharge during year, 318 cfs Jan. 12 (gage height, 7.92 ft); minimum, 0.3 cfs Sept. 27.

1948-60: Maximum discharge, 2,550 cfs July 13, 1957 (gage height, 11.78 ft); no flow at times in 1948.

Remarks.--Records good except those for periods of ice effect, which are poor.

Revisions (water years).--WSP 1437: 1948(M), 1953, 1955.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 11-30)

| | | | |
|-----|-----|-----|-----|
| 3.8 | 0.4 | 4.7 | 23 |
| 3.9 | .7 | 5.0 | 38 |
| 4.0 | 1.4 | 5.0 | 105 |
| 4.1 | 2.5 | 7.0 | 198 |
| 4.2 | 4.2 | 8.0 | 332 |
| 4.4 | 10 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|
| 1 | *1.1 | 2.4 | 4.5 | 20 | 13 | 4.7 | 81 | 26 | 4.7 | 4.7 | 0.8 | 1.0 |
| 2 | .9 | 2.2 | *4.5 | 18 | 11 | 4.5 | 64 | 16 | 4.5 | 4.7 | .8 | 1.0 |
| 3 | .8 | 2.2 | 4.2 | 14 | 9.7 | 4.5 | 49 | 12 | 4.0 | 54 | 1.0 | .9 |
| 4 | 1.6 | .73 | 4.0 | 10 | 8.7 | 4.2 | 39 | 9.0 | 5.5 | 30 | 7.6 | .9 |
| 5 | 3.5 | *57 | 4.2 | 8.5 | 27 | 3.5 | 33 | 8.1 | 6.8 | 15 | 2.8 | 1.0 |
| 6 | 20 | 33 | 4.2 | 7.5 | 102 | 3.0 | 27 | 9.4 | 3.9 | 10 | 2.0 | 1.3 |
| 7 | 7.8 | 19 | 3.9 | 8.7 | 56 | 2.5 | 21 | 9.4 | 3.5 | 8.7 | 1.5 | 1.2 |
| 8 | 2.7 | 13 | 3.5 | 7.8 | 37 | 2.3 | 17 | 7.4 | 3.2 | 7.1 | 1.3 | 1.3 |
| 9 | 1.8 | 10 | 3.0 | 6.0 | 32 | 2.3 | 15 | 7.1 | 3.0 | 5.8 | 1.3 | 1.0 |
| 10 | 2.1 | 8.1 | 2.7 | 5.5 | 130 | 2.3 | 13 | 6.5 | 3.0 | 6.5 | 1.0 | .8 |
| 11 | 5.7 | 7.4 | 8.2 | *5.2 | 125 | 2.2 | 13 | 6.0 | 5.3 | 5.5 | .8 | .8 |
| 12 | 2.3 | 6.0 | 23 | 171 | 65 | 2.1 | 13 | 5.8 | 31 | 4.5 | .8 | 1.0 |
| 13 | 1.7 | 7.6 | 18 | 211 | 40 | 2.1 | 10 | 5.0 | 92 | 4.2 | .7 | .8 |
| 14 | 1.3 | 12 | 14 | 96 | 28 | 2.4 | 14 | 4.5 | 120 | 3.5 | 1.0 | .8 |
| 15 | 1.3 | 10 | 12 | 100 | 24 | 5.5 | 29 | 4.5 | 100 | 3.0 | *2.0 | 1.1 |
| 16 | 1.3 | 8.5 | 10 | 65 | 21 | 7.5 | 24 | *8.4 | 56 | 4.0 | 1.0 | .8 |
| 17 | 1.0 | 7.0 | 8.7 | 41 | 21 | 10 | 179 | 31 | 40 | 2.3 | .7 | 1.0 |
| 18 | 1.0 | 6.0 | 7.4 | 32 | *19 | 8.5 | *98 | 17 | 28 | 2.2 | .7 | 1.4 |
| 19 | 1.0 | 5.5 | 6.8 | 25 | 16 | 9.0 | 57 | 16 | 20 | 2.1 | .9 | 7.7 |
| 20 | 1.0 | 4.7 | 6.0 | 19 | 15 | 9.6 | 39 | 17 | *16 | *1.6 | 1.3 | 1.3 |
| 21 | 1.0 | 4.5 | 5.8 | 15 | 13 | *8.0 | 31 | 19 | 48 | 1.3 | 1.1 | .7 |
| 22 | 1.0 | 4.5 | 5.0 | 12 | 12 | 8.0 | 22 | 30 | 36 | 1.9 | .8 | .8 |
| 23 | 6.8 | 5.0 | 4.2 | 10 | 9.0 | 7.4 | 18 | 21 | 28 | 7.5 | .7 | .6 |
| 24 | 11 | 11 | 4.7 | 9.0 | 8.5 | 6.6 | 15 | 15 | 19 | 2.7 | .8 | .5 |
| 25 | 12 | 16 | 4.7 | 8.5 | 7.6 | 6.4 | 13 | 12 | 12 | 1.7 | .7 | .5 |
| 26 | 5.5 | 12 | 17 | 9.0 | 7.4 | 7.0 | 11 | 9.7 | 9.0 | 4.8 | .7 | .6 |
| 27 | 3.9 | 8.7 | 55 | 12 | 7.0 | 102 | 10 | 8.1 | 8.1 | 2.5 | .6 | .4 |
| 28 | 2.8 | 7.1 | 95 | 11 | 6.6 | 198 | 9.4 | 8.1 | 7.1 | 1.6 | .6 | .4 |
| 29 | 2.5 | 6.0 | 59 | 11 | 5.5 | 166 | 9.4 | 6.0 | 6.3 | 1.3 | .7 | .5 |
| 30 | 2.2 | 5.0 | 38 | 12 | | 187 | 30 | 6.0 | 5.2 | 1.2 | .9 | .6 |
| 31 | 2.5 | | 26 | 11 | | 128 | | 5.5 | | 1.0 | .8 | |
| Total | 111.1 | 374.4 | 467.2 | 989.7 | 877.0 | 917.1 | 1,003.8 | 365.5 | 729.1 | 206.9 | 38.4 | 32.7 |
| Mean | 3.58 | 12.5 | 15.1 | 31.9 | 30.2 | 29.6 | 33.5 | 11.8 | 24.3 | 6.67 | 1.24 | 1.09 |
| Cfs/m | 0.153 | 0.534 | 0.645 | 1.36 | 1.29 | 1.26 | 1.43 | 0.504 | 1.04 | 0.285 | 0.053 | 0.047 |
| In. | 0.18 | 0.60 | 0.74 | 1.57 | 1.39 | 1.46 | 1.80 | 0.58 | 1.16 | 0.33 | 0.06 | 0.05 |

Calendar year 1959: Max 306 Min 0.3 Mean 13.9 Cfs/m 0.594 In. 8.04
Water year 1959-60: Max 211 Min 0.4 Mean 16.7 Cfs/m 0.714 In. 9.72

Peak discharge (base, 240 cfs).--Jan. 12 (6:30 p.m.) 318 cfs (7.92 ft); Mar. 28 (5:30 a.m.) 255 cfs (7.43 ft); Apr. 17 (7 a.m.) 262 cfs (7.52 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 13-18, Jan. 3-6, 20-26, Feb. 11-14, Feb. 18 to Mar. 16, Mar. 18-26.

895. Lansing ditch near Lansing, Ill.

Location.--Lat 41°31'40", long 87°31'45", at north boundary of sec.17, T.35 N., R.15 E., on right bank at upstream side of bridge on farm road, 0.2 mile west of Indiana State line, 0.5 mile east of Burnham Avenue, and 2 miles south of Lansing.

Drainage area.--8.7 sq mi, approximately (revised).

Records available.--May 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 607.16 ft above mean sea level, datum of 1929. Prior to Sept. 20, 1948, wire-weight gage at same site and datum.

Average discharge.--12 years, 8.25 cfs.

Extremes.--Maximum discharge during year, 204 cfs June 14 (gage height, 7.13 ft); minimum daily, 0.3 cfs Sept. 11.
1948-60: Maximum discharge, 461 cfs May 10 or 11, 1948 (gage height, 9.24 ft, from floodmark); maximum gage height, 10.18 ft Oct. 11, 1954; no flow at times.

Remarks.--Records good except those for periods of ice effect, which are poor. Undetermined amount of flow diverted for irrigation above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-23, July 18 to Sept. 30)

| | | | |
|-----|-----|-----|-----|
| 2.6 | 0 | 3.7 | 5.7 |
| 2.7 | .2 | 4.0 | 10 |
| 2.8 | .3 | 4.3 | 18 |
| 3.0 | .9 | 5.0 | 50 |
| 3.2 | 1.8 | 6.0 | 112 |
| 3.4 | 3.0 | 7.0 | 191 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1.7 | 7.2 | 3.7 | 5.2 | 6.2 | b5.2 | 36 | 5.5 | 4.0 | 9.3 | 2.2 | 2.5 |
| 2 | 2.9 | 6.3 | 4.0 | 5.2 | 5.1 | b5.2 | 23 | 5.4 | 3.8 | 8.4 | 2.2 | 2.6 |
| 3 | 1.8 | 9.7 | 4.2 | b4.5 | 4.5 | b5.5 | 13 | 4.9 | 7.7 | 46 | 3.0 | 3.4 |
| 4 | 2.9 | 51 | *5.5 | b5.5 | 4.4 | b5.3 | 10 | 4.6 | 10 | 14 | 3.3 | 2.7 |
| 5 | 2.7 | 57 | 7.3 | b2.4 | 12 | b5.2 | 9.6 | 4.4 | 4.7 | 10 | 2.2 | 2.7 |
| 6 | 8.0 | 21 | 5.2 | b2.6 | 77 | b5.1 | 8.7 | 4.2 | 3.8 | 11 | 2.3 | 2.5 |
| 7 | 7.0 | 10 | 4.1 | 3.0 | 24 | b3.2 | 7.4 | 4.4 | 6.2 | 8.1 | 1.0 | 2.8 |
| 8 | 4.4 | 6.7 | 4.0 | 2.7 | 13 | b5.1 | 6.7 | 3.9 | 4.7 | 7.3 | 1.7 | 2.1 |
| 9 | 3.0 | 5.7 | 4.2 | 2.5 | 10 | b5.0 | 5.2 | 3.6 | 6.9 | 5.2 | 2.5 | 2.1 |
| 10 | 4.4 | 6.3 | 3.0 | 2.7 | 102 | b5.1 | 5.1 | 3.8 | 3.6 | 5.7 | 2.4 | 1.1 |
| 11 | 13 | 4.2 | 8.9 | 2.6 | 95 | b5.1 | 7.3 | 4.5 | 3.6 | 10 | 1.4 | 3 |
| 12 | 4.6 | 4.3 | 22 | *98 | b27 | 3.2 | 7.2 | 5.8 | 20 | 6.8 | 1.4 | 2.2 |
| 13 | 5.2 | 5.1 | 7.7 | *108 | b11 | 3.6 | 7.7 | 5.4 | 70 | 6.9 | 5.7 | 1.9 |
| 14 | 3.4 | 11 | 6.3 | 44 | b8.0 | 4.5 | 8.7 | 4.2 | 117 | 6.9 | 5.3 | 1.9 |
| 15 | 2.1 | 7.4 | 5.8 | 61 | 7.2 | 6.3 | 28 | 4.1 | 108 | 6.7 | 2.2 | 1.7 |
| 16 | *2.0 | b6.0 | 4.8 | 20 | 6.7 | 8.2 | 11 | 9.0 | 50 | 5.0 | *3.0 | 1.9 |
| 17 | 2.0 | 5.0 | 3.9 | 11 | 6.9 | 5.2 | 92 | 15 | 46 | 2.8 | 4.1 | 2.8 |
| 18 | 1.5 | 4.5 | 4.2 | 8.6 | 7.2 | 4.2 | 52 | *9.5 | 18 | 4.8 | 3.7 | .9 |
| 19 | 1.8 | *4.1 | 4.8 | b6.0 | b6.5 | 4.0 | *21 | 8.2 | 12 | 5.5 | 3.4 | 2.6 |
| 20 | 4.4 | 3.9 | 3.2 | b5.0 | b5.0 | 3.9 | 12 | 8.7 | 12 | *1.8 | 4.0 | 3.2 |
| 21 | 4.1 | 4.3 | 2.9 | b4.3 | b4.7 | 4.2 | 9.1 | 8.9 | 28 | 1.4 | 1.3 | 2.9 |
| 22 | 1.9 | 4.1 | 4.4 | b5.7 | 4.6 | 4.6 | 7.6 | 11 | *27 | 1.6 | 3.7 | 2.3 |
| 23 | 19 | 5.2 | 6.3 | b3.5 | 4.4 | *5.9 | 6.9 | 8.1 | 12 | 3.2 | 2.8 | 1.6 |
| 24 | 30 | 8.7 | 3.6 | b5.3 | *4.2 | 5.2 | 5.7 | 6.8 | 9.1 | 1.9 | 2.4 | 1.5 |
| 25 | 26 | 7.6 | 3.0 | b5.3 | 4.0 | 4.7 | 6.4 | 7.8 | 10 | 1.9 | 2.6 | 1.8 |
| 26 | 9.5 | 4.8 | 5.3 | b3.5 | b3.9 | 5.7 | 5.9 | 5.4 | 7.6 | 2.3 | 3.4 | 2.3 |
| 27 | 7.8 | 6.4 | 27 | 4.6 | b3.7 | 57 | 4.4 | 5.0 | 9.5 | 3.1 | 2.4 | .9 |
| 28 | 6.2 | 3.6 | 38 | 4.6 | b3.6 | 112 | 4.7 | 7.6 | 8.1 | 2.1 | 2.0 | 2.6 |
| 29 | 5.6 | 3.3 | 12 | 5.4 | b5.4 | 83 | 4.4 | 10 | 9.3 | 2.7 | 2.5 | 1.7 |
| 30 | 4.8 | 4.8 | 7.6 | 5.6 | ----- | 89 | 6.9 | 5.7 | 8.4 | 3.9 | 3.2 | 1.8 |
| 31 | 6.9 | ----- | 5.4 | 5.6 | ----- | 69 | ----- | 7.6 | ----- | 1.0 | 4.0 | ----- |
| Total | 198.7 | 299.2 | 232.3 | 445.9 | 475.2 | 518.4 | 433.6 | 202.8 | 641.0 | 207.3 | 87.3 | 62.3 |
| Mean | 6.41 | 9.97 | 7.49 | 14.4 | 16.4 | 16.7 | 14.5 | 6.54 | 21.4 | 6.69 | 2.82 | 2.08 |
| Cfsm | 0.737 | 1.15 | 0.861 | 1.66 | 1.89 | 1.92 | 1.67 | 0.752 | 2.46 | 0.769 | 0.324 | 0.239 |
| In. | 0.85 | 1.28 | 0.99 | 1.91 | 2.03 | 2.22 | 1.85 | 0.87 | 2.74 | 0.89 | 0.37 | 0.27 |

Calendar year 1959: Max 140 Min 0 Mean 9.87 Cfsm 1.13 In. 15.39
Water year 1959-60: Max 117 Min 0.3 Mean 10.4 Cfsm 1.20 In. 16.27

Peak discharge (base, 140 cfs).--Jan. 12 (10:30 p.m.) 186 cfs (6.97 ft); Feb. 10 (6:30 p.m.) 149 cfs (6.51 ft); Mar. 27 (10 p.m.) 145 cfs (6.46 ft); June 14 (6 p.m.) 204 cfs (7.13 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

900. North Creek near Lansing, Ill.

Location.--Lat 41°32'45", long 87°33'30", in SE¹/₄SE¹/₄ sec.1, T.35 N., R.14 E., or right bank at downstream side of Torrence Avenue Bridge, 1.1 miles south of Lansing and 2.7 miles north of U. S. Highway 30.

Drainage area.--16.7 sq mi (revised).

Records available.--May 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 599.29 ft above mean sea level, datum of 1929. Prior to Dec. 16, 1948, wire-weight gage at same site and datum.

Average discharge.--12 years, 15.5 cfs.

Extremes.--Maximum discharge during year, 285 cfs June 14 (gage height, 8.17 ft); minimum, 0.4 cfs Sept. 12.

1948-60: Maximum discharge, 730 cfs Mar. 20, 1948 (gage height, 8.51 ft, from floodmark); maximum gage height, 8.96 ft Oct. 10, 1954; no flow at times.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Undetermined amount of flow diverted for irrigation above station.

Revisions (water years).--WSP 1337: 1948(M).

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 5.0 | 17 | 6.9 | 11 | 15 | b6.0 | 68 | 14 | 6.0 | 13 | 3.2 | 4.0 |
| 2 | 3.7 | 14 | 6.0 | 11 | 13 | b6.0 | 45 | 11 | 2.5 | 12 | 4.1 | 3.7 |
| 3 | 4.7 | 14 | 6.0 | b10 | 13 | 6.6 | 31 | 11 | 4.1 | 52 | 4.9 | 4.2 |
| 4 | 2.4 | 74 | 7.4 | b7.6 | 11 | 6.2 | 25 | 8.7 | 13 | 32 | 8.1 | 4.5 |
| 5 | 2.8 | 112 | 10 | b6.6 | 22 | 6.2 | 22 | 8.1 | 8.3 | 20 | 4.8 | 2.6 |
| 6 | 17 | 48 | 10 | b6.2 | 106 | 6.0 | 20 | 7.6 | 3.1 | 14 | 4.3 | 3.9 |
| 7 | 17 | 20 | 7.5 | 5.9 | 56 | 6.0 | 18 | 8.1 | 3.2 | 14 | 2.5 | 5.6 |
| 8 | 13 | 15 | 5.8 | 4.9 | 33 | 6.0 | 15 | 7.3 | 5.0 | 9.6 | 1.9 | 4.0 |
| 9 | 8.0 | 12 | 4.9 | 3.9 | 25 | 6.0 | 13 | 5.5 | 6.5 | 6.8 | 4.4 | 3.3 |
| 10 | 6.8 | 11 | 5.1 | 4.1 | 118 | 6.0 | 11 | 5.5 | 2.7 | 5.3 | 4.1 | 2.6 |
| 11 | 23 | 8.9 | 8.4 | 3.8 | 130 | 6.0 | 11 | 5.2 | 1.3 | 11 | 2.9 | 1.2 |
| 12 | 15 | 6.6 | 34 | 99 | 60 | 6.0 | 11 | 7.3 | 27 | 7.7 | 2.0 | 1.4 |
| 13 | 12 | 7.8 | 20 | 165 | 25 | 7.0 | 11 | 7.6 | 101 | 6.7 | 2.4 | 2.9 |
| 14 | 9.6 | 19 | 14 | 88 | 20 | 8.0 | 13 | 5.9 | 176 | 6.5 | 7.6 | 3.2 |
| 15 | 6.8 | 17 | 13 | 92 | 16 | 12 | 35 | 3.0 | 197 | 6.1 | 4.7 | 2.8 |
| 16 | *3.7 | b13 | 10 | 50 | 15 | 15 | 26 | 5.4 | 86 | 4.9 | *2.3 | 2.6 |
| 17 | 4.4 | b11 | 8.8 | 26 | 15 | 10 | 136 | 28 | 70 | 2.7 | 5.4 | 5.3 |
| 18 | 2.9 | b10 | 8.0 | 21 | 14 | 8.0 | 105 | *22 | 41 | *4.0 | 4.8 | 2.1 |
| 19 | 2.6 | 8.1 | 7.5 | b15 | b13 | 7.6 | 50 | 16 | 28 | 10 | 4.6 | 4.1 |
| 20 | 4.4 | *6.6 | 7.2 | *b12 | 11 | 7.4 | 29 | 16 | 21 | 6.6 | 7.4 | 6.2 |
| 21 | 8.8 | 6.6 | 5.2 | 9.0 | 10 | 8.0 | 23 | 15 | 28 | 2.2 | 2.3 | 5.3 |
| 22 | 6.5 | 6.4 | 4.9 | 8.0 | 9.0 | 8.6 | 18 | 21 | 34 | 2.3 | 2.6 | 4.9 |
| 23 | 8.5 | 8.0 | 7.7 | 7.0 | 8.4 | *b10 | 16 | 15 | 25 | 5.4 | 5.2 | 2.7 |
| 24 | 35 | 12 | 8.2 | 7.0 | 8.8 | 9.5 | 14 | 13 | 17 | 3.2 | 2.7 | 2.8 |
| 25 | 36 | 18 | 5.4 | 7.0 | b7.6 | 9.0 | 13 | 12 | 15 | 2.4 | 3.2 | 2.7 |
| 26 | 19 | 12 | 9.0 | 8.0 | b7.4 | 11 | 12 | 8.2 | 13 | 3.0 | 4.0 | 5.9 |
| 27 | 15 | 11 | 30 | 9.0 | b7.0 | 73 | 9.1 | 5.4 | 12 | 4.4 | 3.6 | 2.0 |
| 28 | 13 | 8.7 | 65 | 10 | b6.5 | 170 | 7.3 | 6.4 | 12 | 3.9 | 2.7 | 4.4 |
| 29 | 10 | 5.8 | 31 | 11 | b6.0 | 133 | 7.4 | 15 | 11 | 3.4 | 3.0 | 5.2 |
| 30 | 9.8 | 6.0 | 19 | 12 | ----- | 142 | 12 | 7.6 | 12 | 8.0 | 3.4 | 4.9 |
| 31 | 13 | ----- | 13 | 13 | ----- | 117 | ----- | 5.9 | ----- | 3.1 | 6.4 | ----- |
| Total | 338.4 | 539.5 | 398.9 | 744.0 | 800.9 | 839.1 | 826.8 | 325.7 | 981.7 | 286.2 | 125.4 | 107.0 |
| Mean | 10.9 | 18.0 | 12.9 | 24.0 | 27.6 | 27.1 | 27.6 | 10.5 | 32.7 | 9.23 | 4.05 | 3.57 |
| Cfsm | 0.653 | 1.08 | 0.772 | 1.44 | 1.65 | 1.62 | 1.65 | 0.629 | 1.96 | 0.553 | 0.243 | 0.214 |
| In. | 0.75 | 1.20 | 0.89 | 1.66 | 1.78 | 1.87 | 1.84 | 0.73 | 2.19 | 0.64 | 0.28 | 0.24 |

Calendar year 1959: Max 285 Min 0 Mean 18.8 Cfsm 1.13 In. 15.37
 Water year 1959-60: Max 197 Min 1.2 Mean 17.3 Cfsm 1.04 In. 14.07

Peak discharge (base, 210 cfs).--June 14 (7:30 p.m.) 285 cfs (8.17 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Jan. 21-28, Feb. 11-18, 20-24, Mar. 2-22, 24-26; discharge estimated on basis of weather records and records for Lansing ditch near Lansing.

905. Thorn Creek at Thornton, Ill.

Location.--Lat 41°34'05", long 87°36'30", near center of N½ sec.34, T.36 N., R.14 E., on right bank at downstream side of Ridge Road Bridge in Thornton, 1 mile downstream from North Creek and ½ miles upstream from Grand Trunk Railway.

Drainage area.--104 sq mi (revised).

Records available.--May 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 586.43 ft above mean sea level, datum of 1929. Prior to Dec. 18, 1948, wire-weight gage at same site and datum.

Average discharge.--12 years, 91.7 cfs.

Extremes.--Maximum discharge during year, 1,220 cfs Jan. 13 (gage height, 9.90 ft); minimum daily, 12 cfs Sept. 25.

1948-60: Maximum discharge, 4,700 cfs July 13, 1957 (gage height, 16.00 ft); minimum daily, 4.4 cfs Sept. 11, 1949.

Flood of Apr. 5, 1947, reached a stage of 14.34 ft, from floodmark (discharge, 4,200 cfs).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Some diurnal fluctuation caused by pumping operations above station. Figures of discharge include about 6 cfs pumped from ground-water sources for municipal supply of Chicago Heights and undetermined amount of ground-water pumpage for industrial use above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 2.1 | 6.1 | 5.0 | 422 |
| 2.2 | 16 | 7.0 | 659 |
| 2.5 | 56 | 10.0 | 1,250 |
| 3.0 | 146 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 33 | 72 | 54 | 89 | 89 | 53 | a450 | 144 | 47 | 48 | 31 | 29 |
| 2 | 28 | 72 | *55 | 80 | 89 | 52 | 348 | 102 | 41 | 46 | 33 | 29 |
| 3 | 26 | 66 | 47 | b70 | 77 | 50 | 238 | 84 | 38 | 314 | 42 | 23 |
| 4 | 29 | 417 | 44 | b60 | 74 | 50 | 174 | 72 | 45 | 170 | 94 | 21 |
| 5 | 41 | *535 | 47 | b54 | 136 | 47 | 142 | 67 | 70 | 100 | 44 | 20 |
| 6 | 173 | 362 | 48 | b52 | 513 | 37 | 118 | 79 | 44 | 74 | 34 | 27 |
| 7 | 144 | 178 | 46 | 54 | 398 | 41 | 103 | 74 | 40 | 67 | 28 | 31 |
| 8 | 65 | 107 | 44 | 50 | 245 | 42 | 93 | 61 | 37 | 59 | 28 | 29 |
| 9 | 48 | 89 | 38 | 44 | 186 | 42 | 80 | 64 | 37 | 47 | 29 | 26 |
| 10 | 46 | 77 | 37 | 42 | 522 | 44 | 72 | 64 | 36 | 53 | 32 | 20 |
| 11 | 96 | 72 | 79 | 42 | 850 | 42 | 77 | 59 | 32 | 47 | 28 | 15 |
| 12 | 74 | 67 | 165 | 541 | a500 | 44 | 84 | 56 | 197 | 52 | 28 | 20 |
| 13 | 54 | 84 | 142 | 1,150 | a350 | 48 | 86 | 56 | 423 | 47 | 23 | 21 |
| 14 | 48 | 118 | 98 | 635 | a250 | 56 | 100 | 50 | 619 | 42 | 55 | 24 |
| 15 | 41 | 102 | 86 | 513 | a180 | 86 | 238 | 40 | 881 | 38 | 48 | 32 |
| 16 | *34 | b90 | 75 | 386 | a150 | 96 | 192 | 69 | 480 | 34 | *31 | 26 |
| 17 | 28 | b80 | 66 | 231 | a140 | 100 | a650 | *205 | 336 | 27 | 28 | 34 |
| 18 | 22 | b70 | 61 | 169 | 128 | 84 | 686 | 136 | 290 | 28 | 28 | 22 |
| 19 | 27 | 67 | 56 | 126 | *109 | 80 | *370 | 119 | 172 | *38 | 31 | 85 |
| 20 | 28 | 62 | 52 | 98 | 87 | 80 | 208 | 124 | 138 | 40 | 29 | 29 |
| 21 | 31 | 58 | 48 | 86 | 82 | 74 | 163 | 118 | *249 | 32 | 26 | 26 |
| 22 | 33 | 58 | 47 | 72 | 72 | 82 | 122 | 146 | 200 | 32 | 23 | 22 |
| 23 | 93 | 64 | 44 | 62 | 69 | 91 | 103 | 116 | 146 | 82 | 29 | 21 |
| 24 | 141 | 98 | 50 | 54 | 75 | 82 | 89 | 91 | 107 | 33 | 28 | 16 |
| 25 | 179 | 122 | 47 | 54 | 84 | 75 | 80 | 77 | 80 | 32 | 27 | 12 |
| 26 | 124 | 93 | 79 | 53 | 66 | 79 | 103 | 69 | 66 | 42 | 27 | 18 |
| 27 | 93 | 70 | 271 | 72 | 59 | 287 | 107 | 61 | 62 | 41 | 27 | 26 |
| 28 | 74 | b55 | 491 | 79 | 58 | 794 | 69 | 52 | 66 | 41 | 21 | 24 |
| 29 | 66 | b45 | 362 | 82 | 54 | 794 | 72 | 47 | 56 | 36 | 26 | 27 |
| 30 | 61 | 48 | 200 | 82 | | 850 | 171 | 48 | 52 | 34 | 26 | 28 |
| 31 | 77 | | 126 | 79 | | 725 | | 46 | | 36 | 28 | |
| Total | 2,057 | 3,498 | 3,103 | 5,261 | 5,692 | 5,107 | 5,589 | 2,596 | 5,087 | 1,812 | 1,012 | 783 |
| Mean | 66.4 | 117 | 100 | 170 | 196 | 165 | 186 | 83.7 | 170 | 58.5 | 32.6 | 26.1 |
| Cfsm | 0.638 | 1.12 | 0.962 | 1.63 | 1.88 | 1.59 | 1.79 | 0.805 | 1.63 | 0.562 | 0.313 | 0.251 |
| In. | 0.74 | 1.25 | 1.11 | 1.88 | 2.04 | 1.83 | 2.00 | 0.93 | 1.82 | 0.65 | 0.36 | 0.28 |

Calendar year 1959: Max 1,370 Min 16 Mean 108 Cfsm 1.04 In. 14.15
Water year 1959-60: Max 1,150 Min 12 Mean 114 Cfsm 1.10 In. 14.89

Peak discharge (base, 900 cfs, revised).--Jan. 13 (11 a.m.) 1,220 cfs (9.90 ft); Feb. 11 (5 to 6 a.m.) 1,030 cfs (9.08 ft); June 15 (4 to 5 a.m.) 990 cfs (8.94 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for station at Glenwood.

b Stage-discharge relation affected by ice.

910. Little Calumet River at South Holland, Ill.

Location.--Lat 41°36'05", long 87°34'38", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.13, T.36 N., R.14 E., on right bank at downstream side of bridge on U. S. Highway 6, 0.6 mile downstream from Thorn Creek, 1.6 miles east of South Holland, and 4.1 miles upstream from former gaging station at Harvey.

Records available.--October 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 575.00 ft above mean sea level. Prior to Oct. 27, 1947, wire-weight gage at same site and datum. Auxiliary water-stage recorder at Dixmoor, 6.1 miles downstream; prior to Nov. 17, 1947, auxiliary wire-weight gage at same site read twice daily.

Average discharge.--13 years, 167 cfs.

Extremes.--Maximum discharge during year, 1,860 cfs Jan. 13 (gage height, 13.64 ft); minimum daily, 40 cfs Sept. 11.

1947-60: Maximum discharge, 4,440 cfs July 14, 1957 (gage height, 20.11 ft); minimum daily, 7.9 cfs Oct. 6, 1950; minimum gage height, 3.99 ft Sept. 26, 1949.

Flood of Apr. 6, 1947, reached a stage of 19.24 ft, from floodmark (discharge, 4,760 cfs).

Remarks.--Records good except those for periods of ice effect, which are poor. Flow from about 330 sq mi of upper Little Calumet River basin above a point in Gary, Ind., is diverted to Lake Michigan by Burns ditch (see p. 106). Calumet Sag Channel, 8 miles below station, usually diverts the entire low flow to the Mississippi River basin.

Revisions (water years).--WSP 1507: 1950, 1953.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

(Shifting-control method used June 16 to July 3; fall used as a factor Feb. 5, 8, 10, May 8-16, May 19 to June 13, June 20 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 4.8 | 36 | 9.0 | 615 |
| 5.0 | 50 | 12.0 | 1,380 |
| 6.0 | 145 | 14.0 | 2,000 |
| 7.0 | 267 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|--------|----------|--------|--------|-------|-------|-------|-------|
| 1 | 67 | 123 | 94 | 173 | 167 | b90 | 940 | 241 | 96 | 92 | 54 | 57 |
| 2 | *58 | 116 | 94 | 150 | 167 | b88 | 655 | 167 | 89 | 94 | 49 | 63 |
| 3 | 52 | 104 | *93 | b130 | 141 | b84 | 461 | 137 | 81 | 550 | 87 | 65 |
| 4 | 51 | 504 | 92 | b110 | 130 | b84 | 332 | 117 | 86 | 352 | 130 | 55 |
| 5 | 72 | 965 | 99 | b100 | 180 | b78 | 261 | 106 | 138 | 163 | 74 | 54 |
| 6 | 188 | 695 | 115 | b95 | 855 | b70 | 234 | 114 | 90 | 114 | 64 | 53 |
| 7 | 248 | 367 | 110 | 103 | 840 | b70 | 203 | 133 | 75 | 96 | 62 | 48 |
| 8 | 162 | 228 | 96 | 95 | 497 | b70 | 179 | 109 | 69 | 84 | 58 | 50 |
| 9 | 105 | 179 | 85 | 83 | 357 | b70 | 162 | 120 | 68 | 72 | 58 | 58 |
| 10 | 89 | 156 | 80 | 80 | 796 | 75 | 142 | 108 | 72 | 84 | 63 | 47 |
| 11 | 185 | 133 | 116 | 79 | 1,620 | 82 | 134 | 113 | 64 | 76 | 57 | 40 |
| 12 | 185 | 116 | 288 | 757 | b1,050 | 81 | 137 | 100 | 407 | 81 | 49 | 51 |
| 13 | 126 | 127 | 295 | 1,770 | b600 | 96 | 125 | 96 | 764 | 89 | 50 | 49 |
| 14 | 98 | 215 | 203 | 1,440 | 416 | 106 | 132 | 89 | 990 | 85 | 49 | 47 |
| 15 | 82 | 209 | 162 | 1,060 | 267 | 141 | 338 | 79 | 1,500 | 74 | 81 | 48 |
| 16 | 71 | b170 | 145 | 840 | 234 | 179 | 340 | 97 | 1,080 | 69 | 70 | 49 |
| 17 | 61 | b150 | 126 | 515 | 222 | 162 | 1,030 | *311 | 740 | 65 | *58 | 54 |
| 18 | 52 | b150 | 114 | 548 | b200 | 145 | 1,350 | 281 | 655 | 84 | 55 | 50 |
| 19 | 48 | 119 | 105 | b250 | b180 | 137 | 4790 | 202 | 400 | *64 | 57 | 158 |
| 20 | 52 | *105 | 93 | b180 | b150 | 144 | 434 | 219 | 259 | 68 | 86 | 78 |
| 21 | 49 | 101 | 88 | b160 | b140 | 128 | 316 | 215 | *336 | 70 | 63 | 59 |
| 22 | 51 | 98 | 81 | b140 | b120 | 137 | 248 | 254 | 359 | 67 | 52 | 57 |
| 23 | 102 | 105 | 79 | b120 | b120 | *140 | 197 | 220 | 284 | 150 | 52 | 59 |
| 24 | 228 | 150 | 82 | b100 | 124 | 133 | 173 | 185 | 206 | 72 | 58 | 54 |
| 25 | 260 | 222 | 82 | b100 | 150 | 118 | 156 | 138 | 155 | 61 | 58 | 50 |
| 26 | 209 | 179 | 109 | 106 | 119 | 115 | 150 | 123 | 123 | 80 | 54 | 48 |
| 27 | 167 | 133 | 309 | 119 | b100 | 368 | 167 | 108 | 117 | 67 | 54 | 55 |
| 28 | 134 | b100 | 765 | 140 | b95 | 1,290 | 120 | 102 | 119 | 62 | 47 | 54 |
| 29 | 112 | b90 | 675 | 145 | b90 | 1,410 | 114 | 93 | 113 | 64 | 46 | 54 |
| 30 | 99 | 91 | 382 | 162 | ----- | 1,500 | 222 | 113 | 96 | 54 | 50 | 61 |
| 31 | 121 | ----- | 246 | 156 | ----- | 1,440 | ----- | 101 | ----- | 58 | 50 | ----- |
| Total | 3,584 | 6,180 | 5,505 | 9,806 | 10,137 | 8,831 | 10,262 | 4,571 | 9,631 | 3,271 | 1,695 | 1,723 |
| Mean | 116 | 206 | 178 | 316 | 350 | 285 | 342 | 147 | 321 | 106 | 61.1 | 57.4 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 2,600 | | | Min 23 | | Mean 221 | | Cfsm - | | In. - | | |
| Water year 1959-60: Max | 1,770 | | | Min 40 | | Mean 206 | | Cfsm - | | In. - | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

920. Midlothian Creek at Oak Forest, Ill.

Location.--Lat 41°36'51", long 87°43'46", in SE1/4 sec.15, T.36 N., R.13 E., on right bank at downstream side of Kilbourn Avenue Bridge in Oak Forest, 4.4 miles upstream from mouth.

Drainage area.--14.0 sq mi (revised).

Records available.--October 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 620.41 ft above mean sea level, datum of 1929 (Cook County Highway Department bench mark).

Average discharge.--10 years, 10.8 cfs.

Extremes.--Maximum discharge during year, 210 cfs Mar. 27 (gage height, 3.95 ft); minimum, 0.3 cfs Aug. 3.

1950-60: Maximum discharge, 569 cfs Oct. 10, 1954 (gage height, 8.49 ft); maximum gage height, 9.00 ft July 13, 1957; no flow at times in most years.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Diurnal fluctuation at low flow caused by small industrial plants upstream.

Revisions (water years).--WSP 1337: 1951-53.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.3 | 0.2 | 2.0 | 34 |
| 1.4 | 1.4 | 3.0 | 120 |
| 1.5 | 4.1 | 4.0 | 210 |
| 1.8 | 21 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 0.9 | 1.8 | a3.0 | 16 | 10 | 3.7 | 70 | 20 | 3.4 | 2.2 | 0.4 | 0.8 |
| 2 | .9 | 1.1 | a3.0 | 13 | 9.0 | 3.5 | 54 | 14 | 2.8 | 2.2 | .5 | .6 |
| 3 | .8 | 1.2 | a2.8 | 9.0 | 8.0 | 3.3 | 40 | 11 | 2.5 | 2.3 | .8 | .8 |
| 4 | 1.2 | 30 | a2.6 | 7.0 | 12 | 3.0 | 33 | 9.2 | 3.8 | 11 | 2.8 | .6 |
| 5 | 2.5 | 32 | a2.8 | 6.0 | 22 | 2.7 | 24 | 7.7 | 7.2 | 5.1 | 1.4 | .6 |
| 6 | 23 | 19 | a2.8 | 5.2 | 73 | 2.3 | 24 | 9.2 | 3.4 | 2.8 | 1.4 | .6 |
| 7 | 14 | 14 | a2.6 | 5.6 | 38 | 2.0 | 21 | 9.2 | 2.8 | 2.2 | 1.6 | .8 |
| 8 | 7.2 | 10 | a2.3 | 5.1 | 28 | 1.9 | 18 | 7.2 | 2.5 | 1.6 | 1.2 | .5 |
| 9 | 4.1 | 8.2 | 2.0 | 4.1 | 26 | 1.9 | 14 | 6.6 | 2.5 | 1.6 | 1.6 | .6 |
| 10 | 3.4 | 6.6 | *1.8 | 3.8 | 56 | 1.8 | 13 | 5.6 | 2.0 | 2.2 | 1.1 | .8 |
| 11 | 4.6 | 5.1 | 5.4 | 3.8 | 81 | 1.7 | 12 | 5.1 | 2.2 | 1.8 | .8 | .6 |
| 12 | 2.2 | 4.1 | 15 | 101 | 43 | 1.7 | 11 | 3.8 | 19 | 1.4 | .8 | .6 |
| 13 | 2.0 | 4.1 | 13 | *150 | 29 | 1.7 | 9.2 | 3.8 | 70 | 1.4 | .9 | 1.1 |
| 14 | 1.4 | 7.7 | 9.8 | 86 | 21 | 2.0 | 12 | 3.8 | 61 | 1.2 | .8 | .9 |
| 15 | *1.2 | 5.6 | 8.2 | *93 | 19 | 4.0 | 32 | 3.1 | 54 | 1.1 | 1.1 | .6 |
| 16 | 1.1 | 4.5 | 7.2 | 55 | 17 | 6.0 | 26 | 6.6 | 27 | 1.1 | .9 | .8 |
| 17 | 1.1 | 4.0 | 6.1 | 38 | 16 | 8.0 | 137 | 23 | 21 | 1.1 | *.8 | .8 |
| 18 | .9 | 3.5 | 5.6 | 31 | 15 | 7.0 | 79 | 15 | 16 | 1.1 | .8 | .8 |
| 19 | .8 | a5.2 | 4.1 | 22 | 13 | 7.5 | 42 | 12 | 13 | 1.2 | .9 | 4.6 |
| 20 | .9 | *3.0 | 3.8 | 18 | 12 | 8.0 | *30 | 16 | 9.8 | *1.1 | 1.1 | 1.4 |
| 21 | .6 | a2.9 | 3.4 | 14 | 10 | 6.4 | 24 | 21 | 15 | .9 | 1.4 | .8 |
| 22 | .8 | a2.9 | 3.1 | 10 | 9.0 | 6.4 | 18 | 21 | 12 | 2.1 | .9 | .8 |
| 23 | 2.2 | a3.5 | 3.1 | 8.0 | 7.0 | 6.0 | 15 | 15 | 9.2 | 2.2 | 1.1 | .9 |
| 24 | 3.4 | 6.6 | 2.5 | 7.0 | *6.6 | 5.4 | 12 | 12 | *8.2 | 1.2 | 1.1 | .9 |
| 25 | 6.1 | 11 | 2.8 | 6.2 | 6.0 | 5.2 | 11 | 9.2 | 5.6 | .9 | .9 | .9 |
| 26 | 3.8 | 8.0 | 8.8 | 6.6 | 5.0 | 6.0 | 9.2 | 8.2 | 4.1 | 5.1 | .9 | .9 |
| 27 | 3.4 | 5.6 | 40 | 9.0 | 4.5 | 85 | 8.2 | 6.6 | 4.1 | 1.6 | 1.1 | 1.1 |
| 28 | 2.0 | 4.5 | 62 | 8.4 | 4.2 | 177 | 7.2 | 6.1 | 4.1 | 1.2 | .8 | .9 |
| 29 | 1.8 | 3.8 | 37 | 8.4 | 4.0 | 164 | 7.2 | 5.1 | 3.8 | 1.1 | .6 | .9 |
| 30 | 1.4 | a3.4 | 26 | 9.0 | ----- | 150 | 20 | 4.1 | 3.1 | .9 | .9 | 1.1 |
| 31 | 1.8 | ----- | 20 | 9.0 | ----- | 104 | ----- | 4.1 | ----- | .8 | ----- | ----- |
| Total | 101.5 | 220.9 | 312.6 | 768.2 | 604.3 | 789.1 | 833.0 | 304.3 | 395.1 | 8.4 | 32.2 | 28.1 |
| Mean | 3.27 | 7.36 | 10.1 | 24.8 | 20.8 | 25.5 | 27.8 | 9.82 | 13.2 | 2.72 | 1.04 | 0.94 |
| Cfsm | 0.234 | 0.526 | 0.721 | 1.77 | 1.49 | 1.82 | 1.99 | 0.701 | 0.943 | 0.194 | 0.074 | 0.067 |
| In. | 0.27 | 0.59 | 0.83 | 2.04 | 1.61 | 2.10 | 2.21 | 0.81 | 1.05 | 0.22 | 0.09 | 0.07 |

Calendar year 1959: Max 180 Min 0.4 Mean 10.1 Cfsm 0.721 In. 9.81
 Water year 1959-60: Max 177 Min 0.4 Mean 12.2 Cfsm 0.871 In. 11.89

Peak discharge (base, 220 cfs).--No peak above base.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Butterfield Creek at Flossmoor.

Note.--Stage-discharge relation affected by ice Nov. 15-18, 20, 26-29, Dec. 9, Jan. 3-6, Jan. 19 to Feb. 3, Feb. 14 to Mar. 26.

925. Wolf Lake at Chicago, Ill.

Location.--Lat 41°39'53", long 87°32'22", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.29, T.37 N., R.15 E., at outlet on west shore in Chicago. Prior to Aug. 17, 1960, at site 600 ft north.

Records available.--December 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 580.45 ft above mean sea level, datum of 1929 (Cook County Highway Department bench mark). Prior to Apr. 6, 1941, staff gage, and Apr. 6, 1941, to Sept. 11, 1957, water-stage recorder, at site 600 ft north at same datum. Sept. 12, 1957, to May 4, 1959, staff gage at present site and datum, read once daily. May 5, 1959, to Aug. 16, 1960, water-stage recorder at site 600 ft north at same datum.

Extremes.--Maximum mean hourly gage height, 2.22 ft Jan. 14; minimum, 1.62 ft July 22. 1939-60: Maximum mean hourly gage height, 3.00 ft Oct. 11, 12, 1954; minimum gage height observed, 0.76 ft Aug. 3, 1940.

Remarks.--Mean hourly values used to determine extremes in order to dampen effects of wind action. Portion of lake at former recorder site diked off and drained June 30, 1957, to May 5, 1959.

Gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|-------|------|------|-------|-------|-------|------|-------|------|------|-------|
| 1 | 2.03 | 1.96 | 1.93 | 1.98 | 1.99 | 2.07 | a2.00 | 1.90 | 1.83 | 1.92 | 1.70 | 1.83 |
| 2 | 2.01 | 1.96 | 1.93 | 1.95 | 1.99 | 2.07 | a1.97 | 1.86 | 1.84 | 1.91 | 1.70 | 1.84 |
| 3 | 1.99 | 1.96 | 1.93 | 1.93 | 1.99 | 2.07 | a1.94 | 1.87 | 1.83 | 2.02 | 1.74 | 1.83 |
| 4 | 1.99 | 2.09 | 1.93 | 1.95 | 2.00 | 2.07 | 1.92 | 1.87 | 1.82 | 1.95 | 1.77 | 1.79 |
| 5 | 2.02 | 2.11 | 1.95 | 1.97 | 2.02 | 2.07 | a1.90 | 1.87 | 1.84 | 1.96 | 1.79 | 1.76 |
| 6 | 2.08 | 2.09 | 1.94 | 1.96 | 2.06 | 2.07 | a1.89 | 1.89 | 1.83 | 1.96 | 1.79 | 1.75 |
| 7 | 2.10 | 2.09 | 1.91 | 1.96 | 2.03 | 2.07 | a1.88 | 1.85 | 1.84 | 1.95 | 1.77 | 1.75 |
| 8 | 2.08 | 2.07 | 1.92 | 1.95 | 2.02 | 2.07 | a1.87 | 1.85 | 1.82 | 1.92 | 1.77 | 1.74 |
| 9 | 2.05 | 2.05 | 1.92 | 1.93 | 2.04 | 2.07 | a1.86 | 1.84 | 1.82 | 1.91 | 1.79 | 1.74 |
| 10 | 2.05 | 2.03 | 1.93 | 1.92 | 2.17 | 2.07 | 1.86 | 1.87 | 1.80 | 1.92 | 1.80 | 1.72 |
| 11 | 2.01 | 2.03 | 1.95 | 1.91 | 2.20 | 2.07 | a1.85 | 1.86 | 1.81 | 1.91 | 1.80 | 1.69 |
| 12 | 2.00 | 2.06 | 1.98 | 2.10 | 2.20 | 2.07 | a1.83 | 1.87 | 1.89 | 1.90 | 1.80 | 1.67 |
| 13 | 2.01 | 2.08 | 1.97 | 2.16 | 2.20 | 2.07 | 1.85 | 1.87 | 1.98 | 1.90 | 1.79 | 1.65 |
| 14 | 2.00 | 2.06 | 1.96 | 2.17 | 2.20 | a2.06 | 1.89 | 1.85 | 2.00 | 1.87 | 1.78 | 1.66 |
| 15 | 1.99 | 2.03 | 1.95 | 2.18 | 2.20 | a2.05 | 1.93 | 1.82 | 2.00 | 1.84 | 1.80 | 1.67 |
| 16 | 1.97 | 2.00 | 1.96 | 2.13 | 2.13 | a2.04 | 1.93 | 1.85 | 2.02 | 1.82 | 1.81 | 1.70 |
| 17 | 1.96 | 1.97 | 1.97 | 2.09 | 2.07 | a2.03 | 1.99 | 1.89 | 2.05 | 1.79 | 1.81 | 1.72 |
| 18 | 1.92 | 1.98 | 1.97 | 2.07 | 2.07 | a2.02 | 1.98 | 1.92 | 2.02 | 1.77 | 1.82 | 1.74 |
| 19 | 1.90 | 1.98 | 1.95 | 2.06 | 2.07 | a2.01 | 1.99 | 1.93 | 1.99 | 1.74 | 1.85 | 1.83 |
| 20 | 1.93 | 1.99 | 1.93 | 2.05 | 2.07 | 2.00 | 1.99 | 1.94 | 1.99 | 1.72 | 1.92 | 1.85 |
| 21 | 1.95 | 1.99 | 1.92 | 2.06 | 2.07 | a1.97 | 1.98 | 1.92 | 2.00 | 1.67 | 1.92 | 1.87 |
| 22 | 1.92 | 1.98 | 1.92 | 2.05 | 2.07 | 1.94 | 1.97 | 1.93 | 1.99 | 1.66 | 1.92 | 1.87 |
| 23 | 1.94 | 1.97 | 1.94 | 2.05 | 2.07 | 1.94 | 1.94 | 1.92 | 1.96 | 1.73 | 1.93 | 1.89 |
| 24 | 1.96 | 2.00 | 1.94 | 2.05 | 2.07 | a1.95 | 1.90 | 1.92 | 1.94 | 1.70 | 1.92 | 1.86 |
| 25 | 1.95 | 2.00 | 1.93 | 2.05 | 2.07 | a1.95 | 1.90 | 1.90 | 1.94 | 1.69 | 1.90 | 1.84 |
| 26 | 1.95 | 2.00 | 1.93 | 2.05 | 2.07 | a2.00 | 1.89 | 1.89 | 1.92 | 1.75 | 1.89 | 1.82 |
| 27 | 1.97 | 1.97 | 1.95 | 2.05 | 2.07 | 2.07 | 1.89 | 1.88 | 1.91 | 1.77 | 1.88 | 1.83 |
| 28 | 1.97 | 1.95 | 1.97 | 2.05 | 2.07 | a2.08 | 1.88 | 1.88 | 1.93 | 1.75 | 1.84 | 1.83 |
| 29 | 1.98 | 1.94 | 1.99 | 2.05 | 2.07 | a2.08 | 1.88 | 1.85 | 1.93 | 1.75 | 1.83 | 1.82 |
| 30 | 1.98 | 1.92 | 1.99 | 2.03 | ----- | a2.05 | 1.90 | 1.82 | 1.93 | 1.75 | 1.84 | 1.84 |
| 31 | 1.98 | ----- | 1.99 | 2.00 | ----- | a2.02 | ----- | 1.83 | ----- | 1.72 | 1.83 | ----- |

a No gage-height record; gage height estimated on basis of recorded range in stage when available and weather records.

930. Deep River at Lake George Outlet at Hobart, Ind.

Location.--Lat 41°32'10", long 87°15'25", in NW¼ sec.32, T.36 N., R.7 W., on left bank at upstream side of highway bridge, 300 ft upstream from Duck Creek and 400 ft downstream from Lake George Dam.

Drainage area.--125 sq mi.

Records available.--April 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 588.17 ft above mean sea level, datum of 1929 (levels by Indiana Flood Control and Water Resources Commission). Prior to July 30, 1952, staff gage and July 30, 1952, to July 20, 1955, water-stage recorder, at site 400 ft upstream at datum 11.80 ft higher.

Average discharge.--13 years, 98.1 cfs.

Extremes.--Maximum discharge during year, 1,260 cfs Feb. 11 (gage height, 10.65 ft); minimum, 7.4 cfs Sept. 10 (gage height, 3.61 ft).
1947-60: Maximum discharge, 3,880 cfs Oct. 11, 1954 (gage height, 15.48 ft, present datum, site then in use); minimum, 2.0 cfs (regulated) Oct. 8, 1956; minimum gage height, 3.35 ft Sept. 21, 1956.

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

Revisions (water years).--WSP 1337: 1953, drainage area. WSP 1507: 1956.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.6 | 7.0 | 7.0 | 427 |
| 3.8 | 16 | 9.0 | 820 |
| 4.0 | 30 | 11.0 | 1,380 |
| 4.5 | 83 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|---------|-------|----------|-------|-----------|-------|-----------|-------|-------|
| 1 | 76 | 170 | 89 | 184 | 177 | 62 | 640 | 107 | 89 | 46 | 14 | 10 |
| 2 | 50 | 164 | 83 | 157 | 177 | 61 | 495 | 101 | 68 | 49 | 14 | *9.1 |
| 3 | 37 | 138 | 89 | b136 | 150 | 58 | 382 | 83 | 52 | 184 | 26 | 9.8 |
| 4 | 35 | 235 | 89 | b120 | 131 | 56 | 310 | 72 | 42 | 352 | 35 | 10 |
| 5 | 54 | 564 | 107 | 101 | 142 | 54 | 240 | 62 | 46 | 367 | 27 | 9.8 |
| 6 | 240 | 640 | 144 | 89 | 434 | 52 | 212 | 62 | 45 | 226 | 22 | 10 |
| 7 | 412 | 478 | 144 | 83 | 640 | 50 | 177 | 71 | 48 | 144 | 23 | 10 |
| 8 | 397 | 324 | 119 | 76 | 512 | 48 | 144 | 67 | 32 | 107 | 18 | 9.8 |
| 9 | 268 | 240 | 101 | 68 | 367 | 48 | 119 | 83 | 28 | 83 | 19 | 8.4 |
| 10 | 184 | 198 | 89 | 68 | 570 | 48 | 101 | 101 | 28 | 73 | 16 | 8.0 |
| 11 | 254 | 164 | 107 | 64 | 1,200 | 47 | 95 | 107 | 26 | 68 | 15 | 8.8 |
| 12 | 324 | 138 | 226 | 247 | 1,200 | 46 | 89 | 101 | 69 | 58 | 16 | 9.8 |
| 13 | 254 | 131 | 254 | 870 | 700 | 52 | 89 | 89 | 310 | 49 | 15 | 9.1 |
| 14 | 170 | 198 | 212 | 920 | 400 | 58 | 89 | 76 | 660 | 41 | 14 | 9.4 |
| 15 | 131 | 254 | *170 | 745 | 290 | 65 | 198 | 64 | 720 | 37 | 21 | 12 |
| 16 | 107 | 240 | 144 | 620 | 200 | 74 | 240 | 63 | 620 | 32 | 27 | 13 |
| 17 | 89 | 212 | 125 | 461 | 175 | 74 | 478 | 107 | 564 | 28 | 22 | 18 |
| 18 | 77 | 164 | 113 | 352 | 160 | 68 | 700 | 131 | 478 | 26 | 16 | 19 |
| 19 | 68 | 138 | 101 | 268 | 140 | 66 | 564 | 125 | 352 | 24 | 22 | 54 |
| 20 | 58 | 113 | 95 | 184 | 125 | 66 | *362 | 119 | 254 | 22 | 33 | 44 |
| 21 | *51 | 101 | 89 | 150 | 110 | 72 | 296 | 119 | 212 | 21 | 28 | 30 |
| 22 | 49 | 101 | 78 | 125 | 98 | *70 | 240 | 113 | 170 | 24 | 21 | 21 |
| 23 | 62 | *113 | 71 | 110 | 88 | 68 | 198 | 119 | *150 | 40 | 16 | 16 |
| 24 | 119 | 138 | 68 | 94 | *78 | 67 | 157 | 107 | 125 | 33 | 15 | 17 |
| 25 | 184 | 170 | 66 | 82 | 77 | 66 | 125 | *95 | 101 | 27 | 14 | 15 |
| 26 | 226 | 164 | 71 | *73 | 71 | 76 | 107 | 78 | 83 | 29 | 13 | 14 |
| 27 | 212 | 138 | 107 | 77 | 67 | 128 | 95 | 66 | 71 | *28 | 12 | *14 |
| 28 | 184 | 119 | 226 | 101 | 66 | 495 | 83 | 57 | 63 | 21 | 12 | 12 |
| 29 | 164 | 107 | 338 | 113 | 66 | 770 | 78 | 53 | 56 | 18 | 10 | 14 |
| 30 | 138 | 89 | 310 | 138 | ----- | 845 | 101 | 72 | 48 | 16 | 12 | 12 |
| 31 | 138 | ----- | 226 | 157 | ----- | 795 | ----- | 95 | ----- | 15 | 12 | ----- |
| Total | 4,810 | 6,141 | 4,251 | 7,031 | 8,611 | 4,605 | 7,224 | 2,785 | 5,610 | 2,286 | 578 | 457.0 |
| Mean | 155 | 205 | 137 | 227 | 297 | 149 | 241 | 89.2 | 187 | 73.7 | 18.6 | 15.2 |
| Cfsm | 1.24 | 1.64 | 1.10 | 1.82 | 2.38 | 1.19 | 1.93 | 0.714 | 1.50 | 0.590 | 0.149 | 0.122 |
| In. | 1.43 | 1.83 | 1.27 | 2.10 | 2.57 | 1.37 | 2.15 | 0.82 | 1.67 | 0.68 | 0.17 | 0.14 |
| Calendar year 1959: Max | 1,810 | | | Min 11 | | Mean 163 | | Cfsm 1.30 | | In. 17.76 | | |
| Water year 1959-60: Max | 1,200 | | | Min 8.0 | | Mean 149 | | Cfsm 1.19 | | In. 16.20 | | |

Peak discharge (base, 700 cfs).--Jan. 13 (11 p.m.) 1,020 cfs (9.80 ft); Feb. 11 (6:30 p.m.) 1,260 cfs (10.65 ft); Mar. 30 (10 p.m.) 870 cfs (9.17 ft); Apr. 18 (11 a.m. to 1 p.m.) 720 cfs (8.55 ft); June 14 (12 p.m.) 770 cfs (8.81 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Jan. 23-25, Feb. 12-24, Mar. 3-26; discharge estimated on basis of weather records, engineer's notes, 2 discharge measurements, and records for stations on nearby streams.

932. Little Calumet River at Gary, Ind.

Location.--Lat 41°34'19", long 87°19'13", in SE $\frac{1}{4}$ sec.15, T.36 N., R.8 W., on right bank at upstream side of Pennsylvania Railroad bridge at Gary, 1.3 miles downstream from bridge on State Highway 53 and 1.5 miles upstream from confluence with Deep River.

Drainage area.--Indeterminate.

Records available.--June 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 580.00 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 94 cfs Feb. 11 or 12 (gage height, 8.38 ft); no flow Aug. 30 to Sept. 16.

1958-60: Maximum discharge, 196 cfs May 1, 1959 (gage height, 9.63 ft); no flow Sept. 13-20, 1959, Aug. 30 to Sept. 16, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow is generally west to east except during times of flood, when the flow passing the gage may be either east or west, depending on the stages in Hart ditch and in Deep River.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-20, May 7-23, Aug. 17 to Sept. 1, Sept. 17-30)

| | | | |
|------|-----|-----|-----|
| 5.95 | 0 | 7.0 | 22 |
| 6.0 | .3 | 7.5 | 41 |
| 6.2 | 2.3 | 8.0 | 67 |
| 6.4 | 5.0 | 9.0 | 141 |
| 6.7 | 12 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|------|------|------|-------|------|-------|------|-------|-------|------|-------|
| 1 | 6.3 | 14 | 14 | 16 | 35 | 20 | 87 | 29 | 13 | 18 | 1.7 | 0 |
| 2 | 5.8 | 15 | 13 | 14 | 35 | 19 | 87 | 27 | 12 | 17 | 1.6 | *0 |
| 3 | 5.0 | 15 | 13 | 13 | 29 | 19 | 80 | 26 | 13 | 33 | 3.4 | 0 |
| 4 | 5.2 | 16 | 13 | 13 | 30 | 18 | 67 | 22 | 12 | 29 | 2.2 | 0 |
| 5 | 5.6 | 24 | 16 | 12 | 40 | 18 | 61 | 19 | 11 | 26 | 2.0 | 0 |
| 6 | 16 | 30 | 21 | 12 | 52 | 17 | 52 | 18 | 9.1 | 24 | 1.9 | 0 |
| 7 | 15 | 26 | 22 | 11 | 70 | 16 | 46 | 18 | 7.4 | 22 | 3.7 | 0 |
| 8 | 14 | 23 | 20 | 11 | 58 | 16 | 45 | 17 | 6.1 | 20 | 2.3 | 0 |
| 9 | 14 | 21 | 18 | 11 | 52 | 15 | 41 | 18 | 4.8 | 17 | 2.0 | 0 |
| 10 | 14 | 19 | 17 | 11 | 59 | 15 | 39 | 21 | 4.1 | 17 | 1.9 | 0 |
| 11 | 18 | 17 | 19 | 21 | 74 | 15 | 35 | 21 | 3.6 | 15 | 1.7 | 0 |
| 12 | 17 | 17 | 32 | 43 | 88 | 15 | 35 | 21 | 16 | 13 | 1.6 | 0 |
| 13 | 16 | 17 | 27 | 68 | 85 | 16 | 31 | 19 | 31 | 11 | 1.6 | 0 |
| 14 | 15 | 21 | 23 | 80 | 86 | 18 | 31 | 17 | 41 | 9.1 | 2.0 | 0 |
| 15 | 13 | 25 | *20 | 70 | 52 | 21 | 35 | 16 | 50 | 7.6 | 1.7 | 0 |
| 16 | 12 | 24 | 19 | 56 | 41 | 25 | 35 | 16 | 55 | 6.3 | 1.4 | 0 |
| 17 | 11 | 21 | 17 | 46 | 37 | 26 | 45 | 22 | 61 | 5.0 | 1.0 | .8 |
| 18 | 9.8 | 19 | 16 | 39 | 34 | 24 | 52 | 22 | 61 | 3.4 | 1.0 | .5 |
| 19 | 8.6 | 17 | 15 | 36 | 31 | 23 | 55 | 24 | 55 | 2.8 | 1.4 | 4.9 |
| 20 | *8.1 | 15 | 14 | 34 | 30 | 22 | *58 | 24 | 50 | 2.3 | 3.6 | 1.7 |
| 21 | 7.4 | 15 | 13 | 27 | 28 | 24 | 52 | 26 | 45 | 2.0 | 2.5 | 1.0 |
| 22 | 6.7 | 14 | 12 | 26 | 27 | 27 | 50 | 26 | 41 | 3.3 | 2.1 | .8 |
| 23 | 7.8 | 17 | 11 | 25 | 26 | *24 | 45 | 26 | 37 | 6.1 | 1.7 | .8 |
| 24 | 12 | *20 | 11 | 24 | *24 | 22 | 41 | *24 | *35 | 3.6 | 1.2 | .8 |
| 25 | 14 | 23 | 11 | 24 | 24 | 20 | 37 | 22 | 31 | 2.9 | .8 | .8 |
| 26 | 16 | 23 | 15 | *23 | 23 | 19 | 35 | 20 | 27 | *3.6 | .6 | .6 |
| 27 | 17 | 19 | 23 | 23 | 22 | 24 | 33 | 17 | 26 | 3.4 | .4 | *.4 |
| 28 | 18 | 17 | 40 | 24 | 22 | 37 | 29 | 15 | 24 | 3.0 | .5 | .4 |
| 29 | 15 | 14 | 31 | 26 | 21 | 48 | 27 | 14 | 24 | 2.7 | .3 | .6 |
| 30 | 14 | 13 | 25 | 29 | --- | 58 | 29 | 16 | 21 | 2.3 | 0 | .5 |
| 31 | 14 | --- | 19 | 33 | --- | 73 | --- | 15 | --- | 2.0 | 0 | --- |
| Total | 369.3 | 571 | 580 | 901 | 1,215 | 754 | 1,397 | 638 | 827.1 | 333.4 | 49.8 | 14.6 |
| Mean | 11.9 | 19.0 | 18.7 | 29.1 | 41.9 | 24.3 | 46.6 | 20.6 | 27.6 | 10.8 | 1.61 | 0.49 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 196

Min 0

Mean 27.9

Cfsm -

In. -

Water year 1959-60: Max 88

Min 0

Mean 20.9

Cfsm -

In. -

* Discharge measurement or observation of no flow made on this day.

Note.--No gage-height record Oct. 21 to Mar. 26; discharge estimated on basis of weather records, 5 discharge measurements, and records for stations on nearby streams.

935. Burns ditch at Gary, Ind.

Location.--Lat 41°34'30", long 87°17'20", in N $\frac{1}{2}$ sec.13, T.36 N., R.8 W., on left bank on downstream side of bridge on Central Avenue, 0.4 mile east of Gary and 0.4 mile downstream from confluence of Deep River and Little Calumet River.

Drainage area.--About 160 sq mi.

Records available.--October 1943 to September 1960 (October 1950 to September 1955, high-water records only).

Gage.--Water-stage recorder. Datum of gage is 577.04 ft above mean sea level, datum of 1929. Prior to July 28, 1955, wire-weight gage at same site and datum.

Average discharge.--12 years (1943-50, 1955-60), 139 cfs.

Extremes.--Maximum discharge during year, 1,420 cfs Feb. 12 (gage height, 10.40 ft); minimum daily, 8.9 cfs Sept. 10; minimum gage height, 3.32 ft Sept. 11, 14.

1943-60: Maximum discharge, 3,430 cfs Oct. 11, 1954; maximum gage height, 16.44 ft Mar. 16, 1944, from graph based on gage readings; minimum discharge determined, 1.8 cfs Oct. 14, 1946.

Remarks.--Records good except those for periods of indefinite stage-discharge relation, which are fair. Burns ditch is an artificial channel which reverses the direction of flow of part of Little Calumet River and flows into Lake Michigan at Wickliffe.

Revisions (water years).--WSP 1034: 1944. WSP 1337: Drainage area.

Rating table, water year 1959-60, except periods of indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 30 to May 12, July 6 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 3.2 | 4.0 | 6.0 | 379 |
| 3.5 | 20 | 8.0 | 778 |
| 3.7 | 35 | 10.0 | 1,270 |
| 4.0 | 74 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 95 | 186 | 119 | 239 | 239 | 102 | 874 | 164 | 119 | 77 | 16 | 12 |
| 2 | 65 | 194 | 119 | 194 | 239 | 100 | 665 | 164 | 98 | 72 | 16 | 11 |
| 3 | 46 | 164 | 119 | 174 | 194 | 100 | 526 | 142 | 80 | 239 | 36 | 12 |
| 4 | 39 | 284 | 126 | 154 | 156 | 98 | 415 | 126 | 71 | 347 | 60 | 12 |
| 5 | 55 | 564 | 142 | 142 | 179 | 98 | 347 | 112 | 76 | 415 | 35 | 12 |
| 6 | 218 | 709 | 179 | 119 | 488 | 86 | 299 | 112 | 66 | 299 | 27 | 12 |
| 7 | 397 | 603 | 186 | 112 | 709 | 84 | 254 | 126 | 64 | 186 | 21 | 12 |
| 8 | 433 | 433 | 156 | 102 | 644 | 80 | 224 | 119 | 52 | 126 | 20 | 11 |
| 9 | 331 | 331 | 134 | 92 | 488 | 80 | 194 | 134 | 44 | 11 | 19 | 10 |
| 10 | 224 | 269 | 126 | 89 | 644 | 78 | 172 | 186 | 40 | 96 | 18 | 8.9 |
| 11 | 269 | 224 | 142 | 89 | 1,240 | 78 | 156 | 179 | 42 | 69 | 18 | 10 |
| 12 | 347 | 194 | 254 | 294 | 1,240 | 77 | 149 | 156 | 119 | 72 | 17 | 12 |
| 13 | 315 | 186 | 315 | 850 | 895 | 83 | 142 | 134 | 331 | 60 | 16 | 11 |
| 14 | 224 | 269 | 269 | 1,140 | 665 | 92 | 149 | 126 | 644 | 48 | 16 | 11 |
| 15 | 164 | 315 | *224 | 1,040 | 451 | 112 | 269 | 112 | 850 | 39 | 25 | 13 |
| 16 | 126 | 315 | 194 | 898 | 347 | 134 | 331 | 104 | 778 | 33 | 29 | 15 |
| 17 | 112 | 284 | 172 | 687 | 299 | 134 | 526 | 156 | 778 | 31 | 23 | 18 |
| 18 | 94 | 224 | 156 | 507 | 269 | 126 | 826 | 186 | 623 | 28 | 19 | 22 |
| 19 | 83 | 186 | 142 | 397 | 224 | 119 | 778 | 186 | 488 | 25 | 25 | 69 |
| 20 | *74 | 156 | 126 | 315 | 179 | 119 | 564 | 179 | 363 | 23 | 38 | 60 |
| 21 | 68 | 142 | 119 | 269 | 179 | 126 | *433 | 172 | 284 | 21 | 29 | 29 |
| 22 | 64 | 134 | 112 | 224 | 164 | 142 | 347 | 172 | 254 | 24 | 22 | 24 |
| 23 | 84 | 149 | 102 | 194 | 142 | *119 | 299 | 172 | *209 | 56 | 18 | 19 |
| 24 | 142 | *179 | 98 | 172 | *134 | 112 | 254 | *156 | 186 | 40 | 17 | 20 |
| 25 | 224 | 224 | 96 | 142 | 126 | 104 | 209 | 134 | 142 | 29 | 16 | 18 |
| 26 | 269 | 224 | 102 | *134 | 119 | 102 | 186 | 119 | 119 | *35 | 15 | 17 |
| 27 | 269 | 186 | 134 | 134 | 119 | 149 | 184 | 104 | 104 | 29 | 14 | 17 |
| 28 | 224 | 164 | 254 | 142 | 119 | 451 | 149 | 92 | 98 | 26 | 14 | 14 |
| 29 | 194 | 142 | 379 | 156 | 112 | 826 | 142 | 83 | 89 | 21 | 13 | 16 |
| 30 | 172 | 126 | 379 | 186 | ----- | 946 | 156 | 102 | 82 | 19 | 14 | 14 |
| 31 | 164 | ----- | 299 | 209 | ----- | 995 | ----- | 119 | ----- | 17 | 14 | ----- |
| Total | 5,585 | 7,760 | 5,474 | 9,596 | 11,103 | 6,052 | 10,199 | 4,328 | 7,293 | 2,773 | 680 | 541.9 |
| Mean | 180 | 259 | 177 | 310 | 383 | 195 | 340 | 140 | 243 | 87.8 | 21.9 | 18.1 |
| Cfsm | 1.12 | 1.62 | 1.11 | 1.94 | 2.39 | 1.22 | 2.12 | 0.875 | 1.52 | 0.549 | 0.137 | 0.113 |
| In. | 1.29 | 1.81 | 1.28 | 2.24 | 2.58 | 1.41 | 2.36 | 1.01 | 1.70 | 0.63 | 0.16 | 0.13 |

Calendar year 1959: Max 1,720 Min 9.0 Mean 214 Cfsm 1.34 In. 18.12
Water year 1959-60: Max 1,240 Min 8.9 Mean 195 Cfsm 1.22 In. 16.60

* Discharge measurement made on this day.

Note.--Stage-discharge relation indefinite July 13, 14, 17-20, 29-31, Aug. 1, 2, 6-16, 23-26, Aug. 28 to Sept. 5, Sept. 7, 9-16, 22-30; discharge estimated on basis of weather records and records for Deep River at Lake George Outlet at Hobart.

940. Little Calumet River at Porter, Ind.

Location.--Lat 41°37'18", long 87°05'13", in NE¼ sec.34, T.37 N., R.6 W., near center of span on downstream side of highway bridge, three-quarters of a mile northwest of Porter and 4.5 miles upstream from Salt Creek.

Drainage area.--62.9 sq mi.

Records available.--May 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 603.48 ft above mean sea level, datum of 1929. Prior to June 26, 1952, wire-weight gage at same site and datum.

Average discharge.--15 years, 71.6 cfs.

Extremes.--Maximum discharge during year, 1,120 cfs Feb. 11 (gage height, 8.18 ft); minimum, 24 cfs July 22, Aug. 17, 18; minimum gage height, 2.62 ft Aug. 19, Sept. 4.
1945-60: Maximum discharge, 3,110 cfs Oct. 10, 1954 (gage height, 11.65 ft); minimum, 15 cfs Dec. 6, 1958, result of freezeup; minimum gage height, 2.14 ft Aug. 22, 1949.

Remarks.--Records fair.

Revisions (water years).--WSP 1084: 1945. WSP 1337: 1946-47, drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-5, 10, 13-23, 30, Nov. 3, Nov. 8 to Dec. 8, Dec. 15-27, Dec. 31 to Jan. 2, Jan. 8-11, Jan. 16 to Feb. 5, Feb. 18 to Mar. 28, Aug. 20 to Sept. 5)

| | | | |
|-----|----|-----|-------|
| 2.6 | 23 | 5.0 | 177 |
| 2.8 | 28 | 6.0 | 325 |
| 3.2 | 44 | 7.0 | 590 |
| 3.5 | 59 | 8.0 | 1,020 |
| 4.0 | 88 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 33 | 137 | 76 | 70 | 127 | b52 | 199 | 95 | 35 | 32 | 26 | 28 |
| 2 | 30 | 110 | 76 | 64 | 102 | b49 | 157 | 76 | 33 | 30 | 26 | 28 |
| 3 | 28 | 95 | 88 | b60 | 82 | b47 | 127 | 62 | 32 | 147 | 97 | 28 |
| 4 | 32 | 156 | 102 | a54 | 76 | b44 | 110 | 54 | 30 | 118 | 199 | 27 |
| 5 | 70 | 385 | 118 | a50 | 95 | b42 | 102 | 52 | 39 | 59 | 93 | 27 |
| 6 | 204 | 289 | 137 | a45 | 336 | a40 | 88 | 54 | 35 | 46 | 49 | 27 |
| 7 | 345 | 177 | 118 | a41 | 385 | b37 | 82 | 70 | 32 | 39 | 42 | 27 |
| 8 | 177 | 137 | 102 | 37 | 225 | b37 | 76 | 59 | 30 | 35 | 37 | 26 |
| 9 | 110 | 110 | 95 | 35 | 177 | b37 | 70 | 56 | 30 | 32 | 32 | 28 |
| 10 | 82 | 95 | 82 | 37 | 386 | b37 | 70 | 70 | 28 | 33 | 32 | 27 |
| 11 | 167 | 88 | 102 | 39 | 920 | b37 | 70 | 70 | 28 | 35 | 30 | 27 |
| 12 | 157 | 76 | 177 | 189 | a500 | b37 | 76 | 62 | 110 | 32 | 27 | 28 |
| 13 | 95 | 82 | 157 | 750 | 225 | b37 | 64 | 54 | 308 | 32 | 26 | 30 |
| 14 | 70 | 147 | 118 | 460 | 167 | 37 | 70 | 49 | 590 | 30 | 26 | 27 |
| 15 | 59 | 177 | 95 | 345 | 127 | 39 | 167 | 44 | 302 | 28 | 27 | 28 |
| 16 | 54 | 137 | 88 | 289 | 110 | 49 | 157 | 44 | 177 | 28 | 26 | 30 |
| 17 | 46 | 110 | 76 | 187 | 110 | 49 | 245 | 70 | 167 | 27 | 24 | 32 |
| 18 | 42 | 82 | 70 | 147 | 95 | 46 | 365 | 59 | 137 | 27 | 24 | 32 |
| 19 | 39 | 70 | 62 | 118 | 82 | 54 | 199 | 54 | 95 | 26 | 46 | 62 |
| 20 | 37 | 62 | 56 | 95 | 70 | 64 | 137 | 76 | 76 | 28 | 157 | 44 |
| 21 | *39 | 59 | 54 | a80 | b70 | 76 | *110 | 88 | 62 | 26 | 102 | 35 |
| 22 | 49 | 59 | *49 | a62 | 70 | 70 | 95 | 82 | *56 | 26 | 59 | 33 |
| 23 | 64 | 64 | 44 | a57 | *64 | 64 | 82 | 64 | 52 | 56 | 44 | 32 |
| 24 | 118 | *70 | 44 | a54 | 62 | *64 | 70 | 54 | 46 | 37 | 39 | 32 |
| 25 | 167 | 102 | 46 | a53 | 62 | 59 | 64 | *49 | 39 | 30 | *37 | 32 |
| 26 | 167 | 88 | 59 | a55 | 59 | 62 | 62 | 46 | 35 | 33 | 35 | 32 |
| 27 | 167 | 82 | 82 | *64 | b58 | 114 | 55 | 42 | 33 | *35 | 32 | *32 |
| 28 | 747 | 82 | 118 | 82 | 54 | 465 | 1.76 | 0.950 | 39 | 35 | 28 | 32 |
| 29 | 110 | 70 | 118 | 95 | b54 | 490 | 52 | 37 | 33 | 27 | 32 | 32 |
| 30 | 102 | 70 | 110 | 127 | ----- | 410 | 76 | 44 | 32 | 26 | 32 | 33 |
| 31 | 118 | ----- | 82 | 137 | ----- | 307 | ----- | 39 | ----- | 26 | 30 | ----- |
| Total | 3,105 | 3,462 | 2,801 | 3,978 | 4,950 | 3,072 | 3,352 | 1,814 | 2,737 | 1,212 | 1,520 | 938 |
| Mean | 100 | 115 | 90.4 | 128 | 171 | 99.1 | 112 | 58.5 | 91.2 | 39.1 | 49.0 | 31.3 |
| Cfsm | 1.59 | 1.83 | 1.44 | 2.03 | 2.72 | 1.58 | 1.76 | 0.950 | 1.45 | 0.622 | 0.779 | 0.498 |
| In. | 1.83 | 2.04 | 1.66 | 2.34 | 2.93 | 1.82 | 1.99 | 1.07 | 1.62 | 0.72 | 0.90 | 0.56 |

Calendar year 1959: Max 986 Min 22 Mean 86.2 Cfsm 1.37 In. 18.59

Water year 1959-60: Max 920 Min 24 Mean 90.0 Cfsm 1.43 In. 19.46

Peak discharge (base, 700 cfs).--Jan. 13 (11 a.m.) 870 cfs (7.73 ft); Feb. 11 (5:30 a.m.) 1,120 cfs (8.18 ft); June 14 (3 a.m.) 710 cfs (7.34 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

b Stage-discharge relation affected by ice.

945. Salt Creek near McCool, Ind.

Location.--Lat 41°35'48", long 87°08'40", in SE $\frac{1}{4}$ sec. 6, T.36 N., R.6 W., or left bank on downstream side of highway bridge, 50 ft downstream from New York Central Railroad bridge, $\frac{1}{4}$ miles north of McCool, and 1.5 miles upstream from Little Calumet River.

Drainage area.--78.7 sq mi.

Records available.--May 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 594.10 ft above mean sea level, datum of 1929 (levels by Indiana Flood Control and Water Resources Commission). Prior to July 25, 1955, wire-weight gage at same site and datum.

Average discharge.--15 years, 71.6 cfs.

Extremes.--Maximum discharge during year, about 980 cfs Feb. 11, from peak discharge, drainage area relationship; minimum, 28 cfs Aug. 1-3, Sept. 11, 12, 27-29; minimum gage height, 2.83 ft Sept. 11, 12.

1945-60: Maximum discharge, 3,180 cfs Oct. 11, 1954 (gage height, 14.12 ft); minimum, 6.3 cfs Aug. 24, 1955 (gage height, 2.31 ft).

Remarks.--Records good except for periods of doubtful or no gage-height record or ice effect, which are fair.

Revisions (water years).--WSP 1337: 1946-48(M), 1950(M), drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 18 to Apr. 21)

| | | | |
|-----|-----|------|-----|
| 2.9 | 28 | 6.0 | 266 |
| 3.5 | 53 | 9.0 | 700 |
| 4.5 | 114 | 10.0 | 940 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 46 | 96 | 58 | 66 | 105 | 55 | 220 | 100 | 38 | 36 | 28 | 31 |
| 2 | 38 | 74 | 60 | 61 | 96 | 53 | 159 | 72 | 36 | 36 | 28 | 29 |
| 3 | 38 | 63 | 68 | 58 | 80 | 52 | 122 | 62 | 36 | 157 | 57 | 29 |
| 4 | 38 | 170 | 71 | 54 | 70 | 50 | 102 | 58 | 34 | 179 | 74 | 29 |
| 5 | 88 | 380 | 89 | 52 | 68 | 49 | 96 | 58 | 41 | 66 | 43 | 29 |
| 6 | 242 | 290 | 106 | 50 | 150 | 48 | 86 | 64 | 38 | 56 | 34 | 29 |
| 7 | 354 | 122 | 83 | 48 | 300 | 47 | 80 | 74 | 36 | 46 | 34 | 29 |
| 8 | 183 | 89 | 71 | 48 | 240 | 46 | 77 | 66 | 34 | 41 | 33 | 29 |
| 9 | 99 | 77 | 63 | 46 | 150 | 46 | 68 | 60 | 33 | 36 | 31 | 29 |
| 10 | 77 | 68 | 60 | 48 | 300 | 46 | 66 | 74 | 33 | 38 | 38 | 29 |
| 11 | 199 | 66 | 82 | 48 | 740 | 47 | 66 | 74 | 33 | 38 | 33 | 28 |
| 12 | 140 | 60 | 179 | 215 | 500 | 48 | 71 | 66 | 63 | 36 | 31 | 29 |
| 13 | 83 | 66 | 114 | 686 | 250 | 50 | 68 | 58 | 268 | 36 | 29 | 29 |
| 14 | 68 | 198 | 89 | 515 | 150 | 52 | 71 | 52 | 578 | 34 | 29 | 29 |
| 15 | 58 | 159 | 77 | 328 | 120 | 55 | 199 | 50 | 270 | 33 | 34 | 29 |
| 16 | 53 | 114 | 71 | 231 | 100 | 58 | 140 | 50 | 131 | 33 | 31 | 33 |
| 17 | 48 | 99 | 68 | 131 | 94 | 60 | 300 | 68 | 140 | 31 | 29 | 33 |
| 18 | 46 | 71 | 68 | 102 | 88 | 63 | 446 | 58 | 96 | 31 | 29 | 34 |
| 19 | 43 | 63 | 63 | 89 | 82 | 66 | 231 | 56 | 71 | 31 | 39 | 58 |
| 20 | 41 | 60 | 58 | 63 | 78 | 68 | 131 | 92 | 60 | 29 | 140 | 46 |
| 21 | **41 | 63 | 56 | 63 | 74 | 71 | *114 | 84 | 53 | 29 | 71 | 36 |
| 22 | 41 | 66 | *53 | 60 | 70 | 71 | 90 | 80 | *50 | 29 | 48 | 33 |
| 23 | 50 | 71 | 50 | 58 | *67 | *66 | 84 | 65 | 50 | 46 | 41 | 31 |
| 24 | 89 | *86 | 50 | 58 | 65 | 63 | 75 | 52 | 48 | 34 | 36 | 31 |
| 25 | 122 | 114 | 53 | 56 | 63 | 60 | 70 | *48 | 43 | 31 | 34 | 29 |
| 26 | 99 | 83 | 58 | 56 | 62 | 60 | 68 | 43 | 38 | 33 | *33 | 29 |
| 27 | 89 | 71 | 80 | *60 | 61 | 124 | 62 | 43 | 36 | *33 | 33 | *29 |
| 28 | 92 | 66 | 114 | 66 | 60 | 502 | 58 | 43 | 43 | 31 | 31 | 28 |
| 29 | 74 | 60 | 102 | 99 | 56 | 516 | 58 | 41 | 41 | 29 | 31 | 28 |
| 30 | 63 | 58 | 86 | 131 | ----- | 474 | 70 | 43 | 36 | 29 | 31 | 29 |
| 31 | 80 | ----- | 74 | 114 | ----- | 367 | ----- | 41 | ----- | 29 | 31 | ----- |
| Total | 2,822 | 3,123 | 2,372 | 3,800 | 4,439 | 3,433 | 3,548 | 1,895 | 2,527 | 1,401 | 1,244 | 943 |
| Mean | 91.0 | 104 | 76.5 | 123 | 153 | 111 | 118 | 61.1 | 84.2 | 45.2 | 40.1 | 31.4 |
| Cfs/m | 1.16 | 1.32 | 0.972 | 1.56 | 1.94 | 1.41 | 1.50 | 0.776 | 1.07 | 0.574 | 0.510 | 0.399 |
| In. | 1.34 | 1.47 | 1.12 | 1.80 | 2.09 | 1.63 | 1.67 | 0.89 | 1.19 | 0.63 | 0.59 | 0.45 |

Calendar year 1959: Max 970 Min 24 Mean 90.4 Cfs/m 1.15 In. 15.58
Water year 1959-60: Max 740 Min 28 Mean 86.2 Cfs/m 1.10 In. 14.90

Peak discharge (base, 800 cfs).--Jan. 13 (1 p.m.) 760 cfs (9.28 ft); Feb. 11 (time unknown) about 980 cfs; June 14 (8 a.m.) 664 cfs (8.77 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Feb. 1-29; discharge estimated on basis of weather records, discharge measurement, and records for stations on nearby streams. Stage-discharge relation affected by ice Jan. 2-5, 7, 22-23, Mar. 1-17. Doubtful gage-height record Apr. 22 to May 24; discharge computed on basis of weather records and records for Little Calumet River at Porter.

965. East Branch Coldwater River at Coldwater, Mich.

Location.--Lat 41°56'25", long 85°01'00", in NW¼ sec.21, T.6 S., R.6 W., on downstream side of Jay Street Bridge at Coldwater, 1 mile upstream from mouth.

Drainage area.--About 60 sq mi.

Records available.--October 1937 to September 1960. Monthly discharge only for October, November 1937, published in WSP 1307.

Gage.--Wire-weight gage, read twice daily, and crest-stage gage. Datum of gage is 930.72 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Oct. 1, 1947, staff gage at site 400 ft downstream at same datum.

Average discharge.--23 years, 45.2 cfs.

Extremes.--Maximum discharge during year, 236 cfs Jan. 13 (gage height, 5.87 ft); minimum, 3.8 cfs Oct. 5 (gage height, 4.23 ft).
1937-60: Maximum discharge, 735 cfs Apr. 24, 1950 (gage height, 6.60 ft); minimum, 0.1 cfs Dec. 13, 15-18, 1946, Sept. 12-18, 24, 1953, Sept. 21, 22, 1955.

Remarks.--Records good except those below 10 cfs, which are fair. Flow infrequently affected by contribution to or from Coldwater Lake. Regulation caused by dam at outlet of Marble Lake.

Revisions (water years).--WSP 1307: 1938-39(M), 1945(M).

Rating table, water year 1959-60 (gage height, in feet, and discharge,
in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 10)

| | | | |
|-----|-----|-----|-----|
| 4.1 | 2.5 | 4.8 | 62 |
| 4.2 | 7.0 | 5.6 | 186 |
| 4.4 | 20 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 5.6 | 8.2 | 29 | 39 | 82 | 55 | 122 | 82 | 55 | 75 | 16 | 9.4 |
| 2 | 5.2 | 8.2 | 31 | 39 | *78 | 55 | 120 | 70 | 54 | 73 | 28 | 10 |
| 3 | 5.2 | 7.6 | 31 | 39 | 66 | 54 | 124 | 70 | 50 | 103 | 27 | 9.4 |
| 4 | 4.3 | *22 | 29 | 41 | 65 | 51 | 116 | 69 | 43 | 87 | 27 | 9.4 |
| 5 | 4.3 | 20 | 37 | 33 | 63 | 44 | 110 | 68 | 46 | 91 | 25 | 9.4 |
| 6 | 17 | 19 | 37 | 25 | 62 | 46 | 108 | 58 | 38 | 82 | 25 | 9.4 |
| 7 | *16 | 16 | 35 | *39 | 104 | 42 | 91 | 72 | 35 | 73 | 24 | *9.4 |
| 8 | 12 | 13 | 34 | 39 | 96 | 46 | 91 | 60 | 32 | 68 | 24 | 9.4 |
| 9 | 12 | 15 | *33 | 35 | 91 | 40 | 98 | *49 | 30 | 60 | *24 | 12 |
| 10 | 11 | 16 | 31 | 35 | 116 | 36 | 86 | 59 | 25 | 57 | 24 | 7.0 |
| 11 | 12 | 16 | 32 | 30 | 173 | 38 | *80 | 62 | 20 | *52 | 23 | 9.4 |
| 12 | 14 | 16 | 36 | 84 | 150 | 38 | 80 | 56 | 40 | 48 | 20 | 11 |
| 13 | 12 | 18 | 43 | *186 | 153 | 40 | 63 | 57 | 57 | 46 | 19 | 9.4 |
| 14 | 12 | 58 | 37 | 168 | 133 | 38 | 69 | 57 | *103 | 43 | 21 | 8.8 |
| 15 | 12 | 57 | 58 | 181 | 122 | 36 | 82 | 51 | 127 | 37 | 14 | 9.4 |
| 16 | 10 | 32 | 38 | 182 | 115 | 35 | 84 | 49 | 109 | 34 | 19 | 8.8 |
| 17 | 10 | 36 | 38 | 186 | 108 | 34 | 134 | 55 | 156 | 35 | 18 | 7.6 |
| 18 | 10 | 28 | 38 | 145 | 100 | 37 | 151 | 54 | 144 | 33 | 18 | 7.6 |
| 19 | 10 | 30 | 34 | 140 | 103 | 19 | 142 | 54 | 133 | 35 | 17 | 15 |
| 20 | 10 | 31 | 36 | 142 | 88 | 19 | 132 | 65 | 109 | 34 | 17 | 21 |
| 21 | 8.2 | 31 | 36 | 121 | 86 | *28 | 127 | 78 | 102 | 31 | 19 | 15 |
| 22 | 8.2 | 27 | 36 | 118 | 86 | 36 | 120 | 85 | 106 | 29 | 15 | 13 |
| 23 | 9.4 | 29 | 32 | 112 | 75 | 33 | 118 | 84 | 120 | 35 | 12 | 12 |
| 24 | 11 | 33 | 34 | 118 | 68 | 35 | 110 | 79 | 109 | 31 | 12 | 11 |
| 25 | 11 | 31 | 34 | 69 | 61 | 29 | 97 | 72 | 106 | 29 | 11 | 11 |
| 26 | 11 | 31 | 33 | 92 | 65 | 43 | 160 | 62 | 94 | 47 | 10 | 12 |
| 27 | 10 | 31 | 36 | 88 | 68 | 36 | 110 | 65 | 85 | 32 | 10 | 12 |
| 28 | 10 | 30 | 47 | 80 | 68 | 69 | 94 | 73 | 78 | 30 | 11 | 12 |
| 29 | 10 | 30 | 47 | 79 | 57 | 88 | 82 | 70 | 75 | 27 | 8.2 | 11 |
| 30 | 8.8 | 29 | 42 | 75 | ----- | 110 | 80 | 69 | 70 | 27 | 8.2 | 11 |
| 31 | 10 | ----- | 39 | 84 | ----- | 132 | ----- | 68 | ----- | 17 | 8.2 | ----- |
| Total | 512.2 | 769.0 | 1,113 | 2,844 | 2,702 | 1,442 | 3,181 | 2,032 | 2,351 | 1,511 | 552.6 | 322.8 |
| Mean | 10.1 | 25.6 | 35.9 | 91.7 | 93.2 | 46.5 | 106 | 65.5 | 78.4 | 48.7 | 17.8 | 10.8 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 190 Min 3.3 Mean 43.5 Cfsm - In. -
Water year 1959-60: Max 186 Min 4.3 Mean 52.3 Cfsm - In. -

* Discharge measurement made on this day.

975. St. Joseph River at Three Rivers, Mich.

Location.--Lat 41°56'25", long 85°38'00", in S $\frac{1}{2}$ sec.18, T.6 S., R.11 W., on right bank in Scidmore Park at Three Rivers, 250 ft downstream from Rocky River and at mile 112.

Drainage area.--1,320 sq mi, approximately.

Records available.--May 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 781.34 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--7 years, 1,008 cfs.

Extremes.--Maximum discharge during year, 3,970 cfs Jan. 17 (gage height, 7.56 ft); minimum, 300 cfs Oct. 4; minimum daily, 402 cfs Sept. 7.
1953-60: Maximum discharge, that of Jan. 17, 1960; minimum daily, 96 cfs Aug. 30, 1953.

Remarks.--Records good. Flow regulated by powerplants above station.

Rating table, water 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 8 to June 16)

| | |
|-----|-------|
| 2.8 | 395 |
| 4.0 | 1,170 |
| 7.5 | 3,920 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|------------|--------|------------|--------|-----------|--------|--------|
| 1 | 594 | 563 | 1,230 | 1,350 | 1,980 | 1,510 | 3,520 | 1,790 | 1,510 | 1,620 | 970 | 627 |
| 2 | 588 | 584 | 1,080 | 1,290 | 2,060 | 1,530 | 3,720 | 1,690 | 1,660 | 1,520 | 732 | 622 |
| 3 | 542 | 571 | 1,130 | 1,240 | *2,020 | 1,570 | 3,600 | 1,670 | 1,530 | 1,680 | 720 | 612 |
| 4 | 476 | *876 | 1,060 | 1,360 | 1,920 | 1,510 | 3,340 | 1,890 | 1,380 | 1,750 | 938 | 532 |
| 5 | 555 | 978 | 1,160 | 972 | 1,870 | 1,440 | 3,130 | 1,430 | 1,360 | 1,960 | 913 | 529 |
| 6 | 908 | 946 | 1,190 | 1,030 | 2,110 | 1,450 | 2,910 | 1,400 | 1,200 | 2,050 | 780 | 461 |
| 7 | *1,150 | 1,070 | 1,210 | *1,160 | 2,000 | 1,450 | 2,700 | 1,720 | 700 | 2,000 | 836 | *402 |
| 8 | 1,170 | 1,110 | *1,220 | 1,230 | 2,220 | 1,390 | 2,600 | 1,610 | 749 | 1,900 | 870 | 460 |
| 9 | 1,200 | 1,000 | 1,240 | 1,040 | 2,430 | 1,390 | 2,500 | *1,610 | 1,000 | 1,810 | *793 | 554 |
| 10 | 1,240 | 899 | 1,190 | 1,060 | 2,600 | 1,320 | 2,320 | 1,870 | 902 | 1,550 | 797 | 534 |
| 11 | 1,140 | 951 | 1,260 | 1,110 | 2,660 | 1,320 | 2,110 | 1,880 | 880 | 1,500 | 821 | 496 |
| 12 | 1,150 | 972 | 1,310 | 1,520 | 2,840 | 1,220 | 2,030 | 1,780 | 1,020 | *1,520 | 768 | 510 |
| 13 | 1,140 | 968 | 1,390 | 2,350 | 2,910 | 1,290 | 1,860 | 1,740 | 1,420 | 1,480 | 779 | 503 |
| 14 | 1,120 | 1,100 | 1,420 | 3,110 | 2,870 | 1,200 | 1,940 | 1,720 | *1,820 | 1,330 | 774 | 530 |
| 15 | 1,070 | 1,280 | 1,400 | 3,620 | 2,910 | 1,210 | 1,980 | 1,630 | 2,270 | 1,210 | 738 | 580 |
| 16 | 978 | 1,360 | 1,460 | 3,870 | 2,820 | 1,230 | 2,060 | 1,560 | 2,590 | 1,200 | 700 | 594 |
| 17 | 859 | 1,440 | 1,360 | 3,910 | 2,660 | 1,240 | 2,320 | 1,550 | 3,070 | 1,140 | 698 | 566 |
| 18 | 720 | 1,350 | 1,380 | 3,700 | 2,500 | 1,250 | *2,550 | 1,420 | 3,110 | 909 | 558 | 542 |
| 19 | 752 | 1,410 | 1,340 | 3,420 | 2,440 | 1,240 | 2,620 | 1,350 | 3,110 | 998 | 592 | 594 |
| 20 | 700 | 1,450 | 1,260 | 3,160 | 2,350 | 1,230 | 2,650 | 1,600 | 3,080 | 1,010 | 640 | 637 |
| 21 | 716 | 1,390 | 1,200 | 2,910 | 2,220 | 974 | 2,620 | 1,630 | 3,010 | 956 | 660 | 639 |
| 22 | 672 | 1,350 | 1,140 | 2,470 | 2,200 | *1,110 | 2,490 | 1,570 | 2,830 | 930 | 676 | 670 |
| 23 | 702 | 1,320 | 1,090 | 2,630 | 1,890 | 1,370 | 2,320 | 1,760 | 2,820 | 943 | 616 | 693 |
| 24 | 764 | 1,350 | 998 | 2,510 | 1,850 | 1,560 | 2,270 | 1,820 | 2,550 | 877 | 586 | 774 |
| 25 | 748 | 1,400 | 1,010 | 2,340 | 1,730 | 1,200 | 2,210 | 1,790 | 2,390 | 870 | 674 | 801 |
| 26 | 709 | 1,380 | 960 | 2,220 | 1,620 | 1,060 | 2,030 | 1,680 | 2,250 | 890 | 670 | 757 |
| 27 | 605 | 1,280 | 1,090 | 2,200 | 1,770 | 1,130 | 1,880 | 1,630 | 2,120 | 924 | 614 | 664 |
| 28 | 688 | 1,280 | 1,160 | 2,200 | 1,630 | 1,540 | 1,920 | 1,780 | 2,110 | 1,030 | 637 | 670 |
| 29 | 747 | 1,190 | 1,120 | 2,260 | 1,630 | 1,950 | 1,870 | 1,790 | 1,900 | 1,040 | 636 | 705 |
| 30 | 742 | 1,020 | 1,350 | 2,230 | ----- | 2,400 | 1,790 | 1,780 | 1,680 | 900 | 563 | 760 |
| 31 | 748 | ----- | 1,320 | 2,150 | ----- | 3,070 | ----- | 1,690 | ----- | 918 | 544 | ----- |
| Total | 25,984 | 33,818 | 37,728 | 67,622 | 64,710 | 44,354 | 73,860 | 51,810 | 58,021 | 40,415 | 22,293 | 18,118 |
| Mean | 838 | 1,127 | 1,217 | 2,181 | 2,121 | 1,431 | 2,462 | 1,671 | 1,954 | 1,304 | 719 | 604 |
| Cfsm | 0.635 | 0.854 | 0.922 | 1.65 | 1.69 | 1.08 | 1.87 | 1.27 | 1.47 | 0.988 | 0.545 | 0.458 |
| In. | 0.73 | 0.95 | 1.06 | 1.91 | 1.82 | 1.25 | 2.08 | 1.46 | 1.63 | 1.14 | 0.63 | 0.51 |
| Calendar year 1959: Max | 3,570 | | | Min 220 | | Mean 1,118 | | Cfsm 0.847 | | In. 11.50 | | |
| Water year 1959-60: Max | 3,910 | | | Min 402 | | Mean 1,472 | | Cfsm 1.12 | | In. 15.17 | | |

* Discharge measurement made on this day.

985. Fawn River near White Pigeon, Mich.

Location.--Lat 41°47'00", long 85°35'00", in SW $\frac{1}{4}$ sec.10, T.8 S., R.11 W., on right bank a quarter of a mile downstream from bridge on county highway, 3.1 miles east of White Pigeon, and 3 $\frac{1}{2}$ miles upstream from outlet of Klinger Lake.

Drainage area.--191 sq mi.

Records available.--July 1903 to July 1904 (gage heights and discharge measurements only), October 1957 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 805.4 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 346 cfs June 17, 18 (gage height, 3.70 ft); minimum, 86 cfs Nov. 3 (gage height, 2.23 ft).
1957-60: Maximum discharge, 410 cfs Apr. 6 or 7, 1959, estimated on basis of records for nearby stations; minimum, 47 cfs Sept. 17, 1949 (gage height, 1.92 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Small diurnal fluctuation caused by powerplants above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Jan. 30 to Feb. 13, May 17 to Sept. 30)

| | |
|-----|-----|
| 2.2 | 82 |
| 2.5 | 126 |
| 3.0 | 220 |
| 3.6 | 350 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|--------|--------|----------|------------|-----------|-------|-------|-------|
| 1 | 134 | 113 | 140 | 162 | 230 | 220 | 264 | 255 | 226 | 220 | 182 | 132 |
| 2 | 118 | 101 | 140 | 164 | *228 | 210 | 274 | 249 | 218 | 220 | 162 | 129 |
| 3 | 116 | 100 | 140 | 156 | 230 | 210 | 280 | 238 | 206 | 230 | 151 | 121 |
| 4 | 113 | *116 | 140 | 151 | 230 | 210 | 278 | 240 | 198 | 250 | 144 | 116 |
| 5 | 98 | 129 | 140 | 129 | 230 | 210 | 276 | 247 | 188 | 250 | 142 | 120 |
| 6 | 118 | 146 | 140 | *126 | 230 | 210 | 267 | 240 | 184 | 260 | 140 | 118 |
| 7 | *137 | 146 | 140 | 134 | 250 | 200 | 262 | 251 | 172 | 250 | 144 | *112 |
| 8 | 137 | 139 | 150 | 156 | 270 | 200 | 255 | 264 | 170 | 250 | 137 | 106 |
| 9 | 139 | 132 | *144 | 162 | 280 | 200 | 253 | *262 | 164 | 240 | *134 | 106 |
| 10 | 142 | 126 | 144 | 160 | 300 | 200 | 247 | 258 | 158 | 240 | 131 | 101 |
| 11 | 149 | 128 | 142 | 156 | 300 | 200 | 242 | 249 | 149 | *240 | 131 | 98 |
| 12 | 150 | 126 | 149 | 184 | 300 | 200 | 238 | 242 | 160 | *240 | 134 | 95 |
| 13 | 150 | 123 | 164 | *226 | 300 | 190 | 228 | 240 | 218 | 232 | 136 | 95 |
| 14 | 150 | 149 | 158 | 258 | 300 | 190 | 222 | 232 | *253 | 224 | 131 | 98 |
| 15 | 150 | 164 | 162 | 290 | 300 | 190 | 226 | 220 | 287 | 216 | 128 | 106 |
| 16 | 140 | 170 | 160 | 306 | 290 | 190 | 220 | 216 | 308 | 198 | 126 | 116 |
| 17 | 130 | 174 | 160 | 301 | 290 | 190 | 235 | 214 | 332 | 176 | 123 | 118 |
| 18 | 110 | 166 | 156 | 280 | 280 | 190 | *258 | 212 | 342 | 168 | 123 | 112 |
| 19 | 110 | 178 | 156 | 271 | 280 | 190 | 269 | 200 | 328 | 172 | 126 | 124 |
| 20 | 110 | 164 | 147 | 240 | 270 | 190 | 294 | 196 | 315 | 168 | 124 | 123 |
| 21 | 113 | 160 | 146 | b240 | 270 | *192 | 310 | 206 | 310 | 156 | 126 | 136 |
| 22 | 104 | 158 | 147 | 232 | 260 | 188 | 310 | 212 | 308 | 147 | 140 | 140 |
| 23 | 92 | 150 | 139 | 236 | 260 | 190 | 303 | 212 | 287 | 168 | 151 | 149 |
| 24 | 113 | 150 | 126 | 244 | 250 | 190 | 296 | 210 | 278 | 164 | 146 | 151 |
| 25 | 118 | 150 | 131 | b240 | 240 | 200 | 290 | 212 | 269 | 139 | 139 | 142 |
| 26 | 115 | 150 | 142 | 240 | 230 | 200 | 287 | 204 | 253 | 140 | 137 | 147 |
| 27 | 113 | 150 | 147 | 249 | 230 | 200 | 283 | 204 | 247 | 147 | 140 | 146 |
| 28 | 118 | 150 | 156 | 253 | 230 | 210 | *274 | 208 | 244 | 168 | 142 | 149 |
| 29 | 112 | 140 | 164 | 260 | 220 | 218 | 269 | 214 | 240 | 200 | 140 | 142 |
| 30 | 98 | 130 | 166 | 242 | --- | 242 | 264 | 220 | 222 | 204 | 134 | 149 |
| 31 | 107 | --- | 164 | 230 | --- | 242 | --- | 222 | --- | 198 | 128 | --- |
| Total | 3,804 | 4,278 | 4,600 | 6,678 | 7,578 | 6,262 | 7,975 | 7,049 | 7,234 | 6,275 | 4,272 | 3,700 |
| Mean | 123 | 145 | 148 | 215 | 261 | 202 | 266 | 227 | 241 | 202 | 136 | 123 |
| Cfsm | 0.644 | 0.749 | 0.775 | 1.13 | 1.37 | 1.06 | 1.39 | 1.19 | 1.26 | 1.06 | 0.723 | 0.644 |
| In. | 0.74 | 0.83 | 0.90 | 1.30 | 1.48 | 1.22 | 1.55 | 1.37 | 1.41 | 1.22 | 0.83 | 0.72 |
| Calendar year 1959: Max | 400 | | | | | Min 53 | Mean 164 | Cfsm 0.859 | In. 11.68 | | | |
| Water year 1959-60: Max | 342 | | | | Min 92 | | Mean 190 | Cfsm 0.995 | In. 13.57 | | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Oct. 12-19, Nov. 23 to Dec. 8, Jan. 31, Feb. 1, Feb. 3 to Mar. 20, Mar. 23-27, July 1-10; discharge estimated on basis of recorded range in stage and records for St. Joseph River at Three Rivers, Kalamazoo River at Marshall, and East Branch Coldwater River at Coldwater.

990. St. Joseph River at Mottville, Mich.

Location.--Lat 41°48'05", long 85°45'15", in SW¹/₄ sec. 6, T. 8 S., R. 12 W., Michigan meridian, on right bank 500 ft upstream from bridge on U. S. Highway 112 at Mottville, 0.4 mile downstream from Michigan Gas and Electric Co. hydroelectric plant, 4 miles upstream from Pigeon River, and at mile 96.

Drainage area.--1,860 sq mi, approximately.

Records available.--October 1923 to September 1960. Monthly discharge only for October, November 1923, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 755.3 ft above mean sea level (Michigan Gas & Electric Co. bench mark). Prior to Oct. 1, 1951, at site 0.4 mile upstream at datum 4.2 ft higher.

Average discharge.--37 years, 1,525 cfs.

Extremes.--Maximum discharge during year, 4,600 cfs Apr. 3 (gage height, 6.48 ft); minimum, 48 cfs Sept. 7, 9; minimum daily, 646 cfs Sept. 10, 1923-60. Maximum discharge, 10,700 cfs Apr. 27, 1950 (gage height, 6.56 ft, site and datum then in use); minimum daily, 44 cfs Oct. 17, 1937.

Remarks.--Records good. Flow regulated by powerplants above station.

Revisions (water years).--WSP 1387: 1930, 1932, 1938, 1940-42, 1945.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 23, May 16 to Aug. 6, Aug. 21 to Sept. 15)

| | |
|-----|-------|
| 2.4 | 585 |
| 3.0 | 1,040 |
| 6.0 | 4,010 |
| 6.5 | 4,650 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 878 | 873 | 1,510 | 1,640 | 2,710 | 2,090 | 4,090 | 2,400 | 2,180 | 2,070 | 1,490 | a900 |
| 2 | 1,030 | 1,030 | 1,540 | 1,630 | *2,610 | 2,010 | 4,400 | 2,350 | 2,110 | 2,160 | 1,440 | a1,000 |
| 3 | 870 | *952 | 1,480 | 1,620 | 2,640 | 2,020 | 4,530 | 2,140 | 2,220 | 2,530 | 1,140 | a900 |
| 4 | 783 | 950 | 1,420 | 1,550 | 2,520 | 1,980 | 4,180 | 2,360 | 1,920 | 2,350 | 1,250 | a900 |
| 5 | 1,240 | 1,250 | 1,590 | 1,630 | 2,460 | 1,920 | 3,980 | 2,090 | 1,960 | 2,570 | 1,260 | a900 |
| 6 | 1,300 | 1,210 | 1,570 | *1,410 | 2,710 | 1,890 | 3,620 | 2,020 | 1,830 | 2,700 | 1,130 | a950 |
| 7 | 1,220 | 1,420 | 1,580 | 1,120 | 2,730 | 1,890 | 3,470 | 2,310 | 1,740 | 2,730 | 1,180 | *a800 |
| 8 | 1,550 | 1,370 | 1,400 | 1,600 | 2,690 | 1,870 | 3,210 | 2,540 | 1,390 | 2,570 | 1,370 | 745 |
| 9 | 1,630 | 1,110 | 1,530 | 1,560 | 2,960 | 1,850 | 3,150 | *2,490 | 1,260 | 2,610 | *1,270 | 961 |
| 10 | 1,500 | 1,300 | 1,460 | 1,350 | 3,340 | 1,810 | 2,980 | 2,580 | 1,570 | 2,370 | 1,120 | 846 |
| 11 | 1,590 | 1,180 | 1,690 | 1,320 | 3,340 | 1,770 | 2,620 | 2,590 | 1,430 | 2,010 | 1,120 | 766 |
| 12 | 1,370 | 1,210 | 1,720 | 1,720 | 3,490 | 1,770 | 2,670 | 2,440 | 1,480 | *2,210 | 1,180 | 874 |
| 13 | 1,440 | 1,500 | 1,660 | 2,700 | 3,590 | 1,750 | 2,510 | 2,420 | 1,750 | 2,070 | 876 | 798 |
| 14 | 1,650 | 1,470 | 1,550 | 3,370 | 3,550 | 1,650 | 2,580 | 2,380 | *2,310 | 1,910 | 1,070 | 804 |
| 15 | 1,440 | 1,400 | 1,760 | 4,360 | 3,570 | 1,610 | 2,590 | 2,270 | 2,800 | 1,830 | 1,240 | 831 |
| 16 | 1,340 | 1,580 | 1,660 | 4,470 | 3,590 | 1,610 | 2,560 | 2,210 | 3,060 | 1,770 | 1,120 | 898 |
| 17 | 1,160 | 1,770 | 1,660 | 4,530 | 3,480 | 1,640 | 2,770 | 2,190 | 3,650 | 1,730 | 1,030 | 982 |
| 18 | 1,160 | 1,480 | 1,690 | 4,530 | 3,280 | 1,650 | *3,180 | 2,180 | 3,800 | 1,470 | 1,000 | 785 |
| 19 | 1,070 | 1,800 | 1,730 | 4,310 | 3,160 | 1,650 | 3,200 | 1,950 | 3,770 | 1,500 | 776 | 1,150 |
| 20 | 881 | 1,650 | 1,640 | 4,000 | 3,040 | 1,650 | 3,240 | 2,170 | 3,780 | 1,470 | 808 | 890 |
| 21 | 1,120 | 1,650 | 1,430 | 3,530 | 2,900 | 1,600 | 3,310 | 2,290 | 3,750 | 1,430 | 914 | 925 |
| 22 | 902 | 1,950 | 1,690 | 3,300 | 2,800 | *1,620 | 3,190 | 2,250 | 3,550 | 1,370 | 1,200 | 974 |
| 23 | 915 | 1,630 | 1,350 | 3,140 | 2,740 | 1,490 | 3,040 | 2,270 | 3,400 | 1,190 | 931 | 914 |
| 24 | 1,020 | 1,730 | 1,450 | 3,320 | 2,360 | 1,760 | 2,900 | 2,490 | 3,350 | 1,190 | 940 | 857 |
| 25 | 978 | 1,570 | 1,380 | 3,030 | 2,430 | 1,910 | 2,890 | 2,370 | 2,960 | 1,450 | 955 | 1,080 |
| 26 | 1,210 | 1,780 | 1,280 | 2,820 | 2,170 | 1,720 | 2,700 | 2,370 | 2,920 | 1,670 | 923 | 1,130 |
| 27 | 978 | 1,770 | 1,530 | 2,830 | 2,240 | 1,670 | 2,570 | 2,400 | 2,680 | 1,370 | 840 | 1,060 |
| 28 | 944 | 1,630 | 1,480 | 2,850 | 2,320 | 1,720 | 2,430 | 2,280 | 2,640 | 1,150 | a900 | 1,130 |
| 29 | 993 | 1,690 | 1,590 | 2,900 | 2,230 | 2,270 | 2,510 | 2,450 | 2,550 | 1,350 | a1,100 | 863 |
| 30 | 882 | 1,360 | 1,550 | 2,900 | ----- | 2,880 | 2,450 | 2,440 | 2,380 | 1,500 | a900 | 1,010 |
| 31 | 1,040 | ----- | 1,570 | 2,840 | ----- | 3,550 | ----- | 2,390 | ----- | 971 | a800 | ----- |
| Total | 36,084 | 43,265 | 47,520 | 83,880 | 83,880 | 58,270 | 93,300 | 72,080 | 76,190 | 57,231 | 33,273 | 27,423 |
| Mean | 1,164 | 1,442 | 1,533 | 2,708 | 2,884 | 1,860 | 3,110 | 2,325 | 2,540 | 1,846 | 1,073 | 914 |
| Cfs/m | 0.626 | 0.775 | 0.824 | 1.45 | 1.55 | 1.01 | 1.67 | 1.25 | 1.37 | 0.972 | 0.577 | 0.491 |
| In. | 0.72 | 0.87 | 0.95 | 1.68 | 1.67 | 1.17 | 1.87 | 1.44 | 1.52 | 1.14 | 0.67 | 0.55 |
| Calendar year 1959: Max | 4,580 | | | Min | 282 | Mean | 1,546 | Cfs/m | 0.831 | In. | 11.27 | |
| Water year 1959-60: Max | 4,530 | | | Min | 646 | Mean | 1,946 | Cfs/m | 1.05 | In. | 14.25 | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of powerplant records.

995. Pigeon Creek at Hogback Lake Outlet, near Angola, Ind.

Location.--Lat 41°37'24", long 85°05'44", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.36, T.37 N., R.12 E., on right bank 200 ft north of lake outlet, 2 miles southeast of Flint, and 5.1 miles west of Angola.

Drainage area.--102 sq mi.

Records available.--October 1945 to September 1960. Prior to October 1947, published as "near Flint."

Gage.--Water-stage recorder. Datum of gage is 940.00 ft above mean sea level, datum of 1929. Prior to October 1947, wire-weight gage at site $\frac{1}{2}$ miles downstream at different datum. October 1947 to Aug. 3, 1953, staff gage at site 600 ft downstream at same datum.

Average discharge.--15 years, 81.8 cfs.

Extremes.--Maximum discharge during year, 339 cfs Jan. 18 (gage height, 11.70 ft); minimum, 18 cfs Sept. 14-19 (gage height, 7.82 ft).
1945-60: Maximum discharge, 744 cfs Apr. 8, 1950 (gage height, 14.95 ft); minimum, 5.2 cfs Oct. 19-25, 1953; minimum gage height, 7.24 ft Sept. 9, 10, 1953.

Remarks.--Records good except those for period of no gage-height record, which are fair.

Revisions (water years).--WSP 1144: 1948. WSP 1337: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-21, Jan. 15 to Mar. 10,
May 20 to June 11, July 30 to Aug. 13)

| | | | |
|-----|----|------|-----|
| 7.7 | 16 | 10.0 | 132 |
| 8.2 | 28 | 12.0 | 351 |
| 9.0 | 67 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 35 | 32 | 67 | 103 | 116 | 85 | 243 | 109 | 105 | 103 | 30 | 22 |
| 2 | 40 | 32 | 87 | 109 | 109 | 79 | 279 | 103 | *103 | 97 | 30 | 22 |
| 3 | 40 | *32 | *64 | 109 | *109 | 73 | 221 | *97 | 97 | 97 | 30 | 20 |
| 4 | 40 | 37 | 62 | 103 | 109 | 73 | 291 | 91 | 91 | 97 | *30 | 20 |
| 5 | 42 | 42 | 60 | 103 | 103 | 67 | 279 | 85 | 85 | 97 | 30 | 20 |
| 6 | 44 | 52 | 62 | 103 | 109 | 67 | 255 | 79 | 79 | 97 | 30 | 19 |
| 7 | 47 | 62 | 62 | 97 | 116 | 64 | 221 | 73 | 73 | 91 | 30 | *19 |
| 8 | 52 | 73 | 64 | 91 | 132 | 62 | *199 | 73 | 67 | 91 | 28 | 19 |
| 9 | 54 | 79 | 62 | 85 | 140 | 60 | 178 | 73 | 64 | 85 | 28 | 19 |
| 10 | 57 | 79 | 62 | 79 | 158 | *60 | 158 | 73 | 60 | 79 | 28 | 19 |
| 11 | 60 | 79 | 64 | 73 | 199 | 54 | 140 | 73 | 54 | 73 | 28 | 19 |
| 12 | 62 | 73 | 67 | 79 | 232 | 54 | 132 | 79 | 60 | 67 | 28 | 19 |
| 13 | 67 | 73 | 79 | 109 | 279 | 52 | 116 | 79 | 67 | 62 | 28 | 19 |
| 14 | 73 | 79 | 85 | 158 | 291 | 50 | 109 | 79 | 91 | 57 | 27 | 18 |
| 15 | 73 | 91 | 97 | 232 | 291 | 47 | 109 | 73 | 132 | 50 | 27 | 18 |
| 16 | 67 | 109 | 103 | 279 | 267 | 47 | 103 | 73 | 188 | 50 | 26 | 18 |
| 17 | 64 | 132 | 103 | 327 | 243 | 47 | 124 | 73 | 255 | 47 | 24 | 18 |
| 18 | 60 | 149 | 103 | 339 | 210 | 47 | 168 | 67 | 291 | 42 | 24 | 18 |
| 19 | 57 | 158 | 103 | 327 | 188 | 44 | 232 | 67 | 315 | 40 | 23 | 22 |
| 20 | 52 | 149 | 97 | a303 | 168 | 44 | 279 | 73 | 315 | 37 | 23 | 23 |
| 21 | 47 | 132 | 91 | a267 | 149 | 44 | 291 | 73 | 303 | 35 | 24 | 24 |
| 22 | 44 | 124 | 85 | a232 | 132 | 44 | 291 | 79 | 267 | 37 | 24 | 26 |
| 23 | 42 | 109 | 79 | a210 | 124 | 47 | 267 | 85 | 243 | 35 | 24 | 26 |
| 24 | 40 | 103 | 73 | a188 | 116 | 47 | 232 | 91 | 221 | 35 | 23 | 26 |
| 25 | 40 | 97 | 67 | a168 | 103 | 50 | 210 | 91 | 199 | 32 | 23 | 26 |
| 26 | 37 | 91 | 64 | a149 | 103 | 50 | 178 | 91 | 178 | 35 | 23 | 24 |
| 27 | 37 | 85 | 67 | a132 | 97 | 52 | 158 | 91 | 158 | 35 | 22 | 24 |
| 28 | 37 | 79 | *73 | a124 | 91 | 60 | 140 | 91 | 149 | 35 | 22 | 23 |
| 29 | 35 | 79 | 79 | a116 | 85 | 85 | 124 | 91 | *132 | 32 | 22 | 23 |
| 30 | 35 | 73 | 91 | a116 | ----- | 124 | 116 | 97 | 116 | 32 | 23 | 22 |
| 31 | 35 | ----- | 103 | a116 | ----- | 188 | ----- | 103 | ----- | 30 | 22 | ----- |
| Total | 1,515 | 2,584 | 2,405 | 5,026 | 4,569 | 1,967 | 5,913 | 2,581 | 4,556 | 1,832 | 804 | 635 |
| Mean | 48.9 | 86.1 | 77.6 | 162 | 158 | 63.5 | 197 | 83.3 | 152 | 59.1 | 25.9 | 21.2 |
| Cfsm | 0.479 | 0.844 | 0.761 | 1.59 | 1.55 | 0.623 | 1.93 | 0.817 | 1.49 | 0.579 | C.254 | 0.208 |
| In. | 0.55 | 0.94 | 0.88 | 1.83 | 1.67 | 0.72 | 2.15 | 0.94 | 1.66 | 0.67 | 0.29 | 0.23 |

Calendar year 1959: Max 442 Min 15 Mean 96.7 Cfsm 0.948 In. 12.87
Water year 1959-60: Max 339 Min 18 Mean 94.0 Cfsm 0.922 In. 12.53

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

1002.2 (Revised). North Branch Elkhart River near Cosperville, Ind.

Location.--Lat 41°29'32", long 85°26'54", in SW¹/₄NE¹/₄ sec.14, T.35 N., R.9 E., at downstream side of county road bridge over outlet of Waldron Lake at extreme west end of lake, 1.5 miles northeast of Cosperville and 6.6 miles northwest of Albion.

Drainage area.--133 sq mi.

Records available.--October 1950 to September 1960.

Gage.--Wire-weight gage read twice daily. Datum of gage is 880.00 ft above mean sea level, datum of 1929. Prior to Aug. 7, 1956, staff gage at same site and datum.

Average discharge.--10 years, 124 cfs.

Extremes.--Maximum discharge during year, 476 cfs June 19-22; maximum gage height, 7.99 ft June 20; minimum discharge, 14 cfs Sept. 7, 8; minimum gage height, 4.64 ft Sept. 8.

1950-60: Maximum discharge observed, 717 cfs May 13, 1956 (gage height, 8.78 ft); minimum, 2.2 cfs Sept. 17, 18, 21, 1959; minimum gage height, 4.50 ft Oct. 3, 1953.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 30 to June 19)

| | | | |
|-----|-----|-----|-----|
| 4.6 | 8.0 | 6.0 | 165 |
| 4.8 | 23 | 7.0 | 318 |
| 5.0 | 41 | 8.0 | 494 |
| 5.5 | 99 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 60 | 58 | 92 | 193 | 193 | b165 | 301 | 223 | 193 | 369 | 25 | 19 |
| 2 | 59 | 58 | 86 | 179 | 193 | b155 | 301 | 223 | 193 | 352 | 21 | 18 |
| 3 | 72 | *55 | 86 | 179 | 179 | b145 | 301 | 208 | 193 | 352 | 27 | 17 |
| 4 | 92 | 64 | 86 | b160 | *172 | b135 | 301 | 193 | 179 | 335 | 35 | 16 |
| 5 | 112 | 80 | 92 | *b140 | 165 | b130 | 301 | *172 | 179 | 318 | *38 | 15 |
| 6 | *144 | 86 | 92 | b145 | 193 | b125 | *285 | 165 | 172 | 301 | 36 | 15 |
| 7 | 144 | 86 | 99 | b155 | 208 | b123 | 285 | 179 | 165 | 285 | 35 | 15 |
| 8 | 132 | 80 | *99 | 158 | 208 | b120 | 269 | 193 | 158 | 269 | 35 | *14 |
| 9 | 125 | 80 | 99 | 151 | 208 | *b115 | 253 | 193 | 151 | 253 | 32 | 21 |
| 10 | 125 | 74 | 99 | 144 | 238 | b114 | 253 | 193 | *138 | 238 | 33 | 28 |
| 11 | 132 | 69 | 106 | 138 | 301 | b110 | 238 | 193 | 138 | 223 | 32 | 30 |
| 12 | 151 | 68 | 125 | 193 | 335 | 112 | 223 | 179 | 193 | 208 | 30 | 30 |
| 13 | 165 | 74 | 144 | 269 | 335 | 112 | 208 | 179 | 253 | 179 | 28 | 27 |
| 14 | 172 | 125 | 151 | 318 | 335 | 112 | 208 | 165 | 318 | 179 | 28 | 25 |
| 15 | 165 | 144 | 144 | 352 | 335 | 112 | 208 | 151 | 352 | 165 | 29 | 25 |
| 16 | 144 | 151 | 151 | 352 | 335 | 112 | 223 | 144 | 386 | 151 | 28 | 24 |
| 17 | 125 | 151 | 151 | 352 | 318 | 112 | 301 | 138 | 422 | 132 | 27 | 23 |
| 18 | 118 | 138 | 151 | 352 | 301 | 112 | 386 | 125 | 458 | 118 | 24 | 23 |
| 19 | 118 | 132 | 144 | 352 | 285 | 112 | 404 | 125 | 476 | 106 | 23 | 41 |
| 20 | 112 | 125 | 138 | 335 | 269 | 112 | 404 | 125 | 476 | 92 | 22 | 60 |
| 21 | 99 | 112 | 132 | 301 | 253 | 112 | 386 | 144 | 476 | *90 | 28 | 67 |
| 22 | 86 | 112 | 132 | 285 | 238 | 112 | 386 | 158 | 476 | 67 | 26 | 64 |
| 23 | 74 | 106 | 125 | 269 | 223 | 112 | 369 | 165 | 458 | 63 | 27 | 62 |
| 24 | 73 | 106 | 118 | b250 | 223 | 112 | 352 | 158 | 458 | 58 | 28 | 58 |
| 25 | 73 | 106 | 112 | b235 | 208 | 112 | 335 | 144 | 440 | 49 | 26 | 53 |
| 26 | 72 | 106 | 112 | b225 | 193 | 112 | 318 | 138 | 422 | 42 | 24 | 49 |
| 27 | 69 | 99 | 132 | b210 | 193 | 112 | 301 | 158 | 404 | 36 | 24 | 46 |
| 28 | 63 | 92 | 151 | 223 | 193 | 158 | 269 | 193 | 404 | 32 | 22 | 56 |
| 29 | 60 | 92 | 179 | 223 | 179 | 223 | 253 | 208 | 386 | 30 | 21 | 61 |
| 30 | 58 | 92 | 193 | 208 | ----- | 253 | 253 | 208 | 369 | 28 | 21 | 59 |
| 31 | 55 | ----- | 193 | 208 | ----- | 285 | ----- | 208 | ----- | 27 | 20 | ----- |
| Total | 3,249 | 2,921 | 3,914 | 7,254 | 7,009 | 4,148 | 8,875 | 5,348 | 9,486 | 5,137 | 855 | 1,061 |
| Mean | 105 | 97.4 | 126 | 234 | 242 | 134 | 296 | 173 | 318 | 166 | 27.6 | 35.4 |
| Cfsm | 0.789 | 0.732 | 0.947 | 1.76 | 1.82 | 1.01 | 2.23 | 1.30 | 2.38 | 1.25 | 0.208 | 0.266 |
| In. | 0.91 | 0.82 | 1.09 | 2.03 | 1.96 | 1.16 | 2.48 | 1.50 | 2.66 | 1.44 | 0.24 | 0.30 |

Calendar year 1959: Max 574 Min 14.2 Mean 147 Cfsm 1.11 In. 14.95
Water year 1959-60: Max 476 Min 14 Mean 162 Cfsm 1.22 In. 16.60

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1005. Elkhart River at Goshen, Ind.

Location.--Lat 41°35', long 85°50', near line between secs. 8 and 9, T.36 N., R.6 E., on right bank 20 ft downstream from River Avenue Bridge at Goshen and half a mile upstream from Rock Run.

Drainage area.--580 sq mi.

Records available.--April 1931 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 769.43 ft above mean sea level, datum of 1929. Prior to Nov. 20, 1931, chain gage at same site and datum.

Average discharge.--29 years, 512 cfs.

Extremes.--Maximum discharge during year, 2,910 cfs Apr. 18 (gage height, 7.29 ft); minimum, 132 cfs Oct. 3; minimum gage height, 2.10 ft Oct. 28, 1931-60; Maximum discharge, 5,440 cfs Apr. 4, 1950 (gage height, 10.15 ft); maximum gage height, 10.33 ft July 10, 1951; minimum daily discharge, 11 cfs Oct. 15, 1953.

Remarks.--Records fair. Flow regulated by three powerplants above station.

Revisions (water years).--WSP 1337: 1939(M), drainage area. WSP 1557: 1954.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 318 | 265 | 450 | 735 | 830 | 610 | 1,540 | 940 | 735 | 735 | 206 | 173 |
| 2 | 265 | 265 | 410 | 735 | 830 | 610 | 1,270 | 885 | 690 | 690 | 197 | 167 |
| 3 | 215 | 265 | 410 | 735 | 735 | 610 | 1,220 | 830 | 690 | 735 | 230 | 161 |
| 4 | 248 | *300 | 390 | 690 | *690 | 570 | 1,160 | 780 | 650 | 690 | 265 | 158 |
| 5 | 282 | 430 | 370 | *b418 | 735 | 570 | 1,100 | 735 | 650 | 650 | 248 | 158 |
| 6 | 352 | 490 | 390 | b520 | 995 | 570 | 1,050 | 690 | 650 | 610 | 230 | 158 |
| 7 | 430 | 410 | 410 | b650 | 1,270 | 610 | *995 | 995 | 610 | 530 | 230 | 155 |
| 8 | *410 | 390 | *410 | 690 | 995 | 570 | 940 | 1,100 | 610 | 530 | 224 | 152 |
| 9 | 390 | 390 | 410 | 650 | 940 | *610 | 885 | 940 | 570 | 530 | 215 | 182 |
| 10 | 370 | 370 | 390 | 650 | 1,380 | 610 | 830 | 940 | *570 | 490 | *218 | 215 |
| 11 | 410 | 335 | 410 | 650 | 2,260 | 570 | 830 | *940 | 530 | 470 | 215 | 215 |
| 12 | 470 | 352 | 530 | 995 | 1,985 | 570 | 780 | 885 | 850 | 450 | 206 | 209 |
| 13 | 450 | 370 | 690 | 2,040 | 1,540 | 530 | 780 | 830 | 1,320 | 430 | 197 | *203 |
| 14 | 430 | 728 | 610 | 2,150 | 1,270 | 530 | 780 | 830 | 1,600 | 410 | 197 | 200 |
| 15 | 410 | 1,160 | 570 | 1,760 | 1,220 | 530 | 830 | 780 | 1,440 | 390 | 206 | 200 |
| 16 | 410 | 940 | 570 | 1,600 | 1,270 | 530 | 1,100 | 735 | 1,220 | 370 | 206 | 176 |
| 17 | 390 | 780 | 570 | 1,440 | 1,220 | 490 | 1,820 | 780 | 1,270 | 370 | 200 | 182 |
| 18 | 370 | 650 | 570 | 1,320 | 1,160 | 470 | 2,700 | 735 | 1,380 | 352 | 194 | 173 |
| 19 | 370 | 610 | 570 | 1,270 | 995 | 490 | 2,150 | 735 | 1,320 | 318 | 188 | 300 |
| 20 | 390 | 610 | 530 | 1,220 | 940 | 490 | 1,760 | 735 | 1,270 | 318 | 203 | 390 |
| 21 | 390 | 570 | 530 | 1,050 | 940 | 470 | 1,490 | 735 | 1,220 | *318 | 248 | 335 |
| 22 | 318 | 570 | 530 | b1,000 | 885 | 470 | 1,440 | 780 | 1,220 | 282 | 248 | 318 |
| 23 | 282 | 570 | 490 | b940 | 830 | 470 | 1,320 | 780 | 1,160 | 282 | 218 | 300 |
| 24 | 318 | 570 | 470 | b900 | 780 | 470 | 1,270 | 780 | 1,160 | 282 | 209 | 282 |
| 25 | 335 | 570 | 490 | b860 | 780 | 470 | 1,220 | 735 | 1,100 | 265 | 197 | 265 |
| 26 | 335 | 530 | 470 | b840 | 690 | 470 | 1,160 | 735 | 995 | 248 | 188 | 300 |
| 27 | 318 | 510 | 530 | b820 | 690 | 470 | 1,160 | 780 | 940 | 282 | 179 | 248 |
| 28 | 265 | 490 | 780 | 885 | 690 | 937 | 1,050 | 780 | 885 | 282 | 179 | 248 |
| 29 | 335 | 470 | 885 | 885 | 690 | 1,660 | 995 | 780 | 830 | 215 | 179 | 230 |
| 30 | 300 | 430 | 885 | 885 | ----- | 1,980 | 995 | 780 | 780 | 179 | 173 | 248 |
| 31 | 282 | ----- | 780 | 885 | ----- | 1,820 | ----- | 780 | ----- | 200 | 170 | ----- |
| Total | 10,858 | 15,390 | 16,480 | 30,868 | 30,230 | 20,827 | 36,620 | 25,265 | 28,715 | 12,903 | 6,463 | 6,701 |
| Mean | 350 | 513 | 532 | 996 | 1,042 | 672 | 1,221 | 815 | 957 | 416 | 208 | 223 |
| Cfsm | 0.603 | 0.884 | 0.917 | 1.72 | 1.80 | 1.16 | 2.11 | 1.41 | 1.65 | 0.717 | 0.359 | 0.384 |
| In. | 0.70 | 0.99 | 1.06 | 1.98 | 1.94 | 1.34 | 2.35 | 1.63 | 1.84 | 0.83 | 0.41 | 0.43 |

Calendar year 1959: Max 2,770 Min 20 Mean 646 Cfsm 1.11 In. 15.16
 Water year 1959-60: Max 2,700 Min 152 Mean 659 Cfsm 1.14 In. 15.50

Peak discharge (base, 1,800 cfs).--Jan. 14 (1:30 a.m.) 2,320 cfs (6.43 ft); Feb. 11 (8:30 p.m.) 2,380 cfs (6.52 ft); Mar. 30 (1 p.m.) 2,040 cfs (5.32 ft); Apr. 18 (12 m.) 2,910 cfs (7.29 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1010. St. Joseph River at Elkhart, Ind.

Location.--Lat 41°41'30", long 85°58'25", in NE $\frac{1}{4}$ sec.5, T.37 N., R.5 E., on left bank 100 ft downstream from Elkhart River, 200 ft upstream from Main Street Bridge in Elkhart, and 1,900 ft downstream from Christiana Creek.

Drainage area.--3,339 sq mi.

Records available.--August 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 700.00 ft above mean sea level, datum of 1929.

Average discharge.--13 years, 3,174 cfs.

Extremes.--Maximum discharge during year, 8,600 cfs Jan. 18, Apr. 18 (gage height, 22.88 ft, result of regulation); minimum daily, 1,500 cfs Nov. 3.
1947-60: Maximum discharge, 18,400 cfs Apr. 5, 1950 (gage height, 27.82 ft); minimum daily, 564 cfs Nov. 1, 5, 1956.

Remarks.--Records good. Flow regulated by Elkhart Hydroelectric Plant, 2,400 ft upstream, and by hydroelectric plant on Elkhart River at Goshen.

Revisions.--WSP 1337: Drainage area.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)

| | |
|------|-------|
| 18.0 | 1,010 |
| 19.0 | 2,200 |
| 21.0 | 5,160 |
| 23.0 | 8,800 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| 1 | 2,260 | 2,010 | 2,700 | 3,400 | 4,720 | 3,850 | 6,850 | 4,570 | 4,250 | 4,560 | 2,420 | 1,830 |
| 2 | 1,940 | 1,560 | 2,850 | 3,380 | 4,520 | 3,770 | 6,490 | 4,380 | 3,900 | 4,320 | 2,550 | 1,760 |
| 3 | 2,020 | 1,500 | 2,820 | 3,420 | 4,400 | 3,750 | 6,490 | 4,140 | 4,040 | 4,900 | 2,200 | 1,930 |
| 4 | 1,880 | 1,960 | 2,790 | 3,260 | 4,340 | 3,660 | 6,670 | 4,240 | 3,860 | 4,780 | 2,490 | 1,860 |
| 5 | 1,880 | *2,450 | 3,020 | 3,000 | 4,200 | 3,570 | 6,490 | 3,750 | 3,710 | 4,590 | 2,440 | 1,810 |
| 6 | 2,600 | 2,920 | 2,930 | 2,630 | 4,830 | 3,500 | 5,960 | 3,760 | 3,650 | 4,640 | 2,440 | 1,900 |
| 7 | 2,420 | 2,790 | 2,810 | 2,750 | 5,410 | 3,560 | *5,810 | 4,390 | 3,600 | 4,660 | 2,240 | 1,600 |
| 8 | 2,910 | 2,780 | *2,750 | 3,380 | 4,740 | 3,500 | 5,400 | 4,800 | *2,890 | 4,390 | 2,500 | 1,760 |
| 9 | *2,900 | 2,400 | 2,870 | 3,160 | 5,080 | *3,460 | 5,260 | 4,650 | 2,750 | 4,350 | *2,500 | 1,750 |
| 10 | 2,770 | 2,570 | 2,850 | 3,010 | *5,900 | 3,350 | 5,170 | 4,620 | 3,120 | 4,270 | 1,970 | 1,980 |
| 11 | 2,900 | 2,400 | 3,050 | 2,730 | 5,960 | 3,320 | 4,600 | 4,690 | 2,870 | 3,730 | 2,170 | 2,010 |
| 12 | 2,770 | 2,440 | 3,370 | 3,940 | 6,300 | 3,290 | 4,600 | 4,570 | 3,230 | 3,810 | 2,130 | 1,760 |
| 13 | 2,700 | 2,610 | 3,460 | 6,310 | 6,850 | 3,270 | 4,450 | 4,340 | 4,230 | 3,710 | 2,220 | *1,950 |
| 14 | 3,000 | 3,360 | 3,320 | 7,410 | 7,220 | 3,160 | 4,240 | 4,320 | 5,860 | 3,440 | 1,930 | 1,750 |
| 15 | 2,780 | 3,780 | 3,370 | 7,800 | 6,670 | 3,090 | 4,550 | 4,200 | 6,020 | 3,370 | 2,170 | 1,900 |
| 16 | 2,530 | 3,560 | 3,300 | 7,800 | 6,490 | 3,080 | 4,760 | 4,060 | 5,890 | 3,240 | 2,060 | 1,970 |
| 17 | 2,660 | 4,140 | 3,240 | 7,800 | 6,150 | 3,080 | 5,800 | 4,040 | 6,490 | 3,210 | 2,030 | 1,870 |
| 18 | 2,380 | 3,480 | 3,260 | 7,800 | 5,830 | 3,050 | 8,000 | 3,880 | 7,030 | 2,970 | 1,820 | 1,930 |
| 19 | 2,200 | 3,310 | 3,270 | 7,220 | 5,610 | 3,070 | 7,410 | 3,850 | 6,850 | 2,750 | 1,900 | 2,430 |
| 20 | 2,130 | 3,800 | 3,150 | 6,490 | 5,350 | 3,070 | 6,670 | 3,960 | 6,670 | *2,890 | 1,820 | 2,600 |
| 21 | 2,220 | 3,730 | 3,850 | 5,820 | 5,190 | 2,980 | 6,490 | 4,140 | 6,670 | 2,740 | 2,040 | 2,320 |
| 22 | 2,280 | 3,840 | 3,070 | 5,400 | 5,030 | 3,000 | 5,940 | 4,170 | 6,310 | 2,620 | 2,150 | 2,400 |
| 23 | 1,960 | 3,460 | 2,680 | 5,510 | 4,760 | 2,760 | 5,840 | 4,090 | 5,990 | 2,550 | 2,220 | 2,450 |
| 24 | 2,400 | 3,260 | 2,770 | 5,280 | 4,560 | 2,950 | 5,450 | 4,270 | 5,880 | 2,430 | 1,940 | 1,900 |
| 25 | 2,100 | 3,120 | 2,720 | 5,330 | 4,250 | 3,220 | 5,430 | 4,160 | 5,540 | 2,510 | 1,940 | 2,290 |
| 26 | 2,290 | 3,160 | 2,750 | 4,970 | 4,020 | 3,040 | 5,150 | 4,140 | 5,180 | 3,040 | 1,850 | 2,370 |
| 27 | 2,570 | 3,780 | 4,400 | 4,160 | 2,970 | 4,980 | 4,980 | 4,370 | 5,170 | 2,720 | 1,910 | 2,260 |
| 28 | 2,080 | 2,930 | 3,150 | 4,840 | 4,200 | 3,680 | 4,750 | 4,120 | 4,860 | 2,350 | 1,930 | 2,270 |
| 29 | 2,030 | 3,110 | 3,550 | 4,850 | 4,010 | 5,180 | 4,690 | 4,360 | 4,830 | 2,500 | 1,890 | 2,070 |
| 30 | 2,420 | 2,780 | 3,590 | 4,900 | ----- | 6,490 | 4,730 | 4,510 | 4,630 | 2,780 | 2,010 | 2,100 |
| 31 | 2,320 | ----- | 3,410 | 4,850 | ----- | 7,030 | ----- | 4,450 | ----- | 2,140 | 1,780 | ----- |
| Total | 74,300 | 89,170 | 95,510 | 152,860 | 150,750 | 110,750 | 169,100 | 131,990 | 145,990 | 106,920 | 65,460 | 60,780 |
| Mean | 2,397 | 2,972 | 3,081 | 4,931 | 5,198 | 3,573 | 5,637 | 4,258 | 4,866 | 3,449 | 2,112 | 2,026 |
| Cfsm | 0.718 | 0.890 | 0.923 | 1.48 | 1.56 | 1.07 | 1.69 | 1.28 | 1.46 | 1.03 | 0.633 | 0.607 |
| In. | 0.83 | 0.99 | 1.06 | 1.71 | 1.68 | 1.23 | 1.89 | 1.48 | 1.63 | 1.19 | 0.73 | 0.68 |
| Calendar year 1959: Max | 7,800 | | | Min | 764 | | Mean | 3,096 | Cfsm | 0.927 | In. | 12.58 |
| Water year 1959-60: Max | 8,000 | | | Min | 1,500 | | Mean | 3,698 | Cfsm | 1.11 | In. | 15.10 |

* Discharge measurement made on this day.

1015. St. Joseph River at Niles, Mich.

Location.--Lat 41°49'45", long 86°15'35", in SW¹ sec.26, T.7 S., R.17 W., on right bank 100 ft upstream from Main Street Bridge at Niles, 0.6 mile downstream from dam of French Paper Co., 1 mile upstream from Dowagiac River, and at mile 44.

Drainage area.--3,620 sq mi, approximately.

Records available.--October 1930 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 635.02 ft above mean sea level, datum of 1929. Oct. 1, 1930, to Feb. 11, 1931, tape gage on Main Street Bridge and Feb. 12 to June 30, 1931, staff gage 50 ft upstream from present site (gage heights referred to mean sea level). Since Oct. 1, 1943, auxiliary gage is headwater gage at hydroelectric plant at Buchanan Dam, 8 miles downstream.

Average discharge.--30 years, 3,143 cfs.

Extremes.--Maximum discharge during year, 9,980 cfs Jan. 13 (gage height, 7.94 ft); minimum daily, 1,290 cfs Sept. 3.

1930-60: Maximum discharge, 20,200 cfs Apr. 5, 1950 (gage height, 13.10 ft); minimum daily, 420 cfs Aug. 30, 1931.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow regulated by powerplants above station.

Cooperation.--Gage-height record at auxiliary gage furnished by Indiana and Michigan Electric Co.

Revisions (water years).--WSP 1387: 1931, 1933-36, 1940-43, 1945-46(M), 1949(^).

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| 1 | 2,160 | 2,110 | 2,680 | 3,570 | 5,290 | 4,000 | 7,970 | 5,180 | 4,650 | 4,700 | 1,980 | 1,700 |
| 2 | 2,080 | 2,140 | 2,950 | 3,480 | 5,050 | 4,000 | 7,590 | 4,920 | 4,070 | 4,640 | 2,750 | 2,180 |
| 3 | 2,070 | *1,930 | 3,110 | 3,470 | *5,000 | 3,900 | 7,590 | 4,750 | 4,320 | 4,940 | 2,930 | 1,290 |
| 4 | 1,600 | 2,390 | 3,050 | 3,480 | 5,000 | 3,800 | 7,860 | 4,510 | 3,980 | 5,150 | 2,610 | 1,750 |
| 5 | *2,440 | 2,540 | 3,020 | 2,980 | 4,700 | 3,700 | 7,110 | 4,390 | 3,870 | 4,780 | 2,320 | 1,810 |
| 6 | 3,180 | 3,080 | 3,100 | *3,000 | 5,400 | 3,800 | 6,870 | 4,010 | 4,070 | 4,890 | 2,560 | 1,780 |
| 7 | 2,620 | 2,710 | 3,260 | 2,940 | 5,200 | 3,800 | 6,330 | 4,430 | 3,650 | 4,700 | 2,290 | 1,840 |
| 8 | 2,840 | 2,800 | *3,170 | 3,410 | 5,200 | 3,800 | 6,130 | 5,220 | 3,350 | 4,620 | 2,390 | *1,560 |
| 9 | 2,740 | 2,870 | 3,070 | 3,240 | 6,000 | 3,600 | 5,850 | 5,280 | 3,490 | 4,280 | 3,180 | 1,810 |
| 10 | 2,950 | 2,820 | 3,090 | 3,240 | 7,000 | 3,500 | 5,490 | 4,890 | 2,430 | 4,290 | *2,160 | 1,730 |
| 11 | 3,040 | 2,800 | 3,050 | 2,890 | 8,000 | 3,400 | 5,470 | *5,050 | 3,080 | 4,140 | 2,430 | 1,730 |
| 12 | 3,430 | 2,520 | 3,650 | 4,390 | 8,000 | 3,400 | 4,890 | 4,950 | 3,740 | 3,580 | 1,880 | 1,910 |
| 13 | 2,700 | 2,780 | 3,500 | 7,080 | 8,000 | 3,300 | 5,000 | 4,780 | 5,010 | *4,050 | 2,100 | 1,860 |
| 14 | 2,690 | 3,390 | 3,700 | 8,840 | 8,000 | 3,200 | 4,620 | 4,510 | 6,110 | 3,510 | 1,890 | 1,810 |
| 15 | 2,760 | 3,920 | 3,350 | 8,910 | 7,500 | 3,200 | 5,000 | 4,420 | *6,950 | 3,490 | 2,350 | 1,900 |
| 16 | 3,200 | 4,210 | 3,620 | 8,890 | 7,000 | 3,200 | 4,940 | 4,570 | 6,940 | 3,500 | 2,330 | 1,730 |
| 17 | 1,900 | 4,030 | 3,420 | 8,870 | 6,600 | 3,200 | 6,150 | 4,590 | 6,790 | 3,020 | 2,500 | 1,860 |
| 18 | 2,470 | 3,780 | 3,380 | 8,690 | 6,400 | 3,200 | 9,180 | 4,390 | 7,390 | 3,170 | 1,780 | 1,980 |
| 19 | 2,280 | 3,570 | 3,420 | 7,700 | 6,000 | 3,200 | *8,720 | 4,450 | 7,340 | 2,810 | 2,050 | 2,480 |
| 20 | 2,190 | 3,760 | 3,360 | 7,300 | 5,800 | 3,100 | 7,420 | 3,980 | 7,130 | 3,190 | 1,580 | 2,640 |
| 21 | 2,270 | 3,680 | 3,040 | 8,440 | 5,600 | 3,100 | 7,130 | 4,260 | 7,130 | 2,500 | 2,120 | 2,240 |
| 22 | 2,500 | 4,320 | 3,770 | 5,890 | 5,400 | *2,900 | 6,800 | 4,500 | 7,130 | 3,100 | 2,270 | 2,080 |
| 23 | 2,240 | 3,950 | 3,090 | 6,210 | 5,200 | 3,240 | 6,270 | 4,670 | 6,430 | 2,550 | 2,120 | 1,680 |
| 24 | 2,420 | 3,680 | 2,310 | 5,810 | 4,600 | 3,100 | 5,310 | 4,460 | 6,310 | 2,630 | 1,910 | 2,290 |
| 25 | 2,890 | 3,540 | 2,800 | 5,800 | 4,700 | 3,440 | 6,250 | 4,560 | 6,090 | 2,610 | 2,030 | 1,870 |
| 26 | 2,600 | 3,340 | 2,700 | 5,820 | 4,300 | 3,210 | 5,920 | 4,520 | 5,560 | 2,980 | 2,180 | 2,290 |
| 27 | 2,600 | 3,430 | 2,870 | 5,590 | 4,500 | 3,310 | 5,310 | 4,560 | 4,640 | 2,970 | 1,450 | 2,390 |
| 28 | 2,740 | 3,390 | 3,350 | 4,900 | 4,400 | 4,280 | 4,390 | 5,220 | 2,780 | 2,780 | 1,810 | 2,030 |
| 29 | 1,750 | 3,290 | 3,830 | 5,510 | 4,300 | 6,150 | 5,090 | 4,550 | 4,980 | 2,550 | 1,840 | 2,390 |
| 30 | 2,590 | 3,590 | 3,670 | 5,350 | ----- | 7,790 | 4,980 | 4,570 | 4,850 | 2,510 | 2,140 | 1,820 |
| 31 | 2,100 | ----- | 3,630 | 5,290 | ----- | 8,200 | ----- | 4,940 | ----- | 2,750 | 1,810 | ----- |
| Total | 78,020 | 96,340 | 99,750 | 168,980 | 168,140 | 118,420 | 168,540 | 143,230 | 156,680 | 111,080 | 67,850 | 58,270 |
| Mean | 2,517 | 3,211 | 3,218 | 5,451 | 5,798 | 3,820 | 6,285 | 4,620 | 5,223 | 3,583 | 2,189 | 1,942 |
| Cfsm | 0.695 | 0.887 | 0.889 | 1.51 | 1.63 | 1.06 | 1.74 | 1.28 | 1.44 | 0.990 | 0.605 | 0.556 |
| In. | 0.80 | 0.99 | 1.02 | 1.74 | 1.73 | 1.22 | 1.94 | 1.47 | 1.61 | 1.14 | 0.70 | 0.60 |

Calendar year 1959: Max 8,700 Min 758 Mean 3,423 Cfsm 0.946 In. 12.62
 Water year 1959-60: Max 9,160 Min 1,290 Mean 3,976 Cfsm 1.10 In. 14.96

* Discharge measurement made on this day.

Note.--No gage-height record Oct. 31, Feb. 3 to Mar. 22; discharge estimated on basis of powerplant record and records for stations at Elkhart, Ind., and at Motville, Mich.

STREAMS TRIBUTARY TO LAKE MICHIGAN

1025. Paw Paw River at Riverside, Mich.

Location.--Lat 42°11'10", long 86°22'05", in SE $\frac{1}{4}$ sec. 23, T.3 S., R.18 W., on left bank at upstream side of county highway bridge, three-quarters of a mile east of Riverside.

Drainage area.--391 sq mi.

Records available.--October 1951 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 588.80 ft above mean sea level, datum of 1929.

Average discharge.--9 years, 397 cfs.

Extremes.--Maximum discharge during year, 1,620 cfs Apr. 2 (gage height, 8.91 ft); minimum, 172 cfs Sept. 4 (gage height, 3.48 ft).

1951-60: Maximum discharge, 1,650 cfs Jan. 23, 1952 (gage height, 8.72 ft); maximum gage height that of Apr. 2, 1960; minimum, 139 cfs Sept. 18, 1959; minimum gage height, 2.92 ft Sept. 7, 1953, July 17, 1959.

Remarks.--Records good. Diurnal fluctuation, principally during low flow, caused by papermill above station.

Revisions.--WSP 1337: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 21 to Jan. 15,
June 19 to Aug. 28)

| | | | |
|-----|-----|-----|-------|
| 3.5 | 173 | 7.5 | 715 |
| 5.0 | 280 | 8.0 | 950 |
| 6.0 | 377 | 9.0 | 1,700 |
| 7.0 | 567 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 228 | 313 | 417 | 439 | 527 | 429 | *1,380 | 412 | 469 | 393 | 245 | 220 |
| 2 | 220 | 267 | 418 | 432 | 527 | 335 | 1,610 | 480 | 460 | 337 | 274 | 220 |
| 3 | 217 | 287 | 390 | 402 | *515 | 335 | 1,500 | 532 | 408 | 486 | 308 | 197 |
| 4 | 206 | 304 | 360 | 387 | 495 | 344 | *1,280 | 537 | 341 | 527 | 342 | 177 |
| 5 | 221 | *398 | 355 | *379 | 436 | 360 | 1,100 | 467 | 320 | 537 | 344 | 179 |
| 6 | *299 | 429 | 370 | 286 | 534 | 370 | 939 | 374 | 302 | 530 | 318 | 187 |
| 7 | 369 | 420 | 347 | 246 | 668 | 370 | 827 | 370 | 320 | 537 | 318 | 204 |
| 8 | 396 | 401 | 411 | 302 | 680 | 392 | 751 | 378 | 306 | 530 | 298 | *196 |
| 9 | 402 | 364 | 412 | 340 | 698 | 394 | 680 | 353 | 291 | 533 | 286 | 184 |
| 10 | 405 | 410 | *414 | 347 | 747 | 392 | 641 | 352 | 292 | 532 | *289 | 192 |
| 11 | 410 | 423 | 412 | 323 | 809 | 392 | *609 | *406 | 288 | 434 | 278 | 190 |
| 12 | 385 | 381 | 469 | 441 | 985 | 375 | 587 | 422 | 280 | 396 | 291 | 191 |
| 13 | 422 | 364 | 503 | 814 | 845 | 367 | 567 | 420 | 341 | *352 | 301 | 196 |
| 14 | 410 | 374 | 482 | 1,060 | 786 | 366 | 550 | 410 | 510 | 341 | 294 | 196 |
| 15 | 374 | 363 | 500 | 944 | 764 | 364 | 567 | 351 | *617 | 336 | 274 | 193 |
| 16 | 341 | 341 | 512 | 1,130 | 796 | 363 | 612 | 295 | 662 | 335 | 272 | 197 |
| 17 | 321 | 394 | 515 | 1,310 | 814 | 365 | 635 | 392 | 690 | 310 | 266 | 194 |
| 18 | 297 | 402 | 507 | 1,300 | 755 | 367 | 644 | 429 | 791 | 286 | 245 | 192 |
| 19 | 252 | 397 | 492 | 1,180 | 698 | 369 | *668 | 432 | 818 | 397 | 245 | 210 |
| 20 | 276 | 389 | 439 | 1,030 | 650 | 373 | 671 | 450 | 845 | 288 | 254 | 222 |
| 21 | 268 | 373 | 397 | 968 | 620 | 379 | 677 | 503 | 860 | 286 | 235 | 221 |
| 22 | 256 | 346 | 404 | 860 | 595 | 380 | 671 | 515 | 855 | 279 | 252 | 232 |
| 23 | 260 | 323 | 366 | 747 | 572 | *379 | 644 | 507 | 827 | 291 | 272 | 238 |
| 24 | 288 | 390 | 347 | 671 | 547 | 384 | 603 | 547 | 755 | 258 | 245 | 233 |
| 25 | 313 | 411 | 311 | 609 | 517 | 383 | 560 | 544 | 677 | 264 | 241 | 232 |
| 26 | 304 | 426 | 300 | 603 | 503 | 384 | 530 | 530 | 614 | 306 | 240 | 234 |
| 27 | 358 | 424 | 326 | 564 | 484 | 396 | 402 | 512 | 550 | 304 | 226 | 246 |
| 28 | 377 | 439 | 357 | 544 | 471 | 515 | 372 | 493 | 420 | 313 | 191 | 271 |
| 29 | 390 | 430 | 423 | 517 | 471 | 723 | 370 | 424 | 390 | 306 | 215 | 249 |
| 30 | 384 | 375 | 441 | 530 | ----- | 1,170 | 399 | 416 | 396 | 275 | 236 | 221 |
| 31 | 346 | ----- | 443 | 527 | ----- | 1,160 | ----- | 452 | ----- | 258 | 218 | ----- |
| Total | 9,995 | 11,358 | 12,830 | 20,232 | 18,409 | 13,675 | 22,046 | 13,705 | 15,695 | 11,537 | 8,313 | 6,324 |
| Mean | 322 | 379 | 414 | 653 | 635 | 441 | 735 | 442 | 523 | 372 | 268 | 211 |
| Cfsm | 0.824 | 0.969 | 1.06 | 1.67 | 1.62 | 1.13 | 1.88 | 1.13 | 1.34 | 0.951 | 0.685 | 0.540 |
| In. | 0.95 | 1.08 | 1.22 | 1.92 | 1.75 | 1.30 | 2.10 | 1.30 | 1.49 | 1.10 | 0.79 | 0.60 |
| Calendar year 1959: Max | 875 | | | Min | 144 | Mean | 352 | Cfsm | 0.900 | In. | 12.22 | |
| Water year 1959-60: Max | 1,610 | | | Min | 177 | Mean | 448 | Cfsm | 1.15 | In. | 15.60 | |

* Discharge measurement made on this day.

1035. Kalamazoo River at Marshall, Mich.

Location--Lat 42°15'55", long 84°57'55", on line between secs. 25 and 26, T.2 S., R.6 W., on left bank at upstream side of bridge on U. S. Highway 27 at Marshall.

Drainage area--449 sq mi.

Records available--October 1948 to September 1960. Monthly discharge only for October 1948, published in WSP 1307.

Gage--Water-stage recorder. Datum of gage is 877.09 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Nov. 11, 1948, wire-weight gage at same site and datum.

Average discharge--12 years, 325 cfs.

Extremes--Maximum discharge during year, 1,110 cfs Apr. 1 (gage height, 6.32 ft); minimum, 47 cfs Sept. 7; minimum daily, 92 cfs Sept. 7; minimum gage height, 3.47 ft June 11.

1948-60: Maximum discharge, 2,130 cfs Mar. 29, 1950 (gage height, 8.20 ft); minimum, 26 cfs Aug. 30, 1952; minimum daily, 36 cfs July 24, 1958.

Remarks--Records good except those for period of no gage-height record, which are fair. Diurnal fluctuation caused by powerplant above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 18 to Sept. 30)

| | | | |
|-----|-----|-----|-------|
| 3.6 | 84 | 6.0 | 950 |
| 4.0 | 169 | 6.3 | 1,100 |
| 5.0 | 505 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|--------|----------|--------|------------|--------|----------|-------|-------|
| 1 | 166 | 204 | 285 | 274 | 364 | 258 | 1,050 | 340 | 376 | 263 | 232 | 196 |
| 2 | 186 | *188 | 266 | 272 | *332 | 315 | 962 | 264 | 298 | 298 | 217 | 185 |
| 3 | 160 | 188 | 213 | 228 | 322 | 262 | 845 | 356 | 292 | 560 | 243 | 157 |
| 4 | 160 | 246 | 286 | 274 | 364 | 292 | 768 | 266 | 282 | 550 | 278 | 167 |
| 5 | 214 | 306 | 258 | 200 | 310 | 258 | 674 | 261 | 287 | 571 | 241 | 148 |
| 6 | 464 | 272 | 311 | 210 | 395 | 272 | 609 | 277 | 236 | 490 | 221 | *164 |
| 7 | 466 | 275 | *316 | *286 | 446 | 265 | 537 | 391 | 256 | 456 | 228 | 92 |
| 8 | 420 | 259 | 278 | 239 | 453 | 306 | 452 | 278 | 245 | 394 | *260 | 172 |
| 9 | 328 | 258 | 265 | 228 | 486 | 250 | 426 | 336 | 222 | 333 | 237 | 236 |
| 10 | 346 | 266 | 248 | 193 | 461 | 322 | 414 | *387 | 211 | 288 | 228 | 222 |
| 11 | 292 | 242 | 261 | 189 | 542 | 238 | 418 | 328 | 214 | *231 | 230 | 161 |
| 12 | 324 | 234 | 336 | 372 | 522 | 304 | 370 | 356 | 222 | 262 | 213 | 157 |
| 13 | 328 | 248 | 300 | 705 | 524 | 214 | 418 | 297 | 328 | 297 | 250 | 192 |
| 14 | 250 | 369 | 362 | 802 | 422 | 200 | 407 | 358 | 528 | 260 | 238 | 176 |
| 15 | *246 | 356 | 328 | 886 | 432 | 286 | 394 | 310 | 506 | 260 | 242 | 176 |
| 16 | 242 | 454 | 287 | 856 | 432 | 276 | 496 | 324 | 592 | 261 | 228 | 185 |
| 17 | 243 | 408 | 320 | 748 | 382 | 232 | 465 | 362 | 790 | 296 | 232 | 155 |
| 18 | 218 | 302 | 246 | 660 | 404 | 282 | 556 | 306 | 820 | 414 | 220 | 170 |
| 19 | 216 | 348 | 344 | 574 | 541 | a290 | 571 | 342 | 721 | 332 | 202 | 258 |
| 20 | 208 | 358 | 232 | 506 | 360 | a300 | *534 | 218 | 706 | 331 | 198 | 274 |
| 21 | 254 | 270 | 185 | 420 | 318 | *a250 | 484 | 338 | *524 | 316 | 184 | 190 |
| 22 | 196 | 234 | 206 | 422 | 334 | 312 | 446 | 340 | 409 | 322 | 186 | 203 |
| 23 | 198 | 320 | 225 | 390 | 354 | 276 | 430 | 348 | 448 | 363 | 192 | 240 |
| 24 | 192 | 264 | 222 | 332 | 311 | 236 | 395 | 374 | 409 | 294 | 212 | 173 |
| 25 | 188 | 316 | 223 | 354 | 342 | 270 | 377 | 342 | 390 | 266 | 194 | 228 |
| 26 | 176 | 300 | 248 | 290 | 234 | 244 | 350 | 274 | 352 | 310 | 240 | 298 |
| 27 | 191 | 270 | 227 | 375 | 319 | 256 | 348 | 314 | 330 | 304 | 188 | 320 |
| 28 | 202 | 256 | 313 | 327 | 281 | 456 | 289 | 376 | 303 | 306 | 158 | 210 |
| 29 | 215 | 261 | 290 | 372 | 314 | 651 | 314 | 375 | 317 | 256 | 170 | 165 |
| 30 | 168 | 246 | 300 | 294 | ----- | 838 | 306 | 376 | 302 | 266 | 202 | 161 |
| 31 | 210 | ----- | 276 | 347 | ----- | 1,060 | ----- | 386 | ----- | 219 | 323 | ----- |
| Total | 7,689 | 8,518 | 8,457 | 12,625 | 11,121 | 10,291 | 15,103 | 10,200 | 11,916 | 10,429 | 6,887 | 5,811 |
| Mean | 248 | 284 | 273 | 407 | 363 | 332 | 505 | 329 | 397 | 336 | 222 | 194 |
| Cfsm | 0.652 | 0.633 | 0.608 | 0.906 | 0.853 | 0.739 | 1.32 | 0.733 | 0.884 | 0.748 | 0.434 | 0.432 |
| In. | 0.64 | 0.71 | 0.70 | 1.05 | 0.92 | 0.85 | 1.25 | 0.84 | 0.93 | 0.86 | 0.37 | 0.48 |
| Calendar year 1959: Max | 970 | | | Min 64 | | Mean 280 | | Cfsm 0.624 | | In. 8.47 | | |
| Water year 1959-60: Max | 1,060 | | | Min 92 | | Mean 325 | | Cfsm 0.724 | | In. 9.86 | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of powerplant record and record for station near Kalamazoo.

1050. Battle Creek at Battle Creek, Mich.

Location.--Lat 42°19'55", long 85°09'15", in sec.5, T.2 S., R.7 W., on right bank 350 ft upstream from Emmett Street Bridge, at Battle Creek, and 3 miles upstream from mouth.

Drainage area.--241 sq mi.

Records available.--October 1930 to September 1931, October 1932 to July 1933, January 1934 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 823.24 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to May 14, 1951, staff gage at same site and datum.

Average discharge.--27 years (1930-31, 1934-60), 199 cfs.

Extremes.--Maximum discharge during year, 1,970 cfs Apr. 1 (gage height, 3.07 ft); minimum, 60 cfs Sept. 9-19 (gage height, 0.62 ft).
1930-31, 1932-60: Maximum discharge, 3,640 cfs Apr. 7, 1947 (gage height, 4.48 ft, from floodmark); minimum, 22 cfs Aug. 14, 1934; minimum gage height, about -0.5 ft in July 1936 and on Aug. 31, 1939, due to opening of gates at dam forming control.

Remarks.--Records good. Occasional slight regulation prior to November 1943.

Revisions (water years).--WSP 1387: 1931, 1944. WSP 1507: 1956.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.6 | 54 | 2.0 | 910 |
| .8 | 118 | 3.0 | 1,890 |
| 1.0 | 203 | 3.1 | 2,000 |
| 1.5 | 480 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|-------|-------|--------|-------|--------|-------|-------|-------|
| 1 | 78 | 134 | 172 | 263 | *223 | 150 | 1,940 | 232 | 360 | 247 | 118 | 75 |
| 2 | 72 | *138 | 162 | 268 | 218 | 154 | 1,700 | 232 | 366 | 223 | 108 | 72 |
| 3 | 72 | 138 | 162 | 228 | 194 | 162 | 1,410 | 237 | 338 | 268 | 111 | 69 |
| 4 | 69 | 150 | 167 | 198 | 190 | 150 | 1,150 | 237 | 289 | 273 | 130 | 66 |
| 5 | 81 | 180 | 180 | 150 | 198 | 150 | 964 | 237 | 247 | 289 | 138 | 63 |
| 6 | | *138 | 218 | 198 | 158 | 218 | 150 | 793 | 228 | 208 | 327 | 134 |
| 7 | 237 | 252 | *213 | 180 | 263 | 158 | 658 | 263 | 185 | 322 | 126 | *63 |
| 8 | 316 | 289 | 232 | 180 | 310 | 142 | 552 | 294 | 172 | 273 | *118 | 63 |
| 9 | 404 | 278 | 237 | 167 | 410 | 146 | 467 | 322 | 154 | 223 | 111 | 60 |
| 10 | 434 | 247 | 232 | 162 | 371 | 142 | 410 | *354 | 142 | 190 | 115 | 60 |
| 11 | 404 | 213 | 218 | 158 | 404 | 134 | 366 | 360 | 134 | 172 | 122 | 60 |
| 12 | 360 | 180 | 237 | 218 | 422 | 138 | 332 | 354 | 130 | 150 | 130 | 60 |
| 13 | 322 | 172 | 263 | 387 | 410 | 130 | 305 | 354 | *167 | 138 | 130 | 60 |
| 14 | 278 | 185 | 305 | 887 | 434 | 138 | 289 | 332 | 252 | 138 | 115 | 60 |
| 15 | 252 | 218 | 354 | 1,330 | 398 | 130 | 305 | 300 | 338 | 138 | 115 | 60 |
| 16 | 203 | 252 | 349 | *1,280 | 382 | 134 | 360 | 268 | 516 | 130 | 111 | 60 |
| 17 | 176 | 305 | 310 | 1,130 | 332 | 142 | 508 | 247 | 806 | 118 | 104 | 60 |
| 18 | 154 | 278 | 273 | 964 | 294 | 142 | 703 | 232 | 1,040 | 122 | 98 | 60 |
| 19 | 134 | 305 | 237 | 793 | 273 | 138 | 748 | 232 | 1,190 | 138 | 98 | 72 |
| 20 | 118 | 278 | 218 | 632 | 247 | 146 | *721 | 242 | 1,120 | *154 | 91 | 98 |
| 21 | 115 | 237 | 194 | 474 | 237 | *146 | 600 | 263 | 919 | 158 | 94 | 108 |
| 22 | 108 | 203 | 167 | 398 | 228 | 142 | 480 | 284 | 739 | 154 | 98 | 104 |
| 23 | 104 | 194 | 162 | 371 | 218 | 138 | 404 | 305 | 624 | 142 | 94 | 94 |
| 24 | 126 | 194 | 158 | 327 | 208 | 142 | 344 | 316 | 608 | 126 | 87 | 84 |
| 25 | 134 | 194 | 158 | 273 | 190 | 130 | 305 | 322 | 600 | 115 | 84 | 81 |
| 26 | 134 | 198 | 154 | 268 | 138 | 142 | 278 | 300 | 544 | 111 | 78 | 78 |
| 27 | 134 | 203 | 167 | 268 | 194 | 142 | 257 | 268 | 467 | 130 | 78 | 75 |
| 28 | 134 | 198 | 203 | 257 | 180 | 200 | 257 | 242 | 398 | 146 | 78 | 72 |
| 29 | 134 | 185 | 237 | 247 | 172 | 370 | 247 | 232 | 344 | 162 | 78 | 72 |
| 30 | 134 | 176 | 268 | 242 | ----- | 1,090 | 237 | 268 | 294 | 158 | 78 | 69 |
| 31 | 134 | ----- | 284 | 232 | ----- | 1,850 | ----- | 327 | ----- | 138 | 78 | ----- |
| Total | 5,693 | 6,392 | 6,871 | 13,090 | 7,956 | 7,368 | 18,090 | 8,684 | 13,691 | 5,573 | 3,248 | 2,141 |
| Mean | 184 | 213 | 222 | 422 | 274 | 238 | 603 | 280 | 456 | 180 | 105 | 71.4 |
| Cfs/m | 0.763 | 0.884 | 0.921 | 1.75 | 1.14 | 0.988 | 2.50 | 1.16 | 1.89 | 0.747 | 0.436 | 0.296 |
| In. | 0.88 | 0.99 | 1.06 | 2.02 | 1.23 | 1.14 | 2.79 | 1.34 | 2.11 | 0.86 | 0.50 | 0.33 |

Calendar year 1959: Max 937 Min 39 Mean 185 Cfs/m 0.768 In. 10.44
Water year 1959-60: Max 1,940 Min 60 Mean 270 Cfs/m 1.12 In. 15.25

* Discharge measurement made on this day.

1055. Kalamazoo River near Battle Creek, Mich.

Location.--Lat 42°19'26", long 85°11'51", in SW $\frac{1}{4}$ sec.1, T.2 S., R.8 W., near center of span on upstream side of bridge on Kendall Street in Battle Creek.

Drainage area.--824 sq mi.

Records available.--July 1937 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage read twice daily. Altitude of gage is 815 ft (from topographic map). Prior to Oct. 1, 1957, water-stage recorder at site 4.7 miles downstream at various datums. Oct. 1, 1957, to June 15, 1959, staff gage at bridge 1,800 ft upstream at different datum.

Average discharge.--23 years, 666 cfs.

Extremes.--Maximum discharge during year, 3,200 cfs Apr. 1 (gage height, 6.38 ft); minimum observed, 173 cfs Sept. 6 (gage height, 2.88 ft); minimum daily, 218 cfs Sept. 8. 1937-60: Maximum discharge, 7,290 cfs Apr. 7, 1947 (gage height, 9.13 ft, site and datum then in use); minimum, 50 cfs Sept. 22, 1939; minimum daily, 131 cfs Aug. 20, 1958.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Diurnal fluctuation, below 1,500 cfs. caused by powerplants above station.

Revisions (water years).--WSP 924: 1938-39. WSP 1387: 1938, 1945-46, 1948.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 10

Jan. 11 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-------|
| 3.1 | 277 | 2.9 | 184 | 5.0 | 1,770 |
| 4.2 | 869 | 3.5 | 539 | 6.3 | 3,110 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1 | 351 | 469 | 502 | 577 | *592 | 488 | *3,110 | 552 | 788 | 690 | 402 | 320 |
| 2 | 319 | *480 | 545 | 502 | 598 | 501 | 2,550 | 598 | 742 | 742 | 332 | 297 |
| 3 | 309 | 372 | 518 | 480 | 592 | 513 | *2,260 | 592 | 690 | 750 | 367 | 297 |
| 4 | 319 | 454 | 486 | 459 | 598 | 513 | 1,930 | 579 | 647 | 969 | 408 | 297 |
| 5 | 426 | 523 | 502 | 415 | 640 | 463 | 1,610 | 539 | 735 | 993 | 444 | 251 |
| 6 | *718 | 567 | 502 | 383 | 735 | 438 | 1,410 | 526 | 661 | 1,060 | 309 | *229 |
| 7 | 858 | 577 | *567 | 415 | 647 | 565 | 1,290 | 668 | 469 | 1,080 | a350 | 268 |
| 8 | 848 | 502 | 572 | 513 | 780 | 526 | 1,080 | 735 | 451 | 873 | *463 | 218 |
| 9 | 826 | 523 | 540 | 394 | 913 | 526 | 849 | 735 | 451 | 750 | a350 | 274 |
| 10 | 848 | 540 | 545 | 426 | 969 | 501 | 957 | *795 | 426 | 633 | a350 | 280 |
| 11 | 793 | 502 | 572 | 457 | 1,050 | 513 | 742 | 795 | 390 | 605 | a350 | 332 |
| 12 | 815 | 486 | 826 | 772 | 1,080 | 539 | 795 | 765 | 414 | 533 | a350 | 286 |
| 13 | 696 | 523 | 664 | *1,400 | 1,100 | 592 | 690 | 720 | *735 | 457 | a350 | 263 |
| 14 | 685 | 594 | 842 | 1,630 | 969 | 488 | 712 | 705 | 1,170 | 475 | 379 | 263 |
| 15 | 610 | 664 | 664 | 2,150 | 921 | 475 | 873 | 633 | 1,230 | 507 | 343 | 274 |
| 16 | 405 | 631 | 680 | *2,150 | 913 | 546 | 889 | 647 | 1,250 | 507 | 349 | 274 |
| 17 | 388 | 588 | 631 | 2,000 | 865 | 579 | 969 | 698 | 1,700 | 507 | 379 | 240 |
| 18 | 448 | 577 | 599 | 1,710 | 825 | 501 | 1,250 | 640 | 2,120 | 579 | 343 | 229 |
| 19 | 437 | 572 | 550 | 1,520 | 765 | 526 | 1,330 | 592 | 2,150 | 698 | 338 | 343 |
| 20 | 426 | 561 | 556 | 1,320 | 690 | 579 | *1,240 | 698 | 1,990 | *640 | 309 | 384 |
| 21 | 437 | 610 | 491 | 1,190 | 661 | *501 | 1,140 | 647 | 1,860 | 533 | 320 | 367 |
| 22 | 459 | 610 | 432 | 1,000 | 605 | 451 | 1,070 | 720 | 1,520 | 552 | 343 | 355 |
| 23 | 399 | 567 | 448 | 969 | 598 | 475 | 865 | 758 | 1,130 | 546 | 326 | 349 |
| 24 | 453 | 588 | 448 | 788 | 633 | 481 | 825 | 750 | 1,200 | 526 | 286 | 332 |
| 25 | 415 | 577 | 448 | 605 | 619 | 451 | 758 | 705 | 1,130 | 513 | 286 | 355 |
| 26 | 426 | 513 | 442 | 742 | 605 | 475 | 720 | 690 | 1,000 | 481 | 286 | 349 |
| 27 | 426 | 480 | 556 | 720 | 598 | 488 | 847 | 647 | 953 | 475 | 320 | 367 |
| 28 | 426 | 480 | 610 | 682 | 539 | 605 | 619 | 698 | 810 | 513 | 268 | 402 |
| 29 | 426 | 486 | 610 | 675 | 539 | 953 | 579 | 675 | 795 | 488 | 258 | 320 |
| 30 | 410 | 491 | 642 | 661 | ----- | 1,660 | 552 | 668 | 605 | 469 | 274 | 297 |
| 31 | 415 | ----- | 621 | 565 | ----- | 2,760 | ----- | 661 | ----- | 451 | 326 | ----- |
| Total | 16,217 | 16,117 | 17,411 | 28,270 | 21,639 | 19,672 | 34,291 | 20,801 | 30,212 | 19,595 | 10,586 | 9,112 |
| Mean | 523 | 537 | 562 | 912 | 746 | 635 | 1,143 | 671 | 1,007 | 632 | 341 | 304 |
| Cfsm | 0.635 | 0.652 | 0.682 | 1.11 | 0.905 | 0.771 | 1.39 | 0.814 | 1.22 | 0.767 | 0.414 | 0.369 |
| In. | 0.73 | 0.73 | 0.79 | 1.28 | 0.98 | 0.89 | 1.55 | 0.94 | 1.36 | 0.88 | 0.48 | 0.41 |
| Calendar year 1959: Max 2,200 Min 180 Mean 553 Cfsm 0.671 In. 9.12 | | | | | | | | | | | | |
| Water year 1959-60: Max 3,110 Min 218 Mean 666 Cfsm 0.808 In. 11.02 | | | | | | | | | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of 1 discharge measurement and records for stations at Comstock and at Marshall.

1060. Kalamazoo River at Comstock, Mich.

Location.--Lat 42°17'05", long 85°30'50", in NE¼ sec.19, T.2 S., R.10 W., on left bank at downstream side of bridge on River Street, in Comstock, a quarter of a mile downstream from Comstock Creek.

Drainage area.--1,010 sq mi, approximately.

Records available.--April to August 1931, October 1932 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 759.12 ft above mean sea level, datum of 1929. Prior to October 1936, staff gage and October 1936 to October 1945, wire-weight gage, at same site and datum.

Average discharge.--28 years (1932-60), 840 cfs.

Extremes.--Maximum discharge during year, 3,780 cfs Apr. 2 (gage height, 5.39 ft); minimum, 194 cfs Sept. 10 (gage height, 0.41 ft).
1931, 1932-60: Maximum discharge, 6,910 cfs Apr. 8, 1947 (gage height, 7.94 ft); minimum, 119 cfs May 29, 1958 (gage height, 0.09 ft).

Remarks.--Records good. Flow regulated by powerplants above station.

Revisions (water years).--WSP 824: 1933-36. WSP 1387: 1933, 1934(M), 1935, 1936(M), 1938(M), 1940(M), 1941.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-17, May 16 to Aug. 25)

| | | | |
|-----|-------|-----|-------|
| 0.9 | 385 | 3.0 | 1,920 |
| 1.0 | 440 | 5.0 | 3,400 |
| 1.5 | 810 | 5.4 | 3,790 |
| 2.0 | 1,210 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 440 | 615 | 742 | 924 | *956 | 864 | *3,190 | 980 | 1,030 | 964 | 693 | 481 |
| 2 | 446 | *615 | 717 | 802 | 1,000 | 846 | 3,760 | 952 | 1,100 | 805 | 484 | 494 |
| 3 | 418 | 585 | 750 | 802 | 1,030 | 810 | 3,630 | 873 | 1,110 | 1,440 | 617 | 494 |
| 4 | 402 | 569 | 725 | 855 | 924 | 802 | *3,090 | 864 | 681 | 1,540 | 701 | 514 |
| 5 | 446 | 940 | 784 | 653 | 855 | 742 | 2,720 | 837 | 873 | 1,550 | 669 | 470 |
| 6 | 932 | 891 | 864 | 549 | 1,090 | 759 | 2,410 | 837 | 916 | 1,200 | 578 | *517 |
| 7 | 1,490 | 932 | *750 | 600 | 1,160 | 793 | 2,080 | 980 | 661 | 1,350 | 638 | 458 |
| 8 | *1,080 | 828 | 882 | *784 | 1,270 | 768 | 1,730 | 1,220 | 845 | 1,160 | *776 | 452 |
| 9 | 1,200 | 924 | 948 | 768 | 1,280 | 759 | 1,500 | 1,140 | 630 | 972 | 535 | 440 |
| 10 | 1,150 | 846 | 846 | 709 | 1,530 | 750 | 1,340 | *1,070 | 608 | 810 | 585 | 444 |
| 11 | 1,080 | 837 | 837 | 693 | 1,440 | 742 | 1,260 | 1,150 | 476 | 1,040 | 561 | 452 |
| 12 | 1,070 | 784 | 1,010 | 882 | 1,480 | 768 | 1,260 | 1,160 | 528 | 630 | 534 | 483 |
| 13 | 932 | 793 | 1,000 | 1,730 | 1,440 | 768 | 1,140 | 1,090 | *916 | 773 | 495 | 458 |
| 14 | 908 | 948 | 964 | 1,940 | 1,400 | 734 | 1,060 | 972 | 1,280 | 864 | 570 | 402 |
| 15 | 742 | 980 | 980 | 2,260 | 1,320 | 693 | 1,310 | 988 | 1,500 | 709 | 608 | 464 |
| 16 | 685 | 972 | 1,040 | 2,540 | 1,300 | 742 | 1,390 | 948 | 1,560 | 528 | 549 | 446 |
| 17 | 701 | 1,020 | 1,070 | 2,790 | 1,280 | 793 | 1,470 | 956 | 1,770 | 669 | 549 | 458 |
| 18 | 570 | 1,160 | 956 | 2,700 | 1,170 | 828 | 1,630 | 996 | 1,920 | 846 | 563 | 446 |
| 19 | 528 | 1,140 | 864 | 2,350 | 1,110 | 793 | 1,690 | 916 | 2,340 | 761 | 542 | 476 |
| 20 | 521 | 988 | 819 | 2,090 | 924 | 864 | *1,810 | 1,070 | 2,460 | *846 | 518 | 535 |
| 21 | 514 | 948 | 819 | 1,680 | 1,060 | 819 | 1,670 | 1,140 | 2,460 | 743 | 458 | 578 |
| 22 | 535 | 846 | 669 | 1,420 | 1,030 | 768 | 1,570 | 1,040 | 2,280 | 693 | 622 | 615 |
| 23 | 563 | 802 | 608 | 1,270 | 964 | *750 | 1,350 | 1,240 | 1,760 | 685 | 531 | 556 |
| 24 | 608 | 837 | 615 | 1,260 | 956 | 793 | 1,280 | 1,150 | 1,520 | 759 | 494 | 500 |
| 25 | 570 | 924 | 645 | 1,060 | 940 | 776 | 1,160 | 1,100 | 1,410 | 717 | 488 | 521 |
| 26 | 542 | 916 | 645 | 1,030 | 846 | 709 | 980 | 1,080 | 1,430 | 679 | 520 | 535 |
| 27 | 556 | 802 | 677 | 1,180 | 725 | 750 | 1,030 | 1,040 | 1,350 | 690 | 460 | 500 |
| 28 | 600 | 802 | 768 | 1,010 | 908 | 855 | 1,000 | 1,000 | 1,250 | 741 | 476 | 528 |
| 29 | 578 | 776 | 891 | 1,030 | 916 | 1,180 | 924 | 1,040 | 1,140 | 653 | 563 | 521 |
| 30 | 622 | 701 | 964 | 1,040 | ----- | 1,700 | 819 | 1,000 | 1,050 | 685 | 452 | 500 |
| 31 | 645 | ----- | 964 | 1,030 | ----- | 2,240 | ----- | 980 | ----- | 608 | 476 | ----- |
| Total | 22,074 | 25,821 | 25,813 | 40,431 | 32,304 | 26,958 | 51,253 | 31,769 | 38,654 | 27,107 | 17,305 | 14,738 |
| Mean | 712 | 861 | 833 | 1,304 | 1,114 | 870 | 1,708 | 1,025 | 1,288 | 874 | 558 | 491 |
| Cfsm | 0.705 | 0.852 | 0.825 | 1.29 | 1.10 | 0.861 | 1.69 | 1.01 | 1.28 | 0.865 | 0.552 | 0.486 |
| In. | 0.81 | 0.95 | 0.95 | 1.49 | 1.19 | 0.99 | 1.89 | 1.17 | 1.42 | 1.00 | 0.64 | 0.54 |

Calendar year 1959: Max 2,230
Water year 1959-60: Max 3,760

Min 294
Min 402

Mean 746
Mean 968

Cfsm 0.739
Cfsm 0.958

Ir. 10.04
Ir. 13.04

* Discharge measurement made on this day.

1064. West Fork Portage Creek at Kalamazoo, Mich.

Location.--Lat 42°14'40", long 85°36'50", in NE¹ sec.5, T.3 S., R.11 W., on right bank 30 ft upstream from culvert on Oakland Drive, 2½ miles upstream from mouth, and 3.7 miles southwest of main business district of Kalamazoo.

Drainage area.--21.2 sq mi.

Records available.--September 1959 to September 1960.

Gage.--Water-stage recorder and sharp-crested trapezoidal weir. Altitude of gage is 860 ft (from topographic map).

Extremes.--Maximum discharge during period Sept. 10, 1959, to Sept. 30, 1960, 26 cfs Jan. 13 (gage height, 2.40 ft); minimum, 4.4 cfs Sept. 11, 16-19, 1959 (gage height, 1.32 ft).

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

Rating tables, Sept. 10, 1959, to Sept. 30, 1960 (gage height, in feet, and discharge, in cubic feet per second)

| Sept. 10-25, 1959, July 22 to Sept. 14, 1960 | | Sept. 26, 1959, to July 21, 1960, Sept. 15-30, 1960 | |
|---|-----|--|-----|
| 1.32 | 4.4 | 1.5 | 5.4 |
| 1.73 | 11 | 1.9 | 13 |
| | | 2.4 | 26 |

Discharge, in cubic feet per second, 1959

| | | | |
|---------------|------|---------------|------|
| Sept. 10..... | *4.6 | Sept. 21..... | 5.3 |
| 11..... | 4.4 | 22..... | 6.5 |
| 12..... | 4.6 | 23..... | 6.5 |
| 13..... | 4.7 | 24..... | *6.7 |
| 14..... | 4.9 | 25..... | 6.8 |
| 15..... | 4.7 | 26..... | 7.1 |
| 16..... | 4.4 | 27..... | 10 |
| 17..... | 4.4 | 28..... | 11 |
| 18..... | 4.4 | 29..... | 11 |
| 19..... | 4.4 | 30..... | 11 |
| 20..... | 4.7 | | |

* Discharge measurement made on this day.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 10 | 8.8 | 7.5 | 8.2 | 8.8 | 9.4 | 17 | 10 | 10 | 8.8 | 8.2 | 8.5 |
| 2 | 9.6 | 8.5 | 7.7 | 7.9 | 8.6 | 9.0 | 14 | 10 | 9.6 | 9.0 | 8.1 | 8.4 |
| 3 | 8.8 | 8.2 | 7.7 | 7.9 | 8.4 | 9.0 | 13 | 10 | 8.8 | 14 | 9.2 | 8.5 |
| 4 | 8.4 | 10 | 7.7 | 7.9 | 8.0 | 9.0 | 12 | 9.4 | 8.0 | 15 | 10 | 8.4 |
| 5 | 9.7 | 13 | *8.6 | 7.7 | 8.2 | 9.0 | 11 | 9.0 | 7.8 | 14 | 11 | 8.4 |
| 6 | 18 | 12 | 9.4 | 7.3 | 11 | 9.0 | 11 | 9.2 | 7.8 | 12 | 10 | 8.4 |
| 7 | *22 | *11 | 9.8 | 7.0 | 13 | 9.0 | 11 | 12 | 7.8 | 10 | 10 | 8.4 |
| 8 | 21 | 9.8 | 9.4 | *7.2 | 13 | 9.0 | 10 | 13 | 7.8 | 8.8 | 10 | 8.4 |
| 9 | *17 | 9.0 | 8.6 | 7.0 | 11 | 9.0 | 10 | 12 | 7.6 | 8.0 | 11 | *8.4 |
| 10 | 13 | 8.4 | 7.9 | 7.0 | 12 | 9.0 | 10 | 12 | 7.4 | 7.9 | 11 | 8.5 |
| 11 | 13 | 8.0 | 8.2 | 6.8 | 14 | 9.0 | 10 | 12 | 7.4 | 7.5 | *10 | 8.5 |
| 12 | *12 | 7.5 | 10 | 15 | 14 | 9.0 | 11 | *11 | 7.5 | *7.5 | 9.9 | 8.7 |
| 13 | 10 | 7.9 | 11 | *25 | 12 | 9.0 | 10 | 10 | 14 | 7.7 | 9.5 | 8.9 |
| 14 | 9.8 | *10 | 9.8 | 24 | 11 | 8.6 | 10 | 10 | 21 | 8.2 | 9.6 | 8.9 |
| 15 | 9.2 | 11 | 9.0 | 20 | 10 | 8.6 | 14 | 9.0 | 22 | 8.2 | 9.6 | 9.0 |
| 16 | 8.6 | 11 | 8.4 | 16 | 9.8 | 8.6 | 17 | 9.0 | *20 | 8.0 | 9.3 | 9.0 |
| 17 | *8.4 | 10 | 8.0 | 14 | 9.8 | 8.6 | 19 | 10 | 20 | 7.9 | 9.2 | 9.4 |
| 18 | 8.0 | 9.3 | 7.7 | 13 | *9.6 | 8.6 | 18 | 11 | 18 | 7.7 | 8.9 | 9.4 |
| 19 | 7.7 | 8.6 | 7.5 | 12 | 9.4 | 8.4 | 14 | 12 | 15 | 7.5 | 8.9 | 11 |
| 20 | 7.5 | 8.0 | 7.3 | 11 | 9.4 | 8.4 | 12 | 17 | 13 | 7.3 | 9.0 | 12 |
| 21 | 7.1 | *8.0 | 6.9 | 10 | 9.2 | 8.6 | 12 | 18 | 11 | 7.1 | 9.3 | 12 |
| 22 | 7.1 | 8.0 | 6.8 | 9.6 | 9.2 | 8.6 | 11 | 18 | 11 | 9.0 | 9.5 | 12 |
| 23 | 7.1 | 8.0 | 6.6 | 9.2 | 9.2 | 8.6 | 10 | 16 | 11 | 9.8 | 9.5 | 11 |
| 24 | *7.7 | 8.6 | 6.8 | 9.0 | 9.0 | 8.6 | 9.4 | 14 | 11 | 9.6 | 9.3 | 11 |
| 25 | 8.2 | 9.4 | 6.9 | 9.0 | 8.8 | 9.0 | 9.6 | 12 | 11 | 9.5 | 9.2 | 11 |
| 26 | 8.2 | 9.4 | 7.3 | 9.2 | 9.0 | 9.2 | 9.6 | 11 | 10 | 9.8 | 9.0 | 11 |
| 27 | 8.2 | *9.0 | 8.0 | 9.4 | 9.2 | 9.4 | 9.4 | 12 | 9.4 | 10 | 8.9 | 10 |
| 28 | 8.2 | 8.6 | 9.0 | 9.4 | 9.4 | 12 | 9.0 | 13 | 9.2 | 9.8 | 8.7 | 10 |
| 29 | 8.0 | 8.4 | 9.2 | 9.1 | 9.4 | 20 | 9.0 | 13 | 8.8 | 9.5 | 8.7 | 11 |
| 30 | 7.9 | 8.0 | 9.2 | 8.8 | ----- | 22 | 9.4 | 12 | 8.8 | 9.0 | 8.5 | 11 |
| 31 | *8.6 | ----- | 8.8 | 8.8 | ----- | 20 | ----- | 11 | ----- | 8.7 | 8.5 | ----- |
| Total | 318.0 | 275.5 | 256.7 | 333.4 | 293.4 | 313.2 | 352.4 | 367.6 | 341.7 | 286.8 | 291.5 | 289.1 |
| Mean | 10.3 | 9.18 | 8.28 | 10.8 | 10.1 | 10.1 | 11.7 | 11.9 | 11.4 | 9.25 | 9.40 | 9.64 |
| Cfsm | 0.486 | 0.433 | 0.391 | 0.509 | 0.476 | 0.476 | 0.552 | 0.561 | 0.538 | 0.436 | 0.443 | 0.455 |
| In. | 0.56 | 0.48 | 0.45 | 0.58 | 0.51 | 0.55 | 0.62 | 0.64 | 0.60 | 0.50 | 0.51 | 0.51 |

Calendar year 1959: Max - Min - Mean - Cfsm - In. -
 Water year 1959-60: Max 25 Min 6.6 Mean 10.2 Cfsm 0.481 In. 6.51

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 15-19, Jan. 7-12, 14-19, 25-29, Feb. 13, Feb. 28 to Mar. 17, Mar. 20-24, Apr. 27-30, May 13-17, and June 5-11; discharge estimated on basis of records for Paw Paw River at Riverside and Kalamazoo River at Marshall.

1085. Kalamazoo River near Fennville, Mich.

Location.--Lat 42°36', long 85°59', in NE¹ sec. 5, T.2 N., R.14 W., on left bank 40 ft upstream from bridge on State Highway 89, 2 miles downstream from Swan Creek, 3½ miles downstream from Calkins Dam, and 6½ miles east of Fennville.

Drainage area.--1,600 sq mi. approximately.

Records available.--April 1929 to September 1936, October 1937 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "near Allegan" April 1929 to September 1932; as "at Calkins Bridge, near Allegan" October 1932 to September 1936 and October 1937 to September 1938; as "at Calkins Dam, near Allegan" October 1938 to September 1950.

Gage.--Water-stage recorder. Datum of gage is 586.51 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). April 1929 to September 1936 at bridge and October 1937 to September 1950 in powerplant, 3½ miles upstream at mean sea level datum (levels by city of Allegan).

Average discharge.--30 years, 1,343 cfs.

Extremes.--Maximum discharge during year, 5,280 cfs Mar. 31 (gage height, 12.85 ft); minimum, 100 cfs July 24 (gage height, 3.89 ft); minimum daily, 443 cfs A/g. 28. 1929-36, 1937-60: Maximum discharge, 17,500 cfs Apr. 11, 1947 (gage height, 606.76 ft, site and datum then in use); minimum daily, 73 cfs Aug. 31, 1941.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow regulated at low and medium stages by powerplants above station, and since June 1936 by Calkins Dam and powerplant 3½ miles upstream from station.

Revisions (water years).--WSP 1387: 1929(M), 1930, 1933, 1934-36(M), 1938(M), 1939-40, 1942.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 10 to Dec. 27, July 8 to Aug. 2)

| | | | |
|-----|-------|------|-------|
| 5.2 | 431 | 11.0 | 2,550 |
| 6.0 | 627 | 12.0 | 3,760 |
| 9.0 | 1,610 | 12.5 | 4,620 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 787 | 895 | 1,370 | 1,360 | 1,600 | 1,510 | *3,350 | 1,550 | 1,870 | 1,420 | 1,090 | 1,060 |
| 2 | 740 | 1,290 | 1,370 | 1,430 | 1,600 | 1,480 | 3,390 | 1,510 | 1,530 | 1,360 | 743 | 705 |
| 3 | 589 | 977 | 1,320 | 1,390 | 1,600 | 1,510 | 3,980 | 1,550 | 1,530 | 1,470 | 808 | 652 |
| 4 | 448 | 987 | 1,290 | 1,460 | *1,620 | 1,490 | 4,620 | 1,570 | 1,540 | 1,880 | 1,260 | 730 |
| 5 | 845 | *1,370 | 1,260 | *1,880 | 1,600 | 1,410 | 4,390 | 1,570 | 1,440 | 2,170 | 1,000 | 854 |
| 6 | | 966 | 1,390 | 1,300 | 1,510 | 1,870 | 1,450 | 4,000 | 1,590 | 1,540 | 2,080 | 888 |
| 7 | | 1,340 | 1,360 | 1,380 | 1,370 | 2,160 | 1,520 | 3,500 | 1,560 | 1,530 | 1,950 | 764 |
| 8 | | 1,320 | 1,290 | 1,350 | 1,390 | 2,360 | 1,430 | 3,000 | 1,500 | 1,460 | 1,680 | 1,340 |
| 9 | | 1,410 | 1,320 | *1,340 | 1,340 | 2,160 | 1,390 | 2,560 | 1,630 | 1,390 | 1,370 | *847 |
| 10 | | 1,270 | 1,350 | 1,340 | 870 | 2,070 | 1,370 | 2,000 | 1,710 | 1,360 | 1,330 | 1,340 |
| 11 | | 1,490 | 1,330 | 1,560 | 1,330 | 2,840 | 1,400 | 2,000 | *1,760 | 1,290 | 1,460 | *923 |
| 12 | | 1,580 | 1,340 | 1,380 | 1,790 | 3,060 | 1,330 | 2,000 | 1,810 | 1,230 | 1,320 | 660 |
| 13 | | 1,550 | 1,360 | 1,490 | 3,830 | 2,830 | 1,360 | 2,000 | 1,820 | 1,450 | 1,320 | 1,200 |
| 14 | | 1,450 | 1,280 | 1,650 | 3,930 | 1,780 | 1,460 | 2,000 | 1,770 | 1,550 | *904 | 1,020 |
| 15 | | *1,440 | 1,240 | 1,630 | 4,000 | 1,910 | 1,380 | 2,100 | 1,700 | 1,690 | 1,220 | 854 |
| 16 | | 1,370 | 1,340 | 1,580 | 4,000 | 2,200 | 1,450 | 2,200 | 1,680 | *2,450 | 1,240 | 1,190 |
| 17 | | 1,090 | 1,350 | 1,550 | 4,000 | 2,170 | 1,390 | 2,300 | 1,710 | 2,670 | 1,170 | 1,140 |
| 18 | | 1,240 | 1,360 | 1,600 | 3,500 | 2,140 | 1,320 | 2,400 | 1,710 | 2,590 | 1,290 | 750 |
| 19 | | 1,260 | 1,350 | 1,550 | 3,200 | 2,140 | 1,310 | 2,400 | 1,740 | 2,540 | 1,210 | 1,130 |
| 20 | | 1,260 | 1,420 | 1,460 | 3,000 | 2,020 | 1,340 | 2,400 | 2,030 | 2,540 | 1,180 | 1,270 |
| 21 | | 992 | 1,430 | 1,480 | 2,500 | 1,660 | 1,430 | *2,550 | 2,610 | 2,680 | 1,170 | 1,030 |
| 22 | | 1,300 | 1,360 | 1,450 | 2,200 | 1,730 | 1,420 | 2,610 | 2,720 | 2,710 | 1,200 | 775 |
| 23 | | 766 | 1,430 | 1,400 | 2,000 | 1,720 | 1,510 | 1,510 | 2,380 | 2,680 | 1,200 | 892 |
| 24 | | 707 | 1,390 | 1,390 | 1,800 | 1,700 | *1,470 | 1,670 | 1,870 | 2,680 | 592 | 1,160 |
| 25 | | 1,220 | 1,430 | 1,330 | 1,700 | 1,590 | 1,430 | 1,660 | 1,550 | 2,470 | 1,050 | 909 |
| 26 | | 1,320 | 1,400 | 1,320 | 1,600 | 1,410 | 1,520 | 1,910 | 1,570 | 2,280 | 1,220 | 1,030 |
| 27 | | 1,240 | 1,410 | 750 | 1,600 | 1,400 | 1,400 | 2,050 | 1,660 | 2,160 | 1,190 | 664 |
| 28 | | 788 | 1,460 | 1,460 | 1,600 | 1,420 | 1,530 | 1,980 | 1,690 | 2,020 | 1,170 | 443 |
| 29 | | 745 | 1,350 | 1,490 | 1,600 | 1,540 | 2,110 | 1,920 | 1,890 | 1,560 | 1,180 | 1,040 |
| 30 | | 919 | 1,390 | 1,480 | 1,600 | ----- | 4,100 | 1,670 | 1,980 | 1,440 | 1,090 | 1,060 |
| 31 | | 945 | ----- | 1,410 | 1,600 | ----- | 4,420 | ----- | 2,010 | ----- | 929 | 1,070 |
| Total | 34,395 | 39,649 | 43,540 | 66,180 | 55,900 | 50,640 | 76,860 | 55,350 | 57,800 | 41,045 | 30,874 | 25,638 |
| Mean | 1,110 | 1,322 | 1,405 | 2,135 | 1,928 | 1,634 | 2,562 | 1,785 | 1,927 | 1,324 | 996 | 855 |
| Cfsm | 0.694 | 0.826 | 0.878 | 1.33 | 1.20 | 1.02 | 1.60 | 1.12 | 1.20 | 0.828 | 0.622 | 0.534 |
| In. | 0.80 | 0.92 | 1.01 | 1.54 | 1.50 | 1.18 | 1.79 | 1.29 | 1.34 | 0.95 | 0.72 | 0.60 |

Calendar year 1959: Max 3,530 Min 448 Mean 1,229 Cfsm 0.768 In. 10.44
Water year 1959-60: Max 4,620 Min 443 Mean 1,579 Cfsm 0.987 In. 13.44

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 15 to Feb. 3, Apr. 6-20; discharge estimated on basis of records for stations at Comstock and Paw Paw River at Riverside.

1090. Grand River at Jackson, Mich.

Location.--Lat 42°17'05", long 84°24'30", in sec.22, T.2 S., R.1 W., on left bank at sewage-treatment plant, 1 mile north of Jackson, 2 $\frac{1}{4}$ miles upstream from Portage River, and at mile 216.

Drainage area.--174 sq mi.

Records available.--April 1935 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 900.00 ft above mean sea level (Fargo Engineering Co. bench mark). Prior to Sept. 24, 1935, staff gage at same site and datum.

Average discharge.--25 years, 119 cfs.

Extremes.--Maximum discharge during year, 621 cfs Mar. 31 (gage height, 11.6 ft, from high-water mark); minimum, 25 cfs Sept. 12, 18; minimum gage height, 8.50 ft Feb. 26; minimum daily discharge, 28 cfs Sept. 11.
1935-60: Maximum discharge, 1,070 cfs June 25, 1937 (gage height, 13.50 ft); minimum, 9.2 cfs Aug. 22, 1936.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Slight regulation by mills above station.

Revisions (water years).--WSP 974: 1937(M). WSP 1387: 1936.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|-------|----------|-------|-------------|-------|----------|-------|-------|
| 1 | 43 | 39 | 76 | 141 | *113 | 87 | 580 | 125 | 181 | 218 | 71 | 57 |
| 2 | 44 | 48 | 71 | 141 | 107 | 89 | 470 | 146 | 165 | 189 | 72 | 56 |
| 3 | 41 | 50 | 69 | 95 | 153 | 85 | 420 | 95 | 135 | 216 | 88 | 43 |
| 4 | 35 | 78 | 68 | *81 | 163 | 87 | 360 | 81 | 125 | 205 | 76 | 36 |
| 5 | *66 | *74 | 80 | 75 | 189 | *85 | 350 | 81 | 112 | 189 | 106 | 33 |
| 6 | 99 | 71 | 116 | 70 | 220 | 80 | 320 | 81 | 112 | 194 | 88 | *45 |
| 7 | 68 | 60 | *136 | 70 | 190 | 80 | 300 | 85 | 106 | 172 | 62 | 50 |
| 8 | 62 | 55 | 84 | 89 | 196 | 80 | 269 | 72 | 100 | 136 | *78 | 48 |
| 9 | 62 | 63 | 71 | 80 | 198 | 80 | 199 | 81 | 94 | 120 | 80 | 60 |
| 10 | 56 | 69 | 72 | 75 | 233 | 85 | 153 | 98 | 85 | 110 | 95 | 36 |
| 11 | 61 | 72 | 101 | 92 | 239 | 85 | 155 | 92 | 73 | *118 | 136 | 28 |
| 12 | 66 | 67 | 135 | 208 | 223 | 85 | 229 | 92 | 67 | 114 | 119 | 40 |
| 13 | 69 | 105 | 141 | 297 | 203 | 80 | 171 | 96 | 122 | 118 | 71 | 44 |
| 14 | 68 | 169 | 148 | 303 | 194 | 75 | 122 | 94 | 190 | 130 | 63 | 42 |
| 15 | 67 | 155 | 151 | 329 | 203 | 70 | 187 | 88 | 218 | 158 | 66 | 44 |
| 16 | 66 | 160 | 101 | 305 | 218 | 70 | 192 | 98 | 343 | 135 | 63 | 45 |
| 17 | 56 | 160 | 91 | 250 | 208 | 70 | 222 | 157 | 364 | 96 | 61 | 36 |
| 18 | 46 | 141 | 88 | 246 | 199 | 70 | *212 | 244 | 381 | 100 | 63 | 29 |
| 19 | 51 | 153 | 80 | 246 | 187 | 75 | 210 | 148 | 372 | 113 | 60 | 71 |
| 20 | 50 | 143 | 68 | 244 | 165 | 80 | 210 | 104 | *368 | 138 | 55 | 56 |
| 21 | 48 | 98 | 76 | 235 | 160 | 85 | 214 | 148 | 320 | 114 | 43 | 52 |
| 22 | 46 | 81 | 71 | 220 | 163 | 85 | 214 | 160 | 300 | 92 | 56 | 52 |
| 23 | 53 | 87 | 68 | 216 | 116 | 80 | 205 | *156 | 280 | 77 | 58 | 51 |
| 24 | 44 | 94 | 67 | 199 | 92 | 80 | 192 | 160 | 235 | 64 | 56 | 45 |
| 25 | 40 | 133 | 58 | 187 | 89 | 90 | 192 | 124 | 214 | 73 | 54 | 38 |
| 26 | 45 | 135 | 60 | 181 | 75 | 80 | 185 | 96 | 183 | 80 | 56 | 58 |
| 27 | 48 | 131 | 81 | 155 | 98 | 100 | 172 | 102 | 169 | 76 | 46 | 52 |
| 28 | 48 | 82 | 153 | 176 | 78 | 200 | 114 | 110 | 199 | 76 | 35 | 50 |
| 29 | 48 | 66 | 160 | 181 | 92 | 300 | 91 | 108 | 216 | 74 | 54 | 49 |
| 30 | 44 | 63 | 156 | 118 | ----- | 550 | 89 | 136 | 205 | 66 | 54 | 48 |
| 31 | 49 | ----- | 148 | 106 | ----- | 600 | ----- | 172 | ----- | 58 | 54 | ----- |
| Total | 1,689 | 2,902 | 3,045 | 5,411 | 4,764 | 3,848 | 7,019 | 3,630 | 6,034 | 3,827 | 2,139 | 1,394 |
| Mean | 54.5 | 96.7 | 98.2 | 175 | 164 | 124 | 234 | 117 | 201 | 123 | 69.0 | 46.5 |
| Cfs/m | 0.313 | 0.556 | 0.564 | 1.01 | 0.943 | 0.713 | 1.34 | 0.672 | 1.16 | 0.707 | 0.397 | 0.267 |
| In. | 0.36 | 0.62 | 0.65 | 1.16 | 1.02 | 0.82 | 1.80 | 0.78 | 1.29 | 0.82 | 0.46 | 0.30 |
| Calendar year 1959: Max | 527 | | | Min 16 | | Mean 111 | | Cfs/m 0.638 | | In. 8.61 | | |
| Water year 1959-60: Max | 600 | | | Min 28 | | Mean 125 | | Cfs/m 0.718 | | In. 9.78 | | |

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 5-7, 9, 10, Mar. 6 to Apr. 7, June 21-23; discharge estimated on basis of records for Grand River near Eaton Rapids and Grand River at Lansing.

1110. Grand River near Eaton Rapids, Mich.

Location.--Lat 42°32'05", long 84°37'25", in NE $\frac{1}{4}$ sec.26, T.2 N., R.3 W., on right bank 400 ft upstream from bridge on Petrieville Highway, 2 miles northeast of Eaton Rapids, 2 $\frac{1}{2}$ miles downstream from Spring Brook, 25 miles upstream from Cedar River, and at mile 178.

Drainage area.--661 sq mi.

Records available.--October 1950 to September 1960. Gage-height records for flood seasons collected in this vicinity 1905-28 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 852.68 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--10 years, 468 cfs.

Extremes.--Maximum discharge during year, 3,060 cfs Mar. 31 (gage height, 7.17 ft); minimum, 19 cfs Sept. 3 (gage height, 0.89 ft); minimum daily, 83 cfs Sept. 3.

1950-60: Maximum discharge, 3,360 cfs May 1, 1956 (gage height, 7.65 ft, from high-water mark); minimum, that of Sept. 3, 1960; minimum daily, 44 cfs Sept. 22, 1955.

Revisions.--The minimum discharge for the water year 1951 has been revised to 29 cfs Sept. 12, 1951 (gage height, 1.02 ft), superseding figure published in WSP 1207.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by powerplant at Smithville and mills at Eaton Rapids.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.7 | 126 | 6.0 | 2,280 | 1.4 | 72 | 3.0 | 570 |
| 2.0 | 204 | 7.1 | 3,010 | 1.8 | 149 | 5.0 | 1,590 |
| 3.0 | 605 | | | 2.0 | 199 | 6.9 | 2,630 |
| | | | | 2.5 | 365 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|----------|--------|-------------|--------|-----------|-------|-------|
| 1 | 148 | 252 | 409 | 570 | 610 | 406 | 2,830 | 600 | *525 | 525 | 186 | 129 |
| 2 | 146 | 268 | 437 | 546 | 575 | 376 | 2,400 | 615 | 548 | 489 | 182 | 122 |
| 3 | 136 | 268 | 429 | 542 | 524 | b400 | 2,120 | 534 | 457 | 597 | 204 | 83 |
| 4 | 128 | 286 | 421 | 542 | 514 | b350 | 1,950 | 552 | 481 | 610 | 204 | 125 |
| 5 | *200 | *461 | 437 | 517 | 519 | b350 | 1,790 | 505 | 417 | 642 | 256 | 109 |
| 6 | 518 | 461 | 496 | 385 | *760 | b350 | 1,840 | 453 | 350 | 651 | 163 | 112 |
| 7 | 604 | 461 | 532 | 305 | 882 | b350 | 1,520 | 497 | 300 | 838 | 204 | 99 |
| 8 | 780 | 449 | 570 | b400 | 958 | b350 | 1,390 | 505 | 350 | 556 | 225 | 103 |
| 9 | 680 | 432 | 519 | *b350 | 1,000 | b360 | 1,230 | 465 | 341 | 517 | 199 | 118 |
| 10 | 615 | 389 | 465 | 349 | 1,040 | b400 | 1,160 | 525 | 294 | 413 | 166 | 135 |
| 11 | 560 | 359 | 478 | 341 | 1,060 | b400 | 1,080 | 538 | 243 | 441 | 220 | 128 |
| 12 | 537 | 379 | 600 | 518 | 1,040 | b400 | 955 | 543 | 237 | 311 | 215 | 136 |
| 13 | 501 | 313 | 630 | 1,240 | 1,020 | 402 | 865 | 538 | 352 | *353 | 194 | 115 |
| 14 | 446 | 627 | 640 | 1,380 | 1,050 | 341 | 800 | 525 | 556 | 333 | 209 | 102 |
| 15 | 367 | 656 | 680 | 1,850 | 972 | 335 | 885 | 513 | 651 | 318 | 231 | 119 |
| 16 | 373 | 715 | 645 | 1,820 | 882 | 341 | 950 | 505 | 754 | 304 | 184 | 156 |
| 17 | 337 | 735 | 615 | 1,600 | 848 | 329 | 1,010 | 445 | 1,260 | 314 | 172 | 112 |
| 18 | 294 | 751 | 585 | 1,490 | 772 | 323 | 1,080 | 477 | 1,320 | 337 | 194 | 84 |
| 19 | 301 | 695 | 555 | 1,290 | 724 | 350 | 1,100 | 477 | 1,520 | 345 | 171 | *126 |
| 20 | 177 | 665 | 457 | 1,170 | 695 | 365 | 1,100 | 548 | 1,220 | 252 | 142 | 172 |
| 21 | 268 | 625 | *457 | 1,010 | 620 | 405 | 980 | 584 | *1,080 | 269 | 138 | 186 |
| 22 | 263 | 600 | 356 | 980 | 625 | *417 | 960 | 505 | 1,010 | 266 | 194 | 179 |
| 23 | 212 | 546 | 357 | 936 | 570 | 377 | 895 | 606 | 985 | 276 | 154 | 169 |
| 24 | 205 | 580 | 369 | 860 | 524 | 357 | 835 | 588 | 950 | 228 | *150 | 153 |
| 25 | 229 | 546 | 345 | 819 | 514 | 445 | 850 | 556 | 910 | 262 | 152 | 147 |
| 26 | 279 | 537 | 337 | 735 | 417 | 357 | 780 | 525 | 830 | 207 | 145 | 190 |
| 27 | 275 | 496 | 361 | 672 | 409 | 465 | 750 | 453 | 719 | 258 | 153 | 128 |
| 28 | 524 | 524 | 470 | 685 | 495 | 1,040 | 741 | 602 | 674 | 215 | 137 | 124 |
| 29 | 268 | 537 | 537 | 685 | 469 | *1,700 | 714 | 615 | 602 | 231 | 169 | 152 |
| 30 | 232 | 478 | 495 | 575 | ----- | 2,510 | *678 | 633 | 552 | 192 | 176 | 136 |
| 31 | 279 | ----- | 590 | 595 | ----- | 2,970 | ----- | 602 | ----- | 186 | 122 | ----- |
| Total | 10,613 | 15,093 | 15,274 | 25,757 | 21,088 | 18,321 | 36,038 | 16,629 | 20,288 | 11,516 | 5,611 | 3,949 |
| Mean | 349 | 503 | 493 | 831 | 727 | 591 | 1,201 | 536 | 676 | 371 | 181 | 132 |
| Cfs/m | 0.526 | 0.761 | 0.748 | 1.26 | 1.10 | 0.894 | 1.82 | 0.811 | 1.02 | 0.561 | 0.274 | 0.200 |
| In. | 0.61 | 0.85 | 0.86 | 1.45 | 1.19 | 1.03 | 2.03 | 0.94 | 1.14 | 0.65 | 0.32 | 0.22 |
| Calendar year 1959: Max | 2,200 | | | Min 60 | | Mean 469 | | Cfs/m 0.710 | | In. 9.64 | | |
| Water year 1959-60: Max | 2,970 | | | Min 83 | | Mean 547 | | Cfs/m 0.828 | | In. 11.29 | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1115. Deer Creek near Dansville, Mich.

Location.--Lat 42°36'30", long 84°19'15", in E $\frac{1}{2}$ sec. 33, T. 3 N., R. 1 E., on right bank 15 ft upstream from bridge on Clark Road, $\frac{3}{4}$ miles north of Dansville, and $\frac{7}{8}$ miles upstream from mouth.

Drainage area.--16.3 sq mi.

Records available.--May 1954 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 889.08 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--6 years, 10.8 cfs.

Extremes.--Maximum discharge during year, 437 cfs Oct. 6 (gage height, 8.54 ft); minimum, 0.7 cfs Sept. 7, 8 (gage height, 2.76 ft).

1954-60: Maximum discharge, 570 cfs May 13, 1956 (gage height, 8.83 ft); minimum, 0.1 cfs Dec. 9, 1956, result of freezeup.

Remarks.--Records good.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 12

Jan. 13 to Sept. 30

5.0 152
7.0 295

| | | | |
|-----|-----|-----|-----|
| 2.7 | 0.3 | 3.3 | 21 |
| 2.8 | 1.1 | 3.5 | 41 |
| 2.9 | 2.4 | 4.0 | 92 |
| 3.0 | 4.7 | 5.0 | 152 |
| 3.1 | 8.2 | 6.1 | 247 |
| 3.2 | 14 | | |

Note.--Same as following table below 5.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 6.6 | 12 | 12 | 16 | 8.6 | 7.4 | 68 | 14 | 5.0 | 4.7 | 1.3 | 1.2 |
| 2 | 5.3 | 9.6 | 12 | 14 | 8.2 | 7.4 | 51 | 12 | 5.3 | 4.1 | 1.4 | 1.1 |
| 3 | 4.7 | 9.1 | 15 | 13 | 8.6 | 5.9 | 42 | 11 | 4.7 | 5.6 | 1.9 | 1.1 |
| 4 | 4.1 | 30 | 15 | 17 | 6.6 | 8.2 | 34 | 9.1 | 3.8 | 4.7 | 2.4 | 1.1 |
| 5 | *17 | 43 | 25 | 14 | 9.6 | 7.8 | 29 | 8.2 | 3.8 | 3.8 | 2.2 | 1.0 |
| 6 | *247 | 30 | 30 | 11 | *66 | 7.8 | 25 | 7.8 | 3.4 | 3.4 | 1.8 | .9 |
| 7 | *274 | 23 | 23 | 9 | 42 | 7.8 | 24 | 14 | 2.9 | 3.4 | 1.7 | .9 |
| 8 | *97 | 18 | 16 | 8 | 29 | 7.4 | 23 | 12 | 2.9 | 3.1 | 1.7 | .8 |
| 9 | 54 | 15 | 14 | 7 | 26 | 7.4 | 19 | 10 | 2.9 | 2.9 | 1.7 | .9 |
| 10 | 39 | 14 | 12 | 6.2 | 26 | 7.4 | 17 | 21 | 2.7 | 2.7 | 1.8 | .8 |
| 11 | 39 | 12 | 22 | 5.9 | 34 | 6.6 | 16 | 17 | 2.5 | *2.5 | 1.7 | .8 |
| 12 | 30 | 11 | 60 | 43 | 26 | 6.6 | 16 | 16 | 2.7 | 2.4 | 1.4 | *.9 |
| 13 | 24 | 17 | 36 | 133 | 26 | 6.2 | 15 | 15 | 9.5 | 2.4 | 1.4 | 1.4 |
| 14 | 21 | 117 | 25 | 55 | *16 | 6.6 | 15 | 14 | 26 | 2.2 | 1.7 | 1.1 |
| 15 | 19 | 51 | 22 | 59 | 13 | 6.4 | 39 | 11 | 39 | 1.9 | 1.7 | 1.0 |
| 16 | 16 | 38 | 20 | 40 | 12 | 5.6 | 53 | 9.1 | 43 | 1.9 | 1.4 | 1.0 |
| 17 | 14 | 28 | 17 | 25 | 16 | 6.2 | 67 | 9.1 | *102 | 2.4 | 1.3 | 1.0 |
| 18 | 12 | 19 | 15 | 20 | 14 | 5.9 | 46 | 9.1 | 44 | 2.5 | 1.1 | 1.0 |
| 19 | 11 | 16 | 12 | 17 | 12 | 6.2 | 28 | 8.2 | 27 | 2.4 | 1.1 | 2.2 |
| 20 | 9.6 | 14 | 10 | 15 | 11 | 6.6 | 23 | 10 | 17 | 1.9 | 1.5 | 2.6 |
| 21 | 8.6 | 14 | 9.1 | 14 | 10 | 6.6 | 19 | 11 | 13 | 1.8 | 1.9 | 1.7 |
| 22 | 8.2 | 15 | 8.2 | 14 | 9.6 | 4.4 | 16 | *16 | 16 | 1.8 | 1.9 | 1.5 |
| 23 | 8.2 | 22 | 7.4 | 11 | 8.6 | *8.2 | 14 | 14 | 18 | 1.7 | *1.5 | 1.4 |
| 24 | 9.6 | 25 | *7.0 | 11 | 8.6 | 6.0 | 12 | 11 | *12 | 1.5 | 1.4 | 1.4 |
| 25 | 10 | 24 | 6.6 | 11 | 5.9 | 7.2 | 22 | 8.6 | 9.6 | 1.4 | 1.4 | 1.4 |
| 26 | 9.6 | 18 | 7.4 | 9.1 | 7.4 | 7.0 | 25 | 7.4 | 7.0 | 1.8 | 1.2 | 1.3 |
| 27 | 11 | 16 | 11 | 8.6 | 9.1 | 28 | 19 | 7.0 | 5.9 | 2.1 | 1.2 | 1.3 |
| 28 | 9.6 | 15 | 28 | 8.6 | 8.6 | 195 | 15 | 8.6 | 5.6 | 1.7 | 1.2 | 1.2 |
| 29 | 9.1 | 14 | 38 | 8.2 | 8.2 | *206 | 13 | 7.4 | 5.6 | 1.5 | 1.3 | 1.1 |
| 30 | 8.6 | 12 | 25 | 8.6 | ----- | *240 | *13 | 6.6 | 4.7 | 1.4 | 1.5 | 1.1 |
| 31 | *11 | ----- | 19 | 8.6 | ----- | 135 | ----- | 5.6 | ----- | 1.4 | 1.4 | ----- |
| Total | 1,047.8 | 701.7 | 579.7 | 640.8 | 468.6 | 980.8 | 818 | 340.8 | 447.5 | 79.0 | 48.1 | 36.1 |
| Mean | 33.8 | 23.4 | 18.7 | 20.7 | 16.8 | 31.6 | 27.3 | 11.0 | 14.9 | 2.55 | 1.55 | 1.20 |
| Cfsm | 2.07 | 1.44 | 1.15 | 1.27 | 1.03 | 1.94 | 1.67 | 0.675 | 0.914 | 0.156 | 0.095 | 0.074 |
| In. | 2.39 | 1.60 | 1.32 | 1.46 | 1.11 | 2.24 | 1.87 | 0.78 | 1.02 | 0.19 | 0.11 | 0.08 |

Calendar year 1959: Max 274 Min 0.4 Mean 16.1 Cfsm 0.988 In. 13.44
Water year 1959-60: Max 274 Min 0.8 Mean 17.0 Cfsm 1.04 In. 14.16

Peak discharge (base, 100 cfs).--Oct. 6 (9 p.m.) 437 cfs (8.54 ft); Nov. 14 (7 a.m.) 146 cfs (4.89 ft); Jan. 13 (6 to 7 a.m.) 158 cfs (5.08 ft); Mar. 28 (9 p.m.) 280 cfs (6.45 ft); June 17 (3 to 4 a.m.) 158 cfs (4.75 ft).

* Discharge measurement made on this day.

1120. Sloan Creek near Williamston, Mich.

Location.--Lat 42°40'30", long 84°21'50", in E $\frac{1}{2}$ sec.1, T.3 N., R.1 W., on left bank 30 ft downstream from bridge on Meridian Road, 2 miles upstream from mouth, and 4 $\frac{1}{4}$ miles west of Williamston.

Drainage area.--9.34 sq mi.

Records available.--June 1954 to September 1960.

Gage.--Water-stage recorder and concrete control with V-notch sharp-crested weir. Datum of gage is 862.12 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--6 years, 5.78 cfs.

Extremes.--Maximum discharge during year, 486 cfs Oct. 6 (gage height, 6.19 ft); minimum, 0.14 cfs Sept. 7, 8, 9; minimum gage height, 1.32 ft Sept. 7.
1954-60: Maximum discharge, 685 cfs July 11, 1957 (gage height, 7.35 ft); minimum, 0.01 cfs Sept. 11, 1954, Jan. 18 1957 (gage height, 1.10 ft), caused by unusual regulation; minimum natural discharge, 0.04 cfs Sept. 18-21, 1955.

Remarks.--Records good except those for period of no gage-height record, which are fair.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 4, 5, 7, 8, 10-14, 20-29, July 12-16, Aug. 24, 25, Sept. 9, 10, 28, 29)

| | | | |
|-----|------|-----|-----|
| 1.3 | 0.12 | 2.3 | 7.0 |
| 1.4 | .27 | 2.7 | 18 |
| 1.5 | .47 | 3.0 | 34 |
| 1.6 | .75 | 4.0 | 153 |
| 1.8 | 1.6 | 5.0 | 300 |
| 2.0 | 2.9 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 4.1 | 5.2 | 6.2 | 6.2 | 3.7 | 3.4 | 55 | 5.1 | 3.9 | 1.3 | 0.34 | 0.25 |
| 2 | 3.3 | 4.5 | 6.4 | 6.1 | 3.4 | 3.3 | 43 | 4.7 | 3.5 | 1.2 | .34 | .22 |
| 3 | 2.8 | 3.9 | 7.8 | 8.0 | 3.3 | 3.3 | 34 | 4.2 | 3.0 | 1.4 | .80 | .22 |
| 4 | 2.5 | 2.9 | 7.8 | 6.6 | 3.0 | 3.1 | 26 | 3.7 | 2.5 | 1.2 | .87 | .22 |
| 5 | *4.2 | 34 | 17 | 4.9 | 5.8 | 3.0 | 20 | 3.5 | 2.2 | .99 | .63 | .22 |
| 6 | *232 | 22 | 21 | 4.2 | *49 | 2.8 | 16 | 3.5 | 2.1 | .95 | .47 | .19 |
| 7 | 123 | 14 | 13 | 3.9 | 27 | 2.8 | a14 | 5.5 | 1.8 | .91 | .54 | .17 |
| 8 | 56 | 9.0 | 7.6 | 3.5 | 18 | 2.6 | a10 | 4.8 | 1.7 | .83 | .50 | .16 |
| 9 | 40 | 7.4 | 6.2 | 3.0 | 15 | 2.5 | a8 | 4.5 | 1.6 | .75 | .57 | .16 |
| 10 | 27 | 6.6 | 5.5 | 2.9 | 14 | 2.4 | a6 | 11 | 1.5 | .72 | .72 | .19 |
| 11 | 27 | 5.8 | 16 | 2.7 | 21 | 2.2 | a6 | 8.0 | 1.5 | *.69 | .52 | .20 |
| 12 | 20 | 5.2 | 53 | 14 | 14 | 2.1 | a6 | 6.7 | 1.4 | .63 | .42 | *.22 |
| 13 | 16 | 7.3 | 25 | 60 | 8.4 | 2.0 | a6 | 6.7 | 2.3 | .63 | .42 | .29 |
| 14 | 11 | 79 | 16 | 26 | 6.7 | 2.0 | 5.8 | 6.1 | 3.1 | .57 | .54 | .27 |
| 15 | 8.6 | 33 | 12 | 36 | 5.5 | 2.0 | 22 | 5.2 | 3.4 | .54 | .60 | .25 |
| 16 | 7.4 | 24 | 9.3 | 21 | 5.5 | 2.1 | 24 | 4.4 | 4.5 | .52 | .50 | .24 |
| 17 | 6.4 | 17 | 7.8 | 12 | 7.0 | 2.1 | 30 | 4.2 | 26 | .95 | .36 | .24 |
| 18 | 5.8 | 9.6 | 6.8 | 8.4 | 6.0 | 2.1 | 22 | 3.9 | 13 | 1.2 | .36 | .27 |
| 19 | 4.9 | 7.0 | 6.0 | 6.7 | 5.4 | 2.2 | 11 | 3.5 | 7.0 | .83 | .38 | .52 |
| 20 | 4.4 | 6.1 | 5.2 | 6.1 | 4.5 | 2.2 | 8.2 | 3.7 | 4.7 | .66 | .32 | 1.1 |
| 21 | 3.9 | 6.0 | 4.8 | 5.5 | 4.1 | 2.2 | 6.8 | 4.4 | 3.5 | .57 | .42 | 1.2 |
| 22 | 3.6 | 5.8 | 4.1 | 4.9 | 4.0 | 1.9 | 6.0 | *8.4 | 3.1 | .47 | .60 | .69 |
| 23 | 3.6 | 7.8 | 3.7 | 4.8 | 3.7 | *2.1 | 5.5 | 6.6 | 2.8 | .44 | *.49 | .50 |
| 24 | 3.9 | 11 | *3.6 | 4.5 | 4.1 | 2.2 | 4.9 | 5.1 | *2.6 | .42 | .40 | .44 |
| 25 | 3.7 | 11 | 3.3 | 4.2 | 3.7 | 2.2 | 12 | 4.0 | 2.2 | .38 | .34 | .38 |
| 26 | 3.7 | 7.8 | 3.5 | 4.1 | 3.3 | 2.2 | 12 | 3.4 | 1.8 | .54 | .29 | .36 |
| 27 | 4.0 | 6.7 | 5.2 | 4.0 | 3.1 | 4.8 | 7.8 | 5.2 | 1.6 | .72 | .31 | .34 |
| 28 | 3.9 | 6.6 | 28 | 3.7 | 3.5 | 108 | 6.1 | 10 | 1.5 | .52 | .27 | .31 |
| 29 | 3.4 | 6.4 | 22 | 3.5 | 3.5 | 159 | 4.9 | 6.0 | 1.6 | .42 | .27 | .27 |
| 30 | 3.3 | 6.4 | 12 | 3.5 | ----- | *178 | *4.8 | 5.2 | 1.4 | .38 | .27 | .27 |
| 31 | *4.4 | ----- | 7.8 | 3.6 | ----- | 96 | ----- | 4.5 | ----- | .36 | .25 | ----- |
| Total | 647.8 | 405.1 | 353.6 | 288.5 | 259.2 | 608.8 | 443.8 | 185.7 | 112.8 | 22.69 | 13.91 | 10.36 |
| Mean | 20.9 | 13.5 | 11.4 | 9.31 | 8.34 | 19.6 | 14.8 | 5.35 | 3.76 | 0.732 | 0.449 | 0.345 |
| Cfs/m | 2.24 | 1.45 | 1.22 | 0.997 | 0.957 | 2.10 | 1.58 | 0.573 | 0.403 | 0.078 | 0.048 | 0.037 |
| In. | 2.58 | 1.61 | 1.41 | 1.15 | 1.03 | 2.42 | 1.77 | 0.66 | 0.45 | 0.09 | 0.06 | 0.04 |

Calendar year 1959: Max 232 Min 0.10 Mean 8.97 Cfs/m 0.960 In. 13.03
Water year 1959-60: Max 232 Min 0.16 Mean 9.10 Cfs/m 0.974 In. 13.27

Peak discharge (base, 60 cfs).--Oct. 6 (4 p.m.) 486 cfs (6.19 ft); Nov. 4 (3 to 6 p.m.) 61 cfs (3.26 ft); Nov. 14 (4 a.m.) 123 cfs (3.77 ft); Dec. 12 (1 a.m.) 76 cfs (3.39 ft); Jan. 12 (9 to 12 p.m.) 89 cfs (3.50 ft); Feb. 6 (5 a.m.) 72 cfs (3.36 ft); Mar. 29 (6 p.m.) 285 cfs (4.90 ft).

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Deer Creek near Dansville and Cedar River at East Lansing.

1125. Cedar River at East Lansing, Mich.

Location.--Lat 42°43'40", long 84°28'40", in SW 1/4 sec. 18, T. 4 N., R. 1 W., in left downstream bridge abutment of Farm Lane Bridge on Michigan State University campus in East Lansing, 3 miles upstream from Sycamore Creek and 4 miles upstream from mouth.

Drainage area.--355 sq mi.

Records available.--August 1902 to December 1903, March 1931 to September 1960. Monthly discharge only for some periods, published in WSP 1307. August 1902 to December 1903 published as Red Cedar River at Agricultural College, Mich. Gage-height records collected in this vicinity 1911-19, and for flood seasons only 1920-28, are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder and concrete control. Datum of gage is 824.39 ft above mean sea level, datum of 1929. August 1902 to December 1903 chain gage at site three-quarters of a mile downstream at different datum. March 1931 to November 1940 water-stage recorder at site 250 ft upstream at present datum.

Average discharge.--30 years, 210 cfs.

Extremes.--Maximum discharge during year, 3,580 cfs Mar. 31 (gage height, 9.18 ft); minimum, 12 cfs Sept. 6, 7 (gage height, 3.12 ft).
1902-3, 1931-60: Maximum discharge, 5,920 cfs Apr. 7, 1947 (gage height, 11.58 ft); minimum, 3 cfs July 31, 1931.

Remarks.--Records good. Occasional regulation at low flow caused by mill at Williamston 16 miles above station.

Revisions (water years).--WSP 1307: 1936(M).

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Mar. 27 | | | | Mar. 28 to Sept. 30 | | | |
|-------------------|-----|-----|-------|---------------------|-----|-----|-------|
| 3.4 | 71 | 6.0 | 1,250 | 3.1 | 9.0 | 3.5 | 85 |
| 4.0 | 240 | 7.0 | 1,960 | 3.2 | 22 | 4.0 | 238 |
| 4.5 | 440 | 7.4 | 2,280 | 3.3 | 39 | 4.5 | 440 |
| | | | | | | 5.0 | 690 |
| | | | | | | 6.0 | 1,250 |
| | | | | | | 9.2 | 3,600 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 131 | 228 | 250 | 367 | 212 | 166 | 3,240 | 371 | 307 | 109 | 29 | *45 |
| 2 | 110 | 224 | 247 | 315 | 209 | 166 | *2,430 | 355 | 253 | 104 | 25 | 17 |
| 3 | 99 | 209 | 258 | 299 | 192 | 157 | 1,870 | 299 | 235 | 104 | 58 | 37 |
| 4 | 94 | 278 | 268 | 295 | 174 | 137 | 1,430 | 264 | 212 | 104 | 58 | 41 |
| 5 | 123 | 585 | 303 | 183 | 197 | 174 | 1,120 | 235 | 189 | 96 | 56 | 17 |
| 6 | 504 | 600 | 436 | 171 | 546 | 160 | 889 | 215 | 176 | 85 | 62 | 14 |
| 7 | 1,640 | 510 | 445 | 221 | 867 | 163 | 730 | 256 | 154 | 82 | 65 | 47 |
| 8 | *2,210 | 418 | 383 | 212 | 765 | 145 | 650 | 256 | 139 | 80 | 62 | 43 |
| 9 | 1,630 | 363 | 323 | 171 | 640 | 145 | 575 | 231 | 127 | 78 | 78 | 16 |
| 10 | 1,210 | 315 | 268 | 180 | 575 | 148 | 505 | 299 | 118 | 78 | 80 | 45 |
| 11 | 960 | 275 | 268 | 168 | 615 | 143 | 445 | 347 | 109 | 70 | 72 | 43 |
| 12 | 812 | 240 | 610 | 235 | 610 | 137 | 413 | 351 | 104 | 62 | 37 | 16 |
| 13 | 655 | 234 | 775 | 828 | 520 | 118 | 379 | 327 | 118 | 56 | 18 | 16 |
| 14 | 525 | 595 | 650 | 1,150 | 440 | 145 | 351 | 307 | 176 | 56 | 19 | 16 |
| 15 | 422 | 950 | 520 | 1,020 | 311 | 137 | 408 | 279 | 303 | 60 | 50 | 60 |
| 16 | 339 | 884 | 455 | 960 | 343 | 137 | 670 | 249 | 404 | 52 | 72 | 58 |
| 17 | 275 | 720 | 404 | 775 | 315 | 145 | 750 | 225 | 705 | 54 | 50 | 45 |
| 18 | 237 | 580 | 355 | 620 | 319 | 143 | 872 | 225 | 872 | 56 | 39 | 18 |
| 19 | 212 | 510 | 307 | 500 | 291 | 145 | 818 | 215 | 650 | 54 | 17 | 24 |
| 20 | 197 | 431 | 268 | 400 | 247 | 157 | 675 | 222 | 440 | 60 | 41 | 60 |
| 21 | 186 | 363 | 234 | 319 | 231 | 157 | 575 | 242 | 331 | 58 | 54 | 72 |
| 22 | 174 | 315 | 206 | 247 | 221 | 151 | 485 | 295 | 264 | 50 | 56 | 68 |
| 23 | 168 | 315 | 186 | 268 | 206 | 143 | 413 | 323 | 245 | 36 | 88 | 68 |
| 24 | 180 | 371 | 180 | 240 | 189 | 166 | 351 | 295 | 225 | 34 | 62 | 58 |
| 25 | 197 | 422 | 183 | 192 | 166 | 143 | 367 | 256 | 192 | 30 | 22 | 45 |
| 26 | 218 | 408 | 180 | 221 | 143 | 160 | 535 | 215 | 161 | 36 | 58 | 18 |
| 27 | 231 | 371 | 209 | 240 | 197 | 180 | 580 | 208 | 142 | 62 | 62 | 16 |
| 28 | 228 | 331 | 359 | 228 | *192 | 860 | 510 | 426 | 130 | 56 | 50 | 16 |
| 29 | 215 | 299 | 570 | 221 | 189 | 2,120 | 426 | 505 | 124 | *60 | 18 | 56 |
| 30 | 203 | *268 | 550 | 215 | ----- | *3,140 | *387 | 455 | *118 | 60 | 41 | 56 |
| 31 | *212 | ----- | *450 | *215 | ----- | *3,530 | ----- | *375 | ----- | 52 | 60 | ----- |
| Total | 14,597 | 12,612 | 11,100 | 11,676 | 10,122 | 13,718 | 25,849 | 9,083 | 7,723 | 2,034 | 1,559 | 1,151 |
| Mean | 471 | 420 | 358 | 377 | 349 | 443 | 795 | 293 | 257 | 65.6 | 50.3 | 38.4 |
| Cfsm | 1.33 | 1.18 | 1.01 | 1.06 | 0.983 | 1.25 | 2.24 | 0.825 | 0.724 | 0.185 | 0.142 | 0.108 |
| In. | 1.53 | 1.32 | 1.16 | 1.22 | 1.06 | 1.44 | 2.50 | 0.95 | 0.81 | 0.21 | 0.16 | 0.12 |
| Calendar year 1959: Max | 2,210 | Min | 11 | Mean | 289 | Cfsm | 0.814 | In. | 11.05 | | | |
| Water year 1959-60: Max | 3,530 | Min | 14 | Mean | 326 | Cfsm | 0.918 | In. | 12.48 | | | |

Peak discharge (base, 1,100 cfs).--Oct. 8 (7 to 9 a.m.) 2,310 cfs (7.44 ft); Jan. 14 (11 a.m. to 3 p.m.) 1,180 cfs (5.88 ft); Mar. 31 (4 to 9 p.m.) 3,580 cfs (9.18 ft).

* Discharge measurement made on this day.

1130. Grand River at Lansing, Mich.

Location.--Lat 42°45'05", long 84°33'20", in NW¼ sec.9, T.4 N., R.2 W., on right bank 30 ft upstream from bridge on North Grand River Avenue in Lansing, 2 miles downstream from Cedar River, and at mile 152.

Drainage area.--1,230 sq mi, approximately.

Records available.--March 1901 to September 1906, October 1934 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "at North Lansing" 1901-6. Gage-height records collected in this vicinity 1907-10 (flood seasons only), 1911-19, 1920-28 (flood seasons only), and since 1931 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 805.53 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to August 1906, staff gage at same site at different datum. November 1934 to June 1949 water-stage recorder at site 1½ miles downstream at datum 2.42 ft lower.

Average discharge.--31 years, 851 cfs.

Extremes.--Maximum discharge during year, 8,070 cfs Apr. 1 (gage height, 12.08 ft); minimum, 39 cfs July 16; minimum daily, 140 cfs Sept. 11.

1901-6, 1934-60: Maximum discharge, 24,500 cfs Mar. 26, 1904 (gage height, 18.60 ft, datum then in use), from rating curve extended above 15,000 cfs by logarithmic plotting; minimum, 4.0 cfs Aug. 28, 1952, July 17, 1954 (gage height, 0.90 ft); minimum daily, 20 cfs Aug. 25, 1941.

Maximum discharge since 1901, 24,500 cfs Mar. 26, 1904.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Large diurnal fluctuation at medium and low flows caused by powerplants above station.

Revisions (water years).--WSP 1174: 1949. WSP 1387: 1901, 1903-4, 1935, 1937, 1942.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.8 | 128 | 5.0 | 1,590 |
| 2.0 | 186 | 9.0 | 4,450 |
| 2.5 | 365 | 11.0 | 6,450 |
| 3.0 | 586 | 12.0 | 7,950 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 312 | 639 | 853 | 1,140 | 980 | 660 | *7,780 | 1,270 | 886 | 766 | 211 | 288 |
| 2 | 270 | 597 | 811 | 1,050 | 919 | 596 | *6,320 | 1,150 | 961 | 668 | 234 | 250 |
| 3 | 193 | 586 | 807 | 1,000 | 867 | 612 | *4,990 | 1,020 | 848 | 770 | 392 | 210 |
| 4 | 246 | 953 | 853 | 968 | 765 | 530 | 4,230 | 994 | 775 | 824 | 318 | 190 |
| 5 | 416 | 1,310 | 914 | 667 | 909 | 637 | 3,650 | 904 | 761 | 818 | 309 | 210 |
| 6 | 1,350 | 1,450 | 1,120 | 473 | 1,480 | 609 | 3,200 | 839 | 623 | 848 | 291 | 180 |
| 7 | 2,990 | 1,340 | 1,240 | 683 | *2,240 | 641 | 2,860 | 947 | 542 | 825 | 310 | 190 |
| 8 | 3,750 | 1,160 | 1,180 | 701 | 2,500 | 563 | 2,620 | 957 | 478 | 755 | 393 | 210 |
| 9 | 3,480 | 1,050 | 1,050 | 673 | 2,080 | 531 | 2,400 | 923 | 488 | 683 | 406 | 230 |
| 10 | 2,660 | 929 | 942 | 637 | 2,080 | 558 | 2,160 | 1,050 | 422 | 586 | 358 | 210 |
| 11 | 2,270 | 823 | 970 | 600 | 2,150 | 623 | 2,010 | 1,110 | 434 | 504 | 297 | 140 |
| 12 | 1,880 | 728 | 1,450 | 1,060 | 2,010 | 609 | 1,810 | 1,100 | 382 | *504 | 306 | 160 |
| 13 | 1,570 | 804 | 1,730 | 2,520 | 1,750 | 586 | 1,640 | 1,100 | 496 | 420 | 261 | 200 |
| 14 | 1,290 | 1,380 | 1,730 | 3,270 | 1,590 | 581 | 1,460 | 1,000 | 808 | 412 | 312 | 230 |
| 15 | 1,140 | 2,030 | 1,490 | 3,460 | 1,460 | 500 | 1,710 | 1,000 | 1,060 | 429 | 312 | 200 |
| 16 | 906 | 2,240 | 1,370 | 3,410 | 1,520 | 495 | 2,110 | 920 | 1,540 | 366 | 328 | 180 |
| 17 | 816 | 1,980 | 1,250 | 2,990 | 1,410 | 504 | 2,410 | 920 | 2,380 | 498 | 266 | 210 |
| 18 | 716 | 1,620 | 1,150 | 2,570 | 1,360 | 536 | 2,550 | 900 | 2,730 | 487 | 222 | 250 |
| 19 | 594 | 1,490 | 1,070 | 2,220 | 1,220 | 531 | 2,500 | 900 | 2,560 | 494 | 260 | 200 |
| 20 | 588 | 1,340 | 904 | 1,950 | 1,110 | 540 | 2,270 | 950 | 2,100 | 431 | 344 | *293 |
| 21 | 434 | 1,200 | 816 | 1,580 | 1,040 | 580 | 2,030 | 1,100 | 1,740 | 336 | 284 | 344 |
| 22 | 515 | 1,120 | 729 | 1,350 | 1,020 | 620 | 1,810 | 1,200 | 1,450 | 382 | 334 | 330 |
| 23 | 563 | 1,120 | 686 | 1,370 | 938 | 650 | 1,670 | 1,200 | 1,450 | 359 | 317 | 319 |
| 24 | 515 | 1,140 | 632 | 1,310 | 837 | *632 | 1,450 | 1,200 | *1,460 | 340 | *294 | 267 |
| 25 | 506 | 1,210 | 623 | 1,010 | 758 | 586 | 1,550 | 1,100 | 1,320 | 292 | 218 | 263 |
| 26 | 568 | 1,180 | 604 | 1,060 | 692 | 660 | 1,680 | 1,000 | 1,220 | 402 | 234 | 196 |
| 27 | 635 | 1,100 | 678 | 1,170 | 721 | 761 | 1,700 | 900 | 1,060 | 335 | 239 | 286 |
| 28 | 561 | 1,010 | 994 | 1,090 | 736 | 2,220 | 1,570 | 900 | 970 | 379 | 230 | 152 |
| 29 | 589 | 1,030 | 1,340 | 1,100 | 726 | 4,590 | 1,450 | 1,100 | 882 | 296 | 242 | 246 |
| 30 | 549 | *881 | 1,380 | 943 | ----- | 6,560 | 1,370 | 800 | 1,200 | 311 | 250 | 237 |
| 31 | *606 | ----- | *1,260 | 965 | ----- | *7,760 | ----- | *1,100 | ----- | 283 | 270 | ----- |
| Total | 33,458 | 35,440 | 32,556 | 44,988 | 37,667 | 37,041 | 76,960 | 31,953 | 33,736 | 15,813 | 8,932 | 6,858 |
| Mean | 1,079 | 1,181 | 1,050 | 1,451 | 1,299 | 1,195 | 2,565 | 1,031 | 1,125 | 510 | 288 | 229 |
| Cfs/m | 0.877 | 0.960 | 0.854 | 1.18 | 1.06 | 0.972 | 2.09 | 0.838 | 0.915 | 0.415 | 0.234 | 0.186 |
| In. | 1.01 | 1.07 | 0.98 | 1.36 | 1.14 | 1.12 | 2.33 | 0.97 | 1.02 | 0.48 | 0.27 | 0.21 |

Calendar year 1959: Max 4,550 Min 88 Mean 930 Cfs/m 0.756 In. 10.28
Water year 1959-60: Max 7,780 Min 140 Mean 1,080 Cfs/m 0.878 In. 11.96

Peak discharge (base, 2,800 cfs).--Oct. 8 (10 p.m.) 4,030 cfs (8.48 ft); Jan. 15 (4 p.m.) 3,610 cfs (7.95 ft); Apr. 1 (1 to 3 a.m.) 8,070 cfs (12.08 ft); June 18 (3 p.m.) 2,880 cfs (6.33 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Mar. 20-23, May 12-31, Aug. 30 to Sept. 19; discharge estimated on basis of recorded range in stage and records for Grand River at Portland and Cedar River at East Lansing.

1140. Grand River at Portland, Mich.

Location.--Lat 42°51'20", long 84°54'45", in NW¹ sec. 4, T.5 N., R.5 W., on left bank at downstream side of bridge on Kent Street, 1.0 mile south of Portland, 1.9 miles upstream from Lookingglass River, and at mile 115.

Drainage area.--1,385 sq mi.

Records available.--August 1952 to September 1960. Gage-height records for flood seasons collected in this vicinity 1907-28 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 705.00 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to July 6, 1953, wire-weight gage at same site and datum.

Average discharge.--8 years, 868 cfs.

Extremes.--Maximum discharge during year, 8,710 cfs Mar. 31 (gage height, 11.56 ft); minimum, 127 cfs Sept. 12; minimum daily, 158 cfs Sept. 11, 12.
1952-60: Maximum discharge, 9,100 cfs May 13, 1956; maximum gage height, that of Mar. 31, 1960; minimum discharge, 55 cfs Sept. 9, 1953 (gage height, 4.07 ft); minimum daily, 68 cfs Sept. 9, 1953.

Remarks.--Records good. Slight diurnal fluctuation caused by powerplants above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 13, June 16 to Sept. 30; stage-discharge relation affected by ice Jan. 5-12)

| | | | |
|-----|-------|------|-------|
| 4.3 | 132 | 8.0 | 3,040 |
| 4.5 | 194 | 10.0 | 5,960 |
| 5.0 | 400 | 11.3 | 8,600 |
| 6.0 | 1,050 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1 | 445 | 651 | 1,030 | 1,400 | 1,100 | 851 | *8,560 | *1,490 | 1,160 | 844 | 382 | 329 |
| 2 | 410 | 651 | 960 | 1,260 | 1,100 | 774 | *7,780 | 1,320 | 998 | 816 | 351 | 273 |
| 3 | 378 | 619 | 960 | 1,210 | 1,040 | 718 | 6,280 | 1,270 | 998 | 781 | 337 | 246 |
| 4 | 315 | 695 | 960 | 1,150 | 968 | 746 | *5,150 | 1,120 | 858 | 830 | 559 | 201 |
| 5 | 378 | 1,500 | 1,020 | 1,000 | 930 | 670 | 4,330 | 1,080 | 837 | 872 | 456 | 238 |
| 6 | 712 | 1,600 | 1,160 | 800 | 1,300 | 746 | 3,740 | 1,000 | 739 | 893 | 430 | 198 |
| 7 | 2,170 | *1,550 | 1,540 | 700 | 2,150 | 725 | 3,340 | 1,120 | 670 | 908 | 430 | 223 |
| 8 | 3,340 | 1,360 | 1,400 | 800 | 2,550 | 739 | 2,940 | 1,120 | 583 | 915 | 391 | 234 |
| 9 | *3,740 | 1,200 | 1,300 | 700 | 2,440 | 677 | 2,720 | 1,080 | 553 | 809 | 425 | 273 |
| 10 | 2,960 | 1,100 | 1,160 | 700 | 2,330 | 638 | 2,450 | 1,130 | 559 | 753 | 595 | 242 |
| 11 | 2,420 | 960 | 1,080 | 700 | 2,530 | 677 | 2,250 | 1,220 | 500 | 677 | 478 | 158 |
| 12 | 1,980 | 872 | 1,400 | 900 | 2,460 | 711 | 2,120 | 1,260 | 511 | *619 | 410 | 158 |
| 13 | 1,690 | 830 | 1,920 | 2,590 | 2,180 | 711 | 1,900 | 1,220 | 483 | 697 | 405 | *246 |
| 14 | 1,400 | 1,150 | 2,000 | 3,550 | 1,940 | 697 | 1,750 | 1,180 | 664 | 535 | 360 | 273 |
| 15 | 1,160 | 1,920 | 1,860 | 3,990 | 1,910 | 690 | 1,760 | 1,120 | 1,010 | 450 | 396 | 230 |
| 16 | 998 | 2,400 | 1,650 | 4,010 | 1,650 | 644 | 2,280 | 1,050 | 1,320 | 541 | 368 | 198 |
| 17 | 823 | 2,330 | 1,530 | 3,630 | 1,700 | 638 | 2,570 | 1,080 | 2,130 | 461 | 420 | 242 |
| 18 | 753 | 2,120 | 1,390 | 3,110 | 1,580 | 651 | 2,860 | 1,050 | 2,680 | 644 | 346 | 298 |
| 19 | 644 | 1,730 | 1,290 | 2,640 | 1,500 | 664 | 2,740 | 990 | 2,810 | 613 | 286 | 223 |
| 20 | 571 | 1,630 | 1,180 | *2,320 | 1,380 | 651 | 2,560 | 1,120 | 2,450 | 613 | 333 | 386 |
| 21 | 547 | 1,450 | 1,020 | 2,010 | 1,260 | 690 | 2,370 | 1,220 | 2,030 | 547 | 397 | 315 |
| 22 | 472 | 1,330 | 952 | 1,660 | 1,180 | 746 | 2,110 | 1,360 | 1,750 | 461 | 351 | 382 |
| 23 | 517 | 1,260 | *837 | 1,580 | 1,160 | *753 | 1,900 | 1,360 | *1,630 | 505 | *386 | 373 |
| 24 | 632 | 1,320 | 788 | 1,540 | 1,070 | 739 | 1,700 | 1,320 | 1,560 | 450 | 396 | 351 |
| 25 | 511 | 1,380 | 753 | 1,480 | 975 | 732 | 1,670 | 1,220 | 1,480 | 445 | 355 | 315 |
| 26 | 523 | 1,350 | 739 | 1,260 | 900 | 718 | 1,890 | 1,060 | 1,350 | 435 | 282 | 269 |
| 27 | 607 | 1,300 | 760 | 1,260 | *837 | 746 | 1,970 | 982 | 1,250 | 595 | 282 | 257 |
| 28 | 632 | 1,200 | 1,030 | 1,290 | 851 | 1,620 | 1,840 | 1,040 | 1,120 | 445 | 294 | 298 |
| 29 | 644 | 1,170 | 1,510 | 1,230 | 853 | 4,970 | 1,690 | 1,260 | 1,030 | 483 | 245 | 226 |
| 30 | 583 | 1,140 | 1,640 | 1,220 | ----- | 7,690 | 1,580 | 1,340 | 930 | 450 | 282 | 246 |
| 31 | 607 | ----- | 1,580 | 1,070 | ----- | 8,560 | ----- | 1,270 | ----- | 420 | 286 | ----- |
| Total | 33,562 | 39,768 | 38,199 | 52,760 | 43,819 | 41,982 | 88,800 | 36,452 | 36,623 | 19,507 | 11,705 | 7,901 |
| Mean | 1,083 | 1,326 | 1,232 | 1,702 | 1,511 | 1,354 | 2,960 | 1,176 | 1,221 | 629 | 378 | 263 |
| Cfsm | 0.782 | 0.957 | 0.890 | 1.23 | 1.09 | 0.978 | 2.14 | 0.849 | 0.882 | 0.454 | 0.273 | 0.190 |
| In. | 0.90 | 1.07 | 1.03 | 1.42 | 1.13 | 1.13 | 2.38 | 0.98 | 0.98 | 0.52 | 0.31 | 0.21 |

Calendar year 1959: Max 5,110 Min 130 Mean 1,039 Cfsm 0.750 In. 10.19
Water year 1959-60: Max 8,560 Min 158 Mean 1,232 Cfsm 0.890 In. 12.11

* Discharge measurement made on this day.

1145. Lookingglass River near Eagle, Mich.

Location--Lat 42°49'45", long 84°46'40", in sec.10, T.5 N., R.4 W., on upstream side of highway bridge, 1½ miles northeast of Eagle and 10 miles upstream from mouth.

Drainage area--281 sq mi.

Records available--August 1944 to September 1960.

Gage--Wire-weight gage read twice daily. Datum of gage is 747.09 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge--16 years, 182 cfs.

Extremes--Maximum discharge during year, 1,260 cfs Mar. 30 (gage height, 5.27 ft); minimum, 24 cfs Sept. 7-17; minimum gage height, 1.23 ft Aug. 8, 9, Sept. 9, 10, 12.

1944-60: Maximum discharge, 2,860 cfs Apr. 5, 1947 (gage height, 7.70 ft, from graph based on gage readings), from rating curve extended above 1,900 cfs by logarithmic plotting; minimum, 18 cfs Aug. 31, 1953 (gage height, 1.11 ft).

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

Revisions (water years)--WSP 1387: 1946-47.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.1 | 19 | 3.0 | 350 |
| 1.3 | 33 | 4.0 | 650 |
| 1.5 | 55 | 5.0 | 1,110 |
| 2.0 | 125 | 6.0 | 1,700 |
| 2.5 | 225 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 50 | a150 | 209 | 315 | 183 | 160 | 975 | *380 | 230 | 70 | 40 | 29 |
| 2 | 51 | 145 | 201 | 335 | 167 | 160 | *965 | 370 | 209 | 67 | 38 | 27 |
| 3 | 48 | 149 | 193 | a320 | 173 | 160 | a1,100 | 350 | 187 | a65 | 42 | 29 |
| 4 | a50 | 195 | 179 | 308 | 155 | 150 | 1,120 | 318 | 165 | 60 | 44 | a30 |
| 5 | 55 | 298 | 189 | 258 | 167 | 150 | 1,180 | 290 | a150 | 57 | 46 | a30 |
| 6 | 77 | 298 | a200 | 213 | *223 | 150 | 1,200 | 258 | 133 | 56 | 40 | 27 |
| 7 | 131 | 288 | 199 | 242 | a250 | 140 | 1,200 | 312 | 118 | 59 | a35 | 24 |
| 8 | 129 | a280 | 199 | 302 | 278 | 140 | 1,140 | a310 | 108 | 54 | 27 | 24 |
| 9 | *133 | 275 | 199 | 250 | 285 | 140 | 1,080 | a280 | 101 | 52 | 27 | 24 |
| 10 | 157 | 270 | 211 | *197 | 330 | 140 | a900 | a300 | 94 | a50 | 53 | 24 |
| 11 | a170 | a260 | 217 | 201 | 362 | 140 | 830 | a320 | 88 | 48 | 46 | a24 |
| 12 | 187 | *248 | 282 | 203 | 355 | 140 | 770 | a300 | a85 | *48 | 45 | 24 |
| 13 | 213 | 238 | a300 | 524 | 330 | 140 | 682 | 258 | 89 | 43 | 43 | *24 |
| 14 | 213 | 292 | 262 | 412 | a340 | 140 | 606 | 268 | 92 | 42 | a44 | 24 |
| 15 | 217 | a300 | 262 | 430 | 355 | 140 | 566 | a260 | 92 | 41 | 44 | 24 |
| 16 | 223 | 260 | 278 | 450 | 350 | 140 | 560 | 252 | 98 | 40 | 37 | 24 |
| 17 | 213 | 255 | 280 | a440 | 350 | 140 | a600 | 342 | 179 | a50 | 42 | 24 |
| 18 | a220 | 250 | 302 | 432 | 325 | 140 | 510 | 310 | 189 | 65 | 36 | a30 |
| 19 | 221 | 268 | 305 | 425 | 280 | 140 | 468 | 230 | a200 | 56 | 33 | 33 |
| 20 | 197 | 315 | a300 | 418 | 282 | 140 | 452 | 185 | 209 | 53 | 31 | 42 |
| 21 | 173 | 285 | 308 | 412 | a230 | 140 | 440 | 125 | 205 | 52 | a35 | 35 |
| 22 | 153 | a280 | 248 | 418 | 207 | 140 | 425 | a200 | 199 | 42 | 38 | 35 |
| 23 | 151 | 268 | *219 | 368 | 205 | 140 | 402 | 282 | *175 | 41 | *40 | 33 |
| 24 | 147 | 260 | 223 | a370 | 185 | 140 | a500 | 265 | 149 | a40 | 41 | 32 |
| 25 | a147 | 255 | a190 | 368 | 181 | 140 | 560 | 258 | 133 | 38 | 42 | a30 |
| 26 | 143 | a250 | 155 | 298 | 170 | 160 | 630 | 260 | a120 | 38 | 37 | 30 |
| 27 | 147 | 238 | a190 | 245 | 170 | 250 | 458 | 262 | 104 | 60 | 37 | 30 |
| 28 | 145 | 223 | 225 | 215 | 160 | 400 | 402 | 470 | 94 | 48 | a35 | 27 |
| 29 | 145 | a230 | 235 | 205 | 160 | 798 | 388 | a350 | 84 | 44 | 32 | 28 |
| 30 | 147 | 230 | 260 | 197 | ----- | 1,230 | 382 | 292 | 76 | 42 | 30 | 27 |
| 31 | 145 | ----- | 250 | a190 | ----- | 1,120 | ----- | 265 | ----- | a40 | 29 | ----- |
| Total | 4,598 | 7,553 | 7,270 | 9,961 | 7,138 | 7,548 | 21,491 | 8,922 | 4,155 | 1,561 | 1,189 | 848 |
| Mean | 148 | 252 | 235 | 321 | 246 | 243 | 716 | 288 | 138 | 50.4 | 38.4 | 28.3 |
| Cfs/m | 0.527 | 0.897 | 0.836 | 1.14 | 0.875 | 0.865 | 2.55 | 1.02 | 0.491 | 0.179 | 0.137 | 0.101 |
| In. | 0.61 | 1.00 | 0.96 | 1.32 | 0.94 | 1.00 | 2.84 | 1.18 | 0.55 | 0.21 | 0.16 | 0.11 |

Calendar year 1959: Max 1,000 Min 21 Mean 184 Cfs/m 0.655 In. 8.86
 Water year 1959-60: Max 1,230 Min 24 Mean 225 Cfs/m 0.801 In. 10.88

* Discharge measurement made on this day.

a No gage-height record; discharge interpolated or estimated on basis of weather records and records for Thornapple River near Hastings and Cedar River at East Lansing.

Note--Stage-discharge relation affected by ice Feb. 26 to Mar. 27 (no gage-height record Feb. 28, Mar. 6, 13, 20, 28).

1150. Maple River at Maple Rapids, Mich.

Location.--Lat 43°06'35", long 84°41'35", in sec.5, T.8 N., R.3 W., on upstream side of highway bridge at Maple Rapids, 30 ft downstream from Pine Creek and three-quarters of a mile upstream from Hayworth Creek.

Drainage area.--434 sq mi.

Records available.--August 1944 to September 1960.

Gage.--Wire-weight gage read twice daily. Datum of gage is 642.58 ft above near sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--16 years, 254 cfs.

Extremes.--Maximum discharge during year, 5,550 cfs Mar. 31 (gage height, 10.22 ft); minimum, 19 cfs Sept. 11, 12; minimum gage height, 2.33 ft Sept. 12.

1944-60: Maximum daily discharge, 6,500 cfs Mar. 20, 1948; maximum gage height, 11.22 ft Mar. 20, 1948, from floodmark (backwater from ice); minimum discharge observed, 8.2 cfs Aug. 11, 1944 (gage height, 1.61 ft).

Flood in March 1904 reached a stage of 13.8 ft, from information by local resident.

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

Revisions.--Revised figures of discharge in cubic feet per second, for a high-water period in 1956, superseding those published in WSP 1437, are given herewith:

1956
Mar. 6..... 1,630
7..... 3,050
8..... 2,980
9..... 2,300

| Month | Cfs-days | Maximum | Minimum | Mean | Per square mile | Runoff in inches |
|-------------------------|----------|---------|---------|-------|-----------------|------------------|
| March 1956..... | 31,464 | 3,050 | 80 | 1,015 | 2.34 | 2.70 |
| Water year 1955-56..... | - | 4,480 | 16 | 365 | .841 | 11.45 |
| Calendar year 1956..... | - | 4,480 | 26 | 358 | .825 | 11.22 |

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 1 to Dec. 25, July 31 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 2.2 | 18 | 7.0 | 610 |
| 2.5 | 30 | 7.5 | 770 |
| 3.0 | 55 | 8.0 | 1,050 |
| 4.0 | 118 | 8.5 | 1,480 |
| 5.0 | 220 | 9.0 | 2,250 |
| 6.0 | 365 | 10.2 | 5,490 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|-------|----------|--------|-------------|----------|-------|-------|-------|
| 1 | 28 | 80 | 226 | 520 | 277 | 140 | 5,190 | *532 | 231 | 164 | 31 | 29 |
| 2 | 27 | 85 | 214 | 508 | 279 | 140 | *4,500 | 502 | 221 | 151 | 30 | 28 |
| 3 | 25 | 91 | 205 | 496 | 271 | 140 | *3,810 | 455 | 209 | 143 | 36 | 26 |
| 4 | 24 | 109 | 199 | 465 | 258 | 130 | 2,850 | 424 | 194 | 126 | 54 | 24 |
| 5 | 32 | 167 | 198 | 440 | 244 | 130 | 2,360 | 398 | 183 | 114 | 54 | 24 |
| 6 | 50 | 188 | 205 | 420 | 240 | 120 | 1,850 | 375 | 166 | a100 | 48 | 24 |
| 7 | 79 | 207 | 215 | 396 | *274 | 120 | 1,490 | 365 | 151 | 90 | 45 | 23 |
| 8 | 85 | 218 | 219 | 355 | 294 | 120 | 1,280 | 368 | 141 | 75 | 42 | 23 |
| 9 | *86 | 232 | 219 | *331 | 325 | 120 | 1,110 | 358 | 129 | a70 | 40 | 21 |
| 10 | 86 | a230 | 216 | 308 | 375 | 110 | 974 | 355 | 118 | 60 | 46 | 20 |
| 11 | 80 | a230 | 219 | 285 | 410 | 110 | 825 | 350 | 108 | 56 | 48 | 19 |
| 12 | 86 | *225 | 281 | 279 | 430 | 110 | 778 | 343 | 102 | *52 | 46 | 19 |
| 13 | 86 | a220 | 333 | 379 | 450 | 110 | 718 | 341 | 94 | 50 | 44 | 21 |
| 14 | 84 | a220 | 370 | 470 | 470 | 110 | 658 | 340 | 93 | 47 | 42 | 22 |
| 15 | 80 | a210 | 393 | 568 | 450 | 110 | a600 | 329 | 92 | 44 | 46 | 22 |
| 16 | 76 | 219 | 404 | 637 | 400 | 110 | a600 | 320 | 91 | 40 | 50 | 22 |
| 17 | 72 | 227 | 398 | 697 | 370 | 110 | a620 | 312 | 91 | 38 | 48 | 22 |
| 18 | 67 | 234 | 382 | 664 | 350 | 110 | 538 | 304 | 94 | 44 | 44 | 26 |
| 19 | 66 | 231 | 365 | 640 | 300 | 110 | 508 | 297 | 100 | 46 | 39 | *27 |
| 20 | 61 | 225 | 345 | 598 | 270 | 110 | 562 | 297 | 112 | 45 | 39 | 42 |
| 21 | 57 | 220 | 320 | 550 | 250 | *110 | 526 | 296 | 117 | 40 | 54 | 49 |
| 22 | 54 | 212 | 297 | 485 | 230 | 110 | 478 | 291 | 117 | 38 | 79 | 47 |
| 23 | 56 | 213 | 278 | 465 | 210 | 110 | 455 | 286 | *116 | 34 | *80 | 42 |
| 24 | 59 | 224 | *256 | 434 | 190 | 110 | 430 | 284 | 158 | 33 | 71 | 38 |
| 25 | 62 | 247 | a230 | 412 | 180 | 110 | 416 | 278 | 181 | 31 | 61 | 35 |
| 26 | 64 | 261 | 227 | 389 | 170 | 110 | 455 | 274 | 180 | 27 | 53 | 32 |
| 27 | 68 | 225 | 362 | 160 | 150 | 110 | 529 | 271 | 177 | 39 | 46 | 30 |
| 28 | 71 | 253 | 256 | 336 | 150 | 285 | 544 | 265 | 169 | 42 | 41 | 28 |
| 29 | 72 | 247 | 455 | 318 | 150 | 694 | 485 | 258 | 167 | 40 | 35 | 26 |
| 30 | 73 | 237 | 452 | 303 | ----- | 2,770 | 468 | 248 | 170 | 38 | 33 | 24 |
| 31 | 76 | ----- | 511 | 292 | ----- | *5,490 | ----- | 242 | ----- | 34 | 30 | ----- |
| Total | 1,992 | 6,218 | 9,113 | 13,804 | 8,407 | 12,379 | 36,607 | 10,358 | 4,272 | 1,951 | 1,455 | 835 |
| Mean | 64.3 | 207 | 294 | 445 | 290 | 399 | 1,220 | 334 | 142 | 62.9 | 46.9 | 27.8 |
| Cfs/m | 0.148 | 0.477 | 0.677 | 1.03 | 0.668 | 0.919 | 2.81 | 0.770 | 0.327 | 0.145 | 0.108 | 0.064 |
| In. | 0.17 | 0.53 | 0.78 | 1.18 | 0.72 | 1.06 | 3.14 | 0.89 | 0.37 | 0.17 | 0.12 | 0.07 |
| Calendar year 1959: Max | 2,790 | | | Min 11 | | Mean 240 | | Cfs/m 0.553 | In. 7.51 | | | |
| Water year 1959-60: Max | 5,490 | | | Min 19 | | Mean 293 | | Cfs/m 0.675 | In. 9.20 | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Grand River at Ionia and Rogue River near Rockford.

Note.--Stage-discharge relation affected by ice Feb. 11 to Mar. 27.

1160. Grand River at Ionia, Mich.

Location.--Lat 42°58'20", long 85°04'10", in NW $\frac{1}{4}$ sec.30, T.7 N., R.6 W., on left bank 15 ft downstream from bridge on State Highway 66 at Ionia, 2.7 miles downstream from Prairie Creek, and at mile 87.

Drainage area.--2,840 sq mi, approximately.

Records available.--March to June 1931, July and September 1931 (fragmentary), July 1951 to September 1960. Gage-height records for flood seasons collected in this vicinity 1907-28 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 615.38 ft above mean sea level, datum of 1929. Mar. 19 to Sept. 24, 1931, chain gage at site $1\frac{1}{2}$ miles upstream at different datum.

Average discharge.--9 years (1951-60), 1,846 cfs.

Extremes.--Maximum discharge during year, 21,500 cfs Apr. 1 (gage height, 23.43 ft); minimum, 189 cfs Sept. 11 (gage height, 6.59 ft); minimum daily, 369 cfs Sept. 11. 1931, 1951-60: Maximum discharge, that of Apr. 1, 1960; minimum, 105 cfs Sept. 8, 9, 1954 (gage height, 6.20 ft); minimum daily, 115 cfs Aug. 27, 1953.

Remarks.--Records good except those for period of ice effect, which are fair. Diurnal fluctuation below about 5,000 cfs caused by powerplants above station.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|------|-------|------|--------|
| 7.1 | 345 | 17.0 | 7,090 |
| 8.0 | 770 | 19.0 | 9,990 |
| 9.0 | 1,300 | 23.0 | 20,000 |
| 14.0 | 4,400 | 23.4 | 21,400 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 602 | 1,340 | 1,990 | 2,850 | 2,120 | 1,590 | *21,300 | 3,290 | 3,040 | 1,410 | 614 | 504 |
| 2 | 708 | 1,120 | 1,880 | 2,740 | 2,080 | 1,840 | *20,200 | 3,110 | 2,220 | 1,420 | 590 | 496 |
| 3 | 530 | 1,210 | 1,740 | 2,720 | 1,900 | 1,390 | *17,700 | 2,880 | 2,050 | 1,330 | 640 | 524 |
| 4 | 850 | 1,450 | 1,730 | 2,570 | 1,680 | 1,490 | *14,900 | 2,800 | 1,930 | 1,300 | 692 | 433 |
| 5 | 608 | 2,720 | 1,790 | 2,280 | 1,790 | 1,470 | *12,300 | 2,410 | 1,640 | 1,370 | 920 | 453 |
| 6 | 1,310 | 3,040 | 2,050 | b1,700 | 2,140 | 1,320 | 10,200 | 2,380 | 1,580 | 1,170 | 646 | 436 |
| 7 | 2,090 | *2,910 | 2,270 | b1,500 | 2,900 | 1,440 | 8,700 | *2,580 | 1,530 | 1,340 | 750 | 475 |
| 8 | 3,350 | 2,760 | 2,330 | b1,800 | 3,520 | 1,440 | *7,680 | 2,760 | 1,360 | 1,280 | 770 | 392 |
| 9 | 3,940 | 2,410 | 2,290 | b1,800 | 3,600 | 1,290 | 6,890 | 2,580 | 1,140 | 1,240 | 671 | 409 |
| 10 | *3,960 | 2,230 | 2,100 | b1,900 | 3,560 | 1,270 | 6,320 | 2,590 | 1,150 | 1,210 | 715 | 392 |
| 11 | 3,130 | 2,090 | 1,990 | b1,900 | 3,880 | 1,260 | 5,550 | 2,560 | 1,100 | 955 | 780 | 369 |
| 12 | 2,920 | 1,970 | 2,570 | 2,820 | 4,000 | 1,300 | *5,100 | 2,660 | 1,030 | 930 | 780 | 418 |
| 13 | 2,490 | 1,680 | 3,110 | 4,510 | 3,770 | 1,300 | 4,740 | 2,600 | 1,010 | 960 | 745 | *417 |
| 14 | 2,280 | 1,970 | 3,410 | 5,640 | 3,350 | 1,310 | 4,300 | 2,500 | 1,140 | 970 | 632 | 414 |
| 15 | 1,870 | 2,530 | 3,220 | 5,980 | 3,090 | 1,270 | 4,060 | 2,460 | 1,340 | 860 | 651 | 438 |
| 16 | 1,690 | 3,070 | 2,950 | 6,170 | 3,050 | 1,120 | *4,360 | 2,300 | 1,710 | 740 | 825 | 435 |
| 17 | 1,600 | 3,160 | 2,740 | *5,870 | 3,070 | 1,240 | 4,720 | 2,260 | *2,080 | 760 | 604 | 397 |
| 18 | 1,440 | 2,980 | 2,680 | 5,350 | 3,050 | 1,150 | 5,140 | 2,350 | 3,010 | 762 | 626 | 404 |
| 19 | 1,170 | 2,530 | 2,540 | 4,640 | 2,810 | 1,220 | 5,140 | 2,290 | 3,230 | *974 | *636 | 604 |
| 20 | 1,240 | 2,390 | 2,320 | 4,090 | 2,650 | 1,210 | 4,860 | 2,170 | 3,110 | 971 | 637 | 597 |
| 21 | 1,040 | 2,390 | 2,030 | 3,800 | 2,440 | 1,230 | 4,390 | 2,390 | 2,750 | 883 | 825 | 646 |
| 22 | 955 | 2,170 | 1,920 | 3,220 | 2,330 | 1,310 | 3,990 | 2,350 | 2,420 | 725 | 880 | 555 |
| 23 | 970 | 2,200 | *1,820 | 2,960 | 2,170 | *1,250 | 3,650 | 2,610 | 2,320 | 594 | 330 | 743 |
| 24 | 1,040 | 2,250 | 1,610 | 2,930 | 2,000 | 1,340 | 3,360 | 2,370 | 2,180 | 830 | 855 | 649 |
| 25 | 1,230 | 2,530 | 1,590 | 2,810 | 2,000 | 1,290 | 3,300 | 2,440 | 2,170 | 640 | 770 | 571 |
| 26 | 1,080 | 2,330 | 1,640 | 2,420 | 1,760 | 1,260 | 3,960 | 2,180 | 2,030 | 726 | 725 | 487 |
| 27 | 992 | 2,440 | 1,540 | 2,380 | *1,640 | 1,520 | 4,350 | 2,080 | 1,820 | 760 | 700 | 553 |
| 28 | 1,210 | 2,260 | 2,150 | 2,630 | 1,680 | 2,760 | 4,070 | 2,890 | 1,840 | 910 | 514 | 499 |
| 29 | 1,160 | 2,150 | 3,270 | 2,430 | 1,610 | 6,520 | 3,730 | 3,110 | 1,680 | 845 | 500 | 464 |
| 30 | 1,120 | 2,030 | 3,300 | 2,230 | ----- | 11,700 | 3,430 | 2,930 | 1,460 | 682 | 587 | 446 |
| 31 | 1,060 | ----- | 3,130 | 2,140 | ----- | 18,600 | ----- | 2,680 | ----- | 618 | 505 | ----- |
| Total | 49,435 | 68,310 | 71,700 | 98,780 | 75,640 | 75,300 | 212,370 | 79,560 | 57,070 | 30,165 | 21,715 | 14,620 |
| Mean | 1,595 | 2,277 | 2,313 | 3,186 | 2,608 | 2,429 | 7,079 | 2,566 | 1,902 | 973 | 700 | 487 |
| Cfs/m | 0.562 | 0.802 | 0.814 | 1.12 | 0.918 | 0.855 | 2.49 | 0.904 | 0.670 | 0.343 | 0.246 | 0.171 |
| In. | 0.65 | 0.89 | 0.94 | 1.29 | 0.99 | 0.99 | 2.78 | 1.04 | 0.75 | 0.40 | 0.28 | 0.19 |
| Calendar year 1959: Max | 11,000 | Min | 214 | Mean | 1,953 | Cfs/m | 0.688 | In. | 9.33 | | | |
| Water year 1959-60: Max | 21,300 | Min | 369 | Mean | 2,335 | Cfs/m | 0.822 | In. | 11.19 | | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1165. Flat River at Smyrna, Mich.

Location.--Lat 43°03'10", long 85°15'50" in NW $\frac{1}{4}$ sec.28, T.8 N., R.8 W., on right bank at downstream side of highway bridge, 600 ft downstream from dam and inactive powerplant, and half a mile south of Smyrna.

Drainage area.--528 sq mi.

Records available.--December 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 729.53 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--9 years (1951-60), 411 cfs.

Extremes.--Maximum discharge during year, 2,460 cfs Apr. 1 (gage height, 6.81 ft); minimum, 11 cfs June 8 (gage height, 2.36 ft); minimum daily, 164 cfs Sept. 29.
1950-60: Maximum discharge, 2,500 cfs Apr. 4, 1959; maximum gage height, 6.81 ft Apr. 1, 1960; minimum discharge, 7.4 cfs Sept. 9, 1953; minimum daily, 86 cfs Aug. 14, 1958.

Remarks.--Records good. Diurnal fluctuation caused by powerplants above station prior to September 1956; occasional diurnal fluctuation since.

Rating table, water year 1959-60 (gage height, in feet, and discharge,
in cubic feet per second)
(shifting-control method used Oct. 1-12, July 5 to Sept. 30)

| | | | |
|-----|-----|-----|-------|
| 3.1 | 140 | 6.0 | 1,710 |
| 4.0 | 481 | 6.8 | 2,450 |
| 5.0 | 990 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|---------|--------|----------|--------|------------|-----------|--------|-------|
| 1 | 283 | 371 | 476 | 584 | 463 | 330 | 1,990 | 776 | 814 | 410 | 261 | 229 |
| 2 | 216 | 454 | 436 | 745 | 436 | 392 | 2,180 | 770 | 745 | 405 | 254 | 205 |
| 3 | 196 | 410 | 436 | 665 | 396 | 346 | 2,060 | 705 | 685 | 401 | 372 | 202 |
| 4 | 196 | 338 | 436 | 651 | 364 | 358 | 1,960 | 725 | 646 | 334 | 490 | 216 |
| 5 | 261 | 603 | 450 | 423 | 445 | 375 | 1,810 | 685 | 576 | 379 | 427 | 268 |
| 6 | 420 | 612 | 472 | 338 | 571 | 423 | 1,650 | 589 | 463 | 358 | 330 | 254 |
| 7 | 540 | 651 | 540 | 522 | 499 | 375 | 1,460 | *690 | 490 | 302 | 280 | 209 |
| 8 | 450 | 675 | 526 | 517 | 535 | 371 | 1,270 | 740 | 418 | 287 | 302 | 205 |
| 9 | 291 | 715 | 499 | 476 | 580 | 371 | 1,190 | 760 | 357 | 280 | 423 | 196 |
| 10 | *322 | 603 | 436 | 508 | 508 | 375 | 1,030 | 776 | 350 | 210 | 350 | 192 |
| 11 | 423 | 608 | *454 | 440 | 490 | 322 | 960 | 715 | 326 | 299 | 299 | 189 |
| 12 | 401 | *576 | 548 | 512 | 472 | 310 | 942 | 745 | 330 | 291 | *280 | 196 |
| 13 | 375 | 472 | 617 | 720 | *528 | 427 | 892 | 670 | 334 | 254 | 295 | *233 |
| 14 | 236 | 490 | 651 | 808 | 522 | 358 | 924 | 594 | 363 | 219 | 306 | 250 |
| 15 | 254 | 468 | 702 | 814 | 530 | 318 | 914 | 617 | 440 | *233 | 342 | 236 |
| 16 | 318 | 463 | 617 | 809 | 558 | 354 | 990 | 594 | 530 | 236 | 414 | 236 |
| 17 | 306 | 396 | 540 | *740 | 535 | 363 | 972 | 558 | *504 | 229 | 405 | 229 |
| 18 | 272 | 334 | 540 | 715 | 517 | 379 | 960 | 553 | 517 | 268 | 295 | 219 |
| 19 | 276 | 423 | 526 | 705 | 490 | 367 | 886 | 548 | 508 | 299 | 243 | 276 |
| 20 | 265 | 436 | 481 | 755 | 450 | 379 | 851 | 617 | 476 | 364 | 247 | 295 |
| 21 | 265 | 338 | 458 | 627 | 450 | 375 | 792 | 576 | 384 | 322 | 414 | 371 |
| 22 | 243 | 387 | 418 | 526 | 450 | 363 | *725 | 580 | 392 | 295 | 418 | 243 |
| 23 | 195 | 427 | 358 | 589 | 445 | *367 | 690 | 660 | 358 | 299 | 384 | 229 |
| 24 | 302 | 472 | 334 | 576 | 418 | 375 | 636 | 641 | 458 | 233 | 418 | 250 |
| 25 | 432 | 504 | 379 | 522 | 358 | 350 | 660 | 627 | 461 | 202 | 306 | 291 |
| 26 | 499 | 562 | 440 | 530 | 410 | 358 | 782 | 608 | 427 | 268 | 291 | 302 |
| 27 | 490 | 608 | 468 | 458 | 463 | 388 | 875 | 622 | 436 | 342 | 283 | 280 |
| 28 | 469 | 562 | 454 | 553 | 468 | 499 | 836 | 750 | 423 | 436 | 243 | 243 |
| 29 | 432 | 504 | 705 | 512 | 384 | 773 | 864 | 924 | 368 | 358 | 268 | 164 |
| 30 | 338 | 472 | 700 | 504 | ----- | *1,140 | 770 | 902 | 508 | 354 | 265 | 189 |
| 31 | 423 | ----- | 638 | 494 | ----- | *1,500 | ----- | 853 | ----- | 334 | 261 | ----- |
| Total | 10,368 | 14,914 | 15,735 | 18,338 | 13,755 | 13,781 | 33,481 | 21,170 | 14,127 | 9,521 | 10,166 | 7,097 |
| Mean | 335 | 497 | 508 | 592 | 474 | 445 | 1,116 | 683 | 471 | 307 | 328 | 237 |
| Cfsm | 0.634 | 0.941 | 0.962 | 1.12 | 0.898 | 0.843 | 2.11 | 1.29 | 0.892 | 0.581 | 0.621 | 0.449 |
| In. | 0.73 | 1.05 | 1.11 | 1.29 | 0.97 | 0.97 | 2.36 | 1.49 | 1.00 | 0.67 | 0.72 | 0.50 |
| Calendar year 1959: Max | 2,140 | | | | Min 115 | | Mean 414 | | Cfsm 0.784 | In. 10.64 | | |
| Water year 1959-60: Max | 2,160 | | | | Min 164 | | Mean 499 | | Cfsm 0.945 | In. 12.86 | | |

* Discharge measurement made on this day.

1170. Quaker Brook near Nashville, Mich.

Location.--Lat 42°33'57", long 85°05'37", in NW $\frac{1}{4}$ sec.13, T.2 N., R.7 W., on left bank 150 ft upstream from culvert on county road, 500 ft upstream from small tributary, and $2\frac{1}{2}$ miles south of Nashville.

Drainage area.--7.60 sq mi.

Records available.--August 1954 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 821.89 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--6 years, 5.86 cfs.

Extremes.--Maximum discharge during year, 176 cfs Mar. 29 (gage height, 4.87 ft); minimum, 1.9 cfs Sept. 10, 11; minimum gage height, 1.67 ft Sept. 11.
1954-60: Maximum discharge, 294 cfs Oct. 4, 1954 (gage height, 5.47 ft), from rating curve extended above 140 cfs; minimum, 1.0 cfs July 15, 16, 17, 1959.

Remarks.--Records good.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|----|
| 1.7 | 2.2 | 2.5 | 30 |
| 2.0 | 6.0 | 3.0 | 70 |
| 2.1 | 8.2 | 3.3 | 94 |
| 2.3 | 17 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 2.9 | 6.3 | 5.0 | 5.0 | 6.9 | 5.0 | 20 | 6.9 | *5.1 | 4.0 | 2.9 | 2.8 |
| 2 | 2.6 | 5.0 | 5.4 | 5.3 | 6.0 | 5.1 | 16 | 6.3 | 5.3 | 4.1 | 3.1 | 2.7 |
| 3 | 2.5 | 4.1 | 6.2 | 6.5 | 5.3 | 4.7 | 14 | 5.6 | 4.7 | 18 | 8.7 | 2.9 |
| 4 | 2.8 | 16 | 5.7 | 5.1 | 5.0 | 5.6 | 12 | 5.1 | 4.4 | 7.7 | 8.2 | 2.9 |
| 5 | 11 | *21 | 8.0 | 4.7 | 6.2 | 5.1 | 11 | 4.8 | 5.0 | 5.0 | 4.6 | 2.7 |
| 6 | *41 | 9.0 | 9.1 | 3.9 | 18 | 5.0 | 9.8 | 5.9 | 3.9 | 4.4 | 3.8 | 2.6 |
| 7 | *29 | 6.5 | 7.1 | 4.6 | 14 | 5.0 | 9.8 | 22 | 3.8 | 3.9 | 3.7 | 2.5 |
| 8 | 11 | 5.8 | 5.8 | 4.6 | 10 | 4.6 | 8.5 | 10 | 3.7 | 3.4 | 3.4 | 2.6 |
| 9 | 6.7 | 5.3 | 5.3 | 4.2 | 9.4 | 4.7 | 8.2 | 8.2 | 3.5 | 3.3 | 4.7 | 2.6 |
| 10 | 5.4 | 4.8 | *4.9 | *4.7 | 11 | 4.7 | 7.4 | 13 | 3.4 | 3.3 | 5.1 | 2.4 |
| 11 | 10 | 4.4 | 7.9 | 4.7 | 19 | 4.6 | 8.2 | 8.2 | 3.4 | 3.2 | 4.3 | 2.6 |
| 12 | 6.7 | 4.3 | 18 | 38 | 11 | 4.4 | 9.1 | 8.2 | 3.7 | 3.2 | 3.8 | 2.6 |
| 13 | 5.4 | 5.2 | 9.1 | *5.7 | 7.7 | 4.6 | 7.1 | 7.1 | 17 | *3.6 | 3.5 | 2.6 |
| 14 | 4.8 | 16 | 6.5 | 21 | 7.4 | 4.7 | 8.2 | 6.5 | 30 | 3.9 | 4.0 | 2.6 |
| 15 | 4.7 | 9.0 | 6.3 | 21 | 6.3 | 4.7 | 20 | 5.6 | 28 | 3.5 | 3.9 | 2.5 |
| 16 | 4.0 | 7.6 | 6.2 | 14 | 6.9 | 4.8 | 21 | 5.1 | 27 | 3.3 | 3.7 | 2.7 |
| 17 | 3.8 | 6.1 | 5.6 | 9.1 | 8.2 | 5.1 | 22 | 13 | 36 | 4.0 | 3.4 | 2.8 |
| 18 | 3.5 | 4.7 | 5.1 | 7.9 | 7.9 | 5.3 | 18 | 9.1 | 14 | 6.3 | 3.4 | 2.8 |
| 19 | 3.4 | 4.7 | 4.6 | 7.6 | 6.9 | 5.6 | 9.4 | 7.6 | 9.1 | 5.0 | 3.1 | *7.0 |
| 20 | 3.4 | 4.7 | 4.2 | 6.9 | 6.4 | 5.6 | 7.9 | 38 | 6.7 | 3.8 | 3.1 | 5.8 |
| 21 | 3.4 | 5.0 | 4.0 | 6.2 | 6.5 | 5.6 | *7.1 | 18 | 5.7 | 3.5 | 3.1 | 4.0 |
| 22 | 3.4 | 5.4 | 3.8 | 6.5 | 6.3 | *4.6 | 6.7 | 12 | *11 | 3.4 | 3.1 | 3.9 |
| 23 | 3.7 | 7.9 | 3.7 | 6.5 | 6.0 | 6.3 | 6.3 | 9.8 | 12 | 3.8 | *3.2 | 3.3 |
| 24 | 4.8 | 6.9 | 4.0 | 6.1 | 5.8 | 5.4 | 6.2 | 7.9 | 7.6 | 3.3 | 3.1 | 3.1 |
| 25 | 4.3 | 6.7 | 4.1 | 5.6 | 5.6 | 5.4 | 7.1 | 6.3 | 6.2 | 3.1 | 2.7 | 2.9 |
| 26 | 4.3 | 5.7 | 5.5 | 6.3 | 7.4 | 5.4 | 6.5 | 5.8 | 5.0 | 5.0 | 2.4 | 3.5 |
| 27 | 6.0 | 5.3 | 9.4 | 6.3 | *6.2 | 8.8 | 6.0 | 7.8 | 4.6 | 5.8 | 2.7 | 3.2 |
| 28 | 4.7 | 5.1 | 14 | 6.5 | 5.6 | 33 | 5.6 | 18 | 5.0 | 3.5 | 3.1 | 3.1 |
| 29 | 4.0 | 5.0 | 11 | 6.5 | 5.4 | *9.3 | 5.4 | 9.4 | 4.8 | 3.2 | 3.4 | 2.7 |
| 30 | 3.9 | 4.7 | 7.4 | 6.9 | ----- | 62 | 6.9 | 7.1 | 4.1 | 3.2 | 3.3 | 2.8 |
| 31 | 8.0 | ----- | 5.4 | 6.9 | ----- | 35 | ----- | 6.3 | ----- | 2.8 | 2.8 | ----- |
| Total | 215.1 | 208.2 | 208.3 | 306.1 | 234.3 | 363.4 | 309.4 | 304.6 | 283.7 | 137.5 | 117.3 | 93.2 |
| Mean | 6.94 | 6.94 | 6.72 | 9.87 | 9.08 | 11.7 | 10.3 | 9.83 | 9.46 | 4.44 | 3.78 | 3.11 |
| Cfsm | 0.913 | 0.913 | 0.884 | 1.30 | 1.06 | 1.54 | 1.36 | 1.29 | 1.24 | 0.584 | 0.497 | 0.409 |
| In. | 1.05 | 1.02 | 1.02 | 1.50 | 1.15 | 1.78 | 1.51 | 1.49 | 1.39 | 0.67 | 0.57 | 0.46 |
| Calendar year 1959: Max | 43 | | | Min | 1.1 | Mean | 5.45 | Cfsm | 0.717 | In. | 9.73 | |
| Water year 1959-60: Max | 93 | | | Min | 2.4 | Mean | 7.60 | Cfsm | 1.00 | In. | 13.61 | |

Peak discharge (base, 50 cfs).--Oct. 6 (7 p.m.) 68 cfs (3.00 ft); Jan. 12 (9:30 p.m.) 104 cfs (3.46 ft); Mar. 29 (6 p.m.) 176 cfs (4.87 ft); May 20 (9 a.m.) 55 cfs (2.84 ft); June 16 (11 p.m.) 71 cfs (3.03 ft).

* Discharge measurement made on this day.

1175. Thornapple River near Hastings, Mich.

Location.--Lat 42°36'55", long 85°14'15", in sec.27, T.3 N., R.8 W., on downstream side of highway bridge, half a mile downstream from Cedar Creek, 2 miles downstream from Thornapple Lake, and 3½ miles southeast of Hastings.

Drainage area.--385 sq mi.

Records available.--October 1944 to September 1960.

Gage.--Wire-weight gage read twice daily. Datum of gage is 786.71 ft above rean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--16 years, 311 cfs.

Extremes.--Maximum discharge during year, 3,880 cfs Apr. 1 (gage height, 8.75 ft); minimum, 70 cfs Sept. 14 (gage height, 2.92 ft).
1944-60: Maximum discharge, 6,810 cfs Apr. 7, 1947 (gage height, 10.20 ft, from graph based on gage readings); minimum, 43 cfs Aug. 26-28, 1946.

Remarks.--Records good.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.9 | 72 | 5.0 | 990 |
| 3.2 | 140 | 8.0 | 3,230 |
| 3.5 | 230 | 9.0 | 4,110 |
| 4.0 | 440 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|--------|--------|--------|--------|----------|-------------|-----------|--------|-------|-------|-------|
| 1 | 140 | 215 | 254 | 435 | 280 | 221 | *3,770 | 340 | 480 | 224 | 110 | 88 |
| 2 | 130 | 224 | 245 | 430 | 264 | 209 | *3,260 | 318 | 425 | 212 | 110 | 88 |
| 3 | 112 | 233 | 245 | 358 | 248 | 224 | 2,750 | 296 | 336 | 230 | 130 | 88 |
| 4 | 108 | 248 | 248 | 318 | 248 | 218 | *2,030 | 284 | 284 | 254 | 176 | 85 |
| 5 | 140 | *410 | 268 | 260 | *248 | 206 | *1,660 | 260 | 280 | 251 | 200 | 79 |
| 6 | | 221 | 560 | 288 | 236 | 300 | 209 | 1,220 | 251 | 242 | 230 | 194 |
| 7 | | 350 | 634 | 345 | 242 | 400 | 215 | 966 | 350 | 224 | 209 | 185 |
| 8 | | *460 | 634 | 363 | 254 | 525 | 218 | 821 | 440 | 209 | 188 | 143 |
| 9 | | 500 | 570 | 345 | 248 | 570 | 197 | 689 | 500 | 194 | 176 | 158 |
| 10 | | 525 | 505 | *309 | *230 | 580 | 197 | 590 | 500 | 182 | 164 | 188 |
| 11 | | 530 | 390 | 288 | 206 | 601 | 182 | 520 | 490 | 176 | 158 | 209 |
| 12 | | 500 | 358 | 354 | 280 | 645 | 170 | 485 | 490 | 170 | 146 | 209 |
| 13 | | 460 | 300 | 440 | 767 | 650 | 176 | 465 | *460 | 218 | 146 | 176 |
| 14 | | 405 | 304 | 525 | 1,300 | 645 | 191 | 440 | 415 | 358 | 140 | 170 |
| 15 | | 345 | 368 | 525 | 1,500 | 570 | 185 | 440 | 376 | 525 | 140 | 158 |
| 16 | | 284 | 430 | 475 | 1,550 | 500 | 185 | 515 | 336 | 601 | 135 | 143 |
| 17 | | 280 | 450 | 450 | 1,480 | 430 | 194 | 650 | 345 | 839 | 132 | 135 |
| 18 | | 230 | 455 | 368 | 1,270 | 400 | 194 | 839 | 410 | 930 | 135 | 125 |
| 19 | | 200 | 435 | 327 | 1,060 | 376 | 182 | 936 | 430 | 978 | *152 | *120 |
| 20 | | 188 | 368 | 292 | 633 | 358 | 194 | 905 | 490 | 930 | 146 | 112 |
| 21 | | 173 | 309 | 254 | 645 | 345 | 197 | *803 | 716 | 773 | 135 | 115 |
| 22 | | 170 | 280 | 236 | 515 | 309 | *194 | 634 | 851 | *618 | 130 | 112 |
| 23 | | 164 | 284 | 218 | 475 | 296 | 200 | 520 | 863 | 560 | 125 | 108 |
| 24 | | 167 | 309 | 212 | 405 | 276 | 200 | 440 | 755 | 520 | 122 | 105 |
| 25 | | 182 | 327 | 206 | 354 | 254 | 188 | 420 | 634 | 480 | 118 | 100 |
| 26 | | 200 | 336 | 200 | 345 | 239 | 194 | 400 | 510 | 440 | 118 | 95 |
| 27 | | 206 | 322 | 221 | 336 | 239 | 203 | 386 | 440 | 363 | 143 | 92 |
| 28 | | 206 | 304 | 292 | 309 | 236 | 318 | 410 | 460 | 309 | 167 | 90 |
| 29 | | 209 | 284 | 425 | 304 | 242 | 923 | 381 | 525 | 272 | 155 | 88 |
| 30 | | 209 | 254 | 530 | 288 | ----- | 2,650 | 354 | 565 | 248 | 138 | 90 |
| 31 | | 206 | ----- | 500 | 280 | ----- | 3,750 | ----- | 530 | ----- | 128 | 88 |
| Total | 8,180 | 11,078 | 10,248 | 17,513 | 11,274 | 12,984 | 28,699 | 14,630 | 13,164 | 5,047 | 4,234 | 2,574 |
| Mean | 264 | 369 | 331 | 565 | 369 | 419 | 957 | 472 | 439 | 163 | 137 | 85.8 |
| Cfs/m | 0.666 | 0.956 | 0.860 | 1.47 | 1.01 | 1.09 | 2.49 | 1.23 | 1.14 | 0.423 | 0.356 | 0.223 |
| In. | 0.79 | 1.07 | 0.99 | 1.69 | 1.09 | 1.25 | 2.77 | 1.41 | 1.27 | 0.49 | 0.41 | 0.25 |
| Calendar year 1959: Max | 1,770 | | | Min 51 | | Mean 277 | Cfs/m 0.719 | In. 9.77 | | | | |
| Water year 1959-60: Max | 3,770 | | | Min 72 | | Mean 381 | Cfs/m 0.990 | In. 13.48 | | | | |

* Discharge measurement made on this day.

1180. Thornapple River near Caledonia, Mich.

Location.--Lat 42°48'40", long 85°29'00", in NW¼ sec.22, T.5 N., R.10 W., on right bank 200 ft downstream from LaBarge powerplant, 2.3 miles northeast of Caledonia, and 3.3 miles downstream from Coldwater River.

Drainage area.--773 sq mi.

Records available.--October 1930 to September 1938, October 1951 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 676.31 ft above mean sea level, unadjusted (Consumers Power Co. bench mark). Oct. 1, 1930, to Sept. 30, 1938, staff gage at same site at mean sea level datum (unadjusted).

Average discharge.--17 years, 516 cfs.

Extremes.--Maximum discharge during year, 5,920 cfs Apr. 1, 2 (gage height, 10.6 ft); minimum, 18 cfs Sept. 9 (gage height, 2.56 ft); minimum daily, 186 cfs Aug. 27, 1930-38, 1951-60; Maximum discharge, 6,290 cfs May 10, 1956 (gage height, 10.79 ft); minimum not determined.

Flood of Apr. 7, 1947, reached a stage of 14.4 ft, from information by powerplant operator.

Remarks.--Records good. Large diurnal fluctuation at low and medium flow caused by power-plant above station.

Revisions (water years).--WSP 824: 1931-36. WSP 1307: 1931-37.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.5 | 172 | 7.0 | 2,340 |
| 3.7 | 245 | 10.0 | 5,200 |
| 4.0 | 395 | 10.5 | 5,800 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 283 | 434 | 492 | 846 | 624 | 546 | *5,800 | 792 | 902 | 468 | 237 | 229 |
| 2 | 263 | 422 | 498 | 780 | 618 | 534 | 5,760 | 744 | 822 | 450 | 241 | 241 |
| 3 | 250 | 434 | 510 | 726 | 588 | 540 | *5,060 | 714 | 738 | 462 | 298 | 233 |
| 4 | 245 | 549 | 492 | 666 | *558 | 528 | 4,030 | 666 | 672 | 504 | 325 | 210 |
| 5 | 432 | 811 | 492 | 618 | 558 | 528 | 3,090 | 630 | 636 | 486 | 340 | 218 |
| 6 | 513 | 858 | 594 | 498 | 600 | 528 | 2,520 | 624 | 570 | 486 | 362 | 203 |
| 7 | 582 | 896 | 642 | 546 | 708 | 528 | 2,080 | 642 | 522 | 456 | 378 | 218 |
| 8 | *618 | 916 | 648 | 558 | 822 | 510 | 1,670 | 816 | 434 | 444 | 325 | 226 |
| 9 | 642 | 890 | 648 | 498 | 935 | 498 | 1,470 | 883 | 439 | 390 | 385 | 210 |
| 10 | 672 | 828 | 642 | 486 | 1,010 | 444 | 1,320 | 928 | 422 | 351 | 441 | 218 |
| 11 | 720 | 732 | 594 | 486 | 1,140 | 400 | 1,050 | 928 | 412 | 315 | 362 | 218 |
| 12 | 714 | *680 | 684 | 618 | 1,200 | 406 | 1,090 | 890 | 400 | 335 | 330 | 218 |
| 13 | 690 | 588 | 798 | 1,570 | 1,150 | 468 | 1,010 | *846 | 395 | 325 | 373 | 218 |
| 14 | 642 | 576 | 828 | 2,050 | 1,120 | 546 | 958 | 792 | 510 | *330 | 368 | *206 |
| 15 | 576 | 612 | 864 | 2,340 | 1,060 | 456 | 1,050 | 738 | 696 | 320 | 325 | 210 |
| 16 | 504 | 618 | 840 | *2,420 | 968 | 406 | 1,210 | 684 | 890 | 315 | 335 | 210 |
| 17 | 456 | 672 | 786 | 2,310 | 883 | 456 | 1,300 | 684 | 1,030 | 310 | 310 | 210 |
| 18 | 444 | 702 | 714 | 2,140 | 834 | 474 | 1,510 | 720 | 1,230 | 310 | 305 | 210 |
| 19 | 406 | 702 | 660 | 1,930 | 768 | 474 | 1,550 | 756 | 1,290 | 315 | *286 | 214 |
| 20 | 340 | 654 | 618 | 1,680 | 714 | 474 | 1,530 | 916 | 1,280 | 315 | 258 | 271 |
| 21 | 315 | 648 | 552 | 1,370 | 684 | 474 | 1,460 | 994 | 1,190 | 315 | 258 | 263 |
| 22 | 335 | 564 | *492 | 1,110 | 666 | 474 | *1,310 | 1,120 | *1,070 | 310 | 263 | 258 |
| 23 | 330 | 534 | 486 | 987 | 642 | 468 | 1,100 | 1,360 | 980 | 295 | 263 | 250 |
| 24 | 356 | 624 | 486 | 922 | 624 | 474 | 948 | 1,310 | 902 | 286 | 305 | 245 |
| 25 | 378 | 654 | 434 | 774 | 594 | 468 | 902 | 1,160 | 834 | 263 | 300 | 229 |
| 26 | 379 | 660 | 450 | 666 | 564 | 468 | 1,030 | 994 | 756 | 258 | 258 | 226 |
| 27 | 417 | 654 | 474 | 702 | 552 | 474 | 968 | 896 | 690 | 362 | 186 | 229 |
| 28 | 395 | 642 | 618 | 678 | 526 | 682 | 896 | 948 | 642 | 241 | 255 | 229 |
| 29 | 395 | 588 | 909 | 660 | 534 | *1,740 | 834 | 1,030 | 624 | 263 | 245 | 226 |
| 30 | 373 | 552 | 948 | 848 | ----- | 3,920 | 804 | 1,020 | 510 | 351 | 245 | 226 |
| 31 | 428 | ----- | 916 | 636 | ----- | 5,130 | ----- | 980 | ----- | 305 | 241 | ----- |
| Total | 14,093 | 19,674 | 19,609 | 32,919 | 22,246 | 24,516 | 55,380 | 27,205 | 22,488 | 10,936 | 9,403 | 6,772 |
| Mean | 455 | 654 | 639 | 1,062 | 787 | 791 | 1,846 | 878 | 750 | 353 | 303 | 226 |
| Cfsm | 0.589 | 0.849 | 0.827 | 1.37 | 0.992 | 1.02 | 2.39 | 1.14 | 0.970 | 0.457 | 0.392 | 0.292 |
| In. | 0.68 | 0.95 | 0.95 | 1.58 | 1.07 | 1.18 | 2.66 | 1.31 | 1.08 | 0.53 | 0.45 | 0.33 |

Calendar year 1959: Max 3,300 Min 147 Mean 551 Cfsm 0.713 In. 9.67

Water year 1959-60: Max 5,800 Min 186 Mean 725 Cfsm 0.938 In. 12.77

* Discharge measurement made on this day.

1185. Rogue River near Rockford, Mich.

Location.--Lat 43°05'00", long 85°35'30", in NE $\frac{1}{4}$ sec.15, T.8 N., R.11 W., on left bank at downstream side of highway bridge, 2.2 miles upstream from mouth and 3.0 miles southwest of Rockford.

Drainage area.--234 sq mi.

Records available.--February 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 625.2 ft above mean sea level (levels by Blass Survey Co.). Prior to Aug. 30, 1952, wire-weight gage at same site and datum.

Average discharge.--8 years, 213 cfs.

Extremes.--Maximum discharge during year, 2,640 cfs Mar. 31 (gage height, 8.59 ft); minimum, 49 cfs Sept. 17 (gage height, 3.61 ft); minimum daily, 83 cfs Sept. 17.
1952-60: Maximum discharge, that of Mar. 31, 1960; minimum, 30 cfs Oct. 5, 13, 1952 (gage height, 3.55 ft); minimum daily, 49 cfs Aug. 27, 1955.

Remarks.--Records good. Some diurnal fluctuation caused by mills above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 3.8 | 73 | 7.0 | 1,230 |
| 4.2 | 152 | 8.0 | 1,960 |
| 5.0 | 360 | 8.6 | 2,650 |
| 6.0 | 705 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 141 | 232 | 260 | 440 | 265 | 182 | 2,030 | 469 | 427 | 218 | 212 | 126 |
| 2 | 97 | 228 | 252 | 348 | 245 | 182 | 1,340 | 492 | 372 | 202 | 170 | 121 |
| 3 | 108 | 208 | 248 | 333 | 222 | 202 | 975 | 478 | 324 | 202 | 200 | 119 |
| 4 | 110 | 281 | 245 | *301 | 210 | 218 | 810 | 412 | 283 | 190 | 195 | 87 |
| 5 | 198 | 462 | 255 | 268 | *238 | 232 | 645 | 351 | 258 | 180 | 192 | 112 |
| 6 | 232 | *625 | 255 | 252 | 321 | 208 | 544 | 330 | 240 | 170 | 178 | 105 |
| 7 | 245 | 618 | 280 | 235 | 327 | 220 | 461 | *354 | 228 | 166 | 153 | 129 |
| 8 | 238 | 530 | 280 | 245 | 363 | 198 | 427 | 316 | 210 | 159 | 168 | 121 |
| 9 | *265 | 443 | 270 | 238 | 406 | 195 | 390 | 321 | 192 | 152 | 178 | 88 |
| 10 | 230 | 375 | 250 | 232 | 336 | 195 | 357 | 339 | 195 | 148 | 202 | 90 |
| 11 | 218 | 327 | *304 | 232 | 310 | 181 | 378 | 327 | 185 | 157 | 210 | 106 |
| 12 | 198 | 293 | 393 | 359 | 318 | 182 | 384 | 316 | 173 | 145 | *205 | 124 |
| 13 | 175 | 272 | 478 | 649 | 321 | 175 | 396 | 304 | 182 | 139 | 182 | *128 |
| 14 | 161 | 268 | 478 | 950 | 316 | 192 | 488 | 288 | 205 | 166 | 158 | 126 |
| 15 | 152 | 235 | 436 | 765 | 327 | 178 | 586 | 265 | 212 | *170 | 178 | 119 |
| 16 | 144 | 230 | 375 | 590 | 275 | 182 | 534 | 258 | 225 | 170 | 168 | 115 |
| 17 | 137 | 230 | 324 | 558 | 268 | 185 | 482 | 275 | *245 | 145 | 164 | 83 |
| 18 | 132 | 220 | 293 | 462 | 262 | 188 | 468 | 270 | 225 | 170 | 154 | 98 |
| 19 | 120 | 222 | 268 | 396 | 258 | 195 | 452 | 283 | 215 | 170 | 143 | 142 |
| 20 | 123 | 212 | 242 | 366 | 255 | 192 | 427 | 339 | 218 | 166 | 148 | 145 |
| 21 | 123 | 225 | 232 | 333 | 245 | 200 | 378 | 336 | 198 | 152 | 250 | 145 |
| 22 | 111 | 218 | 200 | 310 | 245 | 195 | *324 | 468 | 192 | 143 | 262 | 137 |
| 23 | 219 | 230 | 192 | 288 | 238 | 182 | 307 | 496 | 202 | 141 | 252 | 137 |
| 24 | 307 | 310 | 185 | 283 | 230 | 185 | 280 | 452 | 280 | 126 | 205 | 139 |
| 25 | 393 | 372 | 192 | 278 | 210 | 175 | 301 | 406 | 296 | 148 | 168 | 121 |
| 26 | 433 | 378 | 215 | 262 | 215 | 182 | 375 | 354 | 283 | 161 | 152 | 143 |
| 27 | 430 | 375 | 260 | 260 | 222 | 192 | 378 | 375 | 270 | 208 | 141 | 139 |
| 28 | 369 | 336 | 396 | 262 | 215 | 310 | 384 | 562 | 275 | 208 | 120 | 132 |
| 29 | 313 | 296 | 488 | 265 | 218 | 575 | 369 | 597 | 291 | 200 | 137 | 126 |
| 30 | 280 | 278 | 502 | 265 | ----- | *1,670 | 399 | 815 | 235 | 208 | 123 | 123 |
| 31 | 265 | ----- | 485 | 260 | ----- | *2,570 | ----- | 583 | ----- | 212 | 132 | ----- |
| Total | 6,657 | 9,529 | 9,533 | 11,285 | 7,881 | 10,318 | 16,069 | 12,230 | 7,346 | 5,292 | 5,500 | 3,626 |
| Mean | 215 | 318 | 308 | 364 | 272 | 333 | 536 | 395 | 245 | 171 | 177 | 121 |
| Cfsm | 0.919 | 1.36 | 1.32 | 1.56 | 1.16 | 1.42 | 2.29 | 1.69 | 1.05 | 0.731 | 0.756 | 0.517 |
| In. | 1.06 | 1.51 | 1.52 | 1.79 | 1.25 | 1.64 | 2.55 | 1.94 | 1.17 | 0.84 | 0.87 | 0.58 |

Calendar year 1959: Max 1,540 Min 69 Mean 238 Cfsm 1.02 In. 13.80
Water year 1959-60: Max 2,570 Min 83 Mean 288 Cfsm 1.23 In. 16.72

* Discharge measurement made on this day.

1190. Grand River at Grand Rapids, Mich.

Location.--Lat 42°57'50", long 85°40'35", in NE¹/₄ sec.25, T.7 N., R.12 W., on right bank 500 ft upstream from bridge on Fulton Street, 1.7 miles upstream from Plaster Creek, and at mile 41.

Drainage area.--4,900 sq mi, approximately.

Records available.--March 1901 to December 1905, January 1906 to August 1918 (gage heights only), October 1930 to September 1960. Gage-height records collected in this vicinity since 1907 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 585.70 ft above mean sea level, datum of 1929 (levels by city of Grand Rapids). March 1901 to August 1918, staff gage at Fulton Street Bridge 500 ft downstream and Oct. 1, 1930, to Oct. 26, 1953, water-stage recorder at sewage pumping station 1 mile downstream at datum 2.99 ft higher.

Average discharge.--34 years, 3,520 cfs.

Extremes.--Maximum discharge during year, 31,800 cfs Apr. 3 (gage height, 19.25 ft); minimum, 1,020 cfs Sept. 10 (gage height, 2.84 ft); minimum daily, 1,080 cfs Sept. 10. 1901-5, 1930-60: Maximum discharge, 54,000 cfs Mar. 28, 1904 (gage height, 19.5 ft, from gage based on gage readings, site then in use); minimum daily, 381 cfs Aug. 9, 17, 1936. Maximum discharge since 1901, that of Mar. 28, 1904.

Remarks.--Records good except those for periods of indefinite stage-discharge relation or no gage-height record, which are fair. Moderate diurnal fluctuation at low and medium flow caused by powerplants above station.

Revisions (water years).--WSP 924: 1938(M). WSP 1387: 1901-5, 1940.

Rating table, water year 1959-60, except periods of indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second) (Shifting-control method used Oct. 4-15, Nov. 4-22)

| | | | |
|-----|-------|------|--------|
| 2.8 | 950 | 11.0 | 11,300 |
| 3.0 | 1,400 | 14.0 | 17,000 |
| 3.5 | 2,500 | 19.2 | 31,600 |
| 4.0 | 3,320 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| 1 | e1,300 | e2,100 | 3,570 | 5,360 | 3,920 | 2,920 | *24,500 | 6,320 | 5,420 | 2,780 | 1,580 | 1,420 |
| 2 | e1,300 | e2,200 | 3,500 | 4,990 | 3,760 | 2,560 | *29,900 | 5,980 | 4,820 | 2,620 | 1,420 | 1,380 |
| 3 | e1,300 | e2,200 | 3,290 | 4,910 | 3,600 | 2,420 | *31,500 | 5,600 | 4,320 | 2,520 | 1,480 | 1,310 |
| 4 | 1,220 | 2,320 | 3,160 | *4,610 | 3,400 | 2,660 | 30,300 | 5,230 | 3,960 | 2,230 | 1,600 | 1,310 |
| 5 | 1,420 | 4,170 | 3,230 | 4,280 | *3,130 | 2,740 | 27,300 | 4,810 | a3,600 | 2,460 | 1,790 | 1,280 |
| 6 | 1,880 | *5,210 | 3,420 | 2,800 | 3,710 | 2,640 | 23,600 | 4,480 | a3,300 | 2,230 | 1,970 | 1,240 |
| 7 | 2,360 | 5,300 | 3,740 | 2,340 | 4,420 | 2,560 | 20,100 | *4,650 | a3,000 | 2,180 | 1,740 | 1,130 |
| 8 | 3,360 | 5,100 | 4,080 | 3,410 | 5,240 | 2,840 | *16,900 | 4,870 | a2,800 | 2,300 | 1,650 | 1,240 |
| 9 | *4,600 | 4,830 | 4,080 | 3,780 | 5,770 | 2,580 | 14,100 | 5,020 | a2,500 | 2,230 | 1,790 | 1,220 |
| 10 | 4,970 | 4,510 | 3,980 | 4,030 | 6,210 | 2,380 | 12,200 | 5,070 | a2,300 | 2,120 | 1,950 | 1,080 |
| 11 | 4,940 | 4,250 | *3,910 | 3,910 | 6,330 | 2,340 | 10,900 | 5,070 | a2,100 | 1,900 | 1,880 | 1,150 |
| 12 | 4,340 | 3,750 | 4,520 | 4,560 | 6,480 | 2,320 | *9,780 | 5,030 | a2,100 | 1,740 | *1,780 | 1,220 |
| 13 | 4,110 | 3,580 | 5,080 | 7,490 | 6,430 | 2,420 | 8,780 | 4,930 | a2,100 | 1,810 | 1,760 | *1,130 |
| 14 | 3,660 | 3,190 | 5,540 | 9,360 | 6,310 | 2,740 | 8,220 | 4,750 | a2,100 | *1,900 | 1,830 | 1,150 |
| 15 | 3,150 | 3,280 | 5,700 | 10,400 | 5,930 | 2,780 | 8,040 | 4,470 | a2,400 | 1,970 | 1,830 | 1,170 |
| 16 | e3,000 | 4,060 | 5,560 | 10,700 | 5,690 | 2,500 | *7,790 | 4,310 | a3,000 | 1,740 | 1,740 | 1,220 |
| 17 | e2,500 | 4,450 | 5,090 | 10,500 | 5,540 | 2,160 | 8,080 | 4,280 | *3,820 | 1,620 | 1,810 | 1,190 |
| 18 | e2,400 | 4,600 | 4,650 | 10,200 | 5,240 | 2,560 | 8,400 | 4,200 | 4,210 | 1,670 | 1,810 | 1,220 |
| 19 | e2,200 | 4,430 | 4,420 | 9,590 | 5,180 | a2,400 | 8,690 | 4,270 | 5,030 | 1,740 | 1,800 | 1,400 |
| 20 | e1,900 | 3,970 | 4,220 | 8,520 | 4,690 | a2,300 | 8,680 | 4,370 | 5,280 | 1,830 | 1,550 | 1,420 |
| 21 | e1,900 | 3,830 | 3,820 | 7,380 | 4,500 | a2,300 | 8,370 | 4,560 | 5,180 | 1,810 | 1,700 | 1,700 |
| 22 | e1,700 | 3,810 | 3,440 | 6,690 | 4,230 | a2,300 | 7,850 | 4,990 | 4,940 | 1,730 | 1,900 | 1,760 |
| 23 | e2,000 | 3,690 | 3,160 | 5,780 | 4,030 | a2,300 | 7,060 | 5,100 | 4,370 | 1,670 | 2,010 | 1,670 |
| 24 | e2,300 | 3,880 | 3,060 | 5,320 | 3,870 | *2,320 | 6,220 | 5,540 | 4,290 | 1,500 | 2,010 | 1,680 |
| 25 | e2,200 | 4,310 | 2,860 | 4,960 | 3,690 | 2,400 | 5,720 | 5,090 | 4,080 | 1,480 | 1,900 | 1,650 |
| 26 | e2,200 | 4,410 | 2,720 | 4,640 | 3,490 | 2,360 | 6,210 | 4,730 | 4,020 | 1,520 | 1,880 | 1,500 |
| 27 | e2,400 | 4,270 | 2,940 | 4,510 | 3,240 | 2,460 | 7,080 | 4,410 | 3,620 | 1,620 | 1,820 | 1,480 |
| 28 | e2,200 | 4,270 | 3,720 | 4,560 | 3,090 | 3,440 | 7,180 | 4,750 | 3,550 | 1,700 | 1,450 | 1,400 |
| 29 | e2,200 | 4,070 | 4,970 | 4,680 | 3,180 | 7,200 | 6,770 | 5,650 | 3,570 | 1,700 | 1,450 | 1,400 |
| 30 | e2,200 | 3,800 | 5,880 | 4,400 | ----- | 12,800 | 6,520 | 6,090 | 3,190 | 1,740 | 1,260 | 1,330 |
| 31 | e2,200 | ----- | 5,670 | 4,030 | ----- | 18,200 | ----- | 5,970 | ----- | 1,700 | 1,400 | ----- |
| Total | 79,410 | 117,800 | 127,180 | 183,290 | 134,300 | 108,900 | 386,700 | 154,390 | 108,970 | 59,830 | 53,100 | 40,630 |
| Mean | 2,562 | 3,927 | 4,103 | 5,913 | 4,631 | 3,513 | 12,890 | 4,980 | 3,632 | 1,932 | 1,713 | 1,354 |
| Cfsm | 0.523 | 0.801 | 0.837 | 1.21 | 0.945 | 0.717 | 2.63 | 1.02 | 0.741 | 0.394 | 0.350 | 0.276 |
| In. | 0.60 | 0.69 | 0.97 | 1.39 | 1.02 | 0.83 | 2.93 | 1.17 | 0.83 | 0.45 | 0.40 | 0.31 |

Calendar year 1959: Max 18,100 Min 740 Mean 3,563 Cfsm 0.727 In. 9.87
 Water year 1959-60: Max 31,500 Min 1,080 Mean 4,247 Cfsm 0.867 In. 11.79

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, record for unpublished former station 1 mile downstream and sum of records of tributary streams
 e Indefinite stage-discharge relation; discharge estimated on basis of same records as footnote "a" above.

1210. Muskegon River near Merritt, Mich.

Location.--Lat 44°20'10", long 84°53'25", in NW¹/₄ sec. 2, T.22 N., R.5 W., on right bank 35 ft upstream from bridge on State Highway 55, 0.7 mile upstream from West Branch, 2.7 miles east of Merritt, 4.3 miles downstream from Reedsburg Dam, and at mile 210.8.

Drainage area.--309 sq mi.

Records available.--October 1946 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,117.82 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to July 13, 1949, wire-weight gage on downstream side of bridge at same datum.

Average discharge.--14 years, 224 cfs.

Extremes.--Maximum discharge during year, 995 cfs Apr. 18 (gage height, 7.71 ft); minimum, 98 cfs Oct. 3.

1946-60: Maximum discharge, 1,340 cfs Apr. 8, 1959 (gage height, 8.16 ft); maximum gage height, 8.25 ft July 11, 1957; minimum discharge, 26 cfs Aug. 17, 18-20, Sept. 2-5, 12-15, 1958.

Remarks.--Records good except those for periods of ice effect, which are poor. Occasional regulation by operation of gates at Reedsburg Dam.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 16, Nov. 22-25, June 26 to July 16, Aug. 1-17)

| | | | |
|-----|-----|-----|-------|
| 3.5 | 93 | 6.5 | 482 |
| 5.0 | 234 | 8.0 | 1,140 |
| 6.0 | 362 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 112 | 314 | 280 | 320 | 270 | 260 | 522 | 576 | 506 | 298 | 202 | 151 |
| 2 | 106 | 314 | 280 | 330 | 260 | 260 | 576 | 561 | 519 | 286 | 197 | 158 |
| 3 | 100 | 306 | 270 | 330 | 250 | 260 | 636 | 550 | 506 | 295 | 201 | 150 |
| 4 | 103 | 312 | 280 | 320 | 230 | 250 | 741 | 536 | 503 | 290 | 193 | 154 |
| 5 | 115 | 355 | 280 | 300 | 240 | 250 | 801 | 529 | 482 | 282 | 183 | 153 |
| 6 | 131 | 351 | 290 | 280 | 250 | 250 | 768 | 526 | 447 | 275 | 174 | *146 |
| 7 | 181 | 370 | 300 | 270 | 250 | 250 | 737 | 539 | 398 | 267 | 177 | 145 |
| 8 | 204 | 368 | 300 | 280 | 250 | 260 | 693 | 576 | 398 | *256 | 187 | 144 |
| 9 | 187 | 370 | 270 | 290 | 240 | 270 | 652 | 620 | *394 | 249 | 186 | 142 |
| 10 | 207 | 314 | *260 | 290 | 230 | 270 | 620 | 668 | 368 | 248 | 191 | 138 |
| 11 | 218 | 357 | 270 | 280 | 240 | 260 | 612 | 677 | 325 | 237 | 181 | 135 |
| 12 | 212 | *351 | 280 | 290 | *250 | 250 | 664 | 648 | 340 | 230 | *169 | 141 |
| 13 | 234 | 348 | 290 | 300 | 280 | 240 | 759 | *624 | 335 | 225 | 164 | 138 |
| 14 | 263 | 341 | 280 | *310 | 260 | 230 | 805 | 584 | 341 | 210 | 177 | 130 |
| 15 | *238 | 329 | 270 | 310 | 260 | 240 | *876 | 573 | 364 | 197 | 182 | 135 |
| 16 | 213 | 315 | 270 | 300 | 270 | 240 | 940 | 546 | 358 | 189 | 174 | 136 |
| 17 | 209 | 300 | 270 | 290 | 270 | 240 | 980 | 536 | 370 | 187 | 160 | 136 |
| 18 | 199 | 270 | 270 | 280 | 270 | 240 | 975 | 608 | 366 | 187 | 149 | 139 |
| 19 | 193 | 260 | 250 | 270 | 270 | 240 | 930 | 522 | 358 | 187 | 154 | 149 |
| 20 | 197 | 260 | 230 | 270 | 270 | 240 | 890 | 573 | 353 | 173 | 153 | 160 |
| 21 | 197 | 270 | 220 | 260 | 270 | 240 | 824 | 576 | 340 | 150 | 155 | 156 |
| 22 | 188 | 283 | 210 | 260 | 270 | 240 | 773 | 596 | 332 | 177 | 160 | 156 |
| 23 | 237 | 295 | 210 | 260 | 260 | 240 | 724 | 648 | 328 | 179 | 159 | 161 |
| 24 | 319 | 318 | 210 | 260 | 250 | *240 | 677 | 664 | 335 | 173 | 156 | 156 |
| 25 | 342 | 335 | 220 | 260 | 250 | 240 | 664 | 616 | 330 | 165 | 152 | 154 |
| 26 | 355 | 320 | 230 | 260 | 240 | 230 | 648 | 584 | 318 | 202 | 138 | 154 |
| 27 | 364 | 310 | 260 | 270 | 250 | 225 | 588 | 554 | 296 | 257 | 124 | 151 |
| 28 | 362 | 300 | 310 | 280 | 250 | 249 | 543 | 506 | 275 | 260 | 130 | 146 |
| 29 | 346 | 290 | 380 | 280 | 260 | 271 | 557 | 503 | 297 | 240 | 149 | 146 |
| 30 | 334 | 280 | 400 | 280 | ----- | 335 | 576 | 508 | 303 | 231 | 148 | 150 |
| 31 | 325 | ----- | 360 | 280 | ----- | 424 | ----- | 519 | ----- | 220 | 144 | ----- |
| Total | 7,010 | 9,566 | 8,500 | 8,860 | 7,390 | 7,974 | 21,751 | 17,844 | 11,185 | 7,022 | 5,169 | 4,410 |
| Mean | 226 | 319 | 274 | 286 | 255 | 257 | 725 | 576 | 373 | 227 | 167 | 147 |
| Cfsm | 0.731 | 1.03 | 0.887 | 0.926 | 0.825 | 0.832 | 2.35 | 1.86 | 1.21 | 0.735 | 0.540 | 0.476 |
| In. | 0.84 | 1.15 | 1.02 | 1.07 | 0.89 | 0.96 | 2.62 | 2.14 | 1.35 | 0.85 | 0.62 | 0.53 |

| | | | | | | | | | |
|-------------------------|-------|-----|-----|------|-----|------|-------|-----|-------|
| Calendar year 1959: Max | 1,310 | Min | 51 | Mean | 231 | Cfsm | 0.748 | In. | 10.13 |
| Water year 1959-60: Max | 980 | Min | 100 | Mean | 319 | Cfsm | 1.03 | In. | 14.04 |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-21, Nov. 26 to Mar. 26 (no gage-height record Feb. 2-4, 12-17, Feb. 29 to Mar. 4, Mar. 11, 13-18; discharge estimated on basis of weather records and records for station at Evart).

1215. Muskegon River at Evart, Mich.

Location (revised).--Lat 43°53'55", long 85°15'20", in NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.3, T.17 N., R.8 W., on right bank 500 ft downstream from bridge on U. S. Highway 10 at Evart, 0.4 mile up-stream from Twin Creek, and at mile 123.9.

Drainage area.--1,450 sq mi, approximately.

Records available.--October 1930 to September 1931, October 1933 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 977.72 ft above mean sea level, datum of 1929. Prior to Apr. 12, 1934, chain gage at site 500 ft upstream Apr. 12, 1934, to May 22, 1935, chain gage at site 400 ft upstream, and May 23, 1935, to Nov. 7, 1957, wire-weight gage at site 500 ft upstream at present datum.

Average discharge.--28 years, 960 cfs.

Extremes.--Maximum discharge during year, 4,920 cfs Apr. 6 (gage height, 11.92 ft); maximum gage height, 12.27 ft Jan. 25 (ice jam); minimum discharge, 459 cfs Oct. 4, 5. 1930-31, 1933-60: Maximum discharge, 7,750 cfs Apr. 9, 1959 (gage height, 14.42 ft); minimum observed, 164 cfs Dec. 20, 1947 (result of freezeup).

Remarks.--Records good except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Revisions (water years).--WSP 1437: 1934, 1947(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 11-13)

| Oct. 1-13 | | | Oct. 14 to Sept. 30 | | |
|-----------|-------|--|---------------------|-----|-------|
| 6.8 | 435 | | 8.8 | 500 | 2,100 |
| 7.0 | 520 | | 7.0 | 600 | 12.0 |
| 8.0 | 1,200 | | | | 5,000 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|---------|--------|------------|--------|------------|--------|-----------|--------|
| 1 | 480 | 1,340 | 1,190 | 1,300 | 950 | 850 | 3,750 | 2,300 | 1,870 | 1,120 | 891 | 560 |
| 2 | 475 | 1,270 | 1,180 | 1,330 | 900 | 850 | 4,100 | 2,230 | 1,800 | 1,080 | 849 | 560 |
| 3 | 471 | 1,200 | 1,180 | 1,380 | 850 | 850 | 4,270 | 2,130 | 1,790 | 1,030 | 891 | 575 |
| 4 | 463 | 1,230 | 1,180 | 1,300 | 850 | 820 | 4,390 | 2,010 | 1,680 | | 936 | 575 |
| 5 | 460 | 1,540 | 1,220 | 1,150 | 870 | 800 | 4,750 | 1,910 | 1,630 | 988 | 716 | 570 |
| 6 | | 525 | 1,740 | 1,290 | 1,000 | 900 | 4,860 | 1,830 | 1,580 | 947 | 681 | *560 |
| 7 | | 600 | 1,810 | 1,300 | 980 | 900 | 4,580 | 1,870 | 1,480 | 926 | 688 | 550 |
| 8 | | 701 | 1,700 | 1,250 | 1,000 | 900 | 4,290 | 1,920 | 1,400 | 891 | 744 | 540 |
| 9 | | 792 | 1,590 | 1,150 | 1,000 | 880 | 3,890 | 1,960 | *1,320 | 856 | *758 | 530 |
| 10 | | 848 | 1,540 | *1,050 | 1,000 | 800 | 3,440 | 2,090 | 1,230 | 821 | 807 | 520 |
| 11 | | 911 | 1,520 | 1,100 | 1,050 | 780 | 3,200 | 2,200 | 1,140 | 779 | 786 | 510 |
| 12 | | 960 | *1,480 | 1,180 | 1,080 | *800 | 3,150 | 2,250 | 1,080 | 744 | 751 | 510 |
| 13 | | 984 | 1,430 | 1,180 | 1,280 | 880 | 3,220 | *2,240 | 1,030 | 709 | 709 | 510 |
| 14 | | 954 | 1,380 | 1,130 | *1,300 | 920 | 3,400 | 2,220 | 1,040 | 674 | 702 | 515 |
| 15 | | *912 | 1,300 | 1,100 | 1,250 | 940 | 3,500 | 2,140 | 1,250 | 642 | 744 | 520 |
| 16 | | 891 | 1,240 | 1,110 | 1,200 | 940 | 3,710 | 2,000 | 1,210 | 618 | 709 | 525 |
| 17 | | 858 | 1,180 | 1,120 | 1,100 | 950 | 4,120 | 1,980 | 1,250 | 600 | 695 | 520 |
| 18 | | 828 | 1,060 | 1,100 | 1,150 | 950 | 4,520 | 2,170 | 1,270 | 642 | 660 | 525 |
| 19 | | 779 | 1,000 | 1,000 | 1,110 | 1,000 | 4,840 | 2,380 | 1,220 | 654 | 630 | 595 |
| 20 | | 737 | 1,000 | 920 | 1,060 | 1,000 | *4,670 | 2,470 | 1,170 | 642 | 595 | 648 |
| 21 | | 709 | 1,060 | 850 | 1,050 | 950 | 4,140 | 2,400 | 1,110 | 624 | 585 | 636 |
| 22 | | 688 | 1,090 | 820 | 1,050 | 950 | 3,580 | 2,570 | 1,060 | 618 | 585 | 630 |
| 23 | | 898 | 1,170 | 800 | 1,050 | 920 | 3,180 | 2,740 | 1,080 | 612 | 585 | 642 |
| 24 | | 1,360 | 1,360 | 786 | 1,050 | 920 | *800 | 2,870 | 2,680 | 1,700 | 585 | 630 |
| 25 | | 1,630 | 1,460 | 821 | 1,000 | 900 | 770 | 2,710 | 2,470 | 1,620 | 590 | 642 |
| 26 | | 1,830 | 1,350 | 919 | 1,000 | 860 | 760 | 2,810 | 2,200 | 1,370 | 730 | 575 |
| 27 | | 1,710 | 1,260 | 989 | 1,000 | 860 | 835 | 2,780 | 2,080 | 1,210 | 1,070 | 565 |
| 28 | | 1,520 | 1,200 | 1,560 | 1,000 | 860 | 1,050 | 2,650 | 1,990 | 1,120 | 1,020 | 565 |
| 29 | | 1,420 | 1,200 | 1,760 | 1,000 | 860 | 1,440 | 2,400 | 1,870 | 1,170 | 968 | 550 |
| 30 | | 1,370 | 1,200 | 1,800 | 1,000 | | 2,330 | 2,280 | 1,870 | 1,180 | 933 | 555 |
| 31 | | 1,360 | | 1,400 | 950 | | 3,450 | | 2,030 | | 926 | 550 |
| Total | 29,142 | 39,890 | 35,215 | 34,110 | 26,000 | 30,235 | 110,050 | 67,200 | 40,020 | 24,995 | 21,058 | 17,064 |
| Mean | 940 | 1,350 | 1,136 | 1,100 | 897 | 975 | 3,668 | 2,168 | 1,334 | 806 | 679 | 569 |
| Cfsm | 0.648 | 0.917 | 0.783 | 0.759 | 0.619 | 0.672 | 2.53 | 1.50 | 0.920 | 0.556 | 0.468 | 0.392 |
| In. | 0.75 | 1.02 | 0.90 | 0.88 | 0.67 | 0.77 | 2.82 | 1.73 | 1.03 | 0.64 | 0.54 | 0.44 |
| Calendar year 1959: Max | | | 7,660 | | Min 354 | | Mean 1,034 | | Cfsm 0.713 | | In. 9.69 | |
| Water year 1959-60: Max | | | 4,860 | | Min 463 | | Mean 1,298 | | Cfsm 0.895 | | In. 12.19 | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19, 20, 26-30, Dec. 9-11, 19-22, Dec. 30 to Jan. 1, Jan. 6-11, 17, Jan. 21 to Mar. 16, Mar. 19-26.

1220. Muskegon River at Newaygo, Mich.

Location.--Lat 43°25'20", long 85°48'05", in NE¹/₄NE¹/₄ sec. 24, T.12 N., R.13 W., on left bank in tailrace of powerplant operated by Consumers Power Co. at Newaygo, 600 f' downstream from Penoyer Creek and at mile 39.1.

Drainage area.--2,350 sq mi, approximately.

Records available.--July to December 1908, July 1909 to July 1915, January 1916 to December 1919, October 1930 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Records for June 1901 to December 1906, published in WSP 129, 170, and 206, have been found unreliable and should not be used.

Gage.--Water-stage recorder. Datum of gage is 585.83' above mean sea level, datum of 1929. October 1930 to January 1939 staff gage at present site and datum.

Average discharge.--38 years (1909-14, 1916-19, 1930-60), 1,915 cfs.

Extremes.--Maximum discharge during year, 6,630 cfs Apr. 17 (gage height, 50.70 ft); minimum, 332 cfs sometime between July 23 and Aug. 9 (gage height, 46.00 ft); minimum daily, 763 cfs Mar. 6.

1908-19, 1930-60: Maximum daily discharge, 14,950 cfs Mar. 25, 1913; minimum, 122 cfs Oct. 3, 1958 (gage height, 45.46 ft); minimum daily, 330 cfs Feb. 15, 1914.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow regulated by powerplants above station, the largest of which are at Croton Dam, Hardy Dam (since 1931), and Rogers Dam.

Revisions (water years).--WSP 974: 1933, 1935, 1937-38. See also Records available.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 8-13, Mar. 16-28, Aug. 31 to Sept. 30)

| | |
|------|-------|
| 46.7 | 735 |
| 47.2 | 1,140 |
| 48.0 | 2,240 |
| 51.0 | 7,110 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | | | | |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--|-----|-------|--|
| 1 | 770 | 2,450 | 1,190 | 2,760 | 2,540 | 1,720 | 4,500 | 3,810 | 3,000 | 2,820 | 1,300 | 999 | | | | |
| 2 | 784 | 1,900 | 1,420 | 2,740 | 2,540 | 1,550 | 4,820 | 3,810 | 3,200 | 2,250 | 1,600 | 999 | | | | |
| 3 | 880 | 1,280 | 1,950 | 2,510 | 2,540 | 1,270 | 5,150 | 3,800 | 3,500 | 1,400 | 2,000 | 1,010 | | | | |
| 4 | 865 | 1,430 | 2,260 | 2,530 | 2,250 | 1,280 | 5,320 | 3,800 | 3,430 | 1,380 | 2,000 | 990 | | | | |
| 5 | 888 | 1,540 | 2,660 | 2,330 | 1,980 | 1,130 | 5,000 | 3,810 | 2,910 | 1,340 | 2,500 | 990 | | | | |
| 6 | 880 | 1,300 | 3,150 | 1,370 | 2,000 | 763 | 5,010 | 3,680 | 2,750 | *1,660 | 2,500 | *990 | | | | |
| 7 | 872 | 1,770 | 2,800 | 1,940 | 2,000 | 1,000 | 5,060 | 3,480 | *2,950 | 1,970 | 1,800 | 990 | | | | |
| 8 | 888 | 1,140 | 2,510 | 1,970 | 2,260 | 1,460 | 5,090 | 3,460 | 2,950 | 1,950 | 1,800 | 1,020 | | | | |
| 9 | 801 | 2,880 | *2,500 | 1,920 | 2,580 | 1,720 | 5,030 | 3,350 | 2,680 | 1,970 | *1,100 | 999 | | | | |
| 10 | 1,160 | 3,220 | 2,240 | 1,950 | 2,590 | 2,160 | 5,140 | 3,040 | 1,730 | 1,400 | 1,260 | 946 | | | | |
| 11 | 1,320 | *2,990 | 1,950 | 1,940 | *2,460 | 3,120 | 5,620 | *3,280 | 1,350 | 1,630 | 1,280 | 922 | | | | |
| 12 | 1,430 | 2,590 | 1,970 | 2,230 | 2,290 | 3,120 | 5,720 | 3,460 | 1,340 | 1,970 | 1,250 | 981 | | | | |
| 13 | 1,640 | 2,360 | 1,950 | *2,500 | 1,950 | 3,120 | *5,640 | 3,460 | 1,620 | 1,630 | 1,180 | 1,360 | | | | |
| 14 | *1,780 | 1,860 | 1,980 | 2,690 | 1,970 | 3,120 | 5,650 | 3,450 | 2,100 | 1,360 | 1,140 | 1,750 | | | | |
| 15 | 1,950 | 1,160 | 2,260 | 2,830 | 1,980 | 3,100 | 5,770 | 3,310 | 2,590 | 1,290 | 1,790 | 1,330 | | | | |
| 16 | 1,860 | 2,470 | 2,580 | 3,230 | 1,980 | 2,810 | 5,750 | 3,190 | 2,970 | 1,070 | 2,290 | 999 | | | | |
| 17 | 1,970 | 2,570 | 2,810 | 2,520 | 1,500 | 2,140 | 6,190 | 3,480 | 3,150 | 1,080 | 2,300 | 1,010 | | | | |
| 18 | 1,950 | 1,880 | 2,660 | 2,510 | 1,300 | 2,160 | 6,380 | 3,450 | 2,930 | 1,210 | 2,200 | 850 | | | | |
| 19 | 1,940 | 1,230 | 1,930 | 2,500 | 1,950 | 2,160 | 5,750 | 3,460 | 1,950 | 1,340 | 1,800 | 881 | | | | |
| 20 | 1,940 | 2,020 | 1,250 | 2,510 | 1,940 | 2,160 | 5,570 | 3,500 | 2,200 | 1,340 | 1,120 | 850 | | | | |
| 21 | 1,950 | 2,980 | 1,200 | 2,370 | 1,970 | 2,190 | 5,440 | 3,500 | 2,510 | 1,350 | 1,110 | 842 | | | | |
| 22 | 1,610 | 2,510 | 1,360 | 2,180 | 2,130 | *2,210 | 5,380 | 3,500 | 2,530 | 1,310 | 1,590 | 1,030 | | | | |
| 23 | 1,610 | 2,310 | 2,100 | 2,180 | 2,340 | 2,210 | 5,310 | 3,500 | 2,300 | 1,300 | 1,980 | 1,620 | | | | |
| 24 | 2,480 | 1,980 | 2,040 | 2,210 | 2,350 | 2,210 | 4,770 | 3,500 | 2,550 | 1,300 | 1,670 | 990 | | | | |
| 25 | 3,100 | 2,330 | 1,890 | 2,180 | 2,350 | 2,290 | 4,840 | 3,500 | 3,210 | 1,300 | 1,100 | 990 | | | | |
| 26 | 3,450 | 5,120 | 1,670 | 2,370 | 2,430 | 1,930 | 4,870 | 3,500 | 2,100 | 1,600 | 1,130 | 1,370 | | | | |
| 27 | 4,040 | 3,100 | 1,330 | 2,540 | 2,540 | 1,360 | 4,760 | 3,300 | 2,150 | 2,500 | 1,100 | 1,750 | | | | |
| 28 | 3,990 | 2,840 | 2,450 | 2,540 | 2,560 | 1,950 | 4,590 | 3,500 | 2,560 | 3,000 | 1,080 | 1,760 | | | | |
| 29 | 4,020 | 2,480 | 4,280 | 2,540 | 2,420 | 2,860 | 4,140 | 3,300 | 2,740 | 3,000 | 1,440 | 1,730 | | | | |
| 30 | 3,680 | 2,120 | 4,470 | 2,540 | ----- | 3,800 | 3,830 | 3,000 | 3,030 | 1,700 | 1,780 | 1,190 | | | | |
| 31 | 2,720 | ----- | 3,660 | 2,560 | ----- | 4,260 | ----- | 2,600 | ----- | 1,300 | 1,410 | ----- | | | | |
| Total | 59,218 | 65,810 | 70,470 | 73,690 | 63,690 | 68,333 | 156,070 | 106,780 | 76,980 | 51,720 | 49,600 | 34,138 | | | | |
| Mean | 1,910 | 2,134 | 2,273 | 2,377 | 2,196 | 2,204 | 5,202 | 3,445 | 2,566 | 1,668 | 1,600 | 1,158 | | | | |
| Cfsm | 0.813 | 0.934 | 0.967 | 1.01 | 0.934 | 0.938 | 2.21 | 1.47 | 1.09 | 0.710 | 0.681 | 0.484 | | | | |
| In. | 0.94 | 1.04 | 1.11 | 1.16 | 1.01 | 1.08 | 2.47 | 1.70 | 1.22 | 0.82 | 0.79 | 0.54 | | | | |
| Calendar year 1959: Max | 9,040 | | | Min | 742 | | | Mean | 2,076 | | Cfsm | 0.883 | | In. | 11.98 | |
| Water year 1959-60: Max | 6,380 | | | Min | 763 | | | Mean | 2,395 | | Cfsm | 1.02 | | In. | 13.88 | |

* Discharge measurement made on this day.

Note.--No gage-height record May 20 to June 3, July 23 to Aug. 9; discharge estimated on basis of powerplant records and records for station at Ewart.

1222. White River near Whitehall, Mich.

Location.--Lat 43°27'50", long 86°14'00", in W $\frac{1}{2}$ sec. 4, T.12 N., R.16 W., on right bank 30 ft downstream from highway bridge on Fruitvale Road, 5 miles downstream from North Branch, and 7 $\frac{1}{2}$ miles northeast of Whitehall.

Drainage area.--380 sq mi, approximately.

Records available.--August 1957 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 594.1 ft above mean sea level, unadjusted. Nov. 18, 1957, to Oct. 22, 1958, wire-weight gage at same site and datum.

Extremes.--Maximum discharge during year, 1,910 cfs Mar. 31 (gage height, 6.06 ft); minimum, 263 cfs Sept. 11.
1957-60: Maximum discharge, that of Mar. 31, 1960; minimum, 163 cfs Aug. 18, 19, 1958.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 10 to Nov. 29)

Oct. 1 to Dec. 30

Dec. 31 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-------|
| 2.4 | 270 | 2.3 | 260 | 5.0 | 1,030 |
| 4.0 | 560 | 3.0 | 362 | 6.0 | 1,850 |
| 5.0 | 985 | 4.0 | 620 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1 | 318 | 426 | 413 | 560 | 427 | 340 | 1,600 | 711 | 800 | 627 | 418 | 296 |
| 2 | 305 | 422 | 413 | 530 | 413 | 350 | 1,280 | 788 | 732 | 532 | 373 | 293 |
| 3 | 283 | 411 | 417 | 500 | 370 | 350 | 1,270 | 728 | 718 | 495 | 376 | 283 |
| 4 | 280 | 418 | 426 | 490 | 390 | 360 | 1,210 | 672 | 690 | 411 | 386 | 280 |
| 5 | 310 | 476 | 431 | 482 | 400 | 360 | 1,060 | 613 | 648 | 375 | 407 | 280 |
| 6 | 361 | 575 | 436 | 478 | 400 | 360 | 975 | 576 | 610 | *339 | 375 | 277 |
| 7 | 406 | 633 | 444 | 470 | 400 | 350 | 885 | 602 | *558 | 348 | 355 | *274 |
| 8 | 395 | 600 | 444 | 460 | 400 | 350 | 820 | 739 | 510 | 340 | 418 | 270 |
| 9 | 400 | 558 | *431 | 460 | 400 | 350 | 772 | 760 | 465 | 323 | *452 | 272 |
| 10 | 399 | 518 | 415 | 460 | 400 | 360 | 725 | 725 | 458 | 314 | 448 | 265 |
| 11 | 415 | *478 | 408 | 480 | *400 | 360 | 690 | *708 | 413 | 311 | 510 | 264 |
| 12 | 429 | 444 | 424 | 525 | 400 | 360 | 708 | 683 | 394 | 378 | 552 | 280 |
| 13 | 395 | 422 | 462 | *638 | 400 | 360 | *820 | 634 | 386 | 374 | 495 | 282 |
| 14 | *364 | 420 | 474 | 600 | 400 | 360 | 788 | 579 | 386 | 374 | 427 | 281 |
| 15 | 348 | 409 | 454 | 580 | 410 | 360 | *753 | 534 | 400 | 373 | 462 | 281 |
| 16 | 329 | 406 | 444 | 560 | 410 | 360 | 732 | 495 | 418 | 237 | 507 | 276 |
| 17 | 323 | 406 | 442 | 540 | 420 | 360 | 736 | 490 | 428 | 232 | 440 | 276 |
| 18 | 321 | 404 | 413 | 520 | 420 | 360 | 995 | 504 | 462 | 348 | 382 | 280 |
| 19 | 305 | 418 | 397 | 510 | 420 | 357 | *1,030 | 543 | 450 | 418 | 354 | 340 |
| 20 | 299 | 413 | 381 | 500 | 410 | 343 | 880 | 592 | 427 | 398 | 342 | 445 |
| 21 | 294 | 406 | 370 | 500 | 410 | 339 | 808 | 750 | 396 | 332 | 340 | 470 |
| 22 | 289 | 390 | 357 | 480 | 407 | *335 | 739 | 965 | 386 | 329 | 357 | 394 |
| 23 | 366 | 411 | 350 | 480 | 396 | 331 | 669 | 1,060 | 388 | 336 | 371 | 367 |
| 24 | 500 | 450 | 350 | 480 | 386 | 320 | 610 | 921 | 450 | 452 | 339 | 364 |
| 25 | 760 | 506 | 350 | 470 | 378 | 320 | 585 | 800 | 666 | 373 | 318 | 348 |
| 26 | 778 | 524 | 370 | 460 | 376 | 330 | 700 | 704 | 711 | 338 | 311 | 345 |
| 27 | 652 | 508 | 408 | 460 | 375 | 352 | 854 | 630 | 564 | 552 | 303 | 329 |
| 28 | 585 | 480 | 490 | 460 | 371 | 407 | 800 | 666 | 478 | 816 | 297 | 314 |
| 29 | 536 | 446 | 636 | 455 | 360 | 554 | 722 | 1,270 | 436 | 708 | 296 | 306 |
| 30 | 480 | 426 | 650 | 436 | ----- | 1,240 | 683 | 1,130 | 519 | 616 | 314 | 301 |
| 31 | 444 | ----- | 650 | 431 | ----- | 1,850 | ----- | 908 | ----- | 507 | 304 | ----- |
| Total | 12,669 | 13,804 | 13,530 | 15,455 | 11,549 | 13,508 | 25,899 | 22,480 | 15,337 | 12,876 | 12,029 | 9,333 |
| Mean | 409 | 460 | 436 | 499 | 398 | 436 | 863 | 725 | 511 | 416 | 368 | 311 |
| Cfs/m | 1.08 | 1.21 | 1.15 | 1.31 | 1.05 | 1.15 | 2.27 | 1.91 | 1.34 | 1.09 | 1.02 | 0.818 |
| In. | 1.24 | 1.35 | 1.33 | 1.51 | 1.13 | 1.33 | 2.53 | 2.20 | 1.50 | 1.26 | 1.18 | 0.91 |

Calendar year 1959: Max 1,730 Min 194 Mean 392 Cfs/m 1.03 In. 14.02
Water year 1959-60: Max 1,850 Min 264 Mean 488 Cfs/m 1.28 In. 17.47

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 23-26, Dec. 30 to Jan. 4, Jan. 7-11, 14-28, Feb. 3-21, Feb. 29 to Mar. 17, Mar. 24-26.

1225. Pere Marquette River at Scottville, Mich.

Location.--Lat 43°56'40", long 86°16'45", in NW $\frac{1}{4}$ sec.19, T.18 N., R.16 W., on right bank 20 ft upstream from highway bridge at south edge of Scottville and 5 $\frac{1}{4}$ miles downstream from South Branch.

Drainage area.--709 sq mi.

Records available.--August 1939 to September 1960. Published as "at Custer" prior to October 1942.

Gage.--Water-stage recorder. Datum of gage is 606.30 ft above mean sea level, datum of 1929. Prior to June 12, 1943, wire-weight gage at bridge 4 $\frac{1}{4}$ miles upstream at different datum.

Average discharge.--21 years, 614 cfs.

Extremes.--Maximum discharge during year, 2,300 cfs Apr. 2 (gage height, 5.47 ft); minimum, 432 cfs Sept. 11.
1939-60: Maximum discharge, 2,740 cfs Apr. 4, 1959 (gage height, 5.84 ft); minimum daily, 310 cfs Aug. 9, 10, 1941 (site and datum then in use).

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1437: 1941(M), 1943(M), 1949(M), 1950.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 12

Mar. 13 to Sept. 30

| | | | | | |
|-----|-------|-----|-------|-----|-------|
| 2.1 | 425 | 2.1 | 430 | 5.0 | 1,840 |
| 3.0 | 655 | 3.0 | 675 | 5.9 | 2,810 |
| 4.0 | 1,070 | 4.0 | 1,150 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 475 | 706 | 640 | 780 | 592 | 520 | 1,990 | 1,110 | 985 | 872 | 696 | 498 |
| 2 | 453 | 688 | 628 | 700 | 583 | 510 | 2,250 | 1,140 | 975 | 880 | 651 | 488 |
| 3 | 449 | 670 | 628 | 680 | 520 | 510 | 2,180 | 1,130 | 945 | 856 | 678 | 480 |
| 4 | 441 | 670 | 625 | 660 | 560 | 510 | 1,980 | 1,080 | 965 | 759 | 703 | 480 |
| 5 | 470 | 716 | 628 | 650 | 607 | 510 | 1,880 | 1,020 | 950 | 686 | 718 | 480 |
| 6 | 510 | 783 | 640 | 640 | 616 | 510 | 1,700 | 980 | 862 | *636 | 657 | 468 |
| 7 | 558 | 866 | 655 | 630 | 616 | 510 | 1,500 | 1,050 | *826 | 600 | 642 | *458 |
| 8 | 555 | 898 | *661 | 630 | 628 | 510 | 1,320 | 1,100 | 782 | 573 | 654 | 450 |
| 9 | 568 | 870 | 646 | 620 | 628 | 500 | 1,230 | 1,160 | 730 | 549 | 696 | 444 |
| 10 | 565 | *830 | 625 | 620 | *630 | 500 | 1,160 | 1,170 | 692 | 531 | *768 | 438 |
| 11 | 586 | 786 | 613 | 630 | 620 | 500 | 1,120 | 1,160 | 666 | 518 | 782 | 434 |
| 12 | 586 | 755 | 619 | *650 | 610 | 500 | 1,090 | *1,110 | 645 | 508 | 772 | 445 |
| 13 | *592 | 720 | 646 | 720 | 610 | 500 | *1,110 | 1,050 | 630 | 498 | 718 | 446 |
| 14 | 565 | 699 | 661 | 780 | 610 | 500 | 1,140 | 980 | 624 | 490 | 678 | 446 |
| 15 | 548 | 673 | 655 | 780 | 610 | 500 | 1,140 | 908 | 656 | 488 | 657 | 442 |
| 16 | 532 | 655 | 640 | 760 | 620 | 508 | 1,130 | 844 | 657 | 478 | 660 | 438 |
| 17 | 522 | 640 | 631 | 720 | 620 | 518 | 1,190 | 858 | 672 | 470 | 639 | 438 |
| 18 | 508 | 630 | 619 | 700 | 620 | 522 | 1,210 | 894 | 672 | 485 | 600 | 440 |
| 19 | 500 | 630 | 607 | 680 | 610 | 520 | *1,280 | 950 | 692 | 528 | 564 | 552 |
| 20 | 490 | 616 | 589 | 660 | 601 | 520 | 1,320 | 1,000 | 692 | 555 | 546 | 624 |
| 21 | 480 | 634 | 571 | 640 | 586 | 510 | 1,250 | 1,070 | 669 | 522 | 582 | 669 |
| 22 | 480 | 619 | 550 | 640 | 580 | 510 | 1,120 | 1,250 | 642 | 498 | 636 | 663 |
| 23 | 586 | 643 | 530 | 643 | 574 | *500 | 1,030 | 1,390 | 627 | 492 | 621 | 627 |
| 24 | 679 | 688 | 530 | 634 | 558 | 498 | 965 | 1,390 | 633 | 490 | 588 | 603 |
| 25 | 806 | 734 | 530 | 631 | 550 | 508 | 930 | 1,340 | 692 | 475 | 561 | 606 |
| 26 | 960 | 762 | 550 | 620 | 552 | 505 | 945 | 1,210 | 822 | 561 | 534 | 615 |
| 27 | 990 | 758 | 601 | 610 | 555 | 520 | 1,020 | 1,100 | 908 | 722 | 512 | 585 |
| 28 | 920 | 727 | 716 | 607 | 550 | 579 | 1,050 | 1,030 | 912 | 885 | 500 | 555 |
| 29 | 862 | 692 | 826 | 607 | 535 | 754 | 1,040 | 995 | 912 | 980 | 490 | 525 |
| 30 | 783 | 670 | 930 | 601 | ----- | 1,200 | 1,050 | 985 | 867 | 885 | 495 | 512 |
| 31 | 741 | ----- | 900 | 598 | ----- | 1,950 | ----- | 980 | ----- | 750 | 510 | ----- |
| Total | 18,750 | 21,428 | 19,890 | 20,521 | 17,151 | 18,212 | 39,320 | 33,414 | 22,962 | 19,200 | 19,508 | 15,350 |
| Mean | 605 | 714 | 642 | 662 | 591 | 587 | 1,311 | 1,078 | 765 | 619 | 629 | 512 |
| Cfsm | 0.853 | 1.01 | 0.906 | 0.934 | 0.634 | 0.828 | 1.85 | 1.52 | 1.08 | 0.873 | 0.887 | 0.722 |
| In. | 0.98 | 1.13 | 1.04 | 1.08 | 0.90 | 0.95 | 2.06 | 1.75 | 1.20 | 1.01 | 1.02 | 0.81 |

Calendar year 1959: Max 2,700 Min 382 Mean 648 Cfsm 0.914 In. 12.41
Water year 1959-60: Max 2,250 Min 434 Mean 726 Cfsm 1.02 In. 13.93

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-19, Dec. 23-26, Dec. 31 to Jan. 22, Jan. 26, 27, Feb. 3, 4, 10-19, Mar. 1-15.

1230. Big Sable River near Freesoil, Mich.

Location.--Lat 44°07'15", long 86°16'50", in NE1/4 sec.24, T.20 N., R.17 W., near center of span on downstream side of bridge on U. S. Highway 31, 3.4 miles northwest of Freesoil, and 7 miles upstream from Hamlin Lake.

Drainage area.--127 sq mi.

Records available.--May 1942 to September 1960.

Gage.--Wire-weight gage read once daily. Datum of gage is 615.32 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Sept. 15, 1959, staff gage at site 30 ft downstream at same datum.

Average discharge.--18 years, 137 cfs.

Extremes.--Maximum daily discharge during year, 410 cfs Apr. 3; minimum discharge, 99 cfs Oct. 3.

1942-60: Maximum discharge, 555 cfs Apr. 7, 1959 (gage height, 3.4 ft, from flood-marks); minimum, 81 cfs Aug. 14, 1944, Aug. 7, 1957.

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

Revisions (water years).--WSP 1437: 1946(M), 1947.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Aug. 25 to Sept. 30)

| Oct. 1 to Apr. 3 | | | | Apr. 4 to Sept. 30 | | | |
|------------------|-----|-----|-----|--------------------|-----|--|--|
| 1.1 | 99 | 3.0 | 400 | 1.1 | 108 | | |
| 2.0 | 204 | 3.4 | 555 | 2.0 | 213 | | |
| 2.5 | 269 | | | 3.0 | 410 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|----------|-----------|-----------|-------|-------|-------|-------|
| 1 | 101 | a140 | 145 | a140 | 137 | 125 | 344 | a290 | a190 | 229 | 136 | 116 |
| 2 | 100 | 134 | 145 | 150 | 134 | 125 | 368 | 302 | 197 | 275 | 142 | 116 |
| 3 | 100 | 134 | 145 | a150 | 130 | 125 | a110 | 277 | a185 | a190 | 194 | 117 |
| 4 | a105 | 140 | 145 | 148 | 130 | 125 | 392 | a250 | 175 | a175 | 194 | a115 |
| 5 | 112 | 162 | 146 | 137 | 143 | 125 | 351 | 219 | a170 | 164 | 178 | a115 |
| 6 | 118 | 175 | a150 | 142 | 148 | a125 | 304 | 210 | 162 | 158 | 166 | 114 |
| 7 | 142 | 172 | 151 | 148 | a145 | 120 | 274 | 295 | 158 | *148 | a155 | *111 |
| 8 | 136 | a170 | *149 | 143 | 146 | 120 | 256 | a310 | *153 | 141 | 162 | 109 |
| 9 | 131 | 164 | 148 | 142 | 145 | 120 | 240 | 317 | 150 | 138 | 166 | 108 |
| 10 | 128 | *156 | 143 | a140 | *148 | 120 | a235 | 327 | 146 | a135 | *167 | 108 |
| 11 | a130 | a150 | 140 | 136 | 145 | 120 | 234 | 313 | 144 | 131 | 161 | a110 |
| 12 | 129 | 146 | a140 | *151 | 145 | 120 | 229 | *290 | a140 | 128 | 154 | 118 |
| 13 | *123 | 144 | a145 | 173 | 140 | a120 | *235 | 256 | 140 | 127 | a140 | 120 |
| 14 | 119 | 145 | 142 | 180 | a140 | 120 | 250 | 229 | 140 | 124 | a150 | 116 |
| 15 | 118 | a145 | 142 | 179 | 140 | 120 | 243 | a210 | 151 | 123 | 146 | 113 |
| 16 | 117 | 140 | 139 | 169 | 150 | 120 | 235 | 193 | 156 | 122 | 139 | 110 |
| 17 | 113 | 146 | 140 | a155 | 148 | 125 | a260 | a210 | 149 | a120 | 135 | 114 |
| 18 | a110 | 143 | 138 | 150 | 143 | 123 | 286 | 221 | 147 | 124 | 130 | a125 |
| 19 | 109 | 144 | 137 | a150 | 139 | 124 | *302 | 240 | a150 | 126 | 128 | 144 |
| 20 | 107 | 140 | a135 | a145 | 138 | a125 | 272 | 274 | 149 | 123 | 127 | 144 |
| 21 | 108 | 138 | 130 | a145 | a135 | 124 | 250 | 301 | 145 | 121 | a130 | 141 |
| 22 | 112 | a140 | 125 | a145 | a135 | a125 | 226 | a320 | 140 | 120 | 144 | 138 |
| 23 | 158 | 155 | 125 | a140 | 134 | *125 | 210 | 329 | 140 | 125 | 146 | 134 |
| 24 | a200 | 166 | 125 | a140 | 133 | a120 | a220 | 302 | 140 | a120 | 139 | 132 |
| 25 | 182 | 169 | a125 | 142 | 134 | 120 | 232 | 259 | 140 | 124 | 134 | a140 |
| 26 | 176 | a165 | 137 | 139 | 136 | 120 | 258 | 226 | a140 | 173 | 133 | 132 |
| 27 | 164 | 160 | a150 | 143 | 132 | a125 | a260 | 194 | 135 | 178 | a130 | 128 |
| 28 | a150 | 144 | 202 | 142 | a130 | 136 | 250 | 197 | 163 | 176 | a130 | 125 |
| 29 | 143 | a145 | 193 | 138 | 130 | 163 | 226 | a190 | 199 | 163 | 123 | 128 |
| 30 | 142 | 146 | 185 | 143 | ----- | 286 | 275 | 183 | 224 | 151 | 121 | 125 |
| 31 | 142 | ----- | 155 | a140 | ----- | 328 | ----- | 183 | ----- | a145 | 119 | ----- |
| Total | 4,025 | 4,518 | 4,517 | 4,585 | 4,033 | 4,219 | 8,127 | 7,917 | 4,718 | 4,527 | 4,519 | 3,666 |
| Mean | 130 | 151 | 146 | 148 | 139 | 136 | 271 | 255 | 157 | 146 | 146 | 122 |
| Cfsm | 1.02 | 1.19 | 1.15 | 1.17 | 1.09 | 1.07 | 2.13 | 2.01 | 1.24 | 1.15 | 1.15 | 0.961 |
| In. | 1.18 | 1.33 | 1.33 | 1.35 | 1.18 | 1.23 | 2.38 | 2.32 | 1.38 | 1.33 | 1.33 | 1.07 |
| Calendar year 1959: Max | 531 | | | | Min 88 | Mean 141 | Cfsm 1.11 | In. 15.04 | | | | |
| Water year 1959-60: Max | 410 | | | | Min 100 | Mean 162 | Cfsm 1.28 | In. 17.41 | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

Note.--Stage-discharge relation affected by ice Dec. 21-24, Dec. 31 to Jan. 3, Jan. 18, Feb. 3, 4, 11-15, Mar. 1-16, 25, 26.

1235. Manistee River near Grayling, Mich.

Location.--Lat 44°41'35", long 84°50'50", in NW $\frac{1}{4}$ sec.31, T.27 N., R.4 W., on right bank 25 ft upstream from bridge on State Highway 72, 2 $\frac{1}{2}$ miles downstream from Goose Creek, and 6 $\frac{1}{2}$ miles northwest of Grayling.

Drainage area.--159 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for October 1942, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 1,120.64 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--18 years, 183 cfs.

Extremes.--Maximum discharge during year, 388 cfs Apr. 18 (gage height, 1.88 ft); minimum, 139 cfs Feb. 11.

1942-60: Maximum discharge, that of Apr. 18, 1960; maximum gage height, 2.00 ft Feb. 9, 1951 (ice jam); minimum discharge, 122 cfs Feb. 14, 1943, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Aug. 12 to Sept. 30)

| | |
|-----|-----|
| 0.4 | 140 |
| 1.0 | 222 |
| 1.9 | 392 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 182 | 200 | 189 | 182 | 173 | 160 | *224 | 231 | 210 | *194 | 182 | *159 |
| 2 | *180 | 200 | 189 | 186 | *180 | 165 | 215 | 227 | *210 | 192 | 184 | 162 |
| 3 | 180 | 195 | 189 | 186 | 185 | *160 | 228 | *233 | 205 | 202 | 196 | 160 |
| 4 | 180 | 202 | *189 | 182 | 165 | 162 | 235 | 229 | 202 | 200 | 182 | 169 |
| 5 | 186 | 217 | 192 | *162 | 171 | 166 | 229 | 219 | 199 | 194 | 180 | 168 |
| 6 | 202 | *219 | 194 | 170 | 177 | 160 | 217 | 219 | 200 | 192 | 178 | 162 |
| 7 | *238 | 210 | 191 | 175 | 177 | 160 | 215 | 233 | 200 | 189 | 184 | 161 |
| 8 | 250 | 203 | 186 | 184 | 173 | 160 | 212 | 242 | 194 | 186 | 191 | 159 |
| 9 | 244 | 203 | 186 | 177 | 173 | 160 | 208 | 245 | 192 | 186 | 184 | 159 |
| 10 | 224 | 202 | 184 | 170 | 159 | 160 | 205 | 268 | 191 | 184 | *189 | 157 |
| 11 | 227 | 202 | 184 | 170 | 147 | 160 | 207 | 268 | 192 | 184 | 186 | 157 |
| 12 | 231 | 199 | 186 | 177 | 160 | 160 | 217 | 251 | 194 | 184 | 177 | 165 |
| 13 | 226 | 197 | 184 | 182 | 165 | 160 | 253 | 233 | 192 | 186 | 174 | 166 |
| 14 | 217 | 200 | 182 | 180 | 165 | 164 | 297 | 226 | 194 | 183 | 176 | 166 |
| 15 | 210 | 194 | 184 | 177 | 170 | 162 | 303 | 219 | 203 | 182 | 178 | 165 |
| 16 | 205 | 194 | 186 | 176 | 170 | 162 | 295 | 215 | 202 | 180 | 176 | 168 |
| 17 | 205 | 191 | 186 | 174 | 170 | 164 | 339 | 220 | 203 | 182 | 171 | 173 |
| 18 | 202 | 184 | 186 | 170 | 170 | 165 | 386 | 227 | 199 | 191 | 170 | 171 |
| 19 | 197 | 199 | 183 | 170 | 170 | 164 | *341 | 219 | 195 | 194 | 168 | 174 |
| 20 | 197 | 192 | 182 | 170 | 169 | 164 | *295 | 229 | 194 | 189 | 168 | 182 |
| 21 | 192 | 192 | 178 | 174 | 169 | 162 | 274 | 229 | 192 | 191 | 170 | 177 |
| 22 | 192 | 192 | 178 | 174 | 165 | 160 | 261 | 235 | 194 | 210 | 174 | 177 |
| 23 | 217 | 195 | 177 | 174 | 160 | 160 | 251 | 238 | 199 | 215 | 171 | 177 |
| 24 | 240 | 208 | 178 | 173 | 160 | 160 | 244 | 224 | 208 | 197 | 168 | 174 |
| 25 | 235 | 207 | 178 | 173 | 160 | 160 | 248 | 215 | 210 | 191 | 165 | 174 |
| 26 | 219 | 200 | 182 | 173 | 160 | 165 | 253 | 210 | 200 | 215 | 164 | 173 |
| 27 | 208 | 194 | 186 | 174 | 166 | 168 | 248 | 208 | 199 | 244 | 164 | 171 |
| 28 | 202 | 192 | 219 | 174 | 165 | 176 | 235 | 205 | 199 | 224 | 161 | 171 |
| 29 | 199 | 189 | 208 | 174 | 160 | 182 | 226 | 203 | 205 | 195 | 164 | 170 |
| 30 | 197 | 189 | 195 | 171 | ----- | 207 | 227 | 208 | 200 | 189 | 165 | 170 |
| 31 | 200 | ----- | 189 | 171 | ----- | 244 | ----- | 217 | ----- | 186 | 160 | ----- |
| Total | 6,484 | 5,961 | 5,802 | 5,425 | 4,814 | 5,177 | 7,586 | 7,046 | 5,977 | 6,031 | 5,410 | 5,035 |
| Mean | 209 | 199 | 187 | 175 | 166 | 167 | 253 | 227 | 199 | 195 | 175 | 168 |
| Cfsm | 1.31 | 1.25 | 1.18 | 1.10 | 1.04 | 1.05 | 1.59 | 1.43 | 1.25 | 1.23 | 1.10 | 1.06 |
| In. | 1.51 | 1.40 | 1.36 | 1.27 | 1.12 | 1.21 | 1.77 | 1.65 | 1.40 | 1.42 | 1.27 | 1.18 |

Calendar year 1959: Max 322 Min 145 Mean 188 Cfsm 1.18 In. 16.07
Water year 1959-60: Max 386 Min 147 Mean 193 Cfsm 1.21 In. 16.56

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 6, 7, 10, 11, 18-20, Feb. 2-4, 12-17, 22-26, Feb. 29 to Mar. 3, Mar. 6-13, 22-25.

1240. Manistee River near Sherman, Mich.

Location.--Lat 44°26'10", long 85°41'55", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.36, T.24 N., R.12 W., near center span on downstream side of bridge on State Highway 37, 150 ft upstream from Wheeler Creek, 0.9 mile north of Sherman, and at mile 60.8.

Drainage area.--900 sq mi.

Records available.--July 1903 to May 1916, October 1930 to September 1931, October 1933 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage read twice daily. Altitude of gage is 804 ft (from river-profile map). Prior to Apr. 13, 1934, chain gages at various datums. Apr. 13, 1934, to May 22, 1935, staff gage at present datum.

Average discharge.--40 years (1903-15, 1930-31, 1933-60), 1,068 cfs.

Extremes.--Maximum discharge during year, 3,260 cfs Apr. 18 (gage height, 15.39 ft); minimum, 790 cfs Sept. 10, 11.

1903-16, 1930-31, 1933-60: Maximum discharge, 3,570 cfs Mar. 25, 1913 (gage height, 7.1 ft from graph based on gage readings, datum then in use); minimum daily, 540 cfs Feb. 21-23, 1936.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1004: 1936(m). WSP 1437: 1911, 1913-14(M), 1936(M), 1937, 1940(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 8-11)

Oct. 1 to May 11

May 12 to Sept. 30

| | | | |
|------|-------|------|-------|
| 10.5 | 825 | 10.3 | 790 |
| 12.0 | 1,300 | 12.0 | 1,430 |
| 14.0 | 2,320 | 13.3 | 2,070 |
| 15.4 | 3,270 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 872 | 1,020 | 974 | 1,000 | 912 | 868 | 1,720 | 1,540 | 1,420 | 976 | 927 | 847 |
| 2 | 855 | 1,010 | 968 | 1,010 | 898 | 855 | 1,760 | 1,420 | 1,430 | 962 | 913 | 850 |
| 3 | 845 | 995 | 971 | 1,010 | 840 | 850 | 1,990 | 1,410 | 1,400 | 966 | 896 | 868 |
| 4 | 832 | 992 | 989 | 986 | 878 | 850 | 2,030 | 1,380 | 1,300 | 994 | 892 | 857 |
| 5 | 845 | 1,170 | 1,010 | 1,000 | 935 | 850 | 1,960 | 1,350 | 1,250 | 976 | 882 | 838 |
| 6 | 885 | 1,280 | 1,050 | 1,000 | 932 | 855 | 1,860 | 1,370 | 1,210 | 941 | 864 | 832 |
| 7 | 1,130 | 1,240 | 1,040 | 1,000 | 940 | 850 | 1,750 | 1,520 | 1,170 | 927 | 885 | 829 |
| 8 | 1,160 | 1,200 | 1,010 | 1,000 | 932 | 848 | 1,700 | 1,600 | 1,140 | 924 | 899 | 817 |
| 9 | 1,170 | 1,160 | 966 | 1,000 | 930 | 848 | 1,620 | 1,620 | 1,110 | 910 | 910 | 805 |
| 10 | 1,140 | 1,100 | 959 | 1,000 | 956 | 842 | 1,500 | 1,860 | 1,090 | 902 | 930 | 793 |
| 11 | 1,200 | 1,070 | 938 | 1,000 | 900 | 850 | 1,480 | 2,020 | 1,070 | 896 | 924 | 793 |
| 12 | 1,170 | 1,040 | 935 | 980 | 890 | 850 | 1,620 | 2,000 | 1,060 | 888 | 896 | 844 |
| 13 | 1,170 | 1,020 | 938 | 1,080 | 900 | 845 | 1,870 | 1,910 | 1,050 | 888 | 874 | 850 |
| 14 | 1,090 | 1,010 | 932 | 1,120 | 920 | 850 | *2,120 | 1,740 | 1,050 | 882 | 920 | 844 |
| 15 | 1,040 | 995 | 910 | 1,050 | 950 | 855 | 2,320 | 1,580 | 1,090 | 871 | 910 | 838 |
| 16 | 1,010 | 989 | 930 | 1,000 | 950 | 862 | 2,460 | 1,480 | 1,120 | 868 | 885 | 835 |
| 17 | 974 | 986 | 945 | 974 | 950 | 860 | 2,880 | 1,470 | 1,120 | 857 | 864 | 841 |
| 18 | 948 | 974 | 945 | 965 | 1,040 | 868 | *3,200 | 1,510 | 1,110 | 860 | 854 | 844 |
| 19 | 930 | 962 | 958 | 965 | 1,000 | 868 | 2,950 | 1,480 | 1,080 | 871 | 844 | 868 |
| 20 | 918 | 965 | 922 | 945 | 908 | 870 | *2,810 | 1,690 | 1,070 | 874 | 838 | 868 |
| 21 | 900 | 965 | 910 | 935 | 915 | 865 | 2,530 | 1,800 | 1,040 | 896 | 838 | 899 |
| 22 | 895 | 971 | 900 | 942 | 925 | 870 | 2,230 | 1,710 | 1,020 | 952 | 885 | 885 |
| 23 | 1,000 | 1,020 | 898 | 940 | 915 | 865 | 1,950 | 1,640 | 1,010 | 948 | 902 | 874 |
| 24 | 1,280 | *1,130 | 890 | 938 | 908 | 868 | 1,780 | 1,570 | 1,020 | 930 | 882 | 871 |
| 25 | 1,370 | 1,150 | 895 | 932 | *875 | 862 | 1,680 | 1,530 | 1,010 | 920 | 868 | 834 |
| 26 | 1,320 | 1,110 | 895 | 922 | 890 | 872 | 1,650 | *1,470 | 1,000 | 994 | 844 | 910 |
| 27 | 1,250 | 1,070 | 910 | *920 | 900 | 872 | 1,610 | 1,390 | *994 | 1,210 | 835 | 878 |
| 28 | *1,170 | 1,030 | *1,090 | 920 | 900 | 935 | *1,540 | 1,350 | 1,040 | *1,170 | 829 | *854 |
| 29 | 1,100 | 1,020 | 1,300 | 925 | 895 | 1,000 | 1,440 | 1,310 | 1,030 | 1,090 | *832 | 844 |
| 30 | 1,040 | 986 | 1,150 | 918 | ----- | 1,280 | 1,440 | 1,290 | 1,000 | 1,020 | 823 | 841 |
| 31 | 1,020 | ----- | 1,050 | 915 | ----- | *1,690 | ----- | 1,380 | ----- | 962 | 826 | ----- |
| Total | 32,529 | 31,630 | 30,178 | 30,292 | 28,694 | 28,073 | 59,460 | 48,390 | 33,504 | 29,325 | 27,171 | 25,571 |
| Mean | 1,049 | 1,054 | 973 | 977 | 920 | 906 | 1,982 | 1,561 | 1,117 | 946 | 876 | 852 |
| Cfsm | 1.17 | 1.17 | 1.08 | 1.09 | 1.02 | 1.01 | 2.20 | 1.73 | 1.24 | 1.05 | 0.973 | 0.947 |
| In. | 1.35 | 1.30 | 1.24 | 1.26 | 1.10 | 1.16 | 2.46 | 1.99 | 1.38 | 1.21 | 1.12 | 1.06 |

Calendar year 1959: Max 2,840 Min 750 Mean 1,033 Cfsm 1.15 In. 15.56
Water year 1959-60: Max 3,200 Min 793 Mean 1,101 Cfsm 1.22 In. 16.63

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 30 to Jan. 1, Jan. 5-12, Feb. 11-17, 27, 28, Mar. 3-5, 7, 11, 12, 14.

1245. East Branch Pine River near Tustin, Mich.

Location.--Lat 44°06'10", long 85°31'00", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 28, T.20 N., R.10 W., on left bank 75 ft downstream from highway bridge, 1.6 miles upstream from North Branch, 3.0 miles west of Tustin, and 5.5 miles northwest of Le Roy.

Drainage area.--63 sq mi, approximately.

Records available.--July 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,077.65 ft above mean sea level, unadjusted (levels by Michigan Department of Conservation).

Average discharge.--8 years, 27.5 cfs.

Extremes.--Maximum discharge during year, 536 cfs Apr. 3 (gage height, 4.79 ft); minimum, 6.1 cfs July 17.

1952-60: Maximum discharge, 1,410 cfs Aug. 4, 1956 (gage height, 6.23 ft), from rating curve extended above 450 cfs by logarithmic plotting; minimum, 4.1 cfs Mar. 13, 1958, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 27,
Apr. 17 to Sept. 30

Nov. 28 to Apr. 16

| | | | | | | | |
|-----|------|-----|-----|-----|----|-----|-----|
| 1.6 | 5.5 | 3.0 | 101 | 1.8 | 11 | 3.5 | 165 |
| 1.8 | 12.5 | 3.5 | 165 | 2.0 | 20 | 4.5 | 420 |
| 2.0 | 22 | 4.5 | 420 | 2.5 | 50 | 5.0 | 620 |
| 2.3 | 40 | | | 3.0 | 94 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 12 | 28 | 22 | 26 | 16 | 16 | 230 | 85 | 57 | 26 | 9.7 | 7.6 |
| 2 | 10 | 26 | 22 | 24 | 15 | 16 | 357 | 72 | 70 | 16 | 11 | 8.2 |
| 3 | 9.7 | 24 | 24 | 22 | 15 | 16 | 444 | 65 | 66 | 13 | 16 | 8.2 |
| 4 | 9.7 | 43 | 26 | 20 | 15 | 16 | 363 | 63 | 45 | 14 | 13 | 8.2 |
| 5 | 17 | 85 | 29 | 18 | 15 | 15 | 255 | 50 | 32 | *16 | 10 | 7.6 |
| 6 | 22 | 77 | 31 | 17 | 20 | 15 | 177 | 52 | *24 | 11 | 9.3 | 7.0 |
| 7 | 33 | 60 | *28 | 17 | 20 | 15 | 153 | 95 | 27 | 9.3 | 20 | 7.9 |
| 8 | 26 | 46 | 22 | 16 | 20 | 14 | 123 | 88 | 21 | 9.3 | *24 | 6.7 |
| 9 | 28 | *41 | 20 | 16 | *21 | 14 | 103 | 91 | 16 | 8.5 | 18 | *7.9 |
| 10 | 22 | 41 | 19 | 16 | 18 | 14 | 86 | *113 | 17 | 8.2 | 19 | 7.3 |
| 11 | 36 | 39 | 19 | *16 | 18 | 14 | 110 | 99 | 18 | 7.9 | 15 | 7.6 |
| 12 | *28 | 32 | 20 | 18 | 18 | 13 | *183 | 80 | 15 | 7.6 | 12 | 9.7 |
| 13 | 26 | 29 | 20 | 29 | 18 | 13 | 260 | 63 | 13 | 7.3 | 10 | 9.7 |
| 14 | 18 | 26 | 21 | 30 | 18 | 13 | *354 | 51 | 14 | 7.0 | 14 | 8.5 |
| 15 | 15 | 23 | 22 | 27 | 18 | 13 | 280 | 41 | 18 | 7.0 | 14 | 8.2 |
| 16 | 14 | 23 | 24 | 23 | 18 | 13 | 201 | 34 | 18 | 7.0 | 12 | 8.2 |
| 17 | 14 | 23 | 24 | 20 | 18 | 13 | 280 | 118 | 18 | 6.7 | 10 | 9.7 |
| 18 | 12 | 23 | 22 | 19 | 18 | 13 | 270 | 115 | 16 | 8.2 | 9.3 | 10 |
| 19 | 12 | 23 | 16 | 18 | 18 | 13 | *191 | 90 | 16 | 8.2 | 8.9 | 22 |
| 20 | 11 | 22 | 15 | 18 | 17 | 14 | 142 | 136 | 17 | 7.6 | 8.2 | 22 |
| 21 | 10 | 22 | 14 | 18 | 17 | *15 | 113 | 106 | 13 | 7.3 | 12 | 14 |
| 22 | 12 | 23 | 13 | 18 | 17 | 14 | 95 | 108 | 12 | 7.0 | 12 | 12 |
| 23 | 114 | 38 | 12 | 18 | 16 | 14 | 81 | 93 | 15 | 7.0 | 9.7 | 12 |
| 24 | 145 | 50 | 12 | 18 | 16 | 14 | 81 | 77 | 18 | 7.0 | 8.9 | 11 |
| 25 | 95 | 46 | 12 | 18 | 16 | 14 | 142 | 63 | 17 | 6.7 | 8.2 | 14 |
| 26 | 71 | 39 | 13 | 18 | 17 | 14 | 136 | 54 | 17 | 26 | 7.9 | 10 |
| 27 | 50 | 29 | 23 | 18 | 16 | 16 | 108 | 50 | 11 | 34 | 7.9 | 9.7 |
| 28 | 38 | 25 | 80 | 18 | 16 | 29 | 86 | 46 | 22 | 17 | 15 | 9.3 |
| 29 | 32 | 22 | 55 | 17 | 16 | 49 | 71 | 37 | 29 | 12 | 10 | 8.9 |
| 30 | 29 | 22 | 40 | 18 | ----- | 214 | 78 | 41 | 24 | 12 | 8.2 | 8.9 |
| 31 | 36 | ----- | 32 | 17 | ----- | 255 | ----- | 60 | ----- | 11 | 7.3 | ----- |
| Total | 1,007.4 | 1,050 | 752 | 606 | 501 | 931 | 5,553 | 2,358 | 716 | 352.8 | 370.5 | 302.0 |
| Mean | 32.5 | 35.0 | 24.3 | 19.5 | 17.3 | 30.0 | 185 | 75.4 | 23.9 | 11.4 | 12.0 | 10.1 |
| Cfsm | 0.515 | 0.555 | 0.368 | 0.310 | 0.275 | 0.476 | 2.94 | 1.20 | 0.379 | 0.181 | 0.190 | 0.160 |
| In. | 0.59 | 0.62 | 0.44 | 0.36 | 0.30 | 0.55 | 3.28 | 1.38 | 0.42 | 0.21 | 0.22 | 0.18 |

Calendar year 1959: Max 568 Min 5.3 Mean 33.5 Cfsm 0.532 In. 7.20
Water year 1959-60: Max 444 Min 6.7 Mean 39.6 Cfsm 0.629 In. 8.55

Peak discharge (base, 130 cfs).--Oct. 24 (1:30 a.m.) 189 cfs (3.62 ft); Mar. 30 (9:30 p.m.) 342 cfs (4.24 ft); Apr. 3 (12:50 to 1:30 a.m.) 536 cfs (4.79 ft); Apr. 14 (12:50 to 2 p.m.) 381 cfs (4.37 ft); Apr. 17 (10 to 11 a.m.) 321 cfs (4.17 ft); Apr. 25 (3:30 a.m.) 162 cfs (3.48 ft); May 17 (1 to 2 p.m.) 191 cfs (3.63 ft); May 20 (5 to 6 a.m.) 199 cfs (3.46 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 16, 27-29, Dec. 8, 9, 12-14, 19, 20, Dec. 29 to Jan. 1, Jan. 15-21, Feb. 2, 3, 7, 8, 11-13, 21, 23.

1250. Pine River near Le Roy, Mich.

Location.--Lat 44°03'50", long 85°32'55", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.6, T.19 N., R.10 W., on right bank 15 ft downstream from highway bridge, 5.0 miles northwest of Le Roy, 5.1 miles downstream from East Branch, and 5.3 miles southwest of Tustin.

Drainage area.--118 sq mi.

Records available.--July 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,040 ft (by barometer).

Average discharge.--8 years, 91.5 cfs.

Extremes.--Maximum discharge during year, 682 cfs Apr. 3 (gage height, 6.51 ft); minimum, 46 cfs Feb. 2 (result of freezeup).

1952-60: Maximum discharge, 1,550 cfs Aug. 4, 1956 (gage height, 10.02 ft, from floodmark), from rating curve extended above 700 cfs by logarithmic plotting; minimum, 42 cfs Jan. 4, 1954 (result of freezeup), Aug. 3-5, 16-19, 1958, Sept. 14, 1959.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 5

Apr. 6 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 2.0 | 54 | 6.0 | 590 | 1.8 | 46 |
| 2.5 | 80 | 7.0 | 780 | 2.5 | 80 |
| 3.0 | 125 | | | 3.0 | 125 |
| | | | | 6.0 | 590 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 61 | 96 | 84 | 80 | 71 | 60 | 455 | 213 | 135 | 86 | 55 | 52 |
| 2 | 57 | 92 | 85 | 76 | 62 | 60 | 523 | 176 | 150 | 70 | 65 | 56 |
| 3 | 57 | 86 | 89 | 74 | 64 | 60 | 639 | 146 | 170 | 68 | 100 | 55 |
| 4 | 58 | 108 | 95 | 72 | 66 | 60 | 550 | 138 | 150 | 64 | 66 | 55 |
| 5 | 76 | 236 | 101 | 72 | 68 | 60 | 451 | 121 | 130 | *64 | 58 | 53 |
| 6 | 100 | 207 | 106 | 72 | 78 | 60 | 325 | 121 | *110 | 58 | 55 | 51 |
| 7 | 125 | 150 | *97 | 74 | 75 | 60 | 312 | 232 | 93 | 55 | 87 | 51 |
| 8 | 107 | 120 | 86 | 74 | 70 | 60 | 256 | 208 | 85 | 53 | *94 | 49 |
| 9 | 112 | *114 | 80 | 72 | *75 | 58 | 225 | 210 | 77 | 52 | 76 | *50 |
| 10 | 94 | 113 | 73 | 72 | 69 | 58 | 192 | *267 | 72 | 52 | 86 | 50 |
| 11 | 122 | 113 | 73 | *66 | 68 | 57 | 237 | 228 | 76 | 51 | 71 | 49 |
| 12 | *107 | 102 | 75 | 77 | 68 | 57 | *362 | 177 | 72 | 51 | 61 | 59 |
| 13 | 91 | 94 | 76 | 111 | 68 | 57 | 463 | 141 | 67 | 50 | 56 | 59 |
| 14 | 79 | 94 | 79 | 100 | 70 | 56 | *580 | 122 | 72 | 49 | 66 | 56 |
| 15 | 72 | 82 | 82 | 90 | 70 | 56 | 551 | 112 | 94 | 49 | 70 | 54 |
| 16 | 68 | 82 | 90 | 82 | 71 | 57 | 423 | 103 | 87 | 49 | 59 | 53 |
| 17 | 66 | 82 | 88 | 78 | 71 | 60 | 551 | 264 | 90 | 50 | 56 | 54 |
| 18 | 63 | 86 | 76 | 74 | 70 | 60 | 517 | 319 | 79 | 54 | 55 | 56 |
| 19 | 60 | 86 | 68 | 72 | 69 | 60 | 406 | 216 | 78 | 54 | 51 | 93 |
| 20 | 59 | 80 | 62 | 72 | 68 | 58 | 300 | 355 | 75 | 51 | 51 | 94 |
| 21 | 58 | 85 | 60 | 74 | 62 | *57 | 243 | 285 | 67 | 50 | 62 | 70 |
| 22 | 60 | 86 | 58 | 76 | 62 | 56 | 210 | 254 | 63 | 51 | 78 | 62 |
| 23 | 276 | 112 | 56 | 74 | 62 | 56 | 180 | 214 | 64 | 51 | 58 | 66 |
| 24 | 411 | 147 | 55 | 74 | 62 | 56 | 174 | 171 | 74 | 49 | 55 | 62 |
| 25 | 274 | 129 | 56 | 70 | 62 | 57 | 322 | 144 | 68 | 48 | 53 | 65 |
| 26 | 186 | 113 | 60 | 70 | 62 | 59 | 302 | 133 | 66 | 116 | 52 | 62 |
| 27 | 130 | 100 | 86 | 70 | 62 | 66 | 244 | 125 | 59 | 174 | 51 | 58 |
| 28 | 110 | 90 | 239 | 72 | 62 | 103 | 188 | 122 | 99 | 94 | 55 | 56 |
| 29 | 100 | 86 | 150 | 72 | 62 | 154 | 153 | 115 | 130 | 68 | 56 | 56 |
| 30 | 92 | 85 | 110 | 72 | ----- | 450 | 171 | 110 | 96 | 63 | 54 | 58 |
| 31 | 102 | ----- | 92 | 71 | ----- | 583 | ----- | 120 | ----- | 59 | 51 | ----- |
| Total | 3,433 | 3,256 | 2,685 | 2,355 | 1,949 | 2,871 | 10,505 | 5,682 | 2,748 | 1,953 | 1,963 | 1,764 |
| Mean | 111 | 109 | 86.6 | 76.0 | 67.2 | 92.6 | 350 | 183 | 91.6 | 63.0 | 63.3 | 58.8 |
| Cfsm | 0.941 | 0.924 | 0.754 | 0.644 | 0.569 | 0.785 | 2.97 | 1.55 | 0.776 | 0.534 | 0.536 | 0.498 |
| In. | 1.08 | 1.03 | 0.85 | 0.74 | 0.61 | 0.90 | 3.31 | 1.79 | 0.87 | 0.62 | 0.62 | 0.56 |

Calendar year 1959: Max 811 Min 43 Mean 100 Cfsm 0.847 In. 11.53
 Water year 1959-60: Max 639 Min 48 Mean 112 Cfsm 0.949 In. 12.98

Peak discharge (base, 300 cfs).--Oct. 24 (12:30 a.m.) 476 cfs (5.35 ft); Mar. 31 (1 a.m.) 678 cfs (6.49 ft); Apr. 3 (4:30 a.m.) 682 cfs (6.51 ft); Apr. 14 (8 p.m.) 622 cfs (6.18 ft); Apr. 25 (9:30 a.m.) 348 cfs (4.52 ft); May 17 (6 p.m.) 454 cfs (5.19 ft); May 20 (9:30 to 11:30 a.m.) 386 cfs (4.70 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-17, 20, 27-29, Dec. 8-14, 18-26, Dec. 29 to Jan. 6, Jan. 9, 11, 14-20, 25-27, Feb. 2-4, 7-9, 11-15, Feb. 21 to Mar. 16, Mar. 22-26. No gage-height record Mar. 17-21, May 30 to June 6; discharge estimated on basis of weather records, recorded range in stage, and records for nearby stations.

1255. Pine River near Hoxeyville, Mich.

Location.--Lat 44°12'10", long 85°48'00", in SW¹/₄ NW¹/₄ sec.20, T.21 N., R.12 W., on right bank 500 ft upstream from bridge on State Highway 37, 4.2 miles northwest of Hoxeyville, 8.0 miles east of Wellston, and 8 miles upstream from mouth.

Drainage area.--251 sq mi.

Records available.--July 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 775 ft (by barometer).

Average discharge.--8 years, 275 cfs.

Extremes.--Maximum discharge during year, 1,140 cfs Mar. 31 (gage height, 5.16 ft); minimum, 192 cfs Mar. 13.

1952-60: Maximum discharge, 2,440 cfs Aug. 6, 1956 (gage height, 6.82 ft), from rating curve extended above 1,100 cfs by logarithmic plotting; minimum, 168 cfs Jan. 9, 1956.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Aug. 13 to Sept. 30)

| Oct. 1-24 | | | Oct. 25 to Dec. 30 | | | Dec. 31 to Sept. 30 | | |
|-----------|-----|--|--------------------|-----|--|---------------------|-------|--|
| 2.6 | 200 | | 2.5 | 200 | | 2.4 | 196 | |
| 3.0 | 294 | | 3.0 | 340 | | 3.0 | 356 | |
| 4.1 | 700 | | 4.0 | 690 | | 5.1 | 1,110 | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 237 | 298 | 253 | b250 | a230 | b215 | 942 | 474 | 371 | 290 | 239 | 222 |
| 2 | 225 | 286 | 250 | b255 | a225 | b210 | 842 | 438 | 380 | 271 | 239 | 225 |
| 3 | 222 | 274 | 256 | 260 | a225 | b220 | 982 | 407 | 422 | 263 | 356 | 230 |
| 4 | 220 | 289 | 265 | 252 | a225 | b210 | 958 | 374 | 362 | 258 | 310 | 230 |
| 5 | 239 | 417 | 280 | 234 | a240 | b210 | 812 | 353 | 321 | *252 | 255 | 225 |
| 6 | 271 | 473 | 289 | 234 | a240 | b210 | 662 | 356 | *301 | 247 | 239 | 222 |
| 7 | 314 | 420 | *283 | 247 | a240 | b210 | 578 | 458 | 290 | 239 | 252 | 220 |
| 8 | 316 | 358 | 265 | 239 | a240 | b215 | 540 | 508 | 279 | 237 | *318 | *220 |
| 9 | 294 | *331 | 253 | 232 | *a240 | b215 | 490 | 484 | 268 | 234 | 282 | 215 |
| 10 | 286 | 322 | 242 | a235 | b240 | b215 | 442 | *536 | 260 | 232 | 279 | 215 |
| 11 | 286 | 316 | 242 | *a240 | 232 | 215 | 458 | 532 | 258 | 232 | 268 | 218 |
| 12 | *308 | 301 | 248 | 249 | b230 | 215 | *574 | 458 | 258 | 230 | 247 | 232 |
| 13 | 273 | 286 | 256 | 290 | b235 | 215 | 690 | 395 | 252 | 227 | 232 | 239 |
| 14 | 254 | 277 | 245 | 312 | 237 | b215 | *784 | 365 | 258 | 227 | 244 | 234 |
| 15 | 239 | 265 | 242 | 298 | 237 | 218 | 862 | 342 | 290 | 225 | 258 | 227 |
| 16 | 234 | 271 | 245 | 282 | 244 | 220 | 767 | 318 | 293 | 225 | 247 | 222 |
| 17 | 227 | 271 | 250 | 263 | 239 | 225 | 802 | 395 | 284 | 227 | 232 | 225 |
| 18 | 225 | 256 | 245 | 255 | 239 | 225 | 926 | 662 | 279 | 234 | 230 | 227 |
| 19 | 218 | 262 | 238 | 249 | 237 | 225 | *798 | 522 | 271 | 237 | 225 | 266 |
| 20 | 214 | 256 | 228 | 249 | 237 | 225 | 627 | 599 | 266 | 230 | 222 | 312 |
| 21 | 212 | 259 | 220 | 247 | 237 | *222 | 532 | 627 | 260 | 227 | 230 | 276 |
| 22 | 214 | 259 | 218 | 242 | 237 | 225 | 474 | 529 | 252 | 227 | 263 | 252 |
| 23 | 348 | 298 | 212 | 242 | 234 | 218 | 438 | 498 | 252 | 230 | 247 | 249 |
| 24 | 668 | 364 | 210 | 239 | 232 | 227 | 407 | 432 | 260 | 227 | 232 | 249 |
| 25 | 620 | 364 | 212 | 239 | 230 | 215 | 543 | 389 | 263 | 225 | 227 | 266 |
| 26 | 487 | 325 | 218 | 237 | 234 | 225 | 613 | 362 | 252 | 328 | 225 | 249 |
| 27 | 389 | 298 | 240 | 237 | 237 | 230 | 550 | 347 | 249 | 422 | 222 | 239 |
| 28 | 334 | 280 | 396 | 239 | 232 | 271 | 458 | 339 | 327 | 362 | 222 | 234 |
| 29 | 304 | 265 | 470 | 239 | 232 | 371 | 407 | 327 | 371 | 284 | 227 | 234 |
| 30 | 289 | 256 | 344 | 237 | ----- | 745 | 422 | 327 | 336 | 263 | 227 | 234 |
| 31 | 289 | ----- | b285 | 239 | ----- | 1,100 | ----- | 365 | ----- | 249 | 225 | ----- |
| Total | 9,256 | 9,197 | 8,100 | 7,762 | 6,817 | 8,377 | 19,380 | 13,518 | 8,785 | 7,861 | 7,721 | 7,108 |
| Mean | 299 | 307 | 261 | 250 | 235 | 270 | 646 | 436 | 293 | 254 | 249 | 237 |
| Cfs/m | 1.19 | 1.22 | 1.04 | 0.996 | 0.938 | 1.08 | 2.57 | 1.74 | 1.37 | 1.01 | 0.992 | 0.944 |
| In. | 1.37 | 1.36 | 1.20 | 1.15 | 1.01 | 1.24 | 2.87 | 2.01 | 1.30 | 1.16 | 1.14 | 1.05 |

Calendar year 1959: Max 1,280 Min 185 Mean 285 Cfs/m 1.14 In. 15.43
Water year 1959-60: Max 1,100 Min 210 Mean 311 Cfs/m 1.24 In. 16.86

Peak discharge (base, 650 cfs).--Oct. 24 (7 p.m.) 716 cfs (4.14 ft); Mar. 31 (9 p.m.) 1,140 cfs (5.16 ft); Apr. 18 (9 to 11 a.m.) 950 cfs (4.70 ft); May 18 (9 to 10 a.m.) 718 cfs (4.08 ft); May 20 (12 p.m.) 683 cfs (3.98 ft).

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for nearby stations.
b Stage-discharge relation affected by ice.

1260. Manistee River near Manistee, Mich.

Location.--Lat 44°16'15", long 86°11'55", in NW¼NW¼ sec.36, T.22 N., R.16 W., on right bank 6.4 miles northeast of Manistee, 6.4 miles south of Onekama, 7.8 miles upstream from Manistee Lake, and at mile 10.8.

Drainage area.--1,780 sq mi, approximately.

Records available.--November 1951 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 585 ft (from river-profile map).

Average discharge.--8 years (1952-60), 1,956 cfs.

Extremes.--Maximum discharge during year, 6,080 cfs Apr. 19 (gage height, 8.04 ft); maximum gage height, 8.12 ft Feb. 10 (backwater from ice); minimum daily discharge, 1,150 cfs Oct. 4.

1951-60: Maximum discharge, 6,800 cfs Apr. 9, 1954 (gage height, 8.16 ft); maximum gage height, 9.15 ft Feb. 12, 1955 (ice jam); minimum daily discharge, 1,040 cfs Aug. 25, Sept. 22, 1957, Aug. 3, 17, 18, 1958.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated at all stages by powerplant 21 miles upstream.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|-------|
| 4.1 | 1,140 | 7.5 | 3,840 |
| 6.0 | 2,010 | 8.0 | 5,900 |
| 7.0 | 2,940 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|-----------|------------|-----------|-----------|--------|--------|--------|--------|
| 1 | 1,190 | 2,010 | 2,010 | 2,340 | 1,730 | 1,690 | 3,710 | 3,240 | 2,330 | 2,180 | 1,530 | al,600 |
| 2 | 1,160 | 1,870 | 2,020 | 1,790 | 1,840 | 1,680 | 4,500 | 3,040 | 2,560 | 2,070 | 1,840 | 1,900 |
| 3 | 1,180 | 2,200 | 1,930 | 1,750 | 1,700 | 1,940 | 4,180 | 2,970 | 2,830 | 1,630 | 1,720 | 1,710 |
| 4 | 1,150 | 2,450 | 2,030 | 1,870 | 1,710 | 1,660 | 3,790 | 3,110 | 2,740 | 1,560 | 1,810 | al,600 |
| 5 | 1,250 | 2,460 | 1,940 | 2,210 | 1,770 | 1,500 | 3,940 | 3,110 | a2,000 | 1,440 | 1,680 | al,800 |
| 6 | 1,460 | 2,660 | 1,910 | 2,260 | 1,840 | 1,470 | 4,040 | 3,080 | 2,080 | 1,910 | 1,520 | a2,200 |
| 7 | 1,970 | 2,820 | 1,840 | 1,880 | 1,830 | 1,560 | 3,790 | 3,350 | 2,370 | *1,830 | 1,280 | 2,390 |
| 8 | 1,430 | 2,300 | *2,140 | 1,640 | 1,600 | 1,760 | 3,660 | 3,440 | *2,150 | 1,840 | 1,600 | *2,600 |
| 9 | 1,580 | 1,960 | 2,010 | 1,760 | 1,890 | 1,620 | 3,460 | 3,460 | 2,290 | 1,730 | 1,820 | 1,950 |
| 10 | 1,580 | *2,280 | 2,090 | 1,770 | *bl,800 | 1,740 | 3,000 | 3,580 | 1,880 | 1,380 | *1,890 | 1,680 |
| 11 | 2,010 | 2,330 | 1,880 | 1,680 | bl,800 | 1,700 | 2,990 | 3,420 | 1,870 | al,300 | 1,910 | 1,360 |
| 12 | 1,920 | 2,480 | 2,090 | *1,930 | bl,600 | 1,620 | 3,300 | *3,610 | 1,520 | al,700 | 1,660 | 1,620 |
| 13 | *2,160 | 2,190 | 1,690 | 2,250 | bl,800 | 1,470 | 3,280 | 3,680 | 1,820 | al,600 | 1,640 | 1,790 |
| 14 | 2,220 | 2,100 | 1,610 | 2,280 | bl,300 | 1,450 | *3,260 | 3,940 | 1,920 | al,800 | 1,420 | 1,620 |
| 15 | 2,230 | 1,780 | 2,050 | 2,160 | bl,500 | 2,080 | 3,580 | 3,810 | 2,050 | al,600 | 1,720 | 1,660 |
| 16 | 2,220 | 1,860 | 1,960 | 2,340 | 2,040 | 2,240 | 4,080 | 2,510 | 2,020 | al,500 | 1,680 | 1,500 |
| 17 | 1,910 | 1,840 | 1,730 | 1,760 | 1,880 | 2,180 | 4,710 | 2,160 | 2,270 | al,200 | 1,780 | 1,540 |
| 18 | 1,590 | 1,980 | 1,970 | 1,640 | 2,020 | 2,040 | 5,090 | 2,280 | 2,060 | al,300 | 1,640 | 1,660 |
| 19 | 1,640 | 2,160 | 1,760 | 2,040 | 1,980 | 2,110 | 5,500 | 2,630 | 1,700 | a2,000 | 1,880 | 1,600 |
| 20 | 1,820 | 2,060 | 1,630 | 1,910 | 2,010 | 1,620 | *5,540 | 3,280 | 1,710 | al,600 | 1,690 | 1,740 |
| 21 | 1,780 | 1,920 | 1,710 | 1,830 | 1,690 | 1,660 | 5,000 | 3,560 | 1,890 | al,700 | 1,320 | 1,670 |
| 22 | 1,900 | 1,550 | 1,940 | 1,970 | 1,620 | 1,780 | 4,540 | 3,380 | 1,930 | 1,760 | 1,380 | 1,720 |
| 23 | 2,040 | 1,850 | 1,960 | 1,770 | 1,710 | *1,740 | 3,540 | 3,110 | 1,990 | 1,680 | 1,710 | 1,400 |
| 24 | 2,720 | 2,430 | 1,790 | 1,560 | 1,760 | 1,730 | 3,250 | 3,170 | 2,030 | 1,390 | 1,540 | 1,670 |
| 25 | 2,970 | 2,460 | 1,650 | 1,640 | 1,950 | 1,640 | 3,110 | 3,150 | 1,910 | 1,320 | 1,660 | 1,540 |
| 26 | 3,100 | 2,660 | 1,510 | 1,900 | 1,990 | 1,530 | 3,170 | 3,080 | 1,660 | 1,830 | al,600 | 2,020 |
| 27 | 3,060 | 2,270 | 1,690 | 1,870 | 1,630 | 1,570 | 3,310 | 2,990 | 1,480 | 2,440 | al,600 | 1,680 |
| 28 | 2,660 | 2,210 | 2,000 | 1,810 | 1,200 | 1,970 | 3,350 | 2,820 | 2,040 | 2,350 | al,200 | 1,280 |
| 29 | 2,640 | 1,960 | 2,720 | 1,870 | 1,580 | 2,140 | 3,210 | 2,800 | 2,340 | 2,100 | al,400 | 1,240 |
| 30 | 2,130 | 1,760 | 2,840 | 1,740 | ----- | 2,900 | 3,350 | 2,200 | 2,050 | 2,090 | 1,630 | 1,270 |
| 31 | 2,120 | ----- | 2,870 | 1,510 | ----- | 3,280 | ----- | 1,860 | ----- | 1,480 | 1,600 | ----- |
| Total | 60,790 | 64,860 | 60,970 | 58,730 | 50,840 | 57,070 | 115,210 | 95,880 | 61,490 | 53,310 | 50,350 | 51,290 |
| Mean | 1,961 | 2,162 | 1,967 | 1,895 | 1,753 | 1,841 | 3,640 | 3,090 | 2,050 | 1,720 | 1,624 | 1,710 |
| Cfsm | 1.10 | 1.21 | 1.11 | 1.06 | 0.985 | 1.03 | 2.16 | 1.74 | 1.15 | 0.966 | 0.912 | 0.961 |
| In. | 1.27 | 1.35 | 1.28 | 1.22 | 1.06 | 1.19 | 2.41 | 2.01 | 1.28 | 1.11 | 1.05 | 1.07 |
| Calendar year 1959: Max | 5,820 | | | | Min 1,150 | Mean 2,047 | Cfsm 1.15 | In. 15.61 | | | | |
| Water year 1959-60: Max | 5,540 | | | | Min 1,150 | Mean 2,133 | Cfsm 1.20 | In. 16.30 | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records of Tippy Dam powerplant.

b Stage-discharge relation affected by ice.

1262. Little Manistee River near Freesoil, Mich.

Location.--Lat 44°11'00", long 86°10'00", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.31, T.21 N., R.15 W., on right bank 25 ft upstream from Sixmile Bridge, 5.8 miles north of Freesoil, 7.4 miles upstream from mouth, and 9.0 miles southeast of Manistee.

Drainage area.--200 sq mi.

Records available.--October 1956 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 610 ft (from survey level line in vicinity).

Extremes.--Maximum discharge during year, 486 cfs Apr. 2 (gage height, 3.42 ft); minimum, 117 cfs Mar. 12, 13.

1956-60: Maximum discharge, 575 cfs Apr. 6, 1959 (gage height, 3.70 ft); minimum, 71 cfs Feb. 11, 1958, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Jan. 1 | | Jan. 2 to Apr. 16, Aug. 22 to Sept. 30 | | Apr. 17 to Aug. 21 | |
|------------------|-----|---|-----|--------------------|-----|
| 1.8 | 130 | 1.6 | 120 | 1.8 | 157 |
| 3.0 | 380 | 3.0 | 380 | 3.0 | 390 |
| | | 3.5 | 510 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 150 | 164 | 170 | b150 | 156 | 140 | 382 | 332 | 254 | 232 | 176 | 154 |
| 2 | 146 | 164 | 168 | b155 | 154 | b135 | 465 | 322 | 272 | 210 | 175 | 154 |
| 3 | 144 | 158 | 166 | 168 | b140 | b135 | 445 | 294 | 266 | 208 | 198 | 154 |
| 4 | 140 | 174 | 170 | 165 | b145 | b135 | 412 | 272 | 262 | 204 | 226 | 154 |
| 5 | 148 | 200 | 172 | 156 | 153 | b135 | 425 | 256 | 244 | *196 | 206 | 154 |
| 6 | 164 | 218 | 174 | b150 | 162 | b135 | 368 | 262 | *234 | 190 | 187 | 154 |
| 7 | 228 | 214 | *174 | b160 | 162 | b135 | 324 | 314 | 226 | 187 | 190 | 154 |
| 8 | 212 | 194 | 168 | b155 | 162 | b135 | 294 | 326 | 220 | 183 | *200 | *153 |
| 9 | 196 | 184 | 162 | b150 | *160 | b135 | 280 | 334 | 216 | 178 | 216 | 152 |
| 10 | 178 | *180 | 158 | b155 | 159 | b135 | 264 | 340 | 212 | 178 | 212 | 150 |
| 11 | 178 | 178 | 156 | *159 | 153 | b135 | 264 | 328 | 208 | 176 | 204 | 152 |
| 12 | 168 | 174 | 158 | 168 | b150 | b130 | *274 | *314 | 206 | 175 | 188 | 159 |
| 13 | *164 | 168 | 160 | 184 | b150 | b135 | 290 | 286 | 204 | 173 | 180 | 158 |
| 14 | 160 | 170 | 158 | 192 | b150 | b135 | *306 | 266 | 206 | 170 | 188 | 156 |
| 15 | 154 | 166 | 156 | 188 | b140 | b135 | 306 | 256 | 224 | 168 | 187 | 153 |
| 16 | 152 | 162 | 154 | 178 | 154 | 136 | 294 | 246 | 234 | 168 | 187 | 152 |
| 17 | 150 | 158 | 154 | 170 | 154 | 140 | 350 | 258 | 224 | 168 | 178 | 153 |
| 18 | 148 | 160 | 152 | 168 | 153 | 138 | *374 | 290 | 216 | 170 | 175 | 154 |
| 19 | 142 | 160 | 150 | 166 | 153 | 138 | 372 | 324 | 216 | 173 | 171 | 174 |
| 20 | 142 | 160 | 146 | 165 | 152 | 138 | 350 | 354 | 210 | 173 | 175 | 188 |
| 21 | 140 | 160 | 144 | 164 | 150 | *138 | 306 | 356 | 204 | 170 | 200 | 184 |
| 22 | 144 | 162 | 142 | 162 | 152 | 138 | 276 | 376 | 198 | 173 | 184 | 172 |
| 23 | 194 | 178 | 140 | 162 | 148 | 138 | 264 | 356 | 198 | 171 | 174 | 171 |
| 24 | 234 | 198 | 140 | 160 | 147 | 138 | 254 | 320 | 200 | 168 | 168 | 168 |
| 25 | 252 | 206 | 140 | 160 | 146 | 135 | 264 | 290 | 196 | 165 | 164 | 171 |
| 26 | 248 | 194 | 142 | 160 | 146 | 136 | 286 | 270 | 192 | 204 | 162 | 178 |
| 27 | 204 | 184 | 158 | 160 | 147 | 140 | 292 | 262 | 188 | 244 | 159 | 171 |
| 28 | 194 | 178 | 204 | 160 | 146 | 153 | 286 | 264 | 226 | 266 | 158 | 164 |
| 29 | 174 | 172 | 218 | 159 | 146 | 176 | 266 | 260 | 252 | 214 | 160 | 164 |
| 30 | 168 | 170 | 210 | 158 | ----- | 254 | 290 | 256 | 260 | 190 | 158 | 160 |
| 31 | 164 | ----- | b160 | 158 | ----- | 324 | ----- | 256 | ----- | 182 | 156 | ----- |
| Total | 5,378 | 5,308 | 5,024 | 5,063 | 4,390 | 4,585 | 9,623 | 9,240 | 6,668 | 5,827 | 5,662 | 4,835 |
| Mean | 173 | 177 | 162 | 163 | 151 | 148 | 321 | 298 | 222 | 188 | 183 | 161 |
| Cfs/m | 0.865 | 0.885 | 0.810 | 0.815 | 0.755 | 0.740 | 1.60 | 1.49 | 1.11 | 0.940 | 0.915 | 0.805 |
| In. | 1.00 | 0.99 | 0.93 | 0.94 | 0.81 | 0.85 | 1.78 | 1.72 | 1.24 | 1.08 | 1.05 | 0.90 |

Calendar year 1959: Max 540 Min 99 Mean 175 Cfs/m 0.875 In. 11.88
 Water year 1959-60: Max 465 Min 130 Mean 196 Cfs/m 0.980 In. 13.28

* Discharge measurement made on this day.
 b Stage-discharge relation affected by ice.

STREAMS TRIBUTARY TO LAKE MICHIGAN

1270. Boardman River near Mayfield, Mich.

Location.--Lat 44°38'20", long 85°31'10", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.21, T.26 N., R.10 W., on right bank 25 ft downstream from Brown's Bridge, 300 ft downstream from East Creek, 0.9 mile downstream from Brown's Bridge Dam, 1.0 mile northeast of Mayfield, and 9.6 miles south-east of Traverse City.

Drainage area.--223 sq mi.

Records available.--June 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 760 ft (by barometer).

Average discharge.--8 years, 190 cfs.

Extremes.--Maximum discharge during year, 725 cfs Apr. 18 (gage height, 5.36 ft, from Floodmark); minimum daily, 119 cfs Feb. 21, 26.
1952-60: Maximum discharge, 980 cfs July 8, 1957 (gage height, 6.23 ft); minimum daily, 83 cfs Sept. 11, 1959.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Diurnal fluctuation caused by powerplant 0.9 mile upstream.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 18-25)

| | |
|-----|-----|
| 3.1 | 113 |
| 3.5 | 183 |
| 5.0 | 559 |
| 6.0 | 900 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 134 | 187 | 170 | 166 | 160 | 157 | 273 | 306 | 268 | 200 | 162 | 168 |
| 2 | 149 | 183 | 178 | 168 | 160 | 157 | 273 | 310 | 266 | 194 | 160 | 166 |
| 3 | 163 | 164 | 194 | 168 | 164 | 157 | 290 | 369 | 288 | 202 | 160 | 164 |
| 4 | 168 | 234 | 204 | 186 | 164 | 157 | 290 | 346 | 246 | 202 | 175 | 168 |
| 5 | 175 | 275 | 188 | 183 | 150 | 123 | 266 | 323 | 235 | 202 | 191 | 159 |
| 6 | 174 | 215 | 162 | 171 | 151 | 121 | 251 | 328 | 233 | 189 | 185 | 153 |
| 7 | 233 | 214 | 205 | 134 | 160 | 146 | 252 | 356 | 210 | 179 | 191 | 164 |
| 8 | 218 | 201 | 205 | 146 | 157 | 150 | 244 | 313 | 212 | 166 | 168 | 164 |
| 9 | 278 | 213 | 162 | 162 | 162 | 143 | 226 | 379 | 196 | 166 | 174 | *141 |
| 10 | 258 | 196 | 170 | 166 | 159 | 141 | 191 | 492 | 189 | 166 | 170 | 157 |
| 11 | 202 | 159 | 198 | 164 | 162 | 138 | 263 | 462 | 206 | 166 | *181 | 151 |
| 12 | 198 | 178 | 146 | 179 | 146 | 146 | a300 | 411 | 206 | 166 | 196 | 168 |
| 13 | 196 | 185 | 156 | 153 | 148 | 139 | a350 | 346 | 196 | 206 | 175 | 168 |
| 14 | 210 | 187 | 174 | 222 | 160 | 150 | a400 | 308 | 198 | 166 | 204 | 166 |
| 15 | 202 | 168 | *164 | 191 | 164 | 159 | a475 | 276 | 244 | 166 | 196 | 164 |
| 16 | 202 | 165 | 175 | 154 | 162 | 146 | a475 | 303 | 196 | 181 | a190 | 140 |
| 17 | 170 | 168 | 176 | 149 | 159 | 162 | a550 | 268 | 226 | 166 | a170 | 141 |
| 18 | 170 | 170 | 215 | 164 | 160 | 148 | *a550 | 293 | 166 | 157 | a160 | 168 |
| 19 | 168 | *168 | 172 | 166 | 157 | 166 | 588 | *293 | 242 | 157 | a190 | 174 |
| 20 | 144 | 168 | 141 | 162 | 162 | 155 | *425 | 366 | *189 | 164 | a170 | 172 |
| 21 | 134 | 168 | 163 | 162 | 119 | 150 | 387 | 310 | 177 | 210 | a170 | 170 |
| 22 | 170 | 170 | 161 | 162 | 150 | 157 | 244 | 310 | 185 | 174 | a200 | 170 |
| 23 | 290 | 187 | 160 | 162 | *160 | *157 | 251 | 328 | 222 | 183 | a190 | 170 |
| 24 | 285 | 192 | 162 | 162 | 153 | 170 | 251 | 288 | 246 | 204 | a180 | 168 |
| 25 | 190 | 220 | 155 | *162 | 139 | 157 | 283 | 288 | 210 | 162 | a170 | 179 |
| 26 | 203 | 216 | 153 | 164 | 119 | 153 | 318 | 254 | 206 | 210 | a170 | 166 |
| 27 | *174 | 202 | 172 | 164 | 153 | 164 | 320 | 280 | 206 | 283 | a170 | 162 |
| 28 | 214 | 170 | 256 | 139 | 159 | 170 | 316 | 261 | 216 | *254 | a180 | 160 |
| 29 | 159 | 170 | 240 | 150 | 155 | 179 | 276 | 210 | 213 | 216 | a170 | 179 |
| 30 | 168 | 170 | 196 | 166 | ----- | 214 | 293 | 268 | 196 | 220 | 168 | 175 |
| 31 | 185 | ----- | 197 | 151 | ----- | 244 | ----- | 293 | ----- | 168 | 166 | ----- |
| Total | 5,984 | 5,663 | 5,570 | 5,098 | 4,474 | 4,876 | 9,971 | 9,338 | 6,489 | 5,845 | 5,502 | 4,915 |
| Mean | 193 | 189 | 180 | 164 | 154 | 157 | 332 | 321 | 216 | 189 | 177 | 164 |
| Cfsm | 0.865 | 0.848 | 0.807 | 0.735 | 0.691 | 0.704 | 1.49 | 1.44 | 0.969 | 0.848 | 0.794 | 0.735 |
| In. | 1.00 | 0.95 | 0.93 | 0.85 | 0.75 | 0.81 | 1.66 | 1.66 | 1.08 | 0.98 | 0.92 | 0.82 |

Calendar year 1959: Max 560 Min 83 Mean 178 Cfsm 0.798 In. 10.85
Water year 1959-60: Max 650 Min 119 Mean 203 Cfsm 0.910 In. 12.41

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and powerplant records.

1280. Sturgeon River near Wolverine, Mich.

Location--Lat 45°17'55", long 84°36'40", in SE¹/₄NE¹/₄ sec.36, T.34 N., R.3 W., on left bank 1.8 miles north of Wolverine, 2.8 miles downstream from West Branch, and 9 miles upstream from mouth.

Drainage area--170 sq mi, approximately.

Records available--April 1942 to September 1960.

Gage--Water-stage recorder. Altitude of gage is 740 ft (from topographic map). Prior to June 15, 1942, staff gage at site about 1 mile upstream at different datum. June 16, 1942, to Sept. 30, 1958, staff gage at site 0.7 mile upstream at different datum.

Average discharge--18 years, 196 cfs.

Extremes--Maximum discharge during year, 1,010 cfs Apr. 18 (gage height, 3.86 ft); minimum, 120 cfs Feb. 11, result of freezeup; minimum daily, 150 cfs Feb. 2, 11.
1942-60: Maximum discharge, that of Apr. 18, 1960; minimum, 96 cfs Aug. 13, 1959; minimum daily, 113 cfs Aug. 6, 1958, site and datum then in use.

Remarks--Records good except those for periods of ice effect which are fair. Intermittent regulation at low flows from ponds 2.4 miles upstream. Records of water temperatures for the water year 1960 are given in WSP 1741.

Revisions (water years)--WSP 1307: 1944(M), 1948(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 2.3 | 142 | 3.5 | 690 |
| 2.5 | 199 | 3.8 | 960 |
| 3.0 | 377 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|----------|--------|-----------|-----------|-------|-------|-------|
| 1 | 187 | 219 | 199 | 180 | 182 | 160 | 267 | 278 | 231 | 196 | 170 | 190 |
| 2 | 182 | 214 | 202 | 185 | 150 | 170 | 264 | 254 | 234 | 193 | 170 | 179 |
| 3 | 187 | *214 | 208 | 205 | 160 | 175 | 311 | 257 | 222 | 202 | *170 | 167 |
| 4 | 187 | 216 | 211 | 193 | 170 | 175 | 347 | 254 | 214 | 205 | 164 | 225 |
| 5 | 202 | 303 | 219 | 167 | 175 | 170 | 307 | 238 | 208 | 190 | 164 | 202 |
| 6 | 234 | 334 | 219 | 175 | 187 | 170 | 270 | 260 | *199 | 187 | 164 | 170 |
| 7 | 241 | 267 | 211 | 190 | 187 | *170 | 270 | 458 | 196 | 179 | 205 | 167 |
| 8 | *257 | 234 | 202 | 200 | *184 | 170 | 267 | 401 | 193 | 173 | 244 | 164 |
| 9 | 231 | 225 | 196 | 200 | 187 | 170 | 257 | *436 | 190 | 173 | 184 | 164 |
| 10 | 216 | 219 | 193 | 200 | 176 | 170 | 238 | 771 | 187 | 170 | 208 | 162 |
| 11 | 278 | 219 | 187 | 200 | 150 | 170 | *257 | 658 | 190 | 170 | 190 | 164 |
| 12 | 239 | 214 | 193 | 208 | 160 | 170 | 391 | 387 | 193 | *170 | 176 | 164 |
| 13 | 254 | 208 | 187 | 216 | 165 | 170 | *568 | 307 | 190 | 162 | 170 | *173 |
| 14 | 228 | 214 | *187 | 205 | 175 | 170 | *762 | 278 | 190 | 162 | 208 | 179 |
| 15 | 219 | 205 | 193 | 199 | 180 | 170 | 753 | 260 | 214 | 162 | 196 | 173 |
| 16 | 219 | 208 | 214 | 193 | 185 | 170 | 582 | 247 | 214 | 164 | 179 | 173 |
| 17 | 214 | 202 | 219 | 190 | 184 | 173 | 915 | 270 | 228 | 170 | 173 | 193 |
| 18 | 211 | 200 | 208 | *190 | 184 | 173 | 924 | 284 | 211 | 167 | 167 | 193 |
| 19 | 199 | 202 | 199 | 193 | 179 | 170 | 452 | 250 | 219 | 170 | 164 | 190 |
| 20 | 193 | 199 | 190 | 193 | 179 | 170 | 347 | 264 | 211 | 164 | 162 | 208 |
| 21 | 190 | 205 | 184 | 190 | 179 | 165 | 334 | 264 | 193 | 176 | 164 | 196 |
| 22 | 190 | 205 | 175 | 187 | 179 | 160 | 318 | 307 | 193 | 199 | 170 | 187 |
| 23 | 216 | 225 | 175 | 164 | 164 | 160 | 307 | 281 | 210 | 179 | 164 | 184 |
| 24 | 284 | 264 | 180 | 182 | 165 | 160 | 303 | 254 | 575 | 170 | 164 | 182 |
| 25 | 260 | 244 | 182 | 164 | 165 | 160 | 368 | 238 | 338 | 164 | 159 | 187 |
| 26 | 238 | 222 | 187 | 180 | 170 | 170 | 326 | 234 | 241 | 216 | 159 | 184 |
| 27 | 219 | 214 | 205 | 180 | 176 | 179 | 292 | 225 | 215 | 278 | 153 | 176 |
| 28 | 208 | 205 | 230 | 184 | 176 | 208 | 270 | 216 | 231 | 199 | 159 | 170 |
| 29 | 199 | 205 | 220 | 182 | 155 | 216 | 254 | 216 | 241 | 182 | 173 | 179 |
| 30 | 193 | 199 | 210 | 182 | ----- | 303 | 260 | 238 | 214 | 176 | 170 | 182 |
| 31 | 208 | ----- | 200 | 182 | ----- | 343 | ----- | 267 | ----- | 173 | 159 | ----- |
| Total | 6,843 | 6,704 | 6,185 | 5,899 | 5,028 | 5,630 | 11,781 | 9,552 | 6,786 | 5,641 | 5,422 | 5,427 |
| Mean | 221 | 223 | 200 | 190 | 173 | 182 | 393 | 308 | 226 | 182 | 175 | 181 |
| Cfsm | 1.30 | 1.31 | 1.18 | 1.12 | 1.02 | 1.07 | 2.31 | 1.61 | 1.33 | 1.07 | 1.03 | 1.06 |
| In. | 1.50 | 1.46 | 1.36 | 1.29 | 1.10 | 1.23 | 2.58 | 2.09 | 1.48 | 1.23 | 1.19 | 1.18 |
| Calendar year 1959: Max | 658 | | | | Min 125 | Mean 204 | | Cfsm 1.20 | In. 16.29 | | | |
| Water year 1959-60: Max | 924 | | | | Min 150 | Mean 221 | | Cfsm 1.30 | In. 17.69 | | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 18, Dec. 22-24, Dec. 28 to Jan. 2, Jan. 6-11, 26, 27, Feb. 2, 11-16, 24-26, Feb. 29 to Mar. 16, Mar. 21-26.

1285. Indian River at Indian River, Mich.

Location.--Lat 45°24'40", long 84°37'10", in NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.24, T.35 N., R.3 W., on left bank at Indian River, 500 ft downstream from Burt Lake and 2.3 miles upstream from Mullett Lake.

Drainage area.--583 sq mi.

Records available.--April 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 590.21 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Nov. 12, 1942, staff gage at site 100 ft downstream at same datum.

Average discharge.--18 years, 546 cfs.

Extremes.--Maximum daily discharge during year, 1,140 cfs May 22, 23; maximum daily gage height, 5.58 ft May 13, 14; minimum daily discharge, 400 cfs Sept. 14; minimum daily gage height, 3.48 ft Mar. 21, 26-28.

1942-60: Maximum daily discharge, that of May 22, 23, 1960; maximum daily gage height, that of May 13, 14, 1960; minimum daily discharge, 249 cfs Sept. 9, 1955.

Remarks.--Records fair.

Revisions (water years).--WSP 1437: 1942(M), 1945(M), 1947.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 552 | 596 | 640 | 624 | 608 | 573 | 556 | 990 | 1,060 | 745 | 545 | 456 |
| 2 | 538 | 596 | 644 | 616 | 604 | 566 | 566 | 985 | 1,040 | 725 | 542 | 450 |
| 3 | 538 | *573 | 648 | 616 | 600 | 562 | 575 | 995 | 1,040 | 740 | *542 | 441 |
| 4 | 534 | 596 | 656 | 616 | 600 | 559 | 584 | 990 | 1,020 | 715 | 539 | 456 |
| 5 | 538 | 616 | 660 | 632 | 600 | 556 | 600 | 985 | 1,000 | 705 | 531 | 453 |
| 6 | 538 | 628 | 672 | 628 | 612 | 552 | 600 | 1,000 | *980 | 692 | 524 | 447 |
| 7 | *531 | 612 | 668 | 628 | 616 | *552 | 600 | 1,040 | 960 | 688 | 548 | 441 |
| 8 | 531 | 612 | 656 | 628 | *612 | 552 | 610 | 1,060 | 935 | 684 | 556 | 444 |
| 9 | 528 | 620 | 656 | 624 | 612 | 548 | 610 | *1,100 | 915 | 676 | 552 | 441 |
| 10 | 528 | 612 | 648 | 620 | 632 | 545 | 620 | 1,110 | 890 | 676 | 548 | 426 |
| 11 | 542 | 616 | 640 | 620 | 652 | 542 | *630 | *1,050 | 880 | 672 | 542 | 420 |
| 12 | 556 | 616 | 620 | 620 | 636 | 534 | 656 | 1,070 | 865 | *160 | 534 | 420 |
| 13 | 552 | 620 | 620 | 624 | 632 | 531 | 668 | 1,080 | 840 | 644 | 531 | *410 |
| 14 | 542 | 628 | *610 | 620 | 628 | 524 | 710 | 1,100 | 830 | 628 | 556 | 400 |
| 15 | 542 | 608 | 620 | 620 | 620 | 524 | 740 | 1,100 | 820 | 608 | 545 | 412 |
| 16 | 538 | 600 | 620 | 612 | 616 | 520 | 780 | 1,110 | 815 | 600 | 539 | 410 |
| 17 | 534 | 600 | 620 | 608 | 616 | 520 | 850 | 1,120 | 820 | 592 | 534 | 420 |
| 18 | 531 | 592 | 620 | *608 | 616 | 517 | 900 | 1,120 | 790 | 580 | 531 | 420 |
| 19 | 517 | 592 | 616 | 616 | 612 | 517 | 905 | 1,120 | 785 | 576 | 524 | 420 |
| 20 | 517 | 580 | 608 | 612 | 608 | 514 | 910 | 1,120 | 765 | 566 | 520 | 423 |
| 21 | 504 | 588 | 604 | 608 | 608 | 507 | 910 | 1,120 | 750 | 559 | 517 | 423 |
| 22 | 501 | 588 | 600 | 604 | 604 | 514 | 905 | 1,140 | 740 | 562 | 510 | 423 |
| 23 | 510 | 592 | 592 | 604 | 596 | 510 | 895 | 1,140 | 740 | 556 | 504 | 429 |
| 24 | 542 | 616 | 584 | 600 | 592 | 517 | 885 | 1,120 | 800 | 545 | 492 | 435 |
| 25 | 566 | 624 | 584 | 600 | 592 | 510 | *875 | 1,110 | 785 | 538 | 480 | 450 |
| 26 | 570 | 624 | 584 | 604 | 588 | 507 | 895 | 1,100 | 785 | 559 | 471 | 453 |
| 27 | 570 | 628 | 592 | 608 | 580 | 510 | 940 | 1,100 | 770 | 570 | 468 | 450 |
| 28 | 570 | 632 | 628 | 608 | 576 | 510 | 960 | 1,090 | 775 | 570 | 462 | 450 |
| 29 | 580 | 632 | 628 | 608 | 576 | 517 | *970 | 1,080 | 765 | 562 | 471 | 465 |
| 30 | 588 | 640 | 628 | 608 | 531 | 531 | 980 | 1,080 | 760 | 573 | 465 | 465 |
| 31 | 592 | ----- | 628 | 608 | ----- | 548 | ----- | 1,080 | ----- | 556 | 459 | ----- |
| Total | 16,820 | 18,277 | 19,394 | 19,052 | 17,644 | 16,489 | 22,863 | 33,405 | 25,720 | 19,322 | 16,080 | 13,053 |
| Mean | 543 | 609 | 626 | 615 | 608 | 532 | 762 | 1,078 | 857 | 623 | 519 | 435 |
| Cfsm | 0.931 | 1.04 | 1.07 | 1.05 | 1.04 | 0.913 | 1.31 | 1.85 | 1.47 | 1.07 | 0.890 | 0.746 |
| In. | 1.07 | 1.16 | 1.23 | 1.21 | 1.12 | 1.05 | 1.46 | 2.13 | 1.64 | 1.23 | 1.03 | 0.83 |

Calendar year 1959: Max 1,030 Min 288 Mean 554 Cfsm 0.950 In. 12.89
 Water year 1959-60: Max 1,140 Min 400 Mean 651 Cfsm 1.12 In. 15.16

* Discharge measurement made on this day.

1290. Pigeon River near Vanderbilt, Mich.

Location.--Lat 45°10'15", long 84°26'20", in SE1/4 sec.9, T.32 N., R.1 W., on right bank at Pigeon River Fisheries Experiment Station, and 11.1 miles east of Vanderbilt.

Drainage area.--63 sq mi, approximately.

Records available.--September 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 886.24 ft above mean sea level, datum of 1929.

Average discharge.--10 years, 74.2 cfs.

Extremes.--Maximum discharge during year, 602 cfs Apr. 17 (gage height, 5.18 ft); minimum, 33 cfs July 16.

1950-60: Maximum discharge, 1,500 cfs May 15, 1957 (gage height, 6.80 ft, from floodmark), from rating curve extended above 500 cfs by logarithmic plotting, result of failure of Lansing Club Dam 3.5 miles upstream; minimum, 13 cfs Jan. 8, 1957.

Remarks.--Records good except those for periods of ice effect, which are fair. Prior to May 16, 1957, and since Apr. 22, 1958, occasional regulation by Lansing Club Dam 3.5 miles upstream. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 17-20)

Oct. 1 to Dec. 24

Dec. 25 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 2.1 | 56 | 1.8 | 41 | 4.5 | 360 |
| 3.0 | 128 | 3.0 | 144 | 5.0 | 530 |
| 4.0 | 222 | 4.0 | 248 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 67 | 73 | 79 | 82 | 83 | 73 | 147 | 107 | 86 | 55 | 60 | 67 |
| 2 | 59 | 93 | 75 | 82 | 74 | 75 | 136 | 112 | 79 | 55 | 60 | 55 |
| 3 | 61 | *69 | 84 | 88 | 70 | 76 | 124 | 95 | 90 | 58 | *60 | 59 |
| 4 | 71 | 79 | 74 | 86 | 70 | 78 | 140 | 96 | 86 | 73 | 58 | 84 |
| 5 | 75 | 119 | 94 | 76 | 70 | 75 | 146 | 85 | 75 | 60 | 58 | 78 |
| 6 | 103 | 123 | 92 | 70 | 70 | 72 | 122 | 85 | *76 | 58 | 61 | 68 |
| 7 | 127 | 103 | 82 | 73 | 70 | *70 | 102 | 137 | 75 | 62 | 71 | 55 |
| 8 | *174 | 83 | 82 | 75 | *70 | 68 | 101 | 157 | 71 | 60 | 94 | 61 |
| 9 | 107 | 73 | 79 | 75 | 70 | 68 | 106 | *144 | 71 | 58 | 62 | 62 |
| 10 | 93 | 87 | 76 | 75 | 70 | 67 | 107 | 286 | 71 | 59 | 80 | 59 |
| 11 | 99 | 70 | 77 | 75 | 86 | 66 | *108 | 262 | 71 | 59 | 73 | 55 |
| 12 | 135 | 70 | 76 | 75 | 86 | 66 | 142 | 156 | 71 | *60 | 67 | 59 |
| 13 | 99 | 72 | 74 | 75 | 71 | 66 | 124 | 113 | 71 | 59 | 67 | *62 |
| 14 | 86 | 76 | *74 | 75 | 72 | 66 | *310 | 97 | 71 | 59 | 67 | 63 |
| 15 | 78 | 75 | 76 | 75 | 74 | 66 | *296 | 96 | 67 | 57 | 67 | 63 |
| 16 | 75 | 76 | 78 | 72 | 75 | 67 | 226 | 95 | 70 | 45 | 67 | 61 |
| 17 | 78 | 75 | 94 | 70 | 76 | 68 | 426 | 96 | 90 | 59 | 60 | 66 |
| 18 | 77 | 66 | 86 | *70 | 77 | 71 | *434 | 121 | 71 | 67 | 59 | 67 |
| 19 | 64 | 76 | 83 | 70 | 77 | 73 | 149 | 119 | 75 | 75 | 57 | 63 |
| 20 | 68 | 74 | 75 | 70 | 77 | 73 | 127 | 95 | 67 | 71 | 59 | 75 |
| 21 | 72 | 74 | 73 | 70 | 76 | 73 | 156 | 96 | 63 | 59 | 59 | 73 |
| 22 | 72 | 74 | 70 | 72 | 75 | 72 | *142 | 124 | 58 | 62 | 64 | 80 |
| 23 | 82 | 84 | 70 | 73 | 74 | 71 | 128 | 101 | 56 | 64 | 61 | 71 |
| 24 | 146 | 102 | 70 | 74 | 74 | 70 | 133 | 99 | 128 | 64 | 59 | 67 |
| 25 | 125 | 106 | 71 | 75 | 74 | 70 | 132 | 93 | 104 | 62 | 59 | 67 |
| 26 | 90 | 95 | 84 | 77 | 75 | 71 | 140 | 83 | 67 | 82 | 61 | 73 |
| 27 | 94 | 81 | 86 | 80 | 76 | 77 | 117 | 82 | 62 | 156 | 61 | 71 |
| 28 | 75 | 80 | 114 | 79 | 75 | 99 | 102 | 83 | 61 | 85 | 58 | 67 |
| 29 | 66 | 78 | 111 | 79 | 70 | 97 | 110 | 79 | 86 | 65 | 58 | 67 |
| 30 | 82 | 76 | 96 | 79 | | 143 | 93 | 76 | 66 | 63 | 57 | 67 |
| 31 | 76 | | 82 | 79 | | 188 | | 61 | | 62 | 57 | |
| Total | 2,776 | 2,482 | 2,537 | 2,346 | 2,119 | 2,433 | 4,914 | 3,551 | 2,255 | 2,033 | 1,961 | 1,985 |
| Mean | 89.5 | 82.7 | 81.8 | 75.7 | 73.1 | 78.5 | 164 | 115 | 75.2 | 65.8 | 63.3 | 66.2 |
| Cfs/m | 1.42 | 1.31 | 1.30 | 1.20 | 1.16 | 1.25 | 2.60 | 1.85 | 1.19 | 1.04 | 1.00 | 1.05 |
| In. | 1.64 | 1.46 | 1.50 | 1.38 | 1.25 | 1.44 | 2.90 | 2.11 | 1.33 | 1.20 | 1.15 | 1.17 |

Calendar year 1959: Max 280

Min 37

Mean 76.1

Cfs/m 1.21

In. 16.43

Water year 1959-60: Max 434

Min 45

Mean 65.8

Cfs/m 1.36

In. 18.53

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 28, 29, Dec. 21-24, Dec. 31 to Jan. 2, Jan. 5-26, Feb. 2 to Mar. 17, Mar. 19, 21, 23-26 (no gage-height record Feb. 15-22).

1295. Pigeon River at Afton, Mich.

Location.--Lat 45°22'25", long 84°30'55", in NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.2, T.34 N., R.2 W., on right up-stream abutment of bridge on State Highway 68, 0.9 mile west of Afton, 2.2 miles down-stream from Wilkes Creek, and 7 miles upstream from Mullett Lake.

Drainage area.--159 sq mi.

Records available.--April 1942 to September 1960.

Gage.--Staff gage read twice daily. Altitude of gage is 675 ft (by barometer). Prior to Sept. 13, 1943, staff gage at site 50 ft upstream at same datum.

Average discharge.--18 years, 133 cfs.

Extremes.--Maximum discharge during year, 1,170 cfs Apr. 17 (gage height, 6.80 ft, from high-water mark); minimum, 85 cfs Sept. 12.

1942-60: Maximum discharge, that of Apr. 17, 1960; maximum gage height, about 10.5 ft Mar. 31, 1943, from floodmarks (ice jam); minimum discharge, 49 cfs Aug. 8, 1958.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Occasional regulation by Lansing Club Dam about 22 miles upstream.

Revisions (water years).--WSP 1437: 1945-46, 1950.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 3-12)

Oct. 1 to Mar. 26

Mar. 27 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-------|
| 4.4 | 88 | 4.4 | 85 | 5.5 | 396 |
| 5.0 | 229 | 4.7 | 132 | 6.0 | 620 |
| 5.5 | 404 | 5.0 | 212 | 6.8 | 1,170 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|----------|-------------|-----------|-------|-------|-------|-------|-------|
| 1 | 135 | 138 | 135 | 150 | 140 | 120 | a350 | 212 | 150 | 119 | 99 | 96 |
| 2 | 128 | 145 | 133 | 150 | 130 | 120 | 347 | 206 | 150 | 128 | 96 | 98 |
| 3 | 126 | *147 | 135 | 159 | 125 | 120 | 350 | 202 | 154 | 136 | *96 | 92 |
| 4 | 122 | 135 | 142 | 152 | 120 | 120 | 366 | 202 | 150 | 130 | 93 | 99 |
| 5 | 124 | 194 | 157 | 140 | 120 | 120 | 373 | 186 | 134 | 125 | 92 | 128 |
| 6 | 140 | 237 | 159 | 130 | 120 | 115 | 320 | 183 | *127 | 127 | 93 | 111 |
| 7 | *166 | 251 | 159 | 130 | 120 | *110 | 284 | 284 | 119 | 127 | 95 | 99 |
| 8 | 171 | a200 | 145 | 135 | *120 | 105 | 266 | 331 | 114 | 119 | 128 | 92 |
| 9 | 197 | a150 | 142 | 135 | 120 | 105 | 252 | *396 | 112 | 106 | 127 | 96 |
| 10 | 226 | a170 | 133 | 135 | 120 | 105 | 237 | 560 | 111 | 102 | 111 | 92 |
| 11 | 221 | a150 | 130 | 135 | 115 | 105 | *230 | 656 | 112 | 99 | 119 | 91 |
| 12 | 218 | a140 | 150 | 135 | 120 | 105 | 364 | 525 | 114 | *96 | 112 | 88 |
| 13 | 221 | 140 | 147 | 135 | 130 | 105 | *585 | 350 | 111 | 93 | 111 | *91 |
| 14 | 181 | 145 | *159 | 135 | 130 | 105 | *776 | 295 | 111 | 93 | 114 | 96 |
| 15 | 166 | 145 | 147 | 135 | 135 | 105 | *807 | 241 | 123 | 92 | 114 | 96 |
| 16 | 150 | 145 | 140 | 135 | 135 | 105 | 698 | 212 | 130 | 91 | 110 | 93 |
| 17 | 145 | 147 | 147 | 135 | 135 | 105 | a1,100 | 219 | 136 | 91 | 99 | 96 |
| 18 | 140 | 140 | 147 | *135 | 135 | 105 | a1,080 | 237 | 128 | 91 | 95 | 100 |
| 19 | 135 | 145 | 145 | 130 | 135 | 105 | 668 | 273 | 123 | 96 | 89 | 102 |
| 20 | 120 | 150 | 140 | 130 | 135 | 110 | 369 | 273 | 119 | 104 | 91 | 111 |
| 21 | 124 | 142 | 135 | 130 | 135 | 115 | 313 | 255 | 118 | 95 | 91 | 110 |
| 22 | 124 | 135 | 130 | 130 | 130 | 120 | 302 | 252 | 119 | 96 | 96 | 104 |
| 23 | 135 | 135 | 130 | 135 | 130 | 125 | 284 | 237 | 118 | 99 | 96 | 99 |
| 24 | 197 | 140 | 130 | 135 | 130 | 135 | 266 | 209 | 219 | 96 | 92 | 102 |
| 25 | 237 | 142 | 135 | 140 | 125 | 145 | 298 | 202 | 206 | 100 | 89 | 102 |
| 26 | 221 | 147 | 140 | 145 | 120 | 160 | *320 | 180 | 175 | 100 | 91 | 104 |
| 27 | 186 | 147 | 150 | 145 | 120 | 180 | 295 | 162 | 159 | 100 | 91 | 104 |
| 28 | 169 | 145 | 164 | 145 | 120 | 200 | 255 | 150 | 162 | 136 | 91 | 102 |
| 29 | 147 | 145 | 171 | 145 | 120 | 250 | 216 | 150 | 162 | 123 | 92 | 100 |
| 30 | 135 | 140 | 160 | 145 | ----- | 350 | 219 | 147 | 154 | 106 | 92 | 102 |
| 31 | 138 | ----- | 150 | 145 | ----- | 419 | ----- | 143 | ----- | 104 | 88 | ----- |
| Total | 5,045 | 4,632 | 4,467 | 4,296 | 3,670 | 4,394 | 12,590 | 8,130 | 4,120 | 3,320 | 3,093 | 2,896 |
| Mean | 163 | 154 | 144 | 139 | 127 | 142 | 420 | 262 | 137 | 107 | 99.8 | 99.9 |
| Cfs/m | 1.03 | 0.969 | 0.906 | 0.874 | 0.799 | 0.893 | 2.64 | 1.85 | 0.862 | 0.673 | 0.628 | 0.628 |
| In. | 1.19 | 1.08 | 1.04 | 1.01 | 0.86 | 1.03 | 2.94 | 1.90 | 0.96 | 0.78 | 0.72 | 0.70 |
| Calendar year 1959: Max | | | 724 | Min 61 | Mean 143 | Cfs/m 0.899 | In. 12.26 | | | | | |
| Water year 1959-60: Max | | | 1,100 | Min 88 | Mean 166 | Cfs/m 1.04 | In. 14.21 | | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

Note.--Stage-discharge relation affected by ice Nov. 18, 19, 28-30, Dec. 20-27, Dec. 30 to Mar. 29.

1300. Cheboygan River near Cheboygan, Mich.

Location.--Lat 45°34'40", long 84°29'15", in SW¼ sec.19, T.37 N., R.1 W., 300 ft downstream from Mullett Lake, 2½ miles upstream from Black River, and 5 miles south of Cheboygan.

Drainage area.--865 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for October 1942, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 591.21 ft above mean sea level, datum of 1929. Auxiliary staff gage at Cheboygan 5.2 miles (revised) downstream read hourly. Datum of auxiliary gage is 590.00 ft above mean sea level, datum of 1929.

Average discharge.--18 years, 774 cfs.

Extremes.--Maximum daily discharge during year, 1,560 cfs May 13, 14; maximum daily gage height, 3.27 ft May 13, 14; minimum daily discharge, 242 cfs Aug. 21; minimum daily gage height, 1.32 ft Mar. 28, 29.
1942-60: Maximum daily discharge, 1,640 cfs May 8, 1959; maximum daily gage height, that of May 13, 14, 1960; minimum daily discharge, 90 cfs Mar. 29, 30, 1958; minimum daily gage height, 1.12 ft Dec. 29, 1952.

Remarks.--Records fair except those for periods of ice effect, indefinite stage-discharge relation, or no gage-height record, which are poor. Flow affected by variable backwater from powerplant at Cheboygan 5.2 miles below station and by Alverno powerplant.

Cooperation.--Auxiliary gage readings furnished by Consumers Power Co.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|----------|--------|------------|-----------|--------|--------|--------|
| 1 | 879 | 801 | 1,020 | 1,000 | 875 | b700 | 788 | 1,410 | 1,390 | 1,130 | 701 | 623 |
| 2 | 825 | 981 | 1,020 | 1,100 | 906 | 766 | 768 | 1,420 | 1,340 | 1,110 | *581 | 630 |
| 3 | 575 | 1,110 | 1,000 | 1,100 | 873 | 742 | 829 | 1,420 | 1,320 | 780 | 591 | 645 |
| 4 | e550 | 1,020 | 997 | 1,050 | 844 | 748 | 911 | 1,400 | 1,250 | 742 | 614 | 641 |
| 5 | 584 | *1,100 | 799 | 1,000 | 826 | 783 | 936 | 1,360 | 1,300 | 779 | 511 | 664 |
| 6 | *579 | 1,100 | 653 | 920 | 870 | 737 | 924 | 1,370 | 1,250 | 721 | 356 | 599 |
| 7 | 605 | 1,110 | 927 | 980 | 802 | 752 | 942 | 1,380 | *1,130 | 774 | 543 | 523 |
| 8 | 679 | 1,100 | 939 | 940 | 864 | *733 | 955 | 1,390 | 1,130 | 753 | 726 | 562 |
| 9 | 807 | 1,090 | 930 | 900 | *831 | 696 | 955 | 1,410 | 1,090 | 746 | 649 | 549 |
| 10 | 667 | 1,080 | 932 | 910 | b810 | 751 | 945 | *1,470 | 1,090 | 724 | 596 | 295 |
| 11 | 789 | 1,080 | 930 | 950 | b800 | 729 | 928 | 1,530 | 1,090 | 693 | 617 | 338 |
| 12 | 1,070 | 1,080 | 980 | 950 | b800 | 723 | 897 | 1,550 | 1,100 | 656 | 633 | 387 |
| 13 | 1,010 | 1,090 | 771 | 940 | b820 | 724 | 901 | 1,560 | 1,090 | *675 | 601 | 387 |
| 14 | 795 | 1,090 | 891 | 1,000 | b800 | 709 | 881 | 1,560 | 1,020 | 663 | 715 | *412 |
| 15 | 894 | 1,050 | *1,010 | 1,000 | b780 | 727 | 961 | 1,550 | 1,010 | 636 | 694 | 516 |
| 16 | 990 | 1,000 | 991 | 1,000 | 876 | 749 | 1,080 | 1,540 | 1,070 | 515 | 646 | 530 |
| 17 | 986 | 920 | 979 | 920 | 858 | 757 | 1,240 | 1,540 | 1,120 | 425 | 623 | 504 |
| 18 | 959 | 850 | 996 | 920 | 840 | 759 | 1,330 | 1,540 | 1,100 | 563 | 566 | 368 |
| 19 | 816 | 860 | 841 | *1,000 | 866 | 756 | 1,350 | 1,530 | 1,090 | 573 | 620 | 421 |
| 20 | 862 | 1,000 | 716 | 1,000 | 878 | 747 | 1,350 | 1,540 | 1,040 | 559 | 289 | 579 |
| 21 | 840 | 952 | 973 | 1,000 | 842 | 739 | 1,360 | 1,540 | 1,040 | 575 | 242 | 537 |
| 22 | 800 | 880 | 900 | 920 | 863 | 752 | 1,370 | 1,550 | 1,050 | 668 | 578 | 601 |
| 23 | 935 | 924 | 760 | 760 | 839 | 747 | 1,380 | 1,540 | 1,060 | 617 | e450 | 650 |
| 24 | 1,000 | 965 | 820 | 800 | 824 | 747 | 1,390 | 1,530 | 1,160 | 410 | e430 | 601 |
| 25 | 1,080 | 982 | 800 | 850 | 834 | 732 | 1,390 | 1,520 | 1,140 | 588 | 399 | 560 |
| 26 | 923 | 952 | 850 | 880 | 823 | 729 | *1,420 | 1,490 | 1,160 | 692 | 489 | 636 |
| 27 | e650 | 973 | 800 | 895 | 799 | 723 | 1,430 | 1,440 | 1,120 | 717 | 420 | 672 |
| 28 | e800 | 955 | 820 | 874 | 667 | 735 | 1,420 | 1,430 | 1,150 | 663 | e320 | 590 |
| 29 | 987 | 956 | 748 | 901 | b630 | 705 | 1,420 | 1,430 | 1,140 | 736 | e500 | 592 |
| 30 | 1,060 | 1,010 | 1,000 | 868 | ----- | 775 | 1,420 | 1,420 | 1,120 | 753 | e500 | 603 |
| 31 | 1,000 | ----- | 1,050 | 852 | ----- | 756 | ----- | 1,410 | ----- | 490 | e520 | ----- |
| Total | 25,995 | 30,161 | 27,643 | 29,180 | 23,980 | 22,908 | 33,871 | 45,770 | 34,160 | 21,126 | 16,719 | 16,215 |
| Mean | 838 | 1,005 | 882 | 941 | 827 | 739 | 1,129 | 1,476 | 1,139 | 691 | 539 | 540 |
| Cfsm | 0.970 | 1.16 | 1.03 | 1.09 | 0.956 | 0.864 | 1.31 | 1.71 | 1.32 | 0.787 | 0.623 | 0.624 |
| In. | 1.12 | 1.29 | 1.19 | 1.26 | 1.03 | 0.98 | 1.46 | 1.97 | 1.47 | 0.91 | 0.72 | 0.70 |
| Calendar year 1959: Max | 1,640 | | | Min 150 | | Mean 864 | | Cfsm 0.999 | In. 13.55 | | | |
| Water year 1959-60: Max | 1,560 | | | Min 242 | | Mean 895 | | Cfsm 1.03 | In. 14.10 | | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

e Stage-discharge relation indefinite; discharge computed on basis of weather records and records of powerplant operation at Cheboygan and Alverno.

Note.--No gage-height record Oct. 21, 22, Nov. 15-20, Dec. 22-28, Dec. 31 to Jan. 26; discharge estimated on basis of weather records and records of powerplant operation at Cheboygan and Alverno.

1305. Black River near Tower, Mich.

Location.--Lat 45°23'35", long 84°20'00", in SE 1/4 sec. 29, T. 35 N., R. 1 E., on right bank 400 ft downstream from Kleber Dam, 1,000 ft upstream from Milligan Creek, 3.0 miles northwest of Tower, and 10.8 miles upstream from Black Lake.

Drainage area.--313 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for October 1942, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 658.00 ft above mean sea level (Stanley Engineering Co. bench mark). Prior to Aug. 1, 1949, at site 1 mile upstream at different datum.

Average discharge.--18 years, 248 cfs.

Extremes.--Maximum discharge during year, 2,340 cfs Apr. 17 (gage height, 7.13 ft); minimum, 9.5 cfs July 25; minimum daily, 115 cfs Feb. 11, Sept. 11.
1942-60: Maximum discharge, that of Apr. 17, 1960; minimum, 0.6 cfs Mar. 11, 1950; minimum daily, 4.0 cfs Nov. 27, 1949.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow regulated by powerplants at Tower and Kleber Dams.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Apr. 19 | | | | Apr. 20 to Aug. 9 | | Aug. 10 to Sept. 30 | |
|-------------------|-----|-----|-------|-------------------|-------|---------------------|-----|
| 2.2 | 108 | 5.0 | 1,020 | 2.1 | 120 | 2.1 | 114 |
| 3.0 | 270 | 6.0 | 1,540 | 3.0 | 330 | 3.0 | 330 |
| 3.5 | 402 | 7.0 | 2,240 | 4.0 | 690 | | |
| | | | | 6.0 | 1,650 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 295 | 218 | 279 | 280 | 237 | 206 | 497 | 554 | 289 | 287 | 200 | 172 |
| 2 | 256 | 285 | 259 | 250 | 184 | 198 | 586 | 452 | 332 | 227 | 204 | 200 |
| 3 | 206 | 316 | 218 | 270 | 145 | 181 | 722 | 311 | 333 | 210 | 200 | 173 |
| 4 | 213 | *316 | 284 | 250 | 185 | 220 | 698 | 435 | 300 | 250 | *166 | 150 |
| 5 | 223 | 324 | 272 | 280 | 225 | 210 | 764 | 506 | 266 | 270 | 186 | 237 |
| 6 | 241 | 382 | 306 | 200 | 230 | 188 | 722 | 371 | 298 | 200 | 171 | 205 |
| 7 | *231 | 434 | 312 | 150 | 242 | 204 | 662 | 520 | *269 | 250 | 174 | 195 |
| 8 | 277 | 429 | 311 | 210 | 221 | 194 | 682 | 530 | *258 | 200 | 221 | 136 |
| 9 | 356 | 374 | 310 | 210 | 226 | *177 | 618 | 658 | 248 | 200 | 257 | 198 |
| 10 | 369 | 385 | 202 | 210 | *243 | 194 | 527 | 1,090 | 252 | 170 | 218 | 191 |
| 11 | 394 | 307 | 214 | 240 | 115 | 131 | 482 | *1,210 | 227 | 210 | 202 | 115 |
| 12 | 386 | 294 | 298 | 280 | 146 | 194 | 570 | 1,120 | 176 | 180 | 187 | 152 |
| 13 | 431 | 263 | 245 | 310 | 209 | 198 | *866 | 1,080 | 244 | *160 | 211 | 180 |
| 14 | 340 | 298 | 240 | 300 | 271 | 195 | 1,230 | 858 | 194 | *167 | 136 | 160 |
| 15 | 351 | 211 | 271 | 320 | 260 | 199 | *1,320 | 564 | 259 | 162 | 191 | *132 |
| 16 | 340 | 252 | *267 | 300 | 237 | 192 | 1,450 | 660 | 279 | 216 | 203 | 165 |
| 17 | 291 | 247 | 255 | 280 | 258 | 178 | 1,860 | 579 | 332 | 137 | 163 | 208 |
| 18 | 262 | 205 | 275 | 260 | 245 | 224 | *1,750 | 530 | 333 | 187 | 165 | 168 |
| 19 | 260 | 259 | 319 | 250 | 265 | 209 | 1,580 | 526 | 301 | 201 | 155 | 227 |
| 20 | 230 | 269 | 226 | *200 | 267 | 167 | 1,400 | 526 | 345 | 199 | 146 | 134 |
| 21 | 241 | 298 | 188 | 243 | 165 | 233 | *945 | 558 | 295 | 174 | 150 | 214 |
| 22 | 235 | 328 | 170 | 256 | 204 | 209 | 790 | 618 | 177 | 202 | 140 | 193 |
| 23 | 254 | 298 | 192 | 239 | 213 | 214 | 815 | 618 | 252 | 175 | 203 | 161 |
| 24 | 289 | 282 | 195 | 246 | 197 | 213 | 749 | 602 | 357 | 187 | 199 | 168 |
| 25 | 368 | 361 | 222 | 226 | 213 | 181 | *729 | 562 | 495 | *169 | 134 | 203 |
| 26 | 445 | 354 | 259 | 234 | 205 | 174 | 802 | 526 | 495 | 217 | 127 | 180 |
| 27 | 456 | 347 | 307 | 205 | 160 | 242 | 718 | 442 | 368 | 278 | 152 | 172 |
| 28 | 341 | 319 | 340 | 210 | 244 | 261 | 618 | 307 | 267 | 323 | 154 | 165 |
| 29 | 354 | 297 | 279 | 219 | 215 | 310 | 662 | 325 | 315 | 312 | 157 | 177 |
| 30 | 334 | 286 | 239 | 259 | 227 | 468 | 638 | 368 | 338 | 246 | 151 | 184 |
| 31 | 286 | ----- | 300 | 227 | ----- | 447 | ----- | 419 | ----- | 195 | 159 | ----- |
| Total | 9,555 | 9,238 | 8,054 | 7,594 | 6,227 | 6,811 | 26,462 | 18,425 | 8,894 | 6,561 | 5,482 | 5,353 |
| Mean | 308 | 308 | 260 | 245 | 215 | 220 | 882 | 594 | 296 | 212 | 177 | 178 |
| Cfs/m | 0.984 | 0.984 | 0.831 | 0.783 | 0.687 | 0.703 | 2.82 | 1.90 | 0.946 | 0.677 | 0.565 | 0.569 |
| In. | 1.13 | 1.10 | 0.96 | 0.90 | 0.74 | 0.81 | 3.15 | 2.19 | 1.06 | 0.78 | 0.65 | 0.63 |

Calendar year 1959: Max 1,200 Min 79 Mean 271 Cfs/m 0.866 In. 11.72
Water year 1959-60: Max 1,860 Min 115 Mean 324 Cfs/m 1.04 In. 14.10

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 1-20, July 3-13; discharge estimated on basis of weather records and powerplant operation at Kleber Dam.

1315. Rainy River near Ocqueoc, Mich.

Location.--Lat 45°24'30", long 84°10'45", in NE¼NW¼ sec.22, T.35 N., R.2 E., on upstream side of highway bridge, 4.4 miles west of Ocqueoc and 5 miles upstream from Black Lake.

Drainage area.--85 sq mi, approximately.

Records available.--October 1952 to September 1960.

Gage.--Wire-weight gage read once daily. Datum of gage is 674.85 ft above mean sea level, unadjusted.

Average discharge.--8 years, 35.9 cfs.

Extremes.--Maximum discharge during year, 946 cfs Apr. 18 (gage height, 6.33 ft, from floodmark); minimum daily, 2.1 cfs Aug. 26.

1952-60: Maximum discharge, that of Apr. 18, 1960; minimum, 0.4 cfs Sept. 7, 1955.

Remarks.--Records fair except those for periods of ice effect or no gage-height record and those below 10 cfs, which are poor.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.3 | 0.6 | 3.0 | 140 |
| 1.5 | 4.6 | 4.0 | 322 |
| 1.7 | 11 | 5.0 | 560 |
| 2.0 | 29 | 6.4 | 970 |
| 2.5 | 77 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 12 | 58 | 59 | 45 | 28 | 25 | 130 | 150 | 53 | 29 | 12 | 2.5 |
| 2 | 12 | 58 | 58 | 42 | 28 | 24 | 180 | 150 | 47 | 29 | 9.2 | 2.7 |
| 3 | 11 | 58 | 59 | 41 | 28 | 24 | 208 | 145 | 44 | 28 | 11 | 2.9 |
| 4 | 11 | *58 | 61 | 40 | 28 | 24 | 237 | 140 | 40 | 28 | 8.1 | 2.9 |
| 5 | 12 | 58 | 68 | 39 | 28 | 24 | 266 | 140 | 35 | 28 | 6.4 | 2.9 |
| 6 | *11 | 58 | 77 | 38 | 28 | 24 | 280 | 140 | 32 | 25 | 6.4 | 2.9 |
| 7 | 20 | 58 | 78 | 37 | 28 | 24 | 284 | 180 | 29 | 22 | 6.4 | 2.9 |
| 8 | 21 | 64 | 70 | 36 | 28 | 24 | 284 | 210 | *27 | 20 | 6.8 | 3.3 |
| 9 | 21 | 68 | 68 | 35 | 28 | *24 | 284 | 300 | 30 | 17 | 6.4 | 3.5 |
| 10 | 24 | 75 | 65 | 35 | *28 | 24 | 284 | *430 | 31 | 15 | 6.2 | 3.7 |
| 11 | 26 | 70 | 65 | 35 | 28 | 24 | 286 | 550 | 35 | 13 | 6.4 | 3.7 |
| 12 | 28 | 43 | 64 | 35 | 28 | 24 | 307 | 450 | 31 | 12 | 6.4 | 3.9 |
| 13 | 30 | 48 | 64 | 35 | 28 | 24 | *515 | 330 | 29 | *10 | 6.8 | 4.1 |
| 14 | 34 | 50 | 63 | 34 | 28 | 24 | 600 | 230 | 28 | 10 | 6.8 | *3.9 |
| 15 | 35 | 47 | 63 | 34 | 27 | 24 | 650 | 170 | 28 | 8.5 | 6.2 | 4.8 |
| 16 | 34 | 45 | *62 | 34 | 27 | 24 | 550 | 159 | 28 | 8.1 | 5.3 | 4.8 |
| 17 | 31 | 44 | 63 | 33 | 27 | 25 | 800 | 137 | 28 | 6.8 | 5.1 | 4.8 |
| 18 | 30 | 43 | 63 | 33 | 27 | 25 | *900 | 136 | 27 | 5.6 | 4.8 | 4.6 |
| 19 | 28 | 42 | 60 | 33 | 27 | 25 | 650 | 133 | 27 | 5.9 | 4.3 | 4.8 |
| 20 | 27 | 40 | 60 | *32 | 26 | 25 | 300 | 129 | 27 | 5.9 | 3.7 | 5.1 |
| 21 | 27 | 40 | 58 | 32 | 28 | 26 | *250 | 126 | 28 | 6.4 | 3.5 | 5.1 |
| 22 | 28 | 39 | 57 | 32 | 26 | 26 | 230 | 122 | 28 | 8.1 | 3.3 | 5.1 |
| 23 | 28 | 39 | 56 | 31 | 26 | 26 | 210 | 119 | 35 | 9.0 | 3.1 | 5.3 |
| 24 | 30 | 41 | 54 | 31 | 25 | 27 | 200 | 118 | 37 | 9.6 | 2.7 | 5.6 |
| 25 | 33 | 45 | 51 | 31 | 25 | 29 | 210 | 116 | 39 | 11 | 2.7 | 5.6 |
| 26 | 35 | 50 | 50 | 30 | 25 | 31 | 230 | 112 | 39 | 16 | 2.1 | 5.6 |
| 27 | 40 | 55 | 52 | 30 | 25 | 35 | 210 | 108 | 37 | 21 | 2.5 | 5.6 |
| 28 | 50 | 62 | 54 | 29 | 25 | 45 | 180 | 104 | 37 | 18 | 2.3 | 5.9 |
| 29 | 60 | 61 | 54 | 29 | 25 | 60 | 160 | 75 | 35 | 18 | 2.5 | 5.9 |
| 30 | 60 | 60 | 52 | 29 | 25 | 85 | 150 | 66 | 31 | 16 | 2.5 | 5.6 |
| 31 | 59 | ----- | 50 | 28 | ----- | 105 | ----- | 61 | ----- | 14 | 2.5 | ----- |
| Total | 908 | 1,577 | 1,878 | 1,058 | 781 | 980 | 10,005 | 5,516 | 1,000 | 469.9 | 164.4 | 129.8 |
| Mean | 29.3 | 52.6 | 60.6 | 34.1 | 26.9 | 31.6 | 334 | 178 | 33.3 | 15.2 | 5.30 | 4.33 |
| Cfsm | 0.345 | 0.619 | 0.713 | 0.401 | 0.316 | 0.372 | 3.93 | 2.09 | 0.392 | 0.179 | 0.062 | 0.051 |
| In. | 0.40 | 0.89 | 0.82 | 0.46 | 0.34 | 0.43 | 4.38 | 2.41 | 0.44 | 0.21 | 0.07 | 0.06 |

Calendar year 1959: Max 477 Min 0.8 Mean 50.1 Cfsm 0.589 In. 8.00
 Water year 1959-60: Max 900 Min 2.1 Mean 66.8 Cfsm 0.786 In. 10.7

Peak discharge (base, 110 cfs).--Apr. 18 (time unknown) 946 cfs (6.33 ft); May 10 (time unknown) about 600 cfs.

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-27, Dec. 8-14, Dec. 19 to Apr. 2. No gage-height record Oct. 28, Apr. 14 to May 14, June 6, 7, July 23, Sept. 9; discharge estimated on basis of weather records and records for stations on nearby streams.

1320. Black River near Cheboygan, Mich.

Location.--Lat 45°30'00", long 84°19'35", in NW $\frac{1}{4}$ sec. 21, T.36 N., R.1 E., on left bank 0.3 mile downstream from Black Lake, 5.3 miles upstream from Alverno Dam, and 12.6 miles southeast of Cheboygan.

Drainage area.--597 sq mi.

Records available.--October 1942 to September 1960. Monthly discharge only for October 1942, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 609.26 ft above mean sea level, datum of 1929. Auxiliary water-stage recorder 3 miles downstream at same datum.

Average discharge.--18 years, 424 cfs.

Extremes.--Maximum daily discharge during year, 2,500 cfs Apr. 20; maximum daily gage height, 5.74 ft Apr. 20; minimum daily discharge, 40 cfs Aug. 28; minimum daily gage height, 1.77 ft Mar. 27, 28.
1942-60: Maximum daily discharge, that of Apr. 20, 1960; maximum daily gage height, that of Apr. 20, 1960; minimum daily discharge, 11 cfs Aug. 14, 1949; minimum daily gage height, 1.60 ft Sept. 2, 1947.

Remarks.--Records fair except those for periods of ice effect, indefinite stage-discharge relation or no gage-height record, which are poor. Flow regulated by powerplant at Alverno Dam.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 1,070 | e150 | 724 | 700 | b450 | 400 | 451 | 1,850 | 706 | 657 | e190 | 174 |
| 2 | 905 | 485 | 749 | 700 | b480 | 350 | 547 | 1,790 | 710 | 527 | *e320 | 350 |
| 3 | 258 | 706 | 755 | 700 | b500 | 320 | 596 | 1,710 | 579 | 361 | e300 | 450 |
| 4 | 293 | *744 | 749 | 650 | b450 | 370 | 677 | 1,610 | 395 | 305 | e150 | 500 |
| 5 | 255 | 717 | 500 | 550 | 387 | 330 | 779 | 1,510 | e320 | 339 | e200 | 300 |
| 6 | *141 | 782 | 60 | 500 | 360 | 331 | 853 | 1,440 | e450 | e300 | e170 | 500 |
| 7 | e260 | 800 | 300 | 500 | 256 | 330 | 963 | 1,400 | e430 | e200 | e70 | 250 |
| 8 | e270 | 900 | 500 | 500 | 419 | *350 | 1,100 | 1,420 | e410 | 321 | e200 | 200 |
| 9 | 287 | 900 | 350 | 480 | *548 | 330 | 1,150 | 1,410 | e450 | 310 | e220 | 300 |
| 10 | e200 | 900 | 500 | 470 | 484 | 340 | 1,150 | *1,570 | e500 | 300 | e170 | 150 |
| 11 | 188 | 894 | 550 | 480 | b350 | 350 | 1,100 | 1,770 | e200 | 280 | 340 | 50 |
| 12 | 814 | 850 | 700 | 550 | b350 | 340 | *1,200 | 1,940 | e100 | 200 | 336 | 110 |
| 13 | 1,000 | 750 | 110 | 520 | b500 | 330 | 1,400 | 1,970 | 278 | *200 | 341 | 120 |
| 14 | 98 | 700 | 250 | 500 | b450 | 330 | 1,500 | 1,970 | 292 | 186 | e250 | *120 |
| 15 | 502 | 700 | *660 | 650 | b400 | 330 | 1,700 | 1,940 | 187 | 213 | e150 | 200 |
| 16 | 508 | 700 | 660 | 640 | 538 | 340 | 1,800 | 1,850 | 310 | 176 | 202 | 200 |
| 17 | e350 | b640 | 660 | 600 | 464 | 320 | 2,000 | 1,790 | 315 | e45 | 196 | 170 |
| 18 | 223 | b500 | 660 | 500 | 512 | 260 | 2,200 | 1,770 | 329 | e200 | 200 | 45 |
| 19 | 418 | b600 | 600 | *650 | 595 | 230 | 2,400 | 1,680 | 234 | e140 | 200 | 130 |
| 20 | 502 | b600 | 50 | 650 | 578 | 320 | 2,500 | 1,640 | e200 | 85 | 185 | 180 |
| 21 | 282 | b600 | 250 | 620 | 388 | 340 | 2,450 | 1,690 | 252 | 93 | e110 | e300 |
| 22 | 429 | 289 | 550 | 586 | 528 | 356 | 2,400 | 1,510 | 260 | 128 | 146 | 167 |
| 23 | 521 | 386 | 300 | 310 | 433 | 308 | 2,350 | 1,480 | 425 | 130 | e190 | 294 |
| 24 | 717 | 463 | 450 | 260 | 479 | 330 | 2,250 | 1,400 | 447 | e60 | 115 | 474 |
| 25 | 696 | 708 | 150 | 493 | b450 | 357 | *2,200 | 1,370 | 659 | 118 | 71 | e210 |
| 26 | 724 | 544 | 250 | 520 | b400 | 318 | 2,180 | 1,340 | 582 | 132 | 322 | e400 |
| 27 | 738 | b350 | 350 | 432 | 353 | 331 | 2,140 | 1,300 | 413 | 360 | 76 | e350 |
| 28 | 724 | 756 | 250 | 404 | 214 | 306 | 2,060 | 1,230 | 658 | 336 | e40 | e300 |
| 29 | 713 | 738 | 500 | 534 | 186 | 319 | 1,980 | 1,120 | 671 | 330 | e120 | e250 |
| 30 | 717 | 742 | 600 | 529 | ----- | 428 | 1,920 | 1,040 | 670 | 362 | e140 | e200 |
| 31 | 648 | ----- | 680 | 312 | ----- | 412 | ----- | 984 | ----- | e100 | e140 | ----- |
| Total | 15,431 | 19,614 | 14,417 | 16,490 | 12,502 | 10,406 | 47,976 | 48,494 | 12,432 | 7,514 | 5,860 | 7,444 |
| Mean | 498 | 654 | 465 | 532 | 431 | 336 | 1,599 | 1,564 | 414 | 242 | 189 | 248 |
| Cfsm | 0.634 | 1.10 | 0.779 | 0.891 | 0.722 | 0.563 | 2.68 | 2.62 | 0.693 | 0.405 | 0.317 | 0.415 |
| In. | 0.96 | 1.23 | 0.90 | 1.03 | 0.78 | 0.65 | 2.99 | 3.02 | 0.77 | 0.47 | 0.37 | 0.46 |

Calendar year 1959: Max 1,840 Min 16 Mean 507 Cfsm 0.649 In. 11.55
 Water year 1959-60: Max 2,500 Min 40 Mean 597 Cfsm 1.00 In. 13.63

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

c Stage-discharge relation indefinite; discharge estimated on basis of weather records and records of powerplant operation at Alverno Dam and at Cheboygan.

Note.--No gage-height record Nov. 7-10, 12-16, Dec. 5 to Jan. 21, Mar. 1-5, 7-21, Apr. 6-22, July 9-13, Sept. 2-20; discharge estimated on basis of weather records and records of powerplant operation at Alverno Dam and at Cheboygan.

1325. Thunder Bay River near Hillman, Mich.

Location.--Lat 45°00'30", long 83°58'20", in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.8, T.30 N., R.4 E., on left bank 25 ft upstream from bridge on State Highway 32, 0.4 mile downstream from Miller Creek, and 5.2 miles southwest of Hillman.

Drainage area.--232 sq mi.

Records available.--June 1945 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 760 ft (by barometer).

Average discharge.--15 years, 207 cfs.

Extremes.--Maximum discharge during year, 1,270 cfs May 10 (gage height, 8.72 ft); minimum daily, 150 cfs Mar. 10-25.
1945-60: Maximum discharge, 1,380 cfs Apr. 12, 1947 (gage height, 8.86 ft); minimum daily, 98 cfs Aug. 7, 1949.

Remarks.--Records good except those for periods of ice effect, which are fair. Prior to May 12, 1950, diurnal fluctuation below about 500 cfs by powerplant at Atlanta. Occasional regulation by dam at Atlanta thereafter.

Revisions (water years).--WSP 1307: 1946(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 16 to May 10)

| | | | |
|-----|-----|-----|-------|
| 4.7 | 150 | 7.0 | 508 |
| 5.0 | 174 | 8.0 | 870 |
| 6.0 | 313 | 8.9 | 1,380 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 177 | 225 | 204 | 190 | 165 | *155 | 555 | 353 | *344 | 214 | *172 | *158 |
| 2 | 168 | *216 | *202 | 180 | 165 | 155 | 490 | *322 | 339 | 202 | 168 | 160 |
| 3 | 166 | 209 | 206 | 175 | 165 | 160 | 499 | 330 | 344 | 209 | 164 | 157 |
| 4 | 163 | 209 | 214 | 170 | *165 | 160 | *586 | 325 | 296 | 214 | 158 | 177 |
| 5 | *169 | 310 | 229 | 165 | 165 | 160 | 558 | 296 | 261 | 200 | 156 | 180 |
| 6 | 214 | 353 | 272 | 165 | 160 | 160 | 496 | 280 | 244 | *193 | 156 | 172 |
| 7 | 261 | 322 | 264 | *165 | 160 | 155 | 483 | 300 | 230 | 188 | 170 | 164 |
| 8 | 293 | 282 | 248 | 165 | 160 | 166 | 462 | 323 | 218 | 182 | 188 | 161 |
| 9 | 266 | 254 | 232 | 165 | 160 | 155 | 428 | 391 | 210 | 175 | 177 | 162 |
| 10 | 229 | 242 | 205 | 165 | 160 | 150 | 391 | 997 | 201 | 172 | 189 | 156 |
| 11 | 226 | 230 | 200 | 170 | 160 | 150 | 396 | 955 | 199 | 168 | 179 | 154 |
| 12 | 223 | 219 | 200 | 175 | 155 | 150 | 492 | 665 | 202 | 168 | 168 | 156 |
| 13 | 210 | 210 | 200 | 180 | 155 | 150 | 763 | 528 | 196 | 166 | 162 | 165 |
| 14 | 198 | 205 | 200 | 180 | 155 | 150 | 986 | 458 | 191 | 164 | 163 | 169 |
| 15 | 189 | 200 | 201 | 180 | 160 | 150 | 976 | 418 | 328 | 166 | 169 | 165 |
| 16 | 182 | 200 | 216 | 180 | 160 | 150 | 785 | 379 | 322 | 164 | 164 | 163 |
| 17 | 179 | 200 | 229 | 180 | 160 | 150 | 808 | 391 | 398 | 164 | 161 | 164 |
| 18 | 175 | 200 | 223 | 175 | 155 | 150 | 851 | 492 | 410 | 168 | 158 | 172 |
| 19 | 170 | 200 | 205 | 175 | 155 | 150 | 641 | 444 | 362 | 173 | 154 | 178 |
| 20 | 169 | 200 | 200 | 175 | 155 | 150 | 516 | 428 | 325 | 172 | 152 | 220 |
| 21 | 167 | 201 | 200 | 170 | 155 | 150 | 454 | 428 | 275 | 168 | 172 | 199 |
| 22 | 168 | 201 | 200 | 170 | 155 | 150 | 412 | 426 | 251 | 178 | 204 | 189 |
| 23 | 227 | 215 | 195 | 170 | 155 | 150 | 377 | 460 | 248 | 173 | 187 | 185 |
| 24 | 368 | 269 | 195 | 170 | 155 | 150 | 353 | 424 | 337 | 167 | 178 | 179 |
| 25 | 381 | 277 | 195 | 170 | 155 | 150 | 454 | 379 | 370 | 162 | 168 | 174 |
| 26 | 339 | 240 | 201 | 170 | 155 | 160 | 503 | 343 | 315 | 192 | 163 | 171 |
| 27 | 291 | 220 | 199 | 170 | 155 | 200 | 477 | 313 | 267 | 381 | 159 | 167 |
| 28 | 251 | 215 | 240 | 170 | 155 | 250 | 420 | 293 | 253 | 294 | 156 | 164 |
| 29 | 226 | 210 | 270 | 170 | 155 | 300 | 376 | 283 | 269 | 234 | 156 | 164 |
| 30 | 211 | 211 | 230 | 165 | ----- | 369 | 348 | 275 | 233 | 200 | 156 | 168 |
| 31 | 215 | ----- | 210 | 165 | ----- | 624 | ----- | 383 | ----- | 187 | 154 | ----- |
| Total | 6,871 | 6,945 | 6,685 | 5,335 | 4,590 | 5,718 | 16,336 | 13,082 | 8,438 | 5,958 | 5,181 | 5,113 |
| Mean | 222 | 232 | 216 | 172 | 158 | 184 | 545 | 422 | 281 | 192 | 167 | 170 |
| Cfsm | 0.957 | 1.00 | 0.931 | 0.741 | 0.681 | 0.793 | 2.35 | 1.82 | 1.21 | 0.828 | 0.720 | 0.733 |
| In. | 1.10 | 1.12 | 1.07 | 0.85 | 0.73 | 0.91 | 2.62 | 2.10 | 1.35 | 0.95 | 0.83 | 0.82 |

Calendar year 1959: Max 935 Min 121 Mean 214 Cfsm 0.922 In. 12.48
Water year 1959-60: Max 997 Min 150 Mean 247 Cfsm 1.06 In. 14.45

Peak discharge (base, 600 cfs).--Mar. 31 (9 to 11 a.m.) 662 cfs (7.51 ft); Apr. 15 (12:30 a.m.) 1,070 cfs (8.41 ft); Apr. 18 (2 a.m.) 940 cfs (8.41 ft); May 10 (7 p.m.) 1,270 cfs (8.72 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 14-16, 18-20, 26-29, Dec. 10-14, 19-25, Dec. 28 to Mar. 29.

1335. Thunder Bay River near Bolton, Mich.

Location.--Lat 45°07'40", long 83°38'30", in NE¹ sec. 36, T.32 N., R.6 E., on left bank half a mile upstream from Orchard Hill Bridge, 4 miles upstream from North Branch Thunder Bay River, 5 miles southwest of Bolton, and 11 miles northwest of Alpena.

Drainage area.--588 sq mi.

Records available.--March 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 671.96 ft above mean sea level, unadjusted. Prior to Aug. 12, 1945, staff gage at site 500 ft downstream at different datum.

Average discharge.--15 years, 436 cfs.

Extremes.--Maximum discharge during year, 2,840 cfs May 11 (gage height, 8.48 ft); minimum, 153 cfs Sept. 8.
1945-60: Maximum discharge (revised), 3,350 cfs Apr. 7, 1959 (gage height, 9.12 ft); minimum, 92 cfs Sept. 28, 29, 1955.

Revisions.--The maximum discharge for the water year 1947 has been revised to 3,250 cfs Apr. 12, 1947 (gage height, 9.00 ft), superseding figures published in WSP 1307.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diurnal fluctuation caused by powerplant at Hillman and regulation by Fletcher Pond on the Upper South Branch Thunder Bay River (usable capacity, 40,170 acre-ft).

Revisions (water years).--WSP 1437: 1946.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 3.2 | 202 | 5.0 | 780 |
| 3.5 | 260 | 8.0 | 2,500 |
| 4.0 | 405 | 9.0 | 3,250 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1 | 321 | 390 | 572 | 470 | 400 | *440 | 1,000 | 683 | 753 | 463 | *423 | 312 |
| 2 | 294 | *396 | *558 | 450 | 390 | 440 | 1,270 | *651 | *735 | 423 | 405 | *306 |
| 3 | 282 | 361 | 561 | 450 | *390 | 440 | 1,330 | 659 | 707 | 405 | 390 | 309 |
| 4 | 275 | 375 | 572 | 410 | 360 | 440 | *1,650 | 655 | 703 | 402 | 378 | 369 |
| 5 | *278 | 420 | 607 | 400 | 380 | 440 | 1,910 | 631 | 595 | 395 | 369 | 300 |
| 6 | 288 | 544 | 671 | 400 | 380 | 440 | 2,010 | 564 | 554 | *429 | 360 | 351 |
| 7 | 363 | 575 | 699 | *400 | 380 | 440 | 2,140 | 568 | 522 | 460 | 369 | 381 |
| 8 | 411 | 550 | 695 | 400 | 380 | 440 | 1,880 | 603 | 498 | 449 | 396 | 210 |
| 9 | 432 | 505 | 663 | 400 | 380 | 430 | 1,540 | 758 | 474 | 442 | 405 | 278 |
| 10 | 399 | 558 | 580 | 400 | 380 | 430 | 1,270 | 1,620 | 449 | 432 | 393 | 278 |
| 11 | 384 | 568 | 550 | 410 | 380 | 430 | 1,110 | 2,600 | 432 | 425 | 399 | 268 |
| 12 | 381 | 491 | 530 | 430 | 380 | 430 | 1,240 | 2,600 | 429 | 417 | 390 | 270 |
| 13 | 375 | 498 | 510 | 440 | 390 | 420 | 1,760 | 2,040 | 420 | 411 | 378 | 270 |
| 14 | 351 | 488 | 510 | 450 | 400 | 420 | 2,370 | 1,640 | 423 | 402 | 369 | 278 |
| 15 | 333 | 450 | 530 | 450 | 410 | 420 | 2,440 | 1,360 | 508 | 399 | 363 | 282 |
| 16 | 315 | 440 | 536 | 450 | 420 | 420 | 2,180 | 1,180 | 615 | 399 | 345 | 278 |
| 17 | 303 | 430 | 575 | 450 | 420 | 410 | 1,970 | 1,120 | 727 | 387 | 324 | 278 |
| 18 | 294 | 430 | 587 | 440 | 430 | 410 | 1,990 | 1,250 | 843 | 394 | 318 | 282 |
| 19 | 285 | 460 | 561 | 430 | 430 | 410 | 1,970 | 1,360 | 856 | 390 | 315 | 294 |
| 20 | 278 | 480 | 526 | 430 | 430 | 410 | 1,640 | 1,320 | 744 | 393 | 306 | 312 |
| 21 | 272 | 490 | 470 | 430 | 420 | 410 | 1,260 | 1,260 | 655 | 405 | 309 | 357 |
| 22 | 270 | 505 | 440 | 430 | 420 | 410 | 1,020 | 1,220 | 583 | 405 | 342 | 330 |
| 23 | 284 | 491 | 426 | 420 | 420 | 410 | 838 | 1,170 | 526 | 411 | 378 | 320 |
| 24 | 405 | 599 | 438 | 420 | 420 | 410 | 735 | 1,170 | 575 | 399 | 360 | 310 |
| 25 | 558 | 639 | 460 | 420 | 420 | 410 | 900 | 1,080 | 671 | 387 | 345 | 300 |
| 26 | 599 | 643 | 494 | 420 | 430 | 410 | 1,080 | 930 | 671 | 405 | 333 | 290 |
| 27 | 508 | 620 | 519 | 420 | 430 | 420 | 1,140 | 780 | 579 | 470 | 321 | 280 |
| 28 | 466 | 600 | 631 | 420 | 430 | 440 | 1,060 | 691 | 533 | 583 | 312 | 278 |
| 29 | 417 | 580 | 700 | 410 | 430 | 470 | 856 | 655 | 547 | 564 | 312 | 275 |
| 30 | 399 | 572 | 600 | 410 | ----- | 561 | 715 | 615 | 526 | 470 | 303 | 272 |
| 31 | 387 | ----- | 520 | 400 | ----- | 740 | ----- | 667 | ----- | 446 | 303 | ----- |
| Total | 11,217 | 15,168 | 17,291 | 13,140 | 11,750 | 13,651 | 44,274 | 34,080 | 17,653 | 13,248 | 11,013 | 8,918 |
| Mean | 362 | 506 | 558 | 424 | 405 | 440 | 1,476 | 1,099 | 595 | 427 | 355 | 297 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 3,230 Min 194 Mean 442 Cfsm - In. -
Water year 1959-60: Max 2,600 Min 210 Mean 578 Cfsm - In. -

* Discharge measurement made on this day.
Note.--Stage-discharge relation affected by ice Nov. 15-21, 27-29, Dec. 10-14, 21, 22, Dec. 29 to Mar. 29 (no gage-height record Feb. 12-25). No gage-height record Sept. 22-27; discharge estimated on basis of weather records and records for stations on nearby streams.

1340. North Branch Thunder Bay River near Bolton, Mich.

Location.--Lat 45°08'55", long 83°36'35", in sec.29, T.32 N., R.7 E., on left bank $1\frac{1}{2}$ miles upstream from mouth, $2\frac{1}{2}$ miles south of Bolton, and 9 miles northwest of Alpena.

Drainage area.--184 sq mi.

Records available.--March 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 675.52 ft above mean sea level, unadjusted. Prior to Aug. 16, 1945, staff gage at site half a mile upstream at different datum.

Average discharge.--15 years, 106 cfs.

Extremes.--Maximum discharge during year, 1,980 cfs Apr. 15 (gage height, 6.67 ft); minimum, 6.3 cfs Aug. 31.

1945-60: Maximum discharge, 2,330 cfs Apr. 13, 1947 (gage height, 7.00 ft); maximum gage height, 7.98 ft Mar. 31, 1950 (ice jam); minimum discharge, 0.4 cfs Oct. 14, 1955.

Remarks.--Records good except those for periods of ice effect, which are poor. Occasional regulation during low flows.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 15

Apr. 16 to Sept. 30

| | | | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-----|-----|-------|
| 3.1 | 34 | 5.0 | 560 | 2.6 | 6.0 | 3.2 | 46 | 5.0 | 670 |
| 3.5 | 94 | 6.0 | 1,310 | 2.7 | 9.0 | 3.5 | 94 | 6.0 | 1,420 |
| 4.0 | 210 | 6.8 | 2,110 | 2.9 | 21 | 4.0 | 220 | 7.0 | 2,320 |

Discharge, in cubic feet per second, water year October 1959 to September 1967

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 49 | 145 | 160 | 110 | 94 | 81 | 400 | 318 | *146 | 90 | *29 | *7.8 |
| 2 | 53 | *134 | 154 | 110 | 93 | *80 | 500 | 286 | 150 | 80 | 28 | 8.1 |
| 3 | 49 | 129 | *145 | 100 | *93 | 80 | 600 | *266 | 146 | 73 | 28 | 8.1 |
| 4 | 45 | 132 | 145 | 100 | 92 | 80 | 750 | 244 | 141 | 65 | 29 | 9.0 |
| 5 | *41 | 143 | 159 | 100 | 92 | 80 | *1,020 | 227 | 129 | 83 | 27 | 9.5 |
| 6 | 42 | 164 | 173 | 100 | 91 | 80 | 1,240 | 214 | 114 | 62 | 26 | 10 |
| 7 | 49 | 202 | 190 | *100 | 91 | 80 | 1,250 | 208 | 100 | *56 | 26 | 13 |
| 8 | 50 | 258 | 180 | 100 | 91 | 80 | 1,190 | 211 | 80 | 47 | 26 | 14 |
| 9 | 60 | 255 | 170 | 100 | 91 | 80 | 1,170 | 280 | 63 | 42 | 24 | 22 |
| 10 | 83 | 231 | 160 | 100 | 91 | 80 | 1,020 | 600 | 57 | 38 | 24 | 20 |
| 11 | 96 | 194 | 150 | 100 | 90 | 80 | 960 | 1,320 | 53 | 36 | 25 | 20 |
| 12 | 94 | 166 | 150 | 105 | 90 | 80 | 920 | 1,500 | 49 | 31 | 22 | 18 |
| 13 | 106 | 157 | 150 | 110 | 90 | 80 | 1,240 | 1,040 | 44 | 24 | 22 | 19 |
| 14 | 132 | 148 | 150 | 110 | 90 | 80 | 1,700 | 700 | 50 | 22 | 20 | 20 |
| 15 | 154 | 120 | 150 | 110 | 90 | 80 | 1,880 | 500 | 89 | 22 | 20 | 19 |
| 16 | 123 | 110 | 143 | 110 | 90 | 80 | 1,700 | 380 | 81 | 21 | 19 | 16 |
| 17 | 104 | 110 | 157 | 110 | 90 | 80 | 1,460 | 339 | 148 | 20 | 15 | 15 |
| 18 | 90 | 110 | 173 | 110 | 88 | 80 | 1,340 | 343 | 155 | 21 | 12 | 14 |
| 19 | 85 | 110 | 160 | 105 | 88 | 81 | 1,310 | 343 | 155 | 25 | 12 | 14 |
| 20 | 78 | 106 | 150 | 100 | 86 | 82 | 1,060 | 384 | 153 | 27 | 11 | 13 |
| 21 | 70 | 98 | 150 | 100 | 86 | 82 | *794 | 366 | 138 | 22 | 12 | 15 |
| 22 | 66 | 94 | 140 | 100 | 85 | 83 | 630 | 330 | 123 | 21 | 12 | 18 |
| 23 | 71 | 100 | 140 | 100 | 84 | 84 | 530 | 318 | 110 | 19 | 10 | 14 |
| 24 | 81 | 121 | 130 | 100 | 83 | 86 | 420 | 310 | 121 | 14 | 8.7 | 18 |
| 25 | 94 | 125 | 121 | 100 | 82 | 90 | 411 | 286 | 123 | 13 | 9.0 | 17 |
| 26 | 127 | 140 | 110 | 100 | 82 | 98 | 450 | 255 | 129 | 16 | 9.5 | 16 |
| 27 | 171 | 160 | 123 | 98 | 82 | 120 | 525 | 217 | 141 | 25 | 11 | 16 |
| 28 | 205 | 170 | 148 | 96 | 81 | 150 | 490 | 190 | 153 | 26 | 8.1 | 14 |
| 29 | 199 | 170 | 150 | 96 | 81 | 200 | 411 | 166 | 118 | 30 | 7.8 | 12 |
| 30 | 181 | 160 | 140 | 95 | ----- | 250 | 357 | 150 | 102 | 32 | 7.5 | 12 |
| 31 | 166 | ----- | 120 | 94 | ----- | 300 | ----- | 160 | ----- | 33 | 7.2 | ----- |
| Total | 2,992 | 4,462 | 4,641 | 3,189 | 2,557 | 3,147 | 27,728 | 12,451 | 3,561 | 1,116 | 547.8 | 441.5 |
| Mean | 96.5 | 149 | 150 | 102 | 88.2 | 102 | 924 | 402 | 112 | 36.0 | 17.7 | 14.7 |
| Cfs/m | 0.524 | 0.810 | 0.815 | 0.554 | 0.479 | 0.554 | 5.02 | 2.18 | 0.609 | 0.196 | 0.096 | 0.080 |
| In. | 0.60 | 0.90 | 0.94 | 0.64 | 0.52 | 0.64 | 5.60 | 2.51 | 0.68 | 0.23 | 0.11 | 0.09 |

Calendar year 1959: Max 1,940 Min 4.1 Mean 130 Cfs/m 0.707 In. 9.60
 Water year 1959-60: Max 1,880 Min 7.2 Mean 182 Cfs/m 0.989 In. 13.46

Peak discharge (base, 500 cfs).--Apr. 6 (7 p.m.) 1,370 cfs (6.06 ft); Apr. 15 (3 to 4 a.m.) 1,980 cfs (6.67 ft); Apr. 27 (3 to 8 p.m.) 540 cfs (4.74 ft); May 12 (7 to 8 a.m.) 1,590 cfs (6.19 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-19, Nov. 25 to Dec. 1, Dec. 7-15, 19-24, Dec. 29 to Apr. 4.

1355. Au Sable River at Grayling, Mich.

Location.--Lat 44°39'35", long 84°42'45", in SE $\frac{1}{4}$ sec. 7, T. 26 N., R. 3 W., on right bank 65 ft upstream from bridge on U. S. Highway 27 at Grayling and three-quarters of a mile upstream from East Branch.

Drainage area.--110 sq mi.

Records available.--October 1942 to September 1960. Prior to October 1954, published as Middle Branch Au Sable River at Grayling. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder above steel-crested dam. Datum of gage is 1,123.49 ft above mean sea level, datum of 1929.

Average discharge.--18 years, 75.2 cfs.

Extremes.--Maximum discharge during year, 186 cfs Apr. 18 (gage height, 2.38 ft); minimum, 49 cfs Feb. 11.
1942-60: Maximum discharge, 274 cfs June 2, 1943 (gage height, 3.00 ft); minimum, 28 cfs Apr. 21, 1946.

Remarks.--Records good except those for periods of ice effect, which are fair. Prior to Dec. 31, 1952, diurnal fluctuation caused by powerplant 2.5 miles upstream. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 25

Mar. 26 to Sept. 30

| | | | |
|-----|-----|-----|-----|
| 1.2 | 50 | 1.2 | 53 |
| 2.0 | 133 | 2.0 | 138 |
| | | 3.0 | 268 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 76 | 85 | 78 | b75 | 66 | 58 | *114 | 107 | 103 | *78 | 75 | *64 |
| 2 | *72 | 85 | 77 | 76 | *83 | 60 | 113 | 105 | *103 | 76 | 72 | 65 |
| 3 | 70 | 84 | 77 | 81 | 59 | *60 | 114 | *107 | 100 | 78 | 72 | 65 |
| 4 | 70 | 85 | *76 | 77 | 65 | 61 | 115 | 106 | 96 | 78 | 73 | 69 |
| 5 | 75 | 98 | 78 | *65 | 67 | 59 | 117 | 105 | 93 | 76 | *73 | 70 |
| 6 | 82 | *103 | 80 | 65 | 71 | 56 | 116 | 104 | 90 | 74 | 71 | 67 |
| 7 | 108 | 101 | 80 | b70 | 70 | b56 | 115 | 111 | 88 | 73 | 76 | 65 |
| 8 | 118 | 86 | 78 | 76 | 66 | 57 | 111 | 115 | 86 | 70 | 80 | 64 |
| 9 | 119 | 89 | 76 | 75 | 69 | 56 | 108 | 123 | 84 | 69 | 81 | 62 |
| 10 | 109 | 87 | b75 | 73 | 65 | b56 | 106 | 137 | 83 | 67 | 79 | 61 |
| 11 | 107 | 84 | b75 | 72 | 52 | 57 | 105 | 137 | 81 | 67 | 76 | 61 |
| 12 | 104 | 83 | 75 | 73 | 59 | 56 | 110 | 132 | 81 | 66 | 75 | 62 |
| 13 | 101 | 81 | 72 | 76 | b62 | 56 | 126 | 126 | 81 | 66 | 71 | 64 |
| 14 | 97 | 82 | 72 | 79 | b65 | 59 | 153 | 118 | 83 | 65 | 71 | 64 |
| 15 | 91 | 76 | 73 | 78 | 67 | 59 | 158 | 113 | 86 | 65 | 71 | 64 |
| 16 | 88 | 78 | 73 | 75 | 67 | 58 | 163 | 108 | 87 | 65 | 71 | 63 |
| 17 | 86 | 79 | 74 | 73 | 68 | 62 | 173 | 108 | 89 | 65 | 70 | 64 |
| 18 | 84 | 74 | 73 | b70 | 68 | 62 | 184 | 108 | 88 | 66 | 68 | 64 |
| 19 | 81 | 79 | 71 | 70 | 67 | 60 | *175 | 106 | 86 | 69 | 66 | 70 |
| 20 | 83 | 80 | 67 | b70 | 66 | 61 | *156 | 111 | 83 | 69 | 66 | 72 |
| 21 | 76 | 79 | 69 | 72 | 65 | 57 | 143 | 115 | 81 | 71 | 66 | 71 |
| 22 | 76 | 78 | 67 | 72 | 65 | 55 | 158 | 125 | 80 | 75 | 68 | 70 |
| 23 | 90 | 81 | 67 | 72 | 59 | b58 | 128 | 128 | 79 | 79 | 70 | 69 |
| 24 | 110 | 86 | 70 | 71 | 60 | b58 | 124 | 125 | 82 | 79 | 70 | 67 |
| 25 | 116 | 89 | 69 | 70 | 60 | b60 | 123 | 119 | 85 | 74 | 67 | 67 |
| 26 | 108 | 87 | 70 | 67 | 65 | 66 | 125 | 115 | 84 | 83 | 66 | 67 |
| 27 | 99 | 84 | 75 | 69 | 66 | 71 | 123 | 110 | 81 | 94 | 65 | 64 |
| 28 | 91 | 80 | b85 | 71 | 63 | 75 | 117 | 104 | 81 | 94 | 65 | 61 |
| 29 | 86 | 79 | b62 | 71 | 59 | 79 | 112 | 98 | 81 | 90 | 63 | 60 |
| 30 | 84 | 78 | b78 | 70 | ----- | 91 | 110 | 98 | 80 | 84 | 63 | 60 |
| 31 | 85 | ----- | b75 | 69 | ----- | 112 | ----- | 104 | ----- | 79 | 63 | ----- |
| Total | 2,842 | 2,530 | 2,307 | 2,243 | 1,864 | 1,949 | 3,873 | 3,528 | 2,585 | 2,304 | 2,183 | 1,956 |
| Mean | 91.7 | 84.3 | 74.4 | 72.4 | 64.3 | 62.9 | 129 | 114 | 86.2 | 74.3 | 70.4 | 65.2 |
| Cfsm | 0.834 | 0.766 | 0.676 | 0.658 | 0.585 | 0.572 | 1.17 | 1.04 | 0.784 | 0.675 | 0.640 | 0.593 |
| In. | 0.96 | 0.85 | 0.78 | 0.76 | 0.63 | 0.66 | 1.30 | 1.20 | 0.87 | 0.78 | 0.74 | 0.66 |

Calendar year 1959: Max 153 Min 45 Mean 71.7 Cfsm 0.652 In. 8.82
Water year 1959-60: Max 184 Min 52 Mean 82.4 Cfsm 0.749 In. 10.19

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1356. East Branch Au Sable River at Grayling, Mich.

Location.--Lat 44°40'10", long 84°42'20", in NW¼NW¼ sec. 8, T.26 N., R.3 W., on right bank at south boundary of State fish hatchery area at Grayling and 0.4 mile upstream from mouth.

Drainage area.--76.0 sq mi.

Records available.--April 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,110 ft (from topographic map). Prior to Sept. 30, 1958, staff gage at site 10 ft downstream at same datum.

Extremes.--1958: Maximum discharge during period April to September, 53 cfs Apr. 6 (gage height, 3.31 ft); minimum, 17 cfs Aug. 1 (gage height, 2.89 ft).
1958-59: Maximum discharge during water year, 119 cfs Aug. 30 (gage height, 4.34 ft); minimum, 15 cfs Mar. 6 (gage height, 2.58 ft), result of freezeup.
1959-60: Maximum discharge during water year, 135 cfs Apr. 14 (gage height, 4.67 ft); minimum, 25 cfs Mar. 15 (gage height, 3.00 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Occasional regulation by State fish hatchery above gage.

Rating tables, Apr. 1, 1958, to Sept. 30, 1960, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used July 22 to Dec. 31, 1958; July 18 to Sept. 30, 1959; Apr. 14-25, May 16 to June 29, Aug. 7 to Sept. 5, 1960)

| Apr. 1, 1958, to Sept. 30, 1959 | | Oct. 1, 1959, to Sept. 30, 1960 | |
|------------------------------------|-----|------------------------------------|-----|
| 2.6 | 16 | 3.1 | 30 |
| 3.0 | 32 | 4.0 | 85 |
| 4.0 | 106 | 4.6 | 158 |
| 4.4 | 139 | | |

Discharge, in cubic feet per second, April to September 1958

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 1 | | | | | | | *42 | *36 | 32 | 26 | *19 | 24 |
| 2 | | | | | | | 42 | 35 | 36 | *26 | 19 | *25 |
| 3 | | | | | | | 42 | 35 | 30 | 26 | 19 | 22 |
| 4 | | | | | | | 42 | 34 | 29 | 27 | 20 | 31 |
| 5 | | | | | | | 43 | 34 | 30 | 28 | 21 | 32 |
| 6 | | | | | | | 48 | 34 | 30 | 30 | 20 | 34 |
| 7 | | | | | | | 50 | 33 | 28 | 27 | 21 | 34 |
| 8 | | | | | | | 48 | 34 | 30 | 26 | 23 | 32 |
| 9 | | | | | | | 46 | 33 | 31 | 26 | 21 | 28 |
| 10 | | | | | | | 44 | 33 | 31 | 26 | 23 | 27 |
| 11 | | | | | | | 43 | 33 | 30 | 28 | 23 | 23 |
| 12 | | | | | | | 41 | 33 | 28 | 27 | 22 | 24 |
| 13 | | | | | | | 41 | 33 | 27 | 25 | 23 | 24 |
| 14 | | | | | | | 41 | 32 | 27 | 25 | 22 | 24 |
| 15 | | | | | | | 41 | 33 | 27 | 25 | 22 | 24 |
| 16 | | | | | | | 41 | 32 | 28 | 26 | 20 | 23 |
| 17 | | | | | | | 42 | 32 | 26 | 25 | 20 | 24 |
| 18 | | | | | | | 42 | 31 | 25 | 24 | 20 | 25 |
| 19 | | | | | | | 40 | 32 | 25 | 23 | 20 | 30 |
| 20 | | | | | | | 39 | 33 | 28 | 23 | 38 | 28 |
| 21 | | | | | | | 38 | 33 | 27 | 23 | 26 | 25 |
| 22 | | | | | | | 39 | 33 | 27 | 22 | 25 | 25 |
| 23 | | | | | | | 43 | 31 | 27 | 21 | 23 | 22 |
| 24 | | | | | | | 45 | 32 | 27 | 22 | 23 | 25 |
| 25 | | | | | | | 42 | 32 | 26 | 22 | 22 | 34 |
| 26 | | | | | | | 40 | 32 | 30 | 20 | 21 | 30 |
| 27 | | | | | | | 38 | 30 | *28 | 20 | 21 | 28 |
| 28 | | | | | | †12.4 | 36 | 31 | 27 | 23 | 22 | 27 |
| 29 | | | | | | | *37 | 31 | 26 | 20 | 21 | 26 |
| 30 | | | | | | | 36 | 31 | 26 | 24 | 23 | 28 |
| 31 | | | | | | | | 30 | | 20 | 25 | |
| Total | | | | | | | 1,252 | 1,011 | 847 | 756 | 688 | 804 |
| Mean | | | | | | | 41.7 | 32.6 | 28.2 | 24.4 | 22.2 | 26.8 |
| Cfsm | | | | | | | 0.549 | 0.429 | 0.371 | 0.321 | 0.292 | 0.353 |
| In. | | | | | | | 0.61 | 0.49 | 0.41 | 0.37 | 0.34 | 0.39 |

| | | | | | |
|---------------|-------|-----|------|------|-----|
| Calendar year | : Max | Min | Mean | Cfsm | In. |
| Water year | : Max | Min | Mean | Cfsm | In. |

* Discharge measurement made on this day.

† Result of discharge measurement.

1356. East Branch Au Sable River at Grayling, Mich.--Continued

Discharge, in cubic feet per second, water year October 1958 to September 1959

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 32 | 35 | 33 | 28 | 24 | 21 | 45 | 65 | 56 | a32 | 36 | 48 |
| 2 | *28 | 30 | 33 | *28 | b24 | 21 | 48 | 66 | 51 | *a32 | 32 | 47 |
| 3 | 28 | 28 | 34 | 27 | b24 | 21 | 56 | 62 | 47 | 33 | 30 | *45 |
| 4 | 26 | 28 | *34 | 26 | 24 | 21 | 55 | *72 | *44 | 30 | 31 | 42 |
| 5 | 26 | 28 | 33 | 25 | *24 | *21 | 62 | 78 | 44 | 30 | *30 | 41 |
| 6 | 26 | 31 | 27 | b25 | 24 | 21 | 69 | 70 | 44 | 30 | 29 | 40 |
| 7 | 25 | 30 | 31 | b25 | 23 | 20 | 76 | 68 | 42 | 30 | 30 | 38 |
| 8 | 30 | 31 | b30 | 25 | 23 | 20 | 83 | 62 | 39 | 30 | 30 | 37 |
| 9 | 36 | 33 | b30 | 25 | 23 | 20 | 78 | 59 | 39 | 30 | 30 | 37 |
| 10 | 34 | 33 | 30 | a25 | 24 | 19 | 75 | 57 | 39 | 29 | 31 | 37 |
| 11 | 33 | 32 | 30 | a26 | b23 | 20 | 81 | 63 | 39 | 30 | 30 | 37 |
| 12 | 32 | 31 | 30 | a26 | 23 | 20 | 88 | 60 | 39 | 30 | 28 | 36 |
| 13 | 34 | 30 | 30 | a26 | 23 | 20 | 90 | 56 | 39 | a30 | a28 | 36 |
| 14 | 33 | 33 | 30 | a26 | 23 | 20 | 94 | 53 | 37 | a29 | a28 | 36 |
| 15 | 32 | 36 | 30 | a26 | 23 | 21 | 100 | 52 | 36 | a28 | 28 | 39 |
| 16 | 31 | 36 | 30 | a25 | 24 | 21 | 107 | 51 | 35 | a28 | 30 | 39 |
| 17 | 30 | 36 | 30 | 25 | 22 | 20 | *109 | 51 | 34 | a28 | 36 | 37 |
| 18 | 29 | 44 | 30 | 25 | 22 | 20 | 114 | 50 | 34 | 32 | 33 | 36 |
| 19 | 28 | 39 | 29 | 25 | 22 | 22 | 112 | 49 | 33 | 34 | 31 | 35 |
| 20 | 28 | 39 | 27 | 25 | b21 | 22 | 98 | 62 | 32 | 31 | 30 | 39 |
| 21 | 29 | 37 | b28 | 25 | b21 | 22 | 87 | 67 | 32 | 30 | 42 | 41 |
| 22 | 28 | 36 | b28 | 25 | 22 | 22 | 80 | 64 | 32 | 28 | 65 | 46 |
| 23 | 33 | 36 | 29 | 25 | 22 | 23 | 74 | 61 | 31 | 28 | 80 | 66 |
| 24 | 34 | 36 | 29 | 24 | 22 | 25 | 74 | 57 | 31 | 28 | 71 | 65 |
| 25 | 33 | 36 | 26 | 25 | 21 | 28 | 72 | 53 | 32 | 28 | *60 | 58 |
| 26 | 32 | 36 | 28 | b24 | 21 | 34 | 66 | 51 | 30 | 27 | 53 | a55 |
| 27 | 32 | 31 | 28 | b25 | 21 | 36 | 65 | 49 | a30 | 27 | 49 | a50 |
| 28 | 30 | 31 | 28 | b26 | 21 | 39 | 73 | 46 | a30 | 26 | 48 | a55 |
| 29 | 30 | 28 | 29 | 26 | - | 39 | 80 | 46 | a35 | 25 | 48 | 58 |
| 30 | 30 | b28 | 26 | 25 | ----- | 41 | 72 | 45 | a33 | 20 | 53 | 52 |
| 31 | *36 | ----- | 26 | 24 | ----- | 44 | ----- | 52 | ----- | 42 | 56 | ----- |
| Total | 948 | 998 | 916 | 788 | 633 | 764 | 2,363 | 1,795 | 1,119 | 965 | 1,234 | 1,328 |
| Mean | 30.6 | 33.3 | 29.5 | 25.4 | 22.6 | 24.6 | 79.4 | 57.9 | 37.3 | 31.1 | 39.8 | 44.3 |
| Cfsm | 0.403 | 0.436 | 0.388 | 0.334 | 0.297 | 0.324 | 1.04 | 0.762 | 0.491 | 0.469 | 0.524 | 0.563 |
| In. | 0.46 | 0.49 | 0.45 | 0.39 | 0.31 | 0.37 | 1.16 | 0.88 | 0.55 | 0.47 | 0.60 | 0.65 |

Calendar year 1958: Max - Min 19 Mean - Cfsm - In. -
 Water year 1958-59: Max 114 Min 19 Mean 38.0 Cfsm 0.500 In. 6.78

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

b Stage-discharge relation affected by ice.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 50 | 63 | 53 | 45 | b39 | 36 | *68 | 66 | 73 | *49 | 39 | 36 |
| 2 | *48 | 62 | 53 | 52 | *36 | 36 | 67 | 65 | *77 | 47 | 39 | *37 |
| 3 | 48 | 61 | 52 | 53 | b38 | *38 | 71 | 68 | 74 | 48 | 40 | 36 |
| 4 | 48 | 63 | *52 | 50 | 41 | 37 | 74 | 66 | 69 | 46 | 38 | 38 |
| 5 | 53 | 72 | 53 | *41 | 42 | 35 | 75 | 84 | 66 | 43 | 38 | 38 |
| 6 | 59 | *72 | 54 | 45 | 44 | 34 | 75 | *85 | 63 | 42 | 38 | 37 |
| 7 | 75 | 69 | 53 | 47 | 44 | b34 | 78 | 74 | 62 | 41 | 41 | 36 |
| 8 | 76 | 66 | 51 | 47 | 42 | 34 | 76 | 72 | 59 | 40 | 42 | 35 |
| 9 | 75 | 65 | 50 | 46 | 44 | 32 | 75 | 79 | 58 | 40 | 45 | 35 |
| 10 | 69 | 64 | 50 | b45 | 38 | b33 | 73 | 97 | 57 | 40 | *45 | 35 |
| 11 | 74 | 63 | 48 | 45 | 32 | 34 | 74 | 98 | 57 | *39 | 42 | 35 |
| 12 | 74 | 61 | 49 | 46 | b36 | 34 | 84 | 91 | 57 | 39 | 40 | 36 |
| 13 | 71 | 59 | 48 | b47 | b39 | a33 | 105 | 85 | 56 | 39 | 39 | 37 |
| 14 | 68 | 59 | 49 | 48 | 41 | a33 | 129 | 79 | 57 | 39 | 40 | 37 |
| 15 | 65 | 55 | 48 | 48 | 38 | 34 | 125 | 75 | 60 | 39 | 40 | 36 |
| 16 | 63 | b55 | 48 | 46 | 41 | 36 | 116 | 72 | 57 | 33 | 38 | 36 |
| 17 | 62 | 56 | 49 | 45 | 42 | 38 | 120 | 74 | 59 | 33 | 38 | 38 |
| 18 | 60 | 53 | 48 | b44 | 42 | 39 | 122 | 76 | 57 | 33 | 37 | 38 |
| 19 | 59 | 56 | 47 | 43 | a40 | 38 | *105 | 73 | 54 | 40 | 36 | 43 |
| 20 | 57 | 56 | 42 | b43 | a40 | 38 | 91 | 85 | 54 | 40 | 36 | 44 |
| 21 | 56 | a56 | b42 | 42 | a40 | 36 | 84 | 81 | 52 | 41 | 36 | 42 |
| 22 | 54 | a56 | 42 | 44 | a39 | 36 | 78 | 87 | 52 | 45 | 40 | 42 |
| 23 | 68 | a58 | 45 | 44 | a37 | 36 | 74 | 90 | 53 | 46 | 41 | 41 |
| 24 | 80 | a60 | 46 | 43 | a37 | b35 | 71 | 85 | 54 | 45 | 40 | 41 |
| 25 | 79 | a64 | 45 | 43 | a37 | 35 | *6 | 79 | 53 | 42 | 38 | 40 |
| 26 | *75 | a60 | 46 | 42 | a39 | 37 | 76 | 75 | 51 | 51 | 37 | 38 |
| 27 | 72 | a58 | 47 | 43 | 40 | 37 | 74 | 74 | 50 | 57 | 36 | 38 |
| 28 | 68 | 54 | 57 | 43 | 37 | 42 | 69 | 71 | 53 | 50 | 36 | 38 |
| 29 | 65 | 55 | 55 | 43 | 35 | 44 | 66 | 69 | 53 | 45 | 36 | 38 |
| 30 | 62 | 54 | 53 | 43 | ----- | 60 | 66 | 75 | 50 | 44 | 36 | 39 |
| 31 | 63 | ----- | b50 | 43 | ----- | 76 | ----- | 78 | ----- | 41 | 36 | ----- |
| Total | 1,996 | 1,805 | 1,524 | 1,399 | 1,140 | 1,182 | 2,537 | 2,384 | 1,747 | 1,330 | 1,203 | 1,140 |
| Mean | 64.4 | 60.2 | 49.2 | 45.1 | 39.3 | 38.1 | 84.6 | 76.9 | 58.2 | 42.9 | 38.8 | 38.0 |
| Cfsm | 0.847 | 0.792 | 0.647 | 0.595 | 0.517 | 0.501 | 1.11 | 1.01 | 0.766 | 0.564 | 0.511 | 0.500 |
| In. | 0.98 | 0.88 | 0.75 | 0.68 | 0.56 | 0.58 | 1.24 | 1.16 | 0.86 | 0.65 | 0.59 | 0.56 |

Calendar year 1959: Max 114 Min 19 Mean 44.8 Cfsm 0.589 In. 7.99
 Water year 1959-60: Max 129 Min 32 Mean 53.0 Cfsm 0.697 In. 9.48

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

b Stage-discharge relation affected by ice.

1365. Au Sable River at Mio, Mich.

Location.--Lat 44°39'35", long 84°07'30", on line between sec.7, T.26 N., R.3 E., and sec.12, T.26 N., R.2 E., on right bank 150 ft upstream from bridge on State Highway 33 at Mio, 10 miles downstream from Big Creek, and 80 miles upstream from Mouth.

Drainage area.--1,100 sq mi, approximately.

Records available.--July 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 929.60 ft above mean sea level, datum of 1929.

Average discharge.--8 years, 922 cfs.

Extremes.--Maximum discharge during year, 3,260 cfs Apr. 18 (gage height, 5.38 ft); minimum, 218 cfs Jan. 21 (gage height, 1.31 ft); minimum daily, 624 cfs Sept. 11.
1952-60: Maximum discharge, that of Apr. 18, 1960; minimum, 113 cfs Sept. 22, 1954; minimum daily, 456 cfs Feb. 17, 1958; minimum gage height, 0.83 ft July 17, 1959.

Remarks.--Records good. Flow regulated at all stages by powerplant 500 ft upstream.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 28,
Apr. 19 to Sept. 30

Nov. 29 to Apr. 18

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 2.5 | 625 | 4.0 | 1,700 | 2.6 | 725 | 4.0 | 1,750 |
| 3.0 | 920 | 5.0 | 2,800 | 3.0 | 975 | 5.1 | 2,920 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 982 | 1,170 | 1,020 | 1,040 | 968 | 740 | 1,610 | 1,350 | 1,330 | 1,000 | 903 | 779 |
| 2 | 906 | 1,160 | 1,100 | 1,050 | 872 | 752 | 1,550 | 1,460 | 1,400 | 932 | 844 | 844 |
| 3 | 748 | 1,070 | 1,110 | 1,250 | 772 | 838 | 1,800 | 1,420 | 1,340 | 978 | 821 | 748 |
| 4 | 884 | 1,290 | 1,160 | 946 | 972 | 910 | 2,010 | 1,410 | 1,420 | 1,010 | 824 | 880 |
| 5 | 999 | 1,610 | 1,080 | 1,010 | 1,050 | 834 | 1,960 | 1,410 | 1,240 | 958 | 844 | 874 |
| 6 | 1,320 | 1,470 | 1,030 | 794 | 1,020 | 846 | 1,730 | 1,380 | 1,120 | 966 | 764 | 808 |
| 7 | 1,310 | 1,430 | 1,140 | 818 | 931 | 851 | 1,620 | 1,270 | 1,100 | 859 | 897 | 801 |
| 8 | 1,580 | 1,290 | 1,100 | 1,420 | 933 | 921 | 1,700 | 1,430 | 1,070 | 836 | 1,120 | 709 |
| 9 | 1,160 | *1,360 | 1,070 | 918 | 932 | 792 | 1,630 | 1,560 | 979 | 860 | *860 | 883 |
| 10 | 1,560 | 1,200 | 1,050 | 946 | 928 | 884 | 1,500 | 2,110 | 974 | 942 | 761 | 860 |
| 11 | 1,310 | 1,080 | 1,000 | 1,040 | 866 | 792 | 1,560 | 2,220 | 937 | 894 | 1,070 | 624 |
| 12 | 1,220 | 1,320 | 1,000 | 1,040 | 822 | 758 | 1,760 | 1,620 | 1,130 | 762 | 880 | 676 |
| 13 | 1,230 | 1,080 | 1,020 | *1,290 | 856 | 914 | 2,220 | 1,590 | 1,070 | *834 | 870 | *802 |
| 14 | 1,220 | 1,130 | 994 | 1,090 | 904 | 827 | 2,450 | 1,560 | 1,010 | 804 | 731 | 826 |
| 15 | 1,140 | 1,080 | 1,020 | 994 | *961 | *866 | 2,550 | 1,280 | 1,270 | 818 | 936 | 898 |
| 16 | 1,010 | 1,080 | *1,200 | 1,010 | 1,100 | 828 | 2,540 | 1,290 | *977 | 800 | 928 | 723 |
| 17 | 1,010 | 1,060 | 1,100 | 989 | 932 | 866 | 2,590 | 1,500 | 1,230 | 770 | 762 | 811 |
| 18 | 1,150 | 956 | 1,080 | 1,000 | 948 | 824 | 2,840 | *1,570 | 1,240 | 834 | 863 | 718 |
| 19 | 1,010 | 1,090 | 996 | 1,160 | 864 | 828 | 2,410 | 1,420 | 1,080 | 816 | 744 | 850 |
| 20 | 996 | 1,070 | 926 | 957 | 922 | 812 | *2,190 | 1,570 | 1,080 | 888 | 662 | 1,170 |
| 21 | *898 | 1,010 | 886 | 850 | 900 | 832 | 1,910 | 1,720 | 1,080 | 790 | 802 | 950 |
| 22 | 998 | 1,040 | 912 | 1,040 | 941 | 828 | 1,650 | 1,530 | 1,050 | 894 | 1,150 | 811 |
| 23 | 1,340 | 1,050 | 816 | 942 | 866 | 782 | 1,740 | 1,860 | 892 | 956 | 848 | 860 |
| 24 | 1,940 | 1,270 | 1,110 | 852 | 844 | 799 | 1,500 | 1,590 | 970 | 873 | 802 | 890 |
| 25 | 1,680 | 1,320 | 960 | 972 | 836 | 871 | 1,660 | 1,550 | 1,310 | 878 | 816 | 789 |
| 26 | 1,520 | 1,190 | 1,030 | 964 | 816 | 813 | 1,730 | 1,440 | 999 | 1,040 | 808 | 806 |
| 27 | 1,420 | 1,120 | 957 | 1,080 | 1,010 | 838 | 1,710 | 1,300 | 974 | 1,330 | 832 | 787 |
| 28 | 1,240 | 1,140 | 1,470 | 932 | 916 | 1,000 | 1,570 | 1,510 | 988 | 1,470 | 635 | 790 |
| 29 | 1,380 | 1,030 | 1,320 | 936 | 824 | 1,030 | 1,450 | 1,260 | 1,170 | 922 | 778 | 788 |
| 30 | 1,140 | 1,060 | 1,280 | 908 | ----- | 1,280 | 1,400 | 1,190 | 1,040 | 1,000 | 864 | 926 |
| 31 | 1,210 | ----- | 1,220 | 1,020 | ----- | 1,750 | ----- | 1,320 | ----- | 936 | 712 | ----- |
| Total | 37,711 | 35,228 | 32,957 | 31,338 | 26,508 | 27,484 | 56,550 | 46,690 | 33,470 | 28,632 | 26,131 | 24,679 |
| Mean | 1,216 | 1,174 | 1,063 | 1,011 | 914 | 887 | 1,885 | 1,506 | 1,116 | 924 | 843 | 823 |
| Cfs/m | 1.11 | 1.07 | 0.966 | 0.919 | 0.831 | 0.806 | 1.71 | 1.37 | 1.01 | 0.840 | 0.766 | 0.748 |
| In. | 1.28 | 1.19 | 1.11 | 1.06 | 0.90 | 0.93 | 1.91 | 1.58 | 1.13 | 0.97 | 0.88 | 0.83 |

Calendar year 1959: Max 2,460 Min 543 Mean 998 Cfs/m 0.907 In. 12.32
Water year 1959-60: Max 2,840 Min 624 Mean 1,113 Cfs/m 1.01 In. 13.77

* Discharge measurement made on this day.

1380. East Branch Au Gres River at McIvor, Mich.

Location.--Lat 44°14'20", long 83°41'50", on line between secs. 3 and 10, T.21 N., R.6 E., on right bank 25 ft downstream from highway bridge at McIvor, 1.1 miles east of National City, and 9 miles southwest of Tawas City.

Drainage area.--84 sq mi, approximately.

Records available.--November 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 646.58 ft above mean sea level, datum of 1929. Prior to Aug. 30, 1951, wire-weight gage at site 25 ft upstream at same datum.

Average discharge.--9 years (1951-60), 67.6 cfs.

Extremes.--Maximum discharge during year, 499 cfs Apr. 4 (gage height, 6.29 ft); minimum, 30 cfs Sept. 14; minimum daily, 36 cfs Oct. 3, 4.
1950-60: Maximum discharge, 1,310 cfs May 20, 1959 (gage height, 8.88 ft); minimum, 16 cfs Dec. 4, 1952; minimum daily, 27 cfs Dec. 16-24, 1958, Jan. 31 to Feb. 10, 1959.

Remarks.--Records good except those for periods of ice effect, which are poor. Since 1952, some intermittent regulation at low and medium flow by dam $2\frac{1}{2}$ miles upstream. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-23)

Oct. 1 to Nov. 4

Nov. 5 to Sept. 30

| | | | |
|-----|-----|-----|-----|
| 1.7 | 33 | 1.8 | 35 |
| 2.0 | 49 | 3.0 | 114 |
| 3.0 | 128 | 4.0 | 191 |
| | | 6.0 | 447 |
| | | 7.0 | 650 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 38 | 58 | 58 | 85 | 73 | 60 | 251 | 142 | 115 | 73 | 45 | 38 |
| 2 | 37 | 55 | 58 | 80 | 70 | 60 | 235 | 129 | 116 | 69 | 45 | 40 |
| 3 | 36 | 52 | 60 | 80 | 66 | 60 | 306 | 122 | 106 | 77 | 46 | 39 |
| 4 | 36 | 88 | 67 | 75 | 66 | 60 | 466 | 117 | 97 | 69 | 44 | 45 |
| 5 | 68 | 144 | 79 | 74 | 70 | 60 | 411 | 112 | 91 | 63 | 44 | 45 |
| 6 | 74 | 128 | 98 | 72 | 77 | 60 | 267 | 108 | 86 | 60 | 42 | 41 |
| 7 | 86 | 96 | 92 | 72 | 77 | 60 | 247 | 123 | 83 | 58 | 57 | 39 |
| 8 | 65 | 81 | 78 | 70 | 75 | 60 | 232 | 120 | 78 | 55 | *59 | 39 |
| 9 | 77 | 72 | 71 | 70 | 74 | 58 | 206 | 152 | 74 | 54 | 54 | 38 |
| 10 | 59 | *70 | 65 | 70 | 72 | 58 | 190 | 234 | 73 | 52 | 56 | 37 |
| 11 | 78 | 66 | 62 | 70 | 70 | 58 | 215 | 195 | 71 | 50 | 51 | 37 |
| 12 | 62 | 82 | 85 | *70 | 66 | 56 | 321 | 161 | 71 | 50 | 47 | *38 |
| 13 | 51 | 59 | 77 | 74 | 66 | 56 | 339 | 141 | *68 | *49 | 43 | 40 |
| 14 | 48 | 63 | 70 | 76 | 66 | *55 | *329 | 134 | 79 | 48 | 47 | 38 |
| 15 | 45 | 55 | *65 | 76 | 66 | 55 | 266 | 124 | 102 | 46 | 49 | 37 |
| 16 | 44 | 57 | 73 | 75 | *66 | 55 | 213 | *117 | 84 | 45 | 44 | 39 |
| 17 | 43 | 52 | 84 | 74 | 66 | 55 | 236 | 161 | 93 | 47 | 42 | 42 |
| 18 | 42 | 110 | 79 | 72 | 68 | 55 | 334 | 221 | 79 | 48 | 41 | 42 |
| 19 | 42 | 100 | 70 | 70 | 65 | 55 | *220 | 163 | 74 | 51 | 41 | 53 |
| 20 | *43 | 90 | 65 | 70 | 64 | 55 | 185 | 165 | 70 | 49 | 40 | 54 |
| 21 | 41 | 60 | 65 | 70 | 62 | 55 | 173 | 157 | 66 | 48 | 48 | 47 |
| 22 | 41 | 51 | 65 | 70 | 60 | 55 | 160 | 173 | 84 | 48 | 74 | 45 |
| 23 | 72 | 71 | 65 | 70 | 60 | 55 | 148 | 169 | 85 | 44 | 52 | 45 |
| 24 | 107 | 110 | 65 | 70 | 60 | 56 | 141 | 145 | 182 | 43 | 48 | 44 |
| 25 | 90 | 94 | 65 | 70 | 60 | 56 | 144 | 129 | 105 | 42 | 45 | 43 |
| 26 | 78 | 80 | 65 | 70 | 60 | 60 | 152 | 120 | 78 | 73 | 43 | 42 |
| 27 | 66 | 70 | 84 | 70 | 60 | 64 | 142 | 113 | 71 | 96 | 41 | 41 |
| 28 | 58 | 65 | 348 | 70 | 60 | 83 | 131 | 108 | 138 | 62 | 41 | 41 |
| 29 | 55 | 65 | 150 | 74 | 60 | 91 | 124 | 104 | 124 | 53 | 41 | 41 |
| 30 | 52 | 60 | 120 | 73 | ----- | 136 | 131 | 106 | 85 | 50 | 40 | 45 |
| 31 | 61 | ----- | 100 | 73 | ----- | 259 | ----- | 133 | ----- | 49 | 38 | ----- |
| Total | 1,793 | 2,284 | 2,648 | 2,255 | 1,923 | 2,121 | 6,915 | 4,398 | 2,688 | 1,721 | 1,448 | 1,255 |
| Mean | 57.8 | 76.1 | 85.4 | 72.7 | 66.3 | 68.4 | 230 | 142 | 89.6 | 55.5 | 46.7 | 41.8 |
| Cfsm | 0.688 | 0.906 | 1.02 | 0.865 | 0.789 | 0.814 | 2.74 | 1.69 | 1.07 | 0.661 | 0.556 | 0.498 |
| In. | 0.79 | 1.01 | 1.18 | 1.00 | 0.85 | 0.94 | 3.06 | 1.95 | 1.19 | 0.76 | 0.64 | 0.56 |

Calendar year 1959: Max 809 Min 27 Mean 74.1 Cfsm 0.882 In. 11.96
Water year 1959-60: Max 466 Min 36 Mean 85.9 Cfsm 1.02 In. 13.93

Peak discharge (base, 300 cfs).--Dec. 28 (3 p.m.) 449 cfs (6.01 ft); Apr. 4 (6 p.m.) 499 cfs (6.29 ft); Apr. 12 (11:30 p.m.) 367 cfs (5.48 ft); Apr. 18 (9 a.m.) 377 cfs (5.55 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 17-21, 26-30, Dec. 14, 19-26, Dec. 29 to Jan. 28, Feb. 2-5, 8, Feb. 10 to Mar. 26.

1385. Au Gres River near National City, Mich.

Location.--Lat 44°10'45", long 83°44'15", in NW $\frac{1}{4}$ sec.32, T.21 N., R.6 E., on left bank 20 ft downstream from highway bridge, 1 $\frac{1}{2}$ miles upstream from Elm Creek, 4 miles southwest of National City, 12 $\frac{1}{2}$ miles southwest of Tawas City, and 15 $\frac{1}{2}$ miles upstream from mouth.

Drainage area.--169 sq mi.

Records available.--November 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 710 ft (by barometer). Prior to Oct. 1, 1951, wire-weight gage at site 1.7 miles upstream at different datum.

Average discharge.--9 years (1951-60), 103 cfs.

Extremes.--Maximum discharge during year, about 2,100 cfs Mar. 31; maximum gage height, 9.04 ft Mar. 31 (backwater from ice); minimum discharge, 11 cfs Sept. 1.

1950-60: Maximum discharge, 2,480 cfs Apr. 4, 1959 (gage height, 7.87 ft), from rating curve extended above 1,100 cfs by logarithmic plotting; maximum gage height, 10.5 ft Feb. 21, 1953 (ice jam); minimum discharge, 8.4 cfs Aug. 26, 1957.

Remarks.--Records good except those for periods of ice effect, which are poor.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 9-24)

Oct. 1 to Nov. 5

Nov. 6 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-------|-----|----|-----|-------|
| 1.0 | 22 | 1.2 | 56 | 5.0 | 865 | 0.8 | 15 | 2.0 | 188 |
| 1.4 | 64 | 2.0 | 178 | 7.0 | 1,980 | 1.0 | 32 | 5.0 | 970 |
| 2.0 | 162 | 4.0 | 583 | | | 1.5 | 98 | 7.0 | 1,980 |
| 4.0 | 583 | | | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 30 | 77 | 94 | 150 | 90 | 76 | 1,300 | 226 | 86 | 88 | 22 | 17 |
| 2 | 28 | 70 | 96 | 140 | 90 | 74 | 1,100 | 170 | 90 | 66 | 21 | 18 |
| 3 | 27 | 63 | 104 | 130 | 88 | 72 | 1,150 | 145 | 86 | 60 | 22 | 17 |
| 4 | 27 | 110 | 131 | 130 | 88 | 70 | 1,300 | 126 | 77 | 54 | 21 | 18 |
| 5 | 52 | 427 | 155 | 120 | 90 | 68 | 1,040 | 114 | 72 | 46 | 20 | 20 |
| 6 | 98 | 280 | 222 | 120 | 92 | 66 | 683 | 106 | 68 | 43 | 20 | 18 |
| 7 | 122 | 161 | 140 | 120 | 92 | 64 | 675 | 136 | 65 | 40 | 29 | 17 |
| 8 | 97 | 123 | 110 | 120 | 92 | 62 | 568 | 131 | 61 | 34 | *44 | 17 |
| 9 | 121 | 106 | 100 | 120 | 92 | 62 | 530 | 210 | 57 | 30 | 32 | 16 |
| 10 | 78 | *101 | 100 | 120 | 90 | 60 | 442 | 535 | 55 | 28 | 45 | 15 |
| 11 | 91 | 96 | 100 | 120 | 88 | 60 | 505 | 402 | 45 | 27 | 30 | 15 |
| 12 | 81 | 92 | 105 | *120 | 86 | 60 | 690 | 275 | 43 | 26 | 24 | *15 |
| 13 | 65 | 88 | 110 | 125 | 85 | 60 | 655 | 215 | *40 | *25 | 21 | 17 |
| 14 | 62 | 92 | 110 | 125 | 85 | *60 | *618 | 196 | 42 | 25 | 21 | 18 |
| 15 | 58 | 85 | *115 | 125 | 84 | 60 | 530 | 180 | 65 | 27 | 28 | 17 |
| 16 | 68 | 85 | 119 | 125 | *82 | 60 | 412 | *160 | 52 | 25 | 22 | 18 |
| 17 | 63 | 85 | 134 | 120 | 82 | 60 | 446 | 240 | 65 | 25 | 21 | 19 |
| 18 | 59 | 82 | 116 | 115 | 84 | 60 | 789 | 402 | 56 | 29 | 20 | 23 |
| 19 | 56 | 80 | 100 | 115 | 84 | 60 | *499 | 265 | 50 | 29 | 19 | 26 |
| 20 | *53 | 80 | 100 | 115 | 84 | 60 | 362 | 278 | 44 | 27 | 18 | 34 |
| 21 | 56 | 76 | 100 | 110 | 84 | 60 | 300 | 260 | 40 | 24 | 18 | 26 |
| 22 | 57 | 77 | 100 | 110 | 84 | 60 | 268 | 315 | 36 | 25 | 20 | 24 |
| 23 | 82 | 102 | 95 | 110 | 82 | 60 | 230 | 278 | 36 | 36 | 19 | 24 |
| 24 | 172 | 288 | 95 | 105 | 80 | 60 | 208 | 202 | 583 | 22 | 20 | 23 |
| 25 | 117 | 160 | 90 | 105 | 80 | 62 | 238 | 182 | 172 | 22 | 19 | 22 |
| 26 | 91 | 140 | 84 | 100 | 78 | 70 | 280 | 153 | 83 | 48 | 18 | 23 |
| 27 | 77 | 110 | 150 | 100 | 78 | 90 | 250 | 135 | 64 | 90 | 18 | 22 |
| 28 | 68 | 100 | 600 | 98 | 76 | 130 | 194 | 117 | 304 | 46 | 18 | 20 |
| 29 | 62 | 95 | 350 | 96 | 76 | 164 | 250 | 164 | 403 | 31 | 19 | 20 |
| 30 | 62 | 95 | 220 | 94 | ----- | 450 | 164 | 89 | 144 | 31 | 20 | 22 |
| 31 | 70 | ----- | 170 | 92 | ----- | 1,700 | ----- | 117 | ----- | 25 | 18 | ----- |
| Total | 2,250 | 3,626 | 4,415 | 3,595 | 2,466 | 4,266 | 16,590 | 6,454 | 3,084 | 1,154 | 707 | 601 |
| Mean | 72.6 | 121 | 142 | 116 | 85.0 | 138 | 553 | 208 | 103 | 37.2 | 22.8 | 20.0 |
| Cfsm | 0.430 | 0.718 | 0.840 | 0.686 | 0.503 | 0.817 | 3.27 | 1.23 | 0.609 | 0.220 | 0.135 | 0.118 |
| In. | 0.50 | 0.80 | 0.97 | 0.79 | 0.54 | 0.94 | 3.65 | 1.42 | 0.68 | 0.25 | 0.16 | 0.13 |

Calendar year 1959: Max 2,040

Min 13

Mean 119

Cfsm 0.704

In. 9.49

Water year 1959-60: Max 1,700

Min 15

Mean 134

Cfsm 0.793

In. 10.83

Peak discharge (base, 600 cfs).--Dec. 28 (time unknown) about 900 cfs; Mar. 31 (time unknown) about 2,100 cfs; Apr. 4 (12 m.) about 1,600 cfs; Apr. 13 (1 a.m.) 718 cfs (4.15 ft); Apr. 18 (9 a.m.) 891 cfs (4.77 ft); May 10 (10 a.m.) 602 cfs (3.54 ft); June 24 (9 a.m.) 873 cfs (4.71 ft); June 28 (8 p.m.) 745 cfs (4.26 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15-20, 25-30, Dec. 7-14, 19-25, Dec. 27 to Mar. 31, Apr. 2-4 (no gage-height record Dec. 28, Mar. 9-14).

1390. Houghton Creek near Lupton, Mich.

Location.--Lat 44°23'50", long 84°02'55", in SE $\frac{1}{4}$ sec.10, T.23 N., R.3 E., on right bank half a mile upstream from mouth, 3 miles downstream from Wilkins Creek, and 3 miles southwest of Lupton.

Drainage area.--27 sq mi, approximately.

Records available.--July 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 860 ft (by barometer).

Average discharge.--10 years, 51.8 cfs.

Extremes.--Maximum discharge during year, 248 cfs Mar. 31 (gage height, 4.68 ft); minimum, 31 cfs Mar. 9.

1950-60: Maximum discharge, 955 cfs May 20, 1959 (gage height, 7.15 ft), from rating curve extended above 400 cfs on basis of slope-area measurement of peak flow; minimum, 28 cfs Feb. 1, 1953, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. Intermittent regulation at low flow by sawmill on Sandback Creek at Rose City prior to June 1955 and since November 1958. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | |
|-----|-----|
| 2.2 | 31 |
| 3.0 | 88 |
| 4.0 | 180 |
| 5.0 | 281 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 40 | 45 | 44 | 52 | 44 | 38 | 139 | 84 | 49 | 39 | 42 | 37 |
| 2 | 39 | 45 | 44 | 49 | 41 | 40 | 126 | 59 | 54 | 39 | 42 | 38 |
| 3 | 39 | 44 | 47 | 49 | 40 | 41 | 155 | 55 | 51 | 41 | 42 | 36 |
| 4 | 39 | 58 | 51 | 47 | 41 | 58 | 190 | 50 | 46 | 39 | 42 | 37 |
| 5 | 50 | 87 | 54 | 44 | 43 | 40 | 134 | 49 | 46 | 38 | 42 | 37 |
| 6 | 50 | 66 | 60 | 41 | 46 | 39 | 93 | 49 | 45 | 38 | 41 | 36 |
| 7 | 58 | 51 | 51 | 42 | 46 | 39 | 88 | 78 | 45 | 39 | 54 | 36 |
| 8 | 46 | 47 | 46 | 43 | 46 | 38 | 87 | 66 | 44 | 38 | 49 | 35 |
| 9 | 49 | 46 | 44 | 42 | 46 | 38 | 84 | 102 | 44 | 38 | *45 | 35 |
| 10 | 44 | 49 | 43 | 42 | 45 | 38 | 82 | 155 | 44 | 38 | 46 | 35 |
| 11 | 49 | *51 | 43 | *42 | 41 | 39 | 101 | 83 | 44 | 38 | 43 | 35 |
| 12 | 44 | 46 | 47 | 43 | 40 | 39 | 108 | 64 | 44 | *38 | 42 | 36 |
| 13 | 42 | 44 | 45 | 50 | 41 | 39 | *189 | 58 | 43 | 37 | 42 | *37 |
| 14 | 41 | 46 | *42 | 48 | 41 | 40 | 169 | 56 | *46 | 37 | 42 | 36 |
| 15 | 41 | 44 | 43 | 47 | *42 | *41 | 118 | 53 | 51 | 38 | 42 | 36 |
| 16 | 41 | 44 | 48 | 45 | 42 | 41 | 93 | 49 | 45 | 38 | 41 | 36 |
| 17 | 40 | 42 | 51 | 44 | 42 | 41 | 180 | *80 | 59 | 39 | 41 | 40 |
| 18 | 40 | 42 | 48 | 44 | 42 | 41 | 186 | 83 | 48 | 42 | 41 | 39 |
| 19 | *40 | 42 | 44 | 44 | 42 | 41 | *92 | 58 | 48 | 41 | 41 | 44 |
| 20 | 41 | 42 | 42 | 44 | 42 | 41 | 71 | 72 | 44 | 39 | 41 | 43 |
| 21 | 41 | 43 | 41 | 43 | 42 | 40 | 63 | 63 | 42 | 40 | 42 | 39 |
| 22 | 41 | 43 | 40 | 43 | 42 | 39 | 58 | 74 | 42 | 40 | 41 | 39 |
| 23 | 63 | 51 | 41 | 43 | 39 | 39 | 56 | 71 | 42 | 38 | 41 | 41 |
| 24 | 89 | 72 | 41 | 43 | 39 | 39 | 55 | 59 | 51 | 38 | 41 | 40 |
| 25 | 56 | 58 | 41 | 43 | 39 | 39 | 60 | 54 | 44 | 38 | 40 | 41 |
| 26 | 49 | 51 | 42 | 43 | 42 | 41 | 69 | 51 | 41 | 60 | 40 | 41 |
| 27 | 45 | 48 | 54 | 44 | 42 | 46 | 61 | 50 | 41 | 80 | 38 | 39 |
| 28 | 44 | 46 | 167 | 44 | 40 | 74 | 54 | 49 | 42 | 45 | 38 | 39 |
| 29 | 42 | 44 | 96 | 44 | 39 | 82 | 50 | 48 | 43 | 42 | 40 | 39 |
| 30 | 42 | 44 | 86 | 44 | ----- | 131 | 60 | 50 | 40 | 42 | 38 | 39 |
| 31 | 45 | ----- | 57 | 44 | ----- | 231 | ----- | 57 | ----- | 42 | 36 | ----- |
| Total | 1,450 | 1,491 | 1,623 | 1,380 | 1,217 | 1,596 | 3,071 | 2,029 | 1,368 | 1,279 | 1,296 | 1,141 |
| Mean | 46.1 | 49.7 | 52.4 | 44.5 | 42.0 | 51.5 | 102 | 65.5 | 45.6 | 41.3 | 41.8 | 38.0 |
| Cfsm | 1.71 | 1.84 | 1.94 | 1.65 | 1.56 | 1.91 | 3.78 | 2.43 | 1.69 | 1.53 | 1.55 | 1.41 |
| In. | 1.97 | 2.05 | 2.24 | 1.90 | 1.68 | 2.20 | 4.22 | 2.80 | 1.89 | 1.76 | 1.79 | 1.57 |

Calendar year 1959: Max 580 Min 33 Mean 55.7 Cfsm 2.06 In. 28.02
 Water year 1959-60: Max 231 Min 35 Mean 51.7 Cfsm 1.91 In. 26.07

Peak discharge (base, 150 cfs).--Dec. 28 (2 p.m.) 195 cfs (4.15 ft); Mar. 31 (10 a.m.) 248 cfs (4.68 ft); Apr. 4 (6 a.m.) 214 cfs (4.34 ft); Apr. 13 (1 a.m.) 201 cfs (4.21 ft); Apr. 17 (7 p.m.) 238 cfs (4.58 ft); May 10 (8 to 9 a.m.) 182 cfs (4.02 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17, 18, Dec. 22, Jan. 6, 7, Feb. 2-4, 10-15, 23-25, Feb. 28 to Mar. 2, Mar. 5-13, 21-25.

1395. Rifle River at "The Ranch" near Lupton, Mich.

Location.--Lat 44°23'35", long 84°02'15", in SW $\frac{1}{4}$ sec.11, T.23 N., R.3 E., on left bank a quarter of a mile downstream from Houghton Creek and 3 miles southwest of Lupton.

Drainage area.--54 sq mi, approximately.

Records available.--July 1950 to September 1960.

Gage.--Water-stage recorder and wooden control. Altitude of gage is 850 ft (by barometer).

Average discharge.--10 years, 91.5 cfs.

Extremes.--Maximum discharge during year, 370 cfs Apr. 18 (gage height, 9.10 ft); minimum, 60 cfs Sept. 10, 11, 12.

1950-60: Maximum discharge, 1,330 cfs May 20, 1959 (gage height, 10.10 ft); minimum, 48 cfs Oct. 8, 1952.

Remarks.--Records good except those for periods of ice effect, which are fair. Occasional regulation by dams above station. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 23, 24, Aug. 27 to Sept. 30)

| Oct. 1 to Nov. 18, June 25 to Sept. 30 | | Nov. 19 to June 24 | |
|---|-----|--------------------|-----|
| 6.2 | 59 | 6.4 | 70 |
| 7.0 | 98 | 7.0 | 105 |
| 8.0 | 191 | 8.0 | 206 |
| | | 9.0 | 345 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 70 | 82 | 83 | 100 | 80 | 70 | 234 | 149 | 87 | 68 | 70 | 66 |
| 2 | 74 | 82 | 83 | 95 | 76 | 70 | 219 | 118 | 93 | 68 | 71 | 67 |
| 3 | 80 | 79 | 86 | 95 | 74 | 72 | 255 | 108 | 89 | 73 | 72 | 65 |
| 4 | 73 | 96 | 90 | 90 | 76 | 72 | 309 | 100 | 81 | 69 | 69 | 66 |
| 5 | 84 | 147 | 93 | 85 | 78 | 72 | 257 | 90 | 78 | 68 | 69 | 65 |
| 6 | 90 | 120 | 105 | 82 | 84 | 72 | 202 | 86 | 77 | 67 | 69 | 63 |
| 7 | 100 | 102 | 94 | 85 | 83 | 73 | 184 | 129 | 76 | 67 | 82 | 62 |
| 8 | 88 | 94 | 89 | 86 | 82 | 70 | 175 | 121 | 74 | 66 | 82 | 62 |
| 9 | 89 | 91 | 85 | 83 | 82 | 70 | 165 | 166 | 73 | 65 | *77 | 61 |
| 10 | 81 | 90 | 82 | 83 | 90 | 70 | 158 | 240 | 72 | 65 | 78 | 61 |
| 11 | 86 | *92 | 81 | *81 | 76 | 70 | 181 | 175 | 72 | 65 | 74 | 61 |
| 12 | 80 | 86 | 88 | 83 | 75 | 70 | 243 | 145 | 72 | *65 | 72 | 61 |
| 13 | 77 | 84 | 86 | 97 | 75 | 72 | *307 | 128 | 72 | 65 | 70 | *61 |
| 14 | 75 | 84 | *82 | 94 | 75 | 73 | 286 | 119 | *76 | 65 | 72 | 61 |
| 15 | 74 | 75 | 83 | 92 | *75 | *73 | 237 | 111 | 91 | 65 | 73 | 61 |
| 16 | 74 | 81 | 88 | 89 | 76 | 74 | 208 | 103 | 80 | 65 | 70 | 61 |
| 17 | 73 | 76 | 92 | 86 | 78 | 75 | 284 | *139 | 104 | 68 | 69 | 64 |
| 18 | 72 | 72 | 88 | 87 | 78 | 75 | 329 | 151 | 87 | 76 | 68 | 64 |
| 19 | *70 | 81 | 83 | 86 | 78 | 75 | *224 | 121 | 85 | 72 | 68 | 72 |
| 20 | 71 | 80 | 78 | 84 | 77 | 74 | *175 | 137 | 78 | 68 | 68 | 72 |
| 21 | 70 | 82 | 78 | 82 | 74 | 72 | 150 | 128 | 74 | 69 | 70 | 66 |
| 22 | 70 | 82 | 76 | 81 | 72 | 72 | 137 | 146 | 72 | 70 | 80 | 66 |
| 23 | 101 | 81 | 76 | 81 | 72 | 70 | 134 | 155 | 72 | 67 | 72 | 67 |
| 24 | 141 | 120 | 76 | 81 | 72 | 70 | 132 | 139 | 83 | 66 | 70 | 66 |
| 25 | 112 | 107 | 77 | 81 | 72 | 70 | 137 | 120 | 76 | 65 | 68 | 66 |
| 26 | 97 | 97 | 78 | 81 | 76 | 74 | 145 | 108 | 71 | 101 | 67 | 66 |
| 27 | 89 | 92 | 92 | 81 | 75 | 78 | 132 | 100 | 70 | 152 | 66 | 65 |
| 28 | 84 | 87 | 226 | 80 | 72 | 114 | 119 | 94 | 74 | 85 | 66 | 65 |
| 29 | 81 | 84 | 164 | 80 | 72 | 125 | 110 | 90 | 75 | 76 | 68 | 64 |
| 30 | 79 | 83 | 135 | 80 | ----- | 186 | 116 | 92 | 70 | 74 | 67 | 64 |
| 31 | 83 | ----- | 110 | 80 | ----- | 307 | ----- | 100 | ----- | 72 | 65 | ----- |
| Total | 2,588 | 2,719 | 2,927 | 2,651 | 2,215 | 2,680 | 5,944 | 3,908 | 2,354 | 2,247 | 2,202 | 1,931 |
| Mean | 83.5 | 90.6 | 94.4 | 85.5 | 76.4 | 86.5 | 198 | 126 | 78.5 | 72.5 | 71.0 | 64.4 |
| Cfs/m | 1.55 | 1.68 | 1.75 | 1.58 | 1.41 | 1.60 | 3.67 | 2.33 | 1.45 | 1.34 | 1.31 | 1.19 |
| In. | 1.79 | 1.87 | 2.02 | 1.82 | 1.52 | 1.84 | 4.10 | 2.69 | 1.62 | 1.54 | 1.51 | 1.33 |

Calendar year 1959: Max 807 Min 58 Mean 100 Cfs/m 1.85 In. 25.14
Water year 1959-60: Max 329 Min 61 Mean 93.9 Cfs/m 1.74 In. 23.65

Peak discharge (base, 250 cfs).--Dec. 28 (3 p.m.) 253 cfs (8.42 ft); Mar. 31 (11:30 a.m.) 333 cfs (8.94 ft); Apr. 4 (6:30 a.m.) 335 cfs (8.95 ft); Apr. 14 (1 to 3 a.m.) 319 cfs (8.87 ft); Apr. 18 (2 to 4 a.m.) 370 cfs (9.10 ft); May 10 (10 a.m.) 261 cfs (8.48 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 17, 18, Dec. 31 to Jan. 7, Feb. 2-4, 10-15, 21-25, Feb. 28 to Mar. 6, Mar. 8-13, 21-25.

1400. Prior Creek near Selkirk, Mich.

Location.--Lat 44°20'10", long 84°04'00", in SE $\frac{1}{4}$ sec.33, T.23 N., R.3 E., on right bank a quarter of a mile upstream from mouth, half a mile downstream from Ammond Creek, and $\frac{1}{2}$ miles north of Selkirk.

Drainage area.--19 sq mi, approximately.

Records available.--September 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 840 ft (by barometer).

Average discharge.--10 years, 16.6 cfs.

Extremes.--Maximum discharge during year, 325 cfs Mar. 31 (gage height, 5.19 ft); minimum, 5.4 cfs July 26, 27.

1950-60: Maximum discharge, 584 cfs May 20, 1959 (gage height, 5.64 ft); minimum, 3.8 cfs Sept. 10, 1950.

Remarks.--Records good except those for periods of ice effect, which are poor. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 12-23)

Oct. 1 to Nov. 5

Nov. 6 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 1.3 | 7.0 | 1.3 | 5.5 | 4.0 | 118 |
| 2.0 | 24 | 1.6 | 12 | 4.5 | 158 |
| 3.0 | 54 | 2.5 | 42 | 5.0 | 250 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|-------|-------|------|-------|------|-------|-------|-------|-------|
| 1 | 8.6 | 16 | 15 | 23 | 12 | 11 | 138 | 34 | 17 | 7.8 | 6.9 | 7.5 |
| 2 | 8.6 | 15 | 15 | 18 | 12 | 11 | 112 | 29 | 16 | 7.3 | 6.9 | 7.3 |
| 3 | 8.6 | 14 | 17 | 17 | 11 | 11 | 125 | 25 | 16 | 9.0 | 6.9 | 6.9 |
| 4 | 8.6 | 20 | 22 | 16 | 11 | 11 | 149 | 22 | 13 | 6.0 | 6.7 | 7.5 |
| 5 | 13 | 51 | 26 | 15 | 11 | 11 | 110 | 19 | 12 | 7.5 | 6.5 | 7.3 |
| 6 | 16 | 50 | 39 | 15 | 12 | 12 | 72 | 18 | 11 | 7.3 | 6.3 | 7.1 |
| 7 | 18 | 26 | 23 | 15 | 12 | 12 | 69 | 27 | 10 | 7.8 | 10 | 6.9 |
| 8 | 16 | 19 | 17 | 15 | 12 | 12 | 64 | 32 | 9.5 | 7.1 | 10 | 6.7 |
| 9 | 16 | 16 | 14 | 15 | 12 | 12 | 58 | 42 | 9.2 | 6.7 | *8.2 | 6.5 |
| 10 | 13 | 18 | 13 | 15 | 12 | 11 | 51 | 100 | 8.8 | 6.5 | 10 | 6.3 |
| 11 | 16 | *19 | 12 | *15 | 12 | 11 | 62 | 59 | 8.5 | 6.5 | 7.8 | 6.5 |
| 12 | 14 | 15 | 12 | 15 | 11 | 11 | 94 | 34 | 8.5 | 6.5 | 6.9 | 6.7 |
| 13 | 12 | 14 | 13 | 16 | 11 | 11 | *106 | 27 | 8.2 | 6.3 | 6.5 | *6.9 |
| 14 | 11 | 14 | *13 | 16 | 11 | 12 | 95 | 26 | *10 | *6.9 | 7.1 | 6.9 |
| 15 | 10 | 13 | 14 | 16 | *11 | *12 | 76 | 23 | 16 | 6.9 | 7.8 | 6.9 |
| 16 | 10 | 14 | 20 | 16 | 11 | 12 | 53 | 21 | 13 | 5.9 | 6.9 | 6.9 |
| 17 | 10 | 13 | 27 | 15 | 11 | 12 | 94 | *37 | 22 | 6.1 | 6.5 | 7.5 |
| 18 | 9.8 | 13 | 22 | 15 | 12 | 12 | 116 | 64 | 18 | 6.9 | 6.3 | 7.8 |
| 19 | 9.2 | 12 | 15 | 14 | 12 | 12 | *57 | 30 | 14 | 6.7 | 6.1 | 10 |
| 20 | *9.2 | 12 | 14 | 14 | 12 | 12 | 36 | 37 | 12 | 6.3 | 5.9 | 11 |
| 21 | 9.2 | 13 | 13 | 14 | 12 | 12 | 30 | 35 | 10 | 6.5 | 7.5 | 8.0 |
| 22 | 9.2 | 13 | 13 | 14 | 12 | 12 | 27 | 33 | 9.5 | 6.9 | 7.8 | 7.8 |
| 23 | 22 | 17 | 12 | 14 | 11 | 12 | 23 | 39 | 9.8 | 6.1 | 6.9 | 8.2 |
| 24 | 44 | 42 | 12 | 14 | 11 | 12 | 22 | 29 | 14 | 5.9 | 6.9 | 7.5 |
| 25 | 34 | 35 | 12 | 13 | 11 | 12 | 27 | 22 | 12 | 5.7 | 6.5 | 8.0 |
| 26 | 22 | 25 | 12 | 13 | 12 | 13 | 34 | 20 | 9.5 | 17 | 6.5 | 7.8 |
| 27 | 18 | 18 | 20 | 13 | 12 | 14 | 37 | 18 | 8.8 | 26 | 6.3 | 7.1 |
| 28 | 16 | 16 | 139 | 13 | 12 | 17 | 29 | 16 | 11 | 12 | 6.3 | 6.9 |
| 29 | 14 | 16 | 70 | 13 | 12 | 30 | 25 | 15 | 10 | 8.5 | 6.7 | 6.9 |
| 30 | 13 | 15 | 40 | 13 | ----- | 126 | 23 | 16 | 8.5 | 8.2 | 6.7 | 6.9 |
| 31 | 15 | ----- | 30 | 13 | ----- | 248 | ----- | 22 | ----- | 7.3 | 6.5 | ----- |
| Total | 454.0 | 594 | 736 | 463 | 336 | 739 | 2,014 | 971 | 355.8 | 248.1 | 221.8 | 222.2 |
| Mean | 14.6 | 19.8 | 23.7 | 14.9 | 11.6 | 23.8 | 67.1 | 31.3 | 11.9 | 8.00 | 7.15 | 7.41 |
| Cfsm | 0.768 | 1.04 | 1.25 | 0.784 | 0.611 | 1.25 | 3.53 | 1.65 | 0.626 | 0.421 | 0.376 | 0.390 |
| In. | 0.89 | 1.16 | 1.44 | 0.90 | 0.66 | 1.44 | 3.94 | 1.90 | 0.70 | 0.49 | 0.43 | 0.44 |

Calendar year 1959: Max 379 Min 5.0 Mean 19.4 Cfsm 1.02 In. 13.82
Water year 1959-60: Max 248 Min 5.7 Mean 20.1 Cfsm 1.06 In. 14.39

Peak discharge (base, 100 cfs).--Dec. 28 (10:30 a.m.) 203 cfs (4.79 ft); Mar. 31 (3 to 4 a.m.) 325 cfs (5.19 ft); Apr. 4 (8 a.m.) 164 cfs (4.55 ft); Apr. 13 (8 to 9 a.m.) 116 cfs (3.97 ft); Apr. 17 (8 to 9 p.m.) 143 cfs (4.34 ft); May 10 (1 p.m.) 129 cfs (4.12 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 17-20, 25-29, Dec. 7-14, 19-23, Dec. 29 to Mar. 29.

1405. Rifle River at Selkirk, Mich.

Location.--Lat 44°18'50", long 84°04'00", in NE $\frac{1}{4}$ sec. 9, T.22 N., R.3 E., on left bank at upstream side of highway bridge at Selkirk, $\frac{1}{2}$ miles downstream from Prior Creek.

Drainage area.--110 sq mi.

Records available.--September 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 828.47 ft above mean sea level, datum of 1929.

Average discharge.--10 years, 144 cfs.

Extremes.--Maximum discharge during year, 695 cfs Apr. 4 (gage height, 3.45 ft); minimum, 74 cfs July 14.

1950-60: Maximum discharge, 2,760 cfs May 20, 1959 (gage height, 6.76 ft); minimum, 55 cfs Aug. 19, 1958.

Remarks.--Records good except those for periods of ice effect, which are fair. Some regulation from dams above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 23 to Sept. 30)

| | |
|-----|-----|
| 1.5 | 61 |
| 2.0 | 172 |
| 3.0 | 500 |
| 4.0 | 970 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 95 | 126 | 123 | 170 | 117 | 105 | 524 | 245 | 153 | 103 | 89 | 83 |
| 2 | 97 | 123 | 123 | 165 | 115 | 105 | 479 | 198 | 153 | 95 | 89 | 85 |
| 3 | 112 | 119 | 128 | 160 | 110 | 105 | 540 | 186 | 153 | 99 | 91 | 83 |
| 4 | 103 | 138 | 140 | 160 | 110 | 105 | 685 | 172 | 135 | 97 | 91 | 85 |
| 5 | 117 | 257 | 148 | 150 | 114 | 105 | 580 | 158 | 128 | 93 | 85 | 85 |
| 6 | 140 | 221 | 178 | 145 | 123 | 105 | 430 | 148 | 121 | 91 | 83 | 81 |
| 7 | 153 | 169 | 156 | 145 | 128 | 105 | 395 | 218 | 117 | 91 | 101 | 81 |
| 8 | 135 | 150 | 140 | 140 | 115 | 105 | 360 | 221 | 114 | 87 | 114 | 77 |
| 9 | 135 | *143 | 151 | 140 | 115 | 100 | 332 | 290 | 108 | 85 | *99 | 77 |
| 10 | 121 | 140 | 123 | 140 | 115 | 100 | 314 | 458 | 106 | 83 | 108 | 77 |
| 11 | 131 | 143 | 121 | *135 | 115 | 100 | 353 | 374 | 103 | 83 | 93 | 77 |
| 12 | 123 | 135 | 133 | 125 | 110 | 100 | 476 | 269 | 103 | 77 | 87 | 79 |
| 13 | 112 | 128 | 133 | 145 | 110 | 100 | *584 | 230 | 101 | 75 | 81 | *79 |
| 14 | 108 | 151 | *121 | 148 | 110 | *93 | 584 | 216 | *108 | *76 | 85 | 81 |
| 15 | 106 | 120 | 123 | 145 | *110 | 101 | 472 | 204 | 145 | 77 | 91 | 79 |
| 16 | 106 | 123 | 138 | 138 | 110 | 99 | 384 | 186 | 123 | 77 | 83 | 81 |
| 17 | 103 | 120 | 153 | 135 | 110 | 103 | 506 | *242 | 161 | 77 | 81 | 85 |
| 18 | 99 | 110 | 143 | 133 | 105 | 103 | 650 | 318 | 138 | 93 | 79 | 89 |
| 19 | *99 | 121 | 128 | 130 | 105 | 103 | *458 | 233 | 126 | 93 | 77 | 97 |
| 20 | 97 | 112 | 120 | 128 | 105 | 103 | 325 | 248 | 117 | 87 | 75 | 114 |
| 21 | 97 | 114 | 110 | 125 | 105 | 100 | 269 | 239 | 106 | 85 | 81 | 95 |
| 22 | 97 | 117 | 110 | 125 | 105 | 100 | 239 | 266 | 103 | 87 | 99 | 93 |
| 23 | 153 | 133 | 105 | 123 | 100 | 100 | 218 | 290 | 107 | 81 | 89 | 95 |
| 24 | 236 | 192 | 108 | 121 | 100 | 100 | 210 | 251 | 133 | 77 | 91 | 93 |
| 25 | 186 | 178 | 108 | 121 | 105 | 100 | 221 | 221 | 126 | 75 | 87 | 93 |
| 26 | 153 | 156 | 110 | 120 | 105 | 105 | 254 | 195 | 112 | 132 | 85 | 93 |
| 27 | 140 | 145 | 138 | 120 | 105 | 110 | 236 | 181 | 108 | 227 | 83 | 89 |
| 28 | 128 | 135 | 426 | 119 | 105 | 169 | 204 | 167 | 119 | 128 | 81 | 87 |
| 29 | 123 | 150 | 318 | 119 | 105 | 210 | 186 | 158 | 121 | 106 | 85 | 87 |
| 30 | 119 | 123 | 230 | 119 | ----- | 353 | 189 | 153 | 110 | 101 | 85 | 87 |
| 31 | 123 | ----- | 200 | 119 | ----- | 588 | ----- | 184 | ----- | 95 | 81 | ----- |
| Total | 3,847 | 4,252 | 4,666 | 4,206 | 3,185 | 4,086 | 11,837 | 7,119 | 3,658 | 2,933 | 2,729 | 2,587 |
| Mean | 124 | 142 | 151 | 136 | 110 | 132 | 388 | 230 | 122 | 94.6 | 88.0 | 86.2 |
| Cfsm | 1.13 | 1.29 | 1.37 | 1.24 | 1.00 | 1.20 | 3.53 | 2.09 | 1.11 | 0.860 | 0.800 | 0.784 |
| In. | 1.30 | 1.44 | 1.58 | 1.43 | 1.08 | 1.38 | 3.94 | 2.41 | 1.24 | 0.99 | 0.92 | 0.87 |

Calendar year 1959: Max 2,200 Min 70 Mean 162 Cfsm 1.47 In. 20.06
Water year 1959-60: Max 665 Min 75 Mean 150 Cfsm 1.36 In. 18.58

Peak discharge (base, 500 cfs).--Mar. 31 (9 to 10 p.m.) 608 cfs (3.27 ft); Apr. 4 (8 to 9 p.m.) 695 cfs (3.45 ft); Apr. 15 (1 to 7 p.m.) 596 cfs (3.24 ft); Apr. 18 (2 to 3 a.m.) 680 cfs (3.42 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 17, 18, 28, 29, Dec. 20-23, Dec. 30 to Jan. 11, Jan. 19, 21, 22, 26, 27, Feb. 2-4, 8-16, Feb. 18 to Mar. 13, Mar. 21-26.

1410. South Branch Shepards Creek near Selkirk, Mich.

Location.--Lat 44°18'25", long 84°05'10", in SE $\frac{1}{4}$ sec.8, T.22 N., R.3 E., on right bank 200 Ft upstream from mouth and 1 mile southwest of Selkirk.

Drainage area.--1.20 sq mi.

Records available.--October 1951 to September 1960.

Gage.--Water-stage recorder and V-notch sharp-crested weir. Altitude of gage is 845 ft (by barometer).

Average discharge.--9 years, 0.558 cfs.

Extremes.--Maximum discharge during year, 63 cfs Mar. 30 (gage height, 3.48 ft), from rating curve extended above 40 cfs by logarithmic plotting; no flow part of each day July 24, 25, 26.
1951-60: Maximum discharge, 181 cfs Apr. 3, 1956 (gage height, 4.42 ft), from rating curve extended above 40 cfs by logarithmic plotting; no flow at times each year, except 1956.

Remarks.--Records fair except those below 1 cfs and those for periods of ice effect or no gage-height record, which are poor.

Revisions (water years).--WSP 1557: 1952(M), 1954(M), 1955(P).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Dec. 28, Apr. 18 to Sept. 30 | | | | Dec. 29 to Apr. 17 | | | |
|---|------|-----|-----|--------------------|------|-----|-----|
| 1.1 | 0.01 | 1.8 | 1.6 | 1.1 | 0.01 | 1.9 | 2.1 |
| 1.2 | .06 | 1.9 | 2.4 | 1.2 | .05 | 2.1 | 4.5 |
| 1.3 | .17 | 2.1 | 5.1 | 1.3 | .13 | 2.5 | 12 |
| 1.4 | .40 | 2.2 | 6.8 | 1.4 | .26 | 2.7 | 17 |
| 1.5 | .91 | | | 1.5 | .71 | 3.0 | 29 |
| | | | | 1.6 | | | |
| | | | | 1.8 | 1.5 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 0.05 | 0.23 | 0.33 | 0.50 | 0.16 | 0.11 | 8.6 | 0.70 | 0.19 | 0.05 | 0.08 | 0.08 |
| 2 | .04 | .19 | .33 | .46 | .15 | .10 | 10 | .48 | .23 | .04 | .06 | .07 |
| 3 | .04 | .17 | .45 | .48 | .14 | .08 | 10 | .40 | .14 | .05 | .04 | .04 |
| 4 | .04 | 2.1 | .80 | .39 | .13 | .08 | 8.2 | .31 | .12 | .04 | .03 | .06 |
| 5 | .36 | 3.9 | 1.6 | .25 | .14 | .08 | 4.5 | .26 | .10 | .03 | .03 | .04 |
| 6 | .26 | 1.4 | 2.6 | .18 | .20 | .08 | 2.8 | .23 | .10 | .03 | .02 | .03 |
| 7 | .53 | .85 | 1.2 | .16 | .19 | .07 | 3.6 | .80 | .10 | .04 | a.06 | .02 |
| 8 | .23 | .68 | .68 | .15 | .19 | .07 | 3.0 | .63 | .09 | .03 | a.06 | .02 |
| 9 | .41 | a.64 | .48 | .14 | .18 | .07 | 2.2 | 1.5 | .08 | .02 | a.05 | .02 |
| 10 | .21 | .60 | .36 | a.14 | .18 | .07 | 1.7 | 6.5 | .07 | .02 | a.06 | .02 |
| 11 | .40 | .52 | .28 | a.14 | .16 | .07 | 4.2 | 1.6 | .07 | .02 | a.05 | .02 |
| 12 | .23 | .36 | .50 | .15 | .13 | .07 | 6.4 | .94 | .05 | .02 | a.04 | .02 |
| 13 | .17 | .31 | .50 | *.33 | .13 | .07 | 4.6 | .65 | .05 | .01 | a.04 | .02 |
| 14 | .14 | .31 | .33 | .35 | .12 | .07 | *4.1 | a.62 | .10 | .01 | .08 | .02 |
| 15 | .12 | .23 | .36 | .50 | .11 | .07 | 1.8 | a.60 | .21 | .01 | .08 | .02 |
| 16 | .12 | .26 | .78 | .33 | .12 | .07 | 1.2 | a.90 | .13 | .01 | .06 | .02 |
| 17 | a.12 | .21 | 1.1 | .28 | .13 | .08 | 11 | 3.4 | .21 | .01 | .04 | .04 |
| 18 | a.12 | .16 | .75 | .22 | .14 | .08 | 5.4 | *2.0 | .14 | .03 | .03 | .04 |
| 19 | a.11 | .17 | .42 | .20 | .14 | .08 | 1.5 | .82 | .12 | .03 | .03 | .11 |
| 20 | .10 | .17 | .21 | .18 | .13 | .09 | *1.0 | 1.1 | .08 | *.02 | .03 | .09 |
| 21 | .09 | .19 | .16 | .17 | .13 | .09 | .82 | .82 | .09 | .02 | .06 | .06 |
| 22 | .09 | .23 | .14 | .16 | .12 | .09 | .68 | .91 | .11 | .03 | .06 | .06 |
| 23 | 1.2 | .74 | .14 | .16 | .12 | .10 | .58 | .80 | .11 | .01 | .04 | .06 |
| 24 | 3.3 | 3.2 | .14 | .16 | .10 | .10 | .48 | .54 | .38 | .01 | .04 | .06 |
| 25 | .82 | 1.5 | .16 | .16 | .10 | .10 | .58 | .38 | .12 | .01 | .03 | .06 |
| 26 | .54 | 1.0 | .17 | .16 | .11 | .10 | .82 | .31 | .08 | .88 | .03 | .06 |
| 27 | .40 | .75 | a.80 | .16 | .11 | .16 | .72 | .19 | .06 | .42 | .03 | .05 |
| 28 | .28 | .54 | a2.0 | .15 | .11 | .47 | .52 | .19 | .16 | .09 | .02 | .04 |
| 29 | .23 | .42 | 1.4 | .15 | .11 | *.4 | .42 | .17 | .12 | .06 | .03 | .04 |
| 30 | .19 | .36 | .90 | .16 | ----- | 25 | .58 | .28 | .06 | .29 | .03 | .04 |
| 31 | .28 | ----- | .65 | .16 | ----- | 20 | ----- | .42 | ----- | .11 | .03 | ----- |
| Total | 11.22 | 22.39 | 20.52 | 7.28 | 3.98 | 57.17 | 102.00 | 29.45 | 3.67 | 2.45 | 1.37 | 1.33 |
| Mean | 0.362 | 0.748 | 0.662 | 0.235 | 0.137 | 1.84 | 3.40 | 0.950 | 0.122 | 0.079 | 0.044 | 0.044 |
| Cfsm | 0.302 | 0.622 | 0.552 | 0.196 | 0.114 | 1.53 | 2.83 | 0.792 | 0.102 | 0.066 | 0.037 | 0.037 |
| In. | 0.35 | 0.69 | 0.64 | 0.23 | 0.12 | 1.76 | 3.16 | 0.91 | 0.11 | 0.08 | 0.04 | 0.04 |

Calendar year 1959: Max 33 Min 0 Mean 0.903 Cfsm 0.752 In. 10.21
Water year 1959-60: Max 25 Min 0.01 Mean 0.718 Cfsm 0.598 In. 8.13

Peak discharge (base, 10 cfs).--Dec. 27 (time unknown) 20 cfs (2.8 ft); Mar. 30 (11 p.m.) 63 cfs (3.48 ft); Apr. 3 (9 p.m.) 19 cfs (2.76 ft); Apr. 11 (9 p.m.) 11 cfs (2.44 ft); Apr. 17 (6 a.m.) 43 cfs (3.23 ft); May 10 (5 a.m.) 12 cfs (2.45 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

Note.--Stage-discharge relation affected by ice Dec. 29 to Jan. 1, Jan. 18-22, Mar. 1-10, 14-22.

1415. West Branch Rifle River near Selkirk, Mich.

Location.--Lat 44°15'40", long 84°06'30", in NE¹/₄ sec. 31, T.22 N., R.3 E., on left bank half a mile downstream from Campbell Creek, 3½ miles upstream from mouth, 4 miles southwest of Selkirk, and 6½ miles southeast of town of West Branch.

Drainage area.--52 sq mi, approximately.

Records available.--February 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 796 ft (by barometer).

Average discharge.--8 years, 60.1 cfs.

Extremes.--Maximum discharge during year, 662 cfs Dec. 28 (gage height, 7.06 ft); minimum, 29 cfs Sept. 10, 11, 12.

1952-60: Maximum discharge, 1,160 cfs Apr. 4, 1956 (gage height, 8.80 ft), from rating curve extended above 666 cfs by logarithmic plotting; minimum, 19 cfs Aug. 3, 1953.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Occasional regulation from mill about 7 miles upstream. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 2.7 | 33 | 6.0 | 450 | 2.6 | 25 | 4.5 | 180 |
| 3.0 | 56 | 7.0 | 650 | 4.0 | 133 | 6.0 | 450 |
| 4.0 | 149 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 42 | 63 | 58 | 85 | 51 | 49 | a300 | 112 | 82 | 40 | 37 | 32 |
| 2 | 39 | 58 | 60 | 75 | 50 | 48 | a250 | 90 | 75 | 38 | 35 | 32 |
| 3 | 39 | 53 | 62 | 70 | 48 | 48 | a300 | 78 | 73 | 38 | 35 | 32 |
| 4 | 39 | 92 | 77 | 70 | 48 | 49 | a350 | 70 | 56 | 39 | 32 | 32 |
| 5 | 54 | 250 | 88 | 66 | 50 | 50 | a300 | 64 | 52 | 37 | 32 | 32 |
| 6 | 82 | 171 | 120 | 65 | 54 | 50 | a230 | 62 | 48 | 37 | 31 | 32 |
| 7 | 98 | 104 | 89 | 65 | 54 | 50 | a190 | 106 | 46 | 36 | 39 | 32 |
| 8 | 78 | 86 | 74 | 65 | 54 | 48 | a180 | 104 | 43 | 33 | *50 | 31 |
| 9 | 78 | 76 | 66 | 65 | 54 | 46 | 149 | 137 | 41 | 33 | 44 | 31 |
| 10 | 62 | *75 | 60 | 65 | 52 | 46 | 138 | 232 | 40 | 31 | 47 | 30 |
| 11 | 71 | 72 | 58 | 65 | 50 | 46 | a180 | 140 | 39 | 32 | 41 | 30 |
| 12 | 66 | 66 | 58 | 68 | 50 | 45 | a260 | 103 | 39 | 33 | 37 | *30 |
| 13 | 54 | 61 | 60 | *75 | 50 | 45 | a350 | 86 | 39 | 32 | 35 | 31 |
| 14 | 50 | 62 | 60 | 72 | 52 | *45 | 298 | 78 | 41 | *30 | 38 | 31 |
| 15 | 46 | 60 | *58 | 70 | *55 | 45 | 202 | 74 | *68 | 30 | 42 | 31 |
| 16 | 46 | 60 | 69 | 65 | 56 | 45 | 153 | 66 | 51 | 30 | 38 | 31 |
| 17 | 44 | 58 | 77 | 62 | 59 | 45 | 337 | *134 | 74 | 30 | 36 | 33 |
| 18 | 43 | 56 | 65 | 62 | 55 | 45 | 377 | 155 | 62 | 32 | 34 | 34 |
| 19 | 42 | 58 | 60 | 62 | 51 | 45 | *168 | 99 | 52 | 33 | 33 | 40 |
| 20 | 43 | 56 | 60 | 62 | 49 | 45 | *123 | 114 | 45 | 30 | 32 | 46 |
| 21 | *41 | 54 | 58 | 62 | 50 | 45 | 107 | 104 | 42 | 31 | 34 | 42 |
| 22 | 41 | 54 | 58 | 60 | 48 | 45 | 96 | 100 | 40 | 35 | 36 | 37 |
| 23 | 104 | 70 | 56 | 58 | 47 | 45 | 89 | 139 | 40 | 33 | 34 | 39 |
| 24 | 280 | 147 | 56 | 57 | 47 | 45 | 84 | 98 | 52 | 31 | 34 | 38 |
| 25 | 137 | 100 | 56 | 57 | 48 | 46 | 95 | 77 | 50 | 30 | 33 | 39 |
| 26 | 91 | 85 | 58 | 56 | 50 | 47 | 120 | 66 | 42 | 39 | 33 | 40 |
| 27 | 77 | 72 | 59 | 56 | 50 | 50 | 114 | 61 | 39 | 99 | 33 | 38 |
| 28 | 68 | 70 | 53 | 55 | 50 | 105 | 90 | 59 | 45 | 52 | 32 | 38 |
| 29 | 61 | 65 | 200 | 52 | 49 | a150 | 79 | 59 | 52 | 41 | 33 | 35 |
| 30 | 58 | 60 | 130 | 53 | ----- | a250 | 82 | 61 | 44 | 40 | 33 | 34 |
| 31 | 62 | ----- | 95 | 52 | ----- | a450 | ----- | 137 | ----- | 39 | 32 | ----- |
| Total | 2,136 | 2,414 | 2,782 | 1,972 | 1,481 | 2,213 | 5,771 | 3,065 | 1,510 | 1,144 | 1,115 | 1,033 |
| Mean | 68.9 | 80.5 | 89.7 | 63.6 | 51.1 | 71.4 | 192 | 98.9 | 50.3 | 36.9 | 36.0 | 34.4 |
| Cfs/m | 1.32 | 1.55 | 1.72 | 1.22 | 0.983 | 1.37 | 3.69 | 1.90 | 0.967 | 0.710 | 0.692 | 0.662 |
| In. | 1.52 | 1.73 | 1.98 | 1.41 | 1.06 | 1.58 | 4.12 | 2.19 | 1.08 | 0.82 | 0.80 | 0.74 |

Calendar year 1959: Max 1,040 Min 26 Mean 74.6 Cfs/m 1.43 In. 19.47
 Water year 1959-60: Max 539 Min 30 Mean 72.8 Cfs/m 1.40 In. 19.03

Peak discharge (base, 300 cfs).--Oct. 24 (3:30 a.m.) 368 cfs (5.55 ft); Dec. 28 (9:30 a.m.) 662 cfs (7.06 ft); Mar. 31 (time and discharge unknown); Apr. 4 (time and discharge unknown); Apr. 13 (time unknown) about 440 cfs; Apr. 18 (4 to 5 a.m.) 470 cfs (6.10 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for stations on nearby streams.

Note.--Stage-discharge relation affected by ice Nov. 15, 17, 18, 20, 25-29, Dec. 10-14, 18-26, Dec. 29 to Jan. 3, Jan. 5-16, 19-23, 25-27, Feb. 2-16, Feb. 21 to Mar. 26.

1420. Rifle River at Michigan Highway 70, near Sterling, Mich.

Location.--Lat 44°04', long 84°02', in SW $\frac{1}{4}$ sec.5, T.19 N., R.4 E., on left bank 30 ft downstream from bridge on State Highway 70, 3 miles north of Sterling, and 18 miles upstream from mouth.

Drainage area.--320 sq mi, approximately.

Records available.--October 1936 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Altitude of gage is 641 ft (by barometer). Jan. 13, 1937, to June 7, 1938, chain gage and June 8, 1938, to Jan. 10, 1939, wire-weight gage, at same site and datum.

Average discharge.--24 years, 309 cfs.

Extremes.--Maximum discharge during year, 2,200 cfs Mar. 31 (gage height, 7.89 ft); minimum, 136 cfs Sept. 10, 11, 12.
1936-60: Maximum discharge, 5,340 cfs Mar. 28, 1950 (gage height, 13.74 ft), from rating curve extended above 3,800 cfs; minimum, 87 cfs Dec. 2, 1946, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. Occasional regulation from dams above station.

Revisions (water years).--WSP 1437: 1937(M), 1938, 1939-40(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 19 to May 8)

Oct. 1 to Mar. 30

Mar. 31 to June 24

June 25 to Sept. 30

| | | | | | |
|-----|-------|-----|-------|-----|-----|
| 1.5 | 158 | 1.8 | 192 | 1.5 | 136 |
| 2.0 | 254 | 3.0 | 452 | 2.0 | 221 |
| 4.0 | 800 | 5.0 | 1,040 | 4.0 | 730 |
| 6.0 | 1,420 | 8.0 | 2,260 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 176 | 290 | 285 | 400 | 270 | 260 | 1,670 | 606 | 402 | 290 | 167 | 187 |
| 2 | 171 | 269 | 285 | 380 | 270 | 250 | 1,660 | 530 | 364 | 251 | 165 | 167 |
| 3 | 174 | 256 | 301 | 370 | 260 | 250 | 1,810 | 481 | 373 | 238 | 170 | 157 |
| 4 | 178 | 305 | 377 | 360 | 260 | 250 | 2,050 | 436 | 312 | 234 | 162 | 154 |
| 5 | 215 | 784 | 417 | 350 | 270 | 250 | 1,810 | 397 | 280 | 203 | 159 | 159 |
| 6 | 330 | 737 | 533 | 350 | 280 | 250 | 1,340 | 371 | 260 | 196 | 154 | 151 |
| 7 | 370 | 522 | 449 | 320 | 290 | 250 | 1,240 | 491 | 248 | 190 | 183 | 148 |
| 8 | 357 | 412 | 390 | 310 | 300 | 240 | 1,100 | 578 | 235 | 178 | *244 | 144 |
| 9 | 333 | 362 | 347 | 310 | 300 | 240 | 1,000 | 606 | 223 | 170 | 205 | 140 |
| 10 | 294 | *352 | 321 | 300 | 300 | 240 | 889 | 1,090 | 220 | 162 | 225 | 138 |
| 11 | 297 | 342 | 306 | 300 | 300 | 240 | 970 | 968 | 216 | 161 | 197 | 139 |
| 12 | 297 | 321 | 370 | *300 | 300 | 230 | 1,250 | 691 | 216 | 159 | 175 | *139 |
| 13 | 243 | 297 | 377 | 300 | 290 | 230 | 1,430 | 561 | *205 | *157 | 164 | 144 |
| 14 | 222 | 301 | 352 | 320 | 290 | *230 | *1,460 | 504 | 212 | 150 | 167 | 144 |
| 15 | 211 | 280 | *311 | 320 | 290 | 230 | 1,270 | 460 | 303 | 146 | 188 | 144 |
| 16 | 205 | 288 | 337 | 320 | *290 | 240 | 991 | *412 | 274 | 145 | 172 | 144 |
| 17 | 200 | 278 | 377 | 320 | 280 | 240 | 1,170 | 580 | 262 | 146 | 162 | 150 |
| 18 | 196 | 222 | 357 | 310 | 280 | 240 | 1,730 | 925 | 314 | 156 | 162 | 162 |
| 19 | 188 | 250 | 316 | 310 | 280 | 240 | *1,310 | 659 | 262 | 170 | 154 | 172 |
| 20 | *187 | 260 | 270 | 300 | 280 | 240 | *943 | 653 | 240 | 162 | 150 | 217 |
| 21 | 185 | 260 | 250 | 300 | 270 | 240 | 775 | 662 | 216 | 156 | 161 | 187 |
| 22 | 183 | 272 | 230 | 290 | 270 | 240 | 670 | 642 | 206 | 165 | 199 | 173 |
| 23 | 284 | 306 | 250 | 290 | 270 | 240 | 589 | 787 | 212 | 159 | 178 | 175 |
| 24 | 660 | 598 | 260 | 280 | 260 | 240 | 550 | 650 | 877 | 150 | 165 | 172 |
| 25 | 547 | 530 | 260 | 280 | 260 | 240 | 605 | 527 | 506 | 142 | 157 | 170 |
| 26 | 417 | 400 | 265 | 280 | 260 | 250 | 670 | 452 | 324 | 222 | 154 | 170 |
| 27 | 350 | 340 | 384 | 280 | 260 | 270 | 679 | 404 | 257 | 530 | 153 | 164 |
| 28 | 301 | 320 | 1,410 | 280 | 260 | 300 | 578 | 376 | 450 | 317 | 150 | 156 |
| 29 | 276 | 300 | 1,080 | 270 | 260 | 450 | 483 | 354 | 578 | 219 | 153 | 156 |
| 30 | 261 | 290 | 700 | 270 | ----- | 1,100 | 465 | 343 | 392 | 197 | 156 | 156 |
| 31 | 272 | ----- | 500 | 270 | ----- | 2,030 | ----- | 473 | ----- | 181 | 151 | ----- |
| Total | 8,580 | 10,744 | 12,667 | 9,820 | 8,050 | 10,440 | 33,165 | 17,669 | 9,459 | 6,102 | 5,296 | 4,748 |
| Mean | 277 | 358 | 409 | 310 | 278 | 337 | 1,106 | 570 | 315 | 197 | 171 | 158 |
| Cfs/m | 0.866 | 1.12 | 1.28 | 0.969 | 0.868 | 1.05 | 3.46 | 1.78 | 0.984 | 0.616 | 0.534 | 0.494 |
| In. | 1.00 | 1.25 | 1.48 | 1.12 | 0.94 | 1.21 | 3.86 | 2.05 | 1.10 | 0.71 | 0.62 | 0.55 |

Calendar year 1959: Max 3,470 Min 131 Mean 353 Cfs/m 1.10 In. 15.01

Water year 1959-60: Max 2,060 Min 138 Mean 373 Cfs/m 1.17 In. 15.89

Peak discharge (base, 1,600 cfs).--Dec. 28 (5 p.m.) 1,810 cfs (6.99 ft); Mar. 31 (1 to 2 p.m.) 2,200 cfs (7.89 ft); Apr. 4 (7:30 a.m.) 2,140 cfs (7.76 ft); Apr. 18 (12 m.) 1,790 cfs (6.95 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 15, 19-21, 26-30, Dec. 20-25, Dec. 30 to Mar. 30.

1435. North Branch Kawkawlin River near Kawkawlin, Mich.

Location.--Lat 43°40'05", long 83°58'15", in SE¹/₄ sec. 27, T.15 N., R.4 E., on left bank 50 ft upstream from bridge on Beaver Road, 1¹/₂ miles northwest of Kawkawlin, and 2¹/₂ miles upstream from mouth.

Drainage area.--101 sq mi.

Records available.--March 1951 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 586.00 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Sept. 27, 1951, staff gage at site 70 ft downstream at same datum.

Average discharge.--9 years, 60.6 cfs.

Extremes.--Maximum discharge during year, 1,540 cfs Apr. 1 (gage height, 8.32 ft); no flow at times.

1951-60: Maximum discharge, that of Apr. 1, 1960; no flow at times in each year.

Remarks.--Records good except those for periods of ice effect and those below 10 cfs, which are poor.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 14 to Nov. 13, May 26 to June 30)

| | | | |
|-----|-----|-----|-------|
| 0.5 | 0 | 2.0 | 27 |
| .6 | .1 | 2.5 | 56 |
| .7 | .4 | 3.0 | 86 |
| .8 | .9 | 4.0 | 198 |
| .9 | 1.5 | 5.0 | 380 |
| 1.1 | 3.3 | 6.0 | 635 |
| 1.3 | 6.0 | 8.4 | 1,600 |
| 1.7 | 15 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|--------|------|-------|
| 1 | 0.2 | 94 | 130 | 160 | *51 | *31 | 1,450 | 130 | 52 | 1.7 | | |
| 2 | .2 | *78 | 120 | 170 | 50 | 31 | *1,220 | *104 | 45 | 1.4 | (*) | |
| 3 | .2 | 64 | 105 | 190 | 50 | 30 | 1,130 | 90 | 36 | 1.2 | | |
| 4 | .1 | 84 | 100 | *190 | 50 | 30 | 1,100 | 88 | 35 | 1.2 | | |
| 5 | .6 | 148 | 113 | 180 | 50 | 30 | 916 | 88 | 37 | *.9 | | |
| 6 | 1.0 | 172 | 161 | 150 | 50 | 29 | 784 | 81 | *34 | .4 | | (*) |
| 7 | 2.3 | 350 | *201 | 120 | 50 | 29 | 626 | 76 | 30 | 0 | | |
| 8 | 1.9 | 414 | 205 | 90 | 52 | 29 | 500 | 68 | 26 | .1 | | |
| 9 | 1.1 | 347 | 190 | 70 | 56 | 28 | 426 | 61 | 21 | 0 | | |
| 10 | .6 | 262 | 175 | 60 | 60 | 28 | 378 | 52 | 17 | 0 | | |
| 11 | .4 | 195 | 169 | 55 | 70 | 28 | 348 | 94 | 14 | 0 | | |
| 12 | *.3 | 144 | 270 | 50 | 85 | 28 | 334 | 128 | 11 | 0 | | |
| 13 | .4 | 113 | 257 | 47 | 95 | 28 | 318 | 171 | 8.8 | 0 | | |
| 14 | 22 | 108 | 328 | 45 | 90 | 28 | 313 | 162 | 7.8 | 0 | | |
| 15 | 40 | 94 | 414 | 47 | 82 | 28 | 277 | 132 | 6.8 | 0 | | |
| 16 | 42 | 84 | 352 | 55 | 76 | 28 | 230 | 106 | 5.8 | 0 | | |
| 17 | 39 | 72 | 275 | 100 | 72 | 28 | 200 | 92 | 5.2 | 0 | | |
| 18 | 30 | 62 | 211 | 110 | 66 | 28 | 171 | 84 | 4.8 | 0 | | |
| 19 | 23 | 55 | 150 | 120 | 62 | 28 | 147 | 74 | 4.3 | 0 | | |
| 20 | 17 | 52 | 120 | 110 | 58 | 28 | 153 | 67 | 3.8 | 0 | | |
| 21 | 13 | 52 | 90 | 100 | 54 | 28 | 195 | 64 | 3.2 | 0 | | |
| 22 | 10 | 48 | 80 | 90 | 49 | 28 | 167 | 67 | 2.6 | 0 | | |
| 23 | 9.6 | 57 | 70 | 80 | 45 | 29 | 134 | 70 | 2.7 | 0 | | |
| 24 | 13 | 100 | 60 | 75 | 43 | 29 | 108 | 78 | 2.7 | 0 | | |
| 25 | 12 | 142 | 52 | 70 | 40 | 31 | 94 | 122 | 2.7 | 0 | | |
| 26 | 13 | 244 | 43 | 65 | 38 | 35 | 101 | 187 | 2.6 | 0 | | |
| 27 | 37 | 326 | 51 | 60 | 36 | 45 | 89 | 162 | 2.4 | 0 | | |
| 28 | 67 | 300 | 244 | 57 | 35 | 60 | 100 | 123 | 2.2 | 0 | | |
| 29 | 94 | 200 | 248 | 55 | 32 | 150 | 161 | 93 | 2.1 | 0 | | |
| 30 | 100 | 150 | 200 | 52 | ----- | 700 | 155 | 75 | 1.9 | 0 | | |
| 31 | 101 | ----- | 150 | 52 | ----- | *1,400 | ----- | 63 | ----- | 0 | | |
| Total | 691.9 | 4,611 | 5,334 | 2,876 | 1,648 | 3,110 | 12,325 | 3,072 | 428.6 | 6.9 | 0 | 0 |
| Mean | 22.3 | 154 | 172 | 92.8 | 56.8 | 100 | 411 | 99.1 | 14.3 | 0.22 | 0 | 0 |
| Cfsm | 0.221 | 1.52 | 1.70 | 0.919 | 0.562 | 0.990 | 4.07 | 0.981 | 0.142 | 0.0022 | 0 | 0 |
| In. | 0.25 | 1.70 | 1.96 | 1.06 | 0.61 | 1.14 | 4.54 | 1.13 | 0.16 | 0.002 | 0 | 0 |

Calendar year 1959: Max 1,200 Min 0

Water year 1959-60: Max 1,450 Min 0

Mean 78.2 Cfsm 0.774 In. 10.50

Mean 95.2 Cfsm 0.925 In. 12.55

* Discharge measurement or observation of no flow made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17, 18, 20, Nov. 29 to Dec. 1, Dec. 8-10, 19-24, Dec. 30 to Mar. 29.

1440. Shiawassee River at Byron, Mich.

Location.--Lat 42°49'25", long 83°56'45", on line between secs. 14 and 28, T.5 N., R.4 E., on upstream side of highway bridge at Byron, a quarter of a mile downstream from mill-dam which is just upstream from South Branch Shiawassee River.

Drainage area.--368 sq mi.

Records available.--October 1947 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage, read twice daily, and crest-stage gage. Datum of gage is 811.54 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--13 years, 286 cfs.

Extremes.--Maximum discharge during year, 2,900 cfs Apr. 1 (gage height, 12.58 ft); minimum, 32 cfs Sept. 16 (gage height, 3.55 ft).

1947-60: Maximum discharge, that of Apr. 1, 1960; maximum gage height, 12.58 ft May 15, 1956, Apr. 1, 1960; minimum discharge observed, 25 cfs Sept. 4, 1956; minimum gage height, that of Sept. 16, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair. Low flow slightly regulated at times by mills above station.

Revisions.--WSP 1144: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.5 | 29 | 6.0 | 410 |
| 4.0 | 58 | 9.0 | 1,180 |
| 4.3 | 91 | 12.5 | 2,860 |
| 5.0 | 212 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|----------|--------|-------------|-----------|-------|-------|
| 1 | 153 | 274 | 380 | 402 | 268 | 208 | 2,820 | 414 | 214 | 124 | 40 | 59 |
| 2 | 153 | 254 | 350 | 358 | 250 | 186 | 2,730 | 378 | 216 | 124 | 40 | 59 |
| 3 | 144 | 231 | 330 | 406 | 250 | 177 | 2,290 | 356 | 229 | 130 | 50 | 58 |
| 4 | 132 | 242 | 306 | 374 | 250 | 177 | 1,800 | 346 | 208 | 116 | 60 | 51 |
| 5 | 146 | 320 | 304 | 300 | 282 | 160 | 1,410 | 324 | 184 | 97 | 64 | 43 |
| 6 | 368 | 398 | 322 | 250 | 342 | 150 | 1,160 | 310 | 182 | 67 | 56 | 39 |
| 7 | 850 | 374 | 346 | 280 | 572 | 200 | 995 | 290 | 162 | 86 | 53 | 40 |
| 8 | 1,190 | 322 | 334 | 320 | 540 | 940 | 314 | 155 | 94 | 49 | 41 | |
| 9 | 1,370 | 286 | 318 | 300 | 510 | 190 | 875 | 348 | 137 | 91 | 55 | 40 |
| 10 | 1,500 | 302 | 310 | 250 | 575 | 180 | 760 | 402 | 117 | 94 | 64 | 40 |
| 11 | 1,010 | 350 | 362 | 260 | 505 | 180 | 698 | 450 | 111 | 78 | 78 | 41 |
| 12 | 845 | 376 | 590 | 386 | 535 | 180 | 605 | 480 | 117 | 82 | 87 | 43 |
| 13 | 732 | 346 | 695 | 585 | 525 | 170 | 560 | 428 | 104 | *88 | 75 | 45 |
| 14 | 630 | 505 | 555 | 810 | 450 | 160 | 482 | 362 | 141 | 81 | 52 | 43 |
| 15 | 515 | 678 | 475 | 920 | 402 | 157 | 505 | 330 | 204 | 69 | 52 | 36 |
| 16 | 406 | 758 | 408 | 860 | 430 | 160 | *610 | 302 | 258 | 69 | *51 | *32 |
| 17 | *356 | 790 | 380 | 730 | 398 | 160 | 725 | 310 | 316 | 67 | 62 | 36 |
| 18 | 326 | 740 | 350 | 662 | 380 | 161 | 720 | 282 | 340 | 53 | 75 | 40 |
| 19 | 292 | 665 | 330 | 600 | 364 | 170 | 742 | 276 | 336 | 53 | 84 | 44 |
| 20 | 278 | 595 | 310 | 500 | 350 | 170 | 755 | 276 | 268 | 54 | 86 | 60 |
| 21 | 266 | *530 | 300 | 430 | 300 | *179 | 705 | 280 | *239 | 49 | 88 | 62 |
| 22 | 248 | 414 | 300 | 374 | 290 | 190 | 648 | 278 | 222 | 45 | 83 | 58 |
| 23 | 233 | 362 | 280 | 320 | 270 | 200 | 625 | 292 | 216 | 46 | 94 | 52 |
| 24 | 216 | 396 | 262 | 280 | 250 | 210 | 452 | 338 | 212 | 42 | 94 | 54 |
| 25 | 246 | 435 | 233 | 250 | 230 | 220 | 408 | 430 | 202 | 42 | 79 | 55 |
| 26 | 270 | 410 | 244 | 250 | 210 | 250 | 585 | 388 | 201 | 45 | 71 | 52 |
| 27 | 286 | 390 | 286 | 250 | 300 | 300 | 690 | 294 | 184 | 48 | 65 | 58 |
| 28 | 282 | 350 | 302 | 250 | *240 | 802 | 622 | 229 | 161 | 49 | 64 | 80 |
| 29 | 272 | 380 | 515 | 258 | 220 | 975 | 502 | 227 | 139 | 44 | 55 | 56 |
| 30 | 262 | 400 | *555 | 260 | ----- | 1,780 | 428 | 210 | 134 | 45 | 58 | 55 |
| 31 | 272 | ----- | 510 | *274 | ----- | 2,500 | ----- | 208 | ----- | 43 | 57 | ----- |
| Total | 14,047 | 12,863 | 11,620 | 12,749 | 10,408 | 10,902 | 27,867 | 10,152 | 5,889 | 2,215 | 2,041 | 1,450 |
| Mean | 453 | 429 | 375 | 411 | 359 | 352 | 929 | 327 | 196 | 71.5 | 65.8 | 48.3 |
| Cfs/m | 1.23 | 1.17 | 1.02 | 1.12 | 0.976 | 0.957 | 2.62 | 0.889 | 0.533 | 0.194 | 0.179 | 0.131 |
| In. | 1.42 | 1.30 | 1.17 | 1.29 | 1.05 | 1.10 | 2.82 | 1.03 | 0.60 | 0.22 | 0.21 | 0.15 |
| Calendar year 1959: Max | | | 1,430 | | Min 39 | | Mean 315 | | Cfs/m 0.856 | In. 11.62 | | |
| Water year 1959-60: Max | | | 2,820 | | Min 32 | | Mean 334 | | Cfs/m 0.908 | In. 12.36 | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 27 to Dec. 3, Dec. 18-22, Jan. 5-10, 20-28, Feb. 2-4, 20-29, Mar. 5-14, 16, 17, 19, 20, 22-27.

1445. Shiawassee River at Owosso, Mich.

Location.--Lat 43°00'54", long 84°10'52", in SW $\frac{1}{4}$ sec.12, T.7 N., R.2 E., on right bank on grounds of sewage-treatment plant, 1 $\frac{1}{2}$ miles north of Owosso.

Drainage area.--538 sq mi.

Records available.--March 1931 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Gage-height records for flood seasons collected in this vicinity 1910-28 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 707.25 ft above mean sea level, datum of 1929. Prior to Oct. 15, 1933, at site 1 $\frac{1}{2}$ miles upstream at datum 5.46 ft higher.

Average discharge.--29 years, 331 cfs.

Extremes.--Maximum discharge during year, 4,210 cfs Apr. 1 (gage height, 8.41 ft); minimum, 49 cfs Sept. 18, 19 (gage height, 1.86 ft).
1931-60: Maximum discharge, 6,240 cfs Apr. 6, 1947 (gage height, 10.35 ft); minimum, 0.2 cfs July 27, 1934 (gage height, 1.12 ft); minimum daily, 2.0 cfs July 28, 1934.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated below about 800 cfs by powerplant at Shiawassee town prior to February 1953.

Revisions (water years).--WSP 1307: 1949(M). WSP 1337: 1932, 1934, 1936-38, 1944.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.8 | 44 | 4.0 | 755 |
| 2.0 | 81 | 5.0 | 1,260 |
| 2.5 | 220 | 7.0 | 2,850 |
| 3.0 | 375 | 8.3 | 4,100 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 154 | 331 | 558 | 594 | 375 | 344 | 4,090 | 566 | 283 | 178 | 59 | 69 |
| 2 | 154 | 334 | 501 | 558 | 358 | 292 | 3,680 | 543 | 295 | 172 | 59 | 77 |
| 3 | 148 | 316 | 470 | 546 | 334 | 256 | 3,370 | 518 | 289 | 169 | 75 | 71 |
| 4 | 142 | 420 | 438 | 532 | 334 | 247 | 2,780 | 470 | 283 | 160 | 63 | 69 |
| 5 | 181 | 626 | 428 | 414 | 362 | 241 | 2,130 | 448 | 274 | 151 | 61 | 67 |
| 6 | 328 | 610 | 515 | 361 | 599 | 214 | 1,700 | 428 | 256 | 139 | 63 | 71 |
| 7 | 899 | 574 | 529 | 400 | 822 | 295 | 1,330 | 434 | 232 | 122 | 73 | 65 |
| 8 | 1,140 | 522 | 504 | 473 | 822 | 286 | 1,300 | 403 | 220 | 104 | 77 | 61 |
| 9 | 1,400 | 459 | 459 | 428 | 773 | 271 | 1,150 | 428 | 205 | 107 | 97 | 58 |
| 10 | 1,450 | 400 | 403 | 334 | 728 | 274 | 1,050 | 522 | 187 | 109 | 88 | 58 |
| 11 | 1,340 | 389 | 432 | 372 | 822 | 265 | 935 | 578 | 163 | 112 | 71 | 56 |
| 12 | 1,150 | 431 | 974 | 430 | 760 | 262 | 814 | 670 | 160 | 104 | 71 | 58 |
| 13 | 755 | 459 | 1,080 | 985 | 658 | 250 | 682 | 554 | 166 | *102 | 73 | 61 |
| 14 | 791 | 760 | 881 | 1,140 | 562 | 235 | 686 | 546 | 166 | 104 | 95 | 58 |
| 15 | 686 | 912 | 737 | 1,240 | 540 | 235 | 710 | 490 | 208 | 99 | 102 | 58 |
| 16 | 582 | 960 | 638 | 1,330 | 543 | 235 | *922 | 466 | 331 | 95 | 81 | 56 |
| 17 | *423 | 925 | 566 | 1,040 | 610 | 247 | 950 | 487 | 523 | 88 | 71 | 54 |
| 18 | 326 | 814 | 518 | 950 | 582 | 241 | 1,080 | 442 | 504 | 95 | 69 | 51 |
| 19 | 386 | 858 | 480 | 782 | *536 | 244 | 930 | 406 | 494 | 88 | 67 | *81 |
| 20 | 347 | 773 | b450 | b680 | 466 | 256 | 904 | 400 | 466 | 81 | 75 | 52 |
| 21 | 322 | *650 | b450 | b600 | 448 | *262 | 858 | *406 | *382 | 75 | 86 | 51 |
| 22 | 313 | 566 | b430 | *490 | 442 | 250 | 768 | 452 | 351 | 71 | 112 | 63 |
| 23 | 298 | 501 | b380 | 410 | 372 | 292 | 719 | 512 | 328 | 69 | *99 | 67 |
| 24 | 292 | 508 | 316 | 358 | 354 | 344 | 658 | 470 | 319 | 65 | 90 | 67 |
| 25 | 283 | 602 | b340 | 382 | 331 | 328 | 746 | 445 | 295 | 63 | 99 | 67 |
| 26 | 304 | 606 | 344 | 340 | 301 | 344 | 912 | 574 | 277 | 71 | 95 | 67 |
| 27 | 322 | 522 | 350 | 368 | 322 | 456 | 917 | 544 | 265 | 65 | 90 | 67 |
| 28 | 322 | 470 | 874 | 400 | 382 | 1,870 | 863 | 322 | 250 | 61 | 83 | 65 |
| 29 | 322 | 540 | 1,180 | 403 | 364 | 3,000 | 737 | 319 | 235 | 63 | 77 | 65 |
| 30 | 316 | 586 | *365 | 386 | 364 | 3,720 | 662 | 310 | 199 | 61 | 83 | 69 |
| 31 | 325 | ----- | 786 | 363 | ----- | 4,080 | ----- | 295 | ----- | 59 | 71 | ----- |
| Total | 16,201 | 17,425 | 17,976 | 18,090 | 14,922 | 20,136 | 39,013 | 14,548 | 8,592 | 3,102 | 2,475 | 1,879 |
| Mean | 523 | 581 | 580 | 584 | 515 | 650 | 1,300 | 469 | 286 | 100 | 79.8 | 62.6 |
| Cfs/m | 0.972 | 1.08 | 1.08 | 1.09 | 0.957 | 1.21 | 2.42 | 0.872 | 0.532 | 0.186 | 0.148 | 0.116 |
| In. | 1.12 | 1.20 | 1.24 | 1.25 | 1.03 | 1.39 | 2.70 | 1.01 | 0.59 | 0.21 | 0.17 | 0.13 |

Calendar year 1959: Max 2,050 Min 51 Mean 407 Cfs/m 0.757 In. 10.28
Water year 1959-60: Max 4,090 Min 51 Mean 476 Cfs/m 0.885 In. 12.0'

Peak discharge (base, 1,500 cfs).--Oct. 9 (10:30 p.m.) 1,610 cfs (5.53 ft); Apr. 1 (6 to 8 a.m.) 4,210 cfs (8.41 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1450. Shiawassee River near Fergus, Mich.

Location.--Lat 43°15'17", long 84°06'20", in sec.22, T.10 N., R.3 E., on downstream hand-rail of highway bridge, 1.2 miles east of Fergus and 1¼ miles upstream from Bear Creek.

Drainage area.--637 sq mi.

Records available.--October 1939 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage read twice daily. Datum of gage is 587.80 ft above mean sea level, datum of 1929.

Average discharge.--21 years, 443 cfs.

Extremes.--Maximum discharge during year, 5,390 cfs Mar. 30 (gage height, 13.04 ft); maximum gage height, 13.44 ft Mar. 29, affected by ice; minimum discharge, 52 cfs Sept. 12, 17, 18; minimum gage height, 2.95 ft Sept. 12.
1939-60: Maximum discharge, 7,500 cfs Apr. 6, 1947 (includes overflow bypassing gage); maximum gage height, that of Mar. 29, 1960; minimum discharge observed, 29 cfs Aug. 31, 1946.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Some regulation at low stages by powerplant above Owosso prior to February 1953.

Revisions (water year).--WSP 1337: 1940(M), 1941-42, 1943(M), 1944, 1945(M), 1946, 1947(M), 1948, 1950. WSP 1627: 1952, 1954(M), 1957.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 12-16, July 31 to Sept. 8)

| | | | |
|-----|-----|------|-------|
| 3.0 | 50 | 8.0 | 1,030 |
| 3.5 | 78 | 9.0 | 1,440 |
| 4.0 | 119 | 10.0 | 2,020 |
| 4.5 | 168 | 11.0 | 2,840 |
| 5.0 | 235 | 13.0 | 5,350 |
| 6.0 | 412 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 186 | 438 | 724 | 900 | 450 | 400 | *4,740 | 877 | 336 | 223 | 62 | 85 |
| 2 | 179 | 421 | 670 | 700 | 450 | 350 | *4,500 | 712 | 325 | 203 | 60 | 76 |
| 3 | a170 | 408 | 569 | 650 | 400 | 300 | *4,050 | 691 | 334 | 196 | 59 | 77 |
| 4 | a170 | 419 | 555 | a600 | 400 | 300 | *3,460 | 628 | 320 | 183 | 95 | 77 |
| 5 | a230 | 880 | 580 | a500 | 450 | 300 | *2,840 | 556 | 313 | 175 | 81 | a75 |
| 6 | a350 | 886 | 820 | a450 | 650 | 300 | 2,280 | 538 | 283 | 168 | 67 | *71 |
| 7 | 565 | 808 | 706 | a500 | 950 | 350 | 1,820 | 532 | 266 | 156 | 64 | 70 |
| 8 | 1,090 | 736 | 670 | a500 | 950 | 350 | 1,690 | 502 | 244 | 144 | 80 | 66 |
| 9 | 1,340 | 640 | 619 | a500 | 950 | 350 | 1,550 | 490 | 234 | 131 | 82 | 60 |
| 10 | *1,690 | 580 | 538 | a400 | 900 | 350 | 1,370 | 604 | 212 | 126 | a100 | 58 |
| 11 | 1,720 | 502 | 520 | a450 | 900 | 300 | 1,280 | 718 | 202 | *124 | a90 | 55 |
| 12 | 1,460 | 496 | 856 | a500 | 900 | 300 | 1,180 | 826 | 186 | 123 | *84 | 52 |
| 13 | 1,170 | 508 | 1,340 | 1,200 | 800 | 300 | 990 | 874 | *178 | 121 | 81 | 56 |
| 14 | 1,030 | 1,070 | 1,280 | 1,400 | 700 | 300 | *910 | 775 | 197 | 117 | 81 | 62 |
| 15 | 853 | 1,100 | 1,050 | 1,500 | 650 | 300 | 895 | 682 | 190 | 111 | 114 | 60 |
| 16 | 775 | 1,100 | 914 | 1,600 | 650 | 300 | 1,110 | 586 | 226 | 106 | 114 | 56 |
| 17 | 610 | 1,100 | 790 | 1,400 | 700 | 300 | 1,250 | 670 | 667 | 103 | 97 | 52 |
| 18 | 490 | 1,000 | 718 | a1,200 | *760 | 300 | 1,440 | 730 | 658 | 102 | 86 | 52 |
| 19 | 426 | *920 | 637 | a1,000 | 650 | 300 | 1,320 | 619 | 559 | 101 | 81 | 64 |
| 20 | 392 | 900 | 550 | a900 | 550 | 300 | 1,240 | 490 | 532 | 98 | 77 | 79 |
| 21 | 402 | 800 | 550 | a800 | 500 | 300 | 1,100 | *475 | 475 | 92 | 94 | 64 |
| 22 | 581 | 700 | 550 | *600 | 500 | 300 | 1,040 | 460 | 398 | 85 | 140 | 58 |
| 23 | 354 | 600 | 450 | 500 | 450 | 350 | 982 | 694 | 400 | 79 | 136 | 67 |
| 24 | 369 | 637 | 400 | 450 | 450 | 400 | 898 | 646 | 1,070 | 74 | 122 | 75 |
| 25 | 365 | 736 | 400 | 450 | 400 | 400 | 886 | 532 | 358 | 72 | 116 | a75 |
| 26 | 347 | 796 | 400 | 450 | 350 | 400 | 1,370 | 553 | 318 | 69 | 109 | 75 |
| 27 | 352 | 733 | 450 | 450 | 400 | 500 | 1,510 | 754 | 293 | 82 | 101 | 74 |
| 28 | 329 | 772 | 700 | 450 | 400 | 1,700 | 1,150 | 544 | 286 | 73 | 99 | 72 |
| 29 | 329 | 709 | 1,500 | 450 | 400 | 3,500 | 1,010 | 484 | 269 | 71 | a95 | 70 |
| 30 | 329 | 700 | *1,400 | 450 | ----- | *5,000 | 868 | 358 | 246 | 68 | a90 | 72 |
| 31 | 406 | ----- | 1,100 | 450 | ----- | 5,150 | ----- | 307 | ----- | 67 | a90 | ----- |
| Total | 18,839 | 22,095 | 23,027 | 22,350 | 17,660 | 24,350 | 50,729 | 18,907 | 10,575 | 3,643 | 2,687 | 2,005 |
| Mean | 608 | 736 | 743 | 721 | 609 | 785 | 1,691 | 610 | 352 | 118 | 93.1 | 66.8 |
| Cfsm | 0.954 | 1.16 | 1.17 | 1.13 | 0.956 | 1.23 | 2.65 | 0.958 | 0.553 | 0.185 | 0.146 | 0.105 |
| In. | 0.110 | 1.29 | 1.34 | 1.30 | 1.03 | 1.42 | 2.96 | 1.10 | 0.62 | 0.21 | 0.17 | 0.12 |

Calendar year 1959: Max 3,320 Min 52 Mean 519 Cfsm 0.815 In. 11.05
Water year 1959-60: Max 5,150 Min 52 Mean 593 Cfsm 0.931 In. 12.66

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of weather records and records for Shiawassee River at Owosso and Cedar River at East Lansing.

Note.--Stage-discharge relation affected by ice Nov. 15-23, Dec. 20 to Mar. 30.

1460. Farmers Creek near Lapeer, Mich.

Location.--Lat 43°02', long 83°20', in sec.6, T.7 N., R.10 E., on left bank at sewage-treatment plant at Michigan Home and Training School, 2 miles west of Lapeer.

Drainage area.--57 sq mi, approximately.

Records available.--October 1932 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder and concrete control. Datum of gage is 805.79 ft above mean sea level, datum of 1929. Prior to May 25, 1954, staff gage at same site and datum.

Average discharge.--28 years, 30.2 cfs.

Extremes.--Maximum discharge during year, 612 cfs Mar. 31 (gage height, 18.43 ft); minimum, 1.8 cfs Sept. 16, 17 (gage height, 15.04 ft).

1932-60: Maximum discharge, 1,280 cfs Apr. 6, 1947 (gage height, 19.87 ft, from floodmark), from rating curve extended above 660 cfs on basis of contracted-opening measurement of peak flow; minimum not determined.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Prior to 1941, occasional regulation by dam above station.

Revisions (water years).--WSP 924: 1940. WSP 1084: 1942(M), 1943. WSP 1337: 1934-38, 1940(M), 1944(M), 1946, 1946(M), 1948-52(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|------|-----|------|-----|
| 15.0 | 1.8 | 15.7 | 40 |
| 15.1 | 3.8 | 16.0 | 80 |
| 15.2 | 7.0 | 17.0 | 266 |
| 15.4 | 16 | 18.4 | 600 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 9.8 | 16 | 29 | 78 | 25 | 21 | 453 | 65 | 25 | 12 | 3.8 | 3.0 |
| 2 | 8.6 | 19 | 27 | 64 | 24 | 20 | *327 | 61 | 25 | 11 | 3.4 | 2.4 |
| 3 | 7.8 | 20 | 27 | 54 | 23 | 20 | 239 | 57 | 24 | 9.8 | 3.6 | 2.4 |
| 4 | 7.0 | 21 | 27 | 44 | 22 | 19 | 193 | 52 | 25 | 9.8 | 4.6 | 2.2 |
| 5 | *8.2 | 22 | 27 | 38 | 23 | 19 | 159 | 48 | 23 | 9.4 | 4.3 | 2.2 |
| 6 | 17 | 27 | 29 | 41 | 26 | 19 | 135 | 43 | 20 | 8.2 | 4.0 | 2.2 |
| 7 | 25 | 31 | 29 | 34 | 30 | 19 | 120 | 42 | 17 | 7.8 | 3.8 | *2.2 |
| 8 | 46 | 32 | 35 | 29 | 38 | 18 | 108 | 38 | 15 | 7.0 | *3.8 | 2.0 |
| 9 | 94 | 30 | 36 | 27 | 42 | 17 | 104 | 37 | 13 | 6.6 | 5.3 | 2.0 |
| 10 | 94 | 27 | 36 | 24 | 44 | 17 | 96 | 41 | 11 | 6.2 | 9.0 | a2 |
| 11 | 71 | 25 | 33 | 23 | 46 | 17 | 88 | 46 | 10 | 5.8 | 7.0 | a2 |
| 12 | 51 | 22 | 38 | 25 | 49 | 17 | 80 | 57 | 9.8 | *5.2 | 5.2 | a2 |
| 13 | 48 | 22 | 49 | 36 | 59 | 17 | 74 | 58 | 9.4 | 5.2 | 4.6 | a2 |
| 14 | 36 | 31 | 70 | 66 | 61 | 17 | 70 | 58 | *12 | 5.2 | 4.9 | 2.2 |
| 15 | 31 | 40 | *71 | 95 | 58 | 17 | 72 | 54 | 14 | 4.6 | 5.8 | 2.2 |
| 16 | 27 | *86 | 58 | 90 | 47 | 17 | 85 | 49 | 20 | 4.0 | 5.5 | 2.0 |
| 17 | 22 | 86 | 48 | 80 | *43 | 17 | 108 | 46 | 29 | 3.8 | 4.6 | 2.0 |
| 18 | 20 | 70 | 42 | 65 | 43 | 17 | 111 | 42 | 37 | 3.8 | 4.0 | 2.6 |
| 19 | 17 | 48 | 36 | 50 | 40 | 19 | 110 | 40 | 46 | 4.0 | 3.6 | 3.8 |
| 20 | 15 | 41 | 31 | 45 | 38 | 20 | 96 | 38 | 43 | 4.3 | 3.6 | 7.8 |
| 21 | 14 | 36 | 29 | *38 | 33 | 21 | 80 | *36 | 33 | 3.8 | 3.8 | 12 |
| 22 | 14 | 33 | 25 | 35 | 31 | 21 | 71 | 36 | 25 | 3.6 | 5.5 | 13 |
| 23 | 12 | 33 | 25 | 35 | 28 | 21 | 65 | 34 | 20 | 3.4 | 5.8 | 12 |
| 24 | 13 | 34 | 24 | 34 | 25 | 21 | 62 | 34 | 18 | 3.4 | 5.2 | 10 |
| 25 | 14 | 35 | 22 | 31 | 24 | 21 | 98 | 33 | 16 | 3.2 | 4.6 | 8.2 |
| 26 | 15 | 36 | 22 | 28 | 23 | 22 | 115 | 31 | 14 | 3.4 | 3.8 | 8.2 |
| 27 | 16 | 36 | 28 | 27 | 22 | 25 | 130 | 26 | 12 | 4.0 | 3.4 | 7.4 |
| 28 | 16 | 35 | 42 | 27 | 22 | 50 | 106 | 25 | 10 | 4.9 | 3.2 | 7.8 |
| 29 | *16 | 31 | 64 | 27 | 22 | 170 | 86 | 23 | 14 | 4.0 | 3.2 | 8.2 |
| 30 | 16 | 30 | 93 | 26 | ----- | *489 | 72 | 22 | 14 | 3.8 | 3.2 | 8.2 |
| 31 | 16 | ----- | 96 | 26 | ----- | *582 | ----- | 22 | ----- | 4.3 | 3.0 | ----- |
| Total | 817.4 | 1,055 | 1,250 | 1,342 | 1,011 | 1,807 | 3,713 | 1,294 | 606.2 | 175.5 | 139.1 | 146.2 |
| Mean | 26.4 | 35.2 | 40.3 | 43.5 | 34.9 | 58.3 | 124 | 41.7 | 20.2 | 5.66 | 4.43 | 4.87 |
| Cfsm | 0.483 | 0.618 | 0.707 | 0.760 | 0.612 | 1.02 | 2.18 | 0.732 | 0.354 | 0.099 | 0.079 | 0.085 |
| In. | 0.53 | 0.69 | 0.82 | 0.88 | 0.66 | 1.18 | 2.42 | 0.84 | 0.40 | 0.11 | 0.09 | 0.10 |

Calendar year 1959: Max 341 Min 1.4 Mean 30.7 Cfsm 0.539 In. 7.30
 Water year 1959-60: Max 582 Min 2.0 Mean 36.5 Cfsm 0.640 In. 8.72

Peak discharge (base, 160 cfs).--Mar. 31 (4 to 9 a.m.) 612 cfs (18.43 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Flint River near Flint and Swartz Creek near Holly.

Note.--Stage-discharge relation affected by ice Nov. 18, 30, Dec. 9, 10, Jan. 15-22, 25, 26, Jan. 30 to Feb. 4, Feb. 23 to Mar. 29.

1470. Holloway Reservoir near Otisville, Mich.

Location.--Lat 43°07'15", long 83°29'45", in NW $\frac{1}{4}$ sec.11, T.8 N., R.8 E., in gatehouse on left side of Holloway Dam on Flint River, 3 $\frac{1}{2}$ miles southeast of Otisville.

Drainage area.--543 sq mi.

Records available.--March 1954 to September 1960.

Gage.--Water-stage recorder. Datum of gage is at mean sea level, datum of 1929 (levels by city of Flint).

Extremes.--Maximum contents during year, 797,000,000 cu ft May 16-20, June 17 (elevation, 755.3 ft); minimum, 163,000,000 cu ft Oct. 16 (elevation, 744.3 ft).
1954-60: Maximum contents, 996,000,000 cu ft Mar. 8, 1956 (elevation, 757.4 ft); minimum, reservoir empty at times during October, November 1954, January, February 1955.

Remarks.--Records good. Reservoir is formed by an earthfill dam with concrete spillway completed in 1953. Capacity of reservoir, 1,256,000,000 cu ft at elevation 760.00 ft. The spillway section includes two 90-foot drum gates with minimum crest elevation of 751 ft and maximum of 755 ft, three 20-foot radial gates with sill elevation of 745 ft and two sluices (each 4 by 6 ft), one on each side with valve controls. Entrance elevation of sluiceways is 724 ft. Reservoir is used to regulate flow for water supply and sewage dilution for city of Flint.

Cooperation.--Reservoir elevations furnished by city of Flint.

Month-end elevation and contents, water year October 1959 to September 1960

| Date | Elevation (feet) [†] | Contents (millions of cubic feet) | Change in contents during month | |
|-------------------------|----------------------------------|---|------------------------------------|----------------------|
| | | | Millions of cubic feet | Equivalent in cfs |
| Sept. 30..... | 747.7 | 290 | - | - |
| Oct. 31..... | 745.8 | 214 | -76 | -28.4 |
| Nov. 30..... | 751.5 | 503 | +289 | +111 |
| Dec. 31..... | 752.2 | 551 | +48 | +17.9 |
| Calendar year 1959..... | - | - | +196 | +6.2 |
| Jan. 31..... | 751.4 | 497 | -54 | -20.2 |
| Feb. 29..... | 751.3 | 491 | -6 | -2.4 |
| Mar. 31..... | 754.8 | 752 | +261 | +97.4 |
| Apr. 30..... | 752.0 | 537 | -215 | -82.9 |
| May 31..... | 755.1 | 779 | +242 | +90.4 |
| June 30..... | 754.8 | 752 | -27 | -10.4 |
| July 31..... | 752.5 | 572 | -180 | -67.2 |
| Aug. 31..... | 749.9 | 407 | -165 | -61.6 |
| Sept. 30..... | 747.2 | 270 | -137 | -52.9 |
| Water year 1959-60..... | - | - | -20 | -0.6 |

[†] Elevation at 12 p.m.

1475. Flint River near Otisville, Mich.

Location.--Lat 43°06'40", long 83°31'10", in SE $\frac{1}{4}$ sec.9, T.8 N., R.8 E., on left bank 20 ft downstream from bridge on State Highway 15, $1\frac{1}{2}$ miles downstream from Holloway Reservoir, $3\frac{1}{2}$ miles upstream from Powers-Cullen drain, and $3\frac{1}{2}$ miles south of Otisville.

Drainage area.--547 sq mi.

Records available.--October 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 721.39 ft above mean sea level, datum of 1929.

Average discharge.--8 years, 293 cfs (adjusted for storage since 1954).

Extremes.--Maximum discharge during year, 6,150 cfs Apr. 1 (gage height, 14.97 ft); minimum, 50 cfs Nov. 10, May 9; minimum gage height, 2.60 ft Nov. 10.
1952-60: Maximum discharge, that of Apr. 1, 1960; minimum, 7.6 cfs Apr. 14, 1955 (gage height, 2.03 ft).

Remarks.--Records good. Flow regulated by Holloway Reservoir $1\frac{1}{2}$ miles above station (see preceding page).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 12 to May 12)

| | | | |
|------|-------|------|-------|
| 2.6 | 50 | 12.0 | 2,710 |
| 3.0 | 116 | 14.0 | 4,740 |
| 9.0 | 1,400 | 15.0 | 6,200 |
| 11.0 | 2,110 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 288 | 56 | 298 | 934 | 274 | 219 | 5,940 | 933 | 217 | 133 | 146 | 154 |
| 2 | 356 | 56 | 298 | 932 | 256 | 209 | 5,300 | 756 | 219 | 129 | 146 | 150 |
| 3 | 350 | 56 | 274 | 866 | 242 | 205 | 4,110 | 648 | 211 | 129 | 144 | 137 |
| 4 | 346 | 62 | 264 | 769 | 228 | 202 | 3,130 | 575 | 213 | 127 | 144 | 137 |
| 5 | 342 | 59 | 280 | 602 | 232 | 196 | 2,510 | 299 | 211 | 126 | 144 | 137 |
| 6 | 373 | 58 | 316 | 455 | 268 | 192 | 2,040 | 95 | 194 | 126 | 144 | 135* |
| 7 | 468 | 58 | 352 | 413 | 310 | 188 | 1,730 | 81 | 182 | 124 | 144 | *135 |
| 8 | *476 | 58 | 381 | 440 | 335 | 184 | 1,450 | 70 | 187 | 124 | *143 | 133 |
| 9 | 402 | 58 | 367 | 404 | 381 | 182 | 1,280 | 60 | 154 | 126 | 144 | 135 |
| 10 | 394 | 73 | 342 | 350 | 440 | 175 | 1,150 | 58 | 141 | 126 | 144 | 131 |
| 11 | 423 | 86 | 358 | 312 | 474 | 171 | 1,040 | 53 | 135 | 126 | 144 | 131 |
| 12 | 417 | 86 | 493 | 306 | 493 | 164 | 956 | 68 | 141 | *126 | 144 | 126 |
| 13 | 400 | 79 | 583 | 421 | 476 | 162 | 873 | 86 | 139 | 127 | 143 | 131 |
| 14 | 386 | *76 | 629 | 558 | 472 | 158 | 793 | 173 | *141 | 133 | 144 | 116 |
| 15 | 331 | 70 | 677 | 675 | 478 | 158 | 809 | 344 | 143 | 143 | 143 | 93 |
| 16 | 194 | 71 | 716 | 708 | 486 | 162 | 857 | 459 | 179 | 143 | 143 | 118 |
| 17 | 116 | 95 | 690 | 738 | 484 | 164 | 914 | 474 | 352 | 144 | 143 | 118 |
| 18 | 112 | 207 | 619 | 765 | 451 | 164 | 941 | 465 | 478 | 144 | 143 | 118 |
| 19 | 105 | 333 | 539 | 703 | *426 | 165 | 965 | 426 | 468 | 143 | 143 | 116 |
| 20 | 133 | 432 | 438 | 617 | 388 | 173 | 912 | 386 | 453 | 144 | 143 | 114 |
| 21 | 83 | 430 | 400 | 537 | 352 | 186 | 826 | *350 | 423 | 144 | 143 | 112 |
| 22 | 75 | 377 | *350 | 472 | 344 | 200 | 749 | 339 | 348 | 143 | 143 | 112 |
| 23 | 64 | 342 | 286 | 434 | 306 | 194 | *670 | 323 | 298 | 144 | 143 | 112 |
| 24 | 65 | 348 | 258 | 400 | 274 | 203 | 608 | 302 | 244 | 144 | 143 | 111 |
| 25 | 67 | 377 | 240 | 354 | 260 | 205 | 807 | 278 | 228 | 146 | 141 | 109 |
| 26 | 64 | 411 | 236 | *312 | 252 | 202 | 998 | 268 | 205 | 146 | 141 | 107 |
| 27 | 62 | 415 | 266 | 312 | 234 | 220 | 1,100 | 258 | 156 | 144 | 141 | 107 |
| 28 | 70 | 402 | 455 | 300 | 226 | 482 | 1,090 | 234 | 156 | 146 | 141 | 107 |
| 29 | 78 | 377 | 681 | 290 | 224 | 1,040 | 1,010 | 213 | 148 | 146 | 139 | 105 |
| 30 | 73 | 329 | 804 | 280 | ----- | 2,060 | 921 | 207 | 131 | 146 | 146 | 105 |
| 31 | 56 | ----- | 875 | 276 | ----- | *4,930 | ----- | 219 | ----- | 146 | 154 | ----- |
| Total | 7,169 | 5,937 | 13,755 | 15,937 | 10,066 | 13,513 | 46,479 | 9,380 | 6,875 | 4,238 | 4,451 | 3,650 |
| Mean | 231 | 198 | 444 | 514 | 347 | 436 | 1,549 | 303 | 229 | 137 | 144 | 122 |
| (†) | -28.4 | +111 | +17.9 | -20.2 | -2.4 | +97.4 | -32.9 | +90.4 | -10.4 | -67.2 | -61.6 | -52.9 |

Adjusted for change in contents in Holloway Reservoir

| Mean | 203 | 309 | 462 | 494 | 345 | 533 | 1,466 | 393 | 219 | 69.8 | 82.4 | 69.1 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cfs | 0.371 | 0.565 | 0.845 | 0.903 | 0.631 | 0.974 | 2.68 | 0.718 | 0.400 | 0.128 | 0.151 | 0.126 |
| In. | 0.43 | 0.63 | 0.97 | 1.04 | 0.68 | 1.12 | 2.99 | 0.83 | 0.45 | 0.15 | 0.17 | 0.14 |
| Observed | | | | | | | | | | | | |
| Adjusted | | | | | | | | | | | | |
| Calendar year 1959: | Max | 3,440 | Min | 47 | Mean | 353 | Mean | 360 | Cfs | 0.658 | In. | 8.93 |
| Water year 1959-60: | Max | 5,940 | Min | 53 | Mean | 386 | Mean | 386 | Cfs | 0.706 | In. | 9.60 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Holloway Reservoir; furnished by city of Flint.

1482. Swartz Creek near Holly, Mich.

Location.--Lat 42°49'40", long 83°37'40", in SW $\frac{1}{4}$ sec.15, T.5 N., R.7 E., on right bank 25 ft downstream from bridge on Elliott Road and 2 $\frac{1}{2}$ miles north of Holly.

Drainage area.--11.9 sq mi.

Records available.--January 1956 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 905 ft (from topographic map).

Extremes.--Maximum discharge during year, 74 cfs Mar. 31 (gage height, 3.30 ft), minimum, 0.5 cfs Sept. 1, 7, 8; minimum gage height, 1.55 ft July 25, Aug. 31, Sept. 1, 1956-60; Maximum discharge, 77 cfs May 13, 1956 (gage height, 3.40 ft); minimum, 0.2 cfs Sept. 5, 1958, July 13, 1959.

Remarks.--Records good except those for periods of ice effect, which are poor.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.5 | 0.5 | 2.0 | 8.5 |
| 1.6 | 1.4 | 2.4 | 25 |
| 1.8 | 4.4 | 3.3 | 74 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|-------|-----------|------------|-------|-----------|-------|-------|
| 1 | 2.6 | 5.4 | 7.4 | 14 | 7.7 | 5.5 | 69 | 16 | 6.0 | 5.6 | 1.1 | 0.6 |
| 2 | 2.3 | 5.2 | 7.2 | 12 | 7 | 5 | *58 | 15 | 6.2 | 5.0 | 1.1 | .7 |
| 3 | 2.1 | 4.8 | 7.2 | 12 | 6.5 | 5 | 48 | 13 | 6.2 | 5.0 | 1.3 | .8 |
| 4 | 2.0 | 6.2 | 7.0 | 11 | 6 | 5 | 42 | 11 | 6.0 | 4.4 | 1.3 | .8 |
| 5 | 3.2 | 8.5 | 8.3 | 10 | 6 | 5 | 36 | 9.7 | 5.8 | 3.9 | 1.3 | .8 |
| 6 | 18 | 9.7 | 9.7 | 9.7 | 7 | 5 | 30 | 8.5 | 5.4 | 3.4 | 1.3 | .8 |
| 7 | 30 | 9.1 | 9.7 | 7.7 | 8 | 5 | 27 | 8.8 | 5.0 | 3.1 | 1.4 | .6 |
| 8 | *28 | 8.6 | 9.4 | 7.2 | 10 | 4.5 | 24 | 9.3 | 4.8 | 2.9 | 1.3 | .6 |
| 9 | 24 | 7.7 | 8.6 | 6.6 | 11 | 4.5 | 22 | 8.5 | 4.4 | 2.5 | 1.4 | .7 |
| 10 | 20 | 7.2 | 7.7 | 6.2 | 12 | 4.5 | 19 | 14 | 4.2 | 2.1 | 1.5 | .7 |
| 11 | 18 | 6.6 | 8.6 | 6.4 | 15 | 4.5 | 17 | 15 | 4.5 | 2.0 | 1.4 | .7 |
| 12 | 14 | 6.2 | 17 | 9.7 | 15 | 4.5 | 16 | 16 | 7.7 | 1.9 | *1.4 | .7 |
| 13 | 12 | 6.8 | 18 | 24 | 14 | 4.5 | 15 | 16 | 8.5 | 1.8 | 1.4 | .7 |
| 14 | 10 | *20 | 15 | 23 | *13 | 4.5 | 14 | 16 | 9.1 | 1.5 | 1.5 | .8 |
| 15 | 8.5 | 21 | 14 | 25 | 12 | 4.5 | 20 | 15 | 9.4 | 1.4 | 1.3 | *.8 |
| 16 | 7.2 | 19 | 12 | 18 | 11 | 4.5 | *24 | 13 | 11 | 1.4 | 1.2 | .8 |
| 17 | 6.6 | 17 | 12 | 18 | 11 | 4.5 | 26 | 12 | 22 | 1.6 | 1.1 | .8 |
| 18 | 6.2 | 14 | 11 | 16 | 11 | 4.5 | 25 | 12 | 20 | 2.3 | 1.1 | .9 |
| 19 | 5.4 | 12 | 9.7 | 15 | 10 | 5 | 22 | 11 | 15 | 2.3 | 1.1 | 3.8 |
| 20 | 5.0 | 11 | 8.5 | 13 | 9.7 | 5.5 | 18 | 11 | 11 | *2.1 | 1.0 | 8.8 |
| 21 | 4.5 | 9.7 | 7.7 | 11 | 8.5 | 5.5 | 16 | *10 | 9.1 | 2.0 | .9 | 7.4 |
| 22 | 4.4 | 9.1 | *7.2 | 10 | 8 | *6 | 14 | 11 | 7.7 | 1.9 | 1.1 | 6.6 |
| 23 | 4.4 | 9.4 | 6.8 | 9.5 | 7.5 | 6 | 12 | 11 | 7.0 | 1.5 | 1.0 | 5.4 |
| 24 | 4.7 | 11 | 6.2 | 9 | 7 | 6 | 11 | 10 | *6.6 | 1.3 | 1.0 | 4.7 |
| 25 | 4.7 | 12 | 6.2 | 9 | 6.5 | 6 | 25 | 9.1 | 6.0 | 1.1 | .9 | 3.9 |
| 26 | 4.7 | 11 | 6.4 | 8.5 | 6 | 6 | 26 | 8.3 | 5.4 | 1.3 | .7 | 3.2 |
| 27 | 4.8 | 10 | 18.8 | 8 | 6 | 8 | 23 | 7.4 | 4.8 | 1.3 | .6 | 2.8 |
| 28 | 4.8 | 9.4 | 16 | 7.5 | 6 | 20 | 19 | 7.4 | 3.8 | 1.2 | .6 | 2.3 |
| 29 | 4.6 | 8.5 | 20 | 7.5 | 6 | 35 | 17 | 7.0 | 6.0 | 1.4 | .6 | 2.0 |
| 30 | 4.5 | 8.0 | 18 | ----- | ----- | 64 | 16 | 7.0 | 6.0 | 1.3 | .6 | 2.0 |
| 31 | 5.0 | ----- | 16 | *8.0 | ----- | *73 | ----- | 6.6 | ----- | 1.2 | .6 | ----- |
| Total | 276.2 | 304.3 | 327.7 | 360.5 | 264.4 | 331.0 | 751 | 344.6 | 234.7 | 71.5 | 33.9 | 66.2 |
| Mean | 8.91 | 10.1 | 10.6 | 11.6 | 9.12 | 10.7 | 25.0 | 11.1 | 7.82 | 2.31 | 1.09 | 2.21 |
| Cfsm | 0.749 | 0.849 | 0.891 | 0.975 | 0.766 | 0.899 | 2.10 | 0.933 | 0.657 | 0.194 | 0.092 | 0.186 |
| In. | 0.86 | 0.95 | 1.02 | 1.13 | 0.83 | 1.03 | 2.35 | 1.08 | 0.73 | 0.22 | 0.11 | 0.21 |
| Calendar year 1959: Max | 48 | | | | Min 0.4 | | Mean 7.21 | Cfsm 0.606 | | Ir. 8.22 | | |
| Water year 1959-60: Max | 73 | | | | Min 0.6 | | Mean 9.20 | Cfsm 0.773 | | Ir. 10.52 | | |

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 21-29, Feb. 2-15, Feb. 22 to Mar. 29.

1485. Flint River near Flint, Mich.

Location.--Lat 43°02'20", long 83°46'10", in SW $\frac{1}{4}$ sec.4, T.7 N., R.6 E., on left bank on grounds of sewage-treatment plant, 1 mile upstream from Pirnie Creek, 2 miles downstream from Flint, and 5 miles downstream from Swartz Creek.

Drainage area.--927 sq mi.

Records available.--September 1903 to March 1904 (gage heights only), August 1932 to September 1960. Gage-height records for flood seasons collected in this vicinity 1911-28, are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 678.80 ft above mean sea level (levels by U. S. Weather Bureau and city of Flint).

Average discharge.--28 years, 566 cfs (adjusted for storage since 1954).

Extremes.--Maximum discharge during year, 8,800 cfs Apr. 1 (gage height, 13.20 ft); minimum, 42 cfs Aug. 20 (gage height, 2.21 ft).
1932-60: Maximum discharge, 14,900 cfs Apr. 6, 1947 (gage height, 16.35 ft); minimum, 9.0 cfs Aug. 7, 1934.

Remarks.--Records good. Some regulation by reservoirs above station. City of Flint diverts water above station for municipal and industrial use, but sewage from city is included in flow at station.

Revisions (water years).--WSP 954: 1941. WSP 1337: 1933-34(M), 1935-37.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 6-26, Sept. 10-30)

| | | | |
|-----|-----|------|-------|
| 2.4 | 65 | 5.0 | 1,070 |
| 3.0 | 165 | 7.0 | 2,580 |
| 3.5 | 358 | 13.2 | 8,800 |
| 4.0 | 530 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 334 | 188 | 563 | 1,460 | 510 | 410 | 8,690 | 1,320 | 597 | 223 | 241 | 176 |
| 2 | 385 | 202 | 421 | 1,390 | 462 | 399 | 8,540 | 1,210 | 476 | 145 | 177 | 165 |
| 3 | 403 | 210 | 494 | 1,360 | 450 | 392 | 7,490 | 1,070 | 438 | 232 | 259 | 116 |
| 4 | 398 | 582 | 534 | 1,110 | 446 | 374 | 5,780 | 968 | 345 | 218 | 159 | 177 |
| 5 | 570 | 695 | 650 | 830 | 518 | 378 | 4,420 | 824 | 331 | 291 | 132 | 180 |
| 6 | 1,220 | 550 | 808 | 710 | 944 | 367 | 3,520 | 381 | 306 | 202 | 185 | 180 |
| 7 | 1,460 | 399 | 772 | 680 | 1,010 | 367 | 3,040 | 345 | 289 | 232 | 198 | *124 |
| 8 | *1,040 | 380 | 725 | 681 | 902 | 345 | 2,630 | 292 | 322 | 168 | 235 | 170 |
| 9 | 944 | 334 | 668 | 820 | 902 | 331 | 2,210 | 237 | 229 | 107 | 268 | 159 |
| 10 | 920 | 302 | 630 | 593 | 968 | 345 | *1,900 | 543 | 180 | 167 | 451 | 180 |
| 11 | 938 | 282 | 844 | 526 | 1,140 | 316 | 1,720 | 444 | 200 | 276 | 283 | 161 |
| 12 | 758 | 269 | 1,790 | 755 | 1,050 | 320 | 1,560 | 575 | 198 | *174 | *169 | 200 |
| 13 | 650 | 310 | 1,400 | 1,630 | 932 | 320 | 1,350 | 557 | 216 | 184 | 174 | 207 |
| 14 | 584 | 1,460 | 1,260 | 1,320 | 878 | 324 | 1,280 | 557 | *254 | 181 | 368 | 145 |
| 15 | 539 | 1,170 | 1,200 | 1,560 | 814 | 327 | 1,520 | 685 | 257 | 173 | 465 | 154 |
| 16 | 406 | 764 | 1,120 | 1,520 | 758 | 324 | 1,720 | 786 | 544 | 120 | 185 | 131 |
| 17 | 266 | 665 | 1,050 | 1,340 | 814 | 327 | 1,620 | 664 | 691 | 183 | 172 | 115 |
| 18 | 244 | 593 | 974 | 1,240 | 830 | 338 | 2,000 | 816 | 700 | 286 | 192 | 125 |
| 19 | 250 | 685 | 792 | 1,100 | *770 | 374 | 1,760 | 690 | 690 | 188 | 189 | 368 |
| 20 | 269 | 751 | 748 | 950 | 685 | 410 | 1,620 | 695 | 724 | 187 | 70 | 296 |
| 21 | 235 | 695 | *588 | 914 | 640 | 406 | 1,390 | *625 | 525 | 188 | 229 | 185 |
| 22 | 190 | 685 | 552 | 775 | 598 | 422 | 1,200 | 620 | 459 | 185 | 315 | 123 |
| 23 | 192 | 695 | 490 | 705 | 522 | 410 | 1,110 | 650 | 522 | 75 | 174 | 111 |
| 24 | 202 | 721 | 466 | 670 | 490 | 418 | 1,070 | 575 | 464 | 170 | 170 | 125 |
| 25 | 181 | 995 | 462 | 602 | 466 | 406 | 2,310 | 494 | 399 | 268 | 185 | 115 |
| 26 | 170 | 802 | 470 | 580 | 458 | 418 | 2,550 | 462 | 403 | 183 | 221 | 232 |
| 27 | 195 | 852 | 654 | 562 | 454 | 689 | 2,330 | 462 | 412 | 216 | 174 | 190 |
| 28 | 165 | 766 | 2,080 | 552 | 430 | 3,130 | 1,900 | 458 | 232 | 222 | 165 | 174 |
| 29 | 170 | 631 | 2,200 | 530 | 426 | 4,480 | 1,630 | 399 | 337 | 207 | 176 | 154 |
| 30 | 178 | 690 | 1,780 | 510 | ----- | 6,330 | 1,490 | 406 | 256 | 116 | 176 | 70 |
| 31 | 210 | ----- | 1,550 | 514 | ----- | 8,240 | ----- | 467 | ----- | 188 | 174 | ----- |
| Total | 14,664 | 18,293 | 28,745 | 28,269 | 20,287 | 32,437 | 81,530 | 19,507 | 11,996 | 5,955 | 6,731 | 4,958 |
| Mean | 473 | 610 | 927 | 912 | 700 | 1,046 | 2,718 | 629 | 400 | 192 | 217 | 165 |
| (†) | -28.4 | +1.11 | +17.9 | -20.2 | -2.4 | +97.4 | -82.9 | +90.4 | -10.4 | -67.2 | -61.6 | -52.9 |

Adjusted for change in contents in Holloway Reservoir

| Mean | 445 | 721 | 945 | 892 | 698 | 1,143 | 2,635 | 719 | 390 | 125 | 155 | 112 |
|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cfs/m | 0.480 | 0.778 | 1.02 | 0.962 | 0.753 | 1.23 | 2.84 | 0.776 | 0.421 | 0.135 | 0.167 | 0.161 |
| In. | 0.55 | 0.87 | 1.18 | 1.11 | 0.81 | 1.42 | 3.17 | 0.89 | 0.47 | 0.16 | 0.19 | 0.13 |

| | Observed | | | | | | Adjusted | | | | | |
|---------------------|----------|-------|-----|----|------|-----|----------|-----|-------|-------|-----|-------|
| Calendar year 1959: | Max | 5,230 | Min | 95 | Mean | 688 | Mean | 694 | Cfs/m | 0.749 | In. | 10.17 |
| Water year 1959-60: | Max | 8,690 | Min | 70 | Mean | 747 | Mean | 746 | Cfs/m | 0.805 | In. | 10.95 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Holloway Reservoir; furnished by city of Flint.

1490. Flint River near Fosters, Mich.

Location.--Lat 43°17'56", long 83°55'58", on west line of sec.6, T.10 N., R.5 E., on downstream side of bridge on Sheridan Road, 1 mile west of Fosters, 1½ miles upstream from Birch Run, and 4 miles downstream from Silver Creek.

Drainage area.--1,120 sq mi, approximately.

Records available.--October 1939 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Gage-height records for flood seasons collected in this vicinity 1910-20, 1922-27 are contained in reports of U. S. Weather Bureau.

Gage.--Wire-weight gage read twice daily. Datum of gage is 582.22 ft above mean sea level, unadjusted (levels by U. S. Weather Bureau). Prior to August 1943, chain gage at same site and datum.

Average discharge.--21 years, 740 cfs.

Extremes.--Maximum discharge during year, 9,200 cfs Mar. 31, from graph based on discharge measurements; maximum gage height, 17.92 ft Mar. 31; minimum discharge, 123 cfs July 24, 31, Sept. 5. Maximum discharge, 19,000 cfs Apr. 7, 1947 (including flow bypassing gage); maximum gage height, 18.2 ft Mar. 7, 1956, from graph based on gage readings; minimum discharge observed, 27 cfs Aug. 6, 1941 (gage height, 3.67 ft). Maximum stage known, about 18.4 ft (from U. S. Weather Bureau data) in March 1904.

Remarks.--Records good except those for periods of ice effect, indefinite stage-discharge relation, or no gage-height record, which are fair. Some regulation by reservoirs above Flint.

Revisions (water years).--WSP 954: 1941. WSP 1337: 1940, 1942, 1943-44(M), 1945, 1946-47(M), 1948-50.

Rating table, water year 1959-60, except periods of ice effect or indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.9 | 116 | 11.0 | 2,040 |
| 5.0 | 294 | 16.0 | 4,300 |
| 7.0 | 780 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|---------|----------|---------|-----------|--------|-------|-------|-------|
| 1 | 352 | 344 | 735 | 1,550 | 616 | 500 | *e8,400 | 1,730 | 500 | 298 | 186 | 183 |
| 2 | 348 | 283 | 500 | 1,550 | 582 | 480 | *e8,000 | 1,420 | 492 | 276 | 262 | 191 |
| 3 | 367 | 365 | 458 | 1,550 | 537 | 480 | e7,800 | 1,320 | 517 | 219 | 283 | 168 |
| 4 | 408 | 1,450 | 610 | 1,520 | 562 | 450 | *e7,370 | 1,180 | 465 | 240 | 299 | 158 |
| 5 | 431 | 978 | 879 | 996 | 639 | 450 | *e6,310 | 1,030 | 388 | 229 | 195 | 167 |
| 6 | 792 | 704 | 1,050 | 900 | 852 | 450 | 4,010 | 603 | 348 | 294 | 130 | *176 |
| 7 | 2,030 | 502 | 1,100 | 850 | 1,030 | 450 | 5,350 | 510 | 322 | 224 | 173 | 186 |
| 8 | 1,560 | 445 | 906 | 800 | 1,160 | 420 | 3,200 | 527 | 303 | 222 | 205 | 145 |
| 9 | 1,120 | 417 | 629 | 750 | 1,180 | 400 | 2,820 | 468 | 269 | 208 | 294 | 170 |
| 10 | *1,110 | 371 | 661 | 700 | 1,280 | 400 | 2,510 | 618 | 208 | 164 | 367 | 173 |
| 11 | 1,050 | a350 | 661 | 650 | 1,490 | 380 | 2,210 | 567 | 178 | *167 | *360 | 160 |
| 12 | 972 | a350 | 2,320 | 1,000 | 1,300 | 380 | 1,850 | 948 | 214 | 173 | 280 | 166 |
| 13 | 780 | a400 | 2,430 | 2,660 | 1,200 | 380 | 1,630 | 948 | *222 | 167 | 205 | 205 |
| 14 | 715 | a1,800 | 1,550 | 2,900 | 1,100 | 380 | *1,480 | 870 | a300 | 181 | 212 | 173 |
| 15 | 652 | a1,500 | 1,390 | 1,860 | 1,000 | 380 | 1,630 | 846 | a350 | 178 | 426 | 154 |
| 16 | 603 | a1,000 | 1,210 | 1,720 | 900 | 380 | 1,990 | 975 | a600 | 181 | 377 | 164 |
| 17 | 477 | a850 | 1,130 | 1,570 | 1,000 | 380 | 2,240 | 1,110 | a1,100 | 186 | 203 | 158 |
| 18 | 560 | a800 | 1,090 | 1,450 | *927 | 400 | 2,310 | 1,100 | 616 | 189 | 199 | 134 |
| 19 | 316 | *760 | 1,020 | 1,370 | 610 | 450 | 1,880 | 846 | 786 | 327 | 200 | 155 |
| 20 | 318 | a750 | 921 | 1,130 | 720 | 500 | 1,700 | 873 | 704 | 242 | 208 | 426 |
| 21 | 331 | a750 | 795 | 1,090 | 647 | 500 | 1,650 | *828 | 732 | 187 | 141 | 320 |
| 22 | 290 | a750 | 693 | 1,030 | 608 | 500 | 1,450 | 786 | 391 | 184 | 236 | 200 |
| 23 | 258 | a700 | 636 | 900 | 530 | 500 | 1,280 | 786 | 413 | 183 | 195 | 157 |
| 24 | 274 | 732 | 582 | 813 | 507 | 500 | 1,200 | 804 | 375 | 127 | 189 | 145 |
| 25 | 274 | 1,130 | a560 | 700 | 504 | 500 | 2,260 | 774 | 312 | 170 | 169 | 144 |
| 26 | 256 | 1,080 | *542 | *700 | 500 | 500 | 3,500 | 582 | 428 | 296 | 195 | 138 |
| 27 | 258 | 966 | 750 | 700 | 500 | 500 | 3,360 | 552 | 410 | 194 | 219 | 258 |
| 28 | 274 | 783 | 1,670 | 650 | 500 | 2,000 | 2,740 | 532 | 344 | 251 | 181 | 203 |
| 29 | 244 | 798 | 3,700 | 650 | 500 | *e4,700 | 2,110 | 514 | 258 | 244 | 176 | 197 |
| 30 | 242 | 744 | 2,670 | 600 | ----- | *e8,000 | 1,940 | 461 | 290 | 219 | 183 | 189 |
| 31 | 482 | ----- | 1,930 | 597 | ----- | e9,000 | ----- | 507 | ----- | 127 | 170 | ----- |
| Total | 17,944 | 22,852 | 35,778 | 35,936 | 23,681 | 35,690 | 94,360 | 25,615 | 13,035 | 6,547 | 7,138 | 5,563 |
| Mean | 579 | 762 | 1,154 | 1,159 | 817 | 1,151 | 3,145 | 826 | 434 | 211 | 230 | 185 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 6,630 | | | | Min 100 | Mean 837 | Cfsm - | In. 10.15 | | | | |
| Water year 1959-60: Max | 9,000 | | | | Min 127 | Mean 886 | Cfsm - | In. 10.76 | | | | |

* Discharge measurement made on this day.

e No gage-height record; discharge estimated on basis of records for station near Flint.

a Stage-discharge relation indefinite; discharge computed on basis of 6 discharge measurements.

Note.--Stage-discharge relation affected by ice Nov. 17-20, Jan. 6-12, 25-30, Feb. 12-17, Feb. 26 to Mar. 28.

1495. Flint River near Alicia, Mich.

Location.--Lat 43°18'40", long 84°02'00", in SE $\frac{1}{4}$ sec.31, T.11 N., R.4 E., on left bank 100 ft downstream from The Prairie Farms Association flood-pumping station, 2 $\frac{1}{2}$ miles north of Alicia, and 4 miles upstream from mouth.

Records available.--November 1948 to September 1960 (gage heights only).

Gage.--Water-stage recorder. Datum of gage is 577.00 ft above mean sea level, datum of 1929.

Extremes.--Maximum gage height during year, 13.70 ft Apr. 3; minimum, 1.71 ft Oct. 3. 1948-60: Maximum gage height, that of Apr. 3, 1960; minimum, less than 1.5 ft during short periods in 1949, 1958, 1959.

Remarks.--Records represent stages in the Shiawassee Flats area.

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-----|------|------|------|------|------|------|-------|------|------|------|------|-------|
| 1 | 2.21 | 2.24 | 3.54 | 7.14 | 3.73 | 3.77 | 13.21 | 6.18 | 3.71 | 4.06 | - | 3.90 |
| 2 | 1.96 | 2.54 | 3.26 | 6.32 | 3.65 | 3.65 | 13.56 | 5.74 | 3.53 | 3.63 | - | 4.05 |
| 3 | 1.77 | 2.56 | 3.03 | 5.98 | 3.46 | 3.60 | 13.68 | 5.21 | 3.59 | 3.77 | - | 3.72 |
| 4 | 1.84 | 3.06 | 3.06 | 5.77 | 3.63 | 3.26 | 13.59 | 4.71 | 3.54 | 3.74 | - | 3.51 |
| 5 | 2.13 | 6.00 | 3.38 | 5.16 | 3.90 | 3.27 | 13.31 | 4.24 | 3.53 | 3.79 | - | 3.87 |
| 6 | 2.84 | 6.15 | 4.50 | 5.28 | 4.00 | 3.33 | 12.75 | 3.84 | 3.71 | 3.80 | - | 3.53 |
| 7 | 5.09 | 4.98 | 5.44 | 5.41 | 5.44 | 3.26 | 12.04 | 3.49 | 3.61 | 3.80 | - | 3.52 |
| 8 | 6.39 | 4.03 | 4.54 | 5.01 | 6.20 | 3.31 | 11.34 | 3.56 | 3.57 | 3.48 | - | 3.54 |
| 9 | 5.13 | 3.46 | 3.82 | 4.46 | 6.11 | 3.21 | 10.63 | 3.59 | 3.56 | 3.54 | - | 3.61 |
| 10 | 4.84 | 3.08 | 3.60 | 4.24 | 6.04 | 3.20 | 9.91 | 4.57 | 3.41 | 3.69 | - | 3.81 |
| 11 | 4.67 | 2.78 | 3.61 | 4.11 | 6.37 | 3.16 | 9.14 | 5.05 | 3.38 | 3.63 | 3.9 | 3.66 |
| 12 | 4.39 | 2.68 | 6.38 | 3.81 | 6.83 | 3.04 | 8.48 | 5.15 | 3.97 | 3.66 | 3.68 | 3.91 |
| 13 | 4.25 | 2.72 | 8.52 | 6.52 | 6.51 | 2.98 | 7.88 | 5.33 | 3.54 | 4.13 | 3.52 | 3.72 |
| 14 | 3.62 | - | 7.25 | 8.62 | 6.29 | 3.27 | 7.12 | 5.03 | 3.93 | 4.37 | 3.98 | 3.45 |
| 15 | 3.33 | - | 5.88 | 7.85 | 5.88 | 3.41 | 6.84 | 4.73 | 3.42 | 3.62 | 4.46 | 4.03 |
| 16 | 3.07 | - | 5.33 | 7.49 | 5.52 | 3.16 | 7.04 | 4.44 | 3.37 | 3.46 | 4.16 | 3.79 |
| 17 | 2.87 | - | 4.98 | 7.07 | 5.63 | 3.01 | 7.07 | 4.70 | 5.76 | 3.72 | 3.95 | 3.46 |
| 18 | 2.72 | - | 4.68 | 6.49 | 5.45 | 3.08 | 7.36 | 5.55 | 5.59 | 3.54 | 3.86 | 4.03 |
| 19 | 2.42 | 4.5 | 4.38 | 6.09 | 5.27 | 3.17 | 7.15 | 4.92 | 4.56 | 3.71 | 3.86 | 3.97 |
| 20 | 2.52 | 4.40 | 3.80 | 5.69 | 4.92 | 3.17 | 6.68 | 4.43 | 4.31 | 3.90 | 3.84 | 3.69 |
| 21 | 2.49 | 4.07 | 3.54 | 5.30 | 4.54 | - | 6.17 | 4.31 | 4.06 | 3.43 | 3.73 | 3.67 |
| 22 | 2.21 | 3.56 | 3.38 | 5.06 | 4.34 | - | 5.67 | 4.18 | 3.73 | 3.49 | 3.87 | 3.56 |
| 23 | 2.19 | 3.57 | 3.54 | 4.89 | 4.03 | - | 5.21 | 4.39 | 4.02 | 3.78 | 4.28 | 3.83 |
| 24 | 2.25 | 3.59 | 3.73 | 4.57 | 3.87 | - | 4.82 | 4.57 | 4.18 | 3.76 | 4.17 | 3.50 |
| 25 | 2.45 | 4.84 | 3.53 | 4.16 | 3.96 | - | 5.56 | 4.47 | 4.18 | 3.60 | 3.83 | 3.50 |
| 26 | 2.50 | 5.24 | 3.43 | 4.23 | 3.84 | - | 8.66 | 4.24 | 3.93 | 3.67 | 3.52 | 3.61 |
| 27 | 2.89 | 4.71 | 3.10 | 4.39 | 3.91 | - | 9.17 | 4.11 | 3.74 | 3.86 | 3.85 | 3.68 |
| 28 | 2.49 | 4.36 | 6.08 | 4.48 | 3.92 | - | 8.37 | 3.94 | 3.67 | 3.90 | 3.52 | 3.81 |
| 29 | 2.26 | 3.76 | 9.65 | 4.63 | 3.86 | - | 7.40 | 3.66 | 3.59 | 3.71 | 3.64 | 3.54 |
| 30 | 2.19 | 3.36 | 9.43 | 4.36 | - | - | 11.34 | 3.58 | 3.93 | 3.83 | 3.75 | 3.86 |
| 31 | 2.18 | - | 8.26 | 3.95 | - | - | 13.05 | - | 3.62 | - | 4.0 | 3.61 |

Note.--No gage-height record Nov. 14-18, Mar. 21-28, Aug. 1-10.

1500. East Branch Cass River near Cass City, Mich.--Continued

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Dec. 11, June 1-20)

| | | | |
|-----|-----|------|-------|
| 1.6 | 0.2 | 3.0 | 131 |
| 1.7 | 1.6 | 5.0 | 595 |
| 1.9 | 7.5 | 7.0 | 1,400 |
| 2.1 | 18 | 13.0 | 4,890 |
| 2.5 | 61 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 3.6 | 19 | 57 | 550 | *80 | *52 | *3,910 | 100 | 352 | 27 | *5.0 | 3.0 |
| 2 | 3.6 | *27 | 48 | 350 | 80 | 50 | *3,460 | *89 | 131 | 20 | 5.1 | 3.3 |
| 3 | 3.0 | 26 | 49 | 270 | 80 | 50 | 3,540 | 77 | 100 | 19 | 5.4 | 3.0 |
| 4 | 3.0 | 36 | 58 | *240 | 80 | 50 | 2,910 | 69 | 69 | 17 | 5.1 | 4.2 |
| 5 | 4.5 | 192 | 93 | 210 | 81 | 50 | 2,070 | 60 | 54 | *15 | 5.1 | 4.5 |
| 6 | 9.8 | 246 | 350 | 190 | 104 | 50 | 1,440 | 55 | *44 | 13 | 5.4 | *3.6 |
| 7 | 29 | 153 | *355 | 170 | 140 | 50 | 1,040 | 55 | 37 | 12 | 5.7 | 3.0 |
| 8 | 104 | 92 | 145 | 140 | 170 | 50 | 669 | 55 | 31 | 11 | 5.7 | 2.5 |
| 9 | 82 | 62 | 120 | 120 | 180 | 50 | 688 | 65 | 26 | 9.8 | 5.7 | 1.9 |
| 10 | 56 | 48 | 100 | 105 | 180 | 50 | 485 | 214 | 23 | 8.4 | 6.0 | 1.6 |
| 11 | 40 | 39 | 90 | 82 | 180 | 50 | 368 | 272 | 22 | 8.0 | 6.0 | 1.5 |
| 12 | *30 | 31 | 648 | 75 | 170 | 50 | 450 | 867 | 19 | 7.2 | 7.5 | 1.3 |
| 13 | 23 | 27 | 986 | 150 | 160 | 50 | 310 | 557 | 18 | 7.2 | 6.9 | 1.2 |
| 14 | 17 | 189 | 681 | 370 | 150 | 50 | 216 | 475 | 22 | 6.9 | 5.7 | .9 |
| 15 | 14 | 505 | 388 | 350 | 140 | 50 | 208 | 365 | 54 | 6.9 | 5.1 | .9 |
| 16 | 11 | 410 | 223 | 320 | 130 | 50 | 378 | 202 | 73 | 6.6 | 4.8 | .9 |
| 17 | 9.8 | 200 | 196 | 280 | 125 | 50 | 382 | 162 | 280 | 6.3 | 3.9 | .9 |
| 18 | 8.4 | 150 | 157 | 250 | 115 | 50 | 338 | 320 | 332 | 6.3 | 3.9 | 1.0 |
| 19 | 8.0 | 95 | 110 | 220 | 105 | 52 | 231 | 204 | 223 | 6.6 | 3.9 | 1.6 |
| 20 | 7.2 | 65 | 100 | 200 | 100 | 53 | 151 | 129 | 140 | 6.6 | 3.6 | 2.5 |
| 21 | 6.3 | 51 | 80 | 180 | 94 | 54 | 120 | 108 | 92 | 6.3 | 3.6 | 3.0 |
| 22 | 5.7 | 45 | 70 | 170 | 88 | 56 | 109 | 96 | 66 | 5.7 | 6.3 | 4.5 |
| 23 | 5.7 | 49 | 60 | 160 | 82 | 58 | 100 | 96 | 55 | 5.4 | 6.3 | 4.5 |
| 24 | 6.6 | 73 | 58 | 150 | 76 | 62 | 89 | 110 | 72 | 5.4 | 4.5 | 4.2 |
| 25 | 7.2 | 221 | 56 | 140 | 70 | 68 | 123 | 96 | 90 | 4.8 | 3.3 | 3.0 |
| 26 | 9.3 | 208 | 57 | 130 | 65 | 80 | 358 | 80 | 69 | 4.8 | 3.0 | 2.8 |
| 27 | 12 | 123 | 94 | 120 | 60 | 100 | 382 | 67 | 49 | 5.1 | 2.5 | 2.5 |
| 28 | 14 | 87 | 900 | 110 | 55 | 200 | 208 | 62 | 38 | 6.3 | 2.2 | 2.2 |
| 29 | 14 | 73 | 1,500 | 100 | 55 | 600 | 125 | 59 | 39 | 8.0 | 1.9 | 1.9 |
| 30 | 13 | 52 | 900 | 92 | ----- | *3,000 | 100 | 61 | 34 | 6.9 | 1.9 | 1.9 |
| 31 | 14 | ----- | 700 | 85 | ----- | *4,690 | ----- | 706 | ----- | 6.0 | 1.6 | ----- |
| Total | 574.7 | 3,594 | 9,639 | 6,079 | 3,195 | 9,975 | 24,958 | 5,933 | 2,654 | 285.5 | 142.6 | 73.8 |
| Mean | 18.5 | 120 | 311 | 196 | 110 | 322 | 832 | 191 | 88.5 | 9.21 | 4.60 | 2.46 |
| Cfsm | 0.074 | 0.478 | 1.24 | 0.781 | 0.438 | 1.28 | 3.31 | 0.761 | 0.353 | 0.037 | 0.018 | 0.010 |
| In. | 0.09 | 0.53 | 1.43 | 0.90 | 0.47 | 1.48 | 3.69 | 0.88 | 0.39 | 0.04 | 0.02 | 0.01 |

Calendar year 1959: Max 2,580 Min 1.3 Mean 146 Cfsm 0.582 In. 7.90
Water year 1959-60: Max 4,690 Min 0.9 Mean 185 Cfsm 0.729 In. 9.93

Peak discharge (base, 800 cfs).--Dec. 12 (9 p.m.) 1,180 cfs (6.57 ft); Dec. 29 (about 2 a.m.) about 1,780 cfs; Mar. 31 (2:30 p.m.) 4,890 cfs (13.00 ft); May 12 (1 p.m.) 990 cfs (6.09 ft); May 31 (5 p.m.) 1,010 cfs (6.17 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-20, 22, 30, Dec. 8-11, 19-24, Dec. 30 to Feb. 4, Feb. 7 to Mar. 30.

1505. Cass River at Cass City, Mich.

Location.--Lat 43°35'10", long 83°10'35", in NE¼ sec.4, T.13 N., R.11 E., on left bank 500 ft downstream from highway bridge, half a mile downstream from confluence of North Branch and East Branch, and 1 mile south of Cass City.

Drainage area.--370 sq mi, approximately.

Records available.--October 1947 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 697.92 ft above mean sea level, datum of 1929. Prior to Nov. 14, 1952, wire-weight gage at site 500 ft upstream at same datum.

Average discharge.--13 years, 220 cfs.

Extremes.--Maximum discharge during year, 6,810 cfs Mar. 31 (gage height, 14.41 ft); minimum 1.3 cfs Sept. 16, 17 (gage height, 4.59 ft)

1947-60: Maximum discharge, 8,460 cfs (revised) Mar. 20, 1948 (gage height, 15.80 ft, from graph based on gage readings); minimum, 0.5 cfs Sept. 26, 1948.

Revisions.--The maximum discharge for the water year 1948 has been revised to 8,460 cfs Mar. 20, 1948 (gage height, 15.80 ft), superseding figure published in WSP 1307.

Remarks.--Records good except those for periods of ice effect or no gage-height record and those below 5 cfs, which are poor.

Revisions (water years).--WSP 1337: 1949-50.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 7-12, Aug. 24 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 4.4 | 0.7 | 5.5 | 150 |
| 4.5 | 4.0 | 6.0 | 290 |
| 4.6 | 9.0 | 7.0 | 700 |
| 4.7 | 16 | 9.0 | 1,840 |
| 5.0 | 48 | 12.0 | 4,300 |
| 5.2 | 83 | 14.0 | 6,360 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 15 | 36 | 150 | 300 | *170 | *100 | *5,760 | 210 | 880 | 61 | *10 | 5.0 |
| 2 | 15 | *50 | 130 | 700 | 165 | 95 | 4,850 | *190 | 569 | 47 | 9.7 | 6.0 |
| 3 | 15 | 60 | 135 | 540 | 165 | 90 | 4,820 | 165 | 447 | 40 | 12 | 5.5 |
| 4 | 17 | 100 | 140 | *500 | 165 | 90 | 4,030 | 142 | 290 | 36 | 12 | 4.5 |
| 5 | 15 | 200 | 180 | 370 | 162 | 90 | 3,000 | 118 | 200 | *23 | 11 | 6.0 |
| 6 | 20 | 300 | 350 | 310 | 195 | 90 | 2,100 | 99 | *148 | 30 | 11 | *5.0 |
| 7 | 30 | 280 | *450 | 280 | 250 | 90 | 1,550 | 97 | 107 | 28 | 13 | 4.5 |
| 8 | 59 | 250 | 314 | 260 | 300 | 90 | 1,120 | 93 | 87 | 25 | 14 | 4.0 |
| 9 | 128 | 200 | 230 | 260 | 320 | 90 | 1,110 | 110 | 68 | 22 | 14 | 3.5 |
| 10 | 87 | 160 | 205 | 260 | 320 | 90 | 885 | 325 | 56 | 20 | 16 | 2.6 |
| 11 | 70 | 130 | 180 | 290 | 320 | 90 | 740 | 407 | 51 | 18 | 16 | 2.6 |
| 12 | *54 | 110 | 944 | 350 | 310 | 90 | 805 | 1,170 | 43 | 17 | 17 | 2.0 |
| 13 | 45 | 100 | 1,250 | 440 | 300 | 90 | 614 | 1,070 | 39 | 18 | 18 | 2.0 |
| 14 | 38 | 250 | 900 | 710 | 290 | 90 | 524 | 985 | 39 | 15 | 16 | 2.0 |
| 15 | 32 | 600 | 700 | 650 | 270 | 95 | 463 | 750 | 61 | 14 | 16 | 1.6 |
| 16 | 27 | 550 | 478 | 600 | 250 | 98 | 685 | 487 | 97 | 13 | 13 | 1.6 |
| 17 | 24 | 450 | 378 | 540 | 235 | 100 | 700 | 423 | 314 | 13 | 11 | 1.6 |
| 18 | 20 | 350 | 297 | 430 | 220 | 105 | 655 | 636 | 415 | 13 | 11 | 2.0 |
| 19 | 19 | 250 | 200 | 370 | 205 | 110 | 546 | 569 | 332 | 13 | 11 | 3.5 |
| 20 | 17 | 170 | 180 | 340 | 195 | 120 | 384 | 435 | 248 | 13 | 11 | 5.0 |
| 21 | 15 | 140 | 160 | 310 | 180 | 125 | 290 | 308 | 162 | 12 | 11 | 5.5 |
| 22 | 15 | 130 | 140 | 300 | 170 | 135 | 245 | 238 | 112 | 12 | 11 | 7.0 |
| 23 | 15 | 130 | 135 | 260 | 160 | 145 | 209 | 218 | 89 | 11 | 12 | 10 |
| 24 | 15 | 160 | 130 | 240 | 150 | 155 | 190 | 218 | 188 | 9.7 | 8.0 | 9.0 |
| 25 | 18 | 250 | 120 | 230 | 140 | 170 | 350 | 192 | 254 | 8.5 | 6.0 | 8.0 |
| 26 | 22 | 350 | 130 | 210 | 130 | 190 | 500 | 180 | 245 | 8.5 | 5.0 | 7.5 |
| 27 | 25 | 300 | 148 | 200 | 120 | 210 | 800 | 130 | 227 | 10 | 5.0 | 6.0 |
| 28 | 28 | 230 | 1,010 | 190 | 115 | 350 | 500 | 112 | 168 | 9.7 | 4.5 | 5.0 |
| 29 | 30 | 190 | 1,970 | 180 | 110 | 1,000 | 400 | 97 | 114 | 12 | 4.0 | 4.0 |
| 30 | 29 | 170 | 1,200 | 175 | ----- | *3,200 | 250 | 91 | 81 | 12 | 4.0 | 4.0 |
| 31 | 33 | ----- | 1,100 | 170 | ----- | *6,300 | ----- | 931 | ----- | 12 | 4.0 | ----- |
| Total | 992 | 6,646 | 14,035 | 11,565 | 6,082 | 13,883 | 38,895 | 11,174 | 6,131 | 604.4 | 337.2 | 136.5 |
| Mean | 32.0 | 222 | 453 | 373 | 210 | 448 | 1,296 | 360 | 204 | 19.5 | 10.9 | 4.60 |
| Cfsm | 0.086 | 0.600 | 1.22 | 1.01 | 0.568 | 1.21 | 3.50 | 0.973 | 0.551 | 0.053 | 0.029 | 0.012 |
| In. | 0.10 | 0.67 | 1.41 | 1.16 | 0.61 | 1.40 | 3.90 | 1.12 | 0.61 | 0.06 | 0.03 | 0.01 |

Calendar year 1959: Max 3,620 Min 1.3 Mean 216 Cfsm 0.584 In. 7.92
Water year 1959-60: Max 6,300 Min 1.6 Mean 302 Cfsm 0.816 In. 11.08

Peak discharge (base, 1,000 cfs).--Dec. 13 (12:30 a.m.) 1,430 cfs (8.43 ft); Dec. 29 (4 a.m.) 2,260 cfs (9.60 ft); Mar. 31 (6 p.m.) 6,810 cfs (14.41 ft); May 12 (3 p.m.) 1,350 cfs (8.22 ft); May 31 (8 p.m.) 1,420 cfs (8.34 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 9-11, 14, 15, 19-28, Dec. 30 to Feb. 4, Feb. 7 to Mar. 30. No gage-height record Nov. 2 to Dec. 7, Apr. 24 to May 2; discharge estimated on basis of weather records, records for stations on nearby streams, and recorded range in stage.

1510. Cass River at Vassar, Mich.

Location.--Lat 43°22'10", long 83°34'55", in SW $\frac{1}{4}$ sec.7, T.11 N., R.8 E., on downstream side of bridge on State Highway 15 in Vassar, $\frac{1}{4}$ miles upstream from Gooding's Creek.

Drainage area.--700 sq mi, approximately.

Records available.--October 1948 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Gage-height records for flood seasons collected in this vicinity 1910-28 are contained in reports of U.S. Weather Bureau.

Gage.--Wire-weight gage and crest-stage indicator above concrete dam; gage read twice daily. Datum of gage is 612.376 ft above mean sea level, datum of 1929 (levels by U.S. Weather Bureau).

Average discharge.--12 years, 427 cfs.

Extremes.--Maximum discharge during year, 11,400 cfs Apr. 1 (gage height, 16.70 ft); minimum 26 cfs Sept. 26.
1948-60: Maximum discharge, that of Apr. 1, 1960; minimum observed, 15 cfs Oct. 10, 1955 (gage height, 3.14 ft).

A stage of 30.8 ft occurred on Mar. 20, 1948, from U.S. Weather Bureau records (discharge, 18,000 cfs, from rating curve extended above 12,000 cfs by logarithmic plotting).

Remarks.--Records good except those for periods of ice effect, which are fair. Some regulation by dam at Michigan Sugar Co. 10 miles above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 30 to Nov. 15)

| | | | |
|-----|-----|------|--------|
| 3.1 | 26 | 6.0 | 1,130 |
| 3.2 | 36 | 10.0 | 3,890 |
| 3.5 | 80 | 14.0 | 7,700 |
| 3.8 | 155 | 17.0 | 11,900 |
| 4.5 | 405 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|---------|--------|--------|-------|-------|-------|-------|
| 1 | 49 | 122 | 341 | 1,800 | 330 | 180 | 10,600 | 575 | 1,320 | 149 | 44 | 34 |
| 2 | 48 | 128 | 321 | 1,500 | *330 | *164 | 8,180 | 548 | 895 | 143 | *47 | 43 |
| 3 | 49 | *176 | 305 | 1,100 | 330 | 160 | 6,700 | *477 | 630 | 125 | 51 | 40 |
| 4 | 47 | 313 | 365 | 900 | 330 | 160 | 6,130 | 413 | 413 | 102 | 49 | 38 |
| 5 | 52 | 441 | 518 | 750 | 389 | 160 | 4,800 | 381 | 317 | 88 | 48 | 36 |
| 6 | 100 | 512 | 665 | 600 | 516 | 160 | 3,460 | 369 | 264 | *84 | 46 | 36 |
| 7 | 203 | 530 | 725 | *500 | 650 | 160 | 2,570 | 377 | *194 | 76 | 44 | *36 |
| 8 | 218 | 413 | *800 | 450 | 665 | 155 | 2,080 | 373 | 182 | 86 | 46 | 37 |
| 9 | 200 | 345 | 710 | 450 | 700 | 155 | 1,810 | 405 | 164 | 94 | 49 | 38 |
| 10 | 179 | 278 | 635 | 450 | 730 | 158 | 1,520 | 534 | 143 | 90 | 46 | 35 |
| 11 | 161 | 229 | 562 | 530 | 650 | 160 | 1,320 | 905 | 143 | 94 | 48 | 34 |
| 12 | 152 | 194 | 1,290 | 890 | 600 | 180 | 1,280 | 1,490 | 128 | 90 | 46 | 35 |
| 13 | *137 | 179 | 2,330 | 1,200 | 550 | 180 | 1,180 | 2,000 | 94 | 84 | 46 | 35 |
| 14 | 115 | 333 | 2,190 | 1,500 | 520 | 165 | 990 | 1,720 | 115 | 84 | 47 | 34 |
| 15 | 98 | 857 | 1,490 | 1,320 | 480 | 170 | 910 | 1,250 | 140 | 80 | 52 | 36 |
| 16 | 90 | 975 | 990 | 1,120 | 460 | 170 | 915 | 995 | 179 | 80 | 51 | 34 |
| 17 | 84 | 800 | 785 | 950 | 430 | 176 | 955 | 785 | 268 | 75 | 46 | 33 |
| 18 | 80 | 494 | 655 | 800 | 410 | 191 | 1,080 | 820 | 381 | 71 | 37 | 32 |
| 19 | 69 | 409 | 516 | 720 | 390 | 191 | 1,020 | 1,000 | 409 | 71 | 32 | 37 |
| 20 | 66 | 561 | 417 | 650 | 360 | 200 | 860 | 1,110 | 369 | 66 | 32 | 35 |
| 21 | 61 | 329 | 333 | 550 | 340 | 210 | 720 | 1,030 | 345 | 62 | 36 | 32 |
| 22 | 59 | 313 | 317 | 500 | 320 | 220 | 610 | 755 | 297 | 54 | 40 | 32 |
| 23 | 59 | 313 | 297 | 460 | 300 | 230 | 552 | 508 | 250 | 48 | 37 | 30 |
| 24 | 73 | 369 | 278 | 450 | 270 | 250 | 512 | 425 | 197 | 46 | 35 | 29 |
| 25 | 78 | 465 | 260 | 410 | 250 | 280 | 787 | 401 | 200 | 44 | 35 | 30 |
| 26 | 86 | 575 | 250 | 400 | 230 | 317 | 1,040 | 381 | 182 | 48 | 37 | 28 |
| 27 | 98 | 585 | 472 | 580 | 220 | 349 | 925 | 357 | 152 | 51 | 37 | 29 |
| 28 | 108 | 485 | 1,630 | 360 | 210 | 854 | 910 | 337 | 125 | 46 | 37 | 30 |
| 29 | 108 | 401 | 3,460 | 350 | 200 | 2,780 | 750 | 313 | 128 | 48 | 34 | 29 |
| 30 | 108 | 349 | 3,290 | 350 | ----- | *5,890 | 610 | 289 | 140 | 46 | 34 | 30 |
| 31 | 120 | ----- | 2,500 | 330 | ----- | *10,600 | ----- | 333 | ----- | 44 | 33 | ----- |
| Total | 3,155 | 12,273 | 29,495 | 22,520 | 12,160 | 25,355 | 65,746 | 21,756 | 8,764 | 2,369 | 1,302 | 1,017 |
| Mean | 102 | 409 | 951 | 726 | 419 | 817 | 2,192 | 702 | 292 | 76.4 | 42.0 | 33.9 |
| Cfs/m | 0.146 | 0.584 | 1.36 | 1.04 | 0.599 | 1.17 | 3.13 | 1.00 | 0.417 | 0.109 | 0.060 | 0.048 |
| In. | 0.17 | 0.65 | 1.57 | 1.20 | 0.65 | 1.35 | 3.49 | 1.15 | 0.47 | 0.13 | 0.07 | 0.05 |

Calendar year 1959: Max 7,180 Min 25 Mean 462 Cfs/m 0.660 In. 8.9F
Water year 1959-60: Max 10,600 Min 28 Mean 563 Cfs/m 0.804 In. 10.9F

Peak discharge (base, 3,000 cfs).--Dec. 29 (10 p.m.) 4,090 cfs (10.25 ft); Apr. 1 (1 a.m.) 11,400 cfs (16.70 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 31 to Jan. 10, Jan. 17 to Feb. 4, Feb. 10 to Mar. 1, Mar. 3-8, 11-16, 20-25.

1515. Cass River at Frankenmuth, Mich.

Location.--Lat 43°19'35", long 83°44'50", in sec.27, T.11 N., R.6 E., on right bank half a mile west of Frankenmuth, 3.4 miles upstream from Dead Creek, and 5.4 miles downstream from Perry Creek.

Drainage area.--848 sq mi.

Records available.--February 1908 to March 1909, July 1935 to September 1936, June 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 583.96 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). February 1908 to March 1909 staff gage at site half a mile upstream at datum 1.81 ft lower. July 18 to Sept. 11, 1935, wire-weight gage and Sept. 12, 1935, to Sept. 30, 1936, and June 20, 1939, to Sept. 30, 1949, water-stage recorder, at site half a mile downstream at datum 0.04 ft higher than present datum.

Average discharge.--22 years (1935-36, 1939-60), 486 cfs.

Extremes.--Maximum discharge during year, 11,900 cfs Apr. 1 (gage height, 21.00 ft); minimum, 39 cfs Aug. 19, 20.

1908-9, 1935-36, 1939-60: Maximum discharge, 17,700 cfs Mar. 18, 1942 (gage height, 20.88 ft), site and datum then in use; maximum gage height, 22.44 ft Feb. 17, 1954 (ice jam); minimum daily discharge, about 1.5 cfs Aug. 6, 1944.

Remarks.--Records good except those for periods of ice effect, which are fair. Occasional regulation by dams above station. Prior to 1950, regulation at low and medium flows by mill above station.

Revisions (water years).--WSP 1307: 1936(M), 1940(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 15

Nov. 16 to Sept. 30

| | | | | | |
|-----|-------|-----|-------|------|--------|
| 3.4 | 61 | 3.2 | 34 | 12.0 | 2,70C |
| 3.8 | 104 | 3.8 | 104 | 16.0 | 5,20C |
| 4.5 | 217 | 4.5 | 208 | 20.0 | 10,40C |
| 6.0 | 590 | 5.0 | 291 | 21.0 | 11,90C |
| 8.0 | 1,190 | 8.0 | 1,120 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|---------|--------|--------|--------|-------|-------|-------|
| 1 | 73 | 209 | 360 | 1,700 | 400 | 260 | 11,500 | 760 | 1,200 | 218 | 56 | 47 |
| 2 | 70 | 202 | 339 | 1,400 | 400 | *250 | *9,380 | 691 | 1,060 | 180 | *56 | 68 |
| 3 | 67 | *180 | 333 | 1,200 | 400 | 240 | 7,720 | *586 | 799 | 156 | 63 | 60 |
| 4 | 63 | 226 | 343 | 1,100 | 400 | 230 | 7,040 | 502 | 643 | 148 | 60 | 54 |
| 5 | 70 | 629 | 391 | 900 | 400 | 230 | 5,680 | 432 | 396 | 213 | 56 | 53 |
| 6 | 136 | 824 | 721 | 700 | 528 | 230 | 4,050 | 376 | 329 | *142 | 53 | 50 |
| 7 | 305 | 803 | 1,070 | *560 | 766 | 220 | 3,000 | 360 | *266 | 118 | 56 | *48 |
| 8 | 286 | 611 | *934 | 500 | 817 | 220 | 2,400 | 358 | 242 | 115 | 60 | 48 |
| 9 | 269 | 470 | 631 | 500 | 931 | 220 | 2,080 | 351 | 219 | 115 | 60 | 50 |
| 10 | 275 | 392 | 505 | 514 | 900 | 220 | 1,980 | 605 | 203 | 111 | 68 | 46 |
| 11 | 228 | 325 | 474 | 502 | 850 | 220 | 1,660 | 1,070 | 192 | 80 | 76 | 46 |
| 12 | 196 | 273 | 1,310 | 450 | 800 | 220 | 1,800 | 1,460 | 184 | 94 | 67 | 47 |
| 13 | *171 | 250 | 2,510 | 1,010 | 760 | 220 | 1,500 | 2,260 | 172 | 88 | 63 | 50 |
| 14 | 149 | 620 | 1,860 | 1,800 | 700 | 220 | 1,250 | 1,900 | 158 | 70 | 64 | 50 |
| 15 | 133 | 1,160 | 1,590 | 1,600 | 660 | 220 | 1,130 | 1,700 | 135 | 82 | 67 | 48 |
| 16 | 120 | 1,170 | 1,250 | 1,400 | 620 | 220 | 1,160 | 1,260 | 192 | 71 | 63 | 46 |
| 17 | 110 | 800 | 937 | 1,200 | 580 | 220 | 1,400 | 943 | 812 | 68 | 59 | 48 |
| 18 | 104 | 450 | 760 | 1,000 | 540 | 220 | 1,440 | 1,170 | 829 | 73 | 55 | 47 |
| 19 | 96 | 400 | 540 | 900 | 510 | 220 | 1,250 | 1,230 | 724 | 84 | 42 | 56 |
| 20 | 90 | 370 | 400 | 800 | 480 | 230 | 1,070 | 1,050 | 530 | 91 | 42 | 55 |
| 21 | 89 | 341 | 310 | 700 | 450 | 230 | 863 | 876 | 384 | 86 | 53 | 50 |
| 22 | 85 | 327 | 270 | 620 | 420 | 230 | 736 | 706 | 304 | 85 | 101 | 48 |
| 23 | 86 | 323 | 250 | 560 | 390 | 240 | 634 | 601 | 284 | 67 | 82 | 47 |
| 24 | 100 | 403 | 250 | 520 | 360 | 250 | 556 | 488 | 362 | 62 | 63 | 45 |
| 25 | 110 | 700 | 270 | 490 | 330 | 260 | 601 | 488 | 472 | 56 | 56 | 43 |
| 26 | 110 | 859 | 300 | 460 | 300 | 280 | 1,250 | 428 | 405 | 57 | 52 | 40 |
| 27 | 119 | 712 | 369 | 450 | 290 | 340 | 1,780 | 371 | 345 | 66 | 51 | 41 |
| 28 | 136 | 574 | 1,210 | 440 | 280 | 950 | 1,330 | 323 | 323 | 62 | 48 | 41 |
| 29 | 133 | 483 | 3,700 | 420 | 270 | 3,000 | 961 | 295 | 304 | 57 | 46 | 42 |
| 30 | 129 | 389 | 3,590 | 410 | ----- | 7,230 | 766 | 273 | 251 | 56 | 46 | 43 |
| 31 | 151 | ----- | 2,000 | 410 | ----- | *10,900 | ----- | 298 | ----- | 59 | 45 | ----- |
| Total | 4,259 | 15,475 | 29,777 | 25,216 | 15,532 | 28,440 | 77,767 | 24,211 | 12,719 | 3,030 | 1,829 | 1,455 |
| Mean | 137 | 516 | 961 | 813 | 536 | 917 | 2,592 | 761 | 424 | 97.7 | 59.0 | 48.5 |
| Cfs/m | 0.162 | 0.608 | 1.13 | 0.959 | 0.632 | 1.08 | 3.06 | 0.921 | 0.500 | 0.115 | 0.070 | 0.057 |
| In. | 0.19 | 0.68 | 1.30 | 1.11 | 0.68 | 1.24 | 3.41 | 1.06 | 0.56 | 0.13 | 0.08 | 0.06 |

Calendar year 1959: Max 8,440 Min 32 Mean 542 Cfs/m 0.639 In. 8.68

Water year 1959-60: Max 11,500 Min 40 Mean 655 Cfs/m 0.772 In. 10.50

Peak discharge (base, 3,500 cfs).--Dec. 29 (10 p.m.) 4,320 cfs (14.86 ft); Apr. 1 (2 to 4 a.m.) 11,900 cfs (21.00 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-20, Dec. 19-25, Dec. 31 to Jan. 9, Jan. 15 to Feb. 5, Feb. 10 to Mar. 29.

1525. Tobacco River at Beaverton, Mich.

Location.--Lat 43°52'45", long 84°28'25", in sec.7, T.17 N., R.1 W., on left bank 15 ft downstream from highway bridge, 1 mile downstream from powerplant at Beaverton, and 2 miles upstream from Venison Creek.

Drainage area.--487 sq mi.

Records available.--July 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 683.27 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--12 years, 373 cfs.

Extremes.--Maximum discharge during year, 5,720 cfs Mar. 31 (gage height, 11.12 ft); minimum, 6.8 cfs Sept. 8, 10, 30 (gage height, 0.76 ft); minimum daily, 70 cfs Mar. 5. 1948-60: Maximum discharge, 7,680 cfs July 9, 1957 (gage height, 12.95 ft); minimum, 5.6 cfs July 12, 13, 14, 1959; minimum daily, 5.9 cfs July 12, 13, 1959.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Regulation at all stages by powerplant 1 mile upstream.

Revisions (water years).--WSP 1307: 1948(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 5

Nov. 6 to Sept. 30

| | | | | | |
|-----|-------|-----|-----|------|-------|
| 2.1 | 142 | 1.7 | 68 | 6.0 | 1,600 |
| 3.0 | 335 | 2.0 | 110 | 9.0 | 3,700 |
| 4.0 | 680 | 3.0 | 335 | 11.0 | 5,600 |
| 6.0 | 1,600 | 4.0 | 680 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 221 | 411 | 350 | 637 | 290 | 200 | *3,360 | 651 | 624 | 200 | 148 | 258 |
| 2 | 203 | 375 | 363 | 605 | 240 | 80 | 2,660 | 725 | 591 | 220 | 247 | 192 |
| 3 | 194 | 346 | 381 | 608 | 240 | 150 | 2,720 | 531 | 234 | 280 | 216 | 205 |
| 4 | 146 | 554 | 402 | 468 | *300 | *200 | 2,390 | 436 | 226 | 320 | *212 | 169 |
| 5 | 385 | *1,270 | 476 | 220 | 330 | 70 | 1,500 | *405 | 402 | 290 | 172 | 217 |
| 6 | 427 | 1,400 | 651 | *230 | 340 | 140 | 1,190 | 440 | 249 | 200 | 159 | 185 |
| 7 | 602 | 925 | 578 | 274 | 360 | 170 | 958 | 620 | 173 | 260 | 228 | 219 |
| 8 | 488 | 681 | 508 | 504 | 350 | 160 | 877 | 647 | 179 | *260 | 193 | 106 |
| 9 | 513 | 525 | 411 | 321 | 360 | 160 | 883 | 667 | *342 | 180 | 318 | *136 |
| 10 | 291 | 467 | *323 | 356 | 300 | 170 | 845 | 736 | 322 | 156 | 199 | 165 |
| 11 | 263 | 434 | 374 | 357 | 224 | 140 | 834 | 740 | 177 | 201 | 199 | 141 |
| 12 | 419 | 434 | 650 | 555 | 350 | 95 | 1,190 | 705 | 184 | 170 | 199 | 186 |
| 13 | 277 | 430 | 552 | 652 | 330 | 230 | 1,140 | 453 | 181 | 191 | 199 | 184 |
| 14 | 272 | 317 | 431 | 648 | 300 | 210 | 1,110 | 414 | 337 | 246 | 141 | 108 |
| 15 | *302 | 408 | 426 | 376 | 270 | 200 | 965 | 414 | 418 | 179 | 351 | 263 |
| 16 | 286 | 326 | 394 | 489 | 320 | 230 | 856 | 414 | 403 | 182 | 207 | 161 |
| 17 | 194 | 310 | 407 | 370 | 283 | 170 | 871 | 461 | 248 | 185 | 166 | 106 |
| 18 | 196 | 269 | 432 | 496 | 316 | 220 | 1,260 | 690 | 335 | 280 | 250 | 192 |
| 19 | 204 | 326 | 338 | 378 | 328 | 200 | 990 | 601 | 411 | 190 | 190 | 195 |
| 20 | 297 | 364 | 246 | 418 | 220 | 240 | 775 | 627 | 285 | 202 | 198 | 366 |
| 21 | 204 | 326 | 281 | 348 | 250 | 230 | 731 | 681 | 296 | 206 | 181 | 230 |
| 22 | 204 | 375 | 261 | 368 | 270 | 200 | 445 | 795 | 208 | 201 | 218 | 293 |
| 23 | 560 | 436 | 238 | 411 | 250 | 160 | 506 | 1,050 | 327 | 89 | 233 | 163 |
| 24 | 1,370 | 736 | 270 | 360 | 230 | 140 | 476 | 778 | 700 | 210 | 174 | 256 |
| 25 | 1,310 | 764 | 240 | 300 | 270 | 170 | 461 | 586 | 700 | 150 | 183 | 215 |
| 26 | 795 | 680 | 335 | 280 | 250 | 210 | 750 | 539 | 450 | 300 | 205 | 264 |
| 27 | 679 | 627 | 504 | 332 | 240 | 350 | 1,000 | 281 | 300 | 166 | 114 | 221 |
| 28 | 508 | 460 | 1,200 | 328 | 240 | 594 | 855 | 424 | 450 | 353 | 188 | 184 |
| 29 | 455 | 405 | 1,530 | 340 | 250 | 1,190 | 514 | 296 | 600 | 164 | 176 | 246 |
| 30 | 353 | 387 | 904 | 363 | ----- | 2,870 | 466 | 334 | 500 | 239 | 176 | 113 |
| 31 | 414 | ----- | 836 | 358 | ----- | 5,030 | ----- | 510 | ----- | 194 | 167 | ----- |
| Total | 13,032 | 15,768 | 15,292 | 12,790 | 8,301 | 14,379 | 33,578 | 17,651 | 10,852 | 6,663 | 6,206 | 5,939 |
| Mean | 420 | 526 | 493 | 413 | 286 | 464 | 1,119 | 569 | 362 | 215 | 200 | 198 |
| Cfsm | 0.862 | 1.08 | 1.01 | 0.848 | 0.587 | 0.953 | 2.30 | 1.17 | 0.743 | 0.441 | 0.411 | 0.407 |
| In. | 0.99 | 1.20 | 1.16 | 0.98 | 0.63 | 1.10 | 2.57 | 1.35 | 0.83 | 0.51 | 0.47 | 0.45 |

Calendar year 1959: Max 4,900 Min 5.9 Mean 422 Cfsm 0.867 In. 11.75

Water year 1959-60: Max 5,030 Min 70 Mean 438 Cfsm 0.899 In. 12.24

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 5, 6, 25, 26, Feb. 1-10, 12-16, Feb. 20 to Mar. 27. No gage-height record Apr. 5, June 24 to July 8, July 24-26; discharge estimated on basis of weather records, records of powerplant operation, and records for Tittabawassee River at Midland.

1535. Salt River near North Bradley, Mich.

Location.--Lat 43°42'10", long 84°28'15", in SE $\frac{1}{4}$ sec.7, T.15 N., R.1 W., on right bank 200 ft upstream from bridge on U. S. Highway 10, 0.5 mile upstream from Bluff Creek, and 1.1 miles southeast of North Bradley.

Drainage area.--138 sq mi.

Records available.--June 1934 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 616.01 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). June 4, 1934, to Mar. 26, 1942, staff gage at site 100 ft downstream, Mar. 27, 1942, to July 7, 1954, wire-weight gage at bridge 200 ft downstream, and July 8, 1954, to Sept. 30, 1959, water-stage recorder at present site, at datum 2.00 ft higher.

Average discharge.--26 years, 77.7 cfs.

Extremes.--Maximum discharge during year, 4,590 cfs Mar. 31 (gage height, 14.98 ft); minimum, 6.6 cfs Oct. 4 (gage height, 2.31 ft).
1934-60: Maximum discharge, 8,200 cfs Mar. 20, 1948 (gage height, 14.95 ft, from graph based on gage readings, site and datum then in use), from rating curve extended above 4,400 cfs; minimum observed, 1.1 cfs Aug. 14, 1944 (gage height, 0.21 ft, site and datum then in use).

Remarks.--Records good except those for periods of ice effect, which are poor.

Revisions (water years).--WSP 1337: 1936-39, 1940(M), 1943(M), 1949-50.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 5

Nov. 6 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|------|-------|
| 2.3 | 6.1 | 2.3 | 6.0 | 10.0 | 1,110 |
| 2.5 | 17 | 2.5 | 16 | 11.0 | 1,320 |
| 3.0 | 49 | 3.0 | 48 | 13.0 | 2,300 |
| 4.0 | 152 | 4.0 | 154 | 15.0 | 4,620 |
| 6.0 | 435 | 6.0 | 435 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 8.8 | 34 | 51 | 150 | 53 | 35 | *1,600 | 140 | 112 | 48 | 13 | 17 |
| 2 | 8.3 | 34 | 50 | 120 | 52 | 33 | *1,210 | 110 | 104 | 33 | 14 | 16 |
| 3 | 7.7 | 28 | 59 | 100 | *53 | *32 | 1,250 | 87 | 165 | 28 | *32 | 15 |
| 4 | 7.2 | 50 | 71 | 70 | 54 | 32 | 862 | 72 | 68 | 24 | 80 | 14 |
| 5 | 15 | *391 | 84 | *55 | 60 | 31 | 569 | *61 | 65 | 21 | 37 | 14 |
| 6 | 21 | 339 | 185 | 52 | 75 | 31 | 378 | 56 | 49 | 19 | 24 | 13 |
| 7 | 25 | 150 | 164 | 50 | 105 | 30 | 351 | 123 | 40 | *18 | 20 | 13 |
| 8 | 24 | 96 | 97 | 50 | 120 | 30 | 483 | 160 | 36 | 17 | 20 | *13 |
| 9 | 21 | 71 | *70 | 50 | 130 | 30 | 348 | 123 | *31 | 17 | 20 | 12 |
| 10 | 24 | 60 | 60 | 50 | 120 | 30 | 244 | 157 | 29 | 16 | 22 | 11 |
| 11 | 24 | 51 | 65 | 52 | 110 | 30 | 235 | 142 | 28 | 16 | 20 | 11 |
| 12 | 23 | 42 | 280 | 60 | 105 | 30 | 468 | 109 | 27 | 16 | 17 | 11 |
| 13 | 18 | 38 | 252 | 130 | 100 | 30 | 290 | 88 | 25 | 17 | 16 | 12 |
| 14 | 16 | 30 | 132 | 220 | 90 | 30 | 249 | 82 | 30 | 17 | 18 | 12 |
| 15 | *14 | 30 | 97 | 200 | 85 | 30 | 235 | 72 | 49 | 15 | 55 | 12 |
| 16 | 13 | 30 | 103 | 170 | 80 | 30 | 183 | 62 | 43 | 14 | 42 | 11 |
| 17 | 13 | 30 | 108 | 140 | 75 | 30 | 214 | 65 | 39 | 15 | 25 | 11 |
| 18 | 12 | 32 | 88 | 120 | 70 | 30 | 443 | 100 | 37 | 22 | 20 | 12 |
| 19 | 10 | 37 | 55 | 110 | 65 | 30 | 234 | 85 | 33 | 23 | 17 | 14 |
| 20 | 10 | 33 | 45 | 100 | 65 | 30 | 158 | 92 | 30 | 22 | 16 | 16 |
| 21 | 10 | 35 | 40 | 90 | 60 | 31 | 131 | 125 | 26 | 18 | 17 | 15 |
| 22 | 11 | 37 | 35 | 80 | 55 | 31 | 109 | 133 | 24 | 16 | 17 | 13 |
| 23 | 23 | 76 | 32 | 75 | 52 | 32 | 90 | 575 | 24 | 15 | 74 | 12 |
| 24 | 99 | 352 | 31 | 70 | 50 | 33 | 80 | 295 | 56 | 14 | 44 | 12 |
| 25 | 81 | 312 | 32 | 65 | 45 | 35 | 103 | 161 | 78 | 14 | 30 | 12 |
| 26 | 55 | 162 | 33 | 60 | 42 | 50 | 279 | 112 | 40 | 26 | 24 | 12 |
| 27 | 50 | 102 | 61 | 58 | 40 | 70 | 275 | 89 | 30 | 31 | 20 | 11 |
| 28 | 44 | 70 | 737 | 55 | 38 | 350 | 158 | 77 | 29 | 23 | 18 | 10 |
| 29 | 37 | 55 | 988 | 55 | 37 | 1,000 | 116 | 69 | 51 | 17 | 18 | 9.3 |
| 30 | 31 | 50 | 300 | 55 | ----- | 3,360 | 100 | 73 | 89 | 16 | 18 | 9.3 |
| 31 | 31 | ----- | 200 | 55 | ----- | 3,810 | ----- | 160 | ----- | 15 | 17 | ----- |
| Total | 785.0 | 2,857 | 4,603 | 2,767 | 2,086 | 9,416 | 11,445 | 3,855 | 1,507 | 623 | 825 | 375.6 |
| Mean | 25.3 | 95.2 | 148 | 89.3 | 71.9 | 304 | 382 | 124 | 50.2 | 20.1 | 26.6 | 12.6 |
| Cfsm | 0.183 | 0.690 | 1.07 | 0.647 | 0.521 | 2.20 | 2.77 | 0.899 | 0.364 | 0.146 | 0.193 | 0.091 |
| In. | 0.21 | 0.77 | 1.23 | 0.75 | 0.56 | 2.54 | 3.09 | 1.04 | 0.41 | 0.17 | 0.22 | 0.10 |

Calendar year 1959: Max 2,640 Min 6.1 Mean 99.4 Cfsm 0.720 In. 9.75
Water year 1959-60: Max 3,810 Min 7.2 Mean 112 Cfsm 0.812 In. 11.09

Peak discharge (base, 800 cfs).--Dec. 29 (10 a.m.) 1,140 cfs (10.15 ft); Mar. 31 (8 to 10 a.m.) 4,590 cfs (14.98 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 14-18, 28-30, Dec. 9-11, 19-23, Dec. 30 to Mar. 29 (no gage-height record Mar. 1-18, 25-26; discharge estimated on basis of weather records and records for stations on nearby streams).

1540. Chippewa River near Mount Pleasant, Mich.

Location--Lat 43°37'35", long 84°42'30", on line between secs. 7 and 8, T.14 N., R.3 W., on right bank 12 ft downstream from highway bridge and 4 miles northeast of Mount Pleasant.

Drainage area--416 sq mi.

Records available--October 1930 to September 1931, October 1932 to September 1960.

Monthly discharge only for some periods, published in WSP 1307. Gage-height records for flood seasons collected in this vicinity 1910-27, are contained in reports of U.S. Weather Bureau.

Gage--Water-stage recorder. Datum of gage is 710.38 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Oct. 21, 1938, chain and wire-weight gage at site 30 ft upstream at same datum.

Average discharge--29 years, 290 cfs.

Extremes--Maximum discharge during year, 2,770 cfs Mar. 31 (gage height, 10.15 ft); minimum, 54 cfs Sept. 16 (gage height, 2.99 ft); minimum daily, 113 cfs Sept. 11, 12, 16; minimum gage height, 2.93 ft Mar. 25.
1930-31, 1932-60: Maximum discharge, 4,960 cfs Mar. 8, 1946 (gage height, 12.78 ft); minimum, 12 cfs Aug. 18, 1945; minimum daily, 19 cfs Aug. 16, 1926; minimum gage height, 2.82 ft Dec. 21, 1944.

Remarks--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation below 750 cfs caused by powerplant at Mount Pleasant.

Revisions (water years)--WSP 744: Drainage area. WSP 1337: 1931, 1933-40, 1945, 1948-49.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Nov. 21, June 8 to Sept. 25)

| | | | |
|-----|-------|------|-------|
| 3.0 | 107 | 9.0 | 2,160 |
| 4.5 | 572 | 10.0 | 2,680 |
| 6.0 | 1,050 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 150 | 284 | 268 | 400 | 268 | 205 | 2,240 | 535 | 432 | 411 | 206 | 157 |
| 2 | 141 | 268 | 262 | 360 | *228 | *205 | *2,220 | 578 | 426 | 358 | *178 | 172 |
| 3 | 141 | *259 | 262 | 340 | 225 | 200 | 2,080 | 584 | 429 | 308 | 321 | 150 |
| 4 | 135 | 293 | 271 | 330 | 230 | 200 | 1,840 | *504 | 377 | 293 | 426 | 150 |
| 5 | 160 | 618 | 287 | *320 | 240 | 195 | 1,660 | 439 | 355 | 274 | 398 | 141 |
| 6 | 200 | 671 | 333 | 310 | 240 | 195 | 1,430 | 395 | 321 | *253 | 284 | 150 |
| 7 | 225 | 529 | 333 | 300 | 245 | 190 | 1,220 | 442 | *290 | 240 | 271 | *163 |
| 8 | 231 | 439 | *308 | 300 | 245 | 190 | 1,110 | 516 | 268 | 212 | 274 | 144 |
| 9 | 240 | 355 | 287 | 290 | 240 | 190 | 993 | 535 | 246 | 203 | 271 | 126 |
| 10 | 222 | 346 | 271 | 284 | 240 | 185 | 852 | 522 | 228 | 194 | 268 | 116 |
| 11 | 219 | 327 | 281 | 270 | 230 | 185 | 791 | 510 | 209 | 188 | 274 | 113 |
| 12 | 222 | 308 | 383 | 270 | 230 | 180 | 849 | 485 | 203 | 184 | 256 | 113 |
| 13 | *222 | 293 | 405 | 350 | 230 | 180 | 845 | 448 | 194 | 181 | 243 | 119 |
| 14 | 212 | 287 | 358 | 430 | 230 | 180 | 842 | 411 | 188 | 175 | 243 | 132 |
| 15 | 203 | 265 | 330 | 390 | 230 | 180 | 849 | 386 | 296 | 157 | 296 | 138 |
| 16 | 191 | 268 | 321 | 350 | 230 | 180 | 781 | 364 | 308 | 147 | 321 | 113 |
| 17 | 184 | 240 | 327 | 330 | 225 | 180 | 743 | 370 | 293 | 160 | 281 | 141 |
| 18 | 178 | 235 | 318 | 300 | 220 | 180 | 756 | 398 | 290 | 188 | 253 | 132 |
| 19 | 166 | 235 | 299 | 290 | 220 | 180 | 749 | 395 | 349 | 225 | 216 | 150 |
| 20 | 169 | 235 | 271 | 290 | 220 | 180 | 690 | 414 | 324 | 234 | 212 | 172 |
| 21 | 169 | 243 | 250 | 280 | 215 | 180 | 625 | 454 | 287 | 175 | 222 | 200 |
| 22 | 169 | 243 | 225 | 280 | 215 | 180 | 556 | 504 | 259 | 163 | 274 | 191 |
| 23 | 184 | 259 | 220 | 280 | 210 | 185 | 522 | 581 | 250 | 178 | 256 | 172 |
| 24 | 360 | 445 | 228 | 280 | 210 | 185 | 476 | 597 | 374 | 154 | 209 | 197 |
| 25 | 464 | 451 | 246 | 275 | 210 | 190 | 476 | 535 | 426 | 160 | 194 | 194 |
| 26 | 432 | 383 | 262 | 275 | 210 | 200 | 550 | 460 | 402 | 166 | 172 | 197 |
| 27 | 386 | 346 | 281 | 275 | 210 | 222 | 634 | 417 | 349 | 234 | 166 | 178 |
| 28 | 352 | 324 | 639 | 287 | 210 | 555 | 606 | 392 | 327 | 290 | 166 | 157 |
| 29 | 312 | 302 | 956 | 290 | 210 | 1,420 | 538 | 374 | 427 | 262 | 166 | 160 |
| 30 | 281 | 274 | 600 | 274 | ----- | *1,840 | 488 | 374 | 547 | 237 | 163 | 147 |
| 31 | 274 | ----- | 470 | 271 | ----- | *2,490 | ----- | 402 | ----- | 200 | 172 | ----- |
| Total | 7,214 | 10,025 | 10,552 | 9,571 | 6,566 | 11,407 | 29,011 | 14,321 | 9,674 | 6,804 | 7,652 | 4,585 |
| Cfs/m | 233 | 334 | 340 | 309 | 226 | 368 | 967 | 462 | 322 | 219 | 247 | 153 |
| Cfs/m | 0.560 | 0.803 | 0.817 | 0.743 | 0.543 | 0.885 | 2.32 | 1.11 | 0.774 | 0.526 | 0.594 | 0.368 |
| In. | 0.65 | 0.90 | 0.94 | 0.74 | 0.59 | 1.02 | 2.59 | 1.28 | 0.86 | 0.61 | 0.68 | 0.41 |

Calendar year 1959: Max 2,750 Min 88 Mean 328 Cfs/m 0.788 In. 10.71
Water year 1959-60: Max 2,490 Min 113 Mean 348 Cfs/m 0.837 In. 11.39

Peak discharge (base, 850 cfs)--Dec. 29 (2 to 4 a.m.) 1,080 cfs (6.09 ft); Mar. 31 (2 to 3 p.m.) 2,770 cfs (10.15 ft).

* Discharge measurement made on this day.

Note--Stage-discharge relation affected by ice Nov. 17-20, Dec. 21-23, Dec. 30 to Jan. 9, Jan. 11-27, Feb. 3 to Mar. 26.

1545. Chippewa River near Midland, Mich.

Location.--Lat 43°35'40", long 84°22'10", on line between sec.24, T.14 N., R.1 W., and sec.28, T.14 N., R.1 E., on upstream side of bridge on State Highway 30, 5 miles upstream from Pine River and 6 miles southwest of Midland.

Drainage area.--597 sq mi.

Records available.--October 1947 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Wire-weight gage read twice daily. Datum of gage is 612.35 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--13 years, 445 cfs.

Extremes.--Maximum discharge during year, 6,030 cfs Mar. 31 (gage height, 7.74 ft, from graph based on gage readings); minimum daily, 130 cfs Sept. 11, 12.

1947-60: Maximum discharge, 8,510 cfs Mar. 20, 1948 (gage height, 9.85 ft, from graph based on gage readings); maximum gage height observed, 12.43 ft Mar. 19, 1948 (ice jam); minimum daily discharge, 44 cfs Aug. 16, 1948.

Maximum stage known since at least 1904, 15.65 ft in March 1904, from information from Michigan State Highway Department (discharge, 16,000 cfs, from rating curve extended above 9,000 cfs by logarithmic plotting).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diurnal fluctuation below 750 cfs caused by powerplant at Mount Pleasant.

Revisions (water years).--WSP 1337: 1950.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 1 to Aug. 23)

Oct. 1 to Aug. 5

Aug. 6 to Sept. 30

2.3 116
2.5 218
2.9 530
8.0 6,340

2.2 85
2.4 190
2.7 400
3.0 700

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 162 | 360 | 440 | 700 | 270 | 280 | 4,400 | 829 | 560 | 600 | 207 | 184 |
| 2 | 157 | 338 | 416 | 550 | 260 | 275 | 3,890 | 862 | 550 | 500 | 212 | 179 |
| 3 | 148 | 301 | 400 | 450 | *250 | *270 | 3,510 | 873 | 530 | 430 | *316 | 168 |
| 4 | 140 | *345 | 449 | 400 | 255 | 270 | 3,120 | *763 | 467 | 390 | 610 | 162 |
| 5 | 200 | 660 | 521 | 350 | 260 | 265 | 2,860 | 807 | 449 | 353 | 630 | 162 |
| 6 | 252 | 1,080 | 560 | *320 | 265 | 260 | 2,570 | 807 | 408 | 323 | 430 | 168 |
| 7 | 301 | 1,180 | 630 | 310 | 270 | 255 | 2,030 | 752 | 368 | *293 | 360 | 168 |
| 8 | 323 | 862 | 580 | 310 | 275 | 250 | 1,920 | 730 | *345 | 279 | 344 | *184 |
| 9 | 338 | 660 | *458 | 310 | 275 | 250 | 1,740 | 818 | 345 | 266 | 352 | 162 |
| 10 | 345 | 467 | 384 | 310 | 280 | 245 | 1,280 | 917 | 350 | 232 | 352 | 150 |
| 11 | 358 | 416 | 360 | 310 | 280 | 245 | 1,250 | 906 | 323 | 225 | 336 | 130 |
| 12 | 323 | 408 | 400 | 350 | 275 | 240 | 1,500 | 840 | 376 | 219 | 328 | 130 |
| 13 | 266 | 432 | 700 | 400 | 275 | 240 | 1,320 | 752 | 323 | 201 | 306 | 140 |
| 14 | *252 | 424 | 650 | 450 | 270 | 235 | 1,260 | 700 | 338 | 196 | 313 | 150 |
| 15 | 245 | 376 | 600 | 450 | 270 | 230 | 1,200 | 630 | 476 | 190 | 328 | 170 |
| 16 | 238 | 330 | 550 | 420 | 270 | 230 | 1,150 | 590 | 512 | 179 | 320 | 140 |
| 17 | 207 | 300 | 521 | 380 | 270 | 230 | 1,150 | 580 | 503 | 179 | 336 | 170 |
| 18 | 190 | 300 | 512 | 350 | 275 | 230 | 1,320 | 600 | 440 | 201 | 344 | 165 |
| 19 | 173 | 300 | 458 | 330 | 280 | 230 | 1,260 | 620 | 416 | 252 | 313 | 168 |
| 20 | 173 | 290 | 440 | 310 | 280 | 230 | 1,040 | 650 | 392 | 279 | 232 | 179 |
| 21 | 162 | 300 | 416 | 300 | 280 | 230 | 816 | 680 | 353 | 272 | 264 | 196 |
| 22 | 162 | 330 | 420 | 300 | 285 | 230 | 752 | 800 | 338 | 232 | 336 | 238 |
| 23 | 238 | 458 | 360 | 300 | 285 | 230 | 710 | 851 | 308 | 225 | 352 | 230 |
| 24 | 288 | 494 | 350 | 300 | 285 | 235 | 660 | 950 | 400 | 196 | 306 | 220 |
| 25 | 610 | 928 | 380 | 300 | 280 | 240 | 862 | 950 | 500 | 190 | 257 | 232 |
| 26 | 660 | 800 | 458 | 300 | 280 | 250 | 1,050 | 850 | 450 | 236 | 226 | 220 |
| 27 | 570 | 600 | 467 | 300 | 280 | 350 | 1,250 | 700 | 420 | 333 | 196 | 214 |
| 28 | 512 | 500 | 807 | 300 | 280 | 850 | 1,180 | 600 | 400 | 338 | 196 | 190 |
| 29 | 416 | 467 | 1,700 | 300 | 280 | 3,230 | 917 | 550 | 500 | 316 | 208 | 174 |
| 30 | 360 | 458 | 1,500 | 290 | ----- | 4,970 | 884 | 550 | 700 | 293 | 214 | 168 |
| 31 | 353 | ----- | 950 | 280 | ----- | *5,730 | ----- | 550 | ----- | 245 | 202 | ----- |
| Total | 9,100 | 15,164 | 17,637 | 11,050 | 7,940 | 21,505 | 48,653 | 23,057 | 12,820 | 8,772 | 9,726 | 5,311 |
| Mean | 294 | 505 | 569 | 356 | 274 | 694 | 1,622 | 744 | 427 | 231 | 314 | 177 |
| Cfsm | 0.492 | 0.846 | 0.953 | 0.596 | 0.459 | 1.16 | 2.72 | 1.25 | 0.715 | 0.471 | 0.526 | 0.296 |
| In. | 0.57 | 0.94 | 1.10 | 0.69 | 0.50 | 1.34 | 3.04 | 1.44 | 0.80 | 0.54 | 0.61 | 0.33 |

Calendar year 1959: Max 5,560 Min 80 Mean 487 Cfsm 0.816 In. 11.08

Water year 1959-60: Max 5,730 Min 130 Mean 521 Cfsm 0.873 In. 11.90

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19-22, 26-28, Dec. 25, Dec. 31 to Mar. 28. No gage-height record Oct. 4, 5, 18, Nov. 17, 18, Dec. 13-16, 22-24, 30, Apr. 11, May 22, 26-31, June 24 to July 4, Sept. 10-18, 23; discharge estimated on basis of weather records and records for Chippewa River near Mount Pleasant, Pine River at Alma, and Tobacco River at Beaverton.

1550. Pine River at Alma, Mich.

Location.--Lat 43°23', long 84°39', in SE $\frac{1}{4}$ sec.34, T.12 N., R.3 W., on right bank 270 ft downstream from Superior Street Bridge on grounds of Municipal Water Works at Alma.

Drainage area.--288 sq mi.

Records available.--October 1930 to September 1960. Gage-height records for flood seasons collected in this vicinity 1910-28 are contained in reports of U.S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 718.37 ft above mean sea level, datum of 1929. Prior to Dec. 10, 1930, tape gage at Superior Street Bridge at different datum. Dec. 10, 1930, to June 15, 1938, staff gage at site 70 ft downstream from bridge and June 16 to Oct. 25, 1938, wire-weight gage at Superior Street Bridge, at present datum.

Average discharge.--30 years, 199 cfs.

Extremes.--Maximum discharge during year, 2,480 cfs Mar. 31 (gage height, 8.60 ft); minimum, 19 cfs Dec. 2 (gage height, 0.58 ft); minimum daily, 66 cfs Oct. 4. 1930-60: Maximum discharge, 4,400 cfs Mar. 19, 1948 (gage height, 10.81 ft); minimum daily, 2 cfs July 23, 1938, caused by cofferdam upstream during bridge construction.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Flow affected by regulation at dam half a mile above station and by variable backwater from powerplant at St. Louis $5\frac{1}{2}$ miles below station.

Revisions (water years).--WSP 744: Drainage area. WSP 1337: 1931, 1932-34(M), 1936, 1939, 1945, 1949.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 25 to Dec. 18, Apr. 22 to May 12, June 25 to Aug. 4, Sept. 23-30)

| | | | |
|-----|-----|-----|-------|
| 1.1 | 62 | 5.0 | 795 |
| 1.5 | 102 | 7.0 | 1,600 |
| 2.0 | 175 | 9.0 | 2,760 |
| 4.0 | 539 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 84 | 215 | 245 | 360 | 220 | 160 | 2,170 | 441 | 322 | a350 | 92 | 77 |
| 2 | 76 | *196 | 153 | 330 | *200 | *160 | 2,090 | 414 | 300 | a280 | *92 | 87 |
| 3 | 73 | 191 | 165 | 280 | 150 | 160 | 1,900 | *403 | 257 | a240 | 162 | 85 |
| 4 | 66 | 242 | 225 | 250 | 140 | 150 | 1,610 | 378 | 227 | a200 | 213 | 82 |
| 5 | 87 | 494 | 234 | *210 | 150 | 150 | 1,430 | 344 | 196 | a170 | 250 | 85 |
| 6 | 128 | 494 | 288 | 180 | 180 | 150 | 1,200 | 302 | 175 | *a150 | 210 | 82 |
| 7 | 227 | 494 | 317 | 150 | 190 | 150 | 1,040 | 354 | *162 | 136 | 156 | *75 |
| 8 | 252 | 519 | *309 | 160 | 190 | 150 | 902 | 381 | 148 | 130 | 138 | 81 |
| 9 | 249 | 524 | 281 | 180 | 200 | 150 | 775 | 420 | 142 | 111 | 125 | 80 |
| 10 | 215 | 460 | 232 | 200 | 200 | 150 | 705 | 454 | 129 | 115 | 125 | 76 |
| 11 | 222 | 358 | 232 | 210 | 200 | 150 | 680 | 447 | 118 | 101 | 146 | 87 |
| 12 | 205 | 284 | 435 | 230 | 200 | 150 | 670 | 334 | 118 | 106 | 159 | 87 |
| 13 | *181 | 250 | 464 | 270 | 190 | 150 | 625 | 381 | 115 | 112 | 121 | 97 |
| 14 | 140 | 245 | 460 | 340 | 190 | 150 | 658 | 383 | 148 | 115 | 119 | 100 |
| 15 | 111 | 235 | 460 | 340 | 190 | 150 | 695 | 349 | 225 | 112 | 118 | 101 |
| 16 | 100 | 237 | 418 | 320 | 190 | 150 | 675 | 313 | 297 | 115 | 119 | 101 |
| 17 | 88 | 357 | 371 | 300 | 190 | 150 | 655 | 295 | 369 | 111 | 122 | 95 |
| 18 | 87 | 146 | 335 | 270 | 190 | 150 | 700 | 290 | 369 | 101 | 103 | 81 |
| 19 | 79 | 144 | 300 | 260 | 190 | 150 | 618 | 299 | 318 | 101 | 90 | 97 |
| 20 | 73 | 194 | 257 | 250 | 180 | 150 | 568 | 432 | 261 | 107 | 102 | 107 |
| 21 | 77 | 223 | 190 | 250 | 180 | 150 | 515 | 181 | 208 | 108 | 140 | 115 |
| 22 | 78 | 211 | 150 | 240 | 180 | 150 | 468 | 313 | 172 | 98 | 152 | 116 |
| 23 | 100 | 234 | 121 | 230 | 180 | 150 | 418 | 363 | 185 | 101 | 134 | 105 |
| 24 | 263 | 369 | 121 | 230 | 180 | 150 | 383 | 394 | 360 | 103 | 122 | 107 |
| 25 | 313 | 447 | 173 | 230 | 170 | 160 | 378 | 409 | 390 | 95 | 115 | 105 |
| 26 | 335 | 443 | 230 | 230 | 170 | 170 | 487 | 392 | a360 | 103 | 102 | 96 |
| 27 | 353 | 437 | 277 | 230 | 160 | 230 | 565 | 333 | a310 | 158 | 90 | 90 |
| 28 | 326 | 390 | 476 | 240 | 160 | 630 | 594 | 291 | a290 | 188 | 92 | 86 |
| 29 | 300 | 310 | 554 | 240 | 160 | 1,220 | 550 | 272 | a350 | 147 | 87 | 83 |
| 30 | 264 | 250 | 500 | 240 | ----- | 1,900 | 492 | 291 | a450 | 136 | 83 | 76 |
| 31 | 230 | ----- | 420 | 230 | ----- | *2,330 | ----- | 329 | ----- | 108 | 76 | ----- |
| Total | 5,382 | 9,593 | 9,394 | 7,660 | 5,270 | 10,270 | 25,216 | 10,982 | 7,471 | 4,308 | 3,955 | 2,742 |
| Mean | 174 | 320 | 303 | 247 | 182 | 331 | 841 | 354 | 249 | 139 | 128 | 91.4 |
| Cfsm | 0.604 | 1.11 | 1.05 | 0.858 | 0.632 | 1.15 | 2.92 | 1.23 | 0.865 | 0.483 | 0.444 | 0.317 |
| In. | 0.70 | 1.24 | 1.21 | 0.99 | 0.68 | 1.33 | 3.26 | 1.42 | 0.97 | 0.56 | 0.51 | 0.35 |

Calendar year 1959: Max 2,290 Min 54 Mean 244 Cfsm 0.847 In. 11.54
Water year 1959-60: Max 2,330 Min 66 Mean 279 Cfsm 0.969 In. 13.22

Peak discharge (base, 700 cfs).--Mar. 31 (3 to 5 a.m.) 2,480 cfs (8.60 ft); May 12 (1 p.m.) 738 cfs (4.93 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for Pine River near Midland and Chippewa River near Mount Pleasant.

Note.--Stage-discharge relation affected by ice Nov. 29, 30, Dec. 21, 22, Dec. 30 to Mar. 27.

1555. Pine River near Midland, Mich.

Location.--Lat 43°33'50", long 84°22'10", on line between sec.36, T.14 N., R.1 W., and sec.4, T.13 N., R.1 E., on left bank at downstream side of bridge on State Highway 30, 7 miles southwest of Midland and 8 miles upstream from mouth.

Drainage area.--390 sq mi, approximately.

Records available.--May 1934 to September 1938, February 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 623.87 ft above mean sea level (Michigan State Highway Department bench mark). May 31, 1934, to Sept. 30, 1938, tape, staff, or wire-weight gage at same site at datum 5.48 ft lower. Feb. 3, 1948, to Dec. 13, 1951, wire-weight gage, water-stage recorder, or staff gage at present site and datum.

Average discharge.--16 years, 282 cfs.

Extremes.--Maximum discharge during year, 4,100 cfs Mar. 31 (gage height, 8.16 ft); minimum, 29 cfs Sept. 8 (gage height, 2.25 ft).
1934-38, 1948-60: Maximum discharge, 6,360 cfs Mar. 20, 1948 (gage height, 10.00 ft from graph based on gage readings); minimum not determined.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Regulation at low and medium stages by powerplant at St. Louis. Some diversion above station for irrigation.

Revisions (water years).--WSP 1337: 1935(M), 1936-38, 1948-49.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-18, May 1-19, June 30 to Aug. 28)

Oct. 1 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 2.5 | 80 | 6.0 | 1,960 | 2.3 | 35 | 3.5 | 370 |
| 3.0 | 210 | 8.0 | 3,920 | 2.8 | 89 | 5.0 | 1,220 |
| 4.0 | 620 | | | 3.0 | 192 | 7.1 | 3,000 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 112 | 245 | 270 | 450 | 250 | 170 | *2,990 | 550 | 309 | 309 | 133 | 107 |
| 2 | 126 | 231 | 251 | 400 | 240 | 165 | 2,650 | 520 | 295 | 312 | 102 | 77 |
| 3 | 102 | 198 | 217 | 320 | *215 | *165 | 2,460 | 480 | 274 | 302 | *159 | 93 |
| 4 | 84 | *231 | 234 | 270 | 180 | 160 | 2,030 | *450 | 236 | 250 | 195 | 102 |
| 5 | 116 | 331 | 335 | 240 | 190 | 160 | 1,680 | 406 | 222 | 232 | 222 | 91 |
| 6 | 180 | 585 | 339 | *210 | 200 | 160 | 1,450 | 386 | 189 | 183 | 260 | 91 |
| 7 | 186 | 498 | 383 | 190 | 205 | 160 | 1,250 | 420 | 186 | *168 | 192 | 128 |
| 8 | 242 | 489 | 387 | 190 | 210 | 160 | 1,110 | 455 | *186 | 151 | 154 | *48 |
| 9 | 245 | 502 | *359 | 200 | 210 | 160 | 972 | 475 | 168 | 148 | 165 | 85 |
| 10 | 270 | 498 | 363 | 230 | 210 | 160 | 810 | 545 | 168 | 162 | 174 | 98 |
| 11 | 214 | 448 | 287 | 250 | 210 | 160 | 744 | 545 | 171 | 113 | 128 | 44 |
| 12 | 198 | 355 | 489 | 300 | 210 | 160 | 732 | 520 | 148 | 146 | 140 | 91 |
| 13 | 214 | 304 | 620 | 370 | 210 | 160 | 696 | 354 | 185 | 121 | 177 | 67 |
| 14 | *228 | 294 | 556 | 450 | 210 | 160 | 605 | 415 | 165 | 130 | 125 | 107 |
| 15 | 186 | 248 | 530 | 400 | 210 | 160 | 768 | 374 | 253 | 109 | 128 | 93 |
| 16 | 160 | 228 | 520 | 350 | 210 | 160 | 744 | 323 | 274 | 133 | 135 | 96 |
| 17 | 144 | 230 | 466 | 330 | 210 | 160 | 702 | 323 | 334 | 107 | 125 | 102 |
| 18 | 129 | 230 | 370 | 310 | 205 | 160 | 810 | 292 | 366 | 136 | 133 | 107 |
| 19 | 142 | 225 | 330 | 300 | 205 | 160 | 696 | 284 | 346 | 128 | 130 | 91 |
| 20 | 139 | 220 | 300 | 300 | 200 | 160 | 600 | 284 | 281 | 111 | 100 | 93 |
| 21 | 84 | 245 | 270 | 285 | 200 | 165 | 560 | 435 | 253 | 116 | 116 | 128 |
| 22 | 121 | 248 | 250 | 280 | 200 | 165 | 530 | 193 | 225 | 102 | 162 | 107 |
| 23 | 124 | 242 | 220 | 275 | 195 | 170 | 500 | 534 | 180 | 113 | 174 | 128 |
| 24 | 186 | 367 | 190 | 270 | 190 | 175 | 470 | 480 | 290 | 77 | 154 | 107 |
| 25 | 245 | 530 | 159 | 270 | 190 | 180 | 450 | 430 | 382 | 109 | 118 | 109 |
| 26 | 259 | 534 | 211 | 265 | 185 | 210 | 550 | 406 | 374 | 135 | 135 | 118 |
| 27 | 298 | 466 | 262 | 265 | 180 | 300 | 650 | 358 | 358 | 195 | 133 | 96 |
| 28 | 343 | 410 | 478 | 265 | 160 | 500 | 730 | 298 | 316 | 177 | 98 | 107 |
| 29 | 266 | 350 | 168 | 260 | 175 | 1,200 | 670 | 280 | 260 | 264 | 100 | 96 |
| 30 | 262 | 310 | 600 | 260 | ----- | 3,210 | 600 | 260 | 302 | 113 | 102 | 96 |
| 31 | 301 | ----- | 550 | 255 | ----- | 3,910 | ----- | 295 | ----- | 151 | 107 | ----- |
| Total | 5,886 | 10,292 | 11,563 | 9,010 | 5,885 | 13,405 | 30,209 | 12,440 | 7,656 | 5,005 | 4,474 | 2,903 |
| Mean | 190 | 343 | 373 | 291 | 203 | 432 | 1,007 | 401 | 255 | 161 | 144 | 96.8 |
| Cfs/m | 0.487 | 0.879 | 0.956 | 0.746 | 0.521 | 1.11 | 2.58 | 1.03 | 0.854 | 0.413 | 0.369 | 0.245 |
| In. | 0.56 | 0.98 | 1.10 | 0.86 | 0.56 | 1.28 | 2.88 | 1.19 | 0.73 | 0.48 | 0.43 | 0.28 |

Calendar year 1959: Max 3,200 Min 38 Mean 315 Cfs/m 0.808 In. 10.95

Water year 1959-60: Max 3,910 Min 44 Mean 324 Cfs/m 0.831 In. 11.33

Peak discharge (base, 950 cfs).--Mar. 31 (4 to 5 a.m.) 4,100 cfs (8.16 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-19, Nov. 28 to Dec. 2, Dec. 18-24, Dec. 30 to Mar. 29. No gage-height record Apr. 21 to May 4; discharge estimated on basis of weather records, recorded range in stage, and records for Pine River at Alma, Chippewa River near Mount Pleasant, and Cass River at Vassar.

1560. Tittabawassee River at Midland, Mich.

Location.--Lat 43°36', long 84°15', in NE $\frac{1}{4}$ sec.28, T.14 N., R.2 E., on right bank half a mile downstream from Dow Chemical Co. powerplant in Midland, 1 mile downstream from Chippewa River, and 1 mile upstream from Bullock Creek.

Drainage area.--2,400 sq mi, approximately.

Records available.--March 1936 to September 1960. Gage-height records for flood seasons collected in this vicinity 1910-26, 1928, and since 1946 are contained in reports of U.S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 580.28 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1955, at datum 10.00 ft higher.

Average discharge.--24 years, 1,570 cfs (adjusted for diversion).

Extremes.--Maximum discharge during year, 24,600 cfs Apr. 1 (gage height, 27.08 ft); minimum, 116 cfs Aug. 31 (gage height, 9.49 ft); minimum daily, 294 cfs Oct. 2.

1936-60: Maximum discharge, 34,000 cfs Mar. 21, 1948 (gage height, 19.50 ft, datum then in use); minimum, 39 cfs Oct. 12, 1942; minimum daily, 111 cfs Aug. 21, 1949; minimum gage height, -0.96 ft Aug. 19, 1954, datum then in use, caused by bridge construction above station.

Remarks.--Records good except those below 400 cfs, which are fair. Water is diverted from river a short distance above station for industrial use; small part returned to river at gage; small part returned to river a quarter of a mile below station; remainder returned 1 mile below. Extremes and daily discharge not adjusted for diversion. Discharge below 4,000 cfs regulated by dam half a mile above station.

Revisions (water years).--WSP 1054: 1945. WSP 1144: 1948.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Jan. 1-12)

| | | | |
|------|-------|------|--------|
| 9.9 | 290 | 23.0 | 13,200 |
| 11.0 | 800 | 26.0 | 20,900 |
| 13.0 | 2,060 | 27.0 | 24,300 |
| 16.0 | 4,990 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 582 | 1,570 | 1,380 | 3,740 | 1,070 | 1,430 | *23,000 | 2,570 | 2,110 | 1,660 | 650 | 408 |
| 2 | 234 | 1,650 | 1,390 | 3,570 | 929 | 1,220 | 16,600 | 2,710 | 2,110 | 1,190 | 626 | 524 |
| 3 | 560 | 1,180 | 1,450 | 3,520 | *960 | *1,000 | 17,400 | 2,530 | 1,890 | 1,110 | *568 | 635 |
| 4 | 616 | *1,100 | 1,690 | 3,100 | 1,000 | 1,060 | 15,300 | *5,500 | 1,170 | 968 | 894 | 531 |
| 5 | 984 | 3,300 | 1,920 | 2,110 | 1,120 | 976 | 11,200 | 1,960 | 1,150 | 836 | 916 | 450 |
| 6 | 1,520 | 4,550 | 2,020 | *1,540 | 1,580 | 826 | 8,980 | 1,900 | 1,100 | 836 | 860 | 478 |
| 7 | 1,240 | 4,140 | 2,610 | 1,130 | 1,360 | 1,090 | 8,230 | 2,350 | 1,000 | *822 | 730 | 484 |
| 8 | 1,700 | 3,430 | 2,390 | 1,200 | 1,530 | 995 | 7,120 | 2,600 | *1,040 | 772 | 762 | *405 |
| 9 | 1,630 | 3,170 | *2,130 | 1,040 | 1,980 | 1,150 | 6,460 | 2,700 | 845 | 807 | 842 | 393 |
| 10 | 1,540 | 2,960 | 1,970 | 1,020 | 2,060 | 1,310 | 5,640 | 3,620 | 796 | 582 | 890 | 489 |
| 11 | 1,000 | 2,780 | 1,740 | 1,500 | 1,770 | 862 | 5,060 | 3,730 | 842 | 507 | 831 | 398 |
| 12 | 970 | 1,790 | 2,610 | 1,560 | 1,270 | 688 | 5,640 | 3,500 | 644 | 603 | 710 | 362 |
| 13 | 1,340 | 1,720 | 3,500 | 3,060 | 1,080 | 750 | 6,070 | 3,220 | 766 | 550 | 630 | 365 |
| 14 | *980 | 1,410 | 3,070 | 3,310 | 835 | 928 | 5,420 | 2,270 | 924 | 528 | 594 | 377 |
| 15 | 532 | 1,110 | 2,670 | 3,820 | 1,400 | 960 | 5,110 | 1,950 | 952 | 506 | 716 | 371 |
| 16 | 719 | 1,210 | 2,540 | 2,100 | 1,440 | 1,210 | 4,690 | 2,030 | 1,500 | 525 | 775 | 421 |
| 17 | 1,360 | 1,180 | 2,240 | 2,200 | 1,390 | 1,460 | 4,560 | 1,930 | 1,580 | 488 | 733 | 377 |
| 18 | 1,030 | 1,040 | 2,020 | 2,220 | 1,300 | 1,400 | 6,270 | 2,190 | 904 | 605 | 742 | 395 |
| 19 | 858 | 1,070 | 1,470 | 1,790 | 1,370 | 1,630 | 5,740 | 2,500 | 806 | 616 | 627 | 642 |
| 20 | 860 | 890 | 1,230 | 1,850 | 1,180 | 1,640 | 4,420 | 2,610 | 1,350 | 562 | 519 | 536 |
| 21 | 576 | 1,320 | 1,270 | 1,910 | 1,150 | 1,520 | 4,070 | 2,990 | 1,230 | 660 | 508 | 696 |
| 22 | 414 | 1,150 | 1,150 | 1,570 | 1,320 | 1,600 | 3,690 | 3,000 | 1,110 | 576 | 590 | 684 |
| 23 | 562 | 1,700 | 948 | 1,590 | 1,130 | 1,280 | 3,390 | 4,010 | 849 | 508 | 761 | 698 |
| 24 | 1,420 | 2,460 | 818 | 1,340 | 1,300 | 1,190 | 2,530 | 4,420 | 1,900 | 520 | 772 | 658 |
| 25 | 2,940 | 3,960 | 630 | 1,460 | 1,220 | 1,230 | 2,310 | 2,900 | 1,580 | 525 | 698 | 574 |
| 26 | 2,800 | 3,820 | 1,070 | 1,610 | 1,100 | 1,010 | 3,860 | 2,590 | 1,010 | 791 | 558 | 478 |
| 27 | 2,740 | 3,280 | 1,720 | 1,590 | 1,070 | 1,120 | 4,670 | 2,310 | 1,260 | 1,480 | 460 | 444 |
| 28 | 2,750 | 2,120 | 3,780 | 1,290 | 940 | 2,800 | 4,320 | 1,430 | 1,580 | 671 | 418 | 542 |
| 29 | 1,800 | 1,780 | 6,950 | 1,440 | 1,160 | 8,100 | 3,530 | 964 | 1,860 | 894 | 416 | 532 |
| 30 | 970 | 1,610 | 5,840 | 1,450 | ----- | 13,500 | 2,720 | 1,190 | 1,670 | 878 | 436 | 606 |
| 31 | 1,260 | 4,440 | 394 | ----- | ----- | 20,800 | ----- | 1,800 | ----- | 610 | 456 | ----- |
| Total | 38,527 | 64,610 | 70,616 | 62,024 | 37,034 | 76,735 | 210,020 | 79,174 | 37,548 | 22,981 | 20,706 | 15,245 |
| Mean | 1,243 | 2,154 | 2,278 | 2,001 | 1,277 | 2,475 | 7,001 | 2,554 | 1,252 | 741 | 668 | 508 |
| (+) | 81.1 | 79.2 | 81.5 | 70.2 | 68.9 | 72.3 | 67.5 | 72.5 | 76.3 | 77.1 | 78.3 | 80.6 |

Adjusted for diversion by Dow Chemical Co.

| | Mean | Cfsm | In. | 1,324 | 2,233 | 2,360 | 2,071 | 1,546 | 2,547 | 7,068 | 2,626 | 1,328 | 818 | 746 | 589 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0.552 | 0.930 | 0.963 | 0.863 | 0.561 | 1.06 | 1.22 | 1.06 | 2.94 | 1.09 | 0.553 | 0.341 | 0.311 | 0.245 | 0.245 |
| | 0.64 | 1.04 | 1.13 | 0.99 | 0.60 | 1.22 | 1.22 | 1.22 | 3.28 | 1.26 | 0.62 | 0.39 | 0.36 | 0.27 | 0.27 |

| | | Observed | | | | Adjusted | | | | | | |
|---------------------|-----|----------|-----|-----|------|----------|------|-------|------|-------|-----|-------|
| Calendar year 1959: | Max | 26,700 | Min | 174 | Mean | 1,871 | Mean | 1,953 | Cfsm | 0.814 | In. | 11.05 |
| Water year 1959-60: | Max | 23,000 | Min | 294 | Mean | 2,009 | Mean | 2,084 | Cfsm | 0.868 | In. | 11.80 |

Peak discharge (base, 5,800 cfs).--Dec. 29 (10:30 a.m.), 7,270 cfs (18.07 ft); Apr. 1 (3 to 7 a.m.) 24,600 cfs (27.08 ft); Apr. 19 (1 a.m.), 6,980 cfs (17.81 ft).

* Discharge measurement made on this day.

† Diversion in cubic feet per second, for industrial use; furnished by Dow Chemical Co.

1570. Saginaw River at Saginaw, Mich.

Location.--Lat 43°26'00", long 83°56'30", in sec. 24, T.12 N., R.4 E., on upstream end of right pier of Genesee Street Bridge in Saginaw, $3\frac{3}{4}$ miles downstream from Tittabawassee River and 18.1 miles upstream from mouth.

Drainage area.--6,060 sq mi, approximately.

Records available.--1904, 1908-9, 1912-13, 1916, 1918-19, 1929-30, and 1942 (flood discharge for certain periods only) in WSP 1084; December 1942 to September 1960 (high-water periods only; no high water 1944, 1949, 1953, 1955, 1958). Gage-height records for flood seasons collected in this vicinity 1910-20, and for entire years since 1921 are contained in reports of U. S. Weather Bureau.

Gage.--Staff gage read at least once daily. Datum of gage is 566.85 ft, U. S. Lake Survey datum, levels by U. S. Weather Bureau. Auxiliary water-stage recorder on right bank at Essexville 15 miles downstream.

Extremes.--Maximum discharge during year, 45,900 cfs Apr. 3 (gage height, 20.60 ft, from graph based on gage readings).
1904-60: Maximum discharge, 68,000 cfs Mar. 29, 1904 (gage height, 24.9 ft).

Remarks.--Records good. Considerable diversion through metropolitan area of Saginaw.

Cooperation.--Gage readings at base gage furnished by city of Saginaw and U.S. Weather Bureau. Auxiliary gage-height record furnished by Corps of Engineers.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|------|------|------|------|--------|---------|-----|------|------|------|-------|
| 1 | | | | | | - | 39,600 | | | | | |
| 2 | | | | | | - | *44,100 | | | | | |
| 3 | | | | | | - | *45,700 | | | | | |
| 4 | | | | | | - | 45,400 | | | | | |
| 5 | | | | | | - | *43,900 | | | | | |
| 6 | | | | | | - | 40,500 | | | | | |
| 7 | | | | | | - | 35,000 | | | | | |
| 8 | | | | | | - | *31,200 | | | | | |
| 9 | | | | | | - | 27,200 | | | | | |
| 10 | | | | | | - | *23,200 | | | | | |
| 11 | | | | | | - | 20,600 | | | | | |
| 12 | | | | | | - | 17,000 | | | | | |
| 13 | | | | | | - | 16,600 | | | | | |
| 14 | | | | | | - | (*) | | | | | |
| 15 | | | | | | - | - | | | | | |
| 16 | | | | | | - | - | | | | | |
| 17 | | | | | | - | - | | | | | |
| 18 | | | | | | - | - | | | | | |
| 19 | | | | | | - | - | | | | | |
| 20 | | | | | | - | - | | | | | |
| 21 | | | | | | - | - | | | | | |
| 22 | | | | | | - | - | | | | | |
| 23 | | | | | | - | - | | | | | |
| 24 | | | | | | - | - | | | | | |
| 25 | | | | | | - | - | | | | | |
| 26 | | | | | | - | - | | | | | |
| 27 | | | | | | - | - | | | | | |
| 28 | | | | | | - | - | | | | | |
| 29 | | | | | | - | - | | | | | |
| 30 | | | | | | - | - | | | | | |
| 31 | | | | | | - | - | | | | | |
| | | | | | | 21,400 | - | | | | | |
| | | | | | | 31,200 | - | | | | | |

* Discharge measurement made on this day.

1585. Pigeon River near Owendale, Mich.

Location.--Lat 43°45'35", long 83°14'45", in SE $\frac{1}{4}$ sec.36, T.16 N., R.10 E., on left bank 600 ft downstream from bridge on county road, 2 miles downstream from confluence of East and West Branches, and 2 $\frac{1}{2}$ miles northeast of Owendale.

Drainage area.--55 sq mi, approximately.

Records available.--October 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 645 ft (from topographic map). Prior to June 10, 1954, wire-weight gage at site 600 ft upstream at same datum.

Average discharge.--8 years, 33.1 cfs.

Extremes.--Maximum discharge during year, about 2,000 cfs Mar. 30; maximum gage height, 10.25 ft Mar. 30 (ice jam); minimum daily discharge, 1.2 cfs Sept. 9.
1952-60: Maximum discharge, 2,550 cfs Mar. 25, 1954 (gage height, 10.75 ft), from rating curve extended above 1,200 cfs; minimum observed, 0.5 cfs Oct. 11, 1952 (gage height, 1.00 ft).

Remarks.--Records good except those for periods of ice effect and those below 10 cfs, which are poor.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 3.5 | 18 | 28 | 80 | *24 | *13 | 600 | 38 | 48 | 12 | *3.8 | 2.3 |
| 2 | 3.2 | *13 | 29 | 79 | 24 | 12 | *250 | *32 | 32 | 11 | 3.5 | 3.5 |
| 3 | 2.9 | 8.5 | 40 | 84 | 24 | 12 | 510 | 28 | 32 | 12 | 4.6 | 3.3 |
| 4 | 2.9 | 28 | 45 | *84 | 24 | 12 | 287 | 26 | 24 | 14 | 4.6 | 3.1 |
| 5 | 6.0 | 88 | 52 | 70 | 24 | 12 | 165 | 24 | 20 | *11 | 3.3 | 3.3 |
| 6 | 16 | 46 | 104 | 50 | 25 | 12 | 109 | 22 | *18 | 9.4 | 2.7 | *2.3 |
| 7 | 24 | 30 | *71 | 40 | 30 | 12 | 108 | 24 | 17 | 8.2 | 3.5 | 1.3 |
| 8 | 20 | 20 | 56 | 32 | 35 | 12 | 132 | 23 | 16 | 7.6 | 3.5 | 1.3 |
| 9 | 13 | 15 | 44 | 30 | 38 | 12 | 152 | 30 | 15 | 7.0 | 3.5 | 1.2 |
| 10 | 9.5 | 13 | 33 | 30 | 41 | 12 | 109 | 104 | 14 | 7.0 | 4.6 | 1.3 |
| 11 | 8.5 | 12 | 38 | 30 | 41 | 12 | 107 | 93 | 14 | 7.0 | 4.2 | 1.4 |
| 12 | *8.5 | 11 | 316 | 32 | 40 | 12 | 141 | 391 | 13 | 6.6 | 3.1 | 1.4 |
| 13 | 7.0 | 12 | 189 | 40 | 38 | 12 | 85 | 168 | 13 | 6.8 | 2.7 | 1.5 |
| 14 | 6.0 | 83 | 74 | 80 | 36 | 12 | 69 | 109 | 14 | 5.6 | 3.1 | 1.9 |
| 15 | 5.0 | 71 | 55 | 74 | 35 | 12 | 69 | 72 | 17 | 5.6 | 3.5 | 1.9 |
| 16 | 5.5 | 40 | 55 | 66 | 32 | 13 | 59 | 52 | 17 | 5.6 | 3.1 | 1.5 |
| 17 | 4.7 | 30 | 52 | 56 | 30 | 13 | 114 | 115 | 65 | 5.2 | 2.7 | 1.9 |
| 18 | 4.4 | 25 | 44 | 50 | 28 | 14 | 73 | 191 | 37 | 6.3 | 2.5 | 2.3 |
| 19 | 4.4 | 20 | 35 | 45 | 27 | 14 | 49 | 66 | 25 | 6.6 | 2.5 | 2.5 |
| 20 | 4.4 | 18 | 30 | 42 | 25 | 15 | 41 | 46 | 20 | 6.3 | 2.5 | 3.3 |
| 21 | 4.4 | 18 | 25 | 38 | 24 | 16 | 37 | 40 | 17 | 5.2 | 2.3 | 2.9 |
| 22 | 4.4 | 19 | 22 | 35 | 22 | 17 | 34 | 34 | 15 | 5.6 | 2.9 | 2.7 |
| 23 | 4.7 | 36 | 22 | 32 | 20 | 18 | 30 | 45 | 17 | 4.9 | 2.9 | 2.9 |
| 24 | 7.5 | 69 | 22 | 31 | 19 | 20 | 28 | 36 | 69 | 4.6 | 2.9 | 2.7 |
| 25 | 8.5 | 123 | 24 | 29 | 18 | 21 | 30 | 30 | 67 | 4.6 | 2.5 | 2.7 |
| 26 | 8.0 | 62 | 24 | 27 | 17 | 23 | 51 | 26 | 30 | 7.0 | 2.1 | 2.3 |
| 27 | 12 | 44 | 51 | 27 | 15 | 27 | 52 | 25 | 21 | 9.4 | 1.9 | 1.9 |
| 28 | 12 | 38 | 324 | 26 | 15 | 100 | 37 | 21 | 17 | 6.3 | 1.9 | 1.7 |
| 29 | 9.5 | 34 | 341 | 25 | 14 | 400 | 31 | 20 | 15 | 5.6 | 1.9 | 1.9 |
| 30 | 8.0 | 30 | 100 | 25 | ----- | 1,500 | 30 | 20 | 14 | 5.6 | 2.1 | 2.1 |
| 31 | 13 | ----- | 82 | 24 | ----- | 1,100 | ----- | 124 | ----- | 5.2 | 1.9 | ----- |
| Total | 251.4 | 1,074.5 | 2,427 | 1,413 | 785 | 3,492 | 3,587 | 2,071 | 753 | 224.6 | 92.6 | 66.3 |
| Mean | 8.11 | 35.8 | 78.3 | 45.6 | 27.1 | 113 | 120 | 66.8 | 25.1 | 7.25 | 2.99 | 2.21 |
| Cfsm | 0.147 | 0.651 | 1.42 | 0.829 | 0.493 | 2.05 | 2.18 | 1.21 | 0.456 | 0.132 | 0.054 | 0.040 |
| In. | 0.17 | 0.73 | 1.64 | 0.96 | 0.53 | 2.36 | 2.43 | 1.40 | 0.51 | 0.15 | 0.06 | 0.04 |

Calendar year 1959: Max 938 Min 1.9 Mean 37.3 Cfsm 0.678 In. 9.21
Water year 1959-60: Max 1,500 Min 1.2 Mean 44.4 Cfsm 0.807 In. 10.58

Peak discharge (base, 500 cfs).--Dec. 29 (1:30 a.m.) 554 cfs (5.87 ft); Mar. 30 (about 1 p.m.) about 2,000 cfs; Apr. 3 (3 a.m.) 653 cfs (6.59 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-19, 28-30, Dec. 8-10, 19-23, Dec. 30 to Apr. 2.

1595. Black River near Fargo, Mich.

Location.--Lat 43°06', long 82°37', in NW¼ sec.32, T.8 N., R.16 E., on left bank 20 ft downstream from bridge on Norman Road, 2½ miles southeast of Fargo, 4½ miles upstream from Mill Creek, and 12 miles northwest of Port Huron.

Drainage area.--475 sq mi.

Records available.--February 1944 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 613.75 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to July 9, 1954, wire-weight gage at same site and datum.

Average discharge.--16 years, 309 cfs.

Extremes.--Maximum discharge during year, 10,100 cfs Mar. 31 (gage height, 14.24 ft); minimum, 9.0 cfs Aug. 14 (gage height, 1.70 ft).

1944-60: Maximum discharge, 14,400 cfs Apr. 5, 1947 (gage height, 16.06 ft, from floodmark), from rating curve extended above 10,000 cfs; maximum gage height observed, 18.05 ft Feb. 20, 1951 (ice jam); minimum discharge observed, 1.8 cfs Sept. 18, 19, 1946.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1307: 1950(M), WSP 1627: 1956-58.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 2-5)

| | | | |
|-----|-----|------|-------|
| 1.7 | 9.0 | 4.0 | 530 |
| 1.8 | 16 | 6.0 | 1,430 |
| 2.0 | 35 | 8.0 | 2,700 |
| 2.2 | 60 | 11.0 | 5,390 |
| 2.5 | 108 | 14.0 | 9,660 |
| 3.0 | 220 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 22 | 56 | 140 | 642 | 130 | 90 | 8,210 | 238 | 425 | 56 | 27 | 16 |
| 2 | 21 | 71 | 127 | 478 | 130 | 90 | *5,980 | 225 | 285 | 52 | 25 | 18 |
| 3 | 19 | 67 | 131 | 700 | 140 | 85 | *4,550 | 168 | 205 | 48 | 18 | 19 |
| 4 | 18 | 80 | 190 | 886 | 140 | 85 | 4,320 | 157 | 168 | 46 | 24 | 19 |
| 5 | *20 | 362 | 240 | 516 | 140 | 80 | 2,580 | 135 | 133 | 43 | 23 | 20 |
| 6 | 159 | 474 | 805 | 350 | 150 | 80 | 1,420 | 123 | 104 | 41 | 23 | 19 |
| 7 | 794 | 275 | 1,010 | 250 | 200 | 80 | 1,100 | 114 | 88 | 40 | 23 | 18 |
| 8 | 674 | 179 | 458 | 200 | 300 | 80 | 1,160 | 110 | 77 | 37 | *25 | *16 |
| 9 | 300 | 125 | 273 | 150 | 350 | 80 | 1,270 | 116 | 70 | 35 | 50 | 15 |
| 10 | 185 | 99 | 232 | 150 | 400 | 80 | 886 | 216 | 63 | 34 | 63 | 15 |
| 11 | 131 | 87 | 457 | 150 | 500 | 75 | 662 | 510 | 64 | 32 | 33 | 15 |
| 12 | 99 | 79 | 2,100 | 250 | 800 | 75 | 746 | 1,550 | 77 | 31 | 15 | 14 |
| 13 | 84 | 82 | 3,360 | 500 | 800 | 75 | 666 | 1,410 | 66 | *32 | 12 | 14 |
| 14 | 71 | 1,210 | 1,330 | 1,400 | 700 | 75 | 460 | *927 | *80 | 32 | 10 | 14 |
| 15 | 61 | 2,540 | *526 | 1,180 | 500 | 75 | 733 | 878 | 95 | 31 | 18 | 14 |
| 16 | 56 | *974 | 390 | 909 | 350 | 75 | 1,830 | 467 | 106 | 29 | 22 | 14 |
| 17 | 51 | 484 | 384 | 714 | *250 | 75 | 1,200 | 324 | 1,160 | 29 | 21 | 15 |
| 18 | 47 | 278 | 336 | 400 | 230 | 80 | 900 | 666 | 911 | 28 | 20 | 19 |
| 19 | 43 | 190 | 255 | 300 | 200 | 80 | 586 | 485 | 392 | 28 | 20 | 19 |
| 20 | 41 | 195 | 185 | *250 | 170 | 80 | 357 | 288 | 214 | 28 | 20 | 20 |
| 21 | 40 | 142 | 152 | 200 | 150 | 80 | 276 | 220 | 140 | 27 | 20 | 24 |
| 22 | 37 | 127 | 142 | 160 | 140 | 80 | 276 | 192 | 106 | 27 | 20 | 28 |
| 23 | 37 | 125 | 130 | 150 | 130 | 85 | 265 | 215 | 88 | 27 | 19 | 24 |
| 24 | 43 | 159 | 110 | 140 | 120 | 85 | 222 | 248 | 163 | 26 | 19 | 23 |
| 25 | 43 | 391 | 108 | 130 | 110 | 90 | 1,530 | 232 | 246 | 24 | 19 | 21 |
| 26 | 48 | 484 | 118 | 130 | 110 | 95 | 1,940 | 172 | 148 | 26 | 18 | 19 |
| 27 | 51 | 276 | 218 | 120 | 100 | 118 | 990 | 140 | 101 | 28 | 17 | 18 |
| 28 | 57 | 202 | 2,530 | 120 | 100 | 658 | 500 | 121 | 79 | 28 | 17 | 16 |
| 29 | 60 | 172 | 5,300 | 120 | 95 | 4,500 | 312 | 110 | 70 | 32 | 16 | 15 |
| 30 | 55 | 148 | 3,770 | 120 | ----- | *6,860 | 245 | 103 | 60 | 30 | 18 | 18 |
| 31 | 54 | ----- | 1,140 | 120 | ----- | *9,590 | ----- | 144 | ----- | 27 | 18 | ----- |
| Total | 3,421 | 10,130 | 26,645 | 11,885 | 7,635 | 23,836 | 46,202 | 11,024 | 5,984 | 1,034 | 693 | 539 |
| Mean | 110 | 338 | 860 | 383 | 263 | 769 | 1,540 | 356 | 199 | 32.4 | 22.4 | 18.0 |
| Cfam | 0.232 | 0.712 | 1.81 | 0.806 | 0.554 | 1.62 | 3.24 | 0.749 | 0.419 | 0.070 | 0.047 | 0.038 |
| In. | 0.27 | 0.79 | 2.09 | 0.93 | 0.80 | 1.87 | 3.62 | 0.86 | 0.47 | 0.08 | 0.05 | 0.04 |

Calendar year 1959: Max 6,540 Min 6.5 Mean 380 Cfam 0.800 In. 10.86
Water year 1959-60: Max 9,590 Min 10 Mean 407 Cfam 0.857 In. 11.67

Peak discharge (base, 3,500 cfs).--Dec. 13 (6 a.m.) 3,680 cfs (9.2 ft); Dec. 29 (time unknown) about 5,500 cfs; Mar. 31 (8 a.m.) 10,100 cfs (14.24 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 23, 24, Jan. 6-14, Jan. 18 to Mar. 26.

1600. Mill Creek near Abbotsford, Mich.

Location.--Lat 43°03', long 82°37', in NW $\frac{1}{4}$ sec.17, T.7 N., R.16 E., on downstream side of highway bridge, 1 mile upstream from mouth and 2 miles northeast of Abbotsford.

Drainage area.--138 sq mi.

Records available.--May 1947 to September 1960.

Gage.--Wire-weight gage and crest-stage gage; gage read twice daily. Datum of gage is 609.80 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Mar. 7, 1950, staff gage at same site and datum.

Average discharge.--13 years, 114 cfs.

Extremes.--Maximum discharge during year, 3,070 cfs Mar. 31 (gage height, 9.18 ft); minimum, 6.8 cfs Sept. 17, 18; minimum gage height, 2.51 ft Oct. 2.
1947-60: Maximum discharge, that of Mar. 31, 1960; maximum gage height observed, 10.81 ft Jan. 3, 1951 (ice jam); minimum discharge, 2.7 cfs Sept. 22, 1955; minimum gage height, 2.28 ft Aug. 11, 1949.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1437: 1950.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 26 to June 12)

| | | | |
|-----|-----|-----|-------|
| 2.5 | 6.0 | 3.7 | 159 |
| 2.6 | 8.5 | 4.5 | 375 |
| 2.7 | 13 | 5.0 | 570 |
| 2.9 | 28 | 6.0 | 1,060 |
| 3.2 | 61 | 9.0 | 2,950 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 9.0 | 25 | 64 | 510 | 40 | 35 | 2,320 | 252 | 166 | 36 | 9.8 | 9.8 |
| 2 | 8.2 | 27 | 58 | 363 | 40 | 35 | *2,030 | 208 | 141 | 32 | 9.4 | 14 |
| 3 | 9.0 | 32 | 54 | 350 | 40 | 30 | *1,750 | 164 | 121 | 28 | 9.8 | 11 |
| 4 | 9.8 | 38 | 54 | 265 | 45 | 30 | 1,390 | 128 | 115 | 27 | 12 | 9.8 |
| 5 | 11 | 69 | 77 | 115 | 51 | 30 | 990 | 101 | 88 | 25 | 11 | 9.8 |
| 6 | *30 | 136 | 196 | 100 | 75 | 25 | 760 | 84 | 64 | 23 | 10 | 11 |
| 7 | 434 | 109 | 274 | 80 | 154 | 25 | 618 | 75 | 49 | 22 | 11 | 11 |
| 8 | 450 | 74 | 176 | 70 | 188 | 25 | 554 | 66 | 40 | 19 | *10 | *9.4 |
| 9 | 312 | 56 | 150 | 60 | 178 | 25 | 482 | 67 | 32 | 18 | 11 | 9.0 |
| 10 | 211 | 46 | 91 | 55 | 164 | 25 | 382 | 86 | 29 | 16 | 23 | 8.5 |
| 11 | 148 | 39 | 119 | 55 | 304 | 25 | 321 | 150 | 25 | 19 | 23 | 7.8 |
| 12 | 105 | 35 | 626 | 56 | 382 | 25 | 287 | 218 | 22 | 19 | 44 | 7.2 |
| 13 | 82 | 36 | 820 | 309 | 356 | 25 | 265 | 255 | 21 | *16 | 46 | 7.2 |
| 14 | 63 | 347 | 546 | 434 | 255 | 25 | 231 | *247 | *27 | 14 | 30 | 7.2 |
| 15 | 52 | 680 | *344 | 410 | 193 | 25 | 332 | 224 | 41 | 13 | 25 | 7.2 |
| 16 | 44 | 558 | 255 | 392 | 150 | 25 | 800 | 169 | 61 | 12 | 18 | 7.0 |
| 17 | 37 | *378 | 231 | 369 | *103 | 25 | 750 | 123 | 450 | 12 | 16 | 7.0 |
| 18 | 32 | 247 | 166 | 298 | 90 | 25 | 665 | 107 | 400 | 12 | 14 | 7.0 |
| 19 | 28 | 159 | 123 | 203 | 75 | 25 | 490 | 91 | 330 | 11 | 14 | 7.2 |
| 20 | 26 | 145 | 103 | *128 | 65 | 25 | 356 | 82 | 301 | 10 | 13 | 10 |
| 21 | 22 | 81 | 47 | 100 | 60 | 30 | 276 | 72 | 263 | 26 | 12 | 11 |
| 22 | 21 | 72 | 40 | 80 | 55 | 30 | 239 | 72 | 221 | 19 | 12 | 9.8 |
| 23 | 21 | 74 | 35 | 60 | 50 | 30 | 280 | 101 | 175 | 14 | 11 | 12 |
| 24 | 24 | 82 | 35 | 55 | 45 | 35 | 166 | 152 | 141 | 11 | 10 | 14 |
| 25 | 23 | 141 | 35 | 50 | 45 | 35 | 1,420 | 128 | 101 | 9.4 | 10 | 11 |
| 26 | 23 | 128 | 46 | 45 | 40 | 40 | 1,470 | 90 | 71 | 10 | 9.4 | 9.8 |
| 27 | 30 | 84 | 67 | 40 | 40 | 51 | 1,040 | 71 | 61 | 13 | 9.8 | 8.5 |
| 28 | 26 | 67 | 586 | 40 | 35 | 590 | 660 | 58 | 53 | 13 | 9.4 | 8.0 |
| 29 | 26 | 65 | 1,200 | 40 | 35 | 1,560 | 466 | 51 | 48 | 13 | 9.4 | 8.0 |
| 30 | 25 | 65 | 820 | 40 | ----- | *2,220 | 321 | 48 | 40 | 10 | 9.4 | 8.5 |
| 31 | 26 | ----- | 570 | 40 | ----- | *2,730 | ----- | 95 | ----- | 11 | 9.0 | ----- |
| Total | 2,368.0 | 4,075 | 8,008 | 5,212 | 3,353 | 7,886 | 22,091 | 3,835 | 3,695 | 533.4 | 471.4 | 278.7 |
| Mean | 76.4 | 136 | 258 | 168 | 116 | 254 | 736 | 124 | 123 | 17.2 | 15.2 | 9.29 |
| Cfsm | 0.554 | 0.986 | 1.87 | 1.22 | 0.841 | 1.84 | 5.33 | 0.899 | 0.891 | 0.125 | 0.110 | 0.067 |
| In. | 0.64 | 1.10 | 2.16 | 1.40 | 0.90 | 2.13 | 5.95 | 1.03 | 1.00 | 0.14 | 0.13 | 0.08 |

Calendar year 1959: Max 1,550 Min 5.0 Mean 140 Cfsm 1.01 In. 13.8?
Water year 1959-60: Max 2,730 Min 7.0 Mean 169 Cfsm 1.22 In. 16.63

Peak discharge (base, 900 cfs).--Dec. 13 (2 a.m.) 945 cfs (5.79 ft); Dec. 29 (1 a.m.) 1,320 cfs (6.44 ft); Mar. 31 (1 to 2 a.m.) 3,070 cfs (9.18 ft); Apr. 25 (10 a.m.) 2,300 cfs (8.00 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 22-25, Jan. 6-11, Jan. 21 to Feb. 4, Feb. 18 to Mar. 26.

1608. Sashabaw Creek near Drayton Plains, Mich.

Location.--Lat 42°43'12", long 83°21'13", in SE¹ sec.26, T.4 N., R.9 E., on right bank 25 ft upstream from bridge on Maybee Road, 1.1 miles upstream from mouth, and 2.5 miles northeast of Drayton Plains.

Drainage area.--21.0 sq mi.

Records available.--October 1959 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 970 ft (from topographic map).

Extremes.--Maximum discharge during year, 86 cfs Mar. 30 (gage height, 3.90 ft); minimum, 0.3 cfs Sept. 9-17, 19; minimum gage height, 1.59 ft Aug. 1, 2.

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

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 20 to Dec. 25, Feb. 6-19, Sept. 5-30)

| | | | |
|-----|-----|-----|----|
| 1.5 | 0.2 | 2.5 | 19 |
| 1.6 | .8 | 3.0 | 33 |
| 1.7 | 1.9 | 3.7 | 74 |
| 2.0 | 7.3 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| 1 | 3 | 7 | 9.9 | 22 | 16 | 11 | 59 | 34 | 13 | 7.9 | 0.8 | 0.7 |
| 2 | 3 | 7 | 10 | 22 | 15 | 11 | 56 | 32 | 12 | 6.9 | .7 | .7 |
| 3 | 3 | 7 | 10 | 24 | 15 | 11 | 55 | 30 | 12 | 7.5 | 1.0 | .7 |
| 4 | 3 | 8 | 10 | 22 | 14 | 11 | 53 | 27 | 11 | 6.7 | 1.9 | .6 |
| 5 | 5 | 11 | 12 | 21 | 14 | 11 | 49 | 26 | 11 | 5.8 | 2.9 | .6 |
| 6 | 20 | 12 | 16 | 20 | 19 | 11 | 45 | 24 | 9.7 | 5.2 | 1.9 | .5 |
| 7 | 25 | 12 | 14 | 18 | 19 | 11 | 44 | 24 | 8.9 | 4.9 | 1.9 | .4 |
| 8 | 25 | 11 | 13 | 17 | 17 | 11 | 43 | 24 | 7.9 | 4.3 | 1.9 | .4 |
| 9 | 23 | 10 | 11 | 15 | 17 | 11 | 42 | 23 | 7.3 | 4.0 | 1.9 | .3 |
| 10 | 20 | 10 | 11 | 17 | 17 | 11 | 38 | 28 | 6.9 | 3.6 | 2.6 | .3 |
| 11 | 15 | 9 | 13 | 16 | 22 | 11 | 36 | 27 | 6.4 | 3.4 | 2.2 | .3 |
| 12 | 11 | 9 | 26 | 18 | 22 | 11 | 38 | 26 | 6.0 | 3.3 | *1.9 | .3 |
| 13 | 8 | 10 | 22 | *38 | 19 | 11 | 36 | 25 | 6.7 | 5.3 | 1.6 | .3 |
| 14 | 6 | 25 | 19 | 36 | *18 | 11 | 34 | 24 | 10 | 5.3 | 1.5 | .3 |
| 15 | *5.5 | 25 | 18 | 29 | 16 | 11 | 45 | 22 | 11 | *2.9 | 1.5 | *.3 |
| 16 | 5.5 | 22 | 17 | 27 | 16 | 11 | 51 | 21 | 12 | 2.6 | 1.4 | .3 |
| 17 | 5.5 | 20 | 17 | 23 | 16 | 11 | 52 | 20 | 23 | 2.2 | 1.4 | .3 |
| 18 | 5.5 | 17 | 18 | 22 | 16 | 11 | 51 | 20 | 17 | 1.9 | 1.4 | .4 |
| 19 | 6 | 15 | 17 | 21 | 15 | 11 | 42 | 19 | 14 | 1.7 | 1.4 | .7 |
| 20 | 6 | 14 | 16 | 20 | 14 | 11 | 38 | 20 | 12 | 1.6 | 1.2 | 1.1 |
| 21 | 6 | 14 | 15 | 18 | 13 | 11 | 36 | 19 | 12 | 1.6 | 1.2 | .8 |
| 22 | 6 | 14 | 15 | 17 | 13 | 11 | 34 | 19 | 12 | 1.5 | 1.4 | .7 |
| 23 | 6 | 14 | *14 | *16 | 13 | 11 | *32 | 19 | 12 | 1.5 | 1.2 | .7 |
| 24 | 6 | 15 | 14 | 16 | 13 | *11 | 30 | 18 | *12 | 1.4 | 1.2 | .7 |
| 25 | 6 | 16 | 15 | 16 | 12 | 11 | 40 | 17 | 11 | 1.2 | 1.2 | .6 |
| 26 | 6 | *13 | *16 | 16 | 12 | 12 | *44 | 16 | 9.3 | 1.4 | 1.0 | .6 |
| 27 | 6 | 12 | 23 | 16 | 12 | 15 | 42 | 15 | 8.3 | 1.5 | 1.0 | .6 |
| 28 | 6 | 12 | *33 | 16 | 11 | 32 | 37 | *17 | 7.7 | 1.2 | .9 | .6 |
| 29 | 6 | 11 | 32 | 16 | 11 | 51 | 34 | 16 | 9.3 | 1.1 | .9 | .6 |
| 30 | 6 | 10 | 28 | 16 | ----- | *70 | 34 | 15 | 9.1 | 1.1 | 1.1 | .6 |
| 31 | 7 | ----- | 26 | 16 | ----- | 72 | ----- | 15 | ----- | .9 | 1.0 | ----- |
| Total | 271.0 | 392 | 530.9 | 621 | 447 | 527 | 1,270 | 682 | 320.5 | 97.4 | 45.1 | 16.0 |
| Mean | 8.74 | 13.1 | 17.1 | 20.0 | 15.4 | 17.0 | 42.3 | 22.0 | 10.7 | 3.14 | 1.45 | 0.53 |
| Cfsm | 0.416 | 0.624 | 0.814 | 0.952 | 0.733 | 0.810 | 2.01 | 1.05 | 0.510 | 0.150 | 0.069 | 0.025 |
| In. | 0.48 | 0.69 | 0.94 | 1.10 | 0.79 | 0.93 | 2.25 | 1.21 | 0.57 | 0.17 | 0.08 | 0.03 |

Calendar year 1959: Max - Min - Mean - Cfsm - In. -
Water year 1959-60: Max 72 Min 0.3 Mean 14.3 Cfsm 0.681 In. 9.24

Peak discharge (base, 45 cfs).--Mar. 30 (9 to 10 p.m.) 86 cfs (3.90 ft); Apr. 17 (8 to 10 p.m.) 56 cfs (3.40 ft); Apr. 25 (12 m. to 2 p.m.) 46 cfs (3.24 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 19 to Feb. 3, Feb. 20 to Mar. 27. No gage-height record Oct. 1 to Nov. 19, Nov. 28; discharge estimated on basis of recorded range in stage, weather records and records for Swartz Creek near Holly, Clinton River near Drayton Plains, and Clinton River at Auburn Heights.

1609. Clinton River near Drayton Plains, Mich.

Location.--Lat 42°39'37", long 83°23'25", in NW¼ sec.21, T.3 N., R.9 E., on left bank 14 ft downstream from bridge on State Highway 59, 1 mile downstream from State fish hatchery, and 2.0 miles south of Drayton Plains.

Drainage area.--79.5 sq mi.

Records available.--October 1959 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 940 ft (from topographic map).

Extremes.--Maximum discharge during year, 145 cfs Apr. 20 (gage height, 3.48 ft); minimum, 8.6 cfs Sept. 17, 18 (gage height, 1.34 ft).

Remarks.--Records good except those for period of no gage-height record, which are fair. Some regulation, especially at low and medium flows, by lake level control structures at many lakes above station.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)
(Shifting-control method used Dec. 28, 29)

| | |
|-----|-----|
| 1.3 | 7.0 |
| 2.0 | 45 |
| 3.5 | 146 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 30 | 40 | 68 | 71 | 57 | 55 | 122 | 112 | 52 | 49 | 9.8 | 11 |
| 2 | 30 | 40 | 75 | 70 | 55 | 54 | 131 | 111 | 47 | 47 | 11 | 12 |
| 3 | 35 | 40 | 69 | 70 | 54 | 55 | 133 | 108 | 42 | 50 | 12 | 11 |
| 4 | 35 | 40 | 66 | 69 | 52 | 55 | 136 | 103 | 45 | 48 | 13 | 11 |
| 5 | 40 | 40 | 65 | 67 | 52 | 55 | 137 | 91 | 47 | 43 | 14 | 11 |
| 6 | 45 | 40 | 65 | 69 | 58 | 54 | 138 | 70 | 46 | 33 | 14 | 14 |
| 7 | 50 | 40 | 62 | 64 | 58 | 52 | 138 | *59 | 44 | 13 | 15 | 14 |
| 8 | 50 | 40 | 62 | 61 | 59 | 52 | 137 | 65 | 46 | 14 | 16 | 14 |
| 9 | 50 | 40 | 60 | 60 | 59 | 50 | *135 | 66 | 46 | 17 | 19 | 12 |
| 10 | 50 | 40 | 61 | 56 | 64 | 49 | 131 | 75 | 34 | 17 | 20 | 9.4 |
| 11 | 50 | 40 | 64 | 54 | 67 | 50 | 127 | 87 | 26 | 15 | 18 | 9.0 |
| 12 | 50 | 45 | 70 | 58 | 66 | 50 | 123 | 88 | 24 | 11 | *17 | 12 |
| 13 | 50 | 46 | 72 | 66 | 67 | 50 | 119 | 96 | 26 | 14 | 18 | 11 |
| 14 | *50 | 55 | 72 | 66 | *66 | 45 | 114 | 100 | 28 | 16 | 18 | 10 |
| 15 | 50 | 57 | 73 | 71 | 65 | 45 | 120 | 97 | 26 | *14 | 20 | *10 |
| 16 | 45 | 60 | 75 | 72 | 64 | 50 | 120 | 94 | 28 | 12 | 18 | 9.8 |
| 17 | 45 | 58 | 78 | 73 | 64 | 50 | 128 | 89 | 35 | 14 | 17 | 9.0 |
| 18 | 45 | 63 | 78 | 75 | 64 | 50 | 132 | 86 | 35 | 12 | 17 | 9.0 |
| 19 | 45 | 64 | 76 | 73 | 62 | 50 | 138 | 81 | 33 | 11 | 16 | 11 |
| 20 | 45 | 64 | 73 | 73 | 60 | 50 | 142 | 78 | 34 | 11 | 18 | 13 |
| 21 | 45 | 64 | 72 | 72 | 60 | 50 | 141 | 74 | 36 | 11 | 17 | 12 |
| 22 | 45 | 64 | 70 | 70 | 60 | 50 | 136 | 72 | 42 | 11 | 16 | 12 |
| 23 | 45 | 63 | *68 | *69 | 59 | 50 | 125 | 67 | *48 | 11 | 17 | 12 |
| 24 | 45 | 65 | 66 | 67 | 57 | 50 | 121 | 67 | 52 | 10 | 24 | 12 |
| 25 | 45 | 64 | 64 | 66 | 57 | 46 | 124 | 70 | 51 | 11 | 22 | 12 |
| 26 | 45 | *65 | 63 | 64 | 59 | 44 | 117 | 67 | 52 | 14 | 20 | 12 |
| 27 | 45 | 64 | 62 | 65 | 57 | 52 | 121 | 63 | 49 | 14 | 20 | 12 |
| 28 | 45 | 64 | *63 | 64 | 57 | 72 | 122 | 74 | 47 | 12 | 16 | 13 |
| 29 | 45 | 61 | 62 | 63 | 56 | 82 | 117 | 68 | 50 | 11 | 20 | 12 |
| 30 | 40 | 60 | 67 | 60 | ----- | 96 | 115 | 64 | 48 | 9.8 | 22 | 14 |
| 31 | 40 | ----- | 70 | 59 | ----- | 110 | ----- | 58 | ----- | 9.4 | 16 | ----- |
| Total | 1,375 | 1,586 | 2,111 | 2,057 | 1,735 | 1,723 | 3,838 | 2,497 | 1,219 | 585.2 | 530.8 | 346.2 |
| Mean | 44.4 | 52.9 | 68.1 | 66.4 | 59.8 | 55.6 | 128 | 80.5 | 40.6 | 18.9 | 17.1 | 11.5 |
| Cfsm | 0.558 | 0.665 | 0.857 | 0.835 | 0.752 | 0.699 | 1.61 | 1.01 | 0.511 | 0.238 | 0.215 | 0.145 |
| In. | 0.64 | 0.74 | 0.99 | 0.96 | 0.81 | 0.81 | 1.80 | 1.17 | 0.57 | 0.27 | 0.25 | 0.16 |

Calendar year 1959: Max - Min - Mean - Cfsm - In. -
 Water year 1959-60: Max 142 Min 9.0 Mean 53.6 Cfsm 0.674 In. 9.17

* Discharge measurement made on this day.

Note.--No gage-height record Oct. 1 to Nov. 12, Mar. 11-24; discharge estimated on basis of recorded range in stage and records for station at Auburn Heights.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

1610. Clinton River at Auburn Heights, Mich.

Location.--Lat 42°38'00", long 83°13'28", in NW¹/₄ sec.26 T.3 N., R.10 E., on right bank 30 ft upstream from bridge on State Highway 59, at Auburn Heights, and 2.8 miles upstream from Galloway Creek.

Drainage area.--123 sq mi.

Records available.--May 1935 to June 1939 and February to September 1940 (published as "at Pontiac"); October 1956 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 860 ft (from topographic map). Prior to October 1940, staff gage at site 3.3 miles upstream at datum 876.01 ft above mean sea level.

Average discharge.--7 years (1935-38, 1956-60), 78.3 cfs.

Extremes.--Maximum discharge during year, 374 cfs Oct. 6 (gage height, 2.90 ft); minimum, 16 cfs Sept. 26; minimum gage height, 1.28 ft Oct. 4.
1935-40, 1956-60: Maximum discharge observed, 716 cfs Feb. 12, 1933 (gage height, 5.10 ft, site and datum then in use), from rating curve extended above 150 cfs; minimum observed, 4.8 cfs Sept. 4, 1936, site then in use.

Remarks.--Records good. Some regulation by many lakes above station. Flow includes waste from city of Pontiac water supply, most of which is pumped from ground water sources.

Revisions (water years).--WSP 1307: 1937(M). WSP 1507: Drainage area at former site.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)
(Shifting-control method used June 29 to Sept. 30)

| | |
|-----|-----|
| 1.2 | 17 |
| 1.6 | 66 |
| 2.0 | 139 |
| 2.6 | 301 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 42 | 56 | 97 | 124 | 112 | 107 | 172 | 206 | 110 | 53 | 34 | 50 |
| 2 | 34 | 51 | 101 | 126 | 116 | 110 | 172 | 195 | 118 | 48 | 38 | 46 |
| 3 | 32 | 48 | 101 | 141 | 116 | 107 | 167 | 200 | 114 | 59 | 76 | 35 |
| 4 | 28 | 86 | 103 | 128 | 114 | 107 | 170 | 195 | 108 | 48 | 89 | 29 |
| 5 | 95 | 74 | 108 | 128 | 126 | 101 | 180 | 182 | 108 | 51 | 64 | 28 |
| 6 | 221 | 62 | 96 | 126 | 192 | 96 | 182 | 148 | 103 | 71 | 39 | 33 |
| 7 | 168 | 58 | 80 | 126 | 135 | 99 | 206 | *141 | 99 | 74 | 40 | 35 |
| 8 | 116 | 53 | 84 | 120 | 128 | 103 | 206 | 131 | 80 | 74 | 41 | *36 |
| 9 | 110 | 56 | 118 | 116 | 128 | 99 | *206 | 131 | 74 | 69 | 42 | 35 |
| 10 | 105 | 58 | 133 | 112 | 139 | 99 | 200 | 162 | 69 | 65 | 46 | 30 |
| 11 | 118 | 66 | 144 | 110 | 190 | 99 | 206 | 141 | 51 | 68 | *38 | 25 |
| 12 | 107 | 68 | 195 | 156 | 141 | 94 | 231 | 137 | 39 | 69 | 36 | 30 |
| 13 | 107 | 89 | 137 | 245 | 128 | 90 | 228 | 135 | 60 | 68 | 32 | 33 |
| 14 | *107 | 174 | 126 | 153 | 122 | 94 | 228 | 133 | 116 | *2 | 32 | 32 |
| 15 | 105 | 122 | 131 | 172 | 124 | 101 | 286 | 126 | 79 | 60 | 34 | 32 |
| 16 | 105 | 118 | 124 | 150 | 131 | 97 | 256 | 128 | 97 | 55 | 33 | 32 |
| 17 | 99 | 114 | 120 | 141 | 131 | 99 | 271 | 139 | 159 | 51 | 33 | 28 |
| 18 | 90 | 107 | 118 | 141 | 126 | 103 | 239 | 137 | 59 | 59 | 34 | 24 |
| 19 | 90 | 103 | 116 | 144 | 122 | 107 | 242 | 135 | 66 | 80 | 34 | 46 |
| 20 | 96 | 101 | 106 | 141 | *114 | 103 | 236 | 150 | 66 | 59 | 33 | 38 |
| 21 | 99 | 101 | 110 | 137 | 110 | 103 | 239 | 135 | 82 | 46 | 29 | 32 |
| 22 | 96 | 99 | 112 | 135 | 112 | 99 | 234 | 135 | 90 | 46 | 34 | 33 |
| 23 | 97 | 101 | *110 | 133 | 114 | *103 | 222 | 139 | *94 | 42 | 34 | 30 |
| 24 | 116 | 108 | 108 | *122 | 112 | 101 | 217 | 131 | 90 | 29 | 34 | 28 |
| 25 | 89 | 107 | 99 | 120 | 112 | 99 | 280 | 150 | 79 | 34 | 33 | 21 |
| 26 | 85 | 101 | 99 | 124 | 114 | 99 | 236 | 124 | 69 | 39 | 34 | 26 |
| 27 | 89 | *99 | 107 | 131 | 112 | 150 | 228 | 124 | 72 | 41 | 32 | 30 |
| 28 | 84 | 101 | 153 | 128 | 103 | 217 | 220 | 124 | 76 | 39 | 26 | 28 |
| 29 | 77 | 96 | 148 | 131 | 103 | 170 | 214 | 114 | 66 | 39 | 50 | 29 |
| 30 | 83 | 94 | 137 | 122 | ----- | 180 | 214 | 114 | 55 | 35 | 46 | 30 |
| 31 | 66 | ----- | 133 | 114 | ----- | 177 | ----- | 114 | ----- | 28 | 40 | ----- |
| Total | 2,932 | 2,671 | 3,656 | 4,193 | 3,625 | 3,513 | 6,608 | 4,456 | 2,568 | 1,641 | 1,220 | 966 |
| Mean | 94.6 | 89.0 | 118 | 135 | 125 | 113 | 220 | 144 | 85.6 | 52.9 | 39.4 | 32.2 |
| Cfsm | 0.769 | 0.724 | 0.959 | 1.10 | 1.02 | 0.919 | 1.79 | 1.17 | 0.696 | 0.430 | 0.320 | 0.262 |
| In. | 0.89 | 0.81 | 1.11 | 1.27 | 1.10 | 1.06 | 2.00 | 1.35 | 0.78 | 0.50 | 0.37 | 0.29 |

Calendar year 1959: Max 379 Min 17 Mean 97.1 Cfsm 0.789 In. 10.73
Water year 1959-60: Max 286 Min 14 Mean 104 Cfsm 0.846 In. 11.53

Peak discharge (base, 300 cfs).--Oct. 6 (6 p.m.) 374 cfs (2.90 ft); Jan. 13 (1 a.m.) 313 cfs (2.64 ft); Mar. 27 (10 p.m.) 307 cfs (2.62 ft); Apr. 17 (3 p.m.) 325 cfs (2.68 ft); Apr. 25 (5 a.m.) 353 cfs (2.77 ft).

* Discharge measurement made on this day.

1615. Paint Creek near Lake Orion, Mich.

Location.--Lat 42°46'03", long 83°13'12", in NE¹/₄ sec.13, T.4 N., R.10 E., on left bank 100 ft upstream from railroad bridge, 1.6 miles southeast of Lake Orion, and 2.8 miles upstream from Trout Creek.

Drainage area.--38.9 sq mi.

Records available.--September 1955 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 940 ft (from topographic map).

Average discharge.--5 years, 23.9 cfs.

Extremes.--Maximum discharge during year, 289 cfs Apr. 1 (gage height, 3.33 ft); minimum, 2.5 cfs Aug. 28, 29; minimum gage height, 1.49 ft Aug. 28, 29, Sept. 15.
1955-60: Maximum discharge, 340 cfs Mar. 6, 1956 (gage height, 3.60 ft), from rating curve extended above 230 cfs by logarithmic plotting; minimum, 1.2 cfs June 28, July 13, 14, 15, 1959.

Remarks.--Records good. Occasional regulation by Lake Orion.

Revisions.--WSP 1557: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.4 | 1.5 | 2.0 | 27 |
| 1.5 | 2.7 | 2.3 | 59 |
| 1.6 | 4.6 | 2.7 | 121 |
| 1.7 | 7.4 | 3.3 | 280 |
| 1.8 | 12 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 13 | 14 | 28 | 42 | 23 | 25 | 256 | 82 | 20 | 18 | 4.6 | 3.6 |
| 2 | 13 | 15 | 27 | 40 | 23 | 25 | *238 | 57 | 23 | 19 | 4.2 | 3.3 |
| 3 | 11 | 15 | 26 | 40 | 23 | 24 | 208 | 53 | 27 | 16 | 3.1 | 3.1 |
| 4 | 11 | 20 | 25 | 38 | 23 | 24 | 149 | 48 | 27 | 16 | 2.7 | 3.1 |
| 5 | 21 | 26 | 26 | 36 | 23 | 24 | 112 | 46 | 27 | 18 | 2.9 | 2.7 |
| 6 | 45 | 28 | 28 | 33 | 27 | 23 | 100 | 43 | 27 | 22 | 3.3 | 2.7 |
| 7 | 58 | 30 | 29 | 31 | 28 | 23 | 90 | *43 | 23 | 20 | 4.4 | 2.6 |
| 8 | 64 | 26 | 29 | 27 | 30 | 23 | 68 | 39 | 21 | 16 | 5.4 | 2.7 |
| 9 | 63 | 25 | 28 | 20 | 30 | 22 | 40 | 38 | 18 | 13 | 6.3 | *3.2 |
| 10 | 60 | 22 | 28 | 21 | 32 | 21 | 39 | 42 | 16 | 11 | 9.2 | 3.8 |
| 11 | 54 | 20 | 28 | 21 | 34 | 21 | 45 | 41 | 14 | 11 | *10 | 2.9 |
| 12 | 54 | 17 | 32 | 32 | 34 | 21 | 46 | 42 | 21 | 6.6 | 6.6 | 2.9 |
| 13 | 51 | 19 | 34 | 43 | 35 | 21 | 43 | 42 | 16 | 10 | 5.7 | 3.1 |
| 14 | 35 | 31 | 36 | 42 | 35 | 19 | 43 | 42 | 18 | *12 | 5.7 | 2.9 |
| 15 | *30 | 31 | 37 | 46 | 34 | 30 | 47 | 42 | 18 | 7.1 | 6.8 | 2.7 |
| 16 | 28 | 48 | 37 | 47 | 32 | 20 | 55 | 39 | 19 | 7.4 | 6.8 | 2.9 |
| 17 | 21 | 60 | *37 | 45 | 32 | 20 | 67 | 37 | 25 | 9.7 | 8.2 | 3.5 |
| 18 | 19 | *51 | 35 | 44 | 31 | 20 | 81 | 35 | 26 | 6.6 | 11 | 6.4 |
| 19 | 17 | 46 | 34 | 43 | 30 | 20 | 87 | 34 | 29 | 12 | 8.8 | 5.2 |
| 20 | 16 | 47 | 32 | 41 | *29 | 20 | 81 | 32 | 36 | 15 | 8.3 | 7.9 |
| 21 | 16 | 47 | 31 | 39 | 28 | 20 | 64 | 31 | 35 | 8.8 | 6.6 | 7.4 |
| 22 | 16 | 46 | 30 | 37 | 29 | 22 | 54 | 26 | 35 | 6.6 | 8.1 | 7.4 |
| 23 | 16 | 44 | 28 | *35 | 29 | *23 | 48 | 27 | 31 | 5.4 | 19 | 7.4 |
| 24 | 18 | 43 | 26 | 22 | 28 | 23 | 48 | 27 | *25 | 5.2 | 9.0 | 7.4 |
| 25 | 19 | 41 | 25 | 17 | 27 | 22 | 67 | 25 | 21 | 4.6 | 6.0 | 7.9 |
| 26 | 17 | 36 | 25 | 19 | 29 | 22 | 68 | 24 | 21 | 4.6 | 2.9 | 7.4 |
| 27 | 17 | 34 | 26 | 22 | 28 | 25 | 84 | 16 | 17 | 4.4 | 2.9 | 7.4 |
| 28 | 16 | 32 | 32 | 23 | 27 | 36 | 89 | 16 | 16 | 5.4 | 2.8 | 6.8 |
| 29 | 15 | 31 | 34 | 23 | 26 | 42 | 76 | 19 | 21 | 9.7 | 2.9 | 6.6 |
| 30 | 14 | 29 | 38 | 23 | ----- | 67 | 66 | 19 | 19 | 6.6 | 2.9 | 7.4 |
| 31 | 15 | ----- | 40 | 23 | ----- | 160 | ----- | 18 | ----- | 5.2 | 3.3 | ----- |
| Total | 863 | 974 | 951 | 1,015 | 839 | 898 | 2,558 | 1,105 | 692 | 332.9 | 189.2 | 144.3 |
| Mean | 27.8 | 32.5 | 30.7 | 32.7 | 28.9 | 29.0 | 85.3 | 35.6 | 23.1 | 10.7 | 6.10 | 4.81 |
| Cfsm | 0.715 | 0.835 | 0.789 | 0.841 | 0.743 | 0.746 | 2.19 | 0.915 | 0.594 | 0.275 | 0.157 | 0.124 |
| In. | 0.83 | 0.93 | 0.91 | 0.97 | 0.80 | 0.86 | 2.45 | 1.06 | 0.66 | 0.32 | 0.18 | 0.14 |

Calendar year 1959: Max 138 Min 1.4 Mean 21.3 Cfsm 0.548 In. 7.43
Water year 1959-60: Max 256 Min 2.6 Mean 28.9 Cfsm 0.743 In. 10.11

Peak discharge (base, 90 cfs).--Apr. 1 (2 to 3 p.m.) 289 cfs (3.33 ft); Apr. 19 (7 a.m. to 2 p.m.) 90 cfs (2.52 ft); Apr. 27 (11 p.m.) to Apr. 28 (9 a.m.) 92 cfs (2.53 ft).

* Discharge measurement made on this day.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

1615.4. Paint Creek at Rochester, Mich.

Location.--Lat 42°41'18", long 83°08'35" in NW¼SE¼ sec.10, T.3 N., R.11 E., on right bank at upstream side of bridge on Ludlow Street in Rochester and 1.5 miles upstream from mouth.

Drainage area.--71.3 sq mi.

Records available.--October 1959 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 760 ft (from topographic map).

Extremes.--Maximum discharge during year, 480 cfs Mar. 31, estimated on basis of records for nearby stations; minimum, 10 cfs Sept. 15-17; minimum gage height, 1.26 ft Sept. 16.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Occasional regulation by Lake Orion.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 20-23, June 25 to Aug. 3,
Aug. 5-20, Aug. 22 to Sept. 5)

| | | | |
|-----|-----|-----|-----|
| 1.2 | 8.0 | 2.0 | 75 |
| 1.4 | 16 | 2.5 | 155 |
| 1.6 | 30 | 3.8 | 475 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 20 | 25 | 52 | 82 | 40 | 45 | 400 | 111 | 46 | 33 | 14 | 13 |
| 2 | 20 | 25 | 51 | 81 | 40 | 45 | *350 | 97 | 48 | 34 | 14 | 13 |
| 3 | 20 | 30 | 50 | 92 | 40 | 40 | 300 | 92 | 55 | 36 | 16 | 12 |
| 4 | 25 | 40 | 48 | 78 | 40 | 40 | 250 | 85 | 51 | 32 | 15 | 12 |
| 5 | 35 | 50 | 50 | b60 | 45 | 40 | 200 | 81 | 49 | 31 | 16 | 12 |
| 6 | 80 | 50 | 61 | b55 | 50 | 40 | 180 | 76 | 48 | 35 | 14 | 12 |
| 7 | 100 | 50 | 55 | b50 | 50 | 40 | 150 | *78 | 42 | 34 | 15 | 12 |
| 8 | 110 | 50 | 50 | b45 | 55 | 40 | 140 | 78 | 37 | 31 | 17 | *11 |
| 9 | 110 | 45 | 46 | 43 | 55 | 40 | 120 | 78 | 34 | 27 | 17 | 12 |
| 10 | 110 | 40 | 43 | 40 | 60 | 35 | 110 | 97 | 33 | 25 | 21 | 12 |
| 11 | 100 | 35 | 48 | 40 | 60 | 35 | 100 | 90 | 29 | 24 | *22 | 12 |
| 12 | 90 | 34 | 108 | 60 | 60 | 35 | 95 | 88 | 35 | 24 | 21 | 11 |
| 13 | 80 | 39 | 90 | *159 | 65 | 35 | 90 | 82 | 36 | 22 | 16 | 11 |
| 14 | 60 | 122 | 72 | 116 | 65 | 35 | 90 | 85 | 65 | *27 | 16 | 11 |
| 15 | *50 | 95 | 70 | 122 | 65 | 35 | 120 | 82 | 65 | 21 | 16 | 10 |
| 16 | 45 | 83 | 68 | 102 | 65 | 35 | 151 | 75 | 58 | 20 | 16 | 10 |
| 17 | 40 | 102 | 68 | 90 | 65 | 35 | 161 | 72 | 106 | 20 | 15 | 10 |
| 18 | 35 | 83 | 67 | 85 | 65 | 35 | 157 | 71 | 71 | 21 | 20 | 13 |
| 19 | 30 | 75 | *62 | 79 | 60 | 35 | 144 | 67 | 58 | 19 | 18 | 14 |
| 20 | 30 | 72 | 58 | 74 | *55 | 35 | 133 | 72 | 61 | 24 | 19 | 19 |
| 21 | 30 | 74 | 57 | 70 | 50 | 40 | 113 | 67 | 57 | 21 | 17 | 17 |
| 22 | 30 | 74 | 57 | 67 | 50 | 40 | 99 | 65 | 56 | 19 | 16 | 16 |
| 23 | 30 | 76 | 56 | 62 | 50 | *40 | 89 | 68 | *51 | 17 | 28 | 17 |
| 24 | 30 | 79 | 50 | *56 | 50 | 40 | 83 | 65 | 46 | 16 | 22 | 16 |
| 25 | 30 | 78 | 50 | 50 | 45 | 40 | 167 | 58 | 36 | 16 | 15 | 17 |
| 26 | 30 | 68 | 52 | 45 | 45 | 50 | 142 | 55 | 36 | 16 | 14 | 16 |
| 27 | 30 | *63 | 68 | 40 | 45 | 70 | 136 | 52 | 35 | 16 | 12 | 16 |
| 28 | 30 | 60 | *133 | 40 | 45 | 90 | 156 | 44 | 31 | 15 | 12 | 16 |
| 29 | 30 | 56 | 128 | 40 | 45 | 150 | 121 | 48 | 37 | 15 | 13 | 15 |
| 30 | 25 | 54 | 97 | 40 | ----- | *350 | 108 | 50 | 39 | 15 | 15 | 15 |
| 31 | 25 | 85 | 40 | 40 | ----- | 450 | ----- | 50 | ----- | 15 | 13 | ----- |
| Total | 1,510 | 1,827 | 2,050 | 2,103 | 1,525 | 2,115 | 4,645 | 2,279 | 1,447 | 721 | 515 | 403 |
| Mean | 48.7 | 60.9 | 66.1 | 67.8 | 52.6 | 68.2 | 155 | 73.5 | 48.2 | 23.3 | 16.6 | 13.4 |
| Cfs/m | 0.683 | 0.854 | 0.927 | 0.951 | 0.738 | 0.957 | 2.17 | 1.03 | 0.676 | 0.327 | 0.233 | 0.188 |
| In. | 0.79 | 0.95 | 1.07 | 1.10 | 0.80 | 1.10 | 2.42 | 1.19 | 0.75 | 0.39 | 0.27 | 0.21 |

Calendar year 1959: Max - Min - Mean - Cfs/m - In. -
Water year 1959-60: Max 450 Min 10 Mean 57.8 Cfs/m 0.811 In. 11.03

Peak discharge (base, 200 cfs).--Jan. 13 (time unknown) 211 cfs (2.77 ft); Mar. 31 (time unknown) about 480 cfs; Apr. 25 (12 m.) 218 cfs (2.80 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Oct. 1 to Nov. 11, Jan. 10-12, Jan. 25 to Apr. 15; discharge estimated on basis of 5 discharge measurements and records for Paint Creek near Lake Orion, Clinton River near Fraser, and Swartz Creek near Holly.

1618. Stony Creek near Washington, Mich.

Location.--Lat 42°42'55", long 83°05'31" in SW $\frac{1}{4}$ sec. 31, T.4 N., R.12 E., on left bank 15 ft downstream from bridge on Mt. Vernon Road, 2.9 miles west of Washington.

Drainage area.--68.0 sq mi.

Records available.--July 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 772.59 ft above mean sea level, datum of 1929 (levels by Huron-Clinton Metropolitan Authority).

Extremes.--Maximum discharge during year, 361 cfs Mar. 30 (gage height, 5.53 ft); minimum, 7.0 cfs Aug. 28 or 29 (gage height, 2.32 ft).
1958-60: Maximum discharge, 400 cfs Mar. 6, 1959; maximum gage height, 6.71 ft Mar. 6, 1959 (ice jam); minimum discharge, 4.1 cfs Aug. 29, 1958 (gage height, 2.18 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Occasional diurnal fluctuation caused by mills above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 4-13)

| | | | |
|-----|-----|-----|-----|
| 2.3 | 6.5 | 3.5 | 76 |
| 2.4 | 9.2 | 4.0 | 128 |
| 2.8 | 26 | 5.0 | 262 |
| 3.0 | 37 | 6.0 | 455 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 15 | 28 | 36 | 57 | 35 | 30 | 272 | 93 | 35 | 21 | 10 | 10 |
| 2 | 16 | 27 | 38 | 51 | 35 | 30 | 241 | 82 | 36 | 19 | 10 | 10 |
| 3 | 16 | 25 | 38 | 63 | 35 | 30 | 214 | 73 | 40 | 19 | 12 | 9 |
| 4 | 16 | 42 | 38 | 51 | 35 | 30 | 186 | 65 | 34 | 19 | 14 | 9 |
| 5 | 30 | 53 | 40 | 45 | 41 | 30 | 157 | 61 | 33 | 17 | 15 | 9 |
| 6 | 126 | 45 | 50 | 40 | 59 | 30 | 134 | 57 | 32 | 17 | 15 | 9 |
| 7 | 137 | 38 | 48 | 40 | 55 | 30 | 122 | 57 | 30 | 16 | 15 | 9 |
| 8 | 178 | 30 | 42 | 40 | 49 | 30 | 115 | 56 | 28 | 15 | 17 | 9 |
| 9 | 50 | 30 | 40 | 35 | 50 | 30 | 100 | 56 | 25 | 15 | 16 | 9 |
| 10 | 38 | 32 | 40 | 35 | 52 | 30 | 88 | 75 | 26 | 15 | 15 | 9 |
| 11 | 42 | 33 | 45 | 35 | 79 | 30 | 80 | 76 | 22 | 16 | *15 | 9 |
| 12 | 37 | 32 | 95 | 56 | 61 | 30 | 77 | 72 | 21 | 14 | 14 | 9 |
| 13 | 33 | 38 | 86 | 141 | 55 | 30 | 71 | 67 | 25 | 15 | 14 | 9 |
| 14 | 30 | 109 | 65 | 104 | 55 | 30 | 70 | 69 | 65 | *15 | 14 | *9.2 |
| 15 | 28 | 87 | 57 | 98 | 50 | 30 | 100 | 64 | 62 | 10 | 13 | 10 |
| 16 | 27 | 68 | 55 | 92 | *50 | 30 | 138 | 56 | *46 | 10 | 12 | 8.9 |
| 17 | 26 | 54 | *50 | 72 | 47 | 30 | 136 | 53 | 102 | 10 | 11 | 9.6 |
| 18 | 24 | *45 | 46 | 58 | 46 | 35 | 124 | 53 | 76 | 9 | 11 | 8.9 |
| 19 | 22 | 45 | 42 | 54 | 40 | 40 | 104 | 48 | 51 | 9 | 11 | 13 |
| 20 | 22 | 39 | 40 | 50 | 35 | 50 | 87 | 53 | 38 | 9 | 11 | 16 |
| 21 | 22 | 38 | 36 | 45 | 35 | 55 | 80 | 53 | 32 | 9 | 12 | 14 |
| 22 | 22 | 38 | 35 | 45 | 35 | 55 | *79 | 56 | 31 | 10 | 11 | 12 |
| 23 | 24 | 41 | 35 | 40 | 35 | *49 | 72 | 62 | 30 | 10 | 10 | 13 |
| 24 | 36 | 47 | 35 | 35 | 35 | 45 | 66 | 52 | 28 | 10 | 10 | 13 |
| 25 | 33 | 50 | 35 | 35 | 35 | 45 | 144 | 48 | 26 | 10 | 10 | 11 |
| 26 | 29 | 44 | 38 | 35 | 35 | 45 | 188 | 45 | 22 | 10 | 10 | 13 |
| 27 | 28 | 42 | 52 | 40 | 30 | 73 | 149 | 42 | 19 | 13 | 9 | 12 |
| 28 | 28 | 41 | 96 | 40 | 30 | 243 | 118 | *45 | 19 | 11 | 11 | 11 |
| 29 | 26 | 38 | 102 | 40 | 30 | 279 | 96 | 40 | 24 | 10 | 8 | 12 |
| 30 | 26 | 36 | 79 | *39 | --- | 317 | 94 | 43 | 23 | 10 | 9 | 14 |
| 31 | 28 | --- | 69 | 36 | --- | *310 | --- | 43 | --- | 10 | 10 | --- |
| Total | 1,115 | 1,315 | 1,603 | 1,647 | 1,264 | 2,151 | 3,702 | 1,813 | 1,081 | 403 | 372 | 319.6 |
| Mean | 36.0 | 43.8 | 51.7 | 53.1 | 43.6 | 69.4 | 123 | 58.5 | 36.0 | 13.0 | 12.0 | 10.7 |
| Cfsm | 0.529 | 0.644 | 0.760 | 0.781 | 0.641 | 1.02 | 1.81 | 0.860 | 0.529 | 0.191 | 0.176 | 0.157 |
| In. | 0.61 | 0.72 | 0.88 | 0.90 | 0.69 | 1.18 | 2.02 | 0.99 | 0.59 | 0.22 | 0.20 | 0.17 |

Calendar year 1959: Max 350 Min 7.3 Mean 43.4 Cfsm 0.638 In. 8.66
Water year 1959-60: Max 317 Min 8 Mean 45.9 Cfsm 0.675 In. 9.17

Peak discharge (base, 200 cfs).--Oct. 6 (6 to 7 p.m.) 218 cfs (4.83 ft); Mar. 30 (8 to 9 p.m.) 361 cfs (5.53 ft); Apr. 26 (2 a.m.) 208 cfs (4.65 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18, 19, Dec. 20, 22-24, Jan. 5-11, 20-28, Feb. 2-4, 13-16, Feb. 20 to Mar. 22. No gage-height record Mar. 6-22, July 15 to Aug. 10, Aug. 12 to Sept. 13; discharge estimated on basis of recorded range in stage and records for Clinton River near Fraser and East Pond Creek at Romeo.

1629. Big Beaver Creek near Warren, Mich.

Location.--Lat 42°32'31", long 83°02'53", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.33, T.2 N., R.12 E., on downstream side of bridge on Mound Road, 1.0 mile north of Warren and 2.0 miles upstream from mouth.

Drainage area.--23.5 sq mi.

Records available.--October 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 610 ft (from topographic map). Prior to Aug. 26, 1960, wire-weight gage and crest-stage gage at same site and datum.

Extremes.--Maximum discharge during year, 527 cfs June 17 (gage height, 12.45 ft); minimum, 0.1 cfs several days in July, August, and September; minimum gage height, 5.25 ft July 25, 30, Aug. 2.

1958-60: Maximum discharge, 560 cfs Apr. 2, 1959 (gage height, 12.53 ft); minimum, 0.1 cfs several days in November, 1958, July, August and September 1959, July, August, and September 1960.

Remarks.--Records good except those for periods of ice effect or no gage-height record and those below 1 cfs, which are poor.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|---------|-------|-------|---------|---------|-------|-------|-------|--------|--------|
| 1 | 1.8 | 5.7 | 9.7 | 19 | b10 | 4.4 | 76 | 17 | 2.7 | aC.6 | 0.1 | 0.2 |
| 2 | .9 | 3.6 | 12 | 17 | b9 | 4.3 | 58 | 12 | 2.5 | .6 | .1 | .2 |
| 3 | .6 | 2.4 | 13 | 61 | b8 | a4 | 54 | 8.0 | 4.2 | a.6 | .2 | .1 |
| 4 | .4 | .9 | 11 | 29 | 7.4 | a4 | 44 | 6.5 | 2.4 | a.6 | .2 | .1 |
| 5 | .4 | 35 | 11 | 20 | 13 | 3.5 | a30 | 5.5 | 1.7 | .6 | 1.0 | .1 |
| 6 | 66 | 16 | 46 | 9.9 | 160 | 2.2 | 24 | 5.0 | 1.5 | a.5 | .4 | .1 |
| 7 | 169 | 8.3 | 24 | 8.3 | 112 | 3.4 | 25 | *4.4 | 1.1 | a.5 | .2 | .1 |
| 8 | 66 | 6.6 | 19 | 7.6 | 28 | 2.7 | 32 | 3.6 | 1.0 | a.5 | .2 | .1 |
| 9 | 36 | 5.5 | 13 | 5.4 | 22 | a3 | *25 | 3.7 | .6 | a.5 | .4 | .1 |
| 10 | 12 | 5.5 | 13 | 5.8 | 36 | a3 | 15 | a6 | a.6 | a.5 | *.3 | .2 |
| 11 | a15 | 5.0 | 11 | 5.5 | 138 | a4 | 16 | 8.5 | a.6 | a.5 | .6 | .2 |
| 12 | 14 | 3.6 | 138 | 10 | 152 | a4.5 | 15 | 7.3 | a1 | a.5 | .3 | .2 |
| 13 | *7.6 | 4.0 | 147 | 152 | 23 | 5.0 | 12 | 6.6 | a10 | a.5 | .2 | .2 |
| 14 | 7.1 | 320 | 54 | 112 | a15 | 5.5 | 12 | 7.6 | a150 | .5 | .1 | *.2 |
| 15 | 4.9 | 95 | 35 | a80 | 8.8 | 5.7 | 68 | 6.0 | *100 | *.4 | .1 | .2 |
| 16 | 4.4 | 50 | 31 | 54 | a8 | a6 | 153 | 4.6 | 119 | .2 | .1 | .2 |
| 17 | 3.2 | 41 | 23 | 24 | b8 | a6.5 | 184 | 3.6 | *386 | .1 | .2 | .2 |
| 18 | 2.6 | 11 | 19 | 18 | b8 | 7.6 | 65 | 3.2 | .86 | .2 | .1 | .2 |
| 19 | 2.2 | 10 | *14 | a16 | b8 | 11 | 30 | 2.8 | 18 | .1 | a.1 | .2 |
| 20 | 1.5 | a10 | b10 | 15 | b8 | a20 | 19 | 2.8 | 10 | .1 | .2 | .3 |
| 21 | .9 | a11 | b7 | a13 | *7.6 | b30 | 16 | 3.1 | 6.8 | .1 | .2 | .3 |
| 22 | 1.6 | 13 | b7 | 10 | 8.6 | b25 | 17 | 2.0 | 5.2 | .1 | .2 | .5 |
| 23 | 1.4 | 19 | b7 | 8.1 | 5.8 | b20 | 12 | 3.4 | a4.5 | .1 | .2 | .3 |
| 24 | 11 | 24 | 7.3 | 8.5 | 5.5 | *18 | 9.5 | 2.8 | 4.2 | .2 | a.1 | .3 |
| 25 | a7 | 19 | 7.8 | 8.6 | 5.5 | 16 | 61 | 2.0 | 2.7 | .1 | .1 | .3 |
| 26 | 4.4 | 12 | 176 | 7.4 | 5.5 | 16 | 27 | 1.9 | 1.5 | .2 | .1 | .2 |
| 27 | 4.2 | 11 | 131 | 8.1 | 4.2 | 95 | 18 | 1.8 | a1 | .1 | .1 | .2 |
| 28 | 3.6 | *12 | 230 | 8.8 | 4.6 | 303 | 9.7 | a2 | .8 | .1 | .1 | .2 |
| 29 | 1.7 | 12 | 119 | 9.5 | 4.4 | 134 | 8.8 | a2 | .6 | .1 | .1 | .2 |
| 30 | 1.9 | 11 | 78 | *14 | ----- | 137 | 10 | 2.0 | .6 | .1 | .1 | .2 |
| 31 | 2.0 | 26 | 11 | ----- | ----- | 160 | ----- | 3.9 | ----- | a.1 | .3 | ----- |
| Total | 455.3 | 781.1 | 1,449.8 | 776.5 | 739.9 | 1,064.3 | 1,146.0 | 151.6 | 926.8 | 9.9 | 6.7 | 6.1 |
| Mean | 14.7 | 26.0 | 46.8 | 25.0 | 25.5 | 34.3 | 38.2 | 4.89 | 30.9 | 0.32 | 0.22 | 0.20 |
| Cfsm | 0.626 | 1.11 | 1.99 | 1.06 | 1.09 | 1.46 | 1.63 | 0.208 | 1.31 | 0.014 | 0.0089 | 0.0085 |
| In. | 0.72 | 1.24 | 2.29 | 1.23 | 1.17 | 1.68 | 1.81 | 0.24 | 1.47 | 0.02 | 0.01 | 0.01 |

Calendar year 1959: Max 521 Min 0.1 Mean 19.3 Cfsm 0.821 In. 11.16
 Water year 1959-60: Max 386 Min 0.1 Mean 20.5 Cfsm 0.872 In. 11.89

Peak discharge (base, 170 cfs).--Oct. 7 (1 a.m.) 353 cfs (11.0 ft); Nov. 14 (4 p.m.) 475 cfs (12.05 ft); Dec. 12 (11 p.m.) 341 cfs (10.89 ft); Dec. 28 (4 p.m.) 328 cfs (10.78 ft); Jan. 13 (9 p.m.) 310 cfs (10.61 ft); Feb. 6 (9 a.m.) 193 cfs (9.40 ft); Mar. 28 (1 a.m.) 494 cfs (12.2 ft); Apr. 17 (6 p.m.) 254 cfs (10.08 ft); June 17 (3 to 6 a.m.) 527 cfs (12.45 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Plum Brook near Utica, River Rouge at Birmingham, and North Branch Clinton River near Mount Clemens.
 b Stage-discharge relation affected by ice.

1635. Plum Brook near Utica, Mich.

Location.--Lat 42°35'01", long 83°01'49", in SW $\frac{1}{4}$ sec.15, T.2 N., R.12 E., on right bank at downstream side of bridge on State Highway 53, 3.0 miles south of Utica and 3.4 miles upstream from mouth.

Drainage area.--22.9 sq mi.

Records available.--January 1954 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 610 ft (from topographic map).

Average discharge.--6 years, 15.1 cfs.

Extremes.--Maximum discharge during year, 361 cfs June 17 (gage height, 7.35 ft); minimum, 0.3 cfs Sept. 9, 12; minimum gage height, 0.77 ft Sept. 9.

1954-60: Maximum discharge, 980 cfs Apr. 29, 1956 (gage height, 8.60 ft); no flow at times.

Remarks.--Records fair except those for periods of ice effect and those below 3 cfs, which are poor.

Revisions.--WSP 1557: Drainage area.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 8 to Nov. 13, June 18 to July 14, Sept. 7-30)

Oct. 1 to Nov. 13

Nov. 14 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 1.0 | 2.1 | 0.6 | 0.1 | 2.0 | 24 |
| 1.2 | 5.0 | .7 | .4 | 2.8 | 47 |
| 1.6 | 15 | .8 | 1.0 | 5.0 | 135 |
| 2.5 | 36 | .9 | 1.8 | 6.0 | 195 |
| 3.0 | 54 | 1.0 | 2.8 | 7.0 | 302 |
| 4.3 | 108 | 1.3 | 7.4 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 3.4 | 12 | 13 | 36 | 9 | 7 | 74 | 25 | 5.4 | 2.2 | 0.9 | 0.8 |
| 2 | 2.8 | 9.1 | 15 | 23 | 9 | 7 | 58 | 17 | 4.6 | 2.0 | 1.0 | .8 |
| 3 | 2.5 | 7.8 | 15 | 35 | 9 | 6 | 54 | 14 | 6.6 | 2.7 | 2.0 | .6 |
| 4 | 2.5 | 28 | 15 | 25 | 10 | 6 | 45 | 11 | 4.0 | 2.3 | 2.0 | .6 |
| 5 | 5.9 | 35 | 15 | 18 | 15 | 6 | 36 | 9.2 | 3.6 | 1.6 | 2.5 | .6 |
| 6 | 93 | 21 | 31 | 14 | 101 | 6 | 30 | 8.4 | 3.1 | 1.7 | 2.0 | .5 |
| 7 | 108 | 14 | 25 | 13 | 48 | 6 | 40 | *9.0 | 2.7 | 1.7 | 2.2 | .4 |
| 8 | 35 | 11 | 18 | 12 | 28 | 5 | 41 | 8.8 | 2.5 | 1.6 | 2.8 | .4 |
| 9 | 27 | 9.1 | 17 | 11 | 24 | 5 | *32 | 8.4 | 2.2 | 1.6 | 2.2 | .3 |
| 10 | 18 | 8.1 | 15 | 11 | 30 | 5 | 25 | 18 | 2.2 | 1.5 | *2.0 | .4 |
| 11 | 28 | 7.6 | 27 | 10 | 94 | 5 | 23 | 16 | 2.2 | 1.5 | 1.9 | .4 |
| 12 | 20 | 5.8 | 178 | 36 | 30 | 5 | 24 | 14 | 2.3 | 1.5 | 1.7 | .3 |
| 13 | *14 | 22 | 104 | 162 | 20 | 5 | 19 | 12 | 3.1 | 1.6 | 1.6 | .4 |
| 14 | 11 | 265 | 104 | 55 | 17 | 5 | 18 | 14 | 200 | 1.7 | 1.5 | *.4 |
| 15 | 9.1 | 100 | 32 | 84 | *14 | 5 | 68 | 12 | *59 | *1.5 | 1.6 | .4 |
| 16 | 7.9 | 48 | 28 | 42 | 12 | 6 | 107 | 8.4 | 65 | 1.2 | 1.5 | .4 |
| 17 | 7.0 | 30 | 23 | 20 | 12 | 6 | 133 | 7.6 | *232 | 1.1 | 1.4 | .4 |
| 18 | 6.3 | 20 | *20 | 18 | 11 | 6 | 79 | 7.2 | 48 | 1.1 | 1.3 | .4 |
| 19 | 5.5 | 17 | 16 | *16 | 11 | 10 | 37 | 6.0 | 23 | 1.2 | 1.3 | .6 |
| 20 | 4.7 | 16 | 12 | 15 | 11 | 20 | 28 | 6.9 | 13 | 1.2 | 1.3 | .3 |
| 21 | 5.5 | 16 | 11 | 14 | 10 | 35 | 26 | 6.6 | 8.2 | 1.1 | 1.3 | .7 |
| 22 | 5.9 | 16 | 10 | 13 | 9 | 40 | 26 | 6.4 | 6.6 | 1.2 | 1.4 | .6 |
| 23 | 6.3 | 19 | 10 | 12 | 9 | 35 | 20 | 8.0 | 5.9 | 1.7 | 1.2 | .6 |
| 24 | 19 | 25 | 10 | 11 | 8 | 30 | 17 | 6.7 | 4.9 | 1.3 | 1.2 | .6 |
| 25 | 17 | 25 | 10 | 10 | 8 | 25 | 36 | 5.4 | 4.0 | 1.2 | 1.0 | .5 |
| 26 | 13 | 17 | 14 | 10 | 7 | 34 | 30 | 4.7 | 3.1 | 1.2 | .9 | .5 |
| 27 | 14 | *15 | 46 | 10 | 7 | 113 | 24 | 4.4 | 2.5 | 1.4 | .9 | .8 |
| 28 | 11 | 14 | 163 | 10 | 7 | 280 | 17 | 5.2 | 2.2 | 1.2 | .9 | .6 |
| 29 | 9.3 | 13 | 103 | 10 | 7 | 131 | 14 | 4.7 | 2.8 | 1.0 | .9 | .5 |
| 30 | 8.7 | 13 | 42 | 11 | ----- | 160 | 17 | 5.4 | 2.2 | 1.0 | 1.1 | .6 |
| 31 | 11 | ----- | 43 | 10 | ----- | 189 | ----- | 9.8 | ----- | 1.0 | .9 | ----- |
| Total | 532.3 | 860.5 | 1,121 | 777 | 585 | 1,204 | 1,198 | 300.2 | 726.9 | 45.8 | 46.4 | 16.0 |
| Mean | 17.2 | 28.7 | 36.2 | 25.1 | 20.2 | 38.8 | 39.9 | 9.68 | 24.2 | 1.48 | 1.50 | 0.53 |
| Cfsm | 0.761 | 1.25 | 1.58 | 1.10 | 0.882 | 1.69 | 1.74 | 0.423 | 1.06 | 0.065 | 0.066 | 0.023 |
| In. | 0.86 | 1.40 | 1.82 | 1.26 | 0.95 | 1.96 | 1.95 | 0.49 | 1.18 | 0.08 | 0.08 | 0.03 |

Calendar year 1959: Max 274 Min 0 Mean 19.2 Cfsm 0.838 In. 11.37
Water year 1959-60: Max 280 Min 0.3 Mean 20.3 Cfsm 0.886 In. 12.06

Peak discharge (base, 150 cfs).--Oct. 6 (10 to 11 p.m.) 234 cfs (6.28 ft); Nov. 14 (2 p.m.) 312 cfs (7.07 ft); Dec. 12 (6 to 7 p.m.) 218 cfs (6.28 ft); Dec. 28 (5 p.m.) 232 cfs (6.40 ft); Jan. 13 (6 a.m.) 228 cfs (6.36 ft); Mar. 28 (6 a.m.) 351 cfs (7.30 ft); Mar. 31 (4 to 6 a.m.) 268 cfs (6.74 ft); Apr. 17 (8 p.m.) 187 cfs (5.63 ft); June 14 (time unknown) 208 cfs (6.14 ft); June 17 (4 to 6 a.m.) 361 cfs (7.35 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17, 18, 28-30, Dec. 20-23, Jan. 4-9, Jan. 17 to Feb. 4, Feb. 12 to Mar. 25.

1640. Clinton River near Fraser, Mich.

Location.--Lat 42°34'40", long 82°57'00", in NW¼ sec. 20, T. 2 N., R. 13 E., on left bank 800 ft downstream from bridge on Garfield Road, 2½ miles north of Fraser, and 4 miles upstream from North Branch.

Drainage area.--445 sq mi.

Records available.--May 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 577.71 ft above mean sea level, datum of 1929. Prior to Nov. 17, 1949, wire-weight gage at site 800 ft upstream at same datum.

Average discharge.--13 years, 346 cfs.

Extremes.--Maximum discharge during year, 2,940 cfs June 17 (gage height, 14.50 ft); minimum, 64 cfs Sept. 12 (gage height, 4.74 ft).

1947-60: Maximum discharge, 8,000 cfs May 11, 1948 (gage height, 16.5 ft, from graph based on gage readings), from rating curve extended above 4,000 cfs; minimum, 47 cfs Sept. 6, 1955; minimum gage height, 4.29 ft Sept. 7, 1954.

Flood of Apr. 5 or 6, 1947, reached a stage of 20 ft, from floodmarks (discharge, 9,000 cfs, from rating curve extended above 4,000 cfs).

Remarks.--Records good.

Revisions.--WSP 1557: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 4.8 | 66 | 10.0 | 987 |
| 5.5 | 142 | 12.0 | 1,560 |
| 7.0 | 367 | 14.1 | 2,630 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 156 | 226 | 294 | 484 | 335 | 281 | 1,600 | 705 | 264 | 194 | 84 | 109 |
| 2 | 130 | 197 | 304 | 452 | 328 | 269 | 1,280 | 574 | 390 | 171 | 98 | 119 |
| 3 | 120 | 190 | 309 | 670 | 309 | 266 | *1,150 | 540 | 356 | 235 | 162 | 105 |
| 4 | 104 | 383 | 309 | 550 | 297 | 280 | 1,030 | 489 | 260 | 163 | 224 | 82 |
| 5 | 159 | 556 | 299 | 398 | 367 | 255 | 904 | 452 | 258 | 143 | 216 | 76 |
| 6 | 915 | 376 | 432 | 347 | 993 | 244 | 778 | 420 | 236 | 150 | 142 | 80 |
| 7 | 1,590 | 296 | 386 | 364 | 778 | 244 | 784 | 381 | 226 | 167 | 131 | 94 |
| 8 | 893 | 254 | 343 | 343 | 512 | 255 | 773 | *357 | 205 | 168 | 154 | 94 |
| 9 | 622 | 228 | 333 | 293 | 479 | 248 | 693 | 347 | 185 | 152 | 128 | 93 |
| 10 | 460 | 231 | 335 | 286 | 575 | 249 | 590 | 502 | 177 | 143 | 271 | 86 |
| 11 | 572 | 225 | 426 | 270 | 1,210 | 246 | 550 | 471 | 159 | 134 | *146 | 75 |
| 12 | 434 | 230 | 1,600 | 435 | 775 | 236 | 580 | 433 | 138 | 147 | 128 | 72 |
| 13 | *370 | 325 | 1,400 | 1,670 | 500 | 230 | 550 | 418 | 268 | 162 | 112 | 92 |
| 14 | 342 | 1,670 | 733 | 1,160 | 433 | 255 | 538 | 420 | 1,080 | 186 | 100 | *86 |
| 15 | 308 | 1,420 | 586 | 1,010 | *353 | 252 | 782 | 395 | *1,130 | *147 | 109 | 88 |
| 16 | 283 | 714 | 546 | 814 | 381 | 328 | 1,250 | 353 | 622 | 131 | 105 | 84 |
| 17 | 270 | 626 | 475 | 584 | 400 | 258 | 1,470 | 350 | 2,600 | 123 | 103 | 78 |
| 18 | 237 | 462 | 436 | 514 | 398 | 285 | 1,360 | 352 | 1,280 | 117 | 103 | 76 |
| 19 | 231 | 402 | *400 | 484 | 367 | 378 | 893 | 331 | 554 | 129 | 108 | 80 |
| 20 | 232 | 367 | 350 | *436 | 314 | 471 | 745 | 384 | 397 | 138 | 100 | 172 |
| 21 | 225 | 347 | 336 | 406 | 302 | 458 | 691 | 348 | 328 | 135 | 100 | 114 |
| 22 | 226 | 343 | 321 | 384 | 297 | 436 | 672 | 335 | 314 | 132 | 110 | 104 |
| 23 | 238 | 343 | 313 | 376 | 301 | *369 | 598 | 350 | 301 | 162 | 115 | 105 |
| 24 | 395 | 399 | 304 | 345 | 284 | 364 | 536 | 342 | 280 | 111 | 120 | 96 |
| 25 | 318 | 424 | 294 | 296 | 283 | 321 | 782 | 314 | 240 | 103 | 106 | 87 |
| 26 | 258 | 357 | 302 | 316 | 283 | 348 | 886 | 293 | 204 | 109 | 95 | 89 |
| 27 | 258 | 323 | 515 | 348 | 293 | 654 | 795 | 288 | 185 | 154 | 93 | 97 |
| 28 | 252 | *330 | 1,120 | 397 | 278 | 1,930 | 691 | 330 | 194 | 117 | 80 | 97 |
| 29 | 242 | 313 | 1,350 | 389 | 264 | 1,870 | 618 | 261 | 226 | 108 | 98 | 96 |
| 30 | 219 | 283 | 792 | 400 | ----- | 1,800 | 610 | 258 | 201 | 108 | 178 | 100 |
| 31 | 248 | ----- | 580 | 343 | ----- | 2,070 | ----- | 309 | ----- | 88 | 119 | ----- |
| Total | 11,307 | 12,830 | 16,543 | 15,554 | 12,699 | 16,128 | 25,169 | 12,101 | 13,258 | 4,437 | 3,938 | 2,826 |
| Mean | 365 | 428 | 534 | 502 | 438 | 520 | 839 | 390 | 442 | 143 | 127 | 94.2 |
| Cfsm | 0.820 | 0.962 | 1.20 | 1.13 | 0.984 | 1.17 | 1.89 | 0.876 | 0.993 | 0.321 | 0.285 | 0.212 |
| In. | 0.94 | 1.07 | 1.38 | 1.30 | 1.06 | 1.35 | 2.10 | 1.01 | 1.11 | 0.37 | 0.33 | 0.24 |

Calendar year 1959: Max 2,330 Min 70 Mean 371 Cfsm 0.834 In. 11.29
Water year 1959-60: Max 2,600 Min 72 Mean 401 Cfsm 0.901 In. 12.25

Peak discharge (base, 1,100 cfs).--Oct. 7 (2 a.m.) 1,900 cfs (12.80 ft); Nov. 14 (7 to 8 p.m.) 2,060 cfs (13.13 ft); Dec. 12 (time unknown) about 1,800 cfs; Dec. 29 (1 a.m.) 1,600 cfs (12.10 ft); Jan. 13 (11 a.m.) 1,820 cfs (12.65 ft); Feb. 6 (1 p.m.) 1,100 cfs (10.45 ft); Feb. 11 (11 a.m.) 1,310 cfs (11.18 ft); Mar. 31 (8 a.m.) 2,140 cfs (13.88 ft); Apr. 17 (12 p.m.) 1,650 cfs (12.23 ft); June 14 (8 p.m.) 1,790 cfs (12.56 ft); June 17 (9 a.m.) 2,940 cfs (14.50 ft).

* Discharge measurement made on this day.

1641. East Pond Creek at Romeo, Mich.

Location.--Lat 42°49'21", long 83°01'13", in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.27, T.5 N., R.12 E., or right bank 10 ft upstream from bridge on State Highway 53 and 1.4 miles north of Romeo.

Drainage area.--21.8 sq mi.

Records available.--September 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 780 ft (from topographic map).

Extremes.--Maximum discharge during year, 173 cfs Mar. 30 (gage height, 2.96 ft); minimum, 1.5 cfs Aug. 29, 1958-60; Maximum discharge, that of Mar. 30, 1960; maximum gage height, 4.05 ft Mar. 3, 1959; minimum discharge, that of Aug. 29, 1960.

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

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-6)

Oct. 1 to Mar. 27

Mar. 28 to Sept. 30

| | | | | | | | |
|-----|-----|-----|----|-----|-----|-----|-----|
| 0.7 | 1.5 | 1.3 | 27 | 0.8 | 2.0 | 2.4 | 104 |
| .8 | 3.0 | 2.0 | 73 | 1.0 | 9.5 | 3.0 | 179 |
| .9 | 6.5 | | | 1.2 | 19 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|
| 1 | 2.1 | 10 | 12 | 22 | 12 | 12 | 121 | 35 | 12 | 6.7 | 2.7 | 2.7 |
| 2 | 2.0 | 8.8 | 12 | 20 | 12 | 12 | *89 | 30 | 14 | 6.3 | 2.7 | 3.0 |
| 3 | 2.4 | 8.8 | 13 | 24 | 12 | 12 | 76 | 25 | 14 | 7.9 | 3.4 | 2.4 |
| 4 | 2.6 | 15 | 12 | 21 | 12 | 11 | 66 | 22 | 12 | 6.7 | 3.8 | 2.7 |
| 5 | 11 | 19 | 14 | 19 | 12 | 11 | 57 | 20 | 12 | 5.9 | 4.1 | 2.7 |
| 6 | *54 | 16 | 17 | 17 | 21 | 11 | 51 | 19 | 11 | 5.5 | 3.8 | 2.4 |
| 7 | 64 | 14 | 15 | 15 | 21 | 11 | 49 | 20 | 10 | 5.2 | 4.1 | *2.4 |
| 8 | 37 | 13 | 14 | 14 | 17 | 11 | 45 | 18 | 9.1 | 4.4 | 5.2 | 2.4 |
| 9 | 32 | 12 | 14 | 13 | 16 | 11 | 39 | 20 | *8.7 | 4.1 | 4.1 | 2.7 |
| 10 | 25 | all | 12 | 12 | 18 | 11 | 35 | 25 | 8.3 | 3.8 | *4.4 | 2.4 |
| 11 | 25 | all | 16 | 11 | 28 | 10 | 32 | 22 | 8.3 | 3.4 | 4.4 | 2.4 |
| 12 | 18 | all | 34 | 18 | 23 | 10 | 30 | 22 | 7.9 | 3.4 | 3.8 | 2.4 |
| 13 | 15 | a13 | 26 | 58 | 21 | 10 | 27 | 20 | 7.5 | *3.8 | 3.8 | 2.7 |
| 14 | 14 | a35 | 22 | 35 | 19 | 11 | 27 | *23 | 29 | 3.8 | 4.1 | 2.4 |
| 15 | 12 | a25 | 21 | 37 | 16 | 11 | 44 | 22 | 26 | 2.7 | 3.8 | 2.4 |
| 16 | 12 | a22 | *20 | 29 | *16 | 11 | 34 | 20 | 23 | 2.7 | 3.0 | 2.4 |
| 17 | 11 | a18 | 20 | 23 | 17 | 12 | 39 | 20 | 62 | 2.7 | 3.0 | 2.7 |
| 18 | 11 | *a17 | 18 | *21 | 16 | 13 | 39 | 19 | 29 | 2.4 | *3.0 | 3.0 |
| 19 | 9.2 | 16 | 17 | 20 | 15 | 15 | 33 | 18 | 21 | 2.4 | 2.7 | 4.8 |
| 20 | 8.8 | 16 | 16 | 19 | 14 | 16 | 30 | 20 | 18 | 2.4 | 3.0 | 5.9 |
| 21 | 8.3 | 16 | 15 | 18 | 13 | 15 | 29 | 18 | 18 | 2.4 | 3.4 | 4.1 |
| 22 | 7.8 | 15 | 14 | 17 | 13 | 15 | 29 | 18 | 16 | 2.7 | 3.0 | 3.8 |
| 23 | 8.3 | 16 | 13 | 16 | 13 | 15 | 26 | 18 | 16 | 2.7 | 2.7 | 3.4 |
| 24 | 14 | 18 | 12 | 15 | 13 | *13 | *30 | 16 | 14 | 2.7 | 2.7 | 3.4 |
| 25 | 12 | 18 | 12 | 14 | 12 | 13 | 90 | 16 | 13 | 2.4 | 2.7 | 3.4 |
| 26 | 10 | 16 | 13 | 14 | 12 | 12 | 62 | 15 | 10 | 3.0 | 3.0 | 3.0 |
| 27 | 10 | 15 | 18 | 14 | 12 | 28 | 50 | 14 | 8.3 | 3.8 | 2.4 | 3.4 |
| 28 | 9.2 | 14 | 36 | 14 | 12 | 100 | 42 | 14 | 8.3 | 3.0 | 2.4 | 3.0 |
| 29 | 8.8 | 14 | 35 | 14 | 12 | 98 | 37 | 14 | 9.1 | 2.7 | 2.0 | 3.0 |
| 30 | 8.8 | 12 | 28 | 13 | ----- | 121 | 36 | 14 | 7.9 | 2.7 | 2.7 | 3.8 |
| 31 | 10 | ----- | 25 | 12 | ----- | *151 | ----- | 14 | ----- | 2.7 | 3.0 | ----- |
| Total | 475.3 | 465.6 | 566 | 609 | 450 | 815 | 1,394 | 611 | 463.4 | 117.0 | 102.9 | 91.2 |
| Mean | 15.3 | 15.5 | 18.3 | 19.6 | 15.5 | 26.2 | 46.5 | 19.7 | 15.4 | 3.77 | 3.32 | 3.04 |
| Cfsm | 0.702 | 0.711 | 0.839 | 0.899 | 0.711 | 1.20 | 2.13 | 0.904 | 0.706 | 0.173 | 0.152 | 0.139 |
| In. | 0.61 | 0.79 | 0.97 | 1.04 | 0.77 | 1.39 | 2.38 | 1.04 | 0.79 | 0.20 | 0.18 | 0.16 |

Calendar year 1959: Max 110

Min 1.6

Mean 15.0

Cfsm 0.688

In. 9.34

Water year 1959-60: Max 151

Min 2.0

Mean 16.8

Cfsm 0.771

In. 10.52

Peak discharge (base, 80 cfs).--Oct. 6 (8 p.m.) 89 cfs (2.34 ft); Mar. 30 (9 p.m.) 173 cfs (2.96 ft); Apr. 25 (7 a.m.) 107 cfs (2.43 ft); June 17 (11 a.m.) 80 cfs (2.10 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and record for Stony Creek near Washington.

Note.--Stage-discharge relation affected by ice Dec. 21, 22, Jan. 4-7, 9, 20-22, 24-26, 30, Feb. 2-4, 13-15, 20, 22-26, Feb. 28 to Mar. 18, Mar. 21-23, 25.

1643. East Branch Coon Creek at Armada, Mich.

Location.--Lat 42°50'45", long 82°53'06", in NE $\frac{1}{4}$ sec.23, T.5 N., R.13 E., on right bank 10 ft downstream from bridge on Prospect Street in Armada.

Drainage area.--13.0 sq mi.

Records available.--October 1958 to September 1960.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 735 ft (from topographic map).

Extremes.--Maximum discharge during year, 338 cfs Mar. 29 (gage height, 4.95 ft); minimum, 0.03 cfs Aug. 25, 26 (gage height, 1.19 ft).

1958-60: Maximum discharge, 376 cfs Apr. 2, 1959 (gage height, 5.17 ft); maximum gage height, 5.20 ft Mar. 15, 1959 (backwater from ice); minimum discharge, 0.03 cfs Nov. 23, 1958, July 4, 7-12, 14-16, 1959, Aug. 25, 26, 1960 (gage height, 1.19 ft).

Remarks.--Records good above 1 cfs and fair below, except those for periods of ice effect or no gage-height record, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 6, 7, Nov. 14)

| | | | |
|-----|------|-----|-----|
| 1.2 | 0.05 | 1.8 | 11 |
| 1.3 | .31 | 2.0 | 22 |
| 1.4 | .88 | 2.5 | 53 |
| 1.5 | 2.0 | 3.5 | 132 |
| 1.6 | 3.9 | 5.0 | 347 |
| 1.7 | 7 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|-------|-------|-------|--------|-------|-------|--------|-------|--------|--------|
| 1 | 0.17 | 1.1 | 2.0 | 7.4 | 1.7 | b1.1 | 70 | 12 | 1.5 | 0.54 | 0.05 | 0.11 |
| 2 | .17 | 1.1 | 2.1 | 6.2 | 1.7 | b1.1 | 58 | 7.0 | 1.6 | .49 | .05 | .14 |
| 3 | .22 | .97 | 2.3 | 28 | 1.6 | 1.2 | *65 | 4.7 | 1.5 | .49 | .11 | .07 |
| 4 | .22 | 5.3 | 3.5 | 18 | 1.4 | 1.3 | 53 | 5.5 | 1.3 | .44 | .11 | .07 |
| 5 | .73 | 11 | 4.7 | 8.6 | 1.5 | 1.2 | 28 | 2.9 | 1.4 | .59 | .11 | .07 |
| 6 | *18 | 8.6 | 26 | b6 | 18 | 1.1 | 20 | 2.5 | 1.2 | .51 | .11 | .05 |
| 7 | *52 | 5.0 | 18 | b4 | 24 | .97 | 29 | 2.7 | .88 | .28 | .14 | .05 |
| 8 | 24 | 3.3 | 7.8 | b3 | 18 | .97 | 26 | 2.3 | .73 | .28 | .17 | *.05 |
| 9 | 11 | 2.3 | 4.4 | b2.5 | 13 | .97 | 16 | 2.7 | *.60 | .22 | *.11 | .05 |
| 10 | 6.2 | a2 | 3.3 | b2.5 | 16 | .97 | 11 | 9.4 | .54 | .22 | .17 | .05 |
| 11 | 4.4 | a2 | 7.7 | b2 | 78 | .88 | 8.2 | 9.4 | .54 | .19 | .14 | .07 |
| 12 | 3.3 | a2 | 114 | b5 | 41 | .88 | 9.4 | 12 | .60 | .17 | .11 | .07 |
| 13 | 2.3 | a10 | 67 | b50 | 16 | .88 | 6.6 | 9.4 | .73 | *.18 | .11 | .07 |
| 14 | 2.0 | a100 | 19 | 27 | 6.2 | .88 | 5.9 | *25 | 1.1 | .22 | .09 | .07 |
| 15 | 1.6 | a60 | 9.4 | 27 | 4.1 | .88 | 54 | 13 | 1.3 | .19 | .14 | .07 |
| 16 | 1.4 | a15 | *9.0 | 26 | *b3 | .97 | 73 | 5.9 | 1.8 | .17 | .09 | .07 |
| 17 | 1.2 | *12 | 8.2 | 9.8 | b2.5 | 1.1 | 56 | 4.1 | .36 | .14 | .07 | .07 |
| 18 | .97 | 5.9 | 5.6 | *5.6 | b2.5 | 1.1 | 33 | 3.5 | .33 | .11 | *.07 | .11 |
| 19 | .88 | 3.9 | 4.1 | 4.4 | b2 | b1.1 | 12 | 2.5 | 12 | .11 | .05 | .14 |
| 20 | .88 | 2.9 | 3.3 | b3.5 | b2 | b1.3 | 7.4 | 2.7 | 7.0 | .09 | .05 | .11 |
| 21 | .80 | 2.5 | 2.7 | b3 | b2 | b1.5 | 5.9 | 2.3 | 3.9 | .09 | .07 | .14 |
| 22 | .73 | 2.3 | 2.5 | b3 | b1.8 | b1.5 | 6.2 | 2.9 | 2.5 | .09 | .07 | .14 |
| 23 | .73 | 2.7 | 2.0 | b2.5 | b1.7 | b1.5 | 4.7 | 22 | 2.0 | .09 | .07 | .17 |
| 24 | 1.4 | 4.4 | 2.0 | 2.1 | b1.5 | b1.5 | *4.1 | 12 | 1.6 | .09 | .05 | .14 |
| 25 | 1.6 | 9.0 | 2.0 | 2.3 | 1.4 | b1.5 | 159 | 4.7 | 1.4 | .09 | .05 | .11 |
| 26 | 1.4 | 5.6 | 2.3 | 1.8 | 1.2 | 1.7 | 45 | 3.1 | .97 | .11 | .05 | .11 |
| 27 | 1.4 | 3.7 | 5.3 | 1.8 | 1.1 | 6.6 | 20 | 2.3 | .80 | .14 | .05 | .14 |
| 28 | 1.3 | 3.1 | *93 | 1.7 | b1.1 | 143 | 9.4 | 2.0 | .66 | .09 | .05 | .11 |
| 29 | 1.1 | 2.5 | 78 | 1.8 | b1.1 | 220 | 5.9 | 1.7 | .73 | .07 | .05 | .11 |
| 30 | .97 | 2.1 | 27 | 1.8 | ----- | 250 | 5.6 | 1.5 | .60 | .05 | .07 | .17 |
| 31 | 1.1 | ----- | 12 | 1.7 | ----- | 183 | ----- | 1.6 | ----- | .05 | .07 | ----- |
| Total | 144.17 | 290.27 | 550.0 | 270.0 | 267.1 | 832.65 | 903.3 | 193.3 | 120.48 | 6.19 | 2.70 | 2.90 |
| Mean | 4.65 | 9.68 | 17.7 | 8.71 | 9.21 | 26.9 | 30.1 | 6.24 | 4.02 | 0.200 | 0.087 | 0.097 |
| Cfsm | 0.358 | 0.745 | 1.36 | 0.670 | 0.708 | 2.07 | 2.32 | 0.480 | 0.309 | 0.015 | 0.0067 | 0.0075 |
| In. | 0.41 | 0.83 | 1.57 | 0.77 | 0.76 | 2.38 | 2.58 | 0.55 | 0.34 | 0.02 | 0.01 | 0.01 |

Calendar year 1959: Max 214 Min 0.03 Mean 6.61 Cfsm 0.508 In. 6.89
Water year 1959-60: Max 250 Min 0.05 Mean 9.79 Cfsm 0.753 In. 10.23

Peak discharge (base, 100 cfs).--Nov. 14 (time unknown) 140 cfs (3.75 ft); Dec. 12 (8 to 9 a.m.) 146 cfs (3.73 ft); Dec. 28 (3 to 4 p.m.) 153 cfs (3.79 ft); Feb. 11 (12 m.) 100 cfs (3.13 ft); Mar. 29 (7 p.m.) 338 cfs (4.95 ft); Apr. 15 (9 p.m.) 140 cfs (3.59 ft); Apr. 25 (7:30 a.m.) 286 cfs (4.63 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for North Branch Clinton River near Mount Clemens, and Big Beaver Creek near Warren.

b Stage-discharge relation affected by ice.

1645. North Branch Clinton River near Mount Clemens, Mich.

Location.--Lat 42°37'45", long 82°53'25", in NW¹ sec.2, T.2 N., R.13 E., on left bank 30 ft upstream from bridge on State Highway 59, 2 miles north of Mount Clemens, and 3½ miles upstream from mouth.

Drainage area.--199 sq mi.

Records available.--May 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 576.38 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Nov. 15, 1949, wire-weight gage at same site and datum.

Average discharge.--13 years, 127 cfs.

Extremes.--Maximum discharge during year, 2,530 cfs Mar. 29 (gage height, 13.98 ft); minimum, 2.8 cfs Sept. 9, 13, 14, 15, 16, 17; minimum gage height, 3.48 ft Aug. 28, 29. 1947-60: Maximum daily discharge, 4,500 cfs Apr. 4, 1950; maximum gage height, 17.5 ft Apr. 4 or 5, 1950, from high-water mark in gage well (backwater from Clinton River); minimum discharge, 0.2 cfs Sept. 13, 14, 1954 (gage height, 3.12 ft). Flood of Apr. 5 or 6, 1947, reached a stage of 20.0 ft, from floodmark.

Remarks.--Records good except those for periods of ice effect and those below 10 cfs, which are fair. Some regulation at times by mill above station.

Revisions (water years).--WSP 1437: 1948. WSP 1557: Drainage area.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 30 | 64 | 82 | 245 | 70 | 55 | 1,770 | 222 | 51 | 30 | 6.1 | 5.5 |
| 2 | 24 | 67 | 81 | 161 | 70 | 55 | 939 | 235 | 50 | 26 | 4.6 | 5.5 |
| 3 | 20 | 66 | 85 | 227 | 65 | 55 | *697 | 168 | 48 | 26 | 7.0 | 5.5 |
| 4 | 17 | 69 | 86 | 328 | 65 | 50 | 676 | 126 | 50 | 22 | 9.4 | 4.9 |
| 5 | 18 | 134 | 87 | 225 | 75 | 50 | 578 | 103 | 45 | 22 | 12 | 4.6 |
| 6 | 78 | 185 | 124 | 150 | 246 | 50 | 419 | 87 | 40 | 23 | 12 | 4.6 |
| 7 | 451 | 132 | 227 | 120 | 432 | 45 | 360 | *81 | 37 | 17 | 10 | 4.0 |
| 8 | *580 | 96 | 174 | 100 | 414 | 45 | 385 | 81 | 34 | 14 | 12 | 3.2 |
| 9 | 491 | 81 | 122 | 90 | 269 | 45 | 359 | 80 | 33 | 13 | *10 | *3.2 |
| 10 | 247 | 74 | 108 | 84 | 227 | 45 | 265 | 112 | 29 | 7.0 | 12 | 3.6 |
| 11 | 148 | 72 | 100 | 82 | 524 | 45 | 205 | *231 | 27 | 6.1 | 11 | 3.4 |
| 12 | 120 | 69 | 465 | 88 | 696 | 45 | 179 | 215 | 29 | 8.8 | 11 | 3.2 |
| 13 | 102 | 71 | 1,120 | 452 | 533 | 45 | 161 | 197 | 30 | 9.4 | 9.4 | 2.8 |
| 14 | 86 | 442 | 863 | 789 | 276 | 45 | 142 | 197 | 43 | *12 | 8.2 | 3.0 |
| 15 | 77 | 1,170 | 410 | 632 | *150 | 45 | 209 | 269 | *69 | 12 | 7.6 | 2.8 |
| 16 | 71 | 862 | 241 | 504 | 110 | 45 | 604 | 180 | 125 | 10 | 6.4 | 2.8 |
| 17 | 68 | 438 | 193 | 413 | 105 | 50 | 1,180 | 110 | 343 | 8.8 | 6.4 | 3.2 |
| 18 | 63 | 225 | *157 | 231 | 100 | 55 | 1,010 | 82 | 385 | 7.6 | 6.1 | 4.0 |
| 19 | 59 | *165 | 134 | *140 | 100 | 60 | 608 | 84 | 373 | 7.0 | 5.2 | 5.2 |
| 20 | 57 | 119 | 100 | 110 | 95 | 75 | 312 | 76 | 187 | 6.4 | 4.6 | 7.6 |
| 21 | 54 | 93 | 90 | 95 | 90 | 85 | 195 | 76 | 87 | 6.1 | 5.2 | 8.2 |
| 22 | 51 | 88 | 90 | 85 | 75 | 90 | 173 | 74 | 63 | 6.1 | 6.1 | 8.8 |
| 23 | 51 | 91 | 85 | 80 | 75 | 90 | 159 | 78 | 53 | 6.1 | 5.8 | 5.8 |
| 24 | 59 | 103 | 85 | 80 | 70 | *90 | 131 | 141 | 50 | 5.8 | 5.8 | 5.5 |
| 25 | 79 | 135 | 87 | 75 | 65 | 80 | 518 | 109 | 45 | 6.1 | 5.2 | 5.2 |
| 26 | 88 | 141 | 90 | 75 | 55 | 93 | 1,620 | 74 | 40 | 6.4 | 4.0 | 4.9 |
| 27 | 78 | 110 | 106 | 80 | 55 | 176 | 872 | 63 | 34 | 8.2 | 3.6 | 5.5 |
| 28 | 70 | 95 | 399 | 77 | 55 | 992 | 451 | 57 | 30 | 8.8 | 3.4 | 5.2 |
| 29 | 67 | 91 | 1,040 | 79 | 55 | 2,260 | 274 | 52 | 31 | 11 | 4.3 | 4.6 |
| 30 | 63 | 92 | 942 | 75 | ----- | 2,390 | 196 | 50 | 31 | 8.2 | 8.8 | 4.9 |
| 31 | 62 | ----- | 478 | 75 | ----- | 2,380 | ----- | 50 | ----- | 7.0 | 6.4 | ----- |
| Total | 3,530 | 5,640 | 8,471 | 6,047 | 5,217 | 9,731 | 15,643 | 3,770 | 2,492 | 367.9 | 229.6 | 141.2 |
| Mean | 114 | 188 | 273 | 195 | 180 | 314 | 521 | 122 | 83.1 | 11.9 | 7.41 | 4.71 |
| Cfsm | 0.573 | 0.945 | 1.37 | 0.980 | 0.905 | 1.58 | 2.62 | 0.613 | 0.418 | 0.060 | 0.037 | 0.024 |
| In. | 0.66 | 1.05 | 1.58 | 1.13 | 0.97 | 1.82 | 2.92 | 0.70 | 0.47 | 0.07 | 0.04 | 0.03 |

Calendar year 1959: Max 1,730 Min 0.8 Mean 116 Cfsm 0.583 In. 7.91
 Water year 1959-60: Max 2,390 Min 2.8 Mean 167 Cfsm 0.839 In. 11.44

Peak discharge (base, 650 cfs).--Nov. 15 (2 p.m.) 1,290 cfs (11.67 ft); Dec. 13 (time unknown) 1,240 cfs (11.5 ft); Dec. 29 (time unknown) 1,180 cfs (11.3 ft); Jan. 14 (2 p.m.) 849 cfs (9.87 ft); Feb. 12 (2 p.m.) 711 cfs (9.18 ft); Mar. 29 (7 p.m.) 2,530 cfs (13.98 ft); Apr. 17 (10 a.m.) 1,230 cfs (11.47 ft); Apr. 26 (6 a.m.) 1,780 cfs (12.93 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-24, Jan. 6-9, 19-26, Jan. 30 to Feb. 4, Feb. 15 to Mar. 25.

1655. Clinton River at Mount Clemens, Mich.

Location.--Lat 42°35'45", long 82°54'35", on left bank 20 ft downstream from bridge on Moravian Drive, a quarter of a mile downstream from North Branch, and half a mile west of Mount Clemens.

Drainage area.--734 sq mi.

Records available.--May 1934 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 570.43 ft above mean sea level, datum of 1929. May 10, 1934, to May 7, 1935, chain gage and May 8, 1935, to Jan. 11, 1939, wire-weight gage, at same site and datum. Auxiliary water-stage recorder on right bank 2 miles downstream from base gage at same datum. Mar. 15, 1938, to Jan. 3, 1952, auxiliary wire-weight gage $1\frac{1}{4}$ miles downstream from base gage.

Average discharge.--26 years, 496 cfs.

Extremes.--Maximum discharge during year, 5,210 cfs Mar. 31 (gage height, 11.8 ft); minimum not determined; minimum gage height, 3.74 ft Oct. 4.
1934-60: Maximum discharge 21,200 cfs Apr. 6, 1947 (gage height, 23.55 ft, from floodmark); minimum not determined; minimum gage height, 2.90 ft Oct. 15, 1934.

Remarks.--Records good except those for periods of ice effect, indefinite stage-discharge relation, or no gage-height record, which are fair.

Revisions (water years).--WSP 1084: 1943, 1945-46. WSP 1437: 1935, 1936(M), 1937-39, 1949(M), 1950. WSP 1557: Drainage area.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 201 | 309 | 410 | 892 | 450 | 354 | 3,930 | 1,040 | 340 | 250 | 100 | 130 |
| 2 | 154 | 247 | 420 | 726 | 450 | 370 | 2,720 | 889 | 426 | 220 | 120 | 140 |
| 3 | 146 | 286 | 444 | 1,080 | 420 | 350 | *2,250 | 767 | 465 | 300 | 200 | 120 |
| 4 | 118 | 437 | 454 | 1,050 | 400 | 350 | 2,060 | 668 | 330 | 210 | 250 | 100 |
| 5 | 148 | 890 | 430 | 690 | 500 | 350 | 1,750 | 607 | 340 | 190 | 250 | 90 |
| 6 | 850 | 684 | 654 | 600 | 1,400 | 340 | 1,380 | 544 | 310 | 200 | 180 | 100 |
| 7 | 2,460 | 532 | 739 | 500 | 1,300 | 330 | 1,300 | *483 | 290 | 200 | 160 | 110 |
| 8 | 1,710 | 417 | 612 | 480 | 1,000 | 330 | 1,330 | 466 | 270 | 200 | 180 | 110 |
| 9 | 1,230 | 357 | 498 | 450 | 900 | 330 | 1,200 | 446 | 250 | 190 | 160 | *110 |
| 10 | 799 | 360 | 476 | 420 | 900 | 330 | 946 | 634 | 230 | 170 | *300 | 100 |
| 11 | 795 | 318 | 576 | 400 | 2,000 | 320 | 818 | 763 | 210 | 160 | 180 | 100 |
| 12 | 647 | 296 | 2,480 | 600 | 1,500 | 310 | 814 | 699 | 200 | 180 | 150 | 100 |
| 13 | *532 | 370 | 3,100 | 2,500 | 1,100 | 310 | 763 | 655 | 350 | 200 | 140 | 100 |
| 14 | 481 | 2,560 | 1,920 | 2,300 | 700 | 310 | 714 | 651 | 1,060 | *220 | 120 | 100 |
| 15 | 440 | 3,110 | 1,160 | 1,700 | *500 | 302 | 1,010 | 689 | 1,850 | 180 | 130 | 100 |
| 16 | 399 | 1,820 | 915 | 1,400 | 500 | 410 | 2,320 | 559 | *914 | 160 | 130 | 100 |
| 17 | 357 | 1,250 | 777 | 1,100 | 500 | 322 | 3,210 | 456 | 3,510 | 150 | 130 | 90 |
| 18 | 306 | 777 | *694 | 900 | 500 | 322 | 3,030 | 456 | 2,220 | 140 | 130 | 90 |
| 19 | 306 | *658 | 633 | *730 | 500 | 430 | 1,830 | 426 | 1,060 | 150 | 130 | 100 |
| 20 | 396 | 560 | 524 | 615 | 403 | 618 | 1,200 | 470 | 624 | 160 | 120 | 200 |
| 21 | 283 | 516 | 482 | 557 | 407 | 615 | 949 | 444 | 435 | 160 | 120 | 150 |
| 22 | 271 | 505 | 440 | 520 | 384 | 619 | 922 | 433 | 430 | 160 | 130 | 130 |
| 23 | 293 | 505 | 440 | 536 | 387 | *518 | 793 | 454 | 400 | 190 | 140 | 130 |
| 24 | 479 | 587 | 432 | 486 | 360 | 497 | 696 | 508 | 350 | 130 | 140 | 120 |
| 25 | 476 | 663 | 424 | 450 | 370 | 448 | 1,340 | 462 | 300 | 120 | 120 | 110 |
| 26 | 387 | 599 | 430 | 450 | 400 | 439 | 2,750 | 390 | 270 | 130 | 110 | 110 |
| 27 | 344 | 501 | 725 | 500 | 397 | 856 | 1,960 | 347 | 250 | 180 | 110 | 120 |
| 28 | 334 | 490 | 1,940 | 500 | 367 | 3,530 | 1,320 | 398 | 250 | 150 | 100 | 120 |
| 29 | 334 | 454 | 3,040 | 500 | 344 | 4,720 | 966 | 324 | 280 | 140 | 120 | 120 |
| 30 | 296 | 403 | 2,100 | 500 | ----- | 5,080 | 858 | 316 | 260 | 130 | 200 | 120 |
| 31 | 309 | ----- | 1,300 | 480 | ----- | 5,020 | ----- | 390 | ----- | 120 | 150 | ----- |
| Total | 16,181 | 21,461 | 29,670 | 24,612 | 19,359 | 29,430 | 47,129 | 16,854 | 18,494 | 5,440 | 4,700 | 3,420 |
| Mean | 522 | 715 | 957 | 794 | 668 | 949 | 1,571 | 544 | 616 | 175 | 152 | 114 |
| Cfsm | 0.711 | 0.974 | 1.30 | 1.08 | 0.910 | 1.29 | 2.14 | 0.741 | 0.839 | 0.238 | 0.207 | 0.155 |
| In. | 0.82 | 1.09 | 1.50 | 1.25 | 0.98 | 1.49 | 2.39 | 0.85 | 0.94 | 0.28 | 0.24 | 0.17 |

Calendar year 1959: Max 4,580 Min 73 Mean 557 Cfsm 0.759 In. 10.29
Water year 1959-60: Max 5,080 Min 90 Mean 647 Cfsm 0.881 In. 12.00

Peak discharge (base, 3,000 cfs).--Nov. 15 (2 to 5 a.m.) 3,480 cfs (9.75 ft); Dec. 13 (6 to 9 a.m.) 3,340 cfs (9.55 ft); Dec. 29 (7 to 10 a.m.) 3,200 cfs (9.35 ft); Jan. 13 (5 to 7 p.m.) 3,010 cfs (9.07 ft); Mar. 31 (time unknown) 5,210 cfs (11.8 ft); Apr. 18 (1 to 4 a.m.) 3,420 cfs (9.66 ft); June 17 (2 to 3 p.m.) 4,050 cfs (10.18 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 6-9, Feb. 16-19, 26, Mar. 3-14. No gage-height record Jan. 10-18, Jan. 25 to Feb. 15, Mar. 29-31, July 15-28; discharge estimated on basis of sum of record for Clinton River near Fraser and North Branch Clinton River near Mount Clemens. Stage-discharge relation indefinite June 5-13, June 22 to July 14, July 29 to Sept. 30; discharge computed on basis of 3 discharge measurements and sum of records listed above.

1660. River Rouge at Birmingham, Mich.

Location.--Lat 42°32'45", long 83°13'25", in NW $\frac{1}{4}$ sec.36, T.2 N., R.10 E., on left bank in Birmingham, 25 ft downstream from mouth of Quarton Lake outlet and 100 ft upstream from bridge on West Maple Road.

Drainage area.--36.9 sq mi.

Records available.--June 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 720 ft (by barometer).

Average discharge.--10 years, 17.0 cfs.

Extremes.--Maximum discharge during year, 313 cfs Mar. 28 (gage height, 3.97 ft), from rating curve extended above 200 cfs by logarithmic plotting; minimum, 1.0 cfs Sept. 14 (gage height, 1.27 ft).

1950-60: Maximum discharge, 700 cfs Apr. 29, 1956 (gage height, 5.38 ft), from rating curve extended above 340 cfs by logarithmic plotting; minimum, 0.4 cfs Sept. 1, 3, 4, 6-8, 1954; minimum gage height, 1.27 ft Sept. 16, 1955, Sept. 14, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Occasional regulation by Quarton Lake above station.

Revisions (water years).--WSP 1387: 1951-52(M). WSP 1557: Drainage area.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 13

Nov. 14 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.5 | 3.2 | 2.0 | 25 | 1.3 | 1.2 | 2.0 | 27 |
| 1.6 | 5.4 | 2.2 | 40 | 1.4 | 2.4 | 2.5 | 72 |
| 1.7 | 8.9 | 2.5 | 70 | 1.5 | 4.3 | 3.0 | 135 |
| 1.8 | 13 | 3.0 | 135 | 1.8 | 15 | 4.0 | 320 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|
| 1 | 4.2 | 7.0 | 10 | a20 | 15 | 11 | 84 | 30 | 10 | 9.3 | 1.9 | 3.4 |
| 2 | 3.6 | 6.3 | 11 | a30 | 13 | 12 | 71 | 24 | 12 | 8.5 | 2.0 | 2.8 |
| 3 | 3.4 | *6.0 | 11 | a31 | *13 | 10 | 65 | 21 | 11 | 12 | 4.9 | 2.4 |
| 4 | 3.2 | 25 | 11 | 24 | 12 | 11 | 58 | 18 | 8.5 | 8.5 | 5.5 | 2.4 |
| 5 | 12 | 21 | 13 | 17 | 21 | 11 | 49 | 17 | 8.5 | 7.8 | 4.9 | 2.3 |
| 6 | 84 | 14 | 18 | 14 | 73 | 11 | 42 | 16 | 7.1 | 6.5 | 4.3 | 2.2 |
| 7 | *44 | 10 | 15 | 13 | 44 | 11 | 45 | 14 | 6.8 | 6.5 | 5.2 | 2.2 |
| 8 | 18 | 8.9 | 13 | 13 | 28 | 11 | 41 | 15 | 7.1 | 5.8 | 4.3 | *2.1 |
| 9 | 14 | 8.1 | *12 | a12 | 26 | 10 | 38 | 16 | 5.8 | 5.2 | 4.1 | 1.8 |
| 10 | 11 | 7.3 | 12 | 12 | 33 | 10 | *33 | 26 | 5.2 | 4.9 | *3.7 | 1.8 |
| 11 | 17 | 7.0 | 31 | 12 | 73 | 9.7 | 31 | 21 | 5.8 | 4.3 | 3.9 | 1.9 |
| 12 | 11 | 7.0 | 85 | 84 | 41 | 9.7 | 30 | 19 | 6.2 | 4.6 | 3.7 | 1.8 |
| 13 | 8.1 | 36 | 50 | 79 | 27 | 9.7 | 24 | 18 | 14 | *4.3 | 3.2 | 1.7 |
| 14 | 6.6 | 112 | 32 | a60 | 21 | 10 | 22 | 18 | 137 | 5.9 | 3.2 | 1.7 |
| 15 | 5.7 | 48 | 25 | a65 | 18 | 10 | 65 | 16 | 66 | 3.7 | 3.0 | 3.9 |
| 16 | 5.4 | 32 | 21 | a35 | 19 | 11 | 76 | 13 | 93 | 3.4 | 2.4 | 3.2 |
| 17 | 4.9 | 22 | 18 | a30 | 20 | 12 | 99 | 14 | *125 | 3.2 | 2.2 | 2.4 |
| 18 | 5.4 | 15 | 18 | a25 | 17 | 12 | 80 | 13 | 55 | 3.4 | 2.8 | 2.0 |
| 19 | 5.1 | 13 | 15 | 22 | 18 | 15 | 56 | 13 | 33 | 3.0 | 3.2 | 2.6 |
| 20 | 5.1 | 12 | 13 | 20 | 15 | 21 | 45 | 14 | 21 | 2.8 | 3.0 | 3.2 |
| 21 | 4.4 | 13 | 12 | 19 | 15 | 22 | 44 | 13 | 16 | 2.8 | 3.0 | 2.8 |
| 22 | 4.2 | 12 | 12 | 18 | 15 | 19 | 39 | 13 | *15 | 3.2 | 3.5 | 2.8 |
| 23 | 6.0 | 13 | 11 | 18 | 13 | 19 | 32 | 14 | 13 | 3.2 | 3.0 | 2.8 |
| 24 | 11 | 16 | a10 | 16 | 13 | *16 | 28 | 12 | 12 | 3.0 | 2.6 | 3.0 |
| 25 | 8.1 | 15 | a11 | 14 | 12 | 15 | 51 | 11 | 12 | 2.6 | 2.6 | 2.2 |
| 26 | 5.7 | 12 | a15 | 12 | 13 | 16 | 40 | 10 | 12 | 3.5 | 3.0 | 1.9 |
| 27 | 5.7 | 12 | a40 | 14 | 13 | 103 | 32 | 10 | 10 | 3.5 | 2.4 | 2.3 |
| 28 | 5.1 | 12 | a94 | 15 | 12 | 269 | 26 | *12 | 9.7 | 3.2 | 2.4 | 2.2 |
| 29 | 5.1 | 11 | a55 | 17 | 12 | 165 | 23 | 10 | 10 | 2.8 | 4.5 | 1.9 |
| 30 | 4.9 | 10 | a38 | 16 | 160 | 26 | 10 | 8.5 | 2.6 | 3.2 | 2.6 | 2.6 |
| 31 | 7.7 | ----- | a24 | 15 | ----- | 136 | ----- | 12 | ----- | 2.2 | 3.2 | ----- |
| Total | 339.6 | 541.6 | 749 | 770 | 665 | 1,169.1 | 1,393 | 483 | 756.2 | 144.2 | 104.9 | 72.3 |
| Mean | 11.0 | 18.1 | 24.2 | 24.8 | 22.9 | 37.7 | 46.4 | 15.6 | 25.2 | 4.65 | 3.38 | 2.41 |
| Cfsm | 0.298 | 0.491 | 0.656 | 0.672 | 0.621 | 1.02 | 1.26 | 0.423 | 0.683 | 0.126 | 0.092 | 0.065 |
| In. | 0.34 | 0.55 | 0.75 | 0.78 | 0.67 | 1.18 | 1.40 | 0.49 | 0.76 | 0.15 | 0.11 | 0.07 |

Calendar year 1959: Max 294 Min 1.0 Mean 18.2 Cfsm 0.493 In. 6.68
 Water year 1959-60: Max 269 Min 1.7 Mean 19.6 Cfsm 0.531 In. 7.25

Peak discharge (base, 110 cfs).--Oct. 6 (3 p.m.) 190 cfs (3.35 ft); Nov. 14 (8:30 a.m.) 153 cfs (3.12 ft); Dec. 28 (time unknown) 111 cfs (2.85 ft); Jan. 12 (6 p.m.) 140 cfs (3.05 ft); Mar. 28 (1 a.m.) 313 cfs (3.97 ft); Apr. 17 (6 to 7 p.m.) 121 cfs (2.90 ft); June 14 (8:30 a.m.) 261 cfs (3.75 ft); June 16 (9 p.m.) 286 cfs (3.85 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of fragmentary gage-height record, recorded range in stage, and records for Clinton River near Fraser, and River Rouge at Southfield.

1661. River Rouge at Southfield, Mich.

Location.--Lat 42°26'52", long 83°17'52", in SW $\frac{1}{4}$ sec.32, T.1 N., R.10 E., on right bank at downstream side of bridge on Beech Road at Southfield, 4.2 miles east of Farmington.

Drainage area.--88.0 sq mi.

Records available.--April 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 609.62 ft above mean sea level, datum of 1929 (city of Southfield bench mark). Prior to Sept. 30, 1958, wire-weight gage at same site and datum.

Extremes.--Maximum discharge during year, 1,140 cfs June 17 (gage height, 11.61 ft); minimum, 6.2 cfs Sept. 11; minimum gage height, 1.57 ft Aug. 1.
1958-60: Maximum discharge, 1,200 cfs Mar. 6, 1959 (gage height, 11.90 ft; minimum, 4.4 cfs July 11, 1959 (gage height, 1.49 ft).

Remarks.--Records good except those for periods of ice effect or indefinite stage-discharge relation, which are fair.

Rating table, water year 1959-60, except periods of ice effect or indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 29 to May 5)

| | | | |
|-----|-----|------|-------|
| 1.6 | 7.5 | 4.0 | 145 |
| 2.0 | 20 | 7.0 | 450 |
| 2.5 | 44 | 11.0 | 1,030 |
| 3.0 | 74 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 16 | 33 | 39 | 70 | 50 | 35 | 285 | 118 | 36 | 37 | 8.0 | 12 |
| 2 | 15 | 27 | 41 | 70 | 45 | 35 | 231 | 87 | 45 | 32 | 8.8 | 14 |
| 3 | 14 | *24 | 41 | 130 | *45 | 35 | 212 | 75 | 51 | 52 | 19 | 11 |
| 4 | 14 | 93 | 42 | 85 | 45 | 35 | 186 | 64 | 35 | 34 | 24 | 9.8 |
| 5 | 25 | 102 | 45 | 70 | 66 | 35 | 156 | 58 | 34 | 27 | 27 | 10 |
| 6 | 208 | 57 | 89 | *55 | 339 | *35 | 140 | 54 | 30 | 24 | 16 | 10 |
| 7 | 336 | 40 | 67 | 50 | 174 | 35 | 147 | 52 | 28 | 21 | 22 | 8.5 |
| 8 | 81 | 34 | 52 | 47 | 96 | 35 | 139 | 48 | 25 | 20 | 23 | *8.8 |
| 9 | *60 | 32 | *45 | 45 | 84 | 35 | 120 | 45 | 23 | 18 | 15 | 9.2 |
| 10 | 42 | 29 | 42 | 39 | 110 | 35 | 107 | 85 | 23 | 18 | *28 | 9.0 |
| 11 | 74 | 29 | 87 | 38 | 332 | 35 | 107 | 76 | 22 | 16 | 17 | 8.0 |
| 12 | 48 | 28 | 475 | 129 | 151 | 35 | 111 | 63 | 26 | 16 | 15 | 9.2 |
| 13 | 36 | 61 | 240 | *571 | 100 | 35 | 87 | 60 | 67 | *18 | 13 | 8.2 |
| 14 | 31 | 639 | 117 | 203 | 80 | 35 | 80 | 60 | 394 | 23 | 13 | 9.2 |
| 15 | 26 | 227 | 92 | 260 | 70 | 35 | 236 | 52 | 342 | 16 | 14 | 8.5 |
| 16 | 25 | 111 | 80 | 148 | 60 | 40 | 382 | 45 | 197 | 15 | 12 | 11 |
| 17 | 24 | 92 | 69 | 102 | 60 | 40 | 455 | 44 | 843 | 14 | 10 | 11 |
| 18 | e23 | 58 | 61 | 89 | 58 | 45 | 311 | 43 | 210 | 14 | 11 | 10 |
| 19 | e22 | 50 | 54 | 78 | 54 | 50 | 176 | 39 | 118 | 14 | 11 | 9.5 |
| 20 | e20 | 45 | 46 | 70 | 51 | 70 | 140 | 45 | 82 | 13 | 13 | 15 |
| 21 | e20 | 44 | 45 | 65 | 45 | 80 | *130 | 42 | 68 | 12 | 15 | 12 |
| 22 | e20 | 44 | 44 | 60 | 44 | 70 | 126 | 43 | *67 | 13 | 14 | 12 |
| 23 | 28 | 45 | 40 | 57 | 41 | 60 | 104 | 44 | 60 | 20 | 13 | 12 |
| 24 | 59 | 55 | 36 | 52 | 40 | 55 | 92 | 40 | 52 | 14 | 12 | 12 |
| 25 | 38 | 61 | 36 | 50 | 45 | 51 | 196 | *36 | 43 | 12 | 11 | 12 |
| 26 | 29 | 48 | 41 | 45 | 55 | 59 | 152 | 35 | 40 | 12 | 9.5 | 11 |
| 27 | 26 | 43 | 126 | 49 | 45 | 221 | 121 | 24 | 37 | 16 | 10 | 10 |
| 28 | 24 | 44 | 356 | 56 | 40 | 300 | 96 | 46 | 34 | 12 | 8.5 | 11 |
| 29 | 22 | 42 | 265 | 59 | 35 | 635 | 84 | 36 | 34 | 11 | 9.8 | 9.5 |
| 30 | 22 | 38 | 131 | 55 | ----- | 541 | 87 | 37 | 31 | 10 | 21 | 12 |
| 31 | 31 | ----- | 90 | 55 | ----- | 493 | ----- | 44 | ----- | 9.2 | 12 | ----- |
| Total | 1,459 | 2,275 | 5,034 | 2,952 | 2,460 | 3,935 | 4,996 | 1,650 | 3,097 | 583.2 | 455.6 | 315.4 |
| Mean | 47.1 | 75.8 | 97.9 | 95.2 | 84.8 | 127 | 167 | 53.2 | 103 | 18.8 | 14.7 | 10.5 |
| Cfsm | 0.535 | 0.861 | 1.111 | 1.08 | 0.964 | 1.44 | 1.90 | 0.605 | 1.17 | 0.214 | 0.167 | 0.119 |
| In. | 0.62 | 0.96 | 1.28 | 1.25 | 1.04 | 1.66 | 2.11 | 0.70 | 1.31 | 0.25 | 0.19 | 0.13 |

Calendar year 1959: Max 897

Min 6.2

Mean 70.1

Cfsm 0.797

In. 10.82

Water year 1959-60: Max 900

Min 8.0

Mean 74.4

Cfsm 0.845

In. 11.50

Peak discharge (base, 350 cfs).--Oct. 7 (3 to 4 a.m.) 572 cfs (7.98 ft); Nov. 14 (2 to 3 p.m.) 734 cfs (9.13 ft); Dec. 12 (5 a.m.) 523 cfs (7.60 ft); Dec. 28 (4 to 5 p.m.) 497 cfs (7.39 ft); Jan. 13 (7 a.m.) 708 cfs (8.95 ft); Feb. 6 (7:30 a.m.) 438 cfs (6.90 ft); Feb. 11 (7:30 a.m.) 410 cfs (6.67 ft); Mar. 28 (time unknown) about 950 cfs; Apr. 17 (7 p.m.) 616 cfs (8.10 ft); June 14 (11:30 p.m.) 714 cfs (8.99 ft); June 17 (6 a.m.) 1,140 cfs (11.61 ft).

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge computed on basis of records for River Rouge at Birmingham and Upper River Rouge at Farmington.

Note.--Stage-discharge relation affected by ice Dec. 23, Jan. 5-7, 21, 22, 25, 23, Jan. 30 to Feb. 4, Feb. 13-17, Feb. 24 to Mar. 24.

1662. Evans ditch at Southfield, Mich.

Location.--Lat 42°27'28", long 83°16'03", in SE $\frac{1}{4}$ sec.28, T.1 N., R.10 E., on right bank at Southfield, 20 ft upstream from bridge on Ninemile Road, 1.6 miles upstream from mouth, and $\frac{1}{2}$ miles east of Farmington.

Drainage area.--9.49 sq mi.

Records available.--September 1958 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 615.07 ft above mean sea level, datum of 1929 (city of Southfield bench mark).

Extremes.--1958-59: Maximum discharge during water year, 233 cfs Mar. 6 (gage height, 7.8 ft); minimum, 0.4 cfs July 15; minimum gage height, 5.09 ft Oct. 6, Nov. 2.
1959-60: Maximum discharge during water year, 370 cfs June 14 (gage height, 9.23 ft), from rating curve extended above 220 cfs; minimum, 0.4 cfs Sept. 19 (gage height, 5.10 ft).

Remarks.--Records good except those for periods of ice effect, indefinite stage-discharge relation, or no gage-height record, which are poor.

Rating table, Sept. 1, 1958, to Sept. 30, 1960, except periods of ice effect or indefinite stage-discharge relation (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 5.1 | 0.4 | 5.5 | 18 |
| 5.2 | 1.6 | 5.6 | 28 |
| 5.3 | 4.2 | 6.0 | 82 |
| 5.4 | 10 | 8.0 | 251 |

Discharge, in cubic feet per second, 1958

| Day | Discharge | Day | Discharge | Day | Discharge | Day | Discharge |
|--|-----------|--------------|-----------|---------------|-----------|---------------|-----------|
| Sept. 1..... | 0.9 | Sept. 9..... | 1.2 | Sept. 17..... | 9.0 | Sept. 25..... | 1.3 |
| 2..... | 1.0 | 10..... | *1.5 | 18..... | 31 | 26..... | 1.6 |
| 3..... | 1.1 | 11..... | 1.2 | 19..... | 3.2 | 27..... | 1.3 |
| 4..... | 1.1 | 12..... | 1.2 | 20..... | 2.0 | 28..... | .8 |
| 5..... | 1.2 | 13..... | 1.2 | 21..... | 1.6 | 29..... | .8 |
| 6..... | 1.3 | 14..... | 1.3 | 22..... | 2.2 | 30..... | .9 |
| 7..... | 1.2 | 15..... | 3 | 23..... | 1.6 | | |
| 8..... | 1.2 | 16..... | 18 | 24..... | 1.3 | | |
| Total..... | | | | | | | 96.0 |
| Mean..... | | | | | | | 3.20 |
| Cubic feet per second per square mile..... | | | | | | | 0.337 |
| Runoff in inches..... | | | | | | | 0.38 |
| Peak discharge (base, 130 cfs).--No peak above base. | | | | | | | |

* Discharge measurement made on this day.

Note.--No gage-height record Sept. 1-16; discharge estimated on basis of records for River Rouge at Birmingham and Upper River Rouge at Farmington. Results of discharge measurements are as follows: Apr. 1, 3.55 cfs; June 19, 9.71 cfs; July 16, 1.10 cfs.

Discharge, in cubic feet per second, water year October 1958 to September 1959

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1.4 | 0.7 | 1.3 | 3 | 1.3 | 40 | 17 | 12 | 2.9 | 1.1 | 0.8 | 2.0 |
| 2 | .9 | .8 | 1.3 | 2.5 | 1.3 | 60 | 2.7 | 8.4 | 2.7 | 1.3 | .7 | 12 |
| 3 | .9 | .9 | 1.5 | 1.3 | 1.3 | 45 | *91 | 6.6 | 2.2 | .9 | .6 | 4.2 |
| 4 | .9 | .9 | 2.2 | 1.2 | 1.3 | 30 | 36 | 5.5 | 2.0 | .8 | 1.1 | 2.7 |
| 5 | .8 | .8 | 2.0 | 1 | 1.3 | 21 | 18 | 4.6 | 2.0 | .8 | .8 | 1.6 |
| 6 | .7 | .7 | 1.4 | 1 | 1.3 | 149 | 14 | 4.2 | 1.6 | .8 | .7 | 1.3 |
| 7 | .7 | .8 | 1.1 | 1 | 1.3 | 25 | 20 | *3.5 | 1.4 | .8 | 2.2 | 1.1 |
| 8 | .8 | 1.1 | 1.1 | 1 | 1.3 | 16 | 44 | 2.9 | 1.3 | .8 | 3.5 | 1.4 |
| 9 | 2.4 | 2.2 | .9 | 1 | 1.5 | 11 | 30 | 2.4 | 1.4 | .8 | 1.3 | 1.4 |
| 10 | 1.8 | 1.3 | 1.3 | 1 | 5 | 10 | 19 | 2.4 | 1.3 | .8 | .8 | 1.1 |
| 11 | 1.1 | .9 | 1.3 | .9 | 3 | 12 | 14 | 5.5 | 1.8 | .8 | 1.1 | al.0 |
| 12 | .9 | .8 | 1.1 | .9 | 3 | 7.8 | 11 | 5.0 | 5.0 | .8 | .9 | a.9 |
| 13 | .8 | 1.4 | .9 | .9 | 5 | 8.4 | 8.4 | 5.0 | 2.0 | .6 | .9 | a.9 |
| 14 | .8 | 5.0 | .9 | .9 | 10 | 9.0 | 7.8 | 3.8 | 1.3 | .7 | .9 | a.9 |
| 15 | .8 | 10 | .9 | 1 | 15 | 42 | 6.0 | 2.9 | 1.3 | .6 | .7 | a.9 |
| 16 | .8 | 7.8 | .9 | al | 9 | *18 | 6.0 | 2.7 | 1.4 | .7 | 21 | a.8 |
| 17 | 2.4 | *3.5 | 1.1 | al | 6 | *11 | 5.0 | 2.4 | 1.3 | .7 | 20 | .8 |
| 18 | 2.0 | 2.9 | 1.1 | al | 4 | 8.4 | 5.0 | 2.7 | 1.1 | .9 | 1.8 | .7 |
| 19 | 1.3 | 2.2 | *1.3 | al | 3.5 | 16 | 4.6 | 4.2 | .9 | 1.6 | 1.3 | .7 |
| 20 | .9 | 1.8 | .9 | al.1 | 3 | 22 | 3.8 | 3.8 | 1.3 | 5.0 | .9 | .7 |
| 21 | 1.1 | 1.6 | .9 | al.5 | 3 | 17 | 3.8 | 41 | 1.3 | 1.8 | .9 | .6 |
| 22 | .9 | 1.4 | .9 | *4 | 3 | 10 | 3.5 | 7.8 | 1.4 | 1.3 | 1.5 | .9 |
| 23 | 1.3 | 1.4 | .9 | 3 | 3 | 8.4 | 3.2 | 1.6 | 2.3 | 1.1 | 1.1 | .9 |
| 24 | 1.3 | 2.0 | .9 | 2 | 3 | 8.4 | 3.2 | 6.6 | 1.1 | 1.6 | 6.6 | 2.2 |
| 25 | 1.8 | 2.4 | .9 | 1.7 | 5 | 8.4 | 3.2 | 4.2 | 1.3 | 1.6 | 1.6 | 1.1 |
| 26 | 1.1 | 4.6 | .9 | 1.6 | *9 | 8.4 | 3.2 | 4.6 | 1.8 | .9 | 1.3 | .8 |
| 27 | .9 | 2.4 | 1 | 1.5 | 14 | 25 | 4.2 | 4.6 | 1.8 | .9 | 35 | 3.2 |
| 28 | .8 | 1.8 | 1 | 1.5 | 22 | 16 | 68 | 2.9 | 1.3 | .8 | 36 | 1.6 |
| 29 | .7 | 1.6 | 1 | 1.4 | -- | 12 | 28 | 6.3 | .9 | 3.2 | 5.0 | 1.5 |
| 30 | .7 | 1.3 | 1 | 1.4 | -- | 12 | 26 | 12 | 1.6 | 4.2 | 4.2 | 2.2 |
| 31 | .8 | -- | 1 | 1.3 | -- | 12 | -- | 3.8 | -- | 1.4 | 2.7 | -- |
| Total | 34.5 | 67.0 | 34.8 | 44.8 | 140.4 | 699.2 | 634.9 | 192.7 | 50.3 | 55.7 | 157.7 | 65.5 |
| Mean | 1.11 | 2.23 | 1.12 | 1.45 | 5.01 | 22.6 | 21.2 | 6.22 | 1.68 | 1.80 | 5.09 | 2.18 |
| Cfs/m | 0.117 | 0.235 | 0.118 | 0.153 | 0.528 | 2.38 | 2.23 | 0.655 | 0.177 | 0.190 | 0.536 | 0.230 |
| In. | 0.14 | 0.26 | 0.14 | 0.18 | 0.55 | 2.74 | 2.49 | 0.76 | 0.20 | 0.22 | 0.62 | 0.26 |

Calendar year 1958: Max - Min - Mean - Cfs/m - In. -
Water year 1958-59: Max 149 Min 0.6 Mean 5.97 Cfs/m 0.629 In. 8.56

Peak discharge (base, 130 cfs).--Mar. 6 (9 a.m.) 233 cfs (7.8 ft); Apr. 2 (5 a.m.) 230 cfs (7.7 ft); Apr. 3 (2 p.m.) 162 cfs (6.90 ft); Apr. 28 (2:30 p.m.) 130 cfs (6.48 ft).

* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of records for River Rouge at Birmingham and Upper River Rouge at Farmington.

Note.--Stage-discharge relation affected by ice Dec. 23-25, Dec. 27 to Jan. 11, Jan. 15 to Mar. 4.

1662. Evans ditch at Southfield, Mich.--Continued

| Discharge, in cubic feet per second, water year October 1959 to September 1960 | | | | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
| 1 | 1.4 | 3.5 | 4.6 | 7.8 | 5.5 | 3.5 | 23 | 14 | 2.9 | 3.2 | 0.8 | e0.8 |
| 2 | 1.1 | 2.7 | e4.6 | 8.4 | 5 | 3.5 | 18 | 7.8 | 4.6 | 2.4 | .8 | e.8 |
| 3 | .9 | *2.2 | e4.6 | 21 | *5.0 | 3.5 | 17 | 6.0 | 4.2 | 7.2 | 2.2 | e.8 |
| 4 | .8 | 3.5 | 4.6 | 11 | 5.0 | 3.5 | 16 | 5.0 | 2.4 | 2.9 | 3.5 | .8 |
| 5 | 2.7 | 25 | 6.0 | 6.6 | 13 | 3.5 | 14 | 4.2 | 2.7 | 2.2 | 2.2 | .7 |
| 6 | *72 | 7.2 | 14 | *4.2 | 47 | 3.5 | 12 | 3.8 | 2.0 | 2.0 | 1.3 | .8 |
| 7 | 44 | 4.6 | 8.4 | 3.8 | 18 | 3.5 | 14 | 3.8 | 1.8 | 1.8 | 2.7 | .8 |
| 8 | 10 | 3.5 | 6.0 | 3.8 | 11 | 3.5 | 13 | 3.5 | 1.6 | 1.8 | 2.9 | *.7 |
| 9 | 6.8 | 3.2 | *6.0 | 3.2 | 10 | 3.2 | 10 | 4.2 | 1.6 | 1.6 | 1.6 | .8 |
| 10 | 4.2 | 3.2 | 5.0 | 3.2 | 18 | 3.2 | 8.4 | 12 | 1.6 | 1.6 | *2.2 | .5 |
| 11 | 12 | 2.9 | 18 | 3.2 | 47 | 3 | 8.4 | 7.8 | 1.4 | 1.4 | 1.6 | .5 |
| 12 | 6.0 | 2.7 | 82 | 37 | 16 | 2.9 | 8.4 | 6.6 | 1.6 | 1.6 | 1.1 | .5 |
| 13 | 4.2 | 13 | 31 | *100 | 10 | 2.7 | 7.2 | 6.0 | 8.4 | *1.8 | 1.1 | .7 |
| 14 | 3.5 | 112 | 16 | 22 | 7.2 | 3 | 7.8 | 6.6 | 170 | 1.8 | 1.8 | .6 |
| 15 | 2.9 | 21 | 12 | 34 | 5.5 | 3.5 | 48 | 6.0 | 82 | 1.3 | 1.6 | .5 |
| 16 | 2.7 | 15 | 10 | 17 | 5.0 | 3.5 | 86 | 5.0 | 53 | 1.1 | .9 | .6 |
| 17 | 2.7 | 12 | 7.8 | 11 | 6.6 | 4 | 118 | 4.2 | *161 | 1.1 | .9 | .6 |
| 18 | 2.7 | 6.6 | 7.2 | 9.0 | 6.0 | 4.5 | 50 | 3.5 | 23 | 1.1 | .8 | .6 |
| 19 | 2.2 | 5.5 | 6.0 | 7.8 | 5.0 | 5 | 16 | 3.2 | 14 | 1.1 | .9 | .6 |
| 20 | 2.4 | 5.0 | 4.6 | 6.6 | 3.8 | 7 | 12 | 4.2 | 9.0 | .9 | .9 | 1.1 |
| 21 | 2.2 | 5.5 | 4.2 | 6.0 | 3.5 | 8 | *12 | 3.5 | 6.6 | 1.1 | e.8 | .7 |
| 22 | 2.0 | 6.0 | 3.8 | 5.5 | 3.5 | 7 | 11 | 3.5 | *6.0 | .8 | e.8 | .6 |
| 23 | 2.7 | 6.6 | 3.5 | 5.0 | 3.5 | 6 | 7.8 | 3.8 | 5.5 | 1.6 | e.8 | .6 |
| 24 | 7.8 | 8.4 | 3.5 | 4.6 | 3.2 | 5.5 | 6.6 | 3.2 | 4.6 | .9 | e.8 | .7 |
| 25 | 4.2 | 7.8 | 3.8 | 4.6 | 2.7 | 5 | 23 | *2.9 | 3.2 | .8 | .8 | .6 |
| 26 | 3.2 | 5.5 | 5.5 | 4.2 | 3.2 | 7 | 14 | 2.7 | 2.7 | 1.1 | .8 | .6 |
| 27 | 2.9 | 5.0 | 21 | 4.5 | 2.9 | 57 | 10 | 2.7 | 2.4 | 1.4 | .8 | .7 |
| 28 | 2.7 | 5.5 | 56 | 5.5 | 2.9 | 81 | 7.2 | 4.2 | 2.7 | 1.3 | .7 | .7 |
| 29 | 2.2 | 5.0 | 28 | 6 | 3.2 | 40 | 6.6 | 2.7 | 2.7 | .8 | .9 | .6 |
| 30 | 2.2 | 4.2 | 16 | 7 | ----- | *43 | 9.0 | 4.2 | 2.2 | .8 | 1.8 | .8 |
| 31 | 3.5 | ----- | 10 | 6 | ----- | 40 | ----- | 5.0 | ----- | .8 | e.9 | ----- |
| Total | 220.6 | 343.3 | 413.7 | 379.5 | 278.2 | 373.0 | 614.4 | 155.8 | 587.4 | 51.3 | 41.7 | 20.2 |
| Mean | 7.12 | 11.4 | 13.3 | 12.2 | 9.59 | 12.0 | 20.5 | 5.03 | 19.6 | 1.65 | 1.55 | 0.67 |
| Cfsm | 0.750 | 1.20 | 1.40 | 1.29 | 1.01 | 1.26 | 2.16 | 0.530 | 2.07 | 0.174 | 0.142 | 0.071 |
| In. | 0.86 | 1.35 | 1.62 | 1.49 | 1.09 | 1.46 | 2.41 | 0.61 | 2.30 | 0.20 | 0.16 | 0.08 |
| Calendar year 1959: Max 149 Min 0.6 Mean 8.27 Cfsm 0.871 In. 11.85 | | | | | | | | | | | | |
| Water year 1959-60: Max 170 Min 0.5 Mean 9.51 Cfsm 1.00 In. 13.63 | | | | | | | | | | | | |
| Peak discharge (base, 130 cfs).--Oct. 6 (10 p.m.) 157 cfs (6.83 ft); Nov. 14 (12 m.) 147 cfs (6.69 ft); Jan. 13 (1:30 a.m.) 181 cfs (7.16 ft); Mar. 27 (12 p.m.) 180 cfs (7.15 ft); Apr. 17 (3 to 4 p.m.) 155 cfs (6.80 ft); June 14 (3 p.m.) 370 cfs (9.23 ft); June 17 (2 a.m.) 378 cfs (8.61 ft). | | | | | | | | | | | | |

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge computed on basis of records for River Rouge at Birmingham and Upper River Rouge at Farmington.

Note.--Stage-discharge relation affected by ice Jan. 27 to Feb. 2, Mar. 3-7, 11, 14-26.

1663. Upper River Rouge at Farmington, Mich.

Location.--Lat 42°27'52", long 83°22'11", in NW¹ sec.27, T.1 N., R.9 E., on left bank 800 ft downstream from bridge on Shiawassee Road in Farmington.

Drainage area.--17.5 sq mi.

Records available.--March 1958 to September 1960.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 695 ft (from topographic map).

Extremes.--Maximum discharge during year, 252 cfs June 16 (gage height, 4.79 ft); minimum, 1.6 cfs Aug. 26 (gage height, 2.77 ft).

1958-60: Maximum discharge, 277 cfs Apr. 2, 1959; maximum gage height, 6.00 ft Feb. 15, 1959 (ice jam); minimum discharge, 1.2 cfs July 8, 10, Sept. 12, 1959.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|------|-----|-----|-----|
| 2.79 | 1.8 | 3.1 | 13 |
| 2.8 | 1.9 | 3.4 | 36 |
| 2.9 | 4.3 | 3.9 | 101 |
| 3.0 | 7.6 | 4.3 | 165 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 2.4 | 7.6 | 6.1 | 12 | 11 | 7.2 | 54 | 19 | 6.8 | 12 | 2.1 | 2.1 |
| 2 | 2.2 | 6.1 | 6.4 | 13 | 9.1 | 7 | 42 | 15 | 10 | 7.2 | 2.1 | 1.9 |
| 3 | 2.2 | 5.2 | 6.4 | 19 | *8.1 | 7 | 38 | 14 | 9.1 | 15 | 3.7 | 1.9 |
| 4 | 2.1 | 18 | 6.8 | 13 | 7.6 | 7 | 33 | 12 | 7.2 | 8.1 | 7.6 | 1.9 |
| 5 | 4.9 | 14 | 8.6 | 9.6 | 21 | 8 | 27 | 11 | 6.4 | 6.1 | 4.9 | 1.9 |
| 6 | 55 | 9.6 | 14 | *8.6 | 78 | *8 | 24 | 9.1 | 5.8 | 5.5 | 3.1 | 1.8 |
| 7 | *21 | 7.2 | 11 | 7.6 | 37 | 6.5 | 24 | 11 | 4.9 | 4.9 | 5.5 | 1.8 |
| 8 | 11 | 6.4 | 9.1 | 6.8 | 24 | 5 | 24 | 10 | 4.6 | 4.3 | 4.9 | *1.8 |
| 9 | 10 | 5.8 | 7.6 | 6.4 | 21 | 6 | 21 | 10 | 4.0 | 4.0 | 3.4 | 1.9 |
| 10 | 6.4 | 5.8 | 6.8 | 6.4 | 27 | 6 | 19 | 16 | 3.7 | 4.0 | *3.4 | 2.1 |
| 11 | 12 | 5.5 | 17 | 6.4 | 70 | 6 | 18 | 15 | 4.0 | 4.0 | 2.8 | 1.9 |
| 12 | 6.8 | 5.2 | 49 | 37 | 32 | 6 | 18 | 12 | 4.3 | 3.4 | 2.8 | 1.9 |
| 13 | 5.8 | 11 | 30 | *100 | 22 | 6.1 | 18 | 12 | 20 | *4.4 | 2.4 | 2.1 |
| 14 | 5.5 | 57 | 20 | 47 | 16 | 6.4 | 18 | 12 | 53 | 5.2 | 2.6 | 2.1 |
| 15 | 5.2 | 27 | 16 | 49 | 13 | 6.4 | 36 | 12 | 36 | 3.7 | 2.4 | 2.1 |
| 16 | 4.6 | 19 | 14 | 30 | 12 | 7.2 | 60 | 11 | 62 | 3.4 | 2.2 | 2.1 |
| 17 | 4.6 | 14 | 12 | 24 | 11 | 7.2 | 76 | 11 | *98 | 3.4 | 2.2 | 2.2 |
| 18 | 4.3 | 10 | 10 | 18 | 11 | 7.2 | 62 | 9.6 | 42 | 3.4 | 1.9 | 2.2 |
| 19 | 4.0 | 8.6 | 8.6 | 16 | 10 | 10 | 35 | 8.6 | 24 | 3.1 | 2.1 | 2.8 |
| 20 | 3.7 | 8.1 | 6.8 | 13 | 9 | 12 | 27 | 12 | 16 | 2.6 | 2.1 | 3.1 |
| 21 | 3.7 | 7.6 | 6.8 | 11 | 8.5 | 12 | *24 | 11 | 14 | 2.6 | 2.2 | 2.6 |
| 22 | 3.7 | 7.2 | 6.1 | 11 | 8.1 | 11 | 21 | 11 | 13 | 2.6 | 2.2 | 2.6 |
| 23 | 4.3 | 7.6 | 8.4 | 10 | 7.6 | 11 | 19 | 9.6 | 11 | 2.8 | 2.1 | 2.6 |
| 24 | 8.6 | 9.6 | *5.8 | 9.6 | 7.2 | 10 | 16 | 9.1 | 9.6 | 2.4 | 1.9 | 2.6 |
| 25 | 6.8 | 10 | 5.8 | 8.1 | 6.4 | 9.6 | 35 | *8.1 | 8.6 | 2.4 | 1.9 | 2.4 |
| 26 | 6.4 | 8.1 | 6.4 | 9.1 | 8.1 | 11 | 29 | 8.1 | 6.4 | 2.8 | 1.8 | 2.4 |
| 27 | 6.4 | 7.2 | 20 | 9.1 | 8.1 | 64 | 22 | 7.6 | 5.5 | 3.1 | 1.9 | 2.6 |
| 28 | 5.8 | *7.2 | 50 | 10 | 7.6 | 164 | 18 | 11 | 5.2 | 2.2 | 1.9 | 2.4 |
| 29 | 5.8 | 6.8 | 40 | 11 | 7.6 | 126 | 15 | 8.6 | 5.8 | 2.1 | 2.2 | 2.2 |
| 30 | 5.8 | 6.1 | 25 | 13 | ----- | *106 | 17 | 8.6 | 5.5 | 2.1 | 3.1 | 2.6 |
| 31 | 7.2 | ----- | 18 | 12 | ----- | 85 | ----- | 7.6 | ----- | 1.9 | 2.2 | ----- |
| Total | 238.2 | 328.5 | 456.5 | 556.7 | 519.0 | 752.8 | 890 | 342.6 | 506.4 | 134.7 | 87.6 | 66.6 |
| Mean | 7.68 | 11.0 | 14.7 | 18.0 | 17.9 | 24.3 | 29.7 | 11.1 | 16.9 | 4.35 | 2.83 | 2.22 |
| Cfsm | 0.439 | 0.629 | 0.840 | 1.03 | 1.02 | 1.39 | 1.70 | 0.634 | 0.965 | 0.249 | 0.162 | 0.127 |
| In. | 0.51 | 0.70 | 0.97 | 1.18 | 1.10 | 1.60 | 1.89 | 0.73 | 1.08 | 0.29 | 0.19 | 0.14 |

Calendar year 1959: Max 200 Min 1.4 Mean 12.6 Cfsm 0.720 In. 9.77
 Water year 1959-60: Max 164 Min 1.8 Mean 13.3 Cfsm 0.760 In. 10.39

Peak discharge (base, 80 cfs).--Oct. 6 (2 p.m.) 112 cfs (3.97 ft); Nov. 14 (10 a.m.) 83 cfs (3.78 ft); Jan. 13 (2 a.m.) 134 cfs (4.11 ft); Feb. 6 (4 a.m.) 102 cfs (3.91 ft); Feb. 11 (3 a.m.) 98 cfs (3.88 ft); Mar. 27 (10 p.m.) 192 cfs (4.46 ft); Apr. 17 (4 p.m.) 108 cfs (3.95 ft); June 14 (3 p.m.) 94 cfs (3.85 ft); June 16 (12 p.m.) 252 cfs (4.79 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Feb. 16-21, Mar. 2-12, 19-24.

1665. River Rouge at Detroit, Mich.

Location.--Lat 42°22'20", long 83°15'20", in SW $\frac{1}{4}$ sec. 27, T.1 S., R.10 E., on right bank 500 ft upstream from bridge on Plymouth Road in Detroit and 4 miles upstream from Middle River Rouge.

Drainage area.--185 sq mi.

Records available.--October 1930 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 584.00 ft above mean sea level, datum of 1929. Prior to Aug. 11, 1943, chain gage and Aug. 11, 1943, to Oct. 15, 1948, wire-weight gage, at site 1 mile downstream at datum 4.6 ft lower.

Average discharge.--30 years, 111 cfs.

Extremes.--Maximum discharge during year, 2,140 cfs June 17 (gage height, 13.42 ft); minimum, 7.7 cfs Sept. 8; minimum gage height, 3.34 ft Aug. 1.
1930-60: Maximum discharge, 13,000 cfs Apr. 5, 1947; maximum gage height, 23.0 ft Apr. 6, 1947, from floodmark, site and datum then in use; minimum discharge observed, 2.7 cfs Aug. 11, 1934 (gage height, 3.50 ft, site and datum then in use.)

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

Revisions (water years).--WSP 1034: 1933(M), WSP 1054: 1939, 1943, 1945(M). WSP 1437: 1931-32, 1934, 1936(M), 1937-38, 1944(M), 1945. WSP 1557: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 8-14, July 9 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 3.1 | 8.0 | 5.0 | 184 |
| 3.3 | 15 | 8.0 | 667 |
| 3.6 | 34 | 12.0 | 1,610 |
| 4.0 | 67 | 13.0 | 1,970 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 33 | 66 | 69 | 145 | 100 | 67 | 528 | 213 | 64 | 64 | 11 | 14 |
| 2 | 28 | 50 | 72 | 137 | *105 | 65 | 400 | 153 | 118 | 68 | 11 | 18 |
| 3 | 28 | *41 | 72 | 267 | 90 | 76 | 350 | 125 | 110 | 148 | 25 | 16 |
| 4 | 25 | 172 | 72 | 194 | 101 | 69 | 324 | 102 | 67 | 80 | 56 | 13 |
| 5 | 46 | 278 | 75 | 122 | 124 | 72 | 260 | 90 | 63 | 50 | 49 | 11 |
| 6 | 607 | 128 | 161 | *b100 | 694 | 71 | 234 | 82 | 54 | 40 | 27 | 11 |
| 7 | 719 | 82 | 81 | b90 | 463 | 70 | 240 | 80 | 48 | 35 | 41 | *9.5 |
| 8 | 188 | 66 | 97 | b80 | 225 | 70 | 232 | 75 | 41 | 30 | 63 | 8.3 |
| 9 | *116 | 57 | *85 | b80 | 187 | 70 | 199 | 76 | 40 | 27 | 28 | 10 |
| 10 | 77 | 52 | 74 | 74 | 256 | 70 | 176 | 142 | 36 | 25 | *36 | 9.8 |
| 11 | 154 | 51 | 138 | 67 | 759 | 70 | 160 | 144 | 36 | 24 | 29 | 9.8 |
| 12 | 99 | 52 | 828 | 273 | 404 | 70 | 176 | 112 | 45 | *22 | 22 | 9.8 |
| 13 | 64 | 135 | 606 | *1,240 | 213 | 70 | 143 | 99 | 181 | 28 | 19 | 12 |
| 14 | 51 | 1,000 | 271 | 593 | 170 | 70 | 73 | 104 | 1,000 | 44 | 19 | 12 |
| 15 | 44 | 639 | 198 | 550 | 128 | 70 | 244 | 99 | 975 | 27 | 21 | 13 |
| 16 | 38 | 261 | 167 | 404 | 116 | 70 | 534 | 82 | 541 | 21 | 20 | 13 |
| 17 | 36 | 208 | 142 | 243 | 125 | 80 | 648 | 74 | 1,860 | 19 | 15 | 15 |
| 18 | 35 | 122 | 122 | 201 | 118 | 80 | 668 | 74 | 885 | 20 | 14 | 15 |
| 19 | 33 | 101 | 106 | 150 | 100 | 90 | 336 | 69 | 298 | 19 | 14 | 18 |
| 20 | 30 | 86 | 86 | 140 | 90 | 110 | 243 | 81 | 187 | 19 | 15 | 28 |
| 21 | 31 | 82 | 85 | 130 | 86 | 140 | *213 | 76 | 136 | 17 | 20 | 23 |
| 22 | 28 | 83 | 73 | 120 | 63 | 120 | 216 | 75 | *124 | 17 | 20 | 17 |
| 23 | 34 | 81 | 71 | 110 | 72 | 110 | 175 | 71 | 122 | 23 | 17 | 16 |
| 24 | 99 | 97 | 69 | 100 | 71 | 110 | 147 | 69 | 100 | 22 | 16 | 18 |
| 25 | 76 | 121 | 62 | 100 | b80 | 110 | 311 | *60 | 82 | 17 | 14 | 17 |
| 26 | 54 | 92 | 72 | 100 | b100 | 110 | 562 | 56 | 70 | 36 | 12 | 18 |
| 27 | 47 | 79 | 157 | 100 | b80 | 700 | 213 | 57 | 60 | 42 | 11 | 18 |
| 28 | 43 | 79 | 578 | 100 | 72 | 1,200 | 161 | 80 | 58 | 20 | 10 | 16 |
| 29 | 37 | 77 | 662 | 100 | 72 | 1,100 | 134 | 66 | 57 | 15 | 9.2 | 17 |
| 30 | 36 | 67 | 315 | 100 | ----- | *855 | 150 | 80 | 54 | 14 | 20 | 17 |
| 31 | 52 | ----- | 205 | 100 | ----- | 827 | ----- | 97 | ----- | 13 | 16 | ----- |
| Total | 2,986 | 4,505 | 5,869 | 6,310 | 5,286 | 6,862 | 8,458 | 2,863 | 7,514 | 1,046 | 700.2 | 446.2 |
| Mean | 96.3 | 150 | 189 | 204 | 182 | 221 | 282 | 92.4 | 250 | 33.7 | 22.6 | 14.9 |
| Cfs/m | 0.521 | 0.811 | 1.02 | 1.10 | 0.984 | 1.19 | 1.52 | 0.499 | 1.35 | 0.162 | 0.122 | 0.081 |
| In. | 0.60 | 0.91 | 1.18 | 1.27 | 1.06 | 1.38 | 1.70 | 0.58 | 1.51 | 0.21 | 0.14 | 0.09 |

Calendar year 1959: Max 1,330 Min 7.0 Mean 129 Cfs/m 0.697 In. 9.46
Water year 1959-60: Max 1,860 Min 8.3 Mean 144 Cfs/m 0.778 In. 10.63

Peak discharge (base, 800 cfs).--Oct. 7 (1 a.m.) 1,020 cfs (9.82 ft); Nov. 14 (8 p.m.) 1,210 cfs (10.50 ft); Dec. 12 (4 p.m.) 989 cfs (9.60 ft); Dec. 29 (2 a.m.) 861 cfs (8.97 ft); Jan. 13 (2 p.m.) 1,410 cfs (11.29 ft); Feb. 6 (4 p.m.) 847 cfs (8.90 ft); Feb. 11 (2 p.m.) 889 cfs (9.11 ft); Mar. 28 (time unknown) 1,310 cfs (10.9 ft); Apr. 18 (1 a.m.) 921 cfs (9.27 ft); June 15 (2:30 a.m.) 1,410 cfs (11.29 ft); June 17 (4:30 p.m.) 2,140 cfs (13.42 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Jan. 19 to Feb. 1, Mar. 7-29; discharge estimated on basis of recorded range in stage and records for River Rouge at Birmingham and River Rouge at Southfield.

1670. Middle River Rouge near Garden City, Mich.

Location.--Lat 42°20'55", long 83°18'45", in W $\frac{1}{2}$ sec. 6, T.2 S., R.10 E., on right bank 200 ft downstream from bridge on Inkster Road, 1.8 miles northeast of Garden City, and 6.0 miles upstream from mouth.

Drainage area.--104 sq mi.

Records available.--June 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 600.95 ft above mean sea level, datum of 1929. Prior to Oct. 18, 1948, wire-weight gage at site 200 ft upstream at same datum.

Average discharge.--13 years, 75.2 cfs.

Extremes.--Maximum discharge during year, 1,040 cfs June 17 (gage height, 8.6f ft); minimum, 5.6 cfs Sept. 12 (gage height, 1.48 ft).
1947-60: Maximum discharge, 2,150 cfs May 10, 1948 (gage height, 10.50 ft, from floodmark); minimum, 0.9 cfs Aug. 16, 1956.

Remarks.--Records good except those for periods of ice effect, which are fair. Occasional regulation by reservoirs above station since 1956.

Revisions.--WSP 1557: Drainage area.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Jan. 12

Jan. 13 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.6 | 9.0 | 3.0 | 116 | 1.5 | 6.2 | 5.0 | 335 |
| 1.8 | 18 | 6.0 | 433 | 2.0 | 32 | 7.0 | 620 |
| 2.0 | 31 | | | 3.0 | 121 | 8.3 | 950 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 16 | 25 | 48 | 81 | 77 | 38 | 250 | 79 | 56 | 50 | 8.6 | 14 |
| 2 | 12 | 20 | 45 | 77 | *87 | 34 | 184 | 73 | 57 | 45 | 28.6 | 12 |
| 3 | 11 | *18 | 36 | 108 | 59 | 35 | 158 | 62 | 57 | 102 | 28 | 9.6 |
| 4 | 11 | 31 | 33 | 86 | 58 | 35 | 145 | 55 | 46 | 70 | 24 | 9.6 |
| 5 | 17 | 89 | 39 | 60 | 91 | 35 | 130 | 49 | 54 | 49 | 20 | 9.1 |
| 6 | 257 | 67 | 57 | *45 | 362 | 35 | 112 | 43 | 33 | 35 | 16 | 8.1 |
| 7 | 194 | 49 | 49 | 40 | 304 | 35 | 109 | 43 | 28 | 30 | 40 | *8.1 |
| 8 | 102 | 38 | 53 | 55 | 168 | 35 | 104 | 40 | 24 | 26 | 30 | 9.1 |
| 9 | *69 | 37 | *47 | 35 | 117 | 35 | 92 | 44 | 22 | 24 | *20 | 9.6 |
| 10 | 47 | 60 | 33 | 31 | 180 | 35 | 61 | 72 | 22 | 22 | 24 | 8.6 |
| 11 | 82 | 94 | 78 | 40 | 388 | 35 | 74 | 68 | 22 | 24 | 17 | 8.1 |
| 12 | 50 | 90 | 237 | 193 | 253 | 35 | 75 | 58 | 25 | *22 | 16 | 7.6 |
| 13 | 39 | 153 | 147 | *590 | 144 | 35 | 68 | 52 | 109 | 26 | 14 | 9.1 |
| 14 | 30 | 354 | 108 | 434 | 98 | 35 | 64 | 54 | 509 | 31 | 14 | 9.1 |
| 15 | 23 | 173 | 63 | 316 | 79 | 35 | 88 | 50 | 376 | 27 | 19 | 9.1 |
| 16 | 23 | 163 | 80 | 229 | 61 | 40 | 123 | 44 | 365 | 24 | 16 | 9.6 |
| 17 | 22 | 149 | 70 | 145 | 65 | 40 | 258 | 44 | 230 | 20 | 14 | 12 |
| 18 | 19 | 133 | 62 | 127 | 67 | 45 | 237 | 41 | 443 | 24 | 13 | 19 |
| 19 | 16 | 70 | 53 | 111 | 60 | 50 | 192 | 38 | 208 | 22 | 12 | 23 |
| 20 | 16 | 45 | 44 | 81 | 60 | 60 | *129 | 46 | 134 | 21 | 14 | 24 |
| 21 | 14 | 44 | 41 | 70 | 44 | 70 | 108 | 43 | *95 | 19 | 22 | 18 |
| 22 | 14 | 42 | 39 | 68 | 45 | 70 | 98 | 44 | 78 | 19 | 18 | 15 |
| 23 | 19 | 37 | 33 | 57 | 42 | 60 | 84 | 40 | 75 | 20 | 16 | 13 |
| 24 | 49 | 43 | 31 | 56 | 45 | 55 | 73 | *37 | 68 | 18 | 14 | 13 |
| 25 | 33 | 49 | 31 | 64 | 44 | 55 | 90 | 31 | 54 | 18 | 14 | 12 |
| 26 | 25 | 45 | 36 | 59 | 60 | 62 | 111 | 28 | 44 | 19 | 14 | 12 |
| 27 | 25 | 47 | 72 | 61 | 45 | 125 | 95 | 29 | 36 | 24 | 14 | 11 |
| 28 | 21 | 52 | 233 | 72 | 41 | 491 | 75 | 31 | 32 | 17 | 13 | 11 |
| 29 | 19 | 49 | 262 | 82 | 38 | 546 | 62 | 65 | 31 | 14 | 22 | 9.6 |
| 30 | 18 | 47 | 179 | 93 | | *442 | 77 | 58 | 30 | 12 | 18 | 12 |
| 31 | 30 | | 115 | 84 | | 362 | | 80 | | 11 | 14 | |
| Total | 1,323 | 2,371 | 2,454 | 3,629 | 3,162 | 3,100 | 3,604 | 1,561 | 4,073 | 885 | 548.2 | 355.0 |
| Mean | 42.7 | 79.0 | 79.2 | 117 | 109 | 100 | 120 | 50.4 | 136 | 28.5 | 17.7 | 11.8 |
| Cfam | 0.411 | 0.760 | 0.762 | 1.12 | 1.05 | 0.962 | 1.15 | 0.485 | 1.31 | 0.274 | 0.170 | 0.113 |
| In. | 0.47 | 0.85 | 0.88 | 1.30 | 1.13 | 1.11 | 1.29 | 0.56 | 1.46 | 0.32 | 0.20 | 0.13 |

Calendar year 1959: Max 811 Min 3.8 Mean 62.0 Cfam 0.596 In. 8.10
Water year 1959-60: Max 930 Min 7.6 Mean 73.9 Cfam 0.711 In. 9.70

Peak discharge (base, 500 cfs).--Jan. 13 (3 p.m.), 668 cfs (7.24 ft); Mar. 29 (3 to 6 a.m.), 578 cfs (6.74 ft); June 14 (10 a.m.), 720 cfs (7.50 ft); June 17 (4 p.m.), 1,040 cfs (8.66 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 5-9, Feb. 26, 27, Mar. 3-25.

1680. Lower River Rouge at Inkster, Mich.

Location.--Lat 42°18'00", long 83°18'00", in S $\frac{1}{2}$ sec. 19, T.2 S., R.10 E., on right bank 10 ft downstream from bridge on John Daly Road, 0.6 mile northeast of Inkster, and $\frac{1}{4}$ miles upstream from mouth.

Drainage area.--82.9 sq mi.

Records available.--June 1947 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 593.14 ft above mean sea level, datum of 1929. Prior to Oct. 20, 1948, wire-weight gage at same site and datum.

Average discharge.--13 years, 53.0 cfs.

Extremes.--Maximum discharge during year, 1,010 cfs June 18 (gage height, 9.24 ft); minimum, 0.7 cfs Sept. 12.

1947-60: Maximum discharge, 3,120 cfs Apr. 4, 1950 (gage height, 12.42 ft); minimum, 0.2 cfs Sept. 13, 1955.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1174: 1948(M). WSP 1437: 1949. WSP 1557: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 2.8 | 0.8 | 4.0 | 60 |
| 2.9 | 1.8 | 5.0 | 161 |
| 3.0 | 4.0 | 7.0 | 490 |
| 3.2 | 10 | 9.0 | 950 |
| 3.4 | 19 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|
| 1 | 8.4 | 12 | 23 | 60 | 50 | 14 | 178 | 34 | 29 | 66 | 1.8 | 2.0 |
| 2 | 4.8 | 13 | 21 | 61 | *45 | 14 | 136 | 26 | 29 | 42 | 2.0 | 1.7 |
| 3 | 3.3 | *10 | 23 | 144 | 39 | 13 | 127 | 20 | 26 | 108 | 7.2 | 1.6 |
| 4 | 2.5 | 61 | 29 | 102 | 31 | 14 | 116 | 16 | 37 | 90 | 4.5 | 1.4 |
| 5 | 11 | 137 | 32 | 43 | 55 | 12 | 91 | 13 | 93 | 37 | 3.8 | 1.4 |
| 6 | 166 | 65 | 72 | *30 | 461 | *11 | 72 | 12 | 32 | 22 | 3.1 | 1.3 |
| 7 | 202 | 39 | 70 | 25 | 251 | 11 | 76 | 11 | 19 | 15 | 3.6 | *1.4 |
| 8 | 59 | 27 | 39 | 21 | 101 | 12 | 74 | 11 | 12 | 12 | 8.7 | 1.4 |
| 9 | *44 | 20 | *30 | 19 | 87 | 10 | 58 | 14 | 8.7 | 5.0 | *12 | 1.2 |
| 10 | 29 | 16 | 23 | 18 | 148 | 11 | 46 | 32 | 7.0 | 7.7 | 40 | 1.4 |
| 11 | 61 | 15 | 52 | 17 | 550 | 11 | 40 | 32 | 6.4 | 6.7 | 9.3 | 1.3 |
| 12 | 48 | 13 | 419 | 158 | 235 | 11 | 38 | 25 | 8.7 | *6.4 | 4.5 | 1.2 |
| 13 | 25 | 58 | 409 | *792 | 107 | 13 | 32 | 20 | 88 | 11 | 3.6 | .9 |
| 14 | 17 | 455 | 140 | 496 | 77 | 13 | 29 | 20 | 597 | 11 | 3.3 | 1.0 |
| 15 | 13 | 438 | 91 | 356 | 58 | 13 | 37 | 17 | 499 | 8.0 | 3.5 | 1.1 |
| 16 | 9.7 | 140 | 79 | 214 | 39 | 15 | 57 | 14 | 290 | 6.7 | 2.7 | 1.1 |
| 17 | 8.7 | 107 | 64 | 109 | 43 | 17 | 196 | 13 | 815 | 5.6 | 2.0 | 1.3 |
| 18 | 7.4 | 53 | 52 | 82 | 42 | 20 | 240 | 12 | 530 | 11 | 2.5 | 1.6 |
| 19 | 6.7 | 41 | 40 | 62 | 34 | 25 | 86 | 12 | 154 | 8.7 | 2.5 | 3.7 |
| 20 | 7.0 | 30 | 30 | 48 | 32 | 45 | *57 | 18 | 87 | 11 | 2.7 | 4.8 |
| 21 | 5.9 | 27 | 28 | 44 | 25 | 70 | 48 | 17 | *56 | 6.7 | 5.1 | 2.2 |
| 22 | 5.6 | 26 | 20 | 40 | 24 | 60 | 46 | 21 | 46 | 6.2 | 3.3 | 1.8 |
| 23 | 6.7 | 26 | 21 | 35 | 20 | 50 | 37 | 17 | 52 | 5.6 | 3.3 | 1.4 |
| 24 | 18 | 36 | 18 | 30 | 19 | 45 | 30 | *14 | 51 | 4.8 | 3.6 | 1.4 |
| 25 | 18 | 51 | 19 | 27 | 15 | 40 | 26 | 11 | 34 | 4.8 | 2.5 | 2.0 |
| 26 | 14 | 39 | 25 | 27 | 19 | 49 | 26 | 9.3 | 23 | 4.5 | 2.2 | 2.9 |
| 27 | 12 | 30 | 72 | 34 | 18 | 112 | 23 | 9.7 | 18 | 4.8 | 2.0 | 4.0 |
| 28 | 10 | 28 | 353 | 40 | 16 | 466 | 18 | 14 | 16 | 4.5 | 1.7 | 4.3 |
| 29 | 9.3 | 27 | 404 | 50 | 16 | 307 | 16 | 27 | 14 | 3.3 | 4.4 | 4.5 |
| 30 | 7.7 | 21 | 156 | 60 | ----- | 322 | 28 | 35 | 19 | 2.9 | 4.5 | 6.2 |
| 31 | 14 | ----- | 91 | 55 | ----- | 314 | ----- | 48 | ----- | 2.2 | 2.5 | ----- |
| Total | 854.7 | 2,061 | 2,945 | 3,299 | 2,657 | 2,140 | 2,084 | 595.0 | 3,696.8 | 546.1 | 158.4 | 63.5 |
| Mean | 27.6 | 68.7 | 95.0 | 106 | 91.6 | 69.0 | 69.5 | 19.2 | 123 | 17.6 | 5.11 | 2.12 |
| Cfsm | 0.333 | 0.829 | 1.15 | 1.28 | 1.10 | 0.832 | 0.838 | 0.232 | 1.48 | 0.212 | 0.062 | 0.026 |
| In. | 0.38 | 0.92 | 1.32 | 1.48 | 1.19 | 0.96 | 0.93 | 0.27 | 1.66 | 0.24 | 0.07 | 0.03 |

Calendar year 1959: Max 832 Min 1.4 Mean 53.2 Cfsm 0.642 In. 8.70

Water year 1959-60: Max 815 Min 0.9 Mean 57.7 Cfsm 0.696 In. 9.45

Peak discharge (base, 600 cfs).--Nov. 15 (5 a.m.) 635 cfs (7.74 ft); Jan. 14 (1 a.m.) 995 cfs (9.18 ft); Feb. 11 (10 p.m.) 630 cfs (7.72 ft); June 14 (8 a.m.) 878 cfs (8.71 ft); June 18 (2 a.m.) 1,010 cfs (9.24 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 6, 7, 22-24, Jan. 28 to Feb. 2, Mar. 15-25.

1695. Huron River at Commerce, Mich.

Location.--Lat 42°35'25", long 83°29'05", on line between NE $\frac{1}{4}$ and SE $\frac{1}{4}$ sec. 10, T.2 N., R.8 E., on downstream left abutment of bridge on Commerce Road, 10 ft upstream from Hayes Creek and 0.2 mile east of Commerce. Records include flow of Hayes Creek.

Drainage area.--51 sq mi, approximately, includes that of Hayes Creek.

Records available.--March 1946 to September 1960.

Gage.--Staff gage read twice daily. Datum of gage is 910.00 ft above mean sea level, datum of 1929.

Average discharge.--14 years, 41.9 cfs.

Extremes.--Maximum discharge during year, 107 cfs Apr. 18; maximum gage height, 2.06 ft Apr. 18, 25, 26; minimum discharge, 8.6 cfs Aug. 2 (gage height, 0.82 ft); minimum gage height, 0.76 ft June 11.
1946-60: Maximum discharge, 266 cfs Apr. 7, 1947 (gage height, 2.98 ft, from graph based on gage readings); maximum gage height, 3.10 ft May 12, 1948, from graph based on gage readings (backwater from debris); minimum discharge, 6.7 cfs June 25, 1959; minimum gage height, 0.66 ft Sept. 10, 1953.

Remarks.--Records good except those for period of ice effect, which are fair. Some regulation by dams operated for lake level control at outlets of Pontiac, Oxbow, and Union Lakes.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Jan. 31 to Feb. 15, June 9 to July 9)

| | | | |
|-----|-----|-----|-----|
| 0.8 | 8.8 | 1.6 | 57 |
| .9 | 12 | 2.2 | 115 |
| 1.2 | 27 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 26 | 27 | 50 | 46 | 50 | 45 | 99 | 90 | 33 | 20 | 9.7 | 12 |
| 2 | 25 | *26 | 46 | 46 | 50 | 45 | 99 | 81 | 31 | 18 | 8.8 | 11 |
| 3 | 25 | 28 | 45 | 47 | *49 | 45 | 101 | 76 | 30 | 23 | 12 | 11 |
| 4 | 24 | 29 | 42 | 46 | 51 | 45 | 103 | 74 | 28 | 18 | 13 | 10 |
| 5 | 49 | 32 | 42 | 46 | 54 | 45 | 103 | 70 | 28 | 16 | 15 | 11 |
| 6 | 62 | 32 | 43 | 46 | 55 | 45 | 102 | 67 | 26 | 16 | 14 | 11 |
| 7 | *60 | 32 | 42 | *47 | 55 | 40 | 102 | 65 | 22 | 17 | 13 | 11 |
| 8 | 60 | 32 | 42 | 47 | 55 | 40 | 101 | 63 | 20 | 17 | 13 | 10 |
| 9 | 60 | 32 | 42 | 47 | 55 | 40 | 99 | 61 | 18 | 17 | 13 | 11 |
| 10 | 59 | 32 | *46 | 47 | 58 | 40 | 95 | 59 | 16 | 16 | 14 | 11 |
| 11 | 54 | 35 | 50 | 47 | 61 | 40 | 92 | 57 | 13 | 17 | 15 | 11 |
| 12 | 51 | 33 | 59 | 51 | 58 | 40 | 89 | 55 | 13 | 18 | 15 | 11 |
| 13 | 47 | 34 | 60 | 67 | 51 | 40 | 83 | 52 | 21 | 19 | 14 | 11 |
| 14 | 44 | 49 | 58 | 65 | 51 | 40 | 80 | 50 | 31 | *19 | 14 | 11 |
| 15 | 40 | 52 | 63 | 67 | 48 | 39 | 91 | 48 | 30 | 18 | 14 | *11 |
| 16 | 37 | 51 | 66 | 68 | 47 | 39 | 94 | 45 | 34 | 16 | 13 | 11 |
| 17 | 37 | 51 | 63 | 67 | 46 | 39 | 102 | 41 | 43 | 11 | 13 | 11 |
| 18 | 36 | 50 | 60 | 64 | 45 | 39 | 106 | 39 | 41 | 10 | *13 | 11 |
| 19 | 33 | 46 | 56 | 61 | 43 | 39 | 102 | 38 | 39 | 11 | 13 | 14 |
| 20 | 32 | 45 | 51 | 57 | 42 | 39 | 99 | 39 | 36 | 11 | 13 | 17 |
| 21 | 29 | 46 | 48 | 53 | 42 | 39 | *99 | 39 | 35 | 9.7 | 13 | 16 |
| 22 | 26 | 49 | 47 | 50 | 42 | 39 | 99 | 41 | *32 | 14 | 12 | 16 |
| 23 | 25 | 52 | 46 | 47 | 41 | 39 | 99 | 48 | 31 | 12 | 12 | 16 |
| 24 | 28 | 58 | 45 | 46 | 39 | 40 | 98 | 46 | 30 | 11 | 11 | 16 |
| 25 | 28 | 58 | 45 | 46 | 42 | *42 | 106 | *46 | 28 | 9.7 | 10 | 16 |
| 26 | 27 | 57 | 45 | 45 | 45 | 46 | 105 | 42 | 25 | 11 | 13 | 16 |
| 27 | 26 | 57 | 43 | 46 | 46 | 55 | 97 | 40 | 24 | 11 | 11 | 16 |
| 28 | 26 | 58 | 49 | 46 | 46 | 64 | 93 | 40 | 22 | 11 | 11 | 16 |
| 29 | 26 | 57 | 50 | 46 | 45 | 72 | 92 | 39 | 22 | 12 | 12 | 16 |
| 30 | 26 | 52 | 49 | 47 | ----- | 88 | 96 | 36 | 20 | 11 | 13 | 16 |
| 31 | 26 | ----- | 47 | 49 | ----- | 99 | ----- | 34 | ----- | 11 | 12 | ----- |
| Total | 1,154 | 1,290 | 1,558 | 1,600 | 1,412 | 1,447 | 2,926 | 1,621 | 822 | 451.4 | 392.5 | 388 |
| Mean | 37.2 | 43.0 | 49.6 | 51.6 | 48.7 | 46.7 | 97.5 | 52.3 | 27.4 | 14.6 | 12.7 | 12.9 |
| Cfsm | 0.729 | 0.843 | 0.973 | 1.01 | 0.955 | 0.916 | 1.91 | 1.03 | 0.537 | 0.286 | 0.249 | 0.253 |
| In. | 0.84 | 0.94 | 1.12 | 1.17 | 1.03 | 1.06 | 2.13 | 1.18 | 0.60 | 0.33 | 0.29 | 0.28 |

Calendar year 1959: Max 157 Min 6.7 Mean 35.7 Cfsm 0.700 In. 9.51
Water year 1959-60: Max 106 Min 8.8 Mean 41.1 Cfsm 0.806 In. 10.97

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Feb. 29 to Mar. 14.

1700. Huron River at Milford, Mich.

Location.--Lat 42°34'45", long 83°37'35", in SE $\frac{1}{4}$ sec. 9, T. 2 N., R. 7 E., or right bank 200 ft upstream from bridge on General Motors Road, half a mile downstream from Sherwood Creek, and half a mile west of Milford.

Drainage area.--125 sq mi.

Records available.--September 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 880.00 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 105 cfs.

Extremes.--Maximum discharge during year, 301 cfs Mar. 31 (gage height, 6.82 ft); minimum, 15 cfs Mar. 26 (gage height, 4.21 ft).
1948-60: Maximum discharge, 645 cfs Apr. 5, 1950 (gage height, 8.25 ft); minimum daily, 8.3 cfs Sept. 17, 1949.

Remarks.--Records good except those for period of no gage-height record, which are fair. Flow below about 300 cfs regulated by powerplant $1\frac{1}{2}$ miles above station prior to May 20, 1957; occasional regulation for lake level control since.

Revisions (water years).--WSP 1337: 1952(m).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1, 2, May 30 to Sept. 30)

4.4 25
5.0 68
6.0 178
6.9 315

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----------------------------|-------|-------|-------|--------|-----------|-------|-------|-------|------------|-----------|-------|-------|
| 1 | 55 | 78 | 119 | 130 | 115 | 105 | 291 | 211 | 106 | 66 | 36 | 42 |
| 2 | 56 | *75 | 118 | 129 | 112 | 104 | 271 | 204 | 106 | 66 | 35 | 44 |
| 3 | 60 | 69 | 117 | 128 | 112 | 103 | 255 | 198 | 106 | 70 | 41 | 42 |
| 4 | 58 | 76 | 114 | 125 | *110 | 103 | 243 | 188 | 100 | 67 | 46 | 42 |
| 5 | 64 | 89 | 114 | 122 | 111 | 105 | 232 | 178 | 99 | 62 | 46 | 41 |
| 6 | 72 | 92 | 112 | 118 | 116 | 102 | 224 | 132 | 95 | 60 | 44 | 39 |
| 7 | *83 | 93 | 112 | *114 | 119 | 103 | 218 | 105 | 91 | 56 | 44 | 38 |
| 8 | 128 | 100 | 112 | 111 | 123 | 103 | 213 | 112 | 83 | 51 | 45 | 36 |
| 9 | 135 | 97 | 110 | 108 | 124 | 104 | 206 | 68 | 70 | 54 | 42 | 35 |
| 10 | 131 | 93 | *110 | 107 | 126 | 104 | 202 | 66 | 63 | 53 | 44 | 34 |
| 11 | 132 | 91 | 114 | 106 | 130 | 102 | 198 | 137 | 62 | 53 | 44 | 36 |
| 12 | 128 | 87 | 118 | 109 | 134 | 101 | 192 | 148 | 63 | 49 | 43 | 33 |
| 13 | 123 | 90 | 124 | 128 | 140 | a100 | 191 | 146 | 75 | 58 | 42 | 34 |
| 14 | 117 | 103 | 134 | 137 | 136 | a100 | 187 | 144 | 102 | *32 | 41 | 32 |
| 15 | 112 | 112 | 134 | 136 | 132 | a100 | 211 | 137 | 107 | 54 | 42 | *31 |
| 16 | 126 | 118 | 132 | 136 | 131 | a90 | 238 | 132 | 112 | 52 | 41 | 30 |
| 17 | 154 | 120 | 134 | 144 | 130 | a90 | 259 | 128 | 136 | 53 | 41 | 33 |
| 18 | 148 | 120 | 134 | 148 | 129 | a90 | 268 | 123 | 140 | 54 | *39 | 32 |
| 19 | 141 | 119 | 135 | 143 | 129 | a90 | 259 | 115 | 129 | 53 | 39 | 42 |
| 20 | 132 | 118 | 134 | 148 | 130 | a90 | 242 | 114 | 116 | 51 | 41 | 47 |
| 21 | 120 | 117 | 131 | 141 | 131 | a90 | *231 | 111 | 101 | 44 | 40 | 46 |
| 22 | 110 | 115 | 128 | 136 | 126 | a90 | 246 | 111 | 93 | 44 | 43 | 44 |
| 23 | 102 | 114 | 124 | 135 | 119 | a90 | 230 | 115 | *92 | 51 | 43 | 42 |
| 24 | 98 | 116 | 120 | 134 | 116 | a90 | 225 | 114 | 85 | 51 | 42 | 42 |
| 25 | 94 | 115 | 118 | 131 | 112 | *67 | 231 | *112 | 82 | 49 | 42 | 40 |
| 26 | 88 | 116 | 115 | 130 | 110 | 52 | 237 | 110 | 78 | 49 | 40 | 39 |
| 27 | 84 | 118 | 114 | 126 | 108 | 136 | 234 | 107 | 72 | 50 | 38 | 39 |
| 28 | 82 | 120 | 120 | 124 | 108 | 147 | 230 | 110 | 66 | 42 | 37 | 39 |
| 29 | 78 | 120 | 128 | 123 | 106 | 209 | 224 | 110 | 65 | 39 | 39 | 31 |
| 30 | 75 | 119 | 131 | 119 | ----- | 279 | 216 | 107 | 64 | 37 | 46 | 31 |
| 31 | 73 | ----- | 131 | 118 | ----- | 300 | ----- | 107 | ----- | 36 | 46 | ----- |
| Total | 3,159 | 3,110 | 3,791 | 3,943 | 3,525 | 3,537 | 6,904 | 4,000 | 2,759 | 1,636 | 1,292 | 1,136 |
| Mean | 102 | 104 | 122 | 127 | 122 | 114 | 230 | 129 | 92.0 | 52.8 | 41.7 | 37.9 |
| Cfsm | 0.816 | 0.832 | 0.976 | 1.02 | 0.976 | 0.912 | 1.84 | 1.03 | 0.736 | 0.422 | 0.334 | 0.303 |
| In. | 0.94 | 0.93 | 1.13 | 1.17 | 1.05 | 1.05 | 2.05 | 1.19 | 0.82 | 0.49 | 0.38 | 0.34 |
| Calendar year 1959: Max 314 | | | | Min 10 | Mean 97.3 | | | | Cfsm 0.778 | In. 10.57 | | |
| Water year 1959-60: Max 300 | | | | Min 30 | Mean 106 | | | | Cfsm 0.848 | In. 11.54 | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Commerce and near New Hudson.

1705. Huron River near New Hudson, Mich.

Location.--Lat 42°30'45", long 83°40'35", in NE $\frac{1}{4}$ sec.1, T.1 N., R.6 E., on right bank 150 ft downstream from Kent Lake Dam, 2 miles upstream from Woodruff Creek, and 3 miles west of New Hudson.

Drainage area.--143 sq mi.

Records available.--August 1948 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 868.00 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 119 cfs.

Extremes.--Maximum discharge during year, 313 cfs Nov. 2 (gage height, 2.88 ft); minimum, 19 cfs Mar. 17, Apr. 14 (gage height, 0.77 ft); minimum daily, 34 cfs Sept. 13-16. 1948-60: Maximum discharge, 1,080 cfs Dec. 29, 1950 (gage height, 5.05 ft), from rating curve extended above 600 cfs by logarithmic plotting; minimum, 3.4 cfs July 18, 1952; minimum gage height, 0.63 ft Mar. 16, 17, 1953.

Remarks.--Records good except those for period of no gage-height record, which are fair. Occasional regulation by Kent Lake.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-19)

| | |
|-----|-----|
| 0.9 | 29 |
| 1.2 | 60 |
| 2.0 | 175 |
| 3.0 | 332 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 50 | 86 | 127 | 138 | 126 | 132 | 125 | 218 | 115 | 78 | a50 | 52 |
| 2 | 45 | *148 | 168 | 139 | 124 | 130 | 211 | 206 | 118 | 70 | a58 | 50 |
| 3 | 45 | 157 | 180 | 140 | 166 | 130 | 246 | 199 | 114 | 83 | 65 | 44 |
| 4 | 48 | 134 | 152 | 136 | *164 | 130 | 257 | 162 | 108 | 77 | 68 | 45 |
| 5 | 80 | 122 | 142 | 133 | 163 | 128 | 255 | 118 | 104 | 70 | 68 | 44 |
| 6 | 133 | 110 | 138 | 130 | 164 | 127 | 250 | 139 | 96 | 68 | 63 | 40 |
| 7 | *122 | 108 | 168 | *127 | 163 | 127 | 244 | 122 | 92 | 63 | 63 | 39 |
| 8 | 118 | 103 | 176 | 130 | 160 | 127 | 238 | 120 | 85 | 58 | 66 | 39 |
| 9 | 121 | 176 | 148 | 132 | 158 | 127 | 233 | 110 | 78 | 56 | 66 | 38 |
| 10 | 130 | 187 | *134 | 124 | 157 | 127 | 226 | 65 | 73 | 58 | 73 | 37 |
| 11 | 134 | 145 | 191 | 115 | 126 | 127 | 216 | 49 | 70 | 56 | 65 | 37 |
| 12 | 133 | 124 | 205 | 122 | 76 | 127 | 217 | 86 | 72 | 53 | 60 | 36 |
| 13 | 128 | 124 | 166 | 152 | 87 | 126 | 211 | 110 | 85 | 64 | 56 | 34 |
| 14 | 124 | 140 | 150 | 152 | 108 | 124 | 122 | 127 | 104 | *68 | 59 | 34 |
| 15 | 114 | 138 | 146 | 160 | 126 | 122 | 98 | 128 | 112 | 58 | 64 | *34 |
| 16 | 102 | 204 | 144 | 154 | 142 | 121 | 176 | 132 | 118 | 54 | 56 | 34 |
| 17 | 124 | 228 | 144 | 154 | 156 | 66 | 228 | 132 | 146 | 54 | 53 | 35 |
| 18 | 136 | 180 | 142 | 158 | 157 | 53 | 255 | 130 | 144 | 54 | 52 | 40 |
| 19 | 136 | 156 | 138 | 166 | 152 | 78 | 263 | 124 | 140 | 54 | *50 | 50 |
| 20 | 139 | 142 | 138 | 163 | 148 | 93 | 258 | 124 | 132 | 52 | 48 | 59 |
| 21 | 128 | 138 | 139 | 160 | 152 | 102 | *250 | 120 | 120 | 47 | 48 | 58 |
| 22 | 118 | 132 | 136 | 156 | 152 | 110 | 239 | 124 | *112 | 45 | 50 | 54 |
| 23 | 115 | 128 | 134 | 152 | 150 | 110 | 239 | 126 | 108 | 48 | 49 | 54 |
| 24 | 115 | 132 | 130 | 150 | 145 | 112 | 230 | 124 | 94 | 46 | 46 | 52 |
| 25 | 104 | 130 | 128 | 146 | 145 | *112 | 268 | 121 | 93 | 46 | 45 | 50 |
| 26 | 165 | 130 | 127 | 145 | 145 | 83 | 252 | *120 | 90 | 47 | 43 | 49 |
| 27 | 205 | 128 | 132 | 184 | 140 | 108 | 238 | 116 | 85 | 53 | 44 | 49 |
| 28 | 145 | 130 | 145 | 225 | 136 | 118 | 228 | 120 | 81 | a54 | 42 | 49 |
| 29 | 116 | 128 | 140 | 193 | 134 | 83 | 223 | 121 | 78 | a52 | 48 | 47 |
| 30 | 99 | 126 | 138 | 175 | ----- | 187 | 217 | 121 | 76 | a50 | 56 | 47 |
| 31 | 94 | ----- | 138 | 163 | ----- | 139 | ----- | 118 | ----- | a50 | 53 | ----- |
| Total | 3,566 | 4,212 | 4,584 | 4,674 | 4,122 | 3,586 | 6,713 | 3,932 | 3,043 | 1,786 | 1,727 | 1,330 |
| Mean | 115 | 140 | 148 | 151 | 122 | 116 | 224 | 127 | 101 | 57.6 | 55.7 | 44.3 |
| Cfsm | 0.804 | 0.979 | 1.03 | 1.06 | 0.993 | 0.811 | 1.57 | 0.888 | 0.706 | 0.403 | 0.390 | 0.310 |
| In. | 0.93 | 1.10 | 1.19 | 1.22 | 1.07 | 0.93 | 1.75 | 1.02 | 0.79 | 0.46 | 0.45 | 0.35 |

Calendar year 1959: Max 318 Min 32 Mean 109 Cfsm 0.762 In. 10.33

Water year 1959-60: Max 268 Min 34 Mean 118 Cfsm 0.825 In. 11.23

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for stations at Milford and near Hamburg.

1715. Ore Creek near Brighton, Mich.

Location.--Lat 42°29'40", long 83°48'05", in NW¼ sec.12, T.1 N., R.5 E., on downstream side of bridge on Hamburg Road, half a mile upstream from Ore Lake and 2½ miles southwest of Brighton.

Drainage area.--31 sq mi, approximately.

Records available.--March 1951 to September 1960.

Gage.--Wire-weight gage read twice daily. Datum of gage is 850.56 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--9 years, 24.9 cfs.

Extremes.--Maximum discharge during year, 104 cfs Apr. 3 (gage height, 15.85 ft); minimum, 4.7 cfs Sept. 9, 11; minimum gage height, 14.07 ft Sept. 11, 18.
1951-60: Maximum discharge observed, 193 cfs May 13, 1956 (gage height, 16.50 ft); minimum, 1.5 cfs July 16, 1952; minimum gage height, 13.82 ft Oct. 4, 1955.

Remarks.--Records fair except those for periods of ice effect or no gage-height record, which are poor. Occasional regulation by lakes above station.

Revisions (water years).--WSP 1437: 1951(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 24 to Sept. 10)

| | | | |
|------|-----|------|-----|
| 13.9 | 2.9 | 14.3 | 18 |
| 14.0 | 5.1 | 15.9 | 109 |
| 14.1 | 8.3 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 13 | 25 | 37 | 37 | 28 | 26 | 89 | 48 | 30 | 22 | 10 | 6.1 |
| 2 | 15 | 25 | 36 | 37 | 26 | b25 | 102 | 46 | 28 | 22 | 10 | 7.0 |
| 3 | 12 | 28 | 36 | 37 | 25 | 25 | 104 | 43 | 27 | 21 | 10 | 7.0 |
| 4 | 13 | *35 | 34 | 36 | *25 | 25 | 94 | 40 | 25 | 20 | 10 | 7.3 |
| 5 | 29 | 34 | 36 | 35 | 26 | 25 | 90 | 37 | 22 | 20 | 10 | 7.3 |
| 6 | 55 | 38 | 35 | 32 | 36 | 25 | 84 | 35 | 20 | 19 | 10 | 6.1 |
| 7 | 60 | 37 | 35 | *31 | 37 | 25 | 80 | 53 | 18 | 19 | 10 | 5.4 |
| 8 | *55 | 35 | 34 | 30 | 36 | b25 | 74 | 32 | 16 | 18 | 10 | 5.1 |
| 9 | 55 | 34 | 34 | 29 | 36 | 23 | 69 | 31 | 15 | 16 | 11 | 4.9 |
| 10 | 55 | 35 | *31 | 28 | 40 | 22 | 63 | 35 | 15 | 17 | 11 | 5.1 |
| 11 | 55 | 33 | 32 | 27 | 47 | 20 | 60 | 35 | 15 | 17 | 11 | 4.9 |
| 12 | 55 | 30 | 44 | 30 | 47 | 19 | 53 | 32 | 15 | 16 | 11 | 5.1 |
| 13 | 56 | 34 | 42 | 52 | 43 | 19 | 48 | 32 | 18 | 16 | 11 | 5.4 |
| 14 | 53 | 55 | 41 | 48 | 42 | 19 | 47 | 32 | 42 | 15 | 11 | *6.4 |
| 15 | 50 | 51 | 36 | 52 | 41 | b20 | 54 | 32 | 40 | 15 | 10 | 7.0 |
| 16 | 40 | 50 | 40 | 53 | 38 | 20 | 63 | 31 | 48 | 15 | 10 | 7.3 |
| 17 | 35 | 50 | 42 | 52 | 38 | 21 | 68 | 32 | 56 | 14 | 10 | 6.7 |
| 18 | 34 | 47 | 42 | 52 | 37 | 20 | 68 | 32 | 51 | 14 | 9 | 6.1 |
| 19 | 31 | 47 | 40 | 52 | 35 | 20 | *66 | 30 | 48 | 14 | *8.3 | 10 |
| 20 | 29 | 46 | 37 | 48 | 33 | 20 | 66 | 32 | 42 | *14 | 8 | 11 |
| 21 | 26 | 47 | 35 | 44 | 32 | 20 | 62 | 32 | 38 | 13 | 8 | 13 |
| 22 | 25 | 46 | 34 | 40 | 31 | 21 | 60 | 32 | *35 | 13 | 8 | 14 |
| 23 | 25 | 46 | 31 | 38 | 30 | 22 | 56 | 32 | 32 | 12 | 8 | 14 |
| 24 | 29 | 49 | 29 | 36 | 30 | 22 | 55 | 30 | 31 | 12 | 8 | 15 |
| 25 | 28 | 47 | 26 | 34 | 29 | b22 | 74 | 28 | 30 | 12 | 8 | 15 |
| 26 | 27 | 45 | 30 | 31 | 29 | 23 | 70 | *28 | 28 | 11 | 8 | 14 |
| 27 | 26 | 41 | 35 | 31 | 28 | 30 | 62 | 26 | 27 | 11 | 8 | 15 |
| 28 | 25 | 40 | 35 | 30 | 28 | *40 | 56 | 26 | 25 | 11 | 8 | 15 |
| 29 | 25 | 39 | 38 | 29 | 28 | 54 | 52 | 29 | 24 | 11 | 7 | 14 |
| 30 | 24 | 37 | 38 | 29 | ----- | 70 | 50 | 29 | 23 | 11 | 7.0 | 14 |
| 31 | 25 | ----- | 37 | 28 | ----- | 82 | ----- | 32 | ----- | 11 | 6.7 | ----- |
| Total | 1,083 | 1,206 | 1,112 | 1,168 | 981 | 850 | 2,039 | 1,024 | 884 | 474 | 286.0 | 274.2 |
| Mean | 34.9 | 40.2 | 35.9 | 37.7 | 33.8 | 27.4 | 68.0 | 33.0 | 29.5 | 15.3 | 9.23 | 9.14 |
| Cfsm | 1.13 | 1.30 | 1.16 | 1.22 | 1.09 | 0.684 | 2.19 | 1.06 | 0.952 | 0.494 | 0.298 | 0.295 |
| In. | 1.30 | 1.45 | 1.33 | 1.40 | 1.18 | 1.02 | 2.45 | 1.23 | 1.06 | 0.57 | 0.34 | 0.33 |

Calendar year 1959: Max 100 Min 2.5 Mean 26.4 Cfsm 0.852 In. 11.56
Water year 1959-60: Max 104 Min 4.9 Mean 31.1 Cfsm 1.00 In. 13.66

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Oct. 9-12, 16, Nov. 17, 26, Dec. 6, 16, 26-28, Jan. 1, 2, 17, 22-25, Feb. 14, 16-28, Mar. 13, 20-22, 27, 30, Apr. 11, 22, 30, May 1, 8, June 2-8, 19-21, June 23 to July 19, July 21 to Aug. 18, Aug. 20-29; discharge estimated on basis of records for Huron River near Hamburg and Huron River near Commerce.

1720. Huron River near Hamburg, Mich.

Location.--Lat 42°27'55", long 83°48'00", sec.24, T.1 N., R.5 E., on right bank at downstream side of bridge on Hamburg Road, 1.1 miles north of Hamburg and 3 miles upstream from Strawberry Lake.

Drainage area.--299 sq mi.

Records available.--October 1951 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 850.00 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). Prior to Aug. 12, 1953, staff gage at same site and datum.

Average discharge.--9 years, 220 cfs.

Extremes.--Maximum discharge during year, 716 cfs Apr. 1 (gage height, 6.32 ft); minimum, 67 cfs Sept. 14; minimum gage height, 3.62 ft Sept. 16, 17.
1951-60: Maximum discharge, 1,560 cfs May 15, 1956 (gage height, 8.35 ft); minimum, 44 cfs July 18, 1959; minimum gage height, 3.31 ft May 22, 23, 1958.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Occasional regulation by Kent Lake 11 miles above station.

Discharge, in cubic feet per second, water year October 1959 to September 1930

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 113 | 185 | 239 | 286 | 292 | 230 | 707 | 441 | 225 | 164 | 77 | 89 |
| 2 | 106 | 174 | 234 | 284 | 280 | 230 | 690 | 420 | 219 | 160 | 75 | 86 |
| 3 | 101 | 196 | 248 | 286 | 280 | 230 | 688 | 401 | 216 | 172 | 77 | 84 |
| 4 | 100 | *237 | 268 | 286 | 290 | 230 | 682 | 385 | 208 | 174 | 89 | 81 |
| 5 | 120 | 252 | 266 | 286 | 300 | 230 | 665 | 361 | 198 | 171 | 101 | 81 |
| 6 | 205 | 252 | 264 | 283 | 310 | 230 | 640 | 319 | 187 | 160 | 103 | 78 |
| 7 | 284 | 237 | 261 | 275 | 330 | 230 | 607 | 300 | 171 | 147 | 103 | 75 |
| 8 | *313 | 226 | 262 | 288 | 340 | 230 | 575 | 279 | 157 | 139 | 106 | 73 |
| 9 | 317 | 216 | 271 | 252 | 350 | 230 | 543 | 262 | 140 | 128 | 110 | 72 |
| 10 | 305 | 234 | *255 | 239 | 350 | 230 | 512 | 261 | 130 | 124 | 118 | 71 |
| 11 | 304 | 266 | 243 | 230 | 350 | 230 | 482 | 230 | 120 | 122 | 118 | 71 |
| 12 | 298 | 253 | 263 | 237 | 340 | 230 | 463 | 214 | 118 | 118 | 112 | 71 |
| 13 | 286 | 237 | 319 | 309 | 300 | 220 | 434 | 226 | 132 | 114 | 104 | 71 |
| 14 | 273 | 270 | 317 | 358 | 310 | 210 | 415 | 244 | 183 | 125 | 103 | *69 |
| 15 | 261 | 296 | 300 | 417 | 320 | 200 | 385 | 253 | 217 | 125 | 106 | 69 |
| 16 | 244 | 305 | 294 | 453 | 330 | 190 | 363 | 253 | 243 | 114 | 101 | 69 |
| 17 | 230 | 321 | 294 | 458 | 340 | 170 | 401 | 250 | 296 | 112 | 96 | 71 |
| 18 | 226 | 341 | 290 | 446 | 340 | 150 | 458 | 252 | 319 | 112 | 91 | 73 |
| 19 | 226 | 344 | 281 | 429 | 340 | 170 | *510 | 250 | 337 | 107 | *87 | 75 |
| 20 | 225 | 315 | 270 | 406 | 340 | 160 | 546 | 250 | 333 | *104 | 85 | 78 |
| 21 | 219 | 290 | 255 | 394 | 320 | 200 | 554 | 250 | 313 | 100 | 85 | 82 |
| 22 | 214 | 271 | 246 | 380 | 300 | 210 | 541 | 252 | *294 | 96 | 86 | 85 |
| 23 | 207 | 262 | 237 | 360 | 290 | 220 | 518 | 253 | 275 | 91 | 86 | 88 |
| 24 | 212 | 264 | 228 | 350 | 280 | 220 | 492 | 253 | 259 | 89 | 84 | 90 |
| 25 | 212 | 270 | 225 | 320 | 270 | 220 | 495 | 246 | 235 | 87 | 81 | 92 |
| 26 | 208 | 268 | 219 | 310 | 260 | 220 | 512 | *237 | 217 | 85 | 78 | 93 |
| 27 | 219 | 266 | 230 | 300 | 260 | 220 | 520 | 226 | 205 | 87 | 80 | 94 |
| 28 | 252 | 261 | 257 | 294 | *252 | *260 | 502 | 221 | 190 | 89 | 80 | 93 |
| 29 | 243 | 255 | 284 | 321 | 248 | 360 | 478 | 230 | 180 | 87 | 81 | 92 |
| 30 | 210 | 246 | 292 | *323 | ----- | 504 | 458 | 232 | 167 | 85 | 87 | 92 |
| 31 | 192 | ----- | 294 | 305 | ----- | 643 | ----- | 234 | ----- | 81 | 91 | ----- |
| Total | 6,925 | 7,810 | 8,226 | 10,165 | 8,912 | 7,517 | 15,836 | 8,485 | 6,484 | 3,669 | 2,881 | 2,408 |
| Mean | 223 | 280 | 265 | 328 | 307 | 242 | 528 | 274 | 216 | 118 | 92.9 | 80.3 |
| Cfsm | 0.746 | 0.870 | 0.886 | 1.10 | 1.03 | 0.809 | 1.77 | 0.916 | 0.722 | 0.395 | 0.311 | 0.269 |
| In. | 0.86 | 0.97 | 1.02 | 1.26 | 1.11 | 0.93 | 1.97 | 1.06 | 0.81 | 0.46 | 0.36 | 0.30 |

Calendar year 1959: Max 759 Min 45 Mean 218 Cfsm 0.729 In. 9.86
Water year 1959-60: Max 707 Min 69 Mean 244 Cfsm 0.816 In. 11.11

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 22-27, Feb. 2-27, Mar. 1-27, Sept. 19-30; discharge estimated on basis of recorded range in stage and records for stations near Dexter and near New Hudson.

1725. Portage Creek near Pinckney, Mich.

Location.--Lat 42°25'40", long 83°57'35", in SW $\frac{1}{4}$ sec.34, T.1 N., R.4 E., on right up-stream abutment of bridge on Tipiady Road, 2 miles upstream from Little Portage Lake and 2 $\frac{1}{4}$ miles southwest of Pinckney.

Drainage area.--79 sq mi, approximately.

Records available.--November 1944 to September 1960.

Gage.--Staff gage read once daily. Datum of gage is 860.38 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation).

Average discharge.--16 years, 53.6 cfs.

Extremes.--Maximum discharge during year, 214 cfs Apr. 4-7 (gage height, 4.12 ft); minimum, 2.3 cfs Sept. 15-17 (gage height, 0.74 ft).
1944-60: Maximum discharge, 529 cfs Apr. 9, 10, 1947 (gage height, 5.72 ft); minimum, 0.6 cfs Oct. 5, 1946 (gage height, 0.56 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Regulation by Hiland Lake 2 $\frac{1}{2}$ miles above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 12 to Feb. 13, June 17-25, Sept. 10-23)

| | | | |
|-----|-----|-----|-----|
| 0.5 | 1.3 | 2.0 | 33 |
| .6 | 2.5 | 2.5 | 51 |
| 1.0 | 9.2 | 3.0 | 80 |
| 1.5 | 20 | 4.2 | 225 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|
| 1 | 12 | a45 | 73 | a66 | 81 | 69 | 157 | a125 | 56 | 46 | 18 | 13 |
| 2 | 12 | 45 | 71 | 66 | 80 | 69 | 175 | 123 | 58 | 45 | 15 | 12 |
| 3 | 13 | 43 | 70 | a66 | 87 | b60 | a200 | 121 | 56 | a45 | 14 | 8.2 |
| 4 | a14 | *46 | 68 | 66 | *77 | b60 | 214 | 117 | 49 | a45 | 22 | a8 |
| 5 | 15 | 56 | 68 | 66 | 71 | b60 | 214 | 114 | a48 | 46 | 19 | a8 |
| 6 | 41 | 54 | a68 | 66 | 80 | a50 | 214 | 108 | 46 | 44 | 18 | 7.3 |
| 7 | 41 | 52 | 68 | 63 | a80 | b50 | 214 | 106 | 45 | 43 | a18 | 6.1 |
| 8 | *37 | a52 | 68 | *59 | 84 | b50 | 211 | a100 | 32 | 40 | 17 | 5.3 |
| 9 | 46 | 51 | 66 | b58 | 88 | b50 | 203 | 93 | 30 | 37 | 19 | 4.2 |
| 10 | 48 | 51 | 64 | a54 | 102 | b50 | a200 | 95 | a30 | a35 | 18 | 4.0 |
| 11 | a60 | a50 | *64 | 52 | 106 | b45 | 180 | 89 | a30 | 33 | 18 | a3.5 |
| 12 | 68 | 50 | 71 | 59 | 106 | b45 | 173 | 87 | a32 | 32 | 17 | 3.2 |
| 13 | 62 | 50 | a72 | 79 | 114 | a45 | 165 | 85 | 35 | 29 | 15 | 3.1 |
| 14 | 62 | 67 | 71 | 79 | a110 | 44 | 157 | 82 | 45 | 30 | a14 | 2.6 |
| 15 | 60 | a68 | 71 | 90 | 111 | b45 | 157 | a80 | 46 | *28 | 13 | 2.3 |
| 16 | 60 | 68 | 73 | 103 | 98 | 45 | 157 | 77 | 50 | 29 | 14 | *2.3 |
| 17 | 60 | 74 | 71 | a110 | 97 | 45 | a160 | 75 | 75 | a30 | 14 | 2.3 |
| 18 | a58 | 80 | 71 | 112 | 93 | 42 | 157 | 72 | 72 | 29 | 15 | a4 |
| 19 | 56 | 80 | 70 | 114 | 91 | 41 | *153 | 69 | a72 | 28 | *16 | 5.0 |
| 20 | 54 | 78 | a70 | 116 | 90 | a40 | 140 | 60 | 72 | 25 | 14 | 4.8 |
| 21 | 54 | 78 | 68 | 116 | a88 | 41 | 140 | 59 | 72 | 23 | a15 | 5.0 |
| 22 | 52 | a78 | 65 | 111 | a86 | 43 | 140 | a60 | 72 | 23 | 15 | 5.1 |
| 23 | 54 | 78 | 63 | 104 | 82 | 45 | 140 | 63 | *76 | 22 | 14 | 5.6 |
| 24 | 54 | 81 | 62 | a100 | 82 | 41 | a140 | 63 | 74 | a22 | 14 | 5.8 |
| 25 | a50 | 81 | a60 | b90 | 82 | 41 | 140 | 62 | 71 | 23 | 14 | a7 |
| 26 | 49 | a80 | 58 | b80 | 79 | 40 | 133 | *59 | a70 | 22 | 13 | 7.5 |
| 27 | 49 | 78 | a60 | b80 | 73 | a50 | 133 | 58 | 64 | 22 | 14 | 8.1 |
| 28 | 47 | 78 | 66 | b80 | b70 | *60 | 133 | 60 | 61 | 20 | a12 | 8.2 |
| 29 | 45 | a78 | 68 | b80 | 69 | 68 | 133 | a58 | 60 | 18 | 11 | 8.8 |
| 30 | 43 | 77 | 68 | b80 | ----- | 99 | 128 | a58 | 57 | 18 | 11 | 9.8 |
| 31 | 45 | ----- | 67 | a80 | ----- | 121 | ----- | 56 | ----- | a18 | 24 | ----- |
| Total | 1,421 | 1,947 | 2,093 | 2,545 | 2,557 | 1,654 | 4,961 | 2,534 | 1,656 | 850 | 485 | 180.1 |
| Mean | 45.8 | 64.9 | 67.5 | 82.1 | 88.2 | 53.4 | 165 | 81.7 | 55.2 | 36.6 | 15.6 | 6.00 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 205 | | | Min | 1.2 | Mean | 49.9 | Cfsm | 0.632 | In. | 8.58 | |
| Water year 1959-60: Max | 214 | | | Min | 2.3 | Mean | 62.8 | Cfsm | 0.795 | In. | 10.82 | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for Huron River near Dexter and Ore Creek near Brighton.

b Stage-discharge relation affected by ice.

1730. Huron River near Dexter, Mich.

Location.--Lat 42°23'10", long 83°54'40", in S $\frac{1}{2}$ sec.13, T.1 S., R.4 E., on right bank 20 ft downstream from highway bridge on North Territorial Road, half a mile east of Hudson Mills, 2 miles downstream from Portage Lake Outlet, and 4 miles north of Dexter.

Drainage area.--506 sq mi.

Records available.--August to December 1904 (gage heights only), March 1946 to September 1960. Published as "at Dover" 1904.

Gage.--Water-stage recorder. Datum of gage is 837.11 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). August to December 1904 chain gage at site 1 mile upstream at different datum. Mar. 5, 1946, to July 30, 1953, wire-weight gage at present site and datum.

Average discharge.--14 years, 400 cfs.

Extremes.--Maximum discharge during year, 1,110 cfs Apr. 4, 5 (gage height, 5.29 ft); minimum, 96 cfs Sept. 17, 18, 19; minimum gage height, 2.88 ft Sept. 17, 18.
1946-60: Maximum discharge, 3,120 cfs Apr. 9, 1947 (gage height, 8.17 ft, from graph based on gage readings); minimum, 40 cfs July 16, 17, 18, 1959.

Remarks.--Records good except those for period of no gage-height record, which are fair. Occasional regulation by lake level control operations above station.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)
(Shifting-control method used Aug. 1 to Sept. 18)

| | | | |
|-----|-----|-----|-------|
| 2.9 | 80 | 4.0 | 439 |
| 3.0 | 100 | 5.4 | 1,180 |
| 3.5 | 228 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|--------|--------|--------|--------|----------|------------|-----------|--------|-------|-------|-------|
| 1 | 156 | 303 | 425 | 465 | 490 | 393 | 894 | 758 | 430 | 344 | 148 | 132 |
| 2 | 156 | 291 | 416 | 480 | 480 | 380 | 1,080 | 730 | 421 | 316 | 146 | 132 |
| 3 | 154 | 275 | 407 | 480 | 448 | 375 | 1,100 | 705 | 411 | 330 | 151 | 132 |
| 4 | 151 | *308 | 407 | 467 | 430 | 362 | 1,110 | 680 | 393 | 316 | 158 | 122 |
| 5 | 161 | 352 | 421 | 448 | *434 | 352 | 1,110 | 655 | 388 | 303 | 158 | 120 |
| 6 | 210 | 380 | 434 | 416 | 476 | 348 | 1,100 | 620 | 370 | 295 | 158 | 118 |
| 7 | 275 | 384 | 439 | 398 | 514 | 348 | 1,070 | 591 | 276 | 283 | 161 | 115 |
| 8 | *339 | 380 | 434 | *393 | 543 | 339 | 1,030 | 562 | 222 | 271 | 166 | 113 |
| 9 | 380 | 366 | 430 | 393 | 571 | 326 | 1,000 | 533 | 228 | 256 | 168 | 113 |
| 10 | 402 | 352 | 430 | 384 | 606 | 321 | 950 | 519 | 228 | 238 | 171 | 113 |
| 11 | 425 | 357 | *430 | 375 | 640 | 308 | 906 | 509 | 222 | 228 | 171 | 109 |
| 12 | 421 | 370 | 457 | 398 | 655 | 299 | 868 | 485 | 219 | 225 | 171 | 107 |
| 13 | 421 | 393 | 476 | 485 | 650 | 291 | 818 | 462 | 242 | 219 | 171 | 104 |
| 14 | 416 | 448 | 490 | 576 | 630 | 287 | 785 | 453 | 291 | 213 | 171 | *100 |
| 15 | 407 | 476 | 499 | 635 | 608 | 283 | 785 | 448 | 348 | *207 | 171 | 100 |
| 16 | 393 | 485 | 504 | 670 | 586 | 279 | 768 | 448 | 411 | 195 | 164 | 98 |
| 17 | 380 | 504 | 499 | 700 | 571 | a280 | 774 | 448 | 504 | 190 | 161 | 96 |
| 18 | 357 | 543 | 485 | 710 | 567 | a310 | 796 | 448 | 543 | 193 | 156 | 98 |
| 19 | 344 | 606 | 485 | 680 | 543 | a320 | *812 | 439 | 576 | 190 | *151 | 107 |
| 20 | 330 | 581 | 467 | 690 | 523 | a330 | 829 | 448 | 591 | 187 | 146 | 113 |
| 21 | 326 | 547 | 457 | 665 | 509 | a340 | 840 | 439 | 591 | 182 | 146 | 120 |
| 22 | 316 | 519 | 439 | 635 | 495 | a340 | 851 | 448 | 586 | 179 | 146 | 124 |
| 23 | 312 | 495 | 416 | 610 | 476 | a340 | 846 | 448 | 571 | 171 | 146 | 132 |
| 24 | 321 | 490 | 402 | 581 | 462 | a350 | 829 | 444 | *538 | 164 | 146 | 136 |
| 25 | 321 | 485 | 388 | 543 | 448 | a350 | 829 | 434 | 499 | 161 | 141 | 136 |
| 26 | 316 | 476 | 380 | 519 | 444 | a360 | 829 | *425 | 462 | 158 | 136 | 139 |
| 27 | 312 | 471 | 388 | 509 | 434 | a370 | 829 | 421 | 430 | 164 | 139 | 139 |
| 28 | 312 | 462 | 421 | 495 | 421 | *416 | 818 | 430 | 407 | 161 | 136 | 136 |
| 29 | 326 | 453 | 457 | 490 | 411 | 581 | 796 | 434 | 380 | 156 | 132 | 136 |
| 30 | 326 | 434 | 476 | 495 | 495 | 736 | 780 | 439 | 352 | 156 | 132 | 134 |
| 31 | 321 | ----- | 485 | 499 | ----- | 884 | ----- | 448 | ----- | 148 | 132 | ----- |
| Total | 9,787 | 12,996 | 13,754 | 16,314 | 15,053 | 11,598 | 26,912 | 15,751 | 12,130 | 6,799 | 4,750 | 3,574 |
| Mean | 316 | 433 | 444 | 528 | 519 | 374 | 897 | 509 | 404 | 219 | 153 | 119 |
| Cfsm | 0.825 | 0.856 | 0.877 | 1.04 | 1.03 | 0.739 | 1.77 | 1.00 | 0.798 | 0.433 | 0.302 | 0.235 |
| In. | 0.72 | 0.86 | 1.01 | 1.20 | 1.11 | 0.85 | 1.98 | 1.16 | 0.89 | 0.50 | 0.35 | 0.26 |
| Calendar year 1959: Max | 1,130 | | | Min 42 | | Mean 353 | Cfsm 0.698 | In. 9.49 | | | | |
| Water year 1959-60: Max | 1,110 | | | Min 96 | | Mean 408 | Cfsm 0.806 | In. 10.99 | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and records for station at Ann Arbor and near Hamburg.

1735. Mill Creek near Dexter, Mich.

Location.--Lat 42°18'00", long 83°53'55", in SW $\frac{1}{4}$ sec.18, T.2 S., R.5 E., on left bank 12 ft downstream from bridge on Parker Road, 2 $\frac{1}{2}$ miles south of Dexter, and 4 miles upstream from mouth.

Drainage area.--134 sq mi.

Records available.--February 1952 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 850 ft (from topographic map). Prior to May 23, 1958, wire-weight gage at same site and datum.

Average discharge.--8 years, 69.2 cfs.

Extremes.--Maximum discharge during year, 804 cfs Mar. 28 or 29 (gage height, 10.03 ft, from floodmark); minimum, 14 cfs Sept. 16 (gage height, 5.03 ft).
1952-60: Maximum discharge, 1,300 cfs Apr. 29, 1956 (gage height, 12.2 ft, from graph based on gage readings), from rating curve extended above 870 cfs by logarithmic plotting; minimum, 11 cfs Sept. 15, 1958, July 15-17, 1959.

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

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 26-30)

Oct. 1 to Jan. 12

Jan. 13 to Sept. 30

| | | | | | | | |
|-----|----|-----|-----|-----|----|------|-----|
| 5.1 | 15 | 6.0 | 88 | 5.0 | 15 | 7.0 | 218 |
| 5.3 | 24 | 7.0 | 218 | 5.3 | 29 | 9.0 | 554 |
| 5.5 | 38 | | | 5.6 | 52 | 10.0 | 796 |
| | | | | 6.0 | 92 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 19 | 36 | 54 | 85 | 80 | 56 | 406 | 81 | 43 | 72 | 27 | 24 |
| 2 | 19 | 32 | 54 | 72 | 80 | 54 | 327 | 72 | 39 | 70 | 26 | 23 |
| 3 | 18 | 29 | 58 | 87 | 80 | 57 | 274 | 65 | 47 | 134 | 29 | 22 |
| 4 | 17 | 50 | 63 | 79 | 80 | b56 | 228 | 60 | 38 | 132 | 33 | 21 |
| 5 | 20 | 86 | 70 | *b70 | *95 | 57 | 186 | 59 | 37 | 108 | 33 | 20 |
| 6 | 63 | *75 | 88 | b60 | 351 | 55 | 158 | 56 | 37 | 89 | 31 | 19 |
| 7 | 101 | 62 | 80 | 42 | 290 | 49 | 146 | 56 | 34 | 74 | 30 | 19 |
| 8 | *63 | 51 | *67 | 40 | 210 | b50 | 137 | 53 | 33 | 60 | 31 | 18 |
| 9 | 50 | 44 | 59 | b40 | 164 | 50 | 124 | 53 | 32 | 49 | 34 | 18 |
| 10 | 40 | 42 | 54 | 36 | 170 | b50 | 116 | 74 | 32 | 42 | 84 | 20 |
| 11 | 52 | 38 | 59 | 36 | 368 | 48 | 112 | 77 | 31 | 41 | 60 | 20 |
| 12 | 49 | 35 | 147 | 160 | 270 | 49 | 111 | 71 | 33 | 37 | 47 | 19 |
| 13 | 43 | 144 | *623 | 190 | 44 | 102 | 69 | 66 | 49 | 39 | 20 | |
| 14 | 34 | 200 | 112 | 407 | 155 | 41 | 100 | 67 | 218 | 81 | 35 | *20 |
| 15 | 31 | 187 | 95 | 394 | 131 | 41 | 128 | 61 | 286 | *57 | 38 | 19 |
| 16 | 29 | 151 | 88 | 309 | 95 | 41 | 166 | 54 | 248 | 48 | 34 | 19 |
| 17 | 28 | 137 | 80 | 229 | 102 | 42 | 200 | 52 | 470 | 47 | 32 | 19 |
| 18 | 27 | 120 | 73 | 170 | 101 | 42 | 250 | 50 | 348 | 68 | 30 | 19 |
| 19 | 26 | 79 | 63 | 130 | 86 | 48 | *200 | 48 | 263 | 68 | *28 | 24 |
| 20 | 26 | 68 | 54 | 130 | 81 | 56 | 153 | 63 | 217 | *57 | 29 | 30 |
| 21 | 25 | 63 | 48 | 120 | 72 | 61 | 130 | 60 | 176 | 51 | 32 | 27 |
| 22 | 26 | 62 | 44 | 120 | 67 | 56 | 121 | 61 | 174 | 45 | 32 | 25 |
| 23 | 26 | 69 | 45 | 110 | 64 | 66 | 105 | 58 | *171 | 43 | 31 | 23 |
| 24 | 29 | 86 | 39 | 110 | 61 | 58 | 94 | *54 | 146 | 38 | 31 | 23 |
| 25 | 30 | 95 | 40 | 110 | 55 | 56 | 88 | 48 | 118 | 34 | 29 | 22 |
| 26 | 33 | 80 | 45 | 110 | 60 | 53 | 83 | 45 | 93 | 33 | 28 | 21 |
| 27 | 35 | 71 | 76 | 100 | 56 | 150 | 79 | 41 | 77 | 34 | 27 | 23 |
| 28 | 32 | 66 | 150 | 90 | b56 | 350 | 70 | 50 | 65 | 33 | 26 | 23 |
| 29 | 29 | 61 | 189 | 90 | 56 | *668 | 66 | 48 | 59 | 31 | 25 | 22 |
| 30 | 29 | 53 | 140 | 80 | ----- | 622 | 71 | 42 | 53 | 30 | 26 | 22 |
| 31 | 32 | ----- | 105 | 80 | ----- | 541 | ----- | 50 | ----- | 28 | 25 | ----- |
| Total | 1,076 | 2,271 | 2,483 | 4,319 | 3,726 | 3,667 | 4,531 | 1,798 | 3,684 | 1,733 | 1,042 | 644 |
| Mean | 34.7 | 75.7 | 80.1 | 139 | 128 | 119 | 151 | 58.0 | 123 | 57.5 | 33.6 | 21.5 |
| Cfsm | 0.259 | 0.565 | 0.598 | 1.04 | 0.955 | 0.881 | 1.13 | 0.433 | 0.918 | 0.429 | 0.251 | 0.160 |
| In. | 0.30 | 0.63 | 0.69 | 1.20 | 1.03 | 1.02 | 1.26 | 0.50 | 1.02 | 0.48 | 0.29 | 0.18 |

Calendar year 1959: Max 774 Min 11 Mean 68.8 Cfsm 0.513 In. 6.98

Water year 1959-60: Max 668 Min 17 Mean 84.8 Cfsm 0.633 In. 8.61

Peak discharge (base, 390 cfs).--Jan. 13 (11 a.m.) 661 cfs (9.47 ft); Feb. 11 (time unknown) 421 cfs (8.3 ft); Mar. 28 or 29, 804 cfs (10.03 ft); June 17 (12 m.) 507 cfs (8.77 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Jan. 20 to Feb. 4, Mar. 27, 28, Apr. 17-19; discharge estimated on basis of 1 discharge measurement and records for Grand River at Jackson, Huron River at Ann Arbor, and River Raisin near Tecumseh.

1745. Huron River at Ann Arbor, Mich.

Location.--Lat 42°17'10", long 83°44'00", in NW¼ sec.28, T.2 S., R.6 E., on left bank 100 ft upstream from bridge on Wall Street in Ann Arbor, three-quarters of a mile downstream from Argo Dam, and 4 miles upstream from Geddes Dam.

Drainage area.--711 sq mi.

Records available.--February 1904 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "at Geddes" February 1904 to December 1914 and as "at Barton" January 1914 to September 1940. Records published from both sites, January to December 1914.

Gage.--Water-stage recorder. Datum of gage is 744.81 ft above mean sea level, datum of 1929 (levels by Michigan Department of Conservation). February 1904 to December 1914 at Geddes Dam, 4 miles downstream, and January 1914 to September 1947, at Barton Dam, 3 miles upstream; flow computed from records of operation of powerplants and records of depth of flow over dam and/or flow through undersluices.

Average discharge.--56 years, 446 cfs (adjusted for diversion since 1955).

Extremes.--Maximum discharge during year, 1,970 cfs Mar. 30 (gage height, 14.64 ft); minimum, 24 cfs Aug. 10 (gage height, 11.52 ft); minimum daily, 90 cfs Sept. 18.

1914-60: Maximum daily discharge, 5,840 cfs Mar. 14, 1918; minimum daily, 4 cfs Aug. 2, Sept. 11, 1931 (plant leakage), but may be doubtful due to change in leakage.

Remarks.--Records good except those for period of no gage-height record, which are fair. Diversion above station for Ann Arbor municipal supply had negligible effect on natural flow prior to 1955; figures of runoff adjusted since. Flow regulated by powerplants and by occasional lake level control operations above station.

Revisions (water years).--WSP 874: 1938.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 6 to Aug. 4)

| | | | |
|------|-----|------|-------|
| 11.8 | 82 | 13.0 | 600 |
| 12.0 | 141 | 14.0 | 1,360 |
| 12.5 | 340 | 14.4 | 1,730 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 155 | 349 | 558 | 588 | 654 | 480 | 1,640 | 892 | 460 | 571 | 159 | 144 |
| 2 | 157 | 372 | 458 | 625 | 583 | 460 | 1,590 | 846 | 474 | 405 | 153 | 118 |
| 3 | 171 | 319 | 470 | 558 | 506 | 460 | 1,540 | 811 | 435 | 496 | 217 | 176 |
| 4 | 166 | 420 | 480 | 595 | 524 | 415 | 1,460 | 797 | 435 | 579 | 164 | 110 |
| 5 | 230 | 430 | 546 | 487 | *558 | 420 | 1,500 | 762 | 376 | 481 | 192 | 117 |
| 6 | 455 | *488 | 534 | 465 | 932 | 400 | 1,430 | 606 | 308 | 350 | 166 | 116 |
| 7 | 369 | 369 | 564 | 502 | 1,080 | 440 | 1,280 | 720 | 340 | 354 | 219 | 138 |
| 8 | *352 | 470 | *529 | *455 | 853 | 425 | 1,220 | 627 | 245 | 375 | 170 | 91 |
| 9 | 445 | 455 | 496 | 420 | 811 | 440 | 1,220 | 614 | 171 | 250 | 169 | 132 |
| 10 | 465 | 376 | 512 | 460 | 932 | 455 | 1,120 | 648 | 201 | 344 | 256 | 126 |
| 11 | 524 | 405 | 528 | 460 | 1,180 | 410 | 1,070 | 594 | 257 | 326 | 189 | 104 |
| 12 | 470 | 405 | 636 | 663 | 1,280 | 415 | 952 | 592 | 195 | 232 | 226 | 116 |
| 13 | 470 | 536 | 654 | 1,190 | 964 | 358 | 948 | 558 | 347 | 331 | 206 | 115 |
| 14 | 465 | 654 | 654 | 1,400 | 846 | 336 | 876 | 524 | 441 | 255 | 220 | 102 |
| 15 | 460 | 678 | 573 | 1,310 | 728 | 358 | 908 | 496 | 636 | *318 | 230 | 123 |
| 16 | 455 | 696 | 660 | 1,110 | 604 | a400 | 996 | 520 | 605 | 262 | 176 | *107 |
| 17 | 445 | 648 | 588 | 964 | 846 | a350 | 1,060 | 596 | 892 | 234 | 160 | 140 |
| 18 | 358 | 636 | 595 | 1,040 | 762 | a400 | 1,050 | 430 | 1,010 | 313 | *166 | 90 |
| 19 | 402 | 648 | 552 | 940 | 650 | a450 | 1,080 | 583 | 853 | 234 | *182 | 180 |
| 20 | 372 | 660 | 546 | 818 | 576 | a410 | *994 | 526 | 801 | *261 | 180 | 139 |
| 21 | 344 | 618 | 534 | 727 | 648 | a410 | 892 | 529 | 660 | 270 | 185 | 133 |
| 22 | 376 | 612 | 470 | 748 | 624 | a410 | 1,040 | 518 | 785 | 239 | 158 | 157 |
| 23 | 367 | 612 | 507 | 776 | 546 | a410 | 1,030 | 512 | 818 | 212 | 148 | 157 |
| 24 | 367 | 598 | 490 | 714 | 534 | a410 | 1,000 | *485 | *636 | 212 | 163 | 147 |
| 25 | 390 | 600 | 440 | 582 | 558 | a410 | 1,040 | 450 | 546 | 204 | 166 | 166 |
| 26 | 336 | 558 | 435 | 594 | 470 | a410 | 1,040 | 502 | 558 | 196 | 176 | 170 |
| 27 | 385 | 577 | 480 | 707 | 564 | a600 | 892 | 430 | 479 | 195 | 125 | 161 |
| 28 | 372 | 558 | 678 | 662 | 470 | a1,000 | 811 | 457 | 512 | 197 | 126 | 148 |
| 29 | 349 | 552 | 696 | 612 | 465 | *1,680 | 839 | 460 | 377 | 196 | 161 | 161 |
| 30 | 358 | 470 | 672 | 576 | ----- | 1,640 | 900 | 460 | 380 | 176 | 139 | 166 |
| 31 | 404 | ----- | 666 | 696 | ----- | 1,650 | ----- | 507 | ----- | 176 | 149 | ----- |
| Total | 11,434 | 15,759 | 17,201 | 22,444 | 20,728 | 17,312 | 33,424 | 18,042 | 15,233 | 9,244 | 5,496 | 4,050 |
| Mean | 369 | 525 | 555 | 724 | 715 | 558 | 1,114 | 582 | 508 | 298 | 177 | 135 |
| (†) | 9.3 | 9.3 | 9.1 | 7.4 | 9.0 | 10.0 | 10.2 | 10.4 | 10.5 | 11.0 | 10.6 | 12.1 |

Adjusted for diversion

| Mean | 378 | 534 | 564 | 731 | 724 | 568 | 1,124 | 592 | 518 | 309 | 188 | 147 |
|---------------------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Cfsm | 0.532 | 0.751 | 0.793 | 1.05 | 1.02 | 0.799 | 1.58 | 0.833 | 0.729 | 0.435 | 0.264 | 0.207 |
| In. | 0.61 | 0.84 | 0.91 | 1.19 | 1.10 | 0.92 | 1.76 | 0.96 | 0.81 | 0.50 | 0.30 | 0.23 |
| Observed | | | | | | | | | | | | |
| Adjusted | | | | | | | | | | | | |
| Calendar year 1959: | Max | 2,110 | Min | 48 | Mean | 468 | Mean | 478 | Cfsm | 0.672 | In. | 9.14 |
| Water year 1959-60: | Max | 1,680 | Min | 90 | Mean | 520 | Mean | 530 | Cfsm | 0.745 | In. | 10.13 |

* Discharge measurement made on this day.

† Diversion, equivalent in cubic feet per second, for municipal supply; records furnished by city of Ann Arbor.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and powerplant record.

1757. River Raisin near Tecumseh, Mich.

Location.--Lat 41°56'35", long 83°56'45", in NE $\frac{1}{4}$ sec. 21, T.6 S., R.4 E., on right bank 12 ft downstream from bridge on North Raisin Center Highway, 3.4 miles upstream from South Branch River Raisin, and 4.5 miles south of Tecumseh.

Drainage area.--266 sq mi.

Records available.--September 1956 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 707.0 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 955 cfs Jan. 14 (gage height, 9.60 ft); minimum daily, 42 cfs Sept. 14.
1956-60: Maximum discharge, 1,200 cfs Mar. 7, 1959 (gage height, 10.33 ft); minimum, 15 cfs Aug. 14, 1959 (gage height, 2.90 ft); minimum daily, 17 cfs Aug. 11, 1959.

Remarks.--Records fair. Diurnal fluctuation caused by powerplant 5.5 miles above gage.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 3.6 | 41 | 6.0 | 225 |
| 4.0 | 68 | 7.0 | 339 |
| 4.5 | 111 | 8.0 | 500 |
| 5.0 | 155 | 10.0 | 1,080 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 70 | 144 | 167 | 222 | *251 | 203 | 593 | 202 | 168 | 256 | 85 | 46 |
| 2 | 90 | 140 | 154 | 204 | 237 | 210 | 541 | 196 | 162 | 248 | 70 | 65 |
| 3 | 67 | 128 | 182 | 220 | 220 | 196 | 490 | 189 | 164 | 358 | 118 | 48 |
| 4 | 55 | 150 | 196 | *226 | 206 | 191 | 456 | 182 | 164 | 382 | 124 | 68 |
| 5 | *83 | 216 | 188 | 231 | 215 | 204 | 442 | 172 | 156 | 327 | 112 | 47 |
| 6 | 128 | *216 | 200 | 194 | 432 | 202 | 410 | 166 | 154 | 251 | 106 | *51 |
| 7 | 204 | 206 | 198 | 186 | 593 | 198 | 384 | 162 | 139 | 245 | 120 | 61 |
| 8 | 227 | 182 | *196 | 172 | 445 | 197 | 342 | 156 | 134 | 237 | *108 | 46 |
| 9 | 206 | 168 | 180 | 164 | 356 | 190 | 332 | 160 | 128 | 220 | 92 | 48 |
| 10 | 195 | 166 | 154 | 148 | 370 | 178 | 310 | 163 | 112 | 178 | 89 | 59 |
| 11 | 210 | 144 | *165 | 146 | 793 | 186 | 290 | 185 | 96 | *169 | 120 | 44 |
| 12 | 185 | 154 | 249 | 195 | 793 | 156 | 277 | 184 | 116 | 182 | 114 | 44 |
| 13 | 192 | 157 | 337 | *727 | 477 | 173 | 266 | 174 | 142 | 167 | 92 | 57 |
| 14 | 176 | 340 | 273 | 835 | 393 | 151 | 247 | 183 | 370 | 170 | 104 | 42 |
| 15 | 188 | 524 | 231 | 694 | 354 | 153 | 238 | 168 | 649 | 170 | 72 | 44 |
| 16 | 111 | 408 | 207 | 667 | 310 | 156 | 245 | 167 | 620 | 158 | 78 | 43 |
| 17 | 120 | 363 | 174 | 529 | 306 | 154 | 313 | 160 | 688 | 98 | 78 | 48 |
| 18 | 128 | 275 | 172 | 406 | 294 | 158 | *470 | 142 | 799 | 170 | 75 | 58 |
| 19 | 108 | 226 | 162 | 394 | 278 | 168 | 396 | 149 | 628 | 148 | 72 | 78 |
| 20 | 104 | 206 | 172 | 347 | 255 | 192 | 332 | 152 | *539 | 128 | 68 | 213 |
| 21 | 122 | 198 | 169 | 320 | 239 | 223 | 326 | 162 | 462 | 132 | 87 | 62 |
| 22 | 110 | 184 | 156 | 293 | 237 | 225 | 285 | 166 | 411 | 132 | 93 | 50 |
| 23 | 106 | 192 | 146 | 251 | 227 | 208 | 252 | *170 | 398 | 159 | 94 | 74 |
| 24 | 124 | 200 | 158 | 268 | 218 | 191 | 243 | 167 | 332 | 127 | 88 | 72 |
| 25 | 108 | 194 | 142 | 282 | 210 | 181 | 220 | 162 | 363 | 141 | 74 | 76 |
| 26 | 122 | 202 | 136 | 252 | 210 | 170 | 224 | 144 | 299 | 113 | 80 | 74 |
| 27 | 126 | 203 | 166 | 247 | 198 | 192 | 219 | 157 | 285 | 133 | 78 | 75 |
| 28 | 126 | 194 | 258 | 269 | 213 | 479 | 208 | 169 | 257 | 84 | 72 | 72 |
| 29 | 130 | 180 | 432 | 277 | 203 | 652 | 176 | 165 | 181 | 85 | 71 | 70 |
| 30 | 107 | 176 | 340 | 290 | ----- | 587 | 190 | 164 | 202 | 103 | 66 | 76 |
| 31 | 125 | ----- | 269 | 272 | ----- | 590 | ----- | 166 | ----- | 90 | 72 | ----- |
| Total | 4,153 | 6,436 | 6,309 | 9,928 | 9,533 | 7,314 | 9,717 | 5,204 | 9,319 | 5,541 | 2,772 | 1,911 |
| Mean | 134 | 215 | 204 | 320 | 329 | 236 | 324 | 168 | 311 | 179 | 89.4 | 63.7 |
| Cfs/m | 0.504 | 0.808 | 0.767 | 1.20 | 1.24 | 0.887 | 1.22 | 0.632 | 1.17 | 0.673 | 0.336 | 0.239 |
| In. | 0.58 | 0.90 | 0.88 | 1.39 | 1.33 | 1.02 | 1.36 | 0.73 | 1.30 | 0.77 | 0.39 | 0.27 |

Calendar year 1959: Max 1,040 Min 17 Mean 196 Cfs/m 0.737 In. 10.00
Water year 1959-60: Max 835 Min 42 Mean 215 Cfs/m 0.801 In. 10.92

Peak discharge (base, 500 cfs).--Nov. 15 (2 a.m.) 584 cfs (8.35 ft); Jan. 14 (11 p.m.) 955 cfs (9.60 ft); Feb. 6 (10 p.m.) 649 cfs (8.58 ft); Feb. 11 (12 p.m.) 925 cfs (9.50 ft); Mar. 29 (1 to 3 a.m.) 715 cfs (8.80 ft); Apr. 18 (7 to 8 a.m.) 513 cfs (8.06 ft); June 18 (7 a.m.) 859 cfs (9.28 ft); July 5 (1:30 a.m.) 507 cfs (8.03 ft).

* Discharge measurement made on this day.

1760. River Raisin near Adrian, Mich.

Location.--Lat 41°54'15", long 83°58'50", in NW $\frac{1}{4}$ sec.5, T.7 S., R.4 E., on right bank 10 ft downstream from bridge on Academy Road, 1.7 miles east of Adrian, and 2.6 miles downstream from South Branch River Raisin.

Drainage area.--455 sq mi.

Records available.--October 1953 to September 1960. Records for October 1930 to August 1931, October 1932 to April 1938, published as "Raisin River" in WSP 714, 744, 759, 784, 804, 824, and 854, have been found to be unreliable and should not be used.

Gage.--Water-stage recorder. Datum of gage is 693.2 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 305 cfs.

Extremes.--Maximum discharge during year, 2,870 cfs Jan. 14 (gage height, 12.36 ft); minimum, 47 cfs Sept. 18 (gage height, 2.09 ft); minimum daily, 74 cfs Sept. 13, 17.
1953-60: Maximum discharge, 5,580 cfs Apr. 30, 1956 (gage height, 14.87 ft), from rating curve extended above 2,700 cfs by logarithmic plotting; minimum, 24 cfs Sept. 19, 1955 (gage height, 1.71 ft); minimum daily, 28 cfs Sept. 19, 1955.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diurnal fluctuation caused by powerplant at Tecumseh 11 miles above station.

Revisions.--WSP 1337: Drainage area at former site. See also Records available.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 10 to Dec. 17, June 13 to July 13, July 30 to Sept. 4)

| | | | |
|-----|-----|------|-------|
| 2.5 | 71 | 8.0 | 955 |
| 3.0 | 114 | 10.0 | 1,540 |
| 6.0 | 537 | 12.1 | 2,680 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|
| 1 | 145 | 162 | 278 | 478 | *473 | 311 | a1,500 | 376 | 337 | 365 | 138 | 94 |
| 2 | 112 | 170 | 265 | 350 | 446 | 300 | a1,300 | 378 | 284 | 414 | 115 | 84 |
| 3 | 112 | 161 | 279 | 400 | 406 | 290 | 995 | 347 | 282 | 614 | 172 | 92 |
| 4 | 92 | 241 | 292 | 450 | 376 | 280 | 865 | 323 | 269 | 1,130 | 202 | 82 |
| 5 | *98 | *410 | 322 | *350 | 389 | *270 | 787 | 303 | 266 | 1,280 | 196 | 90 |
| 6 | 374 | 515 | 335 | 300 | 726 | 260 | 715 | 266 | 236 | 773 | 180 | *76 |
| 7 | 551 | 448 | *372 | 300 | 1,150 | 260 | 645 | 290 | 228 | 525 | 168 | 89 |
| 8 | 584 | 360 | 362 | 300 | 1,160 | 250 | 571 | 262 | 217 | 462 | *204 | 90 |
| 9 | 479 | 294 | 300 | 280 | 765 | 250 | 549 | 274 | 184 | 357 | 141 | 82 |
| 10 | 373 | 249 | 289 | 273 | 739 | 240 | 507 | 306 | 163 | 304 | 144 | 86 |
| 11 | 448 | 236 | 273 | 264 | a1,500 | 230 | 461 | 327 | 154 | *284 | 188 | 94 |
| 12 | 483 | 232 | 514 | 460 | a1,700 | 230 | a430 | 323 | 180 | 290 | 160 | 76 |
| 13 | 431 | 246 | 892 | 1,440 | 1,500 | 220 | a410 | 312 | 242 | 266 | 150 | 74 |
| 14 | 330 | 684 | 885 | 2,650 | a1,000 | 220 | a400 | 298 | 753 | 286 | 152 | 63 |
| 15 | 322 | 1,110 | 600 | 2,260 | a700 | 220 | a400 | 288 | 1,290 | 281 | 128 | 82 |
| 16 | 246 | a1,300 | 476 | 1,860 | 591 | 220 | a500 | 269 | 1,640 | 240 | 118 | 77 |
| 17 | 194 | 1,040 | 404 | 1,490 | 557 | 220 | a1,000 | 248 | 1,670 | 169 | 117 | 74 |
| 18 | 190 | 673 | 362 | 1,080 | 520 | 240 | *1,120 | 258 | 1,640 | 252 | 118 | 76 |
| 19 | 174 | 486 | 346 | 810 | 498 | 280 | 1,150 | 238 | 1,540 | 240 | 113 | 150 |
| 20 | 166 | 404 | 322 | 667 | 440 | 343 | 765 | 276 | *1,120 | 212 | 124 | 291 |
| 21 | 146 | 361 | 299 | 556 | 421 | 424 | 612 | 264 | 761 | 209 | 134 | 170 |
| 22 | 149 | 322 | 290 | 525 | 418 | 440 | 539 | 296 | 614 | 194 | 144 | 123 |
| 23 | 152 | 324 | 260 | 467 | 397 | 403 | 466 | *312 | 673 | 236 | 134 | 108 |
| 24 | 166 | 338 | 255 | 455 | 375 | 372 | 440 | 300 | 639 | 184 | 131 | 112 |
| 25 | 164 | 351 | 242 | 454 | 364 | 330 | 406 | 286 | 534 | 192 | 127 | 110 |
| 26 | 166 | 352 | 256 | 418 | 348 | 321 | 411 | 237 | 450 | 187 | 116 | 98 |
| 27 | 159 | 344 | 296 | 421 | 344 | 346 | 392 | 232 | 406 | 204 | 109 | 108 |
| 28 | 160 | 326 | 579 | 456 | 349 | 769 | 352 | 316 | 362 | 158 | 104 | 109 |
| 29 | 148 | 297 | 980 | 488 | 341 | a1,200 | 323 | 400 | 301 | 150 | 109 | 102 |
| 30 | 148 | 278 | 972 | 525 | ----- | a1,500 | 340 | 388 | 292 | 160 | 106 | 99 |
| 31 | 147 | ----- | 645 | 510 | ----- | a1,600 | ----- | 364 | ----- | 137 | 96 | ----- |
| Total | 7,811 | 12,714 | 13,242 | 21,737 | 18,983 | 12,859 | 19,331 | 9,405 | 17,727 | 10,955 | 4,338 | 3,051 |
| Mean | 246 | 424 | 427 | 701 | 655 | 414 | 644 | 303 | 591 | 353 | 140 | 102 |
| Cfsm | 0.541 | 0.932 | 0.938 | 1.54 | 1.44 | 0.910 | 1.42 | 0.668 | 1.30 | 0.776 | 0.308 | 0.224 |
| In. | 0.62 | 1.04 | 1.08 | 1.78 | 1.55 | 1.05 | 1.58 | 0.77 | 1.45 | 0.90 | 0.35 | 0.25 |

Calendar year 1959: Max 2,200 Min 53 Mean 364 Cfsm 0.800 In. 10.87
Water year 1959-60: Max 2,650 Min 74 Mean 415 Cfsm 0.912 In. 12.42

Peak discharge (base, 1,000 cfs).--Nov. 16 (time unknown) 1,320 cfs (9.5 ft); Dec. 29 (10 p.m.) to Dec. 30 (2 a.m.) 1,040 cfs (8.35 ft); Jan. 14 (1 to 3 p.m.) 2,870 cfs (12.36 ft); Feb. 8 (3 a.m.) 1,220 cfs (8.95 ft); Feb. 11 (time unknown) about 1,800 cfs; Mar. 31 (time unknown) about 1,700 cfs; Apr. 19 (7 a.m.) 1,200 cfs (8.90 ft); June 18 (12 p.m.) 1,700 cfs (10.75 ft); July 5 (10:30 a.m.) 1,360 cfs (9.72 ft).

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of recorded range in stage and records for stations near Monroe and near Tecumseh.

Note.--Stage-discharge relation affected by ice Jan. 2-8, Mar. 2-19.

1765. River Raisin near Monroe, Mich.

Location.--Lat 41°57'40", long 83°31'55", on left bank 0.8 mile downstream from bridge on Ida Maybee Road, 5.0 miles downstream from Saline River, and 7.5 miles west of Monroe, Monroe County.

Drainage area.--1,034 sq mi.

Records available.--September 1937 to September 1960. Published as "Raisin River at Monroe" 1937-52 and as "River Raisin at Monroe" 1952-53.

Gage.--Water-stage recorder. Datum of gage is 616.26 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1953, at site 9 miles downstream at datum 46.26 ft lower.

Average discharge.--23 years, 720 cfs.

Extremes.--Maximum discharge during year, 5,590 cfs Jan. 15-16 (gage height, 7.57 ft); minimum, 46 cfs Sept. 3 (gage height, 1.86 ft); minimum daily, 72 cfs Sept. 15.
1937-60: Maximum discharge, 12,900 cfs May 19, 1945, Mar. 29, 1950; maximum gage height, 10.7 ft Feb. 1, 1949 (ice jam), site and datum then in use; minimum discharge, about 2 cfs Sept. 4, 1938, Sept. 19, 20, 1941, site then in use.

Remarks.--Records good except those for period of ice effect, which are fair. Prior to Feb. 14, 1954, diurnal fluctuation caused by powerplant at Dundee 11 miles above station. Occasional slight diurnal fluctuation caused by powerplants further upstream.

Revisions (water years).--WSP 954: 1938-40(m), 1941. WSP 1337: Drainage area. WSP 1437: 1939, 1948.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 7-19, Nov. 2-18, May 24 to June 1, June 14 to July 18)

| | | | |
|-----|-----|-----|-------|
| 2.0 | 69 | 4.0 | 990 |
| 2.5 | 187 | 5.0 | 1,930 |
| 3.0 | 365 | 6.0 | 3,120 |
| 3.5 | 640 | 7.5 | 5,460 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 401 | 378 | 608 | 1,870 | 1,230 | 545 | 3,420 | 582 | 527 | 515 | 210 | 135 |
| 2 | 316 | 396 | 575 | 1,330 | *1,080 | 510 | 3,220 | 679 | 482 | 557 | 168 | 134 |
| 3 | 254 | 392 | 575 | 1,130 | 938 | 378 | 2,870 | 692 | 425 | 1,170 | 187 | 94 |
| 4 | 204 | 514 | 620 | *1,150 | 855 | 435 | 2,480 | 614 | 392 | 1,860 | 194 | 106 |
| 5 | 207 | *1,210 | 705 | 1,200 | 750 | *498 | 2,020 | 533 | 393 | 2,160 | 207 | 110 |
| 6 | *322 | 1,310 | 855 | 1,090 | 1,830 | 488 | 1,650 | 488 | 370 | 2,130 | 213 | 129 |
| 7 | 1,050 | 1,280 | 975 | 950 | 2,630 | 450 | 1,430 | 445 | 347 | 2,110 | 222 | *122 |
| 8 | 1,280 | 1,330 | *922 | 812 | 2,710 | 420 | 1,280 | 430 | 316 | 1,360 | 219 | 84 |
| 9 | 1,230 | 855 | 819 | 705 | 2,660 | 400 | 1,080 | 430 | 305 | 670 | *207 | 95 |
| 10 | 1,130 | 660 | 679 | 601 | 2,490 | 370 | 960 | 455 | 286 | 646 | 210 | 88 |
| 11 | 1,080 | 557 | 614 | 515 | 4,120 | 350 | 885 | 510 | 264 | *51 | 219 | 99 |
| 12 | 1,220 | 498 | 1,390 | 694 | 3,800 | 350 | 784 | 620 | 264 | *471 | 220 | 116 |
| 13 | 1,140 | 476 | 2,780 | 3,540 | 3,600 | 360 | 731 | 608 | 275 | 440 | 188 | 114 |
| 14 | 1,040 | 1,600 | 2,560 | 4,450 | 3,440 | 370 | 692 | 563 | 1,120 | 415 | 199 | 96 |
| 15 | 812 | 2,820 | 2,410 | 5,030 | 2,980 | 350 | 672 | 527 | 2,680 | 388 | 202 | 72 |
| 16 | 627 | 2,590 | 2,100 | 5,330 | 2,220 | 300 | 666 | 488 | 2,670 | 383 | 174 | 101 |
| 17 | 527 | 2,600 | 1,550 | 4,860 | 1,430 | 350 | 965 | 471 | 3,400 | 378 | 198 | 81 |
| 18 | 430 | 2,410 | 1,160 | 4,090 | 1,100 | 410 | 1,800 | 445 | 3,330 | 334 | 146 | 92 |
| 19 | 365 | 2,050 | 945 | 3,150 | 952 | 410 | 2,050 | 425 | 3,060 | 334 | 138 | 181 |
| 20 | 329 | 1,470 | 798 | 2,250 | 862 | 521 | *2,100 | 440 | 2,730 | 360 | 122 | 309 |
| 21 | 305 | 1,040 | 712 | 1,610 | 724 | 744 | 1,870 | 466 | *2,230 | 334 | 144 | 278 |
| 22 | 278 | 862 | 620 | 1,110 | 738 | 895 | 1,400 | 482 | 1,850 | 301 | 168 | 342 |
| 23 | 268 | 777 | 539 | 1,020 | 640 | 998 | 1,090 | 455 | 1,510 | 320 | 145 | 250 |
| 24 | 286 | 750 | 545 | 952 | 601 | 826 | 900 | *440 | 1,470 | 396 | 165 | 179 |
| 25 | 305 | 839 | 493 | 915 | 533 | 724 | 770 | 410 | 1,270 | 360 | 165 | 155 |
| 26 | 352 | 833 | 488 | 855 | 510 | 601 | 692 | 392 | 1,030 | 293 | 163 | 177 |
| 27 | 352 | 791 | 640 | 791 | 557 | 640 | 672 | 365 | 840 | 261 | 133 | 135 |
| 28 | 342 | 731 | 1,460 | 908 | 575 | 1,670 | 646 | 334 | 705 | 250 | 144 | 141 |
| 29 | 334 | 698 | 2,340 | 1,060 | 533 | 2,370 | 598 | 360 | 640 | 244 | 164 | 128 |
| 30 | 316 | 653 | 2,410 | 1,350 | ----- | 3,120 | 545 | 476 | 557 | 213 | 134 | 142 |
| 31 | 316 | ----- | 2,270 | 1,340 | ----- | 3,560 | ----- | 608 | ----- | 202 | 147 | ----- |
| Total | 17,398 | 33,170 | 36,157 | 56,618 | 47,088 | 24,503 | 40,918 | 15,233 | 35,728 | 20,636 | 5,515 | 4,285 |
| Mean | 561 | 1,106 | 1,166 | 1,826 | 1,624 | 790 | 1,564 | 491 | 1,191 | 666 | 178 | 143 |
| Cfs/m | 0.543 | 1.07 | 1.13 | 1.77 | 1.57 | 0.764 | 1.32 | 0.475 | 1.15 | 0.644 | 0.172 | 0.138 |
| In. | 0.63 | 1.19 | 1.30 | 2.04 | 1.69 | 0.88 | 1.47 | 0.55 | 1.29 | 0.74 | 0.20 | 0.15 |

Calendar year 1959: Max 5,330 Min 42 Mean 851 Cfs/m 0.823 In. 11.17
Water year 1959-60: Max 5,330 Min 72 Mean 921 Cfs/m 0.891 In. 12.13

Peak discharge (base, 2,200 cfs).--Nov. 15 (7 a.m.) 2,960 cfs (6.18 ft); Dec. 13 (10 a.m.) 2,900 cfs (5.83 ft); Dec. 30 (11 a.m. to 12 m.) 2,430 cfs (5.45 ft); Jan. 15 (10:30 p.m.) to Jan. 16 (1:30 a.m.) 5,590 cfs (7.57 ft); Feb. 11 (6 p.m.) 4,520 cfs (6.95 ft); Mar. 31 (11 a.m.) 3,790 cfs (6.46 ft); June 17 (6 p.m.) 3,670 cfs (6.68 ft); July 6 (3 to 11 a.m.) 2,260 cfs (5.67 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Mar. 8-17.

1780. St. Joseph River near Newville, Ind.

Location.--Lat 41°23'10", long 84°48'05", in Ohio, in SW $\frac{1}{4}$ sec.18, T.5 N., R.1 E., on left bank 20 ft downstream from bridge on Ohio State Highway 249 and 3 $\frac{1}{2}$ miles northeast of Newville.

Drainage area.--614 sq mi.

Records available.--October 1946 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 795.40 ft above mean sea level, datum of 1929. Prior to Oct. 22, 1947, wire-weight gage at same site and datum.

Average discharge.--14 years, 556 cfs.

Extremes.--Maximum discharge during year, 3,720 cfs Jan. 16 (gage height, 12.83 ft, from reconstructed graph); minimum, 48 cfs Sept. 11 (gage height, 1.91 ft).
1946-60: Maximum discharge, 9,710 cfs Apr. 6, 1950 (gage height, 17.05 ft); minimum, 16 cfs Sept. 30, 1953 (gage height, 1.45 ft).

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

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 19 to Nov. 14)

| | | | |
|-----|-----|------|-------|
| 1.9 | 47 | 6.0 | 714 |
| 2.5 | 99 | 8.0 | 1,190 |
| 3.0 | 159 | 10.0 | 1,880 |
| 4.0 | 308 | 13.0 | 3,800 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | *276 | 104 | 292 | 1,020 | 750 | 335 | 3,020 | 420 | 460 | 380 | 99 | 66 |
| 2 | 260 | 110 | 292 | 736 | *780 | 320 | 2,960 | 480 | *380 | 400 | 89 | 62 |
| 3 | 122 | 122 | *292 | 890 | 692 | 310 | 2,580 | 400 | 342 | 604 | 94 | 58 |
| 4 | 94 | 225 | 292 | 940 | 560 | 300 | 2,060 | *440 | 308 | 758 | *99 | 54 |
| 5 | 84 | 714 | 308 | 750 | 540 | 300 | *1,560 | 380 | 276 | 915 | 99 | 53 |
| 6 | 166 | 940 | 342 | 580 | 1,070 | 290 | 1,190 | 342 | 244 | 1,040 | 110 | 51 |
| 7 | 560 | 965 | 400 | 550 | 1,520 | 280 | 940 | 325 | 214 | 965 | 104 | 50 |
| 8 | 736 | 758 | 420 | 500 | 1,630 | 270 | 802 | 308 | 193 | 626 | 94 | *49 |
| 9 | 714 | 500 | 361 | 400 | 1,680 | 265 | 692 | 325 | 186 | 440 | 89 | 50 |
| 10 | 500 | 380 | 308 | 325 | 1,880 | 250 | 562 | 361 | 166 | 342 | 110 | 49 |
| 11 | 648 | 325 | 342 | 308 | 2,700 | *230 | 520 | 400 | 152 | 292 | 116 | 49 |
| 12 | 846 | 276 | 969 | 704 | 3,020 | 220 | 480 | 420 | 277 | 260 | 104 | 50 |
| 13 | 846 | 276 | 1,560 | 1,790 | 2,850 | 210 | 440 | 420 | 940 | 244 | 94 | 52 |
| 14 | 670 | 974 | 1,700 | 2,400 | 2,600 | 220 | 420 | 400 | 1,660 | 228 | 84 | 50 |
| 15 | 420 | 1,660 | 1,660 | 2,960 | 2,350 | 210 | 400 | 380 | 2,460 | 214 | 79 | 50 |
| 16 | 308 | 1,880 | 1,460 | 3,640 | 2,100 | 210 | 540 | 342 | 2,700 | 200 | 79 | 50 |
| 17 | 244 | 2,020 | 1,040 | 3,600 | 1,500 | 230 | 1,850 | 342 | 2,830 | 186 | 74 | 49 |
| 18 | 200 | 2,100 | 758 | 3,500 | 1,000 | 220 | 3,020 | 325 | 2,760 | 166 | 70 | 50 |
| 19 | 172 | 1,620 | 604 | 3,000 | 840 | 250 | 3,180 | 325 | 2,460 | 152 | 70 | 62 |
| 20 | 152 | 1,600 | 500 | 2,400 | 700 | 276 | 3,020 | 361 | 2,020 | 152 | 66 | 89 |
| 21 | 134 | 1,100 | 420 | 1,600 | 600 | 325 | 2,700 | 480 | 1,630 | 159 | 74 | 110 |
| 22 | 122 | 750 | 345 | 1,150 | 550 | 380 | 2,120 | 670 | 1,190 | 159 | 84 | 128 |
| 23 | 110 | 500 | 310 | 900 | 510 | 361 | 1,430 | 736 | 890 | 146 | 89 | 104 |
| 24 | 104 | 480 | 300 | 770 | 460 | 342 | 1,020 | 692 | 915 | 140 | 94 | 89 |
| 25 | 110 | 460 | 292 | 680 | 420 | 276 | 780 | 560 | 990 | 134 | 84 | 79 |
| 26 | 116 | 440 | 276 | 620 | 390 | 292 | 648 | 440 | 1,020 | 128 | 74 | 70 |
| 27 | 128 | 400 | 536 | 560 | 370 | 391 | 560 | 420 | 915 | 122 | 70 | 66 |
| 28 | *128 | 361 | 1,220 | 550 | 355 | 1,190 | 520 | 802 | 692 | 122 | 66 | 66 |
| 29 | 116 | 325 | *1,490 | 580 | 345 | 1,660 | 460 | 868 | 520 | 128 | 62 | 62 |
| 30 | 110 | 308 | 1,520 | 620 | ----- | 2,170 | 420 | 758 | *440 | 116 | 62 | 58 |
| 31 | 104 | ----- | 1,370 | 690 | ----- | 2,700 | ----- | 560 | ----- | 104 | 66 | ----- |
| Total | 9,300 | 22,673 | 21,979 | 39,713 | 34,742 | 15,283 | 40,974 | 14,482 | 30,230 | 10,022 | 2,648 | 1,925 |
| Mean | 300 | 756 | 709 | 1,281 | 1,198 | 493 | 1,366 | 467 | 1,008 | 323 | 85.4 | 64.2 |
| Cfsm | 0.489 | 1.23 | 1.15 | 2.09 | 1.95 | 0.803 | 2.22 | 0.761 | 1.64 | 0.526 | 0.139 | 0.105 |
| In. | 0.56 | 1.37 | 1.33 | 2.41 | 2.10 | 0.93 | 2.48 | 0.88 | 1.83 | 0.61 | 0.16 | 0.12 |

Calendar year 1959: Max 4,810 Min 23 Mean 702 Cfsm 1.14 In. 15.54
Water year 1959-60: Max 3,640 Min 49 Mean 667 Cfsm 1.09 In. 14.73

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 18-22, Jan. 17 to Feb. 1, Feb. 13 to Mar. 1; discharge estimated on basis of weather records and records for stations on nearby streams. Stage-discharge relation affected by ice Dec. 22-24, Jan. 5-7, Mar. 2-19.

1790. St. Joseph River at Cedarville, Ind.

Location.--Lat 41°12', long 85°01', in SE $\frac{1}{4}$ sec.28, T.32 N., R.13 E., on left bank 500 ft upstream from highway bridge, 0.4 mile south of Cedarville, 0.5 mile upstream from mouth of Cedar Creek, and 2,700 ft downstream from Cedarville Dam.

Drainage area.--783 sq mi.

Records available.--January 1931 to May 1932, October 1955 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 757.94 ft above mean sea level, datum of 1929. Jan. 1, 1931, to May 31, 1932, tape gage on downstream side of highway bridge 500 ft downstream from present site at datum approximately 20 ft lower.

Average discharge.--5 years (1955-60), 660 cfs.

Extremes.--Maximum daily discharge during year, 4,760 cfs Jan. 18; maximum gage height, 12.55 ft Feb. 10; minimum daily discharge, 49 cfs Sept. 8.
1931-32, 1955-60: Maximum discharge, 10,100 cfs May 1, 1956 (gage height, 18.07 ft, from floodmarks); minimum daily, 1.6 cfs May 22, 27, 1958.

Remarks.--Records good except those for periods of no gage-height record or indefinite stage-discharge relation, which are fair. Flow regulated by reservoir above station.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1 | 198 | 133 | *412 | 1,280 | *983 | *379 | *3,030 | 550 | *460 | 500 | *125 | 72 |
| 2 | 302 | 135 | 363 | 832 | 744 | 363 | 3,200 | *520 | 420 | 560 | 110 | 62 |
| 3 | 159 | 126 | 317 | 1,300 | 680 | 363 | 3,060 | 500 | 370 | 800 | 150 | 66 |
| 4 | 127 | 404 | 332 | 1,250 | 640 | 348 | 2,740 | 570 | 350 | 940 | 232 | 67 |
| 5 | 115 | 360 | 332 | 791 | 700 | 332 | 2,060 | 460 | 300 | 1,100 | 103 | 63 |
| 6 | 164 | 851 | 348 | 780 | 1,020 | 332 | 1,280 | 395 | 270 | 1,340 | 110 | 66 |
| 7 | 395 | 810 | 379 | 670 | 1,980 | 332 | 1,110 | 412 | 250 | 1,280 | 120 | *62 |
| 8 | 860 | 790 | 400 | 600 | 1,770 | 302 | 879 | 412 | 230 | 1,400 | 126 | 49 |
| 9 | 920 | 650 | 350 | 500 | 1,960 | 288 | 665 | 412 | 210 | 700 | 120 | 62 |
| 10 | 660 | 520 | 348 | 420 | 2,800 | 288 | 620 | 461 | 200 | 470 | 114 | 63 |
| 11 | 525 | 461 | 461 | 395 | 3,910 | 273 | 580 | 450 | 210 | 370 | 117 | 62 |
| 12 | 728 | 288 | 1,070 | 1,320 | 3,460 | 259 | 540 | 490 | 300 | 330 | 126 | 60 |
| 13 | 879 | 332 | 1,980 | 3,470 | 3,290 | 245 | 520 | 480 | 1,100 | 310 | 122 | 59 |
| 14 | 769 | 970 | 2,140 | 3,570 | 2,910 | 245 | 510 | 430 | 2,400 | 290 | 115 | 62 |
| 15 | 560 | 1,780 | 2,040 | 3,760 | 2,720 | 245 | 500 | 379 | 3,000 | 270 | 112 | 65 |
| 16 | 395 | 1,990 | 1,740 | 4,410 | 2,950 | 232 | 700 | 370 | 3,500 | 260 | 105 | 66 |
| 17 | 332 | 1,860 | 1,680 | 4,590 | 1,680 | 232 | 1,630 | 370 | 3,600 | 240 | 74 | 67 |
| 18 | 187 | 2,270 | 694 | 4,760 | 1,110 | 259 | 2,940 | 379 | 3,500 | 220 | 72 | 85 |
| 19 | 178 | 1,740 | 600 | 3,850 | 910 | 259 | 3,470 | 428 | 3,100 | 200 | 76 | 105 |
| 20 | 198 | 1,740 | 550 | 3,350 | 770 | 288 | 3,470 | 410 | 2,600 | 200 | 80 | 142 |
| 21 | 178 | 820 | 500 | 1,760 | 680 | 332 | 3,080 | 410 | 2,000 | 205 | 91 | 63 |
| 22 | 220 | 620 | 460 | 2,050 | 620 | 395 | 2,850 | 426 | 1,500 | 210 | 98 | 108 |
| 23 | 144 | 580 | 428 | 1,060 | 580 | 428 | 2,020 | 488 | 1,150 | 190 | 100 | 159 |
| 24 | 126 | 550 | 302 | 920 | 520 | 428 | 1,160 | 710 | 1,200 | 180 | 100 | 135 |
| 25 | 135 | 520 | 348 | 790 | 480 | 395 | 1,110 | 450 | 1,300 | 170 | 102 | 122 |
| 26 | 164 | 470 | 363 | 720 | 450 | 363 | 920 | 270 | 1,330 | 160 | 100 | 76 |
| 27 | 245 | 440 | 800 | 660 | 428 | 509 | 750 | 160 | 1,200 | 155 | 95 | 66 |
| 28 | 79 | 412 | 1,890 | 660 | 412 | 1,480 | 650 | 238 | 900 | 155 | 86 | 73 |
| 29 | *85 | 395 | *2,130 | 700 | 395 | 2,110 | 600 | 706 | 700 | 160 | 82 | 73 |
| 30 | 115 | 273 | 2,060 | 740 | ----- | 2,400 | 540 | 792 | *580 | 150 | 80 | 76 |
| 31 | 131 | ----- | 1,910 | 777 | ----- | 3,010 | ----- | 517 | ----- | 130 | 78 | ----- |
| Total | 10,273 | 23,290 | 27,707 | 52,735 | 41,552 | 17,714 | 47,184 | 14,045 | 38,210 | 13,645 | 3,383 | 2,360 |
| Mean | 331 | 776 | 894 | 1,701 | 1,433 | 571 | 1,573 | 453 | 1,274 | 440 | 109 | 78.7 |
| Cfsm | 0.423 | 0.991 | 1.14 | 2.17 | 1.83 | 0.729 | 2.01 | 0.579 | 1.63 | 0.562 | 0.139 | 0.101 |
| In. | 0.49 | 1.11 | 1.31 | 2.50 | 1.97 | 0.84 | 2.24 | 0.67 | 1.82 | 0.65 | 0.16 | 0.11 |
| Calendar year 1959: Max | 4,950 | | | Min | 43 | Mean | 794 | Cfsm | 1.01 | In. | 13.75 | |
| Water year 1959-60: Max | 4,760 | | | Min | 49 | Mean | 798 | Cfsm | 1.02 | In. | 13.87 | |

* Discharge measurement made on this day.

Note.--No gage-height record June 3 to Aug. 3; stage-discharge relation indefinite Oct. 8-10, 15, Nov. 9, 10, 22-27, Dec. 8, 9, 19-22, 27, Jan. 7-10, 26-30, Feb. 3-5, 19, 21-26, Apr. 10-16, Apr. 20 to May 5, May 11-14, 16, 17, 20, 21, 25, 26, June 1, 2; discharge estimated on basis of weather records, appearance of recorder graph, discharge measurements, and records for stations on nearby streams.

1795. Cedar Creek at Auburn, Ind.

Location.--Lat 41°21', long 85°03', in SW¹ sec.29, T.34 N., R.13 E., near center of span on upstream side of Ninth Street Bridge in Auburn, 2 miles upstream from Peckhart ditch.

Drainage area.--93 sq mi, approximately.

Records available.--July 1943 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 847.14 ft above mean sea level (city of Auburn bench mark). Prior to Aug. 28, 1946, staff gage and Aug. 28, 1946, to Sept. 30, 1953, wire-weight gage at same site and datum.

Average discharge.--17 years, 73.4 cfs.

Extremes.--Maximum discharge during year, 865 cfs Apr. 17 (gage height, 8.06 ft); minimum, 3.7 cfs Sept. 4 (gage height, 0.79 ft).
1943-60: Maximum discharge, 1,520 cfs Apr. 5, 1950 (gage height, 9.90 ft); minimum, 0.5 cfs Nov. 12, 1953; minimum gage height, that of Sept. 4, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1337: 1944-45(M), 1947-49, 1950(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 28 to Jan. 15)

Oct. 1 to Nov. 14

Nov. 15 to Sept. 30

| | | | | | | | |
|-----|----|-----|-----|-----|-----|-----|-----|
| 1.1 | 12 | 2.5 | 124 | 0.8 | 3.9 | 2.0 | 85 |
| 1.3 | 20 | 4.0 | 300 | 1.0 | 12 | 3.0 | 182 |
| 1.5 | 32 | 6.0 | 540 | 1.2 | 21 | 7.0 | 665 |
| 2.0 | 73 | | | 1.5 | 41 | 8.0 | 840 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 43 | 18 | 39 | 140 | 85 | *b32 | 324 | 62 | 94 | 41 | 9.1 | 5.7 |
| 2 | 25 | 18 | 38 | 130 | *80 | b31 | 240 | 55 | *80 | 38 | *6.7 | 5.0 |
| 3 | 16 | 18 | *36 | 228 | 72 | b31 | 182 | *47 | 67 | 48 | 15 | 4.3 |
| 4 | 13 | 117 | 38 | 150 | 62 | b30 | 150 | 43 | 55 | 41 | 18 | 3.9 |
| 5 | 26 | 228 | 39 | b105 | 67 | b30 | 126 | 40 | 56 | 37 | 14 | 3.9 |
| 6 | 133 | 157 | 42 | b90 | 240 | b29 | 112 | 38 | 48 | 33 | 9.9 | 4.6 |
| 7 | 157 | 103 | 47 | 85 | 204 | b28 | 98 | 40 | 42 | 30 | 8.5 | 4.3 |
| 8 | 93 | 73 | 45 | 76 | 150 | b28 | *90 | 40 | 37 | 27 | 8.7 | *5.0 |
| 9 | 62 | 58 | 41 | 67 | 140 | b27 | 76 | 48 | 33 | 25 | 8.3 | 6.4 |
| 10 | 52 | 48 | 38 | 67 | 384 | b27 | 67 | 58 | 28 | 24 | 8.3 | 5.3 |
| 11 | 216 | 40 | 79 | 62 | 613 | b25 | 67 | 62 | 48 | 23 | 8.3 | 5.0 |
| 12 | 168 | 35 | 330 | 333 | 408 | b25 | 62 | 54 | 371 | 21 | 9.1 | 5.3 |
| 13 | 98 | 71 | 300 | 760 | 276 | b24 | 57 | 54 | 516 | 23 | 7.5 | 5.7 |
| 14 | 68 | 456 | 193 | 588 | 193 | 28 | 54 | 49 | 665 | 20 | 8.2 | 5.3 |
| 15 | 51 | 420 | 140 | 504 | 140 | 26 | 76 | 43 | 639 | 18 | 7.5 | 5.0 |
| 16 | 40 | 300 | 116 | 384 | 121 | 27 | 208 | 40 | 432 | 17 | 7.5 | 5.7 |
| 17 | 32 | 228 | 103 | 276 | 108 | 28 | 753 | 47 | 324 | 16 | 7.1 | 5.3 |
| 18 | 27 | 150 | 90 | 204 | 94 | 28 | 684 | 45 | 240 | 16 | 6.8 | 4.3 |
| 19 | 24 | 112 | 76 | 160 | 85 | 31 | 432 | 51 | 182 | 15 | 6.8 | 17 |
| 20 | 21 | 90 | 67 | 130 | 72 | 42 | 300 | 112 | 150 | 14 | 7.1 | 14 |
| 21 | 19 | 78 | 62 | 112 | 67 | 49 | 216 | 160 | 121 | 13 | 13 | 11 |
| 22 | 18 | 72 | 56 | 98 | 62 | 43 | 180 | 140 | 103 | 13 | 9.1 | 9.1 |
| 23 | 18 | 67 | 52 | 85 | 58 | 42 | 126 | 103 | 94 | 12 | 7.9 | 7.5 |
| 24 | 19 | 72 | 47 | 76 | 54 | 38 | 108 | 76 | 85 | 12 | 7.5 | 6.1 |
| 25 | 23 | 67 | 45 | 72 | 51 | b30 | 94 | 58 | 72 | 14 | 6.8 | 5.3 |
| 26 | 24 | 55 | 48 | 67 | 49 | 34 | 85 | 52 | 62 | 17 | 6.1 | 5.3 |
| 27 | 23 | 51 | 222 | 62 | 48 | 134 | 72 | 120 | 58 | 14 | 5.3 | 5.3 |
| 28 | *20 | 47 | 356 | 72 | b42 | 398 | 62 | 216 | 54 | 13 | 5.0 | 5.3 |
| 29 | 18 | 43 | *512 | 65 | b35 | 444 | 58 | 193 | *42 | 12 | 8.2 | 5.0 |
| 30 | 18 | 40 | 240 | 90 | ----- | 492 | 58 | 150 | 44 | 11 | 6.4 | 5.0 |
| 31 | 17 | ----- | 171 | 90 | ----- | 458 | ----- | 121 | ----- | 9.5 | 5.7 | ----- |
| Total | 1,582 | 3,330 | 3,490 | 5,508 | 4,060 | 2,733 | 5,197 | 2,417 | 4,848 | 687.5 | 264.4 | 185.9 |
| Mean | 51.0 | 111 | 113 | 178 | 140 | 88.2 | 173 | 78.0 | 162 | 21.5 | 8.53 | 6.20 |
| Cfsm | 0.548 | 1.19 | 1.22 | 1.91 | 1.51 | 0.948 | 1.86 | 0.839 | 1.74 | 0.231 | 0.092 | 0.067 |
| In. | 0.63 | 1.33 | 1.41 | 2.20 | 1.63 | 1.09 | 2.08 | 0.97 | 1.94 | 0.27 | 0.11 | 0.07 |

Calendar year 1959: Max 780 Min 2.2 Mean 92.4 Cfsm 0.994 In. 13.45

Water year 1959-60: Max 760 Min 3.9 Mean 93.7 Cfsm 1.01 In. 13.73

Peak discharge (base, 700 cfs).--Jan. 13 (3 p.m.) 780 cfs (7.51 ft); Apr. 17 (10 p.m.) 865 cfs (8.06 ft); June 15 (2 a.m.) 725 cfs (7.36 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1800. Cedar Creek near Cedarville, Ind.

Location.--Lat 41°13', long 85°05', in NW $\frac{1}{4}$ sec.19, T.32 N., R.13 E., on left bank at downstream side of bridge on State Highway 427, 2 $\frac{1}{4}$ miles northwest of Cedarville and 4 miles upstream from mouth.

Drainage area.--279 sq mi.

Records available.--October 1946 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 780.09 ft above mean sea level, datum of 1929. Prior to Nov. 4, 1947, wire-weight gage at same site and datum.

Average discharge.--14 years, 262 cfs.

Extremes.--Maximum discharge during year, 3,040 cfs Apr. 18 (gage height, 8.90 ft); minimum, 35 cfs Sept. 8, 9 (gage height, 1.40 ft).

1946-60: Maximum discharge, 4,870 cfs Apr. 5, 1950 (gage height, 11.67 ft); minimum, 12 cfs Oct. 3, 1949 minimum gage height, 1.30 ft Sept. 3, Oct. 1, 1953.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.4 | 31 | 5.0 | 1,260 |
| 1.6 | 60 | 7.0 | 2,120 |
| 2.0 | 138 | 9.0 | 3,100 |
| 3.0 | 469 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|-------|--------|-------|--------|-------|-------|-------|
| 1 | 108 | 64 | *110 | 414 | 263 | *b120 | *940 | 214 | *296 | 136 | *44 | 40 |
| 2 | 74 | 64 | 108 | 362 | *246 | b118 | 700 | *177 | 230 | 127 | 49 | 39 |
| 3 | 60 | 64 | 106 | 700 | 204 | b115 | 543 | 154 | 184 | 159 | 84 | 38 |
| 4 | 49 | 161 | 104 | 506 | 180 | b113 | 450 | 156 | 156 | 146 | 156 | 38 |
| 5 | 49 | 580 | 106 | 329 | 184 | b112 | 395 | 156 | 174 | 125 | 104 | 36 |
| 6 | 141 | 395 | 112 | b260 | 620 | b111 | 346 | 151 | 151 | 114 | 74 | 36 |
| 7 | 296 | 280 | 123 | 220 | 740 | b110 | 296 | 148 | 127 | 106 | 65 | *36 |
| 8 | 207 | 200 | 123 | 190 | 488 | 110 | 263 | 148 | 112 | 98 | 58 | 35 |
| 9 | 141 | 156 | 114 | 164 | 432 | 110 | 230 | 171 | 100 | 91 | 55 | 43 |
| 10 | 116 | 134 | 106 | 156 | 1,020 | 108 | 207 | 246 | 91 | 87 | 54 | 44 |
| 11 | 370 | 116 | 192 | 148 | 2,070 | 108 | 190 | 280 | 161 | 87 | 52 | 40 |
| 12 | 414 | 108 | 940 | 725 | 1,820 | 106 | 187 | 230 | 1,380 | 82 | 49 | 38 |
| 13 | 263 | 127 | 940 | 2,200 | 900 | 106 | 171 | 214 | 2,160 | 83 | 49 | 39 |
| 14 | 171 | 1,020 | 580 | 2,250 | 620 | 98 | 161 | 194 | 2,430 | 85 | 47 | 39 |
| 15 | 129 | 1,340 | 414 | 1,620 | 469 | 91 | 177 | 167 | 2,480 | 74 | 50 | 39 |
| 16 | 106 | 860 | 329 | 1,260 | 378 | 91 | 372 | 148 | 1,580 | 71 | 49 | 40 |
| 17 | 91 | 660 | 280 | 860 | 329 | 104 | 1,840 | 174 | 1,060 | 69 | 46 | 40 |
| 18 | 80 | 450 | 246 | 620 | 296 | 98 | 2,880 | 177 | 780 | 65 | 44 | 39 |
| 19 | 73 | 329 | 204 | 468 | 263 | 102 | 1,760 | 164 | 620 | 64 | 43 | 68 |
| 20 | 69 | 263 | 174 | 395 | 220 | 127 | 1,020 | 378 | 488 | 60 | 43 | 92 |
| 21 | 64 | 220 | 156 | 329 | 210 | 141 | 740 | 506 | 395 | 58 | 64 | 71 |
| 22 | 60 | 194 | 141 | b270 | 197 | 141 | 543 | 469 | 346 | 57 | 65 | 55 |
| 23 | 58 | 180 | 131 | b240 | 184 | 136 | 432 | 362 | 296 | 55 | 52 | 49 |
| 24 | 64 | 184 | 125 | b222 | 167 | 129 | 362 | 280 | 280 | 52 | 47 | 44 |
| 25 | 69 | 174 | 123 | b200 | 159 | 114 | 296 | 217 | 230 | 50 | 44 | 40 |
| 26 | 73 | 148 | 125 | 184 | 156 | 108 | 280 | 184 | 197 | 67 | 41 | 38 |
| 27 | 73 | 134 | 522 | 180 | 154 | 255 | 246 | 780 | 174 | 89 | 41 | 38 |
| 28 | 69 | 125 | 1,100 | 207 | 141 | 1,300 | 214 | 1,060 | 161 | 74 | 41 | 38 |
| 29 | *65 | 120 | *1,060 | 246 | 134 | 1,420 | 194 | 700 | 151 | 62 | 40 | 38 |
| 30 | 64 | 112 | 860 | 263 | ----- | 1,500 | 197 | 506 | *141 | 54 | 47 | 38 |
| 31 | 64 | ----- | 543 | 263 | ----- | 1,260 | ----- | 378 | ----- | 49 | 41 | ----- |
| Total | 5,730 | 8,962 | 10,297 | 16,471 | 13,044 | 8,662 | 16,632 | 9,289 | 17,131 | 2,596 | 1,718 | 1,308 |
| Mean | 120 | 299 | 332 | 531 | 450 | 279 | 554 | 300 | 571 | 83.7 | 55.4 | 43.6 |
| Cfsm | 0.430 | 1.07 | 1.19 | 1.90 | 1.61 | 1.00 | 1.99 | 1.08 | 2.05 | 0.300 | 0.199 | 0.156 |
| In. | 0.50 | 1.19 | 1.37 | 2.19 | 1.74 | 1.15 | 2.22 | 1.24 | 2.29 | 0.35 | 0.23 | 0.17 |

Calendar year 1959: Max 3,960 Min 26 Mean 323 Cfsm 1.16 In. 15.73
 Water year 1959-60: Max 2,880 Min 35 Mean 300 Cfsm 1.08 In. 14.64

Peak discharge (base, 2,000 cfs).--Jan. 13 (12 p.m.) 2,530 cfs (7.93 ft); Feb. 11 (5 p.m.) 2,250 cfs (7.28 ft); Apr. 18 (9 a.m.) 3,040 (8.90 ft); June 15 (1 a.m.) 2,730 cfs (8.24 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1815. St. Marys River at Decatur, Ind.

Location.--Lat 40°51', long 84°56', in SW $\frac{1}{4}$ sec. 27, T.28 N., R.14 E., on right bank 10 ft downstream from bridge on U.S. Highway 27, half a mile north of city limits of Decatur, and half a mile upstream from Holthouse ditch.

Drainage area.--615 sq mi.

Records available.--October 1946 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Gage-height records collected at site half a mile upstream January 1932 to November 1954, and at present site thereafter are contained in reports of U.S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 760.44 ft above mean sea level, datum of 1929. Prior to July 27, 1948, wire-weight gage at same site and datum.

Average discharge.--14 years, 543 cfs.

Extremes.--Maximum discharge during year, 4,200 cfs Feb. 11 (gage height, 18.48 ft); minimum, 11 cfs Sept. 12 (gage height, 1.98 ft).
1946-60: Maximum discharge, 11,300 cfs Feb. 10, 11, 1959; maximum gage height, 24.22 ft Feb. 10, 1959 (ice jam); minimum discharge, 3.6 cfs Aug. 5, 6, 1955; minimum gage height, 1.73 ft Sept. 12, 1955.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated by Grand Lake Reservoir. Slight diversion from or into Wabash River and into Miami and Erie Canal.

Revisions (water years).--WSP 1174: 1948. WSP 1337: 1947. WSP 1627: 1950.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1 to Jan. 15, Sept. 2-30)

| | | | |
|-----|-----|------|-------|
| 1.9 | 12 | 8.0 | 830 |
| 2.3 | 26 | 14.0 | 2,390 |
| 3.0 | 67 | 17.0 | 3,450 |
| 3.5 | 107 | 19.0 | 4,550 |
| 5.0 | 292 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 17 | 36 | *70 | 486 | 630 | b94 | 2,310 | 89 | 982 | 39 | 24 | 23 |
| 2 | 16 | 36 | 67 | 486 | 520 | 85 | 1,720 | 78 | 770 | 35 | 21 | 20 |
| 3 | 16 | 34 | 78 | 1,050 | *418 | b82 | 1,130 | 70 | 670 | 60 | *24 | 16 |
| 4 | 18 | 131 | 93 | 670 | 320 | b78 | 790 | *67 | 452 | 70 | 26 | 13 |
| 5 | 18 | 418 | 127 | 452 | 342 | 74 | *554 | 64 | 320 | 47 | 27 | 13 |
| 6 | 61 | 250 | 173 | b330 | 1,940 | 74 | 418 | 60 | 250 | 39 | 26 | *13 |
| 7 | 197 | 222 | 197 | b250 | 1,910 | 74 | 368 | 56 | 161 | 44 | 26 | 13 |
| 8 | 97 | 209 | 209 | b180 | 1,300 | b72 | 306 | 53 | 117 | 42 | 26 | 14 |
| 9 | 67 | 149 | 222 | 144 | 1,430 | 70 | 250 | 56 | 93 | 34 | 25 | 14 |
| 10 | 70 | 107 | 197 | 122 | 3,120 | 70 | 197 | 67 | 78 | 30 | 26 | 16 |
| 11 | 516 | 85 | 340 | 102 | 4,080 | 67 | 173 | 70 | 85 | 28 | 25 | 13 |
| 12 | 554 | 70 | 1,610 | 1,040 | 3,450 | 67 | 155 | 64 | 297 | 26 | 29 | 12 |
| 13 | 336 | 80 | 2,540 | 2,450 | 2,570 | 67 | 127 | 70 | 278 | 60 | 29 | 13 |
| 14 | 264 | 870 | 1,940 | 1,940 | 1,750 | 64 | 117 | 81 | 1,350 | 498 | 25 | 17 |
| 15 | 173 | 1,100 | 1,400 | 2,390 | 1,200 | 67 | 112 | 74 | 1,100 | 305 | 21 | 18 |
| 16 | 102 | 690 | 1,350 | 2,570 | 850 | 70 | 204 | 67 | 452 | 236 | 20 | 20 |
| 17 | 70 | 590 | 1,200 | 2,220 | 503 | 70 | 914 | 85 | 384 | 236 | 21 | 21 |
| 18 | 53 | 503 | 936 | 1,910 | 320 | 70 | 444 | 97 | 320 | 173 | 20 | 20 |
| 19 | 42 | 401 | 630 | 1,610 | 222 | 81 | 292 | 74 | 222 | 107 | 34 | 23 |
| 20 | 36 | 250 | 401 | 1,180 | 173 | 102 | 292 | 126 | 161 | 70 | 44 | 24 |
| 21 | 34 | 173 | 264 | 830 | b150 | 138 | 250 | 209 | 149 | 47 | 36 | 30 |
| 22 | 32 | 132 | 173 | b550 | 127 | 161 | 185 | 161 | 161 | *36 | 26 | 22 |
| 23 | 29 | 112 | 132 | b470 | b115 | 185 | 144 | 144 | 144 | 32 | 22 | 17 |
| 24 | 28 | 107 | 112 | b420 | b105 | 236 | 127 | 122 | 97 | 250 | 19 | 16 |
| 25 | 31 | 102 | 93 | 368 | 97 | 264 | 117 | 102 | 70 | 138 | 17 | 14 |
| 26 | 34 | 85 | 89 | 292 | b96 | 264 | 102 | 102 | 56 | 70 | 16 | 17 |
| 27 | 36 | 81 | 289 | 332 | b100 | 704 | 89 | 651 | 50 | 81 | 16 | 17 |
| 28 | 39 | 78 | *770 | 914 | b98 | 2,450 | 78 | 1,280 | 50 | 60 | 14 | 16 |
| 29 | 39 | 74 | 871 | 914 | *b95 | 2,810 | 74 | 730 | 47 | 39 | 18 | 14 |
| 30 | *36 | 64 | 810 | 750 | ----- | 2,810 | 85 | 1,090 | 42 | 32 | 25 | 15 |
| 31 | 36 | ----- | 537 | 690 | ----- | 2,690 | ----- | *1,640 | ----- | 28 | 39 | ----- |
| Total | 3,097 | 7,239 | 17,920 | 28,112 | 28,031 | 14,210 | 12,124 | 7,699 | 9,408 | 2,993 | 767 | 514 |
| Mean | 99.9 | 241 | 578 | 907 | 967 | 458 | 404 | 248 | 314 | 96.5 | 24.7 | 17.1 |
| Cfsm | 0.162 | 0.392 | 0.940 | 1.47 | 1.57 | 0.745 | 0.657 | 0.403 | 0.511 | 0.157 | C.040 | 0.028 |
| In. | 0.19 | 0.44 | 1.08 | 1.70 | 1.69 | 0.86 | 0.73 | 0.46 | 0.57 | 0.18 | 0.05 | 0.03 |

Calendar year 1959: Max 10,100 Min 13 Mean 687 Cfsm 1.12 In. 15.15
Water year 1959-60: Max 4,080 Min 12 Mean 361 Cfsm 0.587 In. 7.96

Peak discharge (base, 2,900 cfs).--Feb. 11 (8 a.m.) 4,200 cfs (18.49 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1820. St. Marys River near Fort Wayne, Ind.

Location--Lat 41°00', long 85°07', in NE $\frac{1}{4}$ sec. 12, T.29 N., R.12 E., on left bank 130 ft downstream from highway bridge, 4 miles south of Fort Wayne, and 12 miles upstream from confluence with St. Joseph River.

Drainage area--753 sq mi.

Records available--October 1930 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage--Water-stage recorder. Datum of gage is 748.61 ft above mean sea level, unadjusted. Prior to Apr. 13, 1939, chain gage on highway bridge at same datum.

Average discharge--30 years, 569 cfs.

Extremes--Maximum discharge during year, 4,940 cfs Feb. 11 (gage height, 12.63 ft); minimum, 10 cfs Sept. 14, 15; minimum gage height, 0.55 ft Sept. 6, 14, 15.
1930-60: Maximum discharge, 13,600 cfs Feb. 11, 1959; maximum gage height, 19.42 ft Feb. 11, 1959 (ice jam); minimum discharge observed, 3.4 cfs Oct. 19, 1934 (gage height, 0.28 ft).

Remarks--Records good except those for periods of ice effect, which are fair. Flow regulated by Grand Lake. Slight diversion from or into Wabash River basin and into Miami and Erie Canal.

Revisions (water years)--WSP 824: Drainage area. WSP 974: 1942. WSP 1337: 1933, 1947.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Jan. 13 to Feb 12, Mar. 28 to Apr. 2)

| | | | |
|-----|-----|------|-------|
| 0.5 | 5.7 | 2.0 | 160 |
| .6 | 11 | 3.0 | 365 |
| .8 | 25 | 5.0 | 955 |
| 1.0 | 41 | 8.0 | 2,220 |
| 1.5 | 93 | 13.0 | 5,160 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|--------|-------|-------|-------|
| 1 | 24 | 46 | *81 | 665 | *755 | b124 | *3,050 | 132 | *1,260 | *50 | 31 | 37 |
| 2 | 19 | 45 | 81 | 665 | 665 | b122 | 2,320 | *112 | 850 | 44 | *27 | 29 |
| 3 | 18 | 43 | 81 | 1,300 | 515 | b120 | 1,460 | 93 | 755 | 55 | 27 | 22 |
| 4 | 17 | 165 | 93 | 1,100 | 415 | b118 | 990 | 87 | 545 | 76 | 26 | 20 |
| 5 | 19 | 515 | 118 | 665 | 390 | b118 | 695 | 81 | 415 | 76 | 26 | 16 |
| 6 | 91 | 465 | 160 | b500 | 1,920 | 118 | 515 | 76 | 340 | 53 | 29 | 13 |
| 7 | 200 | 208 | b300 | 2,520 | 118 | 440 | 76 | 218 | 45 | 28 | *13 | 25 |
| 8 | 208 | 268 | 227 | b260 | 1,660 | 118 | 365 | 70 | 160 | 46 | 26 | 12 |
| 9 | 118 | 227 | 246 | b235 | 1,540 | b118 | 302 | 87 | 125 | 44 | 25 | 17 |
| 10 | 87 | 168 | 236 | b220 | 3,440 | 118 | 246 | 125 | 99 | 37 | 25 | 16 |
| 11 | 285 | 125 | 300 | 192 | 4,870 | 118 | 208 | 125 | 110 | 33 | 25 | 14 |
| 12 | 785 | 105 | 1,750 | 1,090 | 4,470 | 118 | 192 | 112 | 575 | 31 | 24 | 14 |
| 13 | 480 | 99 | 3,050 | 3,160 | 3,510 | 118 | 168 | 105 | 575 | 33 | 27 | 12 |
| 14 | 390 | 965 | 2,670 | 2,630 | 2,320 | 118 | 153 | 112 | 2,280 | 207 | 28 | 10 |
| 15 | 279 | 1,540 | 1,620 | 2,940 | 1,500 | 118 | 146 | 112 | 1,950 | 415 | 24 | 12 |
| 16 | 176 | 990 | 1,590 | 3,100 | 1,100 | 125 | 256 | 99 | 815 | 227 | 22 | 14 |
| 17 | 118 | 755 | 1,460 | 2,720 | 695 | 132 | 1,060 | 93 | 575 | 208 | 19 | 14 |
| 18 | 81 | 635 | 1,220 | 2,270 | 465 | 139 | 785 | 118 | 440 | 192 | 19 | 14 |
| 19 | 60 | 545 | 885 | 1,900 | 315 | 139 | 390 | 112 | 302 | 139 | 21 | 17 |
| 20 | 49 | 390 | 605 | 1,480 | b270 | 160 | 365 | 125 | 208 | 99 | 29 | 19 |
| 21 | 42 | 246 | 415 | 1,100 | b220 | 208 | 315 | 246 | 168 | 68 | 46 | 22 |
| 22 | 37 | 184 | 302 | b950 | 200 | 268 | 257 | 236 | 448 | 51 | 41 | 30 |
| 23 | 35 | 153 | 227 | b840 | b160 | 268 | 200 | 184 | 315 | 39 | 31 | 24 |
| 24 | 33 | 139 | 200 | b740 | b165 | 315 | 168 | 168 | 176 | 43 | 24 | 19 |
| 25 | 35 | 132 | 176 | b640 | b155 | 340 | 153 | 139 | 118 | 236 | 21 | 17 |
| 26 | 34 | 118 | 168 | 605 | b150 | 390 | 139 | 125 | 87 | 105 | 19 | 14 |
| 27 | 39 | 99 | 439 | 575 | b155 | 865 | 118 | 306 | 70 | 76 | 19 | 13 |
| 28 | 43 | 93 | 1,160 | 1,060 | b140 | 3,100 | 105 | 1,100 | 62 | 61 | 17 | 15 |
| 29 | 45 | 93 | *1,420 | 1,220 | *b125 | 3,810 | 93 | 885 | 60 | 61 | 16 | 15 |
| 30 | *47 | 66 | 1,300 | 1,260 | ----- | 3,870 | 105 | 815 | 55 | 45 | 17 | 14 |
| 31 | 46 | ----- | 815 | 1,220 | ----- | 3,630 | ----- | 1,820 | ----- | 37 | 24 | ----- |
| Total | 3,950 | 9,764 | 23,523 | 37,822 | 34,845 | 19,541 | 15,759 | 8,076 | 14,156 | 2,952 | 781 | 518 |
| Mean | 127 | 325 | 759 | 1,220 | 1,202 | 630 | 525 | 261 | 472 | 95.2 | 25.2 | 17.3 |
| Cfs/m | 0.169 | 0.432 | 1.01 | 1.62 | 1.60 | 0.937 | 0.697 | 0.347 | 0.627 | 0.126 | 0.033 | 0.023 |
| In. | 0.19 | 0.48 | 1.16 | 1.87 | 1.73 | 0.96 | 0.78 | 0.40 | 0.70 | 0.15 | 0.04 | 0.03 |

Calendar year 1959: Max 12,200 Min 12 Mean 691 Cfs/m 1.18 In. 16.04

Water year 1959-60: Max 4,870 Min 10 Mean 469 Cfs/m 0.623 In. 8.49

Peak discharge (base, 4,000 cfs)--Feb. 11 (9 a.m.) 4,940 cfs (12.63 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1830. Maumee River at New Haven, Ind.

Location.--Lat 41°05', long 85°01', in SW $\frac{1}{4}$ sec.1, T.30 N., R.13 E., in center of span on downstream side of county road bridge, a quarter of a mile upstream from Wabash Railroad bridge, half a mile north of New Haven, and 6 miles downstream from confluence of St. Marys and St. Joseph Rivers.

Drainage area.--1,940 sq mi.

Records available.--December 1946 to September 1956 (high-water records only), October 1956 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 724.51 ft above mean sea level, datum of 1929. Prior to Sept. 7, 1956, wire-weight gage at same site and datum.

Extremes.--Maximum discharge during year, 11,700 cfs Feb. 11 (gage height, 17.05 ft); minimum, 105 cfs Sept. 27; minimum gage height, 2.34 ft Sept. 10, 13.
1946-60: Maximum discharge, 19,100 cfs Feb. 16, 1950 (gage height, 21.4 ft); minimum daily since Sept. 7, 1956, 92 cfs Sept. 20, 1959.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated at low stage by powerplant above station. Flow slightly regulated by upstream reservoirs.

Revisions.--WSP 1337: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 27 to May 27, June 4-9, June 25 to July 10, July 15-17, 26)

| | | | |
|-----|-----|------|--------|
| 2.3 | 115 | 9.0 | 4,060 |
| 2.6 | 195 | 14.0 | 8,430 |
| 3.5 | 490 | 17.0 | 11,700 |
| 4.0 | 740 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--------|-------|-------|
| 1 | *285 | 285 | 510 | 2,800 | 2,280 | *680 | 7,830 | 920 | 2,670 | *740 | 270 | 155 |
| 2 | 432 | 285 | *630 | 2,410 | 2,150 | 680 | 6,840 | 860 | 2,020 | 580 | 285 | 155 |
| 3 | 398 | 255 | 530 | 3,220 | *1,760 | 630 | 5,620 | 800 | 1,700 | 680 | *504 | 195 |
| 4 | 255 | 874 | 530 | 3,570 | 1,630 | 600 | 4,580 | *740 | 1,300 | 860 | 590 | 155 |
| 5 | 270 | 1,760 | 580 | 2,280 | 1,500 | 570 | *3,640 | 740 | 1,700 | 980 | 432 | 145 |
| 6 | 718 | 2,020 | 630 | 1,700 | 3,360 | 520 | 2,800 | 630 | 1,180 | 1,040 | 255 | 145 |
| 7 | 800 | 1,890 | 740 | 1,500 | 5,700 | 520 | 2,220 | 630 | 740 | 1,240 | 285 | 135 |
| 8 | 1,110 | 1,560 | 800 | 1,300 | 4,500 | 520 | 1,890 | 630 | 880 | 1,110 | 370 | *138 |
| 9 | 1,180 | 1,500 | 920 | 1,100 | 3,990 | 500 | 1,630 | 740 | 530 | 740 | 225 | 165 |
| 10 | 1,110 | 980 | 920 | 1,000 | 7,130 | 500 | 1,370 | 860 | 432 | 630 | 240 | 128 |
| 11 | 1,700 | 860 | 920 | 980 | 11,100 | 500 | 1,180 | 860 | 627 | 432 | 285 | 162 |
| 12 | 2,150 | 630 | 3,340 | 2,860 | 11,300 | 500 | 1,110 | 860 | 3,360 | 609 | 225 | 140 |
| 13 | 2,080 | 680 | 6,480 | 8,630 | 9,330 | 480 | 980 | 860 | 4,340 | 385 | 270 | 142 |
| 14 | 1,700 | 2,790 | 6,030 | 9,530 | 6,930 | 470 | 980 | 860 | 8,430 | 470 | 255 | 138 |
| 15 | 1,370 | 5,140 | 4,740 | 9,230 | 5,220 | 490 | 860 | 740 | 9,530 | 680 | 270 | 125 |
| 16 | 860 | 4,420 | 3,920 | 9,130 | 4,420 | 500 | 1,110 | 680 | 6,750 | 580 | 225 | 130 |
| 17 | 580 | 3,640 | 3,570 | 8,630 | 3,640 | 500 | 3,920 | 740 | 5,540 | 510 | 240 | 120 |
| 18 | 530 | 3,430 | 2,870 | 7,930 | 2,480 | 500 | 6,840 | 680 | 4,500 | 470 | 180 | 138 |
| 19 | 380 | 2,610 | 2,150 | 6,750 | 1,820 | 500 | 6,480 | 740 | 4,060 | 450 | 183 | 382 |
| 20 | 362 | 3,000 | 1,820 | 5,380 | 1,370 | 540 | 5,220 | 920 | 3,360 | 398 | 210 | 345 |
| 21 | 362 | 1,890 | 1,440 | 3,570 | 1,440 | 680 | 4,660 | 1,300 | 2,670 | 362 | 338 | 162 |
| 22 | 362 | 1,440 | 1,180 | 2,670 | 1,110 | 800 | 3,920 | 1,500 | 2,740 | 330 | 370 | 171 |
| 23 | 362 | 1,110 | 980 | 2,000 | 1,040 | 860 | 3,280 | 1,440 | 2,150 | 315 | 235 | 240 |
| 24 | 255 | 1,040 | 800 | 1,800 | 1,040 | 920 | 2,280 | 1,440 | 1,560 | 315 | 210 | 255 |
| 25 | 362 | 980 | 680 | 1,600 | 980 | 920 | 1,700 | 1,110 | 1,440 | 388 | 240 | 225 |
| 26 | 255 | 920 | 740 | 1,440 | 860 | 920 | 1,560 | 980 | 1,440 | 510 | 240 | *177 |
| 27 | 432 | 860 | 1,400 | 1,440 | 860 | 1,280 | 980 | 1,370 | 1,300 | 330 | 177 | 118 |
| 28 | 315 | 740 | *4,140 | 1,760 | 860 | 5,780 | 1,040 | 2,870 | 1,180 | 398 | 186 | 125 |
| 29 | *225 | 630 | 5,140 | 2,150 | 800 | 8,030 | 860 | 3,010 | 980 | 330 | 186 | 145 |
| 30 | 225 | 630 | 4,900 | 2,150 | ----- | 8,430 | 860 | 2,670 | 740 | 300 | 195 | 158 |
| 31 | 255 | ----- | 3,780 | 2,150 | ----- | 8,830 | ----- | *3,080 | ----- | 270 | 152 | ----- |
| Total | 21,680 | 48,849 | 67,810 | 112,660 | 100,600 | 48,150 | 88,250 | 36,260 | 79,649 | 17,432 | 8,238 | 5,114 |
| Mean | 699 | 1,628 | 2,187 | 3,634 | 3,469 | 1,553 | 2,942 | 1,170 | 2,655 | 562 | 237 | 170 |
| Cfs/m | 0.360 | 0.839 | 1.13 | 1.87 | 1.79 | 0.801 | 1.52 | 0.603 | 1.37 | 0.290 | 0.138 | 0.088 |
| In. | 0.42 | 0.94 | 1.30 | 2.16 | 1.93 | 0.92 | 1.70 | 0.70 | 1.53 | 0.33 | 0.16 | 0.10 |

Calendar year 1959: Max 18,800 Min 92 Mean 2,226 Cfs/m 1.15 In. 15.60
Water year 1959-60: Max 11,300 Min 118 Mean 1,734 Cfs/m 0.894 In. 12.19

Peak discharge (base, 9,500 cfs).--Jan. 14 (5 a.m.) 9,630 cfs (15.20 ft); Feb. 11 (9 to 11 p.m.) 11,700 cfs (17.05 ft); June 15 (1 to 2 a.m.) 10,100 cfs (15.66 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 7-10, Mar. 4-20.

1835. Maumee River at Antwerp, Ohio

Location.--Lat 41°11'56", long 84°44'40", in sec.22, T.3 N., R.1 E., on left bank 425 ft downstream from bridge on State Highway 49, 1 mile north of Antwerp, Faulding County, 7 miles downstream from Indiana State line, and 10 miles upstream from Marie DeLarme Creek.

Drainage area.--2,049 sq mi.

Records available.--September 1921 to December 1935, April 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 695.49 ft above mean sea level, adjustment of 1912. Prior to Sept. 13, 1925, chain gage at site 400 ft upstream at same datum.

Average discharge.--35 years, 1,705 cfs.

Extremes.--Maximum discharge during year, 12,300 cfs Feb. 12 (gage height, 14.81 ft); minimum, 114 cfs Sept. 14 (gage height, 0.90 ft).

1921-35, 1939-60: Maximum discharge, 26,200 cfs May 20, 1943 (gage height, 20.29 ft); minimum, 24 cfs Oct. 17, 1930, June 21, 22, 1933 (gage height, 0.32 ft).

Flood of Mar. 27, 1913, was estimated as 40,000 cfs.

Remarks.--Records good except those for period of ice effect, which are fair. Low flow slightly regulated by powerplant at Fort Wayne, Ind.

Revisions (water years).--WSP 759: Drainage area. WSP 1174: 1927, 1933, 1940. WSP 1387: 1922-23, 1925-27, 1934.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|--------|
| 0.9 | 114 | 4.0 | 1,360 |
| 1.2 | 183 | 7.0 | 3,460 |
| 1.5 | 259 | 11.0 | 7,140 |
| 2.0 | 413 | 15.0 | 12,700 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--------|-------|-------|
| 1 | *256 | 254 | 601 | 3,210 | 2,080 | b750 | 8,230 | 1,050 | 2,920 | 835 | 243 | 145 |
| 2 | 262 | 270 | *588 | 2,540 | 2,100 | b700 | 7,070 | 970 | 2,140 | 760 | 238 | 138 |
| 3 | 413 | 289 | 642 | 3,180 | 1,780 | b650 | 5,980 | 895 | 1,730 | 668 | 278 | 145 |
| 4 | 366 | 318 | 585 | 3,820 | 1,590 | b650 | 4,860 | 850 | 1,480 | 775 | 500 | 161 |
| 5 | 254 | 1,260 | 578 | 2,880 | 1,440 | b650 | 3,920 | 830 | 1,470 | 940 | 760 | 159 |
| 6 | 289 | 1,840 | 637 | 1,850 | 2,660 | b650 | 3,080 | 780 | 1,590 | 1,100 | 399 | 136 |
| 7 | 795 | 1,860 | 691 | 1,780 | 5,190 | b600 | 2,250 | 704 | 1,080 | 1,100 | 246 | 136 |
| 8 | 825 | 1,540 | 765 | 1,430 | 5,160 | *601 | 1,970 | 704 | 805 | 1,170 | 259 | *129 |
| 9 | 1,050 | 1,380 | 875 | 1,290 | 4,030 | 549 | 1,670 | 750 | 714 | 1,060 | 281 | 136 |
| 10 | 1,010 | 1,300 | 920 | 1,140 | 6,120 | 606 | 1,400 | 875 | 501 | 765 | 218 | 161 |
| 11 | 1,290 | 935 | 895 | 1,040 | 11,300 | 557 | 1,260 | 995 | 463 | 632 | 213 | 136 |
| 12 | 1,640 | 810 | 2,390 | 2,020 | 12,300 | 549 | *1,120 | 970 | 1,610 | 501 | 246 | 134 |
| 13 | 2,040 | 650 | 6,150 | 7,760 | 10,900 | 493 | 1,040 | 945 | 4,200 | *520 | 218 | 143 |
| 14 | 1,670 | 1,560 | 6,320 | 9,760 | 7,920 | 478 | 945 | 990 | 7,580 | 459 | 246 | 123 |
| 15 | 1,410 | 4,650 | 5,290 | 9,970 | 5,540 | 489 | 910 | 895 | 10,600 | 536 | 243 | 138 |
| 16 | 1,100 | 4,910 | 4,160 | 9,410 | 4,420 | 508 | 895 | 736 | 8,480 | 745 | 241 | 121 |
| 17 | 732 | 3,890 | 3,550 | 8,850 | 4,020 | 512 | 2,350 | 790 | 5,950 | 828 | *213 | 132 |
| 18 | 583 | 3,300 | 3,240 | 8,050 | 2,640 | 489 | 5,780 | 780 | 4,920 | 516 | 223 | 125 |
| 19 | 474 | *3,220 | 2,270 | 7,200 | 1,980 | 516 | 6,510 | 765 | 4,140 | 489 | 169 | 138 |
| 20 | 369 | 2,520 | 1,930 | 5,700 | 1,380 | 561 | 5,480 | 850 | 3,490 | 459 | 166 | 414 |
| 21 | 337 | 2,310 | 1,590 | 4,670 | 1,360 | 664 | 4,710 | 1,180 | 3,130 | 389 | 220 | 340 |
| 22 | *340 | 1,490 | 1,270 | 2,880 | 1,160 | 765 | 3,970 | 1,450 | 2,530 | 343 | 372 | 198 |
| 23 | 346 | 1,190 | 1,090 | 2,750 | 1,030 | 835 | 3,460 | 1,510 | 2,530 | 318 | 281 | 185 |
| 24 | 343 | 1,060 | 940 | 2,010 | 1,030 | 875 | 2,540 | 1,330 | 1,730 | 295 | 258 | 235 |
| 25 | 251 | 1,000 | 780 | 1,770 | 995 | 885 | 1,710 | *1,350 | 1,490 | 286 | 198 | 256 |
| 26 | 330 | 940 | 760 | 1,600 | 910 | 880 | 1,650 | 1,110 | 1,340 | 399 | 213 | *228 |
| 27 | 259 | 895 | 1,070 | 1,320 | 830 | 1,020 | 1,200 | 1,140 | 1,560 | 557 | 220 | 200 |
| 28 | 416 | 795 | 2,860 | *1,490 | 805 | 4,210 | 1,060 | 2,220 | 1,300 | 346 | 171 | 138 |
| 29 | *295 | 704 | *5,260 | 1,860 | 780 | 7,600 | 1,030 | 3,040 | 1,110 | 372 | 171 | 129 |
| 30 | 208 | 664 | 5,440 | 2,040 | ----- | 8,610 | 955 | 2,750 | 955 | 309 | 178 | 141 |
| 31 | 236 | ----- | 4,250 | 2,060 | ----- | 8,870 | ----- | 2,640 | ----- | 275 | 181 | ----- |
| Total | 20,159 | 47,804 | 68,367 | 117,330 | 103,450 | 46,772 | 89,015 | 36,844 | 83,118 | 18,547 | 8,143 | 5,094 |
| Mean | 650 | 1,593 | 2,205 | 3,785 | 3,567 | 1,509 | 2,967 | 1,189 | 2,771 | 598 | 263 | 170 |
| Cfsm | 0.317 | 0.777 | 1.08 | 1.85 | 1.74 | 0.736 | 1.45 | 0.580 | 1.35 | 0.292 | 0.128 | 0.083 |
| In. | 0.37 | 0.87 | 1.24 | 2.13 | 1.88 | 0.85 | 1.62 | 0.67 | 1.51 | 0.34 | 0.15 | 0.09 |
| Calendar year 1959: | Max | 19,000 | Min | 95 | Mean | 2,265 | Cfsm | 1.11 | In. | 15.02 | | |
| Water year 1959-60: | Max | 12,300 | Min | 121 | Mean | 1,761 | Cfsm | 0.859 | In. | 11.72 | | |

Peak discharge (base, 8,000 cfs).--Jan. 15 (1 to 3 p.m.) 10,000 cfs (13.34 ft); Feb. 12 (9 a.m.) 12,500 cfs (14.81 ft); Mar. 31 (8 p.m.) 8,900 cfs (12.51 ft); June 15 (11 a.m.) 10,800 cfs (13.87 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1845. Bean Creek at Powers, Ohio

Location.--Lat 41°40'40", long 84°13'50", in NE $\frac{1}{4}$ sec.24, T.9 S., R.1 E., on right bank at downstream side of bridge on U. S. Highway 20, 1 mile east of Powers, Fulton County, and 2 $\frac{1}{4}$ miles upstream from Iron Creek.

Drainage area.--238 sq mi.

Records available.--October 1940 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 722.6 ft above mean sea level, adjustment of 1912. Prior to Jan. 18, 1941, wire-weight gage at same site and datum.

Average discharge.--20 years, 169 cfs.

Extremes.--Maximum discharge during year, 2,600 cfs Jan. 13 (gage height, 11.94 ft); minimum, 16 cfs Sept. 15 (gage height, 0.16 ft).

1940-60: Maximum discharge, 4,250 cfs Apr. 29, 1956 (gage height, 13.82 ft); minimum, 5.9 cfs Sept. 1-3, 1953.

Remarks.--Records good except those for period of ice effect, which are poor.

Revisions (water years).--WSP 1307: 1948(M).

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Nov. 14 | | | | Nov. 15 to Sept. 30 | | | |
|-------------------|----|-----|-------|---------------------|-----|------|-------|
| 0.3 | 27 | 3.0 | 304 | 0.1 | 16 | 4.0 | 430 |
| .5 | 39 | 5.0 | 627 | .5 | 37 | 8.0 | 1,170 |
| 1.0 | 82 | 7.0 | 1,010 | 1.0 | 77 | 10.0 | 1,750 |
| | | | | 2.0 | 170 | 12.0 | 2,640 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|--------|-------|-------|-------|--------|-------|-------|-------|
| 1 | 59 | 72 | 108 | 195 | 210 | 95 | 850 | 181 | 132 | 265 | 43 | 23 |
| 2 | 45 | 69 | 111 | 174 | 191 | 90 | 616 | 166 | 116 | 448 | 41 | 22 |
| 3 | 36 | 63 | 114 | 234 | 162 | 85 | 498 | 142 | 107 | 1,040 | 43 | 21 |
| 4 | 31 | 166 | 121 | 226 | 150 | 85 | 430 | 125 | 97 | 1,260 | 47 | 21 |
| 5 | 35 | 359 | 124 | 166 | 161 | 85 | 360 | *108 | 82 | 648 | 46 | 20 |
| 6 | 305 | 280 | 154 | 162 | 583 | 95 | 297 | 98 | 73 | 434 | 43 | 19 |
| 7 | 580 | 217 | 151 | 144 | 607 | 90 | 271 | 94 | 67 | 313 | 42 | 19 |
| 8 | 337 | 175 | 131 | 123 | 428 | 80 | 246 | 95 | 63 | 239 | 41 | 18 |
| 9 | 241 | 144 | 116 | 106 | 342 | 75 | 219 | 98 | 60 | 196 | 40 | 18 |
| 10 | 187 | 124 | 104 | 108 | 462 | 75 | 194 | 109 | 52 | 169 | 39 | 18 |
| 11 | 347 | 110 | 116 | 101 | *1,400 | 70 | 179 | 118 | 49 | 148 | 37 | 18 |
| 12 | 325 | 97 | 494 | 562 | 1,020 | 70 | 169 | 112 | 63 | 129 | 35 | 18 |
| 13 | 221 | 112 | 698 | 2,340 | 634 | 70 | 157 | 118 | 126 | 114 | 34 | *17 |
| 14 | 169 | 696 | 412 | 2,120 | 472 | 65 | 147 | 116 | 939 | 109 | 32 | 17 |
| 15 | 136 | 1,050 | 268 | 1,650 | 345 | 65 | 147 | 108 | 1,250 | 103 | 32 | 17 |
| 16 | 113 | 610 | 234 | 1,180 | 288 | 70 | 165 | 94 | *1,040 | 92 | 31 | 17 |
| 17 | 96 | 462 | 200 | 794 | 248 | 70 | 589 | 85 | 1,160 | 92 | 31 | 17 |
| 18 | 83 | 311 | *175 | 577 | 226 | 75 | 354 | 82 | 978 | 85 | 30 | 17 |
| 19 | 72 | 243 | 153 | 463 | 204 | 78 | 565 | 81 | 758 | 89 | 29 | 24 |
| 20 | 65 | *199 | 133 | *369 | 179 | 90 | 398 | 107 | 523 | 85 | 28 | 42 |
| 21 | 59 | 173 | 120 | 299 | 173 | 112 | 306 | 169 | 387 | 78 | 31 | 39 |
| 22 | *55 | 157 | 103 | 275 | 160 | 117 | 260 | 140 | 349 | 64 | 32 | 31 |
| 23 | 53 | 153 | 108 | 250 | 152 | 105 | 224 | 142 | 448 | 62 | 32 | 27 |
| 24 | 55 | 157 | 101 | 228 | 141 | 105 | 198 | 126 | 458 | 61 | 30 | 25 |
| 25 | 60 | 163 | 92 | 200 | 131 | 92 | 178 | 108 | 327 | 58 | 28 | 23 |
| 26 | 63 | 146 | 95 | 193 | 118 | 94 | 183 | 94 | 249 | 56 | 27 | 22 |
| 27 | 60 | 133 | 206 | 195 | 110 | 201 | 169 | 98 | 207 | *59 | 25 | 22 |
| 28 | 55 | 125 | 520 | 218 | 100 | *758 | 149 | 117 | 181 | 90 | 25 | 20 |
| 29 | 51 | 119 | 493 | 246 | 100 | 964 | 134 | 137 | 167 | 53 | 24 | 20 |
| 30 | 61 | 112 | 349 | 259 | ----- | 1,090 | 136 | 150 | 151 | 49 | 24 | 20 |
| 31 | 66 | ----- | 254 | 236 | ----- | 1,070 | ----- | 147 | ----- | 46 | 25 | ----- |
| Total | 4,121 | 7,197 | 6,568 | 14,391 | 9,497 | 6,266 | 9,388 | 3,655 | 10,658 | 6,704 | 1,047 | 652 |
| Mean | 133 | 240 | 212 | 464 | 327 | 202 | 313 | 118 | 355 | 216 | 33.8 | 21.7 |
| Cfsm | 0.559 | 1.01 | 0.891 | 1.95 | 1.37 | 0.849 | 1.32 | 0.496 | 1.49 | 0.908 | 0.142 | 0.091 |
| In. | 0.64 | 1.13 | 1.03 | 2.25 | 1.48 | 0.98 | 1.47 | 0.57 | 1.66 | 1.05 | 0.16 | 0.10 |

Calendar year 1959: Max 1,600 Min 11 Mean 216 Cfsm 0.908 In. 12.31
 Water year 1959-60: Max 2,340 Min 17 Mean 219 Cfsm 0.920 In. 12.52

Peak discharge (base, 1,200 cfs).--Nov. 15 (3 a.m.) 1,200 cfs (8.16 ft); Jan. 13 (1 p.m.) 2,600 cfs (11.94 ft); Feb. 11 (5:30 p.m.) 1,480 cfs (9.24 ft); June 15 (12 m.) 1,320 cfs (8.64 ft); July 4 (3 a.m.) 1,610 cfs (9.65 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Feb. 27 to Mar. 18.

1850. Tiffin River at Stryker, Ohio

Location.--Lat 41°30'15", long 84°25'50", in SW $\frac{1}{4}$ sec.5, T.6 N., R.4 E., on right bank at downstream side of bridge on State Highway 191 at west edge of Stryker, Williams County, 0.6 mile upstream from New York Central Railroad bridge and $\frac{1}{2}$ miles downstream from Leatherwood Creek.

Drainage area.--441 sq mi.

Records available.--September 1921 to September 1928 (published as "near Stryker"), October 1940 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 685.5 ft above mean sea level, adjustment of 1912. Prior to Sept. 30, 1928, chain gage at site $3\frac{1}{2}$ miles downstream at different datum. Oct. 13, 1940, to Jan. 17, 1941, staff gage and Jan. 18, 1941, to Sept. 30, 1953, water stage recorder, at site half a mile downstream at same datum.

Average discharge.--27 years, 324 cfs.

Extremes.--Maximum discharge during year, 3,180 cfs Jan. 15 (gage height, 13.68 ft); minimum, 21 cfs Sept. 12-17, 30; minimum gage height, 1.35 ft Sept. 8, 12, 13, 14-17.

1921-28, 1940-60: Maximum discharge, 6,640 cfs Apr. 25, 1950; maximum gage height, 16.16 ft May 1, 1956; minimum discharge, 3.6 cfs Aug. 30, 31, 1953.

Flood in March 1913 reached a stage of 16.0 ft, from floodmarks (discharge, 7,600 cfs). Flood in 1937 reached a stage of 15.0 ft, from information by local resident (discharge, 6,000 cfs).

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

Revisions (water years).--WSP 564: Drainage area. WSP 1144: 1922-28. WSP 1387: 1925.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.2 | 19 | 9.0 | 860 |
| 1.5 | 45 | 11.0 | 1,440 |
| 2.0 | 90 | 13.0 | 2,830 |
| 5.0 | 370 | 14.0 | 3,470 |
| 7.0 | 577 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|-------|--------|-------|--------|--------|-------|-------|
| 1 | 156 | 103 | 194 | 652 | 457 | 180 | 1,930 | 276 | 228 | 215 | 65 | 32 |
| 2 | 89 | 114 | 192 | 434 | 409 | 170 | 1,740 | 313 | 202 | 432 | 60 | 29 |
| 3 | 61 | 112 | 196 | 461 | 347 | 170 | 1,460 | 280 | 180 | 614 | 61 | 28 |
| 4 | 50 | 185 | 206 | 500 | 296 | 160 | 1,170 | 237 | 162 | 758 | 67 | 25 |
| 5 | 44 | 486 | 220 | 422 | 279 | 160 | 888 | 205 | 153 | 1,000 | 69 | 25 |
| 6 | 98 | 612 | 244 | 354 | 666 | 160 | 675 | *180 | 130 | 1,240 | 67 | 25 |
| 7 | 372 | 582 | 298 | 332 | 958 | 160 | 520 | 166 | 114 | 1,060 | 60 | 24 |
| 8 | 544 | 438 | 281 | 290 | 1,180 | 150 | 437 | 160 | 103 | 652 | 58 | 23 |
| 9 | 547 | 305 | 235 | 238 | 1,220 | 150 | 385 | 166 | 95 | 388 | 58 | 25 |
| 10 | 390 | 242 | 203 | 212 | 1,260 | 140 | 330 | 188 | 89 | 278 | 56 | 24 |
| 11 | 317 | 209 | 208 | 194 | *2,040 | 140 | 294 | 219 | 82 | 232 | 54 | 22 |
| 12 | 460 | 186 | 525 | 498 | a2,300 | 140 | *277 | 224 | 195 | 201 | 50 | 21 |
| 13 | 493 | 180 | 886 | 1,490 | a2,300 | 130 | 257 | 213 | 476 | 174 | 48 | *21 |
| 14 | 348 | 486 | 1,050 | 2,380 | a1,700 | *130 | 239 | 213 | 871 | 160 | 45 | |
| 15 | 236 | 826 | 1,170 | 3,110 | a1,300 | 130 | 236 | 204 | 1,340 | 158 | 43 | 21 |
| 16 | 180 | 1,100 | 915 | 2,950 | a950 | 130 | 282 | 184 | *1,960 | 142 | 42 | 21 |
| 17 | 147 | 1,420 | 595 | 2,520 | 601 | 130 | 784 | 174 | 2,090 | 124 | 41 | 21 |
| 18 | 124 | 1,320 | *421 | 2,060 | 453 | 140 | 1,210 | 162 | 1,870 | 121 | 40 | 22 |
| 19 | 107 | 959 | 340 | 1,580 | 386 | 150 | 1,550 | 152 | 1,700 | 112 | 39 | 25 |
| 20 | 94 | *565 | 285 | 1,150 | 330 | 180 | 1,540 | 212 | 1,460 | 112 | 38 | 37 |
| 21 | 86 | 365 | *247 | 860 | 299 | 210 | 1,180 | 288 | 1,180 | 105 | 40 | 52 |
| 22 | *79 | 297 | 216 | 564 | 278 | 220 | 762 | 337 | 975 | 97 | 46 | 45 |
| 23 | 76 | 270 | 188 | 480 | 258 | 220 | 507 | 298 | 912 | 86 | 46 | 41 |
| 24 | 78 | 266 | 221 | 429 | 241 | 200 | 390 | 266 | 691 | 81 | 43 | 36 |
| 25 | 86 | 276 | 205 | 386 | 230 | 190 | 326 | 226 | 563 | 78 | 40 | 32 |
| 26 | 95 | 272 | 175 | 362 | 229 | 180 | 286 | 189 | 456 | 76 | 36 | 30 |
| 27 | 97 | 245 | 328 | 338 | 210 | 250 | 277 | 168 | 342 | *80 | 35 | 28 |
| 28 | 94 | 222 | 702 | 386 | 200 | 713 | 253 | 192 | 273 | 90 | 32 | 28 |
| 29 | 89 | 212 | 690 | 445 | 190 | 1,010 | 225 | 264 | 237 | 96 | 31 | 25 |
| 30 | 83 | 201 | 1,000 | 479 | ----- | 1,490 | 219 | 258 | 214 | 81 | 32 | 21 |
| 31 | 93 | ----- | 935 | 493 | ----- | 1,880 | ----- | 248 | ----- | 70 | 32 | ----- |
| Total | 5,813 | 13,056 | 13,769 | 27,049 | 21,567 | 9,563 | 20,829 | 6,862 | 19,333 | \$,113 | 1,474 | 830 |
| Mean | 188 | 435 | 444 | 873 | 744 | 308 | 668 | 221 | 644 | 294 | 47.5 | 27.7 |
| Cfsm | 0.426 | 0.966 | 1.01 | 1.98 | 1.69 | 0.898 | 1.56 | 0.501 | 1.46 | C.667 | 0.108 | 0.063 |
| In. | 0.49 | 1.10 | 1.16 | 2.28 | 1.82 | 0.80 | 1.74 | 0.58 | 1.63 | 0.77 | 0.12 | 0.07 |

Calendar year 1959: Max 2,400 Min 16 Mean 413 Cfsm 0.937 Ir. 12.71
Water year 1959-60: Max 3,110 Min 21 Mean 407 Cfsm 0.923 Ir. 12.56

Peak discharge (base, 1,800 cfs).--Jan. 15 (3 p.m.) 3,180 cfs (13.68 ft); Feb. 13 (time unknown) about 2,500 cfs; Apr. 1 (2 a.m.) 1,960 cfs (12.02 ft); June 17 (2 a.m.) 2,160 cfs (12.35 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of reconstructed recorder graph, weather records, and records for Bean Creek at Powers.

Note.--Stage-discharge relation affected by ice Feb. 27 to Mar. 27.

1865. Auglaize River near Fort Jennings, Ohio

Location.--Lat 40°56'55", long 84°15'58", in SE $\frac{1}{4}$ sec.15, T.1 S., R.5 E., on left bank 200 ft upstream from bridge on U. S. Highway 224, $3\frac{1}{2}$ miles northeast of Fort Jennings, Putnam County, and 6 miles upstream from Ottawa River.

Drainage area.--333 sq mi.

Records available.--August 1921 to December 1935, October 1940 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 713.9 ft above mean sea level, adjustment of 1912. Prior to Oct. 6, 1930, chain gage at same site and datum.

Average discharge.--34 years, 293 cfs.

Extremes.--Maximum discharge during year, 2,920 cfs Feb. 11 (gage height, 11.59 ft); minimum, 9.5 cfs Sept. 12, 13 (gage height, 1.53 ft).

1921-35, 1940-60: Maximum discharge, about 12,000 cfs Jan. 23, 1959; maximum gage height, 20.30 ft Jan. 23, 1959, from floodmark (ice jam); minimum discharge, 4.5 cfs Oct. 7, 1956; minimum gage height, 0.75 ft Aug. 28, 1932.

Remarks.--Records good except those for periods of ice effect and those below 30 cfs, which are fair. Some diversion from Grand Lake by Miami & Erie Canal into Jennings Creek, tributary to Auglaize River, above station.

Revisions (water years).--WSP 744: 1932. WSP 974: 1930(M). WSP 1307: 1922-24(M), 1926-27(M), 1929(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-7, Aug. 25 to Sept. 30)

| | | | |
|-----|-----|------|-------|
| 1.3 | 9.5 | 3.0 | 179 |
| 1.4 | 15 | 4.0 | 332 |
| 1.5 | 17 | 6.0 | 804 |
| 1.7 | 28 | 9.0 | 1,780 |
| 2.0 | 55 | 12.0 | 3,140 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|------|-------|
| 1 | 19 | 40 | 69 | 273 | 279 | 60 | 519 | 74 | 394 | 40 | 22 | 19 |
| 2 | 19 | 34 | 76 | 229 | 238 | 60 | 347 | 72 | 235 | 40 | 22 | 18 |
| 3 | 19 | 32 | 101 | 596 | 196 | *65 | 273 | 66 | 157 | 44 | 23 | 15 |
| 4 | 17 | 50 | 165 | 778 | 165 | 55 | 252 | 58 | 140 | 46 | 28 | 14 |
| 5 | 24 | 194 | 192 | 390 | 182 | 60 | 299 | 53 | 228 | 46 | 47 | 14 |
| 6 | 39 | 304 | 210 | 316 | 1,150 | 60 | 256 | 49 | 131 | 50 | 31 | 14 |
| 7 | 54 | 176 | 312 | 291 | 2,070 | 60 | 214 | 48 | *87 | 44 | 27 | 13 |
| 8 | 68 | 101 | 278 | 199 | 1,140 | 55 | 179 | 48 | 69 | 36 | 41 | 13 |
| 9 | 49 | *73 | 206 | 146 | 653 | 50 | 140 | 49 | 56 | 33 | 44 | 12 |
| 10 | 40 | 58 | 168 | 123 | 1,800 | 50 | 125 | 60 | 47 | 30 | 36 | 13 |
| 11 | 78 | 52 | 221 | 105 | 2,860 | 50 | 108 | 70 | 44 | 30 | 30 | 12 |
| 12 | 343 | 48 | 1,030 | 448 | 1,940 | 50 | 107 | 67 | 44 | 28 | 27 | 10 |
| 13 | 221 | 49 | 2,320 | 2,240 | 569 | 50 | 99 | 76 | 51 | 31 | 26 | 9.5 |
| 14 | 113 | 176 | 2,490 | 2,570 | 358 | 50 | 91 | 62 | 85 | *49 | 24 | 11 |
| 15 | *69 | 918 | 1,030 | 1,920 | 264 | 55 | 84 | 57 | 268 | 84 | 27 | 10 |
| 16 | 50 | 526 | *507 | 2,420 | 235 | 55 | 103 | 46 | 222 | 87 | 28 | 12 |
| 17 | 44 | 258 | 349 | 1,520 | 182 | 55 | 232 | 47 | 134 | 55 | *48 | 12 |
| 18 | 35 | 175 | 276 | 591 | 164 | 60 | 256 | 50 | 106 | 42 | 54 | 11 |
| 19 | 31 | 130 | 224 | 434 | 140 | 65 | *165 | 55 | 247 | 35 | 38 | 11 |
| 20 | 29 | 107 | 183 | 353 | 120 | 75 | 121 | 62 | 148 | 32 | 30 | 11 |
| 21 | 29 | 88 | 158 | 250 | 120 | 95 | 103 | 63 | 93 | 28 | 28 | 11 |
| 22 | 28 | 77 | 139 | *170 | 110 | *140 | 99 | 67 | 68 | 26 | 26 | 11 |
| 23 | 29 | 69 | 120 | 160 | 100 | 140 | 89 | 63 | 94 | 26 | 24 | 12 |
| 24 | 34 | 67 | 116 | 150 | 90 | 120 | 81 | 65 | 108 | 23 | 22 | 14 |
| 25 | 34 | 66 | 103 | 130 | 80 | 110 | 75 | 58 | 126 | 22 | 23 | 14 |
| 26 | 52 | 66 | 101 | 120 | 80 | 150 | 74 | 50 | 79 | 24 | 18 | 14 |
| 27 | 51 | 67 | 114 | 170 | 80 | 199 | 72 | 48 | 59 | 27 | 16 | *14 |
| 28 | 48 | 66 | 169 | 323 | 80 | 1,300 | 68 | 50 | 27 | 18 | 13 | 13 |
| 29 | 66 | 66 | 442 | 526 | 75 | 2,000 | 63 | 567 | 45 | 25 | 17 | 13 |
| 30 | 45 | 64 | 687 | 483 | ----- | 1,680 | 64 | 428 | 44 | 23 | 20 | 13 |
| 31 | 40 | ----- | 469 | 357 | ----- | 958 | ----- | 690 | ----- | 23 | 19 | ----- |
| Total | 1,801 | 4,097 | 13,025 | 18,781 | 15,500 | 8,012 | 4,758 | 3,545 | 3,657 | 1,156 | 884 | 383.5 |
| Mean | 58.1 | 137 | 420 | 606 | 534 | 258 | 159 | 114 | 122 | 37.3 | 28.5 | 12.8 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 11,000 Min 14 Mean 360 Cfsm - In. -

Water year 1959-60: Max 2,860 Min 9.5 Mean 207 Cfsm - In. -

Peak discharge (base, 2,700 cfs).--Feb. 11 (3 p.m.) 2,920 cfs (11.59 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 21-27, Feb. 19 to Mar. 26.

1875. Ottawa River at Allentown, Ohio

Location.--Lat 40°45'18", long 84°11'41", in NW $\frac{1}{4}$ sec.29, T.3 S., R.6 E., on left bank at upstream side of bridge on State Highway 81 at Allentown, Allen County, 0.3 mile downstream from Kessler Run.

Drainage area.--168 sq mi.

Records available.--October 1923 to December 1935, August 1943 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 789.67 ft above mean sea level, adjustment of 1912. Prior to Oct. 1, 1925, chain gage and Oct. 1, 1925, to Dec. 30, 1935, water-stage recorder, at site 35 ft downstream at same datum.

Average discharge.--29 years, 126 cfs.

Extremes.--Maximum discharge during year, 1,860 cfs Dec. 13 (gage height, 6.52 ft); minimum, 15 cfs Sept. 25 (gage height, 2.50 ft).
1923-35, 1943-60: Maximum discharge, 7,740 cfs Jan. 22, 1959 (gage height, 10.88 ft), from rating curve extended above 4,800 cfs by logarithmic plotting; minimum, 1.4 cfs June 28, 29, 1933.
Flood of Mar. 15, 1939, reached a stage of 10.1 ft and flood in May 1943 a stage of about 10 ft (discharge not determined).

Remarks.--Records good. Diurnal fluctuation and some regulation caused by operation of water-supply and sewage-treatment plants of city of Lima upstream from station.

Revisions (water years).--WSP 1004: 1924. WSP 1144: 1944(M). WSP 1277: 1927. WSP 1387: 1924(M), 1927-28(M), 1929, 1930(M), 1935(M).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.5 | 15 | 3.7 | 235 |
| 2.8 | 29 | 4.0 | 410 |
| 3.1 | 59 | 5.0 | 1,040 |
| 3.3 | 92 | 6.0 | 1,560 |
| 3.5 | 148 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 37 | 25 | 34 | 43 | 53 | 31 | 146 | 50 | 63 | 28 | 18 | 21 |
| 2 | 30 | 24 | 45 | 50 | 45 | 30 | 152 | 41 | 72 | 22 | 21 | 21 |
| 3 | 35 | 21 | 58 | 449 | 37 | *30 | 132 | 28 | 94 | 55 | 30 | 20 |
| 4 | 63 | 98 | 47 | 224 | 57 | 29 | 216 | 25 | 48 | 26 | 65 | 18 |
| 5 | 93 | 74 | 46 | 114 | 114 | 28 | 180 | 24 | 57 | 22 | 60 | 17 |
| 6 | 127 | 42 | 91 | 81 | 1,070 | 33 | 122 | 23 | *44 | 23 | 28 | 18 |
| 7 | 72 | 30 | 118 | 73 | 853 | 35 | 96 | 25 | 34 | 22 | 21 | 20 |
| 8 | 52 | 26 | 68 | 65 | 284 | 31 | 78 | 29 | 29 | 22 | 22 | 21 |
| 9 | 50 | *24 | 46 | 55 | 356 | 31 | 74 | 40 | 26 | 20 | 21 | 25 |
| 10 | 57 | 21 | 42 | 57 | 1,440 | 30 | 66 | 50 | 25 | 20 | 21 | 27 |
| 11 | 248 | 21 | 141 | 55 | 1,360 | 31 | 55 | 36 | 28 | 31 | 23 | 19 |
| 12 | 32 | 22 | 968 | 681 | 456 | 30 | 48 | 30 | 54 | 23 | 21 | 17 |
| 13 | 30 | 69 | 1,520 | 1,300 | 128 | 31 | 45 | 33 | 54 | 70 | 20 | 30 |
| 14 | 24 | 254 | 712 | 732 | 62 | 34 | 42 | 27 | 74 | *41 | 19 | 19 |
| 15 | *23 | 150 | *235 | 1,120 | 47 | 35 | 47 | 31 | 45 | 25 | 36 | 19 |
| 16 | 25 | 50 | 158 | 980 | 45 | 39 | 79 | 31 | 34 | 21 | 22 | 19 |
| 17 | 23 | 39 | 125 | 316 | 43 | 40 | 250 | 32 | 56 | 19 | *21 | 20 |
| 18 | 23 | 30 | 97 | 114 | 40 | 42 | 104 | 24 | 59 | 19 | 22 | 18 |
| 19 | 23 | 28 | 77 | 92 | 36 | 48 | *69 | 26 | 30 | 22 | 21 | 19 |
| 20 | 19 | 26 | 66 | 122 | 37 | 68 | 47 | 40 | 25 | 22 | 21 | 19 |
| 21 | 19 | 26 | 60 | 88 | 59 | 72 | 51 | 47 | 30 | 20 | 23 | 19 |
| 22 | 19 | 24 | 45 | *69 | 59 | 63 | 48 | 71 | 67 | 21 | 19 | 18 |
| 23 | 21 | 28 | 42 | 38 | 55 | *54 | 40 | 45 | 46 | 21 | 21 | 19 |
| 24 | 58 | 29 | 34 | 32 | 40 | 55 | 47 | 27 | 31 | 18 | 21 | 19 |
| 25 | 40 | 28 | 47 | 31 | 38 | 45 | 44 | 27 | 26 | 19 | 21 | 17 |
| 26 | 34 | 26 | 57 | 30 | 38 | 55 | 51 | 25 | 23 | 23 | 21 | 17 |
| 27 | 34 | 32 | 58 | 63 | 41 | 126 | 38 | 103 | 22 | 27 | 22 | 21 |
| 28 | 28 | 34 | 110 | 104 | 44 | 719 | 32 | 199 | 24 | 22 | 17 | *24 |
| 29 | 25 | 30 | 299 | 101 | 41 | 763 | 28 | 63 | 23 | 22 | 22 | 23 |
| 30 | 27 | 31 | 359 | 106 | --- | 594 | 39 | 362 | 22 | 21 | 33 | 23 |
| 31 | 30 | --- | 166 | 71 | --- | 304 | --- | 236 | --- | 19 | 21 | --- |
| Total | 1,441 | 1,364 | 5,961 | 7,456 | 6,378 | 3,556 | 2,466 | 1,850 | 1,246 | 776 | 774 | 607 |
| Mean | 46.5 | 45.5 | 192 | 241 | 241 | 115 | 82.2 | 59.7 | 41.5 | 25.0 | 25.0 | 20.2 |
| Cfsm | 0.277 | 0.271 | 1.14 | 1.43 | 1.43 | 0.685 | 0.469 | 0.355 | 0.247 | 0.149 | 0.149 | 0.120 |
| In. | 0.32 | 0.30 | 1.31 | 1.65 | 1.54 | 0.79 | 0.55 | 0.41 | 0.28 | 0.17 | 0.17 | 0.13 |

Calendar year 1959: Max 5,870 Min 16 Mean 184 Cfsm 1.10 In. 14.90
Water year 1959-60: Max 1,520 Min 17 Mean 94.2 Cfsm 0.561 In. 7.62

Peak discharge (base, 1,600 cfs).--Dec. 13 (2 a.m.) 1,860 cfs (6.52 ft); Feb. 10 (3 p.m.) 1,690 cfs (6.23 ft).

* Discharge measurement made on this day.

1890. Blanchard River near Findlay, Ohio

Location.--Lat 41°03'21", long 83°41'17", on east line of sec.10, T.1 N., R.10 E., on left bank at upstream side of county highway bridge, 2 miles west of Findlay, Hancock County, and 3 miles downstream from Eagle Creek.

Drainage area.--343 sq mi.

Records available.--October 1923 to December 1935, October 1940 to September 1960. Monthly discharge only for October 1923, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 754.55 ft above mean sea level. Prior to July 24, 1930, chain gage at same site and datum.

Average discharge.--32 years, 241 cfs.

Extremes.--Maximum discharge during year, 3,370 cfs Feb. 11 (gage height, 9.48 ft); minimum, 4.0 cfs Sept. 24 (gage height, 0.74 ft).

1923-35, 1940-60: Maximum discharge, 15,000 cfs Feb. 11, 1959 (gage height, 16.76 ft); minimum, 0.4 cfs Aug. 26, 27, Sept. 3, 1934.

Flood in March 1913 reached a stage of 18.5 ft (discharge, 22,000 cfs, from rating curve extended above 10,000 cfs).

Remarks.--Records good except those for periods of shifting control, which are fair.

Revisions (water years).--WSP 974: 1942. WSP 1054: 1927-30, 1933(M), 1945. WSP 1387: 1926, 1928(M), 1930(M), 1952.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 8.4 | 25 | 69 | 263 | 280 | 54 | 579 | 52 | 393 | 67 | 18 | 8.5 |
| 2 | 8.4 | 24 | 77 | 251 | 231 | *54 | 358 | 49 | 214 | 48 | 15 | 7.9 |
| 3 | 7.6 | 22 | 94 | 892 | 167 | 57 | 321 | 40 | 102 | 74 | 24 | 7.2 |
| 4 | 8.4 | *172 | 120 | 597 | 147 | 48 | 529 | 36 | 110 | 55 | 25 | 7.3 |
| 5 | 11 | 324 | 245 | 309 | 231 | 55 | 474 | 40 | 237 | 48 | 22 | 9.9 |
| 6 | 54 | 150 | 385 | 214 | 2,290 | 51 | 301 | 37 | *158 | 42 | 22 | 8.5 |
| 7 | 44 | 77 | 340 | 199 | 2,420 | 52 | 237 | 38 | 102 | 40 | 69 | *8.5 |
| 8 | 40 | 56 | 205 | 158 | 1,390 | 45 | 185 | 40 | 78 | 34 | 44 | 7.9 |
| 9 | 30 | 42 | 137 | 112 | 825 | 44 | 158 | 48 | 65 | 29 | 31 | 12 |
| 10 | 28 | 35 | 104 | 108 | 2,540 | 48 | 110 | 52 | 52 | 26 | 25 | 8.5 |
| 11 | 163 | 40 | 209 | 102 | 2,980 | 45 | 121 | 62 | 46 | 30 | 21 | 6.0 |
| 12 | 129 | 42 | 1,540 | 957 | 1,890 | 49 | 115 | 55 | 72 | 26 | 19 | 7.2 |
| 13 | 73 | 90 | 2,900 | 3,000 | 755 | 41 | 102 | 46 | 78 | 174 | 14 | 6.6 |
| 14 | *50 | 430 | 1,750 | 2,170 | 341 | 42 | 90 | 48 | 115 | 188 | 14 | 6.0 |
| 15 | 40 | 463 | *730 | 2,470 | 248 | 45 | 88 | 41 | 176 | 72 | 20 | 5.6 |
| 16 | 30 | 217 | 414 | 2,400 | 234 | 49 | 90 | 44 | 248 | 40 | 19 | 5.6 |
| 17 | 25 | 127 | 309 | 1,330 | 199 | 54 | 179 | 42 | 301 | 31 | 51 | 5.2 |
| 18 | 19 | 75 | 240 | 520 | 167 | 52 | *196 | 44 | 588 | 29 | 29 | 4.8 |
| 19 | 18 | a65 | 193 | 393 | 124 | 55 | 132 | 44 | 429 | 34 | 25 | 6.0 |
| 20 | 16 | a55 | 147 | 324 | 102 | 70 | 100 | 55 | 225 | 51 | 17 | 6.6 |
| 21 | 14 | a50 | 121 | 234 | 115 | 95 | 92 | 58 | 90 | 32 | 24 | 6.0 |
| 22 | 12 | a50 | 95 | 196 | 98 | 98 | 90 | 63 | 80 | 25 | 19 | 6.6 |
| 23 | 17 | a50 | 82 | 176 | 88 | 98 | 78 | 70 | 141 | 35 | 20 | 5.6 |
| 24 | 29 | *54 | 86 | 141 | 82 | *112 | 70 | 60 | 70 | 22 | 14 | 4.8 |
| 25 | 26 | 53 | 80 | *115 | 72 | 88 | 70 | 55 | 41 | *25 | 13 | 4.8 |
| 26 | 30 | 44 | 82 | 112 | 70 | 112 | 68 | 52 | 52 | 26 | 12 | 5.6 |
| 27 | 31 | 48 | 130 | 156 | 74 | 232 | 67 | 60 | 55 | 27 | 11 | 5.6 |
| 28 | 30 | 47 | 321 | 327 | 68 | 1,490 | 57 | 70 | 54 | 24 | 9.9 | 5.6 |
| 29 | 28 | 51 | 438 | 432 | 65 | 1,830 | 52 | 167 | 54 | 44 | 12 | 5.2 |
| 30 | 26 | 56 | 636 | 438 | ----- | 1,780 | 55 | 610 | 51 | 52 | 50 | 6.0 |
| 31 | 26 | ----- | 411 | 347 | ----- | 1,180 | ----- | 783 | ----- | 24 | 15 | ----- |
| Total | 1,071.8 | 3,032 | 12,690 | 19,443 | 18,293 | 8,125 | 5,174 | 2,961 | 4,477 | 1,474 | 723.9 | 202.2 |
| Mean | 34.6 | 101 | 409 | 627 | 631 | 262 | 172 | 95.5 | 149 | 47.5 | 23.4 | 6.74 |
| Cfsm | 0.101 | 0.294 | 1.19 | 1.83 | 1.84 | 0.764 | 0.501 | 0.278 | 0.434 | 0.138 | 0.068 | 0.020 |
| In. | 0.12 | 0.33 | 1.37 | 2.11 | 1.98 | 0.88 | 0.56 | 0.32 | 0.48 | 0.16 | 0.08 | 0.02 |

Calendar year 1959: Max 11,600 Min 7.6 Mean 397 Cfsm 1.16 In. 15.74
 Water year 1959-60: Max 3,000 Min 4.8 Mean 212 Cfsm 0.618 In. 8.41

Peak discharge (base, 2,400 cfs).--Dec. 13 (11 a.m.) 3,080 cfs (8.96 ft); Jan. 13 (10 a.m.) 3,160 cfs (9.12 ft); Jan. 15 (10 p.m.) 2,940 cfs (8.68 ft); Feb. 6 (9 p.m.) 2,900 cfs (8.60 ft); Feb. 11 (1 a.m.) 3,370 cfs (9.48 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for Portage River at Woodville.

Note.--Shifting-control method used Oct. 1 to Dec. 12, May 7 to Sept. 30.

1915. Auglaize River near Defiance, Ohio

Location.--Lat 41°14'15", long 84°24'02", in NE¼ sec. 9, T. 3 N., R. 4 E., on right bank 125 ft downstream from dam and powerplant of Toledo Edison Co., a quarter of a mile upstream from Jackson ditch, and 3 miles south of Defiance, Defiance County.

Drainage area.--2,329 sq mi.

Records available.--May to August 1903 (gage heights only), April 1915 to September 1960.

Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 660.00 ft above mean sea level, adjustment of 1912. May 20 to Aug. 8, 1903, staff gage at site 1½ miles downstream at different datum. Apr. 13, 1915, to Dec. 6, 1933, staff gage near right bank on upstream side of dam at datum 6.00 ft higher. Auxiliary tailwater staff gage near right bank on downstream side of dam at present datum.

Average discharge.--45 years, 1,695 cfs.

Extremes.--Maximum discharge during year, 17,800 cfs Feb. 12 (gage height, 15.78 ft); minimum daily, 16 cfs July 31.

1915-60: Maximum discharge, 52,500 cfs Feb. 16, 1950, Feb. 12, 1959 (gage height, 26.4 ft, from graph based on hourly powerplant tailwater-gage readings and gage readings, respectively); maximum gage height, 27.65 ft Feb. 13, 1959, from floodmark (ice jam); minimum daily discharge, 0.5 cfs Oct. 13, 14, 1952 (during repairs to powerplant dam).

Flood in March 1913 reached a stage of 38.8 ft from reading on powerplant tailwater gage at present datum (discharge, 120,000 cfs, from rating curve extended above 51,000 cfs).

Remarks.--Records good. Flow regulated by powerplant above station (reservoir capacity, 9,800 acre-ft). Some diversion by Miami & Erie Canal from Grand Lake into Jennings Creek, tributary to Auglaize River above station (see measurements at miscellaneous sites on p. 422).

Revisions (water years).--WSP 759: Drainage area. WSP 954: 1941.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 12

Feb. 13 to Sept. 30

| | | | | | | | |
|-----|-----|------|--------|--|----|-----|-----|
| 4.8 | 15 | 6.5 | 880 | 4.85 | 11 | 5.0 | 39 |
| 4.9 | 27 | 7.0 | 1,410 | 4.9 | 18 | 5.2 | 110 |
| 5.0 | 48 | 9.0 | 3,990 | Note.--Same as preceding table above 5.2 ft. | | | |
| 5.2 | 110 | 12.0 | 9,060 | | | | |
| 5.5 | 238 | 16.0 | 18,400 | | | | |
| 6.0 | 502 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|---------|---------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 32 | 53 | 310 | 3,820 | 1,880 | 62 | 7,400 | 23 | 3,680 | 187 | 19 | 24 |
| 2 | 32 | 53 | 422 | 3,110 | 1,410 | 36 | 5,540 | 579 | 3,060 | 31 | 123 | 90 |
| 3 | 32 | 53 | 436 | 3,020 | 1,410 | 34 | 3,790 | 358 | 1,380 | 245 | 21 | 150 |
| 4 | 30 | 866 | 876 | 4,300 | 1,000 | 161 | 3,320 | 368 | 742 | 31 | 137 | 31 |
| 5 | 189 | 1,190 | 1,300 | 4,290 | 1,080 | 42 | 2,380 | 34 | 2,580 | 319 | 24 | 29 |
| 6 | 1,210 | 1,700 | 2,140 | 3,420 | 3,600 | 350 | 2,320 | 31 | 2,610 | 36 | 309 | 34 |
| 7 | 276 | 1,450 | 2,140 | 1,880 | 9,900 | 539 | 1,170 | 34 | 1,630 | 202 | 39 | 36 |
| 8 | 415 | 769 | 2,150 | 1,400 | 9,840 | *540 | 1,090 | 34 | 803 | 255 | 144 | 36 |
| 9 | 41 | 550 | 1,710 | 853 | 7,440 | 469 | 1,230 | 688 | 543 | 36 | 36 | 34 |
| 10 | 25 | 440 | 1,150 | 686 | 11,100 | 408 | 485 | 492 | 415 | 36 | 140 | 34 |
| 11 | 827 | 444 | 1,540 | 388 | 16,300 | 156 | *974 | 300 | 246 | 36 | 146 | 36 |
| 12 | 1,760 | 52 | 3,300 | 2,150 | 17,100 | 106 | 459 | 404 | 916 | *151 | 34 | 36 |
| 13 | 1,480 | 59 | 8,930 | 9,820 | 10,700 | 45 | 704 | 903 | 620 | 39 | 36 | 36 |
| 14 | 1,190 | 1,840 | 11,800 | 14,300 | 6,780 | 216 | 551 | 798 | 1,510 | 666 | 31 | 36 |
| 15 | 596 | 3,470 | 9,960 | 14,700 | 4,200 | 392 | 574 | 707 | 2,430 | 572 | 26 | 36 |
| 16 | 34 | 3,850 | 6,820 | 14,700 | 3,110 | 444 | 508 | 23 | 2,560 | 361 | *31 | 36 |
| 17 | 374 | 3,280 | 4,820 | 12,000 | 1,360 | 494 | 1,500 | 19 | 1,870 | 463 | 89 | 36 |
| 18 | 292 | 1,370 | 3,120 | 8,210 | 866 | 227 | 3,300 | 19 | 1,570 | 29 | 141 | 36 |
| 19 | 263 | *671 | 1,600 | 5,380 | 876 | 384 | 2,140 | 24 | 1,050 | 287 | 26 | 36 |
| 20 | 28 | 649 | 1,220 | 3,630 | 603 | 66 | 1,070 | 24 | 1,020 | 21 | 34 | 36 |
| 21 | *201 | 697 | 1,060 | 2,540 | 664 | 616 | 1,060 | 270 | 733 | 199 | 173 | 36 |
| 22 | 30 | 446 | 892 | 1,000 | 664 | 650 | 879 | 740 | 582 | 104 | 86 | 36 |
| 23 | 27 | 375 | 708 | 686 | 614 | 510 | 424 | 538 | 282 | 18 | 31 | 39 |
| 24 | 164 | 365 | 708 | 1,140 | 573 | 1,360 | 441 | *425 | 433 | 24 | 31 | 42 |
| 25 | 192 | 480 | 496 | 686 | 553 | 731 | 458 | 384 | 365 | 75 | 34 | 42 |
| 26 | 317 | 53 | 693 | 664 | 478 | 678 | 416 | 376 | 242 | 136 | 165 | 342 |
| 27 | 264 | 664 | 1,110 | *1,300 | 502 | 1,100 | 460 | 607 | 390 | 146 | 24 | 390 |
| 28 | 282 | 858 | 2,640 | 1,270 | 515 | 3,470 | 397 | 2,040 | 414 | 23 | *34 | 34 |
| 29 | 34 | 68 | *3,490 | 2,070 | 224 | 9,790 | 348 | 2,780 | 18 | 192 | 21 | 34 |
| 30 | 30 | 448 | 4,240 | 2,540 | ----- | 11,400 | 552 | 2,840 | 18 | 18 | 21 | 34 |
| 31 | 38 | ----- | 5,060 | 2,600 | ----- | 10,000 | ----- | 2,980 | ----- | 16 | 26 | ----- |
| Total | 10,705 | 27,243 | 86,841 | 128,653 | 115,342 | 45,466 | 45,920 | 19,842 | 34,712 | 4,934 | 2,221 | 1,887 |
| Mean | 345 | 908 | 2,801 | 4,150 | 3,977 | 1,467 | 1,531 | 640 | 1,157 | 159 | 71.6 | 62.9 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 49,500 Min 21 Mean 2,522 Cfsm - In. -
 Water year 1959-60: Max 17,100 Min 16 Mean 1,451 Cfsm - In. -

Peak discharge (base, 13,000 cfs).--Dec. 14 (4 p.m.) 13,000 cfs (13.90 ft); Jan. 15 (8 a.m.) 15,000 cfs (14.70 ft); Feb. 12 (8 a.m.) 17,800 cfs (15.78 ft).

* Discharge measurement made on this day.

1920. Miami & Erie Canal near Defiance, Ohio

Location.--Lat 41°17'30", long 84°16'50", in NW $\frac{1}{4}$ sec.22, T.4 N., R.5 E., on right bank adjacent to Independence Dam, 275 ft downstream from point of diversion from Maumee River and 4 $\frac{1}{2}$ miles east of Defiance, Defiance County.

Records available.--October 1924 to July 1929, May to December 1935, October 1952 to September 1960. Monthly discharge only for October 1924, published in WSP 1307. Published as "near Florida" May to December 1935.

Gage.--Water-stage recorder. Datum of gage is 656.12 ft above mean sea level. Prior to July 23, 1929, water-stage recorder at same site at datum 2.69 ft higher. May to December 1935, staff gage at site 5 $\frac{1}{2}$ miles downstream at different datum. Oct. 1, 1952, to Mar. 25, 1953, staff gage at present site and datum.

Extremes.--1924-29, 1935, 1952-60: Maximum daily discharge, about 900 cfs Feb. 12, 1959; no flow at times.

Remarks.--Records good except those for periods of ice effect, which are poor. Flow is diverted from Maumee River into canal at headgates 275 ft upstream and returned to river above station at Waterville.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | |
|-------|-------|-------|------|-------|------------|------|------|-------|------|-------|------|-------|-------|
| 1 | 39 | 30 | 22 | 31 | b25 (*) | | 35 | 20 | 30 | 26 | 27 | 26 | |
| 2 | 40 | 30 | 22 | 30 | | | 30 | 20 | 30 | 25 | 26 | 26 | |
| 3 | 39 | 30 | 22 | 33 | | | 27 | 21 | 28 | 26 | 27 | 27 | |
| 4 | 40 | 42 | 22 | 30 | | | 25 | 21 | 26 | 27 | 27 | 26 | |
| 5 | 40 | 44 | 24 | 36 | | | 23 | 21 | 26 | 28 | 28 | 27 | |
| 6 | 45 | 36 | 28 | 31 | 54 | (*) | 23 | 21 | 29 | 30 | 29 | 27 | |
| 7 | 43 | 35 | 26 | 26 | 37 | | 21 | 20 | 28 | 30 | 28 | 27 | |
| 8 | 42 | 35 | 26 | 27 | 34 | | 19 | 21 | 27 | 31 | 27 | 27 | |
| 9 | 41 | 32 | 25 | 26 | 32 | | 19 | 22 | 26 | 30 | 27 | 27 | |
| 10 | 42 | 30 | 25 | 24 | 75 | | 19 | 23 | 26 | 30 | 27 | 27 | |
| 11 | 44 | 28 | 29 | 22 | 55 | b20 | *18 | 23 | 25 | 29 | 28 | 27 | |
| 12 | 43 | 28 | 60 | 80 | 42 | | 17 | 23 | 27 | 29 | 27 | 27 | |
| 13 | 45 | 30 | 58 | 80 | 40 | | 18 | 23 | 32 | *29 | 27 | 26 | |
| 14 | 45 | 48 | 49 | 58 | 38 | | 17 | 23 | 46 | 31 | 27 | 26 | |
| 15 | 42 | 48 | 44 | 64 | 34 | | 19 | 22 | 44 | 30 | 27 | 26 | |
| 16 | 40 | 45 | 27 | 40 | 31 | | 20 | 22 | 41 | 30 | *27 | 26 | |
| 17 | 37 | 38 | 35 | 45 | 28 | | 21 | 20 | 36 | 31 | 26 | 26 | |
| 18 | 36 | 39 | 33 | 41 | 25 | | 21 | 21 | 34 | 29 | 26 | 26 | |
| 19 | 35 | *36 | 29 | 34 | b20 | | 25 | 22 | 31 | 29 | 27 | 27 | |
| 20 | 35 | 35 | 27 | 41 | | | 24 | 22 | 30 | 29 | 27 | 26 | |
| 21 | *35 | 30 | 26 | 30 | | | 24 | 22 | 29 | 29 | 28 | 27 | |
| 22 | 35 | 29 | 25 | 25 | | | 23 | 23 | 29 | 28 | 27 | 27 | |
| 23 | 35 | 25 | 24 | 28 | | | 22 | 23 | 28 | 28 | 27 | 27 | |
| 24 | 35 | 24 | 22 | 30 | | | 21 | *23 | 26 | 28 | 27 | 27 | |
| 25 | 35 | 22 | 21 | 30 | | | 21 | 24 | 26 | 28 | 27 | 27 | |
| 26 | 34 | 23 | 20 | 29 | | | 21 | 24 | 26 | 28 | 27 | 27 | |
| 27 | 35 | 23 | 25 | 32 | | | b25 | 21 | 24 | 25 | 28 | *28 | |
| 28 | 35 | 23 | *36 | 32 | | | b35 | 21 | 28 | 26 | 28 | 26 | |
| 29 | 35 | 22 | 38 | 32 | | | 38 | 21 | 31 | 25 | 28 | 26 | |
| 30 | 34 | 21 | 35 | 31 | | | 39 | 21 | 31 | 25 | 27 | 26 | 27 |
| 31 | 33 | ----- | 33 | 30 | | | 40 | ----- | 29 | ----- | 27 | 26 | ----- |
| Total | 1,194 | 961 | 948 | 1,138 | 870 | 697 | 657 | 713 | 887 | 886 | 836 | 802 | |
| Mean | 38.5 | 32.0 | 30.6 | 36.7 | 30.0 | 22.5 | 21.9 | 23.0 | 29.6 | 28.6 | 27.0 | 26.7 | |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - | |
| In. | - | - | - | - | - | - | - | - | - | - | - | - | |

Calendar year 1959: Max 900

Min 20

Mean 69.6

Cfsm -

In. -

Water year 1959-60: Max 80

Min 17

Mean 28.9

Cfsm -

In. -

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1925. Maumee River near Defiance, Ohio

Location.--Lat 41°17'30", long 84°16'50", in NW¼ sec.22, T.4 N., R.5 E., on left bank 40 ft upstream from Independence Dam, 275 ft downstream from point of diversion to Miami & Erie Canal, 4 miles downstream from Auglaize River, and 4½ miles east of Defiance, Defiance County.

Drainage area.--5,530 sq mi.

Records available.--October 1924 to December 1935, March 1939 to September 1960.

Gage.--Water-stage recorder above concrete dam. Datum of gage is 659.12 ft above mean sea level. Prior to Nov. 13, 1924, staff gage at same site and datum.

Average discharge.--32 years, 4,081 cfs (not including flow in Miami & Erie Canal).

Extremes.--Maximum discharge during year, 37,800 cfs Feb. 12 (gage height, 7.37 ft); minimum, 109 cfs Sept. 13 (gage height, 1.47 ft).

1924-35, 1939-60: Maximum discharge, 87,100 cfs Feb. 16, 1950 (gage height, 13.70 ft); maximum gage height, 13.77 ft Feb. 11, 1959 (ice jam); minimum discharge, 2 cfs Sept. 3, 1925 (gage height, 1.14 ft).

Remarks.--Records good. Flow affected by regulation of Auglaize River at hydroelectric plant of Toledo Edison Co., 3 miles south of Defiance. Water diverted into Miami & Erie Canal, 275 ft upstream, bypasses station. These records do not include flow in canal; records of diversion published as Miami & Erie Canal near Defiance (see preceding page).

Revisions (water years).--WSP 974: 1926-27, 1930. WSP 1387: 1925-28, 1946.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|--------|
| 1.5 | 137 | 3.0 | 4,400 |
| 1.7 | 407 | 4.0 | 9,800 |
| 2.0 | 1,000 | 6.0 | 25,100 |
| 2.5 | 2,440 | 8.0 | 45,200 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|---------|---------|---------|---------|---------|--------|---------|--------|--------|-------|
| 1 | 260 | 331 | 1,260 | 9,300 | 4,880 | 913 | 20,200 | 1,440 | 6,930 | 1,360 | 361 | 195 |
| 2 | 361 | 346 | 1,130 | 7,240 | 4,320 | 844 | 16,800 | 2,030 | 5,980 | 1,130 | 407 | 234 |
| 3 | 361 | 332 | 1,200 | 7,460 | 4,050 | 735 | 15,200 | 1,630 | 3,820 | 1,550 | 361 | 260 |
| 4 | 457 | 1,790 | 1,580 | 9,540 | *3,340 | 755 | 11,300 | 1,550 | 2,650 | 1,600 | 441 | 183 |
| 5 | 541 | 2,780 | 1,970 | 8,940 | 3,060 | 936 | 8,880 | 1,180 | 2,720 | 2,170 | 655 | 160 |
| 6 | 1,190 | 3,860 | 3,060 | 6,370 | 8,240 | 1,030 | 7,520 | 1,130 | 4,620 | 2,140 | 1,090 | 183 |
| 7 | 1,010 | 4,240 | 3,180 | 4,360 | 17,800 | *1,310 | 5,460 | 1,080 | 3,180 | 2,580 | 541 | 160 |
| 8 | 1,400 | 3,580 | 3,260 | 3,620 | 19,500 | 1,230 | 4,110 | 882 | 1,920 | 2,690 | 441 | 160 |
| 9 | 1,390 | 2,510 | 3,020 | 2,690 | 13,900 | 1,160 | 3,740 | 1,620 | 1,410 | 2,170 | 331 | 183 |
| 10 | 1,660 | 2,170 | 2,270 | 2,270 | 21,400 | 1,130 | 2,800 | 1,690 | 1,180 | 1,600 | 407 | 137 |
| 11 | 2,340 | 1,800 | 2,690 | 1,920 | 34,300 | 798 | 2,650 | 1,740 | 821 | 1,470 | 407 | 160 |
| 12 | 3,140 | 1,260 | 7,100 | 6,630 | 36,900 | 695 | 2,140 | 1,890 | 1,300 | 1,080 | 274 | 172 |
| 13 | 3,700 | 1,080 | 17,400 | 22,100 | 28,200 | 675 | *2,040 | 2,260 | 4,150 | *844 | 274 | 137 |
| 14 | 3,700 | 4,160 | 21,900 | 31,000 | 20,200 | 844 | 1,860 | 2,170 | 9,990 | 1,390 | 260 | 180 |
| 15 | 2,690 | 8,940 | 19,300 | 31,400 | 13,900 | 936 | 1,740 | 2,020 | 15,800 | 1,210 | 260 | 160 |
| 16 | 1,740 | 10,800 | 13,400 | 30,900 | 10,500 | 890 | 1,740 | 1,310 | 15,900 | 1,120 | *260 | 160 |
| 17 | 1,490 | 9,300 | 10,200 | 27,400 | 7,460 | 1,260 | 2,960 | 1,160 | 11,700 | 1,270 | 317 | 172 |
| 18 | 1,080 | *6,720 | 7,630 | 21,300 | 5,510 | 867 | 9,240 | 1,180 | 9,600 | 755 | 303 | 160 |
| 19 | 821 | 5,560 | 5,330 | 16,300 | 4,110 | 959 | 11,000 | 1,180 | 7,980 | 821 | 260 | 195 |
| 20 | 635 | 5,010 | 3,940 | 12,400 | 3,060 | 775 | 9,480 | 1,360 | 6,880 | 595 | 221 | 183 |
| 21 | *525 | 4,150 | 3,340 | 9,360 | 2,470 | 1,310 | 8,100 | 1,740 | 5,740 | 695 | 338 | 349 |
| 22 | 525 | 3,100 | 2,650 | 6,270 | 2,370 | 1,770 | 7,030 | 2,590 | 4,880 | 595 | 303 | 407 |
| 23 | 441 | 2,140 | 2,140 | 4,200 | 2,100 | 1,600 | 5,560 | 2,580 | 4,150 | 457 | 377 | 303 |
| 24 | 474 | 1,740 | 1,920 | 3,900 | 1,890 | 2,390 | 4,490 | 2,500 | 4,070 | 407 | 346 | 247 |
| 25 | 635 | 1,720 | 1,630 | 2,760 | 1,830 | 2,180 | 3,380 | *1,980 | 3,020 | 407 | 288 | 260 |
| 26 | 516 | 1,330 | 1,630 | 2,540 | 1,600 | 1,920 | 2,510 | 1,770 | 2,440 | 491 | 361 | 528 |
| 27 | 659 | 1,740 | 2,640 | 3,340 | 1,580 | 2,200 | 2,400 | 1,740 | 2,200 | 541 | 247 | *612 |
| 28 | 576 | 1,630 | 4,490 | 3,580 | 1,490 | 7,860 | 1,830 | 4,360 | 2,140 | 635 | 247 | 303 |
| 29 | 595 | 1,390 | *10,800 | 4,620 | 1,360 | 19,700 | 1,720 | 6,220 | 1,630 | 615 | 208 | 234 |
| 30 | 457 | 1,180 | 12,400 | 5,510 | ----- | 24,600 | 1,840 | 6,320 | 1,390 | 491 | 183 | 208 |
| 31 | 346 | ----- | 12,100 | 5,600 | ----- | 23,900 | ----- | 5,930 | ----- | 407 | 208 | ----- |
| Total | 35,715 | 26,749 | 186,560 | 314,620 | 281,300 | 108,172 | 177,720 | 68,112 | 150,191 | 35,286 | 10,977 | 6,965 |
| Mean | 1,152 | 3,225 | 6,018 | 10,150 | 9,700 | 3,489 | 5,924 | 2,197 | 5,006 | 1,138 | 354 | 232 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 72,800 Min 99 Mean 5,763 Cfsm - In. -
 Water year 1959-60: Max 36,900 Min 137 Mean 4,023 Cfsm - In. -

Peak discharge (base, 25,000 cfs).--Jan. 15 (8 to 11 a.m.) 31,800 cfs (6.74 ft); Feb. 12 (7 a.m.) 37,800 cfs (7.37 ft); Mar. 30 (12 p.m.) 25,400 cfs (6.03 ft).

* Discharge measurement made on this day.

1935. Maumee River at Waterville, Ohio

Location.--Lat 41°30'00", long 83°42'46", on downstream side of second pier from left end of bridge on State Highway 64 at Waterville, Lucas County, 3 miles downstream from Tontogany Creek.

Drainage area.--6,314 sq mi.

Records available.--November 1898 to December 1901, August 1921 to December 1935, March 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 596.33 ft above mean sea level, adjustment of 1912. Nov. 19, 1938, to Dec. 31, 1901, wire-weight gage, Aug. 26, 1921, to July 31, 1930, chain gage, Aug. 1, 1930, to Dec. 31, 1935, water-stage recorder, and Mar. 14, 1939, to Mar. 12, 1940, chain gage, all at same site and datum.

Average discharge.--35 years (1921-35, 1939-60), 4,821 cfs (includes flow in Miami & Erie Canal at Waterville 1922-29; canal was abandoned in 1929 and was filled in prior to March 1939).

Extremes.--Maximum discharge during year, 46,800 cfs Feb. 11 (gage height, 10.30 ft); minimum, 79 cfs Sept. 14 (gage height, 1.52 ft).
1921-35, 1939-60: Maximum discharge, 94,000 cfs Feb. 16, 1950 (gage height, 14.52 ft); maximum gage height, 16.17 ft Feb. 12, 1959 (ice jam); practically no flow at times prior to June 30, 1929, when entire river flow was being diverted by canal; minimum since canal was abandoned, 32 cfs Sept. 29, 1941.

Remarks.--Records good. Low flow slightly regulated by powerplants above station. Records include flow of Miami & Erie Canal near Defiance (see p. 253), which returns to river above this station. Small diversion above gage into Portage River basin (see Portage River at Woodville). Records of suspended sediment loads and water temperatures for the water year 1960 are given in WSP 1741.

Revisions (water years).--WSP 759: Drainage area. WSP 894: 1930(M). WSP 1084: 1946. WSP 1387: 1900(M), 1922-23, 1933.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 16-23, Dec. 28 to Jan. 9)

| | | | |
|-----|-------|------|--------|
| 1.6 | 116 | 3.0 | 2,590 |
| 1.7 | 190 | 5.0 | 10,400 |
| 2.1 | 640 | 7.0 | 21,600 |
| 2.5 | 1,260 | 11.0 | 52,400 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|---------|---------|---------|---------|---------|---------|--------|---------|--------|--------|-------|
| 1 | 340 | 590 | 1,390 | 12,200 | 7,080 | 1,570 | 25,100 | 1,910 | 8,530 | g1,480 | 350 | 285 |
| 2 | 340 | 373 | 1,460 | 9,200 | 9,200 | 1,050 | 20,600 | 1,620 | 8,610 | 1,670 | g285 | 218 |
| 3 | 351 | 362 | 1,580 | 9,410 | 6,000 | 1,180 | 16,600 | 1,340 | 6,680 | 2,110 | 478 | 247 |
| 4 | 407 | 1,080 | *1,830 | 11,200 | 5,280 | 990 | 13,900 | 1,670 | 4,020 | 2,790 | 351 | 407 |
| 5 | 443 | 5,630 | 2,560 | 11,300 | 4,090 | 1,020 | 11,600 | 1,460 | 3,360 | 2,400 | *479 | 247 |
| 6 | 590 | 5,820 | 4,130 | 8,660 | 11,300 | 1,090 | 9,540 | 1,070 | 4,690 | 2,530 | 744 | 228 |
| 7 | 1,770 | 6,210 | 5,240 | *5,900 | 20,500 | 1,280 | 7,980 | 1,180 | 5,040 | 2,530 | 1,010 | 276 |
| 8 | 1,460 | 5,590 | 4,580 | 4,460 | 24,000 | 1,400 | 5,280 | 868 | 3,470 | 2,890 | 528 | 247 |
| 9 | 1,800 | 3,720 | 4,500 | 3,580 | 19,300 | 1,410 | 4,850 | 1,150 | 2,140 | 2,760 | 407 | 296 |
| 10 | 1,500 | 3,160 | 3,090 | 2,850 | 24,000 | 1,390 | 4,130 | *1,860 | 1,670 | 1,990 | 329 | 168 |
| 11 | 2,730 | 2,590 | 3,360 | 2,370 | 44,100 | 1,180 | 2,920 | 2,340 | 1,410 | 1,330 | 384 | 123 |
| 12 | 3,580 | 2,020 | 10,000 | 5,170 | *44,800 | 942 | 2,990 | 2,250 | 1,300 | 1,090 | 407 | 190 |
| 13 | 4,810 | 1,500 | 23,700 | 31,000 | 36,200 | 826 | 2,980 | 2,310 | 3,180 | 990 | 296 | 238 |
| 14 | 4,770 | 4,970 | 28,200 | 41,100 | 25,400 | *826 | 2,340 | 2,720 | 11,100 | 974 | 296 | *138 |
| 15 | 3,760 | 12,500 | 25,800 | 41,400 | 18,600 | 868 | 1,990 | 2,560 | 20,100 | g1,160 | 285 | 116 |
| 16 | 2,790 | 15,100 | 18,100 | 39,900 | 13,500 | 1,010 | 2,190 | 2,050 | 21,500 | 1,260 | 238 | 153 |
| 17 | 1,770 | 13,600 | 13,800 | 34,600 | 10,100 | 1,240 | 3,230 | 1,580 | 16,400 | 1,220 | 266 | 168 |
| 18 | 1,620 | 10,400 | 10,100 | 27,000 | 7,700 | 1,280 | 8,090 | 942 | 12,900 | 1,200 | 340 | 183 |
| 19 | 1,050 | 7,610 | 7,000 | 21,400 | 5,980 | 1,010 | 13,200 | 1,150 | 10,700 | 812 | 318 | 175 |
| 20 | 910 | 6,920 | 4,920 | 16,400 | 3,980 | 1,260 | 11,600 | 1,390 | 8,570 | 840 | 318 | 256 |
| 21 | 653 | 5,980 | 4,240 | 13,000 | 3,680 | 1,200 | 10,300 | 1,650 | g7,860 | 679 | 329 | 175 |
| 22 | 628 | 4,730 | 3,470 | 8,700 | 3,020 | 2,140 | 9,160 | 2,220 | g6,680 | 731 | 384 | 389 |
| 23 | 653 | 3,470 | 2,760 | g5,860 | 3,230 | 2,370 | 7,820 | 3,540 | g8,020 | 679 | 329 | 443 |
| 24 | 628 | 2,620 | 2,500 | g5,000 | 2,690 | 2,280 | 6,170 | 3,500 | 5,820 | 491 | 373 | 318 |
| 25 | 666 | 2,400 | 2,250 | 4,800 | 2,620 | 3,360 | 4,460 | 3,090 | 4,350 | 491 | 351 | 285 |
| 26 | 757 | 1,750 | 1,860 | 3,760 | 2,340 | 2,590 | 3,470 | 2,790 | 3,360 | g503 | 529 | 266 |
| 27 | *705 | 1,720 | 2,600 | 3,500 | 2,160 | 2,440 | 2,720 | 2,680 | 2,790 | g503 | 351 | 526 |
| 28 | 733 | 2,190 | 6,960 | 5,320 | 2,110 | 7,610 | 2,190 | 3,580 | g2,470 | g640 | 296 | 578 |
| 29 | 666 | 2,340 | 13,100 | 6,130 | 1,800 | 18,600 | 1,770 | 7,900 | *g2,220 | g679 | 318 | 373 |
| 30 | 666 | 1,370 | 15,200 | 7,200 | ----- | 28,900 | 1,880 | 9,290 | g1,600 | g653 | 218 | 238 |
| 31 | 590 | ----- | 15,200 | 9,780 | ----- | *30,100 | ----- | 8,190 | ----- | g419 | 218 | ----- |
| Total | 44,134 | 138,315 | 245,480 | 412,160 | 362,560 | 124,412 | 220,350 | 82,460 | 198,540 | 40,494 | 11,605 | 7,976 |
| Mean | 1,424 | 4,610 | 7,919 | 13,300 | 12,500 | 4,013 | 7,345 | 2,660 | 6,618 | 1,306 | 374 | 266 |
| Cfsm | 0.226 | 0.730 | 1.25 | 2.11 | 1.98 | 0.636 | 1.16 | 0.421 | 1.05 | 0.207 | 0.059 | 0.042 |
| In. | 0.26 | 0.81 | 1.44 | 2.43 | 2.14 | 0.73 | 1.29 | 0.49 | 1.17 | 0.24 | 0.07 | 0.05 |

Calendar year 1959: Max 80,000 Min 114 Mean 7,017 Cfsm 1.11 In. 15.07

Water year 1959-60: Max 44,800 Min 116 Mean 5,160 Cfsm 0.817 In. 11.12

* Discharge measurement made on this day.

g Computed from once-daily or more frequent wire-weight-gage readings.

1955. Portage River at Woodville, Ohio

Location.--Lat 41°26'55", long 83°21'41", in sec.28, T.6 N., R.13 E., on left bank at upstream side of bridge on U. S. Highway 20 in Woodville, Sandusky County.

Drainage area.--433 sq mi.

Records available.--July 1928 to December 1935, October 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 615.14 ft above mean sea level, adjustment of 1912. Prior to Mar. 24, 1933, chain gage, Apr. 7 to Oct. 8, 1933, staff gage, Oct. 9, 1933, to Dec. 31, 1935, water-stage recorder, and Oct. 17 to Nov. 29, 1939, wire-weight gage, all at same site and datum.

Average discharge.--28 years, 312 cfs (adjusted for diversion).

Extremes.--Maximum discharge during year, 5,270 cfs Jan. 14 (gage height, 10.08 ft); minimum, 4.9 cfs Sept. 28; minimum gage height, 1.92 ft Aug. 11, Sept. 8, 9.

1928-35, 1939-60: Maximum discharge, 11,500 cfs Feb. 15, 1950 (gage height, 14.51 ft); minimum, 0.3 cfs Aug. 28, 1931; minimum gage height, 1.60 ft July 25, 26, 1934.

Flood in March 1913 reached a stage of 17 ft, from information by local residents (discharge, 17,000 cfs, from rating curve extended above 11,500 cfs).

Remarks.--Records good except those for periods of ice effect and those below 10 cfs, which are fair. Flow supplemented by water diverted from Maumee River basin for municipal supply of Bowling Green 16 miles upstream. Diversion began Sept. 1, 1951.

Revisions (water years).--WSP 894: 1929-30. WSP 1207: 1933. WSP 1387: 1931, 1933.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.8 | 2.9 | 3.0 | 159 |
| 1.9 | 5.8 | 3.5 | 279 |
| 2.0 | 11 | 4.0 | 435 |
| 2.1 | 18 | 5.0 | 920 |
| 2.3 | 38 | 8.0 | 3,070 |
| 2.6 | 80 | 10.0 | 5,170 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------|-------|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 19 | 44 | 110 | 439 | 535 | 71 | 836 | 99 | 108 | 71 | 61 | 11 |
| 2 | 20 | 42 | 126 | 342 | 391 | 77 | 565 | 95 | 97 | 146 | 35 | 10 |
| 3 | 19 | 41 | 173 | 1,550 | 272 | 68 | 435 | 80 | 76 | 215 | 25 | 10 |
| 4 | 19 | 70 | 259 | 1,800 | 264 | 64 | 435 | 70 | 59 | 367 | 22 | 9.6 |
| 5 | 16 | 1,020 | 330 | 612 | 264 | 68 | 463 | 61 | 61 | 229 | 22 | 8.7 |
| 6 | 33 | 908 | 409 | 358 | 2,150 | 68 | *327 | 57 | 274 | 129 | 16 | 8.2 |
| 7 | 490 | 399 | 628 | 319 | 3,850 | 59 | 269 | 51 | 166 | 83 | 14 | 7.2 |
| 8 | 565 | 222 | 459 | 227 | 2,210 | 58 | 229 | 48 | 103 | 57 | 11 | 5.8 |
| 9 | 313 | 150 | 274 | 161 | 1,260 | 59 | 191 | 61 | 70 | 42 | 9.2 | 5.8 |
| 10 | 246 | 110 | 222 | 150 | 2,530 | 61 | 152 | 113 | 52 | 34 | 7.2 | 6.3 |
| 11 | 271 | 92 | 219 | 133 | 4,430 | 62 | 122 | 272 | 44 | 26 | 7.2 | 7.2 |
| 12 | 812 | 78 | 1,720 | 384 | 3,060 | 61 | 112 | 248 | 106 | *21 | 7.7 | 7.2 |
| 13 | 404 | 83 | 3,270 | 4,100 | 998 | 87 | 110 | 182 | 565 | 20 | 8.7 | 7.2 |
| 14 | 205 | 501 | 2,860 | 4,610 | 509 | b55 | 99 | 157 | 740 | 32 | 11 | 6.8 |
| 15 | 129 | 1,770 | 1,300 | *3,400 | 355 | *b50 | 95 | 137 | 705 | 152 | *14 | 6.8 |
| 16 | 88 | 1,120 | 765 | 3,570 | 327 | b60 | 112 | 114 | 368 | 97 | 25 | 6.8 |
| 17 | 64 | 557 | *526 | 1,800 | 244 | b70 | 499 | 92 | 222 | 54 | 20 | 8.2 |
| 18 | 48 | 300 | 384 | 830 | 215 | b65 | 738 | *77 | 180 | 34 | 14 | 11 |
| 19 | 38 | 217 | 305 | 623 | *170 | b75 | 342 | 71 | 166 | 37 | 11 | *12 |
| 20 | 30 | 168 | 236 | 428 | 148 | b90 | 224 | 70 | 112 | 84 | 10 | 13 |
| 21 | 23 | 124 | 198 | 311 | 184 | b130 | 196 | 76 | 80 | 274 | 11 | 9.6 |
| 22 | 22 | 110 | 166 | 313 | 110 | b180 | 187 | 80 | 72 | 159 | 10 | 8.7 |
| 23 | 20 | *97 | 139 | 272 | b110 | b210 | 159 | 80 | 387 | 87 | 13 | 8.7 |
| 24 | 20 | 94 | 141 | 194 | b110 | b190 | 145 | 82 | 416 | 58 | 12 | 8.2 |
| 25 | 40 | 116 | 141 | 146 | b95 | b170 | 144 | 68 | 215 | 38 | 11 | 8.2 |
| 26 | 110 | 106 | 124 | 194 | b90 | b200 | 141 | 55 | 118 | 25 | 10 | 7.2 |
| 27 | *112 | 88 | 168 | 189 | b95 | b280 | 135 | 51 | 74 | 20 | 9.6 | 6.3 |
| 28 | 92 | 76 | 903 | b900 | b90 | 2,180 | 116 | 52 | 55 | 74 | 9.6 | 5.2 |
| 29 | 76 | 74 | 1,380 | 1,500 | 83 | 2,340 | 101 | 103 | 46 | 83 | 9.2 | 5.5 |
| 30 | 59 | 76 | 1,210 | 1,110 | ----- | 1,930 | 94 | 126 | 41 | 44 | 10 | 5.5 |
| 31 | 51 | ----- | 790 | 765 | ----- | 1,380 | ----- | 112 | ----- | 62 | 12 | ----- |
| Total | 4,454 | 8,853 | 19,935 | 32,030 | 25,149 | 10,488 | 7,774 | 3,038 | 5,778 | 2,854 | 468.4 | 241.9 |
| Mean | 144 | 295 | 645 | 1,035 | 867 | 339 | 259 | 98.0 | 193 | 92.1 | 15.1 | 8.06 |
| (\bar{x}) | -1.82 | -1.74 | -1.40 | -1.69 | -1.69 | -1.81 | -1.88 | -1.86 | -1.60 | -1.57 | -2.59 | -3.84 |

Adjusted for diversion for city of Bowling Green

| Mean | 142 | 293 | 642 | 1,031 | 865 | 336 | 257 | 96.1 | 191 | 90.5 | 12.5 | 4.22 |
|------|-------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| Cfsm | 0.329 | 0.677 | 1.48 | 2.38 | 2.00 | 0.776 | 0.594 | 0.222 | 0.441 | 0.209 | 0.029 | 0.010 |
| In. | 0.39 | 0.76 | 1.71 | 2.74 | 2.16 | 0.89 | 0.66 | 0.26 | 0.49 | 0.24 | 0.03 | 0.01 |

| | Observed | | | | Adjusted | | | |
|---------------------|----------|-------|-----|-----|----------|-----|------|-------|
| Calendar year 1959: | Max | 6,880 | Min | 4.6 | Mean | 470 | Mean | 468 |
| Water year 1959-60: | Max | 4,810 | Min | 5.2 | Mean | 331 | Cfsm | 1.08 |
| | | | | | | | In. | 14.67 |
| | | | | | | | Cfsm | 0.760 |
| | | | | | | | In. | 10.33 |

Peak discharge (base, 3,500 cfs).--Dec. 14 (1 a.m.) 3,500 cfs (8.47 ft); Jan. 14 (6 a.m.) 5,270 cfs (10.08 ft); Feb. 7 (2:30 p.m.) 4,030-cfs (9.00 ft); Feb. 11 (6 p.m.) 4,650 cfs (9.56 ft).

* Discharge measurement made on this day.

† Diversion from Maumee River basin for municipal supply of city of Bowling Green, equivalent in cubic feet per second.

b Stage-discharge relation affected by ice.

1965. Sandusky River near Upper Sandusky, Ohio

Location.--Lat 40°51'02", long 83°15'23", in sec.21, T.2 S., R.14 E., on left bank at downstream side of highway bridge, three-quarters of a mile upstream from Rock Run and 2 miles northeast of Upper Sandusky, Wyandot County.

Drainage area.--299 sq mi.

Records available.--October 1921 to December 1935, January 1938 to September 1960. Gage-height records (fragmentary) collected at site 3 miles upstream since 1912 are contained in reports of U. S. Weather Bureau.

Gage.--Water-stage recorder. Datum of gage is 792.8 ft above mean sea level, adjustment of 1912. Prior to Sept. 14, 1924, chain gage at same site and datum.

Average discharge.--36 years, 239 cfs.

Extremes.--Maximum discharge during year, 2,250 cfs Feb. 11 (gage height, 5.58 ft); minimum, 2.9 cfs Sept. 10 (gage height, 0.94 ft).

1921-35, 1938-60: Maximum discharge, about 10,000 cfs Jan. 22, 1959; maximum gage height, 15.00 ft in gage well, 15.55 ft from outside floodmark, Jan. 22, 1959 (ice jam); minimum discharge, 0.6 cfs Sept. 13, 14, 1955; minimum gage height, 0.67 ft Sept. 6, 7, 1934.

Flood in June 1937 reached a stage of 14.3 ft, from high-water marks in gage well.

Remarks.--Records fair except those for period of ice effect, which are poor.

Revisions (water years).--WSP 874: 1927-30, 1933. WSP 1387: 1922(M), 1923-29, 1944.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 15-30)

| | | | |
|-----|-----|-----|-------|
| 0.8 | 2.0 | 1.5 | 59 |
| .9 | 3.8 | 2.0 | 174 |
| 1.0 | 6.7 | 2.5 | 330 |
| 1.1 | 12 | 3.0 | 565 |
| 1.3 | 30 | 6.0 | 2,540 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|---------|--------|----------|-------|-------------|-------|-----------|-------|-------|
| 1 | 11 | 12 | 34 | 202 | 233 | 55 | 480 | 63 | 59 | 48 | 23 | 7.2 |
| 2 | 10 | 14 | 34 | 124 | 202 | 65 | 330 | 61 | 48 | 75 | 18 | 6.7 |
| 3 | 14 | 19 | 38 | 224 | 143 | 65 | 338 | 57 | 43 | 53 | 14 | 7.2 |
| 4 | 15 | 29 | 46 | 609 | 146 | 65 | 1,740 | 53 | 39 | 49 | 14 | 7.2 |
| 5 | 17 | 31 | 67 | 260 | 158 | 60 | 1,600 | 48 | 100 | 59 | 19 | 8.5 |
| 6 | | 53 | 108 | 177 | 835 | 60 | 636 | 46 | 267 | 54 | 18 | 7.8 |
| 7 | 23 | 77 | 182 | 174 | 1,450 | 60 | 406 | 46 | 153 | 36 | 13 | *6.1 |
| 8 | 34 | 53 | 194 | 134 | 705 | 55 | 316 | 48 | 94 | 27 | 13 | 5.5 |
| 9 | 20 | 33 | 126 | 106 | 609 | 50 | 245 | 53 | 61 | 21 | 13 | 3.4 |
| 10 | 14 | *24 | *79 | 92 | 1,650 | 55 | 199 | 67 | 43 | 19 | 10 | 3.4 |
| 11 | 20 | 21 | 79 | 81 | 2,130 | 55 | 169 | 94 | 35 | 18 | 9.4 | 4.7 |
| 12 | 14 | 19 | 279 | 270 | 1,180 | 50 | 158 | 182 | 34 | 17 | 9.4 | 9.4 |
| 13 | 14 | 24 | 1,420 | 1,690 | 460 | 50 | 141 | 166 | *39 | 18 | 11 | 6.7 |
| 14 | 12 | 34 | 1,160 | 1,670 | 295 | 50 | 126 | 141 | 290 | 16 | 13 | 7.2 |
| 15 | 10 | 81 | 460 | 1,430 | 219 | 55 | 117 | 129 | 903 | 21 | 24 | 10 |
| 16 | 9.9 | 112 | 295 | 1,700 | 222 | 55 | 141 | 112 | 521 | 20 | 28 | 7.2 |
| 17 | 7.8 | 83 | 227 | 723 | 180 | 55 | 364 | 92 | 274 | 23 | 24 | 5.8 |
| 18 | 6.7 | 45 | 185 | 392 | 153 | 60 | 379 | 77 | 233 | 20 | 15 | 5.5 |
| 19 | *7.2 | 34 | 151 | *358 | 129 | 70 | 224 | 67 | 188 | 19 | 14 | 5.8 |
| 20 | 6.1 | 28 | 126 | 312 | 106 | 90 | 166 | 61 | 126 | 26 | 11 | 5.8 |
| 21 | 5.8 | 24 | 110 | 216 | 120 | 131 | 136 | 56 | 86 | 45 | 11 | 6.1 |
| 22 | 6.4 | 21 | 92 | 182 | 100 | 158 | 124 | 59 | 69 | 57 | 14 | 5.2 |
| 23 | 7.2 | 19 | 79 | 174 | 90 | 136 | 103 | 71 | 298 | 38 | 30 | 5.5 |
| 24 | 8.8 | 22 | 77 | 156 | *80 | *122 | 92 | 61 | 359 | 26 | 34 | 5.5 |
| 25 | 9.9 | 22 | 79 | 146 | 85 | 92 | 83 | 57 | 158 | *20 | 25 | 4.7 |
| 26 | 11 | 22 | 69 | 136 | 90 | 112 | 79 | 53 | 92 | 22 | 16 | 5.0 |
| 27 | 18 | 22 | 71 | 131 | 75 | 151 | 75 | 48 | 61 | 19 | 11 | 4.1 |
| 29 | 16 | 24 | 103 | 192 | 70 | 959 | *63 | 48 | 46 | 25 | 9.9 | 3.6 |
| 29 | 11 | 26 | 230 | 576 | 65 | 1,540 | 56 | 69 | 43 | 23 | 9.9 | 3.3 |
| 30 | 13 | 24 | 402 | 475 | ----- | 1,360 | 57 | 75 | 38 | 31 | 9.9 | 3.6 |
| 31 | 14 | ----- | 330 | 306 | ----- | 873 | ----- | 73 | ----- | 27 | 8.3 | ----- |
| Total | 423.8 | 1,052 | 6,932 | 13,418 | 11,960 | 6,814 | 9,143 | 2,333 | 4,800 | 972 | 492.8 | 177.5 |
| Mean | 13.7 | 35.1 | 224 | 433 | 412 | 220 | 305 | 75.3 | 160 | 31.4 | 15.9 | 5.92 |
| Cfs/m | 0.046 | 0.117 | 0.749 | 1.45 | 1.38 | 0.736 | 1.02 | 0.252 | 0.535 | 0.105 | 0.053 | 0.020 |
| In. | 0.05 | 0.13 | 0.86 | 1.67 | 1.49 | 0.85 | 1.14 | 0.29 | 0.60 | 0.12 | 0.06 | 0.02 |
| Calendar year 1959: Max | 8,400 | | | Min 2.8 | | Mean 304 | | Cfs/m 1.02 | | In. 13.78 | | |
| Water year 1959-60: Max | 2,130 | | | Min 3.3 | | Mean 160 | | Cfs/m 0.535 | | In. 7.28 | | |

Peak discharge (base, 2,500 cfs).--No peak above base.

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Feb. 21 to Mar. 20.

1970. Sandusky River near Mexico, Ohio

Location.--Lat 41°02'39", long 83°11'42", in sec.13, T.1 N., R.14 E., on right bank at downstream side of highway bridge, 3 miles upstream from Honey Creek and 4 $\frac{1}{4}$ miles north of Mexico, Seneca County.

Drainage area.--776 sq mi.

Records available.--November 1898 to November 1900 (gage heights and discharge measurements only), March 1923 to December 1935, July 1938 to September 1960. Discharge records for November 1898 to November 1900, published in 23d Annual Report, Part 4, have been found unreliable and should not be used.

Gage.--Water-stage recorder. Datum of gage is 733.1 ft above mean sea level, adjustment of 1912. Prior to Aug. 15, 1929, chain gage at same site and datum.

Average discharge.--34 years (1923-35, 1938-60), 562 cfs.

Extremes.--Maximum discharge during year, 4,670 cfs Feb. 11 (gage height, 11.13 ft); minimum, 12 cfs Sept. 29, 30 (gage height, 1.66 ft).

1923-35, 1938-60: Maximum discharge, 18,900 cfs Jan. 23, 1959 (gage height, 22.43 ft, from floodmark); minimum, 1.8 cfs Oct. 31, 1942 (during repairs to small dam above station).

Flood in June 1937 reached a stage of 22.5 ft, from information by local residents (discharge, 19,000 cfs).

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 714: 1929-30. WSP 874: 1927(M). WSP 1387: 1925, 1928-29, 1930(M), 1931. See also Records available.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 27 to Nov. 4, Nov. 10-13)

Oct. 1 to Feb. 11

Feb. 12 to Sept. 30

| | | | | | | | |
|-----|-----|------|-------|-----|----|-----|-----|
| 1.7 | 19 | 4.0 | 526 | 1.6 | 13 | 2.0 | 50 |
| 2.0 | 54 | 5.0 | 895 | 1.7 | 19 | 2.5 | 142 |
| 2.5 | 142 | 8.0 | 2,450 | | | | |
| 3.0 | 252 | 11.0 | 4,570 | | | | |

Note.--Same as preceding table above 2.5 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|--------|--------|--------|----------|--------|------------|--------|-----------|-------|-------|
| 1 | 19 | 29 | 71 | 622 | 608 | 150 | 1,720 | 136 | 274 | 86 | 39 | 32 |
| 2 | 19 | 30 | 79 | 422 | 480 | 150 | 1,050 | 132 | 205 | 92 | 36 | 27 |
| 3 | 23 | 29 | 98 | 634 | 346 | 150 | 802 | 124 | 184 | 139 | 34 | 22 |
| 4 | 27 | *43 | 111 | 998 | 312 | 140 | 2,270 | 112 | 126 | 118 | *54 | 21 |
| 5 | 29 | 196 | 162 | 977 | 344 | 140 | 3,120 | 97 | 132 | 95 | 32 | 23 |
| 6 | 41 | 166 | 282 | 517 | 1,910 | 130 | 2,130 | 98 | 223 | 94 | 32 | 19 |
| 7 | 60 | 134 | 394 | 397 | 3,480 | 130 | 1,120 | 84 | 323 | 92 | 32 | 19 |
| 8 | 68 | 126 | 419 | 376 | 2,930 | 120 | *786 | 84 | 238 | *68 | 36 | *19 |
| 9 | 69 | 111 | 373 | 270 | 1,970 | 110 | 605 | 89 | 168 | 55 | 49 | 19 |
| 10 | 53 | 79 | 272 | 212 | 3,190 | 120 | 474 | 116 | 114 | 49 | 39 | 19 |
| 11 | 68 | 57 | 489 | 196 | 4,550 | *120 | 392 | 166 | 86 | 43 | 34 | 19 |
| 12 | 109 | 50 | 772 | 533 | 4,160 | 110 | 346 | 203 | 97 | 39 | 28 | 19 |
| 13 | 74 | 52 | 2,830 | 3,510 | 2,490 | 110 | *320 | 280 | 160 | 45 | 25 | 19 |
| 14 | 53 | 144 | *3,020 | 3,950 | 1,050 | 110 | 282 | 277 | 274 | 60 | 25 | 22 |
| 15 | 45 | 297 | 1,970 | 3,990 | 605 | 120 | 257 | 238 | 772 | 52 | 39 | 21 |
| 16 | 39 | 250 | 976 | 4,310 | 529 | 126 | 250 | 207 | 1,100 | 41 | 30 | 20 |
| 17 | 34 | 235 | 656 | 3,420 | 471 | 139 | 625 | 170 | 1,460 | 40 | 68 | 20 |
| 18 | 31 | 185 | 486 | 1,910 | 396 | 142 | 859 | 144 | 1,060 | 36 | 124 | 21 |
| 19 | *27 | 134 | 394 | 1,070 | 323 | 146 | 584 | *122 | 538 | 39 | 73 | 18 |
| 20 | 24 | 101 | 325 | 877 | 262 | 170 | 400 | 112 | 389 | 43 | 45 | 17 |
| 21 | 22 | 87 | 274 | 650 | 272 | 230 | 312 | 101 | 260 | 40 | 50 | 17 |
| 22 | 22 | 74 | 239 | 552 | 254 | 300 | 272 | 105 | 336 | 49 | 73 | 17 |
| 23 | 21 | 66 | 185 | 552 | 229 | 325 | 238 | 112 | 529 | 79 | 70 | 16 |
| 24 | 25 | 65 | 181 | 469 | *200 | 333 | 207 | 112 | 565 | 61 | 53 | 16 |
| 25 | 29 | 65 | 183 | *350 | 190 | 290 | 195 | 99 | 411 | 41 | 53 | 16 |
| 26 | 39 | 65 | 179 | 320 | 200 | 274 | 172 | 94 | 240 | 39 | 49 | 14 |
| 27 | 40 | 65 | 172 | 305 | 190 | 328 | 172 | 86 | 164 | 50 | 41 | 15 |
| 28 | 40 | 65 | 214 | 459 | 180 | 1,800 | 154 | 88 | 122 | 43 | 36 | 14 |
| 29 | 37 | 66 | 430 | 826 | 170 | 3,040 | 139 | 99 | 105 | 36 | 30 | 13 |
| 30 | 33 | 68 | 895 | 1,060 | 3,530 | 128 | 164 | 92 | 36 | 28 | 13 | |
| 31 | 29 | ----- | 926 | 826 | 2,920 | ----- | 312 | ----- | 43 | 34 | ----- | |
| Total | 1,249 | 3,139 | 18,036 | 35,454 | 32,270 | 16,092 | 20,351 | 4,352 | 10,777 | 1,842 | 1,369 | 567 |
| Mean | 40.3 | 105 | 582 | 1,144 | 1,113 | 516 | 678 | 140 | 359 | 59.4 | 44.2 | 18.9 |
| Cfsm | 0.058 | 0.135 | 0.750 | 1.47 | 1.43 | 0.665 | 0.974 | 0.190 | 0.463 | 0.077 | 0.057 | 0.024 |
| In. | 0.008 | 0.015 | 0.086 | 1.70 | 1.54 | 0.77 | 0.98 | 0.021 | 0.052 | 0.009 | 0.007 | 0.003 |
| Calendar year 1959: Max | | | 16,700 | Min 12 | | Mean 796 | | Cfsm 1.01 | | In. 13.73 | | |
| Water year 1959-60: Max | | | 4,550 | Min 13 | | Mean 397 | | Cfsm 0.512 | | In. 6.99 | | |

Peak discharge (base, 4,200 cfs).--Jan. 16 (5 a.m.) 4,440 cfs (10.84 ft); Feb. 11 (4 p.m.) 4,670 cfs (11.13 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 25, 26, Feb. 24 to Mar. 15.

1980. Sandusky River near Fremont, Ohio

Location.--Lat 41°18'28", long 83°09'32", in sec.17, T.4 N., R.15 E., on left bank at downstream side of highway bridge, 2.3 miles upstream from Ballville power dam, 2½ miles downstream from Wolf Creek, and 3½ miles southwest of Fremont, Sandusky County.

Drainage area.--1,248 sq mi.

Records available.--November 1898 to March 1901 (gage heights and discharge measurements only, published as "at Fremont"), October 1923 to December 1935, July 1938 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage 626.3 ft above mean sea level, adjustment of 1912. Nov. 18, 1898, to Mar. 10, 1901, staff gage at site 4 miles downstream at different datum. Nov. 8, 1923, to Sept. 5, 1930, chain gage at present site and datum.

Average discharge.--34 years (1923-35, 1938-60), 922 cfs.

Extremes.--Maximum discharge during year, 9,410 cfs Feb. 11 (gage height, 5.71 ft); minimum, 19 cfs Sept. 28-29 (gage height, 0.94 ft).
1923-35, 1938-60: Maximum discharge, about 28,000 cfs Feb. 10, 1959; maximum gage height, 15.20 ft Feb. 10, 1959, from floodmark (ice jam); minimum discharge, 5.0 cfs Sept. 27, 28, 1941 (gage height, 0.80 ft).

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 744: 1931-32. WSP 759: Drainage area. WSP 874: 1938. WSP 1144: 1924-30. WSP 1387: 1925, 1928-29, 1931-35.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|--------|-----|-----|-----|-------|
| 0.9 | 15 | 2.0 | 630 | 0.9 | 15 | 2.0 | 675 |
| 1.0 | 31 | 2.5 | 1,280 | 1.0 | 32 | 2.5 | 1,390 |
| 1.1 | 56 | 3.0 | 2,260 | 1.1 | 64 | 3.0 | 2,370 |
| 1.3 | 138 | 6.0 | 10,200 | 1.3 | 149 | 4.0 | 4,760 |
| 1.7 | 382 | | | 1.6 | 327 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|--------|-------|-------|-------|
| 1 | 31 | 56 | 174 | 1,150 | 1,090 | 250 | 3,060 | 280 | 584 | 225 | 76 | 61 |
| 2 | 29 | 56 | 196 | 799 | 822 | 250 | 1,980 | 280 | 434 | 248 | 72 | 76 |
| 3 | 27 | 53 | 242 | 1,620 | 640 | 240 | 1,480 | 260 | 342 | 314 | 68 | 61 |
| 4 | 27 | 80 | 312 | 1,840 | 540 | 230 | 3,150 | 248 | 280 | 401 | *64 | 45 |
| 5 | 31 | 480 | 491 | 1,520 | 524 | 230 | 4,250 | 242 | 534 | 273 | 58 | 38 |
| 6 | 71 | 420 | 720 | 910 | 3,640 | 220 | 3,490 | 225 | 475 | 213 | 54 | 38 |
| 7 | 116 | 267 | 910 | 670 | 6,720 | 220 | *2,100 | 213 | 556 | 201 | 51 | 35 |
| 8 | 112 | 202 | 788 | 612 | 4,810 | 190 | 1,440 | 207 | 485 | *170 | 48 | 30 |
| 9 | 98 | 169 | 680 | 499 | 3,600 | 190 | 1,080 | 213 | 357 | 131 | 48 | 30 |
| 10 | 90 | *154 | 549 | 368 | 6,120 | 200 | 829 | 267 | 254 | 108 | 61 | 28 |
| 11 | 112 | 107 | 466 | 340 | 9,040 | *200 | 665 | 409 | 201 | 91 | 61 | 30 |
| 12 | 207 | 98 | 1,660 | 1,020 | 6,720 | 180 | 574 | 538 | 367 | 84 | 54 | 28 |
| 13 | 169 | 107 | 5,910 | 7,340 | 4,300 | 180 | 519 | 574 | 978 | 122 | 48 | 30 |
| 14 | *120 | 465 | *4,940 | 6,880 | 2,010 | 180 | 467 | 584 | 2,000 | 483 | 55 | *28 |
| 15 | 90 | 558 | 3,450 | 7,260 | 1,220 | *190 | 434 | 501 | 1,340 | 307 | 84 | 28 |
| 16 | 71 | 612 | 1,820 | 7,700 | 858 | 200 | 409 | 409 | 1,880 | 191 | 84 | 30 |
| 17 | 60 | 450 | 1,120 | 5,490 | 710 | 213 | 709 | 342 | 3,780 | 126 | 72 | 30 |
| 18 | 56 | 368 | 822 | *3,420 | 612 | 225 | 1,660 | 287 | 3,420 | 99 | 91 | 32 |
| 19 | 48 | 293 | 680 | 1,900 | 515 | 236 | 1,320 | *248 | 1,610 | 91 | 149 | 32 |
| 20 | 45 | 225 | 540 | 1,420 | 400 | 319 | 842 | 225 | 964 | 112 | 108 | 32 |
| 21 | 38 | 180 | 466 | 1,120 | 405 | 507 | 604 | 207 | 614 | 165 | 87 | 32 |
| 22 | 35 | 159 | 405 | 982 | 390 | 567 | 510 | 207 | 467 | 121 | 102 | 28 |
| 23 | 38 | 138 | 340 | 1,000 | *375 | 540 | 434 | 219 | 1,570 | 112 | 440 | 24 |
| 24 | 42 | 138 | 299 | 800 | 333 | 567 | 379 | 225 | 992 | 117 | 401 | 24 |
| 25 | 56 | 143 | 293 | 650 | 320 | 474 | 349 | 213 | 842 | 95 | 280 | 24 |
| 26 | 67 | 134 | 299 | 550 | 340 | 474 | 327 | 196 | 510 | 87 | 180 | 24 |
| 27 | 79 | 129 | 319 | 507 | 320 | 507 | 334 | 185 | 342 | 108 | 121 | 22 |
| 28 | 79 | 134 | 614 | 730 | 290 | 2,900 | 342 | 160 | 248 | 105 | 95 | 21 |
| 29 | 71 | 136 | 1,020 | 1,490 | 270 | 4,860 | 294 | 180 | 213 | 84 | 84 | 21 |
| 30 | 67 | 146 | 1,560 | 1,950 | ----- | 5,420 | 273 | 225 | 191 | 80 | 72 | 22 |
| 31 | 64 | ----- | 1,530 | 1,540 | ----- | 4,680 | ----- | 558 | ----- | 80 | 61 | ----- |
| Total | 2,246 | 6,959 | 35,675 | 64,057 | 57,934 | 25,909 | 34,284 | 9,127 | 26,628 | 5,142 | 3,327 | 986 |
| Mean | 72.5 | 232 | 1,086 | 2,066 | 1,998 | 836 | 1,143 | 294 | 888 | 166 | 107 | 32.9 |
| Cfs/m | 0.058 | 0.186 | 0.870 | 1.66 | 1.60 | 0.670 | 0.916 | 0.236 | 0.712 | 0.133 | 0.086 | 0.026 |
| In. | 0.07 | 0.21 | 1.00 | 1.91 | 1.73 | 0.77 | 1.02 | 0.27 | 0.79 | 0.15 | 0.10 | 0.05 |

Calendar year 1959: Max 24,000 Min 22 Mean 1,352 Cfs/m 1.06 In. 14.71
Water year 1959-60: Max 9,040 Min 21 Mean 738 Cfs/m 0.591 In. 8.03

Peak discharge (base, 7,000 cfs).--Jan. 13 (8 p.m.) 8,680 cfs (5.45 ft); Jan. 16 (2:30 a.m.) 8,710 cfs (5.46 ft); Feb. 7 (4:30 a.m.) 7,590 cfs (5.06 ft); Feb. 11 (10:30 a.m.) 9,410 cfs (5.71 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 23-26, Feb. 20, Feb. 25 to Mar. 16.

1990. Huron River at Milan, Ohio

Location.--Lat 41°18'00", long 82°36'30", in SE $\frac{1}{4}$ sec.4, T.5 N., R.22 W., on right bank 500 ft downstream from bridge on U. S. Highway 250, a quarter of a mile northwest of Milan, Erie County, and 2 miles downstream from confluence of East and West Branches.

Drainage area.--363 sq mi.

Records available.--March 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 573.43 ft above mean sea level, adjustment of 1912. Prior to July 29, 1953, wire-weight gage at site of former highway bridge 45 ft upstream at same datum.

Average discharge.--10 years, 290 cfs.

Extremes.--Maximum discharge during year, 4,650 cfs Apr. 4 (gage height, 14.85 ft); minimum, 10 cfs Oct. 21; minimum gage height, 5.26 ft Sept. 28.
1950-60: Maximum discharge, 25,800 cfs Jan. 22, 1959 (gage height, 24.08 ft), from rating curve extended above 18,000 cfs on basis of contracted-opening measurement of peak flow; minimum, 2.2 cfs Sept. 10, 15, 19, 20, 21, 1955; minimum gage height, 5.16 ft Sept. 24, 1959.

Remarks.--Records good except those for periods of ice effect, which are fair. Records of water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Dec. 13

Dec. 14 to Sept. 30

| | | | | | | | |
|-----|-----|------|-------|-----|-----|------|-------|
| 5.3 | 8.5 | 7.0 | 297 | 5.2 | 8.4 | 7.0 | 338 |
| 5.4 | 15 | 8.0 | 550 | 5.3 | 14 | 9.0 | 1,020 |
| 5.6 | 37 | 11.0 | 2,020 | 5.5 | 36 | 11.0 | 1,910 |
| 6.0 | 99 | 14.0 | 4,030 | 6.0 | 113 | 14.0 | 3,860 |
| | | | | 6.5 | 212 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 18 | 24 | 63 | 226 | 295 | b75 | 586 | 147 | 186 | 299 | 36 | 63 |
| 2 | *12 | 27 | 75 | 201 | 230 | b70 | 419 | 134 | 118 | 278 | 26 | 44 |
| 3 | 15 | *30 | 114 | 1,110 | b160 | 45 | 844 | 102 | 92 | 476 | 40 | 33 |
| 4 | 12 | 54 | 149 | 664 | b150 | b65 | 3,660 | 89 | 72 | 379 | 31 | 26 |
| 5 | 14 | 89 | 192 | 235 | 163 | b70 | 1,210 | 82 | 118 | 157 | 29 | 23 |
| 6 | 47 | 106 | 273 | b230 | 1,190 | b70 | 662 | 71 | 163 | 94 | 24 | *22 |
| 7 | 51 | 80 | *379 | 205 | 1,190 | b65 | 510 | 69 | 122 | 68 | 22 | 21 |
| 8 | 44 | 56 | 258 | *136 | 548 | b60 | *402 | 78 | 55 | 21 | 20 | 20 |
| 9 | 30 | 44 | 164 | *824 | b60 | 308 | 89 | 60 | 46 | 19 | 34 | 14 |
| 10 | 21 | 36 | 125 | 116 | *2,630 | *b60 | 255 | 276 | 51 | 39 | 18 | 77 |
| 11 | 27 | 35 | 134 | 105 | 2,110 | b60 | 228 | 785 | 49 | 35 | 17 | 44 |
| 12 | 22 | 40 | 1,190 | 932 | 810 | b55 | 212 | 560 | 196 | 30 | 16 | 30 |
| 13 | 21 | 88 | 3,360 | 3,480 | 408 | b55 | 184 | 352 | 532 | 128 | 14 | 26 |
| 14 | 17 | 246 | 1,100 | 1,580 | 270 | b55 | 147 | 280 | 677 | 330 | 15 | 21 |
| 15 | 16 | 328 | 519 | 1,590 | b250 | b55 | 140 | 250 | 1,430 | 141 | 64 | 20 |
| 16 | 14 | 196 | 362 | 1,270 | 235 | b60 | 149 | 180 | 486 | 78 | 54 | 20 |
| 17 | 14 | 118 | 275 | 549 | 190 | b70 | 1,690 | 140 | 988 | 54 | 39 | 19 |
| 18 | 13 | 78 | 219 | 405 | 171 | b85 | 941 | 116 | 969 | 44 | 26 | 19 |
| 19 | 13 | 77 | 182 | 558 | 149 | b95 | 419 | 99 | 382 | 53 | 22 | 21 |
| 20 | 12 | 56 | 145 | 390 | b130 | b120 | 275 | 92 | 203 | 69 | 26 | 20 |
| 21 | 12 | 52 | 134 | 268 | 134 | 169 | 217 | 82 | 136 | *64 | 78 | 20 |
| 22 | 12 | 45 | 105 | b260 | 123 | 192 | 182 | 92 | 162 | 46 | 601 | 19 |
| 23 | 13 | 44 | b110 | b220 | 107 | 161 | 149 | 102 | 335 | 36 | 748 | 19 |
| 24 | 18 | 45 | b110 | b190 | 99 | 155 | 130 | 97 | 171 | 29 | 214 | 16 |
| 25 | 25 | 44 | 107 | b170 | 83 | 138 | 115 | 82 | 110 | 25 | 116 | 14 |
| 26 | 35 | 45 | 111 | b150 | b110 | 140 | *171 | 69 | 77 | 43 | 78 | *14 |
| 27 | 36 | 52 | 151 | b160 | b90 | 303 | 494 | 66 | 61 | 165 | 61 | 14 |
| 28 | 33 | 52 | 460 | b550 | b90 | 2,370 | 228 | 88 | 55 | 89 | 51 | 13 |
| 29 | 35 | 54 | 729 | 836 | b85 | 2,030 | 149 | 73 | 49 | 51 | 57 | 14 |
| 30 | 27 | 56 | 678 | 562 | ----- | 1,700 | 145 | 221 | 56 | 38 | 186 | 15 |
| 31 | 24 | ----- | 373 | 354 | ----- | 972 | ----- | 376 | ----- | 29 | 113 | ----- |
| Total | 703 | 2,297 | 12,346 | 17,607 | 13,024 | 9,680 | 15,221 | 5,315 | 8,183 | 3,458 | 2,862 | 761 |
| Mean | 22.7 | 76.6 | 398 | 568 | 449 | 312 | 507 | 171 | 273 | 112 | 92.3 | 25.4 |
| Cfs/m | 0.063 | 0.211 | 1.10 | 1.56 | 1.24 | 0.860 | 1.40 | 0.471 | 0.752 | 0.309 | 0.254 | 0.070 |
| In. | 0.07 | 0.24 | 1.27 | 1.80 | 1.34 | 0.99 | 1.56 | 0.54 | 0.84 | 0.36 | 0.29 | 0.08 |

Calendar year 1959: Max 18,500 Min 4.0 Mean 419 Cfs/m 1.15 In. 15.68
Water year 1959-60: Max 3,660 Min 12 Mean 250 Cfs/m 0.689 In. 9.38

Peak discharge (base, 3,000 cfs).--Dec. 13 (6 a.m.) 4,160 cfs (14.14 ft); Jan. 13 (5 a.m.) 4,440 cfs (14.64 ft); Feb. 10 (1 p.m.) 3,290 cfs (13.23 ft); Apr. 4 (6 a.m.) 4,650 cfs (14.85 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

1995. Vermilion River near Vermilion, Ohio

Location.--Lat 41°22'55", long 82°19'00", in T.6 N., R.19 W., on right bank 40 ft downstream from bridge on North Ridge Road in Lorain County, 3½ miles southeast of Vermilion, Erie County, and 4½ miles upstream from mouth.

Drainage area.--260 sq mi.

Records available.--March 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 592.58 ft above mean sea level (Lorain County bench mark). Prior to Aug. 3, 1953, wire-weight gage at site 40 ft upstream at same datum.

Average discharge.--10 years, 233 cfs.

Extremes.--Maximum discharge during year, 3,130 cfs Dec. 13 (gage height, 7.43 ft); minimum, 2.3 cfs Oct. 5, 6; minimum gage height, 2.40 ft Sept. 28-30.

1950-60: Maximum discharge, 20,500 cfs Jan. 21, 1959 (gage height, 13.80 ft), from rating curve extended above 9,800 cfs on basis of contracted-opening measurement of peak flow; no flow at times in most years.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 12, 13)

| Oct. 1 to Dec. 13 | | | | Dec. 14 to Sept. 30 | | | |
|-------------------|-----|-----|-------|---------------------|-----|-----|-------|
| 2.4 | 2.1 | 4.0 | 144 | 2.4 | 2.8 | 4.0 | 163 |
| 2.5 | 3.4 | 4.5 | 253 | 2.5 | 4.8 | 4.5 | 290 |
| 2.6 | 8.4 | 5.0 | 400 | 2.6 | 7.5 | 5.0 | 480 |
| 2.9 | 22 | 5.5 | 650 | 2.8 | 15 | 5.5 | 780 |
| 3.2 | 44 | 6.0 | 1,010 | 3.1 | 33 | 6.0 | 1,200 |
| 3.4 | 61 | 8.0 | 3,560 | 3.5 | 80 | 8.0 | 3,990 |
| 3.7 | 95 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|---------|-------|
| 1 | 5.1 | 12 | 83 | 187 | 201 | 50 | 852 | 64 | 102 | 156 | 8.8 | 40 |
| 2 | *4.9 | 19 | 106 | 146 | 167 | 45 | 415 | 66 | 74 | 202 | 7.5 | 23 |
| 3 | 3.4 | *30 | 142 | 670 | 110 | 40 | 639 | 73 | 65 | 360 | 33 | 16 |
| 4 | 2.6 | 28 | 175 | 756 | 101 | 40 | 2,400 | 59 | 46 | 321 | 30 | 13 |
| 5 | 2.3 | 42 | 273 | 257 | 115 | 40 | 1,300 | 49 | 92 | 140 | 15 | 10 |
| 6 | 15 | 120 | 467 | 165 | 463 | 40 | 585 | 41 | 83 | 74 | 10 | 8.8 |
| 7 | 24 | 113 | *692 | 185 | 946 | 35 | 448 | 37 | 107 | 48 | 12 | 7.8 |
| 8 | 37 | 62 | 403 | 115 | 496 | 35 | 341 | 47 | 67 | 32 | 15 | 7.0 |
| 9 | 31 | 43 | 219 | 63 | *444 | 35 | 245 | 69 | 43 | 24 | 9.2 | 6.7 |
| 10 | 20 | 32 | 150 | 84 | *1,530 | *55 | 187 | 320 | *29 | 19 | 7.5 | 9.5 |
| 11 | 16 | 27 | 164 | *74 | 1,880 | 30 | 163 | 862 | 25 | 16 | 7.0 | 7.0 |
| 12 | 11 | 28 | 1,200 | 243 | 924 | 30 | 146 | 896 | 95 | 13 | 5.9 | 5.9 |
| 13 | 9.4 | 50 | 2,940 | 2,010 | 375 | 30 | 128 | 363 | 272 | 12 | 5.6 | 141 |
| 14 | 7.6 | 182 | 1,760 | 1,560 | 210 | 30 | *110 | 233 | 602 | 14 | 5.1 | 33 |
| 15 | 7.2 | 286 | 597 | 1,000 | 155 | 30 | 98 | 183 | 1,140 | 14 | 12 | 15 |
| 16 | 5.7 | 208 | 383 | 1,080 | 150 | 35 | 113 | 148 | 526 | 19 | 11 | 10 |
| 17 | 5.4 | 121 | 272 | 520 | 150 | 40 | 884 | 113 | 320 | 17 | 7.8 | 9.2 |
| 18 | 4.5 | 79 | 205 | 320 | 135 | 45 | 548 | 92 | 230 | 14 | 9.5 | 9.8 |
| 19 | 3.9 | 62 | 163 | 411 | 112 | 55 | 254 | 72 | 133 | *12 | 12 | 8.2 |
| 20 | *3.7 | 53 | 133 | 341 | 100 | 65 | 167 | 61 | 92 | 13 | 9.5 | 7.2 |
| 21 | 3.1 | 42 | 113 | 215 | 100 | 90 | 130 | 56 | 64 | 14 | 21 | 6.7 |
| 22 | 3.1 | 38 | 89 | 173 | 85 | 102 | 107 | 56 | 55 | 21 | 94 | 6.2 |
| 23 | 3.4 | 35 | 80 | 150 | 75 | 101 | 89 | 59 | 59 | 18 | 614 | 5.3 |
| 24 | 4.2 | 34 | 85 | 124 | 65 | 101 | 73 | 57 | 86 | 14 | 149 | 4.8 |
| 25 | 4.8 | 35 | 76 | 120 | 60 | 102 | *61 | 53 | 53 | 10 | 76 | 4.2 |
| 26 | 5.8 | 44 | 74 | 110 | 70 | 110 | 76 | 43 | 37 | 10 | 46 | 3.6 |
| 27 | 14 | 53 | 101 | 118 | 60 | 160 | 113 | 37 | 27 | 43 | 29 | *3.4 |
| 28 | 13 | 50 | 226 | 324 | 55 | 1,900 | 104 | 48 | 21 | 38 | 23 | 3.0 |
| 29 | 11 | 52 | 411 | 724 | 55 | *2,940 | 77 | 149 | 20 | 23 | 35 | 2.8 |
| 30 | 11 | 64 | 515 | 505 | | 2,430 | 64 | 122 | 19 | 16 | *92 | 5.2 |
| 31 | 11 | | 544 | 267 | | 1,130 | | 181 | | 12 | 64 | |
| Total | 304.0 | 2,044 | 12,641 | 13,017 | 9,389 | 9,951 | 10,717 | 4,509 | 4,584 | 1,739 | 1,478.4 | 431.3 |
| Mean | 9.81 | 68.1 | 408 | 420 | 324 | 321 | 357 | 145 | 153 | 56.1 | 47.6 | 14.4 |
| Cfs/m | 0.038 | 0.262 | 1.57 | 1.62 | 1.25 | 1.23 | 1.37 | 0.558 | 0.588 | 0.216 | 0.183 | 0.055 |
| In. | 0.04 | 0.29 | 1.81 | 1.87 | 1.35 | 1.42 | 1.53 | 0.64 | 0.66 | 0.25 | 0.21 | 0.06 |

Calendar year 1959: Max 7,190 Min 1.2 Mean 306 Cfs/m 1.18 In. 15.97
Water year 1959-60: Max 2,940 Min 2.3 Mean 193 Cfs/m 0.742 In. 10.13

Peak discharge (base, 3,200 cfs).--No peak above base.

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 23, 24, Feb. 16, Feb. 20 to Mar. 21, Mar. 27, 28.

2005. Black River at Elyria, Ohio

Location.--Lat 41°22'50", long 82°06'15", in T.6 N., R.17 W., on left bank in Cascade Park at Elyria, Lorain County, three-quarters of a mile downstream from confluence of East and West Branches.

Drainage area.--392 sq mi.

Records available.--October 1944 to September 1960. Records for May 1903 to July 1906 (published as "near Elyria") published in WSP 97, 129, and 205 have been found to be unreliable and should not be used.

Gage.--Water-stage recorder. Datum of gage is 621.6 ft above mean sea level (city of Elyria bench mark).

Average discharge.--16 years, 325 cfs.

Extremes.--Maximum discharge during year, 5,690 cfs Mar. 29 (gage height, 11.15 ft); minimum, 6.1 cfs Oct. 23, Sept. 24; minimum gage height, 0.75 ft Sept. 24.
1944-60: Maximum discharge, 24,000 cfs Jan. 22, 1959 (gage height, 22.9 ft, from floodmark), from rating curve extended above 13,000 cfs by logarithmic plotting; no flow for part of Oct. 10, 1956 (result of temporary storage at dam upstream).

Remarks.--Records good. Some regulation at low flow for industrial use.

Revisions.--See Records available.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Stage-discharge relation affected by ice Mar. 6, 7)

| | | | |
|-----|-----|------|-------|
| 0.7 | 5.5 | 2.5 | 230 |
| .8 | 8.5 | 3.0 | 350 |
| .9 | 13 | 4.0 | 675 |
| 1.1 | 27 | 5.0 | 1,100 |
| 1.5 | 67 | 7.0 | 2,280 |
| 2.0 | 137 | 11.0 | 5,540 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 14 | 40 | 244 | 244 | 272 | 82 | 1,570 | 93 | 218 | 112 | 13 | 28 |
| 2 | 14 | 57 | 282 | 177 | 218 | 78 | 739 | 134 | 161 | 285 | 11 | 18 |
| 3 | 11 | *85 | 395 | 770 | 132 | 75 | 892 | 114 | 152 | 566 | 31 | 12 |
| 4 | 12 | 73 | 436 | 811 | 123 | 68 | 4,440 | 84 | 82 | 791 | 19 | 9.9 |
| 5 | 23 | 275 | 508 | 291 | 126 | 71 | 2,660 | 64 | 114 | 273 | 18 | 10 |
| 6 | 91 | 659 | 703 | 190 | 512 | 80 | 880 | 55 | 131 | 118 | 13 | 10 |
| 7 | 80 | 330 | 1,180 | 181 | 1,260 | 75 | 691 | 53 | 95 | 71 | 28 | 11 |
| 8 | 71 | 140 | 731 | 118 | 699 | 71 | 567 | 63 | 67 | 48 | 22 | 57 |
| 9 | 62 | 82 | *358 | 85 | 553 | *65 | 380 | 125 | *47 | 34 | 16 | 41 |
| 10 | 39 | 56 | 240 | 83 | 2,240 | 64 | 272 | 589 | 37 | 27 | 14 | 35 |
| 11 | 56 | 48 | 266 | *84 | 2,760 | 60 | 230 | 1,660 | 29 | 22 | 13 | 33 |
| 12 | 22 | 43 | 1,840 | 354 | 1,470 | 58 | 202 | 1,060 | 113 | 20 | 12 | 36 |
| 13 | *18 | 135 | 4,490 | 3,110 | 468 | 57 | 170 | 518 | 345 | 24 | 9.9 | 102 |
| 14 | 17 | 435 | 3,040 | *2,390 | 232 | 57 | 142 | 328 | 667 | 297 | 10 | 50 |
| 15 | 14 | 623 | 861 | 1,410 | 212 | 56 | 123 | 278 | 966 | 186 | 20 | 29 |
| 16 | 14 | 395 | 463 | 1,430 | *198 | 59 | 138 | 218 | 472 | 82 | 15 | 15 |
| 17 | 11 | 212 | 338 | 667 | 177 | 66 | 1,270 | 163 | 226 | 47 | 13 | 12 |
| 18 | 9.0 | 132 | 252 | 395 | 181 | 77 | 843 | 137 | 156 | 32 | 13 | 9.9 |
| 19 | 9.4 | 87 | 204 | 539 | 167 | 92 | 365 | 96 | 102 | *38 | 13 | 9.4 |
| 20 | *9.9 | 66 | 163 | 472 | 152 | 142 | 220 | 105 | 77 | 28 | 19 | 9.0 |
| 21 | 9.9 | 54 | 137 | 288 | 127 | 176 | 161 | 77 | 65 | 37 | 46 | 8.5 |
| 22 | 9.9 | 48 | 114 | 214 | 135 | 196 | 131 | 83 | 57 | 30 | 84 | 8.5 |
| 23 | 9.0 | 46 | 92 | 177 | 120 | 181 | 106 | 134 | 74 | 22 | 49 | 8.5 |
| 24 | 19 | 47 | 95 | 147 | 110 | 194 | 87 | 109 | 95 | 17 | 47 | 7.0 |
| 25 | 12 | 54 | 84 | 134 | 110 | 212 | *84 | 84 | 62 | 16 | 34 | 6.7 |
| 26 | 14 | 66 | 84 | 121 | 129 | 212 | 78 | 65 | 41 | 16 | 24 | 7.6 |
| 27 | 34 | 85 | 110 | 126 | 124 | 331 | 102 | 55 | 32 | 34 | 18 | *8.5 |
| 28 | 41 | 100 | 237 | 553 | 99 | 2,750 | 110 | 69 | 26 | 26 | 15 | 8.2 |
| 29 | 39 | 230 | 457 | 1,010 | 109 | *5,100 | 86 | 78 | 23 | 18 | *63 | 7.9 |
| 30 | 36 | 246 | 711 | 683 | ----- | 4,720 | 74 | 163 | 21 | 16 | 67 | 9.0 |
| 31 | 39 | ----- | 475 | 378 | ----- | 3,340 | ----- | 484 | ----- | 13 | 41 | ----- |
| Total | 840.1 | 4,927 | 19,600 | 17,650 | 13,235 | 18,865 | 17,813 | 7,338 | 4,753 | 3,346 | 812.9 | 617.6 |
| Mean | 27.1 | 164 | 632 | 569 | 456 | 609 | 594 | 237 | 158 | 108 | 26.2 | 20.6 |
| Cfs/m | 0.069 | 0.418 | 1.61 | 1.45 | 1.16 | 1.55 | 1.52 | 0.605 | 0.403 | 0.276 | 0.067 | 0.053 |
| In. | 0.08 | 0.47 | 1.86 | 1.67 | 1.25 | 1.79 | 1.70 | 0.70 | 0.45 | 0.32 | 0.08 | 0.06 |

Calendar year 1959: Max 21,100 Min 7.0 Mean 493 Cfs/m 1.26 In. 17.07
Water year 1959-60: Max 5,100 Min 6.7 Mean 300 Cfs/m 0.765 In. 10.43

Peak discharge (base, 3,200 cfs).--Dec. 13 (12 m.) 4,640 cfs (10.03 ft); Jan. 13 (3 p.m.) 3,510 cfs (8.67 ft); Mar. 29 (9 to 10 p.m.) 5,690 cfs (11.15 ft); Apr. 4 (11 a.m.) 4,730 cfs (10.13 ft).

* Discharge measurement made on this day.

2015. Rocky River near Berea, Ohio

Location.--Lat 41°24'22", long 81°53'13", in T.6 N., R.15 W., on right bank at downstream side of highway bridge just downstream from confluence of East and West Branches, 3 miles northwest of Berea, Cuyahoga County.

Drainage area.--269 sq mi.

Records available.--October 1923 to September 1935, September 1943 to September 1960. Monthly discharge only for October 1923, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 649.9 ft above mean sea level, datum of 1929 (Cuyahoga County bench mark). Prior to Aug. 31, 1929, chain gage and Aug. 31, 1929, to Sept. 30, 1935, staff gage, at same site and datum.

Average discharge.--29 years, 260 cfs.

Extremes.--Maximum discharge during year, 5,330 cfs Dec. 13 (gage height, 6.03 ft); minimum, 4.6 cfs Sept. 27; minimum gage height, 1.25 ft Sept. 8, 27. 1923-35, 1943-60: Maximum discharge, 21,400 cfs Jan. 22, 1959 (gage height, 14.10 ft), from rating curve extended above 11,000 cfs on basis of contracted-opening measurement of peak flow; maximum gage height, 18.6 ft June 29, 1924 (backwater caused by tornado); minimum discharge, 0.2 cfs Sept. 2, 1932, Aug. 18, 19, 22, 27, 28, 30, 31, 1933. Maximum stage known, 20.9 ft in March 1913.

Remarks.--Records good except those for periods of ice effect, which are fair. Some regulation at low flow by small reservoirs on East Branch.

Revisions (water years).--WSP 1437: 1924, 1925(M), 1926, 1927(M), 1928-29, 1930-35(M), 1945.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second) (Shifting-control method used Sept. 21-30)

| Oct. 1 to Jan. 12 | | | | Jan. 13 to Sept. 30 | | | | | |
|-------------------|-----|-----|-------|---------------------|-----|-----|-----|-----|-------|
| 1.4 | 16 | 2.6 | 415 | 1.1 | 3.5 | 1.5 | 31 | 2.6 | 470 |
| 1.5 | 26 | 3.0 | 710 | 1.2 | 7.0 | 1.7 | 70 | 3.0 | 840 |
| 1.7 | 58 | 4.0 | 1,860 | 1.3 | 11 | 2.0 | 150 | 4.0 | 2,100 |
| 2.0 | 137 | 6.0 | 5,270 | 1.4 | 18 | 2.3 | 275 | 6.0 | 5,470 |
| 2.3 | 255 | | | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 153 | 246 | 237 | 164 | 221 | 102 | 810 | 304 | 344 | 100 | 13 | 18 |
| 2 | 128 | *265 | 305 | 151 | 171 | 89 | 435 | 213 | 174 | 117 | 13 | 26 |
| 3 | 53 | 198 | 388 | 664 | 112 | 85 | 1,270 | 132 | 154 | 188 | 23 | 14 |
| 4 | 36 | 147 | 388 | 449 | 120 | 85 | 3,690 | 97 | 97 | 249 | 22 | 11 |
| 5 | 53 | 1,370 | 393 | 198 | 123 | 85 | *873 | 75 | 140 | 109 | 30 | 11 |
| 6 | 134 | 770 | 694 | 147 | 512 | 100 | 456 | 60 | 132 | 57 | 42 | 11 |
| 7 | 830 | 270 | 1,030 | 122 | 780 | 95 | 486 | 62 | 80 | 36 | 65 | 11 |
| 8 | 266 | 161 | 427 | 98 | *354 | 90 | 456 | 244 | 51 | 27 | 52 | 10 |
| 9 | *125 | 119 | *260 | 86 | 470 | 90 | 317 | 478 | *36 | 24 | 24 | 11 |
| 10 | 84 | 97 | 250 | 91 | *1,910 | 85 | 235 | 1,330 | 33 | 21 | 21 | 13 |
| 11 | 65 | 89 | 310 | *99 | 1,980 | 85 | 205 | 1,750 | 33 | 18 | 15 | 11 |
| 12 | 53 | 131 | 2,620 | 635 | 569 | 80 | 178 | 680 | 109 | 17 | 13 | 11 |
| 13 | 42 | 304 | 4,180 | 2,670 | 287 | 80 | 154 | 374 | 286 | 22 | 11 | 52 |
| 14 | 37 | 653 | 830 | *855 | 182 | 80 | 132 | 281 | 323 | 78 | 28 | 18 |
| 15 | 33 | 844 | 398 | 842 | 174 | 80 | 117 | 293 | 831 | 94 | 75 | 9.2 |
| 16 | 30 | 327 | 305 | 689 | 205 | *90 | 212 | 193 | 333 | 47 | 49 | 7.4 |
| 17 | 26 | 224 | 246 | 323 | 185 | 100 | 1,500 | 182 | 150 | 30 | 38 | 6.6 |
| 18 | 22 | 171 | 210 | 293 | 205 | 110 | 526 | 178 | 126 | *22 | 19 | 8.3 |
| 19 | 18 | 113 | 171 | 486 | 193 | 150 | 275 | 123 | 102 | 22 | 15 | 7.9 |
| 20 | 16 | 97 | 137 | 317 | 168 | 250 | 189 | 110 | 70 | 28 | 93 | 6.6 |
| 21 | 18 | 91 | 122 | 225 | 141 | 305 | 154 | 115 | 62 | 27 | 186 | 7.0 |
| 22 | 16 | 89 | 107 | 189 | 150 | 240 | 132 | 134 | 55 | 22 | 205 | 7.4 |
| 23 | 17 | 86 | 94 | 174 | 132 | 201 | 132 | 342 | 69 | 19 | 122 | 7.4 |
| 24 | 40 | 102 | 94 | 154 | 129 | 201 | 99 | 245 | 66 | 15 | 57 | 7.0 |
| 25 | 74 | 147 | 89 | 140 | 141 | 189 | *89 | 144 | 44 | 14 | 31 | 7.0 |
| 26 | 176 | 128 | 97 | 135 | 157 | 201 | 89 | 99 | 31 | 26 | 21 | *7.0 |
| 27 | 210 | 142 | 128 | 154 | 144 | 300 | 168 | 84 | 24 | 27 | 16 | 6.3 |
| 28 | 190 | 561 | 206 | 874 | 123 | 2,510 | 132 | 89 | 36 | 22 | 14 | 8.8 |
| 29 | 110 | 415 | 427 | 895 | 126 | 3,800 | 92 | 110 | 51 | 24 | *40 | 7.4 |
| 30 | 70 | 285 | 457 | 449 | ----- | 3,810 | 87 | 158 | 38 | 21 | 52 | 9.2 |
| 31 | 79 | ----- | 255 | 275 | ----- | 2,110 | ----- | 974 | ----- | 14 | 23 | ----- |
| Total | 3,204 | 8,642 | 15,875 | 13,044 | 10,164 | 15,878 | 13,670 | 9,653 | 4,082 | 1,537 | 1,428 | 348.5 |
| Mean | 103 | 288 | 512 | 421 | 350 | 512 | 456 | 311 | 136 | 49.6 | 46.1 | 11.6 |
| Cfsm | 0.383 | 1.07 | 1.90 | 1.57 | 1.30 | 1.90 | 1.70 | 1.16 | 0.506 | 0.184 | 0.171 | 0.043 |
| In. | 0.44 | 1.19 | 2.19 | 1.81 | 1.40 | 2.19 | 1.90 | 1.34 | 0.56 | 0.21 | 0.20 | 0.05 |

Calendar year 1959: Max 14,300 Min 7.4 Mean 446 Cfsm 1.66 In. 22.50
 Water year 1959-60: Max 4,180 Min 6.3 Mean 266 Cfsm 0.989 In. 13.49

Peak discharge (base, 4,000 cfs).--Dec. 13 (6 a.m.) 5,330 cfs (6.03 ft); Mar. 30 (8:30 a.m.) 4,840 cfs (5.65 ft); Apr. 4 (2 a.m.) 5,110 cfs (5.80 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 25, Mar. 3-20.

2020. Cuyahoga River at Hiram Rapids, Ohio

Location.--Lat 41°20'27", long 81°10'01", in T.5 N., R.7 W., on left bank at downstream side of highway bridge at Hiram Rapids, Portage County, 0.6 mile downstream from Black Brook.

Drainage area.--147 sq mi.

Records available.--August 1927 to December 1935, October 1944 to September 1960. Published as "near Hiram" 1927-35.

Gage.--Water-stage recorder. Datum of gage is 1,087.46 ft above mean sea level, unadjusted. Prior to Aug. 26, 1927, staff gage and Aug. 26, 1927, to Dec. 31, 1935, water-stage recorder, at site 2½ miles downstream at different datum. Oct. 20, 1944, to Oct. 22, 1946, wire-weight gage at present site and datum.

Average discharge.--24 years, 199 cfs (unadjusted).

Extremes.--Maximum discharge during year, 2,490 cfs Mar. 31 (gage height, 6.56 ft); minimum, 27 cfs Sept. 30; minimum gage height, 1.40 ft Sept. 8.
1927-35, 1944-60: Maximum discharge, 3,670 cfs Jan. 23, 1959 (gage height, 8.11 ft), from rating curve extended above 2,600 cfs by logarithmic plotting; minimum, 5.1 cfs Sept. 2, 1933.

Remarks.--Records good except those for periods of ice effect or intake lag, which are poor. Flow regulated by East Branch Reservoir (usable capacity, 4,140 acre-ft) since 1939.

Revisions (water years).--WSP 1054: 1945. WSP 1437: 1931.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 12, 15, 17-20, 25-30)

| | | | |
|-----|-----|-----|-------|
| 1.2 | 23 | 2.5 | 259 |
| 1.4 | 34 | 3.0 | 458 |
| 1.7 | 70 | 5.0 | 1,510 |
| 2.0 | 122 | 6.5 | 2,450 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 276 | 215 | 284 | 284 | 381 | 152 | *2,300 | 240 | 227 | 55 | 73 | 50 |
| 2 | 336 | 233 | 273 | 266 | 352 | 146 | 1,800 | 260 | 233 | 68 | 55 | 46 |
| 3 | 402 | 253 | 259 | 336 | 311 | 137 | 1,350 | 210 | 237 | 78 | 73 | 42 |
| 4 | 415 | 276 | 243 | 369 | 276 | 124 | 1,120 | 170 | 218 | 91 | 105 | 37 |
| 5 | 373 | 305 | 230 | 402 | 243 | 129 | 954 | 130 | 194 | 58 | 98 | 33 |
| 6 | 328 | 305 | 233 | 398 | 287 | 135 | 839 | 110 | 166 | 93 | 86 | 33 |
| 7 | 467 | 298 | 256 | 348 | 365 | 137 | 746 | 110 | 144 | 80 | 80 | 32 |
| 8 | *558 | 294 | 259 | 298 | 471 | 133 | 675 | 150 | 122 | 64 | 172 | 30 |
| 9 | 625 | 284 | 270 | 249 | 553 | 131 | 600 | 200 | 103 | 53 | 135 | 30 |
| 10 | 655 | 253 | *270 | 212 | 680 | 126 | 531 | 450 | 86 | 47 | 98 | 30 |
| 11 | 567 | 215 | 262 | 194 | *878 | 122 | 470 | 560 | 75 | 44 | 78 | 31 |
| 12 | 462 | *189 | 469 | 215 | 998 | 118 | 420 | 580 | 91 | 40 | *64 | 30 |
| 13 | 373 | 172 | 883 | 449 | 944 | 114 | 370 | 560 | *142 | *75 | 67 | *32 |
| 14 | 298 | 197 | 1,220 | 605 | 725 | 112 | 340 | 540 | 230 | 59 | 47 | 46 |
| 15 | 246 | 276 | 1,200 | *790 | 567 | 111 | 310 | 470 | 332 | 56 | 48 | 44 |
| 16 | 203 | 328 | 976 | 768 | 449 | 111 | 400 | *407 | 424 | 53 | 49 | 38 |
| 17 | 166 | 381 | 751 | 655 | 381 | *111 | 450 | 324 | 488 | 80 | 61 | 31 |
| 18 | 142 | 390 | 581 | 544 | 324 | 114 | 450 | 270 | 492 | 66 | 58 | 29 |
| 19 | 126 | 357 | 458 | 475 | 276 | 118 | 420 | 233 | 441 | 66 | 52 | 29 |
| 20 | 114 | 317 | 373 | 394 | 249 | 120 | 360 | 206 | 369 | 66 | 47 | 35 |
| 21 | 101 | 280 | 313 | 340 | 230 | 126 | *332 | 183 | 294 | 55 | 61 | 38 |
| 22 | 94 | 246 | 262 | 302 | 218 | 122 | 260 | 175 | 233 | 48 | 144 | 38 |
| 23 | 91 | 227 | 227 | 273 | 206 | 129 | 220 | 237 | 183 | 56 | 137 | 36 |
| 24 | 120 | 215 | 194 | 246 | 197 | 133 | 190 | 298 | 146 | 89 | 103 | 34 |
| 25 | 159 | 221 | 172 | 230 | 186 | 129 | 170 | 321 | 118 | 84 | 61 | 31 |
| 26 | 191 | 221 | 164 | 215 | 177 | 133 | 150 | 309 | 96 | 86 | 64 | 31 |
| 27 | 200 | 240 | 169 | 312 | 175 | 137 | 140 | 280 | 76 | 76 | 55 | 29 |
| 28 | 203 | 273 | 189 | 240 | 169 | 206 | 140 | 249 | 61 | 49 | 49 | 31 |
| 29 | 200 | 280 | 233 | 302 | 164 | 480 | 150 | 221 | 52 | 53 | 47 | 31 |
| 30 | 194 | 287 | 270 | 340 | ----- | 1,290 | 140 | 209 | 50 | 47 | 45 | 27 |
| 31 | 197 | ----- | 267 | 365 | ----- | 2,340 | ----- | 233 | ----- | 75 | 54 | ----- |
| Total | 8,882 | 8,028 | 12,230 | 11,416 | 11,432 | 7,726 | 16,797 | 8,895 | 6,123 | 2,152 | 2,386 | 1,034 |
| Mean | 287 | 268 | 395 | 368 | 393 | 252 | 557 | 289 | 202 | 69.4 | 77.0 | 34.2 |
| Cfsm | 1.95 | 1.82 | 2.69 | 2.50 | 2.67 | 1.71 | 3.79 | 1.96 | 1.37 | 0.472 | 0.524 | 0.233 |
| In. | 2.25 | 2.03 | 3.10 | 2.88 | 2.88 | 1.97 | 4.23 | 2.26 | 1.53 | 0.54 | 0.60 | 0.26 |

Adjusted for change in contents in East Branch Reservoir

| | Observed | Adjusted |
|-------------------------|-----------|-----------|
| Calendar year 1959: Max | 3,560 | Min 26 |
| Water year 1959-60: Max | 2,340 | Min 27 |
| | Mean 303 | Mean 303 |
| | Mean 265 | Mean 265 |
| | Cfsm 2.06 | In. 27.95 |
| | Cfsm 1.80 | In. 24.53 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in East Branch Reservoir.

Note.--Stage-discharge relation affected by intake lag Apr. 11-20, Apr. 22 to May 15; discharge estimated on basis of 2 discharge measurements, weather records, and records for other stations in the basin. Stage-discharge relation affected by ice Jan. 5, 6, Feb. 3, 21, Mar. 2-9, 11-13, 15, 22, 23, 25.

2040. Little Cuyahoga River at Mogadore, Ohio

Location.--Lat 41°03'45", long 81°23'40", in T.1 N., R.10 W., on left bank at upstream side of bridge on State Highway 532, 500 ft downstream from Mogadore Reservoir, three-quarters of a mile upstream from Fritch Lake Outlet, and 0.8 mile north of Mogadore, Summit County.

Drainage area.--12.3 sq mi.

Records available.--February 1946 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,058.74 ft above mean sea level, unadjusted.

Average discharge.--14 years, 13.6 cfs.

Extremes.--Maximum discharge during year, 115 cfs Dec. 12 (gage height, 2.44 ft); minimum, 1.9 cfs Sept. 29, 30 (gage height, 0.46 ft).

1946-60: Maximum discharge, 155 cfs Nov. 16, 1955 (gage height, 3.46 ft); maximum gage height, 4.30 ft Jan. 21, 1959 (backwater from aquatic growth); minimum discharge, 0.2 cfs Nov. 20, 1954; minimum gage height, 0.24 ft Nov. 18, 19, 1954.

Remarks.--Records fair except those above 35 cfs, which are poor. Flow regulated by Mogadore Reservoir (usable capacity, 6,540 acre-ft).

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Jan. 23, Aug. 3 to Sept. 30 | | | | Jan. 24 to Aug. 2 | | | |
|--|-----|-----|----|-------------------|-----|-----|----|
| 0.4 | 1.5 | 1.0 | 15 | 0.65 | 3.7 | 1.2 | 22 |
| .5 | 2.3 | 1.2 | 26 | .75 | 5.6 | 1.3 | 28 |
| .6 | 3.7 | 1.3 | 35 | .9 | 9.5 | 1.4 | 41 |
| .7 | 5.4 | 1.5 | 67 | 1.0 | 12 | 1.6 | 78 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|------|------|-------|------|-------|-------|-------|-------|-------|-------|
| 1 | 4.0 | 12 | 18 | 22 | 17 | 16 | 47 | 7.8 | 12 | 7.3 | 9.8 | 3.6 |
| 2 | 9.3 | 17 | 18 | 22 | 16 | 16 | 41 | 7.6 | 12 | 8.7 | 10 | 3.1 |
| 3 | 11 | 12 | 18 | 30 | 16 | 16 | 45 | 8.4 | *11 | 9.5 | 8.0 | 2.9 |
| 4 | 11 | 13 | 17 | 24 | 16 | 16 | 51 | 8.7 | 11 | 9.2 | 4.5 | 2.6 |
| 5 | 11 | 14 | 17 | 22 | 16 | 16 | 40 | 8.1 | 11 | 8.4 | 4.7 | 2.4 |
| 6 | 12 | 14 | 20 | 21 | 17 | 16 | 40 | 7.8 | 9.8 | 8.1 | 4.7 | 2.4 |
| 7 | 13 | 14 | 20 | 20 | 17 | 15 | 38 | 8.4 | 11 | 7.8 | 4.9 | 2.4 |
| 8 | 14 | 14 | 20 | 19 | 17 | 15 | 37 | 11 | 4.6 | 7.6 | 5.3 | 2.4 |
| 9 | 17 | *13 | 19 | 18 | 18 | 15 | 34 | 12 | 4.2 | 6.8 | 8.6 | 2.6 |
| 10 | 16 | 12 | *18 | 18 | 22 | *14 | 35 | *13 | 6.1 | 6.8 | 8.0 | 2.9 |
| 11 | 15 | 12 | 20 | *18 | *24 | 14 | 34 | 14 | 6.1 | 7.1 | 6.1 | 2.7 |
| 12 | *13 | 12 | 61 | 25 | 21 | 13 | *32 | 13 | 11 | *6.8 | *5.3 | 2.7 |
| 13 | 12 | 14 | 65 | 29 | 21 | 13 | 30 | 13 | 12 | 6.8 | 5.7 | *2.9 |
| 14 | 13 | 18 | 43 | 26 | 22 | 12 | 22 | 13 | 18 | 6.8 | 4.9 | 2.9 |
| 15 | 11 | 21 | 40 | 27 | 20 | 12 | 7.6 | 13 | 14 | 6.6 | 5.3 | 3.0 |
| 16 | 11 | 19 | 38 | 26 | 20 | 12 | 6.3 | 12 | 12 | 6.3 | 9.0 | 3.0 |
| 17 | 9.9 | 18 | 35 | 25 | 19 | 12 | 6.6 | 12 | 12 | 11 | 9.1 | 2.7 |
| 18 | 9.3 | 17 | 32 | 25 | 19 | 12 | 6.3 | 11 | 12 | 6.1 | 4.5 | 2.9 |
| 19 | 8.6 | 15 | 30 | 24 | 19 | 12 | 5.4 | 11 | 12 | 6.3 | 4.2 | 2.6 |
| 20 | 8.0 | 15 | 27 | 23 | 18 | 12 | 5.2 | 9.8 | 11 | 6.3 | 4.0 | 2.7 |
| 21 | 8.0 | 14 | 26 | 22 | 18 | 12 | 5.0 | 9.2 | 11 | 6.3 | 4.0 | 2.6 |
| 22 | 7.7 | 14 | 25 | 22 | 18 | 12 | 5.0 | 10 | 11 | 6.6 | 3.9 | 2.4 |
| 23 | 8.3 | 14 | 23 | 21 | 18 | 18 | 5.0 | 11 | 11 | 6.8 | 3.9 | 2.6 |
| 24 | 14 | 15 | 22 | 18 | 18 | 37 | 4.8 | 9.8 | 9.8 | 7.3 | 3.9 | 2.4 |
| 25 | 14 | 15 | 21 | 18 | 18 | 35 | 4.6 | 9.5 | 8.9 | 4.4 | 3.9 | 2.2 |
| 26 | 16 | 15 | 21 | 17 | 18 | 35 | 5.0 | 8.9 | 8.7 | 4.6 | 3.7 | 2.2 |
| 27 | 14 | 18 | 21 | 18 | 18 | 37 | 8.7 | 10 | 11 | 5.6 | 3.9 | 2.2 |
| 28 | 12 | 20 | 23 | 19 | 16 | 61 | 10 | 10 | 10 | 6.6 | 3.9 | 2.1 |
| 29 | 12 | 20 | 24 | 19 | 16 | 72 | 7.6 | 10 | 7.3 | 6.3 | 3.9 | 2.0 |
| 30 | 11 | 19 | 23 | 18 | ----- | 61 | 7.8 | 12 | 5.4 | 6.1 | 4.0 | 1.9 |
| 31 | 11 | ----- | 22 | 18 | ----- | 51 | ----- | 14 | ----- | 5.6 | 3.7 | ----- |
| Total | 357.1 | 455 | 827 | 674 | 533 | 710 | 626.9 | 329.0 | 306.9 | 216.5 | 169.3 | 78.0 |
| Mean | 11.5 | 15.2 | 26.7 | 21.7 | 18.4 | 22.9 | 20.9 | 10.6 | 10.2 | 6.98 | 5.46 | 2.60 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 65 | | | Min | 3.0 | Mean | 18.8 | Cfsm | - | In. | - | |
| Water year 1959-60: Max | 72 | | | Min | 1.9 | Mean | 14.4 | Cfsm | - | In. | - | |

* Discharge measurement made on this day.

2045. Little Cuyahoga River at Massillon Road, Akron, Ohio

Location.--Lat 41°03'35", long 81°27'45", in T.1 N., R.10 W., on left bank 50 ft downstream from bridge on Massillon Road in Akron, Summit County, and 250 ft upstream from Springfield Lake Outlet.

Drainage area.--31.0 sq mi.

Records available.--February 1946 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,005.20 ft above mean sea level (city of Akron bench mark).

Average discharge.--14 years, 30.7 cfs.

Extremes.--Maximum discharge during year, 252 cfs Dec. 12 (gage height, 1.93 ft); minimum, 5.4 cfs Sept. 25, 26, 28-30 (gage height, 0.35 ft).
1946-60: Maximum discharge, 891 cfs Jan. 21, 1959 (gage height, 3.99 ft); minimum, 2.9 cfs May 10, 1955 (gage height, 0.22 ft).

Remarks.--Records good. Flow regulated by Mogadore Reservoir (usable capacity, 6,540 acre-ft) and Fritch Lake.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 0.3 | 4.4 | 1.1 | 58 |
| .5 | 9.0 | 1.3 | 92 |
| .7 | 18 | 1.6 | 160 |
| .9 | 34 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|------|------|-------|---------|-------|-----------|-------|--------|------|-------|-------|-------|
| 1 | 44 | 32 | 32 | 32 | 39 | 38 | 71 | 21 | 37 | 20 | 15 | 7.7 |
| 2 | 27 | 30 | 33 | 34 | 36 | 37 | 66 | 16 | 31 | 17 | 13 | 7.2 |
| 3 | 22 | 26 | 33 | 72 | 33 | 38 | 76 | 16 | *28 | 35 | 27 | 6.7 |
| 4 | 21 | 34 | 31 | 47 | 33 | 39 | 88 | 16 | 25 | 20 | 13 | 6.4 |
| 5 | 24 | 39 | 31 | 37 | 36 | 38 | 89 | 15 | 23 | 17 | 11 | 6.4 |
| 6 | 35 | 33 | 47 | 34 | 50 | 42 | 67 | 15 | 21 | 16 | 11 | 6.4 |
| 7 | 34 | 28 | 46 | 33 | 40 | 40 | 67 | 18 | 21 | 15 | 22 | 6.2 |
| 8 | 42 | 26 | 35 | 32 | 36 | 39 | 62 | 44 | 15 | 15 | 18 | 6.2 |
| 9 | 51 | *25 | 32 | 32 | 48 | 38 | 59 | 31 | 13 | 13 | 14 | 6.2 |
| 10 | 29 | 23 | *30 | 36 | 79 | *39 | 62 | *44 | 14 | 13 | 15 | 6.4 |
| 11 | 25 | 24 | 44 | *38 | *76 | 37 | 61 | 42 | 15 | 13 | 12 | 6.4 |
| 12 | *20 | 26 | 137 | 69 | 48 | 34 | *59 | 31 | 66 | *14 | *9.8 | 6.7 |
| 13 | 19 | 43 | 116 | 95 | 43 | 28 | 58 | 27 | 39 | 28 | 11 | *6.7 |
| 14 | 20 | 54 | 64 | 59 | 44 | 27 | 54 | 30 | 78 | 21 | 11 | 6.4 |
| 15 | 18 | 44 | 56 | 71 | 43 | 28 | 31 | 26 | 42 | 15 | 17 | 6.4 |
| 16 | 17 | 34 | 58 | 61 | 42 | 28 | 26 | 22 | 29 | 13 | 11 | 6.7 |
| 17 | 16 | 31 | 55 | 56 | 42 | 29 | 18 | 21 | 30 | 17 | 16 | 6.4 |
| 18 | 15 | 26 | 52 | 61 | 42 | 29 | 17 | 21 | 28 | 13 | 8.7 | 6.4 |
| 19 | 14 | 24 | 48 | 61 | 41 | 33 | 16 | 19 | 24 | 36 | 9.0 | 6.4 |
| 20 | 14 | 23 | 44 | 54 | 39 | 34 | 16 | 18 | 22 | 20 | 8.7 | 6.2 |
| 21 | 13 | 23 | 43 | 52 | 38 | 33 | 16 | 17 | 21 | 14 | 11 | 6.4 |
| 22 | 13 | 22 | 41 | 48 | 38 | 32 | 15 | 30 | 23 | 13 | 9.4 | 6.2 |
| 23 | 21 | 23 | 39 | 46 | 37 | 33 | 14 | 33 | 23 | 13 | 8.7 | 6.0 |
| 24 | 58 | 31 | 38 | 39 | 38 | 55 | 14 | 23 | 20 | 14 | 8.5 | 6.0 |
| 25 | 42 | 31 | 38 | 38 | 39 | 55 | 13 | 18 | 18 | 12 | 8.2 | 5.6 |
| 26 | 44 | 25 | 39 | 37 | 40 | 54 | 13 | 17 | 17 | 13 | 8.0 | 5.6 |
| 27 | 38 | 54 | 34 | 44 | 39 | 66 | 15 | 23 | 16 | 22 | 8.7 | 5.8 |
| 28 | 30 | 47 | 47 | 61 | 40 | 106 | 18 | 30 | 21 | 17 | 8.5 | 5.8 |
| 29 | 26 | 36 | 50 | 51 | 39 | 112 | 16 | 21 | 18 | 14 | 8.0 | 5.6 |
| 30 | 23 | 32 | 42 | 43 | | 98 | 18 | 53 | 13 | 13 | 25 | 5.8 |
| 31 | 28 | | 35 | 40 | | 81 | | 74 | | 13 | 13 | |
| Total | 843 | 949 | 1,469 | 1,503 | 1,238 | 1,420 | 1,195 | 832 | 791 | 539 | 390.2 | 189.3 |
| Mean | 27.2 | 31.6 | 47.4 | 48.5 | 42.7 | 45.8 | 39.8 | 26.8 | 26.4 | 17.1 | 12.6 | 6.31 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 592 | | | Min 8.2 | | Mean 41.3 | | Cfsm - | | In. - | | |
| Water year 1959-60: Max | 137 | | | Min 5.6 | | Mean 31.0 | | Cfsm - | | In. - | | |

* Discharge measurement made on this day.

2050. Springfield Lake Outlet at Akron, Ohio

Location--Lat 41°03'20", long 81°27'50", in T.1 N., R.10 W., on right bank in Akron, Summit County, 0.3 mile upstream from mouth and 3 miles downstream from Springfield Lake.

Drainage area--8.40 sq mi.

Records available--May 1946 to September 1960.

Gage--Water-stage recorder and concrete control. Datum of gage is 1,015.34 ft above mean sea level (city of Akron bench mark).

Average discharge--14 years, 6.99 cfs.

Extremes--Maximum discharge during year, 102 cfs Dec. 12 (gage height, 2.23 ft); minimum, 0.1 cfs Sept. 25-30; minimum gage height, 0.33 ft Sept. 28, 29.
1946-60: Maximum discharge, 519 cfs Jan. 21, 1959 (gage height, 3.42 ft), from rating curve extended above 95 cfs by logarithmic plotting; no flow at times in 1953-54.

Remarks--Records good except those for periods of ice effect, which are poor. Flow regulated by Springfield Lake.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 20, Apr. 19-22, June 5-8, July 4, 11, 12, Aug. 17, 24-27)

| | | | |
|-----|-----|-----|-----|
| 0.4 | 0.2 | 1.2 | 4.2 |
| .5 | .4 | 1.4 | 9.0 |
| .6 | .7 | 1.6 | 18 |
| .7 | 1.0 | 1.8 | 31 |
| .9 | 1.9 | 2.0 | 58 |
| 1.0 | 2.4 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|
| 1 | 6.5 | 2.6 | 5.9 | 9.4 | 7.6 | 4.0 | 13 | 5.3 | 7.3 | 3.6 | 0.9 | 0.8 |
| 2 | 3.6 | 2.4 | 6.2 | 9.8 | 6.5 | 3.7 | 10 | 4.4 | 5.5 | 2.1 | .9 | .6 |
| 3 | 1.6 | 2.1 | 6.2 | 22 | 5.9 | 3.5 | 16 | 4.2 | *4.5 | 4.5 | 3.1 | .6 |
| 4 | 1.3 | 3.4 | 5.7 | 13 | 6.2 | 3.8 | 20 | 4.0 | 3.9 | 1.8 | 1.5 | .6 |
| 5 | 1.8 | 3.9 | 5.7 | 9.5 | 7.0 | 4.1 | 14 | 4.0 | 3.6 | 1.4 | 1.0 | .7 |
| 6 | | | | | | | | | | | | |
| 7 | 3.5 | 3.0 | 10 | 8.5 | 9.0 | 4.5 | 13 | 4.0 | 3.2 | 1.4 | 1.0 | .6 |
| 8 | 2.9 | 2.2 | 9.4 | 7.5 | 6.5 | 4.3 | 12 | 4.5 | 5.1 | 1.3 | 3.8 | .5 |
| 9 | *5.6 | 1.9 | 6.5 | 7.0 | 5.1 | 4.2 | 11 | 11 | 3.1 | 1.2 | 2.5 | .5 |
| 10 | 5.7 | *1.6 | 5.7 | 7.0 | 8.3 | 4.1 | 10 | 6.5 | 2.8 | 1.2 | 1.3 | .5 |
| 11 | 2.6 | 3.1 | *7.0 | 7.0 | 17 | *4.1 | 9.4 | *10 | 2.7 | 1.1 | .9 | .5 |
| 12 | | | | | | | | | | | | |
| 13 | 2.1 | 4.7 | 12 | *7.0 | *17 | 3.8 | 9.0 | 7.3 | 2.4 | 1.1 | .8 | .9 |
| 14 | 1.3 | 2.4 | 45 | 20 | 8.3 | 3.5 | *9.0 | 5.5 | 18 | *1.2 | *.6 | 2.1 |
| 15 | 1.3 | 6.7 | 42 | 20 | 6.2 | 3.0 | 9.0 | 6.5 | 8.7 | 9.4 | .8 | *2.2 |
| 16 | 1.2 | 8.0 | 26 | 15 | 4.7 | 2.8 | 8.7 | 11 | 22 | 2.9 | .8 | 2.2 |
| 17 | .9 | 5.5 | 19 | 17 | 4.6 | 3.0 | 9.0 | 5.3 | 11 | 1.6 | 2.6 | 2.1 |
| 18 | | | | | | | | | | | | |
| 19 | .8 | 3.6 | 16 | 13 | 4.5 | 3.0 | 7.3 | 4.1 | 4.5 | 1.3 | 1.3 | 2.1 |
| 20 | .7 | 2.9 | 15 | 9.4 | 4.5 | 3.1 | 5.5 | 4.5 | 5.3 | 1.2 | .8 | 2.1 |
| 21 | .6 | 2.0 | 13 | 11 | 4.5 | 3.1 | 5.1 | 4.5 | 3.9 | 1.1 | .8 | 2.0 |
| 22 | .5 | 1.8 | 12 | 11 | 4.4 | 3.4 | 4.4 | 3.8 | 3.0 | 2.6 | .7 | 2.1 |
| 23 | .5 | 1.7 | 11 | 8.7 | 4.2 | 3.6 | 4.2 | 3.6 | 2.3 | 2.8 | .9 | 1.9 |
| 24 | | | | | | | | | | | | |
| 25 | .5 | 1.6 | 10 | 7.3 | 4.1 | 3.5 | 4.2 | 3.2 | 2.0 | 1.4 | 1.3 | 1.8 |
| 26 | .4 | 1.7 | 9.4 | 6.4 | 4.1 | 3.5 | 4.2 | 7.3 | 5.1 | 1.4 | .9 | 1.9 |
| 27 | 2.4 | 1.7 | 9.0 | 6.0 | 4.0 | 3.5 | 4.4 | 8.0 | 3.8 | 1.3 | .8 | 1.6 |
| 28 | 9.8 | 2.6 | 9.0 | 5.7 | 4.1 | 3.6 | 4.2 | 5.9 | 2.6 | 1.0 | .6 | .3 |
| 29 | 5.5 | 3.1 | 9.0 | 5.6 | 4.2 | 3.7 | 4.1 | 4.5 | 2.6 | 1.0 | .8 | .2 |
| 30 | | | | | | | | | | | | |
| 31 | 5.1 | 2.2 | 10 | 5.6 | 4.2 | 5.8 | 4.1 | 3.9 | 2.0 | 1.8 | .9 | .2 |
| 32 | 4.7 | 9.0 | 11 | 9.0 | 4.1 | 11 | 4.0 | 4.2 | 1.6 | 5.2 | .8 | .2 |
| 33 | 2.9 | 6.7 | 16 | 13 | 4.5 | 24 | 4.1 | 4.9 | 2.6 | 2.3 | .6 | .2 |
| 34 | 2.2 | 7.6 | 16 | 11 | 4.2 | 22 | 4.0 | 3.9 | 2.2 | 1.3 | .6 | .2 |
| 35 | 1.8 | 6.2 | 13 | 8.7 | | 19 | 5.5 | 11 | 1.9 | 1.1 | 7.7 | .2 |
| 36 | 2.2 | | 11 | 6.0 | ----- | 18 | | 15 | ----- | .9 | 1.6 | |
| Total | 82.5 | 109.9 | 402.7 | 319.1 | 179.3 | 190.2 | 242.4 | 185.8 | 146.2 | 59.5 | 43.4 | 32.4 |
| Mean | 2.66 | 3.66 | 13.0 | 10.3 | 6.18 | 6.14 | 8.08 | 5.99 | 4.87 | 1.92 | 1.40 | 1.08 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 292 Min 0.4 Mean 10.1 Cfsm - In. -
Water year 1959-60: Max 45 Min 0.2 Mean 5.45 Cfsm - In. -

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21-23, Jan. 5-7, 22-25, Feb. 15 to Mar. 2, Mar. 4-26.

2060. Cuyahoga River at Old Portage, Ohio

Location.--Lat 41°08'04", long 81°32'49", on right bank 230 ft upstream from highway bridge at Old Portage, Summit County, 1½ miles downstream from Little Cuyahoga River, and 4 miles northwest of Akron.

Drainage area.--405 sq mi.

Records available.--September 1921 to December 1935, March 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 740.11 ft above mean sea level, unadjusted. Prior to Dec. 21, 1923, chain gage at same site and datum.

Average discharge.--35 years, 422 cfs.

Extremes.--Maximum discharge during year, 3,390 cfs Apr. 1 (gage height, 9.05 ft); minimum, 47 cfs Sept. 26 (gage height, 0.74 ft).
1921-35, 1939-60: Maximum discharge, 6,500 cfs Jan. 21, 1959 (gage height, 11.54 ft), from rating curve extended above 3,900 cfs on basis of contracted-opening estimate of peak flow at site with drainage area of 488 sq mi adjusted to gaging station by drainage-area relation; minimum, 14 cfs Aug. 27, 1944; minimum gage height, 0.33 ft Nov. 19-24, Dec. 11-13, 1954.

Remarks.--Records fair. Diurnal fluctuation caused by powerplants above station. Flow regulated by reservoirs and lakes above station. At Lake Rockwell, about 16 miles above gage, an average of 67 cfs was diverted for municipal supply of city of Akron. Sewage from city enters river below station.

Revisions (water years).--WSP 1307: 1924(M).

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-23

Oct. 24 to Sept. 30

1.0 124
2.0 314
4.0 869

0.7 42 4.0 940
1.0 85 6.0 1,730
1.5 197 8.0 2,700
2.0 342 10.0 4,220

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|---------|--------|----------|--------|--------|--------|-------|-------|-------|
| 1 | 590 | 490 | 594 | 609 | 661 | 386 | 3,340 | 342 | 714 | 191 | 150 | 122 |
| 2 | 579 | 525 | 577 | 597 | 626 | 359 | 3,130 | 358 | 522 | 144 | 120 | 109 |
| 3 | 547 | 510 | 560 | 841 | 533 | 386 | 2,690 | 412 | 435 | 291 | 238 | 101 |
| 4 | 573 | 560 | 530 | 847 | 533 | 336 | 2,370 | 148 | 391 | 212 | 177 | 96 |
| 5 | 602 | 655 | 516 | 690 | 548 | 333 | 1,840 | 139 | 354 | 191 | 203 | 112 |
| 6 | 619 | 635 | 620 | 629 | 632 | 356 | 1,460 | 124 | 313 | 171 | 166 | 90 |
| 7 | 802 | 588 | 708 | 676 | 726 | 377 | 1,240 | 153 | 275 | 145 | 200 | 98 |
| 8 | 548 | 568 | 632 | 626 | 717 | 359 | 1,090 | 322 | 532 | 137 | 368 | 94 |
| 9 | 824 | *539 | 574 | 542 | 612 | 359 | 947 | 475 | 191 | 116 | 406 | 87 |
| 10 | 795 | 487 | *545 | 499 | 1,220 | *351 | 850 | *735 | 180 | 103 | 275 | 94 |
| 11 | 799 | 452 | 600 | *475 | *1,640 | 328 | 799 | 879 | 148 | 99 | 180 | 83 |
| 12 | 704 | 435 | 1,330 | 694 | 1,460 | 304 | *729 | 895 | 475 | *94 | *139 | 80 |
| 13 | *596 | 502 | 2,240 | 1,050 | 1,360 | 298 | 696 | 868 | 371 | 220 | 122 | *80 |
| 14 | 503 | 612 | 1,960 | 1,090 | 1,230 | 316 | 644 | 879 | *554 | 272 | 128 | 148 |
| 15 | 426 | 676 | 1,830 | 1,180 | 950 | 275 | 583 | 793 | 562 | 206 | 270 | 191 |
| 16 | 370 | 623 | 1,790 | 1,230 | 860 | 275 | 580 | 670 | 597 | 183 | 171 | 166 |
| 17 | 323 | 615 | 1,440 | 1,160 | 785 | 298 | 580 | 566 | 629 | 139 | 146 | 99 |
| 18 | 283 | 597 | 1,150 | 1,050 | 696 | 304 | 565 | 528 | 661 | 135 | 114 | 76 |
| 19 | 258 | 568 | 921 | 967 | 635 | 319 | 539 | 475 | 626 | 139 | 98 | 78 |
| 20 | 239 | 528 | 768 | 831 | 542 | 345 | 536 | 441 | 586 | 141 | 130 | 71 |
| 21 | 220 | 487 | 670 | 690 | 487 | 380 | 516 | 374 | 490 | 114 | 185 | 68 |
| 22 | 208 | 464 | 577 | 615 | 530 | 362 | 481 | 470 | 441 | 105 | 356 | 64 |
| 23 | 239 | 452 | 478 | 580 | 504 | 350 | 458 | 597 | 371 | 68 | 438 | 62 |
| 24 | 458 | 487 | 441 | 533 | 458 | 371 | 391 | 580 | 293 | 63 | 272 | 61 |
| 25 | 530 | 493 | 414 | 522 | 478 | 371 | 388 | 530 | 243 | 67 | 182 | 52 |
| 26 | 618 | 452 | 414 | 467 | 484 | 374 | 368 | 504 | 214 | 118 | 141 | 54 |
| 27 | 618 | 554 | 429 | 499 | 444 | 423 | 328 | 496 | 197 | 220 | 122 | 54 |
| 28 | 568 | 705 | 545 | 612 | 423 | 799 | 319 | 513 | 166 | 168 | 109 | 54 |
| 29 | 502 | 673 | 652 | 684 | 438 | 1,380 | 293 | 435 | 171 | 120 | 109 | 55 |
| 30 | 449 | 646 | 694 | 695 | ----- | 2,490 | 313 | 600 | 124 | 69 | 174 | 64 |
| 31 | 444 | ----- | 658 | 675 | ----- | 3,100 | ----- | 854 | ----- | 137 | 203 | ----- |
| Total | 15,732 | 16,578 | 25,827 | 22,854 | 21,392 | 17,024 | 29,043 | 16,171 | 11,506 | 4,680 | 6,092 | 2,663 |
| Mean | 507 | 553 | 833 | 737 | 738 | 549 | 968 | 522 | 364 | 151 | 197 | 86.8 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 6,040 | | | Min 119 | | Mean 629 | | Cfsm - | | In. - | | |
| Water year 1959-60: Max | 3,340 | | | Min 52 | | Mean 518 | | Cfsm - | | In. - | | |

* Discharge measurement made on this day.

2075. Ohio Canal at Independence, Ohio

Location.--Lat 41°23'25", long 81°37'35", in T.6 N., R.12 W., on right bank at upstream side of dam, 0.4 mile upstream from Rockside Road and 1 mile northeast of Independence, Cuyahoga County.

Records available.--September 1921 to May 1923, August 1927 to December 1935, October 1940 to September 1960.

Gage.--Water-stage recorder above dam. Datum of gage is 605.31 ft above mean sea level. Prior to Dec. 9, 1946, staff or chain gage, or water-stage recorder at site 0.4 mile downstream at various datums. Dec. 10, 1946, to Nov. 3, 1950, staff gage at present site and datum.

Extremes.--1921-23, 1927-35, 1940-60: Maximum daily discharge, 277 cfs Jan. 22, 1959; no flow June 4, 1947, July 2-7, 1950, July 16 to Aug. 19, 1959.

Remarks.--Records good except those for periods of indefinite stage-discharge relation, which are fair. Water is diverted from Cuyahoga River into canal at headgates at Brecksville, 6 miles upstream. Some diurnal fluctuation caused by small mill upstream from station.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 72 | 61 | 82 | 65 | 72 | 82 | 74 | 68 | 55 | 61 | 66 | 71 |
| 2 | 71 | 59 | 84 | 64 | 71 | 81 | 72 | 63 | 71 | 60 | 66 | 71 |
| 3 | 68 | 56 | 82 | 72 | 70 | 82 | 74 | 63 | 70 | 64 | 74 | 71 |
| 4 | 65 | 60 | 81 | 65 | 74 | 81 | 74 | 61 | 69 | 63 | 70 | 70 |
| 5 | *66 | 69 | 82 | 61 | 71 | 81 | 72 | 59 | 70 | 61 | 69 | 70 |
| 6 | 85 | 52 | 81 | 60 | 79 | 81 | 79 | 60 | 68 | 60 | 68 | 70 |
| 7 | 43 | 47 | 92 | 62 | 77 | 81 | 78 | 61 | 66 | 61 | 70 | 70 |
| 8 | 66 | 53 | 85 | 62 | 75 | 81 | 76 | 68 | 66 | 61 | 75 | 71 |
| 9 | 66 | 69 | 82 | 61 | 84 | 81 | 74 | *73 | 66 | 61 | 72 | 73 |
| 10 | 66 | *66 | 81 | 61 | 72 | 80 | 73 | 73 | 66 | 61 | 71 | 71 |
| 11 | 66 | 66 | *88 | 59 | 66 | *81 | *72 | 73 | 66 | *61 | *70 | 71 |
| 12 | 66 | 59 | 85 | *68 | *66 | 81 | 71 | 72 | 70 | 63 | 69 | *72 |
| 13 | 66 | 91 | 76 | 75 | 64 | 81 | 71 | 69 | *73 | 65 | 68 | 73 |
| 14 | 65 | 87 | 74 | 66 | 62 | 81 | 70 | 69 | 74 | 70 | 70 | 72 |
| 15 | 63 | 91 | 69 | 69 | 62 | 82 | 70 | 68 | 80 | 65 | 74 | 73 |
| 16 | 65 | 87 | 66 | 64 | 59 | 82 | 74 | 66 | 71 | 65 | 66 | 73 |
| 17 | 66 | 82 | 66 | 62 | 59 | 82 | 78 | 68 | 69 | 64 | 71 | 73 |
| 18 | 66 | 80 | 71 | 64 | 72 | 82 | 68 | 65 | 69 | 64 | 73 | 72 |
| 19 | 66 | 79 | 69 | 64 | 89 | 81 | 66 | 64 | 68 | 65 | 73 | 71 |
| 20 | 66 | 78 | 66 | 60 | 86 | 84 | 65 | 63 | 66 | 64 | 74 | 72 |
| 21 | 66 | 78 | 66 | 58 | 85 | 82 | 64 | 63 | 66 | 63 | 82 | 72 |
| 22 | 66 | 77 | 64 | 57 | 85 | 82 | 64 | 65 | 64 | 63 | 85 | 73 |
| 23 | 66 | 78 | 63 | 59 | 85 | 82 | 63 | 70 | 65 | 63 | 77 | 72 |
| 24 | 72 | 79 | 62 | 72 | 85 | 82 | 63 | 68 | 64 | 63 | 75 | e72 |
| 25 | 69 | 68 | 62 | 72 | 85 | 80 | 62 | 65 | 64 | 63 | 73 | 78 |
| 26 | e66 | 59 | 62 | 74 | 85 | 71 | 63 | 65 | 63 | 64 | 73 | 80 |
| 27 | e63 | 73 | 62 | 74 | 84 | 75 | 65 | 66 | 62 | 66 | 73 | 81 |
| 28 | e57 | 88 | 68 | 82 | 82 | 88 | 62 | 66 | 64 | 65 | 73 | 81 |
| 29 | 54 | 85 | 71 | 79 | 82 | 77 | 61 | 66 | 64 | 65 | 73 | 81 |
| 30 | 54 | 82 | 68 | 75 | ----- | 76 | 63 | 66 | 59 | 65 | 73 | 81 |
| 31 | 58 | ----- | 66 | 73 | ----- | 84 | ----- | 47 | ----- | 65 | 73 | ----- |
| Total | 2,014 | 2,159 | 2,286 | 2,059 | 2,187 | 2,507 | 2,081 | 2,033 | 2,008 | 1,964 | 2,239 | 2,201 |
| Mean | 65.0 | 72.0 | 73.7 | 66.4 | 75.4 | 80.9 | 69.4 | 65.6 | 66.9 | 63.4 | 72.2 | 73.4 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 277 | | | Min | 0 | Mean | 65.7 | Cfsm | - | In. | - | |
| Water year 1959-60: Max | 92 | | | Min | 43 | Mean | 70.3 | Cfsm | - | In. | - | |

* Discharge measurement made on this day.

e Stage-discharge relation indefinite; discharge computed on basis of normal flow in canal.

2080. Cuyahoga River at Independence, Ohio

Location.--Lat 41°23'44", long 81°37'54", in T.6 N., R.12 W., on right bank 140 ft downstream from highway bridge on Rockside Road, 1 mile northeast of Independence, Cuyahoga County, and 3 miles downstream from Tinkers Creek.

Drainage area.--709 sq mi.

Records available.--September 1903 to December 1905 (fragmentary), January to July 1906 (gage heights and discharge measurements only), September 1921 to May 1923, September 1927 to December 1935, March 1940 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 584.14 ft above mean sea level (levels by City of Cleveland). Sept. 21, 1903, to July 21, 1906, chain gage at bridge 140 ft upstream at same datum. Sept. 28, 1921, to May 30, 1923, chain gage at bridge 140 ft upstream at datum 2.42 ft higher. Sept. 5 to Oct. 8, 1927, staff gage at present site and datum.

Average discharge.--29 years (1921-22, 1927-35, 1940-60), 765 cfs (not including flow in Ohio Canal).

Extremes.--Maximum discharge during year, 7,780 cfs Dec. 13 (gage height, 15.42 ft); minimum, 95 cfs Sept. 26, 27 (gage height, 2.52 ft).

1921-23, 1927-35, 1940-60: Maximum discharge, 24,800 cfs Jan. 22, 1959 (gage height, 22.41 ft), from rating curve extended above 17,000 cfs on basis of contracted-opening measurement of peak flow; minimum, 14 cfs Nov. 30, 1930; minimum combined daily discharge of river and canal, 55 cfs Aug. 28, 1933.

Remarks.--Records good. Diurnal fluctuation caused by powerplants above station. Flow slightly regulated by reservoirs and lakes above station. Some diversion from Tuscarawas River into this basin at Portage Lakes. Water diverted into Ohio Canal at Brecks-ville, 6 miles above station, bypasses station. These records do not include flow in canal except above about 15,000 cfs, when channels merge; record of diversion published as Ohio Canal at Independence (see preceding page). Records of water temperatures and suspended sediment loads for the water year 1960 are given in WSP 1741.

Revisions (water years).--WSP 1307: 1922-23(M), 1928-30(M), 1933(M), 1940(M), 1947(M), 1950(M).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 7-26, Nov. 29 to Dec. 11)

| | | | |
|-----|-----|------|-------|
| 2.5 | 93 | 7.0 | 1,900 |
| 3.0 | 173 | 12.0 | 4,810 |
| 3.5 | 321 | 14.5 | 6,860 |
| 4.0 | 505 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|-------|
| 1 | 4,620 | 1,200 | 1,100 | 998 | 1,080 | 597 | 5,010 | 1,090 | 1,480 | 434 | 247 | 212 |
| 2 | 1,760 | 1,090 | 1,150 | 955 | 980 | 529 | 4,390 | 742 | 994 | 412 | 215 | 173 |
| 3 | 1,560 | 953 | 1,150 | 1,810 | 827 | 553 | 4,210 | 745 | 782 | 595 | 825 | 149 |
| 4 | 1,100 | 1,200 | 1,090 | 1,580 | 732 | 517 | 6,060 | 541 | 629 | 521 | 534 | 132 |
| 5 | *1,020 | 2,230 | 1,070 | 1,200 | 778 | 493 | 3,410 | 386 | 593 | 352 | 445 | 132 |
| 6 | 2,050 | 1,540 | 1,670 | 962 | 1,340 | 505 | 2,570 | 345 | 517 | 311 | 324 | 127 |
| 7 | 3,600 | 1,180 | 1,900 | 989 | 1,450 | 533 | 2,230 | 341 | 453 | 285 | 438 | 132 |
| 8 | 1,440 | 1,020 | 1,420 | 940 | 1,230 | 537 | 2,020 | 1,290 | 400 | 256 | 1,090 | 132 |
| 9 | 1,510 | 926 | 1,180 | 818 | 1,540 | 497 | 1,700 | *1,430 | 358 | 247 | 737 | 151 |
| 10 | 1,330 | *836 | 1,070 | 746 | 3,670 | 517 | 1,500 | 2,610 | 311 | 204 | 597 | 143 |
| 11 | 1,250 | 773 | *1,210 | 750 | 4,130 | *509 | *1,420 | 2,720 | 282 | *180 | *394 | 126 |
| 12 | 1,120 | 901 | 4,530 | *1,720 | *2,850 | 497 | 1,290 | 2,000 | 582 | 190 | 282 | *116 |
| 13 | 940 | 1,120 | 6,800 | 3,580 | 2,260 | 461 | 1,160 | 1,580 | *782 | 245 | 220 | 324 |
| 14 | 858 | 1,720 | 4,080 | 2,310 | 1,920 | 505 | 1,080 | 1,460 | 1,010 | 773 | 218 | 198 |
| 15 | 724 | 1,700 | 3,060 | 2,390 | 1,590 | 477 | 984 | 1,330 | 2,120 | 453 | 617 | 235 |
| 16 | 621 | 1,280 | 2,700 | 2,160 | 1,400 | 517 | 1,340 | 1,100 | 1,070 | 318 | 355 | 238 |
| 17 | 537 | 1,180 | 2,280 | 1,860 | 1,280 | 505 | 1,750 | 1,060 | 904 | 250 | 247 | 188 |
| 18 | 481 | 1,030 | 1,840 | 1,740 | 1,200 | 545 | 1,210 | 948 | 976 | 215 | 215 | 142 |
| 19 | 418 | 930 | 1,500 | 1,820 | 1,060 | 549 | 1,020 | 822 | 876 | 282 | 169 | 124 |
| 20 | 390 | 858 | 1,220 | 1,480 | 912 | 661 | 930 | 746 | 773 | 298 | 241 | 138 |
| 21 | 362 | 814 | 1,070 | 1,210 | 778 | 649 | 886 | 641 | 688 | 218 | 940 | 132 |
| 22 | 335 | 755 | 922 | 1,050 | 800 | 641 | 836 | 796 | 601 | 196 | 1,500 | 130 |
| 23 | 311 | 732 | 778 | 966 | 786 | 621 | 755 | 1,430 | 577 | 193 | 899 | 126 |
| 24 | 860 | 814 | 688 | 868 | 732 | 633 | 683 | 1,290 | 477 | 164 | 637 | 162 |
| 25 | 858 | 872 | 649 | 822 | 746 | 637 | 641 | 976 | 366 | 134 | 390 | 111 |
| 26 | 1,200 | 791 | 661 | 778 | 786 | 653 | 822 | 804 | 335 | 160 | 288 | 98 |
| 27 | 1,280 | 1,220 | 710 | 764 | 701 | 760 | 971 | 755 | 304 | 408 | 232 | 170 |
| 28 | 1,080 | 1,580 | 980 | 1,590 | 641 | 3,230 | 719 | 1,020 | 348 | 314 | 209 | 111 |
| 29 | 890 | 1,380 | 1,640 | 1,660 | 637 | 5,030 | 613 | 953 | 348 | 244 | 186 | 107 |
| 30 | 746 | 1,200 | 1,460 | 1,390 | ----- | 6,720 | 601 | 904 | 295 | 238 | 220 | 111 |
| 31 | 690 | ----- | 1,180 | 1,180 | ----- | 6,430 | ----- | 2,580 | ----- | 232 | 365 | ----- |
| Total | 35,941 | 33,825 | 52,768 | 43,068 | 38,836 | 36,508 | 52,811 | 35,436 | 20,251 | 9,322 | 14,335 | 4,510 |
| Mean | 1,159 | 1,128 | 1,702 | 1,389 | 1,339 | 1,178 | 1,760 | 1,143 | 675 | 301 | 462 | 150 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 16,700 Min 154 Mean 1,366 Cfs/m - In. -
Water year 1959-60: Max 6,800 Min 98 Mean 1,032 Cfs/m - In. -

* Discharge measurement made on this day.

2090. Chagrin River at Willoughby, Ohio

Location.--Lat 41°37'51", long 81°24'13", on left bank at city waterworks, 150 ft downstream from waterworks dam, 800 ft downstream from East Branch, 1 mile southeast of Willoughby, Lake County, and 5 miles upstream from mouth.

Drainage area.--251 sq mi.

Records available.--July 1925 to November 1935, October 1939 to September 1960 (July 1925 to September 1932 monthly runoff in inches, adjusted for diversion, published in WSP 1307; previously published runoff was unadjusted and should not be used).

Gage.--Water-stage recorder. Datum of gage is 594.24 ft above mean sea level, datum of 1929. Prior to Dec. 20, 1939, staff gage on left concrete abutment on upstream side of waterworks dam, 150 ft upstream at datum 7 ft higher.

Average discharge.--31 years, 320 cfs (adjusted for diversion).

Extremes.--Maximum discharge during year, 7,080 cfs Mar. 29 (gage height, 10.14 ft); minimum daily, 31 cfs Sept. 25, 26.

1925-35, 1939-60: Maximum discharge, 28,000 cfs Mar. 22, 1948 (gage height, 17.95 ft, from high-water mark in well), from rating curve extended above 14,000 cfs on basis of contracted-opening measurement of peak flow; minimum daily, 3.0 cfs July 25, 26, 1934.

Remarks.--Records good except those for periods of ice effect, which are fair. Water diverted at dam just above station for municipal supply of city of Willoughby.

Revisions (water years).--WSP 1084: 1929(M), 1931(M). WSP 1307: 1926-28(M), 1930(M), 1932-35(M), 1942(M). See also Records available.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.8 | 22 | 3.0 | 385 |
| 1.9 | 34 | 4.0 | 985 |
| 2.0 | 50 | 6.0 | 2,620 |
| 2.2 | 97 | 8.5 | 5,150 |
| 2.5 | 185 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 1,960 | 837 | 259 | 244 | 558 | 150 | 1,110 | 400 | 410 | 128 | 149 | 71 |
| 2 | 559 | 470 | 300 | 220 | 354 | 140 | 690 | 263 | 227 | 202 | 111 | 50 |
| 3 | 248 | 351 | 349 | 1,670 | 224 | 140 | 1,150 | 162 | 173 | 133 | 390 | 42 |
| 4 | 167 | 307 | 304 | 859 | 238 | 140 | 2,280 | 149 | 137 | 279 | 611 | 42 |
| 5 | 134 | 1,380 | 283 | 331 | 295 | 150 | 518 | 131 | 161 | 140 | 279 | 42 |
| 6 | *683 | 683 | 794 | 248 | 1,100 | 145 | 552 | 117 | 128 | 92 | 122 | 39 |
| 7 | 2,590 | 358 | 999 | 200 | 992 | 137 | 480 | 119 | 97 | 74 | 94 | 34 |
| 8 | 686 | 241 | 600 | 175 | 552 | 130 | 480 | 1,060 | 84 | 60 | 941 | 34 |
| 9 | 318 | 185 | 420 | 164 | 582 | 125 | 507 | *1,860 | 76 | 54 | 248 | 34 |
| 10 | 216 | *158 | 344 | 164 | 584 | 150 | 496 | 2,090 | 71 | 50 | 143 | 37 |
| 11 | 173 | 149 | *448 | 182 | 2,650 | *125 | *552 | 1,570 | 101 | *50 | *108 | 40 |
| 12 | 137 | 263 | 4,360 | *1,080 | *2,240 | 120 | 465 | 611 | 1,020 | 47 | 81 | *37 |
| 13 | 114 | 624 | 3,750 | 2,950 | 529 | 120 | 326 | 490 | *552 | 48 | 69 | 218 |
| 14 | 114 | 1,260 | 1,070 | 1,090 | 340 | 120 | 259 | 395 | 1,030 | 267 | 63 | 318 |
| 15 | 111 | 1,030 | 624 | 908 | 280 | 125 | 234 | 358 | 1,640 | 146 | 103 | 69 |
| 16 | 94 | 507 | 485 | 678 | 255 | 130 | 426 | 304 | 570 | 79 | 114 | 50 |
| 17 | 84 | 415 | 400 | 425 | 135 | 155 | 1,420 | 227 | 318 | 80 | 81 | 42 |
| 18 | 31 | 300 | 518 | 425 | 240 | 145 | 659 | 210 | 308 | 54 | 69 | 39 |
| 19 | 76 | 230 | 255 | 672 | 230 | 155 | 415 | 173 | 216 | 50 | 63 | 36 |
| 20 | 71 | 199 | 206 | 410 | 210 | 165 | 304 | 164 | 164 | 67 | 60 | 37 |
| 21 | 69 | 192 | 176 | 295 | 190 | 170 | 238 | 143 | 122 | 52 | 217 | 37 |
| 22 | 65 | 182 | 152 | 238 | 200 | 170 | 216 | 226 | 108 | 47 | 536 | 36 |
| 23 | 65 | 164 | 140 | 210 | 185 | 170 | 179 | 845 | 117 | 369 | 244 | 34 |
| 24 | 156 | 185 | 135 | 200 | 180 | 175 | 164 | 766 | 117 | 117 | 119 | 33 |
| 25 | 326 | 255 | 134 | 190 | 190 | 170 | 155 | 354 | 105 | 79 | 84 | 31 |
| 26 | 287 | 230 | 140 | 180 | 205 | 180 | 158 | 220 | 89 | 80 | 60 | 31 |
| 27 | 340 | 389 | 185 | 190 | 196 | 200 | 164 | 182 | 81 | 244 | 54 | 32 |
| 28 | 336 | 708 | 398 | 851 | 192 | 2,320 | 152 | 202 | 79 | 119 | 50 | 32 |
| 29 | 224 | 400 | 600 | 1,100 | 179 | 4,460 | 131 | 182 | 128 | 84 | 48 | 33 |
| 30 | 164 | 318 | 552 | 850 | ----- | 4,970 | 152 | 196 | 89 | 86 | 71 | 34 |
| 31 | 355 | ----- | 344 | 636 | ----- | 2,770 | ----- | 873 | ----- | 287 | 67 | ----- |
| Total | 10,983 | 13,050 | 19,524 | 18,035 | 14,405 | 18,482 | 15,332 | 15,262 | 8,518 | 3,704 | 5,449 | 1,644 |
| Mean | 354 | 435 | 630 | 582 | 497 | 596 | 511 | 492 | 284 | 119 | 176 | 54.8 |
| (+) | 3.0 | 2.8 | 2.8 | 2.9 | 2.9 | 2.9 | 2.9 | 3.0 | 3.3 | 3.2 | 3.3 | 3.4 |

Adjusted for diversion for city of Willoughby

| Mean | 357 | 438 | 633 | 585 | 500 | 599 | 514 | 495 | 287 | 122 | 179 | 58.2 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Cfsm | 1.42 | 1.75 | 2.52 | 2.33 | 1.99 | 2.39 | 2.05 | 1.97 | 1.14 | 0.486 | 0.713 | 0.232 |
| In. | 1.64 | 1.95 | 2.90 | 2.69 | 2.15 | 2.76 | 2.29 | 2.27 | 1.27 | 0.56 | 0.82 | 0.26 |

| | Observed | | | | | Adjusted | | | | | | |
|---------------------|----------|--------|-----|----|------|----------|------|-----|------|------|-----|-------|
| Calendar year 1959: | Max | 10,500 | Min | 26 | Mean | 500 | Mean | 503 | Cfsm | 2.00 | In. | 27.23 |
| Water year 1959-60: | Max | 4,970 | Min | 31 | Mean | 395 | Mean | 398 | Cfsm | 1.59 | In. | 21.56 |

Peak discharge (base, 4,000 cfs).--Dec. 13 (12:30 a.m.) 6,160 cfs (9.40 ft); Jan. 12 (9:30 p.m.) 4,060 cfs (7.51 ft); Mar. 29 (8 p.m.) 7,090 cfs (10.14 ft).

* Discharge measurement made on this day.

† Diversion, equivalent in cubic feet per second, for municipal supply of city of Willoughby.

Note.--Stage-discharge relation affected by ice Dec. 23, 24, Jan. 7, 8, 23-27, Feb. 15-26, Mar. 1-27.

2110. Rock Creek near Rock Creek, Ohio

Location.--Lat 41°39'05", long 80°50'10", in T.10 N., R.4 W., on left bank at downstream side of highway bridge, 0.4 mile downstream from Plum Creek, 1.4 miles southeast of village of Rock Creek, Ashtabula County, 1½ miles downstream from Sugar Creek, and 3 miles upstream from mouth.

Drainage area.--56.6 sq mi.

Records available.--March 1942 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 810 ft (from topographic map). Prior to June 10, 1942, chain gage at same site and datum.

Average discharge.--18 years, 83.0 cfs.

Extremes.--Maximum discharge during year, 3,380 cfs Mar. 30 (gage height, 8.07 ft); minimum, 0.1 cfs Sept. 10-12, 30; minimum gage height, 0.23 ft Sept. 12.

1942-60: Maximum discharge, 8,000 cfs Jan. 21, 1959 (gage height, 10.89 ft), from rating curve extended above 2,000 cfs on basis of flood studies; no flow at times.

Remarks.--Records good except those for periods of ice effect, which are poor.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Dec. 12 | | | | Dec. 13 to Sept. 30 | | | |
|-------------------|-----|-----|-------|---------------------|-----|-----|-------|
| 0.4 | 1.6 | 2.0 | 120 | 0.2 | 0 | 2.0 | 120 |
| .5 | 3.6 | 2.5 | 192 | .3 | .2 | 2.5 | 192 |
| .6 | 6.8 | 3.0 | 290 | .4 | 1.0 | 3.0 | 295 |
| .9 | 22 | 4.0 | 570 | .5 | 3.4 | 4.0 | 650 |
| 1.2 | 43 | 5.0 | 975 | .6 | 6.8 | 5.0 | 1,090 |
| 1.5 | 68 | 6.0 | 1,550 | .9 | 22 | 6.0 | 1,600 |
| | | | | 1.2 | 43 | 7.5 | 2,800 |
| | | | | 1.5 | 68 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|
| 1 | 208 | 225 | 83 | 74 | 72 | 22 | 522 | 56 | 70 | 1.6 | 1.6 | 0.6 |
| 2 | 153 | 143 | 98 | 63 | 50 | 21 | 215 | 41 | 36 | 1.8 | 1.4 | 1.0 |
| 3 | 51 | 80 | 140 | 517 | 32 | 20 | 132 | 24 | 20 | 2.0 | 1.6 | .5 |
| 4 | 24 | 76 | 119 | 320 | 26 | 21 | 118 | 18 | 12 | 2.6 | 1.4 | .3 |
| 5 | 13 | 240 | 101 | 95 | 29 | 22 | 95 | 14 | 8.8 | 3.7 | 1.4 | .3 |
| 6 | *278 | 319 | 142 | 46 | 225 | 21 | 82 | 11 | 6.4 | 5.0 | 1.4 | .3 |
| 7 | *1,130 | 217 | 282 | 28 | 216 | 20 | 118 | 20 | 5.0 | 3.1 | 6.8 | .2 |
| 8 | 325 | 88 | 168 | 19 | 118 | 19 | 135 | 643 | 4.0 | *1.8 | 4.0 | .2 |
| 9 | 132 | 55 | *112 | 19 | 144 | 18 | 178 | 698 | *3.4 | 1.2 | *2.3 | .2 |
| 10 | 78 | 39 | 86 | 21 | *638 | 19 | 182 | *654 | 2.8 | 1.0 | 1.6 | .1 |
| 11 | 41 | *30 | 104 | 26 | 678 | 19 | 140 | 578 | 2.6 | .8 | 1.2 | .1 |
| 12 | 23 | 41 | 1,230 | 153 | 268 | 18 | 90 | 288 | 4.0 | .7 | .9 | .1 |
| 13 | 15 | 162 | 1,170 | *978 | 119 | 18 | 58 | 147 | 5.7 | .9 | .8 | *.5 |
| 14 | 12 | 350 | 439 | 502 | 57 | 18 | 40 | 113 | 23 | 3.1 | .7 | .5 |
| 15 | 10 | 358 | 168 | 273 | 46 | 18 | 33 | 108 | 74 | 1.6 | .7 | .5 |
| 16 | 8.5 | 160 | 110 | 199 | 40 | *19 | 180 | 97 | 49 | 1.6 | .7 | .4 |
| 17 | 7.2 | 106 | 80 | 96 | 36 | 20 | 182 | 54 | 27 | 1.4 | .7 | .5 |
| 18 | 6.1 | 80 | 62 | 79 | 35 | 21 | 94 | 65 | 21 | 1.0 | .5 | .8 |
| 19 | 5.0 | 52 | 48 | 138 | 36 | 23 | *55 | 49 | 18 | .8 | .5 | .7 |
| 20 | 4.1 | 41 | 36 | 99 | 32 | 24 | 38 | 28 | 12 | .7 | .4 | .7 |
| 21 | 3.8 | 50 | 25 | 60 | 29 | 25 | 28 | 21 | 7.6 | .6 | .6 | .6 |
| 22 | 3.3 | 52 | 19 | 48 | 30 | 25 | 23 | 61 | 5.4 | .8 | .9 | .5 |
| 23 | 3.6 | 40 | 16 | 43 | 28 | 26 | 19 | 371 | 4.4 | 2.8 | 1.4 | .5 |
| 24 | 9.8 | 58 | 15 | 40 | 27 | 25 | 16 | 285 | 3.7 | 3.7 | 2.3 | .4 |
| 25 | 31 | 178 | 15 | 37 | 28 | 26 | 14 | 107 | 3.4 | 9.2 | 2.0 | .4 |
| 26 | 101 | 118 | 20 | 35 | 28 | 27 | 14 | 50 | 4.0 | 5.7 | 1.2 | .3 |
| 27 | 132 | 201 | 42 | 38 | 26 | 29 | 14 | 30 | 3.4 | 4.7 | .9 | .3 |
| 28 | 112 | 317 | 174 | 161 | 25 | 296 | 12 | 28 | 2.3 | 2.6 | .7 | .2 |
| 29 | 62 | 185 | 329 | 364 | 24 | 1,410 | 9.7 | 28 | 1.8 | 2.3 | .5 | .2 |
| 30 | 36 | 112 | 231 | 278 | ----- | 2,560 | 12 | 32 | 1.4 | 4.0 | .4 | .1 |
| 31 | 70 | ----- | 123 | 143 | ----- | 1,130 | ----- | 77 | ----- | 3.4 | .4 | ----- |
| Total | 3,088.4 | 4,173 | 5,787 | 4,982 | 3,142 | 5,980 | 2,830.7 | 4,796 | 442.1 | 76.0 | 41.9 | 12.0 |
| Mean | 99.6 | 139 | 187 | 161 | 108 | 193 | 94.4 | 155 | 14.7 | 2.45 | 1.35 | 0.40 |
| Cfsm | 1.76 | 2.46 | 3.30 | 2.84 | 1.91 | 3.41 | 1.67 | 2.74 | 0.260 | 0.043 | 0.024 | 0.007 |
| In. | 2.03 | 2.74 | 3.80 | 3.27 | 2.06 | 3.93 | 1.86 | 3.16 | 0.29 | 0.05 | 0.03 | 0.01 |

Calendar year 1959: Max 3,000 Min 0 Mean 107 Cfsm 1.89 In. 25.67
Water year 1959-60: Max 2,560 Min 0.1 Mean 96.6 Cfsm 1.71 In. 23.23

Peak discharge (base, 1,200 cfs).--Oct. 7 (1 a.m.) 2,100 cfs (6.72 ft); Dec. 12 (10 p.m.) 1,950 cfs (6.54 ft); Mar. 30 (12:30 a.m.) 3,380 cfs (8.07 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21-24, Jan. 5-9, 21, 27, Jan. 31 to Feb. 4, Feb. 15 to Mar. 27.

2115. Mill Creek near Jefferson, Ohio

Location.--Lat 41°45'10", long 80°48'00", in T.11 N., R.3 W., on right bank at downstream side of bridge on State Highway 307, 1½ miles northwest of Jefferson, Ashtabula County, and 3½ miles downstream from Griggs Creek.

Drainage area.--78.3 sq mi.

Records available.--March 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 822.59 ft above mean sea level (Ashtabula County bench mark). Prior to June 10, 1942, wire-weight gage at same site and datum.

Average discharge.--18 years, 113 cfs (unadjusted).

Extremes.--Maximum discharge during year, 4,110 cfs Mar. 30 (gage height, 9.71 ft); minimum daily, 0.1 cfs many days in July, August, September.

1942-60: Maximum discharge, 9,810 cfs Jan. 22, 1959 (gage height, 12.50 ft), from rating curve extended above 3,700 cfs on basis of contracted-opening measurement of peak flow; no flow at times.

Remarks.--Records fair except those below 15 cfs or those for periods of backwater from tributary or periods of ice effect, which are poor. Water diverted above station for municipal supply for city of Jefferson.

Rating tables, water year 1959-60, except periods of ice effect and backwater from tributary (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-----|-----|-------|
| 1.0 | 4.0 | 3.0 | 212 | 0.6 | 0.1 | 1.1 | 6.3 | 2.5 | 125 |
| 1.2 | 9.3 | 4.0 | 440 | .7 | .4 | 1.2 | 9.3 | 3.0 | 213 |
| 1.4 | 18 | 6.0 | 1,080 | .8 | 1.1 | 1.4 | 18 | 4.0 | 469 |
| 1.7 | 36 | 8.0 | 2,180 | .9 | 2.2 | 1.7 | 36 | 6.0 | 1,230 |
| 2.0 | 62 | 9.5 | 3,770 | 1.0 | 4.0 | 2.0 | 62 | 7.1 | 1,750 |
| 2.5 | 125 | | | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|-------|---------|---------|-------|-------|-------|-------|
| 1 | 414 | 541 | 160 | 95 | 170 | 29 | 515 | 35 | 109 | 0.3 | 0.1 | 11 |
| 2 | 457 | 353 | 151 | 69 | 90 | 28 | 221 | 60 | 59 | .3 | .1 | 3.0 |
| 3 | 152 | 162 | 225 | 683 | 50 | 27 | 148 | 35 | 30 | .4 | .2 | .2 |
| 4 | 75 | 102 | 225 | 525 | 36 | 29 | 150 | 20 | 18 | .3 | .2 | .1 |
| 5 | 56 | 373 | 301 | 120 | 80 | 31 | 119 | 13 | 12 | .3 | .1 | .1 |
| 6 | *188 | 513 | 432 | 50 | 816 | 30 | 92 | 9.0 | 7.4 | .2 | .1 | .1 |
| 7 | 2,290 | 318 | 580 | 30 | 614 | 28 | 127 | 7.7 | 4.6 | .2 | 2.7 | .1 |
| 8 | 694 | 119 | 287 | 22 | 222 | 27 | 196 | 501 | 5.4 | *3 | .4 | .1 |
| 9 | 223 | 61 | *218 | 20 | *183 | 26 | 241 | 1,300 | *2.4 | *3 | *1 | .1 |
| 10 | 118 | 40 | 176 | 20 | 787 | 28 | 235 | *1,080 | 2.0 | .4 | .1 | .1 |
| 11 | 61 | *30 | 164 | 28 | 979 | 28 | 213 | 880 | 2.0 | .4 | .1 | .1 |
| 12 | 37 | 70 | 1,700 | *90 | 338 | 27 | 118 | 426 | 3.0 | .4 | .1 | *1 |
| 13 | 25 | 246 | 2,210 | 1,400 | 138 | 27 | 67 | 185 | 4.0 | .7 | .1 | 1.6 |
| 14 | 22 | 670 | 525 | 802 | 67 | 27 | 43 | 106 | 12 | 1.4 | .1 | .3 |
| 15 | 19 | 718 | 187 | 380 | 58 | *28 | 34 | 78 | 22 | .4 | .2 | .1 |
| 16 | 16 | 290 | 124 | 288 | 50 | 28 | 58 | 55 | 23 | .2 | .1 | .1 |
| 17 | 12 | 167 | 95 | 116 | 46 | 28 | 162 | 35 | 23 | .2 | .1 | .1 |
| 18 | 10 | 136 | 70 | 80 | 44 | 31 | 131 | 38 | 19 | .2 | .1 | .1 |
| 19 | 7.7 | 112 | 54 | 141 | 46 | 33 | *73 | 33 | 10 | .2 | .1 | .1 |
| 20 | 6.3 | 100 | 40 | 105 | 41 | 35 | 45 | 25 | 5.6 | .2 | .1 | .1 |
| 21 | 5.3 | 142 | 30 | 75 | 37 | 35 | 32 | 18 | 3.2 | .2 | .2 | .1 |
| 22 | 4.4 | 251 | 22 | 65 | 38 | 36 | 25 | 16 | 2.0 | .2 | .1 | .1 |
| 23 | 4.8 | 162 | 17 | 58 | 36 | 36 | 20 | 380 | 1.5 | 1.2 | .1 | .1 |
| 24 | 9.3 | 138 | 13 | 52 | 35 | 36 | 15 | 409 | 1.3 | .2 | .1 | .1 |
| 25 | 25 | 297 | 11 | 50 | 36 | 39 | 12 | 135 | 1.0 | .1 | .1 | .1 |
| 26 | 139 | 266 | 15 | 52 | 35 | 45 | 10 | 58 | .7 | .2 | .1 | .1 |
| 27 | 339 | 314 | 46 | 62 | 33 | 80 | 8.7 | 33 | .7 | .4 | .1 | .1 |
| 28 | 294 | 598 | 286 | 128 | 32 | 118 | 9.3 | 20 | .5 | .1 | .1 | .1 |
| 29 | 144 | 386 | 643 | 332 | 31 | 1,390 | 8.0 | 16 | .4 | .1 | .1 | .1 |
| 30 | 72 | 222 | 370 | 396 | ----- | 3,550 | 9.3 | 30 | .4 | .1 | .2 | .2 |
| 31 | 93 | ----- | 169 | 290 | ----- | 1,740 | ----- | 84 | ----- | .1 | .1 | ----- |
| Total | 6,012.8 | 7,899 | 9,546 | 6,244 | 5,168 | 7,679 | 3,137.3 | 6,120.7 | 383.1 | 10.2 | 6.5 | 18.7 |
| Mean | 194 | 263 | 308 | 214 | 178 | 248 | 105 | 197 | 12.8 | 0.329 | 0.210 | 0.623 |
| (7) | 0.29 | 0.29 | 0.28 | 0.28 | 0.29 | 0.30 | 0.31 | 0.33 | 0.34 | 0.37 | 0.36 | 0.36 |

Adjusted for diversion for municipal supply of city of Jefferson

| Mean | 194 | 263 | 308 | 214 | 178 | 248 | 105 | 197 | 13.1 | 0.699 | 0.570 | 0.983 |
|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|
| Cfsm | 2.48 | 3.36 | 3.93 | 2.73 | 2.27 | 3.17 | 1.34 | 2.52 | 0.167 | 0.009 | 0.007 | 0.126 |
| In. | 2.86 | 3.75 | 4.53 | 3.15 | 2.45 | 3.66 | 1.50 | 2.90 | 0.19 | 0.01 | 0.01 | 0.14 |

| | Observed | | | | Adjusted | | | |
|---------------------|-----------|---------|----------|--|----------|-----------|-----------|--|
| Calendar year 1959: | Max 5,000 | Min 0 | Mean 162 | | Mean 162 | Cfsm 2.07 | In. 28.08 | |
| Water year 1959-60: | Max 3,550 | Min 0.1 | Mean 144 | | Mean 144 | Cfsm 1.84 | In. 25.15 | |

Peak discharge (base, 1,500 cfs).--Oct. 7 (9 a.m.) 3,280 cfs (9.15 ft); Dec. 13 (1:15 a.m.) 3,250 cfs (9.13 ft); Jan. 13 (5 p.m.) 1,850 cfs (7.54 ft); Mar. 30 (6 a.m.) 4,110 cfs (9.71 ft); May 9 (4:30 a.m.) 1,660 cfs (6.91 ft).

* Discharge measurement made on this day.

† Diversion, equivalent in cubic feet per second, for city of Jefferson.

Note.--Stage-discharge relation affected by ice Jan. 5-10, 20-27, Jan. 31 to Feb. 5, Feb. 16 to Mar. 14, Mar. 17-26. Backwater from tributary Oct. 6, 7, 31, Nov. 1, 4, 5, Dec. 8-11, Mar. 27-29, May 7, 8, 22, 23.

2120. Grand River near Madison, Ohio

Location.--Lat 41°44'26", long 81°02'48", on downstream end of center pier of bridge on State Highway 528, half a mile upstream from Griswold Creek and 2 miles south of Madison, Lake County.

Drainage area.--587 sq mi.

Records available.--July 1922 to December 1935, February 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 674.47 ft above mean sea level, adjustment of 1912. Prior to Jan. 20, 1939, chain gage at same site and datum.

Average discharge.--35 years, 668 cfs.

Extremes.--Maximum discharge during year, 14,300 cfs Mar. 31 (gage height, 12.27 ft); minimum, 8.6 cfs Sept. 12 (gage height, 1.06 ft).

1922-35, 1938-60: Maximum discharge, 21,100 cfs Jan. 22, 1959 (gage height, 14.73 ft), from rating curve extended above 12,200 cfs on basis of estimated peak flow over dam at site about 8 miles upstream with drainage area of 559 sq mi, adjusted to gage site by 0.8 power of the drainage area ratio; no flow July 31, Aug. 1, 2, 1934.

Remarks.--Records good except those for periods of ice effect, which are poor.

Revisions (water years).--WSP 1437: 1923-24(M), 1925-30, 1932(M), 1933, 1934(M), 1935, 1938(M), 1946, 1948(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used July 29 to Aug. 10)

Oct. 1 to Dec. 13

Dec. 14 to Sept. 30

| | | | | | | | | | |
|-----|-----|------|-------|-----|-----|-----|-------|------|--------|
| 1.5 | 49 | 4.0 | 1,030 | 1.0 | 6.5 | 2.5 | 240 | 8.0 | 5,340 |
| 1.7 | 84 | 5.0 | 1,720 | 1.2 | 14 | 3.0 | 440 | 10.0 | 9,230 |
| 2.0 | 145 | 6.0 | 2,570 | 1.4 | 25 | 4.0 | 1,000 | 12.0 | 13,600 |
| 2.5 | 276 | 8.0 | 5,310 | 1.6 | 41 | 5.0 | 1,750 | | |
| 3.0 | 453 | 10.2 | 9,650 | 2.0 | 100 | 6.0 | 2,750 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|------------|-----------|-----------|-------|-------|-------|
| 1 | 1,460 | 1,550 | 1,160 | 1,060 | 1,800 | 270 | 9,170 | 254 | 768 | 36 | 50 | 21 |
| 2 | 1,740 | 1,580 | 1,060 | 878 | 1,260 | 250 | 6,260 | 395 | 585 | 36 | 42 | 38 |
| 3 | 1,130 | 991 | 1,130 | 2,220 | 660 | 240 | 3,880 | 347 | 444 | 36 | 41 | 42 |
| 4 | 744 | 663 | 1,170 | 2,950 | 420 | 250 | 2,620 | 226 | 311 | 45 | 42 | 26 |
| 5 | 491 | 1,480 | 1,210 | 1,510 | 400 | 260 | 1,570 | 154 | 202 | 52 | 41 | 20 |
| 6 | 1,030 | 1,920 | 1,420 | 900 | 1,890 | 250 | 1,140 | 116 | 132 | 63 | 58 | 18 |
| 7 | *5,900 | 1,570 | 2,120 | 540 | 2,890 | 240 | 1,130 | 102 | 106 | *8 | 72 | 16 |
| 8 | 5,200 | 1,050 | 1,780 | 310 | 1,650 | 225 | 1,240 | 1,130 | *86 | 46 | *106 | 13 |
| 9 | 2,150 | 687 | *1,340 | 250 | 1,280 | 215 | 1,410 | *4,260 | 72 | 39 | 77 | 12 |
| 10 | 1,400 | *495 | 1,190 | 240 | *3,030 | 225 | 1,530 | 4,320 | 63 | 36 | 58 | 10 |
| 11 | 880 | 352 | 1,060 | 230 | 4,600 | 220 | 1,520 | 4,220 | 58 | 31 | 52 | 9.6 |
| 12 | 518 | 360 | 4,710 | 418 | 3,320 | 215 | 1,140 | 3,320 | 62 | 27 | 46 | *9.3 |
| 13 | 339 | 687 | 9,430 | *4,290 | 3,250 | 210 | 768 | 2,340 | 77 | 26 | 39 | 110 |
| 14 | 238 | 1,960 | 5,880 | 5,000 | 1,640 | 215 | 540 | 1,650 | 693 | 28 | 33 | 56 |
| 15 | 182 | 2,570 | 3,370 | 3,170 | 980 | 220 | 418 | 1,210 | 1,400 | 28 | 28 | 33 |
| 16 | 154 | 1,840 | 2,580 | 2,680 | 728 | *230 | 440 | 870 | 1,310 | 48 | 24 | 26 |
| 17 | 130 | 1,340 | 1,980 | 1,860 | 555 | 240 | 1,230 | 651 | 1,130 | 59 | 21 | 23 |
| 18 | 116 | 1,130 | 1,270 | 1,240 | 480 | 250 | 1,250 | 495 | 909 | 49 | 19 | 21 |
| 19 | 100 | 880 | 762 | 950 | 440 | 270 | *922 | 431 | 580 | 38 | 18 | 20 |
| 20 | 86 | 606 | 510 | 750 | 390 | 285 | 607 | 343 | 315 | 32 | 19 | 18 |
| 21 | 74 | 555 | 367 | 600 | 350 | 295 | 440 | 283 | 172 | 26 | 21 | 16 |
| 22 | 63 | 776 | 264 | 520 | 360 | 300 | 339 | 247 | 110 | 24 | 19 | 15 |
| 23 | 57 | 623 | 175 | 460 | 340 | 305 | 264 | 1,570 | 84 | 37 | 17 | 14 |
| 24 | 96 | 560 | 172 | 430 | 320 | 300 | 216 | 2,180 | 69 | 41 | 17 | 13 |
| 25 | 224 | 978 | 157 | 400 | 330 | 305 | 175 | 1,320 | 59 | 108 | 30 | 13 |
| 26 | 771 | 1,190 | 151 | 390 | 340 | 320 | 151 | 780 | 56 | 135 | 46 | 13 |
| 27 | 1,320 | 1,260 | 222 | 400 | 310 | 340 | 138 | 530 | 58 | 100 | 44 | 12 |
| 28 | 1,330 | 2,050 | 875 | 618 | 300 | 940 | 125 | 355 | 52 | 72 | 35 | 12 |
| 29 | 920 | 1,920 | 2,280 | 1,380 | 290 | 4,950 | 114 | 272 | 45 | 59 | 29 | 11 |
| 30 | 545 | 1,440 | 2,080 | 2,080 | ----- | 12,000 | 108 | 400 | 38 | 55 | 26 | 12 |
| 31 | 552 | ----- | 1,410 | 1,910 | ----- | 13,000 | ----- | 846 | ----- | 49 | 22 | ----- |
| Total | 29,940 | 35,063 | 53,285 | 40,630 | 33,743 | 37,835 | 40,855 | 35,617 | 10,046 | 1,519 | 1,172 | 672.9 |
| Mean | 966 | 1,169 | 1,719 | 1,311 | 1,164 | 1,220 | 1,362 | 1,149 | 335 | 49.0 | 37.8 | 22.4 |
| Cfsm | 1.65 | 1.99 | 2.93 | 2.23 | 1.98 | 2.08 | 2.32 | 1.96 | 0.571 | 0.083 | 0.064 | 0.038 |
| In. | 1.90 | 2.22 | 3.58 | 2.57 | 2.14 | 2.40 | 2.59 | 2.26 | 0.64 | 0.10 | 0.07 | 0.04 |
| Calendar year 1959: Max | 18,000 | | | | | | Mean 1,011 | Cfsm 1.72 | In. 23.37 | | | |
| Water year 1959-60: Max | 13,000 | | | | | | Mean 875 | Cfsm 1.49 | In. 20.31 | | | |

Peak discharge (base, 5,500 cfs).--Oct. 7 (10 p.m.), 7,400 cfs (9.12 ft); Dec. 13 (12:30 p.m.), 9,950 cfs (10.34 ft); Jan. 14 (2 a.m.), 5,840 cfs (8.30 ft); Mar. 31 (4 a.m.), 14,300 cfs (12.27 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 6-10, 19-27, Feb. 2-6, Feb. 18 to Mar. 29 (no gage-height record Mar. 4-16; discharge estimated on basis of 1 discharge measurement, weather records, and records for other stations in basin).

2125. Ashtabula River near Ashtabula, Ohio

Location.--Lat 41°51'19", long 80°45'43", on left bank at downstream side of highway bridge, 1 mile upstream from Hubbard Run, 1½ miles southeast of Ashtabula, Ashtabula County, and 5½ miles upstream from mouth.

Drainage area.--118 sq mi.

Records available.--July 1924 to December 1935, March 1939 to November 1947, March 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 605 ft (from topographic map). Prior to Aug. 27, 1924, staff gage at same site and datum.

Average discharge.--29 years, 152 cfs.

Extremes.--Maximum discharge during year, 7,110 cfs Mar. 30 (gage height, 8.47 ft); minimum, 0.1 cfs Aug. 30 to Sept. 1, Sept. 8-12; minimum gage height, 0.37 ft Sept. 11, 12. 1924-35, 1939-47, 1950-60: Maximum discharge, 11,600 cfs Jan. 22, 1959 (gage height, 11.03 ft), from rating curve extended above 4,600 cfs by logarithmic plotting; no flow at times during most years.

Remarks.--Records good except those for period Oct. 10 to Dec. 12, which are fair, and those for periods of ice effect, which are poor.

Revisions (water years).--WSP 954: 1929(M). WSP 974: 1942. WSP 1437: 1926, 1932, 1934.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 10-26, 29-31,
Nov. 3, 4, 8-12, Dec. 1-4, 8-11)

Oct. 1 to Mar. 29

Mar. 30 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.1 | 22 | 5.0 | 580 | 0.4 | 0.1 | 1.2 | 24 |
| 1.4 | 47 | 4.0 | 1,310 | .5 | .8 | 1.5 | 64 |
| 1.7 | 89 | 5.0 | 2,280 | .6 | 2.6 | 2.0 | 170 |
| 2.0 | 149 | 6.0 | 3,450 | .7 | 5.6 | 2.5 | 375 |
| 2.5 | 310 | | | .8 | 9.2 | 3.0 | 700 |
| | | | | .9 | 13 | 5.0 | 2,500 |
| | | | | 1.0 | 18 | 7.3 | 5,240 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|-------|-------|-------|
| 1 | 446 | 678 | 342 | 228 | 337 | 52 | 849 | 72 | 51 | 1.9 | 1.2 | 0.1 |
| 2 | 450 | 410 | 319 | 196 | 208 | 50 | 392 | 101 | 46 | 1.9 | .7 | .7 |
| 3 | 154 | 194 | 385 | 1,090 | 145 | 48 | 264 | 60 | 33 | 3.2 | .8 | 1.2 |
| 4 | 78 | 131 | 385 | 696 | 123 | 48 | 264 | 41 | 23 | 2.6 | .9 | 1.2 |
| 5 | 52 | 524 | 574 | 278 | 117 | 50 | 216 | 32 | 18 | 1.9 | 1.0 | .8 |
| 6 | 80 | 710 | 878 | 180 | 912 | 50 | 150 | 25 | 15 | 1.5 | .7 | .4 |
| 7 | *2,350 | 355 | 857 | 130 | 844 | 46 | 161 | 24 | 12 | *1.4 | 1.0 | .3 |
| 8 | 687 | 159 | *526 | 100 | 314 | 44 | 248 | 613 | *9.6 | .9 | *11 | .1 |
| 9 | 238 | 96 | 427 | 90 | *252 | 42 | 325 | *1,700 | 7.7 | .6 | 7.7 | .1 |
| 10 | 129 | *65 | 342 | 85 | 891 | 44 | 330 | 1,560 | 6.3 | .6 | 8.8 | .1 |
| 11 | 72 | 57 | 314 | 90 | 1,290 | 44 | 365 | 954 | 6.0 | .4 | 5.6 | .1 |
| 12 | 49 | 100 | 2,470 | *110 | 472 | 42 | 216 | 522 | 8.1 | .3 | 3.4 | .1 |
| 13 | 42 | 264 | 3,240 | 1,780 | 215 | 42 | 123 | 248 | 8.8 | .3 | 2.6 | *117 |
| 14 | 42 | 745 | 747 | 901 | 145 | 42 | 76 | 147 | 24 | .7 | 2.1 | 22 |
| 15 | 43 | 836 | 365 | 538 | 111 | 42 | 64 | 105 | 52 | 1.2 | 1.9 | 11 |
| 16 | 40 | 370 | 290 | 422 | 95 | *44 | 147 | 74 | 38 | .9 | 1.5 | 7.7 |
| 17 | 36 | 278 | 252 | 212 | 85 | 46 | 55 | 54 | 30 | .5 | 1.0 | 5.0 |
| 18 | 32 | 248 | 215 | 166 | 80 | 48 | *272 | 70 | 30 | .3 | .8 | 3.4 |
| 19 | 29 | 221 | 185 | 221 | 85 | 50 | 139 | 64 | 21 | .3 | .5 | 2.4 |
| 20 | 26 | 205 | 159 | 188 | 75 | 54 | 84 | 42 | 15 | .2 | .6 | 3.7 |
| 21 | 24 | 238 | 140 | 155 | 70 | 58 | 61 | 31 | 12 | .2 | 3.4 | 2.9 |
| 22 | 23 | 380 | 121 | 135 | 70 | 58 | 51 | 36 | 9.2 | .2 | 3.7 | 1.9 |
| 23 | 22 | 274 | 110 | 120 | 65 | 58 | 44 | 650 | 7.7 | 2.4 | 2.9 | 1.4 |
| 24 | 25 | 298 | 105 | 110 | 60 | 58 | 39 | 529 | 6.6 | 4.0 | 1.9 | .9 |
| 25 | 43 | 556 | 105 | 105 | 65 | 60 | 34 | 177 | 6.0 | 2.1 | 1.2 | .7 |
| 26 | 83 | 460 | 113 | 105 | 65 | 62 | 31 | 78 | 4.6 | 1.7 | .6 | .6 |
| 27 | 324 | 478 | 196 | 120 | 60 | 68 | 28 | 46 | 3.7 | 12 | .4 | .4 |
| 28 | 350 | 773 | 595 | 199 | 58 | 252 | 28 | 33 | 2.9 | 7.4 | .3 | .3 |
| 29 | 166 | 532 | 1,050 | 380 | 55 | 2,060 | 30 | 25 | 2.6 | 4.0 | .2 | .3 |
| 30 | 91 | 395 | 593 | 405 | ----- | 5,090 | 29 | 26 | 1.9 | 2.6 | .1 | .6 |
| 31 | 91 | ----- | 324 | 355 | ----- | 2,810 | ----- | 43 | ----- | 1.9 | .1 | ----- |
| Total | 6,317 | 11,030 | 16,724 | 9,890 | 7,364 | 11,562 | 5,115 | 7,982 | 511.7 | 60.1 | 68.6 | 187.4 |
| Mean | 204 | 368 | 539 | 319 | 254 | 373 | 170 | 257 | 17.1 | 1.94 | 2.21 | 6.25 |
| Cfsm | 1.73 | 3.12 | 4.57 | 2.70 | 2.15 | 3.16 | 1.44 | 2.18 | 0.145 | 0.015 | 0.019 | 0.053 |
| In. | 1.99 | 3.48 | 5.27 | 3.11 | 2.32 | 3.64 | 1.61 | 2.51 | 0.16 | 0.02 | 0.02 | 0.06 |

Calendar year 1959: Max 7,500 Min 0 Mean 227 Cfsm 1.92 In. 26.07
Water year 1959-60: Max 5,090 Min 0.1 Mean 210 Cfsm 1.78 In. 24.19

Peak discharge (base, 2,600 cfs).--Oct. 7 (10 a.m.) 4,650 cfs (6.89 ft); Dec. 13 (3:30 a.m.) 5,080 cfs (7.20 ft); Mar. 30 (4 a.m.) 7,110 cfs (8.47 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Jan. 6-13, 21-27, Feb. 16 to Mar. 28.

2130. Conneaut Creek at Amboy, Ohio

Location.--Lat 41°55'34", long 80°36'18", on right bank at downstream side of highway bridge, half a mile east of Amboy, Ashtabula County, 3 miles southwest of Conneaut, and 6½ miles upstream from mouth.

Drainage area.--178 sq mi.

Records available.--July 1922 to December 1935, March 1950 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 605 ft (from topographic map). Prior to Aug. 17, 1924, chain gage at same site and datum.

Average discharge.--23 years, 247 cfs.

Extremes.--Maximum discharge during year, 7,980 cfs Mar. 30 (gage height, 8.90 ft); minimum, 5.2 cfs Sept. 11 (gage height, 0.97 ft).
1922-35, 1950-60: Maximum discharge, 17,000 cfs Jan. 22, 1959 (gage height, 11.70 ft); maximum gage height, 12.94 ft Mar. 4, 1934 (ice jam); minimum discharge, 0.2 cfs July 31, Aug. 1, 1933, Aug. 1, 2, 1934.

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

Revisions (water years).--WSP 714: 1926. WSP 784: 1933. WSP 1437: 1923-25(M), 1926-30, 1931-32(M), 1933, 1935(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11

Feb. 12 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.4 | 34 | 3.5 | 540 | 0.9 | 2.4 | 3.0 | 365 |
| 1.6 | 52 | 4.0 | 815 | 1.0 | 6.4 | 3.5 | 620 |
| 1.9 | 94 | 5.0 | 1,580 | 1.2 | 21 | 4.0 | 950 |
| 2.2 | 148 | 6.5 | 3,250 | 1.4 | 40 | 5.0 | 1,790 |
| 2.5 | 211 | 8.0 | 5,800 | 1.7 | 76 | 6.0 | 2,950 |
| 3.0 | 346 | | | 2.0 | 118 | 8.0 | 6,150 |
| | | | | 2.5 | 220 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 1,280 | 998 | 434 | 286 | 423 | 105 | 2,040 | 120 | 114 | 19 | 12 | 16 |
| 2 | 2,550 | 878 | 390 | 222 | 315 | 100 | 778 | 130 | 115 | 19 | 17 | 16 |
| 3 | 552 | 390 | 446 | 956 | 183 | 95 | 596 | 109 | 81 | 18 | 18 | 11 |
| 4 | 191 | 264 | 458 | 1,430 | 144 | 100 | 512 | 80 | 61 | 18 | 18 | 12 |
| 5 | 129 | 646 | 540 | 443 | 168 | 105 | 428 | 62 | 50 | 15 | 16 | 15 |
| 6 | 229 | 999 | 950 | 229 | 844 | 100 | 327 | 50 | 41 | 13 | 18 | 11 |
| 7 | *2,960 | 572 | 1,310 | 162 | 1,600 | 95 | 373 | 53 | 37 | *12 | 21 | 8.2 |
| 8 | 3,190 | 291 | *782 | 125 | 620 | 90 | 485 | 550 | *34 | 11 | *18 | 7.0 |
| 9 | 522 | 185 | 518 | 105 | *397 | 85 | 596 | *2,450 | 31 | 10 | 49 | 6.0 |
| 10 | 386 | *138 | 423 | 105 | 899 | 90 | 524 | 2,060 | 29 | 11 | 37 | 6.0 |
| 11 | 200 | 116 | 366 | 125 | 2,430 | 85 | 490 | 1,380 | 27 | 9.4 | 24 | 6.0 |
| 12 | 122 | 158 | 1,760 | *227 | 1,600 | 85 | 432 | 838 | 30 | 9.4 | 18 | *5.6 |
| 13 | 88 | 343 | 4,940 | 1,590 | 490 | 85 | 303 | 506 | 35 | 10 | 14 | a6.0 |
| 14 | 81 | 885 | 2,070 | 2,170 | 315 | 85 | 199 | 318 | 65 | 13 | 12 | a150 |
| 15 | 86 | 1,210 | 536 | 798 | 190 | *90 | 167 | 260 | 80 | 15 | 12 | a70 |
| 16 | 78 | 668 | 376 | 635 | 175 | 90 | 373 | 197 | 67 | 16 | 12 | a40 |
| 17 | 62 | 362 | 356 | 359 | 160 | 95 | 548 | 137 | 52 | 15 | 10 | a25 |
| 18 | 50 | 337 | 289 | 252 | 165 | 100 | *389 | 130 | 48 | 13 | 9.4 | a19 |
| 19 | 44 | 267 | 227 | 292 | 155 | 105 | 265 | 184 | 38 | 11 | 10 | a16 |
| 20 | 39 | 234 | 181 | 318 | 145 | 110 | 182 | 135 | 34 | 12 | 11 | a14 |
| 21 | 35 | 242 | 115 | 215 | 135 | 120 | 139 | 100 | 29 | 10 | 15 | 12 |
| 22 | 34 | 401 | 95 | 180 | 140 | 120 | 118 | 104 | 25 | 10 | 11 | 10 |
| 23 | 34 | 401 | 84 | 145 | 130 | 120 | 106 | 534 | 23 | 26 | 10 | 9.4 |
| 24 | 39 | 334 | 80 | 135 | 125 | 125 | 92 | 1,110 | 22 | 23 | 8.8 | 8.8 |
| 25 | 206 | 739 | 80 | 130 | 135 | 120 | 82 | 440 | 20 | 26 | 7.6 | 8.2 |
| 26 | 344 | 770 | 101 | 130 | 140 | 130 | 76 | 193 | 19 | 22 | 6.4 | 7.6 |
| 27 | 726 | 567 | 185 | 180 | 135 | 140 | 72 | 120 | 18 | 40 | 7.0 | 7.6 |
| 28 | 650 | 1,160 | 606 | 269 | 130 | 710 | 70 | 88 | 18 | 21 | 7.0 | 7.6 |
| 29 | 327 | 867 | 1,590 | 544 | 120 | 2,220 | 62 | 71 | 18 | 21 | 8.8 | 7.0 |
| 30 | 183 | 572 | 910 | 600 | ----- | 5,480 | 67 | 75 | 18 | 18 | 10 | 6.2 |
| 31 | 172 | ----- | 454 | 488 | ----- | 6,150 | ----- | 99 | ----- | 13 | 9.4 | ----- |
| Total | 15,559 | 15,984 | 21,452 | 13,783 | 12,608 | 17,332 | 10,891 | 12,683 | 1,279 | 499.8 | 457.4 | 546.2 |
| Mean | 502 | 533 | 692 | 445 | 435 | 559 | 363 | 409 | 42.6 | 16.1 | 14.8 | 18.2 |
| Cfs/m | 2.82 | 2.99 | 3.89 | 2.50 | 2.44 | 3.14 | 2.04 | 2.30 | 0.239 | 0.090 | 0.085 | 0.102 |
| In. | 3.25 | 3.54 | 4.48 | 2.88 | 2.63 | 3.62 | 2.28 | 2.65 | 0.27 | 0.10 | 0.10 | 0.11 |

Calendar year 1959: Max 9,800 Min 6.2 Mean 371 Cfs/m 2.08 In. 28.31
Water year 1959-60: Max 6,150 Min 5.6 Mean 336 Cfs/m 1.89 In. 25.71

Peak discharge (base, 2,900 cfs).--Oct. 2 (9:30 a.m.) 3,080 cfs (6.38 ft); Oct. 8 (1:30 a.m.) 5,610 cfs (7.90 ft); Dec. 13 (4 p.m.) 6,060 cfs (8.13 ft); Feb. 11 (9 p.m.) 2,930 cfs (6.27 ft); Mar. 30 (9 p.m.) 7,980 cfs (8.90 ft); May 9 (8 p.m.) 3,090 cfs (6.10 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for Grand River near Madison.

Note.--Stage-discharge relation affected by ice Dec. 21-25, Jan. 7-12, 21-27, Feb. 16 to Mar. 27.

2135. Cattaraugus Creek at Gowanda, N. Y.

Location.--Lat 42°27'50", long 78°56'10", on right bank at Gowanda, Erie County, 380 ft downstream from highway bridge, 600 ft downstream from powerhouse of Niagara Mohawk Power Corp., and 4.2 miles downstream from South Branch.

Drainage area.--428 sq mi.

Records available.--November 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 738.74 ft above mean sea level (village of Gowanda bench mark).

Average discharge.--20 years (1940-60), 730 cfs.

Extremes.--Maximum discharge during year, 19,700 cfs Mar. 30 (gage height, 10.86 ft); minimum, 37 cfs Sept. 11 (gage height, 1.38 ft); minimum daily, 67 cfs Sept. 10, 11.
1939-60: Maximum discharge, 35,900 cfs Mar. 17, 1942, from rating curve extended above 6,500 cfs by logarithmic plotting; maximum gage height, 14.14 ft Mar. 7, 1956; minimum discharge, about 6 cfs Aug. 21, 1941; minimum gage height, 0.90 ft Oct. 26, 1951; minimum daily discharge, 52 cfs Sept. 13, 1945, Aug. 1, 1955.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated by several industrial plants above station. Diurnal fluctuation at low and medium flow caused by powerplant above station.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1-24, June 16 to Sept. 30 | | | | Oct. 25 to June 15 | | | |
|-----------------------------------|-----|-----|-------|--------------------|-------|------|--------|
| 1.5 | 54 | 2.7 | 440 | 2.0 | 195 | 5.0 | 2,990 |
| 1.7 | 88 | 3.0 | 640 | 2.5 | 405 | 6.0 | 4,890 |
| 1.9 | 130 | 3.5 | 1,050 | 3.0 | 700 | 8.0 | 9,840 |
| 2.1 | 180 | 4.0 | 1,590 | 4.0 | 1,590 | 10.0 | 16,300 |
| 2.4 | 285 | 5.0 | 2,990 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 883 | 2,430 | 792 | 700 | 616 | 560 | 5,070 | 482 | 596 | 183 | 117 | 90 |
| 2 | 367 | 1,450 | 785 | 660 | 490 | 540 | 3,650 | 455 | 435 | 192 | 110 | 98 |
| 3 | 205 | 984 | 893 | 2,790 | 430 | 490 | 4,930 | 420 | 415 | 180 | 1,130 | 88 |
| 4 | 164 | 830 | 869 | 1,440 | 460 | *440 | 5,560 | 400 | 360 | 177 | 346 | 84 |
| 5 | 192 | *1,150 | 800 | 900 | 552 | 520 | 3,460 | 380 | 314 | 164 | 467 | 88 |
| 6 | 906 | 1,140 | 1,030 | *700 | 2,040 | 500 | *1,760 | 355 | 293 | 154 | 242 | 84 |
| 7 | *3,830 | 845 | 1,830 | 780 | 1,520 | 480 | 1,540 | 285 | 285 | 149 | 186 | *81 |
| 8 | 1,040 | 648 | 1,130 | 756 | 980 | 480 | 1,380 | 405 | 276 | 144 | 162 | 79 |
| 9 | 605 | 540 | *1,080 | 600 | 984 | 440 | 1,390 | 871 | 264 | 137 | 149 | 79 |
| 10 | 380 | 477 | 976 | 620 | 2,370 | 450 | 1,260 | 946 | 257 | 135 | *135 | 67 |
| 11 | 277 | 430 | 885 | 640 | *1,760 | 410 | 1,180 | 661 | 245 | 159 | 126 | 67 |
| 12 | 277 | 558 | 4,750 | 560 | 2,380 | 400 | 1,350 | 590 | 372 | 140 | 119 | 84 |
| 13 | 261 | 546 | 6,670 | 7,120 | 1,350 | 400 | 1,320 | 808 | 504 | 132 | 108 | 100 |
| 14 | 231 | 753 | 1,960 | 2,860 | 960 | 400 | 1,130 | 687 | 649 | 152 | 104 | 81 |
| 15 | 214 | 1,140 | 1,320 | 2,210 | 800 | 400 | 1,630 | 564 | 2,660 | 152 | 115 | 81 |
| 16 | 192 | 694 | 1,940 | 1,870 | 968 | 380 | 2,170 | 540 | 1,120 | 140 | 123 | 84 |
| 17 | 180 | 742 | 1,930 | 1,180 | 917 | 390 | 1,400 | 482 | 563 | 132 | 115 | 83 |
| 18 | 175 | 700 | 1,400 | 960 | 861 | 410 | 1,270 | 602 | 458 | 126 | 106 | 79 |
| 19 | 167 | 602 | 1,080 | 880 | 721 | 400 | 1,030 | 564 | 375 | 132 | 102 | 83 |
| 20 | 154 | 558 | 830 | 720 | 470 | 410 | 861 | 516 | 312 | 135 | 112 | 130 |
| 21 | 144 | 583 | 660 | 700 | 742 | 410 | 770 | 590 | 273 | 128 | 100 | 115 |
| 22 | 140 | 742 | 580 | 680 | 760 | 410 | 808 | 635 | 253 | 128 | 104 | 98 |
| 23 | 142 | 648 | 470 | 660 | 720 | 380 | 714 | 694 | 333 | 159 | 102 | 90 |
| 24 | 2,470 | 950 | 560 | 640 | 680 | 380 | 642 | 838 | 452 | 140 | 104 | 88 |
| 25 | 1,600 | 1,490 | 600 | 580 | 620 | 360 | 609 | 749 | 345 | 126 | 88 | 79 |
| 26 | 959 | 993 | 590 | 600 | 660 | 360 | 576 | 552 | 249 | 117 | 83 | 74 |
| 27 | 909 | 1,260 | 1,040 | 602 | 580 | 400 | 628 | *460 | 210 | 245 | 84 | 75 |
| 28 | 674 | 1,570 | 1,900 | 749 | 580 | 1,260 | 576 | 415 | 292 | 154 | 90 | 77 |
| 29 | 494 | 1,160 | 2,230 | 792 | 580 | 4,890 | 510 | 380 | 201 | 126 | *79 | 81 |
| 30 | 400 | 909 | 1,180 | 700 | ----- | 14,900 | 482 | 380 | *198 | 119 | 96 | 88 |
| 31 | 1,010 | ----- | 885 | 620 | ----- | 11,100 | ----- | 510 | ----- | 121 | 108 | ----- |
| Total | 19,642 | 27,522 | 43,545 | 36,269 | 33,531 | 43,750 | 49,656 | 17,268 | 13,459 | 4,578 | 5,214 | 2,575 |
| Mean | 634 | 917 | 1,405 | 1,170 | 1,156 | 1,411 | 1,655 | 557 | 449 | 148 | 168 | 85.8 |
| Cfs/m | 1.48 | 2.14 | 3.28 | 2.73 | 2.70 | 3.30 | 3.87 | 1.30 | 1.05 | 0.346 | 0.392 | 0.200 |
| In. | 1.71 | 2.39 | 3.78 | 3.15 | 2.91 | 3.80 | 4.31 | 1.50 | 1.17 | 0.40 | 0.45 | 0.22 |

Calendar year 1959: Max 15,300 Min 61 Mean 865 Cfs/m 2.02 In. 27.41

Water year 1959-60: Max 14,900 Min 67 Mean 812 Cfs/m 1.90 In. 25.79

Peak discharge (base, 15,000 cfs).--Mar. 30 (5:15 p.m.) 19,700 cfs (10.86 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21-25, Jan. 1, 2, 5-7, 9-12, 18-26, 31, Feb. 2-4, 8, 13-15, 20, Feb. 22 to Mar. 1, Mar. 3-27.

2145. Buffalo Creek at Gardenville, N. Y.

Location.--Lat 42°51'15", long 78°45'30", on left bank in Gardenville, Erie County, 700 ft downstream from bridge on Union Road and 2 miles upstream from Cayuga Creek.

Drainage area.--145 sq mi.

Records available.--October 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 604.04 ft above mean sea level, unadjusted.

Average discharge.--22 years, 193 cfs.

Extremes.--Maximum discharge during year, 7,530 cfs Mar. 30, from rating curve extended above 3,200 cfs on basis of slope-area measurement at 7.07 ft; maximum gage height, 7.45 ft Mar. 30 (ice jam); minimum discharge, 3.8 cfs Sept. 11 (gage height, 0.98 ft, backwater from aquatic vegetation and/or debris present).

1938-60: Maximum discharge, 13,000 cfs Mar. 1, 1955, Mar. 7, 1956, from rating curve extended above 3,200 cfs on basis of slope-area measurement at gage height 7.07 ft; maximum gage height, 11.90 ft Mar. 9, 1942 (ice jam); minimum discharge, 0.7 cfs Aug. 22, 24, 25, 1941.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation at low flow caused by mill 3.2 miles above station.

Revisions (water years).--WSP 1337: 1939-52.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|------|-----|-----|-------|
| 1.2 | 20 | 3.0 | 1,010 | 0.97 | 4.4 | 1.7 | 179 |
| 1.3 | 35 | 3.5 | 1,440 | 1.0 | 6.4 | 2.2 | 460 |
| 1.5 | 83 | 4.0 | 1,940 | 1.1 | 17 | 3.0 | 1,030 |
| 1.8 | 195 | 5.0 | 3,260 | 1.2 | 32 | 4.0 | 2,030 |
| 2.1 | 350 | 6.0 | 4,960 | 1.4 | 76 | 5.0 | 3,340 |
| 2.5 | 620 | 7.0 | 6,950 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 79 | 648 | 165 | 140 | 110 | 106 | 1,330 | 74 | 132 | 27 | 9.8 | *8.0 |
| 2 | 64 | 328 | 187 | 135 | 90 | 104 | 1,310 | 71 | 76 | 35 | 9.8 | 7.2 |
| 3 | 30 | 158 | 290 | 1,020 | 84 | 92 | 1,270 | 66 | 51 | 33 | *31 | 5.7 |
| 4 | 22 | 133 | 302 | 466 | 74 | 80 | 1,450 | 58 | 37 | 28 | 73 | 5.0 |
| 5 | 31 | 275 | 255 | 200 | 160 | 88 | 628 | 54 | 33 | 28 | 35 | 5.0 |
| 6 | 196 | 230 | 326 | 160 | 800 | 84 | 402 | 49 | 28 | 24 | 22 | 5.0 |
| 7 | 900 | 131 | 727 | 165 | 674 | 82 | 377 | 45 | 30 | 22 | 18 | 5.7 |
| 8 | 254 | 93 | 300 | 155 | 320 | 82 | 300 | 49 | 24 | 19 | 17 | 5.0 |
| 9 | 127 | 78 | 280 | 130 | 260 | 80 | 294 | 151 | 22 | 15 | 13 | 5.7 |
| 10 | 86 | 70 | 250 | 145 | 908 | 80 | 256 | 225 | 18 | 14 | 32 | 4.4 |
| 11 | 56 | 67 | 225 | 125 | 3,000 | 78 | 230 | 132 | 17 | 13 | 15 | 4.4 |
| 12 | 43 | 152 | 2,020 | 140 | 590 | 76 | 235 | 105 | 216 | 13 | 11 | 6.4 |
| 13 | 35 | 149 | 2,100 | 2,000 | 280 | 74 | 225 | 179 | 171 | *13 | 8.9 | 7.2 |
| 14 | 31 | 234 | 466 | 820 | 230 | 74 | *184 | 136 | 74 | 15 | 8.9 | 6.4 |
| 15 | 30 | 419 | 296 | 800 | 190 | *72 | 272 | 93 | 814 | 15 | 15 | 6.4 |
| 16 | 28 | 166 | 629 | 560 | 230 | 72 | 607 | 88 | 267 | 19 | 22 | *9.8 |
| 17 | 25 | 185 | 557 | 260 | 190 | 76 | 328 | 88 | 115 | 14 | 22 | 9.8 |
| 18 | 24 | 80 | *332 | 190 | *180 | 76 | 267 | 143 | 88 | 13 | 15 | 8.9 |
| 19 | 24 | 82 | 240 | 170 | 140 | 72 | 188 | 125 | 79 | 12 | 12 | 8.9 |
| 20 | 22 | *84 | 125 | *130 | 110 | 76 | 147 | *93 | 56 | 11 | 9.8 | 8.0 |
| 21 | 21 | 90 | 100 | 125 | 140 | 72 | 139 | 147 | 43 | 9.8 | 11 | 9.8 |
| 22 | *20 | 240 | 90 | 120 | 145 | 70 | 202 | 105 | 37 | 11 | 11 | 17 |
| 23 | 21 | 179 | 86 | 116 | 140 | 66 | 143 | 108 | 33 | 11 | 12 | 12 |
| 24 | 367 | 191 | 125 | 110 | 125 | 64 | 119 | 112 | 45 | 18 | 12 | 9.8 |
| 25 | 440 | 404 | 130 | 104 | 120 | 62 | 119 | 112 | 49 | 15 | 11 | 8.9 |
| 26 | 162 | 199 | 125 | 110 | 122 | 62 | 115 | 76 | 39 | 13 | 8.9 | 7.2 |
| 27 | 273 | 164 | 350 | 116 | 118 | 110 | 112 | 61 | *32 | 24 | 7.2 | 7.2 |
| 28 | 208 | 356 | 560 | 140 | 108 | 400 | 102 | 49 | 27 | 28 | 6.4 | 6.4 |
| 29 | 113 | 220 | 500 | 145 | 110 | 1,800 | 85 | 43 | 27 | 22 | 5.7 | 6.4 |
| 30 | 80 | 150 | 270 | 135 | ----- | 5,000 | 76 | 45 | 27 | 14 | 5.7 | 8.0 |
| 31 | 141 | ----- | 175 | 114 | ----- | 3,130 | ----- | 93 | ----- | 12 | 6.4 | ----- |
| Total | 3,953 | 5,955 | 12,583 | 9,246 | 9,748 | 12,460 | 11,512 | 2,975 | 2,707 | 560.8 | 497.5 | 225.6 |
| Mean | 128 | 199 | 406 | 295 | 336 | 402 | 384 | 96.0 | 90.2 | 18.1 | 16.0 | 7.52 |
| Cfs/m | 0.883 | 1.37 | 2.80 | 2.03 | 2.52 | 2.77 | 2.65 | 0.662 | 0.622 | 0.125 | 0.110 | 0.050 |
| In. | 1.01 | 1.53 | 3.23 | 2.34 | 2.50 | 3.20 | 2.95 | 0.76 | 0.69 | 0.14 | 0.13 | 0.06 |

Calendar year 1959: Max 5,400 Min 5.3 Mean 232 Cfs/m 1.60 In. 21.71
Water year 1959-60: Max 5,000 Min 4.4 Mean 198 Cfs/m 1.37 In. 18.54

Peak discharge (base, 6,000 cfs).--Mar. 30 (9:15 p.m.) 7,530 cfs (7.43 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-22, Nov. 29 to Dec. 1, Dec. 8-11, Dec. 20 to Jan. 3, Jan. 5 to Feb. 6, Feb. 8, 9, Feb. 13 to Mar. 30 (no gage-height record Jan. 17-19, Feb. 24 to Mar. 7, Mar. 11).

2150. Cayuga Creek near Lancaster, N. Y.

Location.--Lat 42°53'20", long 78°38'40", on right bank just upstream from low flat-crested dam in Como Lake Park, 700 ft downstream from bridge on Bowen Road, 800 ft downstream from Little Buffalo Creek, and 2 miles southeast of Lancaster, Erie County.

Drainage area.--93.3 sq mi.

Records available.--September 1938 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 672.80 ft above mean sea level, unadjusted.

Average discharge.--22 years, 128 cfs.

Extremes.--Maximum discharge during year, 7,070 cfs Mar. 30; maximum gage height, 12.58 ft Mar. 30 (ice jam); minimum discharge, 0.2 cfs Sept. 10 (gage height, 2.71 ft).
1938-60: Maximum discharge, 8,750 cfs Jan. 22, 1959; maximum gage height, that of Mar. 30, 1960; practically no flow part of Aug. 8, 9, 1939, when permanent stoplogs were installed in dam.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1437: 1955.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|------|-----|-----|-----|
| 3.1 | 5.4 | 5.0 | 463 | 2.73 | 0.3 | 3.0 | 3.4 |
| 3.3 | 10 | 5.5 | 868 | 2.8 | .7 | 3.1 | 5.4 |
| 3.7 | 21 | 6.0 | 1,450 | 2.9 | 1.8 | | |
| 4.1 | 45 | 7.0 | 3,120 | | | | |
| 4.5 | 170 | 8.0 | 5,050 | | | | |

Note.--Same as preceding table above 3.1 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1 | 33 | 463 | 98 | 106 | 76 | 68 | 909 | 46 | 102 | *7.2 | 1.5 | 0.8 |
| 2 | 25 | 205 | 118 | 106 | 54 | 68 | 722 | 43 | 52 | 10 | 1.3 | *.8 |
| 3 | 12 | 98 | 210 | 973 | 52 | 62 | 868 | 39 | 35 | 9.6 | 7.2 | .6 |
| 4 | 7.2 | 86 | 264 | 300 | 46 | 66 | 1,020 | 33 | 24 | 8.4 | 19 | .6 |
| 5 | 11 | 205 | 242 | 130 | 58 | 66 | 384 | 29 | 21 | 7.6 | 11 | .7 |
| 6 | 222 | 126 | 293 | 90 | 500 | 64 | 242 | 26 | 17 | 6.9 | 6.3 | .6 |
| 7 | 569 | 69 | 498 | 94 | 400 | 62 | 210 | 24 | 13 | 5.8 | 4.6 | .3 |
| 8 | 154 | 54 | 185 | 90 | 250 | 60 | 170 | 29 | 13 | 5.6 | 4.0 | .3 |
| 9 | 81 | 48 | 220 | 80 | 200 | 60 | 154 | 98 | 12 | 5.1 | 3.6 | .3 |
| 10 | 56 | 43 | 210 | 84 | 500 | 60 | 138 | 158 | 11 | 3.4 | 16 | .3 |
| 11 | 33 | 39 | 175 | 70 | 1,850 | 58 | 118 | 84 | 10 | 3.8 | 9.2 | .3 |
| 12 | 21 | 109 | 1,610 | 76 | 500 | 58 | 126 | 81 | 13 | 3.2 | 4.8 | .6 |
| 13 | 17 | 98 | 1,690 | 300 | 58 | 118 | 154 | 21 | *3.2 | 3.4 | .9 | .9 |
| 14 | 14 | 170 | 334 | 780 | 200 | 58 | *94 | 102 | 21 | 5.2 | 2.7 | 1.0 |
| 15 | 13 | 283 | 210 | 780 | 145 | *56 | 161 | 63 | 206 | 4.4 | *6.1 | .6 |
| 16 | 12 | 110 | 573 | 480 | 165 | 56 | 275 | 57 | 84 | 3.0 | 11 | 1.0 |
| 17 | 11 | 122 | 416 | 210 | 130 | 58 | 175 | 50 | 43 | 2.5 | 6.3 | 1.3 |
| 18 | 10 | 60 | *236 | 135 | 125 | 58 | 154 | 69 | 33 | 2.7 | 5.0 | 1.2 |
| 19 | 9.1 | 66 | 162 | *120 | *100 | 56 | 94 | *54 | 28 | 2.4 | 3.2 | 1.0 |
| 20 | 8.6 | 70 | 87 | 94 | 70 | 58 | 75 | 50 | 21 | 2.2 | 3.6 | 1.0 |
| 21 | *7.8 | *84 | 66 | 90 | 90 | 56 | 69 | 69 | 17 | 1.9 | 4.8 | 1.2 |
| 22 | 7.4 | 205 | 56 | 86 | 94 | 54 | 162 | 56 | 14 | 1.9 | 5.8 | 1.3 |
| 23 | 7.2 | 122 | 58 | 82 | 92 | 50 | 98 | 58 | 12 | 2.5 | 5.2 | 1.2 |
| 24 | 162 | 126 | 102 | 78 | 80 | 48 | 69 | 78 | 17 | 3.0 | 3.8 | 1.1 |
| 25 | 251 | 264 | 106 | 74 | 76 | 45 | 72 | 75 | 17 | *2.2 | 2.7 | 1.2 |
| 26 | 90 | 114 | 102 | 78 | 76 | 45 | 75 | 51 | 13 | 2.0 | 2.2 | 1.0 |
| 27 | 146 | 87 | 270 | 82 | 74 | 70 | 75 | 40 | 9.4 | 7.8 | 1.9 | .7 |
| 28 | 138 | 175 | 520 | 96 | 66 | 200 | 63 | 29 | 8.4 | 4.8 | 2.2 | .6 |
| 29 | 72 | 134 | 328 | 100 | 70 | 700 | 54 | 24 | 7.8 | 4.0 | 2.4 | .7 |
| 30 | 51 | 86 | 200 | 94 | ----- | 3,500 | 50 | 25 | 8.4 | 2.7 | 1.4 | .8 |
| 31 | 111 | ----- | 142 | 80 | ----- | 2,410 | ----- | 46 | ----- | 2.0 | 1.0 | ----- |
| Total | 2,362.3 | 3,921 | 9,781 | 7,438 | 6,439 | 8,388 | 6,994 | 1,820 | 904.0 | 137.0 | 163.2 | 24.0 |
| Mean | 76.2 | 131 | 316 | 240 | 222 | 271 | 233 | 58.7 | 30.1 | 4.42 | 5.26 | 0.80 |
| Cfs/m | 0.817 | 1.40 | 3.39 | 2.57 | 2.38 | 2.90 | 2.50 | 0.629 | 0.323 | 0.047 | 0.056 | 0.0086 |
| In. | 0.34 | 1.56 | 3.90 | 2.96 | 2.57 | 3.34 | 2.79 | 0.73 | 0.36 | 0.05 | 0.07 | 0.01 |

Calendar year 1959: Max 4,040 Min 0.4 Mean 161 Cfs/m 1.73 In. 23.47

Water year 1959-60: Max 3,500 Min 0.3 Mean 132 Cfs/m 1.41 In. 19.28

Peak discharge (base, 3,300 cfs).--Dec. 12 (11:15 p.m.) 4,000 cfs (7.47 ft); Feb. 10 (9:45 p.m.) 3,500 cfs; Mar. 30 (7:30 p.m.) 7,070 cfs (9.10 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18-20, 30, Dec. 8-10, 21-24, 27, Jan. 1, Jan. 4 to Mar. 30.

2155. Cazenovia Creek at Ebenezer, N. Y.

Location.--Lat 42°49'45", long 78°46'40", on right bank 30 ft upstream from highway bridge on Ridge Road in Ebenezer, Erie County, 4.4 miles upstream from mouth, and 5 miles southeast of Buffalo.

Drainage area.--136 sq mi.

Records available.--June 1940 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 604.86 ft above mean sea level, unadjusted. Prior to Apr. 4, 1955, at datum 2 ft higher than present datum. Apr. 4 to Oct. 12, 1955, wire-weight gage at temporary site 1.3 miles downstream at different datum, during period of construction of highway bridge.

Average discharge.--20 years, 222 cfs.

Extremes.--Maximum discharge during year, 7,160 cfs Mar. 30 (gage height, 10.82 ft), from rating curve extended above 5,200 cfs by logarithmic plotting; minimum, 4.4 cfs Sept. 6 (gage height, 1.94 ft, backwater from aquatic vegetation).

1940-60: Maximum discharge, 13,500 cfs Mar. 1, 1955 (gage height, 15.82 ft, present datum), from rating curve extended above 7,700 cfs by logarithmic plotting; minimum, 2.6 cfs Nov. 7, 1953; minimum gage height, 1.94 ft Sept. 8, 1959, Sept. 6, 1960.

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation or debris, which are fair.

Rating table, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.9 | 3.8 | 2.7 | 107 |
| 2.0 | 7.4 | 3.2 | 260 |
| 2.1 | 12 | 4.0 | 670 |
| 2.2 | 22 | 6.0 | 2,080 |
| 2.3 | 33 | 8.0 | 3,870 |
| 2.5 | 64 | 10.0 | 6,090 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 113 | 834 | 175 | 190 | 135 | 110 | 1,510 | 93 | 176 | 28 | 11 | *8.8 |
| 2 | 61 | 340 | 180 | 175 | 114 | 110 | 1,050 | 89 | 102 | 44 | 12 | 7.8 |
| 3 | 32 | 183 | 276 | 1,630 | 110 | 100 | 1,650 | 80 | 76 | 36 | 49 | 6.2 |
| 4 | 23 | 172 | 276 | 551 | 100 | 88 | 1,900 | 76 | 61 | 30 | *37 | 6.2 |
| 5 | 32 | 384 | 242 | 270 | 210 | 96 | 726 | 70 | 50 | 28 | 22 | 6.2 |
| 6 | 316 | 284 | 322 | 190 | 1,160 | 92 | 430 | 66 | 43 | 25 | 15 | 8.3 |
| 7 | 1,350 | 181 | 748 | 200 | 687 | 90 | 390 | 64 | 37 | 21 | 13 | 7.0 |
| 8 | 304 | 120 | 355 | 185 | 340 | 90 | 327 | 72 | 31 | 15 | 12 | 6.6 |
| 9 | 161 | 102 | 280 | 160 | 280 | 86 | 509 | 248 | 29 | 18 | 11 | 6.2 |
| 10 | 110 | 89 | 240 | 170 | 1,000 | 88 | 260 | 336 | 26 | 15 | 39 | 6.2 |
| 11 | 70 | 82 | 220 | 150 | 3,100 | 82 | 246 | 218 | 23 | 14 | 13 | 5.8 |
| 12 | 50 | 235 | 2,170 | 165 | 828 | 80 | 318 | 173 | 116 | 14 | 12 | 6.6 |
| 13 | 43 | 195 | 2,430 | 330 | 80 | 327 | 260 | 171 | *13 | 11 | | 6.6 |
| 14 | 39 | 346 | 528 | 880 | 250 | 80 | *232 | 195 | 100 | 29 | 9.5 | *6.2 |
| 15 | 33 | 521 | 330 | 976 | 210 | *76 | 370 | 136 | 1,300 | 23 | 18 | 8.8 |
| 16 | 31 | 212 | 676 | 686 | 250 | 76 | 607 | 147 | 316 | 18 | 23 | 11 |
| 17 | 28 | 245 | 622 | 314 | 210 | 80 | 327 | 115 | 150 | 14 | 17 | 8.8 |
| 18 | 26 | 215 | *395 | 240 | *190 | 82 | 280 | 155 | 117 | 14 | 12 | 8.8 |
| 19 | 23 | *140 | 280 | 215 | 160 | 78 | 212 | 112 | 96 | 12 | 9.8 | 7.8 |
| 20 | 21 | 135 | 195 | *175 | 130 | 82 | 170 | *130 | 72 | 11 | 9.3 | 7.4 |
| 21 | 21 | 135 | 135 | 165 | 155 | 78 | 161 | 167 | 57 | 11 | 9.8 | 8.8 |
| 22 | *19 | 236 | 124 | 155 | 160 | 76 | 218 | 120 | 47 | 11 | 11 | 17 |
| 23 | 18 | 202 | 110 | 150 | 155 | 70 | 167 | 130 | 43 | 13 | 12 | 11 |
| 24 | 994 | 228 | 145 | 145 | 135 | 68 | 136 | 141 | 61 | 16 | 14 | 8.3 |
| 25 | 614 | 498 | 150 | 130 | 130 | 66 | 144 | 128 | 59 | 13 | 11 | 7.8 |
| 26 | 232 | 239 | 145 | 135 | 135 | 66 | 136 | 98 | 40 | 11 | 9.3 | 7.0 |
| 27 | 430 | 238 | 440 | 140 | 125 | 120 | 130 | 78 | *32 | 25 | 8.8 | 7.0 |
| 28 | 268 | 425 | 658 | 175 | 114 | 450 | 115 | 66 | 29 | 37 | 7.8 | 7.0 |
| 29 | 153 | 272 | 778 | 180 | 116 | 2,240 | 100 | 59 | 30 | 20 | 7.8 | 7.8 |
| 30 | 112 | 228 | 336 | 160 | ----- | 5,620 | 96 | 72 | 29 | 14 | 7.8 | 8.8 |
| 31 | 225 | ----- | 240 | 140 | ----- | 3,260 | ----- | 153 | ----- | 12 | 7.8 | ----- |
| Total | 5,952 | 7,698 | 14,193 | 11,697 | 10,819 | 13,858 | 13,044 | 4,047 | 3,519 | 606 | 462.5 | 237.8 |
| Mean | 192 | 257 | 458 | 377 | 373 | 447 | 435 | 131 | 117 | 19.5 | 14.9 | 7.93 |
| Cfsm | 1.41 | 1.89 | 3.37 | 2.77 | 2.74 | 3.29 | 3.20 | 0.963 | 0.860 | 0.143 | 0.110 | 0.058 |
| In. | 1.63 | 2.10 | 3.98 | 3.20 | 2.96 | 3.79 | 3.57 | 1.11 | 0.96 | 0.17 | 0.13 | 0.07 |

Calendar year 1959: Max 6,200 Min 7.0 Mean 270 Cfsm 1.99 In. 26.93

Water year 1959-60: Max 5,620 Min 5.8 Mean 235 Cfsm 1.73 In. 23.57

Peak discharge (base, 5,300 cfs).--Mar. 30 (9 p.m.) 7,160 cfs (10.82 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-21, Dec. 1, 2, 9-11, 14, 15, 20-27, Dec. 31 to Jan. 2, Jan. 5-13, Jan. 18 to Feb. 6, Feb. 8, 9, Feb. 13 to Mar. 29. Backwater from debris Oct. 15-23. Backwater from aquatic vegetation May 14-30, June 3-11, June 20 to Aug. 15, Aug. 19 to Sept. 30.

2160. Niagara River at Buffalo, N. Y.

Location.--Lat 42°52'40", long 78°53'25", at head of Niagara River at Buffalo.

Drainage area.--260,400 sq mi.

Records available.--January 1905 to September 1960 in reports of Geological Survey (prior to October 1935 monthly discharge only). January 1860 to December 1904 in files of U.S. Lake Survey.

Gage.--Flow computed by means of several U.S. Lake Survey gages on river.

Average discharge.--100 years (1860-1960), 203,000 cfs.

Extremes.--Maximum daily discharge during year, 227,000 cfs June 24; minimum daily, 152,000 cfs Mar. 3.

1935-60: Maximum daily discharge, 274,000 cfs Nov. 17, 1955; minimum daily, 100,000 cfs Feb. 6, 7, 1936.

1860-1960: Maximum monthly discharge, 254,000 cfs July 1862; minimum monthly, 117,000 cfs February 1936.

Remarks.--Records do not include water diverted from Lake Michigan by Illinois and Michigan Canal during period of its operation prior to 1910 and by Chicago Sanitary and Ship Canal, operation of which began in 1900, and from Lake Erie by Welland and Black Rock Canals. Records include water diverted into Lake Superior from Hudson Bay drainage by the Long Lake project, operation of which began in July 1939, and by the Ogoki project, operation of which began in July 1943. The diversions into Lake Superior have averaged about 5,000 cfs since July 1943.

Cooperation.--Records of daily discharge furnished by Corps of Engineers.

Discharge, in thousands of cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|---------|-------|-------|----------|-------|-------------|-----------|-------|-------|
| 1 | 168 | 194 | 182 | 185 | 188 | 178 | 209 | 204 | 215 | 211 | 203 | 207 |
| 2 | 170 | 194 | 180 | 186 | 183 | 179 | 201 | 197 | 212 | 216 | 204 | 200 |
| 3 | 174 | 185 | 187 | 205 | 181 | 152 | 205 | 199 | 213 | 218 | 208 | 200 |
| 4 | 177 | 181 | 182 | 218 | 177 | 179 | 206 | 201 | 211 | 220 | 200 | 206 |
| 5 | 173 | 179 | 178 | 218 | 181 | 184 | 201 | 203 | 213 | 220 | 200 | 199 |
| 6 | 173 | 199 | 178 | 213 | 196 | 180 | 195 | 204 | 212 | 214 | 202 | 200 |
| 7 | 183 | 177 | 193 | 192 | 213 | 178 | 188 | 204 | 210 | 214 | 203 | 202 |
| 8 | 178 | 178 | 207 | 216 | 190 | 182 | 194 | 211 | 208 | 216 | 208 | 203 |
| 9 | 196 | 178 | 211 | 186 | 194 | 178 | 194 | 214 | 207 | 216 | 202 | 206 |
| 10 | 184 | 178 | 195 | 183 | 177 | 165 | 192 | 216 | 206 | 212 | 198 | 203 |
| 11 | 201 | 191 | 171 | 180 | 214 | 178 | 192 | 213 | 208 | 211 | 202 | 200 |
| 12 | 201 | 183 | 170 | 178 | 215 | 183 | 189 | 212 | 209 | 211 | 203 | 198 |
| 13 | 182 | 174 | 182 | 188 | 191 | 183 | 175 | 211 | 208 | 210 | 205 | 206 |
| 14 | 175 | 186 | 187 | 187 | 188 | 183 | 193 | 211 | 208 | 203 | 207 | 205 |
| 15 | 179 | 168 | 194 | 189 | 196 | 183 | 183 | 210 | 218 | 207 | 204 | 204 |
| 16 | 183 | 176 | 199 | 209 | 196 | 176 | 189 | 212 | 213 | 209 | 197 | 194 |
| 17 | 184 | 200 | 184 | 196 | 190 | 185 | 191 | 210 | 218 | 209 | 199 | 201 |
| 18 | 189 | 196 | 183 | 183 | 186 | 192 | 200 | 211 | 215 | 208 | 200 | 200 |
| 19 | 178 | 189 | 182 | 207 | 205 | 190 | 190 | 208 | 214 | 208 | 200 | 196 |
| 20 | 183 | 178 | 181 | 203 | 209 | 185 | 194 | 209 | 213 | 207 | 202 | 200 |
| 21 | 158 | 181 | 169 | 191 | 181 | 187 | 197 | 209 | 211 | 205 | 207 | 197 |
| 22 | 172 | 177 | 177 | 192 | 191 | 192 | 196 | 210 | 211 | 210 | 208 | 198 |
| 23 | 176 | 179 | 172 | 194 | 187 | 188 | 198 | 212 | 211 | 210 | 204 | 201 |
| 24 | 180 | 183 | 176 | 196 | 183 | 192 | 198 | 214 | 227 | 204 | 199 | 199 |
| 25 | 180 | 207 | 185 | 193 | 176 | 184 | 190 | 210 | 223 | 201 | 200 | 202 |
| 26 | 183 | 186 | 181 | 195 | 203 | 185 | 188 | 207 | 214 | 203 | 204 | 200 |
| 27 | 178 | 175 | 182 | 183 | 200 | 187 | 189 | 206 | 213 | 211 | 204 | 198 |
| 28 | 179 | 175 | 163 | 186 | 173 | 188 | 193 | 207 | 212 | 205 | 204 | 196 |
| 29 | 171 | 179 | 177 | 187 | 181 | 188 | 196 | 208 | 216 | 205 | 207 | 197 |
| 30 | 171 | 211 | 194 | 186 | ----- | 198 | 194 | 208 | 217 | 206 | 202 | 199 |
| 31 | 178 | ----- | 191 | 189 | ----- | 213 | ----- | 216 | ----- | 198 | 203 | ----- |
| Total | 5,557 | 5,537 | 5,693 | 6,014 | 5,545 | 5,695 | 5,820 | 6,467 | 6,386 | 6,498 | 6,289 | 6,017 |
| Mean | 179 | 185 | 184 | 194 | 191 | 184 | 194 | 209 | 213 | 210 | 203 | 201 |
| Cfs/m | 0.687 | 0.710 | 0.707 | 0.745 | 0.733 | 0.707 | 0.745 | 0.803 | 0.813 | 0.806 | 0.780 | 0.772 |
| In. | 0.79 | 0.79 | 0.81 | 0.86 | 0.78 | 0.81 | 0.83 | 0.92 | 0.91 | 0.93 | 0.90 | 0.86 |
| Calendar year 1959: Max | 215 | | | Min 105 | | | Mean 181 | | Cfs/m 0.695 | In. 9.44 | | |
| Water year 1959-60: Max | 227 | | | Min 152 | | | Mean 195 | | Cfs/m 0.749 | In. 10.20 | | |

Note.--All figures of discharge are expressed in thousands of cubic feet per second.

2162. Scajaquada Creek at Buffalo, N. Y.

Location.--Lat 42°54'40", long 78°47'45", on right bank 58 ft upstream from point where stream goes underground in concrete-lined tunnel, 86 ft upstream from Pine Ridge Road and 0.16 mile east of boundary line of city of Buffalo, Erie County.

Drainage area.--15.7 sq mi.

Records available.--February 1957 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 640 ft (from topographic map).

Extremes.--Maximum discharge during year, 848 cfs Mar. 29 (gage height, 6.49 ft); minimum, 4.6 cfs Aug. 1 (gage height, 1.52 ft).

1957-60: Maximum discharge, 1,150 cfs Jan. 22, 1959 (gage height, 7.98 ft); minimum, 4.1 cfs Sept. 27, 1959; minimum gage height, 1.49 ft Sept. 2, 1957 (may have been lower during period of partly obstructed intake).

Remarks.--Records good except those for periods of partly obstructed intake or no gage-height record, which are fair. Discharge includes sewage diverted into basin above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.6 | 6.9 | 2.2 | 63 |
| 1.7 | 11 | 3.0 | 214 |
| 1.9 | 24 | 5.0 | 552 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 107 | 63 | 22 | 20 | a21 | 16 | 97 | 11 | 46 | 9.9 | 8.3 | *9.5 |
| 2 | 21 | 40 | 39 | 31 | a15 | 15 | 49 | 13 | 36 | 9.1 | 8.7 | 9.5 |
| 3 | 12 | 23 | 56 | 251 | a12 | 14 | 96 | 12 | 22 | 7.6 | *52 | 8.5 |
| 4 | 8.7 | 43 | 46 | 69 | a10 | 14 | 144 | 12 | 14 | 7.2 | 14 | 7.2 |
| 5 | 34 | 61 | 28 | 35 | a25 | 14 | 53 | 12 | 11 | 8.3 | 9.9 | 7.6 |
| 6 | 162 | 34 | 37 | 24 | a215 | 13 | 34 | 11 | 12 | 9.1 | 9.1 | 8.3 |
| 7 | 118 | 19 | 118 | 16 | 95 | 13 | 24 | 13 | 11 | 9.1 | 8.7 | 9.5 |
| 8 | 32 | 16 | 92 | 19 | 51 | 13 | 19 | 23 | 9.9 | 9.1 | 13 | 9.5 |
| 9 | 24 | 13 | 56 | 17 | 54 | 13 | 17 | 97 | 9.9 | 8.7 | 10 | 12 |
| 10 | 14 | 12 | 35 | 15 | 230 | 13 | 15 | 63 | 9.9 | 7.6 | 63 | 9.9 |
| 11 | 11 | 28 | 48 | 15 | 317 | 14 | 16 | 61 | 9.5 | 8.3 | 14 | 7.6 |
| 12 | 10 | 38 | 305 | 27 | 53 | 14 | 16 | 37 | 13 | 6.7 | 11 | 8.7 |
| 13 | 11 | 41 | 193 | 367 | 24 | 14 | 14 | 92 | 11 | 12 | 9.5 | 8.7 |
| 14 | 11 | 81 | 42 | 88 | 14 | 17 | *13 | 42 | 30 | 14 | 8.0 | 9.1 |
| 15 | 9.9 | 67 | 28 | 100 | 14 | 23 | 39 | 23 | 19 | 9.1 | *58 | 9.9 |
| 16 | 9.5 | 28 | 30 | 63 | 15 | *24 | 41 | 23 | 13 | 6.7 | 17 | *11 |
| 17 | 8.7 | 32 | 28 | 30 | 16 | 26 | 59 | 17 | 12 | 7.6 | 11 | 8.7 |
| 18 | 7.6 | 22 | *21 | 20 | *19 | 28 | 58 | 15 | 12 | 6.1 | 10 | 8.3 |
| 19 | 6.7 | *17 | 17 | 19 | 19 | 28 | 26 | 13 | 8.4 | 6.7 | 9.9 | 9.1 |
| 20 | 9.1 | *15 | 14 | *16 | 16 | 30 | 19 | *18 | 9.1 | 8.7 | 14 | 10 |
| 21 | *6.3 | 17 | 12 | 14 | 17 | 35 | 19 | 15 | 10 | 8.3 | 9.1 | 9.5 |
| 22 | 8.3 | 19 | 11 | 14 | 19 | 35 | 24 | 14 | 9.2 | 10 | 14 | 9.1 |
| 23 | 9.3 | 19 | 11 | 13 | 19 | 32 | 19 | 26 | 10 | 9.9 | 12 | 9.1 |
| 24 | 55 | 40 | 11 | 12 | 18 | 30 | 14 | 19 | *26 | 7.6 | 9.5 | 9.1 |
| 25 | 28 | 76 | 9.5 | 13 | 17 | 28 | 21 | 16 | 9.8 | *8.0 | 8.7 | 7.6 |
| 26 | 17 | 34 | 11 | 12 | 17 | 28 | 18 | 13 | 7.4 | 13 | 8.3 | 9.1 |
| 27 | 43 | 30 | 21 | 14 | 16 | 98 | 18 | 12 | *9.0 | 44 | 8.7 | 9.1 |
| 28 | 24 | 34 | 94 | 21 | 15 | 364 | 16 | 11 | 9.5 | 10 | 7.2 | 9.1 |
| 29 | 16 | 32 | 67 | 21 | 16 | 479 | 14 | 9.7 | 21 | 8.7 | 9.1 | 8.7 |
| 30 | 12 | 24 | 44 | 24 | ----- | *357 | 13 | 21 | 11 | 8.0 | 9.9 | 12 |
| 31 | 49 | ----- | 30 | 20 | ----- | 147 | ----- | *65 | ----- | 6.9 | 9.5 | ----- |
| Total | 899.1 | 1,018 | 1,576.5 | 1,422 | 1,389 | 2,009 | 1,025 | 828.7 | 441.6 | 315.0 | 465.1 | 275.2 |
| Mean | 29.0 | 33.9 | 50.9 | 45.9 | 47.9 | 64.8 | 34.2 | 26.7 | 14.7 | 10.2 | 15.0 | 9.17 |
| Cfs/m | 1.85 | 2.16 | 3.24 | 2.92 | 3.05 | 4.13 | 2.18 | 1.70 | 0.936 | 0.650 | 0.955 | 0.584 |
| In. | 2.13 | 2.41 | 3.73 | 3.37 | 3.29 | 4.76 | 2.43 | 1.96 | 1.05 | 0.75 | 1.10 | 0.65 |

Calendar year 1959: Max 604 Min 6.6 Mean 34.1 Cfs/m 2.17 In. 29.51
 Water year 1959-60: Max 479 Min 6.9 Mean 31.9 Cfs/m 2.03 In. 27.63

Peak discharge (base, 450 cfs).--Jan. 13 (7:15 a.m.) 567 cfs (5.08 ft); Feb. 11 (4 a.m.) 530 cfs (5.20 ft); Mar. 29 (8 p.m.) 848 cfs (6.49 ft).

* Discharge measurement made on this day.
 a No gage-height record; discharge estimated on basis of recorded range in stage, observer's notes, and records for nearby stations.

Note.--Partly obstructed intake Nov. 19, 20, 25, Dec. 17, 18, 20, May 14-16, 20-23, June 16, 19, 22-27; discharge computed on basis of discharge measurements, gage heights, weather records, engineers' notes.

2165. Little Tonawanda Creek at Linden, N. Y.

Location.--Lat 42°52'35", long 78°09'45", on right bank at upstream side of highway bridge in Linden, Genesee County, 7 miles upstream from mouth.

Drainage area.--22.0 sq mi.

Records available.--July 1912 to September 1960.

Gage.--Water-stage recorder. Concrete control since Oct. 15, 1930. Datum of gage is 1,081.62 ft above mean sea level, datum of 1929. Prior to Aug. 26, 1943, staff gage at same site and datum.

Average discharge.--47 years (1912-19, 1920-60), 27.7 cfs.

Extremes.--Maximum discharge during year, 1,840 cfs Mar. 30 (gage height, 11.74 ft); minimum, 0.3 cfs Sept. 9, 10 (gage height, 0.22 ft).
1912-60: Maximum discharge, 2,700 cfs Mar. 7, 1956 (gage height, 16.04 ft, from high-water mark); minimum, 0.08 cfs Aug. 3, 4, 1955 (gage height, 0.145 ft, backwater from aquatic vegetation and debris).

Remarks.--Records good except those for periods of ice effect or those below 1 cfs, which are fair.

Revisions (water years).--WSP 729: 1931. WSP 1307: 1919(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-----|
| 0.3 | 0.7 | 2.0 | 66 | 0.2 | 0.2 | 1.5 | 36 |
| .4 | 1.6 | 2.5 | 109 | .3 | .8 | 2.0 | 69 |
| .5 | 2.8 | 3.0 | 165 | .4 | 1.7 | 2.5 | 110 |
| .7 | 6.2 | 5.0 | 456 | .5 | 3.0 | 3.0 | 165 |
| 1.0 | 14 | 7.0 | 822 | .7 | 6.6 | 5.0 | 456 |
| 1.5 | 35 | 9.0 | 1,260 | 1.0 | 15 | 7.0 | 822 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 2.7 | 23 | 19 | 29 | 22 | 22 | 262 | 15 | 20 | 3.2 | 0.8 | 0.6 |
| 2 | 1.7 | 22 | 20 | 28 | 19 | 20 | 304 | 14 | 13 | 3.2 | .7 | .5 |
| 3 | 1.0 | 16 | 27 | 124 | 18 | 21 | 424 | 13 | 10 | 2.9 | 2.6 | .5 |
| 4 | .8 | 13 | 32 | 62 | 15 | 22 | 352 | 11 | 8.4 | 2.9 | 1.7 | .5 |
| 5 | 1.8 | 21 | 39 | 34 | 18 | 21 | 140 | 11 | 7.5 | 2.7 | 1.2 | .5 |
| 6 | 18 | 17 | 54 | 32 | 63 | 21 | 93 | 10 | 6.6 | 2.7 | .9 | .5 |
| 7 | 64 | 13 | 96 | 30 | 69 | 20 | 75 | 9.2 | 6.2 | 2.6 | .9 | .4 |
| 8 | 21 | 11 | 48 | 31 | 48 | 19 | 70 | 9.7 | 5.6 | 2.2 | *1.0 | .4 |
| 9 | 13 | 9.2 | 44 | 25 | 45 | 19 | 68 | 33 | 5.0 | 2.1 | .9 | .4 |
| 10 | 8.4 | 8.4 | 40 | 26 | 90 | 19 | 56 | 34 | 4.6 | 1.8 | 1.7 | .3 |
| 11 | 6.0 | 7.9 | 36 | 24 | 489 | 18 | 46 | 26 | 4.3 | 1.8 | 1.2 | .4 |
| 12 | 4.7 | 11 | 178 | 21 | 115 | 17 | *76 | 24 | 4.6 | 1.8 | 1.0 | .5 |
| 13 | 3.8 | 11 | 313 | 207 | 68 | 17 | 68 | 27 | 5.4 | 1.7 | 1.0 | .5 |
| 14 | 3.4 | 17 | 78 | 124 | 43 | *17 | 64 | 22 | 7.9 | 2.2 | 1.0 | .5 |
| 15 | 3.1 | 32 | 53 | 138 | 38 | 17 | 94 | 18 | 38 | 1.9 | 1.4 | .5 |
| 16 | 3.1 | 19 | *106 | 114 | 42 | 16 | 95 | 15 | 22 | 1.6 | 1.2 | .6 |
| 17 | 3.2 | 21 | 98 | 58 | 36 | 18 | 65 | 13 | 12 | 1.5 | 1.0 | .6 |
| 18 | 3.2 | *15 | 64 | 44 | 37 | 18 | 50 | 16 | 11 | 1.9 | .9 | .6 |
| 19 | 3.1 | 14 | 46 | *40 | 29 | 18 | 36 | *16 | 9.7 | 1.7 | .8 | .6 |
| 20 | 3.1 | 14 | 30 | 30 | 25 | 18 | 31 | 16 | 8.2 | 1.5 | 1.1 | 1.0 |
| 21 | *2.5 | 15 | 24 | 28 | 34 | 18 | 29 | 18 | *6.6 | 1.3 | .8 | 1.2 |
| 22 | 2.4 | 20 | 20 | 27 | 33 | 18 | 41 | 17 | 5.8 | 1.5 | .9 | 1.1 |
| 23 | 2.4 | 16 | 20 | 26 | 28 | 17 | 30 | 34 | 5.4 | 1.7 | .8 | 1.0 |
| 24 | 4.1 | 16 | 20 | 24 | *28 | 18 | 25 | 32 | 6.0 | 1.3 | .8 | .9 |
| 25 | 9.7 | 25 | 21 | 23 | 24 | 16 | 31 | 24 | 5.6 | 1.2 | .7 | .7 |
| 26 | 6.7 | 17 | 25 | 24 | 26 | 16 | 26 | 17 | 4.4 | 1.2 | .6 | .7 |
| 27 | 7.2 | 18 | 91 | 22 | 23 | 19 | 26 | 13 | 3.8 | 1.6 | .6 | .6 |
| 28 | 7.9 | 28 | 148 | 22 | 25 | 95 | 22 | 11 | 3.6 | 1.0 | .6 | .6 |
| 29 | 6.2 | 23 | 97 | 23 | 24 | 275 | 18 | 9.7 | 3.6 | .9 | .5 | .6 |
| 30 | 5.8 | 19 | 53 | 22 | ----- | 1,200 | 16 | 8.9 | 3.6 | .9 | *.5 | .7 |
| 31 | 9.9 | ----- | 40 | 21 | ----- | 722 | ----- | 15 | ----- | .9 | .5 | ----- |
| Total | 233.9 | 512.5 | 1,980 | 1,483 | 1,574 | 2,792 | 2,733 | 552.5 | 258.4 | 57.4 | 30.3 | 18.5 |
| Mean | 7.55 | 17.1 | 63.9 | 47.8 | 54.3 | 90.1 | 91.1 | 17.8 | 8.61 | 1.85 | 0.98 | 0.62 |
| Cfsm | 0.343 | 0.777 | 2.90 | 2.17 | 2.47 | 4.10 | 4.14 | 0.809 | 0.391 | 0.084 | 0.045 | 0.028 |
| In. | 0.40 | 0.87 | 3.35 | 2.51 | 2.66 | 4.72 | 4.62 | 0.93 | 0.44 | 0.10 | 0.05 | 0.03 |

Calendar year 1959: Max 716 Min 0.4 Mean 35.6 Cfsm 1.62 In. 21.97
Water year 1959-60: Max 1,200 Min 0.3 Mean 33.4 Cfsm 1.52 In. 20.68

Peak discharge (base, 530 cfs).--Dec. 13 (2 a.m.) 577 cfs (5.75 ft); Feb. 11 (8 a.m.) 764 cfs (6.72 ft); Mar. 30 (6 p.m.) 1,840 cfs (11.74 ft); Apr. 2 (8 p.m.) 620 cfs (5.99 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 8-10, 14, 20-26, Jan. 1, 2, 5-9, 12, 14, 16, 20-25, Feb. 3, 4, 8, 13-15, 19-23, Feb. 25 to Mar. 10, Mar. 12-14, 16, 23, 25-27 (siphonic action present Mar. 4, 5).

2170. Tonawanda Creek at Batavia, N. Y.

Location.--Lat 42°59'55", long 78°11'20", on right bank 150 ft downstream from municipal dam, 500 ft upstream from Walnut Street Bridge in Batavia, Genesee County, and 3½ miles downstream from Little Tonawanda Creek.

Drainage area.--172 sq mi.

Records available.--July 1944 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 876.01 ft above mean sea level (city of Batavia bench mark).

Average discharge.--16 years, 206 cfs.

Extremes.--Maximum discharge during year, 7,200 cfs Mar. 31 (gage height, 12.70 ft); minimum, 5.5 cfs Sept. 9 (gage height, 1.20 ft).

1944-60: Maximum discharge, that of Mar. 31, 1960; maximum gage height, 13.85 ft Apr. 6, 1947; minimum discharge, 0.4 cfs Aug. 5, 6, 7, 1955; minimum gage height, 0.53 ft July 26, 27, 1948.

Maximum stage known, 14.5 ft in March 1942, from records of city of Batavia.

Remarks.--Records good. Slight regulation at low flow by plants above station.

Revisions (water years).--WSP 1627: 1956-57.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 1.2 | 5.5 | 3.0 | 580 |
| 1.3 | 9.5 | 4.0 | 1,180 |
| 1.4 | 16 | 6.0 | 2,280 |
| 1.6 | 35 | 8.0 | 3,350 |
| 1.8 | 64 | 10.0 | 4,540 |
| 2.1 | 134 | 13.0 | 7,560 |
| 2.5 | 285 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|--------|--------|---------|----------|--------|-----------|-------|-----------|-------|-------|
| 1 | 65 | 293 | 143 | 204 | 150 | 179 | 3,790 | 120 | 159 | 32 | 12 | 9.0 |
| 2 | 101 | 286 | 150 | 190 | 131 | 159 | 1,550 | 112 | 120 | 33 | 12 | 7.8 |
| 3 | 42 | 163 | 179 | 638 | 107 | 162 | 2,220 | 105 | 86 | 33 | 22 | 8.2 |
| 4 | 25 | 112 | 232 | 758 | 102 | 165 | 2,520 | 96 | 74 | 27 | 88 | 8.6 |
| 5 | 25 | 176 | 254 | 285 | 126 | 162 | 1,580 | 89 | 62 | *25 | 39 | 8.2 |
| 6 | 160 | 172 | 357 | 240 | 221 | 156 | 890 | 82 | 56 | 24 | 25 | 7.4 |
| 7 | 586 | 131 | 545 | 224 | 632 | 146 | 678 | 76 | 51 | 23 | 21 | 7.0 |
| 8 | 352 | 98 | 339 | 249 | 420 | 143 | 560 | 78 | 47 | 22 | *17 | 6.2 |
| 9 | 143 | 84 | 310 | 186 | 374 | 140 | 522 | 141 | 43 | 20 | 16 | 5.8 |
| 10 | 115 | 76 | 276 | 179 | 363 | 140 | 438 | 230 | 40 | 18 | 32 | 6.6 |
| 11 | 72 | 70 | 244 | 172 | 2,010 | 134 | 362 | 182 | 39 | 19 | 25 | 7.0 |
| 12 | 53 | 82 | 462 | 143 | 2,050 | 129 | 390 | 176 | 43 | 18 | 16 | 7.4 |
| 13 | 48 | 115 | 1,810 | 392 | 994 | 129 | 476 | 186 | 88 | 17 | 15 | 7.8 |
| 14 | 42 | 112 | 1,580 | 1,070 | 462 | 123 | 346 | 182 | 74 | 18 | 14 | 8.2 |
| 15 | 36 | 300 | 638 | 1,060 | 240 | 120 | 496 | 140 | 266 | 20 | 17 | 9.0 |
| 16 | 33 | 165 | *678 | 830 | 290 | 115 | 690 | 120 | 257 | 21 | 26 | 8.6 |
| 17 | 32 | 140 | 896 | 716 | 285 | *123 | 548 | *115 | 129 | 20 | 23 | 8.6 |
| 18 | 30 | *140 | 580 | 364 | 276 | 123 | 390 | 180 | 96 | 21 | 18 | 8.6 |
| 19 | 27 | 118 | 379 | 295 | 240 | 131 | 285 | 156 | 96 | 17 | 14 | 8.2 |
| 20 | 25 | 110 | 236 | 236 | 140 | 131 | 236 | 120 | 76 | 15 | 19 | 9.5 |
| 21 | *24 | 107 | 156 | 204 | 179 | 131 | 212 | 165 | 61 | 13 | 22 | 14 |
| 22 | 23 | 173 | 146 | *196 | 236 | 137 | 276 | 146 | 51 | 14 | 21 | 13 |
| 23 | 22 | 150 | 131 | 182 | 224 | 126 | 249 | 172 | 48 | 15 | 18 | 10 |
| 24 | 33 | 134 | 137 | 168 | *216 | 134 | 193 | 200 | 60 | 16 | 16 | 9.0 |
| 25 | 283 | 196 | 150 | 153 | 190 | 126 | 186 | 196 | 66 | 16 | 15 | 7.4 |
| 26 | 133 | 165 | 156 | 165 | 193 | 118 | 186 | 140 | 50 | 14 | 13 | 7.4 |
| 27 | 102 | 120 | 336 | 153 | 172 | 134 | 176 | 112 | 42 | 17 | 12 | 6.2 |
| 28 | 131 | 210 | 878 | 153 | 172 | 313 | 165 | 96 | 34 | 23 | 10 | 6.2 |
| 29 | 86 | 182 | 794 | 165 | 179 | 710 | 140 | 84 | 34 | 19 | 9.5 | 5.8 |
| 30 | 70 | 140 | 463 | 162 | ----- | *3,720 | 126 | 80 | 33 | 16 | *13 | 7.0 |
| 31 | 66 | ----- | 305 | 140 | ----- | *6,660 | ----- | 93 | ----- | 14 | 12 | ----- |
| Total | 2,985 | 4,520 | 13,940 | 10,292 | 11,374 | 15,119 | 20,876 | 4,230 | 2,381 | 620 | 632.5 | 243.7 |
| Mean | 96.3 | 151 | 450 | 332 | 392 | 488 | 696 | 136 | 79.4 | 20.0 | 20.4 | 8.12 |
| Cfsm | 0.560 | 0.878 | 2.62 | 1.93 | 2.28 | 2.84 | 4.05 | 0.791 | 0.462 | 0.116 | 0.119 | 0.047 |
| In. | 0.65 | 0.98 | 3.01 | 2.23 | 2.46 | 3.27 | 4.51 | 0.91 | 0.51 | 0.13 | 0.14 | 0.05 |
| Calendar year 1959: Max | | | 3,500 | | Min 4.3 | Mean 265 | | Cfsm 1.54 | | In. 20.92 | | |
| Water year 1959-60: Max | | | 6,660 | | Min 5.8 | Mean 238 | | Cfsm 1.38 | | In. 18.85 | | |

Peak discharge (base, 1,800 cfs).--Dec. 13 (5:30 p.m.) 2,800 cfs (6.94 ft); Feb. 11 (6:15 p.m.) 3,360 cfs (8.01 ft); Mar. 31 (5 a.m.) 7,200 cfs (12.70 ft); Apr. 4 (2 p.m.) 2,740 cfs (6.83 ft).

* Discharge measurement made on this day.

2175. Tonawanda Creek near Alabama, N. Y.

Location.--Lat 43°05'25", long 78°27'15", near center of span on upstream side of highway bridge on Meadville Road, 0.4 mile downstream from canal feeder connecting Tonawanda and Oak Orchard Creeks, 1.1 miles upstream from small tributary, and 3.2 miles west of Alabama, Genesee County.

Drainage area.--230 sq mi.

Records available.--October 1955 to September 1960.

Gage.--Wire-weight gage read twice daily. Crest-stage gage since Sept. 5, 1956. Altitude of gage is 620 ft (from topographic map).

Average discharge.--5 years, 302 cfs.

Extremes.--Maximum discharge during year, 7,980 cfs Mar. 31 (gage height, 14.28 ft, from floodmark); minimum daily, 9.7 cfs Sept. 16, 27.
1955-60: Maximum discharge, 9,000 cfs Jan. 23, 1959 (gage height, 15.9f ft, from graph based on gage readings, ice jam); minimum daily, 8.5 cfs Sept. 14, 1959.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 4.9 | 8.1 | 9.0 | 1,250 |
| 5.0 | 12 | 10.0 | 1,750 |
| 5.2 | 26 | 11.0 | 2,320 |
| 5.8 | 58 | 12.0 | 3,160 |
| 6.2 | 164 | 13.0 | 4,600 |
| 7.0 | 360 | 14.0 | 7,100 |
| 8.0 | 750 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|--|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 34 | 84 | 140 | 387 | 180 | 230 | 6,020 | 153 | 164 | 38 | 20 | 13 |
| 2 | 92 | 277 | 134 | 312 | 185 | 220 | 2,650 | 141 | 194 | 38 | 20 | 13 |
| 3 | 85 | 218 | 154 | 420 | 160 | 215 | 2,280 | 134 | 127 | 37 | 22 | 13 |
| 4 | 43 | 184 | 220 | 1,250 | 140 | 210 | 2,820 | 120 | 100 | 38 | 27 | 12 |
| 5 | 32 | 141 | 264 | 574 | 150 | 215 | 2,300 | 110 | 85 | *34 | *81 | 12 |
| 6 | 47 | 180 | 301 | 350 | 209 | 210 | 1,370 | 101 | 74 | 31 | 50 | 12 |
| 7 | 377 | 154 | 470 | 300 | 600 | 200 | 960 | 101 | 67 | 29 | 31 | 11 |
| 8 | 599 | 117 | 647 | 290 | 790 | 190 | 750 | 106 | 60 | 28 | *28 | 11 |
| 9 | 207 | 98 | 368 | 240 | 562 | 185 | 656 | 174 | 54 | 27 | 25 | *10 |
| 10 | 141 | 88 | 346 | 220 | 511 | 180 | 562 | 420 | 49 | 26 | 26 | 11 |
| 11 | 95 | 82 | 324 | 215 | 1,390 | 180 | 500 | 299 | 47 | 25 | 43 | 10 |
| 12 | 69 | 80 | 403 | 205 | 3,480 | 170 | 446 | 241 | 46 | 23 | 32 | 10 |
| 13 | 56 | 131 | 1,350 | 340 | 1,830 | 165 | *534 | 237 | 60 | 22 | 25 | 10 |
| 14 | 52 | 120 | 2,400 | 1,000 | 1,100 | 165 | 436 | 256 | 100 | 23 | 21 | 10 |
| 15 | 45 | 172 | 1,060 | 2,270 | 600 | 160 | 485 | 220 | 102 | 22 | 20 | 10 |
| 16 | 39 | 304 | 638 | 1,890 | 350 | 155 | 750 | 168 | 340 | 22 | 18 | 9.7 |
| 17 | 36 | 264 | *990 | 1,820 | *370 | *150 | 755 | *156 | 197 | 23 | 26 | 10 |
| 18 | 34 | 160 | 825 | 925 | 360 | 155 | 538 | 151 | 117 | 24 | 27 | 10 |
| 19 | 34 | 136 | 507 | 492 | 340 | 160 | 403 | 214 | 100 | 22 | 23 | 10 |
| 20 | 32 | 129 | 304 | 350 | 220 | 165 | 310 | 176 | 95 | 22 | 22 | 11 |
| 21 | 31 | *120 | 218 | *290 | 240 | 170 | 267 | 203 | 76 | 21 | 21 | 12 |
| 22 | *29 | 120 | 184 | 250 | 270 | 170 | 312 | 194 | 61 | 20 | 23 | 13 |
| 23 | 29 | 184 | 170 | 240 | 280 | 165 | 349 | 207 | 56 | 20 | 30 | 12 |
| 24 | 39 | 149 | 165 | 220 | 280 | 160 | 259 | 261 | 63 | 19 | 24 | 12 |
| 25 | 59 | 160 | 175 | 210 | 260 | 160 | 234 | 212 | 68 | 19 | 20 | 12 |
| 26 | 315 | 316 | 180 | 205 | 240 | 150 | 241 | 176 | 66 | 18 | 18 | 11 |
| 27 | 127 | 147 | 254 | 210 | 240 | 160 | 214 | 154 | 53 | 22 | 17 | 9.7 |
| 28 | 127 | 184 | 851 | 205 | 220 | 300 | 205 | 124 | 47 | 19 | 16 | 10 |
| 29 | 117 | 218 | 1,280 | 205 | 225 | 720 | 184 | 104 | 41 | 18 | 15 | 11 |
| 30 | 84 | 158 | 800 | 210 | ----- | 3,090 | 164 | 98 | 39 | 23 | *14 | 11 |
| 31 | 78 | ----- | 474 | 190 | ----- | 7,100 | ----- | 105 | ----- | 21 | 13 | ----- |
| Total | 3,184 | 4,755 | 16,604 | 16,285 | 15,782 | 16,025 | 27,934 | 5,515 | 2,748 | 774 | 798 | 332.4 |
| Mean | 103 | 158 | 536 | 525 | 544 | 517 | 931 | 178 | 91.6 | 25.0 | 25.7 | 11.1 |
| Cfsm | 0.448 | 0.687 | 2.33 | 2.28 | 2.37 | 2.25 | 4.05 | 0.774 | 0.398 | 0.109 | 0.112 | 0.048 |
| In. | 0.51 | 0.77 | 2.68 | 2.63 | 2.55 | 2.59 | 4.52 | 0.89 | 0.44 | 0.13 | 0.13 | 0.05 |
| Calendar year 1959: Max 5,430 Min 8.5 Mean 331 Cfsm 1.44 In. 19.53 | | | | | | | | | | | | |
| Water year 1959-60: Max 7,100 Min 9.7 Mean 303 Cfsm 1.32 In. 17.89 | | | | | | | | | | | | |

Peak discharge (base, 2,100 cfs).-- Dec. 14 (5 a.m.) 3,050 cfs (11.89 ft); Jan. 15 (10:30 a.m.) 2,600 cfs (11.37 ft); Feb. 12 (8 a.m.) 4,400 cfs (12.89 ft); Mar. 31 (9:30 p.m.) 7,980 cfs (14.28 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 23-26, Jan. 3, 4, 6-14, Jan. 20 to Feb. 5, Feb. 7, Feb. 15 to Mar. 29.

2180. Tonawanda Creek at Rapids, N. Y.

Location.--Lat 43°05'35", long 78°38'05", on right bank at downstream side of highway bridge at Rapids, Niagara County, 4½ miles downstream from Beeman Creek, 4.7 miles east of Pendleton, and 5½ miles upstream from Mud Creek.

Drainage area.--358 sq mi.

Records available.--August 1955 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 580 ft (from topographic map).

Average discharge.--5 years, 434 cfs.

Extremes.--Maximum discharge during year, 6,280 cfs Apr. 1 (gage height, 16.96 ft); minimum, 11 cfs Sept. 16, 17 (gage height, 1.17 ft, backwater from aquatic vegetation).
1955-60: Maximum discharge, that of Apr. 1, 1960; minimum, 10 cfs Sept. 29, 30, 1959; minimum gage height, 1.17 ft Sept. 29, 30, 1959, Sept. 16, 17, 1960 (backwater from aquatic vegetation).

Remarks.--Records good except those for periods of ice effect, backwater from aquatic vegetation, or no gage-height record, which are fair.

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Mar. 30 | | | | Mar. 31 to Sept. 30 | |
|-------------------|-----|------|-------|---------------------|-------|
| 1.1 | 10 | 3.0 | 574 | 11.0 | 3,380 |
| 1.2 | 22 | 5.0 | 1,280 | 15.0 | 5,175 |
| 1.3 | 36 | 6.0 | 1,600 | | |
| 1.6 | 96 | 8.0 | 2,260 | | |
| 2.0 | 215 | 11.0 | 3,380 | | |

Note.--Same as preceding table below 11.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 26 | 112 | 256 | 1,080 | 320 | 420 | *6,130 | 239 | 166 | 50 | 27 | 19 |
| 2 | 43 | 165 | 255 | 769 | 310 | 420 | 5,560 | 222 | 215 | 46 | 26 | 18 |
| 3 | 96 | 342 | 256 | 803 | 280 | 410 | 4,550 | 208 | 229 | 46 | 26 | 18 |
| 4 | 109 | 297 | 283 | 1,220 | 235 | 370 | 3,920 | 195 | 181 | 43 | 30 | 17 |
| 5 | 69 | 222 | 342 | 1,520 | 225 | 370 | 3,830 | 188 | 139 | *43 | *36 | 17 |
| 6 | 51 | 205 | 382 | 1,360 | 322 | 380 | 3,390 | 178 | 112 | 43 | 80 | 17 |
| 7 | 75 | 242 | 536 | 1,010 | 612 | 380 | 2,380 | 175 | 94 | 34 | 57 | 15 |
| 8 | 377 | 225 | 795 | 640 | 1,010 | 360 | 1,660 | 178 | 80 | 36 | *38 | 14 |
| 9 | 506 | 181 | 795 | 560 | 1,140 | 340 | 1,280 | 229 | 65 | 38 | 34 | *14 |
| 10 | 300 | 142 | 559 | 470 | 1,130 | 320 | 1,090 | 411 | 59 | 36 | 33 | 16 |
| 11 | 201 | 119 | 536 | 410 | 1,980 | 320 | 941 | 529 | 57 | 34 | 34 | 16 |
| 12 | 136 | 112 | 661 | 370 | 2,440 | 300 | 803 | 473 | 55 | 34 | 50 | 14 |
| 13 | 94 | 112 | 1,170 | 451 | a2,200 | 310 | 725 | 447 | 57 | 33 | 43 | 14 |
| 14 | 73 | 147 | 1,480 | 758 | a3,400 | 300 | 762 | 458 | 65 | 32 | 35 | 14 |
| 15 | 65 | 188 | 2,060 | 1,250 | a2,200 | 290 | 673 | 414 | 101 | 32 | 29 | 14 |
| 16 | 57 | 273 | 2,030 | 1,690 | a1,300 | *270 | 777 | 339 | 150 | 32 | 29 | 12 |
| 17 | 50 | 336 | *1,360 | 1,830 | *1,000 | 270 | 962 | *280 | 314 | 32 | 29 | 11 |
| 18 | 46 | 256 | 1,300 | 1,670 | 795 | 280 | 1,110 | 246 | 232 | 32 | 29 | 12 |
| 19 | 43 | 229 | 1,190 | 1,310 | 751 | 290 | 867 | 246 | 147 | 32 | 34 | 12 |
| 20 | 39 | 198 | 853 | 871 | 604 | 300 | 639 | 273 | 117 | 32 | 34 | 16 |
| 21 | 39 | *184 | 532 | *612 | 447 | 310 | 503 | 239 | 104 | 32 | 33 | 17 |
| 22 | *36 | 172 | 360 | 480 | 420 | 310 | 466 | 235 | 84 | 30 | 32 | 19 |
| 23 | 34 | 181 | 330 | 430 | 480 | 320 | 484 | 242 | 71 | 29 | 33 | 19 |
| 24 | 39 | 232 | 290 | 410 | 500 | 310 | 484 | 249 | 65 | 29 | 36 | 18 |
| 25 | 55 | 246 | 280 | 360 | 500 | 300 | 407 | 280 | 65 | 27 | 36 | 18 |
| 26 | 159 | 259 | 294 | 340 | 490 | 290 | 360 | 276 | 69 | 27 | 29 | 18 |
| 27 | 249 | 300 | 325 | 342 | 450 | 320 | 350 | 235 | 69 | 30 | 26 | 18 |
| 28 | 186 | 282 | 639 | 342 | 420 | 518 | 355 | 188 | 61 | 33 | 24 | 17 |
| 29 | 156 | 256 | 1,100 | 330 | 590 | 1,210 | 308 | 147 | 55 | 29 | 22 | 16 |
| 30 | 153 | 300 | 1,410 | 330 | ----- | 3,060 | 269 | 125 | 51 | 27 | *21 | 16 |
| 31 | 122 | ----- | 1,390 | 310 | ----- | 5,070 | ----- | 119 | ----- | 29 | 19 | ----- |
| Total | 3,664 | 6,485 | 24,029 | 24,328 | 27,351 | 18,718 | 46,005 | 8,263 | 3,327 | 1,082 | 1,042 | 476 |
| Mean | 118 | 216 | 775 | 785 | 943 | 604 | 1,534 | 267 | 111 | 34.3 | 33.6 | 15.9 |
| Cfsm | 0.330 | 0.603 | 2.18 | 2.19 | 2.63 | 1.69 | 4.28 | 0.746 | 0.310 | 0.096 | 0.094 | 0.044 |
| In. | 0.38 | 0.67 | 2.50 | 2.53 | 2.84 | 1.94 | 4.78 | 0.86 | 0.35 | 0.11 | 0.11 | 0.05 |

Calendar year 1959: Max 4,350 Min 11 Mean 485 Cfsm 1.35 In. 18.40

Water year 1959-60: Max 6,130 Min 11 Mean 450 Cfsm 1.26 In. 17.12

Peak discharge (base, 2,400 cfs).--Dec. 15 (11:30 p.m.) 2,340 cfs (8.23 ft); Feb. 14 (time unknown) about 3,600 cfs; Apr. 1 (9 a.m.) 6,280 cfs (16.96 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

Note.--Stage-discharge relation affected by ice Dec. 22-24, Jan. 8-12, 22-26, Jan. 29 to Feb. 5, Feb. 22 to Mar. 27. Backwater from aquatic vegetation Oct. 1-7, Apr. 25 to Sept. 30.

2185. Ellicott Creek at Williamsville, N. Y.

Location.--Lat 42°57'10", long 78°44'15", on right bank at downstream side of bridge on Wehrle Drive 0.4 mile upstream from small tributary and 0.8 mile south of Williamsville, Erie County.

Drainage area.--76.3 sq mi.

Records available.--October 1955 to September 1960.

Gage.--Water-stage recorder. Crest-stage gage since Sept. 6, 1956. Altitude of gage is 680 ft (from topographic map). Prior to Dec. 17, 1958, wire-weight gage on upstream side of bridge at same datum.

Average discharge.--5 years, 101 cfs.

Extremes.--Maximum discharge during year, 5,960 cfs Mar. 31 (gage height, 8.99 ft); minimum daily, 0.2 cfs July 26.

1955-60: Maximum discharge, that of Mar. 31, 1960; maximum gage height, 10.44 ft Mar. 7, 1956 (from graph based on gage readings); no flow for part of each day Aug. 14, 18-23, Aug. 28 to Sept. 9, 1958.

Remarks.--Records good except those for periods of ice effect, backwater from aquatic vegetation or debris, or shifting control, which are fair. The Buffalo Crushed Stone Co. diverts intermittently up to 27 cfs from stream above station.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 35 | 109 | 67 | 110 | 62 | 68 | 1,160 | 44 | 86 | 12 | 6.4 | *9.5 |
| 2 | 28 | 140 | 55 | 92 | 47 | 62 | 478 | 40 | 116 | 11 | 4.8 | 8.2 |
| 3 | 19 | 93 | 91 | 258 | 28 | 58 | 409 | 38 | 73 | 8.5 | *4.1 | 1.2 |
| 4 | 7.1 | 72 | 162 | 573 | 26 | 56 | 514 | 34 | 51 | 4.8 | 1.7 | .8 |
| 5 | 13 | 102 | 164 | 301 | 33 | 58 | 418 | 31 | 35 | *9.5 | 3.6 | .8 |
| 6 | 38 | 121 | 158 | 175 | 130 | 54 | 248 | 28 | 20 | 10 | 6.0 | .6 |
| 7 | 84 | 60 | 243 | 150 | 255 | 49 | 201 | 24 | e10 | 10 | 1.5 | e.4 |
| 8 | 136 | 36 | 248 | 120 | 270 | 45 | 162 | 22 | e7.8 | *9.5 | 1.5 | e.3 |
| 9 | 69 | 28 | 154 | 92 | 228 | 43 | 134 | 57 | e5.7 | 4.5 | .8 | *e.4 |
| 10 | 44 | 30 | 155 | 80 | 265 | 43 | 116 | 154 | e3.8 | e.9 | 6.8 | .6 |
| 11 | 24 | 38 | 140 | 72 | 987 | 41 | 106 | 140 | e11 | e.6 | 13 | 2.0 |
| 12 | 14 | 39 | 303 | 64 | 1,270 | 41 | 96 | 99 | 17 | *e.6 | 12 | 1.6 |
| 13 | 12 | 49 | 1,190 | 230 | 470 | 42 | 90 | 127 | 17 | e.5 | 12 | 1.1 |
| 14 | 13 | 74 | 798 | 630 | 190 | 44 | *80 | 166 | 22 | e.9 | 12 | 1.1 |
| 15 | 4.3 | 150 | 265 | 472 | 110 | 46 | 86 | 107 | 25 | e.8 | *17 | *1.2 |
| 16 | 6.8 | 134 | 210 | 320 | 111 | *42 | 162 | 74 | 39 | e2.5 | *10 | 1.1 |
| 17 | 14 | 91 | *323 | 280 | *90 | 44 | 196 | 54 | 46 | 10 | 4.3 | 1.0 |
| 18 | 1.6 | 80 | 212 | 156 | *101 | 47 | 224 | 40 | 36 | 11 | 4.5 | .9 |
| 19 | .8 | 58 | 136 | 114 | 92 | 47 | 150 | 29 | 28 | 12 | 4.8 | 3.6 |
| 20 | 7.4 | *36 | 94 | 94 | 72 | 52 | 104 | *27 | 26 | 16 | 5.4 | 4.3 |
| 21 | *11 | 36 | 58 | *82 | 74 | 58 | 85 | 36 | 24 | 18 | 7.8 | 2.9 |
| 22 | 1.2 | 54 | 54 | 76 | 82 | 80 | 111 | 57 | 7.8 | 15 | 6.8 | 2.9 |
| 23 | 1.5 | 84 | 54 | 72 | 80 | 82 | 142 | 53 | 4.8 | 13 | 10 | 3.6 |
| 24 | 9.0 | 74 | 54 | 65 | 76 | 74 | 93 | 69 | *5.7 | .4 | 8.5 | 4.1 |
| 25 | 72 | 127 | 47 | 62 | 74 | 70 | 73 | 104 | 5.4 | .3 | 13 | 2.2 |
| 26 | 66 | 112 | 48 | 58 | 74 | 70 | 74 | 78 | 4.5 | .2 | 21 | 1.2 |
| 27 | 46 | 60 | 70 | 57 | 68 | 80 | 76 | 51 | *3.4 | 3.2 | 8.5 | .9 |
| 28 | 84 | 80 | 231 | 59 | 64 | 240 | 73 | 35 | 2.9 | 1.5 | 5.7 | .7 |
| 29 | 53 | 96 | 301 | 69 | 70 | 482 | 60 | 28 | 6.4 | 1.2 | 5.4 | .4 |
| 30 | 30 | 79 | 221 | 74 | ----- | *2,640 | 51 | 27 | 13 | 5.0 | 9.0 | .6 |
| 31 | 28 | ----- | 152 | 69 | ----- | *4,090 | ----- | 42 | ----- | 6.4 | 10 | ----- |
| Total | 972.7 | 2,342 | 6,456 | 5,126 | 5,479 | 9,148 | 5,972 | 1,915 | 753.2 | 199.8 | 237.9 | 60.2 |
| Mean | 31.4 | 76.1 | 208 | 165 | 189 | 295 | 199 | 61.8 | 25.1 | 6.45 | 7.67 | 2.01 |
| Cfsm | 0.412 | 1.02 | 2.73 | 2.18 | 2.48 | 3.87 | 2.61 | 0.810 | 0.329 | 0.085 | 0.101 | 0.026 |
| In. | 0.47 | 1.14 | 3.15 | 2.50 | 2.67 | 4.46 | 2.91 | 0.93 | 0.37 | 0.10 | 0.12 | 0.03 |

Calendar year 1959: Max 1,220 Min 0.2 Mean 107 Cfsm 1.40 In. 19.12
 Water year 1959-60: Max 4,090 Min 0.2 Mean 106 Cfsm 1.39 In. 18.85

Peak discharge (base, 1,800 cfs).--Mar. 31 (5 a.m.) 5,960 cfs (8.99 ft).

* Discharge measurement made on this day.

e Shifting-control method used.

Note.--Stage-discharge relation affected by ice Dec. 10, 21-24, Jan. 1, 2, 6-12, 16, 21, 22, 26, Feb. 2-5, 8, 14, 15, Feb. 19 to Mar. 28. Backwater from aquatic vegetation and/or debris Oct. 1-24, Apr. 4 to June 5. Backwater from aquatic vegetation and/or debris merged with shifting control June 15 to July 9, July 17 to Sept. 6, Sept. 10-12, 17-30.

2190. Erie (Barge) Canal at lock 30, Macedon, N. Y.

Location.--Lat 43°04'20", long 77°17'45" on left bank at lock 30, in Macedon, Wayne County, 500 ft downstream from headgate in old Erie Canal.

Records available.--November 1919 to December 1920 (navigation seasons only), October 1950 to September 1960. Prior to October 1956, published as Barge Canal at lock 30, Macedon.

Gage.--Water-stage recorder. Datum of gage is 448.80 ft above mean sea level, New York State Erie (Barge) Canal bench mark. Nov. 1, 1919, to Dec. 28, 1920, staff gage at same site at different datum.

Average discharge.--10 years (1950-60), 216 cfs.

Extremes.--1919-20, 1950-60: Maximum daily discharge, 762 cfs Dec. 9, 1954; minimum daily, 1.1 cfs Mar. 20, 21, 1953.

Remarks.--Records excellent except those below 100 cfs and those for period of backwater from aquatic vegetation, which are good. This record represents net diversion from Niagara River basin into Oswego River basin through Erie (Barge) Canal.

Cooperation.--Records of gate openings, lockages, lock-valve openings, and elevations of water surface in Erie (Barge) Canal above and below lock 30 furnished by New York State Department of Public Works.

Revisions (water years).--WSP 1237: 1951.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|-------|-------|-------|-------|---------|-------|-------|--------|--------|--------|
| 1 | 382 | 370 | 357 | a20 | 11 | 26 | 355 | 12 | 137 | 166 | 415 | 403 |
| 2 | 386 | 358 | 347 | a20 | 11 | 23 | 256 | 54 | 136 | 189 | 400 | 393 |
| 3 | 365 | 367 | 353 | a40 | 9, 6 | 23 | 172 | 75 | 133 | 184 | 409 | 399 |
| 4 | 378 | 367 | 351 | 42 | 8, 6 | 24 | 142 | 114 | 131 | 188 | 412 | 402 |
| 5 | 372 | 358 | 351 | 46 | 8, 6 | 24 | 102 | 115 | 140 | 174 | 424 | 402 |
| 6 | 382 | 364 | 351 | 46 | 17 | 22 | 76 | 118 | 134 | 178 | 429 | 396 |
| 7 | 380 | 364 | 304 | 46 | 41 | 21 | 54 | 126 | 132 | 297 | 425 | 396 |
| 8 | 379 | 358 | 50 | 46 | 37 | 20 | 42 | 126 | 123 | 449 | 421 | 390 |
| 9 | 379 | 355 | 88 | a46 | 34 | 19 | 37 | 140 | 135 | 425 | 418 | 387 |
| 10 | 375 | 364 | 186 | a46 | 48 | 19 | 29 | 122 | 135 | 436 | 426 | 393 |
| 11 | 372 | 354 | 184 | 46 | 56 | 19 | 23 | 141 | 138 | 427 | 421 | 391 |
| 12 | 375 | 355 | a184 | 45 | 57 | 17 | 26 | 128 | 138 | *436 | 421 | 397 |
| 13 | 378 | 367 | a183 | 45 | 56 | 17 | 16 | 123 | 129 | 420 | 429 | 393 |
| 14 | 372 | 358 | 183 | 45 | 54 | *18 | 19 | 126 | 127 | 417 | 418 | 399 |
| 15 | 375 | 361 | 81 | 88 | 52 | 15 | *16 | 131 | *161 | 429 | 405 | 384 |
| 16 | 390 | 370 | 102 | a113 | 52 | 14 | 18 | 122 | 129 | 425 | 417 | *387 |
| 17 | 372 | 370 | 46 | a98 | 47 | 17 | 19 | 125 | 166 | 431 | 411 | 384 |
| 18 | 375 | 370 | 12 | 76 | 36 | 17 | 27 | 126 | 146 | 422 | 417 | 381 |
| 19 | *385 | *367 | a12 | 31 | 38 | 18 | 6, 1 | 125 | 155 | 410 | 411 | 393 |
| 20 | 368 | 361 | a12 | 17 | 37 | 18 | 43 | 125 | 152 | 434 | 414 | 387 |
| 21 | 361 | 369 | 54 | 16 | 27 | 20 | 68 | 128 | 141 | 415 | 413 | 387 |
| 22 | 357 | 358 | 51 | 16 | 24 | 21 | 392 | 133 | 156 | 418 | 410 | 389 |
| 23 | 367 | 354 | 51 | 16 | *23 | 21 | 19 | 130 | 149 | 409 | 398 | 373 |
| 24 | 375 | 367 | 30 | 15 | 23 | 22 | 16 | 133 | 153 | 431 | 424 | 366 |
| 25 | 375 | 361 | a30 | *14 | 22 | 22 | 39 | 130 | 156 | 413 | *397 | 392 |
| 26 | 365 | 358 | a30 | 13 | 24 | 20 | 67 | *133 | 168 | 413 | 405 | 378 |
| 27 | 361 | 361 | a30 | 12 | 26 | 18 | 12 | 127 | 159 | 416 | 402 | 372 |
| 28 | 358 | 361 | 39 | 12 | 24 | 24 | 23 | 145 | 171 | 422 | 402 | 382 |
| 29 | 375 | 370 | 40 | *12 | 24 | 38 | 28 | 130 | 161 | 424 | 390 | 382 |
| 30 | 368 | 364 | 40 | 12 | ----- | 109 | 12 | 144 | 167 | 421 | 393 | 376 |
| 31 | 358 | ----- | 20 | 12 | ----- | 389 | ----- | 131 | ----- | 428 | 403 | ----- |
| Total | 11,540 | 10,881 | 4,152 | 1,152 | 927.8 | 1,093 | 2,154.1 | 3,718 | 4,358 | 11,547 | 12,782 | 11,674 |
| Mean | 372 | 363 | 134 | 37.2 | 32.0 | 35.3 | 71.8 | 120 | 145 | 372 | 412 | 389 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 430 Min 4.3

Water year 1959-60: Max 449 Min 6.1

Mean 225

Mean 208

Cfsm -

Cfsm -

In. -

In. -

* Discharge measurement made on this day.

a No lock-valve record; valve discharge estimated on basis of records of lock operation, weather records, and observer's notes.

Note.--Backwater from aquatic vegetation June 1 to July 6.

2202.5. West Creek near Hilton, N. Y.

Location.--Lat 43°18'10" long 77°48'50", on right bank just downstream from bridge on Collamer Road, 0.5 mile north of Collamer and 1.5 miles northwest of Hilton, Monroe County.

Drainage area.--31.0 sq mi.

Records available.--May 1957 to September 1960.

Gage.--Water-stage recorder. Prior to Oct. 1, 1957, wire-weight gage at same site and datum.

Extremes.--Maximum discharge during year, 1,480 cfs Mar. 30 (gage height, 10.67 ft); minimum, 0.7 cfs July 17; minimum gage height, 2.80 ft Oct. 22.
1957-60: Maximum discharge, that of Mar. 30, 1960; minimum daily, 0.6 cfs July 2, 1958.

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation, which are fair. During summer growing season, water is diverted from Erie (Barge) Canal into Moorman Creek, a tributary of West Creek, for irrigation. During canning season, two factories upstream at Hamlin discharge waste water into a tributary. The increase in discharge at gaging station from these diversions is not known.

Revisions (water years).--WSP 1557: 1957.

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 30)

| Oct. 1 to Mar. 30 | | | | Mar. 30 to Sept. 30 | | | |
|-------------------|-----|------|-------|---------------------|-----|-----|-------|
| 4.0 | 42 | 7.0 | 418 | 2.5 | 0.6 | 4.0 | 42 |
| 5.0 | 104 | 9.0 | 930 | 2.6 | 1.1 | 4.5 | 76 |
| 6.0 | 220 | 10.5 | 1,340 | 2.8 | 2.7 | 5.0 | 123 |
| | | | | 3.0 | 5.0 | 6.0 | 259 |
| | | | | 3.3 | 11 | 7.0 | 481 |
| | | | | 3.6 | 22 | 9.0 | 1,020 |

Note.--Same as following table below 4.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|---------|-------|-------|-------|-------|---------|-------|-------|-------|-------|
| 1 | 19 | 7.0 | 5.2 | 56 | 24 | 39 | 397 | 13 | 41 | 7.2 | 9.1 | 2.6 |
| 2 | 20 | 7.0 | 4.9 | 39 | 22 | 36 | 243 | 11 | 24 | 5.8 | 8.6 | 2.5 |
| 3 | 8.0 | 5.3 | 6.0 | 168 | 20 | 38 | 235 | 10 | 24 | 5.2 | 11 | 1.8 |
| 4 | 5.2 | 4.7 | 7.6 | 248 | 18 | 39 | 254 | 9.1 | 20 | 6.8 | 12 | 1.7 |
| 5 | 4.2 | 5.7 | 7.6 | 100 | 17 | 36 | 104 | 8.4 | 12 | 6.5 | 10 | 2.9 |
| 6 | 4.4 | 6.5 | 7.8 | 56 | 49 | 34 | 61 | 7.8 | 9.1 | 6.0 | 6.2 | 3.8 |
| 7 | 7.8 | 5.0 | 62 | 31 | 245 | 32 | 67 | 7.4 | 7.6 | 4.1 | 6.8 | 2.2 |
| 8 | 13 | 4.4 | 201 | 19 | 268 | 29 | 42 | 7.6 | 6.8 | 3.7 | 8.6 | 2.6 |
| 9 | 8.4 | 4.2 | 86 | 18 | 199 | 28 | 33 | 62 | 6.0 | 3.6 | *6.2 | 2.7 |
| 10 | 5.3 | 3.8 | 45 | 17 | 262 | 28 | 25 | 262 | 5.7 | 3.7 | 7.0 | 3.4 |
| 11 | 4.2 | 3.4 | 26 | 14 | 835 | 25 | 20 | 86 | 5.5 | *3.6 | 11 | 4.2 |
| 12 | 3.7 | 3.7 | 91 | 12 | 566 | 23 | 19 | 85 | 5.3 | 3.6 | 9.6 | 4.2 |
| 13 | 3.0 | 4.5 | 350 | 60 | 251 | 21 | 18 | 120 | 5.3 | 2.5 | 8.4 | 4.0 |
| 14 | 2.9 | 5.0 | 93 | 189 | 118 | 20 | 16 | 62 | 5.5 | 2.5 | 8.8 | 3.0 |
| 15 | 3.0 | 6.2 | 40 | 141 | 104 | 19 | 17 | 29 | 7.2 | 2.4 | 9.1 | 2.6 |
| 16 | 3.3 | 5.8 | 30 | 111 | 79 | 18 | 20 | 18 | 8.6 | .9 | 9.4 | 2.7 |
| 17 | 3.3 | *4.5 | *35 | 84 | 78 | *19 | 26 | 12 | 7.4 | 1.7 | 9.1 | 2.7 |
| 18 | 3.3 | 3.7 | 23 | 49 | 80 | 19 | *59 | *11 | 6.3 | 2.4 | 8.8 | 2.7 |
| 19 | 3.1 | 4.2 | 17 | 38 | 60 | 20 | 33 | 10 | 5.5 | 2.8 | 8.2 | 3.0 |
| 20 | 2.7 | 4.5 | 11 | 38 | 33 | 20 | 20 | 8.6 | 4.2 | 3.2 | 10 | 3.2 |
| 21 | *2.4 | 4.5 | 8.0 | 28 | 45 | 20 | 16 | 13 | 4.9 | 4.6 | 9.8 | 3.2 |
| 22 | 2.4 | 4.5 | 5.6 | 25 | 54 | 21 | 19 | 25 | 5.3 | 4.1 | 12 | 3.4 |
| 23 | 2.9 | 4.1 | 6.8 | 24 | 52 | 19 | 18 | 59 | 5.5 | 5.7 | 10 | 3.6 |
| 24 | 3.6 | 3.7 | 7.2 | 23 | *49 | 20 | 15 | 85 | 6.3 | 6.8 | 10 | 4.0 |
| 25 | 6.3 | 3.6 | 7.4 | 22 | 44 | 19 | 15 | 67 | 6.3 | 6.5 | 9.6 | 5.3 |
| 26 | 5.7 | 4.1 | 8.2 | 22 | 46 | 18 | 48 | 30 | 6.2 | 6.5 | 8.8 | 4.9 |
| 27 | 4.4 | 4.5 | 33 | *20 | 41 | 19 | 35 | 20 | 6.5 | 7.2 | 4.0 | 4.9 |
| 28 | 4.4 | 4.7 | 390 | 19 | 43 | 237 | 28 | 13 | 6.8 | 7.6 | 3.7 | 2.8 |
| 29 | 4.7 | 5.3 | 257 | 21 | 42 | 696 | 19 | 9.1 | 7.2 | 2.3 | 3.5 | 2.9 |
| 30 | 4.2 | 5.2 | 129 | 24 | ----- | 1,250 | 18 | 8.2 | 7.2 | 4.4 | 3.3 | 4.2 |
| 31 | 4.5 | ----- | 82 | 24 | ----- | *682 | ----- | 14 | ----- | 9.1 | *3.0 | ----- |
| Total | 173.3 | 143.3 | 2,083.3 | 1,740 | 3,744 | 3,744 | 1,937 | 1,183.2 | 279.0 | 143.2 | 255.6 | 97.4 |
| Mean | 5.59 | 4.78 | 67.2 | 56.1 | 129 | 121 | 64.6 | 38.2 | 9.30 | 4.62 | 8.25 | 3.25 |
| Cfsm | 0.180 | 0.154 | 2.17 | 1.81 | 4.16 | 3.90 | 2.08 | 1.23 | 0.300 | 0.149 | 0.266 | 0.105 |
| In. | 0.21 | 0.17 | 2.50 | 2.09 | 4.49 | 4.49 | 2.32 | 1.42 | 0.33 | 0.17 | 0.31 | 0.12 |

Calendar year 1959: Max 940 Min 0.8 Mean 27.3 Cfsm 0.881 In. 11.91
Water year 1959-60: Max 1,250 Min 0.9 Mean 42.4 Cfsm 1.37 In. 18.62

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-24, Dec. 31 to Jan. 2, Jan. 5-9, Feb. 14, 15, Feb. 19 to Mar. 27. Backwater from aquatic vegetation Oct. 11-28, May 15-22, 28-31, June 7 to Sept. 30.

2205. Dyke Creek at Wellsville, N. Y.

Location.--Lat 42°07'14", long 77°56'13", near center of span on upstream side of Miller Street Bridge at Wellsville, Allegany County, 0.6 mile upstream from Genesee River and 1.2 miles downstream from Trapping Brook.

Drainage area.--71.4 sq mi.

Records available.--August 1955 to September 1960 (discontinued).

Gage.--Wire-weight gage read twice daily. Crest-stage gage since June 19, 1956. Datum of gage is 1,492.18 ft above mean sea level, datum of 1929. Prior to Apr. 17, 1957, at datum 7.18 ft lower; Apr. 17 to Sept. 30, 1957, at datum 11.23 ft lower than present datum; both at site 0.2 mile downstream.

Average discharge.--5 years, 105 cfs.

Extremes.--Maximum discharge during year, 5,230 cfs June 15 (gage height, 16.10 ft, from graph based on gage readings), from rating curve extended above 2,400 cfs by logarithmic plotting; minimum, 3.0 cfs Sept. 7, 8 (gage height, 9.91 ft).

1955-60: Maximum discharge, that of June 15, 1960; minimum observed, 1.0 cfs Sept. 9, 1957 (occurred during period of channel improvement).

Remarks.--Records fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 29

Mar. 30 to Sept. 30

11.0 205
12.0 630
13.0 1,230

9.9 2.7 11.0 205
10.0 7.0 12.0 690
10.1 14 13.0 1,490
10.3 34 14.0 2,520
10.6 84 15.0 3,720

Note.--Same as following below 11.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|----------|-----------|-----------|-------|-------|-------|-------|
| 1 | 13 | 320 | 144 | 121 | 50 | *b43 | 1,090 | 46 | 126 | 22 | 6.5 | 4.5 |
| 2 | 5.5 | 240 | 141 | 168 | 44 | b41 | 600 | 43 | 80 | 20 | 6.5 | 4.1 |
| 3 | 4.5 | *164 | 167 | 510 | b39 | b42 | 632 | 35 | 65 | 19 | 4.2 | 3.7 |
| 4 | 4.5 | 151 | 160 | 205 | b39 | b41 | 698 | 33 | 50 | 18 | 3.8 | 4.1 |
| 5 | *4.5 | 212 | 144 | b160 | 49 | b43 | 388 | 31 | 43 | 17 | 3.3 | 4.1 |
| 6 | 9.8 | 381 | 167 | b180 | 148 | b42 | 272 | 28 | 40 | 15 | 20 | 3.3 |
| 7 | 62 | 226 | *284 | b140 | 106 | b37 | 222 | 23 | 33 | 13 | 13 | 3.3 |
| 8 | 23 | 148 | 226 | *b110 | *92 | b37 | 191 | 32 | 30 | 13 | 10 | 3.3 |
| 9 | 17 | 118 | 216 | b84 | 74 | b37 | 180 | 235 | 26 | 12 | 11 | 3.3 |
| 10 | 13 | 89 | 167 | 65 | 281 | b37 | 180 | 180 | 24 | 10 | 26 | 4.1 |
| 11 | 12 | 78 | 151 | 65 | 828 | b35 | 157 | 118 | 21 | 9.8 | 15 | 4.5 |
| 12 | 9.1 | 94 | 620 | 65 | 264 | b33 | 208 | 174 | 252 | 9.1 | 12 | 5.5 |
| 13 | 9.1 | 74 | 686 | 364 | 170 | b34 | 160 | 194 | 121 | 8.4 | 11 | 6.0 |
| 14 | 9.8 | 71 | 316 | 216 | b94 | b32 | 148 | 164 | 980 | 11 | 10 | 5.5 |
| 15 | 9.1 | 112 | 236 | 271 | b106 | b31 | 144 | 106 | 3,010 | 10 | 10 | 4.5 |
| 16 | 8.4 | 76 | 268 | 222 | b96 | b29 | 180 | 112 | 494 | 9.1 | 9.1 | 5.0 |
| 17 | 7.7 | 86 | 236 | 160 | b88 | b29 | 141 | 86 | 226 | 7.7 | 7.7 | 5.0 |
| 18 | 7.7 | 67 | 194 | 124 | 82 | b27 | 151 | 180 | 164 | 8.4 | 6.5 | 4.5 |
| 19 | 7.7 | 65 | 154 | 112 | 78 | b27 | 112 | 112 | 118 | 8.4 | 7.0 | *4.5 |
| 20 | 7.0 | 61 | 124 | 96 | 82 | 25 | 94 | 112 | 92 | 7.7 | 6.5 | 5.0 |
| 21 | 6.0 | 65 | 96 | b90 | b86 | 25 | 84 | 174 | 65 | 7.0 | 6.0 | 4.5 |
| 22 | 6.5 | 63 | b80 | b80 | 78 | 26 | 99 | 490 | 52 | 6.5 | 7.7 | 4.5 |
| 23 | 9.8 | 55 | b66 | 74 | b72 | 24 | 78 | 1,330 | 49 | 7.0 | 6.5 | 5.0 |
| 24 | 198 | 65 | b84 | b68 | b68 | 24 | 65 | *1,050 | 94 | 7.0 | 6.0 | 4.5 |
| 25 | 43 | 129 | b74 | b70 | b64 | 28 | 58 | 500 | 61 | 6.0 | *5.5 | 4.5 |
| 26 | 53 | 92 | 69 | b62 | b58 | 30 | 52 | 300 | 40 | 5.5 | 5.5 | 4.1 |
| 27 | 55 | 249 | 141 | b58 | b50 | 32 | 78 | 212 | 35 | 7.7 | 5.0 | 3.7 |
| 28 | 43 | 304 | 316 | 53 | b48 | 135 | 58 | 154 | *31 | *5.5 | 4.5 | 3.7 |
| 29 | 35 | 202 | 288 | 58 | b46 | 665 | 52 | 112 | 28 | 6.0 | 4.5 | 3.7 |
| 30 | 30 | 167 | 216 | 55 | ----- | *2,020 | 46 | 102 | 28 | 15 | 6.5 | 3.7 |
| 31 | 157 | ----- | 160 | 49 | ----- | 2,160 | ----- | 126 | ----- | 5.5 | 5.5 | ----- |
| Total | 880.7 | 4,224 | 6,391 | 4,155 | 3,380 | 5,871 | 6,608 | 6,594 | 6,478 | 327.3 | 364.0 | 129.7 |
| Mean | 28.4 | 141 | 206 | 134 | 117 | 189 | 220 | 213 | 216 | 10.6 | 11.7 | 4.32 |
| Cfsm | 0.398 | 1.97 | 2.89 | 1.88 | 1.64 | 2.65 | 3.08 | 2.98 | 3.03 | 0.148 | 0.164 | 0.061 |
| In. | 0.46 | 2.20 | 3.33 | 2.16 | 1.76 | 3.06 | 3.44 | 3.43 | 3.37 | 0.17 | 0.19 | 0.07 |
| Calendar year 1959: Max | 2,090 | | | | Min 1.8 | Mean 104 | Cfsm 1.46 | In. 19.80 | | | | |
| Water year 1959-60: Max | 3,010 | | | | Min 3.3 | Mean 124 | Cfsm 1.74 | In. 23.64 | | | | |

Peak discharge (base, 1,200 cfs).--Feb. 11 (3 a.m.) 1,280 cfs (13.07 ft); Mar. 30 (7:15 p.m.) 2,970 cfs (14.39 ft); May 22 (12 p.m.) 1,980 cfs (13.50 ft); June 15 (7 a.m.) 5,230 cfs (16.10 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2215. Genesee River at Scio, N. Y.

Location.--Lat 42°09'50", long 77°58'50", on left bank 0.4 mile upstream from Vandermark Creek and three-quarters of a mile upstream from Scio, Allegany County.

Drainage area.--309 sq mi.

Records available.--June 1916 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,440 ft (from topographic map). Prior to Aug. 11, 1938, staff gage and Aug. 11 to Oct. 11, 1938, water-stage recorder, at same site at datum 1.0 ft higher.

Average discharge.--44 years, 392 cfs.

Extremes.--Maximum discharge during year, 12,800 cfs June 15 (gage height, 9.97 ft); minimum, 20 cfs Sept. 9 (gage height, 0.20 ft, backwater from debris).
1916-60: Maximum discharge, 19,500 cfs Jan. 22, 1959; maximum gage height, 11.22 ft Nov. 25, 1950; minimum discharge, 5.8 cfs Sept. 4, 1939; minimum gage height, 0.09 ft Sept. 14, 15, 1959.

Remarks.--Records excellent except those for periods of ice effect or backwater from aquatic vegetation or debris, which are good.

Revisions (water years).--WSP 759: Drainage area. WSP 1307: 1916.

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Dec. 12 | | | | Dec. 13 to June 15 | | | | June 16 to Sept. 30 | | | |
|-------------------|-----|-----|-------|--------------------|-------|------|--------|---------------------|-----|-----|-------|
| 0.2 | 20 | 2.0 | 366 | 0.7 | 108 | 5.0 | 2,010 | 0.2 | 22 | 3.0 | 780 |
| .5 | 56 | 3.0 | 760 | 1.0 | 164 | 7.0 | 4,000 | .5 | 60 | 4.0 | 1,320 |
| 1.0 | 131 | 4.0 | 1,500 | 1.5 | 278 | 8.0 | 5,290 | 1.0 | 144 | 5.0 | 2,010 |
| 1.5 | 231 | 5.0 | 1,990 | 2.0 | 418 | 9.0 | 7,500 | 1.5 | 256 | 6.0 | 2,890 |
| | | | | 3.0 | 790 | 10.0 | 13,000 | 2.0 | 392 | | |
| | | | | 4.0 | 1,320 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 72 | 790 | 617 | 636 | 235 | *202 | 5,730 | 253 | 531 | 204 | 53 | 34 |
| 2 | 72 | 860 | 577 | 548 | 190 | 180 | 2,950 | 246 | 412 | 190 | 45 | 32 |
| 3 | 40 | 605 | 638 | 1,330 | 160 | 185 | 2,420 | 229 | 359 | 168 | 106 | 28 |
| 4 | 32 | 525 | 609 | 845 | 160 | 180 | 2,790 | 208 | 312 | 158 | 160 | 26 |
| 5 | 27 | 738 | 525 | *594 | 188 | 190 | 1,790 | 186 | 288 | 144 | 135 | 26 |
| 6 | 43 | *1,270 | 581 | 470 | 667 | 180 | 1,310 | 172 | 246 | 131 | 105 | 26 |
| 7 | *349 | 840 | *990 | 500 | 578 | 160 | 1,060 | 160 | 227 | 122 | 80 | 23 |
| 8 | 149 | 593 | 760 | 440 | 350 | 160 | 925 | 164 | 204 | 115 | 86 | 22 |
| 9 | 101 | 486 | 643 | 360 | *342 | 160 | 860 | 684 | 186 | 110 | 80 | 22 |
| 10 | 94 | 392 | 569 | 359 | 734 | 160 | 790 | 628 | 172 | 100 | 103 | 37 |
| 11 | 69 | 324 | 533 | 359 | 2,950 | 150 | 750 | 587 | 158 | 98 | 91 | 42 |
| 12 | 59 | 345 | 1,750 | 281 | 1,150 | 145 | 890 | 538 | 402 | 91 | 70 | 56 |
| 13 | 52 | 299 | 2,950 | 1,190 | 740 | 150 | 727 | 640 | 388 | 88 | 62 | 69 |
| 14 | 51 | 296 | 1,350 | 822 | 480 | 145 | 660 | 558 | 1,480 | 100 | 57 | 52 |
| 15 | 52 | 432 | 1,030 | 988 | 520 | 140 | 652 | 507 | 7,730 | 108 | 56 | 42 |
| 16 | 48 | 304 | 1,020 | 965 | 560 | 130 | 750 | 484 | 2,400 | 89 | 57 | 33 |
| 17 | 46 | 299 | 925 | 624 | 490 | 136 | 616 | 443 | 1,150 | 78 | 53 | 34 |
| 18 | 43 | 258 | 768 | 548 | 430 | 130 | 602 | 688 | 795 | 74 | 47 | 36 |
| 19 | 40 | 238 | 648 | 504 | 434 | 132 | 521 | 507 | 588 | 75 | 43 | *34 |
| 20 | 38 | 222 | 500 | 420 | 340 | 124 | 462 | 462 | 468 | 86 | 43 | 37 |
| 21 | 37 | 216 | 443 | 360 | 370 | 130 | 437 | 590 | 384 | 72 | 43 | 40 |
| 22 | 34 | 209 | 380 | 340 | 342 | 124 | 449 | 1,260 | 355 | 64 | 43 | 38 |
| 23 | 34 | 186 | 310 | 350 | 307 | 120 | 374 | 4,990 | 348 | 60 | 42 | 33 |
| 24 | 677 | 248 | 400 | 300 | 283 | 122 | 334 | *3,610 | 902 | 60 | 40 | 33 |
| 25 | 665 | 415 | 350 | 245 | 250 | 120 | 299 | 1,970 | 523 | 54 | *36 | 29 |
| 26 | 304 | 294 | 339 | 288 | 278 | 110 | 288 | 1,310 | 358 | 49 | 34 | 26 |
| 27 | 233 | 643 | 503 | 250 | 250 | 134 | 296 | 965 | 295 | 57 | 33 | 25 |
| 28 | 194 | 1,220 | 1,060 | 253 | 236 | 544 | 345 | 745 | *256 | *57 | 32 | 24 |
| 29 | 155 | 855 | 1,390 | 258 | 229 | 2,510 | 304 | 640 | 234 | 47 | 32 | 24 |
| 30 | 131 | 702 | 995 | 256 | ----- | *6,300 | 273 | 562 | 237 | 54 | 37 | 25 |
| 31 | 308 | ----- | 776 | 243 | ----- | 7,980 | ----- | 616 | ----- | 62 | 41 | ----- |
| Total | 4,247 | 15,104 | 24,909 | 15,926 | 14,243 | 21,333 | 30,654 | 25,602 | 22,366 | 2,965 | 1,945 | 1,008 |
| Mean | 137 | 503 | 804 | 514 | 491 | 688 | 1,022 | 826 | 746 | 95.6 | 62.7 | 33.6 |
| Cfsm | 0.443 | 1.63 | 2.60 | 1.66 | 1.59 | 2.23 | 3.31 | 2.67 | 2.41 | 0.309 | 0.203 | 0.109 |
| In. | 0.51 | 1.82 | 3.00 | 1.92 | 1.71 | 2.57 | 3.69 | 3.08 | 2.69 | 0.36 | 0.23 | 0.12 |

Calendar year 1959: Max 11,800 Min 12 Mean 452 Cfsm 1.46 In. 19.89
Water year 1959-60: Max 7,980 Min 22 Mean 493 Cfsm 1.60 In. 21.70

Peak discharge (base, 3,800 cfs).--Dec. 13 (2 a.m.) 3,920 cfs (6.93 ft); Feb. 11 (8 a.m.) 4,180 cfs (7.15 ft); Mar. 31 (8:30 p.m.) 9,450 cfs (9.44 ft); May 23 (3:30 a.m.) 5,650 cfs (8.23 ft); June 15 (8:30 a.m.) 12,800 cfs (9.97 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20, 22-25, Jan. 6-9, 20-25, 27, Feb. 1-4, 8, 13-18, 20, 21, 25, 27, Mar. 3-16, 22-26. Backwater from aquatic vegetation July 17 to Aug. 4. Backwater from debris Aug. 29 to Sept. 30.

2220. Caneadea Creek at Caneadea, N. Y.

Location.--Lat 42°23'10", long 78°09'45", on left bank at Caneadea, Allegany County, 800 ft upstream from unnamed tributary and 0.6 mile upstream from mouth.

Drainage area.--61.5 sq mi.

Records available.--July 1949 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 1,240 ft (from topographic map).

Average discharge.--11 years, 91.5 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 9,600 cfs June 15 (gage height, 10.74 ft), from rating curve extended above 770 cfs on basis of hydraulic study of flood flow over Rushford Dam; minimum, 1.2 cfs Oct. 22; minimum gage height, 1.63 ft July 20-22. 1949-60: Maximum discharge, that of June 15, 1960; minimum, 0.7 cfs Nov. 11, 13, 1954; minimum daily, 0.9 cfs Nov. 13, 14, 1954; minimum gage height, 1.63 ft Oct. 21, 1949, July 20-22, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair. Considerable regulation by Rushford Lake (capacity, 1,106,000,000 cu ft) about 2 miles above station.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to June 15

June 16 to Sept. 30

| | | | | | | | |
|------|-----|-----|-------|-----|-----|-----|-------|
| 1.9 | 1.2 | 3.1 | 115 | 1.6 | 1.4 | 2.6 | 85 |
| 1.95 | 2.0 | 3.5 | 233 | 1.7 | 2.5 | 2.8 | 140 |
| 2.0 | 3.3 | 4.0 | 450 | 1.8 | 4.4 | 3.0 | 205 |
| 2.1 | 6.1 | 5.0 | 1,020 | 1.9 | 7.2 | 3.5 | 430 |
| 2.2 | 10 | 6.0 | 1,810 | 2.0 | 12 | 4.0 | 720 |
| 2.5 | 28 | 7.0 | 2,900 | 2.2 | 27 | 5.0 | 1,480 |
| 2.8 | 59 | | | 2.4 | 50 | 6.0 | 2,450 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|---------|---------|---------|---------|---------|-------|---------|----------|------|------|-------|
| 1 | 116 | 3.8 | 6.8 | b6.4 | 342 | 430 | 12 | 130 | 51 | 2.6 | 1.9 | 3.7 |
| 2 | 4.6 | 3.6 | 6.4 | b6.8 | 342 | 425 | 12 | 130 | 49 | 2.5 | 2.0 | 3.7 |
| 3 | 4.0 | 3.0 | 6.8 | b6.8 | 342 | 420 | 12 | 130 | 48 | 2.5 | 2.6 | 3.9 |
| 4 | 3.8 | 3.0 | 6.4 | b6.0 | 337 | 415 | 10 | 128 | 40 | 2.4 | 2.1 | 4.2 |
| 5 | 224 | *3.8 | 6.1 | *b6.8 | 342 | 405 | 7.2 | 128 | 35 | 2.4 | 2.5 | 4.2 |
| 6 | 400 | 4.3 | 6.4 | b7.2 | 346 | 400 | 6.4 | 77 | 32 | 2.4 | 2.0 | 4.2 |
| 7 | *155 | 3.8 | 9.4 | 17 | 346 | *400 | 6.1 | 5.8 | 26 | 2.4 | 2.0 | 4.2 |
| 8 | 7.2 | 3.6 | b8.0 | 218 | 346 | 405 | 11 | 5.4 | 23 | 2.2 | 2.0 | 4.2 |
| 9 | 5.8 | 3.3 | *b6.8 | 355 | 346 | 400 | 11 | 6.1 | 20 | 2.2 | 2.0 | 4.6 |
| 10 | 4.3 | 3.3 | b6.4 | 355 | 342 | 396 | 8.0 | 4.8 | 18 | 2.2 | 2.1 | 4.6 |
| 11 | 3.8 | 3.3 | b6.4 | 346 | 207 | 386 | 8.0 | 4.3 | 16 | 2.2 | 2.1 | 4.9 |
| 12 | 3.0 | 148 | b10 | 208 | *b8.4 | 378 | 6.8 | 4.0 | 22 | 2.0 | 2.2 | 98 |
| 13 | 2.5 | 346 | b11 | 12 | b7.2 | 364 | 7.2 | 5.8 | 31 | 2.0 | 2.2 | 155 |
| 14 | 2.2 | 346 | b9.0 | 33 | b6.2 | 360 | 15 | 6.4 | 99 | 2.4 | 2.2 | 155 |
| 15 | 1.8 | 342 | 7.6 | 294 | b17 | 360 | 8.0 | 6.1 | 2,360 | 2.1 | 2.4 | 107 |
| 16 | 1.5 | 342 | 7.2 | 470 | 20 | *350 | 7.6 | 6.1 | 2,440 | 1.9 | 2.4 | 5.4 |
| 17 | 1.4 | 342 | 7.2 | 360 | 18 | 332 | 6.1 | 6.4 | 2,170 | 1.9 | 2.4 | 5.4 |
| 18 | 1.4 | 337 | 6.8 | 332 | b16 | 150 | 5.4 | 6.4 | 1,650 | 1.9 | 2.5 | 5.4 |
| 19 | 1.4 | 332 | b6.4 | 332 | b14 | 5.2 | 5.2 | 6.1 | 812 | 1.8 | 2.5 | *5.4 |
| 20 | 1.4 | 332 | b6.8 | 332 | b37 | b5.2 | 12 | 6.4 | 418 | 1.8 | 2.6 | 5.7 |
| 21 | 1.4 | 328 | b6.8 | 328 | b54 | b4.3 | 15 | 7.6 | 314 | 1.8 | 2.6 | 5.4 |
| 22 | 1.4 | 324 | 152 | 328 | b52 | b4.3 | 14 | 37 | 115 | 1.9 | 2.8 | 5.4 |
| 23 | 1.4 | 324 | 328 | 324 | b47 | b4.0 | 13 | 102 | 73 | 1.9 | 3.0 | 5.4 |
| 24 | 5.8 | 324 | 337 | 319 | b43 | b5.6 | 13 | *177 | 75 | 1.8 | *3.0 | 5.7 |
| 25 | 3.3 | 324 | 355 | 319 | b250 | b2.5 | 13 | 310 | 47 | 1.8 | 2.8 | 5.7 |
| 26 | 2.5 | 324 | 350 | 319 | 455 | b2.8 | 83 | 209 | 4.4 | 1.8 | 3.0 | 5.7 |
| 27 | 2.5 | 148 | 346 | 319 | 450 | b5.2 | 132 | 22 | 3.9 | *2.2 | 3.0 | 5.7 |
| 28 | 2.0 | 8.4 | 350 | 314 | 440 | 7.2 | 132 | 28 | *3.3 | 2.0 | 3.1 | 5.7 |
| 29 | 1.8 | 6.8 | 237 | 324 | 440 | 10 | 130 | 32 | 3.1 | 1.9 | 3.3 | 5.7 |
| 30 | 1.8 | 6.8 | 7.2 | 342 | ----- | 17 | 130 | 35 | 2.8 | 2.2 | 3.3 | 6.0 |
| 31 | 2.8 | ----- | 6.4 | 342 | ----- | 17 | ----- | 40 | ----- | 2.0 | 3.5 | ----- |
| Total | 971.8 | 5,023.8 | 2,603.3 | 7,282.0 | 6,012.8 | 6,864.3 | 852.0 | 1,800.7 | 10,999.5 | 65.1 | 78.1 | 645.1 |
| Mean | 31.3 | 167 | 84.0 | 235 | 207 | 221 | 28.4 | 58.1 | 387 | 2.10 | 2.52 | 21.5 |

Adjusted for change in contents in Rushford Lake

| | Mean | 135 | 135 | 211 | 154 | 145 | 212 | 71.5 | 188 | 16.1 | 1.81 | 7.14 |
|---------------------|----------|-------|------|------|------|------|----------|------|------|-------|-------|-------|
| Cfsm | 2.20 | 2.20 | 3.43 | 2.50 | 2.36 | 3.45 | 3.28 | 1.16 | 3.06 | 0.262 | 0.029 | 0.116 |
| In. | 2.54 | 2.45 | 3.95 | 2.89 | 2.55 | 3.98 | 3.66 | 1.34 | 3.42 | 0.30 | 0.03 | 0.13 |
| | Observed | | | | | | Adjusted | | | | | |
| Calendar year 1959: | Max | 823 | Min | 1.4 | Mean | 108 | Mean | 113 | Cfsm | 1.84 | In. | 25.03 |
| Water year 1959-60: | Max | 2,440 | Min | 1.4 | Mean | 118 | Mean | 123 | Cfsm | 2.00 | In. | 27.24 |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2230. Genesee River at Portageville, N. Y.

Location.--Lat 42°34'10", long 78°02'45", on left bank at Portageville, Wyoming County, 300 ft downstream from small tributary, 350 ft downstream from Pennsylvania Railroad bridge, and 0.7 mile upstream from Upper Falls.

Drainage area.--982 sq mi. Prior to Oct. 1, 1946, 1,017 sq mi.

Records available.--August 1908 to September 1960. Prior to December 1945 published as "at St. Helena." Records published for both sites December 1945 to September 1950.

Gage.--Water-stage recorder. Datum of gage is 1,082.60 ft above mean sea level (levels by Corps of Engineers). Prior to Aug. 24, 1911, chain gage and Aug. 24, 1911, to Sept. 30, 1946, water-stage recorder, at site 8 miles downstream at different datum.

Average discharge.--52 years, 1,236 cfs (unadjusted).

Extremes.--Maximum discharge during year, 27,800 cfs Mar. 31 (gage height, 17.03 ft); minimum, 69 cfs Sept. 9 (gage height, 2.51 ft, backwater from debris).
1908-60: Maximum discharge, 44,400 cfs May 17, 1916 (gage height, 12.81 ft, site and datum then in use); maximum gage height, 21.70 ft Mar. 7, 1956; minimum discharge, 18 cfs Oct. 5, 17, 1913 (gage height, 1.70 ft, site and datum then in use).

Remarks.--Records good except those for periods of ice effect, which are fair. Some seasonal regulation by Rushford Lake (capacity, 1,106,000,000 cu ft) since July 1928. Diurnal fluctuation at low flow caused by powerplants.

Revisions (water years).--WSP 264: 1908. WSP 564: 1916(M). WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|--------|
| 2.4 | 59 | 5.0 | 1,410 |
| 2.7 | 99 | 6.0 | 2,650 |
| 3.0 | 164 | 8.0 | 6,320 |
| 3.5 | 335 | 12.0 | 16,200 |
| 4.0 | 800 | 16.0 | 25,600 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|---------|---------|--------|--------|-------|-------|-------|
| 1 | 1,150 | 3,390 | 1,830 | 1,610 | 1,110 | 1,160 | *18,000 | 891 | 1,660 | 490 | 169 | 89 |
| 2 | 571 | 2,900 | 1,700 | 1,390 | 1,030 | b1,020 | 9,120 | 845 | 1,260 | 446 | 108 | 88 |
| 3 | 344 | 2,360 | 1,900 | 4,150 | b840 | b960 | 8,840 | 786 | 1,020 | 405 | 155 | 83 |
| 4 | 231 | 1,620 | 2,010 | 3,480 | b860 | b840 | 9,750 | 750 | 860 | 376 | 398 | 82 |
| 5 | 216 | 2,010 | 1,730 | 1,850 | 939 | b1,000 | 5,650 | 691 | 751 | 353 | 450 | 82 |
| 6 | 894 | 2,550 | 2,150 | b1,350 | 1,740 | b1,020 | 3,740 | 646 | 678 | 318 | 348 | 78 |
| 7 | 7,200 | 2,620 | 4,100 | b1,350 | 3,110 | b960 | 3,010 | 496 | 594 | 293 | 274 | 74 |
| 8 | 2,160 | 1,650 | 2,950 | b1,350 | 1,810 | b920 | 2,620 | 463 | 540 | 278 | 215 | 73 |
| 9 | 1,080 | 1,330 | 2,300 | b1,350 | 1,620 | b920 | 2,480 | 936 | 485 | 255 | 186 | 70 |
| 10 | 744 | 1,120 | *1,970 | b1,300 | 2,150 | b920 | 2,330 | 2,480 | 441 | 238 | 186 | 74 |
| 11 | 540 | 972 | 1,720 | b1,300 | 11,800 | b900 | 2,100 | 1,630 | 405 | 228 | 180 | 78 |
| 12 | 405 | 958 | 5,370 | b1,140 | 4,970 | b860 | 2,430 | 1,610 | 670 | 215 | 200 | 65 |
| 13 | 348 | 1,310 | 12,000 | 5,100 | b2,450 | b880 | 2,340 | 1,680 | 1,400 | 203 | 169 | 186 |
| 14 | 301 | 1,420 | 4,630 | 4,570 | b1,550 | b900 | 1,980 | 1,530 | 3,970 | 231 | 150 | 228 |
| 15 | *282 | 2,060 | 2,950 | 3,530 | b1,020 | b860 | 2,270 | 1,320 | 17,500 | 248 | 142 | 224 |
| 16 | 263 | 1,610 | 2,980 | 4,430 | b1,400 | b840 | 2,650 | 1,220 | 9,950 | 235 | 142 | 159 |
| 17 | 235 | 1,410 | 3,130 | 2,510 | b1,500 | 852 | 2,140 | 1,140 | 4,890 | 218 | 153 | 107 |
| 18 | 216 | 1,400 | 2,560 | 2,010 | 1,360 | *822 | 1,920 | 1,970 | 3,350 | 209 | 129 | 94 |
| 19 | 200 | 1,240 | 2,040 | 1,770 | 1,250 | 582 | 1,640 | 1,650 | 2,490 | 197 | 120 | 93 |
| 20 | 188 | 1,170 | 1,510 | b1,500 | b860 | 558 | 1,370 | 1,260 | 1,600 | 197 | 116 | 101 |
| 21 | 175 | 1,140 | b1,220 | b1,400 | b960 | 507 | *1,240 | 1,370 | 1,360 | 188 | 116 | 103 |
| 22 | 164 | *1,220 | b1,040 | b1,350 | b1,080 | 496 | 1,310 | 2,400 | 989 | 186 | 114 | 97 |
| 23 | 159 | 1,140 | b1,140 | b1,300 | b1,060 | 480 | 1,210 | 10,700 | 838 | 241 | 110 | 91 |
| 24 | 2,200 | 1,260 | b1,200 | b1,220 | b980 | 485 | 1,060 | *8,810 | 1,360 | 186 | *108 | 88 |
| 25 | 4,300 | 2,160 | b1,350 | b1,080 | *b900 | 468 | 947 | 5,420 | 1,420 | 162 | 103 | 85 |
| 26 | 1,810 | 1,790 | b1,300 | *1,160 | 1,270 | 430 | 899 | 3,430 | 939 | 150 | 99 | 80 |
| 27 | 1,280 | 1,830 | 1,630 | 1,120 | b1,250 | 496 | 1,270 | 2,310 | 730 | *167 | 96 | 78 |
| 28 | 1,070 | 4,030 | 3,450 | 1,120 | b1,250 | 1,050 | 1,300 | 1,750 | *626 | 164 | 91 | 78 |
| 29 | 822 | 2,840 | 5,300 | 1,120 | 1,240 | 6,320 | 1,060 | 1,460 | 558 | 154 | 88 | 76 |
| 30 | 665 | 2,160 | 3,060 | 1,160 | ----- | 21,500 | 947 | 1,310 | 512 | 184 | 94 | 78 |
| 31 | 750 | ----- | 2,150 | 1,070 | ----- | *24,300 | ----- | 1,440 | ----- | 203 | 93 | ----- |
| Total | 30,942 | 54,710 | 84,360 | 60,140 | 53,259 | 74,406 | 97,603 | 64,376 | 63,756 | 7,598 | 5,062 | 3,002 |
| Mean | 998 | 1,824 | 2,721 | 1,940 | 1,837 | 2,400 | 3,253 | 2,077 | 2,125 | 245 | 163 | 100 |

Adjusted for change in contents in Rushford Lake

| | Mean | 1,102 | 1,791 | 2,848 | 1,859 | 1,774 | 2,391 | 3,427 | 2,090 | 1,947 | 259 | 163 | 85.7 |
|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cfsm | | 1.12 | 1.82 | 2.90 | 1.89 | 1.81 | 2.43 | 3.49 | 2.13 | 1.98 | 0.264 | 0.166 | 0.087 |
| In. | | 1.29 | 2.04 | 3.34 | 2.18 | 1.95 | 2.61 | 3.89 | 2.45 | 2.21 | 0.30 | 0.19 | 0.10 |

| | Observed | | | | Adjusted | | | |
|---------------------|----------|--------|-----|----|----------|-------|------|-------|
| Calendar year 1959: | Max | 27,400 | Min | 60 | Mean | 1,529 | Mean | 1,534 |
| Water year 1959-60: | Max | 24,300 | Min | 70 | Mean | 1,637 | Mean | 1,642 |
| | | | | | | | Cfsm | 1.56 |
| | | | | | | | Cfsm | 1.67 |
| | | | | | | | In. | 21.20 |
| | | | | | | | In. | 22.75 |

Peak discharge (base, 15,000 cfs).--Dec. 13 (5 a.m.) 15,100 cfs (11.60 ft); Mar. 31 (3:30 a.m.) 27,800 cfs (17.03 ft); June 15 (6 p.m.) 21,500 cfs (14.12 ft).

* Discharge measurement made on this day.
b Stage-discharge relation affected by ice.

2240. Mount Morris Reservoir near Mount Morris, N. Y.

Location.--Lat 42°44'00", long 77°54'40", at Mount Morris Dam on Genesee River, 2½ miles northwest of Mount Morris, Livingston County, 5 miles upstream from Canaseraga Creek, and 40 miles upstream from mouth.

Drainage area.--1,077 sq mi (measured by Corps of Engineers).

Records available.--January 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers). Prior to Apr. 8, 1952, reference point at same site and datum.

Extremes.--Maximum elevation during year, 719.4 ft Apr. 5 (contents, 215,980 acre-ft); minimum, 586.4 ft Mar. 26 (contents, 868 acre-ft).
1952-60: Maximum elevation, that of Apr. 5, 1960; minimum, 585.2 ft Sept. 14, 1952 (contents, 643.6 acre-ft).

Remarks.--Reservoir is formed by a concrete gravity-type dam with overflow spillway, completed by Corps of Engineers in 1951 for flood control; first used for flood regulation on Nov. 24, 1951. Usable capacity, 337,000 acre-ft between elevations 585.0 ft (sill of conduits) and 760.0 ft (crest of spillway). Dead storage, 609 acre-ft. Floods are controlled by the operation of nine gates. Water is stored during high flows and released when downstream conditions warrant.

Cooperation.--Capacity table furnished by Corps of Engineers.

Revisions (water years).--WSP 1437: 1955.

Capacity table, water year 1959-60 (elevation, in feet, and contents, in acre-feet)

| | | | | | |
|-------|--------|-------|--------|-------|---------|
| 586.0 | 782 | 620.0 | 19,800 | 680.0 | 119,800 |
| 588.0 | 1,210 | 630.0 | 30,500 | 690.0 | 142,500 |
| 590.0 | 1,730 | 640.0 | 43,700 | 700.0 | 166,300 |
| 595.0 | 3,410 | 650.0 | 59,800 | 710.0 | 191,400 |
| 600.0 | 5,610 | 660.0 | 78,200 | 720.0 | 217,600 |
| 610.0 | 11,600 | 670.0 | 98,300 | | |

Elevation, in feet, at 12 p.m., water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|-------|--------|-------|-------|-------|----------|----------|-------|--------|-------|-------|-------|
| 1 | 599.3 | 601.1 | 590.0 | 590.1 | 589.0 | 588.7 | 694.6 | 588.2 | 590.7 | 597.8 | 596.9 | 595.4 |
| 2 | 597.3 | 598.9 | 589.8 | 589.7 | 588.0 | 588.3 | 702.6 | 588.0 | 590.0 | 597.9 | 596.7 | 595.4 |
| 3 | 597.4 | 594.3 | 590.5 | 599.4 | 587.6 | 588.2 | 710.2 | 587.8 | 590.2 | 597.9 | 597.2 | 595.7 |
| 4 | 596.8 | 589.3 | 590.4 | 592.7 | 587.6 | 588.1 | 717.7 | 587.5 | 590.5 | 598.0 | 598.1 | 595.9 |
| 5 | 597.4 | 590.7 | 589.8 | 590.0 | 587.8 | 588.3 | 719.4 | 587.3 | 591.2 | 598.2 | 598.9 | 596.1 |
| 6 | 598.6 | 591.7 | 591.2 | 589.4 | 592.4 | 589.0 | 717.7 | 587.1 | 592.2 | 596.1 | 599.0 | 596.3 |
| 7 | 615.6 | 590.6 | 584.1 | 589.8 | 591.5 | 588.9 | 714.5 | 586.8 | 594.2 | 597.9 | 598.6 | 596.5 |
| 8 | 604.0 | 589.4 | 592.1 | 589.5 | 590.0 | 588.8 | 710.3 | 586.7 | 595.2 | 597.9 | 597.9 | 596.6 |
| 9 | 598.3 | 588.7 | 591.1 | 589.3 | 589.8 | 588.6 | 705.7 | 588.6 | 595.2 | 597.7 | 597.4 | 596.8 |
| 10 | 597.3 | 588.1 | 590.4 | 589.7 | 593.0 | 588.4 | 700.5 | 590.8 | 596.1 | 597.4 | 597.2 | 596.9 |
| 11 | 598.2 | 587.8 | 590.0 | 589.6 | 623.3 | 588.3 | 694.8 | 589.8 | 597.2 | 597.5 | 597.2 | 597.0 |
| 12 | 598.6 | 587.8 | 604.9 | 589.2 | 622.3 | 588.1 | 689.1 | 589.6 | 598.8 | 597.4 | 597.3 | 597.2 |
| 13 | 598.5 | 589.1 | 628.0 | 610.9 | 612.1 | 587.9 | 683.1 | 590.4 | 599.4 | 597.5 | 597.3 | 597.9 |
| 14 | 598.0 | 589.2 | 626.0 | 612.4 | 588.3 | 587.7 | 676.7 | 589.4 | 605.2 | 597.5 | 597.1 | 598.7 |
| 15 | 597.6 | 590.5 | 615.8 | 616.1 | 588.8 | 587.5 | 670.3 | 589.0 | 634.5 | 598.1 | 596.9 | 599.3 |
| 16 | 597.3 | 589.4 | 597.2 | 621.8 | 589.1 | 587.2 | 664.2 | 588.8 | 642.5 | 598.2 | 596.9 | 599.3 |
| 17 | 597.2 | 589.1 | 592.4 | 612.5 | 589.1 | 587.2 | 657.5 | 590.7 | 643.1 | 598.1 | 597.1 | 598.8 |
| 18 | 597.3 | 589.1 | 591.5 | 590.8 | 589.1 | 587.1 | 650.2 | 591.6 | 638.5 | 598.0 | 597.2 | 598.2 |
| 19 | 597.2 | 588.9 | 590.6 | 590.1 | 588.3 | 587.0 | 640.8 | 589.7 | 629.6 | 597.7 | 597.2 | 597.7 |
| 20 | 596.9 | 588.9 | 589.5 | 589.8 | 588.0 | 586.9 | 629.1 | 589.3 | 612.0 | 597.7 | 597.3 | 597.6 |
| 21 | 596.6 | 588.9 | 588.8 | 589.4 | 588.3 | 586.8 | 609.4 | 589.8 | 597.8 | 597.9 | 597.3 | 597.5 |
| 22 | 596.1 | 589.1 | 588.6 | 589.3 | 588.3 | 586.7 | 588.9 | 592.6 | 597.9 | 598.0 | 597.2 | 597.3 |
| 23 | 595.6 | 588.8 | 588.8 | 589.2 | 588.3 | 586.6 | 588.6 | 619.8 | 598.2 | 598.2 | 597.2 | 597.1 |
| 24 | 600.2 | 589.1 | 589.1 | 589.0 | 588.2 | 586.6 | 588.4 | 626.3 | 598.0 | 598.0 | 597.1 | 596.8 |
| 25 | 600.9 | 590.8 | 589.3 | 588.9 | 587.9 | 586.5 | 588.1 | 624.1 | 598.0 | 597.4 | 597.0 | 596.5 |
| 26 | 599.3 | 589.7 | 589.4 | 588.9 | 589.2 | 586.4 | 587.8 | 616.3 | 597.7 | 597.0 | 596.8 | 596.2 |
| 27 | 598.7 | 590.2 | 590.9 | 589.9 | 589.2 | 589.0 | 589.4 | 598.5 | 598.1 | 596.8 | 596.6 | 596.3 |
| 28 | 598.1 | 595.4 | 584.3 | 588.9 | 589.1 | 589.4 | 588.9 | 590.7 | 597.6 | 596.8 | 596.4 | 596.5 |
| 29 | 597.7 | 591.6 | 597.1 | 589.0 | 589.0 | 618.8 | 588.6 | 590.2 | 597.7 | 596.6 | 596.1 | 596.6 |
| 30 | 597.1 | 590.5 | 592.3 | 589.1 | ----- | 653.3 | 588.4 | 589.9 | 597.9 | 596.5 | 595.9 | 596.8 |
| 31 | 596.3 | ----- | 590.9 | 588.9 | ----- | 678.7 | ----- | 590.6 | ----- | 595.7 | 595.7 | ----- |
| (†) | 3,929 | 1,880 | 2,000 | 1,444 | 1,470 | 116,940 | 1,314 | 1,910 | 4,617 | 4,101 | 3,683 | 4,144 |
| (‡) | -387 | -2,049 | +120 | -556 | +26 | +115,470 | -115,626 | +596 | +2,707 | -516 | -418 | +461 |

Calendar year 1959..... † +1,088

Water year 1959-60..... ‡ -172

† Contents, in acre-feet, at end of month.

‡ Change in contents in acre-feet.

Note.--No gage-height record Nov. 9-14, 17-24, Dec. 21-24, Jan. 24 to Feb. 5, Feb. 14 to Mar. 27, Apr. 22-26, Apr. 28 to May 9, May 15, 16; elevation at 12 p.m. estimated from reconstructed gage-height graph based on record for adjacent days and records for Genesee River at Jones Bridge near Mount Morris.

2250. Canaseraga Creek near Dansville, N. Y.

Location.--Lat 42°33'40", long 77°42'55", on left bank just downstream from Ossian Street Bridge, half a mile downstream from Mill Creek and 1 mile west of Dansville, Livingston County.

Drainage area.--153 sq mi. October 1917 to September 1919, October 1938 to September 1940, 155 sq mi.

Records available.--July 1910 to December 1912, July 1915 to June 1917, October 1917 to September 1919 (published as "at Cumminsville"), March 1919 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 640.00 ft above mean sea level (levels by New York State Conservation Commission). Prior to Oct. 19, 1920, staff gage at or within 1 mile of present site at various datums. Oct. 19, 1920, to Sept. 30, 1938, water-stage recorder at present site and datum, and Oct. 1, 1938, to Oct. 8, 1940, at site 0.9 mile downstream at datum 15.70 ft lower.

Average discharge.--45 years (1910-12, 1915-16, 1917-19, 1920-60), 154 cfs.

Extremes.--Maximum discharge during year, 5,170 cfs Mar. 30 (gage height, 11.26 ft); minimum, 17 cfs Sept. 8 (gage height, 5.59 ft).

1910-12, 1915-60: Maximum discharge at present site, 8,830 cfs July 23, 1940 (gage height, 13.1 ft, from floodmark); maximum gage height at present site, 13.68 ft Mar. 7, 1956; maximum discharge at former site, 9,110 cfs July 23, 1940 (gage height, 9.93 ft), from rating curve extended above 2,100 cfs on basis of slope-area measurement of peak flow; minimum daily, 3 cfs Apr. 28, 1912.

Remarks.--Records fair.

Revisions (water years).--WSP 604: 1923-24. WSP 759: Drainage area. WSP 894: 1935. WSP 1387: 1919.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 125 | 388 | 210 | 220 | 114 | *120 | 1,680 | 121 | 364 | a80 | 40 | 25 |
| 2 | 76 | 265 | 206 | 205 | 104 | 118 | 1,000 | 114 | 220 | a74 | 40 | 23 |
| 3 | 50 | 174 | 240 | 500 | 100 | 116 | 1,070 | 104 | 184 | a70 | 29 | 23 |
| 4 | 38 | 153 | 245 | 540 | 90 | 116 | 1,280 | 93 | 153 | a58 | 58 | 25 |
| 5 | 43 | 225 | 230 | 280 | 102 | 125 | 716 | 90 | 141 | a64 | 50 | 26 |
| 6 | 96 | 220 | 332 | 210 | 220 | 135 | 511 | *87 | 128 | a62 | 45 | 26 |
| 7 | 1,820 | 179 | 658 | 190 | 270 | 130 | 430 | 82 | 110 | a60 | 43 | 22 |
| 8 | 400 | 145 | 460 | 170 | 170 | 122 | 394 | 82 | 104 | a58 | 41 | 20 |
| 9 | 179 | 124 | *360 | 155 | 165 | 120 | 300 | 388 | 96 | a54 | 40 | 22 |
| 10 | 128 | 110 | 300 | 140 | 235 | 116 | 260 | 354 | 90 | a52 | 38 | 25 |
| 11 | 96 | 100 | 270 | 135 | 1,080 | 116 | 230 | 280 | 87 | a52 | 38 | 28 |
| 12 | 79 | 114 | 1,300 | 130 | 460 | 112 | 225 | 250 | 186 | a50 | 36 | 34 |
| 13 | 68 | 118 | 1,800 | 390 | 290 | 110 | 215 | 260 | 206 | a52 | 36 | 36 |
| 14 | *63 | 121 | 580 | 320 | 200 | 108 | 197 | 202 | 664 | *a58 | 34 | 29 |
| 15 | 58 | 179 | 400 | 480 | 165 | 106 | 255 | 170 | 2,000 | a52 | 36 | 26 |
| 16 | *54 | 132 | 420 | 450 | 180 | 102 | 328 | 162 | 720 | a50 | *34 | 29 |
| 17 | 50 | *124 | 450 | 300 | 190 | 100 | 270 | 157 | 348 | a62 | *33 | 28 |
| 18 | 45 | 110 | 370 | 240 | 200 | 96 | 230 | 332 | 220 | a76 | 33 | 29 |
| 19 | 43 | 100 | 290 | 220 | 180 | *92 | 210 | 208 | 179 | 58 | 33 | 28 |
| 20 | *41 | 93 | 240 | 190 | 155 | 88 | *197 | 206 | 157 | 56 | 34 | 33 |
| 21 | 40 | 90 | 200 | 165 | 180 | 90 | 188 | 286 | 132 | 50 | 33 | 31 |
| 22 | 38 | 96 | 165 | 155 | 170 | 90 | 192 | 533 | *124 | 52 | 33 | 29 |
| 23 | 38 | 87 | 140 | 145 | 160 | 86 | 179 | 1,540 | 118 | 61 | 33 | 28 |
| 24 | 200 | 100 | 145 | 135 | 150 | 82 | 157 | 940 | 114 | 52 | 33 | 28 |
| 25 | 326 | 153 | 140 | 114 | 145 | 74 | 149 | 539 | 104 | 50 | 31 | 28 |
| 26 | 162 | 136 | 150 | 120 | *160 | 72 | 136 | 388 | 93 | 45 | 29 | 25 |
| 27 | 141 | 225 | 230 | *110 | 150 | 117 | 174 | 295 | 86 | 43 | 28 | 25 |
| 28 | 118 | 412 | 480 | 120 | 140 | 394 | 149 | 240 | 82 | 43 | 26 | *26 |
| 29 | 104 | 285 | 520 | 124 | 135 | 1,420 | 132 | 210 | 82 | 41 | 25 | 25 |
| 30 | 90 | 235 | 340 | 120 | ----- | 3,870 | 128 | 202 | 88 | 40 | 28 | *26 |
| 31 | 110 | ----- | 270 | 110 | ----- | *3,290 | ----- | 305 | ----- | 47 | 26 | ----- |
| Total | 4,919 | 4,993 | 12,141 | 6,883 | 6,060 | 11,833 | 11,590 | 9,218 | 7,380 | 1,732 | 1,146 | 807 |
| Mean | 159 | 166 | 392 | 222 | 209 | 382 | 386 | 297 | 246 | 55.9 | 37.0 | 26.9 |
| Cfsm | 1.04 | 1.08 | 2.56 | 1.45 | 1.37 | 2.50 | 2.52 | 1.94 | 1.61 | 0.365 | 0.242 | 0.176 |
| In. | 1.20 | 1.21 | 2.95 | 1.67 | 1.47 | 2.88 | 2.82 | 2.24 | 1.79 | 0.42 | 0.28 | 0.20 |

Calendar year 1959: Max 2,150 Min 18 Mean 188 Cfsm 1.23 In. 16.69
 Water year 1959-60: Max 3,870 Min 20 Mean 215 Cfsm 1.41 In. 19.13

Peak discharge (base, 2,000 cfs).--Oct. 7 (5 a.m.) 4,960 cfs (11.13 ft); Dec. 13 (3:15 a.m.) about 4,100 cfs; Mar. 30 (6:30 p.m.) 5,170 cfs (11.26 ft); May 22 (11:30 p.m.) 2,860 cfs (9.64 ft); June 15 (5:15 a.m.) 3,440 cfs (10.11 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge was estimated on basis of discharge measurements, weather records, engineer's notes, and records for nearby stations.

Note.--Stage-discharge relation affected by ice Dec. 21-25, Jan. 5-7, Feb. 2-4, 12-18, 20-26, Mar. 2-26.

2255. Canaseraga Creek at Groveland, N. Y.

Location.--Lat 42°39'45", long 77°46'10", on left bank at downstream side of highway bridge at Groveland, Livingston County, 0.2 mile downstream from small tributary.

Drainage area.--181 sq mi.

Records available.--August 1915 to September 1916 (gage heights and discharge measurements only) and February 1917 to March 1920 (no winter records in 1917, 1918, 1920), published as "at Groveland Station"; October 1955 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 565.42 ft above mean sea level (levels by Corps of Engineers). Prior to Mar. 30, 1916, inclined staff gage at site 400 ft upstream at datum about 5.42 ft lower. Mar. 30, 1916, to Mar. 31, 1920, chain gage on downstream side of bridge at practically same datum as inclined staff gage.

Average discharge.--6 years (1918-19, 1955-60), 199 cfs.

Extremes.--Maximum discharge during year, 3,800 cfs Mar. 30 (gage height, 13.43 ft); minimum, 26 cfs Sept. 8 (gage height, 2.20 ft).
1917-20, 1955-60: Maximum discharge observed, 4,380 cfs May 22, 1919 (gage height, 18.05 ft); minimum, 18 cfs Oct. 2, 5, 1955 (gage height, 1.96 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Overflow of left bank occurs upstream at extremely high stages. Water returns to channel below station.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1-7 | | | | Oct. 7 to Mar. 30 | | | | Mar. 31 to Sept. 30 | | | |
|----------|-----|------|-------|-------------------|-----|------|-------|--|----|-----|-----|
| 2.4 | 40 | 4.0 | 240 | 2.6 | 43 | 7.0 | 810 | 2.2 | 26 | 3.0 | 85 |
| 2.5 | 47 | 6.0 | 695 | 3.0 | 74 | 8.0 | 1,080 | 2.5 | 44 | 4.0 | 212 |
| 3.0 | 92 | 8.0 | 1,210 | 3.5 | 134 | 9.0 | 1,340 | Note.--Same as preceding table above 4.0 ft. | | | |
| 3.5 | 156 | 10.0 | 1,860 | 4.0 | 212 | 10.0 | 1,640 | | | | |
| | | | | 5.0 | 382 | 12.0 | 2,470 | | | | |
| | | | | 6.0 | 580 | 14.0 | 3,600 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|-------|-------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 178 | 360 | 249 | 257 | 137 | 144 | *2,070 | 151 | 438 | 93 | 50 | 30 |
| 2 | 114 | 282 | 252 | 255 | b125 | b145 | 1,170 | 144 | 276 | 50 | 48 | 30 |
| 3 | 57 | 210 | 290 | 591 | b120 | b140 | 1,170 | 132 | 223 | 85 | 95 | 29 |
| 4 | 44 | 191 | 289 | a620 | b110 | b140 | 1,390 | 121 | 190 | 83 | 72 | 29 |
| 5 | 44 | 244 | 281 | a330 | 126 | b150 | 845 | 113 | 168 | 79 | 63 | 30 |
| 6 | 120 | 242 | 384 | b270 | 249 | b180 | 601 | 105 | 153 | 77 | 56 | 28 |
| 7 | 1,840 | 212 | 806 | b225 | 514 | b155 | 488 | 99 | 137 | 73 | 52 | 28 |
| 8 | 472 | 170 | 522 | b205 | 206 | b150 | 408 | 102 | 124 | 71 | 50 | 27 |
| 9 | 276 | 148 | 404 | b190 | 202 | b145 | 353 | 416 | 117 | 66 | 48 | 28 |
| 10 | 190 | 133 | 348 | b175 | 294 | b140 | 319 | 434 | 110 | 64 | 47 | 29 |
| 11 | 136 | 119 | 312 | 166 | 1,250 | b140 | 284 | 339 | 106 | 63 | 47 | 32 |
| 12 | 107 | 127 | 1,290 | b160 | b540 | b140 | 276 | 301 | 229 | 61 | 44 | a37 |
| 13 | 92 | 131 | 1,770 | 469 | b350 | b135 | 265 | 312 | 244 | 62 | 44 | a45 |
| 14 | 82 | 136 | 725 | 393 | b250 | b130 | 242 | 255 | 657 | 72 | 43 | a36 |
| 15 | 75 | 199 | *478 | 578 | b200 | b130 | 292 | 217 | 1,970 | 66 | 45 | a32 |
| 16 | *67 | 155 | 508 | 552 | b210 | 126 | 364 | 206 | 814 | 61 | 44 | a35 |
| 17 | 61 | *144 | 528 | 353 | b230 | 124 | 321 | 211 | 400 | 76 | a40 | 33 |
| 18 | 59 | 133 | 438 | 292 | b240 | *115 | 289 | 387 | 284 | 91 | a41 | 32 |
| 19 | 55 | 116 | 346 | 265 | 225 | 108 | 260 | 268 | 228 | 71 | a40 | 33 |
| 20 | 52 | 108 | 282 | 228 | 194 | 105 | *231 | 244 | 190 | 72 | a40 | 37 |
| 21 | 50 | 107 | b240 | 201 | 212 | 107 | 215 | 344 | *161 | 62 | a40 | 36 |
| 22 | 49 | 110 | b200 | 186 | 207 | 106 | 233 | 648 | 149 | 61 | a40 | 33 |
| 23 | 49 | 102 | b170 | 172 | 198 | 100 | 206 | *1,660 | 144 | 76 | *39 | 32 |
| 24 | 189 | 108 | b175 | 161 | 183 | b98 | 185 | 1,110 | 145 | 63 | 39 | 32 |
| 25 | 328 | 172 | b170 | 146 | b180 | 95 | 171 | 650 | 127 | 59 | 36 | 30 |
| 26 | 201 | 155 | b180 | 150 | *b200 | b90 | 161 | 468 | 114 | *55 | 35 | 30 |
| 27 | 172 | 210 | b270 | *138 | 170 | 142 | 217 | 350 | 104 | 54 | 33 | 30 |
| 28 | 158 | 417 | 583 | 144 | 158 | 447 | 196 | 286 | 97 | 53 | a32 | 32 |
| 29 | 126 | 312 | 632 | 148 | 156 | 1,290 | 168 | 258 | 97 | 50 | a31 | 30 |
| 30 | 105 | 268 | 408 | 142 | ----- | 3,000 | 155 | 247 | 105 | 49 | a32 | 32 |
| 31 | 128 | ----- | 326 | 130 | ----- | 3,100 | ----- | 366 | ----- | 57 | a31 | ----- |
| Total | 5,676 | 5,521 | 13,856 | 8,292 | 7,236 | 11,297 | 13,565 | 10,944 | 8,301 | 2,115 | 1,397 | 958 |
| Mean | 183 | 184 | 447 | 267 | 250 | 364 | 452 | 353 | 277 | 68.2 | 45.1 | 31.9 |
| Cfsm | 1.01 | 1.02 | 2.47 | 1.48 | 1.38 | 2.01 | 2.50 | 1.95 | 1.53 | 0.377 | 0.249 | 0.176 |
| In. | 1.17 | 1.13 | 2.85 | 1.70 | 1.49 | 2.32 | 2.79 | 2.25 | 1.71 | 0.43 | 0.29 | 0.20 |

Calendar year 1959: Max 2,200 Min 22 Mean 220 Cfsm 1.22 In. 16.49
Water year 1959-60: Max 3,100 Min 27 Mean 244 Cfsm 1.35 In. 18.33

Peak discharge (base, 2,200 cfs).--Oct. 7 (9:30 a.m.) 3,280 cfs (13.27 ft); Dec. 13 (1:15 a.m.) 2,730 cfs (12.51 ft); Mar. 30 (12 p.m.) 3,800 cfs (13.43 ft); June 15 (8 a.m.) 2,850 cfs (12.70 ft)

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

b Stage-discharge relation affected by ice.

2270. Canaseraga Creek at Shakers Crossing, N. Y.

Location.--Lat 42°44'15", long 77°50'30", on left bank at upstream side of highway bridge at Shakers Crossing, Livingston County, about 1 mile upstream from mouth and 1½ miles northeast of Mount Morris.

Drainage area.--333 sq mi.

Records available.--July 1915 to September 1922 (gage heights only), November 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 545.30 ft above mean sea level (levels by Corps of Engineers). Prior to November 1958, at site 40 ft downstream at datum 5.30 ft lower.

Extremes.--Maximum discharge during year, 4,350 cfs Apr. 1 (gage height, 11.99 ft); minimum, 24 cfs Sept. 9 (gage height, 2.84 ft).

1958-60: Maximum discharge, that of Apr. 1, 1960; minimum, 23 cfs Sept. 10, 1959; minimum gage height, that of Sept. 9, 1960.

1915-22: Maximum gage height, 23.62 ft (present datum) May 17, 1916 (backwater from Genesee River).

Remarks.--Records good except those for periods of ice effect, no gage-height record, or backwater from Genesee River, which are fair.

Rating tables, water year 1959-60, except periods of ice effect or backwater from the Genesee River (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1-7 | | | | Oct. 8 to Feb. 11 | | | | Feb. 12 to Sept. 30 | | | |
|----------|-----|-----|-------|-------------------|-----|------|-------|---------------------|-----|------|-------|
| 3.1 | 50 | 6.0 | 640 | 3.1 | 54 | 6.0 | 650 | 2.8 | 20 | 6.0 | 740 |
| 3.5 | 114 | 7.0 | 960 | 3.5 | 119 | 7.0 | 960 | 3.0 | 44 | 8.0 | 1,500 |
| 4.0 | 204 | 9.0 | 1,930 | 4.0 | 214 | 9.0 | 1,930 | 3.5 | 128 | 10.0 | 2,680 |
| 5.0 | 402 | | | 5.0 | 419 | 11.0 | 3,420 | 4.0 | 233 | 12.0 | 4,360 |
| | | | | | | | | 5.0 | 469 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 252 | 400 | 397 | 485 | 230 | 260 | *4,260 | 214 | 614 | 136 | 65 | 31 |
| 2 | 204 | 370 | 397 | 445 | 192 | 250 | *3,530 | 201 | 469 | 130 | 57 | 30 |
| 3 | 89 | 320 | 503 | 1,040 | b170 | 250 | 2,600 | 190 | 381 | 115 | 101 | 27 |
| 4 | 62 | 290 | 509 | 1,120 | b175 | 231 | 2,300 | 179 | 321 | 110 | 112 | 28 |
| 5 | 54 | 330 | 470 | 567 | 198 | 246 | 1,700 | 162 | 275 | 99 | 76 | 30 |
| 6 | 139 | 330 | 542 | 505 | 460 | b250 | 1,200 | 156 | 248 | 97 | 69 | 28 |
| 7 | 1,450 | 310 | 1,300 | 441 | 600 | b230 | 960 | 148 | 216 | 90 | 85 | 28 |
| 8 | 720 | 260 | 1,060 | 404 | 400 | b225 | 900 | 142 | 194 | 88 | 60 | 26 |
| 9 | 500 | 228 | 760 | 327 | 384 | b215 | 700 | 398 | 177 | 81 | 55 | 25 |
| 10 | 368 | 204 | 645 | 309 | 560 | b210 | 640 | 620 | 164 | 76 | 51 | 30 |
| 11 | 276 | 178 | 553 | 297 | 2,000 | b205 | 560 | 480 | 152 | 76 | 50 | 30 |
| 12 | 218 | 172 | 1,700 | 283 | 1,100 | b200 | 540 | 462 | 248 | 71 | 48 | 39 |
| 13 | 178 | 190 | 3,000 | 760 | 700 | b190 | 520 | 454 | 566 | 73 | 46 | 54 |
| 14 | 151 | 198 | 1,800 | 680 | 520 | b185 | 480 | 405 | 471 | 123 | 46 | 44 |
| 15 | *131 | 303 | *1,160 | 920 | 430 | *185 | *560 | 335 | 2,200 | 105 | 46 | 36 |
| 16 | 112 | 255 | 1,200 | 900 | *480 | b185 | 700 | 301 | 1,400 | 81 | 50 | 42 |
| 17 | 94 | 220 | 1,250 | 640 | 499 | b180 | 600 | 390 | 920 | 73 | 47 | 40 |
| 18 | 87 | *204 | *918 | 540 | 489 | *b190 | 560 | 983 | 680 | 121 | 42 | 35 |
| 19 | 82 | 180 | 730 | *505 | 459 | 205 | *500 | 575 | 560 | 83 | 40 | 37 |
| 20 | *75 | 166 | 590 | 417 | 359 | 197 | 450 | 436 | *460 | 87 | 40 | 48 |
| 21 | 71 | 163 | 494 | 364 | 383 | 212 | 410 | 492 | 390 | 73 | 42 | 55 |
| 22 | 68 | *168 | 432 | 353 | 390 | 208 | 380 | 697 | 323 | a72 | 42 | 43 |
| 23 | 68 | 161 | b430 | 303 | 363 | 194 | 354 | *1,500 | *285 | a89 | *42 | 36 |
| 24 | 203 | 163 | b390 | 283 | 345 | 199 | 306 | 1,400 | 270 | a74 | 40 | 36 |
| 25 | 520 | 280 | 382 | b245 | 299 | 183 | 271 | 1,040 | 235 | a69 | 39 | 33 |
| 26 | 310 | 268 | 386 | *251 | *347 | 178 | 246 | 800 | 212 | *a84 | 36 | 33 |
| 27 | 240 | 270 | 583 | 234 | 325 | 221 | 304 | 660 | 61 | 35 | 35 | 32 |
| 28 | 214 | 680 | 1,000 | 234 | 304 | 1,020 | 309 | 560 | 166 | 61 | 33 | 33 |
| 29 | 170 | 580 | 1,140 | 238 | 299 | 1,860 | 254 | 512 | 152 | 60 | 32 | 32 |
| 30 | 142 | 440 | 800 | 230 | ----- | 3,120 | 227 | 459 | 156 | 57 | 32 | 32 |
| 31 | 144 | ----- | 600 | 220 | ----- | *3,640 | ----- | 534 | ----- | 61 | 36 | ----- |
| Total | 7,392 | 8,281 | 26,121 | 14,520 | 13,460 | 15,324 | 27,321 | 15,885 | 12,991 | 2,656 | 1,575 | 1,053 |
| Mean | 238 | 276 | 843 | 468 | 464 | 494 | 911 | 512 | 433 | 85.7 | 50.8 | 35.1 |
| Cfs/m | 0.715 | 0.829 | 2.53 | 1.41 | 1.39 | 1.48 | 2.74 | 1.54 | 1.30 | 0.257 | 0.153 | 0.105 |
| In. | 0.83 | 0.92 | 2.92 | 1.62 | 1.50 | 1.71 | 3.05 | 1.77 | 1.45 | 0.30 | 0.18 | 0.12 |

Calendar year 1959: Max 3,000 Min 24 Mean 336 Cfs/m 1.01 In. 13.90

Water year 1959-60: Max 4,260 Min 25 Mean 400 Cfs/m 1.20 In. 16.37

Peak discharge (base, 3,000 cfs).--Dec. 13 (3 a.m.) 3,490 cfs (11.31 ft); Apr. 1 (9:45 a.m.) 4,350 cfs (11.99 ft); June 15 (about 11 a.m.) about 3,100 cfs.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for upstream and downstream stations.

b Stage-discharge relation affected by ice.

Note.--Backwater from Genesee River Oct. 7-9, 25, 26, Nov. 1-8, 28-30, Dec. 7-9, 12-17, 28-31, Jan. 3, 4, 13-18, Feb. 6-8, 11-16, Apr. 3-22, May 11, 12, 23-28, June 15-21, 24, 25.

2275. Genesee River at Jones Bridge, near Mount Morris, N. Y.

Location.--Lat 42°45'55", long 77°50'25", on right bank at Jones Bridge, 1½ miles downstream from Canaseraga Creek and 3½ miles northeast of Mount Morris, Livingston County.

Drainage area.--1,419 sq mi.

Records available.--May 1903 to April 1906, August 1908 to April 1914, July 1915 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 540.00 ft above mean sea level (levels by New York State Conservation Commission). Prior to Sept. 11, 1915, chain gage on bridge at datum 2.73 ft lower.

Average discharge.--50 years (1908-13, 1915-60), 1,615 cfs (unadjusted).

Extremes.--Maximum discharge during year, 10,400 cfs Apr. 20 (gage height, 15.18 ft); minimum, 52 cfs Sept. 29, 30 (gage height, 1.01 ft, backwater from aquatic vegetation); minimum daily, 69 cfs Sept. 10.

1903-6, 1908-14, 1915-60: Maximum discharge, 55,100 cfs May 17, 1916 (gage height, 25.44 ft); minimum, 12 cfs July 23, 1955 (gage height, 0.22 ft, partly obstructed intake); minimum daily, 30 cfs Aug. 8, 1909.

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation, which are fair. Diurnal fluctuation at low flow caused by powerplants. Flow regulated to some extent by Rushford Lake (capacity, 1,106,000,000 cu ft); since July 1928 and, at high flows, since November 1951 by Mount Morris Reservoir (see p.294).

Revisions (water years).--WSP 759: Drainage area. WSP 1277: 1952. WSP 1387: 1913. WSP 1437: 1955.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|-------|-------|
| 1 | 1,400 | 2,510 | 2,320 | 2,380 | 1,420 | 1,550 | 4,100 | 1,330 | 2,500 | 718 | 230 | 148 |
| 2 | 1,320 | 3,530 | 2,140 | 2,100 | 1,340 | 1,400 | 3,570 | 1,260 | 2,140 | 658 | 224 | 136 |
| 3 | 498 | 3,210 | 2,360 | 3,730 | 1,070 | 1,350 | 3,080 | 1,190 | 1,680 | 588 | 230 | 119 |
| 4 | 418 | 2,240 | 2,570 | 5,780 | 1,020 | 1,180 | 3,180 | 1,110 | 1,420 | 540 | 336 | 85 |
| 5 | 249 | 2,210 | 2,310 | 2,890 | 1,180 | 1,200 | 5,640 | 1,030 | 1,200 | 471 | 366 | 88 |
| 6 | 641 | 2,610 | 2,540 | 2,100 | 1,930 | 1,250 | 7,350 | 966 | 1,060 | 471 | 434 | 100 |
| 7 | 4,340 | 3,090 | 4,800 | 1,850 | 3,960 | 1,300 | 8,520 | 849 | 866 | 466 | 418 | 102 |
| 8 | 6,390 | 2,100 | 4,540 | 1,800 | 2,540 | 1,180 | 8,770 | 734 | 755 | 413 | 402 | 96 |
| 9 | 3,190 | 1,680 | 3,280 | 1,700 | 2,180 | 1,160 | 9,250 | 1,170 | 766 | 376 | 317 | 105 |
| 10 | 1,410 | 1,450 | 2,790 | 1,650 | 2,360 | 1,140 | 9,480 | 3,020 | 664 | 371 | 277 | 62 |
| 11 | 878 | 1,250 | 2,400 | 1,600 | 6,540 | 1,120 | 9,500 | 2,430 | 487 | 372 | 234 | 96 |
| 12 | 626 | 1,140 | 4,710 | 1,450 | 6,950 | 1,080 | 9,710 | 2,310 | 620 | 378 | 230 | 107 |
| 13 | 615 | 1,420 | 7,700 | 2,980 | 6,830 | 1,100 | 9,510 | 2,180 | 1,500 | 211 | 230 | 125 |
| 14 | 558 | 1,580 | 7,660 | 4,970 | 5,990 | 1,140 | 9,620 | 2,270 | 2,180 | 413 | 230 | 105 |
| 15 | *519 | 2,160 | 8,210 | 4,590 | 1,550 | 1,120 | *9,680 | 1,890 | 6,490 | 312 | 234 | 148 |
| 16 | 456 | 2,020 | *8,710 | 3,080 | 2,000 | 1,100 | 9,800 | 1,690 | 6,320 | 239 | 220 | 181 |
| 17 | 368 | 1,720 | 5,600 | 6,200 | 2,290 | *1,140 | 9,010 | 1,730 | 5,950 | 317 | 170 | 178 |
| 18 | 308 | 1,630 | 3,900 | 6,870 | 2,150 | 1,170 | 9,240 | 3,080 | 6,940 | 356 | 164 | 181 |
| 19 | 317 | 1,470 | 3,120 | 2,850 | 2,000 | 1,020 | 9,840 | 2,730 | 9,700 | 326 | 167 | 190 |
| 20 | 290 | 1,370 | 2,510 | 2,290 | 1,450 | 877 | 9,880 | 1,970 | 9,400 | 378 | 190 | 153 |
| 21 | 286 | 1,330 | 1,850 | 2,000 | 1,400 | 854 | 9,770 | 2,020 | *5,000 | 235 | 172 | 127 |
| 22 | 277 | 1,380 | 1,550 | 1,850 | 1,550 | 826 | 6,070 | 2,860 | 1,660 | 237 | 164 | 151 |
| 23 | 273 | 1,370 | 1,500 | 1,750 | 1,600 | 799 | 2,030 | *5,480 | *1,290 | 239 | *162 | 141 |
| 24 | 633 | 1,340 | 1,450 | 1,700 | 1,500 | 788 | 1,740 | 8,960 | 1,540 | 374 | 172 | 107 |
| 25 | 4,890 | 2,160 | 1,800 | 1,550 | *1,300 | 750 | 1,560 | 7,890 | 1,940 | 317 | 170 | 127 |
| 26 | 2,680 | 2,170 | 1,950 | *1,450 | 1,560 | 701 | 1,430 | 7,770 | 1,390 | 273 | 167 | 146 |
| 27 | 1,720 | 1,900 | 2,270 | 1,480 | 1,820 | 804 | 1,660 | 7,510 | 1,020 | *235 | 164 | 115 |
| 28 | 1,430 | 4,060 | 4,230 | 1,460 | 1,730 | 1,930 | 1,990 | 4,100 | 955 | 234 | 164 | 91 |
| 29 | 1,160 | 3,610 | 6,440 | 1,460 | 1,700 | 3,400 | 1,620 | 2,350 | 810 | 234 | 148 | 93 |
| 30 | 944 | 2,740 | 5,000 | 1,470 | ----- | 3,860 | 1,440 | 2,060 | 739 | 230 | 143 | 85 |
| 31 | 905 | ----- | 3,130 | 1,450 | ----- | 4,060 | ----- | 2,130 | ----- | 234 | 153 | ----- |
| Total | 59,985 | 62,450 | 115,940 | 80,470 | 70,910 | 42,329 | 188,020 | 86,049 | 78,782 | 11,276 | 7,082 | 3,695 |
| Mean | 1,290 | 2,082 | 3,740 | 2,596 | 2,445 | 1,365 | 6,267 | 2,778 | 2,626 | 331 | 228 | 123 |

Adjusted for change in contents in Rushford Lake and Mount Morris Reservoir†

| Mean | 1,367 | 2,015 | 3,869 | 2,506 | 2,384 | 3,234 | 4,498 | 2,799 | 2,493 | 337 | 221 | 117 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cfs/m | 0.977 | 1.42 | 2.73 | 1.77 | 1.68 | 2.28 | 3.17 | 1.97 | 1.76 | 0.239 | 0.158 | 0.082 |
| In. | 1.13 | 1.58 | 3.14 | 2.04 | 1.81 | 2.63 | 3.54 | 2.27 | 1.96 | 0.30 | 0.18 | 0.09 |

| | Observed | | | | | | Adjusted | | | | | |
|---------------------|----------|-------|-----|----|------|-------|----------|-------|-------|------|-----|-------|
| Calendar year 1959: | Max | 9,010 | Min | 95 | Mean | 1,990 | Mean | 1,997 | Cfs/m | 1.41 | In. | 19.09 |
| Water year 1959-60: | Max | 9,880 | Min | 69 | Mean | 2,150 | Mean | 2,155 | Cfs/m | 1.52 | In. | 20.67 |

* Discharge measurement made on this day.

† Records of contents in Rushford Lake furnished by Rochester Gas and Electric Corp.

Note.--Stage-discharge relation affected by ice Dec. 21-26, Jan. 6-12, 21-26, Feb. 4, 5, 15, 16, 19-25, Feb. 29 to Mar. 16. Backwater from aquatic vegetation Aug. 25 to Sept. 30.

2285. Genesee River at Avon, N. Y.

Location.--Lat 42°55'05", long 77°45'30", on left bank at downstream side of bridge on U.S. Highway 20 (State Highway 5), 0.3 mile west of Avon, Livingston County, and 0.8 mile downstream from Conesus Creek.

Drainage area.--1,666 sq mi.

Records available.--August 1955 to September 1960.

Gage.--Water-stage recorder; wire-weight gage read twice daily used for stages below 23.7 ft. Datum of gage is 500.00 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--5 years, 2,105 cfs (unadjusted).

Extremes.--Maximum discharge during year, 9,820 cfs Apr. 17 (gage height, 31.79 ft); maximum gage height, 33.41 ft Mar. 31 (backwater from Honeoye Creek); minimum discharge observed, 125 cfs Sept. 5 (gage height, 14.03 ft).

1955-60: Maximum discharge, 15,600 cfs Mar. 7, 1956 (gage height, 37.20 ft, from graph based on gage readings); minimum, 56 cfs Oct. 5, 1955 (gage height, 13.73 ft, from graph based on gage readings).

Remarks.--Records good except those for periods of ice effect, backwater from Honeoye Creek, or doubtful or no gage-height record, which are fair. Diurnal fluctuation at low flow caused by powerplants. Flow regulated to some extent by Rushford Lake (capacity, 1,106,000,000 cu ft), and, at high flows, by Mount Morris Reservoir (see p. 294).

Rating tables, water year 1959-60, except periods of ice effect or backwater from Honeoye Creek (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-8

Oct. 9 to Sept. 30

| | | | | | | | |
|------|-------|------|-------|------|-------|------|--------|
| 14.0 | 117 | 24.0 | 4,320 | 14.0 | 119 | 24.0 | 4,320 |
| 15.0 | 395 | 27.0 | 6,230 | 14.5 | 229 | 30.0 | 8,350 |
| 18.0 | 1,420 | | | 15.0 | 364 | 32.0 | 10,000 |
| | | | | 18.0 | 1,420 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|---------|---------|---------|---------|---------|---------|--------|--------|--------|-------|-------|
| 1 | 553 | a3,000 | 2,740 | a3,500 | 1,640 | 2,020 | c6,900 | 1,490 | 2,600 | 759 | 264 | 189 |
| 2 | 756 | a4,000 | 2,660 | 2,940 | b1,550 | b1,800 | c6,000 | 1,400 | 2,550 | 718 | 259 | 187 |
| 3 | 809 | a3,500 | 3,000 | 3,430 | b1,400 | b1,700 | 5,410 | d1,300 | 2,170 | 658 | 272 | 184 |
| 4 | 463 | 2,630 | d3,200 | 5,270 | b1,350 | b1,550 | 4,910 | 1,220 | 1,700 | 608 | 321 | 152 |
| 5 | 454 | 2,710 | 2,980 | 4,900 | b1,700 | b1,600 | 5,940 | 1,130 | 1,400 | 540 | 350 | 129 |
| 6 | 343 | 2,850 | 3,590 | 2,940 | 2,810 | b1,600 | 7,610 | 1,050 | 1,180 | 512 | 415 | a140 |
| 7 | 1,910 | d3,400 | d4,500 | b2,400 | d3,900 | b1,650 | 8,730 | 996 | 1,010 | 502 | 421 | 145 |
| 8 | 5,610 | 3,090 | 6,010 | b2,200 | d3,500 | b1,600 | 8,960 | 867 | 790 | 478 | 409 | 145 |
| 9 | 5,680 | a2,100 | d3,700 | 2,130 | d3,000 | b1,550 | 9,290 | 892 | 800 | 436 | 385 | 141 |
| 10 | 1,910 | a1,700 | 3,140 | 2,050 | 44,000 | b1,550 | 9,450 | 2,150 | 752 | 427 | 344 | 135 |
| 11 | 1,240 | d1,500 | 3,480 | b2,000 | 6,630 | b1,500 | 9,650 | 2,840 | 612 | 415 | 299 | 133 |
| 12 | 935 | 1,440 | 4,380 | b1,900 | 8,380 | b1,450 | 9,630 | 2,370 | 572 | 373 | 267 | 141 |
| 13 | 846 | 1,680 | 9,450 | 3,350 | 7,650 | b1,400 | 9,690 | 2,490 | 856 | 361 | 262 | 173 |
| 14 | 794 | 1,680 | 8,880 | 4,380 | 7,490 | b1,550 | 9,700 | 2,570 | 2,000 | 355 | 259 | 178 |
| 15 | 769 | 2,370 | 8,950 | 5,570 | 3,660 | *b1,350 | 9,630 | 2,270 | 5,050 | 424 | 257 | 187 |
| 16 | 732 | 2,350 | 9,450 | 4,600 | d2,000 | b1,350 | 9,740 | 1,940 | 7,060 | 332 | 262 | 189 |
| 17 | 691 | 2,260 | 8,060 | 6,240 | d2,700 | b1,400 | 9,790 | 1,760 | 6,440 | 344 | 249 | 222 |
| 18 | 540 | *b1,900 | *5,280 | 7,780 | d2,500 | b1,450 | 9,480 | 2,470 | 6,170 | 355 | 203 | 257 |
| 19 | 355 | b1,600 | 3,970 | 5,150 | 2,290 | b1,400 | *9,400 | *2,980 | 8,160 | 379 | 198 | 246 |
| 20 | *327 | 1,440 | 3,160 | 3,130 | b1,800 | b1,150 | 9,640 | 2,560 | *8,910 | 344 | 207 | 212 |
| 21 | 338 | b1,400 | 2,770 | b2,500 | b1,900 | b1,060 | 9,750 | 2,170 | 8,490 | 327 | 222 | 203 |
| 22 | 307 | 1,480 | 2,470 | b2,300 | b2,000 | b1,020 | 9,050 | 2,440 | 3,340 | 299 | 203 | 189 |
| 23 | 304 | 1,370 | b2,000 | b2,100 | b1,950 | b980 | 3,300 | 4,550 | 1,610 | 304 | *198 | 189 |
| 24 | 327 | 1,510 | b1,500 | b2,000 | b1,950 | b960 | 2,100 | 6,620 | 1,380 | 310 | 189 | 180 |
| 25 | a2,800 | d2,000 | b1,900 | b1,950 | *b1,800 | 910 | 1,850 | 8,080 | 1,930 | 341 | 194 | 187 |
| 26 | d4,200 | d2,700 | b2,500 | *b1,900 | b1,950 | 822 | 1,630 | 8,170 | 1,860 | *332 | 196 | 184 |
| 27 | d3,200 | 2,280 | 3,100 | b1,800 | 2,060 | 778 | 1,690 | 7,920 | 1,400 | 304 | 194 | 175 |
| 28 | d2,600 | d2,900 | 4,950 | b1,800 | 2,050 | 2,080 | 2,080 | 6,470 | 2,080 | 288 | 189 | 154 |
| 29 | d1,900 | 4,310 | 7,060 | b1,750 | 2,020 | c3,600 | 1,920 | 2,930 | 920 | 272 | 189 | 158 |
| 30 | d1,450 | d3,300 | 7,070 | b1,650 | ----- | ----- | c6,300 | 1,640 | 2,350 | 786 | 272 | 184 |
| 31 | 2,190 | ----- | 4,670 | 1,640 | ----- | ----- | *c7,300 | ----- | 2,240 | ----- | 264 | 184 |
| Total | 45,333 | 70,650 | 140,550 | 97,250 | 87,640 | 56,208 | 204,470 | 90,685 | 83,587 | 12,633 | 8,045 | 5,258 |
| Mean | 1,462 | 2,355 | 4,534 | 3,137 | 3,022 | 1,813 | 6,816 | 2,925 | 2,786 | 408 | 260 | 175 |

Adjusted for change in contents in Rushford Lake and Mount Morris Reservoir

| | Mean | Cfsm | In. | Observed | Adjusted |
|---------------------|-------|-------|-------|------------|------------|
| Calendar year 1959: | 1,560 | 2,288 | 4,663 | 3,047 | 2,960 |
| Water year 1959-60: | 0.936 | 1.37 | 2.80 | 1.83 | 1.78 |
| | 1.08 | 1.53 | 3.23 | 2.11 | 1.92 |
| | | | | Mean 2,291 | Mean 2,465 |
| | | | | Mean 2,298 | Mean 2,470 |
| | | | | Cfsm 1.38 | Cfsm 1.46 |
| | | | | In. 18.73 | In. 20.19 |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of twice-daily water-level observations at station near Fowlerville and records for station at Jones Bridge, near Mount Morris.

b Stage-discharge relation affected by ice.

c Backwater from Honeoye Creek.

d Doubtful gage-height record; discharge computed on basis of engineers' inspections and other records in the Genesee River basin.

Note.--Records of change in contents in Rushford Lake furnished by Rochester Gas & Electric Corp.

2290. Canadice Lake Outlet near Hemlock, N. Y.

Location.--Lat 42°44'25", long 77°34'15", upstream from weir at outlet of Canadice Lake, Ontario County, 4 miles southeast of Hemlock, Livingston County.

Drainage area.--12.6 sq mi.

Records available.--April 1903 to September 1960.

Gage.--Hook gage. Datum of gage is 1,093.00 ft above mean sea level (furnished by city of Rochester). Gage readings have been reduced to elevations above mean sea level.

Average discharge.--57 years, 11.9 cfs (unadjusted).

Cooperation.--Records furnished by Department of Public Works, city of Rochester.

Monthly discharge, water year October 1959 to September 1960

| Month | Mean elevation of lake (feet) | Observed discharge, in cubic feet per second | Adjusted† | | |
|-------------------------|-------------------------------|--|-------------------------------------|-----------------|------------------|
| | | | Discharge, in cubic feet per second | | Runoff in inches |
| | | | Mean | Per square mile | |
| October..... | 1,092.35 | 4.67 | 3.55 | 0.282 | 0.33 |
| November..... | 1,092.46 | 8.55 | 9.80 | .788 | .87 |
| December..... | 1,094.08 | 10.4 | 41.3 | 3.28 | 3.78 |
| Calendar year 1959..... | 1,095.65 | 15.9 | 14.0 | 1.11 | 15.04 |
| January..... | 1,095.98 | 9.18 | 21.5 | 1.71 | 1.97 |
| February..... | 1,097.15 | 7.06 | 24.5 | 1.94 | 2.10 |
| March..... | 1,097.68 | 20.8 | 40.8 | 3.24 | 3.74 |
| April..... | 1,096.88 | 23.6 | 16.3 | 1.29 | 1.44 |
| May..... | 1,098.62 | 15.5 | 16.8 | 1.33 | 1.54 |
| June..... | 1,098.78 | 11.0 | 7.02 | .557 | .62 |
| July..... | 1,097.48 | 26.3 | -6.81 | -.540 | -.62 |
| August..... | 1,094.32 | 31.3 | -2.75 | -.218 | -.25 |
| September..... | 1,092.39 | 4.91 | -2.91 | -.231 | -.26 |
| Water year 1959-60..... | 1,095.86 | 14.3 | 14.1 | 1.12 | 15.26 |

† Adjusted for change in contents in Canadice Lake. Negative figures indicate that natural losses from Canadice Lake exceeded inflow.

Note.--Elevations of Canadice Lake: 1,092.39 ft at 12 p.m. Sept. 30, 1959, and 1,092.13 ft at 12 p.m. Sept. 30, 1960; 1,097.30 ft at 12 p.m. Dec. 31, 1958, and 1,095.33 ft at 12 p.m. Dec. 31, 1959.

2295. Honeoye Creek at Honeoye Falls, N. Y.

Location.--Lat 42°57'25", long 77°35'20", on right bank 25 ft downstream from highway bridge at Honeoye Falls, Monroe County, and 13 miles upstream from mouth.

Drainage area.--197 sq mi.

Records available.--October 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 609.98 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--15 years, 176 cfs (adjusted for storage and diversion).

Extremes.--Maximum discharge during year, 3,700 cfs Mar. 30 (gage height, 5.94 ft); minimum, 0.6 cfs Sept. 22-30 (gage height, 0.46 ft).

1945-60: Maximum discharge, 4,630 cfs Mar. 28, 1950 (gage height, 6.42 ft), from rating curve extended above 2,100 cfs by logarithmic plotting; minimum, 0.03 cfs Aug. 28, 1949; minimum gage height, 0.35 ft Aug. 28, 1949, Sept. 14, 15, 1952.

Remarks.--Records good except those for periods of ice effect, backwater from debris or aquatic vegetation, or no gage-height record, which are fair. Some diversion from and regulation by Hemlock and Canadice Lakes for water supply of city of Rochester. Diurnal fluctuation at low flow caused by mills above station.

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|------|-----|-----|-------|
| 0.7 | 3.1 | 2.5 | 263 | 0.45 | 0.6 | 1.9 | 94 |
| .9 | 8.2 | 3.0 | 481 | .5 | .9 | 2.2 | 152 |
| 1.2 | 22 | 3.5 | 780 | .6 | 1.9 | 2.5 | 234 |
| 1.5 | 48 | 4.0 | 1,160 | .7 | 3.4 | 3.0 | 44C |
| 1.9 | 104 | 5.0 | 2,250 | .8 | 5.6 | 3.5 | 715 |
| 2.2 | 170 | 6.0 | 3,810 | 1.0 | 12 | 4.0 | 1,08C |
| | | | | 1.2 | 22 | 5.0 | 2,20C |
| | | | | 1.5 | 46 | 5.5 | 2,94C |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 30 | 21 | 75 | 165 | 98 | 155 | *1,600 | 108 | a250 | 34 | 1.6 | 1.1 |
| 2 | 44 | 36 | 74 | 160 | 92 | 150 | 1,110 | 97 | a260 | 31 | 1.3 | 1.0 |
| 3 | 27 | 36 | 101 | 550 | 88 | 150 | 1,010 | 84 | 225 | 27 | 7.6 | .9 |
| 4 | 19 | 32 | 136 | 549 | 84 | 160 | 1,070 | 77 | 190 | 24 | 5.2 | .9 |
| 5 | 14 | 38 | 143 | 230 | 80 | 155 | 1,030 | 66 | 162 | 22 | 6.2 | .8 |
| 6 | 23 | 50 | 181 | 150 | 215 | 150 | 857 | 58 | 141 | 21 | 7.9 | .8 |
| 7 | 168 | 44 | 408 | 160 | 520 | 145 | 703 | 54 | 120 | 20 | 6.4 | .8 |
| 8 | 125 | 35 | 456 | 170 | 270 | 140 | 510 | 60 | 106 | 17 | 4.4 | .7 |
| 9 | 68 | 28 | 310 | 125 | 184 | 135 | 404 | 127 | 93 | 15 | 3.2 | .7 |
| 10 | 38 | 25 | 220 | 122 | 217 | 135 | 372 | 362 | 84 | 13 | 7.4 | .7 |
| 11 | 24 | 22 | 180 | 120 | 734 | 130 | 334 | 274 | 74 | *12 | 3.2 | .7 |
| 12 | 16 | 21 | 541 | 118 | 460 | 125 | 326 | 278 | 65 | 11 | 2.3 | .7 |
| 13 | 13 | 23 | 1,580 | 160 | 200 | 122 | 278 | 314 | 65 | 8.9 | 2.0 | .7 |
| 14 | 11 | 25 | 789 | 300 | 106 | *116 | 234 | 245 | 78 | 8.5 | 1.9 | .7 |
| 15 | 9.5 | 37 | *371 | 289 | 92 | 110 | *215 | 192 | *449 | 11 | 1.7 | *.7 |
| 16 | 7.3 | *40 | 312 | 380 | 125 | 98 | 298 | 166 | 537 | 20 | 1.7 | .7 |
| 17 | 5.9 | 33 | 328 | 282 | 175 | 90 | 306 | 145 | 290 | 19 | 1.5 | .7 |
| 18 | 4.9 | 28 | 268 | 204 | 190 | 94 | 236 | 143 | 203 | 16 | 1.5 | .7 |
| 19 | 4.6 | 26 | 229 | 173 | 165 | 96 | 218 | 150 | 166 | 13 | 1.4 | .7 |
| 20 | *4.4 | 22 | 170 | 160 | 82 | 100 | 187 | 143 | 141 | 10 | 4.4 | .7 |
| 21 | 4.2 | 22 | 145 | 150 | 112 | 98 | 171 | 162 | 120 | 8.5 | 2.9 | .7 |
| 22 | 3.7 | 24 | 125 | 135 | 170 | 96 | 195 | 190 | 102 | 7.9 | 3.6 | .6 |
| 23 | 3.7 | 24 | 104 | 130 | *190 | 92 | 181 | 441 | 94 | 7.0 | 4.6 | .6 |
| 24 | 4.6 | 24 | 112 | 125 | 185 | 94 | 159 | 584 | 84 | 5.6 | 5.2 | .6 |
| 25 | 5.6 | 30 | 114 | 120 | 190 | 92 | 154 | *673 | 81 | 4.9 | *4.6 | .6 |
| 26 | 10 | 38 | 118 | 110 | 170 | 92 | 145 | 540 | 74 | 4.0 | 3.6 | .6 |
| 27 | 16 | 36 | 190 | 106 | 170 | 98 | 141 | a390 | 59 | 3.6 | 2.9 | .6 |
| 28 | 13 | 54 | 850 | *102 | 165 | 260 | 150 | a280 | 44 | 3.1 | 2.6 | .6 |
| 29 | 11 | 72 | 754 | 98 | 165 | 805 | 120 | a220 | 40 | 2.6 | 1.9 | .6 |
| 30 | 12 | 80 | 451 | 102 | ----- | 2,840 | 106 | a200 | 36 | 3.2 | 1.7 | .6 |
| 31 | 11 | ----- | 274 | 98 | ----- | 2,800 | ----- | a210 | ----- | 2.6 | 1.5 | ----- |
| Total | 751.4 | 1,026 | 10,110 | 5,853 | 5,692 | 9,923 | 12,840 | 7,053 | 4,433 | 406.4 | 107.9 | 21.5 |
| Mean | 24.2 | 34.2 | 326 | 189 | 196 | 320 | 428 | 228 | 148 | 13.1 | 3.48 | 0.72 |

Adjusted†

| Mean | 52.1 | 81.6 | 516 | 285 | 291 | 447 | 462 | 298 | 181 | 9.58 | 6.92 | -6.96 |
|------|-------|-------|------|------|------|------|------|------|-------|-------|-------|--------|
| Cfsm | 0.264 | 0.414 | 2.62 | 1.44 | 1.48 | 2.27 | 2.45 | 1.51 | 0.819 | 0.049 | 0.035 | -0.035 |
| In. | 0.30 | 0.46 | 3.02 | 1.66 | 1.59 | 2.62 | 2.73 | 1.74 | 1.02 | 0.06 | 0.04 | -0.04 |

Observed

Adjusted

| Calendar year 1959: | Max | 1,950 | Min | 0.3 | Mean | 142 | Mean | 202 | Cfsm | 1.03 | In. | 13.94 |
|---------------------|-----|-------|-----|-----|------|-----|------|-----|------|------|-----|-------|
| Water year 1959-60: | Max | 2,840 | Min | 0.6 | Mean | 159 | Mean | 220 | Cfsm | 1.12 | In. | 15.20 |

* Discharge measurement made on this day.

† Adjusted for diversions from and change in contents in Hemlock and Canadice Lakes; outlet of Honeoye Lake is not controlled (records of diversion and change in contents furnished by Department of Public Works, city of Rochester). Negative figures indicate that losses from Hemlock, Canadice, and Honeoye Lakes exceeded inflow.

‡ No gage-height record; discharge estimated on basis of records for nearby stations.

Note.--Stage-discharge relation affected by ice Nov. 18, 26-30, Dec. 9-11, 20-28, Jan. 1, 2, 5-14, Jan. 20 to Feb. 8, Feb. 12 to Mar. 28 (no gage-height record Jan. 20-27, Mar. 23-28). Backwater from debris Oct. 1 to Nov. 6 (no gage-height record Oct. 26-30). Backwater from aquatic vegetation June 26 to Aug. 5.

2305. Oatka Creek at Garbutt, N. Y.

Location.--Lat 43°00'30", long 77°47'25", on right bank 40 ft downstream from highway bridge at Garbutt, Genesee County, 2 miles southwest of Scottsville, and 3½ miles upstream from mouth.

Drainage area.--208 sq mi.

Records available.--October 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 560.89 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--15 years, 209 cfs.

Extremes.--Maximum discharge during year, 6,920 cfs Mar. 31 (gage height, 8.64 ft); minimum, 21 cfs Oct. 5 (gage height, 2.21 ft, backwater from debris). 1945-60: Maximum discharge, that of Mar. 31, 1960; minimum, 3.3 cfs Sept. 11, 12, 1958; minimum gage height, 1.88 ft June 19, 1959, result of regulation.

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation or debris, which are fair. Records of chemical analyses and water temperatures for the water year 1960 are given in WSP 1741.

Rating table, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.1 | 17 | 3.5 | 435 |
| 2.2 | 26 | 4.0 | 725 |
| 2.3 | 36 | 5.0 | 1,530 |
| 2.4 | 51 | 6.0 | 2,670 |
| 2.7 | 115 | 7.0 | 3,970 |
| 3.0 | 215 | 8.5 | 6,630 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 36 | 38 | 100 | 312 | 198 | 250 | 3,990 | 204 | 204 | 65 | 42 | 33 |
| 2 | 29 | 80 | 95 | 254 | 184 | b235 | 1,320 | 194 | 215 | 67 | 42 | 32 |
| 3 | 30 | 98 | 100 | b390 | 186 | b235 | 1,830 | 180 | 184 | 64 | 65 | 32 |
| 4 | 27 | 86 | 100 | 540 | b145 | 243 | 1,960 | 170 | 190 | 64 | 51 | 32 |
| 5 | 23 | 69 | 152 | 415 | 159 | 236 | 1,650 | 159 | 148 | 58 | 48 | 32 |
| 6 | 30 | 73 | 162 | b270 | 218 | b230 | 1,100 | 152 | 133 | 56 | 50 | 32 |
| 7 | 35 | 86 | 254 | 266 | 462 | b215 | 825 | 136 | 121 | 56 | 45 | 31 |
| 8 | 152 | 75 | 308 | 299 | b420 | b210 | 708 | 133 | 112 | 56 | 42 | 32 |
| 9 | 110 | 60 | 222 | 246 | 446 | b205 | 642 | 173 | 105 | 55 | *41 | 32 |
| 10 | 56 | 53 | 218 | 236 | 446 | b200 | 584 | 270 | 100 | 51 | 53 | 31 |
| 11 | 41 | 50 | 212 | 226 | 1,270 | b200 | 523 | 266 | 98 | *51 | 45 | 31 |
| 12 | 32 | 48 | 250 | 212 | 1,630 | b185 | 490 | 232 | 102 | 51 | 42 | 31 |
| 13 | 29 | 50 | 822 | 274 | 1,100 | b180 | 518 | 236 | 98 | 51 | 41 | 31 |
| 14 | 25 | 65 | 923 | 594 | b620 | b175 | 484 | 226 | 162 | 56 | 39 | 31 |
| 15 | 24 | 67 | 825 | 751 | b380 | b170 | *462 | 198 | 243 | 53 | 41 | 30 |
| 16 | 25 | 102 | 540 | 758 | 395 | b160 | 545 | 173 | 395 | 50 | 41 | 30 |
| 17 | 24 | 88 | *606 | 650 | 415 | b170 | 606 | 159 | 299 | 50 | 39 | 30 |
| 18 | 25 | *69 | 550 | 506 | 400 | *180 | 540 | *159 | 194 | 50 | 39 | 30 |
| 19 | 25 | 77 | 430 | 385 | 385 | 190 | 446 | 266 | 166 | 48 | 38 | 30 |
| 20 | 25 | 67 | 308 | 317 | 282 | b185 | 365 | 198 | 139 | 48 | 42 | 30 |
| 21 | 25 | 65 | 226 | 282 | 268 | b180 | 326 | 187 | 121 | 47 | 41 | 30 |
| 22 | *25 | 62 | b175 | 268 | 308 | b185 | 322 | 208 | 108 | 47 | 39 | 29 |
| 23 | 25 | 71 | b165 | b245 | 308 | b175 | 308 | 365 | 102 | 48 | 39 | 29 |
| 24 | 30 | 75 | b170 | b230 | *304 | b175 | 278 | 501 | 105 | 47 | 38 | 29 |
| 25 | 31 | 71 | 180 | b220 | 290 | b170 | 258 | 506 | 100 | 45 | 39 | 28 |
| 26 | 32 | 84 | 190 | b210 | 286 | b160 | 250 | 345 | 95 | 45 | 35 | 28 |
| 27 | 48 | 90 | 232 | *215 | 266 | b160 | 240 | 262 | 84 | 47 | 34 | 28 |
| 28 | 39 | 82 | 579 | 208 | 254 | b290 | 236 | 215 | 75 | 45 | 35 | 27 |
| 29 | 36 | 127 | 680 | 208 | 258 | 808 | 222 | 187 | 73 | 44 | 34 | 27 |
| 30 | 36 | 108 | 600 | 201 | ----- | 2,690 | 215 | 170 | 71 | 42 | 35 | 27 |
| 31 | 36 | ----- | 440 | 187 | ----- | *6,500 | ----- | 176 | ----- | 42 | *34 | ----- |
| Total | 1,168 | 2,216 | 10,814 | 10,343 | 12,261 | 15,747 | 22,641 | 7,006 | 4,342 | 1,599 | 1,289 | 905 |
| Mean | 37.7 | 73.9 | 349 | 334 | 423 | 508 | 755 | 226 | 145 | 51.6 | 41.6 | 30.2 |
| Cfsm | 0.161 | 0.355 | 1.68 | 1.61 | 2.03 | 2.44 | 3.63 | 1.09 | 0.697 | 0.248 | 0.200 | 0.145 |
| In. | 0.21 | 0.40 | 1.93 | 1.85 | 2.19 | 2.82 | 4.05 | 1.25 | 0.78 | 0.29 | 0.23 | 0.16 |

Calendar year 1959: Max 3,040 Min 21 Mean 232 Cfsm 1.12 In. 15.14
Water year 1959-60: Max 6,500 Min 23 Mean 247 Cfsm 1.19 In. 16.16

Peak discharge (base, 1,500 cfs).--Feb. 11 (11 p.m.) 1,710 cfs (5.17 ft); Mar. 31 (4:15 a.m.) 6,920 cfs (8.64 ft); Apr. 4 (10 a.m.) 2,020 cfs (5.45 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--Backwater from debris Oct. 1 to Nov. 3, June 17 to Sept. 30. Backwater from aquatic vegetation May 3 to June 14.

2310. Black Creek at Churchville, N. Y.

Location.--Lat 43°06'00", long 77°53'00", on right bank at east end of Carrol Street in Churchville, Monroe County, 60 ft downstream from main-line tracks of New York Central Railroad and 1 mile upstream from unnamed tributary.

Drainage area.--123 sq mi.

Records available.--October 1945 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 552.45 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--15 years, 109 cfs.

Extremes.--Maximum discharge during year, 4,880 cfs Mar. 31 (gage height, 9.44 ft); minimum, 1.1 cfs Aug. 1, 2; minimum gage height, 1.07 ft Sept. 12.
1945-60: Maximum discharge, that of Mar. 31, 1960; minimum, 0.3 cfs Aug. 5-7, Sept. 15, 1959 (gage height, 0.93 ft).

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation or debris, which are fair. Prior to May 1952, small diversion by New York Central Railroad Co. and slight regulation by pumping operations above station.

Rating table, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

(Shifting-control method used May 22 to Aug. 2)

| | | | |
|-----|-----|-----|-------|
| 1.0 | 1.1 | 2.0 | 84 |
| 1.1 | 3.1 | 2.5 | 172 |
| 1.2 | 6.5 | 3.0 | 289 |
| 1.3 | 11 | 4.0 | 610 |
| 1.4 | 18 | 5.0 | 1,060 |
| 1.5 | 26 | 7.0 | 2,360 |
| 1.7 | 45 | 9.0 | 4,350 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 22 | 18 | 25 | 260 | 92 | 150 | 3,480 | 110 | 92 | 21 | 1.2 | 4.3 |
| 2 | 16 | 20 | 25 | 170 | 88 | 150 | 1,930 | 102 | 94 | 21 | 1.6 | 3.1 |
| 3 | 10 | 18 | 27 | 257 | 84 | 160 | 1,370 | 96 | 77 | 18 | 18 | 2.8 |
| 4 | 7.4 | 21 | 32 | 376 | 80 | 160 | 1,260 | 88 | 61 | 18 | 23 | 4.3 |
| 5 | 8.8 | 24 | 36 | 420 | 70 | 155 | 1,020 | 84 | 51 | 16 | 15 | 3.9 |
| 6 | 14 | 25 | 38 | 330 | 135 | 150 | 658 | 78 | 45 | 14 | 10 | 3.3 |
| 7 | 26 | 19 | 80 | 190 | 210 | 140 | 477 | 77 | 38 | 13 | 9.3 | 2.6 |
| 8 | 25 | 17 | 117 | 145 | 245 | 135 | 379 | 83 | 33 | 13 | 11 | 2.4 |
| 9 | 20 | 16 | 102 | 130 | 300 | 130 | 324 | 146 | 28 | 11 | *9.3 | 3.3 |
| 10 | 15 | 14 | 73 | 120 | 385 | 130 | 286 | 229 | 26 | 11 | 13 | 4.3 |
| 11 | 12 | 14 | 76 | 110 | 835 | 130 | 256 | 256 | 25 | *10 | 18 | 4.3 |
| 12 | 9.0 | 13 | 139 | 102 | 1,140 | 125 | 236 | 215 | 27 | 10 | 14 | 3.3 |
| 13 | 7.0 | 15 | 271 | 147 | 1,100 | 124 | 220 | 200 | 36 | 8.3 | 11 | 3.6 |
| 14 | 6.0 | 19 | 330 | 202 | 640 | 120 | 215 | 187 | 43 | 11 | 9.3 | 4.3 |
| 15 | 5.0 | 22 | 394 | 260 | 310 | 114 | *208 | 164 | 60 | 13 | 9.6 | 3.9 |
| 16 | 4.6 | 25 | 253 | 310 | 202 | 110 | 220 | 128 | 94 | 9.3 | 10 | 3.1 |
| 17 | 5.0 | *23 | 231 | 344 | 193 | *106 | 238 | 105 | 78 | 6.9 | 9.3 | 3.3 |
| 18 | 4.6 | 15 | 220 | 300 | 211 | 112 | 240 | *110 | 56 | 6.1 | 7.4 | 3.9 |
| 19 | 3.6 | 17 | 165 | 236 | 231 | 116 | 213 | 109 | 44 | 5.3 | 7.4 | 7.8 |
| 20 | 4.6 | 17 | 117 | 189 | 165 | 120 | 178 | 107 | 37 | 3.9 | 12 | 6.9 |
| 21 | *3.9 | 17 | 64 | 150 | 112 | 120 | 160 | 142 | 31 | 3.6 | 12 | 6.1 |
| 22 | 4.6 | 17 | *52 | 135 | 114 | 118 | 160 | 191 | 29 | 4.3 | 11 | 6.1 |
| 23 | 5.3 | 17 | 47 | 124 | 130 | 116 | 164 | 308 | 27 | 3.6 | 9.3 | 5.3 |
| 24 | 13 | 18 | 50 | 120 | *155 | 120 | 162 | 292 | 31 | 2.6 | 8.6 | 4.6 |
| 25 | 15 | 21 | 54 | 114 | 165 | 116 | 152 | 248 | 33 | 2.0 | 6.9 | 3.9 |
| 26 | 14 | 16 | 65 | 106 | 165 | 116 | 150 | 182 | 33 | 1.6 | 6.1 | 3.3 |
| 27 | 14 | 20 | 115 | *99 | 160 | 122 | 150 | 129 | 28 | 2.4 | 6.5 | 3.1 |
| 28 | 15 | 23 | 345 | 94 | 160 | 162 | 137 | 93 | 24 | 2.0 | 6.5 | 3.6 |
| 29 | 13 | 24 | 522 | 93 | 155 | 270 | 122 | 71 | 25 | 1.8 | 5.7 | 4.3 |
| 30 | 10 | 20 | 561 | 96 | ----- | 1,300 | 113 | 64 | 25 | 1.6 | 4.3 | 10 |
| 31 | 14 | ----- | 450 | 94 | ----- | *4,120 | ----- | 67 | ----- | 1.4 | *3.9 | ----- |
| Total | 347.4 | 565 | 5,058 | 5,823 | 8,032 | 9,317 | 14,678 | 4,461 | 1,349 | 266.7 | 300.6 | 129.2 |
| Mean | 11.2 | 18.8 | 163 | 188 | 277 | 301 | 496 | 144 | 45.0 | 8.60 | 9.70 | 4.31 |
| Cfs/m | 0.091 | 0.153 | 1.33 | 1.53 | 2.25 | 2.45 | 4.03 | 1.17 | 0.366 | 0.070 | 0.079 | 0.035 |
| In. | 0.11 | 0.17 | 1.53 | 1.76 | 2.43 | 2.82 | 4.50 | 1.35 | 0.41 | 0.08 | 0.09 | 0.04 |

Calendar year 1959: Max 1,450 Min 0.3 Mean 127 Cfs/m 1.03 In. 14.00
Water year 1959-60: Max 4,120 Min 1.2 Mean 138 Cfs/m 1.12 In. 15.23

Peak discharge (base, 1,000 cfs).--Feb. 13 (4 a.m.) 1,310 cfs (5.47 ft); Mar. 31 (4:30 p.m.) 4,880 cfs (9.44 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17, 18, 28, Dec. 23-25, Dec. 31 to Jan. 2, Jan. 5-12, 15, 16, 21, 22, 25, 26, 31, Feb. 2-8, 12, 14-16, Feb. 20 to Mar. 19, Mar. 21-26. Backwater from debris Oct. 1-24 (no gage-height record Oct. 10-14). Backwater from aquatic vegetation and/or debris Apr. 18 to Sept. 30.

2320. Genesee River at Driving Park Avenue, Rochester, N. Y.

Location.--Lat 43°10'50", long 77°37'40", on right bank at Rochester, Monroe County, 40 ft downstream from plant 5 of Rochester Gas & Electric Corp. and 100 ft upstream from Driving Park Avenue Bridge.

Drainage area.--2,467 sq mi.

Records available.--December 1919 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 247 ft above mean sea level, Erie (Barge) Canal datum. Prior to Apr. 4, 1927, water-stage recorder and chain gage in plant 5 at datum 3.00 ft higher. Apr. 4, 1927, to June 19, 1956, water-stage recorder at present site at datum 3.00 ft higher.

Average discharge.--40 years (1920-60), 2,787 cfs.

Extremes.--Maximum discharge during year, 25,800 cfs Mar. 31 (gage height, 14.91 ft); minimum, 213 cfs July 25 (gage height, 0.44 ft, from reconstructed gage-height graph, water below intake); minimum daily, 482 cfs Sept. 25.

1919-60: Maximum discharge, 34,400 cfs Mar. 19, 1942; maximum gage height, 17.08 ft Apr. 2, 1940 (present datum); minimum discharge, less than 10 cfs, occurred during low-water periods in some years when powerplant was shut down; minimum daily, 219 cfs Aug. 14, 1927.

Maximum discharge known, about 54,000 cfs Mar. 18, 1865.

Remarks.--Records good. Extensive diurnal fluctuation caused by powerplants above station. New York State Erie (Barge) Canal crosses river 5.4 miles above station. Water diverted by the canal from Lake Erie is discharged into river from the west, the canal again diverting a smaller amount of water from the river to the east. Additional regulation is provided by Rushford Lake and Mount Morris Reservoir. Records of water temperatures for the water year 1960 are given in WSP 1741.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 1.5 | 480 | 6.0 | 3,750 |
| 2.0 | 650 | 8.0 | 6,790 |
| 3.0 | 1,140 | 12.0 | 16,300 |
| 4.0 | 1,800 | 15.0 | 26,100 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| 1 | 1,740 | 1,560 | 3,650 | 4,630 | 2,850 | 2,980 | *23,400 | 2,680 | 3,900 | 1,700 | 734 | 634 |
| 2 | 2,060 | 3,750 | 3,220 | 3,580 | 2,220 | 2,630 | 18,400 | 2,610 | 4,090 | 1,650 | 728 | 596 |
| 3 | 1,430 | 4,050 | 3,040 | 4,530 | 2,080 | 2,410 | 13,200 | 2,510 | 3,810 | 1,480 | 1,060 | 609 |
| 4 | 1,020 | 3,860 | 3,380 | 8,410 | 1,430 | 2,160 | 11,500 | 2,510 | 3,300 | 1,560 | 836 | 570 |
| 5 | 1,020 | 3,080 | 3,580 | 6,720 | 1,960 | 2,230 | 10,900 | 2,310 | 2,710 | 1,440 | 800 | 492 |
| 6 | 905 | 3,120 | 3,390 | 3,890 | 3,040 | 2,340 | 11,800 | 2,220 | 2,430 | 1,430 | 862 | 490 |
| 7 | 1,930 | 3,510 | 4,800 | 2,980 | 5,500 | 2,410 | 12,200 | 1,960 | 2,200 | 1,320 | 897 | 698 |
| 8 | 5,930 | 3,440 | 8,140 | 3,410 | 5,580 | 2,280 | 12,100 | 1,900 | 2,010 | 1,080 | 914 | 538 |
| 9 | 7,190 | 2,830 | 6,250 | 3,140 | 4,460 | 2,190 | 12,100 | 2,450 | 1,880 | 739 | 828 | 555 |
| 10 | 3,310 | 2,340 | 4,820 | 2,580 | 4,320 | 2,180 | 12,100 | 3,560 | 1,770 | 1,010 | 950 | 546 |
| 11 | 1,840 | 2,040 | 4,250 | 2,680 | 9,810 | 2,100 | 12,100 | 4,840 | 1,620 | 986 | 726 | 547 |
| 12 | 1,420 | 1,840 | 4,990 | 2,350 | 13,000 | 1,930 | 12,100 | 4,350 | 1,470 | *832 | 813 | 514 |
| 13 | 976 | 1,670 | 12,300 | 3,180 | 11,400 | 2,000 | 12,000 | 4,310 | 1,780 | 940 | 717 | 596 |
| 14 | 1,070 | 2,110 | 12,100 | 5,350 | 10,300 | 2,000 | 11,900 | 4,220 | 3,070 | 853 | 660 | 594 |
| 15 | 1,010 | 2,220 | 11,100 | 8,530 | 6,440 | 2,000 | 11,600 | 3,950 | 5,520 | 917 | 779 | 592 |
| 16 | 955 | *2,980 | *11,900 | 6,960 | 3,700 | *1,980 | 11,800 | 3,580 | *9,440 | 865 | 598 | *567 |
| 17 | 890 | 2,650 | 11,300 | 6,760 | 3,700 | 2,110 | 11,900 | 3,140 | 8,330 | 825 | 788 | 668 |
| 18 | 895 | 2,420 | 7,240 | 9,640 | 3,900 | 2,150 | 11,500 | 3,480 | 7,380 | 897 | 640 | 592 |
| 19 | 698 | 2,240 | 5,620 | 7,390 | 3,900 | 1,960 | 10,700 | 4,210 | 9,480 | 1,020 | 587 | 595 |
| 20 | 744 | 2,050 | 4,480 | 4,400 | 3,190 | 1,830 | 10,500 | 3,900 | 10,700 | 739 | 808 | 593 |
| 21 | *762 | 1,900 | 4,330 | 3,720 | 2,570 | 1,910 | 10,200 | 3,560 | 10,400 | 916 | 686 | 613 |
| 22 | 626 | 1,770 | 3,210 | 2,840 | 2,840 | 1,910 | 10,300 | 3,760 | 5,320 | 786 | 693 | 692 |
| 23 | 730 | 2,010 | 2,050 | 2,900 | 3,040 | 1,800 | 5,690 | 5,570 | 2,760 | 851 | 700 | 536 |
| 24 | 850 | 1,990 | 1,570 | 2,800 | 3,060 | 1,710 | 3,360 | 9,090 | 2,600 | 698 | *608 | 604 |
| 25 | 2,400 | 2,030 | 1,960 | 2,930 | *2,910 | 1,730 | 3,660 | *10,700 | 2,940 | 822 | 646 | 482 |
| 26 | 4,600 | 3,160 | 2,890 | 2,610 | 2,610 | 1,450 | 3,180 | 11,000 | 2,910 | 812 | 596 | 592 |
| 27 | 3,170 | 2,720 | 3,600 | 2,460 | 2,980 | 1,700 | 2,420 | 10,200 | 2,460 | 844 | 674 | 616 |
| 28 | 2,000 | 3,120 | 6,610 | *2,460 | 3,080 | 2,900 | 3,370 | 8,530 | 2,010 | 732 | 571 | 627 |
| 29 | 1,870 | 4,660 | 9,680 | 2,360 | 3,070 | 6,400 | 3,400 | 4,680 | 2,050 | 864 | 700 | 625 |
| 30 | 1,500 | 4,230 | 9,860 | 2,370 | ----- | 15,800 | 2,850 | 3,790 | 1,790 | 808 | 565 | 615 |
| 31 | 1,660 | ----- | 6,510 | 2,220 | ----- | 23,200 | ----- | 3,730 | ----- | 708 | 586 | ----- |
| Total | 57,201 | 81,350 | 181,820 | 131,180 | 128,920 | 104,360 | 302,230 | 139,300 | 122,110 | 30,924 | 22,750 | 17,610 |
| Mean | 1,845 | 2,712 | 5,865 | 4,231 | 4,446 | 3,566 | 10,070 | 4,494 | 4,070 | 898 | 733 | 587 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 15,000

Min 370

Mean 3,227

Cfsm 1.31

In. 17.75

Water year 1959-60: Max 23,400

Min 482

Mean 3,606

Cfsm 1.46

In. 19.89

* Discharge measurement made on this day.

2320.5. Allen Creek near Rochester, N. Y.

Location.--Lat 43°07'49", long 77°31'08", Rochester East Quadrangle, on right bank 525 ft downstream from New York Central Railroad bridge, near Rochester, Monroe County, about 1 mile upstream from Irondequoit Creek.

Drainage area.--30.1 sq mi, flow from 2.1 sq mi not contributing.

Records available.--November 1959 to September 1960.

Gage.--Water-stage recorder.

Extremes.--Maximum discharge during period, 5,040 cfs Mar. 30 (gage height, 6.06 ft), from rating curve extended above 1,300 cfs by logarithmic plotting; minimum, 4.0 cfs Sept. 28, 29 (gage height, 1.25 ft, backwater from aquatic vegetation).

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation, which are fair.

Discharge, in cubic feet per second, November 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------|------|-------|---------|-------|-------|--------|---------|-------|-------|-------|-------|-------|
| 1 | | - | 13 | b26 | b18 | b28 | 464 | 10 | 23 | 9.9 | 6.2 | 5.9 |
| 2 | | - | 16 | b22 | b15 | b27 | 341 | 8.9 | 18 | 9.9 | 4.9 | 5.5 |
| 3 | | - | 22 | 148 | 15 | b27 | 250 | 7.8 | 25 | 9.0 | 4.5 | 5.5 |
| 4 | | - | 21 | 76 | b13 | b26 | 274 | 7.2 | 19 | 8.6 | 12 | 5.9 |
| 5 | | 11 | 17 | b35 | 18 | b25 | 112 | 6.0 | 17 | 7.8 | 8.2 | 6.2 |
| 6 | | 8.9 | 18 | b20 | 174 | b23 | 89 | 4.7 | 16 | 7.4 | 6.2 | 6.2 |
| 7 | | 8.0 | 190 | 19 | 163 | b22 | 65 | 4.5 | 14 | 7.4 | 5.9 | 5.9 |
| 8 | | 7.3 | 77 | 19 | 62 | b22 | 45 | 5.8 | 14 | 6.6 | 18 | 5.9 |
| 9 | | 6.6 | 37 | 16 | 59 | b22 | 56 | 14.6 | 14 | 8.6 | 8.6 | 5.9 |
| 10 | | 6.0 | 19 | 16 | 164 | b22 | 28 | 80 | 12 | 6.2 | 19 | 6.6 |
| 11 | | 6.0 | 15 | 15 | *522 | b21 | 24 | 79 | 12 | 7.0 | 11 | 5.5 |
| 12 | | 8.3 | 215 | b14 | 87 | b21 | 23 | 58 | 12 | *6.2 | 8.6 | 7.0 |
| 13 | | 10 | 281 | 119 | 42 | b21 | 19 | 92 | 12 | 6.2 | 7.4 | 6.6 |
| 14 | | 11 | 45 | 76 | b28 | b21 | 17 | 35 | 36 | 9.5 | 7.4 | 7.0 |
| 15 | | 14 | 26 | 69 | b23 | b21 | 16 | 21 | 51 | 8.2 | 9.0 | 6.6 |
| 16 | | 9.4 | *30 | 65 | 29 | b21 | 19 | 14 | *26 | 7.0 | 8.6 | *6.6 |
| 17 | | *9.8 | 25 | 36 | 30 | *23 | 29 | 11 | 19 | 6.6 | 7.8 | 6.2 |
| 18 | | 8.5 | 21 | 28 | 32 | 28 | *25 | 21 | 16 | 7.8 | 6.6 | 6.6 |
| 19 | | 7.6 | 19 | 26 | 31 | 32 | 19 | 13 | 15 | 7.4 | 5.9 | 6.6 |
| 20 | | 7.3 | 14 | 22 | 19 | 36 | 13 | 12 | 14 | 6.2 | 24 | 5.9 |
| 21 | | 7.3 | 12 | 22 | 24 | b36 | 16 | 16 | 12 | 6.2 | 12 | 6.2 |
| 22 | | 7.3 | b9.8 | 20 | 30 | b38 | 20 | 23 | 11 | 6.6 | 12 | 6.2 |
| 23 | | 7.3 | b9.4 | 20 | 32 | b35 | 12 | 83 | 11 | 6.6 | 9.9 | 6.6 |
| 24 | | 8.0 | b10 | 19 | 33 | b36 | 10 | 82 | 18 | 5.9 | *8.2 | 7.4 |
| 25 | | 8.9 | b11 | 18 | 33 | b31 | 16 | 42 | 13 | 6.6 | 7.8 | 7.4 |
| 26 | | 8.5 | 17 | 17 | *35 | b32 | 16 | *26 | 11 | 5.5 | 7.4 | 6.6 |
| 27 | | 10 | 63 | 17 | 32 | b37 | 16 | 19 | 10 | 5.5 | 7.0 | 5.9 |
| 28 | | 14 | 360 | *18 | 31 | 100 | 13 | 14 | 9.5 | 5.5 | 7.0 | 5.2 |
| 29 | | 14 | 130 | 18 | 50 | 224 | 10 | 12 | 11 | 5.9 | 6.6 | 5.2 |
| 30 | | 14 | 65 | 19 | ----- | *1,970 | 10 | 12 | 10 | 8.6 | 5.9 | 7.8 |
| 31 | | ----- | 40 | b18 | ----- | 1,040 | ----- | 26 | ----- | 8.2 | 5.5 | ----- |
| Total | | 239.0 | 1,848.2 | 1,073 | 1,824 | 4,068 | 2,044.2 | 991.9 | 501.5 | 222.6 | 319.6 | 186.6 |
| Mean | | 9.19 | 59.6 | 34.6 | 62.9 | 131 | 68.1 | 32.0 | 16.7 | 7.18 | 10.3 | 6.29 |
| Cfsm | | 0.305 | 1.98 | 1.15 | 2.09 | 4.35 | 2.26 | 1.06 | 0.555 | 0.239 | 0.342 | 0.209 |
| In. | | 0.30 | 2.28 | 1.33 | 2.25 | 5.03 | 2.53 | 1.23 | 0.62 | 0.28 | 0.39 | 0.23 |
| Calendar year | | : Max | | Min | | Mean | | Cfsm | | In. | | |
| Water year | | : Max | | Min | | Mean | | Cfsm | | In. | | |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--Backwater from aquatic vegetation June 21 to Sept. 30.

2321. Sterling Creek at Sterling, N. Y.

Location.--Lat 43°19'30", long 76°38'50", on right bank at Sterling, Cayuga County, 25 ft downstream from bridge on State Highway 104A, 1.8 miles southwest of Sterling Valley and 1.9 miles upstream from Sterling Valley Creek.

Drainage area.--44.4 sq mi.

Records available.--April 1957 to September 1960.

Gage.--Water-stage recorder.

Extremes.--Maximum discharge during year, 1,490 cfs Apr. 4 (gage height, 5.13 ft); minimum, 1.7 cfs Sept. 30 (gage height, 1.63 ft, backwater from aquatic vegetation).
1957-60: Maximum discharge, that of Apr. 4, 1960; minimum, 0.6 cfs Sept. 26, 1957; minimum gage height, that of Sept. 30, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 3

Apr. 4 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-------|
| 1.7 | 3.6 | 2.0 | 22 | 1.5 | 0.8 | 2.6 | 123 |
| 1.8 | 7.4 | 2.2 | 47 | 1.6 | 2.2 | 3.0 | 235 |
| 1.9 | 14 | 2.6 | 123 | 1.7 | 4.7 | 3.5 | 430 |
| | | | | 1.8 | 10 | 4.0 | 680 |
| | | | | 2.0 | 24 | 5.0 | 1,380 |
| | | | | 2.2 | 48 | | |

Note.--Same as following table above 2.6 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|---------|-------|-----------|-------|------------|-------|-----------|-------|
| 1 | 17 | 28 | 87 | b195 | 44 | b76 | *944 | 56 | 79 | 11 | 3.1 | 2.7 |
| 2 | 20 | 44 | 87 | b145 | 43 | b70 | 951 | 56 | 80 | 9.5 | 3.1 | 2.7 |
| 3 | 12 | 41 | 103 | 277 | b39 | b72 | 1,030 | 51 | 216 | 6.3 | 3.6 | 2.7 |
| 4 | 6.0 | 30 | 105 | b300 | b39 | b70 | 1,190 | 47 | 112 | 3.4 | 3.9 | 2.2 |
| 5 | 4.5 | 37 | 101 | b260 | 39 | b68 | 726 | 43 | 72 | 4.7 | 3.4 | 2.4 |
| 6 | 7.9 | 61 | 97 | b190 | 74 | b64 | 426 | 40 | 47 | 6.3 | 3.4 | 2.4 |
| 7 | 20 | 91 | 377 | 130 | 145 | b56 | 302 | 36 | 36 | 6.3 | 3.4 | 2.4 |
| 8 | 29 | 72 | 630 | 89 | b122 | b54 | 238 | 33 | 31 | 4.7 | 3.6 | 2.4 |
| 9 | 18 | 53 | 475 | b70 | 125 | b40 | 206 | 76 | 24 | 4.4 | 3.6 | 2.7 |
| 10 | 13 | 43 | 294 | b64 | 161 | b50 | 180 | 116 | 20 | 4.7 | 3.9 | 2.7 |
| 11 | 9.0 | 39 | 191 | b50 | 474 | b54 | 142 | 116 | 18 | 4.7 | 3.6 | 2.4 |
| 12 | 6.9 | 43 | 255 | b49 | b540 | b46 | 130 | 128 | 16 | 4.7 | 3.4 | 2.2 |
| 13 | 6.0 | 44 | 426 | 50 | b450 | 44 | *114 | 177 | *16 | 4.7 | 3.4 | 2.2 |
| 14 | 6.9 | 53 | 369 | 46 | b320 | 37 | 99 | 155 | 16 | 4.7 | 3.1 | 2.2 |
| 15 | 6.4 | 68 | 270 | 46 | 188 | b38 | 91 | 121 | 46 | 4.4 | 2.9 | 2.7 |
| 16 | 6.0 | 57 | 186 | b50 | 135 | b43 | 78 | 95 | 79 | 4.4 | 2.9 | 2.7 |
| 17 | 5.6 | 55 | 142 | b52 | 121 | 49 | 77 | *72 | 65 | 4.1 | 2.9 | 2.7 |
| 18 | 5.6 | 47 | 116 | b54 | *b108 | 53 | 83 | 67 | 65 | 4.1 | 2.9 | 2.4 |
| 19 | 5.2 | 40 | 99 | b54 | b106 | 55 | 70 | 56 | 47 | *4.1 | 2.9 | 2.4 |
| 20 | 4.9 | 37 | 74 | b50 | b94 | 55 | 60 | 51 | 34 | 3.9 | 2.9 | 2.4 |
| 21 | 4.9 | 36 | b56 | *b49 | b92 | 57 | 56 | 54 | 26 | 3.9 | 3.4 | 2.1 |
| 22 | 4.5 | 46 | 52 | b47 | b96 | 57 | 87 | 51 | 22 | 3.9 | 3.6 | *2.1 |
| 23 | *4.9 | *58 | *44 | b46 | b96 | 53 | 82 | 50 | 20 | 3.9 | 3.6 | 2.1 |
| 24 | 12 | 61 | 41 | b46 | b94 | *b52 | 85 | 97 | 20 | 3.9 | 3.4 | 2.1 |
| 25 | 31 | 81 | 41 | b46 | b92 | b50 | 89 | 119 | 27 | 3.6 | 3.4 | 2.1 |
| 26 | 21 | 65 | 43 | b46 | b90 | b52 | 91 | 95 | 20 | 3.4 | 3.1 | 2.2 |
| 27 | 28 | 65 | 63 | 47 | 85 | 52 | 87 | 70 | 18 | 3.1 | 2.9 | 2.2 |
| 28 | 34 | 97 | 200 | 46 | b80 | 81 | 77 | 54 | 15 | 3.1 | 2.7 | 2.2 |
| 29 | 25 | 97 | 256 | 46 | b78 | 129 | 60 | 44 | 12 | 3.1 | *2.9 | 2.1 |
| 30 | 30 | 91 | b250 | 46 | ----- | 344 | 56 | 42 | 12 | 3.1 | 2.9 | 1.9 |
| 31 | 18 | ----- | b250 | 44 | ----- | 722 | ----- | 61 | ----- | 3.1 | 2.9 | ----- |
| Total | 423.2 | 1,681 | 5,760 | 2,750 | 4,170 | 2,741 | 7,907 | 2,329 | 1,311 | 143.2 | 100.7 | 70.7 |
| Mean | 13.7 | 56.0 | 186 | 88.1 | 144 | 88.4 | 264 | 75.1 | 43.7 | 4.62 | 3.25 | 2.36 |
| Cfs/m | 0.309 | 1.26 | 4.19 | 1.98 | 3.24 | 1.99 | 5.95 | 1.69 | 0.984 | 0.104 | 0.073 | 0.053 |
| In. | 0.35 | 1.41 | 4.82 | 2.29 | 3.49 | 2.30 | 6.62 | 1.95 | 1.10 | 0.12 | 0.08 | 0.06 |
| Calendar year 1959: Max | | | 704 | | Min 1.4 | | Mean 82.2 | | Cfs/m 1.85 | | In. 25.15 | |
| Water year 1959-60: Max | | | 1,190 | | Min 1.9 | | Mean 80.2 | | Cfs/m 1.81 | | In. 24.59 | |

Peak discharge (base, 630 cfs).--Dec. 8 (12:30 p.m.) 669 cfs (3.98 ft); Apr. 4 (12:15 a.m.) 1,490 cfs (5.13 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Location.--Lat 42°23'00", long 76°52'05", on east bank about 300 ft from lake on shorter of two boat slips at Watkins Glen, Schuyler County.

Records available.--October 1956 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 440.00 ft above mean sea level, Erie (Barge) Canal datum.

Extremes.--Maximum daily gage height during year, 7.93 ft Apr. 5; minimum daily, 5.65 ft Mar. 26, 27.

1956-60: Maximum daily gage height, 8.04 ft Apr. 8, 1958; minimum daily, 4.64 ft Jan. 14, 1959.

Remarks.-Capacity of lake not determined; area of water surface, 66.7 sq mi. Figures of change in contents computed from surface area and change in stage.

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----------|-------|--------|--------|----------|--------|--------|-------|--------|--------|--------|--------|--------|
| 1 | 6.29 | 6.22 | 6.33 | 7.74 | 5.96 | 6.87 | 7.51 | 7.35 | 7.64 | 6.80 | 6.96 | 6.75 |
| 2 | 6.33 | 6.27 | 6.31 | 7.64 | 5.95 | 6.78 | 7.60 | 7.36 | 7.59 | 6.78 | 6.92 | 6.80 |
| 3 | 6.20 | 6.22 | 6.31 | 7.65 | 5.90 | 6.74 | 7.66 | 7.32 | 7.52 | 6.77 | 6.99 | 6.71 |
| 4 | 6.25 | 6.20 | 6.33 | 7.64 | 5.83 | 6.71 | 7.86 | 7.28 | 7.44 | 6.81 | 7.03 | 6.66 |
| 5 | 6.29 | 6.23 | 6.34 | 7.58 | 5.77 | 6.64 | 7.93 | 7.23 | 7.57 | 6.82 | 7.03 | 6.73 |
| 6 | 6.31 | 6.34 | 6.40 | 7.48 | 5.79 | 6.57 | 7.92 | 7.19 | 7.32 | 6.80 | 7.00 | 6.66 |
| 7 | 6.54 | 6.42 | 6.62 | 7.39 | 5.89 | 6.49 | 7.90 | 7.17 | 7.26 | 6.80 | 6.97 | 6.62 |
| 8 | 6.54 | 6.40 | 6.79 | 7.32 | 5.91 | 6.45 | 7.86 | 7.22 | 7.18 | 6.80 | 6.99 | 6.61 |
| 9 | 6.56 | 6.56 | 6.80 | 7.27 | 5.95 | 6.37 | 7.83 | 7.50 | 7.10 | 6.81 | 7.05 | 6.64 |
| 10 | 6.57 | 6.28 | 6.80 | 7.18 | 5.98 | 6.33 | 7.80 | 7.50 | 7.07 | 6.82 | 7.00 | 6.78 |
| 11 | 6.53 | 6.25 | 6.78 | 7.10 | 6.16 | 6.25 | 7.71 | 7.55 | 7.05 | 6.81 | 7.01 | 6.75 |
| 12 | 6.54 | 6.28 | 6.94 | 6.98 | 6.31 | 6.17 | 7.67 | 7.59 | 7.10 | 6.84 | 6.92 | 6.72 |
| 13 | 6.46 | 6.25 | 7.33 | 7.00 | 6.10 | 6.17 | 7.69 | 7.35 | 7.12 | 6.92 | 6.93 | 6.80 |
| 14 | 6.44 | 6.25 | 6.38 | 6.95 | 6.46 | 6.03 | 7.53 | 7.68 | 7.21 | 6.96 | 6.90 | 6.77 |
| 15 | 6.40 | 6.30 | 7.35 | 6.91 | 6.47 | 5.97 | 7.50 | 7.74 | 7.56 | 6.96 | 6.96 | 6.74 |
| 16 | 6.29 | 6.25 | 7.36 | 6.91 | 6.48 | 5.90 | 7.46 | 7.75 | 7.38 | 6.89 | 6.96 | 6.76 |
| 17 | 6.28 | 6.24 | 7.34 | 6.85 | 6.52 | 5.84 | 7.40 | 7.71 | 7.34 | 6.91 | 6.90 | 6.66 |
| 18 | 6.34 | 6.17 | 7.33 | 6.76 | 6.53 | 5.79 | 7.36 | 7.72 | 7.56 | 6.79 | 6.92 | 6.66 |
| 19 | 6.28 | 6.17 | 7.36 | 6.72 | 6.73 | 5.77 | 7.30 | 7.71 | 7.26 | 6.89 | 6.91 | 6.71 |
| 20 | 6.20 | 6.15 | 7.39 | 6.66 | 6.82 | 5.79 | 7.22 | 7.69 | 7.17 | 6.97 | 6.94 | 6.65 |
| 21 | 6.22 | 6.12 | 7.41 | 6.58 | 6.84 | 5.80 | 7.18 | 7.69 | 7.10 | 6.97 | 6.93 | 6.71 |
| 22 | 6.09 | 6.14 | 7.40 | 6.51 | 6.88 | 5.78 | 7.25 | 7.67 | 6.98 | 6.90 | 6.94 | 6.63 |
| 23 | 6.03 | 6.08 | 7.39 | 6.42 | 6.91 | 5.75 | 7.28 | 7.70 | 6.91 | 6.97 | 6.96 | 6.60 |
| 24 | 6.17 | 6.10 | 7.29 | 6.34 | 6.94 | 5.70 | 7.32 | 7.81 | 6.85 | 6.94 | 6.95 | 6.58 |
| 25 | 6.26 | 6.08 | 7.26 | 6.24 | 6.98 | 5.71 | 7.36 | 7.90 | 6.85 | 6.97 | 6.83 | 6.58 |
| 26 | 6.23 | 6.09 | 7.31 | 6.18 | 7.04 | 5.65 | 7.34 | 7.90 | 6.90 | 6.88 | 6.78 | 6.56 |
| 27 | 6.27 | 6.14 | 7.35 | 6.09 | 7.01 | 5.65 | 7.35 | 7.86 | 6.85 | 6.88 | 6.79 | 6.59 |
| 28 | 6.26 | 6.29 | 7.56 | 6.04 | 6.97 | 5.72 | 7.34 | 7.99 | 6.79 | 6.96 | 6.78 | 6.58 |
| 29 | 6.17 | 6.24 | 7.57 | 5.94 | 6.94 | 5.70 | 7.31 | 7.72 | 6.78 | 6.78 | 6.72 | 6.56 |
| 30 | 6.09 | 6.33 | 7.78 | 5.94 | 6.27 | 5.70 | 7.30 | 7.65 | 6.78 | 6.93 | 6.94 | 6.53 |
| 31 | 6.12 | ----- | 7.79 | 5.95 | ----- | 7.08 | ----- | 7.64 | ----- | 7.00 | 6.76 | ----- |
| Mean (°F) | 6.310 | 6.23 | 7.09 | 6.84 | 6.42 | 6.14 | 7.52 | 7.58 | 7.15 | 6.88 | 6.92 | 6.68 |
| | 0 | +114.8 | +992.8 | -1,270.5 | +705.0 | +340.2 | -50.2 | +222.2 | -595.4 | +131.9 | -180.5 | -114.8 |

| | | | | |
|---------------------|----------|----------|-----------|----------|
| Calendar year 1959: | Max 7.79 | Min 4.64 | Mean 6.61 | † +165.7 |
| Water year 1959-60: | Max 7.93 | Min 5.65 | Mean 6.82 | † +22.9 |

† Change in contents, equivalent in cubic feet per second, in Seneca Lake.

Location.--Lat 42°24'22", long 77°13'08", on left bank of Keuka Inlet 300 ft from mouth at Hammondsport, Steuben County, New York.

Records available.--August to September 1960.

Gage.--Water-stage recorder. Datum of gage is 710.00 ft above mean sea level.

Extremes.--Maximum daily gage height during period, 3.11 ft Aug. 24; minimum daily, 2.47 ft Sept. 30.

Remarks. --Lake regulated at outlet by New York State Electric and Gas Corp. Capacity of lake not determined; area of water surface, 17.43 sq mi. Figures of change in contents computed from surface area multiplied by change in stage.

[illegible]

2330. Cayuga Inlet near Ithaca, N. Y.

Location.--Lat 42°23'35", long 76°32'40", on left bank half a mile upstream from Butternut Creek and 5 miles south of Ithaca, Tompkins County.

Drainage area.--36.7 sq mi.

Records available.--March 1937 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 437.16 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--23 years, 39.1 cfs.

Extremes.--Maximum discharge during year, 1,240 cfs Mar. 30 (gage height, 3.98 ft); minimum, 3.9 cfs Sept. 9 (gage height, 0.52 ft, from recorded range in stage).

1937-60: Maximum discharge, 4,110 cfs Aug. 13, 1942 (gage height, 7.58 ft), from rating curve extended above 1,600 cfs on basis of slope-area measurements at gage heights 5.5 and 7.58 ft; minimum, 1.7 cfs July 22, 1955; minimum gage height, 0.42 ft Aug. 30, 31, Sept. 1, 2, 1939, July 22, 1955.

Remarks.--Records good except those for periods of ice effect, doubtful or no gage-height record, or shifting control, which are fair.

Rating tables, water year 1959-60, except periods of ice effect or shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 30 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 0.5 | 3.2 | 1.4 | 93 | 0.5 | 3.3 | 1.4 | 85 |
| .6 | 6.3 | 1.8 | 187 | .7 | 10 | 1.8 | 186 |
| .7 | 12 | 2.5 | 464 | .9 | 23 | 2.5 | 485 |
| .9 | 28 | 2.8 | 615 | 1.1 | 41 | 3.2 | 845 |
| 1.1 | 48 | 3.2 | 845 | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 7.3 | 61 | 70 | 76 | *29 | 35 | *382 | 35 | 49 | 17 | 6.2 | 5.2 |
| 2 | 4.7 | *53 | 68 | 64 | 27 | 36 | 229 | 32 | 40 | 17 | 5.9 | 4.9 |
| 3 | 4.4 | 36 | 72 | 138 | 27 | 33 | 241 | 29 | 39 | d16 | 8.9 | 4.9 |
| 4 | 4.4 | 37 | *67 | 93 | 27 | 35 | 319 | 28 | 36 | d14 | 9.3 | a5.9 |
| 5 | 4.7 | 51 | 53 | 67 | 28 | 34 | 276 | 25 | 33 | d13 | 7.7 | a7.7 |
| 6 | 14 | 132 | 53 | 54 | 92 | 32 | 162 | 24 | 28 | d13 | 6.5 | a6.9 |
| 7 | 84 | 93 | 206 | 52 | 64 | 30 | 127 | 23 | 25 | d12 | 6.2 | a5.9 |
| 8 | 27 | 64 | 125 | 52 | 44 | 32 | 115 | 23 | 23 | d10 | 5.9 | a4.9 |
| 9 | 48 | 56 | 90 | 40 | 45 | 32 | 115 | *110 | 22 | 9.3 | 5.5 | a4.3 |
| 10 | 24 | 40 | 76 | 40 | 87 | 30 | 107 | 89 | 21 | 8.9 | 17 | alo |
| 11 | 16 | 36 | 68 | 39 | *320 | 29 | 91 | 125 | 21 | 8.5 | 10 | a6.9 |
| 12 | 14 | 35 | 286 | 34 | 150 | 28 | 85 | 135 | 52 | 8.1 | 7.3 | a8.1 |
| 13 | 13 | 31 | 251 | 61 | 92 | 27 | 72 | 182 | 40 | 8.1 | 6.5 | a1.9 |
| 14 | *13 | 32 | 123 | *49 | 56 | *26 | 66 | 165 | 88 | *14 | 6.2 | a7.3 |
| 15 | 12 | 37 | 101 | 67 | 70 | 26 | 64 | 127 | 76 | 14 | *6.2 | a6.5 |
| 16 | 11 | 29 | 95 | 56 | 74 | 24 | 72 | 89 | 47 | 9.7 | 5.9 | a5.9 |
| 17 | 10 | 31 | 81 | 45 | 62 | 27 | 61 | 69 | 33 | 9.7 | 5.2 | a5.9 |
| 18 | 10 | 26 | 72 | 42 | 66 | 28 | 56 | 81 | 35 | 11 | 4.9 | a5.9 |
| 19 | 10 | 25 | 62 | 42 | 78 | 28 | 49 | 63 | 29 | 10 | 6.7 | *6.5 |
| 20 | 9.4 | 24 | 52 | 38 | 62 | 28 | 46 | 68 | 25 | 9.7 | 18 | 6.5 |
| 21 | 8.8 | 23 | 40 | 36 | 60 | 27 | 42 | 87 | 22 | 8.1 | 9.3 | 6.2 |
| 22 | 8.3 | 24 | 36 | 33 | 56 | 25 | 43 | 63 | 21 | 8.5 | 7.3 | 5.9 |
| 23 | 11 | 22 | 32 | 33 | 52 | 24 | 42 | 69 | 21 | 8.1 | 6.9 | 5.5 |
| 24 | 64 | 23 | 33 | 32 | 47 | 22 | 39 | 153 | 22 | 7.3 | 6.2 | 5.5 |
| 25 | 46 | 26 | 38 | 29 | 45 | 21 | 36 | 119 | 22 | 6.5 | 5.5 | 5.2 |
| 26 | 30 | 23 | 45 | 30 | 52 | 20 | 37 | 93 | 18 | 6.5 | 5.2 | 5.2 |
| 27 | 27 | 48 | 66 | 28 | 45 | 34 | 54 | 78 | 17 | 6.5 | 5.2 | 5.5 |
| 28 | 21 | 257 | 116 | 35 | 41 | 82 | 45 | 61 | 16 | 6.5 | 4.9 | 5.9 |
| 29 | 17 | 123 | 243 | 35 | 39 | 225 | 40 | 48 | 16 | 6.2 | 9.0 | 6.2 |
| 30 | 16 | 86 | 127 | 32 | ----- | 800 | 35 | 47 | *18 | 6.9 | 7.3 | 6.2 |
| 31 | 48 | ----- | 93 | 30 | ----- | 809 | ----- | 53 | ----- | 7.7 | 5.9 | ----- |
| Total | 638.0 | 1,582 | 2,942 | 1,502 | 1,937 | 2,689 | 3,148 | 2,391 | 955 | 311.8 | 228.7 | 196.4 |
| Mean | 20.6 | 52.7 | 94.9 | 48.5 | 66.8 | 86.7 | 105 | 77.1 | 31.8 | 10.1 | 7.38 | 6.55 |
| Cfsm | 0.561 | 1.44 | 2.59 | 1.32 | 1.82 | 2.36 | 2.86 | 2.10 | 0.866 | 0.275 | 0.201 | 0.178 |
| In. | 0.65 | 1.60 | 2.98 | 1.52 | 1.96 | 2.72 | 3.19 | 2.42 | 0.97 | 0.32 | 0.23 | 0.20 |

Calendar year 1959: Max 740 Min 3.2 Mean 41.3 Cfsm 1.13 In. 15.28
 Water year 1959-60: Max 809 Min 4.3 Mean 50.6 Cfsm 1.38 In. 18.76

Peak discharge (base, 1,100 cfs).--Mar. 30 (5:15 p.m.) 1,240 cfs (3.98 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated from reconstructed gage-height graph based on recorded range in stage and records for nearby stations.

d Doubtful gage-height record; discharge computed on basis of weather records, engineers' notes, and records for nearby stations.

Note.--Stage-discharge relation affected by ice Dec. 21-25, Jan. 7, 10-12, 25, 31, Feb. 4, 6; backwater from ice merged with shifting-control Feb. 12 to Mar. 27. Shifting-control method used Oct. 1 to Nov. 27, Feb. 11, Mar. 28-30.

2335. Cayuga Lake at Ithaca, N. Y.

Location.--Lat 42°26'45", long 76°30'45", on left bank of Cayuga Inlet, 1 mile from mouth at Ithaca, Tompkins County.

Drainage area.--780 sq mi.

Records available.--August 1905 to December 1909, August 1956 to September 1960 in reports of Geological Survey. January 1910 to September 1925 in reports of State engineer and surveyor.

Gage.--Water-stage recorder. Datum of gage is 380.00 ft above mean sea level, Erie (Barge) Canal datum. Prior to September 1925, staff gage at several sites within 1 mile of present site at same datum.

Extremes.--Maximum daily gage height during year, 5.08 ft May 26; minimum daily, -0.93 ft Mar. 28.

1905-25, 1956-60: Maximum gage height observed, 6.4 ft Apr. 4, 5, 1916; minimum daily, that of Mar. 28, 1960.

Remarks.--Records good. Lake regulated at outlet at Mud Lock by New York State Department of Public Works. Capacity of lake not determined; area of water surface, 66.4 sq mi. Figures of change in contents computed from surface area and change in stage.

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|--------------------|-------|-------|--------|----------|--------|----------|--------|----------|--------|--------|--------|-------|
| 1 | 2.71 | 2.75 | 2.80 | 4.00 | 1.25 | 0.34 | 2.33 | 3.35 | 4.90 | 3.95 | 3.21 | 3.12 |
| 2 | 2.71 | 2.84 | 2.78 | 3.90 | 1.16 | .34 | 2.65 | 3.25 | 4.86 | 3.90 | 3.17 | 3.19 |
| 3 | 2.54 | 2.78 | 2.82 | 4.00 | .99 | .38 | 2.98 | 3.21 | 4.80 | 3.82 | 3.25 | 3.08 |
| 4 | 2.61 | 2.73 | 2.85 | 4.05 | .81 | .47 | 3.61 | 3.21 | 4.74 | 3.80 | 3.28 | 3.04 |
| 5 | 2.61 | 2.77 | 2.84 | 4.05 | .64 | .49 | 4.05 | 3.20 | 4.70 | 3.73 | 3.29 | 3.08 |
| 6 | 2.67 | 2.99 | 2.84 | 3.99 | .55 | .51 | 4.31 | 3.20 | 4.67 | 3.64 | 3.23 | 3.02 |
| 7 | 2.82 | 3.15 | 3.08 | 3.93 | .57 | .48 | 4.48 | 3.19 | 4.60 | 3.58 | 3.19 | 2.99 |
| 8 | 2.85 | 3.13 | 3.30 | 3.88 | .43 | .55 | 4.61 | 3.21 | 4.49 | 3.50 | 3.24 | 2.97 |
| 9 | 2.91 | 3.13 | 3.36 | 3.80 | .32 | .50 | 4.75 | 3.38 | 4.35 | 3.48 | 3.24 | 2.97 |
| 10 | 2.93 | 3.12 | 3.44 | 3.68 | .21 | .49 | 4.89 | 3.49 | 4.19 | 3.41 | 3.21 | 3.13 |
| 11 | 2.86 | 3.07 | 3.43 | 3.58 | .30 | .41 | 4.87 | 3.68 | 4.08 | 3.37 | 3.20 | 3.07 |
| 12 | 2.89 | 3.19 | 3.62 | 3.40 | a.70 | .34 | 4.94 | 3.85 | 3.98 | 3.36 | 3.12 | 3.19 |
| 13 | 2.84 | 3.22 | 4.10 | 3.40 | a.80 | .31 | 4.94 | 4.08 | 3.92 | 3.33 | 3.12 | 3.16 |
| 14 | 2.85 | 3.22 | 4.18 | 3.32 | a.97 | .23 | 4.87 | 4.27 | 3.94 | 3.47 | 3.09 | 3.15 |
| 15 | 2.81 | 3.24 | 4.17 | 3.24 | .90 | .18 | 4.86 | 4.44 | 4.15 | 3.42 | 3.16 | 3.12 |
| 16 | 2.73 | 3.14 | 4.24 | 3.22 | .79 | .11 | 4.82 | 4.58 | 4.29 | 3.34 | 3.15 | 3.17 |
| 17 | 2.76 | 3.18 | 4.26 | 3.13 | .69 | a.04 | 4.75 | 4.63 | 4.37 | 3.38 | 3.11 | 3.04 |
| 18 | 2.78 | 3.10 | 4.25 | 3.00 | .60 | a-.05 | 4.74 | 4.70 | 4.49 | 3.35 | 3.12 | 3.07 |
| 19 | 2.71 | 3.07 | 4.25 | 2.96 | .68 | a-.14 | 4.67 | 4.72 | 4.51 | 3.32 | 3.13 | 3.10 |
| 20 | 2.63 | 3.01 | 4.10 | 2.88 | .69 | a-.23 | 4.55 | 4.74 | 4.55 | 3.40 | 3.13 | 3.06 |
| 21 | 2.64 | 2.90 | 3.97 | 2.76 | .52 | a-.32 | 4.41 | 4.78 | 4.56 | 3.35 | 3.12 | 3.15 |
| 22 | 2.51 | 2.85 | 3.92 | 2.65 | .44 | a-.41 | 4.37 | 4.74 | 4.52 | 3.28 | 3.13 | 3.06 |
| 23 | 2.47 | 2.67 | 3.76 | 2.52 | .36 | -.48 | 4.23 | 4.83 | 4.52 | 3.36 | 3.17 | 3.05 |
| 24 | 2.57 | 2.70 | 3.58 | 2.39 | .25 | -.52 | 4.06 | 4.93 | 4.50 | 3.37 | 3.17 | 3.06 |
| 25 | 2.60 | 2.67 | 3.41 | 2.24 | .21 | -.59 | 3.92 | 5.07 | 4.48 | 3.31 | 3.10 | 2.99 |
| 26 | 2.57 | 2.62 | 3.26 | 2.15 | .20 | -.75 | 3.81 | 5.08 | 4.30 | 3.20 | 3.06 | 3.02 |
| 27 | 2.62 | 2.58 | 3.11 | 2.02 | .21 | -.90 | 3.75 | 5.02 | 4.12 | 3.21 | 3.08 | 3.05 |
| 28 | 2.66 | 2.79 | 3.26 | 1.94 | .24 | -.93 | 3.68 | 4.97 | 4.03 | 3.27 | 3.07 | 3.05 |
| 29 | 2.60 | 2.79 | 3.62 | 1.84 | .29 | -.86 | 3.58 | 4.92 | 3.97 | 3.20 | 3.06 | 3.03 |
| 30 | 2.57 | 2.77 | 3.89 | 1.66 | ----- | 0 | 3.43 | 4.86 | 3.96 | 3.24 | 3.14 | 3.08 |
| 31 | 2.64 | ----- | 4.00 | 1.44 | ----- | 1.59 | ----- | 4.87 | ----- | 3.26 | 3.11 | ----- |
| Mean (†) | 2.70 | 2.94 | 3.56 | 3.07 | 0.58 | 0.05 | 4.20 | 4.21 | 4.38 | 3.44 | 3.16 | 3.08 |
| Water year 1959-60 | +89.8 | +78.6 | +822.4 | -1,879.9 | -724.0 | +1,237.1 | +885.6 | +1,064.3 | -657.0 | -504.5 | -103.7 | -64.3 |

Calendar year 1959: Max 4.26 Min 0.43 Mean 2.77 † +189.6

Water year 1959-60: Max 5.08 Min -0.93 Mean 2.95 † -34.5

† Change in contents, equivalent in cubic feet per second, in Cayuga Lake.

a No gage-height record; gage heights estimated on basis of recorded range in stage.

2340. Fall Creek near Ithaca, N. Y.

Location.--Lat 42°27'20", long 76°28'30", on left bank in Forest Home, half a mile up-stream from Cornell University Dam, 1½ miles northeast of Ithaca, Tompkins County, and 2 miles upstream from mouth.

Drainage area.--124 sq mi.

Records available.--July 1908 to June 1909 (gage heights only), February 1925 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 794.81 ft above mean sea level, adjustment of 1912 (levels by Corps of Engineers). July 1908 to June 1909 chain gage at bridge 1¼ miles downstream at different datum.

Average discharge.--35 years (1925-60), 186 cfs.

Extremes.--Maximum discharge during year, 4,570 cfs Mar. 30 (gage height, 5.34 ft, from outside-inside gage relation, 4.87 ft in gage well); minimum, 8.3 cfs Sept. 22 (gage height, 0.25 ft, result of temporary regulation).
1925-60: Maximum discharge, 15,500 cfs July 8, 1935 (gage height, 9.52 ft), from average of computed flow over each of four dams; minimum, about 3 cfs Aug. 25, 1927 (gage height, 0.18 ft).

Remarks.--Records excellent except those for periods of ice effect or drawdown, which are fair. Cornell University diverted 68,633,062 cu ft during year from point about 1 mile above station for water supply, equivalent to a mean discharge at station of 2.17 cfs.

Revisions (water years).--WSP 759: Drainage area. WSP 874: 1935-38.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.3 | 11 | 2.0 | 428 |
| .4 | 17 | 2.5 | 760 |
| .6 | 31 | 3.0 | 1,210 |
| .9 | 58 | 4.0 | 2,340 |
| 1.2 | 99 | 5.0 | 3,930 |
| 1.5 | 189 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|--------|-------|--------|----------|--------|------------|-----------|-------|-------|-------|
| 1 | 20 | 762 | 302 | 368 | *116 | 150 | 2,580 | 160 | 487 | 53 | 22 | 20 |
| 2 | 36 | *368 | 283 | 278 | 96 | 140 | 1,360 | 147 | 247 | 50 | 17 | 19 |
| 3 | 26 | 238 | 321 | 801 | 76 | 130 | 1,380 | 129 | 175 | 45 | 26 | 17 |
| 4 | 20 | 201 | *302 | 572 | 86 | 155 | 1,950 | 116 | 171 | 49 | 60 | 20 |
| 5 | 19 | 321 | 255 | 283 | 90 | 145 | 1,580 | 108 | 123 | 46 | 35 | 25 |
| 6 | 58 | 780 | 251 | 230 | 343 | 135 | 891 | 97 | 121 | 42 | 27 | 22 |
| 7 | 471 | 731 | 612 | 225 | 434 | 108 | 643 | 90 | 101 | 39 | 23 | 19 |
| 8 | 195 | 342 | 493 | 220 | 215 | 114 | 518 | 87 | 90 | 36 | *22 | 19 |
| 9 | 248 | 260 | 337 | 175 | 217 | 104 | 524 | *197 | 82 | 35 | 19 | 18 |
| 10 | 152 | 209 | 278 | 180 | 361 | 102 | 506 | 255 | 77 | 33 | 20 | 122 |
| 11 | 82 | 175 | 238 | 165 | 2,440 | 100 | 434 | 205 | 72 | 32 | 22 | 47 |
| 12 | 84 | 175 | 1,040 | 120 | 1,100 | 98 | 440 | 235 | 79 | 35 | 20 | 118 |
| 13 | 53 | 171 | 1,810 | 209 | 490 | 98 | 428 | 562 | 99 | 31 | 18 | 147 |
| 14 | *54 | 189 | 582 | *213 | 280 | *98 | 373 | 440 | 140 | 42 | 16 | 82 |
| 15 | 47 | 321 | 412 | 215 | 215 | 94 | 524 | 417 | 440 | 46 | 18 | 50 |
| 16 | 43 | 205 | 406 | 233 | 340 | 90 | 524 | 269 | 238 | 36 | 18 | 38 |
| 17 | 38 | 264 | 373 | 178 | 330 | 98 | 395 | 201 | 129 | 32 | 17 | 33 |
| 18 | 39 | 221 | 302 | 160 | 331 | 98 | 337 | 229 | 116 | *37 | 15 | 30 |
| 19 | 39 | 164 | 269 | 157 | 340 | 104 | 292 | 229 | 106 | 32 | 17 | 32 |
| 20 | 35 | 147 | 217 | 130 | 170 | 102 | 247 | 164 | 118 | 36 | 29 | *32 |
| 21 | 32 | 141 | 155 | 135 | 245 | 100 | 217 | 189 | 101 | 32 | 31 | 35 |
| 22 | 28 | 144 | 175 | 130 | 292 | 98 | 321 | 201 | 82 | 28 | 35 | 26 |
| 23 | 43 | 129 | 150 | 129 | 270 | 96 | 260 | 213 | 79 | 32 | 25 | 26 |
| 24 | 97 | 132 | 145 | 122 | 240 | 94 | 217 | 588 | 78 | 33 | 22 | 25 |
| 25 | 232 | 138 | 180 | 104 | 195 | 88 | 197 | 572 | 77 | 27 | 20 | 22 |
| 26 | 135 | 129 | 185 | 114 | 215 | 76 | 185 | 287 | 62 | 24 | 18 | 20 |
| 27 | 111 | 171 | 269 | 110 | 205 | 102 | 285 | 205 | 56 | 23 | 17 | 20 |
| 28 | 123 | 1,290 | 1,060 | 135 | 190 | 189 | 229 | 160 | 49 | 23 | 17 | 20 |
| 29 | 111 | 636 | 1,620 | 157 | 175 | 451 | 167 | 144 | 47 | 21 | 17 | 20 |
| 30 | 89 | 373 | 745 | 135 | ----- | 2,580 | 153 | 141 | *58 | 21 | 25 | 21 |
| 31 | 332 | ----- | 481 | 116 | ----- | 2,860 | ----- | 185 | ----- | 24 | 27 | ----- |
| Total | 3,072 | 9,517 | 14,048 | 6,499 | 10,097 | 9,997 | 18,127 | 7,216 | 3,900 | 1,075 | 717 | 1,145 |
| Mean | 99.1 | 317 | 453 | 210 | 348 | 322 | 604 | 233 | 130 | 34.7 | 23.1 | 58.2 |
| Cfs/m | 0.799 | 2.56 | 3.85 | 1.69 | 2.81 | 2.60 | 4.87 | 1.88 | 1.05 | 0.280 | 0.186 | 0.308 |
| In. | 0.92 | 2.85 | 4.21 | 1.95 | 3.03 | 3.00 | 5.44 | 2.16 | 1.17 | 0.32 | 0.22 | 0.34 |
| Calendar year 1959: Max | | | 3,300 | | Min 10 | Mean 199 | | Cfs/m 1.60 | In. 21.81 | | | |
| Water year 1959-60: Max | | | 3,860 | | Min 15 | Mean 233 | | Cfs/m 1.88 | In. 25.61 | | | |

Peak discharge (base, 1,900 cfs).--Nov. 28 (3 p.m.) 2,040 cfs (3.77 ft); Dec. 13 (3 a.m.) 2,290 cfs (3.98 ft); Dec. 29 (7 a.m.) 2,110 cfs (3.82 ft); Feb. 11 (2 p.m.) 3,790 cfs (4.92 ft); Mar. 30 (9:30 p.m.) 4,570 cfs (5.34 ft); Apr. 4 (9:30 a.m.) 2,340 cfs (4.00 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21-25, Jan. 6-12, 15, 20-22, 24-27, 30, 31, Feb. 2-4, 8, 13-17, 19-21, Feb. 23 to Mar. 27 (no gage-height record Mar. 9-13). Doubtful gage-height record due to drawdown Nov. 28, Dec. 12, 13, 29, Feb. 11, Mar. 30 to Apr. 1, Apr. 4, 5; discharge computed on basis of outside-inside gage relation, normal pattern of peaks, and records for nearby stations.

2342. Mud Creek at East Victor, N. Y.

Location.--Lat 42°58'32", long 77°22'58", on left bank at bridge on State Highway 96, 0.3 mile upstream from Fish Creek at East Victor, Ontario County.

Discharge area.--64.1 sq mi.

Records available.--April 1958 to September 1960 (no winter records). Low-flow partial-record station 1957.

Gage.--Water-stage recorder. Altitude of gage is 560 ft (from topographic map).

Extremes.--1958: Maximum discharge during period April to September, 896 cfs Apr. 7 (gage height, 5.39 ft); minimum, 0.5 cfs Aug. 24 (gage height, 1.19 ft).
1958-59: Maximum discharge recorded during water year, 132 cfs Nov. 16 (gage height, 2.73 ft); minimum daily, 0.1 cfs Sept. 6.
1959-60: Maximum discharge recorded during water year, 436 cfs May 10 (gage height, 4.02 ft); minimum daily, 0.3 cfs Sept. 27-30.

Remarks.--Records poor.

Rating tables, Apr. 1, 1958, to Sept. 30, 1960 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 18-23, 1959)

Apr. 1 to Nov. 30, 1958

June 15, 1959, to Sept. 30, 1960

| | | | | | | | |
|-----|-----|-----|-----|------|-----|-----|-----|
| 1.2 | 0.6 | 2.5 | 96 | 1.04 | 0.1 | 1.5 | 9.6 |
| 1.3 | 1.6 | 3.0 | 178 | 1.1 | 1.4 | 1.7 | 18 |
| 1.4 | 3.2 | 3.5 | 290 | 1.2 | 1.8 | 2.0 | 39 |
| 1.5 | 6.0 | 4.0 | 430 | 1.3 | 3.9 | 2.5 | 96 |
| 1.7 | 14 | 4.5 | 589 | 1.4 | 6.4 | | |
| 2.0 | 34 | 5.3 | 865 | | | | |

Note.--Same as preceding table above 2.5 ft.

Discharge, in cubic feet per second, April to September 1958

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|------|------|------|------|------|-------|-------|---------|-------|-------|-------|
| 1 | | | | | | | 170 | 60 | 12 | 8.3 | 6.8 | 1.2 |
| 2 | | | | | | | 200 | 52 | 130 | 7.6 | 4.9 | 1.2 |
| 3 | | | | | | | 250 | 46 | 123 | 6.0 | 3.8 | 1.1 |
| 4 | | | | | | | 300 | 55 | 41 | 6.0 | 2.9 | 1.6 |
| 5 | | | | | | | 400 | 50 | 28 | 9.5 | 2.4 | 1.3 |
| 6 | | | | | | | 569 | 42 | 24 | 21 | 2.4 | 1.1 |
| 7 | | | | | | | 865 | 70 | 21 | 47 | 2.2 | 3.2 |
| 8 | | | | | | | 626 | 152 | 19 | 29 | 2.1 | 9.5 |
| 9 | | | | | | | 260 | 100 | 118 | 27 | 1.9 | 6.0 |
| 10 | | | | | | | 191 | 68 | 250 | 19 | 2.2 | 5.7 |
| 11 | | | | | | | 209 | 55 | 163 | 36 | 2.4 | 4.6 |
| 12 | | | | | | | 275 | 45 | 84 | 98 | 2.6 | 4.3 |
| 13 | | | | | | | 197 | 38 | *72 | 113 | 1.9 | 3.0 |
| 14 | | | | | | | 236 | *34 | 111 | 51 | 1.5 | 2.2 |
| 15 | | | | | | | 268 | 33 | 52 | 32 | 1.5 | 1.9 |
| 16 | | | | | | | 236 | 32 | 34 | 103 | 1.6 | 2.1 |
| 17 | | | | | | | 208 | 26 | 26 | 52 | 1.4 | *2.7 |
| 18 | | | | | | | 182 | 24 | 22 | 31 | 1.4 | 9.1 |
| 19 | | | | | | | 158 | 24 | 18 | 32 | 1.1 | 11 |
| 20 | | | | | | | 119 | 22 | 15 | 27 | .9 | 9.1 |
| 21 | | | | | | | 121 | 19 | 14 | 19 | .9 | 7.6 |
| 22 | | | | | | | 257 | 18 | 13 | 15 | .9 | 12 |
| 23 | | | | | | | 241 | 18 | 10 | 14 | .7 | 10 |
| 24 | | | | | | | 130 | 17 | 8.0 | 14 | 1.1 | 7 |
| 25 | | | | | | | 82 | 15 | 11 | 12 | 2.2 | 5 |
| 26 | | | | | | | 70 | 14 | 37 | 12 | 3.2 | 7 |
| 27 | | | | | | | 65 | 13 | 40 | 10 | 2.4 | 13 |
| 28 | | | | | | | 60 | 13 | 15 | 8.7 | 1.4 | 14 |
| 29 | | | | | | | 65 | 14 | 11 | 8.7 | 1.3 | 9.9 |
| 30 | | | | | | | 70 | 14 | 9.9 | *15 | 1.1 | 7.2 |
| 31 | | | | | | | | 11 | | 13 | 1.0 | |
| Total | | | | | | | 7,080 | 1,194 | 1,531.9 | 896.8 | 64.1 | 174.6 |
| Mean | | | | | | | 238 | 39.5 | 51.1 | 29.9 | 2.07 | 5.82 |
| Cfsm | | | | | | | 3.68 | 0.601 | 0.797 | 0.451 | 0.032 | 0.091 |
| In. | | | | | | | 4.11 | 0.69 | 0.89 | 0.52 | 0.04 | 0.10 |

Calendar year : Max Min Mean Cfsm In.
Water year : Max Min Mean Cfsm In.

* Discharge measurement made on this day.

† Result of discharge measurement.

Note.--No gage-height record Apr. 1-4, Apr. 26 to May 1, June 30 to July 2, Sept. 22-26; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

STREAMS TRIBUTARY TO LAKE ONTARIO

2342. Mud Creek at East Victor, N. Y.--Continued

Discharge, in cubic feet per second, water year October 1958 to September 1959

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|------|-----|------|-------|-------|-------|
| 1 | 8.3 | 26 | | | | | | | - | 2.9 | 0.6 | 0.3 |
| 2 | 13 | 22 | | | | | | | - | 3.9 | .4 | .3 |
| 3 | 7.2 | 21 | | | | | | | - | 3.9 | .3 | .3 |
| 4 | 5.7 | 22 | | | | | | | - | 3.7 | .3 | .2 |
| 5 | 5.2 | 18 | | | | | | | - | 2.3 | .3 | .2 |
| 6 | 4.6 | 15 | | | | | | | - | 2.3 | .3 | .1 |
| 7 | *4.0 | 14 | | | | | | | - | 2.3 | .3 | .2 |
| 8 | 3.5 | 13 | | | | | | | - | 1.7 | .2 | .2 |
| 9 | 3.2 | 12 | | | | | | | - | 1.6 | .2 | .2 |
| 10 | 3.0 | 14 | | | | | | | - | 2.1 | .2 | .2 |
| 11 | 2.9 | 17 | | | | | | | - | 1.7 | a.2 | .2 |
| 12 | 2.7 | 15 | | | | | | | - | 1.6 | a.2 | .2 |
| 13 | 3.2 | 13 | | | | | | | - | 1.4 | .2 | .2 |
| 14 | 4.3 | 20 | | | | | | | - | 1.0 | .2 | .2 |
| 15 | 4.6 | 59 | | | | | | | *4.9 | .7 | .2 | .2 |
| 16 | 4.9 | 92 | | | | | | | 4.6 | .6 | .3 | .2 |
| 17 | 12 | 52 | | | | | | | 4.9 | .7 | *.3 | .2 |
| 18 | 12 | *63 | | | | | | | 5.2 | .4 | .7 | *.2 |
| 19 | 8.3 | 51 | | | | | | | 4.9 | .3 | .4 | .2 |
| 20 | 6.8 | 33 | | | | | | | 4.4 | 1.3 | .3 | .2 |
| 21 | 5.7 | 28 | | | | | | | 3.7 | 1.4 | .4 | .2 |
| 22 | 5.2 | 25 | | | | | | | 3.5 | *.7 | .6 | .3 |
| 23 | 8.0 | 21 | | | | | | | 3.3 | .9 | .4 | .3 |
| 24 | 19 | 20 | | | | | | | 3.1 | 2.9 | .4 | .3 |
| 25 | 24 | 20 | | | | | | | 2.9 | 1.4 | a.4 | .3 |
| 26 | 16 | 26 | | | | | | | 3.9 | .9 | .4 | .4 |
| 27 | 17 | 28 | | | | | | | 5.9 | .4 | .4 | .4 |
| 28 | 30 | 20 | | | | | | | 5.9 | .4 | .4 | .4 |
| 29 | 105 | a18 | | | | | | | 4.9 | .9 | .4 | .4 |
| 30 | 71 | a16 | | | | | | | 3.5 | 3.7 | .3 | 1.0 |
| 31 | 37 | | | | | | | | | 1.4 | .3 | |
| Total | 457.3 | 812 | - | - | - | - | - | - | - | 51.4 | 10.5 | 8.2 |
| Mean | 14.8 | 27.1 | - | - | - | - | - | - | - | 1.66 | 0.34 | 0.27 |
| Cfsm | 0.231 | 0.423 | - | - | - | - | - | - | - | 0.026 | 0.005 | 0.004 |
| In. | 0.27 | 0.47 | - | - | - | - | - | - | - | 0.03 | 0.006 | 0.005 |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | |
|-------|-------|------|------|------|------|--------|------|-------|---------|-------|-------|-------|----|
| 1 | 5.6 | | | | | | - | 39 | 105 | 6.7 | 4.9 | 0.8 | |
| 2 | 23 | | | | | | - | 36 | 87 | 6.4 | 2.9 | .8 | |
| 3 | 10 | | | | | | - | 33 | 59 | 6.2 | 2.5 | .7 | |
| 4 | 6.4 | | | | | | - | 30 | 50 | 5.9 | 4.6 | .7 | |
| 5 | 5.2 | | | | | | - | 27 | 36 | 5.6 | 6.2 | .7 | |
| 6 | 8.3 | | | | | | - | 24 | 29 | 5.4 | 4.4 | .6 | |
| 7 | 87 | | | | | | - | 22 | 25 | 4.9 | 3.3 | .6 | |
| 8 | 49 | | | | | | - | 22 | 22 | 4.6 | 2.7 | .4 | |
| 9 | 18 | | | | | | - | 157 | 20 | 4.4 | 3.1 | .4 | |
| 10 | 9.3 | | | | | | - | 354 | 18 | 3.9 | 5.4 | .4 | |
| 11 | 7.0 | | | | | | - | 211 | 16 | 3.1 | 3.3 | .4 | |
| 12 | 5.2 | | | | | | - | 227 | 16 | 3.1 | 2.5 | .4 | |
| 13 | 4.4 | | | | | | - | 210 | 18 | *2.5 | 2.3 | .4 | |
| 14 | 4.2 | | | | | | - | 152 | 25 | 4.6 | 2.1 | .4 | |
| 15 | 3.9 | | | | | | - | 110 | *165 | 4.6 | 1.7 | *.4 | |
| 16 | 3.7 | | | | | | - | 82 | 88 | 4.6 | 1.8 | .4 | |
| 17 | 3.5 | | | | | | - | 85 | 42 | 4.6 | 2.1 | .4 | |
| 18 | 3.1 | | | | | | - | 68 | 33 | 4.6 | 3.9 | .4 | |
| 19 | *2.7 | | | | | | - | 61 | 65 | 28 | 4.4 | 2.9 | .4 |
| 20 | 2.5 | | | | | | - | 51 | 56 | 22 | 3.9 | 4.4 | .4 |
| 21 | 2.1 | | | | | | - | 46 | 73 | 18 | 3.5 | 5.4 | .4 |
| 22 | 1.8 | | | | | | - | 67 | 89 | 15 | 3.3 | 3.9 | .4 |
| 23 | 1.8 | | | | | | - | 58 | 163 | 14 | 3.1 | 3.3 | .4 |
| 24 | 3.3 | | | | | | - | 48 | *260 | 14 | 3.1 | 3.1 | .4 |
| 25 | 7.0 | | | | | | - | 46 | 234 | 13 | 2.9 | *2.3 | .4 |
| 26 | 8.3 | | | | | | - | 45 | 132 | 11 | 2.9 | 1.7 | .4 |
| 27 | 6.0 | | | | | | - | 62 | 92 | 9.0 | 2.7 | 1.4 | .3 |
| 28 | 5.0 | | | | | | - | 52 | 66 | 8.3 | 2.1 | 1.1 | .3 |
| 29 | 4.6 | | | | | | - | 43 | 51 | 8.0 | 1.7 | .9 | .3 |
| 30 | 4.2 | | | | | | - | 39 | 41 | 7.4 | 1.6 | .9 | .3 |
| 31 | 4.6 | | | | | | - | | 73 | 4.2 | .8 | | |
| | | | | | | †1,170 | | | | | | | |
| Total | 310.7 | - | - | - | - | - | - | 3,264 | 1,001.7 | 125.1 | 91.8 | 13.7 | |
| Mean | 10.0 | - | - | - | - | - | - | 105 | 33.4 | 4.04 | 2.96 | 0.46 | |
| Cfsm | 0.156 | - | - | - | - | - | - | 1.64 | 0.521 | 0.063 | 0.046 | 0.007 | |
| In. | 0.18 | - | - | - | - | - | - | 1.89 | 0.58 | 0.07 | 0.05 | 0.008 | |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement made on this day.

† Result of discharge measurement.

Note.--No gage-height record Oct. 27, 28, July 15-17, Aug. 30 to Sept. 4, Sept. 13-19; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

2345. Canandaigua Lake at Canandaigua, N. Y.

Location.--Lat 42°52'20", long 77°16'20", at south end of city pier at northern end of Canandaigua Lake, 1 mile southeast of Canandaigua, Ontario County.

Drainage area.--189 sq mi.

Records available.--November 1939 to September 1945 (gage heights only), October 1945 to September 1960. December 1927 to November 1939, records collected by city of Canandaigua at site on west side of E. T. Waldorf's boathouse.

Gage.--Water-stage recorder. Datum of gage is 680.76 ft above mean sea level (levels by Corps of Engineers). Prior to June 26, 1946, staff gage at E. T. Waldorf's boathouse at same datum.

Extremes.--Maximum daily gage height during year, 8.25 ft Apr. 5 (contents, 53,554 acre-ft); minimum daily, 5.44 ft Oct. 1 (contents, 23,755 acre-ft).
1939-60: Maximum daily gage height, 9.13 ft Mar. 11, 1956 (contents, 62,886 acre-ft); minimum daily, 4.45 ft Jan. 30, 1942 (contents, 13,256 acre-ft).

Remarks.--Elevation of lake surface regulated by gates on east outlet and stoplogs on west outlet. West outlet, which usually carries most of lake outflow, is an artificial canal 1½ miles long which discharges into Canandaigua Lake Outlet; spillway consists of permanent stoplog 9.8 ft long with top at elevation 3.2 ft, gage datum, extending across a masonry-arch opening under roadway. East outlet is at head of natural outlet channel from lake; flow regulated above about 4.6 ft, gage datum, by two gates at highway bridge half a mile downstream. City of Canandaigua regulates storage in lake for Oswego River Watershed Corp., Fulton, by operation of gates and stoplogs on outlets. Water diverted for municipal supply by village of Newark since about December 1951. An additional small diversion is made by village of Palmyra for water-supply purposes. Capacity of lake between 3.2 and 9.3 ft, gage datum, 64,689 acre-ft, on basis of water-surface area of 16.57 sq mi. Total capacity of lake not determined.

Capacity table, water year 1959-60 (elevation, in feet, and contents, in acre-feet)

| | |
|-----|--------|
| 5.0 | 19,089 |
| 6.0 | 29,693 |
| 7.0 | 40,298 |
| 8.0 | 50,903 |
| 8.3 | 54,084 |

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|--------|--------|---------|--------|--------|---------|--------|--------|--------|--------|--------|--------|
| 1 | 5.44 | 5.50 | 5.71 | 7.36 | 6.55 | 6.77 | 7.97 | 7.19 | 7.70 | 7.25 | 6.91 | 6.69 |
| 2 | 5.49 | 5.50 | 5.73 | 7.36 | 6.52 | 6.73 | 8.09 | 7.12 | 7.65 | 7.24 | 6.90 | 6.85 |
| 3 | 5.51 | 5.52 | 5.75 | 7.34 | 6.52 | 6.70 | 8.17 | 7.09 | 7.59 | 7.23 | 6.94 | 6.84 |
| 4 | 5.48 | 5.55 | 5.77 | 7.37 | 6.52 | 6.68 | 8.22 | 7.05 | 7.53 | 7.22 | 6.95 | 6.83 |
| 5 | 5.49 | 5.58 | 5.80 | 7.34 | 6.50 | 6.64 | 8.25 | 7.04 | 7.45 | 7.19 | 6.96 | 6.60 |
| 6 | 5.54 | 5.55 | 5.83 | 7.29 | 6.57 | 6.61 | 8.23 | 7.05 | 7.37 | 7.15 | 6.94 | 6.59 |
| 7 | 5.69 | 5.55 | 6.01 | 7.23 | 6.66 | 6.56 | 8.17 | 7.05 | 7.30 | 7.13 | 6.94 | 6.59 |
| 8 | 5.74 | 5.57 | 6.23 | 7.17 | 6.70 | 6.50 | 8.12 | 7.03 | 7.23 | 7.13 | 6.90 | 6.58 |
| 9 | 5.74 | 5.56 | 6.32 | 7.10 | 6.71 | 6.46 | 8.07 | 7.19 | 7.17 | 7.09 | 6.88 | 6.58 |
| 10 | 5.72 | 5.59 | 6.33 | 7.06 | 6.75 | 6.43 | 8.01 | 7.36 | 7.12 | 7.08 | 6.88 | 6.55 |
| 11 | 5.72 | 5.60 | 6.36 | 7.01 | 6.87 | 6.37 | 7.98 | 7.45 | 7.10 | 7.06 | 6.87 | 6.54 |
| 12 | 5.69 | 5.55 | 6.51 | 6.99 | 6.98 | 6.34 | 7.91 | 7.54 | 7.11 | 7.05 | 6.86 | 6.50 |
| 13 | 5.65 | 5.59 | 6.83 | 7.01 | 7.00 | 6.30 | 7.86 | 7.61 | 7.15 | 7.04 | 6.84 | 6.54 |
| 14 | 5.63 | 5.57 | 7.00 | 7.02 | 7.05 | 6.26 | 7.82 | 7.63 | 7.19 | 7.03 | 6.83 | 6.50 |
| 15 | 5.62 | 5.59 | 7.06 | 7.04 | 7.08 | 6.23 | 7.76 | 7.66 | 7.36 | 7.05 | 6.82 | 6.48 |
| 16 | 5.62 | 5.60 | 7.09 | 7.09 | 7.09 | 6.20 | 7.75 | 7.65 | 7.44 | 7.04 | 6.83 | 6.47 |
| 17 | 5.56 | 5.59 | 7.12 | 7.08 | 7.06 | 6.19 | 7.74 | 7.65 | 7.45 | 7.02 | 6.82 | 6.52 |
| 18 | 5.54 | 5.60 | 7.15 | 7.07 | 7.02 | 6.15 | 7.70 | 7.65 | 7.40 | 7.02 | 6.80 | 6.44 |
| 19 | 5.52 | 5.59 | 7.16 | 7.03 | 7.07 | 6.13 | 7.65 | 7.68 | 7.42 | 7.02 | 6.79 | 6.43 |
| 20 | 5.50 | 5.58 | 7.16 | 6.99 | 7.10 | 6.10 | 7.60 | 7.66 | 7.39 | 6.98 | 6.84 | 6.41 |
| 21 | 5.47 | 5.59 | 7.17 | 6.95 | 7.08 | 6.08 | 7.56 | 7.69 | 7.39 | 6.98 | 6.84 | 6.40 |
| 22 | 5.50 | 5.58 | 7.17 | 6.91 | 7.04 | 6.06 | 7.53 | 7.79 | 7.39 | 7.01 | 6.84 | 6.43 |
| 23 | 5.50 | 5.67 | 7.17 | 6.86 | 7.02 | 6.05 | 7.49 | 7.83 | 7.38 | 6.98 | 6.81 | 6.40 |
| 24 | 5.48 | 5.60 | 7.16 | 6.83 | 6.99 | 6.03 | 7.45 | 7.90 | 7.40 | 6.95 | 6.79 | 6.39 |
| 25 | 5.52 | 5.60 | 7.12 | 6.80 | 6.96 | 6.01 | 7.41 | 7.95 | 7.36 | 6.94 | 6.78 | 6.40 |
| 26 | 5.51 | 5.59 | 7.07 | 6.75 | 6.96 | 6.00 | 7.36 | 7.94 | 7.32 | 6.99 | 6.77 | 6.34 |
| 27 | 5.49 | 5.61 | 7.07 | 6.70 | 6.93 | 5.98 | 7.34 | 7.91 | 7.31 | 6.95 | 6.75 | 6.32 |
| 28 | 5.49 | 5.67 | 7.21 | 6.67 | 6.87 | 6.03 | 7.31 | 7.86 | 7.31 | 6.90 | 6.74 | 6.31 |
| 29 | 5.46 | 5.70 | 7.38 | 6.64 | 6.81 | 6.21 | 7.27 | 7.78 | 7.31 | 6.89 | 6.74 | 6.32 |
| 30 | 5.48 | 5.72 | 7.41 | 6.60 | ----- | 6.85 | 7.25 | 7.73 | 7.27 | 6.91 | 6.71 | 6.30 |
| 31 | 5.49 | ----- | 7.40 | 6.57 | ----- | 7.60 | ----- | 7.72 | ----- | 6.92 | 6.70 | ----- |
| (†) | 24,285 | 26,618 | 44,434 | 35,950 | 38,283 | 49,418 | 42,737 | 47,934 | 43,055 | 39,344 | 37,177 | 32,663 |
| (*) | +1,591 | +2,333 | +17,816 | -8,484 | +2,333 | +11,135 | -6,681 | +5,197 | -4,879 | -3,711 | -2,167 | -4,514 |

Calendar year 1959..... * +14,104

Water year 1959-60..... * +9,969

† Contents, in acre-feet, at 12 p.m. on last day of month, above 3.2 ft, gage datum, elevation of lowest outlet.

* Change in contents, in acre-feet.

2350. Canandaigua Lake Outlet at Chapin, N. Y.

Location.--Lat 42°55'00", long 77°14'00", on left bank at Chapin, Ontario County, 500 ft upstream from highway bridge and 3 miles downstream from Canandaigua Lake.

Drainage area.--199 sq mi.

Records available.--November 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 673.6 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--20 years (1940-60), 150 cfs (unadjusted).

Extremes.--Maximum discharge during year, 1,000 cfs Mar. 30 (gage height, 4.58 ft); minimum daily, 10 cfs Nov. 18-23; minimum gage height, 1.54 ft Nov. 24.
1939-60: Maximum discharge, 1,100 cfs Mar. 17, 1942 (gage height, 4.64 ft); minimum, 4.6 cfs Sept. 17, 1948; minimum gage height, 1.15 ft Feb. 3, 1950.

Remarks.--Records good except those for periods of ice effect, backwater from aquatic vegetation, or no gage-height record, which are fair. Flow regulated by Canandaigua Lake (see preceding page), from which water is diverted for municipal supply by villages of Newark and Palmyra. Monthly runoff adjusted for change in contents in Canandaigua Lake since October 1945

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|--------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 67 | 50 | 52 | 478 | 214 | a320 | 642 | 368 | 581 | 68 | 40 | 50 |
| 2 | 37 | 27 | 56 | 471 | 92 | *a290 | 668 | 356 | 556 | 67 | 36 | 49 |
| 3 | 31 | 27 | 67 | 528 | b100 | b330 | 698 | 346 | 546 | 65 | 42 | 47 |
| 4 | 28 | 29 | 77 | 484 | b100 | b330 | 726 | 310 | 532 | 65 | 38 | 44 |
| 5 | 31 | 29 | 77 | 461 | 103 | b320 | 710 | 109 | 515 | 64 | 38 | 42 |
| 6 | 37 | 29 | 84 | b430 | 175 | b310 | 702 | 90 | 488 | 58 | 59 | 41 |
| 7 | 60 | 25 | 196 | b420 | 150 | b310 | 687 | 90 | 432 | 58 | 59 | 40 |
| 8 | 42 | 23 | 134 | 419 | 123 | b290 | 672 | 89 | 439 | 56 | 58 | 38 |
| 9 | 38 | 23 | 109 | 396 | 121 | b280 | 661 | 157 | 409 | 54 | 56 | 40 |
| 10 | 38 | 22 | 101 | 387 | 152 | b270 | 642 | 154 | 341 | 54 | 54 | 36 |
| 11 | 38 | 16 | 97 | 374 | 186 | 269 | 609 | 184 | 92 | *53 | 52 | 34 |
| 12 | 36 | 14 | 250 | 371 | 152 | 258 | 550 | 212 | 77 | 59 | 52 | 32 |
| 13 | 35 | 14 | 228 | 412 | a140 | 250 | 525 | 225 | 75 | 60 | 52 | 32 |
| 14 | 34 | 13 | 136 | 393 | a135 | 244 | *515 | 220 | 80 | 70 | 54 | 29 |
| 15 | 33 | *13 | *136 | 419 | a130 | 236 | 505 | 220 | *95 | 82 | 54 | 26 |
| 16 | 33 | 11 | 143 | 419 | a180 | 228 | 511 | 220 | 92 | 90 | 54 | 24 |
| 17 | 32 | 11 | 141 | 412 | a270 | 225 | 494 | 217 | 90 | 60 | 52 | 25 |
| 18 | 31 | 10 | 143 | 403 | a350 | *217 | 484 | 230 | 77 | 53 | 52 | 23 |
| 19 | *30 | 10 | 143 | 390 | a370 | 217 | 465 | 230 | 79 | 53 | 52 | 22 |
| 20 | 30 | 10 | 143 | 378 | a350 | 214 | 451 | 241 | 79 | 50 | 62 | *23 |
| 21 | 28 | 10 | 148 | a370 | a340 | 212 | 445 | 258 | 80 | 52 | 58 | 23 |
| 22 | 28 | 10 | 150 | a360 | a330 | 207 | 445 | 272 | 80 | 54 | 54 | 23 |
| 23 | 28 | 10 | 152 | a350 | a330 | 204 | 428 | 412 | 79 | 50 | *54 | 23 |
| 24 | 32 | 17 | 208 | a350 | a330 | 199 | 419 | 672 | 80 | 50 | 54 | 21 |
| 25 | 29 | 38 | 387 | *a340 | a330 | b190 | 412 | 661 | 75 | 46 | 53 | 21 |
| 26 | 27 | 37 | 387 | 322 | a320 | b185 | 399 | *646 | 70 | 47 | 52 | 20 |
| 27 | 28 | 42 | 422 | 304 | a320 | 188 | 399 | 631 | 72 | 47 | 50 | 19 |
| 28 | 27 | 49 | 542 | 295 | a320 | 228 | 390 | 613 | 75 | 42 | 52 | 21 |
| 29 | 26 | 52 | 515 | 292 | a320 | 366 | 381 | 602 | 77 | 41 | 52 | 26 |
| 30 | 26 | 50 | 508 | 284 | ----- | 811 | 374 | 581 | 72 | 42 | 53 | 24 |
| 31 | 28 | ----- | 494 | 278 | ----- | 624 | ----- | 588 | ----- | 42 | 53 | ----- |
| Total | 1,048 | 701 | 6,426 | 11,990 | 6,533 | 8,822 | 16,009 | 10,203 | 6,415 | 1,752 | 1,601 | 918 |
| Mean | 33.8 | 23.4 | 207 | 387 | 225 | 285 | 534 | 329 | 214 | 56.5 | 51.6 | 30.6 |

Adjusted†

| | | | | | | | | | | | | |
|------|-------|-------|------|------|------|------|------|------|-------|-------|-------|--------|
| Mean | 64.8 | 67.4 | 502 | 253 | 270 | 470 | 426 | 418 | 137 | 1.39 | 21.5 | -40.0 |
| Cfsm | 0.326 | 0.339 | 2.52 | 1.27 | 1.36 | 2.36 | 2.14 | 2.10 | 0.688 | 0.007 | 0.108 | -0.201 |
| In. | 0.38 | 0.38 | 2.91 | 1.47 | 1.47 | 2.72 | 2.39 | 2.42 | 0.77 | 0.01 | 0.12 | -0.22 |

| | | Observed | | | | Adjusted | | | |
|---------------------|---------|----------|----------|--|----------|------------|-----------|--|--|
| Calendar year 1959: | Max 661 | Min 10 | Mean 158 | | Mean 182 | Cfsn 0.915 | In. 12.45 | | |
| Water year 1959-60: | Max 811 | Min 10 | Mean 198 | | Mean 216 | Cfsn 1.09 | In. 14.82 | | |

* Discharge measurement made on this day.

† Adjusted for change in contents in Canandaigua Lake and diversions by villages of Newark and Palmyra.

a No gage-height record; discharge estimated on basis of discharge measurements, recorded range in stage, engineer's notes, and record for Canandaigua Lake.

b Stage-discharge relation affected by ice.

Note.--Backwater from aquatic vegetation Oct. 1 to Dec. 23, June 13 to Sept. 30. Negative figures of adjusted discharge and runoff indicate that evaporation and seepage exceeded inflow.

2352.5. Flint Creek at Phelps, N. Y.

Location.--Lat 42°57'27", long 77°04'55", on right bank 25 ft downstream from Eagle Street Bridge at Phelps, Ontario County, and about 1 mile upstream from Canandaigua Lake Outlet.

Drainage area.--101 sq mi.

Records available.--October 1959 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 530 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,940 cfs Mar. 30 (gage height, 5.83 ft); minimum, 0.5 cfs Sept. 12 (gage height, 1.29 ft).

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation or debris, which are fair. Small diversion by Phelps Cement Products, Inc., located about a quarter of a mile upstream, during periods of low ground-water level.

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation or debris (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Mar. 31 | | | | Apr. 1 to Sept. 30 | | | |
|-------------------|-----|-----|-------|--------------------|-----|-----|-------|
| 1.6 | 6.6 | 3.0 | 265 | 1.3 | 0.6 | 2.6 | 80 |
| 1.7 | 11 | 3.5 | 530 | 1.4 | 1.3 | 3.0 | 160 |
| 1.9 | 23 | 4.0 | 885 | 1.5 | 2.3 | 3.5 | 340 |
| 2.2 | 55 | 5.0 | 1,870 | 1.7 | 6.2 | 4.0 | 685 |
| 2.5 | 109 | 5.5 | 2,490 | 2.0 | 18 | 5.0 | 1,780 |
| | | | | 2.3 | 41 | 5.5 | 2,440 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 68 | 94 | 123 | 200 | 66 | 94 | 1,860 | 82 | 198 | 18 | 7.1 | 1.7 |
| 2 | 48 | 81 | 128 | 155 | 52 | *84 | 1,590 | 72 | 170 | 18 | 6.0 | 1.6 |
| 3 | 24 | 77 | 149 | 306 | 49 | 82 | 1,220 | 64 | 129 | 16 | 9.3 | 1.3 |
| 4 | 16 | 81 | 172 | 330 | 44 | 80 | 1,090 | 58 | 97 | 15 | 7.8 | 1.6 |
| 5 | 13 | 96 | 190 | 195 | 58 | 84 | 753 | 51 | 80 | 13 | 16 | 2.8 |
| 6 | 33 | 111 | 211 | 135 | 252 | 80 | 523 | 45 | 65 | 12 | 18 | 2.1 |
| 7 | 212 | 114 | 634 | 116 | 366 | 78 | 330 | 40 | 57 | 11 | 12 | 1.2 |
| 8 | 149 | 116 | 602 | 126 | 211 | 76 | 255 | 38 | 50 | 10 | 9.3 | 1.0 |
| 9 | 111 | 90 | 476 | 72 | 178 | 72 | 223 | 142 | 43 | 9.0 | 7.1 | .8 |
| 10 | 77 | 72 | 330 | 86 | 225 | 70 | 204 | 165 | 38 | 8.7 | 7.8 | .7 |
| 11 | 52 | 62 | 225 | 78 | *588 | 66 | 178 | 409 | 35 | *7.4 | 5.7 | .6 |
| 12 | 37 | 58 | 613 | 76 | 459 | 64 | 163 | 362 | 36 | 6.5 | 4.1 | 1.5 |
| 13 | 27 | 56 | 935 | 141 | 335 | 62 | 144 | 346 | 39 | 6.0 | 3.6 | 3.6 |
| 14 | 22 | 61 | 562 | 181 | 165 | 60 | *142 | 272 | 62 | 14 | 3.3 | 2.5 |
| 15 | 18 | *67 | 437 | 252 | 80 | 60 | 135 | 226 | 155 | 13 | 3.7 | *2.2 |
| 16 | 15 | 62 | 320 | 310 | 125 | 56 | 176 | 170 | *259 | 10 | 4.4 | 2.5 |
| 17 | 13 | 62 | 261 | 225 | 157 | 58 | 181 | 131 | 259 | 8.7 | 4.8 | 2.5 |
| 18 | 11 | 50 | 214 | 175 | 157 | *62 | 158 | 137 | 146 | 7.4 | 4.8 | 2.2 |
| 19 | 9.8 | 48 | 178 | 141 | 146 | 66 | 133 | 142 | 90 | 6.5 | 3.7 | 2.1 |
| 20 | 9.0 | 42 | 135 | 98 | 84 | 66 | 114 | 131 | 71 | 6.2 | 6.8 | 2.2 |
| 21 | 8.2 | 41 | *104 | 82 | 86 | 62 | 106 | 165 | 56 | 5.3 | 8.1 | 2.5 |
| 22 | *7.2 | 41 | 76 | 82 | 106 | 60 | 142 | 272 | 46 | 4.6 | 14 | 2.0 |
| 23 | 8.6 | 41 | 72 | 82 | 125 | 60 | 135 | 292 | 42 | 4.4 | *9.3 | 1.3 |
| 24 | 38 | 45 | 74 | 78 | 120 | 64 | 126 | *623 | 39 | 4.8 | 7.4 | 1.3 |
| 25 | 83 | 52 | 90 | *70 | 118 | 54 | 110 | 598 | 36 | 5.3 | 5.7 | 1.6 |
| 26 | 62 | 48 | 98 | 66 | 114 | 56 | 95 | 454 | 30 | 4.6 | 4.8 | 1.1 |
| 27 | 60 | 60 | 180 | 70 | 112 | 66 | 108 | 302 | 27 | 3.6 | 4.1 | .9 |
| 28 | 52 | 101 | 718 | 72 | 104 | 138 | 101 | 195 | 23 | 3.3 | 3.7 | .8 |
| 29 | 42 | 121 | 665 | 70 | 98 | 312 | 90 | 144 | 21 | 2.3 | 2.9 | .9 |
| 30 | 36 | 128 | 459 | 70 | ----- | 1,700 | 83 | 124 | 17 | 2.1 | 3.3 | .8 |
| 31 | 54 | 306 | 66 | 66 | ----- | *2,170 | ----- | 165 | ----- | 3.4 | 2.1 | ----- |
| Total | 1,414.0 | 2,178 | 9,737 | 4,206 | 4,780 | 6,162 | 10,668 | 6,423 | 2,416 | 260.1 | 210.7 | 49.9 |
| Mean | 45.6 | 72.6 | 314 | 136 | 165 | 199 | 356 | 207 | 80.5 | 8.39 | 6.80 | 1.66 |
| Cfsm | 0.451 | 0.719 | 3.11 | 1.35 | 1.63 | 1.97 | 3.52 | 2.05 | 0.797 | 0.083 | 0.067 | 0.016 |
| In. | 0.52 | 0.80 | 3.59 | 1.55 | 1.76 | 2.27 | 3.93 | 2.37 | 0.89 | 0.10 | 0.08 | 0.02 |

Calendar year 1959: Max - Min - Mean - Cfsm - In. -
 Water year 1959-60: Max 2,170 Min 0.6 Mean 133 Cfsm 1.32 In. 17.88

Peak discharge (base, 1,200 cfs).--Dec. 12 (11:30 p.m.) 1,340 cfs (4.50 ft); Mar. 30 (9:30 p.m.) 2,940 cfs (5.83 ft).

* Discharge measurement made on this day.
 Note.--Stage-discharge relation affected by ice Dec. 20-26, Jan. 1, 2, 5-7, 9-12, 20-27, Jan. 31 to Feb. 5, Feb. 14-16, Feb. 20 to Mar. 27. Backwater from debris May 14-24, Aug. 19-23. Backwater from debris and/or aquatic vegetation Sept. 13-30.

2353. Owasco Inlet at Moravia, N. Y.

Location.--Lat 42°43'05", long 76°26'17", on right bank 575 ft downstream from highway bridge on State Highway 38 and 1 mile west of Moravia, Cayuga County.

Drainage area.--108 sq mi.

Records available.--January to September 1960. Low-flow partial-record station 1949-50, 1955-59.

Gage.--Water-stage recorder. Altitude of gage is 720 ft (from topographic map).

Extremes.--Maximum discharge during period, about 6,400 cfs Mar. 31, from rating curve extended above 170 cfs by logarithmic plotting; maximum gage height, 11.92 ft Feb. 11 (backwater from Owasco Lake); minimum discharge, 9.0 cfs Sept. 9 (gage height, 1.70 ft).

Remarks.--Records good except those for periods of ice effect, partly obstructed intake, or backwater from Owasco Lake, which are fair.

Discharge, in cubic feet per second, January to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|------|------|--------|---------|---------|---------|-------|-------|-------|-------|-------|
| 1 | | | | a700 | 109 | 140 | c2,800 | 135 | 310 | 44 | 20 | 14 |
| 2 | | | | a560 | 107 | 120 | c1,600 | 125 | 200 | 41 | 19 | 14 |
| 3 | | | | a1,800 | 104 | *110 | c1,900 | 112 | 155 | 38 | 52 | 11 |
| 4 | | | | a1,200 | 102 | 100 | c2,300 | 100 | 145 | 41 | 45 | 13 |
| 5 | | | | a900 | 102 | 120 | *c1,180 | 92 | 130 | 39 | 30 | 15 |
| 6 | | | | a700 | 122 | 145 | c820 | 84 | 106 | 37 | 25 | 12 |
| 7 | | | | a580 | 316 | *180 | c600 | 80 | 94 | *35 | 22 | 10 |
| 8 | | | | a500 | 265 | 140 | *c490 | 74 | 82 | 32 | 20 | 9.9 |
| 9 | | | | 435 | 245 | 120 | 400 | 170 | 72 | 30 | 19 | 17 |
| 10 | | | | 435 | 385 | 106 | 320 | 220 | 66 | 29 | *20 | 47 |
| 11 | | | | 155 | *c2,400 | 100 | 330 | 175 | 62 | 27 | 20 | 25 |
| 12 | | | | *120 | *c620 | 96 | 280 | 200 | 70 | 28 | 17 | 84 |
| 13 | | | | 213 | c410 | 92 | 250 | 490 | 98 | 26 | 16 | 70 |
| 14 | | | | *184 | c280 | 88 | 220 | 340 | 170 | 35 | 16 | 43 |
| 15 | | | | 195 | 195 | 80 | 200 | 310 | 390 | *38 | 16 | 30 |
| 16 | | | | 265 | 280 | 86 | 260 | 230 | 180 | 30 | 16 | *24 |
| 17 | | | | 190 | 250 | 94 | 230 | 180 | *110 | 28 | 14 | 20 |
| 18 | | | | 163 | 220 | 90 | 210 | 240 | 100 | 31 | 13 | 19 |
| 19 | | | | 156 | 200 | 88 | 200 | 190 | 92 | 28 | 13 | 19 |
| 20 | | | | 141 | 175 | 86 | *190 | *170 | 102 | 33 | 22 | 28 |
| 21 | | | | 133 | c220 | 84 | 180 | 230 | 90 | 30 | 18 | *21 |
| 22 | | | | *128 | c250 | 84 | 220 | 300 | 76 | 28 | 20 | 18 |
| 23 | | | | 122 | c215 | 82 | 190 | 420 | 68 | 31 | 20 | 16 |
| 24 | | | | 118 | c205 | 82 | 175 | 660 | 68 | 33 | 16 | 16 |
| 25 | | | | 113 | 170 | 80 | 160 | 390 | 64 | 26 | 14 | 14 |
| 26 | | | | 111 | 190 | 76 | 145 | 240 | 56 | 23 | 12 | 14 |
| 27 | | | | 109 | 180 | 110 | 175 | 170 | *49 | 25 | 12 | 14 |
| 28 | | | | 109 | 165 | *170 | 150 | 140 | 44 | 22 | 11 | 14 |
| 29 | | | | 113 | 180 | *260 | 140 | 125 | 41 | 21 | 11 | 13 |
| 30 | | | | 115 | ----- | c820 | 130 | 115 | 48 | 22 | 27 | 15 |
| 31 | | | | 111 | ----- | *c6,400 | ----- | 180 | ----- | 25 | *15 | ----- |
| Total | | | | 10,874 | 8,642 | 10,429 | 16,445 | 6,687 | 3,338 | 956 | 611 | 679.9 |
| Mean | | | | 351 | 298 | 336 | 548 | 216 | 111 | 30.8 | 19.7 | 22.7 |
| Cfsm | | | | 3.25 | 2.76 | 3.11 | 5.07 | 2.00 | 1.03 | 0.285 | 0.182 | 0.210 |
| In. | | | | 3.74 | 2.98 | 3.59 | 5.66 | 2.30 | 1.15 | 0.33 | 0.21 | 0.23 |

Calendar year : Max Min Mean Cfsm In.
 Water year : Max Min Mean Cfsm In.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

c Backwater from Owasco Lake.

Note.--Stage-discharge relation affected by ice and/or partly obstructed intake Jan. 11, 12, Feb. 15-20, Feb. 25 to Mar. 29. Partly obstructed intake Apr. 9 to July 25; discharge computed on basis of discharge measurements, weather records, engineers' notes, and records for nearby stations.

2355. Owasco Lake Outlet near Auburn, N. Y.

Location.--Lat 42°56'45", long 76°36'05", on left bank 2½ miles downstream from center of Auburn, Cayuga County, and 4 miles downstream from State dam at outlet of Owasco Lake.

Drainage area.--208 sq mi.

Records available.--November 1912 to September 1960.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 540 ft (from topographic map).

Average discharge.--47 years (1913-60), 285 cfs.

Extremes.--Maximum discharge during year, 1,970 cfs Apr. 5 (gage height, 4.51 ft); minimum, 17 cfs Sept. 24, 28, 29 (gage height, 1.39 ft); minimum daily, 53 cfs Oct. 4, 14, 20-23, 26, 29, 30.

1912-60: Maximum discharge, 2,090 cfs Mar. 19, 1936, Apr. 9, 1940, Apr. 4, 1950; maximum gage height, 4.88 ft Mar. 19, 1936, Apr. 9, 1940; minimum discharge, about 2 cfs Dec. 5, 1936; minimum gage height, 1.325 ft Dec. 3, 1953; minimum daily discharge, 5 cfs Nov. 11, 1934.

Remarks.--Records good. Diurnal fluctuation caused by mills in Auburn; seasonal regulation at State dam. Water supply for Auburn taken from Owasco Lake, part of which returns as sewage to outlet above gaging station.

Revisions (water years).--WSP 759: Drainage area. WSP 824: 1913-14, 1916, 1920(M), 1922(M), 1928(M), 1929, 1932(M).

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 5

Apr. 6 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-----|
| 1.6 | 47 | 3.0 | 750 | 1.6 | 51 | 2.5 | 369 |
| 1.8 | 91 | 3.5 | 1,150 | 1.8 | 92 | 3.0 | 750 |
| 2.0 | 146 | 4.0 | 1,590 | 2.1 | 172 | | |
| 2.2 | 218 | 4.5 | 1,960 | | | | |
| 2.6 | 450 | | | | | | |

Note.--Same as preceding table above 3.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------------------------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 118 | 59 | 326 | 910 | 348 | 510 | 1,500 | 426 | 285 | 244 | 100 | 89 |
| 2 | 159 | 57 | 320 | 878 | 320 | *502 | 1,630 | 419 | 312 | 235 | 97 | 85 |
| 3 | 55 | 55 | 340 | 878 | 320 | 495 | 1,690 | 315 | 312 | 235 | 137 | 82 |
| 4 | 53 | 59 | 346 | 878 | 314 | 480 | 1,780 | 274 | 312 | 235 | 103 | 81 |
| 5 | 57 | 61 | 340 | 854 | 309 | 465 | 1,940 | 264 | 306 | 235 | 104 | 79 |
| 6 | 63 | 86 | 266 | 814 | 320 | 450 | 1,900 | 264 | 290 | 172 | 104 | 74 |
| 7 | 105 | 86 | 424 | 774 | 340 | 444 | 1,800 | 258 | 290 | 121 | 104 | 73 |
| 8 | 63 | 59 | 502 | 720 | 352 | 424 | 1,690 | 258 | 285 | 116 | 103 | 75 |
| 9 | 61 | 57 | 565 | 698 | 352 | 411 | 1,570 | 274 | 280 | 118 | 100 | 81 |
| 10 | 57 | 77 | 540 | 675 | 378 | 398 | 1,460 | 253 | 274 | 118 | 100 | 81 |
| 11 | 55 | 91 | 532 | 638 | 502 | 392 | 1,350 | 269 | 264 | 119 | 103 | 81 |
| 12 | 55 | 195 | 622 | 622 | 622 | 378 | 1,250 | 269 | 264 | 122 | 100 | 82 |
| 13 | 55 | 191 | 766 | 630 | 652 | a370 | 1,180 | 285 | *264 | 125 | 97 | 74 |
| 14 | 53 | 198 | 902 | 608 | 660 | a360 | *1,090 | 301 | 290 | 128 | 93 | 82 |
| 15 | 59 | 191 | 942 | 592 | 645 | a350 | 1,050 | 312 | 290 | *119 | 102 | 80 |
| 16 | 55 | 191 | 926 | 562 | 652 | a340 | 1,010 | 319 | 280 | 110 | 93 | 79 |
| 17 | 55 | 191 | 910 | 555 | 660 | a330 | 942 | *325 | 274 | 114 | 94 | 78 |
| 18 | 55 | 191 | 878 | 548 | 645 | a330 | 838 | 338 | 269 | 117 | 92 | 74 |
| 19 | 55 | *191 | 830 | 532 | 645 | a320 | 758 | 344 | 269 | 114 | 90 | 82 |
| 20 | 53 | 198 | 798 | 502 | 592 | a310 | 678 | 344 | 264 | 106 | 94 | *76 |
| 21 | 53 | 198 | 758 | 480 | 600 | a290 | 638 | 344 | 264 | 111 | 83 | 76 |
| 22 | *53 | 198 | 735 | *465 | 615 | a290 | 614 | 344 | 264 | 111 | 91 | 77 |
| 23 | 53 | 198 | 698 | 442 | 622 | a280 | 598 | 501 | 264 | 138 | 85 | 77 |
| 24 | 63 | 198 | *675 | 430 | 615 | a270 | 575 | 686 | 258 | 106 | 84 | 77 |
| 25 | 55 | 191 | 645 | 437 | 608 | a270 | 575 | 670 | 258 | 104 | 84 | 69 |
| 26 | 53 | 183 | 608 | 418 | 585 | 270 | 508 | 654 | 249 | 109 | *83 | 76 |
| 27 | 57 | 202 | 622 | 418 | 570 | 270 | 455 | 527 | 244 | 104 | 86 | 75 |
| 28 | 55 | 202 | 728 | 404 | 548 | *292 | 448 | 448 | 253 | 107 | 79 | 74 |
| 29 | 53 | 202 | 686 | 398 | 532 | 340 | 448 | 433 | 253 | 105 | 79 | 82 |
| 30 | 53 | 251 | 942 | 398 | 540 | 433 | 433 | 249 | 433 | 99 | 90 | 86 |
| 31 | 66 | --- | 934 | 372 | --- | 982 | --- | 331 | --- | 93 | 84 | --- |
| Total | 1,855 | 4,487 | 20,296 | 18,532 | 14,921 | 12,153 | 32,398 | 11,482 | 8,230 | 4,190 | 2,938 | 2,357 |
| Mean | 59.8 | 150 | 655 | 598 | 515 | 392 | 1,080 | 370 | 274 | 135 | 94.8 | 78.6 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 1,180 | | | | | | | | | | | |
| Min | 53 | | | | | | | | | | | |
| Mean | 295 | | | | | | | | | | | |
| Cfsm | 1.42 | | | | | | | | | | | |
| In. | 19.21 | | | | | | | | | | | |
| Water year 1959-60: Max | 1,940 | | | | | | | | | | | |
| Min | 53 | | | | | | | | | | | |
| Mean | 366 | | | | | | | | | | | |
| Cfsm | 1.76 | | | | | | | | | | | |
| In. | 23.92 | | | | | | | | | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of observer's notes and elevation of Owasco Lake.

Note.--Increase in contents in Owasco Lake during calendar year 1959, about 700,584,192 cu ft (equivalent mean discharge, 22.15 cfs; runoff, 1.45 in.); increase in elevation, 2.44 ft. Decrease in contents during water year 1959-60, about 83,272,781 cu ft (equivalent mean discharge, 2.63 cfs; runoff, 0.172 in.); decrease in elevation, 0.29 ft. Records of elevations of Owasco Lake furnished by city of Auburn, N. Y.

2375. Seneca River at Baldwinsville, N. Y.

Location.--Lat 43°09'25", long 76°19'55", on left bank 200 ft downstream from highway bridge in Baldwinsville, Onondaga County, and 400 ft downstream from navigation dam of New York State Erie (Barge) Canal system.

Drainage area.--3,130 sq mi.

Records available. November 1949 to September 1960 in reports of Geological Survey. November 1898 to December 1908 prior to construction of Erie (Barge) Canal, not equivalent to later records at same site because of extensive development of Erie (Barge) Canal system. January 1909 to September 1925 (gage heights only) in reports of State engineer and surveyor.

Gage.--Water-stage recorder. Datum of gage is 362.60 ft above mean sea level, New York State Erie (Barge) Canal datum. Prior to Dec. 31, 1908, staff gages on dam at same site at different datum. Auxiliary water-stage recorder 1,500 ft downstream from base gage at same datum.

Average discharge.--10 years (1950-60), 3,448 cfs.

Extremes.--Maximum daily discharge during year, 17,200 cfs Apr. 4; maximum gage height, 9.21 ft Apr. 4; minimum daily discharge, 611 cfs Sept. 17; minimum gage height, 1.16 ft Sept. 17.

1949-60: Maximum daily discharge, that of Apr. 4, 1960; maximum gage height, that of Apr. 4, 1960; minimum daily discharge, 237 cfs Nov. 10, 1957; minimum gage height, 0.81 ft Aug. 10, 1952.

Remarks.--Records good. Discharge from 1898 to 1908 determined on basis of head on dam, flow through ten mills nearby, lockages at Oswego Canal lock, estimated leakage of dam, wheel gates, flumes, and penstocks; not adjusted for inflow from Lake Erie through Erie Canal. Discharge since November 1949, computed by using fall as determined by auxiliary water-stage recorder as a factor, represents total discharge at Baldwinsville and includes flow in Baldwin and Erie (Barge) Canals.

A large amount of natural storage and some artificial regulation is afforded by many large lakes and the Erie (Barge) Canal system in river basin. Large diurnal fluctuations at low and medium flow caused by powerplants above station. Seneca River basin receives water from Erie (Barge) Canal through lock 32 near Pittsford. During part of year, entire flow from 45 sq mi of Mud Creek drainage area may be diverted from Chemung River basin into Keuka Lake in Oswego River basin. Records of water temperatures for the water year 1960 are given in WSP 1741.

Cooperation.--Records of discharge for period January 1907 to December 1908 furnished by New York State engineer and surveyor. Records of lockages at lock 24 furnished by New York State Department of Public Works since November 1949.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| 1 | 1,410 | 1,790 | 4,080 | 9,950 | 6,940 | 4,070 | 13,900 | 5,700 | 7,580 | 3,260 | 1,110 | 1,120 |
| 2 | 1,720 | 1,840 | 4,120 | 9,440 | 6,770 | 4,210 | 15,600 | 5,570 | 7,500 | 2,770 | 1,060 | 1,150 |
| 3 | 1,800 | 1,950 | 4,120 | 9,390 | 6,620 | 4,010 | 16,800 | 4,920 | 7,450 | 2,660 | 1,050 | 1,120 |
| 4 | 1,700 | 1,960 | 4,290 | 9,570 | 6,470 | 3,920 | 17,200 | 2,980 | 7,390 | 2,530 | 1,250 | 1,090 |
| 5 | 1,440 | 2,040 | 4,420 | 9,600 | 6,350 | 3,550 | *16,900 | 2,870 | 7,130 | 2,550 | 1,170 | 1,070 |
| 6 | 1,660 | 1,980 | 4,430 | 9,300 | 6,310 | 3,840 | 16,100 | 2,740 | 6,930 | 2,480 | 1,140 | 1,120 |
| 7 | 1,670 | 2,270 | 4,970 | 8,880 | 6,850 | 3,820 | 15,100 | 2,280 | 6,780 | 2,390 | 1,080 | 1,120 |
| 8 | 1,940 | 2,120 | 6,600 | 8,560 | 7,140 | 3,940 | 14,100 | 2,000 | 6,560 | 2,190 | 1,120 | 1,150 |
| 9 | 2,100 | 2,280 | 7,890 | 8,250 | 7,160 | 4,390 | 12,600 | 2,180 | 6,560 | 2,110 | 1,110 | 931 |
| 10 | 2,070 | 2,360 | 7,800 | 8,050 | 6,810 | 4,620 | 11,700 | 2,490 | 6,160 | 2,130 | 1,120 | 1,010 |
| 11 | 1,720 | 3,120 | 7,290 | 7,950 | 7,670 | 4,860 | 10,700 | 2,800 | 5,370 | 2,150 | 1,280 | 1,150 |
| 12 | 2,090 | 3,740 | 7,250 | 7,890 | 9,020 | 4,920 | *10,200 | 3,220 | 4,280 | 1,950 | 900 | 814 |
| 13 | 2,010 | 2,210 | 8,470 | 7,940 | 8,950 | 4,950 | 9,560 | 3,840 | 4,040 | 1,720 | 867 | 1,230 |
| 14 | 1,790 | 2,150 | 9,260 | 7,980 | 8,290 | 4,830 | 9,440 | 4,130 | 2,740 | 1,600 | 995 | 1,260 |
| 15 | 1,750 | 2,840 | 9,360 | 8,220 | 6,720 | 4,830 | 9,410 | 4,200 | 2,900 | 1,480 | 1,040 | 1,200 |
| 16 | 1,730 | 3,130 | 9,130 | 8,600 | 6,060 | 5,330 | 9,270 | 4,080 | 4,070 | 1,400 | 1,380 | 864 |
| 17 | 1,680 | 3,900 | 8,500 | 8,730 | *6,410 | 5,390 | 9,270 | 3,950 | 4,490 | 1,390 | 1,510 | 611 |
| 18 | 1,720 | 3,910 | 7,920 | 8,700 | 6,440 | 5,290 | 9,430 | *3,980 | 4,530 | *1,200 | 1,370 | 1,210 |
| 19 | 1,660 | 3,760 | 7,580 | 8,630 | 6,680 | 5,150 | 9,090 | 4,450 | 4,450 | 1,300 | 1,290 | 1,240 |
| 20 | 1,570 | 4,150 | 7,210 | *8,350 | 6,370 | 4,990 | 8,640 | 5,180 | 4,240 | 1,170 | 1,260 | 943 |
| 21 | 1,510 | 3,880 | 6,870 | 8,170 | 5,690 | 5,010 | 8,420 | 5,040 | *4,100 | 1,310 | 1,240 | *1,120 |
| 22 | 1,560 | 3,780 | *6,800 | 8,020 | 5,780 | 4,980 | 8,360 | 4,820 | 4,140 | 1,140 | 1,240 | 1,150 |
| 23 | 1,450 | 3,770 | 6,700 | 7,830 | 5,840 | *4,920 | 8,260 | 5,040 | 4,290 | 682 | 1,250 | 932 |
| 24 | 1,640 | *3,860 | 6,890 | 7,700 | 5,900 | 4,990 | 8,170 | 5,520 | 5,010 | 1,020 | 1,240 | 1,050 |
| 25 | 1,780 | 3,990 | 6,990 | 7,600 | 5,290 | 4,940 | 7,960 | 6,730 | 5,100 | 1,070 | 1,250 | 1,100 |
| 26 | *1,680 | 3,860 | 7,070 | 7,540 | 5,200 | 4,880 | 7,560 | 7,770 | 4,880 | 1,100 | 1,160 | 827 |
| 27 | 1,750 | 3,890 | 7,140 | 7,350 | 5,110 | 4,770 | 6,990 | 7,990 | 4,780 | 1,100 | 1,080 | 1,020 |
| 28 | *1,810 | 4,000 | 7,870 | 7,320 | 4,920 | 4,660 | 6,660 | 7,840 | 4,660 | 1,080 | 1,050 | 764 |
| 29 | 1,960 | 3,990 | 9,720 | 7,210 | 4,390 | 4,150 | 6,250 | 7,590 | 4,160 | 1,060 | *1,220 | 1,180 |
| 30 | 2,060 | 4,120 | 10,600 | 7,090 | ----- | 5,220 | 5,880 | 7,270 | 3,960 | 1,040 | 1,210 | 967 |
| 31 | 1,400 | ----- | 10,400 | 6,970 | ----- | 10,200 | ----- | 7,210 | ----- | 1,080 | 1,140 | ----- |
| Total | 55,810 | 92,680 | 221,520 | 256,780 | 188,150 | 149,410 | 319,520 | 146,380 | 155,830 | 52,112 | 36,182 | 31,463 |
| Mean | 1,756 | 3,089 | 7,146 | 8,283 | 6,488 | 4,820 | 10,651 | 4,722 | 5,194 | 1,681 | 1,167 | 1,049 |
| Cfs/m | 0.555 | 0.987 | 2.26 | 2.65 | 2.07 | 1.64 | 3.40 | 1.51 | 1.66 | 0.537 | 0.373 | 0.335 |
| In. | 0.64 | 1.10 | 2.63 | 3.05 | 2.24 | 1.77 | 3.80 | 1.74 | 1.85 | 0.62 | 0.43 | 0.37 |
| Calendar year 1959: Max | 11,500 | Min | 420 | Mean | 3,568 | Cfs/m | 1.08 | In. | 14.62 | | | |
| Water year 1959-60: Max | 17,200 | Min | 611 | Mean | 4,655 | Cfs/m | 1.49 | In. | 20.24 | | | |

* Discharge measurement made on this day.

2380. Onondaga Reservoir near Nedrow, N. Y.

Location.--Lat 42°55'55", long 76°10'25", at Onondaga Dam on Onondaga Creek, 3½ miles southwest of Nedrow, Onondaga County, 4 miles south of Syracuse, and 10½ miles upstream from Onondaga Lake.

Drainage area.--68.1 sq mi (measured by Corps of Engineers).

Records available.--June 1949 to September 1952 (monthly elevations and contents), October 1952 to September 1960.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers).

Extremes.--Maximum elevation during year, 485.9 ft Apr. 1 (contents, 5,960 acre-ft); minimum, 458.1 ft Oct. 1 (no contents).
1949-60: Maximum elevation, that of Apr. 1, 1960; no contents at times.

Remarks.--Reservoir is formed by a rolled earthfill dam, completed by Corps of Engineers in August 1949 for flood control; first used for flood regulation about a year prior to completion. Usable capacity, 18,200 acre-ft between elevations 457.0 ft (conduit invert at intake) and 504.5 ft (crest of spillway). No dead storage. The flood-control works consist of a pressure conduit and a side-channel spillway and are not provided with gates. Water is stored during high flows and released gradually.

Cooperation.--Capacity curve furnished by Corps of Engineers.

Capacity table, water year 1959-60 (elevation, in feet, and contents, in acre-feet)

| | | | |
|-------|-----|-------|-------|
| 460.0 | 0 | 470.0 | 700 |
| 462.0 | 15 | 475.0 | 1,980 |
| 464.0 | 50 | 480.0 | 3,520 |
| 466.0 | 135 | 485.0 | 5,540 |
| 468.0 | 350 | 490.0 | 7,940 |

Elevation, in feet, at 12 p.m., water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 459.7 | 459.6 | 460.5 | 461.7 | 460.0 | 460.5 | 485.1 | 460.8 | 461.2 | 458.8 | 458.5 | 458.5 |
| 2 | 458.7 | 459.7 | 460.9 | 461.6 | 459.8 | 460.6 | 482.6 | 460.5 | 460.3 | 458.8 | 458.5 | 458.4 |
| 3 | 458.4 | 459.3 | 461.3 | 466.6 | 459.6 | 460.6 | 480.2 | 460.4 | 460.0 | 459.0 | 460.3 | 458.4 |
| 4 | 458.3 | 459.7 | 460.9 | 463.2 | 459.9 | 460.7 | 479.0 | 460.2 | 459.7 | 458.8 | 459.1 | 458.5 |
| 5 | 459.0 | 459.9 | 461.0 | 461.1 | 459.9 | 460.6 | 476.7 | 460.1 | 459.6 | 458.8 | 458.8 | 458.5 |
| 6 | 459.4 | 462.3 | 460.9 | 461.2 | 463.9 | 460.4 | 473.7 | 460.0 | 459.5 | 458.7 | 458.6 | 458.5 |
| 7 | 460.3 | 460.4 | 465.5 | 461.0 | 461.9 | 460.6 | 470.4 | 459.9 | 459.4 | 458.7 | 458.6 | 458.4 |
| 8 | 459.3 | 460.0 | 463.3 | 461.0 | 461.7 | 460.1 | 469.7 | 459.9 | 459.3 | 458.8 | 458.5 | 458.4 |
| 9 | 459.2 | 459.7 | 461.8 | 460.7 | 461.4 | 460.2 | 463.2 | 461.0 | 459.3 | 458.6 | 458.5 | 459.1 |
| 10 | 458.7 | 459.5 | 461.2 | 460.7 | 464.9 | 460.0 | 462.7 | 460.4 | 459.2 | 458.6 | 459.0 | 458.7 |
| 11 | 458.5 | 459.4 | 461.2 | 460.2 | 473.4 | 460.2 | 462.4 | 460.9 | 459.2 | 458.6 | 458.6 | 458.9 |
| 12 | 458.4 | 459.6 | 467.0 | 460.7 | 472.0 | 460.2 | 462.3 | 461.3 | 459.4 | 458.6 | 458.6 | 459.8 |
| 13 | 458.4 | 459.5 | 469.4 | 460.9 | 468.2 | 460.2 | 462.0 | 461.5 | 459.2 | 458.6 | 458.6 | 459.0 |
| 14 | 458.4 | 459.8 | 463.3 | 460.6 | 461.9 | 460.1 | 461.9 | 461.5 | 460.9 | 458.9 | 458.5 | 458.6 |
| 15 | 458.3 | 459.7 | 461.9 | 462.5 | 462.3 | 460.2 | 462.2 | 461.0 | 461.1 | 458.7 | 458.6 | 458.6 |
| 16 | 458.3 | 459.6 | 461.9 | 461.1 | 462.4 | 460.2 | 462.0 | 460.5 | 459.8 | 458.6 | 458.5 | 458.6 |
| 17 | 458.4 | 459.9 | 461.5 | 460.7 | 462.0 | 460.1 | 461.6 | 460.3 | 460.4 | 458.6 | 458.5 | 458.5 |
| 18 | 458.4 | 459.5 | 461.2 | 460.7 | 462.7 | 460.2 | 461.6 | 461.1 | 459.6 | 458.6 | 458.5 | 458.5 |
| 19 | 458.4 | 459.4 | 460.9 | 460.6 | 462.4 | 460.2 | 461.3 | 460.4 | 459.3 | 458.7 | 458.6 | 458.6 |
| 20 | 458.3 | 459.3 | 460.2 | 460.5 | 461.5 | 460.2 | 461.1 | 460.4 | 459.2 | 458.6 | 458.6 | 458.7 |
| 21 | 458.3 | 459.4 | 460.5 | 460.4 | 461.8 | 460.2 | 461.1 | 460.3 | 459.1 | 458.6 | 458.5 | 458.6 |
| 22 | 458.3 | 459.3 | 460.1 | 460.3 | 461.8 | 460.2 | 462.1 | 460.1 | 459.1 | 458.6 | 458.8 | 458.6 |
| 23 | 458.4 | 459.2 | 459.7 | 460.3 | 461.5 | 460.0 | 461.5 | 460.4 | 459.1 | 458.6 | 458.6 | 458.5 |
| 24 | 459.0 | 459.3 | 460.3 | 460.2 | 461.4 | 460.1 | 461.5 | 460.5 | 459.1 | 458.5 | 458.5 | 458.5 |
| 25 | 459.3 | 459.3 | 460.4 | 460.2 | 461.3 | 459.9 | 461.2 | 460.2 | 458.9 | 458.5 | 458.5 | 458.5 |
| 26 | 458.9 | 459.1 | 460.5 | 460.1 | 461.6 | 460.2 | 461.2 | 460.0 | 458.9 | 458.5 | 458.5 | 458.4 |
| 27 | 458.8 | 461.6 | 462.6 | 460.1 | 461.2 | 461.0 | 461.6 | 459.7 | 458.8 | 458.5 | 458.5 | 458.5 |
| 28 | 458.8 | 462.2 | 466.1 | 460.1 | 461.1 | 462.9 | 461.1 | 459.6 | 458.6 | 458.5 | 458.5 | 458.5 |
| 29 | 458.7 | 461.0 | 469.0 | 460.1 | 460.9 | 468.3 | 460.8 | 460.0 | 459.0 | 458.6 | 458.5 | 458.5 |
| 30 | 458.6 | 460.6 | 465.9 | 460.0 | ----- | 477.0 | 460.8 | 459.8 | 458.8 | 458.6 | 458.7 | 458.6 |
| 31 | 460.3 | ----- | 462.4 | 460.1 | ----- | 485.4 | ----- | 461.7 | ----- | 458.5 | 458.6 | ----- |
| (†) | 2 | 3 | 21 | 0 | 4 | 5,728 | 4 | 12 | 0 | 0 | 0 | 0 |
| (*) | +2 | +1 | +18 | +21 | +4 | +5,724 | -5,724 | +8 | -12 | 0 | 0 | 0 |

Calendar year 1959..... * +21

Water year 1959-60..... * 0

† Contents, in acre-feet, at end of month.

* Change in contents, in acre-feet.

2390. Onondaga Creek at Dorwin Avenue, Syracuse, N. Y.

Location.--Lat 42°59'00", long 76°09'05", on left bank 550 ft upstream from Dorwin Avenue Bridge, at Syracuse, Onondaga County, and 4 miles downstream from Onondaga Reservoir.

Drainage area.--88.9 sq mi.

Records available.--May 1951 to September 1960.

Gage.--Water-stage recorder.

Average discharge.--9 years, 116 cfs (adjusted).

Extremes.--Maximum discharge during year, 2,130 cfs Mar. 31 (gage height, 5.06 ft); minimum, 18 cfs Oct. 1 (gage height, 1.27 ft).
1951-60: Maximum discharge, that of Mar. 31, 1960; minimum, 9.5 cfs Sept. 16, 1959 (gage height, 1.15 ft).

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation, which are fair. High flow regulated by Onondaga Reservoir (see preceding page).

Rating tables, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 31

Apr. 1 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.3 | 20 | 3.0 | 400 | 1.4 | 20 | 3.0 | 380 |
| 1.4 | 28 | 3.5 | 655 | 1.6 | 35 | 3.5 | 640 |
| 1.6 | 48 | 4.0 | 1,000 | 1.9 | 72 | 4.0 | 1,000 |
| 2.0 | 105 | 4.5 | 1,480 | 2.2 | 124 | 4.5 | 1,480 |
| 2.5 | 220 | 4.9 | 1,940 | 2.6 | 229 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|------|-------|
| 1 | 67 | 89 | 120 | 217 | 84 | b124 | 1,480 | 124 | 211 | 39 | 25 | 24 |
| 2 | 55 | *67 | 116 | 177 | 80 | b114 | 1,350 | 118 | 126 | 39 | 24 | 22 |
| 3 | 31 | 62 | 138 | 412 | b64 | b116 | 1,270 | 108 | 94 | 40 | 90 | 21 |
| 4 | 25 | 54 | 146 | 486 | b68 | b122 | 1,280 | 99 | 78 | 43 | 72 | 22 |
| 5 | *23 | 74 | 134 | 250 | b74 | b116 | 1,180 | 92 | 68 | 38 | 47 | 24 |
| 6 | 44 | 156 | 142 | b150 | 135 | b106 | 1,050 | 86 | 62 | 37 | 34 | 22 |
| 7 | 149 | 178 | 356 | 149 | 297 | b108 | 910 | 81 | 58 | 35 | 30 | 22 |
| 8 | 82 | 96 | 450 | 144 | 182 | b104 | 747 | 81 | 54 | 34 | 27 | 20 |
| 9 | 49 | 77 | 266 | 120 | 172 | b104 | 475 | 116 | 53 | 34 | 26 | 24 |
| 10 | 42 | 66 | 187 | 122 | 223 | b106 | 287 | 122 | 50 | 33 | 44 | 41 |
| 11 | 31 | 58 | 153 | b116 | 966 | b96 | *246 | 122 | 49 | 32 | 37 | 31 |
| 12 | 25 | 66 | 384 | b102 | 872 | b100 | 236 | 122 | 50 | 31 | 29 | 56 |
| 13 | 23 | 63 | 691 | 142 | 760 | b92 | 214 | 214 | 51 | 31 | 27 | 54 |
| 14 | 22 | 61 | 573 | 128 | 484 | 93 | 196 | 171 | 62 | 39 | 26 | 37 |
| 15 | 21 | 83 | 266 | 145 | 223 | b84 | 214 | 166 | 121 | *37 | 26 | 31 |
| 16 | 20 | *67 | 212 | 182 | *238 | b82 | 223 | 133 | 116 | 33 | 27 | 27 |
| 17 | 20 | 78 | 192 | 136 | 223 | 93 | 193 | 108 | *76 | 31 | 26 | 26 |
| 18 | 24 | 67 | 167 | 122 | 212 | 93 | 177 | 131 | 78 | 30 | 24 | 26 |
| 19 | *24 | 62 | 153 | 120 | 270 | 96 | 164 | *128 | 60 | 31 | 25 | *26 |
| 20 | 22 | *58 | 130 | *109 | 195 | 94 | 146 | 104 | 51 | 33 | 31 | 34 |
| 21 | 20 | 57 | b104 | 105 | 190 | 96 | 137 | 114 | 50 | 30 | 29 | 30 |
| 22 | 20 | 58 | b106 | 103 | b185 | 96 | 257 | 102 | 47 | 30 | 28 | 27 |
| 23 | 21 | 54 | b94 | 102 | 184 | 91 | 196 | 106 | 47 | 31 | 31 | 26 |
| 24 | 28 | 56 | b104 | 98 | 170 | 91 | 185 | 112 | 45 | 30 | 27 | 26 |
| 25 | 79 | 58 | 107 | b88 | 162 | b84 | 161 | 108 | 45 | 27 | 24 | 25 |
| 26 | *49 | 55 | 109 | 93 | 167 | b78 | 146 | 96 | 42 | 27 | *24 | 24 |
| 27 | 40 | 94 | 151 | 88 | 165 | 96 | 182 | 84 | 41 | 26 | 24 | 25 |
| 28 | 38 | 275 | 457 | 93 | 149 | *218 | 161 | 75 | 38 | 26 | 24 | 24 |
| 29 | 36 | 135 | 715 | 91 | 142 | 361 | 135 | 72 | 38 | 25 | 22 | 24 |
| 30 | 33 | 136 | *631 | 88 | ----- | *1,270 | 124 | 78 | 44 | 31 | 32 | 24 |
| 31 | 38 | ----- | 390 | 83 | ----- | 1,710 | ----- | 96 | ----- | 29 | 26 | ----- |
| Total | 1,200 | 2,618 | 7,924 | 4,561 | 7,336 | 6,234 | 13,702 | 3,469 | 2,005 | 1,012 | 988 | 843 |
| Mean | 38.7 | 87.3 | 256 | 147 | 253 | 201 | 457 | 112 | 66.8 | 32.6 | 31.9 | 28.1 |

Adjusted for change in contents in Onondaga Reservoir

| Mean | 38.7 | 87.3 | 256 | 147 | 253 | 294 | 361 | 112 | 66.6 | 32.6 | 31.9 | 28.1 |
|------|-------|-------|------|------|------|------|------|------|-------|-------|-------|-------|
| Cfs | 0.435 | 0.982 | 2.88 | 1.65 | 2.85 | 3.31 | 4.06 | 1.26 | 0.749 | 0.367 | 0.359 | 0.316 |
| In. | 0.50 | 1.10 | 3.32 | 1.90 | 3.07 | 3.82 | 4.52 | 1.45 | 0.84 | 0.42 | 0.41 | 0.35 |

| | Observed | | | | | Adjusted | | | | | | |
|---------------------|----------|-------|-----|----|------|----------|------|-----|-----|------|-----|-------|
| Calendar year 1959: | Max | 1,370 | Min | 13 | Mean | 129 | Mean | 129 | Cfs | 1.45 | In. | 19.65 |
| Water year 1959-60: | Max | 1,710 | Min | 20 | Mean | 142 | Mean | 142 | Cfs | 1.60 | In. | 21.70 |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

Note.--Backwater from aquatic vegetation July 18 to Sept. 30.

2401. Harbor Brook at Syracuse, N. Y.

Location.--Lat 43°02'06", long 76°11'17", on right bank 145 ft downstream from Velasco Road Bridge, at Syracuse, Onondaga County, about 3 miles upstream from mouth at Onondaga Lake.

Drainage area.--9.47 sq mi.

Records available.--June 1959 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 394.79 ft above mean sea level, datum of 1929.

Extremes.--1959: Maximum discharge during period June to September, 104 cfs July 20 (gage height, 4.40 ft); minimum, 1.8 cfs Sept. 23 (gage height, 2.00 ft).

1959-60: Maximum discharge during water year, 354 cfs Mar. 30 (gage height, 6.97 ft); minimum, 2.0 cfs Oct. 4 (gage height, 2.02 ft).

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow includes some sewage and storm sewer inflow, some of which originates outside of basin.

Rating tables, June 19, 1959, to Sept. 30, 1960 (gage height, in feet, and discharge, in cubic feet per second)

(Shifting-control method used Apr. 1 to May 16, 1960)

June 19, 1959, to May 16, 1960

May 16 to Sept. 30, 1960

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 2.0 | 1.7 | 4.0 | 78 | 2.7 | 2.4 |
| 2.2 | 5.0 | 5.0 | 150 | 2.8 | 3.3 |
| 2.3 | 7.1 | 6.0 | 243 | 2.9 | 6.2 |
| 2.5 | 12 | 7.0 | 358 | 3.1 | 13 |
| 3.0 | 29 | | | 3.4 | 31 |

Discharge, in cubic feet per second, 1959

| Day | June | July | Aug. | Sept. | Day | June | July | Aug. | Sept. | Day | June | July | Aug. | Sept. |
|-----|------|------|------|-------|-----|------|------|------|-------|-----|------|------|------|-------|
| 1 | - | 4.3 | 2.7 | *2.8 | 11 | - | 3.7 | 3.0 | 2.4 | 21 | 4.5 | *4.5 | 3.7 | 2.4 |
| 2 | - | 6.6 | 2.7 | 2.5 | 12 | - | 3.5 | 2.7 | 2.4 | 22 | 5.2 | 3.8 | 3.3 | 2.2 |
| 3 | - | 4.3 | 2.8 | 2.5 | 13 | - | 3.5 | 2.7 | 2.2 | 23 | 4.6 | 3.8 | 2.8 | 2.0 |
| 4 | - | 4.0 | *2.8 | 2.2 | 14 | - | 3.3 | 3.0 | 2.4 | 24 | 4.5 | 3.8 | 4.5 | 2.0 |
| 5 | - | 3.9 | *2.8 | 2.2 | 15 | - | 3.3 | 2.7 | *2.5 | 25 | *4.5 | 3.7 | 3.2 | 2.2 |
| 6 | - | 5.6 | 3.2 | 2.4 | 16 | - | 3.3 | 2.8 | 2.4 | 26 | 8.1 | 3.3 | 2.7 | 2.2 |
| 7 | - | *4.2 | 2.8 | 2.2 | 17 | - | 3.2 | 3.0 | 2.4 | 27 | 5.0 | 3.3 | 2.7 | 2.2 |
| 8 | - | 3.8 | 3.7 | 2.0 | 18 | - | 3.2 | *3.0 | 3.3 | 28 | 4.5 | 3.3 | 2.7 | 2.2 |
| 9 | - | 3.7 | 3.8 | 2.2 | 19 | 5.2 | 3.7 | 2.7 | 2.7 | 29 | 4.2 | 3.2 | 2.7 | 2.2 |
| 10 | - | 4.0 | 3.5 | 2.0 | 20 | 4.8 | *12 | 2.5 | 2.5 | 30 | 4.0 | 3.0 | 3.3 | 2.8 |
| | | | | | | | | | | 31 | - | 2.8 | 2.8 | - |

| | | | | |
|--|---|-------|-------|-------|
| Total..... | - | 125.5 | 93.3 | 70.6 |
| Mean..... | - | 4.05 | 3.01 | 2.35 |
| Cubic feet per second per square mile..... | - | 0.428 | 0.318 | 0.248 |
| Runoff in inches..... | - | 0.49 | 0.37 | 0.28 |

Peak discharge (base, 100 cfs).--July 20 (4:15 p.m.) 104 cfs (4.40 ft).

* Discharge measurement made on this day.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 15 | 3.8 | 4.2 | 14 | 7.9 | 10 | 66 | 10 | 13 | 5.4 | 3.5 | 2.9 |
| 2 | 3.3 | 4.0 | 4.8 | 12 | 7.6 | 10 | 56 | *9.6 | 8.9 | 5.2 | 3.7 | 2.9 |
| 3 | 2.7 | *3.3 | 5.2 | 44 | 7.4 | 9.9 | 63 | 8.9 | 8.6 | 5.7 | 6.6 | 2.9 |
| 4 | 2.2 | 3.7 | 5.4 | 35 | 7.1 | 9.9 | 73 | 8.4 | 7.9 | 5.2 | 3.7 | 3.0 |
| 5 | 2.4 | 4.0 | 5.8 | 20 | 7.1 | 9.6 | 52 | 8.1 | 8.2 | 5.0 | 3.5 | 3.0 |
| 6 | *3.2 | 5.6 | 6.0 | 13 | 10 | 9.4 | 42 | 7.9 | *7.6 | 4.7 | 3.4 | 3.0 |
| 7 | 17 | 4.0 | 36 | *13 | 12 | 9.1 | 35 | 7.9 | *7.3 | 4.7 | 3.4 | 3.0 |
| 8 | 4.0 | 3.7 | 15 | 12 | 9.4 | 8.9 | 31 | 7.9 | 7.3 | 4.7 | 3.4 | *2.9 |
| 9 | 3.3 | 3.7 | 12 | 10 | 9.6 | 8.6 | 27 | 9.6 | 7.3 | 4.5 | 3.5 | 5.5 |
| 10 | 2.8 | 3.5 | 9.6 | 11 | 29 | 8.6 | 25 | 8.4 | 7.3 | 4.5 | 7.3 | 3.4 |
| 11 | 2.7 | 3.5 | 8.6 | 10 | *15.3 | 8.4 | 23 | 8.6 | 7.3 | 4.5 | *3.9 | 3.2 |
| 12 | 2.5 | 3.8 | 9.6 | 28 | 8.4 | 22 | 9.6 | 7.9 | 4.7 | 4.1 | 4.1 | 5.0 |
| 13 | 2.7 | 3.7 | 36 | 12 | 21 | 8.4 | 20 | 11 | 7.6 | *5.0 | 4.1 | 3.4 |
| 14 | 2.7 | 4.2 | 16 | 11 | 19 | 8.4 | 19 | 11 | 10 | *5.0 | 4.1 | 2.9 |
| 15 | 2.7 | 4.0 | 14 | 12 | 17 | 8.4 | 18 | 9.4 | 10 | 3.7 | 4.5 | 2.8 |
| 16 | 2.7 | 3.8 | 14 | 15 | 16 | 8.4 | 17 | *8.6 | 7.9 | 3.7 | 4.5 | 3.1 |
| 17 | 2.8 | *4.5 | 12 | 11 | 15 | 8.4 | 16 | *8.2 | 7.3 | 3.7 | 4.5 | 2.8 |
| 18 | 3.2 | 3.5 | 11 | 10 | 16 | 8.4 | 15 | 8.9 | 6.8 | 3.5 | 4.3 | 2.9 |
| 19 | 3.0 | 3.5 | 10 | 9.6 | 16 | 8.4 | 14 | 8.6 | 6.2 | 7.3 | 4.5 | 3.2 |
| 20 | *2.7 | 3.7 | 9.0 | 9.0 | 14 | 8.6 | 13 | 8.9 | *5.7 | 4.5 | 4.3 | 3.9 |
| 21 | 2.7 | 3.8 | 7.2 | 8.8 | 13 | 8.4 | 15 | 9.2 | *5.4 | 4.1 | 3.5 | 3.2 |
| 22 | 2.7 | 3.7 | 7.6 | 8.6 | 12 | 8.4 | 20 | 8.6 | 5.4 | 4.1 | 3.4 | *3.0 |
| 23 | 2.8 | 3.7 | 7.0 | 8.6 | 12 | 7.9 | 16 | *9.2 | 5.4 | 4.1 | 3.0 | 2.9 |
| 24 | 3.7 | 3.7 | 7.4 | 8.4 | 12 | 7.9 | 17 | 9.6 | 5.7 | 3.9 | *3.0 | 2.8 |
| 25 | 5.9 | 3.7 | 7.6 | 8.4 | 12 | 7.6 | 14 | 8.9 | 5.4 | 3.7 | 3.0 | 3.0 |
| 26 | 3.2 | 3.3 | 7.6 | 8.4 | 12 | 7.6 | 12 | 8.9 | 5.2 | 3.7 | 3.0 | 3.5 |
| 27 | 3.3 | 6.7 | 10 | 8.1 | 12 | 8.6 | 13 | 8.9 | 5.2 | 3.7 | 3.4 | 3.7 |
| 28 | 3.2 | 7.1 | 62 | 8.1 | 11 | 15 | 11 | 8.2 | 5.0 | *3.5 | 3.0 | 3.5 |
| 29 | 3.0 | 5.2 | 50 | 7.9 | 11 | 27 | 11 | 8.9 | 5.4 | 3.5 | 2.9 | 3.5 |
| 30 | 3.0 | 4.2 | 19 | 7.9 | ----- | 248 | 10 | 9.2 | 5.2 | 3.5 | 3.0 | 3.9 |
| 31 | 4.2 | ----- | 16 | 7.9 | ----- | 145 | ----- | 14 | ----- | 3.5 | 2.9 | ----- |
| Total | 121.5 | 122.6 | 498.0 | 384.3 | 529.1 | 669.6 | 786 | 283.1 | 213.4 | 136.5 | 118.9 | 98.7 |
| Mean | 3.91 | 4.09 | 16.1 | 12.4 | 18.2 | 21.6 | 28.2 | 9.35 | 7.11 | 4.40 | 3.84 | 3.23 |
| Cfs/m | 0.413 | 0.432 | 1.70 | 1.31 | 1.92 | 2.28 | 2.77 | 0.964 | 0.751 | 0.465 | 0.405 | 0.347 |
| In. | 0.48 | 0.48 | 1.96 | 1.51 | 2.08 | 2.63 | 3.09 | 1.11 | 0.84 | 0.54 | 0.47 | 0.39 |

Calendar year 1959: Max - Min - Mean - Cfs/m - In. -
 Water year 1959-60: Max 248 Min 2.2 Mean 10.8 Cfs/m 1.14 In. 15.58

Peak discharge (base, 100 cfs).--Dec. 12 (9:30 p.m.) 130 cfs (4.75 ft); Feb. 11 (9 a.m.) 269 cfs (6.24 ft); Mar. 30 (5 p.m.) 354 cfs (6.97 ft); Apr. 4 (12:30 a.m.) 124 cfs (4.67 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Oct. 5, Dec. 20-30, Jan. 1-7, 9-24; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

2402. Ninemile Creek at Camillus, N. Y.

Location.--Lat 43°02'20", long 76°18'30", on right bank 150 ft downstream from highway bridge on Main Street in Camillus, Onondaga County, 7 miles upstream from Onondaga Lake.

Drainage area.--87.6 sq mi.

Records available.--July 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 410 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,760 cfs Mar. 30 (gage height, 8.25 ft); minimum, 25 cfs Oct. 22; minimum gage height, 1.43 ft Aug. 29 (backwater from aquatic vegetation).

1958-60: Maximum discharge, that of Mar. 30, 1960; minimum, that of Oct. 22, 1959; minimum gage height, that of Aug. 29, 1960.

Remarks.--Records good except those for period of shifting control, which are fair. Flow regulated by Otisco Lake.

Rating tables, water year 1959-60, except period of shifting control (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11

Feb. 11 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.8 | 25 | 4.0 | 418 | 1.8 | 33 | 4.0 | 405 |
| 2.0 | 45 | 5.0 | 676 | 1.6 | 53 | 5.0 | 640 |
| 3.0 | 213 | 6.0 | 1,030 | 2.0 | 94 | 6.0 | 960 |
| | | | | 3.0 | 218 | 7.0 | 1,500 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 100 | 46 | 70 | 143 | 111 | 194 | *658 | 116 | 151 | 54 | 34 | 35 |
| 2 | 45 | 43 | 71 | 136 | 108 | 189 | 594 | 107 | 124 | 53 | 34 | 35 |
| 3 | 33 | 38 | 94 | 342 | 100 | 191 | 619 | 102 | 114 | 52 | 76 | 34 |
| 4 | 30 | 35 | 108 | 273 | 103 | 191 | *740 | 99 | 108 | 53 | 51 | 37 |
| 5 | 30 | 45 | 108 | 230 | 108 | 189 | *657 | 97 | 102 | 51 | 40 | 37 |
| 6 | 35 | 81 | 126 | 200 | 141 | 187 | 584 | 95 | 96 | 50 | 38 | 35 |
| 7 | 131 | 84 | 295 | 183 | 213 | 184 | 516 | 94 | 90 | 48 | 40 | 33 |
| 8 | 60 | 54 | 229 | 176 | 158 | 184 | 459 | 95 | 83 | 46 | 40 | 33 |
| 9 | 43 | 44 | 139 | 162 | 151 | 187 | 416 | 114 | 80 | 45 | 40 | 43 |
| 10 | 34 | 41 | 108 | 155 | 196 | 210 | 380 | 112 | 77 | 45 | 57 | 45 |
| 11 | 32 | 38 | 95 | 148 | 994 | 205 | 348 | 114 | 77 | 46 | 48 | 40 |
| 12 | 30 | 41 | 315 | 136 | 414 | 208 | 327 | 116 | 77 | 44 | 41 | 51 |
| 13 | 30 | 41 | 538 | 158 | 288 | 210 | *301 | 148 | 76 | 44 | 41 | 51 |
| 14 | 30 | 43 | 148 | 180 | 263 | 207 | 284 | 142 | 90 | 48 | 40 | 43 |
| 15 | 29 | 65 | 108 | 169 | 270 | 204 | 285 | 149 | 126 | 44 | 42 | 40 |
| 16 | 28 | 52 | 108 | 204 | 265 | 202 | 284 | 130 | 110 | 42 | 42 | 37 |
| 17 | 28 | 62 | 105 | 174 | *275 | 205 | 272 | 123 | 91 | 41 | 40 | 37 |
| 18 | 30 | 56 | 94 | 162 | 261 | 204 | 252 | 139 | 83 | 40 | 39 | 36 |
| 19 | 30 | 45 | 87 | 155 | 270 | 202 | 171 | *130 | 78 | 45 | 41 | *37 |
| 20 | 28 | 43 | 78 | *146 | 261 | 201 | 163 | 122 | 74 | *13 | 46 | 48 |
| 21 | 26 | 42 | 70 | *143 | 265 | 201 | 160 | 123 | *69 | 41 | 42 | 40 |
| 22 | 26 | 43 | 70 | 139 | 250 | *199 | 182 | 123 | 66 | 42 | 44 | 37 |
| 23 | 26 | 41 | 68 | 132 | 238 | *198 | 137 | 123 | 65 | 43 | 44 | 37 |
| 24 | 28 | *41 | 65 | 129 | 226 | 198 | 136 | 120 | 65 | 40 | 41 | 36 |
| 25 | 31 | 43 | 70 | 126 | 216 | 196 | 126 | 115 | 62 | 40 | 40 | 36 |
| 26 | *31 | 41 | 73 | 122 | 218 | 194 | 118 | 108 | 59 | 39 | *39 | 37 |
| 27 | 31 | 63 | 104 | 122 | 212 | 199 | 123 | 104 | 57 | 39 | 40 | 37 |
| 28 | 32 | 111 | 354 | 124 | 202 | 245 | 119 | 98 | 57 | 38 | 39 | 37 |
| 29 | 30 | 92 | 450 | 119 | 198 | 296 | 112 | 97 | 56 | 36 | 37 | 36 |
| 30 | 30 | 78 | *215 | 114 | ----- | *1,360 | 109 | 96 | 56 | 36 | 39 | 37 |
| 31 | 32 | ----- | 158 | 111 | ----- | 1,340 | ----- | 114 | ----- | 36 | 38 | ----- |
| Total | 1,159 | 1,590 | 4,721 | 5,032 | 6,975 | 8,580 | 9,610 | 3,563 | 2,519 | 1,364 | 1,313 | 1,157 |
| Mean | 37.4 | 53.0 | 152 | 162 | 241 | 277 | 320 | 115 | 84.0 | 44.0 | 42.4 | 38.6 |
| Cfsm | 0.427 | 0.605 | 1.74 | 1.85 | 2.75 | 3.16 | 3.65 | 1.31 | 0.959 | 0.502 | 0.484 | 0.441 |
| In. | 0.49 | 0.68 | 2.00 | 2.14 | 2.96 | 3.64 | 4.08 | 1.51 | 1.07 | 0.58 | 0.56 | 0.49 |

Calendar year 1959: Max 1,210

Min 26

Mean 114

Cfsm 1.30

In. 17.69

Water year 1959-60: Max 1,360

Min 26

Mean 130

Cfsm 1.48

In. 20.20

* Discharge measurement made on this day.

Note.--Shifting-control method used Dec. 29 to Feb. 10.

2425. East Branch Fish Creek at Taberg, N. Y.

Location.--Lat 43°18'05", long 75°37'10", on left bank at downstream side of bridge on State Highway 69 at Taberg, Oneida County, just downstream from Furnace Creek, 2½ miles upstream from confluence of East and West Branches near Blossvale.

Drainage area.--189 sq mi.

Records available.--April 1923 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 491.12 ft above mean sea level, datum of 1929. Prior to Oct. 6, 1923, staff gage at same site and datum.

Average discharge.--37 years, 545 cfs (unadjusted).

Extremes.--Maximum discharge during year, 8,170 cfs Apr. 24 (gage height, 7.48 ft); minimum, 21 cfs Sept. 3 (gage height, 0.27 ft).
1923-60: Maximum discharge, 13,600 cfs Oct. 2, 1945 (gage height, 10.90 ft); minimum, 4.9 cfs Aug. 15, 16, 1949.

Remarks.--Records good except those for periods of ice effect, which are fair. Diversion above station for water supply by city of Rome as shown in monthly table. Additional diversion from a reservoir (capacity, 28,600,000 cu ft; drainage area, 16.4 sq mi) on Florence Creek above station for water supply for city of Oneida amounted to 134,390,000 cu ft during the water year 1960, equivalent to a mean discharge of 4.2 cfs. Diurnal fluctuation at low flow caused by diversion and small power operations upstream.

Revisions (water years).--WSP 604: 1924. WSP 759: Drainage area. WSP 1034: 1944. WSP 1054: 1923-45.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11

Feb. 12 to Sept. 30

| | | | | | |
|-----|-------|-----|-----|-----|-------|
| 1.0 | 126 | 0.4 | 27 | 2.0 | 565 |
| 1.4 | 270 | .6 | 42 | 2.5 | 1,000 |
| 2.0 | 650 | .8 | 67 | 3.0 | 1,560 |
| 3.0 | 1,600 | 1.1 | 134 | 5.0 | 4,300 |
| 5.0 | 4,300 | 1.5 | 285 | 7.0 | 7,400 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|-------|-------|
| 1 | *1,270 | 730 | 788 | 310 | 215 | 250 | 2,660 | 691 | 558 | 315 | 42 | 85 |
| 2 | 1,210 | 1,240 | 722 | 300 | 205 | 240 | 2,540 | 607 | 424 | 200 | 37 | 53 |
| 3 | 738 | 1,010 | 615 | 900 | 195 | 245 | 3,120 | 470 | 340 | 153 | 47 | 60 |
| 4 | 434 | 730 | 601 | 1,090 | 190 | 260 | 4,820 | 407 | 335 | 143 | 45 | 34 |
| 5 | 320 | 1,320 | 580 | 846 | 206 | 250 | 3,940 | 355 | 244 | 140 | *48 | 34 |
| 6 | 743 | 3,250 | 650 | 658 | 220 | 240 | 2,550 | 310 | *190 | 118 | 54 | 39 |
| 7 | 2,450 | 2,720 | 2,340 | 594 | 320 | 230 | 1,780 | 272 | 156 | 105 | 45 | 39 |
| 8 | 1,530 | 1,160 | 2,000 | 517 | 310 | 225 | 1,450 | 249 | 131 | 89 | 38 | *38 |
| 9 | 828 | 762 | 1,220 | 370 | 340 | 220 | 1,160 | 276 | 115 | 105 | 37 | 47 |
| 10 | 587 | 587 | 945 | 370 | 360 | 215 | 872 | 285 | 100 | 96 | 44 | 61 |
| 11 | 416 | 496 | 770 | 340 | 1,250 | 210 | 824 | *300 | 96 | 94 | 45 | 51 |
| 12 | 362 | 552 | 1,080 | 310 | 1,980 | 200 | 1,560 | 440 | 92 | *76 | 39 | 86 |
| 13 | 397 | *538 | 2,970 | 320 | 1,500 | 200 | *2,090 | 1,570 | 87 | 71 | 46 | 103 |
| 14 | 310 | 601 | 1,600 | 280 | 1,280 | 195 | 2,530 | 1,660 | 137 | 130 | 81 | 98 |
| 15 | 295 | 1,130 | *1,000 | 300 | 970 | 190 | 4,280 | 970 | 576 | 80 | 60 | 51 |
| 16 | 261 | 762 | 909 | 340 | *843 | *180 | 3,360 | 628 | 1,160 | 67 | 29 | 44 |
| 17 | 270 | 810 | 837 | 320 | 699 | 180 | 4,330 | 464 | 506 | 60 | 49 | 42 |
| 18 | 374 | 770 | 674 | 300 | 593 | 175 | 5,240 | 621 | 482 | 54 | 60 | 42 |
| 19 | 368 | 658 | 552 | 290 | 579 | 170 | 2,860 | 596 | 370 | 63 | 60 | 41 |
| 20 | 310 | 524 | 300 | 280 | 494 | 165 | 1,780 | 412 | 249 | 72 | 74 | 46 |
| 21 | 225 | 503 | 270 | 270 | 424 | 160 | 1,860 | 458 | 182 | 55 | 47 | 41 |
| 22 | 140 | 489 | 270 | 250 | 375 | 155 | 4,820 | 424 | 140 | 57 | 64 | 38 |
| 23 | 434 | 475 | 235 | 245 | 360 | 155 | 3,460 | 365 | 120 | 80 | 64 | 37 |
| 24 | 890 | 1,170 | 230 | 240 | 335 | 150 | 6,530 | 412 | 154 | 63 | 60 | 38 |
| 25 | 1,840 | 2,090 | 240 | 235 | 325 | 150 | 4,300 | 614 | 520 | 48 | 55 | 38 |
| 26 | 1,150 | 1,220 | 280 | 230 | 300 | 155 | 2,670 | 579 | 452 | 42 | 61 | 35 |
| 27 | 746 | 1,120 | 285 | 225 | 285 | 160 | 1,450 | 412 | 244 | 44 | 54 | 35 |
| 28 | 552 | 2,880 | 588 | 235 | 276 | 247 | 1,050 | 295 | 156 | 47 | 49 | 41 |
| 29 | 416 | 1,700 | 643 | 230 | 276 | 375 | 824 | 240 | 153 | 47 | 46 | 47 |
| 30 | 338 | 972 | 531 | 220 | ----- | 688 | 699 | 236 | 439 | 49 | 43 | 46 |
| 31 | 392 | ----- | 447 | 215 | ----- | 1,900 | ----- | 426 | ----- | 47 | 41 | ----- |
| Total | 20,596 | 32,969 | 25,168 | 11,630 | 15,599 | 8,535 | 82,029 | 16,034 | 8,908 | 2,810 | 1,564 | 1,490 |
| Mean | 664 | 1,099 | 812 | 375 | 538 | 275 | 2,734 | 517 | 297 | 90.6 | 50.5 | 49.7 |
| (†) | 18.1 | 17.8 | 18.0 | 18.1 | 20.0 | 20.4 | 18.5 | 18.4 | 21.1 | 20.1 | 22.1 | 21.0 |

| | Observed | | | | Adjusted for diversion | | | | | |
|---------------------|----------|-------|-----|----|------------------------|-----|------|------|-----|-------|
| Calendar year 1959: | Max | 3,660 | Min | 26 | Mean | 655 | Cfsm | 3.47 | In. | 47.04 |
| Water year 1959-60: | Max | 6,530 | Min | 29 | Mean | 641 | Cfsm | 3.39 | In. | 46.13 |

Peak discharge (base, 4,900 cfs).--Apr. 4 (3 a.m.) 5,020 cfs (5.48 ft); Apr. 18 (3:45 a.m.) 5,600 cfs (5.87 ft); Apr. 24 (7:15 a.m.) 8,170 cfs (7.48 ft).

* Discharge measurement made on this day.

† Diversion, equivalent in cubic feet per second, by city of Rome for water supply. Diversion during calendar year 1959, 19.5 cfs; during water year 1959-60, 19.5 cfs (figures furnished by city of Rome). For diversion by city of Oneida, see "Remarks."

Note.--Stage-discharge relation affected by ice Dec. 20-25, Jan. 1, 2, Jan. 9 to Feb. 10, Mar. 1-27.

2435. Oneida Creek at Oneida, N. Y.

Location.--Lat 43°05'50", long 75°38'20", on right bank 70 ft upstream from bridge on State Highway 365A at Oneida, Madison County, and 500 ft downstream from Sconondoa Creek.

Drainage area.--112 sq mi.

Records available.--October 1949 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 409.33 ft above mean sea level (Corps of Engineers bench mark).

Average discharge.--11 years, 158 cfs.

Extremes.--Maximum discharge during year, 5,130 cfs Mar. 30 (gage height, 12.71 ft); minimum, 18 cfs Aug. 17.

1949-60: Maximum discharge, 7,440 cfs Mar. 28, 1950 (gage height, 13.78 ft); maximum gage height, 14.30 ft Jan. 22, 1959 (backwater from ice); minimum discharge, 13 cfs Aug. 3, 6, Sept. 10, 1955; minimum gage height, 1.30 ft Aug. 3, 6, 1955.

Remarks.--Records good except those for periods of ice effect, which are fair. Slight diurnal fluctuation at low flow caused by small mills above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 30 to Apr. 6)

| | | | |
|-----|-----|------|-------|
| 1.4 | 19 | 7.0 | 1,400 |
| 1.7 | 44 | 9.0 | 2,250 |
| 2.2 | 113 | 11.0 | 3,650 |
| 3.0 | 269 | 12.0 | 4,630 |
| 5.0 | 796 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | *115 | 218 | 222 | 195 | 92 | 135 | 2,040 | 168 | 245 | 53 | 29 | 31 |
| 2 | 67 | 174 | 199 | 207 | 90 | 130 | 1,240 | 161 | 164 | 55 | 25 | 26 |
| 3 | 37 | 153 | 189 | 1,140 | 86 | 125 | 1,210 | 137 | 132 | 51 | 51 | 22 |
| 4 | 30 | 132 | 172 | 513 | 84 | 130 | 1,700 | 122 | 111 | 64 | *52 | 27 |
| 5 | 37 | 218 | 150 | 305 | 84 | 125 | 1,340 | *110 | 96 | 52 | 65 | 30 |
| 6 | 57 | 794 | 139 | 256 | 100 | 122 | 748 | 103 | *90 | 48 | 52 | 29 |
| 7 | 255 | 534 | 605 | 249 | 160 | 118 | 540 | 94 | 81 | 44 | 39 | *27 |
| 8 | 127 | 249 | 458 | 191 | 120 | 116 | 448 | 92 | 72 | 41 | 34 | 25 |
| 9 | 91 | 179 | 287 | 155 | 120 | 114 | 392 | 99 | 68 | 40 | 30 | 29 |
| 10 | 73 | 146 | 234 | 170 | 200 | 112 | 345 | 111 | 64 | 37 | 103 | 46 |
| 11 | 59 | 127 | 195 | 170 | *1,900 | 110 | 291 | 130 | 59 | 37 | 66 | 32 |
| 12 | 44 | *123 | 780 | 165 | 1,100 | 108 | 309 | 141 | 58 | *16 | 38 | 159 |
| 13 | 39 | 113 | 945 | 165 | 520 | 104 | *307 | 403 | 62 | 36 | 31 | 158 |
| 14 | 37 | 111 | 377 | 150 | 370 | 100 | 262 | 332 | 124 | 52 | 32 | 69 |
| 15 | 35 | 148 | 260 | 165 | 270 | *100 | 319 | 269 | 246 | 52 | 32 | 45 |
| 16 | 33 | 115 | 254 | 180 | 290 | 98 | 300 | 189 | 168 | 41 | 30 | 37 |
| 17 | 31 | 151 | 239 | 155 | 280 | 97 | 245 | 155 | 132 | 35 | 25 | 32 |
| 18 | 34 | 109 | 201 | 150 | 270 | 97 | 241 | 544 | 184 | 34 | 25 | 30 |
| 19 | 36 | 102 | 179 | *145 | 290 | 97 | 222 | 306 | 111 | 40 | 27 | 29 |
| 20 | 35 | 96 | 140 | 135 | 230 | 94 | 185 | 205 | 88 | 41 | 46 | 32 |
| 21 | 33 | 96 | 130 | 130 | 220 | 97 | 170 | 211 | 75 | 35 | 39 | 31 |
| 22 | 31 | 97 | 120 | 125 | 220 | 96 | 362 | 310 | 67 | 33 | 35 | 29 |
| 23 | 56 | 92 | 110 | 116 | 199 | 90 | 256 | 218 | 63 | 31 | 35 | 27 |
| 24 | 134 | 100 | 120 | 112 | 183 | 90 | 316 | 282 | 62 | 30 | 32 | 26 |
| 25 | 273 | 105 | 140 | 112 | 174 | 80 | 236 | 249 | 82 | 30 | 28 | 25 |
| 26 | 137 | 86 | 130 | 110 | 181 | 84 | 205 | 195 | 58 | 29 | 27 | 26 |
| 27 | 120 | 264 | 140 | 108 | 177 | 90 | 258 | 159 | 52 | 27 | 28 | 26 |
| 28 | 94 | 1,400 | 600 | 110 | 159 | 247 | 222 | 132 | 50 | 25 | 28 | 26 |
| 29 | 74 | 484 | 666 | 106 | 155 | 482 | 177 | 122 | 46 | 25 | 27 | 27 |
| 30 | 62 | 276 | 324 | 100 | ----- | 2,180 | 157 | 127 | 59 | 26 | 48 | 30 |
| 31 | 87 | ----- | 247 | 56 | ----- | *4,270 | ----- | 143 | ----- | 51 | 38 | ----- |
| Total | 2,373 | 6,992 | 8,952 | 6,176 | 8,324 | 10,018 | 15,043 | 6,019 | 2,969 | 1,279 | 1,197 | 1,188 |
| Mean | 76.5 | 233 | 289 | 199 | 287 | 323 | 501 | 194 | 99.0 | 39.0 | 38.6 | 39.6 |
| Cfsm | 0.683 | 2.08 | 2.58 | 1.78 | 2.56 | 2.88 | 4.47 | 1.73 | 0.884 | 0.348 | 0.345 | 0.354 |
| In. | 0.79 | 2.32 | 2.97 | 2.05 | 2.76 | 3.33 | 5.00 | 2.00 | 0.99 | 0.40 | 0.40 | 0.39 |

Calendar year 1959: Max 3,500 Min 18 Mean 179 Cfsm 1.60 In. 21.73
Water year 1959-60: Max 4,270 Min 22 Mean 195 Cfsm 1.72 In. 23.40

Peak discharge (base, 1,900 cfs).--Nov. 28 (2:45 p.m.) 2,590 cfs (9.58 ft); Jan. 3 (2:15 p.m.) 2,020 cfs (8.55 ft); Feb. 11 (4:15 p.m.) about 3,800 cfs; Mar. 30 (11:30 p.m.) 5,130 cfs (12.71 ft); Apr. 4 (6 a.m.) 2,300 cfs (9.24 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-28, Jan. 9 to Feb. 22, Mar. 1-16, 25-27.

2440. Chittenango Creek near Chittenango, N. Y.

Location.--Lat 43°01'25", long 75°51'30", on right bank at upstream side of county highway bridge, 50 ft west of State Highway 13, 1.6 miles south of Chittenango, Madison County, 12 miles upstream from Butternut Creek, and 23 miles upstream from mouth.

Drainage area.--67.7 sq mi.

Records available.--August 1950 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 489.54 ft above mean sea level, datum of 1929.

Average discharge.--10 years, 116 cfs.

Extremes.--Maximum discharge during year, 2,690 cfs Feb. 11 (gage height, 6.54 ft); minimum, 18 cfs Aug. 1, 2, 3 (gage height, 1.45 ft).

1950-60: Maximum discharge, that of Feb. 11, 1960; maximum gage height, 7.18 ft Apr. 4, 1956; minimum discharge, 9.8 cfs Oct. 11, 1953; minimum gage height, 1.265 ft Oct. 15, 1952.

Flood of Mar. 29, 1950, reached a stage of 6.8 ft (backwater from debris present), from floodmarks (discharge, 2,760 cfs, by slope-area method).

Remarks.--Records good. Flow regulated by storage in Cazenovia Lake and Erieville Reservoir.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Feb. 11)

Oct. 1 to Feb. 11

Feb. 11 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-------|
| 1.8 | 27 | 3.0 | 335 | 1.4 | 14 | 3.0 | 360 |
| 2.0 | 56 | 4.0 | 780 | 1.6 | 29 | 4.0 | 785 |
| 2.5 | 172 | | | 2.0 | 82 | 6.0 | 2,060 |
| | | | | 2.5 | 190 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|------|-------|-------|
| 1 | *40 | 203 | 194 | 166 | 98 | 133 | 945 | 108 | 211 | 37 | 19 | 33 |
| 2 | 40 | 141 | 189 | 175 | 94 | 120 | 632 | 103 | 118 | 37 | 18 | 27 |
| 3 | 35 | 116 | 192 | 490 | 85 | 124 | 722 | 90 | 99 | 39 | 61 | 25 |
| 4 | 33 | 110 | 180 | 299 | 81 | 124 | 860 | 82 | 85 | 45 | *60 | 26 |
| 5 | 35 | 172 | 164 | 221 | 73 | 116 | 730 | *74 | 76 | 37 | 163 | 29 |
| 6 | 50 | 405 | 159 | 186 | 103 | 114 | 488 | 72 | *72 | 33 | 60 | 25 |
| 7 | 168 | 331 | 395 | 183 | 146 | 112 | 404 | 57 | 66 | 32 | 38 | *22 |
| 8 | 90 | 192 | 292 | 178 | 107 | 105 | 356 | 87 | 60 | 31 | 33 | 22 |
| 9 | 75 | 154 | 218 | 156 | 121 | 97 | 328 | 74 | 54 | 29 | 29 | 27 |
| 10 | 66 | 141 | 197 | 162 | 200 | 99 | 308 | 85 | 50 | 28 | 97 | 38 |
| 11 | 44 | 144 | 189 | 159 | *1,310 | 96 | 283 | 87 | 49 | 26 | 64 | 36 |
| 12 | 41 | *156 | 463 | 151 | 614 | 96 | 294 | 94 | 49 | *26 | 39 | 107 |
| 13 | 37 | 154 | 530 | 156 | 283 | 96 | *283 | 196 | 49 | 26 | 34 | 122 |
| 14 | 34 | 164 | 274 | 131 | 185 | 87 | 255 | 144 | 63 | 36 | 30 | 70 |
| 15 | 33 | 183 | 233 | 138 | 171 | *79 | 297 | 131 | 120 | 33 | 29 | 50 |
| 16 | 31 | 156 | 245 | 136 | *205 | 74 | 255 | 110 | 64 | 27 | 28 | 44 |
| 17 | 31 | 172 | 245 | 131 | 196 | 74 | 227 | 97 | 25 | 25 | 26 | 40 |
| 18 | 37 | 149 | 227 | 131 | 196 | 76 | 217 | 249 | 85 | 23 | 24 | 38 |
| 19 | 38 | 144 | 212 | *128 | 202 | 74 | 196 | 158 | 72 | 26 | 28 | 38 |
| 20 | 35 | 144 | 192 | 119 | 176 | 74 | 168 | 135 | 63 | 31 | 83 | 41 |
| 21 | 34 | 144 | 159 | 119 | 171 | 74 | 153 | 135 | 57 | 26 | 52 | 40 |
| 22 | 33 | 146 | 144 | 116 | 176 | 73 | 244 | 149 | 52 | 23 | 40 | 36 |
| 23 | 44 | 141 | 119 | 116 | 166 | 72 | 193 | 139 | 49 | 23 | 41 | 32 |
| 24 | 124 | 126 | 126 | 112 | 161 | 72 | 234 | 137 | 52 | 21 | 34 | 31 |
| 25 | 256 | 121 | 144 | 110 | 156 | 70 | 190 | 126 | 54 | 20 | 28 | 30 |
| 26 | 110 | 103 | 138 | 110 | 161 | 68 | 168 | 107 | 43 | 20 | 25 | 28 |
| 27 | 92 | 204 | 180 | 107 | 161 | 73 | 178 | 94 | 39 | 20 | 26 | 28 |
| 28 | 79 | 572 | 418 | 110 | 153 | 126 | 137 | 65 | 37 | 20 | 26 | 30 |
| 29 | 68 | 285 | 390 | 107 | 151 | 192 | 112 | 84 | 37 | 19 | 25 | 36 |
| 30 | 58 | 203 | 245 | 100 | ----- | *1,410 | 103 | 85 | 39 | 19 | 74 | 36 |
| 31 | 107 | ----- | 206 | 98 | ----- | 2,000 | ----- | 112 | ----- | 19 | 50 | ----- |
| Total | 1,998 | 5,566 | 7,259 | 4,821 | 6,102 | 6,200 | 9,960 | 3,476 | 2,063 | 857 | 1,384 | 1,187 |
| Mean | 64.5 | 186 | 234 | 156 | 210 | 200 | 332 | 112 | 68.8 | 27.6 | 44.6 | 39.6 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 1,300 Min 17 Mean 129 Cfsm 1.91 In. 25.85
Water year 1959-60: Max 2,000 Min 18 Mean 139 Cfsm 2.05 In. 27.95

Peak discharge (base, 1,000 cfs).--Feb. 11 (9:15 a.m.) 2,690 cfs (6.54 ft); Mar. 30 (7:45 p.m.) 2,400 cfs (6.44 ft).

* Discharge measurement made on this day.

2448. Butternut Creek near Jamesville, N. Y.

Location.--Lat 42°56'05", long 76°03'45", on left bank 15 ft downstream from highway bridge on Walberger Road near Jamesville, Onondaga County, 125 ft downstream from unnamed tributary, and 2.2 miles upstream from Jamesville Reservoir.

Drainage area.--32.7 sq mi.

Records available.--July 1955 to October 1958 (operated as a low-flow partial-record station), July 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 720 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,200 cfs Mar. 30 (gage height, 6.20 ft); minimum, 4.4 cfs Oct. 4 (gage height, 2.40 ft).
1958-60: Maximum discharge, that of Mar. 30, 1960; maximum gage height, 6.22 ft Jan. 21, 1959 (ice jam); minimum discharge, 2.0 cfs Sept. 27, 1959 (gage height, 2.26 ft).

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Feb. 11

Feb. 11 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-------|
| 2.4 | 4.4 | 3.5 | 107 | 2.5 | 5.8 | 4.0 | 206 |
| 2.5 | 6.9 | 4.0 | 215 | 2.7 | 13 | 5.0 | 535 |
| 2.7 | 15 | 4.5 | 358 | 3.0 | 35 | 6.0 | 1,060 |
| 2.9 | 29 | 5.5 | 765 | 3.5 | 95 | | |
| 3.1 | 50 | | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 27 | 40 | 57 | 82 | 26 | 43 | 535 | 51 | 121 | 13 | 7.4 | 8.4 |
| 2 | 16 | 29 | 57 | 75 | 24 | 42 | 335 | 47 | 56 | 13 | 6.8 | 8.0 |
| 3 | 10 | 25 | 65 | 221 | 22 | 44 | 341 | 43 | 46 | 16 | 42 | 7.1 |
| 4 | 6.2 | 24 | 62 | 131 | 33 | 44 | 416 | 39 | 38 | 16 | 8.4 | |
| 5 | 9.3 | 33 | 60 | 78 | 35 | 44 | 341 | 35 | 33 | 13 | 47 | 8.4 |
| 6 | 23 | 104 | 62 | 70 | 66 | 43 | 233 | 32 | 31 | 12 | 16 | 7.7 |
| 7 | 67 | 90 | 162 | 64 | 78 | 43 | 178 | 29 | 28 | 12 | 11 | 7.1 |
| 8 | 22 | 50 | 112 | 58 | 57 | 42 | 146 | 29 | 26 | 11 | 9.4 | 6.8 |
| 9 | 19 | 37 | 85 | 50 | 54 | 41 | 126 | 47 | 25 | 10 | 9.0 | 7.7 |
| 10 | 15 | 31 | 72 | 49 | 112 | 40 | 114 | 42 | 23 | 9.8 | 26 | 11 |
| 11 | 11 | 27 | 66 | 46 | *655 | 40 | *97 | 43 | 22 | 9.4 | 15 | 11 |
| 12 | 10 | 32 | 213 | 42 | 284 | 41 | 94 | 47 | 24 | 9.4 | 10 | 35 |
| 13 | 8.3 | 28 | 270 | 44 | 132 | 44 | 84 | 95 | 24 | 9.4 | 9.4 | 27 |
| 14 | 8.3 | 30 | 122 | 48 | 78 | 43 | 82 | 63 | 41 | 13 | 8.7 | 15 |
| 15 | 7.9 | 38 | 93 | 54 | 86 | 38 | 97 | 54 | 53 | 12 | 9.0 | 11 |
| 16 | 6.9 | 30 | 94 | 56 | 90 | 37 | 94 | 44 | 36 | 9.4 | 9.0 | 9.4 |
| 17 | 7.6 | 35 | 85 | 47 | 83 | 36 | 77 | 39 | *39 | 9.0 | 8.0 | 9.0 |
| 18 | 8.3 | 27 | 75 | *43 | 84 | 33 | 74 | 60 | 44 | 9.0 | 7.4 | 9.0 |
| 19 | 9.3 | 25 | 68 | 42 | 89 | 33 | 72 | *44 | 30 | 12 | 9.1 | *9.8 |
| 20 | 6.9 | *24 | 56 | 40 | 63 | 33 | 57 | 39 | 25 | *12 | 16 | 11 |
| 21 | 6.9 | 25 | 52 | 40 | 60 | 32 | 54 | 43 | 21 | 9.4 | 12 | 10 |
| 22 | 6.2 | 26 | 50 | 38 | 58 | *30 | 89 | 42 | 20 | 9.4 | 12 | 9.0 |
| 23 | 8.6 | 23 | 48 | 35 | 58 | 29 | 67 | 56 | 19 | 9.4 | 13 | 8.7 |
| 24 | 13 | 24 | 48 | 35 | 58 | 30 | 72 | 54 | 20 | 8.4 | 9.8 | 7.7 |
| 25 | 37 | 25 | 50 | 33 | 60 | 27 | 65 | 48 | 19 | 7.7 | 8.7 | 7.4 |
| 26 | 18 | 22 | 52 | 31 | 63 | 27 | 59 | 41 | 15 | 7.7 | 8.0 | 7.4 |
| 27 | 15 | 59 | 81 | 31 | 59 | 30 | 77 | 33 | 14 | 7.7 | 8.0 | 7.7 |
| 28 | *16 | 163 | *210 | 34 | 52 | 65 | 65 | 30 | 13 | 7.7 | 7.7 | 7.7 |
| 29 | 14 | 103 | 281 | 35 | 47 | 119 | 53 | 31 | 13 | 7.4 | 7.4 | 8.0 |
| 30 | 12 | 64 | 142 | 32 | ----- | 652 | 50 | 32 | 16 | 7.7 | *20 | 8.7 |
| 31 | 24 | ----- | 101 | 31 | ----- | 893 | ----- | 60 | ----- | 7.7 | 11 | ----- |
| Total | 469.7 | 1,293 | 3,049 | 1,712 | 2,666 | 2,738 | 4,244 | 1,392 | 935 | 320.6 | 409.8 | 310.1 |
| Mean | 15.2 | 43.1 | 98.4 | 55.2 | 91.9 | 88.3 | 141 | 44.9 | 31.2 | 10.3 | 13.2 | 10.3 |
| Cfs/m | 0.465 | 1.32 | 3.01 | 1.69 | 2.81 | 2.70 | 4.31 | 1.37 | 0.954 | 0.315 | 0.404 | 0.315 |
| In. | 0.53 | 1.47 | 3.47 | 1.95 | 3.03 | 3.11 | 4.83 | 1.58 | 1.06 | 0.76 | 0.47 | 0.35 |

Calendar year 1959: Max 698 Min 3.0 Mean 48.7 Cfs/m 1.49 In. 20.21
Water year 1959-60: Max 893 Min 6.2 Mean 53.4 Cfs/m 1.63 In. 22.22

Peak discharge (base, 550 cfs).--Feb. 11 (8:15 a.m.) 965 cfs (5.85 ft); Mar. 30 (11 p.m.) 1,200 cfs (6.20 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-25, Jan. 5-15, 24-27, Jan. 31 to Feb. 5, Feb. 7, 14-16, 21-25, Feb. 28 to Mar. 16, Mar. 22, 23, 25-27.

2450. Limestone Creek at Fayetteville, N. Y.

Location.--Lat 43°01'45", long 76°00'50", on left bank 100 ft downstream from Genesee Street Bridge at Fayetteville, Onondaga County, and 8 miles upstream from mouth.

Drainage area.--85.7 sq mi, not including 15.7 sq mi of Middle Branch Tioughnioga Creek basin, flow from which may be completely diverted into Limestone Creek basin through DeRuyter Reservoir.

Records available.--November 1939 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 427.62 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--20 years (1940-60), 141 cfs.

Extremes.--Maximum discharge during year, 6,060 cfs Mar. 30 (gage height, 7.60 ft), from rating curve extended above 1,100 cfs by logarithmic plotting; minimum, 25 cfs Sept. 2 (gage height, 1.42 ft).

1939-60: Maximum discharge, 7,010 cfs Mar. 28, 1950 (gage height, 7.78 ft), from rating curve extended above 3,500 cfs by logarithmic plotting; minimum, 12 cfs Oct. 4, 1953; minimum gage height, 1.23 ft Aug. 20, 1949.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Canal diverts from Limestone Creek about 3 miles above station and returns water to creek about 400 ft above station. Flow regulated by DeRuyter Reservoir.

Revisions (water years).--WSP 954: 1941.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Mar. 30)

Oct. 1 to Mar. 29

Mar. 30 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|-----|-----|-------|
| 1.4 | 22 | 3.0 | 439 | 1.4 | 22 | 3.0 | 539 |
| 1.5 | 34 | 4.0 | 830 | 1.5 | 37 | 4.0 | 1,070 |
| 1.8 | 85 | 5.0 | 1,390 | 1.8 | 99 | 5.0 | 1,770 |
| 2.1 | 154 | 6.0 | 2,330 | 2.2 | 213 | 7.0 | 4,380 |
| 2.5 | 273 | | | 2.6 | 365 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 43 | 204 | 198 | 198 | 96 | 122 | 1,320 | 154 | 429 | 51 | 30 | 39 |
| 2 | 45 | 132 | 190 | 170 | 87 | 120 | 750 | 143 | 207 | 50 | 31 | 34 |
| 3 | 32 | 115 | 219 | 656 | b76 | b116 | 755 | 127 | 169 | 50 | 73 | 33 |
| 4 | 30 | 102 | 207 | 461 | b78 | 120 | *1,020 | 114 | 143 | 63 | 76 | 34 |
| 5 | 30 | 154 | 181 | 251 | 85 | 118 | 829 | 106 | 119 | 50 | 272 | 37 |
| 6 | 39 | 380 | 168 | 170 | 145 | b113 | 539 | 99 | 109 | 48 | 112 | 34 |
| 7 | 151 | 412 | 496 | 168 | 270 | b110 | 416 | 94 | 99 | 44 | 55 | 33 |
| 8 | 91 | 181 | 425 | 178 | 168 | b108 | 355 | 90 | 88 | 42 | 42 | 30 |
| 9 | 61 | 144 | 276 | 139 | 168 | b102 | 320 | 99 | 85 | 42 | 39 | 33 |
| 10 | 59 | 122 | 226 | 142 | 298 | b102 | 297 | 109 | 81 | 41 | 89 | 36 |
| 11 | 45 | 108 | 196 | 139 | 2,130 | b96 | *266 | 109 | 76 | 39 | 76 | 34 |
| 12 | 39 | 113 | 604 | 122 | a1,250 | b94 | 266 | 124 | 76 | 39 | 48 | 82 |
| 13 | 36 | 104 | 782 | 149 | a720 | 98 | 248 | 278 | 83 | 41 | 44 | 135 |
| 14 | 36 | 108 | 474 | 136 | a420 | 96 | 238 | 178 | *89 | 42 | 41 | 68 |
| 15 | 36 | 154 | 222 | 146 | a300 | b92 | 274 | 154 | 191 | 46 | 39 | 48 |
| 16 | 34 | 115 | 241 | 162 | *a240 | b100 | 274 | 132 | 151 | 41 | 39 | 44 |
| 17 | 33 | 139 | 222 | 139 | 219 | 108 | 234 | 112 | 132 | 37 | 37 | 41 |
| 18 | 34 | 106 | 190 | *132 | 229 | 108 | 224 | 234 | 191 | *34 | 36 | 39 |
| 19 | 36 | 98 | 173 | 127 | 241 | 108 | 210 | 166 | 116 | 36 | 36 | *37 |
| 20 | 36 | *96 | 144 | 115 | 181 | 106 | 160 | *127 | 94 | 41 | 58 | 42 |
| 21 | 33 | 98 | b118 | 113 | 184 | 106 | 151 | 138 | 81 | 37 | 57 | 46 |
| 22 | 32 | 108 | 129 | 111 | 187 | 106 | 289 | 230 | 72 | 34 | 44 | 42 |
| 23 | 36 | 102 | b110 | 106 | 176 | 102 | c10 | 210 | 72 | 36 | 50 | 39 |
| 24 | 71 | 104 | b112 | 102 | 165 | 102 | 227 | 197 | 68 | 34 | 44 | 37 |
| 25 | 201 | 102 | 129 | b90 | 157 | b96 | 191 | 175 | 74 | 33 | 39 | 34 |
| 26 | 98 | 87 | 136 | b92 | 165 | b90 | 172 | 151 | 59 | 31 | 36 | 33 |
| 27 | *76 | 200 | 207 | 96 | 157 | b98 | 230 | 129 | 53 | 31 | 36 | 34 |
| 28 | 76 | 639 | *595 | 106 | 144 | 135 | 197 | 116 | 50 | 31 | 34 | 34 |
| 29 | 74 | 222 | 740 | 115 | 136 | *276 | 180 | 114 | 53 | 36 | 35 | 34 |
| 30 | 64 | 226 | 348 | 102 | ----- | 2,920 | 146 | 129 | 59 | 36 | *80 | 37 |
| 31 | 80 | ----- | 254 | 100 | ----- | 3,500 | ----- | 174 | ----- | 31 | 55 | ----- |
| Total | 1,785 | 5,172 | 8,712 | 5,033 | 8,872 | 9,824 | 10,946 | 4,510 | 3,371 | 1,247 | 1,761 | 1,283 |
| Mean | 57.6 | 172 | 281 | 162 | 306 | 317 | 365 | 145 | 112 | 40.2 | 56.8 | 42.8 |
| Cfs/m | 0.672 | 2.01 | 3.28 | 1.89 | 3.57 | 3.70 | 4.26 | 1.69 | 1.31 | 0.469 | 0.663 | 0.499 |
| In. | 0.77 | 2.24 | 3.78 | 2.18 | 3.85 | 4.26 | 4.75 | 1.96 | 1.46 | 0.54 | 0.76 | 0.56 |

Calendar year 1959: Max 2,690 Min 16 Mean 144 Cfs/m 1.68 In. 22.75

Water year 1959-60: Max 3,500 Min 30 Mean 171 Cfs/m 2.00 In. 27.11

Peak discharge (base, 2,000 cfs).--Feb. 11 (11 a.m.) 3,430 cfs (6.68 ft); Mar. 30 (10:30 p.m.) 6,060 cfs (7.60 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, engineers' notes, and records for nearby stations.

b Stage-discharge relation affected by ice.

2460. Oneida Lake at Brewerton, N. Y.

Location.--Lat 43°14'20", long 76°08'30", at west end of Oneida Lake, 100 ft west of bridge on U. S. Highway 11, at Brewerton, Onondaga County.

Drainage area.--1,353 sq mi.

Records available.--November 1951 to September 1960. April 1904 to September 1925 in reports of State engineer and surveyor, published as Oneida River at Brewerton.

Gage.--Water-stage recorder. Datum of gage is 362.00 ft above mean sea level, Erie (Barge) Canal datum.

Extremes.--Maximum daily gage height during year, 10.69 ft Apr. 7; minimum daily, 6.56 ft Mar. 27, 28.

1951-60: Maximum daily gage height, that of Apr. 7, 1960; minimum daily, 5.98 ft Jan. 20, 1954.

Remarks.--Records good. Elevation of lake surface regulated by taintor-gate dam on Oneida River at Caughdenoy and gates on Oneida Canal and Erie (Barge) Canal. Capacity of lake not determined. Area of water surface is 79.8 sq mi. Figures of charge in contents computed from surface area and change in stage.

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|----------------|----------------|----------------|-----------------|----------------|---------------|-------------------|------------------|----------------|----------------|----------------|---------------|
| 1 | 8.48 | 8.51 | 9.14 | 8.21 | 6.91 | 7.69 | 8.05 | 9.43 | 8.58 | 8.88 | 8.34 | 8.13 |
| 2 | 8.58 | 8.56 | 9.09 | 8.17 | 6.86 | 7.62 | 8.73 | 9.34 | 8.66 | 8.86 | 8.32 | 8.11 |
| 3 | 8.71 | 8.75 | 8.99 | 8.18 | 6.81 | 7.57 | 9.25 | 9.22 | 8.70 | 8.82 | 8.33 | 8.11 |
| 4 | 8.66 | 8.85 | 8.94 | 8.30 | 6.78 | 7.51 | 9.84 | 9.09 | 8.73 | 8.78 | 8.34 | 8.11 |
| 5 | 8.77 | 8.87 | 8.87 | 8.34 | 6.74 | 7.48 | 10.33 | 8.95 | 8.69 | 8.64 | 8.32 | 8.11 |
| 6 | 8.76 | 8.88 | 8.82 | 8.32 | 6.74 | 7.42 | 10.60 | 8.82 | 8.63 | 8.70 | 8.31 | 8.11 |
| 7 | 8.96 | 9.14 | 8.70 | 8.29 | 6.71 | 7.37 | 10.69 | 8.78 | 8.65 | 8.66 | 8.32 | 8.11 |
| 8 | 9.12 | 9.33 | 8.78 | 8.21 | 6.75 | 7.31 | 10.67 | 8.63 | 8.65 | 8.66 | 8.16 | 8.11 |
| 9 | 9.09 | 9.31 | 8.99 | 8.17 | 6.75 | 7.26 | 10.61 | 8.51 | 8.65 | 8.64 | 8.25 | 8.13 |
| 10 | 9.03 | 9.26 | 8.96 | 8.10 | 6.80 | 7.18 | 10.52 | 8.55 | 8.67 | 8.67 | 8.30 | 8.16 |
| 11 | 8.90 | 9.15 | 9.08 | 8.00 | 6.94 | 7.13 | 10.43 | 8.53 | 8.66 | 8.67 | 8.26 | 8.28 |
| 12 | 8.63 | 8.99 | 9.08 | 7.95 | 7.31 | 7.07 | 10.18 | 8.58 | 8.67 | 8.64 | 8.27 | 8.19 |
| 13 | 8.59 | 9.04 | 9.11 | 7.88 | 7.63 | 7.02 | 10.25 | 8.71 | 8.66 | 8.67 | 8.28 | 8.20 |
| 14 | 8.53 | 8.77 | 9.34 | 7.81 | 7.83 | 6.98 | 10.18 | 8.69 | 8.93 | 8.66 | 8.25 | 8.23 |
| 15 | 8.40 | 8.72 | 9.40 | 7.74 | 7.94 | 6.92 | 10.14 | 9.05 | 8.91 | 8.63 | 8.23 | 8.27 |
| 16 | 8.34 | 8.75 | 9.21 | 7.66 | 7.97 | 6.89 | 10.20 | 9.12 | 8.92 | 8.63 | 8.24 | 8.29 |
| 17 | 8.18 | 8.40 | 9.24 | 7.64 | 8.00 | 6.89 | 10.18 | 9.20 | 8.98 | 8.62 | 8.25 | 8.34 |
| 18 | 8.05 | 8.42 | 9.21 | 7.61 | 8.01 | 6.83 | 9.92 | 9.25 | 8.98 | 8.62 | 8.23 | 8.25 |
| 19 | 8.08 | 8.40 | 9.06 | 7.55 | 8.04 | 6.79 | 10.10 | 9.26 | 9.04 | 8.58 | 8.21 | 8.37 |
| 20 | 8.01 | 8.34 | 8.97 | 7.50 | 8.06 | 6.75 | 10.07 | 9.25 | 9.00 | 8.54 | 8.23 | 8.34 |
| 21 | 8.07 | 8.34 | 8.88 | 7.45 | 8.06 | 6.71 | 9.94 | 9.18 | 9.02 | 8.53 | 8.25 | 8.25 |
| 22 | 8.17 | 8.22 | 8.69 | 7.40 | 8.04 | 6.70 | 9.91 | 9.27 | 9.04 | 8.53 | 8.27 | 8.32 |
| 23 | 8.17 | 8.29 | 8.57 | 8.34 | 8.00 | 6.66 | 9.98 | 9.22 | 9.01 | 8.49 | 8.24 | 8.27 |
| 24 | 8.14 | 8.24 | 8.45 | 7.30 | 7.95 | 6.63 | 10.01 | 8.96 | 8.95 | 8.48 | 8.23 | 8.31 |
| 25 | 8.26 | 8.17 | 8.32 | 7.24 | 7.94 | 6.61 | 10.08 | 8.91 | 8.70 | 8.49 | 8.26 | 8.31 |
| 26 | 8.42 | 8.33 | 8.20 | 7.17 | 7.88 | 6.60 | 10.09 | 8.87 | 8.93 | 8.51 | 8.24 | 8.26 |
| 27 | 8.49 | 8.68 | 8.14 | 7.14 | 7.82 | 6.56 | 9.99 | 8.86 | 8.95 | 8.41 | 8.21 | 8.23 |
| 28 | 8.50 | 8.78 | 8.12 | 7.09 | 7.80 | 6.56 | 9.86 | 8.82 | 8.94 | 8.42 | 8.23 | 8.22 |
| 29 | 8.59 | 9.09 | 8.24 | 7.04 | 7.75 | 6.61 | 9.77 | 8.76 | 8.93 | 8.42 | 8.18 | 8.26 |
| 30 | 8.69 | 9.13 | 8.24 | 7.01 | ----- | 6.76 | 9.68 | 8.70 | 8.88 | 8.42 | 8.19 | 8.16 |
| 31 | 8.57 | ----- | 8.23 | 6.97 | ----- | 7.26 | ----- | 8.61 | ----- | 8.32 | 8.18 | ----- |
| Mean (†) | 8.51 +182.7 | 8.72 +472.1 | 8.81 -739.2 | 7.70 -1054.9 | 7.48 +683.7 | 7.01 -66.4 | 10.01 +1,682.3 | 8.95 -1,295.7 | 8.82 +721.0 | 8.60 -440.2 | 8.25 -166.1 | 8.22 +25.8 |
| Calendar year 1959: Max | 10.19 | | | Min 6.23 | Mean 8.28 | | | | | | | |
| water year 1959-60: Max | 10.69 | | | Min 5.98 | Mean 8.42 | | | | | | | |
| | | | | | | | | | | | | |

† Change in contents in Oneida Lake, equivalent cubic feet per second.

2465. Oneida River at Caughdenoy, N. Y.

Location.--Lat 43°14'45", long 76°10'15", on left bank at point of diversion to New York State Erie (Barge) Canal, 1.6 miles downstream from Oneida Lake, and 2.6 miles upstream from Caughdenoy, Oswego County.

Drainage area.--1,377 sq mi; 1902-9, 1,433 sq mi (revised).

Records available.--September 1902 to December 1909 (published as "near Euclid"), January 1910 to December 1912, and October 1947 to September 1960 in reports of Geological Survey. September 1902 to December 1909 and January 1910 to September 1925 in reports of State engineer and surveyor.

Gage.--Water-stage recorder. Datum of gage is 362.00 ft above mean sea level, New York State Erie (Barge) Canal bench mark. Prior to June 5, 1907, headwater readings and June 5, 1907, to Dec. 31, 1909, staff-gage readings at Oak Orchard State Dam, at different datum. Jan. 1, 1910, to Dec. 31, 1912, staff gage at site 2.5 miles downstream at different datum. Oct. 9, 1947, to Nov. 7, 1951, water-stage recorder at site 2.5 miles downstream at different datum; since Nov. 7, 1951, used as auxiliary gage. Since Nov. 9, 1951, auxiliary water-stage recorder 2.6 miles downstream and 180 ft downstream from navigation dam of New York State Erie (Barge) Canal.

Average discharge.--23 years (1902-12, 1947-60), 2,586 cfs.

Extremes.--Maximum daily discharge during year, 8,580 cfs Apr. 7; minimum daily, 345 cfs Sept. 28.

1947-60: Maximum daily discharge, 9,160 cfs Apr. 7, 1950; minimum daily, 62 cfs July 29, 1950.

Remarks.--Records excellent above and good below 1,800 cfs except those for periods of backwater from aquatic vegetation or no gage-height record, which are fair.

Jan. 1, 1910, to Dec. 31, 1912: Flow over dam computed on basis of coefficient determined for model of dam of same general type; flow through gate and diversion through lock culverts estimated by theoretical calculations.

1947-60: Record represents total discharge at Caughdenoy, including flow in Oneida and Erie (Barge) Canals. Considerable seasonal regulation by operation of gates in Oneida and Erie (Barge) Canals. A large amount of natural storage by Oneida Lake. Occasional large diurnal fluctuations caused by seiche in Oneida Lake. Water may be diverted into or received from Mohawk River basin through summit level of Erie (Barge) Canal between New London and Utica. Nearly all of flow from 16 sq mi of the Tiohognoga River basin may be diverted into DeRuyter Reservoir, in Oswego River basin.

Cooperation.--Records for period 1907-12 furnished by New York State engineer and surveyor. Records of gate openings, lockages, and elevations of water surface in Erie (Barge) Canal above and below lock 23, 1947-60, furnished by New York State Department of Public Works.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------------------------|--------|---------|---------|---------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 356 | 1,780 | 5,980 | 4,430 | 2,520 | 3,570 | 4,130 | 6,390 | a2,630 | 1,200 | 679 | 423 |
| 2 | 702 | 1,950 | 5,900 | 4,360 | 2,440 | 3,480 | 5,290 | 6,240 | a1,810 | 1,190 | 672 | 436 |
| 3 | 970 | 1,970 | 5,740 | 4,330 | 2,390 | 3,410 | 6,290 | 6,050 | a2,130 | 1,170 | 662 | 436 |
| 4 | 960 | 2,130 | 5,660 | 4,530 | 2,350 | 3,310 | 7,340 | 5,840 | a2,130 | 1,180 | 679 | 438 |
| 5 | 1,200 | 2,930 | 5,540 | 4,580 | 2,320 | 3,260 | 7,920 | 5,670 | a2,110 | 1,150 | 670 | 437 |
| 6 | 1,400 | 3,270 | 5,450 | 4,580 | 2,330 | 3,190 | 8,410 | 5,420 | a1,970 | 1,140 | 670 | 430 |
| 7 | 2,600 | 3,360 | 5,220 | 4,510 | 2,250 | 3,120 | 8,580 | 5,350 | a1,370 | 948 | 675 | 435 |
| 8 | 3,000 | 3,510 | 5,560 | 4,380 | 2,330 | 3,040 | 8,560 | 5,130 | a1,030 | 749 | 489 | 425 |
| 9 | 4,240 | 4,660 | 5,670 | 4,330 | 2,330 | 2,970 | 8,420 | 4,020 | c796 | 757 | 441 | 414 |
| 10 | 4,680 | 5,120 | 5,620 | 4,230 | 2,390 | 2,880 | 8,270 | 1,000 | c815 | 771 | 430 | 409 |
| 11 | 4,570 | 4,990 | 5,810 | 4,080 | 2,560 | 2,790 | 8,090 | 1,070 | c851 | 764 | 440 | 417 |
| 12 | 4,100 | 5,000 | 5,930 | 4,000 | 3,040 | 2,720 | *7,820 | 1,100 | c799 | 750 | 444 | 400 |
| 13 | 3,620 | 5,380 | 6,000 | 3,900 | 3,500 | 2,680 | 7,730 | 1,120 | c594 | 752 | 440 | 402 |
| 14 | 3,570 | 5,070 | 6,340 | 3,760 | 3,810 | 2,620 | 7,680 | 1,160 | *c497 | 747 | 441 | 402 |
| 15 | 3,520 | 4,940 | 6,440 | 3,670 | 3,950 | 2,550 | 7,720 | 1,210 | c499 | 734 | 422 | 396 |
| 16 | 3,440 | 5,020 | 6,080 | 3,570 | 4,040 | 2,510 | 7,660 | 1,510 | c504 | 736 | 425 | 390 |
| 17 | 3,010 | 4,570 | 6,210 | 3,520 | 4,060 | 2,520 | 7,660 | a2,000 | c870 | 752 | 432 | 395 |
| 18 | 2,580 | 4,550 | 6,150 | 3,520 | *4,080 | 2,430 | 7,240 | a2,900 | 1,260 | 722 | 430 | 396 |
| 19 | 2,470 | 4,560 | 5,820 | *3,400 | 4,090 | 2,370 | 7,600 | a5,700 | 1,240 | *718 | 426 | 395 |
| 20 | 2,410 | 4,490 | 5,690 | 3,290 | 4,110 | 2,330 | 7,560 | a3,800 | 1,200 | 711 | 423 | 383 |
| 21 | 1,700 | 4,490 | 5,540 | 3,240 | 4,140 | 2,270 | 7,300 | a4,300 | 1,210 | 709 | 433 | 383 |
| 22 | 753 | 3,850 | 5,170 | 3,180 | 4,110 | 2,260 | 7,230 | a4,800 | 1,190 | 713 | 420 | 378 |
| 23 | 769 | 2,380 | 5,010 | 3,090 | 4,040 | 2,200 | 7,340 | a4,700 | 1,180 | 720 | 419 | *378 |
| 24 | 744 | *1,500 | 4,790 | 3,050 | 3,980 | 2,180 | 7,340 | a4,500 | 1,180 | 721 | 425 | 361 |
| 25 | 767 | 1,430 | 4,580 | 2,970 | 3,960 | *2,130 | 7,510 | a4,400 | 1,180 | 703 | 429 | 364 |
| 26 | 764 | 1,210 | 4,400 | 2,880 | 3,890 | 2,110 | 7,530 | a4,000 | 1,230 | 696 | 426 | 357 |
| 27 | *973 | 1,490 | 4,280 | 2,850 | 3,730 | 2,090 | 7,300 | a3,400 | 1,220 | 686 | 433 | 356 |
| 28 | 1,190 | 2,230 | 4,240 | 2,780 | 3,740 | 2,070 | 7,170 | a3,100 | 1,220 | 682 | 429 | 345 |
| 29 | 1,470 | 3,360 | 4,480 | 2,700 | 3,670 | 2,140 | 7,000 | a3,200 | 1,200 | 694 | 423 | 353 |
| 30 | 1,880 | 5,300 | *4,460 | 2,660 | ----- | 2,330 | 6,820 | a3,200 | 1,190 | 690 | 437 | 350 |
| 31 | 2,010 | ----- | 4,440 | 2,620 | ----- | 2,980 | ----- | a3,200 | ----- | 687 | *439 | ----- |
| Total | 66,428 | 106,490 | 169,100 | 112,990 | 96,150 | 82,490 | 222,310 | 113,480 | 37,105 | 25,342 | 15,110 | 11,924 |
| Mean | 2,143 | 3,550 | 5,423 | 3,645 | 3,316 | 2,661 | 7,410 | 3,661 | 1,237 | 817 | 487 | 397 |
| Cfsm | 1.56 | 2.58 | 3.94 | 2.65 | 2.41 | 1.93 | 5.38 | 2.66 | 0.898 | 0.593 | 0.354 | 0.288 |
| In. | 1.79 | 2.88 | 4.54 | 3.05 | 2.60 | 2.23 | 6.00 | 3.07 | 1.00 | 0.68 | 0.41 | 0.32 |
| Calendar year 1959: Max | 8,360 | Min | 170 | Mean | 2,712 | Cfsm | 1.97 | In. | 26.74 | | | |
| Water year 1959-60: Max | 8,580 | Min | 345 | Mean | 2,890 | Cfsm | 2.10 | In. | 28.57 | | | |

* Discharge measurement made on this day.

a No gage-height record at base gage; discharge estimated on basis of records at auxiliary gage and assumed discharge ratios.

c Backwater from aquatic vegetation.

2490. Oswego River at lock 7, Oswego, N. Y.

Location.--Lat 43°27'00", long 76°30'25", on right bank at lock 7 in Oswego, Oswego County, three-quarters of a mile upstream from mouth.

Drainage area.--5,121 sq mi. Prior to 1933, 5,111 sq mi (revised).

Records available.--October 1900 to April 1906, October 1933 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Prior to January 1904, published as "above Minetto" or "near Minetto." January 1904 to April 1906, published as "at Battle Island." Records for April 1897 to September 1900, published in WSP 65 and for October 1927 to September 1928 published in WSP 664, have been found to be unreliable and should not be used.

Gage.--Water-stage recorder. Datum of gage is 246.00 ft above mean sea level, New York State Oswego (Barge) Canal datum. Prior to 1933, staff gage at site about 6 miles upstream at different datum.

Average discharge.--27 years (1933-60), 6,473 cfs.

Extremes.--Maximum discharge during year, 31,200 cfs Apr. 4 (gage height, 12.26 ft), includes mean daily discharge of canals; minimum daily, 707 cfs Sept. 18; minimum gage height, 1.35 ft Nov. 34.

1933-60: Maximum discharge, 37,500 cfs Mar. 28, 1936, includes mean daily discharge of canals; maximum gage height, 13.46 ft Apr. 10, 1940; minimum discharge (river only), 30 cfs Nov. 6, 1944; minimum daily, 353 cfs Aug. 14, 1949; minimum gage height, 0.97 ft Aug. 24, 1934.

Remarks.--Records excellent except those for periods of backwater from Lake Ontario, which are good. This record represents total discharge at Oswego and includes flow in Hydraulic and Oswego (Barge) Canals. Prior to 1933, flow in Oswego (Barge) Canals not included. A large amount of natural storage and some artificial regulation is afforded by the many large lakes and the Erie (Barge) and Oswego (Barge) Canal systems in the river basin. Large diurnal fluctuations at low and medium flow by powerplants above station. Oswego River basin receives water from Erie (Barge) Canal through lock 32 near Pittsford. Water may be diverted into or received from Mohawk River basin through summit level of Erie (Barge) Canal between New London and Utica. During part of year entire flow from 45 sq mi of Mud Creek drainage area may be diverted from Chemung River basin into Lake Keuka in Oswego River basin. Nearly all of flow from 16 sq mi of the Troughnioga River basin may be diverted into DeRuyter Reservoir, in Oswego River basin.

Cooperation.--Records of lockages at lock 7 furnished by New York State Department of Public Works, record of elevations of Lake Ontario by Corps of Engineers, daily discharge records for High Dam by Niagara Mohawk Power Corp., and those at Fulton by Oswego River Watershed Corp.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| 1 | 2,880 | 3,340 | 11,300 | 17,200 | 10,500 | 8,710 | 23,200 | 14,000 | 10,800 | 5,180 | c1,900 | 1,340 |
| 2 | 2,780 | 5,280 | 11,100 | 16,500 | 10,200 | 7,280 | 25,300 | 13,600 | 9,900 | 3,660 | c1,900 | 1,780 |
| 3 | 2,940 | 5,720 | 11,000 | 16,700 | 9,550 | 7,960 | 28,200 | 13,100 | 10,000 | 3,600 | c2,200 | 1,520 |
| 4 | 2,760 | 4,700 | 11,000 | 16,900 | 9,580 | 8,120 | 30,500 | 12,100 | 9,080 | 3,980 | c1,950 | 1,520 |
| 5 | 3,480 | 4,570 | 11,000 | 16,800 | 9,430 | 8,580 | 30,400 | 9,270 | 8,910 | 4,210 | c1,900 | 1,360 |
| 6 | 3,470 | 5,750 | 11,100 | 16,200 | 9,660 | 8,330 | 29,800 | 8,220 | 9,270 | 4,180 | c2,250 | 2,000 |
| 7 | 4,680 | 6,820 | 12,700 | 15,600 | 9,510 | 8,330 | 28,800 | 8,290 | 8,610 | 3,750 | c1,450 | 1,630 |
| 8 | 6,240 | 7,380 | 15,700 | 14,900 | 10,400 | 8,300 | 27,600 | 8,090 | 7,880 | c2,800 | c2,150 | 1,580 |
| 9 | 6,050 | 7,160 | 16,400 | 14,400 | 10,700 | 8,130 | 26,000 | 7,460 | 7,530 | c3,000 | c1,650 | 1,690 |
| 10 | 7,200 | 7,680 | 16,000 | 14,000 | 11,000 | 8,250 | 24,500 | 3,120 | 6,610 | 2,650 | c2,150 | 1,840 |
| 11 | 7,770 | 8,170 | 15,300 | 13,200 | 14,100 | 8,380 | 23,000 | 3,740 | 6,260 | 3,600 | 1,920 | 1,140 |
| 12 | 6,750 | 9,450 | 15,000 | 12,600 | 17,300 | 8,150 | 21,500 | 5,280 | 5,650 | c3,000 | c1,950 | 2,180 |
| 13 | 6,360 | 9,560 | 17,100 | 12,800 | 17,000 | 8,580 | *20,500 | 5,920 | 5,360 | c2,900 | c1,300 | 1,920 |
| 14 | 5,190 | 8,120 | 17,800 | 12,800 | 16,100 | 8,620 | 19,700 | 6,530 | 4,280 | 2,710 | c1,100 | 1,560 |
| 15 | 5,650 | 6,700 | 17,000 | 12,900 | 14,700 | 8,240 | 19,200 | 6,170 | 3,900 | c2,600 | 2,150 | 2,020 |
| 16 | 5,360 | 8,490 | 17,300 | 12,800 | 14,200 | 8,130 | 18,900 | 6,940 | 4,460 | c2,400 | 1,590 | 1,620 |
| 17 | 5,360 | 9,070 | 16,700 | 13,200 | 12,500 | 9,000 | 18,700 | *7,250 | 4,800 | c1,800 | 1,780 | 1,400 |
| 18 | 4,360 | 8,940 | 16,100 | 13,200 | 12,000 | 8,800 | 18,300 | 6,890 | 5,910 | c2,800 | 2,000 | 707 |
| 19 | 3,740 | 8,420 | 15,500 | 13,400 | *12,500 | 8,670 | 18,100 | 7,520 | 5,840 | *c2,250 | 1,940 | 1,940 |
| 20 | 3,320 | 7,680 | 14,700 | 13,000 | 12,600 | 8,670 | 18,000 | 6,970 | 6,530 | *c1,950 | 2,100 | 1,660 |
| 21 | 3,740 | 8,430 | 14,100 | *12,700 | 12,400 | 8,530 | 17,600 | 9,590 | 5,840 | c2,050 | 1,910 | 1,500 |
| 22 | 2,720 | 8,450 | 12,600 | 12,500 | 12,000 | 8,530 | 17,700 | 9,980 | 5,480 | c1,950 | 1,910 | *1,620 |
| 23 | *2,460 | 7,380 | *11,900 | 12,100 | 11,900 | 8,410 | 17,500 | 10,800 | 5,200 | c2,000 | 1,660 | 1,780 |
| 24 | 2,450 | 5,900 | *12,000 | 11,800 | 11,800 | *8,330 | 17,400 | 11,000 | 5,290 | c1,140 | 2,070 | 984 |
| 25 | 2,770 | 6,080 | 12,100 | 11,800 | 11,500 | 8,130 | 17,400 | 11,000 | 6,060 | c2,250 | 1,890 | 1,890 |
| 26 | 2,900 | 5,340 | 12,100 | 11,500 | 11,500 | 8,130 | 17,500 | 11,800 | 6,230 | c2,100 | 1,710 | 1,740 |
| 27 | 2,940 | 5,340 | 12,100 | 11,300 | 10,500 | 7,900 | 16,200 | 11,700 | 6,990 | c1,950 | 1,510 | 1,390 |
| 28 | 3,000 | 6,720 | 13,000 | 11,300 | 10,200 | 8,150 | 15,300 | 11,600 | 6,000 | c1,700 | 1,220 | 1,280 |
| 29 | 3,220 | 7,260 | 15,600 | 11,000 | 9,820 | 8,560 | 15,300 | 11,100 | 5,590 | c1,750 | 1,950 | 1,370 |
| 30 | 4,010 | 10,100 | 17,600 | 10,800 | ----- | 10,400 | 14,800 | 11,000 | 5,260 | c1,950 | *1,800 | 1,790 |
| 31 | 4,040 | ----- | 17,900 | 10,600 | ----- | 17,700 | ----- | 10,900 | ----- | c1,750 | 1,890 | ----- |
| Total | 130,650 | 214,280 | 441,600 | 416,300 | 344,750 | 269,960 | 636,900 | 282,910 | 198,520 | 63,810 | 56,650 | 47,751 |
| Mean | 4,215 | 7,143 | 14,245 | 13,429 | 11,688 | 8,708 | 21,230 | 9,126 | 6,617 | 2,704 | 1,833 | 1,592 |
| Cfs/m | 0.623 | 1.39 | 2.78 | 2.62 | 2.32 | 1.70 | 4.15 | 1.78 | 1.29 | 0.528 | 0.358 | 0.311 |
| In. | 0.95 | 1.56 | 3.21 | 3.02 | 2.50 | 1.96 | 4.62 | 2.05 | 1.44 | 0.61 | 0.41 | 0.35 |
| Calendar year 1959: Max | 22,700 | Min | 873 | Mean | 7,259 | Cfs/m | 1.42 | In. | 19.25 | | | |
| Water year 1959-60: Max | 30,500 | Min | 707 | Mean | 8,536 | Cfs/m | 1.67 | In. | 22.68 | | | |

* Discharge measurement made on this day.

c Backwater from Lake Ontario.

2507.5. Sandy Creek near Adams, N. Y.

Location.--Lat 43°48'48", long 76°04'30", on left bank 250 ft upstream from highway bridge, a quarter of a mile downstream from unnamed tributary, 2½ miles downstream from Adams, Jefferson County, and 10 miles upstream from mouth.

Drainage area.--128 sq mi.

Records available.--August 1957 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 523.71 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 6,040 cfs Mar. 31 (gage height, 8.83 ft); minimum, 1.8 cfs Sept. 11; minimum daily, 2.2 cfs Sept. 7, 11.
1957-60: Maximum discharge, 6,100 cfs Apr. 2, 1959 (gage height, 9.40 ft); minimum, that of Sept. 11, 1960; minimum daily, that of Sept. 7, 11, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation at low flow caused by mills above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 23 to Dec. 7, Mar. 30 to Apr. 1, Sept. 4-30)

| | | | |
|-----|-----|-----|-------|
| 0.6 | 1.4 | 1.5 | 45 |
| .7 | 2.8 | 1.8 | 87 |
| .8 | 4.5 | 2.2 | 175 |
| .9 | 6.5 | 2.5 | 295 |
| 1.0 | 9.0 | 3.0 | 560 |
| 1.1 | 13 | 6.0 | 2,940 |
| 1.2 | 18 | 9.0 | 5,700 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1 | 35 | 376 | 294 | 155 | 100 | 140 | *2,940 | 290 | 528 | 57 | 13 | 3.6 |
| 2 | 85 | 424 | 295 | 160 | 100 | 130 | 2,330 | *269 | 277 | 46 | 11 | 4.0 |
| 3 | 47 | 248 | 277 | 400 | 100 | 125 | 3,000 | 218 | 1,300 | 44 | 7.7 | 3.8 |
| 4 | 35 | 178 | 335 | 400 | 100 | 125 | 2,980 | 181 | 581 | 89 | 11 | 4.5 |
| 5 | 32 | 201 | 489 | 350 | 100 | 125 | 1,610 | 159 | 298 | 67 | 6.8 | 4.3 |
| 6 | 191 | 1,060 | 722 | 300 | 110 | 120 | 985 | 136 | 214 | 56 | 6.8 | 5.6 |
| 7 | *335 | 660 | 1,770 | 270 | 130 | 114 | 760 | 119 | 159 | 44 | 6.5 | 2.2 |
| 8 | 233 | 308 | 1,010 | 230 | 130 | 106 | 658 | 105 | 127 | 37 | 30 | 4.3 |
| 9 | 132 | 229 | 715 | 210 | 140 | 104 | 560 | 103 | 105 | 36 | *26 | 2.5 |
| 10 | 101 | 185 | 534 | 190 | 250 | 104 | 483 | 98 | 94 | 36 | 18 | 4.2 |
| 11 | 74 | 156 | 408 | 170 | 2,500 | 100 | 430 | 111 | 82 | 31 | 16 | 2.2 |
| 12 | 64 | 314 | 866 | 160 | 1,890 | 98 | 715 | 153 | 76 | 26 | 12 | 4.7 |
| 13 | 56 | 256 | 1,610 | 150 | 1,170 | 96 | 693 | 424 | 73 | 26 | 9.0 | 4.7 |
| 14 | 52 | 468 | 693 | 140 | 865 | 94 | 752 | 402 | 67 | 26 | 8.2 | 6.2 |
| 15 | 43 | 696 | 483 | 150 | 609 | 90 | 948 | 252 | *130 | 17 | 11 | 4.7 |
| 16 | 40 | 326 | 560 | 160 | 574 | 88 | 623 | 207 | 148 | 15 | 9.7 | 2.7 |
| 17 | 37 | 370 | 752 | 170 | 502 | 88 | 775 | 164 | 142 | 17 | 9.1 | 5.6 |
| 18 | 68 | 298 | *540 | 160 | *453 | 88 | 955 | 191 | 233 | *17 | 6.4 | 2.7 |
| 19 | 89 | 252 | 375 | 150 | 418 | 90 | 540 | 164 | 151 | 17 | 8.1 | 6.8 |
| 20 | 65 | 211 | 200 | 140 | 375 | 92 | *370 | 121 | 103 | 16 | 7.1 | 3.0 |
| 21 | 55 | 207 | 170 | 130 | 335 | 86 | 334 | 115 | 85 | 16 | 8.5 | 4.6 |
| 22 | 47 | 218 | 150 | 120 | 294 | 84 | 910 | 103 | 70 | 15 | 11 | 3.0 |
| 23 | 44 | 248 | 135 | 118 | 285 | *80 | 597 | 94 | 64 | 26 | 10 | 5.5 |
| 24 | 56 | *602 | 150 | 116 | 256 | 80 | 1,350 | 105 | 145 | 31 | 8.0 | 4.8 |
| 25 | 347 | 644 | 155 | 114 | 233 | 80 | 1,300 | 162 | 237 | 22 | 8.0 | 2.5 |
| 26 | 222 | 366 | 145 | 112 | 214 | 78 | 888 | 136 | 123 | 18 | 5.8 | *4.1 |
| 27 | 172 | 396 | 135 | 110 | 191 | 82 | 595 | 107 | 81 | 16 | 3.3 | 2.8 |
| 28 | 170 | 588 | 140 | *108 | 175 | 142 | 459 | 82 | 60 | 14 | 5.3 | 2.7 |
| 29 | 123 | 424 | 150 | 106 | 160 | 324 | 355 | 70 | 57 | 13 | 7.7 | 3.0 |
| 30 | 101 | 277 | 150 | 104 | ----- | 2,380 | 285 | 71 | 71 | 10 | 4.7 | 3.5 |
| 31 | 117 | ----- | 150 | 102 | ----- | *5,160 | ----- | 305 | ----- | 11 | 4.7 | ----- |
| Total | 3,268 | 11,206 | 14,548 | 5,455 | 12,759 | 10,693 | 30,180 | 5,217 | 5,881 | 912 | 310.4 | 118.8 |
| Mean | 105 | 374 | 469 | 176 | 440 | 345 | 1,006 | 168 | 196 | 29.4 | 10.0 | 3.96 |
| Cfs/m | 0.820 | 2.92 | 3.66 | 1.38 | 3.44 | 2.70 | 7.86 | 1.31 | 1.53 | 0.230 | 0.078 | 0.031 |
| In. | 0.95 | 3.26 | 4.23 | 1.58 | 3.71 | 3.11 | 8.77 | 1.52 | 1.71 | 0.26 | 0.09 | 0.03 |

Calendar year 1959: Max 4,030 Min 4.7 Mean 300 Cfs/m 2.34 In. 31.77
Water year 1959-60: Max 5,160 Min 2.2 Mean 275 Cfs/m 2.15 In. 29.22

Peak discharge (base, 3,000 cfs).--Feb. 11 (1:45 p.m.), 4,480 cfs (7.71 ft); Mar. 31 (4:45 a.m.) 6,040 cfs (8.83 ft); Apr. 4 (12:15 a.m.) 3,760 cfs (6.91 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20 to Feb. 11, Feb. 28 to Mar. 27.

2520. Black River Canal (flowing south) near Boonville, N. Y.

Location.--Lat 43°27'20", long 75°19'25", on left bank at lock 69, 200 ft downstream from bridge on State Highway 46 and 2 miles south of Boonville, Oneida County.

Records available.--September 1915 to September 1960 (canal seasons only prior to October 1942 and since October 1957).

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,105.56 ft above mean sea level, datum of 1929. Prior to June 7, 1929, station was operated as a slope station on summit level of canal. Auxiliary water-stage recorder with concrete control on right bank of Lansingkill spillway, 100 ft downstream from spillway headgates, 600 ft upstream from lock 70, and half a mile upstream from lock 69.

Extremes.--1915-60: Maximum daily discharge recorded, 323 cfs Nov. 30, 1915; practically no flow at times when no water is being diverted.

Remarks.--Records good except those for period of no gage-height record at auxiliary gage, which are fair. This record shows combined flow in Black River Canal and Lansingkill spillway, and represents total diversion from Black River at Forestport, through Forestport feeder, into Mohawk River basin. Discharge during periods when no water was diverted, made up of leakage through headgates and runoff from area draining into canal above station.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------|-------|------|------|------|------|------|------|------|------|------|-------|-------|
| 1 | 58 | 1.0 | | | | | - | 0.7 | 1.3 | 0.9 | 0.3 | 12 |
| 2 | *42 | 1.3 | | | | | - | .8 | 1.2 | .6 | .5 | 3.8 |
| 3 | 26 | 1.0 | | | | | - | .8 | 1.0 | .6 | .6 | 4.8 |
| 4 | 18 | .9 | | | | | - | .8 | 1.2 | .5 | .6 | 5.8 |
| 5 | 12 | 1.1 | | | | | - | .8 | 1.2 | .5 | .6 | 5.8 |
| 6 | 13 | 6.2 | | | | | - | *.8 | 1.2 | .4 | .5 | 6.0 |
| 7 | 40 | 1.0 | | | | | - | .7 | *1.2 | .4 | .3 | 6.3 |
| 8 | 3.4 | .8 | | | | | - | .8 | 1.4 | .4 | *.3 | 6.3 |
| 9 | 1.6 | .8 | | | | | - | .7 | 1.4 | .4 | 1.6 | 6.0 |
| 10 | 1.4 | *.6 | | | | | - | .8 | 1.4 | .4 | 3.8 | 6.5 |
| 11 | 1.4 | .6 | | | | | - | 1.1 | 1.4 | .3 | 3.2 | 6.3 |
| 12 | 1.5 | .7 | | | | | - | 1.2 | 1.4 | *.4 | 2.7 | 11 |
| 13 | 1.7 | .6 | | | | | - | 1.3 | 1.4 | .6 | 2.1 | 18 |
| 14 | 1.8 | .7 | | | | | - | 1.3 | 1.2 | .7 | 2.0 | 21 |
| 15 | 1.7 | .7 | | | | | 0.6 | 1.2 | 1.0 | .7 | 1.8 | 21 |
| 16 | 1.6 | .6 | | | | | .4 | 1.1 | 2.9 | .6 | 1.3 | 21 |
| 17 | 1.5 | .6 | | | | | .5 | 1.2 | 3.4 | .5 | 1.3 | 21 |
| 18 | 1.7 | .6 | | | | | .5 | 1.2 | 3.7 | .5 | 1.1 | 21 |
| 19 | 1.7 | .6 | | | | | .4 | 1.3 | 2.2 | .6 | 1.0 | 17 |
| 20 | 1.7 | .6 | | | | | .3 | 1.4 | 1.0 | .7 | 1.1 | 16 |
| 21 | 1.8 | .5 | | | | | .3 | 1.4 | 1.2 | .7 | al.3 | 15 |
| 22 | 1.8 | .5 | | | | | .5 | 1.5 | .6 | .7 | al.3 | 15 |
| 23 | 2.1 | .4 | | | | | .5 | 1.4 | .7 | .5 | al.2 | 14 |
| 24 | 6.8 | .6 | | | | | 2.0 | 1.5 | .8 | .4 | al.0 | 10 |
| 25 | 11 | .7 | | | | | .9 | 1.6 | .7 | .4 | 8.0 | 8.1 |
| 26 | 2.3 | .6 | | | | | .8 | 1.6 | .6 | .6 | *14 | 4.6 |
| 27 | 1.0 | .7 | | | | | .6 | 1.4 | .6 | .6 | 13 | 1.6 |
| 28 | 1.0 | 1.2 | | | | | .7 | 1.4 | 4.8 | .6 | 14 | 1.0 |
| 29 | 1.0 | .7 | | | | | .7 | 1.3 | .8 | .6 | 14 | .8 |
| 30 | .9 | .5 | | | | | .6 | 1.3 | .9 | .5 | 13 | .8 |
| 31 | .8 | | | | | | | 1.2 | | .4 | 13 | |
| Total | 262.2 | 27.4 | - | - | - | - | - | 35.6 | 52.8 | 16.7 | 120.5 | 307.5 |
| Mean | 8.46 | 0.91 | - | - | - | - | - | 1.15 | 1.76 | 0.54 | 3.89 | 10.2 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year | : Max | | Min | | Mean | | Cfsm | | In. | | | |
| Water year | : Max | | Min | | Mean | | Cfsm | | In. | | | |

* Discharge measurement made on this day at main gage.

a No gage-height record at auxiliary gage; discharge estimated on basis of recorded range in stage and record at main gage.

2525. Black River near Boonville, N. Y.

Location.--Lat 43°30'35", long 75°18'25", on left bank at downstream side of county highway Bridge, three-quarters of a mile upstream from Sugar River and 2 miles northeast of Boonville, Oneida County.

Drainage area.--295 sq mi.

Records available.--February 1911 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 935.50 ft above mean sea level, datum of 1929. Prior to Sept. 27, 1933, chain and staff gages at same site and datum.

Average discharge.--49 years, 684 cfs.

Extremes.--Maximum discharge during year, 6,370 cfs Nov. 7 (gage height, 9.79 ft); minimum, 121 cfs Sept. 27; minimum daily, 138 cfs Sept. 26-28.
1911-60: Maximum discharge, 12,400 cfs Mar. 28, 1913 (gage height, about 12.5 ft, from floodmarks); minimum observed, about 5 cfs Aug. 26, 1918 (gage height, 2.40 ft); minimum daily, 7 cfs Aug. 26, 1918.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow slightly regulated by several headwater reservoirs. Forestport feeder diverts water from State Pond at Forestport. That portion of diverted water which does not pass down Black River Canal (flowing south) returns to Black River below station through Mill Creek sluiceway.

Revisions (water years).--WSP 759: Drainage area. WSP 784: 1934. WSP 1084: 1912(M), 1913, 1917-19(M), 1922(M), 1924(M), 1926(M), 1928(M), 1930(M), 1933(M). WSP 1307: 1914(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 3.9 | 124 | 7.0 | 1,780 |
| 4.5 | 257 | 8.0 | 2,840 |
| 5.0 | 415 | 9.0 | 4,410 |
| 5.5 | 640 | 9.5 | 5,530 |
| 6.0 | 955 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1967

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|---------|--------|----------|-----------|-----------|-------|-------|-------|
| 1 | 888 | 755 | 1,640 | 695 | 420 | 450 | *3,010 | a880 | 673 | 590 | 210 | 140 |
| 2 | *1,710 | 1,140 | 1,200 | 620 | 410 | 450 | 3,330 | a920 | 852 | 439 | 187 | 148 |
| 3 | 899 | 1,170 | *1,050 | 1,040 | 390 | 440 | 3,200 | 820 | 656 | 390 | 205 | 157 |
| 4 | 555 | 927 | 969 | *1,670 | 390 | 480 | 4,570 | 707 | 570 | 345 | 210 | 174 |
| 5 | 447 | 1,150 | 859 | 1,490 | 390 | 460 | 4,780 | 640 | 487 | 324 | 225 | 198 |
| 6 | 640 | 2,690 | 846 | 1,110 | 410 | 430 | 3,440 | *595 | 423 | 303 | 288 | 189 |
| 7 | 2,060 | 5,500 | 1,460 | 983 | 580 | 410 | 2,450 | 550 | *380 | 291 | 263 | 178 |
| 8 | 3,170 | 3,160 | 1,980 | 872 | 560 | 420 | 2,020 | 522 | 342 | 263 | *218 | *182 |
| 9 | 2,010 | 1,950 | 1,430 | 646 | 540 | 400 | 1,710 | 508 | 321 | 244 | 196 | 180 |
| 10 | 1,210 | *1,350 | 1,080 | 620 | 520 | 380 | 1,420 | 491 | 306 | 260 | 187 | 254 |
| 11 | 755 | 1,030 | 941 | 600 | 1,160 | 360 | 1,310 | 522 | 288 | 263 | 189 | 252 |
| 12 | 656 | 892 | 1,070 | 580 | 2,100 | 340 | *1,500 | 610 | 288 | 244 | 178 | 285 |
| 13 | 610 | 820 | 3,000 | 640 | 1,940 | 350 | 2,020 | 826 | 285 | 225 | 165 | 526 |
| 14 | 555 | 788 | 2,980 | 620 | 1,400 | 330 | 2,310 | 1,090 | 300 | *384 | 167 | 487 |
| 15 | *500 | 1,120 | 1,950 | 600 | 1,000 | 320 | 3,230 | 1,020 | 625 | 352 | 167 | 356 |
| 16 | 447 | 1,140 | 1,650 | 580 | 913 | 310 | 3,960 | 899 | 794 | 263 | 178 | 252 |
| 17 | 401 | 1,050 | 1,240 | 580 | *814 | 330 | 3,750 | 807 | 585 | 235 | 165 | 200 |
| 18 | 427 | 1,120 | 1,000 | 560 | 725 | *350 | 4,110 | 707 | 560 | 244 | 157 | 176 |
| 19 | 467 | 913 | 859 | 580 | 695 | 362 | 3,900 | 610 | 595 | 241 | 159 | 176 |
| 20 | 439 | 725 | 635 | 560 | 656 | 352 | 2,710 | 550 | 455 | 249 | 178 | 198 |
| 21 | 401 | 690 | 555 | 540 | 600 | 348 | 2,030 | 526 | 376 | 233 | 196 | 184 |
| 22 | 373 | 651 | 560 | 520 | 550 | 348 | 2,510 | 495 | 336 | 208 | 203 | 174 |
| 23 | 495 | 630 | 480 | 500 | 560 | 345 | 2,940 | 475 | 306 | 244 | 203 | 157 |
| 24 | 941 | 788 | 450 | 480 | 555 | 342 | 2,940 | 610 | 318 | 218 | 198 | 155 |
| 25 | 1,990 | 1,360 | 500 | 470 | 555 | 333 | 2,900 | 800 | 427 | 200 | 180 | 150 |
| 26 | 1,980 | 1,400 | 560 | 460 | 540 | 336 | 2,720 | 948 | 415 | 182 | 165 | 138 |
| 27 | 1,390 | 1,250 | 590 | 450 | 536 | 359 | 2,140 | 899 | 342 | 184 | 155 | 138 |
| 28 | 1,060 | 2,530 | 762 | 470 | 518 | 387 | 1,770 | 673 | 300 | 228 | 153 | 138 |
| 29 | 774 | 3,520 | 1,020 | 450 | 508 | 479 | 1,400 | 595 | 300 | 220 | 153 | 144 |
| 30 | 610 | 2,180 | 913 | 440 | ----- | 662 | 1,040 | 560 | 585 | 215 | 152 | 155 |
| 31 | 570 | ----- | 794 | 430 | ----- | 1,720 | ----- | 513 | ----- | 225 | 144 | ----- |
| Total | 29,430 | 44,409 | 35,003 | 20,856 | 20,925 | 13,383 | 81,120 | 21,368 | 13,490 | 8,496 | 5,792 | 6,241 |
| Mean | 949 | 1,480 | 1,129 | 673 | 722 | 432 | 2,704 | 689 | 450 | 274 | 187 | 208 |
| Cfsm | 3.22 | 5.02 | 3.83 | 2.28 | 2.45 | 1.46 | 9.17 | 2.34 | 1.53 | 0.929 | 0.634 | 0.705 |
| In. | 3.71 | 5.60 | 4.41 | 2.63 | 2.64 | 1.69 | 10.23 | 2.69 | 1.70 | 1.07 | 0.73 | 0.79 |
| Calendar year 1959: Max | 5,500 | | | | Min 152 | | Mean 846 | Cfsm 2.87 | In. 38.91 | | | |
| Water year 1959-60: Max | 5,500 | | | | Min 138 | | Mean 821 | Cfsm 2.78 | In. 37.89 | | | |

Peak discharge (base, 3,900 cfs).--Nov. 7 (10:30 a.m.) 6,370 cfs (9.79 ft); Apr. 5 (1:15 a.m.) 5,210 cfs (9.37 ft); Apr. 18 (8:45 p.m.) 4,510 cfs (9.05 ft).

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of recorded range in stage and unpublished record at Forestport feeder dam 8 miles upstream.

Note.--Stage-discharge relation affected by ice Dec. 23-26, Jan. 10 to Feb. 12, Mar. 1-18.

2535. Middle Branch Moose River at Old Forge, N. Y.

Location.--Lat 43°42'50", long 74°58'10", on left bank in Old Forge, Herkimer County, 300 ft downstream from bridge on State Highway 28, 400 ft downstream from State dam, and 1¼ miles upstream from North Branch Moose River.

Drainage area.--52.1 sq mi (revised).

Records available.--October 1911 to September 1960. Monthly discharge only for October 1911, published in WSP 1307.

Gage.--Staff gage read twice daily. Datum of gage is 1,690.63 ft above mean sea level, datum of 1929.

Average discharge.--49 years, 105 cfs.

Extremes.--Maximum daily discharge during year, 417 cfs Nov. 7; maximum gage height observed, 3.76 ft Nov. 7, 8; minimum daily discharge, 10 cfs Apr. 13.
1911-60: Maximum daily discharge, 862 cfs Mar. 23, 1921; minimum daily, 0.1 cfs many times when gates in dam were closed.

Remarks.--Records good except those for period of backwater from North Branch, which are fair. On days when gate openings are changed, discharge is computed from gage readings and record of gate operations. Flow regulated by Fulton Chain of Lakes since about 1880.

Rating table, water year 1959-60, except period of backwater from North Branch (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.6 | 7.6 | 2.2 | 62 |
| 1.7 | 12 | 2.6 | 130 |
| 1.9 | 27 | 3.8 | 441 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| 1 | 241 | 164 | 398 | 211 | 232 | 232 | 142 | 211 | 35 | 89 | 12 | 14 |
| 2 | 15 | 166 | *314 | 211 | 232 | 230 | 178 | 194 | 84 | 89 | 12 | 14 |
| 3 | 15 | 169 | 155 | 211 | 232 | 227 | 198 | 139 | 215 | 89 | 12 | 14 |
| 4 | 15 | 176 | 97 | 211 | 232 | 227 | 214 | 78 | 168 | 89 | 12 | 14 |
| 5 | 15 | 211 | 69 | 209 | 232 | 237 | 224 | 60 | 126 | 64 | 12 | 14 |
| 6 | 15 | 311 | 56 | 206 | 230 | 232 | 235 | 60 | 83 | 12 | 12 | 43 |
| 7 | 17 | 417 | 125 | 211 | 227 | 227 | 245 | 56 | 62 | 12 | 12 | 157 |
| 8 | 17 | 414 | 159 | 209 | 227 | 227 | 167 | 56 | *49 | 12 | 22 | 157 |
| 9 | 17 | 403 | 164 | 206 | 224 | 222 | 54 | 30 | 19 | 12 | 56 | *121 |
| 10 | 17 | 293 | 164 | 206 | 222 | 222 | 52 | *17 | 19 | 48 | *56 | 12 |
| 11 | 17 | *90 | 164 | 206 | 222 | 222 | *38 | 17 | 19 | 181 | 56 | 48 |
| 12 | 17 | 56 | 246 | 206 | 222 | 214 | *11 | 17 | 19 | 162 | 56 | 157 |
| 13 | 17 | 115 | 287 | 206 | 222 | 204 | 10 | 17 | 19 | 64 | 56 | 97 |
| 14 | *17 | 163 | 328 | 206 | 222 | 188 | 11 | 17 | 19 | *63 | 51 | 14 |
| 15 | 17 | 282 | 344 | 206 | 224 | 184 | 11 | 17 | 88 | 62 | 14 | 14 |
| 16 | 17 | 282 | 274 | 204 | 227 | 176 | 169 | 17 | 118 | 62 | 14 | 14 |
| 17 | 17 | 200 | 240 | 201 | *230 | 171 | c250 | 32 | 118 | 62 | 14 | 14 |
| 18 | 17 | 91 | 240 | 201 | 232 | *166 | c180 | 54 | 118 | 29 | 14 | 14 |
| 19 | 17 | 58 | 145 | 217 | 232 | 152 | c12 | 54 | 118 | 12 | 14 | 68 |
| 20 | 17 | 58 | 54 | *248 | 232 | 148 | c12 | 68 | 63 | 12 | 14 | 152 |
| 21 | 17 | 58 | 19 | 248 | 227 | 145 | c12 | 103 | 20 | 12 | 14 | 152 |
| 22 | 17 | 58 | 19 | 245 | 227 | 143 | c12 | 112 | 12 | 12 | 14 | 152 |
| 23 | 17 | 58 | 19 | 243 | 224 | 143 | c12 | 118 | 12 | 12 | 14 | 152 |
| 24 | 50 | 59 | 104 | 240 | 222 | 141 | c120 | 118 | 47 | 12 | 14 | 152 |
| 25 | 205 | 62 | 219 | 237 | 227 | 137 | c185 | 118 | 176 | 12 | 14 | 152 |
| 26 | 287 | 122 | 217 | 237 | 237 | 132 | c185 | 118 | 176 | 12 | 14 | 152 |
| 27 | 205 | 230 | 217 | 237 | 237 | 130 | c200 | 118 | 176 | 12 | 14 | 150 |
| 28 | 166 | 361 | 211 | 237 | 232 | 128 | c210 | 118 | 118 | 12 | 14 | 198 |
| 29 | 169 | 411 | 211 | 235 | 232 | 128 | c210 | 118 | 89 | 12 | 14 | 269 |
| 30 | 169 | 406 | 211 | 232 | --- | 124 | 211 | 94 | 89 | 12 | 14 | 269 |
| 31 | 164 | --- | 211 | 232 | --- | 122 | --- | 35 | --- | 12 | 14 | --- |
| Total | 1,920 | 5,944 | 5,681 | 6,815 | 6,620 | 5,577 | 3,750 | 2,381 | 2,474 | 1,357 | 655 | 2,950 |
| Mean | 61.9 | 198 | 183 | 220 | 228 | 180 | 125 | 76.8 | 82.5 | 43.8 | 21.1 | 98.3 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max 417 Min 12 Mean 121 Cfsm 2.32 In. 31.50 | | | | | | | | | | | | |
| Water year 1959-60: Max 417 Min 10 Mean 126 Cfsm 2.42 In. 32.99 | | | | | | | | | | | | |

* Discharge measurement made on this day.
c Backwater from North Branch.

2540. Middle Branch Moose River near McKeever, N. Y.

Location.--Lat 43°37'45", long 75°04'55", on right bank half a mile upstream from confluence with South Branch and 1½ miles northeast of McKeever, Herkimer County.

Drainage area.--148 sq mi.

Records available.--October 1925 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,530.29 ft above mean sea level, datum of 1929.

Average discharge.--35 years, 327 cfs.

Extremes.--Maximum discharge during year, 1,560 cfs Apr. 18 (gage height, 5.85 ft); minimum, 65 cfs Sept. 3, 6, 7 (gage height, 2.17 ft).

1925-60: Maximum discharge, 2,100 cfs Apr. 27, 1926 (gage height, 6.6 ft); maximum gage height, 7.51 ft Dec. 22, 1958 (backwater from ice); minimum discharge, 27 cfs Aug. 18, 1946 (gage height, 1.73 ft).

Remarks.--Records good except those for period of ice effect, which are fair. Flow regulated to some extent by Fulton Chain of Lakes since about 1880.

Revisions.--WSP 664: Drainage area.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Nov. 8

Nov. 9 to Sept. 30

| | | | |
|-----|-----|-----|-------|
| 2.8 | 150 | 5.0 | 1,000 |
| 3.5 | 320 | 5.5 | 1,300 |
| 4.0 | 505 | | |

| | | | |
|-----|-----|-----|-------|
| 2.1 | 58 | 4.0 | 473 |
| 2.5 | 104 | 5.0 | 975 |
| 3.0 | 189 | 5.9 | 1,600 |
| 3.5 | 313 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 530 | 493 | 993 | 390 | 390 | 300 | 400 | 850 | 250 | 258 | 71 | 71 |
| 2 | 334 | 526 | *963 | 380 | 390 | 290 | 527 | 745 | 265 | 240 | 72 | 69 |
| 3 | 261 | 526 | 811 | 400 | 390 | 290 | 675 | 622 | 353 | 221 | 74 | 66 |
| 4 | 269 | 530 | 577 | 470 | 380 | 290 | 945 | 511 | 444 | 211 | 72 | 67 |
| 5 | 233 | 587 | 492 | 450 | *380 | 280 | 981 | 423 | 377 | 202 | 81 | 68 |
| 6 | 243 | 848 | 427 | 450 | 370 | 280 | 1,020 | 377 | 341 | 154 | 86 | 66 |
| 7 | 387 | 1,040 | 451 | 460 | 370 | 270 | 1,090 | 344 | 286 | 130 | 79 | 110 |
| 8 | 433 | 1,090 | 535 | 450 | 360 | 270 | 1,120 | 316 | *260 | 111 | 78 | 196 |
| 9 | 425 | 1,130 | 531 | 440 | 360 | 270 | 879 | 294 | 221 | 121 | 89 | *225 |
| 10 | 437 | 1,060 | 527 | 440 | 370 | 270 | 685 | *260 | 189 | 105 | *115 | 192 |
| 11 | 403 | *833 | 511 | 430 | 420 | 270 | *590 | 245 | 173 | 194 | 121 | 108 |
| 12 | 370 | 581 | 535 | 430 | 440 | 260 | 539 | 242 | 161 | 278 | 122 | 149 |
| 13 | 353 | 503 | 784 | 430 | 430 | 250 | 523 | 273 | 152 | *235 | 124 | 242 |
| 14 | *320 | 527 | 772 | 420 | 420 | 240 | 572 | 278 | 147 | 202 | 130 | 162 |
| 15 | 275 | 608 | 816 | 420 | 410 | 230 | 769 | 283 | 181 | 175 | 122 | 111 |
| 16 | 246 | 650 | 838 | 420 | 400 | 215 | 873 | 286 | 252 | 173 | 115 | 96 |
| 17 | 225 | 640 | 718 | 420 | 400 | *200 | 1,170 | 235 | 263 | 179 | 108 | 90 |
| 18 | 230 | 527 | 645 | 420 | 380 | 200 | 1,440 | 185 | 273 | 163 | 104 | 86 |
| 19 | 221 | 413 | 590 | 410 | 370 | 200 | 1,530 | 278 | 265 | 128 | 100 | 85 |
| 20 | 207 | 374 | 380 | 420 | 360 | 195 | 1,470 | 278 | 250 | 114 | 98 | 126 |
| 21 | 191 | 353 | 310 | 440 | 350 | 190 | 1,310 | 297 | 185 | 85 | 96 | 207 |
| 22 | 179 | 335 | 300 | 450 | 340 | 190 | 1,240 | 305 | 145 | 81 | 96 | 221 |
| 23 | 189 | 321 | 300 | 440 | 330 | 185 | 1,130 | 310 | 128 | 81 | 96 | 216 |
| 24 | 216 | 338 | 310 | 430 | 330 | 180 | 1,120 | 319 | 177 | 83 | 91 | 218 |
| 25 | 381 | 371 | 350 | 430 | 320 | 175 | 1,200 | 333 | 305 | 79 | 86 | 216 |
| 26 | 578 | 365 | 410 | 430 | 320 | 175 | 1,180 | 347 | 347 | 75 | 81 | 213 |
| 27 | 685 | 430 | 410 | 430 | 310 | 175 | 1,200 | 344 | 341 | 74 | 78 | 218 |
| 28 | 582 | 734 | 400 | 420 | 310 | 175 | 1,180 | 330 | 313 | 74 | 75 | 216 |
| 29 | 513 | 903 | 400 | 410 | 300 | 175 | 1,090 | 310 | 260 | 72 | 71 | 281 |
| 30 | 484 | 957 | 400 | 410 | --- | 200 | 957 | 276 | 270 | 72 | 71 | 313 |
| 31 | 472 | ----- | 400 | 400 | ----- | 300 | ----- | 245 | ----- | 72 | 71 | ----- |
| Total | 10,874 | 18,593 | 16,886 | 13,250 | 10,700 | 7,190 | 29,425 | 10,741 | 7,574 | 4,442 | 2,873 | 4,704 |
| Mean | 351 | 620 | 545 | 427 | 369 | 232 | 981 | 346 | 252 | 143 | 92.7 | 157 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 1,320 Min 63 Mean 368 Cfsm 2.49 In. 33.73
 Water year 1959-60: Max 1,530 Min 66 Mean 375 Cfsm 2.53 In. 34.49

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20 to Apr. 1.

2545. Moose River at McKeever, N. Y.

Location.--Lat 43°36'40", long 75°06'35", on left bank half a mile west of McKeever, Herkimer County, and 2 miles downstream from confluence of Middle and South Branches.

Drainage area.--365 sq mi.

Records available.--June 1900 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "at Moose River" prior to October 1922.

Gage.--Water-stage recorder at present site and datum since Nov. 3, 1922. Datum of gage is 1,479.92 ft above mean sea level, datum of 1929. June 5, 1900, to Dec. 31, 1922, staff gage at site $2\frac{1}{2}$ miles downstream at various datums. May 28 to Nov. 2, 1922, staff gage at present site at datum 1 ft higher.

Average discharge.--55 years (1905-60), 830 cfs.

Extremes.--Maximum discharge during year, 7,320 cfs Apr. 18 (gage height, 10.62 ft); maximum gage height, 10.76 ft Apr. 1 (ice jam); minimum discharge, 108 cfs Sept. 3, 4 (gage height, 1.65 ft).

1900-60: Maximum discharge, 18,700 cfs June 3, 1947 (gage height, 17.45 ft, from floodmark), result of failure of dam; minimum, about 42 cfs July 21, 23, 25-27, 1913.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated to some extent by Fulton Chain of Lakes since 1880.

Revisions (water years).--WSP 624: 1922(M). WSP 729: Drainage area. WSP 874: 1928.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 30 to June 24)

| | | | |
|-----|-------|------|-------|
| 1.7 | 108 | 6.0 | 2,410 |
| 2.5 | 326 | 7.0 | 3,290 |
| 3.0 | 513 | 9.0 | 5,590 |
| 4.0 | 1,010 | 11.0 | 7,810 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-------|-------|-------|
| 1 | 1,110 | 1,070 | 1,900 | 580 | 560 | 520 | 4,100 | 1,630 | 632 | 476 | 149 | 119 |
| 2 | 2,330 | 1,410 | *1,600 | 580 | 540 | 520 | 3,800 | 1,520 | 977 | 433 | 147 | 117 |
| 3 | 1,220 | 1,330 | 1,200 | 800 | 540 | *520 | 2,950 | 1,500 | 1,030 | 396 | 147 | 110 |
| 4 | 766 | 1,160 | 1,100 | 1,250 | 520 | 500 | 4,410 | 1,110 | 1,000 | 367 | 137 | 112 |
| 5 | 569 | 1,430 | 988 | 1,200 | *500 | 500 | 4,700 | 966 | 834 | 357 | 160 | 119 |
| 6 | 648 | 3,490 | 911 | *1,100 | 500 | 490 | 3,390 | 872 | 712 | 297 | 224 | 115 |
| 7 | 3,040 | 5,910 | 1,170 | 1,000 | 500 | 480 | 2,570 | 787 | 596 | 261 | 215 | 148 |
| 8 | 3,820 | 3,100 | 1,780 | 900 | 500 | 470 | 2,220 | 731 | *517 | 229 | 188 | 232 |
| 9 | 1,900 | 2,270 | 1,400 | 840 | 500 | 460 | 1,730 | 683 | 452 | 252 | 185 | *261 |
| 10 | 1,350 | 1,880 | 1,200 | 820 | 520 | 450 | 1,380 | *697 | 396 | 218 | 204 | 297 |
| 11 | 1,060 | *1,510 | 1,100 | 800 | 700 | 440 | *1,200 | 731 | 360 | 276 | *207 | 227 |
| 12 | 955 | 1,190 | 1,100 | 780 | 1,100 | 420 | 1,270 | 751 | 340 | 385 | 199 | 246 |
| 13 | 862 | 1,070 | 2,500 | 740 | 1,300 | 400 | 1,790 | 988 | 326 | *346 | 196 | 586 |
| 14 | *751 | 1,040 | 2,670 | 720 | 1,200 | 400 | 2,450 | 1,230 | 323 | 313 | 202 | 564 |
| 15 | 636 | 2,110 | 1,800 | 680 | 1,100 | 390 | 5,330 | 1,200 | 426 | 273 | 194 | 364 |
| 16 | 556 | 2,060 | 1,600 | 680 | 1,080 | 380 | 5,480 | 1,120 | 618 | 270 | 183 | 261 |
| 17 | 497 | 1,570 | 1,350 | 680 | *1,040 | *370 | 4,590 | 922 | 627 | 264 | 175 | 207 |
| 18 | 539 | 1,350 | 1,160 | 660 | 1,000 | 360 | 6,680 | 731 | 702 | 250 | 167 | 180 |
| 19 | 596 | 1,070 | 1,060 | 640 | 920 | 360 | 5,360 | 772 | 787 | 215 | 159 | 162 |
| 20 | 543 | 889 | 760 | 640 | 840 | 360 | 3,450 | 712 | 640 | 199 | 162 | 188 |
| 21 | 488 | 834 | 580 | *640 | 760 | 360 | 2,690 | 687 | 488 | 167 | 162 | 261 |
| 22 | 445 | 756 | 520 | 640 | 680 | 350 | 4,030 | 654 | 396 | 159 | 164 | 288 |
| 23 | 501 | 692 | 500 | 620 | 640 | 350 | 4,340 | 664 | 343 | 159 | 175 | 276 |
| 24 | 1,120 | 761 | 430 | 620 | 620 | 350 | 3,330 | 721 | 436 | 159 | 170 | 276 |
| 25 | 3,650 | 1,280 | 520 | 620 | 600 | 340 | 4,030 | 933 | 872 | 159 | 157 | 270 |
| 26 | 2,600 | 1,480 | 600 | 600 | 580 | 340 | 3,950 | 1,120 | 884 | 149 | 149 | 261 |
| 27 | 1,740 | 1,210 | 620 | 600 | 560 | 340 | 2,830 | 1,020 | 712 | 144 | 140 | 258 |
| 28 | 1,350 | a2,700 | 620 | 600 | 540 | 340 | 2,420 | 829 | 578 | 147 | 132 | 255 |
| 29 | 1,110 | a3,800 | 600 | 600 | 520 | 360 | 2,100 | 707 | 464 | 149 | 126 | 304 |
| 30 | 955 | 2,490 | 600 | 580 | ----- | 450 | 1,800 | 614 | 488 | 147 | 123 | 343 |
| 31 | 878 | ----- | 600 | 560 | ----- | 1,000 | ----- | 556 | ----- | 149 | 121 | ----- |
| Total | 38,585 | 52,912 | 34,599 | 22,750 | 20,940 | 13,370 | 100,370 | 27,958 | 17,956 | 7,765 | 5,217 | 7,407 |
| Mean | 1,245 | 1,764 | 1,116 | 734 | 722 | 431 | 3,346 | 902 | 599 | 250 | 168 | 247 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 5,910 Min 147 Mean 967 Cfsm 2.65 In. 35.96
Water year 1959-60: Max 6,680 Min 110 Mean 956 Cfsm 2.62 In. 35.64

Peak discharge (base, 5,500 cfs).--Nov. 7 (5:45 a.m.), 7,170 cfs (10.51 ft); Apr. 16 (4 a.m.), 6,290 cfs (9.78 ft); Apr. 18 (7 p.m.), 7,320 cfs (10.62 ft).

* Discharge measurement made on this day.

No gage-height record; discharge estimated on basis of weather records and records for upstream stations.

Note.--Stage-discharge relation affected by ice Dec. 1-4, 9-12, Dec. 15 to Apr. 2.

2560. Independence River at Donnattsburg, N. Y.

Location.--Lat 43°44'50", long 75°20'05", on right bank at downstream side of highway bridge at Donnattsburg, Lewis County, 1½ miles downstream from Chase Lake Outlet, 4½ miles northeast of Glenfield, and 5 miles upstream from mouth.

Drainage area.--91.7 sq mi.

Records available.--July 1942 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 972.84 ft above mean sea level, datum of 1929. Prior to Sept. 16, 1949, wire-weight gage at same site and datum.

Average discharge.--18 years, 195 cfs.

Extremes.--Maximum discharge during year, 1,710 cfs Apr. 4 (gage height, 6.73 ft); minimum, 26 cfs Sept. 3.

1942-60: Maximum discharge, 3,410 cfs Oct. 2, 1945 (gage height, 8.8 ft, from graph based on gage readings); minimum observed, 18 cfs Sept. 17, 1948, Aug. 4, 5, 1949 (gage height, 2.85 ft).

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.9 | 24 | 4.5 | 370 |
| 3.1 | 38 | 5.0 | 590 |
| 3.5 | 88 | 6.0 | 1,190 |
| 3.9 | 172 | 7.0 | 1,930 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 187 | 296 | 325 | 165 | 88 | 108 | 859 | 240 | 235 | 96 | 41 | 29 |
| 2 | 883 | 435 | 246 | 150 | 86 | 108 | 1,010 | 230 | 410 | 84 | 40 | 29 |
| 3 | 470 | 386 | 209 | 175 | 84 | 112 | 1,160 | *203 | 321 | 76 | 39 | 28 |
| 4 | 236 | 289 | 194 | 286 | 82 | 120 | 1,570 | 178 | 269 | 80 | 37 | 30 |
| 5 | 154 | 314 | 189 | 321 | 86 | 112 | *1,480 | 160 | 197 | 91 | 39 | 34 |
| 6 | 196 | 548 | 212 | 270 | 91 | 104 | 925 | 145 | 162 | 78 | 45 | 31 |
| 7 | *465 | 1,250 | 390 | 240 | 111 | 98 | 590 | 129 | 129 | 70 | 54 | 30 |
| 8 | 718 | 704 | 625 | 190 | 124 | 96 | 452 | 123 | 107 | 63 | 29 | |
| 9 | 474 | 406 | 448 | 165 | 123 | 92 | 347 | 115 | 90 | 64 | 69 | 34 |
| 10 | 296 | 300 | 336 | 165 | 115 | 90 | 293 | 115 | 84 | 55 | *69 | 60 |
| 11 | 212 | 243 | 265 | 160 | 343 | 88 | 259 | 117 | 74 | 174 | 58 | 68 |
| 12 | 170 | 236 | 276 | 155 | 712 | 86 | 310 | 129 | 69 | 143 | 50 | 64 |
| 13 | 164 | 233 | 856 | 160 | 706 | 86 | 439 | 179 | 68 | 86 | 45 | 98 |
| 14 | 152 | 230 | 796 | 150 | 585 | 82 | 610 | 314 | 66 | 73 | 44 | 115 |
| 15 | 132 | 343 | 435 | 160 | 410 | 78 | 1,210 | 276 | *107 | 64 | 44 | 93 |
| 16 | 111 | 343 | 340 | 165 | 328 | 76 | 1,390 | 233 | 203 | 54 | 48 | 70 |
| 17 | 100 | 269 | *286 | 160 | 262 | 74 | 1,080 | 194 | 180 | 48 | 46 | 56 |
| 18 | 111 | 276 | 230 | 155 | 218 | 73 | 1,380 | 178 | 183 | 46 | 42 | 48 |
| 19 | 138 | 243 | 203 | 155 | 189 | 73 | 1,070 | 170 | 164 | 48 | 39 | 44 |
| 20 | 134 | *200 | 147 | 150 | 172 | 73 | 571 | 140 | 127 | *80 | 38 | 43 |
| 21 | 123 | 189 | 120 | 145 | 162 | *72 | 414 | 123 | 109 | 68 | 38 | 40 |
| 22 | 109 | 170 | 125 | 138 | *155 | 72 | 710 | 109 | 90 | 56 | 40 | 38 |
| 23 | 113 | 157 | 116 | 129 | 145 | 72 | 799 | 102 | 78 | 61 | 41 | 37 |
| 24 | 199 | 180 | 125 | 125 | 130 | 70 | 576 | 115 | 78 | 74 | 39 | 36 |
| 25 | 571 | 307 | 135 | 118 | 124 | 68 | 865 | 200 | 102 | 65 | 37 | 34 |
| 26 | 552 | 366 | 130 | 104 | 123 | 68 | 968 | 303 | 136 | 53 | 34 | *36 |
| 27 | 340 | 296 | 125 | 103 | 115 | 68 | 571 | 249 | 113 | 48 | 34 | 35 |
| 28 | 256 | 497 | 160 | 98 | 112 | 74 | 414 | 175 | 86 | 48 | 32 | 34 |
| 29 | 200 | 805 | 200 | *93 | 112 | 92 | 332 | 132 | 78 | 47 | 31 | 34 |
| 30 | 164 | 444 | 200 | 92 | ----- | 161 | 269 | 113 | 95 | 47 | 30 | 34 |
| 31 | 160 | ----- | 178 | 90 | ----- | 476 | ----- | 111 | ----- | 43 | 29 | ----- |
| Total | 8,290 | 10,975 | 8,622 | 4,932 | 6,093 | 3,122 | 22,923 | 5,500 | 4,210 | 2,183 | 1,535 | 1,591 |
| Mean | 267 | 366 | 278 | 159 | 210 | 101 | 764 | 171 | 140 | 70.4 | 43.1 | 46.4 |
| Cfs/m | 2.91 | 3.99 | 3.03 | 1.73 | 2.29 | 1.10 | 8.33 | 1.86 | 1.53 | 0.768 | 0.470 | 0.506 |
| In. | 3.56 | 4.45 | 3.50 | 2.00 | 2.47 | 1.27 | 9.30 | 2.15 | 1.71 | 0.89 | 0.54 | 0.56 |

Calendar year 1959: Max 1,250 Min 30 Mean 218 Cfs/m 2.38 In. 32.26
Water year 1959-60: Max 1,570 Min 28 Mean 217 Cfs/m 2.37 In. 32.20

Peak discharge (base, 1,200 cfs).--Nov. 7 (8 to 11 a.m.) 1,330 cfs (6.20 ft); Apr. 4 (10:30 p.m.) 1,710 cfs (6.73 ft); Apr. 16 (7:15 a.m.) 1,500 cfs (6.44 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21-27, Jan. 1-3, 6-21, 24-26, Jan. 30 to Feb. 5, Feb. 8, 22-25, Feb. 28 to Mar. 16, Mar. 21-26, 29.

2565. Stillwater Reservoir near Beaver River, N. Y.

Location.--Lat 43°53'50", long 75°03'05", in gatehouse at Stillwater Dam on Beaver River, $\frac{2}{3}$ miles upstream from Moshier Creek and $7\frac{1}{2}$ miles west of Beaver River Post Office, Herkimer County.

Drainage area.--172 sq mi.

Records available.--May 1908 to September 1960. Prior to February 1925, month-end contents only, published in WSP 1307.

Gage.--Float-tape gage read once daily and prior to reservoir gate changes. Datum of gage is at mean sea level, adjustment of 1912.

Extremes.--Maximum elevation observed during year, 1,679.58 ft Apr. 27 (contents, 4,794,000,000 cu ft); minimum observed, 1,662.43 ft Sept. 30 (contents, 1,133,000,000 cu ft).
1925-60: Maximum elevation observed, 1,679.73 ft June 3, 1947 (contents, 4,838,000,000 cu ft); minimum observed since first filling, 1,644.80 ft Mar. 25-27, 1940 (contents, 8,000,000 cu ft).

Remarks.--Records good. Reservoir originally formed about 1885; enlarged at various times and in 1924 enlarged to a usable capacity of 4,623,000,000 cu ft between elevations 1,650.3 and 1,679.3 ft. Elevation of gate sill of lowest outlet, 1,642.3 ft. Capacity below elevation 1,650.3 ft, 90,000,000 cu ft, is included in records presented herein, but is not ordinarily available for release. Prior to 1956, contents published as usable contents above elevation 1,650.3 ft. Reservoir is used to regulate flow of Beaver and Black Rivers for control of floods, for power development, and for general welfare of the public.

Cooperation.--Record of gate opening and reservoir elevations furnished by Board of Hudson River-Black River Regulating District.

Capacity table, water year 1959-60 (elevation, in feet, and contents, in millions of cubic feet)

| | | | |
|---------|-------|---------|-------|
| 1,660.0 | 821 | 1,675.0 | 3,556 |
| 1,665.0 | 1,518 | 1,680.0 | 4,916 |
| 1,670.0 | 2,431 | | |

Elevation, in feet, at 8 a.m., water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 66.31 | 70.42 | 74.68 | 74.51 | 71.37 | 69.41 | 63.26 | 79.00 | 77.80 | 75.55 | 72.91 | 67.25 |
| 2 | 66.56 | 70.67 | 74.69 | 74.40 | 71.22 | 69.27 | 64.09 | 79.01 | 77.89 | 75.54 | 72.73 | 67.01 |
| 3 | 66.87 | 70.91 | 74.66 | 74.38 | 71.06 | 69.14 | 64.80 | 79.02 | 77.93 | 75.53 | 72.56 | 66.78 |
| 4 | 67.00 | 71.09 | 74.63 | 74.37 | 70.89 | 68.99 | 65.72 | 79.00 | 78.08 | 75.69 | 72.39 | 66.55 |
| 5 | 67.09 | 71.26 | 74.58 | 74.36 | 70.72 | 68.84 | 66.95 | 78.99 | 78.20 | 75.73 | 72.20 | 66.33 |
| 6 | 67.17 | 71.62 | 74.54 | 74.32 | 70.55 | 68.68 | 67.78 | 78.98 | 78.32 | 75.63 | 72.08 | 66.11 |
| 7 | 67.34 | 72.33 | 74.55 | 74.26 | 70.41 | 68.47 | 68.32 | 78.95 | 78.14 | 75.53 | 71.93 | 65.88 |
| 8 | 67.69 | 72.81 | 74.67 | 74.19 | 70.28 | 68.25 | 68.75 | 78.92 | 77.93 | 75.38 | 71.79 | 65.52 |
| 9 | 67.98 | 73.08 | 74.75 | 74.11 | 70.15 | 68.03 | 68.98 | 78.88 | 77.84 | 75.38 | 71.71 | 65.19 |
| 10 | 68.17 | 73.29 | 74.78 | 74.02 | 70.03 | 67.84 | 69.11 | 78.82 | 77.74 | 75.42 | 71.61 | 64.95 |
| 11 | 68.33 | 73.46 | 74.79 | 73.94 | 69.90 | 67.60 | 69.20 | 78.79 | 77.60 | 75.47 | 71.49 | 64.74 |
| 12 | 68.43 | 73.62 | 74.80 | 73.85 | 69.96 | 67.40 | 69.28 | 78.65 | 77.49 | 75.32 | 71.33 | 64.52 |
| 13 | 68.53 | 73.73 | 75.06 | 73.76 | 70.28 | 67.20 | 69.42 | 78.65 | 77.36 | 75.16 | 71.16 | 64.34 |
| 14 | 68.60 | 73.79 | 75.31 | 73.67 | 70.61 | 66.98 | 69.63 | 78.70 | 77.25 | 75.03 | 70.99 | 64.17 |
| 15 | 68.59 | 73.92 | 75.41 | 73.57 | 70.75 | 66.72 | 70.23 | 78.70 | 77.19 | 74.84 | 70.82 | 63.98 |
| 16 | 68.58 | 74.12 | 75.50 | 73.48 | 70.75 | 66.47 | 71.35 | 78.68 | 77.10 | 74.76 | 70.67 | 63.71 |
| 17 | 68.56 | 74.09 | 75.55 | 73.38 | 70.72 | 66.22 | 72.25 | 78.67 | 77.02 | 74.77 | 70.50 | 63.58 |
| 18 | 68.62 | 74.08 | 75.58 | 73.27 | 70.67 | 65.98 | 73.47 | 78.64 | 76.94 | 74.81 | 70.19 | 63.54 |
| 19 | 68.74 | 74.04 | 75.53 | 73.16 | 70.61 | 65.73 | 74.75 | 78.59 | 76.85 | 74.63 | 69.94 | 63.54 |
| 20 | 68.75 | 74.00 | 75.48 | 73.06 | 70.54 | 65.47 | 75.38 | 78.55 | 76.74 | 74.45 | 69.74 | 63.52 |
| 21 | 68.73 | 73.97 | 75.38 | 72.94 | 70.46 | 65.22 | 75.87 | 78.49 | 76.62 | 74.26 | 69.53 | 63.46 |
| 22 | 68.72 | 73.94 | 75.32 | 72.79 | 70.35 | 64.97 | 76.55 | 78.42 | 76.47 | 74.10 | 69.34 | 63.37 |
| 23 | 68.70 | 73.89 | 75.22 | 72.63 | 70.23 | 64.70 | 77.27 | 78.35 | 76.34 | 74.05 | 69.14 | 63.26 |
| 24 | 68.71 | 73.82 | 75.12 | 72.48 | 70.11 | 64.45 | 77.80 | 78.29 | 76.21 | 73.98 | 68.95 | 63.15 |
| 25 | 69.02 | 73.77 | 75.01 | 72.34 | 69.98 | 64.20 | 78.45 | 78.25 | 76.17 | 73.98 | 68.74 | 63.03 |
| 26 | 69.42 | 73.75 | 74.91 | 72.19 | 69.88 | 63.96 | 79.22 | 78.20 | 76.03 | 73.92 | 68.54 | 62.92 |
| 27 | 69.69 | 73.76 | 74.80 | 72.06 | 69.79 | 63.71 | 79.58 | 78.15 | 75.93 | 73.80 | 68.33 | 62.79 |
| 28 | 69.87 | 73.90 | 74.77 | 71.92 | 69.68 | 63.59 | 79.42 | 78.12 | 75.82 | 73.63 | 68.12 | 62.63 |
| 29 | 70.02 | 74.35 | 74.75 | 71.79 | 69.55 | 63.09 | 79.19 | 78.03 | 75.70 | 73.48 | 67.90 | 62.54 |
| 30 | 70.14 | 74.53 | 74.69 | 71.66 | ----- | 62.85 | 79.08 | 77.92 | 75.65 | 73.32 | 67.66 | 62.43 |
| 31 | 70.24 | ----- | 74.61 | 71.52 | ----- | 62.68 | ----- | 77.84 | ----- | 73.12 | 67.47 | ----- |
| (+) | 2,505 | 3,465 | 3,444 | 2,728 | 2,322 | 1,224 | 4,635 | 4,291 | 3,701 | 3,075 | 1,916 | 1,122 |
| (+) | +286 | +370 | -7.8 | -267 | -162 | -410 | +1,316 | -128 | -228 | -234 | -433 | -306 |

Calendar year 1959..... + +28.0

Water year 1959-60..... + -19.5

+ Contents, in millions of cubic feet, at 12 p.m., on last day of month, by interpolation.

* Change in contents, equivalent in cubic feet per second.

Note.--Add 1,600 ft to obtain elevations above mean sea level.

2570. Beaver River below Stillwater Dam, near Beaver River, N. Y.

Location.--Lat 43°53'50", long 75°03'05", in gatehouse at Stillwater Dam, 2½ miles upstream from Moshier Creek and 7½ miles west of Beaver River Post Office, Herkimer County.

Drainage area.--172 sq mi.

Records available.--May 1908 to September 1960.

Gage.--Float-tape gage read once daily and prior to reservoir gate changes. Datum of gage is at mean sea level, adjustment of 1912. Prior to June 1, 1924, staff gage at present site and datum. June 1, 1924, to Nov. 14, 1929, staff gage at site 1,000 ft downstream at same datum.

Average discharge.--52 years, 370 cfs (unadjusted).

Extremes.--Maximum daily discharge during year, 1,610 cfs Apr. 28; minimum daily, 12 cfs Apr. 1.
1908-60: Maximum discharge, about 3,700 cfs May 3, 1926; practically no flow at times when gates in dam are closed.

Remarks.--Records fair. Flow completely regulated by Stillwater Reservoir (see preceding page). Discharge determined from ratings for gates and spillway of Stillwater Dam.

Cooperation.--Records furnished by Board of Hudson River-Black River Regulating District.

Revisions.--WSP 714: Drainage area.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|
| 1 | 193 | 15 | 471 | 615 | 600 | 608 | 12 | 856 | 465 | 450 | 540 | 600 |
| 2 | 14 | 15 | 618 | 614 | 617 | 634 | 13 | 857 | 565 | 16 | 540 | 580 |
| 3 | 14 | 15 | 618 | 614 | 614 | 643 | 14 | 857 | 272 | 16 | 540 | 580 |
| 4 | 14 | 15 | 618 | 614 | 612 | 720 | 14 | 802 | 26 | 390 | 540 | 580 |
| 5 | 74 | 15 | 616 | 614 | 598 | 756 | 14 | 537 | 395 | 580 | 540 | 580 |
| 6 | 205 | 15 | 616 | 614 | 568 | 701 | 14 | 536 | 702 | 580 | 540 | 580 |
| 7 | 94 | 15 | 616 | 614 | 566 | 674 | 14 | 536 | 801 | 580 | 540 | 740 |
| 8 | 14 | 15 | 618 | 612 | 585 | 699 | 237 | 535 | 602 | 380 | 540 | 560 |
| 9 | 14 | 15 | 620 | 612 | 604 | 680 | 500 | 532 | 601 | 16 | 540 | 560 |
| 10 | 14 | 15 | 624 | 610 | 604 | 664 | 556 | 689 | 632 | 400 | 540 | 560 |
| 11 | 14 | 15 | 624 | 610 | 576 | 662 | 554 | 834 | 642 | 580 | 540 | 560 |
| 12 | 14 | 154 | 544 | 608 | 266 | 677 | 556 | 751 | 610 | 580 | 540 | 560 |
| 13 | 188 | 306 | 478 | 608 | 381 | 686 | 556 | 527 | 595 | 580 | 540 | 560 |
| 14 | 303 | 308 | 486 | 606 | 564 | 684 | 196 | 604 | 594 | 580 | 540 | 560 |
| 15 | 303 | 513 | 486 | 604 | 566 | 709 | 15 | 642 | 590 | 480 | 560 | 900 |
| 16 | 273 | 614 | 486 | 604 | 566 | 722 | 15 | 642 | 586 | 16 | 580 | 13 |
| 17 | 14 | 612 | 579 | 602 | 566 | 720 | 15 | 584 | 581 | 420 | 880 | 13 |
| 18 | 207 | 612 | 626 | 602 | 585 | 714 | 15 | 555 | 485 | 600 | 620 | 180 |
| 19 | 304 | 610 | 626 | 653 | 606 | 710 | 16 | 581 | 550 | 600 | 620 | 270 |
| 20 | 304 | 608 | 624 | 679 | 604 | 706 | 16 | 594 | 637 | 600 | 620 | 270 |
| 21 | 304 | 608 | 622 | 678 | 604 | 704 | 16 | 593 | 636 | *600 | 620 | 270 |
| 22 | 304 | 608 | 622 | 648 | 602 | 654 | 16 | 591 | 620 | 600 | 620 | 270 |
| 23 | 111 | 608 | 622 | 590 | 602 | 632 | 16 | 589 | 619 | 430 | 620 | 270 |
| 24 | 14 | 608 | 622 | 588 | 602 | 628 | 21 | 649 | 589 | 360 | 580 | 270 |
| 25 | 14 | 608 | 620 | 588 | 602 | 661 | 194 | 647 | 574 | 560 | 580 | 270 |
| 26 | 14 | 608 | 618 | 586 | 600 | 678 | 575 | 502 | 572 | 560 | 600 | 270 |
| 27 | 14 | 433 | 616 | 584 | 600 | 674 | 1,590 | 566 | 570 | 560 | 600 | *270 |
| 28 | 14 | 308 | 616 | 584 | 600 | 688 | 1,610 | 630 | 600 | 560 | 600 | 270 |
| 29 | 14 | 310 | 616 | 582 | 598 | 709 | 1,290 | 658 | 600 | 560 | 600 | 270 |
| 30 | 15 | 312 | 616 | 580 | ----- | 676 | 1,100 | 673 | 600 | 560 | 600 | 100 |
| 31 | 15 | ----- | 616 | 578 | ----- | 334 | ----- | 620 | ----- | 560 | 600 | ----- |
| Total | 3,407 | 9,513 | 18,400 | 18,895 | 16,858 | 20,807 | 9,750 | 19,169 | 16,891 | 14,354 | 17,860 | 12,336 |
| Mean | 110 | 317 | 594 | 610 | 574 | 671 | 325 | 618 | 563 | 463 | 576 | 411 |

Adjusted for change in contents in Stillwater Reservoir

| | Mean | Cfsm | In. |
|---------------------|-----------|--------|-----------|
| Observed | 396 | 2.30 | 2.65 |
| Adjusted | 687 | 3.99 | 4.46 |
| Calendar year 1959: | Max 810 | Min 12 | Mean 432 |
| Water year 1959-60: | Max 1,610 | Min 12 | Mean 486 |
| | | | Mean 460 |
| | | | Mean 467 |
| | | | Cfsm 2.67 |
| | | | Cfsm 2.72 |
| | | | In. 36.29 |
| | | | In. 36.95 |

* Discharge measurement made on this day.

2580. Beaver River at Croghan, N. Y.

Location.--Lat 43°53'50", long 75°24'15", on left bank 1,000 ft upstream from Black Creek and half a mile west of Croghan, Lewis County.

Drainage area.--294 sq mi.

Records available.--September 1930 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 806.20 ft above mean sea level, datum of 1929.

Average discharge.--30 years, 580 cfs.

Extremes.--Maximum discharge during year, 1,900 cfs Apr. 19 (gage height, 4.53 ft); minimum, 24 cfs July 17 (gage height, 0.85 ft); minimum daily, 32 cfs Sept. 18.
1930-60: Maximum discharge, 4,310 cfs May 13, 1943 (gage height, 6.47 ft); minimum, 12 cfs July 24, 1955; minimum daily, 28 cfs July 8, 1956.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow almost completely regulated by Stillwater Reservoir (see p. 338). Between Stillwater Dam and this station flow is further regulated by nine powerplant ponds. Diurnal fluctuation at low and medium flow.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.9 | 28 | 2.5 | 429 |
| 1.2 | 63 | 3.0 | 681 |
| 1.5 | 117 | 4.0 | 1,400 |
| 2.0 | 247 | 5.0 | 2,410 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|----------|--------|-----------|--------|-----------|--------|--------|
| 1 | 385 | 117 | 875 | 938 | 482 | 800 | 1,340 | 1,390 | 1,140 | 692 | 672 | 774 |
| 2 | 551 | 338 | 768 | b840 | 821 | 788 | 1,340 | 1,080 | 1,020 | 227 | 586 | 774 |
| 3 | 289 | 390 | 848 | b560 | 807 | 788 | 1,430 | *938 | 1,240 | 88 | 647 | 335 |
| 4 | 84 | 335 | 903 | a500 | 781 | 800 | 1,440 | 924 | 1,080 | 66 | 641 | 244 |
| 5 | 308 | 335 | 917 | a940 | 781 | 718 | 1,370 | 882 | 653 | 399 | 664 | 305 |
| 6 | 342 | 481 | 517 | a960 | 821 | 742 | 1,510 | 1,040 | 834 | 730 | 381 | 661 |
| 7 | 396 | 622 | 764 | 1,110 | 291 | 800 | 1,450 | 561 | 814 | 736 | 88 | 730 |
| 8 | *361 | 296 | 1,200 | 861 | 493 | 736 | 1,120 | 163 | 807 | 597 | 702 | 718 |
| 9 | 398 | 526 | 1,100 | b1,000 | 742 | 807 | 1,020 | 514 | 807 | 153 | 675 | 681 |
| 10 | 296 | 701 | 1,020 | b900 | 693 | 903 | 987 | 800 | 821 | 75 | 834 | 452 |
| 11 | 88 | 807 | 1,020 | 607 | 1,320 | 821 | 959 | 781 | 807 | 693 | 794 | 162 |
| 12 | 345 | 755 | 1,110 | 868 | 1,310 | 523 | 966 | 736 | 647 | 647 | 748 | 718 |
| 13 | 317 | 367 | 1,400 | 827 | b1,200 | 205 | 931 | 718 | 469 | 641 | 442 | 768 |
| 14 | 372 | 298 | 1,130 | 861 | b1,080 | 501 | 855 | 868 | 641 | 586 | 168 | 794 |
| 15 | 310 | 105 | 1,230 | 931 | b1,000 | 748 | 917 | 827 | *687 | 664 | 785 | 781 |
| 16 | 331 | 244 | 1,150 | 834 | 973 | 814 | 994 | 632 | 774 | 171 | 794 | 386 |
| 17 | 281 | 655 | *1,110 | 482 | 959 | 875 | 1,150 | 755 | 652 | 71 | 788 | 121 |
| 18 | 84 | 762 | 1,050 | 434 | 945 | 924 | 1,290 | 896 | 800 | 635 | 821 | 32 |
| 19 | 255 | 814 | 994 | 882 | 938 | 875 | 1,560 | 959 | 501 | 658 | 794 | 323 |
| 20 | 410 | 896 | 924 | 781 | 781 | 605 | 1,360 | 966 | 736 | 647 | 471 | 349 |
| 21 | 379 | 774 | 528 | 768 | b600 | 420 | 1,120 | 952 | 742 | 597 | 168 | 335 |
| 22 | 306 | 755 | 742 | 855 | *b560 | 774 | 1,150 | 314 | 768 | *456 | *761 | 349 |
| 23 | 313 | 652 | 742 | 834 | b700 | 896 | 1,020 | 465 | 781 | 409 | 774 | 345 |
| 24 | 289 | 768 | 742 | 347 | 681 | 910 | 1,040 | 827 | 834 | 132 | 781 | 147 |
| 25 | 119 | 781 | 736 | 466 | 718 | 910 | 1,190 | 896 | 952 | 647 | 748 | 52 |
| 26 | 374 | 889 | 730 | 748 | 800 | 612 | 1,070 | 755 | 848 | 647 | 755 | 482 |
| 27 | 881 | 834 | 617 | 736 | 917 | 297 | 1,100 | 938 | 794 | 652 | 361 | *335 |
| 28 | 427 | 924 | 485 | 762 | 665 | 527 | 1,540 | 917 | 781 | 630 | 125 | 299 |
| 29 | 342 | 834 | 868 | 807 | 479 | 807 | 1,420 | 412 | 834 | 670 | 734 | 327 |
| 30 | 317 | 903 | 938 | 868 | 205 | 966 | 1,380 | 233 | 924 | 361 | 768 | 335 |
| 31 | 289 | ----- | 868 | 205 | ----- | 1,450 | ----- | 550 | ----- | 85 | 768 | ----- |
| Total | 10,219 | 17,948 | 28,026 | 23,330 | 23,338 | 23,342 | 36,019 | 23,689 | 24,188 | 14,462 | 19,238 | 13,112 |
| Mean | 330 | 598 | 904 | 753 | 805 | 753 | 1,201 | 764 | 806 | 467 | 621 | 437 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 1,500 | | | Min 52 | | Mean 658 | | Cfsm 2.24 | | In. 30.37 | | |
| Water year 1959-60: Max | 1,560 | | | Min 32 | | Mean 702 | | Cfsm 2.39 | | In. 32.49 | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and recorded range in stage.

b Stage-discharge relation affected by ice.

2587. Deer River at Deer River, N. Y.

Location.--Lat 43°55'49", long 75°35'31", on left bank 350 ft upstream from bridge on State Highway 26 at Deer River, Lewis County, and 2 miles upstream from mouth.

Drainage area.--98.1 sq mi.

Records available.--October 1956 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 762.36 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 6,600 cfs Apr. 4 (gage height, 5.74 ft); maximum gage height, 8.06 ft Feb. 11 (ice jam); minimum discharge, 2.4 cfs Sept. 3, 4.
1956-60: Maximum discharge, 7,460 cfs Dec. 21, 1957 (gage height, 6.10 ft); maximum gage height, 9.20 ft Jan. 23, 1957 (ice jam); minimum discharge, that of Sept. 3, 4, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Aug. 7, 19-21, Aug. 26 to Sept. 10, Sept. 26, 28-30)

| Oct. 1 to Dec. 6 | | | | Dec. 7 to Sept. 30 | | | | | |
|------------------|-----|-----|-------|--------------------|-----|-----|-----|-----|-------|
| 1.0 | 58 | 2.3 | 610 | 0.2 | 2.0 | 0.7 | 26 | 2.4 | 710 |
| 1.4 | 145 | 3.0 | 1,400 | .3 | 3.5 | .8 | 38 | 3.0 | 1,400 |
| 1.8 | 295 | | | .4 | 6.7 | 1.0 | 68 | 4.0 | 3,050 |
| | | | | .5 | 12 | 1.4 | 166 | 5.0 | 4,970 |
| | | | | .6 | 18 | 1.8 | 320 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|--------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 164 | 588 | 300 | 155 | 90 | 130 | 1,820 | 227 | 466 | 86 | 11 | 3.5 |
| 2 | 345 | 648 | 280 | 150 | 88 | 125 | 1,810 | *216 | 242 | 63 | 11 | 2.9 |
| 3 | 157 | 356 | 260 | 460 | 86 | 122 | 3,240 | 176 | 1,240 | 60 | 10 | 2.6 |
| 4 | 91 | 242 | 260 | 520 | 84 | 120 | 3,800 | 148 | 509 | 248 | 9.1 | 2.6 |
| 5 | 65 | 325 | 315 | 400 | 88 | 118 | 1,710 | 124 | 216 | 134 | 8.6 | 3.5 |
| 6 | 408 | 1,070 | 554 | 310 | 90 | 114 | 922 | 109 | 163 | 82 | 8.1 | 3.5 |
| 7 | *675 | 816 | 1,920 | 260 | 114 | 110 | 746 | 95 | 121 | 58 | 6.7 | 4.1 |
| 8 | 395 | 366 | 733 | 225 | 220 | 106 | 630 | 82 | 95 | 44 | 50 | 3.8 |
| 9 | 234 | 242 | 561 | 185 | 280 | 102 | 516 | 76 | 76 | 46 | *64 | 3.2 |
| 10 | 162 | 166 | 470 | 170 | 320 | 98 | 382 | 78 | 66 | 42 | 42 | 4.1 |
| 11 | 120 | 160 | 360 | 160 | 1,650 | 94 | 350 | 84 | 58 | 34 | 30 | 10 |
| 12 | 99 | 298 | 467 | 145 | 1,400 | 90 | 857 | 121 | 56 | 29 | 19 | 17 |
| 13 | 104 | 246 | 1,120 | 135 | 1,020 | 88 | 900 | 573 | 53 | 25 | 14 | 21 |
| 14 | 89 | 569 | 646 | 125 | 800 | 88 | 1,270 | 592 | 64 | 23 | 12 | 26 |
| 15 | 72 | 834 | 410 | 130 | 620 | 86 | 1,900 | 311 | *148 | 21 | 12 | 26 |
| 16 | 65 | 378 | 460 | 135 | 520 | 84 | 1,210 | 227 | 284 | 18 | 14 | 20 |
| 17 | 65 | 384 | 504 | 140 | 454 | 84 | 1,730 | 176 | 172 | 17 | 11 | 16 |
| 18 | 124 | 270 | *335 | 130 | *394 | 84 | 1,660 | 351 | 185 | 17 | 9.1 | 15 |
| 19 | 166 | 220 | 238 | 118 | 335 | 86 | 880 | 288 | 137 | *21 | 7.2 | 21 |
| 20 | 120 | 180 | 135 | 112 | 288 | 86 | 567 | 169 | 102 | 33 | 7.2 | 17 |
| 21 | 95 | 190 | 124 | 106 | 254 | *84 | *573 | 152 | 84 | 25 | 7.2 | 14 |
| 22 | 82 | 200 | 120 | 100 | 225 | 82 | 1,540 | 129 | 64 | 24 | 8.1 | 11 |
| 23 | 78 | 234 | 108 | 98 | 205 | 82 | 880 | 119 | 56 | 36 | 10 | 9.6 |
| 24 | 302 | *877 | 104 | 96 | 190 | 80 | 1,450 | 140 | 86 | 35 | 10 | 9.1 |
| 25 | 977 | 870 | 110 | 96 | 175 | 80 | 1,440 | 271 | 382 | 20 | 8.1 | 8.1 |
| 26 | 483 | 454 | 125 | 94 | 155 | 84 | 842 | 220 | 228 | 18 | 6.4 | *6.4 |
| 27 | 305 | 500 | 140 | 92 | 140 | 90 | 546 | 149 | 116 | 13 | 5.7 | *8.1 |
| 28 | 254 | 620 | 220 | 94 | 135 | 130 | 400 | 104 | 76 | 13 | 5.1 | 6.7 |
| 29 | 169 | 500 | 310 | *96 | 135 | 230 | 288 | 80 | 61 | 13 | 4.1 | 6.1 |
| 30 | 135 | 340 | 240 | 94 | 120 | 721 | 234 | 80 | 102 | 11 | 4.5 | 5.7 |
| 31 | 174 | ----- | 190 | 92 | ----- | 2,290 | ----- | 298 | ----- | 10 | 4.1 | ----- |
| Total | 6,794 | 13,161 | 12,139 | 5,223 | 10,555 | 5,970 | 35,095 | 5,965 | 5,708 | 1,319 | 429.3 | 307.6 |
| Mean | 219 | 439 | 392 | 168 | 364 | 193 | 1,170 | 192 | 190 | 42.5 | 13.8 | 10.3 |
| Cfm | 2.23 | 4.48 | 4.00 | 1.71 | 3.71 | 1.97 | 11.9 | 1.96 | 1.94 | 0.433 | 0.141 | 0.105 |
| In. | 2.58 | 4.99 | 4.60 | 1.98 | 4.00 | 2.26 | 13.50 | 2.26 | 2.16 | 0.50 | 0.16 | 0.12 |

Calendar year 1959: Max 3,770 Min 11 Mean 321 Cfm 3.27 In. 44.47
Water year 1959-60: Max 3,800 Min 2.6 Mean 281 Cfm 2.86 In. 38.91

Peak discharge (base, 2,500 cfs).--Dec. 7 (10 a.m.) 3,390 cfs (4.19 ft); Mar. 31 (7 a.m.) 2,680 cfs (3.79 ft); Apr. 4 (12:15 a.m.) 6,600 cfs (5.74 ft); June 3 (8 a.m.) 2,600 cfs (3.74 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18-22, Nov. 27 to Dec. 4, Dec. 10, 11, 15, Dec. 20 to Feb. 12, Feb. 15, 16, Feb. 22 to Mar. 28.

2605. Black River at Watertown, N. Y.

Location.--Lat 43°59'05", long 75°55'30", on downstream side of right abutment of Vanduzee Street Bridge at Watertown, Jefferson County, 3½ miles upstream from Philomel Creek.

Drainage area.--1,876 sq mi.

Records available.--July 1920 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 374.88 ft above mean sea level, datum of 1929. Prior to Sept. 3, 1921, staff gage at same site and datum.

Average discharge.--40 years, 3,922 cfs.

Extremes.--Maximum discharge during year, 26,200 cfs Apr. 5 (gage height, 9.53 ft); minimum, 70 cfs Aug. 14 (gage height, 0.06 ft); minimum daily, 560 cfs Aug. 14. 1920-60: Maximum discharge, 33,900 cfs Apr. 9, 1928 (gage height, 10.6 ft); minimum, 10 cfs Sept. 2, 1934 (gage height, -0.19 ft); minimum daily, 137 cfs Sept. 4, 1939. Maximum discharge known, about 39,700 cfs in April 1869 (from New York State Museum Bulletin 85).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Appreciable regulation by Stillwater Reservoir, Fulton Chain of Lakes, and other reservoirs. Extensive diurnal fluctuation at low and medium flow caused by mills and powerplants in and above Watertown. During canal season, water is diverted out of basin through Forestport Feeder and Black River Canal (flowing south).

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|--------|
| 0.9 | 510 | 5.0 | 8,250 |
| 1.5 | 1,090 | 7.0 | 15,000 |
| 2.0 | 1,750 | 9.5 | 26,100 |
| 3.0 | 3,510 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|---------|---------|---------|---------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 2,000 | 4,120 | 10,800 | 3,900 | 2,100 | 2,900 | 13,100 | 8,130 | 3,900 | 2,870 | 892 | 1,260 |
| 2 | 4,500 | 4,890 | 10,400 | 3,700 | 2,100 | 2,800 | 14,900 | *6,950 | 4,820 | 2,330 | 1,210 | 1,290 |
| 3 | 5,930 | 5,600 | 9,000 | 3,600 | 2,600 | 2,800 | 22,100 | 5,950 | 6,140 | 1,740 | 1,270 | 1,090 |
| 4 | 5,600 | 5,620 | 7,670 | 3,900 | 2,500 | 2,500 | 25,400 | 5,190 | 6,690 | 1,560 | 1,370 | 991 |
| 5 | 4,740 | 5,350 | 6,840 | 4,900 | 2,500 | 2,600 | *25,800 | 4,450 | 5,040 | 1,450 | 1,560 | 810 |
| 6 | *5,620 | 5,850 | 6,480 | 5,200 | 2,720 | 2,600 | 24,600 | 4,080 | 4,060 | 1,840 | 1,560 | 881 |
| 7 | 4,570 | 7,610 | 7,950 | 5,200 | 3,090 | 2,700 | 20,600 | 3,620 | 3,450 | 1,900 | 566 | 1,130 |
| 8 | 6,140 | 10,300 | 9,640 | 5,000 | 3,000 | 2,600 | 16,200 | 2,740 | 3,070 | 1,700 | 890 | 1,290 |
| 9 | 6,980 | 13,800 | 9,770 | 4,800 | 3,200 | 2,500 | 13,000 | 2,380 | 2,560 | 1,520 | 1,760 | 1,250 |
| 10 | 7,930 | 12,200 | 9,480 | 4,000 | 3,880 | 2,500 | 10,900 | 2,920 | 2,450 | 1,040 | 1,560 | 1,270 |
| 11 | 7,470 | 10,100 | 8,550 | 3,900 | 5,830 | 2,400 | 9,420 | 2,960 | 2,280 | 1,280 | 1,630 | 1,130 |
| 12 | 5,950 | 8,100 | 7,700 | 3,200 | 5,000 | 2,400 | 8,490 | 3,050 | 2,920 | 1,660 | 1,660 | 1,360 |
| 13 | 4,780 | 6,660 | 9,160 | 3,000 | a11,000 | 1,900 | 8,460 | 3,700 | 1,830 | 1,760 | 1,780 | 1,780 |
| 14 | 3,900 | 5,510 | 9,800 | 3,000 | a13,000 | 1,780 | 8,850 | 5,480 | 1,820 | 1,660 | 560 | 2,210 |
| 15 | 3,190 | 5,760 | 10,400 | 2,800 | a10,000 | 2,140 | 10,400 | 5,550 | *1,950 | 1,720 | 956 | 2,690 |
| 16 | 2,600 | 5,720 | 11,300 | 3,000 | a9,000 | 2,100 | 12,800 | 5,220 | 2,690 | 1,750 | 1,530 | 2,260 |
| 17 | 2,300 | 5,950 | 11,000 | 3,000 | 8,020 | 2,200 | 17,200 | 4,780 | 3,600 | 1,370 | 1,450 | 1,400 |
| 18 | 1,960 | 6,140 | *9,770 | 2,900 | *7,250 | 2,300 | 18,400 | 4,400 | 3,450 | 1,150 | 1,410 | 980 |
| 19 | 2,160 | 5,850 | 7,840 | 3,000 | 6,580 | 2,300 | 18,500 | 4,430 | 2,920 | *1,600 | 1,470 | 870 |
| 20 | 2,450 | 5,370 | 6,200 | 3,000 | 5,850 | 2,280 | 18,400 | 3,960 | a2,700 | 1,560 | 1,340 | 1,050 |
| 21 | 2,530 | 4,780 | 4,400 | 3,000 | 5,000 | 2,000 | 15,500 | 3,510 | a2,400 | 1,570 | 980 | 1,060 |
| 22 | 2,280 | 4,400 | 3,300 | 3,000 | 4,500 | 2,010 | 13,500 | 3,130 | a2,500 | 1,450 | *947 | 1,080 |
| 23 | 2,080 | 4,260 | 2,800 | 2,900 | 4,200 | *2,320 | 12,300 | 2,530 | a2,200 | 1,380 | 1,460 | 1,190 |
| 24 | 2,440 | *4,470 | 2,700 | 2,800 | 4,000 | 2,350 | 13,100 | 2,760 | a2,100 | 1,170 | 1,400 | 1,150 |
| 25 | 4,780 | 5,650 | 2,600 | 2,500 | 3,900 | 2,260 | 15,100 | 3,600 | a3,000 | 1,060 | 1,400 | 892 |
| 26 | 6,320 | 6,070 | 2,800 | 2,670 | 3,600 | 2,100 | 15,500 | 4,200 | a3,300 | 1,500 | 1,420 | 840 |
| 27 | 7,140 | 6,350 | 3,170 | 2,920 | 3,660 | 1,700 | 14,400 | 4,470 | a3,300 | 1,560 | 1,260 | 1,230 |
| 28 | 6,640 | 6,760 | 3,210 | *2,920 | 3,400 | 1,800 | 12,800 | 4,430 | 2,720 | 1,420 | 825 | 1,100 |
| 29 | 7,790 | 7,390 | 3,580 | 2,870 | 2,900 | 2,450 | 11,200 | 3,570 | 2,250 | 1,320 | 970 | 1,070 |
| 30 | 5,480 | 9,040 | 4,280 | 2,800 | ----- | 3,980 | 9,640 | 2,690 | 2,260 | 1,420 | 1,020 | 1,050 |
| 31 | 4,430 | ----- | 4,400 | 2,800 | ----- | 9,890 | ----- | 2,620 | ----- | 914 | 1,310 | ----- |
| Total | 140,760 | 199,650 | 216,980 | 106,180 | 148,580 | 81,160 | 450,560 | 127,450 | 93,460 | 48,224 | 39,396 | 37,654 |
| Mean | 4,541 | 6,655 | 6,999 | 3,425 | 5,123 | 2,618 | 15,020 | 4,111 | 3,115 | 1,556 | 1,271 | 1,255 |
| Cfsm | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| In. | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |

Calendar year 1959: Max 23,400 Min 751 Mean 4,714 Cfsm 2.51 In. 34.10
 Water year 1959-60: Max 25,800 Min 560 Mean 4,618 Cfsm 2.46 In. 33.50

Peak discharge (base, 17,000 cfs).--Apr. 5 (2:30 p.m.) 26,200 cfs (9.53 ft); Apr. 20 (2 a.m.) 18,800 cfs (7.94 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of powerplant records at Black River.

Note.--Stage-discharge relation affected by ice Dec. 14, 15, 20-26, Dec. 31 to Jan. 25, Jan. 25, Jan. 30 to Feb. 5, Feb. 8, 9, 21-25, Feb. 28 to Mar. 13, Mar. 16-19, 26-28 (no gage-height record Jan. 11-18).

2610. Oswegatchie River at Cranberry Lake, N. Y.

Location.--Lat 44°13'15", long 74°51'00", on right bank 900 ft downstream from dam at outlet of Cranberry Lake, at village of Cranberry Lake, St. Lawrence County.

Drainage area.--144 sq mi.

Records available.--May 1923 to September 1960. Prior to October 1958, published as East Branch Oswegatchie River at Cranberry Lake.

Gage.--Water-stage recorder. Datum of gage is 1,458.23 ft above mean sea level, datum of 1929. Prior to Oct. 1, 1938, staff gage at site 80 ft upstream at same datum.

Average discharge.--37 years, 290 cfs (unadjusted).

Extremes.--Maximum discharge during year, 942 cfs Apr. 27, 28 (gage height, 6.37 ft); minimum daily, 87 cfs Oct. 31, Nov. 1.
1923-60: Maximum discharge, 1,940 cfs May 13, 1943 (gage height, 7.70 ft); minimum daily, about 3 cfs Apr. 9-16, 1931.

Remarks.--Records good. Since 1867, flow almost completely regulated by Cranberry Lake (total capacity, 2,530,000,000 cu ft).

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 3.9 | 82 | 5.0 | 326 |
| 4.2 | 124 | 6.0 | 730 |
| 4.5 | 184 | 7.0 | 1,370 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 286 | 87 | 422 | 416 | 437 | 456 | 426 | 862 | 484 | 332 | 162 | 152 |
| 2 | 286 | 158 | 422 | 412 | 437 | 453 | 437 | 888 | 484 | 332 | 162 | 150 |
| 3 | 283 | 206 | 422 | 408 | 434 | 449 | 453 | *792 | 608 | 329 | 162 | 150 |
| 4 | 283 | 206 | 422 | 408 | 434 | 445 | 310 | 653 | 750 | 329 | 162 | 150 |
| 5 | 283 | 209 | 419 | 412 | *430 | 441 | 212 | 498 | 745 | 329 | 162 | 150 |
| 6 | 283 | 212 | 419 | 412 | 426 | 437 | 220 | 398 | 740 | 280 | 162 | 150 |
| 7 | 283 | 212 | 419 | 412 | 422 | 445 | 222 | 265 | 740 | 217 | 162 | 150 |
| 8 | *283 | 154 | 422 | 412 | 422 | 456 | 228 | 186 | 735 | 217 | 162 | 150 |
| 9 | 248 | 154 | 422 | 412 | 437 | 453 | 231 | 186 | 517 | 180 | 162 | 150 |
| 10 | 122 | 212 | 422 | 412 | 464 | 445 | *233 | 186 | 280 | 146 | 162 | 150 |
| 11 | 124 | 212 | 422 | 449 | 468 | 445 | 284 | 186 | 180 | 146 | 162 | 148 |
| 12 | 150 | 212 | 422 | 480 | 472 | 437 | 480 | 186 | 180 | 146 | 162 | 148 |
| 13 | 158 | 212 | 426 | 476 | 456 | 434 | 480 | 186 | *160 | 199 | 160 | 148 |
| 14 | 158 | 212 | 426 | 472 | 434 | 426 | 492 | 186 | 137 | 220 | 160 | 148 |
| 15 | 158 | 212 | 426 | 472 | 434 | 422 | 504 | 189 | 135 | 206 | 158 | 148 |
| 16 | 142 | 212 | 426 | 472 | 434 | 419 | 521 | 189 | 135 | 202 | 156 | 148 |
| 17 | 101 | 212 | 426 | 468 | 434 | 412 | 533 | 189 | 137 | 189 | 156 | 148 |
| 18 | 101 | 253 | 426 | 468 | 430 | 408 | 546 | 189 | 137 | 169 | 156 | 148 |
| 19 | 101 | 365 | 426 | 464 | 434 | 405 | 555 | 189 | 138 | 169 | 156 | 148 |
| 20 | 101 | 361 | 426 | 468 | 434 | 402 | 564 | 186 | 138 | 169 | 156 | 148 |
| 21 | 101 | 361 | 426 | 464 | 430 | 398 | 564 | 186 | 138 | 166 | 156 | 148 |
| 22 | 142 | 361 | 426 | 464 | 430 | 391 | 568 | 186 | 138 | 166 | 154 | 148 |
| 23 | 231 | *391 | 426 | 460 | 437 | 388 | 572 | 186 | 138 | 166 | 154 | 146 |
| 24 | 236 | 426 | 426 | 456 | 464 | 384 | 608 | 289 | 138 | 166 | *154 | *280 |
| 25 | 236 | 426 | 422 | 456 | 464 | 381 | 740 | 345 | 220 | 166 | 154 | 336 |
| 26 | 239 | 426 | 419 | 453 | 460 | 378 | 822 | 345 | 329 | *164 | 154 | 332 |
| 27 | 231 | 422 | 416 | 453 | 460 | 374 | 906 | 342 | 251 | 164 | 154 | 332 |
| 28 | 214 | 426 | 416 | 449 | 456 | 384 | 942 | 342 | 175 | 164 | 152 | 332 |
| 29 | 214 | 422 | 416 | 445 | 456 | 408 | 912 | 342 | 214 | 162 | 152 | 329 |
| 30 | 173 | 422 | 416 | 445 | ----- | 408 | 894 | 342 | 332 | 162 | 152 | 329 |
| 31 | 87 | ----- | 416 | 441 | ----- | 416 | ----- | 396 | ----- | 162 | 152 | ----- |
| Total | 6,058 | 8,356 | 13,088 | 13,791 | 12,830 | 13,000 | 15,459 | 10,102 | 9,613 | 6,294 | 4,890 | 5,694 |
| Mean | 195 | 279 | 422 | 445 | 442 | 419 | 515 | 326 | 320 | 203 | 158 | 190 |

Adjusted for change in contents in Cranberry Lake

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|-------|------|------|-------|-------|-------|
| Mean | 234 | 359 | 383 | 237 | 317 | 209 | 1,262 | 337 | 309 | 96.3 | 39.0 | 79.5 |
| Cfs | 1.62 | 2.49 | 2.66 | 1.65 | 2.20 | 1.45 | 8.76 | 2.34 | 2.15 | 0.669 | 0.271 | 0.552 |
| In. | 1.87 | 2.78 | 3.07 | 1.89 | 2.37 | 1.67 | 9.78 | 2.70 | 2.39 | 0.77 | 0.31 | 0.62 |

| | | | | | | | | | | | | |
|---------------------|-----|-------|-----|----|------|----------|------|-----|-----|------|-----|-------|
| Observed | | | | | | Adjusted | | | | | | |
| Calendar year 1959: | Max | 1,120 | Min | 87 | Mean | 284 | Mean | 306 | Cfs | 2.12 | In. | 28.81 |
| Water year 1959-60: | Max | 942 | Min | 87 | Mean | 326 | Mean | 320 | Cfs | 2.22 | In. | 30.22 |

* Discharge measurement made on this day.

Note.--Elevation of surface of Cranberry Lake, 1,483.95 ft at 12 p.m. Sept. 30, 1959; 1,483.25 ft at 12 p.m. Sept. 30, 1960; 1,481.95 ft at 12 p.m. Dec. 31, 1958; 1,484.75 ft at 12 p.m. Dec. 31, 1959 (furnished by Oswegatchie River-Cranberry Reservoir Commission).

2620. Oswegatchie River near Oswegatchie, N. Y.

Location.--Lat 44°13'25", long 75°04'35", on left bank 300 ft downstream from Flat Rock hydroelectric plant of Niagara Mohawk Power Corp. and 2½ miles north of Oswegatchie, St. Lawrence County.

Drainage area.--263 sq mi.

Records available.--October 1924 to September 1960. Prior to October 1958, published as East Branch Oswegatchie River near Oswegatchie.

Gage.--Water-stage recorder. Datum of gage is 1,016.52 ft above mean sea level, datum of 1929.

Average discharge.--36 years, 524 cfs.

Extremes.--Maximum discharge during year, 2,580 cfs June 1 (gage height, 5.84 ft); minimum, 2.6 cfs Oct. 3 (gage height, 0.69 ft); minimum daily, 3.8 cfs Oct. 4.

1924-60: Maximum discharge, 4,090 cfs Apr. 12, 1947; maximum gage height, 7.1 ft Apr. 6, 1928; minimum discharge, probably less than 1 cfs during complete shutdown of powerplant; minimum daily, 1 cfs July 25, 1926.

Remarks.--Records good except those for period of no gage-height record, which are fair. Extensive diurnal fluctuation at low and medium flow caused by powerplant; since 1867, seasonal flow regulated by Cranberry Lake (total capacity, 2,530,000,000 cu ft).

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.7 | 2.7 | 2.5 | 231 |
| .8 | 5.4 | 3.0 | 391 |
| 1.0 | 13 | 4.0 | 905 |
| 1.2 | 24 | 5.0 | 1,680 |
| 1.5 | 49 | 6.0 | 2,770 |
| 2.0 | 120 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|----------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|---------|
| 1 | 478 | 250 | 808 | 398 | 557 | 845 | 1,460 | 1,270 | 1,470 | 548 | 320 | 314 |
| 2 | 491 | 510 | 706 | 507 | 616 | 870 | 1,450 | 1,230 | 1,690 | 486 | 310 | 181 |
| 3 | 223 | 619 | 812 | 556 | 616 | 523 | 1,370 | *1,010 | 1,470 | 497 | 400 | 7.5 |
| 4 | 3.8 | 656 | 752 | 818 | 672 | 553 | 2,340 | 1,090 | 907 | 396 | 360 | 59 |
| 5 | 421 | 677 | 665 | 902 | 729 | 552 | 2,000 | 1,120 | 783 | 600 | 150 | 178 |
| 6 | 498 | 742 | 243 | 856 | 659 | 381 | 1,710 | 1,070 | 793 | 474 | 10 | 342 |
| 7 | 708 | 493 | 808 | 747 | 294 | 623 | 1,420 | 650 | 1,190 | 613 | 60 | 370 |
| 8 | *776 | 279 | 1,160 | 654 | 549 | 639 | 908 | 262 | 1,020 | 605 | 420 | 287 |
| 9 | 592 | 538 | *979 | 510 | 780 | 607 | 971 | 470 | 932 | 231 | 360 | 118 |
| 10 | 193 | 548 | 773 | 375 | 661 | 630 | *816 | 398 | 755 | 165 | 340 | 144 |
| 11 | 188 | 588 | 884 | 663 | 791 | 647 | 1,170 | 493 | 385 | 226 | 330 | 81 |
| 12 | 302 | 574 | 718 | 742 | 1,000 | 472 | 1,100 | 540 | 255 | 230 | 170 | 351 |
| 13 | 382 | 660 | 1,020 | 784 | 854 | 347 | 1,190 | 661 | *438 | 161 | 10 | 355 |
| 14 | 314 | 274 | 1,080 | 656 | 821 | 677 | 1,330 | 532 | 355 | 376 | 110 | 303 |
| 15 | 413 | 258 | 1,170 | 697 | 1,000 | 698 | 1,900 | 622 | 491 | 172 | 370 | 278 |
| 16 | 236 | 687 | 987 | 593 | 1,160 | 620 | 1,750 | 554 | 583 | 272 | 320 | 191 |
| 17 | 70 | 673 | 434 | 345 | 789 | 552 | 1,680 | 665 | 548 | 153 | 330 | 5.8 |
| 18 | 107 | 778 | 812 | 581 | 770 | 747 | 1,840 | 658 | 586 | 354 | 310 | 124 |
| 19 | 481 | 670 | 715 | 674 | 779 | 472 | 1,700 | 617 | 211 | 293 | 140 | 294 |
| 20 | 472 | 552 | 769 | 791 | 681 | 287 | 1,500 | 526 | 554 | 358 | 50 | 385 |
| 21 | 312 | 192 | 708 | 653 | 314 | 654 | 1,460 | 408 | 272 | 308 | 90 | 359 |
| 22 | 371 | 278 | 752 | 662 | 744 | 654 | 1,040 | 361 | 303 | 287 | 290 | 327 |
| 23 | 429 | 375 | 725 | 649 | 755 | 654 | 1,270 | 570 | 306 | 30 | 310 | 193 |
| 24 | 6.4 | 540 | 735 | 270 | 772 | 664 | 1,180 | 604 | 321 | 90 | 296 | 70 |
| 25 | 355 | 901 | 527 | 636 | 649 | 681 | 1,460 | 741 | 596 | 451 | 266 | 82 |
| 26 | 544 | 692 | 541 | 673 | 504 | 442 | 1,690 | 604 | 555 | *370 | 156 | 346 |
| 27 | 524 | 550 | 544 | 657 | 639 | 324 | 1,590 | 589 | 279 | 390 | 143 | 249 |
| 28 | 450 | 660 | 640 | 656 | 554 | 615 | 1,490 | 394 | 383 | 340 | 79 | 329 |
| 29 | 374 | 671 | 754 | 658 | *558 | 836 | 1,340 | 371 | 550 | 300 | 414 | 364 |
| 30 | 315 | 725 | 704 | 663 | 663 | 1,777 | 1,270 | 366 | 441 | 10 | 349 | 315 |
| 31 | 126 | ----- | 772 | 293 | ----- | 1,170 | ----- | 770 | ----- | 90 | 296 | ----- |
| Total | 11,154.2 | 16,610 | 23,597 | 19,319 | 20,267 | 19,013 | 43,395 | 20,204 | 19,422 | 9,874 | 7,549 | 7,012.3 |
| Mean | 360 | 554 | 761 | 623 | 699 | 613 | 1,446 | 652 | 647 | 319 | 244 | 234 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 2,510 Min 3.3 Mean 540 Cfsm 2.05 In. 27.85
 Water year 1959-60: Max 2,340 Min 3.8 Mean 594 Cfsm 2.26 In. 30.74

* Discharge measurement made on this day.

Note.--No gage-height record July 27 to Aug. 23; discharge estimated on basis of recorded range in stage and powerplant records.

2625. West Branch Oswegatchie River near Harrisville, N. Y.

Location.--Lat 44°11'10", long 75°19'55", on right bank just downstream from highway bridge, half a mile northeast of Geers Corners, 1½ miles downstream from Jenny Creek, and 4 miles downstream from Harrisville, Lewis County.

Drainage area.--258 sq mi.

Records available.--July 1916 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 738.51 ft above mean sea level, datum of 1929. Prior to Nov. 30, 1933, staff gage at same site and datum.

Average discharge.--44 years, 511 cfs.

Extremes.--Maximum discharge during year, 5,640 cfs Apr. 5 (gage height, 8.34 ft); minimum, 32 cfs Sept. 30; minimum gage height, 0.94 ft Sept. 3.
1916-60: Maximum discharge, 6,920 cfs Jan. 9, 1930 (gage height, 9.6 ft); minimum, 25 cfs Sept. 1, 1934 (gage height, 0.86 ft).

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation, principally during low flow, caused by pulpmill at Harrisville.

Revisions (water years).--WSP 759: Drainage area. WSP 784: 1934.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Jan. 4, Sept. 10-25)

Oct. 1-7

Oct. 8 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-----|-----|-------|-----|-------|
| 1.6 | 102 | 0.9 | 34 | 2.5 | 301 | 5.0 | 1,980 |
| 2.0 | 162 | 1.2 | 58 | 3.0 | 494 | 7.0 | 4,050 |
| 2.5 | 282 | 1.6 | 107 | 3.5 | 742 | 8.1 | 5,280 |
| 3.0 | 453 | 2.0 | 174 | 4.0 | 1,080 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|-------|--------|--------|--------|-------|-------|-------|
| 1 | 102 | 415 | b780 | 367 | *257 | 367 | 2,550 | 831 | 1,100 | 415 | 92 | 61 |
| 2 | 192 | 634 | 736 | 371 | 251 | 357 | 3,110 | *712 | 2,140 | 364 | 89 | 62 |
| 3 | 255 | 748 | 856 | 463 | 243 | 340 | 3,580 | 828 | 2,150 | 295 | 74 | 39 |
| 4 | 225 | 695 | 577 | *639 | 236 | 335 | 5,010 | 543 | 1,790 | 268 | 96 | 54 |
| 5 | 187 | 618 | 553 | 724 | 233 | 327 | 5,170 | 476 | 1,500 | 268 | 70 | 71 |
| 6 | 204 | 712 | 634 | 718 | 246 | 317 | 3,870 | 426 | 1,140 | 271 | 68 | 63 |
| 7 | 408 | 991 | 857 | 683 | 311 | 307 | 2,690 | 385 | 799 | 251 | 83 | 61 |
| 8 | *644 | 1,150 | 1,270 | 618 | 350 | 295 | 1,370 | *1,900 | 572 | 230 | 108 | 44 |
| 9 | 666 | 1,050 | 1,460 | 529 | 378 | 283 | 1,460 | 333 | 430 | 211 | 116 | 60 |
| 10 | 592 | 818 | 1,230 | 471 | 378 | 277 | 1,190 | 320 | 340 | 191 | 112 | 57 |
| 11 | 480 | 623 | b1,000 | 426 | 639 | 265 | 991 | 320 | 289 | 176 | 119 | 90 |
| 12 | 392 | 543 | 870 | 381 | 1,140 | 251 | 922 | 343 | 260 | 159 | 112 | 97 |
| 13 | 314 | 511 | b1,100 | 360 | 1,750 | 254 | 1,020 | 442 | *249 | 143 | 101 | 94 |
| 14 | 263 | 488 | b1,700 | 340 | 1,800 | 251 | 1,190 | 618 | 228 | 143 | 92 | 127 |
| 15 | 223 | 602 | b1,850 | 336 | 1,520 | 249 | 1,630 | 666 | 251 | 132 | 80 | 136 |
| 16 | 200 | 695 | 1,450 | 367 | 1,310 | 240 | 2,390 | 639 | 320 | 128 | 74 | 119 |
| 17 | 195 | 661 | *1,200 | 389 | 1,160 | 240 | 2,620 | 597 | 364 | 127 | 80 | 90 |
| 18 | 189 | 618 | 963 | 367 | 970 | 240 | 2,790 | 543 | 463 | *103 | 83 | 84 |
| 19 | 211 | 572 | 780 | 347 | 824 | 243 | 2,970 | 502 | 563 | 101 | 70 | 94 |
| 20 | 230 | *463 | b550 | 333 | 695 | 243 | 2,470 | 442 | 476 | 108 | 70 | 90 |
| 21 | 228 | 484 | b450 | 323 | 597 | 240 | 1,750 | 392 | 396 | 110 | 69 | *86 |
| 22 | 228 | 434 | b400 | 314 | 534 | 238 | 1,500 | 353 | 336 | 116 | 76 | 80 |
| 23 | 223 | 396 | b550 | 301 | 506 | 236 | 1,930 | 314 | 280 | 114 | *70 | 73 |
| 24 | 258 | 446 | b320 | 286 | 484 | 233 | 1,990 | 320 | 265 | 135 | 75 | 61 |
| 25 | 407 | 634 | 311 | 280 | 455 | 230 | 1,960 | 450 | 330 | 153 | 117 | 63 |
| 26 | 644 | 767 | 314 | 271 | 430 | 220 | 2,570 | 639 | 502 | 133 | 113 | 80 |
| 27 | 683 | 780 | 317 | 263 | 403 | 223 | 2,310 | 592 | 534 | 125 | 94 | 62 |
| 28 | 602 | 786 | 330 | 263 | 396 | 240 | 1,710 | 455 | 422 | 110 | 79 | 63 |
| 29 | 520 | 864 | 353 | 285 | *389 | 301 | 1,500 | 340 | 327 | 112 | 77 | 47 |
| 30 | 442 | b850 | 378 | 263 | ----- | 480 | 1,010 | 298 | 357 | 100 | 67 | 48 |
| 31 | 378 | ----- | 385 | 257 | ----- | 1,200 | ----- | 369 | ----- | 103 | 52 | ----- |
| Total | 10,765 | 20,048 | 24,124 | 12,315 | 18,885 | 9,520 | 67,553 | 14,638 | 19,153 | 5,400 | 2,678 | 2,256 |
| Mean | 347 | 668 | 778 | 397 | 651 | 307 | 2,245 | 472 | 638 | 174 | 86.4 | 75.2 |
| Cfsm | 1.34 | 2.59 | 3.02 | 1.54 | 2.52 | 1.19 | 8.70 | 1.83 | 2.47 | 0.674 | 0.335 | 0.291 |
| In. | 1.55 | 2.89 | 3.48 | 1.78 | 2.72 | 1.37 | 9.71 | 2.11 | 2.76 | 0.78 | 0.39 | 0.33 |

Calendar year 1959: Max 3,850 Min 66 Mean 535 Cfsm 2.07 In. 28.16
Water year 1959-60: Max 5,170 Min 39 Mean 566 Cfsm 2.19 In. 29.87

Peak discharge (base, 3,500 cfs).--Apr. 5 (12:15 a.m.) 5,640 cfs (8.34 ft).

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2630. Oswegatchie River near Heuvelton, N. Y.

Location.--Lat 44°36'00", long 75°22'45", on right bank 1½ miles downstream from Beaver Creek and 2½ miles upstream from Heuvelton, St. Lawrence County.

Drainage area.--973 sq mi.

Records available.--June 1916 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 288.85 ft above mean sea level, datum of 1929. Prior to Sept. 16, 1916, staff gage at same site and datum.

Average discharge.--44 years, 1,691 cfs.

Extremes.--Maximum discharge during year, 19,600 cfs Apr. 6 (gage height, 10.36 ft); minimum daily, 135 cfs Sept. 7.
1916-60: Maximum discharge, that of Apr. 6, 1960; minimum recorded, 130 cfs Aug. 17, 1949 (gage height, 0.47 ft).

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Since 1867, seasonal flow slightly regulated by Cranberry Lake (total capacity, 2,530,000,000 cu ft); slight diurnal fluctuation at low and medium flow caused by powerplants. During high stages on Grass River, part of flow of that stream may pass through Upper Lake, Indian Creek and Lower Lake, and enter Oswegatchie River at Rensselaer Falls, 4½ miles above station.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 0.6 | 130 | 3.0 | 2,300 |
| .8 | 215 | 5.0 | 5,620 |
| 1.0 | 321 | 8.0 | 12,300 |
| 1.5 | 680 | 10.3 | 19,400 |
| 2.0 | 1,130 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|-------|
| 1 | 600 | 1,300 | 2,100 | 1,500 | 1,140 | 1,530 | 7,830 | 3,720 | 2,090 | 931 | 271 | 410 |
| 2 | 1,080 | 1,230 | 2,160 | 1,450 | 900 | 1,500 | 10,300 | 3,180 | 4,560 | 1,000 | 188 | 377 |
| 3 | 1,150 | 1,480 | 2,240 | 1,330 | 980 | 1,500 | *12,400 | 2,860 | 6,320 | 1,040 | 299 | 364 |
| 4 | 1,110 | 1,890 | 2,330 | 1,290 | *1,000 | 1,450 | 15,700 | 2,410 | 6,520 | 985 | 390 | 364 |
| 5 | 958 | 1,940 | 2,650 | 1,700 | 1,060 | 1,420 | 18,400 | 2,200 | 5,850 | 958 | 481 | 230 |
| 6 | 850 | 1,950 | 2,950 | 1,950 | 1,120 | 1,350 | 19,200 | 2,100 | 4,550 | 850 | 437 | 158 |
| 7 | 1,480 | 2,200 | *3,420 | 2,000 | 1,250 | 1,330 | 17,400 | 1,950 | 3,520 | 886 | 364 | a135 |
| 8 | 2,900 | 2,570 | 4,490 | *2,000 | 1,350 | 1,190 | 14,100 | 1,720 | 2,850 | 958 | 250 | 230 |
| 9 | 3,240 | 2,470 | 4,820 | 1,900 | 1,180 | 1,310 | 10,600 | 1,370 | *2,880 | 841 | 166 | 371 |
| 10 | 2,940 | 2,150 | 4,800 | 1,750 | 1,310 | 1,330 | 7,840 | 1,020 | 2,000 | 868 | 346 | 473 |
| 11 | 2,310 | 2,130 | 4,180 | 1,500 | 2,080 | 1,300 | 5,890 | 1,090 | 1,680 | 672 | 417 | 364 |
| 12 | 1,660 | 1,900 | 3,520 | 1,300 | 5,150 | 1,270 | 4,960 | 1,080 | 1,360 | *540 | 481 | 188 |
| 13 | 1,360 | 1,830 | 3,400 | 1,300 | 5,600 | 1,260 | 4,380 | 1,280 | 1,030 | 444 | 473 | 166 |
| 14 | 1,170 | 1,790 | 3,800 | 1,250 | 5,470 | 1,200 | 4,240 | 1,840 | 823 | 417 | 377 | 346 |
| 15 | 1,090 | 1,860 | 4,000 | 1,250 | 5,030 | 967 | 4,380 | 2,150 | 922 | 397 | 255 | 451 |
| 16 | 1,020 | 1,740 | 4,400 | 1,200 | 4,370 | 1,160 | 4,690 | 2,100 | 1,010 | 466 | 192 | 532 |
| 17 | 949 | 1,800 | 4,700 | 1,160 | 3,790 | 1,270 | 5,280 | 1,940 | 1,120 | 458 | 299 | 473 |
| 18 | 852 | *2,130 | 4,600 | 1,100 | 3,310 | 1,250 | 5,730 | *1,820 | 1,150 | 340 | 488 | 510 |
| 19 | *525 | 2,030 | 3,800 | 1,060 | 3,000 | *1,200 | 5,830 | 1,750 | 1,330 | 410 | 424 | 225 |
| 20 | 585 | 1,900 | 3,200 | 1,190 | 2,670 | 1,230 | 5,900 | 1,630 | 1,330 | 466 | 417 | 202 |
| 21 | 769 | 1,730 | 2,350 | 1,330 | 2,440 | 1,160 | 5,750 | 1,520 | 1,100 | 525 | 383 | 327 |
| 22 | 958 | 1,530 | 1,900 | 1,400 | 2,130 | 886 | 5,350 | 1,380 | 1,190 | 437 | 225 | *424 |
| 23 | 868 | 1,330 | 1,800 | 1,290 | 1,860 | 1,080 | 4,850 | 1,090 | 940 | 473 | 158 | 444 |
| 24 | 823 | 1,230 | 1,600 | 1,280 | 1,860 | 1,210 | 4,580 | 1,000 | 744 | 481 | *250 | 518 |
| 25 | 1,050 | 1,660 | 1,550 | 1,180 | 1,930 | 1,190 | 5,260 | 1,500 | 850 | 340 | 364 | 424 |
| 26 | 1,220 | 2,100 | 1,500 | 976 | 1,880 | 1,190 | 5,960 | 1,420 | 841 | 240 | 371 | 220 |
| 27 | 1,630 | 2,340 | 1,420 | 1,080 | 1,760 | 1,180 | 6,100 | 1,680 | 1,110 | 532 | 333 | 170 |
| 28 | 2,040 | 2,300 | 1,230 | 1,150 | 1,580 | 1,100 | 5,940 | 1,640 | 1,300 | 532 | 304 | 255 |
| 29 | 1,990 | 2,160 | 1,150 | 1,180 | 1,550 | 978 | 5,370 | 1,350 | 1,090 | 510 | 240 | 327 |
| 30 | 1,660 | 2,120 | 1,310 | 1,180 | ----- | 1,570 | 4,530 | 1,100 | 940 | 555 | 245 | 340 |
| 31 | 1,450 | ----- | 1,450 | 1,160 | ----- | 4,610 | ----- | 1,060 | ----- | 451 | 377 | ----- |
| Total | 42,227 | 56,800 | 88,940 | 42,568 | 68,750 | 42,169 | 238,520 | 53,740 | 62,500 | 19,003 | 10,265 | 9,818 |
| Mean | 1,362 | 1,693 | 2,869 | 1,367 | 2,371 | 1,360 | 7,951 | 1,734 | 2,083 | 613 | 331 | 327 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 13,300 | Min | 220 | Mean | 1,947 | Cfsm | 2.00 | In. | 27.16 | | | |
| Water year 1959-60: Max | 19,200 | Min | 135 | Mean | 2,008 | Cfsm | 2.06 | In. | 28.10 | | | |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of adjacent record and weather records.

Note.--Stage-discharge relation affected by ice Dec. 13-26, Jan. 1, 2, 5-19, Jan. 31 to Feb. 9, Feb. 13, Mar. 3, 4.

2640. St. Lawrence River at Ogdensburg, N. Y.

Location.--Lat 44°42'05", long 75°29'40", at Ogdensburg.Drainage area.--295,200 sq mi, including that of Oswegatchie River.Records available.--June 1860 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Discharge determined from ratings of several outflow structures of Lake St. Lawrence. Prior to August 1956, basic gage at lock 25 at Iroquois, Ont., and supplementary gages located at Prescott, Ont., at lock 27 above Cardinal, Ont., at lock 24 between Iroquois and Morrisburg, Ont., and at lock 23 at Morrisburg, Ont. August 1956 to June 1958, basic gage at lock 24 and auxiliary gages located at lock 24 and below Morrisburg. These were gages of the Canadian Hydrographic Service except the supplementary gages in use after August 1956, which are gages of the Hydro-Electric Power Commission of Ontario. The discharge in this reach of river is considered to be same as discharge at Ogdensburg, N. Y., which is directly opposite Prescott, Ont.

Average discharge.--100 years (1860-1960), 240,000 cfs.

Extremes.--Maximum daily discharge during year, 295,000 cfs June 24, 26, 28; minimum daily, 190,000 cfs Jan. 14, 15.
 1917-60: Maximum daily discharge, 315,000 cfs May 13, 1952; minimum daily, 139,000 cfs Feb. 7, 1936.
 1860-1960: Maximum monthly discharge, 314,000 cfs May 1870; minimum monthly, 154,000 cfs February 1936.

Remarks.--Records do not include water diverted from Lake Michigan by Illinois and Michigan Canal during period of its operation prior to 1910 and by Chicago Sanitary and Ship Canal, operation of which began in 1900. They include water diverted into Lake Superior from Hudson Bay drainage by the Long Lake project, operation of which began in July 1939, and by the Ogoki project, operation of which began in July 1943. The diversions into Lake Superior amounted to less than 1 percent of the average St. Lawrence River discharge before July 1943, and since that time have averaged about 5,000 cfs.

Cooperation.--Records of daily discharge furnished by U.S. Lake Survey, Corps of Engineers.Revisions (water years).--WSP 1437: 1870, 1875, 1881, 1883-84, 1890.Note.--Discharges after June 1958 are considered provisional.

Discharge, in thousands of cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 202 | 205 | 203 | 208 | 217 | 215 | 220 | 255 | 267 | 271 | 273 | 246 |
| 2 | 202 | 205 | 203 | 208 | 217 | 215 | 220 | 256 | 268 | 271 | 273 | 248 |
| 3 | 202 | 205 | 204 | 208 | 208 | 225 | 220 | 256 | 267 | 271 | 273 | 247 |
| 4 | 202 | 205 | 203 | 209 | 208 | 225 | 226 | 256 | 267 | 272 | 269 | 247 |
| 5 | 202 | 205 | 206 | 208 | 208 | 225 | 226 | 259 | 267 | 273 | 268 | 246 |
| 6 | 202 | 205 | 205 | 208 | 208 | 225 | 226 | 259 | 267 | 271 | 269 | 245 |
| 7 | 202 | 205 | 205 | 212 | 208 | 225 | 230 | 259 | 267 | 270 | 269 | 247 |
| 8 | 202 | 205 | 205 | 212 | 208 | 225 | 236 | 259 | 268 | 270 | 269 | 232 |
| 9 | 202 | 205 | 205 | 212 | 208 | 225 | 236 | 258 | 268 | 270 | 269 | 235 |
| 10 | 202 | 206 | 205 | 209 | 208 | 225 | 236 | 259 | 269 | 270 | 268 | 234 |
| 11 | 202 | 205 | 205 | 193 | 208 | 225 | 236 | 259 | 268 | 270 | 260 | 232 |
| 12 | 202 | 205 | 205 | 195 | 208 | 225 | 240 | 262 | 268 | 270 | 261 | 235 |
| 13 | 202 | 205 | 205 | 192 | 208 | 225 | 240 | 265 | 268 | 270 | 261 | 233 |
| 14 | 202 | 205 | 205 | 190 | 207 | 225 | 242 | 263 | 268 | 275 | 260 | 235 |
| 15 | 202 | 205 | 205 | 190 | 209 | 225 | 243 | 261 | 272 | 274 | 261 | 230 |
| 16 | 202 | 205 | 204 | 195 | 208 | 225 | 242 | 264 | 288 | 274 | 261 | 230 |
| 17 | 202 | 205 | 210 | 198 | 208 | 225 | 242 | 264 | 288 | 274 | 261 | 229 |
| 18 | 202 | 205 | 210 | 198 | 210 | 225 | 243 | 263 | 288 | 275 | 255 | 227 |
| 19 | 202 | 204 | 210 | 202 | 213 | 220 | 242 | 264 | 288 | 275 | 254 | 230 |
| 20 | 202 | 203 | 210 | 207 | 211 | 219 | 243 | 264 | 288 | 275 | 254 | 229 |
| 21 | 202 | 203 | 210 | 210 | 211 | 221 | 252 | 263 | 288 | 280 | 255 | 229 |
| 22 | 202 | 203 | 210 | 212 | 213 | 220 | 252 | 265 | 288 | 279 | 255 | 226 |
| 23 | 205 | 203 | 210 | 215 | 212 | 220 | 253 | 263 | 294 | 280 | 255 | 227 |
| 24 | 205 | 203 | 210 | 215 | 212 | 220 | 252 | 265 | 295 | 280 | 255 | 226 |
| 25 | 205 | 203 | 213 | 215 | 215 | 220 | 251 | 262 | 294 | 279 | 253 | 226 |
| 26 | 205 | 203 | 213 | 215 | 215 | 216 | 251 | 267 | 295 | 280 | 254 | 227 |
| 27 | 205 | 203 | 213 | 215 | 215 | 215 | 252 | 267 | 294 | 279 | 253 | 226 |
| 28 | 205 | 203 | 213 | 217 | 215 | 217 | 256 | 266 | 295 | 273 | 253 | 226 |
| 29 | 205 | 203 | 213 | 217 | 215 | 216 | 257 | 266 | 293 | 275 | 254 | 225 |
| 30 | 205 | 203 | 213 | 217 | 217 | 216 | 256 | 264 | 287 | 273 | 254 | 225 |
| 31 | 205 | ----- | 213 | 217 | ----- | 216 | ----- | 266 | ----- | 272 | 253 | ----- |
| Total | 6,289 | 6,128 | 6,444 | 6,419 | 6,111 | 6,866 | 7,221 | 8,119 | 8,362 | 8,489 | 8,082 | 6,998 |
| Mean | 203 | 204 | 208 | 207 | 211 | 221 | 241 | 262 | 279 | 274 | 261 | 233 |
| Cfsm | 0.688 | 0.691 | 0.705 | 0.701 | 0.715 | 0.749 | 0.816 | 0.888 | 0.945 | 0.928 | 0.884 | 0.789 |
| In. | 0.79 | 0.77 | 0.81 | 0.81 | 0.77 | 0.86 | 0.91 | 1.02 | 1.05 | 1.07 | 1.02 | 0.88 |
| Calendar year 1959: Max 251 Min 154 Mean 214 Cfsm 0.725 In. 9.85 | | | | | | | | | | | | |
| Water year 1959-60: Max 295 Min 190 Mean 234 Cfsm 0.793 In. 10.76 | | | | | | | | | | | | |

Note.--All figures of discharge are expressed in thousands of cubic feet per second.

2642. Little Sucker Brook at Waddington, N. Y.

Location.--Lat 44°50'28", long 75°11'28", on left bank on downstream side of bridge on State Highway 345, 0.6 mile south of Waddington, St. Lawrence County, and 3.9 miles upstream from mouth.

Drainage area.--19.9 sq mi.

Records available.--October 1958 to November 1960 (no winter records), discontinued.

Gage.--Staff gage read twice daily, and crest-stage gage. Datum of gage is 252.37 ft above mean sea level, datum of 1929.

Extremes.--1959-60: Maximum discharge observed during water year, 553 cfs Apr. 13 (gage height, 3.14 ft); maximum gage height observed, 3.84 ft Apr. 1 (ice Jan); no flow July 12 to Sept. 30.

1960: Maximum discharge observed during period October to November, 0.2 cfs many times; no flow many times.

1958-60: Maximum discharge observed, that of Apr. 13, 1960; maximum gage height, that of Apr. 1, 1960; no flow at times in every year.

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

Rating table, Oct. 1, 1959, to Nov. 30, 1960, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-8, 11-31, Nov. 5-16, 1959)

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 0.2 | 0.0 | 0.6 | 2.7 | 1.7 | 58 |
| .3 | .3 | .8 | 6.4 | 2.3 | 139 |
| .4 | .7 | 1.0 | 12 | 2.6 | 234 |
| .5 | 1.5 | 1.3 | 27 | 3.1 | 538 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|--------|------|-------|
| 1 | 1.0 | 68 | | | | | b100 | 11 | 100 | 0.4 | | |
| 2 | 2.6 | 68 | | | | | b200 | 10 | 174 | .3 | | |
| 3 | 3.7 | 56 | | | | | b350 | 8.0 | 54 | .2 | | |
| 4 | 3.7 | a43 | | | | | *502 | 6.4 | 27 | .2 | | |
| 5 | 2.7 | 33 | | | | | *283 | 5.1 | 16 | .1 | | |
| 6 | *6.4 | 29 | | | | | 193 | *4.1 | *10 | .1 | | |
| 7 | a14 | 21 | | | | | 150 | 3.3 | 8.0 | .1 | | |
| 8 | 26 | 15 | | | | | 234 | 2.6 | 4.7 | .1 | | |
| 9 | 34 | 13 | | | | | 193 | 2.2 | 3.3 | .1 | | |
| 10 | 27 | 9.8 | | | | | a140 | 3.0 | 2.3 | .1 | | |
| 11 | a18 | *8.3 | | | | | *193 | 3.7 | 2.0 | .1 | | |
| 12 | 12 | 8.0 | | | | | 298 | 8.0 | 1.5 | 0 | | |
| 13 | 8.0 | 8.3 | | | | | 236 | 43 | 1.3 | 0 | | |
| 14 | 6.0 | 8.3 | | | | | 139 | 74 | 1.0 | 0 | | |
| 15 | 4.7 | 8.6 | | | | | 143 | 39 | 1.1 | 0 | | |
| 16 | 3.7 | 10 | | | | | 112 | 30 | 1.0 | 0 | | |
| 17 | 2.7 | a13 | | | | | 105 | 22 | 1.0 | 0 | | |
| 18 | 2.1 | 16 | | | | | 143 | 16 | 1.0 | 0 | | |
| 19 | 2.1 | 21 | | | | | 77 | 11 | 1.0 | 0 | | |
| 20 | 2.0 | 21 | | | | | 39 | 7.5 | .8 | 0 | | |
| 21 | 1.1 | 21 | | | | | 32 | 5.6 | .7 | 0 | | |
| 22 | .1 | 16 | | | | | 125 | 4.1 | .4 | 0 | | |
| 23 | .2 | 11 | | | | | 62 | 4.0 | .4 | 0 | | |
| 24 | .4 | 11 | | | | | 65 | 6.9 | .5 | 0 | | |
| 25 | 6.0 | 11 | | | | | 157 | 16 | .7 | 0 | | |
| 26 | 21 | 11 | | | | | 74 | 12 | 1.5 | 0 | | |
| 27 | 20 | 12 | | | | | 39 | 9.4 | 1.3 | *0 | | |
| 28 | 17 | 12 | | | | | 28 | 6.7 | .8 | 0 | | |
| 29 | 15 | 12 | | | | | 20 | 4.1 | .6 | 0 | | |
| 30 | 11 | 12 | | | | | 15 | 3.3 | .4 | 0 | | |
| 31 | 10 | ----- | | | | | ----- | 7.5 | ----- | 0 | | |
| Total | 284.2 | 607.3 | - | - | - | - | 4,447 | 389.5 | 418.4 | 1.8 | 0 | 0 |
| Mean | 9.17 | 20.2 | - | - | - | - | 148 | 12.6 | 13.9 | 0.06 | 0 | 0 |
| Cfsm | 0.461 | 1.02 | - | - | - | - | 7.44 | 0.635 | 0.698 | 0.0030 | 0 | 0 |
| In. | 0.53 | 1.13 | - | - | - | - | 8.31 | 0.73 | 0.78 | 0.003 | 0 | 0 |

Calendar year : Max Min Mean Cfsm In.
Water year : Max Min Mean Cfsm In.

* Discharge measurement or observation of no flow made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

b Stage-discharge relation affected by ice.

Discharge, in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|---------------------------------------|------|------|-----|------|------|-----|------|------|-----|------|------|-----|--------|--------|
| 1 | 0 | a0.1 | 7 | 0 | a0.1 | 13 | 0 | 0 | 19 | 0 | 0.2 | 25 | 0.1 | 0.2 |
| 2 | 0 | a.1 | 8 | 0 | a.1 | 14 | 0 | 0 | 20 | .1 | .2 | 26 | a.1 | .2 |
| 3 | 0 | a.1 | 9 | 0 | a.1 | 15 | 0 | .1 | 21 | 0 | .2 | 27 | a.1 | .2 |
| 4 | 0 | *.1 | 10 | 0 | .1 | 16 | 0 | .1 | 22 | 0 | .2 | 28 | a.1 | .2 |
| 5 | *0 | a.1 | 11 | 0 | 0 | 17 | 0 | .1 | 23 | 0 | .2 | 29 | a.1 | .2 |
| 6 | .1 | a.1 | 12 | 0 | 0 | 18 | 0 | .2 | 24 | .1 | .2 | 30 | a.1 | .2 |
| | | | | | | | | | | | | 31 | a.1 | - |
| Total | | | | | | | | | | | | | 1.0 | 3.9 |
| Mean | | | | | | | | | | | | | 0.03 | 0.13 |
| Cubic feet per second per square mile | | | | | | | | | | | | | 0.0015 | 0.0065 |
| Runoff in inches | | | | | | | | | | | | | 0.002 | 0.007 |

* Discharge measurement or observation of no flow made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

2643. Brandy Brook near Waddington, N. Y.

Location.--Lat 44°49'42", long 75°04'32", on right bank 50 ft downstream from highway bridge, 3.2 miles southeast of Waddington, St. Lawrence County, and 4.4 miles upstream from mouth.

Drainage area.--27.0 sq mi.

Records available.--October 1958 to September 1960 (no winter records)

Gage.--Water-stage recorder. Datum of gage is 255.78 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge recorded during year, 736 cfs Apr. 4 (gage height, 7.44 ft); maximum gage height recorded, 7.73 ft Apr. 3 (ice jam); no flow many times.
1958-60: Maximum discharge recorded, that of Apr. 4, 1960; maximum gage height recorded, that of Apr. 3, 1960; no flow many times in 1960.

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

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 3

Apr. 4 to Sept. 30

| | | | | | |
|-----|-----|------|-----|-----|-----|
| 4.1 | 5.7 | 3.55 | 0 | 4.6 | 29 |
| 4.3 | 12 | 3.7 | .3 | 4.9 | 57 |
| 4.6 | 28 | 3.8 | .7 | 5.5 | 145 |
| 4.9 | 52 | 3.9 | 1.7 | 6.0 | 260 |
| | | 4.0 | 3.4 | 7.0 | 565 |
| | | 4.1 | 5.7 | 7.5 | 760 |
| | | 4.3 | 12 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------|-------|------|------|------|------|------|-------|-------|-------|-------|--------|-------|
| 1 | 8.2 | 27 | | | | | b120 | 59 | 72 | 4.1 | 0.3 | |
| 2 | 9.9 | 27 | | | | | b180 | 49 | 77 | 3.4 | .3 | |
| 3 | 8.2 | 26 | | | | | b450 | 41 | 56 | 3.2 | .3 | |
| 4 | 7.9 | 26 | | | | | 690 | 34 | 43 | 3.0 | .2 | |
| 5 | 7.9 | 28 | | | | | *550 | 28 | 42 | 2.8 | .2 | |
| 6 | 11 | 33 | | | | | b400 | 24 | *41 | 2.4 | .2 | |
| 7 | 19 | 35 | | | | | *b320 | 20 | 36 | 2.4 | .2 | (*) |
| 8 | 29 | a34 | | | | | b370 | 17 | 32 | 2.4 | .2 | |
| 9 | a36 | a35 | | | | | 418 | 16 | 28 | 2.3 | .2 | |
| 10 | a35 | a31 | | | | | 400 | 15 | 24 | 2.0 | .1 | |
| 11 | a35 | *a29 | | | | | *409 | 14 | 21 | 2.0 | .1 | |
| 12 | a34 | 27 | | | | | 424 | 16 | 18 | 1.6 | .1 | |
| 13 | *34 | 27 | | | | | 370 | 30 | 16 | 1.4 | .1 | |
| 14 | 34 | 31 | | | | | *358 | 48 | 14 | 1.3 | 0 | |
| 15 | 33 | 36 | | | | | 340 | 38 | 13 | 1.1 | .1 | |
| 16 | 30 | 32 | | | | | 285 | 37 | 12 | .9 | .1 | |
| 17 | 27 | 32 | | | | | 265 | 34 | 12 | .8 | .1 | |
| 18 | 25 | b30 | | | | | 285 | 31 | 11 | .8 | 0 | |
| 19 | 22 | b26 | | | | | 212 | 28 | 10 | 1.0 | 0 | |
| 20 | 20 | b22 | | | | | 167 | 26 | 8.8 | 1.0 | 0 | |
| 21 | 18 | 21 | | | | | 153 | 22 | 8.2 | .9 | .1 | |
| 22 | 16 | 20 | | | | | 198 | 21 | 7.6 | .8 | .1 | |
| 23 | 16 | 19 | | | | | 127 | 19 | 7.2 | .8 | .1 | |
| 24 | 17 | 26 | | | | | 134 | 20 | 7.9 | .7 | 0 | |
| 25 | 22 | 33 | | | | | 210 | 22 | 8.5 | .6 | 0 | |
| 26 | 24 | b29 | | | | | 136 | 21 | 7.2 | .5 | *0 | |
| 27 | 24 | b24 | | | | | 111 | 18 | 6.6 | *.5 | 0 | |
| 28 | 25 | b18 | | | | | 96 | 16 | 5.5 | .5 | 0 | |
| 29 | 22 | b21 | | | | | 82 | 14 | 4.8 | .4 | 0 | |
| 30 | 20 | b22 | | | | | *69 | 12 | 4.5 | .4 | 0 | |
| 31 | 22 | | | | | | | 15 | | .4 | 0 | |
| Total | 692.1 | 825 | - | - | - | - | 8,299 | 805 | 654.8 | 46.4 | 3.1 | 0 |
| Mean | 22.3 | 27.5 | - | - | - | - | 277 | 26.0 | 21.8 | 1.50 | 0.10 | 0 |
| Cfsm | 0.928 | 1.02 | - | - | - | - | 10.3 | 0.963 | 0.807 | 0.056 | 0.0037 | 0 |
| In. | 0.95 | 1.14 | - | - | - | - | 11.43 | 1.11 | 0.90 | 0.06 | 0.004 | 0 |
| Calendar year | : Max | Min | | | | | Mean | Cfsm | | In. | | |
| Water year | : Max | Min | | | | | Mean | Cfsm | | In. | | |

* Discharge measurement or observation of no flow made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage, weather records, and records for nearby stations.

b Stage-discharge relation affected by ice.

2644. Middle Branch Grass River near Clare, N. Y.

Location.--Lat 44°22'34", long 75°03'42", on right bank on downstream side of highway bridge, 1.1 miles upstream from confluence with South Branch and 1.9 miles south of Clare, St. Lawrence County.

Drainage area.--63.6 sq mi.

Records available.--October 1958 to October 1960 (no winter records), discontinued.

Gage.--Staff gage, read twice daily, and crest-stage gage. Altitude of gage is 810 ft (from topographic map).

Extremes.--1959-60: Maximum discharge observed during water year, about 1,300 cfs Apr. 4 (gage height, 8.90 ft, ice jam); minimum observed, 16 cfs Sept. 29 (gage height, 1.99 ft).

1960: Maximum discharge observed during October, 378 cfs Oct. 26 (gage height, 4.79 ft); minimum observed, 25 cfs Oct. 13-15 (gage height, 2.07 ft).

1958-60: Maximum discharge observed, that of Apr. 4, 1960; maximum gage height observed, 9.11 ft Apr. 3, 1959 (ice jam); minimum discharge observed, that of Sept. 29, 1960.

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

Rating table, Oct. 1, 1959, to Oct. 31, 1960, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 6-15, Apr. 22 to May 12)

| | | | | | |
|------|----|-----|-----|-----|-------|
| 1.99 | 16 | 2.5 | 102 | 6.0 | 755 |
| 2.1 | 29 | 3.0 | 141 | 6.6 | 1,130 |
| 2.2 | 45 | 4.0 | 247 | | |
| 2.3 | 71 | 5.0 | 425 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|--------|-------|-------|-------|-------|-------|
| 1 | 92 | 113 | | | | | b300 | 174 | 398 | 43 | 20 | 20 |
| 2 | 127 | 141 | | | | | b700 | 159 | 546 | 43 | 20 | 19 |
| 3 | 101 | 122 | | | | | b900 | 140 | 410 | 39 | 19 | 19 |
| 4 | 90 | 106 | | | | | b1,100 | 129 | 312 | 43 | 19 | 22 |
| 5 | 71 | 102 | | | | | *1,070 | *118 | 172 | 43 | 19 | 26 |
| 6 | 110 | 155 | | | | | *611 | 115 | 129 | 43 | 18 | 26 |
| 7 | 292 | 195 | | | | | *340 | 109 | 103 | 43 | 18 | 23 |
| 8 | 380 | 141 | | | | | 287 | 108 | *90 | 35 | 23 | 23 |
| 9 | 212 | 106 | | | | | 232 | 108 | 89 | 35 | 28 | 23 |
| 10 | 164 | 95 | | | | | 144 | 129 | 68 | 35 | 25 | 88 |
| 11 | 109 | 90 | | | | | 157 | 126 | 68 | 28 | 23 | 41 |
| 12 | 90 | 101 | | | | | 210 | 132 | 62 | 28 | 22 | 45 |
| 13 | 78 | 101 | | | | | 354 | 149 | 56 | 27 | 22 | 109 |
| 14 | *68 | 102 | | | | | 420 | 218 | 47 | 26 | 22 | 108 |
| 15 | 65 | 143 | | | | | 1,010 | 187 | 65 | 25 | 22 | 49 |
| 16 | 65 | 122 | | | | | 978 | 199 | 89 | 24 | 21 | 30 |
| 17 | 49 | 117 | | | | | 626 | 181 | 89 | 23 | 21 | 30 |
| 18 | 53 | *107 | | | | | 690 | 136 | 125 | 23 | 21 | 30 |
| 19 | 68 | 104 | | | | | 634 | 115 | 86 | 28 | 20 | 30 |
| 20 | 68 | 102 | | | | | 410 | 101 | 89 | 28 | 20 | 28 |
| 21 | 89 | 100 | | | | | 328 | 101 | 68 | 28 | 20 | 28 |
| 22 | 80 | 91 | | | | | 440 | 90 | 62 | 27 | 19 | 28 |
| 23 | 71 | 94 | | | | | 472 | 89 | 45 | 25 | *19 | 24 |
| 24 | 84 | 118 | | | | | 382 | 102 | 59 | 24 | 23 | 22 |
| 25 | 199 | 206 | | | | | 609 | 244 | 53 | 23 | 23 | 20 |
| 26 | 179 | 137 | | | | | 602 | 174 | 96 | *22 | 23 | 19 |
| 27 | 173 | 130 | | | | | 412 | 121 | 68 | 22 | 22 | 18 |
| 28 | 146 | 125 | | | | | 318 | 97 | 43 | 22 | 22 | 17 |
| 29 | 110 | 118 | | | | | 254 | 89 | 39 | 21 | 21 | *16 |
| 30 | 96 | 118 | | | | | 204 | 86 | 59 | 21 | 21 | 18 |
| 31 | 92 | | | | | | | 129 | | 20 | 20 | |
| Total | 3,671 | 3,602 | - | - | - | - | 15,394 | 4,155 | 3,685 | 917 | 656 | 997 |
| Mean | 118 | 120 | - | - | - | - | 513 | 134 | 123 | 29.6 | 21.2 | 33.2 |
| Cfsm | 1.86 | 1.89 | - | - | - | - | 8.07 | 2.11 | 1.93 | 0.465 | 0.333 | 0.522 |
| In. | 2.15 | 2.11 | - | - | - | - | 9.00 | 2.43 | 2.15 | 0.54 | 0.38 | 0.56 |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice (no gage-height record Apr. 1, 3, 4).

Note.--No gage-height record Nov. 19, 20, 29, 30, July 13-18, 22-25, July 27 to Aug. 7, Aug. 16-22, Aug. 27 to Sept. 4, Sept. 22-28, 30; discharge estimated on basis of weather records and records for nearby stations.

Discharge, in cubic feet per second, 1960

| Day | Discharge | Day | Discharge | Day | Discharge | Day | Discharge |
|--|-----------|-------------|-----------|--------------|-----------|--------------|-----------|
| Oct. 1..... | 30 | Oct. 9..... | 26 | Oct. 17..... | 51 | Oct. 25..... | 274 |
| 2..... | 43 | 10..... | 26 | 18..... | 59 | 26..... | 378 |
| 3..... | 39 | 11..... | 26 | 19..... | 43 | 27..... | 360 |
| 4..... | 39 | 12..... | 28 | 20..... | 39 | 28..... | *107 |
| 5..... | 39 | 13..... | 25 | 21..... | 43 | 29..... | 89 |
| 6..... | 45 | 14..... | 25 | 22..... | 47 | 30..... | 68 |
| 7..... | 47 | 15..... | 25 | 23..... | 43 | 31..... | 68 |
| 8..... | 45 | 16..... | 51 | 24..... | 43 | | |
| Total..... | | | | | | | 2,275 |
| Mean..... | | | | | | | 73.4 |
| Cubic feet per second per square mile..... | | | | | | | 1.15 |
| Runoff in inches..... | | | | | | | 1.33 |

* Discharge measurement made on this day.

Note.--Result of discharge measurement, 43.6 cfs Nov. 22, 1960.

2647. North Branch Grass River near Clare, N. Y.

Location.--Lat 44°25'46", long 75°03'07", on right bank 75 ft upstream from highway bridge, 2.0 miles north of Clare, St. Lawrence County, 3.5 miles upstream from mouth, and 5 miles east of Russell.

Drainage area.--46.3 sq mi.

Records available.--August 1958 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 820 ft (from topographic map).

Extremes.--Maximum discharge during year, about 800 cfs Apr. 5 (gage height, 7.25 ft, backwater from ice); minimum, 1.9 cfs Aug. 23, 24.
1958-60: Maximum discharge, that of Apr. 5, 1960; minimum, that of Aug. 23, 24, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 31 | 64 | 86 | 68 | 35 | 44 | 300 | 121 | 186 | 22 | 7.0 | 2.5 |
| 2 | 57 | 77 | 86 | 66 | 35 | 44 | 350 | 103 | 236 | 20 | 6.6 | 2.2 |
| 3 | 70 | 79 | 86 | 72 | 34 | 43 | 450 | 90 | 294 | 18 | 6.4 | 2.2 |
| 4 | 62 | 71 | 86 | 76 | 33 | 43 | 620 | 79 | 240 | 17 | 5.8 | 2.5 |
| 5 | 59 | 63 | 92 | 80 | 33 | 45 | 700 | *70 | 176 | 18 | 5.6 | 3.4 |
| 6 | 68 | 76 | 100 | 78 | 35 | 44 | *627 | 61 | 112 | 20 | 4.8 | 4.6 |
| 7 | 139 | 119 | 140 | 72 | 39 | 43 | *428 | 53 | 79 | 20 | 4.6 | 5.0 |
| 8 | 233 | 122 | 180 | 70 | 43 | 42 | 328 | 47 | *57 | 18 | 4.4 | 4.6 |
| 9 | 228 | 98 | 165 | 66 | 48 | 41 | *264 | 43 | 43 | 17 | 4.2 | 4.2 |
| 10 | 161 | 76 | 140 | 62 | 52 | 40 | 215 | 47 | 35 | 15 | 4.0 | 5.4 |
| 11 | 111 | 62 | *135 | 60 | 64 | 39 | 182 | 59 | 31 | 13 | 4.2 | 9.6 |
| 12 | 75 | 60 | 130 | 60 | 80 | 39 | 193 | 62 | 26 | 12 | 4.2 | 11 |
| 13 | 59 | 62 | 170 | 58 | 100 | 39 | 256 | 75 | 23 | 11 | 4.0 | 19 |
| 14 | *46 | 65 | 175 | 54 | 120 | 38 | 319 | 113 | 20 | 10 | 3.5 | 34 |
| 15 | 39 | 79 | 170 | 52 | 110 | 38 | 436 | 133 | 20 | 9.3 | 3.5 | 34 |
| 16 | 34 | 83 | 170 | 50 | 100 | 38 | 486 | 133 | 22 | 8.7 | 3.4 | 24 |
| 17 | 30 | 82 | 160 | 47 | 90 | 38 | 394 | 122 | 26 | 7.8 | 3.3 | 16 |
| 18 | 28 | *76 | 150 | 43 | 82 | 38 | 350 | 100 | 43 | 7.8 | 3.3 | 13 |
| 19 | 27 | 69 | 135 | 41 | 76 | 39 | 355 | 76 | 55 | 9.6 | 3.0 | 13 |
| 20 | 25 | 60 | 110 | 40 | 72 | 40 | 303 | 59 | 44 | 10 | 2.6 | 13 |
| 21 | 31 | 54 | 90 | 40 | 66 | *39 | 221 | 48 | 35 | 10 | 2.3 | 14 |
| 22 | 34 | 52 | 80 | 38 | 58 | 38 | 210 | 42 | 31 | 9.9 | 2.1 | 13 |
| 23 | 35 | 50 | 72 | 38 | 54 | 38 | 229 | 36 | 28 | 9.6 | *2.1 | 12 |
| 24 | 34 | 65 | 66 | 38 | 50 | 37 | 226 | 45 | 26 | 9.0 | 2.2 | 10 |
| 25 | 59 | 100 | 62 | 37 | 49 | 37 | 290 | 116 | 29 | 8.1 | 2.8 | 9.6 |
| 26 | 102 | 130 | 64 | 37 | 47 | 37 | 380 | 145 | 33 | 7.6 | 2.8 | 9.0 |
| 27 | 97 | 121 | 66 | 36 | 45 | 38 | 317 | 103 | 33 | 7.2 | 2.8 | 8.1 |
| 28 | 89 | 100 | 68 | *36 | 44 | 42 | 240 | 69 | 27 | *7.2 | 2.7 | 7.8 |
| 29 | 79 | 84 | 68 | 36 | 44 | 60 | 184 | 48 | 23 | 7.2 | 2.7 | *7.4 |
| 30 | 66 | 86 | 68 | 35 | ----- | 120 | 146 | 36 | 22 | 7.2 | 2.6 | 7.4 |
| 31 | 58 | ----- | 68 | 35 | ----- | 200 | ----- | 58 | ----- | 7.0 | 2.6 | ----- |
| Total | 2,270 | 2,363 | 3,458 | 1,621 | 1,738 | 1,501 | 9,999 | 2,392 | 2,115 | 374.2 | 116.1 | 321.5 |
| Mean | 73.2 | 79.4 | 112 | 52.3 | 59.9 | 48.4 | 333 | 77.2 | 70.5 | 12.1 | 3.75 | 10.7 |
| Cfsm | 1.58 | 1.71 | 2.42 | 1.13 | 1.29 | 1.05 | 7.19 | 1.67 | 1.52 | 0.261 | 0.081 | 0.231 |
| In. | 1.82 | 1.91 | 2.78 | 1.30 | 1.40 | 1.21 | 8.03 | 1.92 | 1.70 | 0.30 | 0.09 | 0.26 |

Calendar year 1959: Max 616 Min 8.4 Mean 89.3 Cfsm 1.93 In. 26.18
Water year 1959-60: Max 700 Min 2.1 Mean 77.3 Cfsm 1.67 In. 22.72

Peak discharge (base, 450 cfs).--Apr. 5 (12:45 a.m.) about 800 cfs; Apr. 16 (3:45 a.m.) 509 cfs (6.04 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 20, Nov. 28 to Apr. 5.

2648. Plumb Brook at Russell, N. Y.

Location.--Lat 44°25'30", long 75°08'03", on left bank on downstream side of highway bridge, 0.15 mile upstream from mouth and 0.8 mile southeast of village of Russell, St. Lawrence County.

Drainage area.--35.2 sq mi.

Records available.--September 1958 to September 1960 (no winter records), discontinued.

Gage.--Staff gage, read twice daily, and crest-stage gage. Datum of gage is 578.88 ft above mean sea level, adjustment of 1912.

Extremes.--Maximum discharge observed during year, 992 cfs Apr. 4 (gage height, 4.73 ft); maximum gage height observed, 6.45 ft Mar. 31 (backwater from ice jam on Grass River); minimum discharge observed, 3.4 cfs Sept. 1, 2 (gage height, 0.74 ft).
1958-60: Maximum discharge, that of Apr. 4, 1960; maximum gage height, that of Mar. 31, 1960; minimum discharge observed, that of Sept. 1, 2, 1960.

Remarks.--Records poor.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Mar. 30 | | | Mar. 31 to Sept. 30 | | |
|-------------------|-----|--|---------------------|-----|-------|
| 1.1 | 18 | | 0.7 | 3.0 | 2.5 |
| 1.4 | 45 | | .8 | 4.5 | 3.0 |
| 1.8 | 97 | | 1.1 | 21 | 4.0 |
| 2.3 | 187 | | 1.5 | 52 | 4.8 |
| | | | 1.8 | 88 | 1,020 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1 | 38 | | | | | | *500 | 80 | 152 | 23 | 9.5 | 3.5 |
| 2 | 35 | | | | | | *391 | 70 | 429 | 22 | 11 | 3.4 |
| 3 | 30 | | | | | | 376 | 64 | 346 | 22 | 10 | 3.7 |
| 4 | 72 | | | | | | *992 | 58 | 230 | 22 | 11 | 7.0 |
| 5 | 115 | | | | | | 439 | *50 | 150 | 24 | 10 | 11 |
| 6 | 139 | | | | | | 338 | 45 | 100 | 24 | 11 | 11 |
| 7 | 169 | | | | | | 235 | 48 | 70 | 23 | 11 | 7.0 |
| 8 | 140 | | | | | | 176 | 50 | *50 | 21 | 9.0 | 11 |
| 9 | 110 | | | | | | *128 | 54 | 41 | 18 | 8.0 | 16 |
| 10 | 90 | | | | | | 152 | 70 | 35 | 19 | 8.0 | 14 |
| 11 | 70 | | | | | | 146 | 58 | 32 | 19 | 8.4 | 14 |
| 12 | 50 | | | | | | 152 | 111 | 31 | 19 | 7.0 | 17 |
| 13 | 35 | | | | | | 160 | 109 | 30 | 17 | 6.4 | 18 |
| 14 | *27 | | | | | | 180 | 88 | 28 | 13 | 5.6 | 18 |
| 15 | 25 | | | | | | 350 | 88 | 27 | 13 | 12 | 18 |
| 16 | 23 | | | | | | 320 | 78 | 31 | 14 | 12 | 17 |
| 17 | 22 | | | | | | 300 | 70 | 42 | 13 | 11 | 19 |
| 18 | 23 | †68.5 | | | | | 280 | 47 | 66 | 14 | 10 | 14 |
| 19 | 24 | | | | | | 224 | 38 | 59 | 16 | 6.0 | 17 |
| 20 | 25 | | | | | | 193 | 35 | 50 | 20 | 5.0 | 17 |
| 21 | 28 | | | | | | 101 | 32 | 45 | 17 | 5.0 | 11 |
| 22 | 32 | | | | | | 124 | 37 | 38 | 17 | 6.4 | 12 |
| 23 | 40 | | | | | | 169 | 42 | 26 | 17 | *5.8 | *11 |
| 24 | 50 | | | | | | 269 | 55 | 30 | 16 | 5.0 | 10 |
| 25 | 80 | | | | | | 350 | 61 | 34 | 16 | 5.0 | 9.0 |
| 26 | 90 | | | | | | 250 | 64 | 32 | 15 | 5.0 | 12 |
| 27 | 80 | | | | | | 200 | 55 | 32 | 14 | 5.0 | 12 |
| 28 | 70 | | | | | | 150 | 51 | 30 | *13 | 5.0 | 11 |
| 29 | 64 | | | | | | 120 | 44 | 27 | 12 | 6.0 | 12 |
| 30 | 60 | | | | | | 100 | 53 | 25 | 11 | 5.0 | 15 |
| 31 | 56 | | | | | †326 | | 122 | | 10 | 4.3 | |
| Total | 1,912 | - | - | - | - | - | 7,865 | 1,927 | 2,318 | 534 | 239.4 | 371.6 |
| Mean | 61.7 | - | - | - | - | - | 262 | 62.2 | 77.3 | 17.2 | 7.72 | 12.4 |
| Cfsm | 1.75 | - | - | - | - | - | 7.44 | 1.77 | 2.20 | 0.489 | 0.219 | 0.352 |
| In. | 2.02 | - | - | - | - | - | 8.31 | 2.04 | 2.45 | 0.56 | 0.25 | 0.39 |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement made on this day.

† Result of discharge measurement.

Note.--Doubtful or no gage-height record Oct. 6-13, 15-31, Apr. 13-18, Apr. 25 to May 9, June 4-17, Aug. 3-28; discharge estimated on basis of general trend of readings, weather records, discharge measurements, and records for nearby stations.

2650. Grass River at Pyrites, N. Y.

Location.--Lat 44°31'30", long 75°11'50", on left bank 1,000 ft downstream from lower bridge in Pyrites, St. Lawrence County, and half a mile upstream from Harrison Creek.

Drainage area.--335 sq mi.

Records available.--August 1924 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 350.61 ft above mean sea level, datum of 1929.

Average discharge.--36 years, 598 cfs.

Extremes.--Maximum discharge during year, about 4,800 cfs Apr. 4 (gage height, 12.58 ft, backwater from ice); minimum daily, 76 cfs Sept. 3.

1924-60: Maximum discharge, about 8,300 cfs Nov. 18, 1927 (gage height, 13.0 ft, from floodmark); minimum daily, 59 cfs Aug. 29 to Sept. 1, 1934.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation at low flow caused by powerplant above station.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 6-29)

| | | | |
|-----|-----|-----|-------|
| 1.1 | 72 | 3.0 | 760 |
| 1.5 | 162 | 6.0 | 2,510 |
| 2.0 | 325 | 9.0 | 4,640 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 1 | 314 | 602 | 620 | 480 | *320 | 400 | 2,000 | 950 | 1,640 | 352 | 122 | 80 |
| 2 | 508 | *715 | 640 | 470 | 320 | 390 | 2,500 | 845 | 3,480 | 321 | 117 | 80 |
| 3 | 526 | 710 | 660 | 560 | 320 | 390 | *3,000 | 755 | 3,040 | 264 | 114 | 76 |
| 4 | 452 | 629 | 745 | *640 | 310 | 380 | 4,100 | 678 | 2,070 | 247 | 117 | 83 |
| 5 | *398 | 584 | 800 | 700 | 310 | 400 | 4,300 | 624 | 1,320 | 254 | 110 | 110 |
| 6 | 464 | 683 | 860 | 660 | 320 | 390 | 4,090 | 570 | 890 | 254 | 104 | 134 |
| 7 | 1,080 | 1,050 | 1,270 | 620 | 350 | 380 | 2,850 | 521 | 665 | 251 | 104 | 114 |
| 8 | 1,590 | 920 | 1,700 | 600 | 350 | 370 | 2,260 | 473 | 544 | 231 | 104 | 102 |
| 9 | 1,370 | 750 | *1,500 | 580 | 370 | 370 | *1,850 | 456 | 456 | 218 | 141 | 97 |
| 10 | 1,000 | 638 | 1,180 | 520 | 450 | 360 | 1,470 | 580 | 402 | 206 | 157 | 110 |
| 11 | 730 | 562 | 900 | 500 | 700 | 350 | 1,200 | *624 | 363 | *184 | 131 | 170 |
| 12 | 557 | 588 | 860 | 500 | 1,000 | 350 | 1,210 | 629 | 340 | 176 | 122 | 152 |
| 13 | 456 | 588 | 1,200 | 480 | 1,100 | 350 | 1,510 | 770 | *318 | 168 | 108 | 199 |
| 14 | 598 | 602 | 1,400 | 450 | 1,200 | 340 | 1,860 | 982 | 293 | 159 | 106 | 321 |
| 15 | 355 | 760 | 1,300 | 420 | 1,100 | 340 | 2,620 | 960 | 296 | 154 | 114 | 275 |
| 16 | 325 | 740 | 1,300 | 410 | 1,000 | 340 | 3,270 | 1,000 | 340 | 154 | 110 | 215 |
| 17 | 303 | 670 | 1,350 | 390 | 920 | 330 | 2,970 | 982 | 359 | 141 | 114 | 173 |
| 18 | 300 | 640 | 1,100 | 380 | 840 | 330 | 2,940 | 840 | 486 | 146 | 108 | 157 |
| 19 | 318 | 540 | 840 | 370 | 760 | 330 | 3,040 | 706 | 552 | 162 | 95 | 152 |
| 20 | 325 | 480 | 680 | 360 | 700 | 340 | 2,350 | 602 | 443 | 157 | 93 | 168 |
| 21 | 355 | 526 | 620 | 360 | 620 | 340 | 1,760 | 526 | 379 | 165 | 95 | 165 |
| 22 | 375 | 495 | 560 | 350 | 560 | 330 | 1,800 | 477 | 336 | 159 | 102 | 149 |
| 23 | 359 | 464 | 500 | 350 | 540 | *330 | 1,920 | 435 | 296 | 154 | 99 | *141 |
| 24 | 375 | 548 | 470 | 350 | *520 | 330 | 1,840 | 504 | 300 | 157 | *114 | 129 |
| 25 | 660 | 835 | 450 | 340 | 500 | 320 | 2,430 | 865 | 340 | 168 | 126 | 129 |
| 26 | 925 | 935 | 460 | 340 | 470 | 320 | 2,850 | 935 | 406 | 152 | 110 | 112 |
| 27 | 830 | 785 | 480 | 340 | 450 | 330 | 2,260 | 755 | 371 | 131 | 99 | 114 |
| 28 | 775 | 580 | 480 | 330 | 420 | 360 | 1,740 | 590 | 305 | 134 | 93 | 108 |
| 29 | 680 | 580 | 480 | 330 | 400 | 340 | 1,380 | 464 | 269 | 129 | 87 | 106 |
| 30 | 562 | 600 | 480 | 320 | ----- | 1,000 | 1,120 | 398 | 272 | 124 | 95 | 106 |
| 31 | 504 | ----- | 480 | 320 | ----- | 1,500 | ----- | 567 | ----- | 122 | 80 | ----- |
| Total | 18,149 | 19,779 | 26,365 | 13,820 | 17,200 | 12,930 | 70,450 | 21,073 | 21,568 | 5,794 | 3,391 | 4,227 |
| Mean | 585 | 659 | 850 | 446 | 593 | 417 | 2,348 | 680 | 719 | 187 | 109 | 141 |
| Cfs/m | 1.75 | 1.97 | 2.54 | 1.33 | 1.77 | 1.24 | 7.01 | 2.03 | 2.15 | 0.558 | 0.325 | 0.421 |
| In. | 2.01 | 2.20 | 2.93 | 1.53 | 1.91 | 1.44 | 7.82 | 2.34 | 2.39 | 0.64 | 0.38 | 0.47 |

Calendar year 1959: Max 4,710 Min 95 Mean 686 Cfs/m 2.05 In. 27.82
Water year 1959-60: Max 4,300 Min 76 Mean 641 Cfs/m 1.91 In. 26.06

Peak discharge (base, 3,600 cfs).--Apr. 4 (4 p.m.) about 4,800 cfs; June 2 (5:15 p.m.) 3,700 cfs (7.76 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18-20, Nov. 28 to Dec. 3, Dec. 8 to Apr. 5 (no gage-height record Dec. 27 to Jan. 4).

2651. Elm Creek near Hermon, N. Y.

Location.--Lat 44°26'14", long 75°12'52", on left bank 100 ft downstream from highway bridge, 2.3 miles south of Hermon, St. Lawrence County, and 6.8 miles upstream from confluence with Tanner Creek.

Drainage area.--33.0 sq mi.

Records available.--August 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 539.41 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 1,090 cfs June 2 (gage height, 8.55 ft); minimum, 2.3 cfs Aug. 29.

1958-60: Maximum discharge, that of June 2, 1960; minimum, that of Aug. 29, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Mar. 30

Mar. 31 to Sept. 30

| | | | |
|-----|----|-----|-----|
| 3.2 | 21 | 5.0 | 203 |
| 3.5 | 36 | 6.0 | 374 |
| 4.0 | 76 | | |

| | | | |
|-----|-----|-----|-----|
| 2.5 | 2.4 | 4.0 | 76 |
| 2.7 | 5.6 | 5.0 | 206 |
| 3.0 | 13 | 6.0 | 394 |
| 3.5 | 36 | 8.0 | 523 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 31 | 50 | 59 | 25 | *20 | 45 | *550 | 59 | 196 | 14 | 4.0 | 2.6 |
| 2 | 47 | 58 | 56 | 28 | 20 | 44 | 419 | *2 | 904 | 11 | 3.7 | 2.8 |
| 3 | 49 | 56 | 60 | 32 | 20 | 42 | 581 | 46 | 440 | 9.2 | 3.7 | 2.8 |
| 4 | 45 | 49 | 76 | *35 | 19 | 40 | *661 | *40 | 274 | 9.4 | 3.7 | 3.5 |
| 5 | 37 | *44 | 102 | 37 | 19 | 40 | *426 | 36 | 188 | 9.2 | 3.5 | 4.2 |
| 6 | 40 | 52 | 121 | 36 | 20 | 35 | 262 | 32 | 128 | 9.4 | 3.4 | 3.8 |
| 7 | 92 | 73 | 167 | 37 | 22 | 31 | 220 | 27 | *91 | 9.2 | 3.2 | 3.2 |
| 8 | 160 | 85 | 222 | 35 | 24 | 26 | 179 | 23 | 64 | 6.2 | 3.7 | 3.0 |
| 9 | 165 | 72 | *176 | 34 | 30 | 26 | 154 | 22 | 46 | 6.2 | 4.2 | *3.1 |
| 10 | 122 | 55 | 140 | 32 | 43 | 26 | 136 | 30 | 36 | 6.0 | 4.0 | 3.4 |
| 11 | 84 | 45 | 110 | 30 | *450 | 26 | 121 | 33 | 30 | 6.9 | 3.5 | 3.5 |
| 12 | *56 | 48 | 90 | 29 | *328 | 25 | 116 | 40 | 26 | 6.4 | 3.2 | 3.7 |
| 13 | 40 | 56 | 110 | 29 | 254 | 25 | 115 | 56 | 23 | 6.2 | 2.8 | 5.8 |
| 14 | 31 | 64 | 140 | 27 | 190 | 25 | 116 | 69 | 20 | 6.2 | 2.8 | 6.2 |
| 15 | 26 | 79 | 135 | 27 | 125 | 25 | 115 | 68 | 23 | 6.0 | 3.5 | 4.3 |
| 16 | 23 | 87 | 130 | 26 | 106 | *25 | 108 | 63 | 26 | 5.6 | 4.0 | 3.7 |
| 17 | 22 | 78 | 130 | 26 | 94 | 25 | 100 | 55 | 23 | 5.6 | 3.5 | 3.4 |
| 18 | 21 | 64 | 120 | 26 | 82 | 25 | 99 | 44 | 30 | 5.8 | 3.2 | 3.7 |
| 19 | 23 | 54 | 110 | 25 | 70 | 24 | 99 | 34 | 39 | 6.0 | 2.8 | 4.2 |
| 20 | 23 | 48 | 110 | 26 | 62 | 24 | 86 | 26 | 32 | 6.2 | 2.7 | 4.2 |
| 21 | 26 | 44 | 100 | 25 | 56 | 24 | 73 | 24 | 22 | 7.1 | 3.1 | 4.7 |
| 22 | 26 | 44 | 80 | 24 | 56 | 24 | 100 | 22 | 18 | 6.0 | 3.1 | 4.2 |
| 23 | 25 | 44 | 50 | 24 | 56 | 23 | 112 | 20 | 16 | 6.0 | *3.1 | 3.7 |
| 24 | 29 | 50 | 22 | 23 | 55 | 22 | 109 | 30 | 20 | 5.8 | 5.0 | 3.4 |
| 25 | 51 | 70 | 17 | 23 | 53 | 20 | 200 | 46 | 26 | 5.4 | 2.8 | 3.4 |
| 26 | 65 | 77 | 18 | 23 | 52 | 20 | 214 | 50 | 22 | 4.9 | 2.5 | 3.1 |
| 27 | 69 | 69 | 18 | 22 | 49 | 21 | 147 | 36 | 16 | 4.7 | 2.5 | 3.2 |
| 28 | 68 | 52 | 18 | 22 | 47 | 23 | 115 | 23 | 13 | *4.9 | 2.5 | 3.2 |
| 29 | 65 | 56 | 19 | 21 | 45 | *41 | 92 | 19 | 11 | 4.7 | 2.5 | 3.2 |
| 30 | 53 | 60 | 20 | 21 | ----- | 190 | 73 | 16 | 14 | 4.3 | 2.5 | 3.4 |
| 31 | 46 | ----- | 21 | 20 | ----- | *660 | ----- | 42 | ----- | 4.3 | 2.5 | ----- |
| Total | 1,658 | 1,783 | 2,747 | 852 | 2,467 | 1,672 | 6,098 | 1,183 | 2,817 | 218.8 | 99.2 | 110.8 |
| Mean | 53.5 | 59.4 | 88.6 | 27.5 | 85.1 | 53.9 | 203 | 38.2 | 93.9 | 7.06 | 3.20 | 3.69 |
| Cfsm | 1.62 | 1.80 | 2.68 | 0.833 | 2.58 | 1.63 | 6.15 | 1.16 | 2.85 | 0.214 | 0.097 | 0.112 |
| In. | 1.87 | 2.01 | 3.10 | 0.96 | 2.78 | 1.88 | 6.87 | 1.33 | 3.17 | 0.25 | 0.11 | 0.12 |

Calendar year 1959: Max 630 Min 3.5 Mean 55.3 Cfsm 1.68 In. 22.77
 Water year 1959-60: Max 904 Min 2.5 Mean 59.3 Cfsm 1.80 In. 24.45

Peak discharge (base, 330 cfs).--Feb. 11 (7.15 p.m.) 693 cfs (7.34 ft); Mar. 31 (2:30 p.m.) 829 cfs (7.68 ft); Apr. 4 (9:15 a.m.) 953 cfs (8.10 ft); Apr. 6 (1 p.m.) 368 cfs (5.88 ft); June 2 (8 a.m.) 1,090 cfs (8.55 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19, 20, 28-30, Dec. 10 to Feb. 11, Feb. 14, 15, 18-23, Feb. 29 to Mar. 31.

2652. Tanner Creek at Stellaville, N. Y.

Location.--Lat 44°29'04", long 75°15'29", on right bank on downstream side of highway bridge, 0.6 mile west of Stellaville, St. Lawrence County, 1.8 miles northwest of Hermon, and 1.9 miles upstream from mouth.

Drainage area.--32.3 sq mi.

Records available.--September 1958 to November 1960 (no winter records), discontinued.

Gage.--Staff gage, read twice daily, and crest-stage gage. Altitude of gage is 380 ft (from topographic map).

Extremes.--1959-60: Maximum discharge observed during water year, 1,580 cfs June 2 (gage height, 6.07 ft), from rating curve extended above 500 cfs by logarithmic plotting; maximum gage height observed, 9.09 ft Mar. 31 (ice jam); no flow for many days in August and September.

1960: Maximum discharge observed during period October to November, 9.4 cfs Nov. 18, 21 (gage height, 0.82 ft); no flow Oct. 1.

1958-60: Maximum discharge observed, that of June 2, 1960; maximum gage height observed, that of Mar. 31, 1960; no flow many times.

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

Rating tables, Oct. 1, 1959, to Nov. 30, 1960, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1, 1959, to Mar. 31, 1960

Apr. 1 to Nov. 30, 1960

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 0.8 | 8.8 | 1.6 | 57 | 0.1 | 0 | 0.6 | 4.5 | 2.3 | 181 |
| 1.0 | 16 | 2.0 | 96 | .2 | .1 | .8 | 10 | 3.0 | 340 |
| 1.3 | 33 | 3.0 | 224 | .3 | .6 | 1.0 | 19 | 4.0 | 670 |
| | | | | .4 | 1.4 | 1.3 | 40 | 6.0 | 1,550 |
| | | | | .5 | 2.6 | 1.7 | 82 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|---------|-------|------|------|------|------|-------|-------|---------|-------|--------|---------|
| 1 | 9.8 | 64 | | | | | b460 | 46 | 398 | 2.6 | 0.1 | 0 |
| 2 | 58 | 60 | | | | | b400 | 45 | 1,300 | 2.4 | .1 | 0 |
| 3 | 37 | 52 | | | | | b540 | 38 | 479 | 2.2 | .1 | 0 |
| 4 | 27 | 47 | | | | | b700 | *51 | 242 | 1.9 | .1 | 0 |
| 5 | 24 | *44 | | | | | *b480 | 25 | 157 | 1.6 | 0 | 0 |
| 6 | 72 | 51 | | | | | *296 | 20 | 104 | 1.6 | .1 | 0 |
| 7 | 174 | 80 | | | | | *233 | 18 | 71 | 1.4 | .1 | 0 |
| 8 | 151 | 73 | | | | | 189 | 15 | 33 | 1.2 | .1 | 0 |
| 9 | 109 | 59 | | | | | *155 | 14 | *27 | 1.0 | .1 | 0 |
| 10 | 81 | 45 | | | | | 122 | 16 | 21 | .9 | .1 | .1 |
| 11 | 67 | 38 | | | | | 99 | 20 | 16 | .8 | 0 | .1 |
| 12 | *51 | 48 | | | | | 92 | 32 | 15 | .8 | 0 | .1 |
| 13 | 35 | 54 | | | | | 88 | 67 | 10 | .8 | 0 | .1 |
| 14 | 28 | 58 | | | | | 83 | 85 | 7.9 | .9 | .1 | .1 |
| 15 | 22 | 78 | | | | | 85 | 71 | 8.8 | .8 | .2 | .1 |
| 16 | 17 | 71 | | | | | 88 | 57 | 9.1 | .8 | .1 | 0 |
| 17 | 15 | 61 | | | | | 93 | 45 | 8.8 | .6 | .1 | 0 |
| 18 | 14 | 53 | | | | | 110 | 33 | 7.9 | .8 | .1 | 0 |
| 19 | 14 | b49 | | | | | 85 | 25 | 7.5 | 1.1 | 0 | 0 |
| 20 | 14 | b45 | | | | | 68 | 20 | 7.0 | .8 | 0 | 0 |
| 21 | 16 | 46 | | | | | 78 | 15 | 5.0 | .8 | 0 | 0 |
| 22 | 16 | 44 | | | | | 125 | 12 | 3.9 | .8 | 0 | 0 |
| 23 | 23 | 42 | | | | | 102 | 12 | 3.2 | .6 | 0 | 0 |
| 24 | 34 | 54 | | | | | 151 | 16 | 5.5 | .6 | *0 | 0 |
| 25 | 69 | 81 | | | | | 332 | 34 | 18 | .5 | 0 | ao |
| 26 | 55 | 83 | | | | | 133 | 51 | 16 | a.5 | 0 | ao |
| 27 | 55 | 80 | | | | | 130 | 19 | 7.9 | .6 | 0 | ao |
| 28 | 63 | 70 | | | | | 96 | 14 | 4.8 | *.2 | 0 | ao |
| 29 | 53 | 64 | | | | | 64 | 11 | 4.1 | .2 | 0 | ao |
| 30 | 47 | 67 | | | | | 49 | 10 | 3.0 | .2 | .1 | ao |
| 31 | 58 | | | | | | | 51 | | .1 | .1 | |
| Total | 1,508.8 | 1,761 | - | - | - | - | 5,786 | 926 | 2,999.2 | 30.1 | 1.7 | 0.6 |
| Mean | 48.7 | 58.7 | - | - | - | - | 193 | 29.9 | 100 | 0.97 | 0.05 | 0.02 |
| Cfsm | 1.51 | 1.82 | - | - | - | - | 5.98 | 0.926 | 3.10 | 0.030 | 0.0015 | 0.00062 |
| In. | 1.74 | 2.03 | - | - | - | - | 6.66 | 1.07 | 3.45 | 0.03 | 0.002 | 0.0007 |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement or observation of no flow made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

b Stage-discharge relation affected by ice.

Discharge, in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|
| 1 | ao | 2.4 | 7 | 0.5 | 2.8 | 13 | 0.1 | 5.8 | 19 | 0.2 | 7.6 | 25 | 0.8 | 7.6 |
| 2 | .1 | 2.5 | 8 | .2 | 2.4 | 14 | .1 | 6.0 | 20 | .3 | 8.8 | 26 | 3.2 | 6.2 |
| 3 | *.2 | 3.9 | 9 | .1 | *2.4 | 15 | .1 | 5.8 | 21 | .3 | 7.9 | 27 | a5.4 | 4.1 |
| 4 | .2 | 4.3 | 10 | .1 | 5.2 | 16 | .4 | 4.3 | 22 | .4 | 6.8 | 28 | 5.6 | 3.2 |
| 5 | .2 | 3.7 | 11 | .1 | 4.1 | 17 | .3 | 7.6 | 23 | .4 | 7.0 | 29 | 2.4 | 4.8 |
| 6 | .4 | 3.4 | 12 | .1 | 5.2 | 18 | .3 | 9.1 | 24 | .5 | 7.6 | 30 | 2.2 | 7.9 |
| | | | | | | | | | | | | 31 | 2.2 | - |

| | | |
|---------------------------------------|-------|-------|
| Total | 23.4 | 156.4 |
| Mean | 0.75 | 5.21 |
| Cubic feet per second per square mile | 0.023 | 0.161 |
| Runoff in inches | 0.03 | 0.18 |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

2653. Little River near Canton, N. Y.

Location--Lat 44°33'24", long 75°06'56", on right bank on dam abutment, 50 ft downstream from highway bridge, at Brick Chapel, 4.0 miles southeast of Canton, St. Lawrence County, and 7.4 miles upstream from mouth.

Drainage area--42.4 sq mi.

Records available--October 1958 to November 1960 (no winter records), discontinued.

Gage--Staff gage read twice daily, and crest-stage gage. Datum of gage is 389.32 ft above mean sea level, datum of 1929.

Extremes--1959-60: Maximum discharge observed during water year, 2,160 cfs Apr. 4 (gage height, 7.44 ft), from rating curve extended above 1,300 cfs by logarithmic plotting; minimum observed, 0.4 cfs Sept. 3 (gage height, 3.33 ft).
1960: Maximum discharge observed during period October to November, 200 cfs Oct. 25 (gage height, 4.43 ft); minimum observed, 3.2 cfs Oct. 12, 13, 15 (gage height, 3.39 ft).
1958-60: Maximum discharge observed, 3,110 cfs Aug. 9, 1959 (gage height, 8.15 ft), from rating curve extended above 1,300 cfs by logarithmic plotting; minimum observed, that of Sept. 3, 1960.

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

Rating table, Oct. 1, 1959, to Nov. 30, 1960, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|------|-----|-----|-------|
| 3.26 | 0.4 | 4.0 | 87 |
| 3.3 | 1.2 | 4.5 | 225 |
| 3.4 | 4.3 | 5.0 | 406 |
| 3.5 | 10 | 6.0 | 940 |
| 3.6 | 20 | 7.0 | 1,720 |
| 3.8 | 49 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|--------|-------|---------|-------|-------|-------|
| 1 | 46 | 94 | | | | | b480 | 63 | 336 | 8.2 | 2.9 | 0.8 |
| 2 | 79 | 118 | | | | | 565 | 58 | 345 | 8.2 | 2.9 | .6 |
| 3 | 38 | 73 | | | | | 694 | 54 | 268 | 7.5 | 2.9 | .4 |
| 4 | 25 | 51 | | | | | *1,350 | 46 | 123 | 7.5 | 2.9 | 1.2 |
| 5 | 20 | 56 | | | | | *582 | *37 | 60 | 9.0 | 2.3 | 2.3 |
| 6 | 92 | 118 | | | | | *352 | 33 | *43 | 7.5 | 1.4 | 1.7 |
| 7 | 238 | 144 | | | | | *235 | 29 | 33 | 8.2 | 1.0 | 1.4 |
| 8 | 258 | 126 | | | | | 206 | 25 | 25 | 11 | 2.3 | 1.0 |
| 9 | 164 | 60 | | | | | 182 | 23 | 19 | 9.0 | 2.3 | *1.0 |
| 10 | 101 | 49 | | | | | 150 | 51 | 17 | 7.5 | 1.2 | 1.0 |
| 11 | 51 | *40 | | | | | 108 | 40 | 17 | 6.9 | 1.0 | .6 |
| 12 | 36 | 75 | | | | | 184 | 61 | 15 | 6.4 | 1.0 | .8 |
| 13 | *29 | 73 | | | | | 170 | 123 | 13 | 6.4 | 1.0 | 2.9 |
| 14 | 25 | 118 | | | | | 147 | 131 | 13 | *7.5 | 1.0 | 3.6 |
| 15 | 22 | 144 | | | | | 251 | 75 | 15 | 5.9 | .8 | 2.6 |
| 16 | 19 | 105 | | | | | 153 | 71 | 16 | 5.9 | 1.2 | 2.0 |
| 17 | 19 | 83 | | | | | 142 | 58 | 18 | 5.9 | 1.2 | 1.4 |
| 18 | 23 | 83 | | | | | 182 | 43 | 27 | 5.1 | *1.2 | 2.3 |
| 19 | 25 | 54 | | | | | 156 | 35 | 20 | 6.9 | 1.0 | 2.3 |
| 20 | 22 | 38 | | | | | 110 | 26 | 16 | 8.2 | 2.3 | 3.2 |
| 21 | 22 | a46 | | | | | 77 | 25 | 14 | 7.5 | 2.3 | 3.6 |
| 22 | 20 | 54 | | | | | 277 | 23 | 13 | 6.9 | 2.0 | 3.2 |
| 23 | 33 | 46 | | | | | 158 | 19 | 11 | 5.9 | 1.7 | 2.9 |
| 24 | 42 | 73 | | | | | 231 | 38 | 16 | 5.1 | 1.4 | 2.3 |
| 25 | 42 | 89 | | | | | 488 | 152 | 34 | 4.0 | 1.0 | 2.3 |
| 26 | 39 | 69 | | | | | 266 | 79 | 23 | 3.2 | .6 | 2.3 |
| 27 | 73 | 58 | | | | | 197 | 42 | 16 | 3.2 | .6 | 2.9 |
| 28 | 87 | 31 | | | | | 105 | 26 | 10 | 3.2 | .6 | 3.6 |
| 29 | 60 | 25 | | | | | 75 | 22 | 7.5 | 3.2 | 1.4 | 3.2 |
| 30 | 48 | 18 | | | | | 69 | 19 | 9.0 | 3.2 | 1.2 | 3.6 |
| 31 | 69 | ----- | | | | | ----- | 114 | ----- | 2.9 | 1.0 | ----- |
| Total | 1,866 | 2,211 | - | - | - | - | 8,322 | 1,639 | 1,652.5 | 197.0 | 47.6 | 63.0 |
| Mean | 60.2 | 73.7 | - | - | - | - | 277 | 52.9 | 55.1 | 6.35 | 1.54 | 2.10 |
| Cfsm | 1.42 | 1.74 | - | - | - | - | 6.53 | 1.25 | 1.30 | 0.150 | 0.036 | 0.050 |
| In. | 1.64 | 1.94 | - | - | - | - | 7.30 | 1.44 | 1.45 | 0.17 | 0.04 | 0.06 |

Calendar year : Max

Water year : Max

Min

Min

Mean

Mean

Cfsm

Cfsm

In.

In.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of adjacent record.

b Stage-discharge relation affected by ice.

Discharge in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|
| 1 | 4.0 | 12 | 7 | 6.4 | 12 | 13 | 3.2 | 12 | 19 | 4.3 | *20 | 25 | 150 | 12 |
| 2 | 4.3 | 22 | 8 | 5.9 | 10 | 14 | 4.0 | 12 | 20 | 6.4 | 19 | 26 | 194 | 12 |
| 3 | *5.5 | 23 | 9 | 5.5 | 10 | 15 | 3.6 | 12 | 21 | 11 | 14 | 27 | 42 | 12 |
| 4 | 5.9 | 20 | 10 | 4.7 | 8.2 | 16 | 4.0 | 13 | 22 | 10 | 12 | 28 | 34 | 12 |
| 5 | 4.7 | 18 | 11 | 4.0 | 8.2 | 17 | 5.5 | 22 | 23 | 4.3 | 14 | 29 | 20 | 14 |
| 6 | 4.3 | 12 | 12 | 3.2 | 10 | 18 | 5.1 | 23 | 24 | 5.5 | 14 | 30 | 13 | 12 |
| | | | | | | | | | | | | 31 | 10 | - |

Total.....588.3 427.4

Mean.....19.0 14.2

Cubic feet per second per square mile.....0.448 0.335

Runoff in inches.....0.52 0.37

* Discharge measurement made on this day.

2654. Grannis Brook at Crary Mills, N. Y.

Location.--Lat 44°34'55", long 75°04'43", on right bank at downstream side of highway bridge, half a mile northwest of Crary Mills, St. Lawrence County, and 0.6 mile upstream from Boyden Brook.

Drainage area.--20.6 sq mi.

Records available.--October 1958 to November 1960 (no winter records), discontinued.

Gage.--Staff gage, read twice daily, and crest-stage gage. Altitude of gage is 410 ft (from topographic map).

Extremes.--1959-60: Maximum discharge observed during water year, 755 cfs Apr. 4 (gage height, 3.86 ft); minimum observed, 1.7 cfs Sept. 6, 7 (gage height, 0.60 ft).
1960: Maximum discharge observed during period October to November, 14 cfs Oct. 27, Nov. 3 (gage height, 0.96 ft); minimum observed, 3.0 cfs Oct. 10, 11 (gage height, 0.70 ft).

1958-60: Maximum discharge observed, that of Apr. 4, 1960; maximum gage height observed, 4.51 ft sometime during period Mar. 16-31, 1959 (ice jam); minimum discharge observed, that of Sept. 6, 7, 1960.

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

Rating table, Oct. 1, 1959, to Nov. 30, 1960 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 0.6 | 1.7 | 1.6 | 79 |
| .7 | 3.2 | 2.0 | 145 |
| .8 | 6.0 | 3.0 | 389 |
| .9 | 10 | 4.0 | 790 |
| 1.2 | 33 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1 | 22 | 75 | | | | | *352 | 35 | 183 | 5.0 | 2.6 | 2.7 |
| 2 | 19 | 39 | | | | | *274 | 29 | 85 | 4.5 | 2.6 | 2.7 |
| 3 | 10 | 32 | | | | | 343 | 26 | *110 | 4.8 | 2.4 | 2.8 |
| 4 | 5.0 | 27 | | | | | 546 | 24 | 42 | 4.8 | 2.2 | 2.0 |
| 5 | 6.4 | 23 | | | | | 244 | *21 | 23 | 4.8 | 2.2 | 2.0 |
| 6 | 57 | 21 | | | | | 140 | 18 | 16 | 4.8 | 2.2 | 1.7 |
| 7 | 143 | 20 | | | | | 105 | 12 | 15 | 4.8 | 2.6 | 1.7 |
| 8 | 140 | 21 | | | | | 91 | 14 | 14 | 4.8 | 2.4 | 1.3 |
| 9 | 75 | 21 | | | | | 88 | 14 | 12 | 5.4 | 2.4 | *2.0 |
| 10 | 30 | 19 | | | | | 70 | 15 | 9.4 | 4.8 | 2.4 | 2.4 |
| 11 | 22 | *19 | | | †478 | | 64 | 19 | 8.4 | 3.0 | 2.2 | 2.8 |
| 12 | 19 | 24 | | | (††) | | 94 | 23 | 8.4 | 2.8 | 2.2 | 2.7 |
| 13 | *14 | 30 | | | | | 86 | 49 | 8.0 | 2.8 | 2.2 | 1.4 |
| 14 | 12 | 30 | | | | | 130 | 85 | 7.5 | 3.8 | 2.2 | 6.0 |
| 15 | 12 | 52 | | | | | 142 | 64 | 9.4 | 2.8 | 2.6 | 4.0 |
| 16 | 11 | 50 | | | | | 74 | 37 | 9.4 | 2.8 | 2.2 | 3.0 |
| 17 | 10 | 41 | | | | | 79 | 28 | 6.4 | 2.8 | 2.2 | 2.8 |
| 18 | 8.9 | 34 | | | | | 85 | 23 | 6.0 | *2.8 | *2.4 | 2.8 |
| 19 | 8.9 | 29 | | | | | 66 | 16 | 6.7 | 5.4 | 2.2 | 3.2 |
| 20 | 10 | 26 | | | | | 44 | 14 | 7.5 | 4.8 | 2.2 | 4.2 |
| 21 | 12 | 24 | | | | | 45 | 8.0 | 7.1 | 3.5 | 2.2 | 3.8 |
| 22 | 14 | 22 | | | | | 153 | 4.0 | 6.4 | 2.8 | 2.2 | 2.8 |
| 23 | 18 | 22 | | | | | 63 | 7.5 | 5.4 | 3.0 | 2.8 | 2.8 |
| 24 | 19 | 42 | | | | | 75 | 33 | 9.4 | 2.8 | 2.6 | 2.8 |
| 25 | 75 | 41 | | | | | 280 | 70 | 12 | 2.7 | 2.6 | 2.8 |
| 26 | 39 | 37 | | | | | 108 | 29 | 7.5 | 2.7 | 2.6 | 2.8 |
| 27 | 32 | 33 | | | | | 82 | 24 | 6.4 | 2.6 | 2.2 | 2.6 |
| 28 | 26 | 30 | | | | | 52 | 14 | 5.4 | 2.7 | 2.4 | 2.6 |
| 29 | 22 | 31 | | | | | 45 | 8.9 | 5.4 | 2.7 | 2.8 | 2.8 |
| 30 | 22 | 32 | | | | | 42 | 8.0 | 5.4 | 2.6 | 2.7 | 2.8 |
| 31 | 22 | ----- | | | | †432 | ----- | 102 | ----- | 2.6 | 2.8 | ----- |
| Total | 936.2 | 947 | - | - | - | - | 4,062 | 874.4 | 657.5 | 113.0 | 74.5 | 95.9 |
| Mean | 30.2 | 31.6 | - | - | - | - | 135 | 28.2 | 21.9 | 3.65 | 2.40 | 3.20 |
| Cfs/m | 1.47 | 1.53 | - | - | - | - | 6.55 | 1.37 | 1.06 | 0.177 | 0.117 | 0.155 |
| In. | 1.69 | 1.71 | - | - | - | - | 7.33 | 1.58 | 1.13 | 0.20 | 0.13 | 0.17 |

Calendar year

: Max

Min

Mean

Cfs/m

In.

Water year

: Max

Min

Mean

Cfs/m

In.

* Discharge measurement made on this day.

† Result of discharge measurement.

†† Result of discharge measurements made on this day 186 and 166 cfs.

Note.--No gage-height record Oct. 3, 27, 28, Nov. 3-6, 17-21, 26-30; discharge estimated on basis of weather records and records for nearby stations.

Discharge in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | |
|---------------------------------------|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|-------|-------|
| | | 7.5 | 7 | 6.7 | 9.4 | 13 | 3.5 | 8.4 | 19 | 7.5 | *9.4 | 25 | 8.0 | 8.9 | |
| 1 | | 10 | 8 | 6.4 | 8.0 | 14 | 4.0 | 8.4 | 20 | 9.4 | 8.4 | 26 | 10 | 7.1 | |
| 2 | 6.7 | 13 | 9 | 3.5 | 5.6 | 15 | 4.0 | 10 | 21 | 7.1 | 9.4 | 27 | 13 | 5.4 | |
| 3 | 4.5 | 10 | 10 | 3.0 | 6.0 | 16 | 4.0 | 11 | 22 | 5.0 | 10 | 28 | 11 | 6.4 | |
| 4 | 5.0 | 8.9 | 11 | 3.2 | 6.4 | 17 | 7.1 | 10 | 23 | 4.8 | 9.4 | 29 | 8.9 | 10 | |
| 5 | 5.0 | 8.0 | 12 | 3.5 | 8.0 | 18 | 6.4 | 8.9 | 24 | 5.0 | 8.4 | 30 | 8.4 | 12 | |
| 6 | | | | | | | | | | | | 31 | 7.1 | - | |
| Total | | | | | | | | | | | | | | 190.5 | 262.3 |
| Mean | | | | | | | | | | | | | | 6.15 | 8.74 |
| Cubic feet per second per square mile | | | | | | | | | | | | | | 0.299 | 0.424 |
| Runoff in inches | | | | | | | | | | | | | | 0.34 | 0.47 |

* Discharge measurement made on this day.

2665. Raquette River at Piercefield, N. Y.

Location.--Lat 44°14'05", long 74°34'20", on left bank half a mile downstream from dam of International Paper Co. at Piercefield, St. Lawrence County, and 1½ miles upstream from Dead Creek.

Drainage area.--722 sq mi.

Records available.--August 1908 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,502.12 ft above mean sea level, datum of 1929. Prior to Oct. 22, 1912, staff or chain gage at same site (datum of chain gage lowered 2 ft Jan. 1, 1911, to present datum).

Average discharge.--52 years, 1,284 cfs.

Extremes.--Maximum discharge during year, 6,830 cfs Apr. 26 (gage height, 11.30 ft); minimum, 81 cfs Sept. 5 (gage height, 2.09 ft); minimum daily, 208 cfs Sept. 5.
1908-60: Maximum discharge, 8,240 cfs May 16, 1943 (gage height, 12.09 ft); minimum, 4.1 cfs Oct. 12, 1947 (gage height, 0.61 ft), caused by construction work above station; minimum daily, 4.1 cfs Oct. 12, 1947.

Remarks.--Records excellent. Seasonal distribution of flow appreciably modified by natural storage in lakes and ponds above station and by regulation at the Bog River Dam.. Extensive diurnal fluctuation caused by powerplant at Piercefield.

Revisions (water years).--WSP 604: 1924. WSP 759: Drainage area. WSP 1387: 1910, 1913, 1914(M), 1916, 1921.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|-------|
| 3.0 | 208 | 7.0 | 1,970 |
| 4.0 | 457 | 8.0 | 2,850 |
| 5.0 | 812 | 10.0 | 5,010 |
| 6.0 | 1,300 | 11.5 | 7,140 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 837 | 1,910 | 2,170 | 1,410 | 948 | 1,280 | 1,200 | 5,850 | 1,390 | 878 | 494 | 365 |
| 2 | 1,020 | 2,020 | 2,280 | 1,360 | 885 | 1,220 | 1,310 | 5,460 | 1,200 | 878 | 460 | 333 |
| 3 | 1,200 | 2,110 | 2,320 | 1,350 | 863 | 1,120 | 1,430 | 5,050 | 1,320 | 878 | 454 | 306 |
| 4 | 1,220 | 2,010 | 2,350 | 1,370 | 837 | 1,120 | 1,780 | 4,630 | 1,400 | 835 | 457 | 262 |
| 5 | 1,190 | 2,060 | 2,350 | 1,370 | 812 | 1,060 | 2,180 | 4,320 | 1,390 | 835 | 445 | 208 |
| 6 | 1,200 | 2,140 | 2,340 | 1,360 | 772 | 995 | 2,510 | 4,020 | 1,380 | 796 | 454 | 370 |
| 7 | 1,320 | 2,230 | 2,380 | 1,340 | 725 | 1,020 | 2,720 | 3,740 | 1,360 | 738 | 514 | 299 |
| 8 | 1,480 | 2,330 | 2,490 | 1,320 | 808 | 938 | 3,080 | 3,420 | 1,320 | 870 | 433 | 267 |
| 9 | *1,590 | 2,520 | 2,490 | 1,290 | 741 | 898 | 3,090 | 3,130 | 1,120 | 772 | 463 | 282 |
| 10 | 1,630 | 2,690 | 2,430 | 1,290 | 741 | 962 | 3,060 | 2,800 | 1,250 | 675 | 476 | 311 |
| 11 | 1,640 | 2,750 | 2,400 | 1,200 | 800 | 872 | 3,040 | 2,360 | 1,270 | 816 | 498 | 333 |
| 12 | 1,700 | 2,720 | 2,410 | 1,170 | 907 | 875 | 3,020 | 2,310 | 1,060 | 647 | 510 | 387 |
| 13 | 1,710 | 2,650 | 2,490 | 1,170 | 925 | 829 | 3,050 | 2,280 | 1,040 | 776 | 442 | 469 |
| 14 | 1,660 | 2,610 | 2,500 | 1,150 | 1,070 | 880 | 3,150 | 2,240 | 858 | 629 | 553 | 590 |
| 15 | 1,580 | 2,550 | 2,490 | 1,110 | 1,180 | 837 | *3,420 | 2,270 | 894 | 658 | 430 | 640 |
| 16 | 1,580 | 2,520 | 2,490 | 1,100 | 1,220 | 820 | 3,730 | 2,310 | *902 | 590 | 514 | 647 |
| 17 | 1,450 | 2,480 | 2,460 | 1,070 | 1,230 | 796 | 4,080 | 2,340 | 948 | 590 | 457 | 608 |
| 18 | 1,400 | 2,450 | 2,430 | 1,120 | 1,240 | 812 | 4,500 | 2,270 | 920 | 594 | 448 | 695 |
| 19 | 1,420 | 2,390 | 2,360 | 1,120 | 1,280 | 756 | *5,000 | 2,330 | 812 | 558 | 491 | 741 |
| 20 | 1,270 | 2,030 | 2,270 | 1,120 | 1,320 | 780 | 5,540 | 2,320 | 846 | 633 | 392 | 608 |
| 21 | 1,140 | 1,750 | 2,160 | 1,140 | 1,340 | 756 | 5,940 | 2,200 | 820 | 567 | 466 | 749 |
| 22 | 1,140 | 1,770 | 2,020 | 1,140 | 1,330 | 714 | 6,160 | 2,080 | 825 | 590 | 421 | 718 |
| 23 | 1,160 | *1,780 | 1,910 | 1,160 | 1,320 | 699 | 6,240 | 1,950 | 796 | 615 | 494 | 706 |
| 24 | 1,210 | 1,760 | 1,740 | 1,140 | 1,300 | 741 | 6,220 | 1,740 | 752 | 628 | 510 | *703 |
| 25 | 1,290 | 2,060 | 1,460 | *1,150 | 1,260 | 706 | 6,500 | 1,610 | 916 | 612 | *381 | 699 |
| 26 | 1,520 | 1,960 | 1,430 | 1,140 | 1,230 | 703 | 6,700 | 1,640 | 885 | *629 | 392 | 772 |
| 27 | 1,740 | 1,950 | 1,430 | 1,100 | 1,230 | 669 | 6,760 | 1,620 | 912 | 570 | 387 | 630 |
| 28 | 1,780 | 2,000 | 1,440 | 1,080 | 1,400 | 722 | 6,720 | 1,630 | 920 | 587 | 359 | 676 |
| 29 | 1,840 | 2,070 | 1,470 | 1,080 | 1,350 | 651 | 6,540 | 1,570 | 907 | 580 | 359 | 651 |
| 30 | 1,830 | 2,130 | 1,460 | 971 | ----- | 684 | 6,240 | 1,510 | 966 | 538 | 365 | 676 |
| 31 | 1,890 | ----- | 1,430 | 971 | ----- | 925 | ----- | 1,470 | ----- | 580 | 365 | ----- |
| Total | 44,637 | 66,400 | 65,830 | 36,842 | 31,064 | 26,821 | 124,910 | 84,470 | 31,379 | 21,038 | 13,884 | 15,751 |
| Mean | 1,440 | 2,213 | 2,124 | 1,188 | 1,071 | 865 | 4,164 | 2,725 | 1,046 | 630 | 448 | 525 |
| Cfs/m | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 6,200 Min 225 Mean 1,541 Cfs/m 2.13 In. 28.97
Water year 1959-60: Max 6,760 Min 208 Mean 1,538 Cfs/m 2.13 In. 29.00

* Discharge measurement made on this day.

2675. Raquette River at South Colton, N. Y.

Location.--Lat 44°30'40", long 74°53'00", on left bank 300 ft upstream from bridge on State Highway 56 at South Colton, St. Lawrence County, 500 ft downstream from South Colton powerplant, and three-quarters of a mile upstream from Cold Brook.

Drainage area.--939 sq mi.

Records available.--January 1953 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 882.05 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 1,660 cfs.

Extremes.--Maximum discharge during year, 7,100 cfs May 2 (gage height, 8.40 ft); minimum daily, 10 cfs Sept. 18.
1953-60: Maximum discharge, 8,330 cfs Apr. 22, 1954 (gage height, 9.07 ft); minimum, 1.5 cfs Aug. 25, 1957 (gage height, 1.50 ft); minimum daily, 4.6 cfs June 2, 1954.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Flow regulated by Carry Falls Reservoir (usable capacity, 5,011,000,000 cu ft) since 1953; considerable natural storage in large lakes above Piercefild.

Rating table, water year 1959-60 (gage height, in feet,
and discharge, in cubic feet per second)
(Shifting-control method used June 15-17)

| | | | |
|-----|-----|-----|-------|
| 1.7 | 6.1 | 3.0 | 409 |
| 1.8 | 13 | 4.0 | 1,080 |
| 1.9 | 26 | 5.0 | 2,050 |
| 2.0 | 42 | 6.0 | 3,270 |
| 2.2 | 84 | 9.0 | 8,200 |
| 2.5 | 180 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 1,210 | 1,380 | 2,180 | 1,450 | 2,470 | 2,350 | 2,010 | 5,300 | 2,000 | 1,540 | 1,150 | 1,110 |
| 2 | 1,120 | 1,370 | 2,360 | 1,800 | 2,140 | 2,180 | 2,580 | 5,870 | 1,800 | 1,260 | 1,120 | 913 |
| 3 | 552 | 1,550 | 2,290 | 1,950 | 2,240 | 2,200 | 3,280 | 6,200 | 1,700 | 724 | 1,250 | 772 |
| 4 | 654 | 2,120 | 2,400 | 2,090 | 2,190 | 1,650 | 2,830 | 5,120 | 1,600 | 706 | 1,460 | 360 |
| 5 | 1,510 | 2,050 | 2,360 | 1,820 | 2,100 | 1,890 | 2,580 | 4,760 | 1,600 | 1,490 | 1,310 | 710 |
| 6 | 1,190 | 2,210 | 2,220 | 1,740 | 2,030 | 1,850 | 3,100 | 4,600 | 1,450 | 1,590 | 754 | 902 |
| 7 | 1,070 | 2,170 | 2,560 | 1,960 | 1,650 | 2,150 | 3,440 | 4,920 | 1,390 | 1,730 | 1,030 | 1,060 |
| 8 | 1,450 | 1,710 | 3,400 | 2,100 | *2,000 | 2,210 | 3,400 | 4,400 | 1,540 | 1,700 | 1,110 | 1,110 |
| 9 | 1,250 | 2,530 | 3,500 | 1,840 | 1,850 | 2,140 | 3,390 | 3,980 | 1,660 | 828 | 592 | 1,080 |
| 10 | 558 | 3,450 | 3,430 | 1,790 | 2,310 | 2,020 | 3,360 | 3,450 | 1,540 | 676 | 1,030 | 212 |
| 11 | 816 | 3,450 | *3,340 | 1,650 | 2,000 | 2,020 | 3,340 | 3,200 | 1,480 | 1,200 | 1,030 | 708 |
| 12 | 1,150 | *3,440 | 3,230 | 1,500 | 1,790 | 1,950 | 2,980 | 3,370 | 744 | 1,340 | 992 | 883 |
| 13 | 1,550 | 3,410 | 3,070 | 1,960 | 1,310 | 1,560 | 2,550 | 2,600 | 1,500 | 1,120 | 370 | 844 |
| 14 | 1,380 | 3,410 | 2,880 | 2,060 | 1,670 | 2,110 | 3,430 | 2,590 | 1,880 | 1,270 | 835 | 814 |
| 15 | 1,350 | 3,250 | 3,360 | 2,330 | 1,810 | 1,850 | 3,500 | 2,460 | 1,520 | 1,120 | 739 | 1,190 |
| 16 | 1,410 | 3,390 | 2,990 | 2,090 | 2,040 | 2,060 | 3,440 | 3,260 | *1,300 | 640 | 1,020 | 1,070 |
| 17 | 333 | 3,430 | 2,860 | 1,950 | 1,800 | 2,050 | 3,410 | 3,120 | 2,000 | 762 | 1,240 | 90 |
| 18 | 1,120 | 3,430 | 3,220 | 1,920 | 1,990 | 2,130 | 3,410 | 3,300 | 1,220 | 977 | 830 | 10 |
| 19 | 1,380 | 3,430 | 2,830 | 1,850 | 2,010 | 1,790 | 3,410 | 3,230 | 1,160 | 1,300 | 1,140 | 1,210 |
| 20 | 1,420 | 3,430 | 2,210 | 2,050 | 2,010 | 1,610 | 3,430 | 2,980 | 1,330 | 1,620 | 242 | 1,100 |
| 21 | 1,840 | 2,620 | 2,630 | 2,060 | 1,980 | *2,310 | 3,430 | 2,220 | 1,810 | 1,460 | 686 | 1,250 |
| 22 | 1,280 | 2,640 | 2,250 | 2,000 | 2,020 | 1,730 | 3,400 | 2,390 | 1,700 | 1,400 | 1,010 | 1,240 |
| 23 | 1,150 | 2,350 | 2,790 | 1,790 | 1,990 | 1,780 | 3,400 | 2,270 | 1,700 | 690 | 825 | 1,010 |
| 24 | 332 | 2,540 | 2,550 | 1,680 | 1,890 | 1,480 | 3,500 | 2,750 | 1,700 | 600 | 820 | *418 |
| 25 | 824 | 2,240 | 1,790 | 1,980 | 2,320 | 1,550 | 4,160 | 2,800 | 740 | 1,340 | 1,120 | 95 |
| 26 | 1,860 | 2,110 | 1,740 | 2,050 | 2,110 | 775 | 4,100 | 2,600 | 960 | 1,130 | 1,300 | 975 |
| 27 | 1,330 | 2,250 | 1,910 | 2,220 | 1,950 | 352 | 4,160 | 2,330 | 1,450 | *1,100 | 168 | 952 |
| 28 | 1,840 | 2,360 | 2,070 | *1,830 | 1,730 | 1,220 | 5,210 | 2,470 | 1,520 | 1,290 | *428 | 1,140 |
| 29 | 1,440 | 2,100 | 2,130 | 1,900 | 1,980 | 1,330 | 5,860 | 2,300 | 1,860 | 1,450 | 970 | 90 |
| 30 | 1,260 | 2,540 | 1,770 | 1,650 | ----- | 1,270 | 6,100 | 1,300 | 1,460 | 802 | 919 | 1,030 |
| 31 | 1,340 | ----- | 2,050 | 2,050 | ----- | 1,620 | ----- | 2,200 | ----- | 580 | 1,090 | ----- |
| Total | 36,909 | 78,340 | 80,280 | 58,890 | 57,380 | 55,167 | 106,190 | 105,040 | 45,314 | 35,435 | 25,580 | 25,162 |
| Mean | 1,191 | 2,611 | 2,590 | 1,900 | 1,979 | 1,780 | 3,540 | 3,388 | 1,510 | 1,143 | 922 | 839 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| (+) | +555 | -42.7 | -56.8 | -492 | -632 | -497 | +1,878 | -72.3 | -165 | -379 | -390 | -263 |
| Calendar year 1959: Max | 5,940 | Min | 10 | Mean | 1,859 | Cfsm | 1.98 | In. | 26.88 | † | +71.8 | |
| Water year 1959-60: Max | 6,870 | Min | 10 | Mean | 1,947 | Cfsm | 2.07 | In. | 28.23 | † | -49.3 | |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Carry Falls Reservoir (furnished by Niagara Mohawk Power Corp.).

Note.--No gage-height record May 25, 26, May 28 to June 6, June 23-27; discharge estimated on basis of existing gage heights and powerplant record.

2677. Parkhurst Brook near Potsdam, N. Y.

Location.--Lat 44°39'11", long 74°58'15", on right bank 60 ft upstream from bridge on State Highways 56 and 72, 0.3 mile upstream from mouth, and 1.2 miles southeast of campus of State University of New York, College of Education, at Potsdam, St. Lawrence County.

Drainage area.--17.8 sq mi.

Records available.--August 1958 to September 1960 (no winter records).

Gage.--Water-stage recorder. Datum of gage is 412.19 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge recorded during year, 463 cfs Apr. 4 (gage height, 6.09 ft); maximum gage height recorded, 6.97 ft Apr. 3 (ice jam); minimum discharge recorded, 1.7 cfs Aug. 29 (gage height, 2.89 ft).
1958-60: Maximum discharge recorded, that of Apr. 4, 1960; maximum gage height recorded, that of Apr. 3, 1960; minimum discharge recorded, that of Aug. 29, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 3

Apr. 4 to Sept. 30

| | | | |
|-----|-----|-----|-----|
| 3.0 | 6.4 | 4.0 | 80 |
| 3.2 | 14 | 5.0 | 236 |
| 3.5 | 33 | | |

| | | | |
|------|-----|-----|-----|
| 2.86 | 1.9 | 3.7 | 40 |
| 2.9 | 2.5 | 4.2 | 99 |
| 3.1 | 7.0 | 5.0 | 235 |
| 3.4 | 19 | 6.0 | 442 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|------|------|------|------|------|-------|------|-------|-------|-------|-------|
| 1 | 17 | 35 | | | | | b200 | 25 | 80 | 6.5 | 2.9 | 2.5 |
| 2 | 26 | 31 | | | | | b180 | 24 | 78 | 6.0 | 2.9 | 2.5 |
| 3 | 13 | 25 | | | | | *b250 | 21 | 42 | 5.8 | 2.7 | 2.5 |
| 4 | 8.6 | 20 | | | | | *362 | *20 | 25 | 6.0 | 2.5 | 3.5 |
| 5 | 6.8 | 22 | | | | | *203 | 18 | 19 | 6.8 | 2.4 | 4.2 |
| 6 | 39 | 40 | | | | | 128 | 17 | 16 | 7.4 | 2.4 | *3.3 |
| 7 | 80 | 44 | | | | | 92 | 15 | 14 | 6.5 | 2.2 | 2.7 |
| 8 | 95 | 26 | | | | | *77 | 14 | *12 | 6.0 | 4.4 | 2.5 |
| 9 | 54 | 21 | | | | | 67 | 14 | 12 | 6.5 | 3.5 | 2.4 |
| 10 | 30 | 18 | | | | | 59 | 18 | 11 | 5.6 | 3.1 | 3.5 |
| 11 | 19 | 17 | | | | | 51 | 17 | 10 | 5.1 | 2.7 | 3.5 |
| 12 | *14 | *22 | | | | | 78 | 18 | 9.8 | 4.6 | 2.5 | 3.7 |
| 13 | 12 | 21 | | | | | 72 | 24 | 9.4 | 4.9 | 2.2 | 7.7 |
| 14 | 10 | 26 | | | | | 82 | 30 | 8.4 | *4.9 | 2.2 | 5.6 |
| 15 | 9.6 | 38 | | | | | 117 | 31 | 8.8 | 4.6 | 2.9 | 3.9 |
| 16 | 9.3 | 24 | | | | | 71 | 42 | 10 | 4.6 | 3.3 | 3.3 |
| 17 | 8.9 | 25 | | | | | 62 | 28 | 8.8 | 4.4 | 2.5 | 3.1 |
| 18 | 9.3 | b20 | | | | | 95 | 20 | 11 | 4.9 | *2.2 | 3.5 |
| 19 | 10 | b18 | | | | | 53 | 17 | 9.8 | 6.0 | 2.0 | 3.7 |
| 20 | 10 | b17 | | | | | 37 | 15 | 8.8 | 5.6 | 2.2 | 3.9 |
| 21 | 14 | 17 | | | | | 38 | 14 | 9.4 | 4.6 | 2.5 | 3.9 |
| 22 | 11 | 17 | | | | | 108 | 13 | 8.0 | 4.4 | 2.5 | 3.3 |
| 23 | 12 | b18 | | | | | 53 | 13 | 6.8 | 4.6 | 2.7 | 2.9 |
| 24 | 16 | 30 | | | | | 61 | 35 | 12 | 4.4 | 2.7 | 2.9 |
| 25 | 46 | 45 | | | | | 156 | 38 | 16 | 3.9 | 2.5 | 2.7 |
| 26 | 27 | 27 | | | | | 71 | 26 | 10 | 3.5 | 2.2 | 2.7 |
| 27 | 27 | 21 | | | | | 48 | 17 | 7.7 | 3.5 | 2.0 | 2.7 |
| 28 | 30 | b20 | | | | | 38 | 14 | 6.5 | 4.4 | 1.9 | 2.9 |
| 29 | 19 | b24 | | | | | 32 | 12 | 6.5 | 5.5 | 2.0 | 2.7 |
| 30 | 16 | b27 | | | | | 28 | 11 | 7.4 | 3.1 | 3.5 | 2.9 |
| 31 | 18 | | | | | | | 40 | | 3.3 | 3.1 | |
| Total | 717.5 | 756 | | | | | 2,969 | 661 | 493.9 | 155.9 | 81.3 | 101.1 |
| Mean | 23.1 | 25.2 | | | | | 99.0 | 21.3 | 16.5 | 5.03 | 2.62 | 3.37 |
| Cfsm | 1.30 | 1.42 | | | | | 5.56 | 1.20 | 0.927 | 0.283 | 0.147 | 0.189 |
| In. | 1.50 | 1.58 | | | | | 6.20 | 1.38 | 1.03 | 0.33 | 0.17 | 0.21 |

| | | | | | |
|---------------|-------|-----|------|------|-----|
| Calendar year | : Max | Min | Mean | Cfsm | In. |
| Water year | : Max | Min | Mean | Cfsm | In. |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2678. Trout Brook at Allen Corners, N. Y.

Location.--Lat 44°47'33", long 75°01'59", on left bank 250 ft upstream from bridge on State Highway 56A, at Allen Corners, St. Lawrence County, and 2 miles southwest of Norfolk.

Drainage area.--56.2 sq mi.

Records available.--September 1958 to September 1960 (no winter records).

Gage.--Water-stage recorder. Altitude of gage is 250 ft (from topographic map).

Extremes.--Maximum discharge recorded during year, 655 cfs Apr. 12 (gage height, 7.10 ft); maximum gage height observed, 9.4 ft Apr. 1 (ice jam); no flow for part of Aug. 20, 21, 1958-60: Maximum discharge recorded, 1,010 cfs Sept. 3, 1959 (gage height, 8.14 ft), from rating curve extended above 620 cfs on basis of logarithmic plotting; maximum gage height recorded, 9.66 ft Mar. 21, 1959 (ice jam); no flow for part of Aug. 20, 21, 1960.

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

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 10

Apr. 11 to Sept. 30

| | | | | | |
|-----------------|----|------|-----|-----|-----|
| 3.8 | 12 | 3.38 | 0.1 | 4.1 | 36 |
| 4.0 | 27 | 3.4 | .2 | 4.5 | 80 |
| 4.5 | 80 | 3.5 | 1.6 | 5.0 | 155 |
| | | 3.6 | 4.3 | 6.0 | 356 |
| Note.--Same as | | 3.7 | 8.1 | 7.0 | 625 |
| following table | | 3.9 | 20 | | |
| above 4.5 ft. | | | | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|---------|-------|--------|-------|
| 1 | 28 | 79 | | | | | - | 64 | 181 | 3.2 | 0.7 | 0.7 |
| 2 | 76 | 84 | | | | | - | 54 | 206 | 2.7 | .7 | .4 |
| 3 | 59 | 85 | | | | | - | 45 | 177 | 2.7 | .7 | .4 |
| 4 | 57 | 75 | | | | | - | 47 | 116 | 2.7 | .6 | .9 |
| 5 | 45 | 74 | | | | | - | 32 | 80 | 3.8 | .4 | .9 |
| 6 | 92 | 108 | | | | | - | 27 | 54 | 3.2 | .3 | .9 |
| 7 | 233 | 160 | | | | | - | 22 | *34 | 2.7 | .3 | .7 |
| 8 | 385 | 128 | | | | | - | 18 | 24 | 2.4 | .6 | *.6 |
| 9 | 342 | 99 | | | | | - | *17 | 18 | 2.1 | .6 | .4 |
| 10 | 221 | 73 | | | | | - | 21 | 15 | 1.9 | .6 | .6 |
| 11 | 145 | 59 | | | | | *a380 | 23 | 12 | 1.6 | .6 | .4 |
| 12 | 99 | 64 | | | | | *a620 | 34 | 10 | 1.4 | .4 | .7 |
| 13 | *70 | 62 | | | | | 480 | 97 | 8.6 | 1.2 | .3 | 1.0 |
| 14 | 54 | 70 | | | | | 442 | 143 | 7.0 | .9 | .2 | 1.4 |
| 15 | 43 | 88 | | | | | 505 | 124 | 7.3 | .9 | .2 | 1.2 |
| 16 | 36 | 75 | | | | | 338 | 133 | 8.1 | .7 | .2 | .9 |
| 17 | 32 | *78 | | | | | 342 | 100 | 7.3 | .7 | .1 | .9 |
| 18 | 29 | b68 | | | | | 462 | 68 | 7.3 | .7 | .1 | 1.0 |
| 19 | 28 | b58 | | | | | 298 | 49 | 6.2 | 1.2 | .1 | 1.0 |
| 20 | 26 | b50 | | | | | 176 | 35 | 5.4 | 1.2 | .1 | 1.2 |
| 21 | 27 | b41 | | | | | 128 | 28 | 4.7 | 1.0 | .2 | 1.2 |
| 22 | 26 | b35 | | | | | 287 | 26 | 4.0 | 1.0 | .2 | .9 |
| 23 | 29 | b36 | | | | | 214 | 24 | 3.5 | .9 | .2 | .9 |
| 24 | 42 | 60 | | | | | 190 | 48 | 5.1 | .9 | .2 | .7 |
| 25 | 86 | 104 | | | | | 470 | 113 | 7.3 | *.9 | .1 | .6 |
| 26 | 99 | b92 | | | | | 358 | 120 | 7.0 | .9 | *.2 | .6 |
| 27 | 101 | b74 | | | | | 190 | 83 | 5.1 | .9 | .2 | .6 |
| 28 | 100 | b54 | | | | | 130 | 52 | 4.0 | .7 | .2 | .4 |
| 29 | 79 | b72 | | | | | 97 | 34 | 3.5 | .7 | .2 | .4 |
| 30 | 67 | b82 | | | | | 75 | 25 | 3.8 | .7 | .7 | .6 |
| 31 | 62 | ----- | | | | | 45 | ----- | ----- | .9 | .9 | ----- |
| Total | 2,818 | 2,287 | - | - | - | - | - | 1,751 | 1,032.2 | 47.4 | 11.1 | 23.1 |
| Mean | 90.9 | 76.2 | - | - | - | - | - | 56.5 | 34.4 | 1.53 | 0.36 | 0.77 |
| Cfs/m | 1.62 | 1.36 | - | - | - | - | - | 1.01 | 0.612 | 0.027 | 0.0064 | 0.014 |
| In. | 1.86 | 1.51 | - | - | - | - | - | 1.16 | 0.68 | 0.03 | 0.007 | 0.02 |

| | | | | | |
|---------------|-------|-----|------|-------|-----|
| Calendar year | : Max | Min | Mean | Cfs/m | In. |
| Water year | : Max | Min | Mean | Cfs/m | In. |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of records for nearby stations.

b Stage-discharge relation affected by ice.

2680. Raquette River at Raymondville, N. Y.

Location.--Lat 44°50'20", long 74°58'45", on right bank 250 ft upstream from old highway bridge at Raymondville, St. Lawrence County, 0.3 mile downstream from Trout Brook, 0.4 mile downstream from powerplant of Niagara Mohawk Power Corp., and 18 miles upstream from mouth.

Drainage area.--1,131 sq mi.

Records available.--November 1943 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 183.33 ft above mean sea level, datum of 1929.

Average discharge.--16 years (1944-60), 2,014 cfs.

Extremes.--Maximum discharge during year, 8,720 cfs Apr. 4 (gage height, 6.71 ft); minimum, 8.8 cfs Sept. 29, 30; minimum daily, 722 cfs Aug. 18.
1943-60: Maximum discharge, 11,000 cfs Apr. 17, 1954 (gage height, 7.60 ft); maximum gage height, 9.24 ft Feb. 22, 1954 (backwater from ice); minimum discharge, 4.4 cfs Oct. 15, 1951; minimum daily, 7.0 cfs Oct. 15, 1951; minimum gage height, 0.42 ft July 13, 1950.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated by Carry Falls Reservoir (usable capacity, 5,011,000,000 cu ft) about 46 miles upstream, since 1953; considerable natural storage in large lakes above Piercefield. Records of chemical analyses and water temperatures for the water year 1960 are given in WSP 1741.

Rating tables, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1-19

Oct. 20 to Sept. 30

| | | | | | |
|-----|-------|-----|-------|-----|-------|
| 2.5 | 1,010 | 2.0 | 600 | 6.0 | 7,070 |
| 3.0 | 1,550 | 3.0 | 1,670 | 7.0 | 9,440 |
| 4.0 | 3,000 | 4.0 | 3,080 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|---------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1 | 1,330 | 2,010 | 2,760 | 2,400 | 2,250 | 2,400 | 4,030 | 6,450 | 3,000 | 1,700 | 1,320 | 1,110 |
| 2 | 1,790 | 2,090 | 2,740 | 2,400 | 2,200 | 2,400 | 4,990 | 6,120 | 3,320 | 1,700 | 1,680 | 886 |
| 3 | 1,070 | 2,050 | 2,810 | 2,400 | *2,150 | 2,350 | 7,270 | 6,430 | 2,430 | 1,100 | 1,780 | 910 |
| 4 | 1,300 | 2,120 | 3,080 | 2,350 | 2,150 | 2,350 | 8,440 | 6,140 | 2,130 | 1,200 | 749 | 1,050 |
| 5 | 1,190 | 2,250 | 3,380 | 2,350 | 2,150 | 2,350 | 6,980 | 5,570 | 1,930 | 1,700 | 1,200 | 1,080 |
| 6 | 1,560 | 2,360 | 3,410 | 2,300 | 2,200 | 2,300 | 5,530 | 5,110 | 1,880 | 1,700 | 1,300 | 995 |
| 7 | 2,010 | 2,920 | 4,030 | 2,300 | 2,300 | 2,300 | 5,190 | 3,990 | 1,880 | 1,700 | 1,190 | 1,360 |
| 8 | 2,240 | 2,870 | 4,170 | *2,300 | 2,300 | 2,300 | 5,210 | 5,130 | 1,820 | 1,700 | 1,270 | 1,040 |
| 9 | 2,110 | 2,790 | 4,150 | 2,250 | 2,250 | 2,300 | *5,150 | 4,830 | 1,780 | 1,550 | 959 | 778 |
| 10 | 1,890 | 3,480 | 3,970 | 2,250 | 2,200 | 2,300 | 4,930 | 4,290 | 1,730 | 1,160 | 966 | 746 |
| 11 | 1,700 | 3,540 | 4,110 | 2,250 | 2,400 | 2,250 | 4,830 | 3,990 | 1,750 | 1,160 | 944 | 820 |
| 12 | 1,550 | 3,690 | 4,050 | 2,250 | 2,700 | 2,250 | 4,870 | 3,800 | 1,630 | 1,200 | 1,020 | 1,100 |
| 13 | 1,510 | 3,900 | 4,130 | 2,250 | 2,700 | 2,100 | 3,690 | 3,900 | 1,720 | 1,140 | 1,030 | 1,010 |
| 14 | 1,390 | 3,950 | 4,110 | 2,250 | 2,600 | 2,200 | 4,150 | 3,540 | *1,680 | 1,100 | 941 | 1,020 |
| 15 | 1,410 | 3,970 | 3,690 | 2,550 | 2,500 | 2,200 | 5,670 | 3,930 | 1,740 | 1,250 | 1,060 | 942 |
| 16 | 1,430 | 3,930 | *3,860 | 2,350 | 2,450 | *2,200 | 5,110 | 3,560 | 1,670 | 1,330 | 1,050 | 993 |
| 17 | 1,420 | *3,930 | 4,050 | 2,300 | 2,450 | 2,200 | 5,030 | 3,450 | 1,710 | 1,130 | 1,010 | 1,020 |
| 18 | 1,340 | 3,880 | 3,970 | 2,250 | 2,450 | 2,250 | 5,270 | 4,330 | 1,700 | 1,380 | 722 | 956 |
| 19 | *1,480 | 3,840 | 3,320 | 2,250 | 2,400 | 2,200 | 4,750 | 3,820 | 1,700 | 872 | 776 | 1,050 |
| 20 | 1,340 | 3,820 | 3,040 | 2,250 | 2,400 | 2,200 | 4,270 | 3,740 | 1,700 | 1,840 | 1,170 | 968 |
| 21 | 1,500 | 3,700 | 2,900 | 2,250 | 2,400 | 2,200 | 4,190 | 3,560 | 1,700 | 1,620 | 1,100 | *989 |
| 22 | 1,390 | 3,080 | 2,800 | 2,250 | 2,400 | 2,200 | 4,670 | 2,820 | 1,600 | 1,270 | 1,040 | 974 |
| 23 | 1,570 | 2,980 | 2,800 | 2,250 | 2,350 | 2,150 | 4,410 | 2,580 | 1,700 | 1,440 | 967 | 922 |
| 24 | 1,660 | 2,890 | 2,700 | 2,200 | 2,350 | 2,000 | 4,390 | 2,760 | 1,800 | 1,080 | 727 | 980 |
| 25 | 1,740 | 2,790 | 2,700 | 2,200 | 2,400 | 1,900 | 5,170 | 3,650 | 1,800 | 1,370 | 838 | 1,020 |
| 26 | 1,870 | 2,720 | 2,600 | 2,200 | 2,500 | 1,650 | 5,210 | 3,560 | 1,000 | 1,500 | 972 | 1,050 |
| 27 | 1,480 | 2,760 | 2,600 | 2,200 | 2,450 | 1,400 | 5,250 | 3,220 | 1,700 | *1,280 | 1,050 | 1,080 |
| 28 | 1,820 | 2,730 | 2,500 | 2,300 | 2,450 | 1,450 | 5,310 | 2,430 | 1,700 | 1,310 | 968 | 910 |
| 29 | 1,920 | 2,680 | 2,500 | 2,400 | 2,400 | 1,500 | 5,490 | 2,020 | 1,700 | 1,260 | 1,190 | 801 |
| 30 | 1,860 | 2,680 | 2,450 | 2,400 | ----- | 1,800 | 6,200 | 1,870 | 1,700 | 1,250 | 808 | 1,070 |
| 31 | 1,920 | ----- | 2,450 | 2,350 | ----- | 2,280 | ----- | 2,040 | ----- | 1,170 | *970 | ----- |
| Total | 49,790 | 92,400 | 101,830 | 71,050 | 68,900 | 65,930 | 155,650 | 122,230 | 55,360 | 42,162 | 32,767 | 29,630 |
| Mean | 1,606 | 3,080 | 3,285 | 2,292 | 2,376 | 2,127 | 5,188 | 3,943 | 1,845 | 1,360 | 1,057 | 988 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 6,370 Min 620 Mean 2,216 Cfsm 1.96 In. 26.60
Water year 1959-60: Max 8,440 Min 722 Mean 2,425 Cfsm 2.14 In. 29.19

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 21 to Mar. 29. No gage-height record June 18 to July 14; discharge estimated on basis of powerplant records.

2682. Plum Brook at Grantville, N. Y.

Location.--Lat 44°52'45", long 74°54'52", on right bank 175 ft upstream from highway bridge at Grantville, St. Lawrence County, 0.7 mile downstream from tributary, 1.1 miles upstream from mouth, and 2.3 miles southwest of Massena city limits.

Drainage area.--37.6 sq mi.

Records available.--September 1958 to September 1960 (no winter records).

Gage.--Water-stage recorder. Datum of gage is 204.26 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge recorded during year, 1,180 cfs Apr. 4 (gage height, 5.99 ft); no flow Aug. 11 to Sept. 5.
1958-60: Maximum discharge recorded, that of Apr. 4, 1960; no flow Aug. 11 to Sept. 5, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 5

Apr. 6 to Sept. 30

| | | | | | | | |
|-----|-----|-----|-------|-----|----|-----|-----|
| 1.7 | 13 | 4.0 | 304 | 0.8 | 0 | 1.2 | 1.1 |
| 2.0 | 29 | 4.5 | 444 | .9 | .1 | 1.3 | 2.5 |
| 2.5 | 72 | 5.0 | 640 | 1.0 | .1 | 1.5 | 6.5 |
| 3.0 | 129 | 6.0 | 1,180 | 1.1 | .4 | 1.7 | 13 |
| 3.5 | 204 | | | | | | |

Note.--Same as preceding table above 1.7 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------|-------|-------|------|------|------|------|--------|-------|-------|-------|---------|--------|
| 1 | 16 | 59 | | | | | b180 | 79 | 90 | 3.7 | 0.1 | 0 |
| 2 | 26 | 61 | | | | | b360 | 88 | 90 | 3.2 | .1 | 0 |
| 3 | 24 | 55 | | | | | *613 | 59 | 66 | 2.7 | .1 | 0 |
| 4 | 21 | 50 | | | | | *966 | 52 | 50 | 2.4 | .1 | 0 |
| 5 | 18 | 56 | | | | | 1,090 | 41 | 42 | 2.5 | .1 | 0 |
| 6 | 26 | 86 | | | | | 759 | 33 | 41 | 2.2 | .1 | .1 |
| 7 | 77 | 103 | | | | | 618 | 28 | *35 | 1.9 | .1 | *.1 |
| 8 | 122 | 78 | | | | | 553 | 24 | 29 | 1.8 | .1 | .1 |
| 9 | 129 | 62 | | | | | 489 | *21 | 26 | 1.8 | .1 | .1 |
| 10 | 129 | 55 | | | | | 428 | 20 | 23 | 1.6 | .1 | .1 |
| 11 | 129 | 52 | | | | | 403 | 17 | 20 | 1.3 | 0 | .1 |
| 12 | 116 | 56 | | | | | 582 | 17 | 17 | 1.1 | 0 | .1 |
| 13 | 93 | 53 | | | | | 485 | 30 | 16 | 1.0 | 0 | .1 |
| 14 | 75 | 55 | | | | | 454 | 50 | 13 | 1.0 | 0 | .1 |
| 15 | 62 | 62 | | | | | 454 | 34 | 14 | .8 | 0 | .1 |
| 16 | 51 | 51 | | | | | 311 | 36 | 12 | .6 | 0 | .1 |
| 17 | 43 | *50 | | | | | 284 | 38 | 10 | .7 | 0 | .1 |
| 18 | 38 | b46 | | | | | 344 | 34 | 10 | .6 | *0 | .1 |
| 19 | *35 | 41 | | | | | 228 | 30 | 8.5 | 1.0 | 0 | .1 |
| 20 | 31 | b36 | | | | | 166 | 27 | 7.4 | .6 | 0 | .1 |
| 21 | | 32 | | | | | 141 | 26 | 6.8 | .6 | 0 | .2 |
| 22 | 29 | 30 | | | | | 232 | 24 | 6.0 | .6 | 0 | .1 |
| 23 | 28 | 30 | | | | | 156 | 23 | 5.3 | .7 | 0 | .1 |
| 24 | 35 | 48 | | | | | 144 | 31 | 6.5 | .5 | 0 | .1 |
| 25 | 56 | 76 | | | | | 259 | 40 | 7.7 | *.4 | 0 | .1 |
| 26 | 54 | b58 | | | | | 201 | 36 | 6.0 | .3 | 0 | .1 |
| 27 | 47 | b48 | | | | | 189 | 30 | 5.1 | .2 | 0 | .1 |
| 28 | 49 | b41 | | | | | 138 | 24 | 4.7 | .2 | 0 | .1 |
| 29 | 42 | b40 | | | | | 110 | 22 | 4.1 | .2 | 0 | .1 |
| 30 | 42 | b40 | | | | | 91 | 19 | 4.3 | .1 | 0 | .1 |
| 31 | 45 | ----- | | | | | ----- | 30 | ----- | .1 | 0 | ----- |
| Total | 1,715 | 1,608 | | | | | 11,428 | 1,041 | 676.4 | 36.4 | 1.0 | 2.6 |
| Mean | 55.3 | 53.6 | | | | | 381 | 33.6 | 22.5 | 1.17 | 0.032 | 0.087 |
| Cfs/in. | 1.47 | 1.43 | | | | | 10.1 | 0.894 | 0.598 | 0.031 | 0.00085 | 0.0023 |
| In. | 1.70 | 1.59 | | | | | 11.30 | 1.03 | 0.67 | 0.04 | 0.001 | 0.003 |

| | | | | | |
|---------------|-------|-----|------|------|-----|
| Calendar year | : Max | Min | Mean | Cfsm | In. |
| Water year | : Max | Min | Mean | Cfsm | In. |

* Discharge measurement or observation of no flow made on this day.

b Stage-discharge relation affected by ice.

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER

2683. Squeak Brook near Massena, N. Y.

Location.--Lat 44°56'30", long 74°47'50", on downstream side of highway bridge on South Raquette River Road, 0.1 mile upstream from mouth and 4.7 miles east of Grass River bridge at Massena, St. Lawrence County. Prior to Apr. 4, 1960, at site 0.4 mile upstream.

Drainage area.--42.3 sq mi.

Records available.--October 1958 to November 1960 (no winter records), discontinued.

Gage.--Wire-weight gage, read twice daily. Altitude of gage is 180 ft (from topographic map). Prior to Apr. 4, 1960, water-stage recorder at site 0.4 mile upstream at different datum.

Extremes.--1959-60: Maximum discharge observed during water year, 459 cfs Apr. 14; no flow July 28 to Sept. 30.

1960: Maximum discharge observed during period October to November, 46 cfs Oct. 26 (gage height, 2.98 ft); no flow Oct. 1-5, 8-15, 17-19.

1958-60: Maximum discharge recorded, 543 cfs Apr. 6, 1959 (gage height, 7.26 ft, site and datum then in use); maximum gage height recorded, 7.91 ft Apr. 2, 1959, site and datum then in use (ice jam); no flow July 28 to Oct. 5, Oct. 8-15, 17-19, 1960.

Remarks.--Records fair except those for periods of ice effect, backwater from Raquette River or no gage-height record, which are poor.

Rating tables, Oct. 1, 1959, to Nov. 30, 1960, except periods of ice effect or backwater from Raquette River (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1, 1959, to Apr. 28, 1960

Apr. 29 to Nov. 30, 1960

| | | | | | | | | | |
|-----|-----|-----|----|-----|----|-----|-----|-----|----|
| 4.2 | 1.6 | 4.8 | 21 | 1.5 | 0 | 1.8 | 1.1 | 2.3 | 14 |
| 4.3 | 3.3 | 5.3 | 50 | 1.6 | .2 | 1.9 | 2.4 | 2.7 | 31 |
| 4.5 | 8.3 | 5.7 | 85 | 1.7 | .5 | 2.0 | 4.3 | 3.2 | 58 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|--------|------|-------|
| 1 | 1.8 | 30 | | | | | - | 50 | 25 | 0.9 | | |
| 2 | 7.2 | 36 | | | | | - | 41 | 51 | .8 | | |
| 3 | 12 | 33 | | | | | - | 33 | 35 | .7 | | |
| 4 | 10 | 30 | | | | | - | 27 | 31 | .6 | | |
| 5 | 8.3 | 34 | | | | | - | 22 | 22 | .6 | | |
| 6 | 10 | 50 | | | | | - | *18 | 16 | *.5 | | |
| 7 | 24 | 76 | | | | | - | 15 | *12 | .4 | | (*) |
| 8 | 56 | 56 | | | | | - | 13 | 9.7 | .4 | | |
| 9 | 55 | 44 | | | | | - | 11 | 7.4 | .4 | | |
| 10 | 56 | 41 | | | | | - | 10 | 6.0 | .3 | | |
| 11 | 50 | 35 | | | | | - | *9.4 | 4.9 | .2 | | |
| 12 | 40 | 33 | | | | | - | 9.8 | 4.1 | .2 | | |
| 13 | 33 | 33 | | | | | - | 30 | 3.5 | *.2 | | |
| 14 | 27 | 35 | | | | | +459 | 48 | *3.2 | .2 | | |
| 15 | 22 | 44 | | | | | - | 39 | 3.4 | .2 | | |
| 16 | 18 | 41 | | | | | - | 40 | 3.5 | .1 | | |
| 17 | 15 | *40 | | | | | - | *42 | 3.5 | .1 | | |
| 18 | 12 | 38 | | | | | - | 32 | 3.2 | .1 | | (*) |
| 19 | *10 | 32 | | | | | - | 25 | 3.0 | .2 | | |
| 20 | 11 | 26 | | | | | +143 | 20 | 2.8 | .1 | | |
| 21 | 11 | 24 | | | | | - | 16 | 2.1 | .2 | | |
| 22 | 11 | 22 | | | | | - | 14 | *1.9 | .2 | | |
| 23 | 11 | 22 | | | | | - | 13 | 1.6 | .2 | | |
| 24 | 15 | 32 | | | | | - | 19 | 2.2 | .1 | | |
| 25 | 28 | 56 | | | | | - | 42 | 2.8 | *.1 | | |
| 26 | 36 | 48 | | | | | - | 30 | 2.2 | .1 | | |
| 27 | 35 | b35 | | | | | - | 21 | 1.7 | .1 | | |
| 28 | 37 | b32 | | | | | - | 14 | 1.3 | 0 | | |
| 29 | 32 | b31 | | | | | +72.7 | 10 | *1.0 | 0 | | |
| 30 | 26 | b30 | | | | | - | 8.8 | 1.0 | 0 | | |
| 31 | 24 | ----- | | | | | - | 9.1 | ----- | 0 | | |
| Total | 744.3 | 1,119 | - | - | - | - | - | 732.1 | 268.0 | 8.2 | 0 | 0 |
| Mean | 24.0 | 37.3 | - | - | - | - | - | 23.6 | 8.93 | 0.26 | 0 | 0 |
| Cfsm | 0.567 | 0.882 | - | - | - | - | - | 0.558 | 0.211 | 0.0061 | 0 | 0 |
| In. | 0.65 | 0.98 | - | - | - | - | - | 0.64 | 0.24 | 0.007 | 0 | 0 |

Calendar year

: Max

Min

Mean

Cfsm

In.

Water year

: Max

Min

Mean

Cfsm

In.

* Discharge measurement or observation of no flow made on this day.

† Result of discharge measurement.

b Stage-discharge relation affected by ice.

Note.--No gage-height record Oct. 11-18, May 22, 28-30, June 6, 18, 19, 24-28, June 30 to July 5, July 7, 26; discharge estimated on basis of weather records and records for nearby stations. Backwater from Raquette River May 1-16, 18-21, 26, 27 (no gage-height record May 7, 8).

Discharge, in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|---------------------------------------|------|------|-----|------|------|-----|------|------|-----|------|------|-----|-------|-------|
| 1 | 0 | 2.3 | 7 | 0.1 | 2.3 | 13 | 0 | a4.3 | 19 | 0 | 5.1 | 25 | 21 | a4.2 |
| 2 | 0 | 2.4 | 8 | 0 | 2.4 | 14 | 0 | 4.9 | 20 | .1 | 4.6 | 26 | 46 | a3.8 |
| 3 | 0 | 2.6 | 9 | 0 | 3.0 | 15 | 0 | 6.5 | 21 | .1 | 3.7 | 27 | 45 | a3.8 |
| 4 | 0 | 3.0 | 10 | 0 | 3.4 | 16 | .1 | 8.1 | 22 | .2 | a3.7 | 28 | 37 | a3.8 |
| 5 | *0 | 2.6 | 11 | 0 | 3.7 | 17 | 0 | 8.1 | 23 | .2 | a4.2 | 29 | 26 | a4.4 |
| 6 | .1 | 2.2 | 12 | 0 | 3.7 | 18 | 0 | *6.8 | 24 | 1.6 | a4.6 | 30 | 17 | a5.0 |
| | | | | | | | | | | | | 31 | 4.9 | |
| Total | | | | | | | | | | | | | 199.4 | 123.6 |
| Mean | | | | | | | | | | | | | 6.43 | 4.12 |
| Cubic feet per second per square mile | | | | | | | | | | | | | 0.152 | 0.037 |
| Runoff in inches | | | | | | | | | | | | | 0.18 | 0.11 |

* Discharge measurement or observation of no flow made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

2686. East Branch St. Regis River near Meacham Lake, N. Y.

Location.--Lat 44°33'13", long 74°18'34", on left bank 20 ft upstream from bridge on State Highway 10, 30 ft downstream from dam at outlet of Meacham Lake, 2.1 miles southwest of town of Meacham Lake, Franklin County.

Drainage area.--49.4 sq mi.

Records available.--August 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,547.86 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 762 cfs Apr. 19 (gage height, 4.74 ft); minimum, 17 cfs July 27.

1958-60: Maximum discharge, that of Apr. 19, 1960; minimum, that of July 27, 1960.

Remarks.--Records good except those for period of no gage-height record, which are fair. Seasonal distribution of flow slightly modified by storage in lakes and ponds above station.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Feb. 15 to Apr. 1, Sept. 13-30)

| | | | |
|-----|-----|-----|-----|
| 0.6 | 19 | 3.5 | 420 |
| 1.0 | 60 | 4.7 | 748 |
| 2.0 | 183 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 54 | 78 | 76 | 54 | 49 | 51 | 106 | 239 | 96 | 41 | 28 | 30 |
| 2 | 61 | 80 | 73 | 53 | 49 | 48 | 126 | 213 | 105 | 38 | 25 | 28 |
| 3 | 64 | 80 | 70 | 63 | 49 | 47 | *143 | 191 | 111 | 34 | 27 | 26 |
| 4 | 67 | 78 | 69 | 69 | 49 | 47 | 197 | 176 | 116 | 34 | 25 | 28 |
| 5 | 66 | 78 | 67 | 66 | 49 | 47 | *239 | 160 | 113 | 34 | 24 | 32 |
| 6 | 72 | 87 | 66 | 63 | 48 | 46 | *266 | 144 | 105 | 38 | 23 | 30 |
| 7 | 98 | 100 | 73 | 62 | 52 | 46 | 273 | 132 | 93 | 36 | 23 | 30 |
| 8 | 112 | 102 | 83 | 66 | 53 | 46 | *274 | 122 | 82 | *32 | 25 | 30 |
| 9 | 118 | 102 | 84 | 63 | 53 | 45 | 260 | 113 | 76 | 32 | 27 | 32 |
| 10 | 121 | 96 | *93 | 59 | 54 | 45 | 232 | 107 | *69 | 32 | 27 | *51 |
| 11 | 114 | 87 | 92 | 54 | 66 | 45 | 205 | 105 | 60 | 32 | 26 | 47 |
| 12 | 90 | 78 | 100 | 50 | 80 | 45 | 191 | *104 | 52 | 30 | 24 | 45 |
| 13 | 84 | 74 | 121 | 51 | 82 | 44 | 197 | 110 | 47 | 30 | 25 | 57 |
| 14 | 78 | 73 | 124 | 51 | 88 | 44 | 212 | 118 | 47 | 28 | 24 | 61 |
| 15 | 67 | 80 | 123 | 52 | *90 | 44 | 291 | 130 | 48 | 25 | 28 | 57 |
| 16 | 62 | *81 | 127 | 57 | 89 | 43 | *436 | 153 | 48 | 24 | 28 | 50 |
| 17 | 57 | 81 | 128 | 56 | 87 | 43 | 556 | 164 | 51 | 23 | 27 | 41 |
| 18 | 56 | 79 | 118 | 50 | 83 | 43 | 688 | 170 | 54 | 25 | 26 | 41 |
| 19 | 53 | 76 | 105 | 48 | 86 | 42 | *741 | 167 | 53 | 25 | 26 | 43 |
| 20 | *51 | 70 | 94 | 49 | 89 | 42 | 601 | 158 | 53 | 26 | 26 | 46 |
| 21 | 52 | 69 | 82 | 49 | 83 | 42 | *461 | 141 | 51 | 27 | 27 | 48 |
| 22 | 51 | 67 | 74 | 47 | 72 | *42 | 402 | 130 | 48 | 26 | 30 | 42 |
| 23 | 56 | 63 | 68 | 46 | 67 | 41 | 366 | 126 | 47 | 28 | 41 | 36 |
| 24 | 66 | 64 | 62 | 45 | 63 | 40 | 362 | 131 | 47 | 28 | 36 | 34 |
| 25 | 88 | 66 | 59 | 44 | 60 | 39 | 389 | 138 | 52 | 28 | *34 | 30 |
| 26 | 100 | 70 | 58 | *45 | 62 | 37 | 412 | 136 | 51 | 25 | 32 | 28 |
| 27 | 101 | 78 | 57 | 45 | 60 | 36 | 404 | 132 | 50 | 22 | 30 | 26 |
| 28 | 95 | 89 | 54 | 46 | 58 | 43 | 360 | 122 | 47 | 24 | 28 | 21 |
| 29 | 88 | 82 | 61 | 47 | 54 | 45 | 312 | 108 | 45 | 22 | 30 | 21 |
| 30 | 79 | 78 | 62 | 47 | ----- | 53 | 272 | 99 | 43 | 25 | 40 | 21 |
| 31 | 76 | ----- | 59 | 46 | ----- | 76 | ----- | 93 | ----- | 28 | 36 | ----- |
| Total | 2,397 | 2,386 | 2,582 | 1,643 | 1,924 | 1,397 | 9,974 | 4,332 | 1,960 | 902 | 878 | 1,112 |
| Mean | 77.3 | 79.5 | 83.3 | 53.0 | 66.3 | 45.1 | 332 | 140 | 65.3 | 29.1 | 28.3 | 37.1 |
| Cfsm | 1.56 | 1.61 | 1.69 | 1.07 | 1.34 | 0.913 | 6.72 | 2.83 | 1.32 | 0.589 | 0.573 | 0.751 |
| In. | 1.80 | 1.80 | 1.94 | 1.24 | 1.45 | 1.05 | 7.51 | 3.26 | 1.48 | 0.68 | 0.66 | 0.84 |

Calendar year 1959: Max 430 Min 27 Mean 84.2 Cfsm 1.70 In. 23.13
Water year 1959-60: Max 741 Min 21 Mean 86.0 Cfsm 1.74 In. 23.71

* Discharge measurement made on this day.

Note.--No gage-height record Mar. 4-26; discharge estimated on basis of weather record; and records for nearby stations.

2687. St. Regis River at St. Regis Falls, N. Y.

Location.--Lat 44°40'22", long 74°32'56", on left bank 150 ft upstream from lower bridge on State Highway 72 in St. Regis Falls, Franklin County, and 6.4 miles downstream from East Branch St. Regis River.

Drainage area.--230 sq mi.

Records available.--August 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,219.93 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 3,330 cfs Apr. 18 (gage height, 5.73 ft); minimum, 40 cfs Sept. 8 (gage height, 0.34 ft); minimum daily, 71 cfs July 3.
1958-60: Maximum discharge, that of Apr. 18, 1960; minimum, that of Sept. 8, 1960; minimum daily, that of July 3, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair. Slight regulation by small reservoirs above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 26 to June 7, Sept. 14, 15)

| | | | |
|-----|-----|-----|-------|
| 0.6 | 69 | 3.0 | 1,040 |
| 1.0 | 139 | 5.0 | 2,620 |
| 1.5 | 266 | 5.6 | 3,200 |
| 2.0 | 475 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|-------|--------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 139 | 337 | 370 | 253 | 223 | 270 | *900 | 932 | 539 | 203 | 122 | 115 |
| 2 | 188 | 392 | 398 | 247 | 223 | 270 | *1,100 | 842 | 644 | 108 | 116 | 169 |
| 3 | 237 | 401 | 379 | 277 | 223 | 270 | *1,420 | 770 | 596 | 71 | 111 | 191 |
| 4 | 220 | 375 | 370 | 333 | 220 | 266 | *1,920 | 689 | 519 | 120 | 106 | 166 |
| 5 | 206 | 370 | 375 | 366 | 217 | 266 | *2,170 | 628 | 442 | 159 | 100 | 151 |
| 6 | 266 | 392 | 388 | 358 | 217 | 263 | 2,030 | 570 | 383 | 174 | 99 | 190 |
| 7 | 478 | 447 | 461 | 349 | 226 | 256 | 1,770 | 524 | 345 | *177 | 99 | 157 |
| 8 | 794 | 485 | 623 | 350 | 235 | 250 | 1,570 | 470 | 514 | 166 | 107 | *104 |
| 9 | 782 | 447 | 565 | 330 | 244 | 245 | 1,340 | *433 | *284 | 157 | 102 | 110 |
| 10 | 656 | 592 | *480 | 300 | 247 | 240 | 1,140 | 424 | 291 | 149 | 100 | 114 |
| 11 | 534 | 349 | 447 | 295 | 362 | 235 | 998 | 424 | 234 | 143 | 106 | 194 |
| 12 | 447 | 325 | 461 | 280 | 555 | 234 | 1,010 | 406 | 206 | 135 | 106 | 220 |
| 13 | 396 | 306 | 650 | 277 | 580 | 231 | 1,250 | 414 | 209 | 130 | 104 | 284 |
| 14 | 345 | 298 | 782 | 263 | 600 | 228 | 1,520 | 447 | 206 | 120 | 99 | 358 |
| 15 | 310 | 337 | 723 | 263 | *580 | 217 | 2,420 | 504 | 206 | 120 | 102 | 314 |
| 16 | 273 | *366 | 678 | 260 | 550 | 206 | 2,960 | 650 | 212 | 115 | 104 | 253 |
| 17 | 247 | 354 | 656 | 253 | 504 | 217 | 2,860 | 788 | 220 | 111 | 109 | 209 |
| 18 | 237 | 337 | 591 | 250 | 461 | 214 | 3,180 | 717 | 231 | 111 | 109 | 188 |
| 19 | 231 | 306 | 504 | 256 | 442 | 212 | 3,050 | 607 | 247 | 113 | 106 | 188 |
| 20 | *231 | 266 | 430 | 247 | 419 | 212 | 2,430 | 519 | 244 | 118 | 104 | 196 |
| 21 | 234 | 263 | 360 | 244 | 379 | 212 | 1,960 | 456 | 240 | 124 | 108 | 209 |
| 22 | 234 | 270 | 300 | 240 | 350 | *212 | 1,860 | 424 | 234 | 130 | 106 | 209 |
| 23 | 234 | 266 | 290 | 234 | 341 | 209 | 1,840 | 419 | 228 | 126 | 115 | 198 |
| 24 | 240 | 298 | 266 | 228 | 340 | 206 | 1,670 | 461 | 220 | 130 | 133 | 177 |
| 25 | 322 | 379 | 256 | 231 | 322 | 205 | 1,850 | 570 | 223 | 135 | *133 | 166 |
| 26 | 447 | 414 | 253 | *231 | 318 | 205 | 1,990 | 596 | 231 | 135 | 124 | 157 |
| 27 | 456 | 358 | 250 | 228 | 302 | 206 | 1,670 | 534 | 234 | 130 | 116 | 151 |
| 28 | 437 | 333 | 256 | 228 | 295 | 220 | 1,390 | 452 | 220 | 126 | 109 | 147 |
| 29 | 396 | 325 | 260 | 226 | 284 | 280 | 1,200 | 392 | 209 | 126 | 106 | 139 |
| 30 | 357 | 349 | 263 | 223 | ----- | 440 | 1,050 | 354 | 201 | 130 | 111 | 133 |
| 31 | 310 | ----- | 263 | 223 | ----- | 780 | ----- | 370 | ----- | 126 | 115 | ----- |
| Total | 10,862 | 10,537 | 13,346 | 8,343 | 10,259 | 7,977 | 53,518 | 16,786 | 8,812 | 4,118 | 3,365 | 5,547 |
| Mean | 350 | 351 | 431 | 269 | 354 | 257 | 1,784 | 541 | 294 | 133 | 109 | 185 |
| Cfsm | 1.52 | 1.53 | 1.87 | 1.17 | 1.54 | 1.12 | 7.76 | 2.35 | 1.28 | 0.578 | 0.474 | 0.804 |
| In. | 1.76 | 1.70 | 2.16 | 1.35 | 1.66 | 1.29 | 8.65 | 2.71 | 1.42 | 0.67 | 0.55 | 0.90 |

Calendar year 1959: Max 2,100 Min 106 Mean 408 Cfsm 1.77 In. 24.07
Water year 1959-60: Max 3,180 Min 71 Mean 419 Cfsm 1.82 In. 24.82

Peak discharge (base, 1,900 cfs).--Apr. 5 (1:45 p.m.) 2,210 cfs (4.54 ft); Apr. 18 (6:30 p.m.) 3,330 cfs (5.73 ft); Apr. 26 (8:15 a.m.) 2,140 cfs (4.46 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 20-23, Jan. 8-10, Feb. 8, 13-15, 22, 24, Mar. 1-3, 9-11, 25, 26, Mar. 30 to Apr. 2.

2688. West Branch St. Regis River near Parishville, N. Y.

Location.--Lat 44°35'52", long 74°44'19", on right bank 25 ft upstream from highway bridge, 4.1 miles downstream from Mud Pond Outlet, 4.2 miles southeast of Parishville, St. Lawrence County, and 4.8 miles upstream from Niagara Mohawk Power Corp. dam.

Drainage area.--172 sq mi.

Records available.--October 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 971.64 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge during year, 2,990 cfs Apr. 16 (gage height, 5.18 ft); minimum, 53 cfs Sept. 3, 4 (gage height, 0.94 ft).
1958-60: Maximum discharge, that of Apr. 16, 1960; minimum, that of Sept. 3, 4, 1960.

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Apr. 18 | | | | Apr. 19 to Sept. 30 | |
|-------------------|-----|-----|-------|---------------------|-----|
| 1.3 | 119 | 3.0 | 960 | 0.95 | 55 |
| 1.5 | 174 | 4.0 | 1,780 | 1.3 | 121 |
| 2.0 | 365 | 5.2 | 3,010 | 1.5 | 174 |

Note.--Same as preceding table above 1.5 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 149 | 264 | 300 | 200 | 140 | 185 | 900 | 570 | 738 | 126 | 70 | 66 |
| 2 | 230 | 304 | 304 | 195 | 140 | 180 | 1,000 | 505 | 744 | 121 | 70 | 60 |
| 3 | 213 | 300 | 275 | 210 | 140 | 175 | *1,180 | 460 | 656 | 114 | 66 | 55 |
| 4 | 174 | 268 | 256 | 255 | 135 | 170 | *1,920 | 415 | 518 | 108 | 63 | 63 |
| 5 | 168 | 260 | 256 | 260 | 135 | 185 | 2,090 | 592 | 420 | *119 | 61 | 78 |
| 6 | 216 | 271 | 275 | 250 | 130 | 180 | 1,720 | 365 | 342 | 128 | 58 | 84 |
| 7 | 451 | 320 | 383 | 240 | 130 | 165 | 1,430 | 329 | 283 | *124 | 58 | 77 |
| 8 | 606 | 329 | 500 | 230 | 145 | 165 | 1,150 | 300 | 241 | 114 | 61 | *70 |
| 9 | 540 | 304 | 440 | 220 | 170 | 155 | 904 | *287 | 213 | 110 | 70 | 70 |
| 10 | 430 | 264 | 392 | 190 | 190 | 150 | *720 | 304 | 193 | 110 | 82 | 110 |
| 11 | 308 | 234 | *347 | 190 | 250 | 145 | 618 | 300 | 174 | 101 | 77 | 114 |
| 12 | 234 | 224 | 347 | 220 | 440 | 140 | 896 | 291 | 160 | 91 | 70 | 117 |
| 13 | 196 | 216 | 600 | 190 | 540 | 140 | 946 | 320 | 149 | 88 | 63 | 206 |
| 14 | 171 | 216 | 654 | 180 | 540 | 140 | 1,330 | 490 | 138 | 84 | 60 | 271 |
| 15 | 154 | 256 | 540 | 170 | 520 | 135 | 2,700 | 600 | 146 | 80 | 61 | 210 |
| 16 | 140 | 271 | 528 | 170 | *500 | 130 | 2,750 | 654 | *166 | 78 | 65 | 146 |
| 17 | 135 | *256 | 460 | 170 | 440 | 130 | 2,590 | 666 | 174 | 75 | 68 | 114 |
| 18 | 132 | 238 | 388 | 165 | 360 | 130 | 2,820 | 552 | 208 | 73 | 65 | 99 |
| 19 | 137 | 210 | 334 | 160 | 300 | 140 | 2,300 | 450 | 216 | 78 | 60 | 106 |
| 20 | 145 | 180 | 279 | 155 | 250 | 140 | 1,560 | 370 | 193 | 80 | 57 | 114 |
| 21 | 168 | 210 | 234 | 155 | 220 | 140 | 1,130 | 312 | 180 | 88 | 57 | 114 |
| 22 | 174 | 196 | 220 | 160 | 210 | *135 | 1,210 | 275 | 160 | 90 | 58 | 110 |
| 23 | *160 | 187 | 205 | 155 | 205 | 135 | 1,210 | 268 | 141 | 86 | 114 | 97 |
| 24 | 174 | 238 | 190 | 150 | 200 | 130 | 1,050 | 320 | 158 | 86 | 117 | 90 |
| 25 | 252 | 347 | 180 | 145 | 200 | 130 | 1,530 | 420 | 163 | 95 | *97 | 86 |
| 26 | 304 | 320 | 170 | 145 | 200 | 130 | 1,770 | 410 | 203 | 90 | 82 | 90 |
| 27 | 295 | 287 | 190 | 140 | 200 | 135 | 1,370 | 352 | 180 | 80 | 72 | 86 |
| 28 | 283 | 252 | 205 | 150 | 195 | 150 | 1,010 | 295 | 144 | 77 | 65 | 80 |
| 29 | 245 | 249 | 205 | *150 | 190 | 210 | 799 | 260 | 124 | 75 | 63 | 77 |
| 30 | 216 | 264 | 200 | 145 | ----- | 350 | 660 | 238 | 124 | 72 | 68 | 77 |
| 31 | 213 | ----- | 200 | 140 | ----- | 700 | ----- | 383 | ----- | 72 | 70 | ----- |
| Total | 7,413 | 7,735 | 10,057 | 5,635 | 7,415 | 5,425 | 42,865 | 12,153 | 7,605 | 2,913 | 2,168 | 3,137 |
| Mean | 239 | 258 | 324 | 182 | 258 | 175 | 1,429 | 392 | 254 | 94.0 | 69.9 | 105 |
| Cfs/m | 1.39 | 1.50 | 1.88 | 1.08 | 1.49 | 1.02 | 8.31 | 2.28 | 1.48 | 0.547 | 0.406 | 0.610 |
| In. | 1.60 | 1.67 | 2.17 | 1.22 | 1.60 | 1.17 | 9.27 | 2.63 | 1.64 | 0.63 | 0.47 | 0.68 |

Calendar year 1959: Max 1,990 Min 58 Mean 313 Cfs/m 1.82 In. 24.64
Water year 1959-60: Max 2,820 Min 55 Mean 313 Cfs/m 1.82 In. 24.75

Peak discharge (base, 1,600 cfs).--Apr. 4 (8:30 p.m.) 2,240 cfs (4.49 ft); Apr. 16 (2:15 a.m.) 2,990 cfs (5.18 ft); Apr. 26 (1 a.m.) 1,860 cfs (4.09 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19, 20, Dec. 8, 9, 15, Dec. 22 to Apr. 2.

2689. Trout Brook at Stockholm Center, N. Y.

Location.--Lat 44°46'16", long 74°48'47", on right bank on downstream side of highway bridge, 0.7 mile upstream from mouth and 1 mile northeast of Stockholm Center, St. Lawrence County.

Drainage area.--44.9 sq mi.

Records available.--September 1958 to November 1960 (no winter records), discontinued.

Gage.--Staff-gage, read twice daily, and crest-stage gage. Altitude of gage is 310 ft (from topographic map).

Extremes.--1959-60: Maximum discharge observed during water year, about 900 cfs Apr. 4 (gage height, 5.14 ft, ice jam); minimum observed, 4.9 cfs Sept. 7-9.
1960: Maximum discharge observed during period October to November, 158 cfs Oct. 25 (gage height, 1.81 ft); minimum observed, 10 cfs Oct. 2, 10.
1958-60: Maximum discharge observed, that of Apr. 4, 1960; minimum observed, that of Sept. 7-9, 1960.

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

Rating table, Apr. 1 to Nov. 30, 1960, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 8, 9, Sept. 1 to Oct. 6)

| | | | |
|------|-----|-----|-----|
| 0.54 | 4.9 | 1.5 | 107 |
| .6 | 6.2 | 2.0 | 222 |
| .7 | 10 | 2.5 | 383 |
| .8 | 18 | 3.0 | 579 |
| 1.0 | 36 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------|------|-------|------|------|------|-------|-------|---------|-------|-------|-------|
| 1 | | | | | | | b480 | 53 | 281 | 20 | 8.5 | 5.5 |
| 2 | | | | | | | b420 | 51 | 303 | 15 | 8.5 | 5.7 |
| 3 | | | | | | | b500 | 44 | *113 | a14 | 8.5 | 5.5 |
| 4 | | | | | | | b700 | *42 | 80 | a14 | 7.7 | 7.7 |
| 5 | | | | | | | b400 | 37 | 47 | a18 | 7.7 | 6.5 |
| 6 | | | | | | | *b290 | 34 | 35 | a24 | 7.7 | *5.3 |
| 7 | | | | | | | b260 | 30 | 29 | a19 | 7.7 | 5.1 |
| 8 | | | | | | | 251 | 29 | 24 | a15 | 11 | 4.9 |
| 9 | | | | | | | *203 | 28 | 23 | a14 | 12 | 5.1 |
| 10 | | | | | | | 149 | 38 | 21 | 13 | 10 | 5.3 |
| 11 | | | | | | | *136 | 34 | 21 | 12 | 8.5 | 5.5 |
| 12 | | | | | | | 257 | 40 | 18 | 10 | 8.5 | 5.7 |
| 13 | | | †43.6 | | | | 260 | 58 | 18 | 11 | 8.1 | 23 |
| 14 | | | | | | | 251 | 82 | 15 | 12 | 7.7 | 7.7 |
| 15 | | | | | | | 505 | 52 | 19 | *11 | 8.1 | 6.2 |
| 16 | | | | | | | 447 | 71 | 23 | 10 | 8.5 | 5.9 |
| 17 | | | | | | | 297 | 64 | 18 | 10 | 8.5 | 5.7 |
| 18 | | | | | | | 470 | 42 | 21 | 13 | *8.1 | 6.8 |
| 19 | | | | | | | 316 | 35 | 20 | 14 | 7.7 | 7.4 |
| 20 | | | | | | | 98 | 34 | 18 | 12 | 7.7 | 12 |
| 21 | | | | | | | 77 | 32 | 19 | 12 | 10 | 10.0 |
| 22 | | | | | | | 234 | 24 | 18 | 11 | 13 | 7.1 |
| 23 | | | | | | | 132 | 26 | 18 | 10 | 10 | 7.1 |
| 24 | | | | | | | 107 | 61 | 30 | 10 | 8.1 | 6.5 |
| 25 | | | | | | | 375 | 84 | 44 | 9.5 | 7.1 | 5.9 |
| 26 | | | | | | | 263 | 71 | 28 | 9.0 | 6.5 | 5.9 |
| 27 | | | | | | | 111 | 46 | 18 | 9.0 | 6.2 | 7.4 |
| 28 | | | | | | | 84 | 31 | 9.5 | 11 | 5.9 | 7.1 |
| 29 | | | | | | | 71 | 25 | 12 | 9.5 | 5.7 | 7.4 |
| 30 | | | | | | | 60 | 21 | 24 | 9.0 | 9.5 | 9.0 |
| 31 | | | | | | †614 | 67 | 27 | ----- | 9.0 | 6.5 | ----- |
| Total | | | | | | | 8,164 | 1,386 | 1,367.5 | 350.0 | 259.2 | 215.9 |
| Mean | | | | | | | 272 | 44.7 | 45.6 | 12.6 | 8.36 | 7.20 |
| Cfsm | | | | | | | 6.06 | 0.996 | 1.02 | 0.281 | 0.186 | 0.160 |
| In. | | | | | | | 6.76 | 1.15 | 1.13 | 0.32 | 0.21 | 0.18 |

Calendar year : Max Min Mean Cfsm In.

Water year : Max Min Mean Cfsm In.

* Discharge measurement made on this day.

† Result of discharge measurement.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

b Stage-discharge relation affected by ice.

Discharge, in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|---------------------------------------|------|------|-----|------|------|-----|------|------|-----|------|------|-----|-------|-------|
| 1 | 24 | 23 | 7 | 14 | a14 | 13 | 11 | 22 | 19 | 16 | 23 | 25 | 145 | 22 |
| 2 | 11 | 26 | 8 | 13 | *13 | 14 | 12 | 18 | 20 | 23 | 20 | 26 | 84 | 18 |
| 3 | 18 | 18 | 9 | 11 | 16 | 15 | 11 | 19 | 21 | 22 | 20 | 27 | 42 | 18 |
| 4 | 13 | 18 | 10 | 10 | 32 | 16 | 15 | 54 | 22 | 18 | 19 | 28 | 23 | 18 |
| 5 | *11 | 16 | 11 | 11 | 24 | 17 | 24 | 32 | 23 | 16 | 20 | 29 | 20 | 18 |
| 6 | 15 | a15 | 12 | 11 | 20 | 18 | 17 | 28 | 24 | 29 | 22 | 30 | 17 | 24 |
| | | | | | | | | | | | | 31 | 16 | ----- |
| Total | | | | | | | | | | | | | 723 | 650 |
| Mean | | | | | | | | | | | | | 23.3 | 21.7 |
| Cubic feet per second per square mile | | | | | | | | | | | | | 0.519 | 0.483 |
| Runoff in inches | | | | | | | | | | | | | 0.60 | 0.54 |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

2690. St. Regis River at Brasher Center, N. Y.

Location.--Lat 44°51'50", long 74°46'45", on left bank 600 ft upstream from highway bridge at Brasher Center, St. Lawrence County, and 6½ miles downstream from confluence of East and West Branches at Winthrop.

Drainage area.--616 sq mi.

Records available.--August 1910 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 217.23 ft above mean sea level, datum of 1929. Prior to June 24, 1916, chain gage at site 600 ft downstream at different datum. June 24, 1916, to Nov. 10, 1917, and Jan. 1, 1919, to Aug. 13, 1920, staff gage at present site and datum.

Average discharge.--50 years, 1,052 cfs.

Extremes.--Maximum discharge during year, 9,330 cfs Apr. 4 (gage height, 10.59 ft); minimum, 129 cfs Aug. 20 (gage height, 5.72 ft); minimum daily, 143 cfs Aug. 16.
1910-60: Maximum discharge, 16,800 cfs Apr. 6, 1937 (gage height, 12.82 ft); maximum gage height recorded, about 15.3 ft Apr. 6, 1937 (ice jam); minimum discharge observed, about 34 cfs Aug. 8, 1917 (gage height, 5.25 ft); minimum daily discharge, 37 cfs Aug. 8, 1917.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by power operations above station.

Revisions (water years).--WSP 584: Drainage area. WSP 1387: 1910-16, 1917(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 5.7 | 138 | 8.0 | 2,970 |
| 6.0 | 318 | 9.0 | 5,070 |
| 6.5 | 775 | 11.0 | 10,600 |
| 7.0 | 1,370 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-------|-------|-------|
| 1 | 331 | 797 | 840 | 540 | 480 | 620 | 3,200 | 1,920 | 2,260 | 370 | 184 | 174 |
| 2 | 510 | 977 | 900 | 520 | 460 | 620 | 4,000 | 1,680 | 2,580 | 362 | 189 | 174 |
| 3 | 560 | 895 | 931 | 660 | 450 | 620 | 5,000 | 1,570 | 2,060 | 255 | 184 | 236 |
| 4 | 506 | 863 | 1,020 | 760 | 450 | 800 | 7,600 | 1,470 | 1,610 | 275 | 179 | 242 |
| 5 | 452 | 852 | 1,070 | 820 | 440 | 640 | 7,910 | 1,200 | 1,250 | 289 | 169 | 230 |
| 6 | *680 | 897 | 1,130 | 740 | 440 | 620 | *5,880 | 1,170 | 1,020 | 347 | 169 | 218 |
| 7 | 1,280 | 1,140 | 1,520 | 700 | 450 | 800 | 4,680 | 1,080 | 874 | 354 | 164 | 262 |
| 8 | 2,420 | 1,070 | *2,080 | 680 | 460 | 800 | 3,960 | 977 | 786 | 339 | 169 | 218 |
| 9 | 2,060 | 977 | 1,850 | 640 | 480 | 800 | 3,310 | 920 | 702 | 324 | 184 | 169 |
| 10 | 1,610 | *874 | 1,300 | 580 | 560 | 580 | 2,790 | *896 | 610 | 302 | 174 | 207 |
| 11 | 1,180 | 786 | 1,140 | 560 | 900 | 580 | 2,410 | 931 | 478 | 282 | 164 | 236 |
| 12 | 885 | 754 | 1,060 | 580 | 1,300 | 580 | 2,700 | 942 | 436 | 268 | 179 | 324 |
| 13 | 712 | 712 | 1,450 | 560 | 1,500 | 580 | 3,330 | 1,000 | 436 | 255 | 169 | 444 |
| 14 | 640 | 680 | 1,800 | 540 | 1,800 | 560 | 3,770 | 1,290 | *418 | 248 | 164 | 660 |
| 15 | 570 | 808 | 1,750 | 520 | 1,500 | 560 | 6,330 | 1,450 | 444 | *218 | 158 | 680 |
| 16 | 515 | 852 | 1,740 | 520 | 1,400 | *560 | 6,930 | 1,720 | 461 | 201 | 143 | 496 |
| 17 | 470 | 830 | 1,860 | 520 | 1,250 | 540 | 6,260 | 1,980 | 461 | 195 | 153 | 393 |
| 18 | 470 | 764 | 1,550 | 500 | 1,100 | 540 | 6,740 | 1,760 | 506 | 207 | 169 | 339 |
| 19 | 436 | 700 | 1,240 | 500 | 1,000 | 540 | 6,460 | 1,430 | 542 | 224 | 174 | 309 |
| 20 | 461 | 640 | 1,000 | 490 | 920 | 560 | 4,640 | 1,190 | 542 | 224 | 153 | *331 |
| 21 | 496 | 570 | 760 | 490 | 820 | 560 | 3,670 | 1,020 | 478 | 224 | 148 | 370 |
| 22 | 515 | 620 | 660 | 490 | 780 | 540 | 3,900 | 908 | 524 | 242 | 169 | 354 |
| 23 | 515 | 600 | 580 | 490 | 740 | 540 | 3,770 | 885 | 452 | 242 | 164 | 324 |
| 24 | 570 | 733 | 520 | 480 | 720 | 540 | 3,390 | 1,000 | 452 | 224 | 224 | 302 |
| 25 | 754 | 1,040 | 500 | 480 | 700 | 520 | 4,590 | 1,250 | 506 | 236 | 248 | 289 |
| 26 | 885 | 1,100 | 520 | 480 | 680 | 520 | 4,930 | 1,450 | 496 | 230 | *195 | 275 |
| 27 | 1,050 | 931 | 540 | *480 | 660 | 540 | 4,020 | 1,250 | 506 | 218 | *180 | 268 |
| 28 | 966 | 740 | 540 | 480 | 640 | 580 | 3,160 | 1,020 | 461 | 218 | 179 | 262 |
| 29 | 863 | 740 | 540 | 470 | 640 | 900 | 2,610 | 874 | 410 | 213 | 174 | 248 |
| 30 | 764 | 780 | 540 | 470 | ----- | 1,500 | 2,220 | 808 | 393 | 201 | 179 | 242 |
| 31 | 650 | ----- | 540 | 470 | ----- | 2,500 | ----- | 908 | ----- | 207 | 174 | ----- |
| Total | 24,896 | 24,712 | 33,291 | 17,190 | 23,600 | 20,940 | 134,380 | 37,949 | 23,554 | 7,994 | 5,445 | 9,276 |
| Mean | 803 | 824 | 1,074 | 555 | 814 | 675 | 4,479 | 1,224 | 772 | 258 | 176 | 309 |
| Cfsm | 1.30 | 1.34 | 1.74 | 0.901 | 1.32 | 1.10 | 7.27 | 1.99 | 1.25 | 0.419 | 0.266 | 0.502 |
| In. | 1.50 | 1.49 | 2.01 | 1.04 | 1.42 | 1.26 | 8.11 | 2.29 | 1.40 | 0.48 | 0.33 | 0.56 |

Calendar year 1959: Max 5,360 Min 184 Mean 971 Cfsm 1.58 In. 21.39
Water year 1959-60: Max 7,910 Min 143 Mean 991 Cfsm 1.61 In. 21.89

Peak discharge (base, 5,600 cfs).--Apr. 4 (6:15 p.m.) 9,330 cfs (10.59 ft); Apr. 15 (6:37 p.m.) 7,140 cfs (9.82 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19, 20, Nov. 28 to Dec. 2, Dec. 10-15, Dec. 16 to Apr. 4.

2691. Lawrence Brook near Moira, N. Y.

Location.--Lat 44°50'22", long 74°35'46", on left bank on downstream side of highway bridge, 2.4 miles northwest of Moira, Franklin County, and 5.4 miles upstream from mouth.

Drainage area.--28.0 sq mi.

Records available.--September 1958 to November 1960 (no winter records), discontinued.

Gage.--Staff gage, read twice daily, and crest-stage gage. Datum of gage is 303.56 ft above mean sea level, adjustment of 1912.

Extremes.--1959-60: Maximum discharge observed during water year, 907 cfs Apr. 4 (gage height, 6.03 ft); maximum gage height observed, 6.99 ft Mar. 31 (ice jam); minimum discharge observed, 2.8 cfs Sept. 10 (gage height, 2.06 ft).

1960: Maximum discharge observed during period October to November, 177 cfs Oct. 24 (gage height, 4.05 ft); minimum observed, 3.0 cfs Oct. 12 (gage height, 2.20 ft).

1958-60: Maximum discharge observed, that of Apr. 4, 1960; maximum gage height observed, that of Mar. 31, 1960; minimum discharge observed, that of Sept. 10, 1960.

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

Rating table, Oct. 1, 1959, to Nov. 10, 1960 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Oct. 1-15, 1960)

| | | | |
|------|-----|-----|-----|
| 2.07 | 2.9 | 3.0 | 49 |
| 2.1 | 3.3 | 4.0 | 175 |
| 2.2 | 4.7 | 4.5 | 242 |
| 2.3 | 6.6 | 5.0 | 336 |
| 2.5 | 13 | 5.5 | 529 |
| 2.7 | 23 | 6.0 | 860 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1 | 10 | 29 | | | | | 324 | 36 | 53 | 7.2 | 4.6 | 3.7 |
| 2 | 17 | 26 | | | | | 297 | 29 | 95 | 7.2 | 4.3 | 3.6 |
| 3 | 11 | 23 | | | | | 367 | 29 | *79 | 8.9 | 4.3 | 3.4 |
| 4 | 5.1 | 22 | | | | | *590 | *24 | 33 | 12 | 4.1 | 4.4 |
| 5 | 6.4 | 21 | | | | | *271 | 22 | 19 | 12 | 4.1 | 5.1 |
| 6 | 27 | a31 | | | | | *150 | 20 | 16 | 8.9 | 4.7 | 3.9 |
| 7 | 102 | 40 | | | | | 184 | 20 | 14 | 8.0 | 4.0 | 3.7 |
| 8 | 98 | 29 | | | | | 120 | 28 | a14 | 7.5 | 4.8 | 3.4 |
| 9 | 59 | 25 | | | | | 99 | 19 | 13 | 6.9 | 4.4 | 3.3 |
| 10 | 20 | 16 | | | | | *87 | 19 | 11 | 6.4 | 4.6 | *2.9 |
| 11 | 12 | 14 | | | | | 33 | 40 | 11 | 6.4 | a4.6 | 3.9 |
| 12 | 11 | *14 | | | | | 106 | 41 | 10 | 5.8 | 4.6 | 6.9 |
| 13 | 9.5 | 13 | | | | | 82 | 40 | 9.9 | 5.5 | 4.3 | 1.4 |
| 14 | 8.9 | 14 | | | | | 95 | 54 | 8.6 | 5.6 | 3.9 | 7.8 |
| 15 | 8.5 | 17 | | | | | 140 | 52 | 11 | *6.2 | 3.7 | 5.1 |
| 16 | *8.0 | 17 | | | | | 87 | 45 | 13 | 5.1 | 4.4 | 4.4 |
| 17 | 8.0 | 16 | | | | | 76 | 35 | 12 | a5.1 | 4.1 | 4.3 |
| 18 | 7.8 | 13 | | | | | 70 | a28 | 9.9 | 5.1 | 3.9 | 4.3 |
| 19 | a10 | 8.6 | | | | | 61 | a21 | 13 | 6.9 | 3.7 | 4.6 |
| 20 | a12 | 5.6 | | | | | 52 | 17 | 12 | 6.6 | 3.7 | 4.1 |
| 21 | a14 | 7.2 | | | | | 68 | 14 | 13 | 8.3 | 4.9 | 4.4 |
| 22 | 15 | 8.0 | | | | | 134 | 14 | 10 | 6.6 | 4.6 | 4.0 |
| 23 | 12 | 12 | | | | | 81 | a24 | 12 | 5.6 | 4.6 | 3.9 |
| 24 | 12 | 29 | | | | | 98 | 42 | 14 | 5.6 | 4.1 | 3.6 |
| 25 | 12 | 48 | | | | | 150 | 30 | 12 | 5.1 | *3.7 | 3.1 |
| 26 | 14 | 26 | | | | | 96 | 26 | 9.9 | 4.7 | 3.7 | 3.1 |
| 27 | 16 | 20 | | | | | 64 | 19 | 9.2 | 4.4 | 3.7 | 3.3 |
| 28 | 16 | 19 | | | | | 48 | 15 | 7.8 | 5.1 | 3.4 | 3.3 |
| 29 | 15 | 17 | | | | | 36 | 16 | 7.5 | 4.7 | 3.7 | 3.1 |
| 30 | 13 | 19 | | | | | 36 | 14 | 7.5 | 4.6 | 3.7 | a3.4 |
| 31 | 14 | ----- | | | | | 41 | ----- | ----- | 4.6 | 4.0 | ----- |
| Total | 604.0 | 599.4 | - | - | - | - | 4,102 | 874 | 560.3 | 202.6 | 128.7 | 132.0 |
| Mean | 19.5 | 20.0 | - | - | - | - | 137 | 28.2 | 18.7 | 6.54 | 4.15 | 4.40 |
| Cfsm | 0.696 | 0.714 | - | - | - | - | 4.89 | 1.01 | 0.665 | 0.234 | 0.148 | 0.157 |
| In. | 0.80 | 0.80 | - | - | - | - | 5.45 | 1.16 | 0.74 | 0.27 | 0.17 | 0.18 |

Calendar year : Max Min Mean Cfsm In.
Water year : Max Min Mean Cfsm In.

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

Discharge, in cubic feet per second, 1960

| Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. | Day | Oct. | Nov. |
|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|
| 1 | 4.9 | 8.3 | 7 | a3.9 | 9.2 | 13 | 3.7 | - | 19 | 9.9 | - | 25 | 98 | - |
| 2 | 4.4 | 9.2 | 8 | *3.6 | *8.0 | 14 | 4.1 | - | 20 | 11 | - | 26 | 55 | - |
| 3 | 4.4 | 11 | 9 | 3.7 | 9.9 | 15 | 5.5 | - | 21 | 6.3 | - | 27 | 25 | - |
| 4 | 4.3 | 9.2 | 10 | 3.4 | 11 | 16 | 6.0 | - | 22 | 6.9 | - | 28 | 11 | - |
| 5 | a4.1 | 8.6 | 11 | a3.3 | - | 17 | 5.6 | - | 23 | 6.6 | - | 29 | 8.0 | - |
| 6 | a4.0 | 8.6 | 12 | 3.0 | - | 18 | 5.1 | - | 24 | 44 | - | 30 | 8.0 | - |
| | | | | | | | | | | | | 31 | 8.0 | - |

| | | |
|---------------------------------------|-------|---|
| Total | 377.7 | - |
| Mean | 12.2 | - |
| Cubic feet per second per square mile | 0.436 | - |
| Runoff in inches | 0.50 | - |

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and records for nearby stations.

2695. Deer River at Brasher Iron Works, N. Y.

Location.--Lat 44°53'32", long 74°41'28", on left bank 400 ft upstream from highway bridge, at Brasher Iron Works, St. Lawrence County, 2.6 miles southeast of Helena, 3.6 miles upstream from mouth, and 3.8 miles downstream from Lawrence Brook.

Drainage area.--189 sq mi.

Records available.--July 1912 to September 1916, August 1958 to September 1960. Monthly discharge only for some periods, published in WSP 1307. Published as "at Ironton" prior to 1913.

Gage.--Water-stage recorder. Datum of gage is 211.97 ft above mean sea level, datum of 1929. July 1912 to September 1916, staff gage at site 1,400 ft downstream at different datum.

Average discharge.--6 years, 230 cfs.

Extremes.--Maximum discharge during year, 5,090 cfs Apr. 4 (gage height, 7.39 ft), from rating curve extended above 2,500 cfs by logarithmic plotting; minimum, 25 cfs Sept. 4 (gage height, 1.69 ft).

1912-16, 1958-60: Maximum discharge, 9,700 cfs Jan. 17, 1913 (gage height, 9.3 ft, site and datum then in use), from rating curve extended above 3,000 cfs by logarithmic plotting; minimum observed, 17 cfs Aug. 19, 20, Sept. 14, 1913 (gage height, 0.80 ft, site and datum then in use).

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions (water years).--WSP 1387: Drainage area, 1913, 1915-16.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.7 | 26 | 3.5 | 601 |
| 1.8 | 40 | 4.0 | 920 |
| 2.1 | 84 | 5.0 | 1,750 |
| 2.5 | 171 | 7.0 | 4,440 |
| 3.0 | 351 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Avg. | Sept. |
|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 63 | 201 | 200 | 100 | 108 | 190 | *2,100 | 356 | 766 | 62 | 36 | 29 |
| 2 | 98 | 234 | 210 | 98 | 108 | 185 | *1,900 | 297 | 773 | 59 | 36 | 28 |
| 3 | 106 | 254 | 238 | 118 | 106 | 185 | *2,510 | 221 | 546 | 56 | 36 | 26 |
| 4 | 84 | 201 | 351 | 150 | 106 | 180 | 4,260 | 195 | 420 | 55 | 34 | 29 |
| 5 | 74 | 195 | 469 | 160 | 106 | 180 | 3,680 | 177 | 290 | 65 | 32 | 33 |
| 6 | *95 | *238 | 541 | 145 | 104 | 175 | 2,130 | 171 | 221 | 60 | 32 | 34 |
| 7 | 281 | 364 | 716 | 140 | 104 | 165 | 1,600 | 155 | 171 | 59 | 32 | 34 |
| 8 | 552 | 282 | *886 | 135 | 104 | 160 | 1,400 | 143 | 140 | 57 | 36 | 32 |
| 9 | 464 | 231 | 557 | 130 | 102 | 155 | 1,180 | 138 | 120 | 57 | 44 | 29 |
| 10 | 351 | 234 | 440 | 130 | 102 | 145 | 1,040 | *140 | 108 | 56 | 41 | 28 |
| 11 | 252 | 218 | 380 | 125 | 300 | 145 | 913 | 145 | 98 | 53 | 38 | 49 |
| 12 | 195 | 198 | 320 | 125 | 600 | 145 | 1,160 | 161 | 91 | 50 | 34 | 59 |
| 13 | 148 | 171 | 370 | 120 | 460 | 145 | 1,210 | 195 | 84 | *49 | 33 | 65 |
| 14 | 122 | 171 | 420 | 120 | 410 | 143 | 1,170 | 317 | *81 | 49 | 32 | 102 |
| 15 | 112 | 227 | 400 | 120 | 370 | 140 | 1,770 | 270 | 84 | 48 | 32 | 88 |
| 16 | 104 | 214 | 504 | 118 | *360 | 140 | 1,550 | 290 | 88 | 46 | 32 | 69 |
| 17 | 98 | 192 | 728 | 118 | 350 | 143 | 1,300 | 382 | 84 | 45 | 32 | 63 |
| 18 | 95 | 170 | 600 | 118 | 340 | 148 | 1,500 | 326 | 89 | 46 | 32 | 62 |
| 19 | 95 | 150 | 430 | 116 | 320 | 148 | 1,320 | 282 | 98 | 48 | 29 | 62 |
| 20 | 95 | 140 | 280 | 116 | 300 | 150 | 906 | 234 | 89 | 50 | 32 | *68 |
| 21 | 106 | 125 | 230 | 114 | 280 | 150 | 691 | 189 | 89 | 49 | 38 | 72 |
| 22 | 116 | 138 | 180 | 114 | 260 | *148 | 1,000 | 158 | 84 | 49 | 33 | 68 |
| 23 | 116 | 127 | 120 | 112 | 250 | 150 | 858 | 174 | 79 | 46 | 32 | 60 |
| 24 | 116 | 198 | 90 | 112 | 240 | 148 | 709 | 263 | 82 | 42 | 35 | 54 |
| 25 | 171 | 392 | 86 | 112 | 235 | 143 | 1,370 | 378 | 102 | 42 | 33 | 52 |
| 26 | 218 | 330 | 90 | 110 | 225 | 131 | 1,160 | 351 | 97 | 41 | 34 | 49 |
| 27 | 204 | 200 | 96 | *110 | 220 | 143 | 780 | 274 | 84 | 38 | *30 | 48 |
| 28 | 234 | 160 | 96 | 110 | 210 | 160 | 613 | 198 | 72 | 38 | 30 | 46 |
| 29 | 198 | 160 | 96 | 108 | 200 | 250 | 499 | 153 | 68 | 38 | 32 | 44 |
| 30 | 155 | 180 | 98 | 108 | ----- | 400 | 415 | 129 | 68 | 38 | 32 | 46 |
| 31 | 148 | ----- | 100 | 108 | ----- | 1,200 | ----- | 160 | ----- | 37 | 32 | ----- |
| Total | 5,266 | 6,275 | 10,322 | 3,718 | 6,980 | 6,190 | 42,694 | 7,022 | 5,266 | 1,538 | 1,044 | 1,528 |
| Mean | 170 | 209 | 333 | 120 | 241 | 200 | 1,423 | 227 | 176 | 49.6 | 33.7 | 50.9 |
| Cfsm | 0.899 | 1.11 | 1.76 | 0.635 | 1.28 | 1.06 | 7.53 | 1.20 | 0.931 | 0.262 | 0.178 | 0.269 |
| In. | 1.04 | 1.23 | 2.03 | 0.73 | 1.37 | 1.22 | 8.40 | 1.38 | 1.04 | 0.30 | 0.21 | 0.30 |

Calendar year 1959: Max 1,600 Min 41 Mean 209 Cfsm 1.11 In. 15.02
 Water year 1959-60: Max 4,260 Min 26 Mean 267 Cfsm 1.41 In. 19.25

Peak discharge (base, 1,700 cfs)--Apr. 4 (9:15 a.m.) 5,090 cfs (7.39 ft); Apr. 15 (2:45 p.m.) 1,880 cfs (5.13 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18-21, Nov. 26 to Dec. 2, Dec. 10-15, Dec. 18 to Mar. 12, Mar. 28 to Apr. 1.

2700. Salmon River at Chasm Falls, N. Y.

Location.--Lat 44°45'20", long 74°13'10", on right bank a quarter of a mile downstream from powerplant of Niagara Mohawk Power Corp. at Chasm Falls, Franklin County, and 3 miles downstream from Duane Stream.

Drainage area.--132 sq mi.

Records available.--July 1925 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,011.52 ft above mean sea level, datum of 1929.

Average discharge.--35 years, 225 cfs.

Extremes.--Maximum discharge during year, 2,100 cfs Apr. 18 (gage height, 4.39 ft); minimum, 12 cfs Sept. 2 (gage height, 0.47 ft); minimum daily, 45 cfs Sept. 2, 1925-60: Maximum discharge, 2,890 cfs Apr. 25, 1926 (gage height, 5.0 ft); minimum, that of Sept. 2, 1960, minimum daily, 28 cfs Sept. 4, 1934.

Remarks.--Records good. Seasonal regulation of flow by upstream reservoirs. Diurnal fluctuation at low and medium flow caused by powerplant. A small diversion from tributary stream above station is used as water supply for village of Malone.

Revisions (water years).--WSP 729: 1931(m). WSP 759: Drainage area.

Rating tables, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 17-23)

Oct. 1 to Dec. 13

Dec. 14 to Sept. 30

| | | | | | |
|-----|-----|-----|-----|-----|-------|
| 1.2 | 102 | 0.8 | 39 | 2.5 | 582 |
| 1.6 | 201 | 1.1 | 79 | 3.5 | 1,280 |
| 2.3 | 476 | 1.5 | 166 | 4.5 | 2,220 |
| | | 2.0 | 340 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 157 | 229 | 193 | 138 | 126 | *140 | 708 | 230 | 241 | 93 | 93 | 79 |
| 2 | 187 | 229 | 190 | 140 | 126 | 145 | 773 | 241 | 410 | 122 | 88 | 45 |
| 3 | 195 | 184 | 184 | 183 | 126 | 135 | 814 | 244 | 332 | 103 | 88 | 52 |
| 4 | 176 | 201 | 179 | 195 | 122 | 143 | 1,060 | 234 | 281 | 133 | 84 | 83 |
| 5 | 160 | 239 | 181 | *198 | 126 | 135 | 1,330 | 224 | 241 | 101 | 84 | 95 |
| 6 | *253 | 252 | 187 | 175 | 128 | 135 | 1,070 | 217 | 211 | 111 | 73 | 105 |
| 7 | 252 | 273 | 216 | 172 | 135 | 133 | 773 | 211 | 189 | 79 | 77 | 73 |
| 8 | 322 | 216 | 280 | 161 | 133 | 131 | 646 | 198 | 178 | *111 | *95 | 76 |
| 9 | 226 | 220 | 246 | 156 | 143 | 128 | 538 | 198 | 158 | 119 | 93 | 93 |
| 10 | 198 | 220 | 223 | 156 | 131 | 126 | 457 | 208 | *158 | 90 | 83 | 198 |
| 11 | 184 | 213 | 201 | 150 | 201 | 126 | 406 | 198 | 145 | 92 | 83 | 124 |
| 12 | 190 | 184 | 213 | 145 | 300 | 133 | 502 | *180 | 140 | 92 | 83 | 131 |
| 13 | 201 | 170 | 370 | 133 | 300 | 128 | *708 | 211 | 119 | 92 | 59 | 217 |
| 14 | 201 | 155 | 332 | 126 | 261 | 126 | 820 | 244 | 138 | 90 | 78 | 192 |
| 15 | 201 | 220 | 270 | 158 | 252 | 128 | 1,520 | 353 | 140 | 90 | 83 | 158 |
| 16 | 201 | 184 | 289 | 158 | 238 | 126 | 1,760 | 447 | 135 | 84 | 81 | 122 |
| 17 | 201 | 176 | 266 | 148 | 230 | 126 | 1,620 | 447 | 131 | 84 | 76 | *117 |
| 18 | 201 | 155 | 227 | 145 | 211 | 126 | 1,960 | 349 | 150 | 90 | 76 | 117 |
| 19 | 179 | *145 | 195 | 135 | 198 | 128 | 1,620 | 292 | 140 | 92 | 74 | 124 |
| 20 | 173 | 121 | 192 | 135 | 189 | 126 | 1,120 | 258 | 124 | 95 | 76 | 131 |
| 21 | 179 | 152 | 166 | 140 | 180 | 126 | 780 | 230 | 140 | 90 | 101 | .31 |
| 22 | 168 | 137 | 178 | 133 | 180 | 117 | 814 | 248 | 145 | 86 | 111 | 107 |
| 23 | 150 | 137 | 150 | 140 | 180 | 131 | 807 | 285 | 101 | 86 | 99 | 105 |
| 24 | 181 | 168 | 150 | 131 | 172 | 128 | 695 | 308 | 135 | 88 | 99 | 103 |
| 25 | 263 | 190 | 153 | 128 | 166 | 119 | 786 | 366 | 153 | 83 | 86 | 103 |
| 26 | 256 | 181 | 150 | 131 | 161 | 117 | 834 | 312 | 145 | 83 | 81 | 95 |
| 27 | 193 | 163 | 150 | 126 | 161 | 126 | 640 | 273 | 133 | 83 | 79 | 95 |
| 28 | 198 | 140 | 161 | 131 | 150 | 150 | 527 | 244 | 122 | 83 | 76 | 97 |
| 29 | 198 | 195 | 150 | 133 | 145 | 192 | 383 | 208 | 115 | 81 | 76 | 95 |
| 30 | 190 | 160 | 153 | 128 | 128 | 258 | 234 | 205 | 124 | 88 | 90 | 109 |
| 31 | 198 | ----- | 153 | 128 | ----- | 457 | ----- | 201 | ----- | 107 | 86 | ----- |
| Total | 6,232 | 5,609 | 6,348 | 4,556 | 5,191 | 4,545 | 26,705 | 8,064 | 5,074 | 2,921 | 2,609 | 3,372 |
| Mean | 201 | 187 | 205 | 147 | 179 | 147 | 890 | 260 | 169 | 94.2 | 84.2 | 112 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 946 | | | Min | 65 | Mean | 211 | Cfsm | 1.60 | In. | 21.66 | |
| Water year 1959-60: Max | 1,960 | | | Min | 45 | Mean | 222 | Cfsm | 1.68 | In. | 22.88 | |

* Discharge measurement made on this day.

2702. Little Salmon River at Bombay, N. Y.

Location.--Lat 44°56'24", long 74°33'24", on right bank 50 ft downstream from highway bridge, half a mile east of village of Bombay, Franklin County, and 7.2 miles upstream from mouth.

Drainage area.--93.6 sq mi.

Records available.--August to November 1957, July 1958 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 173.91 ft above mean sea level, datum of 1929. August to November 1957, at site 100 ft upstream at datum 0.72 ft higher.

Extremes.--Maximum discharge during year, about 1,800 cfs Apr. 4 (gage height, 12.40 ft, backwater from ice); minimum, 11 cfs Aug. 29.
1957-60: Maximum discharge, that of Apr. 4, 1960; minimum, 10 cfs Sept. 2, 1957 (gage height, 0.85 ft, site and datum then in use).

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 6-8, Sept. 27-30)

| | | | |
|-----|----|-----|-------|
| 1.6 | 12 | 3.0 | 180 |
| 1.8 | 23 | 5.0 | 570 |
| 2.1 | 51 | 7.0 | 1,130 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 26 | 114 | 102 | 54 | 46 | 94 | 1,100 | 129 | 239 | 31 | 16 | 13 |
| 2 | 62 | 132 | 116 | 56 | 46 | 90 | 1,900 | 120 | 564 | 29 | 15 | 13 |
| 3 | 46 | 129 | 140 | 66 | 45 | 88 | 1,000 | 105 | 249 | 27 | 15 | 13 |
| 4 | 31 | 92 | 235 | 84 | 45 | 86 | 1,700 | 95 | 167 | 34 | 15 | 15 |
| 5 | 27 | 92 | 277 | 92 | 42 | 86 | 1,200 | 87 | 102 | 36 | 15 | 17 |
| 6 | *47 | 122 | 275 | 78 | 44 | 84 | *725 | 79 | 82 | *36 | 15 | 16 |
| 7 | 191 | 204 | 354 | 68 | 48 | 80 | *529 | 73 | 65 | *33 | 14 | 15 |
| 8 | 353 | 114 | *385 | 62 | 47 | 76 | 480 | 67 | 56 | 28 | 16 | *14 |
| 9 | 194 | 80 | 235 | 58 | 45 | 74 | 430 | 63 | 51 | 29 | 18 | 13 |
| 10 | 132 | 70 | 175 | 54 | 44 | 70 | 385 | *68 | 47 | 28 | 18 | 13 |
| 11 | 79 | 62 | 140 | 56 | 140 | 70 | 319 | 71 | 42 | 25 | 15 | 24 |
| 12 | 55 | 57 | 125 | 52 | 310 | 70 | 513 | 85 | 41 | 23 | 14 | 20 |
| 13 | 43 | 55 | 160 | 52 | 245 | 68 | 495 | 89 | 39 | 23 | 13 | 38 |
| 14 | 39 | 63 | 215 | 52 | 205 | 68 | 453 | 112 | *36 | 24 | 13 | 55 |
| 15 | 34 | 105 | 210 | 54 | 190 | 64 | 846 | 98 | 41 | 21 | 14 | 32 |
| 16 | 31 | 88 | 270 | 56 | *185 | 64 | 511 | 108 | 47 | 20 | 14 | 24 |
| 17 | 30 | *76 | 360 | 54 | 180 | 66 | 440 | 148 | 40 | 20 | 14 | 20 |
| 18 | 30 | 70 | 250 | 52 | 175 | 68 | 570 | 111 | 51 | 21 | 13 | 19 |
| 19 | 36 | 66 | 165 | 50 | 165 | 68 | 369 | 83 | 53 | 24 | 12 | 20 |
| 20 | 39 | 62 | 102 | 49 | 150 | 70 | 247 | 67 | 43 | 24 | 12 | 23 |
| 21 | 61 | 58 | 74 | 50 | 140 | 70 | 215 | 57 | 42 | 21 | 14 | 30 |
| 22 | 63 | 63 | 58 | 52 | 135 | *68 | 454 | 61 | 40 | 19 | 15 | 24 |
| 23 | 57 | 60 | 60 | 50 | 125 | 68 | 302 | 101 | 40 | 20 | 15 | 20 |
| 24 | 64 | 99 | 62 | 49 | 120 | 68 | 245 | 164 | 42 | 19 | 16 | 18 |
| 25 | 130 | 227 | 58 | 48 | 116 | 66 | 542 | 201 | 63 | 18 | 14 | 17 |
| 26 | 132 | 140 | 64 | 48 | 114 | 62 | 390 | 126 | 55 | 17 | 14 | 16 |
| 27 | 92 | 74 | 60 | *48 | 110 | 66 | 250 | 84 | 42 | 17 | *13 | 14 |
| 28 | 124 | 82 | 58 | 47 | 106 | 74 | 204 | 63 | 34 | 18 | 12 | 14 |
| 29 | 91 | 88 | 58 | 50 | 102 | 114 | 167 | 51 | 32 | 18 | 13 | 15 |
| 30 | 65 | 92 | 58 | 48 | ----- | 185 | 143 | 44 | 34 | 16 | 15 | 15 |
| 31 | 61 | ----- | 56 | 47 | ----- | 520 | ----- | 50 | ----- | 16 | 16 | ----- |
| Total | 2,465 | 2,836 | 4,957 | 1,736 | 3,465 | 2,865 | 16,124 | 2,860 | 2,279 | 735 | 448 | 596 |
| Mean | 79.5 | 94.5 | 160 | 56.0 | 119 | 92.4 | 537 | 92.3 | 76.0 | 23.7 | 14.5 | 19.9 |
| Cfsm | 0.849 | 1.01 | 1.71 | 0.598 | 1.27 | 0.987 | 5.74 | 0.986 | 0.812 | 0.253 | 0.155 | 0.213 |
| In. | 0.98 | 1.13 | 1.97 | 0.69 | 1.38 | 1.14 | 6.41 | 1.14 | 0.91 | 0.29 | 0.18 | 0.24 |

Calendar year 1959: Max 920 Min 13 Mean 96.4 Cfsm 1.03 In. 14.00
Water year 1959-60: Max 1,700 Min 12 Mean 113 Cfsm 1.21 In. 16.46

Peak discharge (base, 900 cfs).--Apr. 4 (2 p.m.) about 1,800 cfs; Apr. 15 (6:45 a.m.) 1,020 cfs (6.70 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17-21, 23, Nov. 26 to Dec. 3, Dec. 10 to Apr. 5.

2705. Chateaugay River near Chateaugay, N. Y.

Location.--Lat 44°54'35", long 74°05'10", on right bank 150 ft downstream from dam of International Hydroelectric Corp., 1 mile south of Chateaugay, Franklin County, and 5 miles upstream from Marble River.

Drainage area.--112 sq mi.

Records available.--September to December 1908, October 1926 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 847.04 ft above mean sea level, datum of 1929. September to December 1908, staff gage 2½ miles downstream at different datum.

Average discharge.--34 years (1926-60), 175 cfs.

Extremes.--Maximum discharge during year, 1,450 cfs Apr. 18 (gage height, 5.84 ft); minimum, 31 cfs Nov. 6 (gage height, 0.97 ft); minimum daily, 33 cfs July 21, 1908, 1926-60: Maximum discharge, 2,060 cfs Apr. 8, 1928 (gage height, 7.3 ft), from rating curve extended above 1,300 cfs by logarithmic plotting; minimum, 6 cfs Nov. 20, 1928 (gage height, 0.23 ft); minimum daily, 26 cfs July 8, 1934.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated by Upper and Lower Chateaugay Lakes. Considerable diurnal fluctuation caused by power operations prior to 1953.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.0 | 33 | 4.0 | 656 |
| 1.2 | 50 | 5.0 | 1,040 |
| 2.0 | 156 | 5.8 | 1,430 |
| 3.0 | 361 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 64 | 148 | 140 | 160 | 118 | 180 | 314 | 191 | 124 | 54 | 39 | 60 |
| 2 | 67 | 156 | 142 | 160 | *116 | *187 | 290 | 175 | 121 | 45 | 40 | 60 |
| 3 | 69 | 163 | 142 | 165 | 116 | 182 | 412 | 143 | 117 | 47 | 40 | 60 |
| 4 | 69 | 144 | 146 | 165 | 114 | 187 | 583 | 131 | 111 | 46 | 40 | 62 |
| 5 | 70 | 89 | 151 | *160 | 114 | 191 | 637 | 106 | 112 | 44 | 40 | 60 |
| 6 | 72 | 84 | 153 | 160 | 116 | 191 | 780 | 104 | 110 | 42 | 40 | 60 |
| 7 | 85 | 199 | 166 | 155 | 118 | 195 | 791 | 103 | 108 | 41 | 40 | 60 |
| 8 | 77 | 195 | 158 | 155 | 116 | 189 | 766 | 103 | 108 | 40 | 42 | 60 |
| 9 | *85 | 195 | 156 | 160 | 116 | 189 | 740 | 102 | 108 | 40 | 41 | 66 |
| 10 | 94 | 193 | *154 | 160 | 116 | 195 | 708 | 90 | 108 | 40 | 41 | 62 |
| 11 | 94 | 191 | 158 | 160 | 155 | 199 | 663 | 75 | 108 | 40 | 41 | 60 |
| 12 | 97 | 191 | 168 | 160 | 170 | 199 | 656 | 67 | 108 | 40 | 41 | 66 |
| 13 | 108 | 191 | 170 | 160 | 170 | 193 | *589 | *50 | 108 | 40 | 41 | 69 |
| 14 | 114 | 191 | 168 | 160 | 170 | 189 | 560 | 50 | 108 | 40 | 41 | 63 |
| 15 | 114 | 191 | 165 | 145 | 165 | 180 | 702 | 50 | 110 | 40 | 42 | 60 |
| 16 | 114 | 191 | 164 | 122 | 165 | 170 | 1,010 | 58 | 108 | 38 | 42 | 60 |
| 17 | 114 | 191 | 164 | 120 | 160 | 171 | 1,210 | 62 | 110 | 37 | 42 | 60 |
| 18 | 115 | 191 | 166 | 118 | 160 | 173 | 1,400 | 101 | *104 | 37 | 42 | 63 |
| 19 | 114 | *189 | 165 | 118 | 160 | 175 | 1,310 | 125 | 103 | 37 | *42 | *60 |
| 20 | 118 | 168 | 175 | 120 | 165 | 170 | 1,180 | 145 | 104 | 36 | *42 | 63 |
| 21 | 114 | 153 | 175 | 118 | 165 | 164 | 1,060 | 150 | 97 | 33 | 42 | 62 |
| 22 | 114 | 153 | 175 | 118 | 170 | 170 | 1,000 | 187 | 85 | 35 | 42 | 62 |
| 23 | 117 | 153 | 170 | 118 | 170 | 170 | 958 | 282 | 85 | 37 | 42 | 60 |
| 24 | 118 | 159 | 170 | 118 | 175 | 170 | 938 | 487 | 88 | 37 | 42 | 60 |
| 25 | 146 | 158 | 170 | 118 | 175 | 168 | 930 | 557 | 88 | *37 | 47 | 60 |
| 26 | 124 | 153 | 165 | 118 | 180 | 170 | 895 | 520 | 85 | 37 | 63 | 60 |
| 27 | 124 | 148 | 165 | 118 | 185 | 164 | 813 | 459 | 78 | 37 | 63 | 60 |
| 28 | 119 | 145 | 165 | 118 | 180 | 175 | 632 | 389 | 56 | 37 | 63 | 60 |
| 29 | 118 | 140 | 165 | 118 | 185 | 171 | 431 | 389 | 55 | 37 | 64 | 93 |
| 30 | 128 | 140 | 160 | 118 | ----- | 202 | 265 | 384 | 58 | 40 | 62 | 134 |
| 31 | 146 | ----- | 160 | 118 | ----- | 354 | ----- | 236 | ----- | 39 | 60 | ----- |
| Total | 3,222 | 4,953 | 5,011 | 4,281 | 4,385 | 5,783 | 23,223 | 6,071 | 2,974 | 1,230 | 1,409 | 1,945 |
| Mean | 104 | 165 | 162 | 138 | 151 | 187 | 774 | 196 | 99.1 | 39.7 | 45.5 | 64.8 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 670 Min 54 Mean 156 Cfsm 1.39 In. 18.95
 Water year 1959-60: Max 1,400 Min 33 Mean 176 Cfsm 1.57 In. 21.41

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 30, Dec. 1, 13, 15, Dec. 19 to Feb. 29, Mar. 19, 20, 22-24.

2707. Trout River at Trout River, N. Y.

Location.--Lat 44°59'23", long 74°17'56", on left bank at downstream side of county highway bridge, 0.2 mile east of State Highway 10 at Trout River, Franklin County, 0.5 mile upstream from international boundary, 1.5 miles downstream from unnamed tributary, and 3.3 miles downstream from Little Trout River.

Drainage area.--107 sq mi.

Records available.--October 1959 to September 1960 (except winter period).

Gage.--Water-stage recorder. Datum of gage is 219.97 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge recorded during year, 4,110 cfs Apr. 4 (gage height, 6.63 ft), from rating curve extended above 2,100 cfs by logarithmic plotting; maximum gage height recorded, 7.36 ft Mar. 31 (ice jam); minimum discharge observed, 6.9 cfs Aug. 20 (gage height, 0.91 ft).

Remarks.--Records good except those for periods of ice effect, which are fair. Diversions for irrigation of a few acres above station.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Apr. 27 to June 13)

| | | | |
|-----|-----|-----|-------|
| 0.9 | 6.0 | 3.0 | 510 |
| 1.2 | 36 | 4.0 | 1,100 |
| 1.6 | 88 | 5.0 | 2,010 |
| 2.0 | 160 | 6.3 | 3,560 |
| 2.5 | 310 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|--------|-------|-------|-------|-------|-------|
| 1 | 32 | 99 | | | | | *2,260 | 136 | 99 | 32 | 17 | 12 |
| 2 | 49 | 117 | | | | | *1,360 | 136 | 241 | 29 | 16 | 11 |
| 3 | 43 | 102 | | | | | 1,800 | 117 | 175 | 27 | 15 | 11 |
| 4 | 33 | 84 | | | | | 3,490 | 104 | 111 | 32 | 14 | 16 |
| 5 | 28 | 118 | | | | | 1,850 | 94 | 77 | 34 | 12 | 20 |
| 6 | 49 | 143 | | | | | 830 | 85 | 64 | 36 | 12 | 18 |
| 7 | 111 | 189 | | | | | 580 | 78 | 55 | 34 | 12 | 16 |
| 8 | 150 | 115 | | | | | *513 | 71 | 48 | 28 | *15 | 11 |
| 9 | *94 | 90 | | | | | 468 | 67 | 43 | 30 | 21 | 12 |
| 10 | 71 | 80 | | | | | 394 | *67 | *40 | 28 | 19 | 34 |
| 11 | 54 | 73 | | | | | *332 | 64 | 37 | 24 | 19 | 38 |
| 12 | 42 | 70 | | | | | 768 | 81 | 37 | 21 | 15 | 30 |
| 13 | 38 | 87 | | | | | 830 | 85 | 37 | 20 | 11 | 76 |
| 14 | 40 | 68 | | | | | 1,030 | 96 | 36 | 20 | 11 | 68 |
| 15 | 36 | 101 | | | | | 2,070 | 91 | 43 | 18 | 15 | 42 |
| 16 | 35 | 88 | | | | | 1,070 | 149 | 47 | 17 | 15 | 27 |
| 17 | 33 | 84 | | | | | 1,050 | 170 | 44 | 18 | 14 | *20 |
| 18 | 33 | b74 | | | | | 1,460 | 115 | 64 | 18 | 11 | 22 |
| 19 | 38 | *b70 | | | | | 588 | 85 | 61 | 22 | 10 | 25 |
| 20 | 40 | b64 | | | | | 366 | 70 | 58 | 21 | 8.7 | 27 |
| 21 | *67 | 67 | | | | | 306 | 59 | 64 | 19 | 13 | 28 |
| 22 | 59 | 67 | | | | | 738 | 169 | 54 | 18 | 15 | 27 |
| 23 | 54 | 67 | | | | | 462 | 261 | 52 | 18 | 19 | 23 |
| 24 | 55 | 96 | | | | | 377 | 296 | 53 | 16 | 24 | 21 |
| 25 | 162 | 160 | | | | | 706 | 378 | 66 | *15 | 20 | 18 |
| 26 | 157 | b118 | | | | | 450 | 175 | 64 | 14 | 19 | 18 |
| 27 | 109 | b92 | | | | | 270 | 113 | 50 | 14 | 15 | 17 |
| 28 | 118 | b72 | | | | | 210 | 85 | 38 | 14 | 13 | 17 |
| 29 | 101 | b80 | | | | | 168 | 68 | 34 | 13 | 11 | 17 |
| 30 | 68 | b86 | | | | | 146 | 59 | 34 | 12 | 17 | 18 |
| 31 | 66 | ----- | | | | | ----- | 58 | ----- | 15 | 15 | ----- |
| Total | 2,085 | 2,801 | - | - | - | - | 26,938 | 3,682 | 1,926 | 677 | 463.7 | 738 |
| Mean | 66.6 | 93.4 | - | - | - | - | 898 | 119 | 64.2 | 21.8 | 15.0 | 24.6 |
| Cfsm | 0.622 | 0.873 | - | - | - | - | 8.39 | 1.11 | 0.600 | 0.204 | 0.140 | 0.230 |
| In. | 0.72 | 0.97 | - | - | - | - | 8.36 | 1.28 | 0.67 | 0.24 | 0.16 | 0.26 |

| | | | | | |
|---------------|-------|-----|------|------|-----|
| Calendar year | : Max | Min | Mean | Cfsm | In. |
| Water year | : Max | Min | Mean | Cfsm | In. |

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2708. English River near Mooers Forks, N. Y.

Location.--Lat 44°58'32", long 73°39'49", on right bank at downstream side of highway bridge, 1.6 miles upstream from unnamed tributary, 1.7 miles northwest of Mooers Forks, Clinton County, and 2.5 miles upstream from international boundary.

Drainage area.--40.8 sq mi.

Records available.--October 1959 to September 1960 (no winter records).

Gage.--Water-stage recorder. Datum of gage is 406.93 ft above mean sea level, datum of 1929.

Extremes.--Maximum discharge recorded during year, 1,750 cfs Apr. 3 (gage height, 6.24 ft), from rating curve extended above 600 cfs by logarithmic plotting; minimum recorded, 0.6 cfs Aug. 13, 14, 18, 19.

Remarks.--Records good except those for periods of ice effect, which are fair. Slight diurnal fluctuation at low flows.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.9 | 0.8 | 1.8 | 60 |
| 1.0 | 2.6 | 2.3 | 152 |
| 1.1 | 5.2 | 3.0 | 328 |
| 1.2 | 8.4 | 4.0 | 632 |
| 1.3 | 13 | 5.0 | 1,060 |
| 1.5 | 26 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|--------|-------|-------|-------|-------|-------|
| 1 | 4.1 | 26 | | | | | b600 | 60 | 14 | 4.4 | 3.9 | 1.8 |
| 2 | 5.8 | 30 | | | | | b540 | 67 | 13 | 3.6 | 4.7 | 1.3 |
| 3 | 4.1 | 31 | | | | | b700 | 50 | 13 | 3.6 | 2.8 | 1.1 |
| 4 | 3.3 | 27 | | | | | 1,000 | 45 | 12 | 4.1 | 2.4 | 2.1 |
| 5 | 3.1 | 31 | | | | | 906 | 39 | 10 | 3.9 | 2.1 | 3.1 |
| 6 | 6.8 | 38 | | | | | *627 | 34 | 9.2 | 4.1 | 2.8 | 2.1 |
| 7 | 13 | 56 | | | | | 454 | 29 | 9.2 | 3.3 | 1.8 | 1.6 |
| 8 | 22 | 40 | | | | | *380 | 26 | 6.8 | 3.3 | 2.4 | 1.0 |
| 9 | 13 | 33 | | | | | 325 | 26 | 6.8 | 3.6 | 3.6 | 1.8 |
| 10 | 9.2 | 29 | | | | | 281 | 26 | 8.4 | 3.3 | 2.6 | 2.6 |
| 11 | 7.1 | 26 | | | | | *244 | 24 | 5.8 | 4.9 | 2.1 | 3.6 |
| 12 | 5.5 | 25 | | | | | 565 | 25 | 6.5 | 1.4 | 1.6 | 3.6 |
| 13 | 5.5 | 23 | | | | | 629 | *31 | 4.7 | 1.1 | 1.0 | 1.1 |
| 14 | 5.5 | 24 | | | | | 546 | 31 | 5.5 | 1.3 | 1.1 | 6.2 |
| 15 | 4.9 | 32 | | | | | 732 | 29 | 5.2 | 3.6 | *1.1 | 4.1 |
| 16 | 4.9 | 29 | | | | | 457 | 28 | 5.5 | 1.1 | 1.3 | 3.1 |
| 17 | 4.7 | 27 | | | | | 506 | 28 | 5.2 | 1.1 | 2.4 | 2.6 |
| 18 | 5.5 | 26 | | | | | 337 | 25 | *9.2 | 1.6 | 1.0 | 2.8 |
| 19 | 6.5 | *25 | | | | | 217 | 21 | 8.4 | 1.6 | 1.3 | *3.3 |
| 20 | 6.5 | b25 | | | | | 150 | 17 | 7.4 | 1.3 | 1.3 | 3.1 |
| 21 | *8.4 | 24 | | | | | 122 | 15 | 6.8 | 1.1 | 2.1 | 3.1 |
| 22 | 8.1 | 23 | | | | | 170 | 16 | 5.8 | 1.3 | 3.6 | 3.6 |
| 23 | 7.8 | 23 | | | | | 143 | 19 | 5.5 | *1.3 | 6.8 | 3.1 |
| 24 | 10 | 35 | | | | | 128 | 26 | 5.5 | 1.1 | 4.7 | 2.8 |
| 25 | 5.1 | 52 | | | | | 220 | 37 | 6.5 | 1.3 | 2.6 | 2.8 |
| 26 | 40 | b37 | | | | | 184 | 34 | 6.5 | 1.0 | 1.8 | 2.8 |
| 27 | 30 | b32 | | | | | 126 | 25 | 5.2 | 1.1 | 1.8 | 2.8 |
| 28 | 31 | b27 | | | | | 97 | 18 | 4.4 | 1.3 | 1.3 | 3.1 |
| 29 | 23 | b29 | | | | | 76 | 14 | 4.1 | 1.1 | 1.3 | 3.6 |
| 30 | 18 | b31 | | | | | 62 | 11 | 4.1 | 2.1 | 2.4 | 4.4 |
| 31 | 18 | ----- | | | | | ----- | 11 | ----- | 5.5 | 1.8 | ----- |
| Total | 386.3 | 916 | - | - | - | - | 11,324 | 885 | 220.2 | 74.4 | 73.5 | 94.0 |
| Mean | 12.5 | 30.5 | - | - | - | - | 377 | 28.5 | 7.34 | 2.40 | 2.37 | 3.13 |
| Cfsm | 0.306 | 0.748 | - | - | - | - | 9.24 | 0.699 | 0.180 | 0.059 | 0.058 | 0.077 |
| In. | 0.35 | 0.83 | - | - | - | - | 10.32 | 0.81 | 0.20 | 0.07 | 0.07 | 0.09 |

| | | | | | |
|---------------|-------|-----|------|------|-----|
| Calendar year | : Max | Min | Mean | Cfsm | In. |
| Water year | : Max | Min | Mean | Cfsm | In. |

* Discharge measurement made on this day.
b Stage-discharge relation affected by ice.

2715. Great Chazy River at Perry Mills, N. Y.

Location.--Lat 45°00'00", long 73°30'05", on left bank 500 ft upstream from highway bridge at Perry Mills, Clinton County, and 7½ miles upstream from Corbeau Creek.

Drainage area.--247 sq mi.

Records available.--September 1928 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 164.93 ft above mean sea level, datum of 1929.

Average discharge.--32 years, 268 cfs.

Extremes.--Maximum discharge during year, 5,300 cfs Apr. 4 (gage height, 9.23 ft); minimum, 7.8 cfs Sept. 3; minimum daily, 29 cfs Sept. 3.
1928-60: Maximum discharge, 6,000 cfs Apr. 7, 1937 (gage height, 9.74 ft); maximum gage height, 11.5 ft Mar. 9, 1946, from floodmark (ice jam); minimum discharge, about 0.8 cfs Sept. 18, 1932 (gage height, 1.33 ft); minimum daily, 10 cfs Sept. 18, 1932.

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation caused by sawmill immediately upstream. Slight regulation by Chazy Lake, from which Clinton Prison at Dannemora obtains its water supply.

Revisions (water years).--WSP 714: 1930. WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.8 | 22 | 4.0 | 620 |
| 2.0 | 41 | 5.0 | 1,160 |
| 2.3 | 86 | 6.0 | 1,840 |
| 3.0 | 250 | 7.0 | 2,730 |
| 3.5 | 410 | 9.0 | 5,000 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|-------|--------|-------|----------|--------|------------|-----------|-------|-------|-------|
| 1 | 83 | 172 | 225 | 220 | 220 | 240 | 3,000 | 399 | 165 | 72 | 46 | 53 |
| 2 | 84 | 184 | 220 | 225 | *220 | 235 | 3,400 | 396 | 272 | 59 | 50 | 62 |
| 3 | 86 | 135 | 227 | 235 | 215 | 230 | 3,200 | 350 | 272 | 57 | 50 | 29 |
| 4 | 74 | 116 | 250 | 260 | 205 | 250 | 4,000 | 305 | 236 | 62 | 49 | 44 |
| 5 | 81 | 113 | 290 | 300 | 200 | 260 | 4,520 | 284 | 180 | 64 | 48 | 63 |
| 6 | 83 | 133 | 337 | 280 | 205 | 250 | 2,560 | 264 | 160 | 63 | 49 | 62 |
| 7 | 113 | 243 | 618 | 270 | 220 | 245 | 1,430 | 236 | 144 | 58 | 49 | 55 |
| 8 | 250 | 200 | 1,050 | 260 | 215 | 240 | 1,230 | 218 | 133 | 69 | 53 | 54 |
| 9 | 180 | 174 | 565 | 250 | 210 | 235 | 985 | 215 | 122 | 66 | 51 | 54 |
| 10 | 141 | 160 | 371 | 245 | 220 | 230 | 888 | 242 | 126 | 64 | 50 | 53 |
| 11 | 109 | *148 | 297 | 240 | 250 | 225 | *735 | 226 | 116 | 68 | 53 | 62 |
| 12 | 94 | 94 | 260 | 240 | 460 | 220 | 1,240 | 218 | 111 | 60 | 49 | 72 |
| 13 | 64 | 94 | 300 | 240 | 500 | 220 | 2,030 | *239 | 111 | 54 | 48 | 146 |
| 14 | 79 | 94 | *400 | 240 | 480 | 220 | 1,680 | 287 | 99 | 45 | 53 | 144 |
| 15 | 105 | 160 | 320 | 245 | 420 | 225 | 2,540 | 290 | 105 | 54 | 50 | 84 |
| 16 | 97 | 190 | 350 | 250 | 350 | 230 | 2,190 | 284 | 111 | 44 | 51 | 64 |
| 17 | 94 | 165 | 380 | 245 | 360 | 240 | 1,670 | 302 | 109 | 40 | 50 | 62 |
| 18 | 90 | 116 | 320 | 240 | 340 | 240 | 2,100 | 247 | *103 | 48 | 50 | 60 |
| 19 | 94 | 94 | 270 | 235 | 320 | 240 | 1,410 | 236 | 101 | 44 | *50 | *64 |
| 20 | 116 | 76 | 235 | 230 | 310 | 235 | 822 | 205 | 105 | 39 | *49 | 64 |
| 21 | *97 | 96 | 225 | 230 | 300 | 230 | 681 | 180 | 101 | 37 | 49 | 62 |
| 22 | 120 | 96 | 220 | 225 | 290 | 225 | 956 | 160 | 99 | 51 | 56 | 62 |
| 23 | 122 | 94 | 235 | 225 | 280 | 220 | 927 | 226 | 90 | *58 | 78 | 63 |
| 24 | 74 | 135 | 235 | 220 | 270 | 215 | 760 | 261 | 99 | 57 | 99 | 58 |
| 25 | 151 | 215 | 230 | 220 | 260 | 215 | 1,150 | 464 | 99 | 58 | 68 | 57 |
| 26 | 343 | 192 | 250 | 220 | 260 | 210 | 1,180 | 364 | 92 | 56 | 62 | 56 |
| 27 | 324 | 158 | 240 | 220 | 260 | 230 | 750 | 270 | 84 | 45 | 64 | 51 |
| 28 | 256 | 144 | 235 | 225 | 250 | 260 | 606 | 218 | 72 | 58 | 63 | 50 |
| 29 | 205 | 175 | 230 | 235 | 245 | 360 | 509 | 184 | 69 | 37 | 84 | 51 |
| 30 | 167 | 250 | 225 | 230 | --- | 500 | 437 | 180 | 72 | 41 | 60 | 57 |
| 31 | 153 | --- | 225 | 225 | --- | 1,400 | --- | 150 | --- | 60 | 54 | --- |
| Total | 4,109 | 4,398 | 9,815 | 7,425 | 8,335 | 8,775 | 49,586 | 8,080 | 3,756 | 1,698 | 1,715 | 1,916 |
| Mean | 133 | 147 | 317 | 240 | 287 | 283 | 1,653 | 261 | 125 | 54.8 | 55.3 | 63.9 |
| Cfsm | 0.538 | 0.595 | 1.28 | 0.972 | 1.16 | 1.15 | 6.69 | 1.06 | 0.506 | 0.222 | 0.224 | 0.259 |
| In. | 0.62 | 0.66 | 1.48 | 1.12 | 1.26 | 1.32 | 7.47 | 1.22 | 0.57 | 0.26 | 0.26 | 0.29 |
| Calendar year 1959: Max | 4,100 | | | Min 32 | | Mean 241 | | Cfsm 0.976 | In. 13.26 | | | |
| Water year 1959-60: Max | 4,520 | | | Min 29 | | Mean 299 | | Cfsm 1.21 | In. 16.53 | | | |

Peak discharge (base, 2,500 cfs).--Apr. 4 (4:15 p.m.) 5,300 cfs (9.23 ft); Apr. 15 (3 p.m.) 2,840 cfs (7.11 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 20, 21, Nov. 29 to Dec. 1, Dec. 12 to Apr. 4.

2735. Saranac River at Plattsburgh, N. Y.

Location.--Lat 44°40'50", long 73°28'20", on right bank in Plattsburgh, Clinton County, 600 ft downstream from Imperial Paper & Color Corp. dam, 3 miles upstream from mouth, and 5½ miles downstream from Mead Brook.

Drainage area.--608 sq mi.

Records available.--March 1903 to September 1930, October 1943 to September 1960. Published as "near Plattsburgh" 1903-30.

Gage.--Water-stage recorder. Datum of gage is 155.74 ft above mean sea level, datum of 1929. Prior to Nov. 12, 1919, staff gage and Nov. 12, 1919, to Sept. 30, 1930, water-stage recorder, at site 1.5 miles upstream at different datum.

Average discharge.--44 years, 832 cfs.

Extremes.--Maximum discharge during year, 7,600 cfs Apr. 15 (gage height, 8.96 ft); minimum, 19 cfs Oct. 5 (gage height, 1.52 ft); minimum daily, 60 cfs Oct. 5.

1903-30, 1943-60: Maximum discharge, 11,500 cfs Apr. 8, 1928, from computation of flow over dam and through waste gates and powerplant; minimum daily, 18 cfs June 19, 1949.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Considerable diurnal fluctuation caused by power and industrial operations. Regulation by storage in Lower Saranac Lake and elsewhere. During year, city of Plattsburgh diverted about 6 cfs from Saranac River and Mead and West Brooks, tributaries above station, for municipal supply.

Revisions (water years).--WSP 354: Drainage area. WSP 384: 1909-10 (monthly discharge only). WSP 1387: 1907-8. WSP 1437: 1908 (minimum daily only).

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.9 | 57 | 5.0 | 1,520 |
| 2.4 | 133 | 6.0 | 2,610 |
| 3.0 | 289 | 7.0 | 3,990 |
| 3.5 | 501 | 9.0 | 7,680 |
| 4.0 | 785 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 280 | 428 | 744 | 897 | 652 | 1,130 | 1,810 | 2,210 | 946 | 482 | 722 | 451 |
| 2 | 283 | 550 | 802 | 761 | 675 | 1,060 | 1,650 | 2,060 | 931 | 455 | 530 | 497 |
| 3 | 295 | 525 | 884 | 680 | 717 | 996 | 1,720 | 1,870 | 922 | 403 | 576 | 444 |
| 4 | 305 | 517 | 996 | 835 | 743 | 996 | 2,950 | 1,730 | 1,100 | 404 | 560 | 402 |
| 5 | 60 | 518 | 874 | 871 | 688 | 956 | 3,990 | 1,220 | 1,070 | 553 | 447 | 363 |
| 6 | a320 | 491 | 731 | 773 | 720 | 975 | 2,710 | 1,090 | 1,140 | 451 | 447 | 601 |
| 7 | a520 | 581 | 1,100 | 864 | 757 | 870 | 1,880 | 1,050 | 1,000 | 481 | 446 | 414 |
| 8 | a660 | 691 | 1,620 | 728 | 701 | 897 | 1,760 | 1,030 | 929 | 471 | 567 | 441 |
| 9 | a640 | 744 | 1,290 | b640 | 750 | 878 | 1,540 | 1,010 | 748 | 481 | 529 | 408 |
| 10 | a500 | 869 | 1,130 | b740 | 764 | 878 | 1,680 | 882 | 597 | 384 | 555 | 336 |
| 11 | a430 | *664 | 1,010 | b780 | 859 | 852 | 1,710 | 770 | 603 | 548 | 479 | 85 |
| 12 | a460 | 682 | 882 | b740 | 1,090 | 863 | 2,190 | 841 | 361 | 512 | 425 | 241 |
| 13 | a540 | 874 | 1,440 | b720 | 985 | 890 | 3,440 | 962 | 532 | 491 | 500 | 444 |
| 14 | a520 | 782 | *1,290 | b740 | 882 | 892 | *3,500 | 975 | 524 | 442 | 395 | 503 |
| 15 | *a540 | 822 | 1,110 | b800 | 677 | 893 | 5,810 | 1,400 | 543 | 486 | 549 | 428 |
| 16 | 387 | 962 | 1,270 | b740 | 818 | 879 | 5,980 | 1,640 | 628 | 353 | 530 | 327 |
| 17 | 346 | 846 | 1,220 | b700 | 843 | *878 | 5,470 | 1,950 | *540 | 279 | *532 | 206 |
| 18 | 518 | 844 | 1,100 | b620 | 790 | 886 | 6,400 | 1,720 | 674 | 471 | 480 | 214 |
| 19 | 627 | 728 | 986 | b660 | 695 | 877 | 5,250 | *1,470 | 472 | 481 | 436 | 193 |
| 20 | 528 | 707 | 890 | b720 | 665 | 857 | 4,020 | 1,390 | 578 | 476 | 476 | 411 |
| 21 | 533 | 669 | 842 | b680 | 677 | 879 | 3,280 | 1,050 | 471 | 452 | 425 | 301 |
| 22 | 572 | 689 | 795 | b660 | 665 | 809 | 3,180 | 1,090 | 594 | 482 | 592 | 303 |
| 23 | 609 | 572 | 776 | 691 | 641 | 873 | 3,130 | 1,440 | 623 | *415 | 502 | 260 |
| 24 | 603 | 667 | 617 | 683 | 763 | 864 | 2,890 | 1,410 | 626 | 410 | 503 | 261 |
| 25 | 878 | 842 | 749 | 622 | 877 | 759 | 3,400 | 1,810 | 671 | 579 | 500 | 213 |
| 26 | 987 | 846 | 632 | 648 | 906 | 678 | 4,020 | 1,470 | 573 | 484 | 492 | 305 |
| 27 | 732 | 793 | 638 | *701 | 1,090 | 737 | 3,460 | 1,250 | 596 | 549 | 445 | 279 |
| 28 | 594 | 564 | 702 | 630 | 1,170 | 758 | 3,130 | 1,130 | 472 | 530 | 423 | 263 |
| 29 | 420 | 704 | 649 | 698 | 1,150 | 938 | 2,710 | 1,070 | 506 | 575 | 503 | 274 |
| 30 | 517 | 847 | 722 | 616 | ----- | 980 | 2,430 | 1,010 | 517 | 479 | 371 | 399 |
| 31 | 373 | ----- | 688 | 683 | ----- | 1,140 | 996 | ----- | 582 | 458 | ----- | ----- |
| Total | 15,577 | 21,018 | 29,179 | 22,101 | 23,410 | 27,918 | 96,870 | 40,976 | 20,487 | 14,641 | 15,395 | 10,287 |
| Mean | 502 | 701 | 941 | 713 | 807 | 901 | 3,229 | 1,322 | 683 | 472 | 497 | 342 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 3,530 Min 60 Mean 813 Cfsm 1.34 In. 18.16
 Water year 1959-60: Max 6,400 Min 60 Mean 923 Cfsm 1.52 In. 20.67

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of powerplant records.

b Stage-discharge relation affected by ice.

2737. Salmon River at South Plattsburgh, N. Y.

Location.--Lat 44°38'24", long 73°29'43", on left bank at bridge on Salmon River Road, at South Plattsburgh, Clinton County, 0.4 mile west of State Highway 22 and 3.9 miles upstream from mouth.

Drainage area.--61.9 sq mi.

Records available.--May 1959 to September 1960 (no winter records).

Gage.--Water-stage recorder. Datum of gage is 220.53 ft above mean sea level, datum of 1929.

Extremes.--1959: Maximum discharge during period May to September, 90 cfs June 19 (gage height, 1.75 ft); minimum, 5.6 cfs Aug. 2, 3 (gage height, 0.83 ft).

1959-60: Maximum discharge recorded during water year, 1,010 cfs Apr. 3 (gage height, 4.54 ft); maximum gage height recorded, 7.31 ft Apr. 3 (ice jam); minimum discharge recorded, 7.9 cfs July 27 (gage height, 0.91 ft).

Remarks.--Records good except those for periods of ice effect, which are fair.

Rating tables, May 1, 1959, to Sept. 30, 1960, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 6-20, 1960)

May 1, 1959, to Mar. 31, 1960

Apr. 1 to Sept. 30, 1960

| | | | |
|-----|-----|-----|-----|
| 0.8 | 4.8 | 1.2 | 26 |
| .9 | 8.3 | 1.5 | 56 |
| 1.0 | 13 | 2.0 | 131 |

| | | | |
|-----|-----|-----|-------|
| 0.9 | 7.5 | 2.5 | 241 |
| 1.0 | 12 | 3.0 | 389 |
| 1.2 | 26 | 4.0 | 764 |
| 1.5 | 56 | 4.6 | 1,040 |
| 2.0 | 131 | | |

Discharge, in cubic feet per second, May to September 1959

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------|-------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| 1 | | | | | | | - | *55 | 24 | 14 | 7.6 | 14 |
| 2 | | | | | | | - | 50 | 24 | 17 | 6.2 | 14 |
| 3 | | | | | | | - | 48 | 23 | 19 | 5.8 | 13 |
| 4 | | | | | | | - | 46 | 20 | 15 | 6.6 | 11 |
| 5 | | | | | | | - | 45 | 18 | 13 | 8.3 | 8.8 |
| 6 | | | | | | | - | 43 | 17 | 12 | 12 | 8.3 |
| 7 | | | | | | | - | 43 | 18 | 16 | 9.7 | 8.3 |
| 8 | | | | | | | - | 44 | 20 | 14 | 8.8 | 8.3 |
| 9 | | | | | | | - | 40 | 20 | 12 | 9.3 | 8.3 |
| 10 | | | | | | | - | 41 | 16 | 11 | 16 | 8.0 |
| 11 | | | | | | | - | 41 | 14 | 10 | 15 | 8.8 |
| 12 | | | | | | | - | 42 | 20 | 13 | 11 | 8.3 |
| 13 | | | | | | | - | 40 | 26 | 19 | 9.7 | 8.0 |
| 14 | | | | | | | - | *36 | 21 | 13 | 8.0 | 8.0 |
| 15 | | | | | | | +180 | 33 | 28 | 11 | 8.0 | 8.8 |
| 16 | | | | | | | - | 32 | 75 | 11 | 7.6 | *11 |
| 17 | | | | | | | - | 32 | 57 | 11 | 8.0 | 11 |
| 18 | | | | | | | - | 31 | 44 | 10 | 8.8 | 10 |
| 19 | | | | | | | - | 29 | 79 | 11 | 7.6 | 10 |
| 20 | | | | | | | - | 30 | 56 | 12 | 6.9 | 9.7 |
| 21 | +21 | | | | | | - | 29 | 49 | 11 | 6.9 | 10 |
| 22 | | | | | | | +93 | 32 | 38 | *10 | 8.0 | 11 |
| 23 | | | | | | | - | 28 | 30 | 9.3 | 7.6 | 10 |
| 24 | | | | | | | - | 30 | 24 | 8.8 | 9.7 | 9.7 |
| 25 | | | | | | | - | 30 | *21 | 8.3 | *4 | 9.7 |
| 26 | | | | | | | - | 26 | 19 | 8.0 | 9.7 | 9.3 |
| 27 | | | | | | | - | 24 | 19 | 7.6 | 9.3 | 9.3 |
| 28 | | | | | | | - | 24 | 19 | 7.2 | 23 | 9.7 |
| 29 | | | | | | | - | 22 | 20 | *7.2 | 26 | 11 |
| 30 | | | | | | | - | 29 | 16 | 6.9 | 18 | 14 |
| 31 | | | | | | | - | 28 | | 7.2 | 17 | |
| Total | | | | | | | - | 1,103 | 875 | 355.5 | 330.1 | 289.3 |
| Mean | | | | | | | - | 35.6 | 29.2 | 11.5 | 10.6 | 9.88 |
| Cfsm | | | | | | | - | 0.575 | 0.472 | 0.186 | 0.171 | 0.161 |
| In. | | | | | | | - | 0.66 | 0.53 | 0.21 | 0.20 | 0.18 |
| Calendar year | : Max | | Min | | Mean | | Cfsm | | In. | | | |
| Water year | : Max | | Min | | Mean | | Cfsm | | In. | | | |

* Discharge measurement made on this day.

† Result of discharge measurement.

2737. Salmon River at South Plattsburgh, N. Y.--Continued

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1 | 23 | 32 | | | | | b440 | 82 | 51 | 22 | 18 | 9.6 |
| 2 | 29 | 30 | | | | | 338 | 78 | 111 | 20 | 14 | 10 |
| 3 | 18 | 29 | | | | | b450 | 71 | 118 | 19 | 14 | 9.6 |
| 4 | 15 | 26 | | | | | 794 | 66 | 99 | 20 | 12 | 14 |
| 5 | 14 | 29 | | | | | *760 | 62 | 62 | 21 | 13 | 18 |
| 6 | 24 | 36 | | | | | *439 | 56 | 54 | 21 | 20 | 14 |
| 7 | 67 | 46 | | | | | 302 | 52 | 43 | 19 | 15 | 12 |
| 8 | 46 | 38 | | | | | 254 | 49 | 58 | 22 | 19 | 10 |
| 9 | 32 | 34 | | | | | 221 | 55 | 54 | 20 | 20 | 9.6 |
| 10 | 25 | 32 | | | | | 206 | 59 | 30 | 17 | 15 | 12 |
| 11 | 20 | 27 | | | | | 192 | 54 | 27 | 16 | 14 | 11 |
| 12 | 17 | 26 | | | | | 296 | 51 | 24 | 14 | *11 | 27 |
| 13 | 15 | 25 | | | | | 402 | 64 | 23 | 14 | 10 | 78 |
| 14 | 15 | 30 | | | | | 386 | 82 | 20 | 15 | 10 | 32 |
| 15 | 14 | 55 | | | | | *540 | 118 | 27 | 14 | 15 | 22 |
| 16 | 14 | 41 | | | | | 414 | 97 | 28 | *12 | 21 | 20 |
| 17 | 14 | b37 | | | | | 308 | 81 | *25 | 11 | 14 | 18 |
| 18 | 15 | b34 | | | | | 293 | 67 | 38 | 15 | 11 | 18 |
| 19 | 16 | b32 | | | | | 211 | *55 | 28 | 31 | 10 | 20 |
| 20 | 16 | b32 | | | | | 154 | 47 | 24 | 23 | 10 | 16 |
| 21 | 16 | b32 | | | | | 135 | 43 | 23 | 17 | 15 | 16 |
| 22 | 16 | 32 | | | | | 140 | 41 | 22 | 14 | 15 | 15 |
| 23 | 19 | 31 | | | | | 127 | 49 | 22 | 14 | 31 | 14 |
| 24 | 39 | 35 | | | | | 120 | 91 | 27 | 11 | 20 | 14 |
| 25 | 72 | 37 | | | | | 242 | 154 | 43 | 11 | 14 | 13 |
| 26 | 63 | 33 | | | | | 197 | 94 | 31 | 10 | 12 | 12 |
| 27 | 46 | b31 | | | | | 148 | 66 | 24 | 10 | 11 | 12 |
| 28 | 37 | b40 | | | | | 124 | 51 | 20 | 11 | 10 | 12 |
| 29 | 30 | b39 | | | | | 102 | 44 | 20 | 10 | 9.2 | 13 |
| 30 | 26 | b37 | | | | | 88 | 36 | 27 | 16 | *10 | 27 |
| 31 | 26 | | | | | | | 36 | | 35 | 9.6 | |
| Total | 839 | 1,018 | - | - | - | - | 8,823 | 2,051 | 1,163 | 525 | 442.8 | 528.8 |
| Mean | 27.1 | 33.9 | - | - | - | - | 294 | 66.2 | 38.8 | 16.9 | 14.3 | 17.6 |
| Cfsm | 0.438 | 0.548 | - | - | - | - | 4.75 | 1.07 | 0.627 | 0.273 | 0.231 | 0.284 |
| In. | 0.50 | 0.61 | - | - | - | - | 5.30 | 1.23 | 0.70 | 0.32 | 0.27 | 0.32 |

Calendar year : Max Min Mean Cfsm In.
 Water year : Max Min Mean Cfsm In.

* Discharge measurement made on this day.

b Stage-discharge relation affected by ice.

2739. Lake Placid at Lake Placid, N. Y.

Location.--Lat 44°17'42", long 73°59'26", on south shore, 400 ft north of State Highway 86 in village of Lake Placid, Essex County.

Records available.--November 1959 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 1,854.93 ft above mean sea level, datum of 1929.

Extremes.--Maximum gage height during period, 4.36 ft Apr. 18; minimum, 2.77 ft Sept. 9.

| Mean gage height, in feet, November 1959 to September 1960 | | | | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|------|------|------|-------|
| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
| 1 | | - | 3.45 | 3.31 | 3.21 | 3.29 | 3.42 | 3.68 | 3.38 | 3.33 | 3.16 | 2.87 |
| 2 | | - | 3.43 | 3.30 | 3.20 | 3.27 | 3.48 | 3.64 | 3.44 | 3.30 | 3.14 | 2.85 |
| 3 | | - | 3.42 | 3.36 | 3.20 | 3.26 | 3.53 | 3.60 | 3.49 | 3.28 | 3.14 | 2.83 |
| 4 | | - | 3.40 | 3.41 | 3.19 | 3.28 | 3.71 | 3.56 | 3.51 | 3.28 | 3.13 | 2.84 |
| 5 | | - | 3.38 | 3.39 | 3.19 | 3.28 | 3.85 | 3.53 | 3.48 | 3.25 | 3.14 | 2.84 |
| 6 | | - | 3.36 | 3.38 | 3.20 | 3.27 | 3.83 | 3.51 | 3.45 | 3.24 | 3.15 | 2.82 |
| 7 | | - | 3.42 | 3.36 | 3.20 | 3.26 | 3.75 | 3.49 | 3.42 | 3.23 | 3.14 | 2.81 |
| 8 | | - | 3.47 | 3.35 | 3.20 | 3.25 | 3.68 | 3.47 | 3.39 | 3.22 | 3.15 | 2.80 |
| 9 | | - | 3.46 | 3.34 | 3.20 | 3.24 | 3.63 | 3.48 | 3.36 | 3.21 | 3.14 | 2.80 |
| 10 | | - | 3.45 | 3.32 | 3.20 | 3.23 | 3.58 | 3.47 | 3.33 | 3.20 | 3.14 | 2.82 |
| 11 | | - | 3.43 | 3.31 | 3.27 | 3.22 | 3.53 | 3.46 | 3.31 | 3.19 | 3.12 | 2.80 |
| 12 | | - | 3.45 | 3.30 | 3.34 | 3.22 | 3.54 | 3.45 | 3.29 | 3.17 | 3.10 | 2.84 |
| 13 | | - | 3.51 | 3.28 | 3.36 | 3.21 | 3.56 | 3.48 | 3.27 | 3.16 | 3.09 | 2.95 |
| 14 | | - | 3.52 | 3.27 | 3.38 | 3.20 | 3.59 | 3.50 | 3.26 | 3.16 | 3.07 | 2.96 |
| 15 | | - | 3.50 | 3.27 | 3.39 | 3.20 | 3.85 | 3.58 | 3.27 | 3.13 | 3.06 | 2.95 |
| 16 | | - | 3.50 | 3.27 | 3.37 | 3.20 | 4.02 | 3.64 | 3.26 | 3.11 | 3.05 | 2.93 |
| 17 | | - | 3.48 | 3.26 | 3.36 | 3.20 | 4.12 | 3.65 | 3.25 | 3.09 | 3.03 | 2.92 |
| 18 | | - | 3.45 | 3.25 | 3.35 | 3.20 | 4.33 | 3.64 | 3.28 | 3.08 | 3.02 | 2.93 |
| 19 | 3.42 | | 3.43 | 3.26 | 3.37 | 3.19 | 4.23 | 3.61 | 3.26 | 3.17 | 3.00 | 2.93 |
| 20 | 3.40 | | 3.40 | 3.26 | 3.39 | 3.19 | 4.07 | 3.57 | 3.24 | 3.18 | 2.99 | 2.93 |
| 21 | | 3.38 | 3.38 | 3.27 | 3.38 | 3.18 | 3.94 | 3.53 | 3.23 | 3.16 | 2.98 | 2.93 |
| 22 | | 3.37 | 3.37 | 3.26 | 3.36 | 3.18 | 3.98 | 3.50 | 3.22 | 3.15 | 2.98 | 2.92 |
| 23 | | 3.36 | 3.36 | 3.25 | 3.35 | 3.17 | 3.99 | 3.48 | 3.21 | 3.17 | 3.00 | 2.92 |
| 24 | | 3.35 | 3.35 | 3.24 | 3.33 | 3.16 | 4.00 | 3.49 | 3.26 | 3.18 | 2.99 | 2.91 |
| 25 | | 3.34 | 3.34 | 3.23 | 3.32 | 3.16 | 4.18 | 3.50 | 3.35 | 3.16 | 2.97 | 2.90 |
| 26 | | 3.34 | 3.34 | 3.23 | 3.33 | 3.15 | 4.13 | 3.48 | 3.37 | 3.15 | 2.95 | 2.90 |
| 27 | | 3.36 | 3.33 | 3.23 | 3.32 | 3.16 | 4.01 | 3.45 | 3.34 | 3.12 | 2.93 | 2.89 |
| 28 | | 3.45 | 3.33 | 3.23 | 3.31 | 3.20 | 3.90 | 3.44 | 3.33 | 3.11 | 2.92 | 2.88 |
| 29 | | 3.48 | 3.32 | 3.23 | 3.30 | 3.20 | 3.81 | 3.41 | 3.33 | 3.10 | 2.90 | 2.89 |
| 30 | | 3.47 | 3.32 | 3.22 | | 3.21 | 3.73 | 3.38 | 3.33 | 3.13 | 2.90 | 2.92 |
| 31 | | | 3.31 | 3.22 | | 3.26 | | 3.37 | | 3.17 | 2.88 | |
| Mean | | - | 3.41 | 3.29 | 3.30 | 3.22 | 3.83 | 3.52 | 3.33 | 3.18 | 3.04 | 2.88 |

Note.--No gage-height record Dec. 21 to Jan. 7, Mar. 23-27; gage heights estimated on basis of weather records.

2740. West Branch Ausable River near Lake Placid, N. Y.

Location.--Lat 44°18'40", long 73°55'00", on right bank 4 miles northeast of Lake Placid, Essex County, and 4 miles downstream from Lake Placid Outlet.

Drainage area.--116 sq mi.

Records available.--June 1916 to December 1917, July 1919 to September 1960. Prior to October 1956, published as "near Newman."

Gage.--Water-stage recorder. Datum of gage is 1,620.76 ft above mean sea level, datum of 1929. Prior to July 14, 1927, staff gage at same site and datum.

Average discharge.--41 years (1919-60), 219 cfs.

Extremes.--Maximum discharge during year, 3,220 cfs Apr. 4 (gage height, 7.54 ft); minimum, 32 cfs Sept. 2; minimum daily, 42 cfs Sept. 1, 2.
1916-17, 1919-60: Maximum discharge, 10,800 cfs Sept. 22, 1938 (gage height, 12.20 ft), from rating curve extended above 4,100 cfs by logarithmic plotting; practically no flow Sept. 13, 1920 (gage height, 1.60 ft), caused by closing gates in logging dam; minimum daily discharge, 7.2 cfs July 29, 1920.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diurnal fluctuation at low and medium flow caused by mills above station.

Revisions (water years).--WSP 1337: 1921-25.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.4 | 36 | 4.0 | 467 |
| 2.7 | 74 | 5.0 | 1,000 |
| 3.0 | 131 | 6.0 | 1,700 |
| 3.5 | 272 | 7.0 | 2,620 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 125 | a280 | 300 | 114 | 78 | 110 | 1,160 | 517 | 162 | 138 | *136 | 42 |
| 2 | 348 | *293 | 230 | 108 | 80 | *108 | 740 | 404 | 227 | 110 | 95 | 42 |
| 3 | 175 | 239 | 205 | 160 | 78 | 102 | 780 | 322 | 296 | 93 | 79 | 46 |
| 4 | 112 | 202 | 188 | 270 | 74 | 106 | 2,000 | 344 | 290 | 136 | 71 | 52 |
| 5 | 89 | 318 | 180 | 210 | 74 | 112 | 1,530 | 379 | 214 | 118 | 101 | 62 |
| 6 | 156 | 1,150 | 188 | 160 | 84 | 110 | 835 | 364 | 180 | 108 | 259 | 52 |
| 7 | 627 | 939 | 279 | *135 | 96 | 108 | 584 | 364 | 152 | 97 | 136 | 51 |
| 8 | 410 | 531 | 340 | 130 | 92 | 106 | 424 | 348 | 136 | 93 | 200 | 44 |
| 9 | 262 | 371 | 260 | 108 | 90 | 102 | 340 | 360 | 114 | 93 | 217 | 46 |
| 10 | 188 | 285 | 217 | 100 | 86 | 100 | 296 | 420 | 106 | 86 | 142 | 52 |
| 11 | 140 | 224 | 200 | 94 | 560 | 98 | 259 | 296 | 102 | 74 | 120 | 52 |
| 12 | 131 | 205 | 210 | 90 | 340 | 96 | 311 | 279 | 95 | 71 | 100 | 91 |
| 13 | 112 | 180 | 914 | 92 | 520 | 96 | *433 | 433 | 89 | 68 | 86 | 628 |
| 14 | 106 | 210 | 540 | 94 | 360 | 98 | 605 | 521 | 84 | 102 | 72 | 280 |
| 15 | 99 | 686 | *400 | 94 | *230 | 100 | 1,720 | 480 | 91 | 95 | 74 | 147 |
| 16 | 89 | 404 | 293 | 98 | 200 | 100 | 1,480 | 494 | 99 | *76 | 70 | 102 |
| 17 | 86 | 311 | 256 | 94 | 180 | 98 | 1,850 | 508 | *95 | 64 | 65 | 82 |
| 18 | 100 | 246 | 215 | 92 | 160 | 96 | 2,590 | 416 | 175 | 64 | 62 | 74 |
| 19 | 104 | 205 | 190 | 92 | 150 | 100 | 1,300 | 352 | 142 | 256 | 59 | 79 |
| 20 | 95 | 185 | 170 | 90 | 160 | 100 | 762 | *290 | 112 | 285 | 59 | 77 |
| 21 | 106 | 167 | 145 | 88 | 160 | 98 | 613 | 249 | 97 | 175 | 58 | 72 |
| 22 | *99 | 149 | 135 | 88 | 150 | 96 | 1,190 | 224 | 89 | 114 | 60 | 70 |
| 23 | 236 | 142 | 125 | 92 | 150 | 94 | 1,000 | 205 | 77 | 125 | 68 | 64 |
| 24 | 960 | 159 | 125 | 88 | 140 | 92 | 1,060 | 230 | 117 | 149 | 84 | 65 |
| 25 | 2,110 | 282 | 122 | 84 | 130 | 90 | 2,410 | 441 | 356 | 110 | 71 | 59 |
| 26 | 852 | 233 | 135 | 84 | 135 | 88 | 1,250 | 360 | 256 | 95 | 65 | 56 |
| 27 | 498 | 184 | 122 | 86 | 140 | 110 | 769 | 276 | 159 | 82 | 58 | 54 |
| 28 | 364 | 987 | 125 | 88 | 135 | 140 | 634 | 211 | 123 | 76 | 54 | 54 |
| 29 | a260 | 700 | 125 | 90 | 130 | 160 | 536 | 183 | 108 | 72 | *55 | 58 |
| 30 | a180 | 430 | 130 | 84 | ----- | 220 | 480 | 157 | 145 | 76 | 49 | 76 |
| 31 | a200 | ----- | 125 | 80 | ----- | 1,100 | ----- | 149 | ----- | 183 | 47 | ----- |
| Total | 9,419 | 10,887 | 7,189 | 3,377 | 5,562 | 4,352 | 29,961 | 10,576 | 4,488 | 3,464 | 2,872 | 2,729 |
| Mean | 304 | 363 | 232 | 109 | 192 | 140 | 999 | 341 | 150 | 112 | 92.6 | 91.0 |
| Cfsm | 2.62 | 3.13 | 2.00 | 0.940 | 1.66 | 1.21 | 8.61 | 2.94 | 1.29 | 0.966 | 0.798 | 0.784 |
| In. | 3.02 | 3.49 | 2.30 | 1.08 | 1.78 | 1.39 | 9.61 | 3.39 | 1.44 | 1.11 | 0.92 | 0.87 |

Calendar year 1959: Max 2,110 Min 41 Mean 233 Cfsm 2.01 In. 27.25

Water year 1959-60: Max 2,590 Min 42 Mean 259 Cfsm 2.23 In. 30.40

Peak discharge (base, 2,000 cfs).--Oct. 25 (2 p.m.) 2,880 cfs (7.24 ft); Nov. 6 (8 p.m.) 2,240 cfs (6.62 ft); Apr. 4 (8:45 a.m.) 3,220 cfs (7.54 ft); Apr. 18 (12:30 p.m.) 2,800 cfs (7.16 ft); Apr. 25 (5 a.m.) 2,660 cfs (7.04 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and weather records.

Note.--Stage-discharge relation affected by ice Nov. 20, Nov. 29 to Dec. 1, Dec. 9, 11, 12, 14, 15, Dec. 18 to Apr. 4 (no gage-height record Mar. 10-14).

2745. Black Brook at Black Brook, N. Y.

Location.--Lat 44°26'50", long 73°44'45", on right bank three-quarters of a mile south of hamlet of Black Brook, Clinton County, and 1½ miles upstream from mouth.

Drainage area.--49.4 sq mi.

Records available.--September 1924 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 888.48 ft above mean sea level, datum of 1929. Prior to Oct. 24, 1936, staff gage at same site and datum.

Average discharge.--36 years, 49.3 cfs.

Extremes.--Maximum discharge during year, 466 cfs Apr. 15 (gage height, 4.70 f'); minimum, 5.2 cfs Aug. 31, Sept. 1.

1924-60: Maximum discharge, 1,050 cfs Apr. 6, 1937 (gage height, 6.95 f'), from rating curve extended above 700 cfs by logarithmic plotting; minimum, 0.8 cfs July 2, Aug. 29, 1931.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Appreciable regulation by Fern Lake and Taylor Pond. Prior to October 1937, diurnal fluctuation at low and medium flow caused by powerplant.

Revisions (water years).--WSP 759: Drainage area. WSP 1337: 1925.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 1.4 | 5.2 | 3.0 | 141 |
| 1.6 | 11 | 4.0 | 311 |
| 2.0 | 33 | 5.0 | 540 |
| 2.5 | 80 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|---------|
| 1 | 48 | 22 | 37 | 76 | 42 | 26 | 133 | 65 | 29 | 21 | 37 | 26 |
| 2 | 51 | 30 | 33 | 76 | 43 | 26 | 180 | 61 | 55 | 20 | *35 | 36 |
| 3 | 26 | 28 | 29 | 84 | 41 | 25 | 168 | 56 | 70 | 18 | 35 | 37 |
| 4 | 9.1 | 25 | 30 | 82 | 30 | 25 | 220 | 51 | 79 | 18 | 30 | 39 |
| 5 | 7.4 | 24 | 32 | 80 | 20 | 28 | 366 | 48 | 52 | 18 | 29 | 39 |
| 6 | 12 | 27 | 31 | 80 | 20 | 27 | 279 | 45 | 42 | 17 | 32 | 38 |
| 7 | 34 | 35 | 57 | *78 | 21 | 26 | 192 | 42 | 33 | 17 | 29 | 38 |
| 8 | 38 | 35 | 109 | 78 | 20 | 25 | 147 | 40 | 27 | 24 | 32 | 38 |
| 9 | 24 | 31 | 78 | 74 | 19 | 24 | 119 | 35 | 23 | 36 | 32 | 38 |
| 10 | 19 | 26 | 58 | 72 | 20 | 23 | 108 | 37 | 21 | 35 | 29 | 39 |
| 11 | 14 | 23 | 46 | 70 | 45 | 22 | 102 | 33 | 36 | 35 | 16 | 42 |
| 12 | 11 | *25 | 42 | 70 | 90 | 22 | 136 | 33 | 52 | 34 | 8.4 | 51 |
| 13 | 9.8 | 25 | 63 | 72 | 86 | 23 | 234 | 50 | 50 | 35 | 7.4 | 77 |
| 14 | 9.4 | 25 | 58 | 72 | 68 | 23 | *248 | 69 | 66 | 37 | 7.2 | 33 |
| 15 | 8.4 | 39 | *47 | 74 | *56 | 22 | 418 | 110 | 78 | 37 | 7.2 | 13 |
| 16 | 8.0 | a35 | 45 | 76 | 48 | 22 | 362 | 91 | 79 | *37 | 8.8 | 10 |
| 17 | 8.0 | a31 | 47 | 74 | 42 | 22 | 247 | 69 | *77 | 37 | 7.7 | 9.4 |
| 18 | 8.0 | a29 | 42 | 72 | 38 | *21 | 259 | 55 | 64 | 37 | 7.0 | 9.1 |
| 19 | 8.8 | 26 | 41 | 70 | 36 | 21 | 184 | 47 | 51 | 44 | 6.7 | 9.1 |
| 20 | 8.8 | 24 | 40 | 70 | 35 | 21 | 129 | *39 | 48 | 42 | 6.5 | 8.4 |
| 21 | 9.1 | 23 | 39 | 68 | 34 | 21 | 105 | 33 | 47 | 22 | 6.7 | 8.8 |
| 22 | *9.1 | 21 | 38 | 56 | 33 | 20 | 105 | 33 | 45 | 9.8 | 9.4 | 29 |
| 23 | 9.8 | 21 | 64 | 46 | 32 | 21 | 98 | 41 | 44 | 9.1 | 16 | 42 |
| 24 | 21 | 24 | 84 | 45 | 30 | 21 | 91 | 50 | 49 | 8.4 | 10 | 42 |
| 25 | 86 | 26 | 82 | 44 | 50 | 21 | 156 | 95 | 59 | 7.7 | 8.4 | 42 |
| 26 | 83 | 25 | 82 | 43 | 29 | 19 | 181 | 74 | 51 | 7.4 | 7.7 | 42 |
| 27 | 46 | 24 | 82 | 43 | 29 | 20 | 127 | 49 | 47 | 21 | 6.7 | 42 |
| 28 | 33 | 33 | 80 | 42 | 28 | 24 | 102 | 39 | 45 | 36 | 6.5 | 43 |
| 29 | 23 | 45 | 80 | 42 | 27 | 42 | 83 | 32 | 44 | 33 | 6.0 | 44 |
| 30 | 20 | 42 | 78 | 43 | ----- | 65 | 72 | 28 | 31 | 35 | *5.7 | 49 |
| 31 | 19 | ----- | 78 | 42 | ----- | 86 | ----- | 26 | ----- | 41 | 5.5 | ----- |
| Total | 721.7 | 849 | 1,752 | 2,014 | 1,092 | 834 | 5,351 | 1,576 | 1,494 | 829.4 | 491.5 | 1,013.8 |
| Mean | 23.3 | 28.3 | 56.5 | 65.0 | 37.7 | 26.9 | 178 | 50.8 | 49.8 | 26.8 | 15.9 | 33.8 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 307 Min 2.6 Mean 47.4 Cfsm 0.960 In. 13.03
 Water year 1959-60: Max 418 Min 5.5 Mean 49.2 Cfsm 0.996 In. 13.56

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of recorded range in stage and weather records.

Note.--Stage-discharge relation affected by ice Nov. 20, Nov. 29 to Dec. 1, Dec. 14-16, Dec. 19 to Mar. 26, Mar. 29 (no gage-height record Dec. 22 to Jan. 7, Feb. 5-15; discharge estimated on basis of discharge measurements, weather records and records for nearby stations).

2750. East Branch Ausable River at Au Sable Forks, N. Y.

Location.--Lat 44°26'20", long 73°40'55", on left bank 700 ft upstream from upper highway bridge in Au Sable Forks, Essex County, and half a mile upstream from confluence with West Branch.

Drainage area.--198 sq mi.

Records available.--September 1924 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 545.37 ft above mean sea level, datum of 1929. Prior to Sept. 21, 1938, staff gage at lower highway bridge in Au Sable Forks, 400 ft upstream from confluence with West Branch at datum 3.54 ft lower.

Average discharge.--36 years, 310 cfs.

Extremes.--Maximum discharge during year, 7,420 cfs Oct. 24 (gage height, 8.03 ft); minimum, 37 cfs Sept. 9 (gage height, 1.03 ft).
1924-60: Maximum discharge, 20,100 cfs Sept. 22, 1938 (gage height, 12.91 ft), from rating curve extended above 5,800 cfs by logarithmic plotting on basis of velocity-area studies; minimum observed, 20 cfs Aug. 11, 14, 28, 1934.

Remarks.--Records good except those for periods of ice effect, which are fair.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.0 | 34 | 4.0 | 1,460 |
| 1.3 | 72 | 5.0 | 2,450 |
| 1.6 | 132 | 6.0 | 3,750 |
| 2.2 | 326 | 7.0 | 5,370 |
| 3.0 | 740 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 84 | 352 | 450 | 130 | 104 | 135 | 2,420 | 764 | 248 | 164 | 142 | 41 |
| 2 | 359 | 435 | 348 | 140 | 102 | 125 | 1,260 | 625 | 554 | 161 | 105 | 41 |
| 3 | 255 | 339 | 310 | 180 | 100 | 120 | 1,520 | 505 | 505 | 178 | *89 | 39 |
| 4 | 164 | 280 | 295 | 220 | 96 | 130 | 4,440 | 526 | 397 | 240 | 77 | 42 |
| 5 | 116 | 348 | 287 | 200 | 96 | 140 | 2,980 | 603 | 280 | 193 | 74 | 50 |
| 6 | 146 | 1,370 | 326 | 170 | 100 | 135 | 1,470 | 586 | 241 | 158 | 371 | 46 |
| 7 | 844 | 1,540 | 801 | 150 | 108 | 130 | 964 | 564 | 196 | 135 | 212 | 43 |
| 8 | 812 | 794 | 746 | 140 | 108 | 125 | 764 | 532 | 170 | 118 | 178 | 40 |
| 9 | 520 | 500 | 485 | 135 | 104 | 120 | 625 | 656 | 153 | 107 | 209 | 38 |
| 10 | 392 | 360 | 387 | 130 | *104 | 118 | 537 | 886 | 140 | 97 | 150 | 39 |
| 11 | 269 | 295 | 320 | 130 | 760 | 114 | 475 | 581 | 130 | 87 | 137 | 40 |
| 12 | 208 | *251 | 310 | 125 | 1,490 | 112 | 558 | 505 | 123 | 79 | 109 | 75 |
| 13 | 167 | 225 | 1,380 | 120 | 686 | 112 | *818 | 975 | 116 | 77 | 89 | 770 |
| 14 | 137 | 215 | 860 | 120 | 460 | 114 | 1,120 | 1,100 | 105 | 105 | 77 | 374 |
| 15 | 118 | 747 | *600 | 125 | 360 | 118 | 3,080 | 1,270 | 114 | 84 | 72 | 221 |
| 16 | 105 | 485 | 526 | 130 | 310 | 118 | 2,310 | 899 | 178 | *39 | 74 | 148 |
| 17 | 97 | 383 | 430 | 125 | 280 | *118 | 2,820 | 788 | *172 | 83 | 69 | 109 |
| 18 | 101 | 318 | 340 | 120 | 250 | 114 | 3,720 | 842 | 484 | 62 | 64 | 95 |
| 19 | 105 | 250 | 280 | 120 | 240 | 112 | 1,880 | *526 | 306 | 191 | 80 | 86 |
| 20 | 93 | 220 | 190 | 118 | 230 | 114 | 1,050 | 425 | 221 | 212 | 58 | 79 |
| 21 | *97 | 215 | 160 | 116 | 190 | 112 | 776 | 356 | 178 | 127 | 63 | 75 |
| 22 | 93 | 193 | 155 | 114 | 180 | 110 | 1,730 | 318 | 142 | 99 | 70 | 70 |
| 23 | 163 | 178 | 150 | 110 | 180 | 110 | 1,720 | 314 | 123 | 93 | 69 | 68 |
| 24 | 3,180 | 187 | 150 | 110 | 170 | 108 | 1,690 | 444 | 156 | 109 | 72 | 64 |
| 25 | 4,280 | 339 | 145 | 108 | 160 | 104 | 4,020 | 1,050 | 650 | 93 | 66 | 60 |
| 26 | 1,590 | 339 | 150 | *108 | 165 | 100 | 1,960 | 710 | 378 | 79 | 57 | 57 |
| 27 | 818 | 273 | 145 | 108 | 170 | 110 | 1,190 | 500 | 251 | 70 | 53 | 54 |
| 28 | 532 | 1,010 | 140 | 110 | 150 | 130 | 932 | 369 | 187 | 69 | 50 | 53 |
| 29 | 369 | 1,050 | 140 | 112 | 145 | 160 | 776 | 296 | 148 | 77 | 47 | 53 |
| 30 | 287 | 640 | 135 | 108 | ----- | 300 | 698 | 244 | 178 | 87 | *47 | 58 |
| 31 | 262 | ----- | 130 | 106 | ----- | 2,520 | ----- | 218 | ----- | 206 | 43 | ----- |
| Total | 16,741 | 14,131 | 11,271 | 4,036 | 7,596 | 6,284 | 50,403 | 18,778 | 7,224 | 3,689 | 3,053 | 3,028 |
| Mean | 540 | 471 | 364 | 130 | 262 | 203 | 1,680 | 606 | 241 | 119 | 98.5 | 101 |
| Cfs/m | 2.73 | 2.38 | 1.84 | 0.657 | 1.32 | 1.03 | 8.48 | 3.06 | 1.22 | 0.601 | 0.497 | 0.510 |
| In. | 3.14 | 2.65 | 2.12 | 0.76 | 1.43 | 1.18 | 9.47 | 3.53 | 1.36 | 0.69 | 0.57 | 0.57 |

Calendar year 1959: Max 4,280 Min 31 Mean 323 Cfs/m 1.63 In. 22.14
Water year 1959-60: Max 4,440 Min 38 Mean 400 Cfs/m 2.02 In. 27.47

Peak discharge (base, 3,700 cfs).--Oct. 24 (9:30 p.m.) 7,420 cfs (8.03 ft); Feb. 11 (8 p.m.) 6,480 cfs (7.58 ft); Apr. 4 (9 a.m.) 5,260 cfs (6.94 ft); Apr. 17 (10:30 p.m.) 4,160 cfs (6.27 ft); Apr. 25 (1 p.m.) 4,600 cfs (6.55 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19, 20, 30, Dec. 1, 11, 12, 14, 15, Dec. 18 to Feb. 11, Feb. 14 to Mar. 30.

2755. Ausable River near Au Sable Forks, N. Y.

Location.--Lat 44°27'05", long 73°38'35", on left bank $1\frac{1}{2}$ miles downstream from confluence of East and West Branches at Au Sable Forks, Clinton County.

Drainage area.--448 sq mi.

Records available.--August 1910 to September 1960. Prior to September 1924, published as "at Au Sable Forks." Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder at present site since September 1924. Datum of gage is 505.65 ft above mean sea level, datum of 1929. August 1910 to September 1924, chain gage at site $1\frac{1}{2}$ miles upstream at different datum.

Average discharge.--50 years, 685 cfs.

Extremes.--Maximum discharge during year, 8,870 cfs Oct. 24 (gage height, 7.38 ft); minimum, 106 cfs Sept. 3 (gage height, 1.15 ft).
1910-60: Maximum discharge, 24,200 cfs Sept. 22, 1938 (gage height, 11.65 ft), from rating curve extended above 9,100 cfs on basis of slope-area measurement at gage height 11.39 ft; maximum gage height, about 14.0 ft Mar. 27, 1934 (ice jam); practically no flow July 21, 1912, result of unusual regulation.

Remarks.--Records good except those for periods of ice effect, which are fair. Regulation since 1905, principally by Taylor Pond and Fern Lake. Diurnal fluctuation at low and medium flow caused by powerplants above station.

Revisions (water years).--WSP 664: Drainage area. WSP 854: 1925(M), 1934 (maximum gage height). WSP 1307: 1911-19(M), 1922-24(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.2 | 117 | 3.0 | 1,110 |
| 1.5 | 204 | 4.0 | 2,190 |
| 2.0 | 416 | 5.0 | 3,650 |
| 2.5 | 705 | 7.0 | 7,850 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-------|-------|-------|
| 1 | 257 | 679 | 948 | 370 | 270 | 320 | 4,490 | 1,580 | 540 | 373 | 350 | 150 |
| 2 | 734 | 842 | 726 | 370 | 270 | 310 | 2,750 | 1,340 | 975 | 328 | 265 | 142 |
| 3 | 541 | 705 | 634 | 480 | 260 | 300 | 2,920 | 1,070 | 1,040 | 336 | *219 | 132 |
| 4 | 339 | 592 | 604 | 640 | 240 | 320 | 7,640 | 1,060 | 939 | 387 | *197 | 156 |
| 5 | 264 | 712 | 592 | 540 | 230 | 340 | 6,290 | 1,180 | 686 | 373 | 191 | 171 |
| 6 | 330 | 2,200 | 634 | 470 | 240 | 330 | 3,290 | 1,130 | 563 | 319 | 596 | 171 |
| 7 | 1,420 | 2,370 | 1,280 | 420 | 270 | 320 | 2,180 | 1,100 | 464 | 281 | 1,070 | 156 |
| 8 | 1,510 | 1,570 | 1,500 | 400 | 260 | 310 | 1,710 | 1,040 | 416 | 273 | 350 | 148 |
| 9 | 898 | 1,060 | 957 | 370 | 250 | 300 | 1,380 | 1,140 | 373 | 273 | 484 | 142 |
| 10 | 679 | 775 | 790 | 350 | *250 | 290 | 1,210 | 1,540 | 341 | 257 | 354 | 145 |
| 11 | 496 | 628 | 672 | 340 | 1,250 | 280 | 1,070 | 1,060 | 323 | 234 | *298 | 151 |
| 12 | 387 | *574 | 653 | 330 | 2,600 | 270 | 1,460 | 930 | 336 | 219 | 234 | 210 |
| 13 | 332 | 518 | 2,390 | 330 | 1,300 | 270 | *1,960 | 1,510 | 319 | 211 | 204 | 1,340 |
| 14 | 294 | 496 | *1,550 | 330 | 960 | 270 | 2,330 | 1,940 | 310 | 257 | 171 | 768 |
| 15 | 273 | 1,480 | 1,060 | 340 | 800 | 280 | 6,220 | 2,230 | 350 | 253 | 174 | 474 |
| 16 | 253 | 1,070 | 960 | 350 | 680 | 280 | 5,140 | 1,780 | 426 | *222 | 168 | 310 |
| 17 | 226 | 842 | 820 | 340 | 600 | *298 | 5,690 | 1,660 | *406 | 201 | 159 | 249 |
| 18 | 253 | 698 | 680 | 330 | 520 | 298 | 7,590 | 1,330 | 686 | 197 | 145 | 215 |
| 19 | 265 | 592 | 600 | 330 | 480 | 298 | 4,190 | *1,100 | 569 | 399 | 140 | 197 |
| 20 | 245 | 501 | 500 | 320 | 470 | 298 | 2,380 | 890 | 452 | 592 | 137 | 201 |
| 21 | *261 | 490 | 420 | 320 | 440 | 290 | 1,810 | 747 | 382 | 397 | 145 | 194 |
| 22 | 257 | 452 | 390 | 310 | 420 | 280 | 3,380 | 679 | 327 | 281 | 154 | 191 |
| 23 | 302 | 416 | 480 | 300 | 420 | 270 | 3,340 | 679 | 298 | 245 | 174 | 208 |
| 24 | 3,640 | 437 | 420 | 290 | 400 | 260 | 2,190 | 828 | 358 | 273 | 184 | 201 |
| 25 | 6,950 | 660 | 400 | 280 | 390 | 250 | 7,440 | 1,800 | 1,100 | 257 | 181 | 197 |
| 26 | 2,990 | 698 | 430 | *280 | 380 | 240 | 4,190 | 1,280 | 761 | 204 | 156 | 194 |
| 27 | 1,570 | 563 | 410 | 280 | 380 | 270 | 2,580 | 957 | 534 | 194 | 142 | 184 |
| 28 | 1,850 | 400 | 290 | 360 | 310 | 270 | 2,050 | 726 | 406 | 204 | 137 | 181 |
| 29 | 747 | 2,150 | 400 | 300 | 340 | 400 | 1,690 | 598 | 341 | 197 | 137 | 184 |
| 30 | 592 | 1,250 | 390 | 290 | ----- | 580 | 1,490 | 529 | 406 | 219 | *130 | 211 |
| 31 | 546 | ----- | 380 | 280 | ----- | 3,400 | ----- | 484 | ----- | 397 | 124 | ----- |
| Total | 28,921 | 28,470 | 22,990 | 10,970 | 15,730 | 12,532 | 103,090 | 35,917 | 15,447 | 8,853 | 7,570 | 7,553 |
| Mean | 933 | 949 | 742 | 354 | 542 | 404 | 3,436 | 1,159 | 515 | 286 | 244 | 252 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |

Calendar year 1959: Max 6,950 Min 120 Mean 689 Cfsm 1.54 In. 20.87
Water year 1959-60: Max 7,640 Min 124 Mean 814 Cfsm 1.82 In. 24.74

Peak discharge (base, 6,200 cfs).--Oct. 24 (11 p.m.) 8,870 cfs (7.38 ft); Apr. 4 (9 p.m.) 8,790 cfs (7.31 ft); Apr. 15 (10 p.m.) 6,800 cfs (6.54 ft); Apr. 18 (1:30 p.m.) 7,980 cfs (7.01 ft); Apr. 25 (1:15 p.m.) 8,330 cfs (7.14 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 14 to Mar. 16, Mar. 21-31.

2765. Bouquet River at Willsboro, N. Y.

Location.--Lat 44°21'30", long 73°23'50", on right bank at Willsboro, Essex County, half a mile upstream from bridge on State Highway 22, 2½ miles downstream from North Branch Bouquet River, and 3 miles upstream from mouth.

Drainage area.--275 sq mi.

Records available.--August and September 1904 (gage heights and discharge measurements only), August to November 1908, July 1923 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 150.88 ft above mean sea level, datum of 1929. Prior to November 1908, staff gages at site three-quarters of a mile downstream at various datums. July 23 to Aug. 28, 1923, staff gage at site 600 ft downstream at present datum.

Average discharge.--37 years (1923-60), 303 cfs.

Extremes.--Maximum discharge during year, 4,990 cfs Apr. 5 (gage height, 7.34 ft); maximum gage height, 8.78 ft Feb. 12 (ice jam); minimum discharge, 26 cfs Sept. 11 (gage height, 3.08 ft).

1923-60: Maximum discharge, 11,800 cfs Oct. 1, 1924 (gage height, 10.85 ft), from rating curve extended above 4,600 cfs by logarithmic plotting; minimum, 8.8 cfs Sept. 20, 1957 (gage height, 1.84 ft).

Remarks.--Records good except those for periods of ice effect, which are fair. Diurnal fluctuation at low flow caused by powerplants above station.

Revisions.--WSP 759: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 2.1 | 28 | 3.3 | 435 |
| 2.3 | 55 | 4.0 | 960 |
| 2.5 | 92 | 5.0 | 1,940 |
| 2.8 | 180 | 7.5 | 5,250 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 84 | 267 | 542 | 290 | 310 | 170 | 2,800 | 615 | 298 | 136 | 130 | 46 |
| 2 | 229 | 324 | 417 | 310 | 300 | 165 | 1,800 | 578 | 500 | 114 | 92 | 41 |
| 3 | 176 | 287 | 380 | 340 | 290 | 170 | 1,400 | 494 | 448 | 114 | 78 | 41 |
| 4 | 122 | 239 | 404 | 400 | 290 | 180 | 3,420 | 461 | 392 | 111 | 72 | 44 |
| 5 | 99 | 226 | 417 | 470 | 280 | 180 | 4,580 | 461 | 303 | 109 | 72 | 50 |
| 6 | 97 | 332 | 423 | 450 | 280 | 175 | 2,280 | 435 | 262 | 104 | 111 | 50 |
| 7 | 298 | 1,020 | 970 | 410 | 270 | 175 | 1,210 | 411 | 226 | 99 | 111 | 54 |
| 8 | 636 | 528 | 1,370 | 390 | 270 | 170 | 996 | 386 | 200 | 99 | 86 | 44 |
| 9 | 287 | 368 | 705 | 380 | 260 | 170 | 856 | 392 | 184 | 94 | 84 | 49 |
| 10 | 235 | 292 | 535 | 370 | *260 | 165 | 784 | 675 | 173 | 86 | 82 | 44 |
| 11 | 176 | 249 | 435 | 370 | 840 | 160 | 690 | 514 | 162 | 84 | *80 | 34 |
| 12 | 139 | *221 | 450 | 360 | 1,400 | 160 | 792 | 807 | 156 | 82 | 72 | 73 |
| 13 | 116 | 205 | 1,520 | 350 | 2,000 | 160 | 1,130 | 608 | 148 | 76 | 70 | 450 |
| 14 | 106 | 232 | 1,080 | 340 | 1,300 | 165 | *1,180 | 904 | 142 | 84 | 82 | 272 |
| 15 | 97 | 660 | *600 | 350 | 800 | 170 | 2,040 | 1,100 | 148 | 90 | 64 | 148 |
| 16 | 90 | 468 | 580 | 350 | 500 | 175 | 2,140 | 784 | 253 | *74 | 62 | 102 |
| 17 | 84 | 374 | 540 | 350 | 350 | 175 | 1,750 | 630 | *244 | 72 | 64 | 88 |
| 18 | 84 | 335 | 460 | 340 | 280 | *175 | 2,260 | 535 | 428 | 72 | 58 | 69 |
| 19 | 82 | 267 | 390 | 340 | 250 | 170 | 1,480 | *487 | 329 | 146 | 52 | 88 |
| 20 | 82 | 215 | 270 | 340 | 230 | 170 | 856 | 404 | 217 | 213 | 54 | 102 |
| 21 | 80 | 205 | 300 | 330 | 220 | 170 | 690 | 352 | 170 | 114 | 57 | 97 |
| 22 | *82 | 200 | 300 | 330 | 220 | 165 | 832 | 313 | 142 | 90 | 57 | 97 |
| 23 | 80 | 196 | 300 | 320 | 210 | 165 | 987 | 318 | 122 | 78 | 86 | 94 |
| 24 | 845 | 200 | 290 | 320 | 205 | 160 | 872 | 449 | 237 | 74 | 82 | 92 |
| 25 | 2,930 | 313 | 290 | 320 | 200 | 160 | 2,200 | 1,130 | 622 | 82 | 67 | 92 |
| 26 | 1,240 | 346 | 300 | 310 | 130 | 155 | 1,810 | 744 | 318 | 65 | 60 | 86 |
| 27 | 645 | 262 | 310 | *310 | 180 | 150 | 1,030 | 507 | 205 | 67 | 55 | 62 |
| 28 | 442 | 1,620 | 320 | 310 | 175 | 150 | 880 | 392 | 156 | 60 | 52 | 69 |
| 29 | 329 | 2,030 | 310 | 320 | 175 | 200 | 792 | 324 | 133 | 87 | *49 | 84 |
| 30 | 267 | 743 | 300 | 330 | ----- | 960 | 698 | 282 | 133 | 67 | 49 | 90 |
| 31 | 239 | ----- | 290 | 320 | ----- | 2,000 | ----- | 258 | ----- | 142 | 46 | ----- |
| Total | 10,498 | 13,224 | 15,798 | 10,820 | 12,535 | 7,835 | 45,235 | 16,450 | 7,451 | 2,965 | 2,216 | 2,752 |
| Mean | 339 | 441 | 510 | 349 | 432 | 253 | 1,508 | 531 | 248 | 95.6 | 71.5 | 91.7 |
| Cfsm | 1.23 | 1.60 | 1.85 | 1.27 | 1.57 | 0.920 | 5.48 | 1.93 | 0.902 | 0.348 | 0.260 | 0.333 |
| In. | 1.42 | 1.79 | 2.14 | 1.46 | 1.70 | 1.06 | 6.12 | 2.22 | 1.01 | 0.40 | 0.30 | 0.37 |

Calendar year 1959: Max 3,800 Min 29 Mean 308 Cfsm 1.12 In. 15.20

Water year 1959-60: Max 4,580 Min 34 Mean 404 Cfsm 1.47 In. 19.99

Peak discharge (base, 2,800 cfs).--Oct. 25 (9:45 a.m.) 3,730 cfs (6.47 ft); Apr. 1 (8 a.m.) about 4,600 cfs; Apr. 5 (7:30 a.m.) 4,990 cfs (7.34 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 20, 21, Dec. 15 to Apr. 3 (no gage-height record Feb. 14-20).

Location.--Lat 43°48'10", long 73°27'25", on west shore about 500 ft north of Hooper's dock at Rogers Rock, Essex County, and 0.4 mile west of Baldwin.

Gage.--Water-stage recorder. Datum of gage is 315.93 ft above mean sea level, adjustment of 1912. Prior to Nov. 4, 1929, staff gages at several sites within half a mile of present site at same datum. Nov. 4, 1929, to Sept. 26, 1936, staff gage at present site and datum.

Remarks.--Elevation of lake surface regulated by powerplant and floodgates at Ticonderoga. Lake George has been controlled by a dam at its outlet for more than 100 years.

| Mean gage height, in feet, water year October 1959 to September 1960 | | | | | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|
| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
| 1 | 2.83 | 3.14 | 3.73 | 3.32 | 2.67 | 2.80 | 2.77 | 3.93 | 3.96 | 3.84 | 3.57 | 3.07 |
| 2 | 2.91 | 3.12 | 3.75 | 3.30 | 2.64 | 2.76 | 2.87 | 3.88 | 3.96 | 3.83 | 3.57 | 2.99 |
| 3 | 2.97 | 3.08 | 3.72 | 3.34 | 2.63 | 2.72 | 2.98 | 3.88 | 3.96 | 3.86 | 3.51 | 2.99 |
| 4 | 2.95 | 3.08 | 3.69 | <u>3.36</u> | 2.61 | 2.76 | 3.27 | 3.89 | <u>3.98</u> | 3.86 | 3.46 | 2.99 |
| 5 | 2.92 | 3.10 | 3.68 | <u>3.31</u> | 2.60 | 2.74 | 3.60 | 3.89 | <u>3.97</u> | <u>3.87</u> | 3.46 | 2.96 |
| 6 | 2.91 | 3.12 | 3.65 | 3.30 | 2.58 | 2.72 | 3.77 | 3.89 | 3.95 | 3.78 | 3.47 | 2.97 |
| 7 | 2.99 | 3.11 | 3.76 | 3.21 | 2.60 | 2.69 | 3.82 | 3.88 | 3.90 | 3.76 | 3.48 | 2.98 |
| 8 | 3.05 | 3.12 | 3.89 | 3.24 | 2.56 | 2.66 | 3.85 | <u>3.84</u> | 3.88 | 3.76 | 3.45 | 2.97 |
| 9 | 3.09 | 3.12 | 3.89 | 3.14 | 2.55 | 2.63 | 3.85 | 3.86 | 3.85 | 3.72 | 3.38 | 2.98 |
| 10 | 3.11 | 3.13 | 3.82 | 3.07 | <u>2.52</u> | 2.59 | 3.83 | 3.90 | 3.86 | 3.73 | 3.33 | 2.96 |
| 11 | 3.12 | 3.16 | 3.76 | 3.05 | 2.63 | 2.57 | 3.82 | 3.88 | 3.84 | 3.76 | 3.32 | 2.94 |
| 12 | 3.13 | 3.12 | 3.76 | 3.05 | 2.79 | 2.55 | 3.82 | 3.89 | 3.83 | 3.75 | 3.34 | 3.03 |
| 13 | 3.07 | 3.09 | 3.86 | 3.00 | 2.79 | 2.53 | 3.82 | 3.93 | 3.82 | 3.74 | 3.32 | 3.33 |
| 14 | 3.03 | 3.13 | 3.90 | 2.99 | 2.80 | 2.51 | 3.83 | 3.96 | <u>3.78</u> | 3.65 | 3.30 | 3.33 |
| 15 | 3.04 | 3.03 | <u>3.92</u> | 2.97 | 2.86 | 2.50 | 3.88 | <u>3.98</u> | 3.85 | 3.70 | 3.23 | 3.28 |
| 16 | 3.02 | 3.07 | 3.89 | 2.95 | 2.85 | 2.47 | 3.93 | 3.96 | 3.94 | 3.70 | 3.22 | 3.25 |
| 17 | 3.00 | 3.12 | 3.84 | 2.82 | 2.84 | 2.47 | 3.95 | 3.94 | 3.95 | 3.85 | 3.22 | 3.30 |
| 18 | 2.98 | 3.12 | 3.85 | 2.85 | 2.83 | 2.50 | 3.93 | 3.94 | 3.94 | 3.85 | 3.21 | 3.26 |
| 19 | 2.94 | 3.09 | 3.76 | 2.87 | 2.86 | 2.48 | 3.96 | 3.92 | 3.95 | 3.67 | 3.18 | 3.20 |
| 20 | 2.90 | 3.08 | 3.71 | 2.86 | <u>2.91</u> | 2.41 | 3.94 | 3.93 | 3.94 | 3.62 | 3.22 | 3.22 |
| 21 | 2.83 | 3.05 | 3.62 | 2.84 | 2.87 | 2.41 | 3.94 | 3.91 | 3.91 | 3.58 | 3.21 | 3.19 |
| 22 | 2.85 | <u>3.01</u> | 3.58 | 2.82 | 2.86 | 2.38 | 3.94 | 3.90 | 3.92 | 3.60 | 3.20 | 3.23 |
| 23 | 2.87 | <u>3.06</u> | 3.54 | 2.79 | 2.86 | 2.36 | 3.92 | 3.89 | 3.89 | 3.58 | 3.15 | 3.20 |
| 24 | 2.98 | 3.05 | 3.50 | 2.77 | 2.85 | 2.34 | 3.94 | 3.92 | 3.91 | 3.52 | 3.14 | 3.16 |
| 25 | 3.12 | 3.15 | 3.49 | 2.75 | 2.83 | 2.34 | 4.01 | 3.97 | 3.96 | 3.51 | 3.15 | 3.17 |
| 26 | <u>3.15</u> | 3.15 | 3.41 | 2.74 | 2.86 | 2.31 | 4.01 | 3.97 | 3.92 | 3.53 | 3.16 | 3.17 |
| 27 | <u>3.15</u> | 3.19 | 3.37 | 2.72 | 2.86 | 2.30 | <u>4.02</u> | 3.95 | 3.91 | 3.53 | 3.13 | 3.16 |
| 28 | 3.14 | 3.49 | 3.33 | 2.74 | 2.83 | 2.25 | <u>3.99</u> | 3.95 | 3.89 | 3.45 | 3.12 | 3.11 |
| 29 | 3.11 | 3.76 | <u>3.36</u> | 2.74 | 2.80 | <u>2.24</u> | 3.96 | 3.96 | 3.91 | <u>3.44</u> | 3.13 | 3.12 |
| 30 | 3.10 | <u>3.81</u> | 3.37 | 2.71 | ----- | <u>2.28</u> | 3.95 | 3.94 | 3.88 | <u>3.48</u> | <u>3.06</u> | 3.14 |
| 31 | 3.12 | ----- | 3.34 | <u>2.69</u> | ----- | 2.52 | ----- | 3.94 | ----- | 3.58 | 3.08 | ----- |
| Mean | 3.01 | 3.16 | 3.67 | 2.98 | 2.75 | 2.51 | 3.77 | 3.92 | 3.91 | 3.67 | 3.28 | 3.12 |
| Calendar year 1959: Max 3.92 Min 2.45 Mean 3.24 | | | | | | | | | | | | |
| Water year 1959-60: Max 4.02 Min 2.24 Mean 3.31 | | | | | | | | | | | | |

2790. Lake George Outlet at Ticonderoga, N. Y.

Location.--Lat 43°50'35", long 73°26'00", at Ticonderoga, Essex County. River channel gage on right bank 250 ft downstream from "c" Mill dam of International Paper Co., 250 ft upstream from Trout Brook, and half a mile downstream from upper dam ("A" Mill dam) of International Paper Co. Turbine gate-opening gage in powerhouse at "c" Mill dam.

Drainage area.--234 sq mi.

Records available.--August 1904 to December 1905, October 1942 to September 1960.

Gage.--Water-stage recorder and concrete control on river channel. Datum of gage is 190.41 ft above mean sea level, datum of 1929. Turbine gate-opening recorder in powerhouse. Prior to Dec. 31, 1905, staff gages at site 2,000 ft upstream at different datum.

Average discharge.--18 years (1942-60), 316 cfs.

Extremes.--Maximum daily discharge during year, 1,010 cfs Apr. 26; minimum daily, 63 cfs Sept. 5.

1942-60: Maximum daily discharge, 1,290 cfs June 5, 6, 1947; minimum daily, 6.1 cfs July 6, 1952.

Remarks.--Records good. Discharge in tailrace determined from rating for turbines gates developed from discharge measurements. Records represent total discharge from Lake George and include flow in river channel and in tailrace. Diurnal fluctuation at low and medium flow caused by three powerplants. Appreciable regulation by Lake George.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|-------|-------|--------|--------|--------|----------|-----------|-----------|-------|-------|-------|-------|
| 1 | 107 | 249 | 884 | 732 | 439 | 466 | 512 | 812 | 279 | 271 | 206 | 107 |
| 2 | 104 | 259 | 876 | 732 | 434 | 496 | 534 | 549 | 277 | 268 | 209 | 107 |
| 3 | 104 | 257 | 852 | 756 | 430 | 485 | 540 | 308 | 274 | 192 | 204 | 108 |
| 4 | 102 | 257 | 740 | 764 | 430 | 485 | 522 | 308 | 274 | 139 | 206 | 74 |
| 5 | 104 | 256 | 492 | 758 | 430 | 511 | 627 | 308 | 276 | 241 | 205 | 63 |
| 6 | 106 | 254 | 732 | 740 | 430 | 545 | 791 | 288 | 270 | 267 | 207 | 76 |
| 7 | 109 | 250 | 695 | 695 | 430 | 539 | 879 | 297 | 268 | 263 | 207 | 79 |
| 8 | 107 | 245 | 788 | 724 | 430 | 527 | 955 | 297 | 267 | 262 | 210 | 80 |
| 9 | 128 | 249 | 868 | 688 | 430 | 522 | 973 | 299 | 266 | 237 | 208 | 81 |
| 10 | 136 | 248 | 868 | 666 | 430 | 511 | 973 | 299 | 266 | 254 | 208 | 81 |
| 11 | 156 | 256 | 844 | 652 | 451 | 501 | 973 | 297 | 262 | 256 | 207 | 81 |
| 12 | 168 | 253 | 844 | 652 | 481 | 496 | 964 | 297 | 266 | 278 | 213 | 74 |
| 13 | 178 | 253 | 876 | 632 | 457 | 491 | 955 | 299 | 264 | 235 | 211 | 113 |
| 14 | 175 | 253 | 884 | 626 | 422 | 485 | 969 | 299 | 266 | 232 | 210 | 140 |
| 15 | 182 | 258 | 901 | 619 | 426 | 475 | 836 | 296 | 269 | 237 | 210 | 139 |
| 16 | 182 | 259 | 918 | 619 | 422 | 466 | 724 | 294 | 268 | 232 | 210 | 139 |
| 17 | 179 | 263 | 892 | 619 | 422 | 466 | 684 | 291 | 273 | 236 | 170 | 139 |
| 18 | 178 | 262 | 884 | 593 | 422 | 470 | 721 | 292 | 268 | 233 | 134 | 139 |
| 19 | 182 | 260 | 868 | 517 | 422 | 466 | 740 | 289 | 260 | 232 | 123 | 140 |
| 20 | 181 | 260 | 860 | 452 | 422 | 462 | 732 | 285 | 266 | 251 | 125 | 139 |
| 21 | 180 | 262 | 828 | 452 | 422 | 452 | 732 | 279 | 265 | 251 | 123 | 139 |
| 22 | 181 | 265 | 804 | 452 | 422 | 444 | 616 | 278 | 267 | 256 | 111 | 140 |
| 23 | 182 | 266 | 804 | 452 | 426 | 439 | 491 | 277 | 268 | 253 | 109 | 139 |
| 24 | 196 | 269 | 788 | 452 | 430 | 439 | 492 | 279 | 266 | 243 | 106 | 139 |
| 25 | 186 | 271 | 800 | 452 | 426 | 430 | 833 | 279 | 275 | 248 | 106 | 140 |
| 26 | 226 | 268 | 771 | 404 | 430 | 422 | 1,010 | 496 | 270 | 205 | 106 | 102 |
| 27 | 251 | 268 | 756 | 299 | 430 | 430 | 1,000 | 524 | 273 | 208 | 106 | 103 |
| 28 | 251 | 529 | 732 | 268 | 430 | 390 | 996 | 267 | 266 | 205 | 107 | 131 |
| 29 | 251 | 868 | 748 | 356 | 426 | 402 | 987 | 170 | 266 | 215 | 108 | 133 |
| 30 | 251 | 910 | 756 | 439 | ----- | 421 | 884 | 246 | 266 | 215 | 107 | 134 |
| 31 | 251 | ----- | 740 | 439 | ----- | 475 | ----- | 281 | ----- | 211 | 107 | ----- |
| Total | 5,272 | 9,277 | 25,093 | 17,699 | 12,502 | 14,609 | 23,645 | 10,080 | 8,061 | 7,532 | 5,079 | 3,399 |
| Mean | 170 | 309 | 809 | 571 | 431 | 471 | 788 | 325 | 269 | 243 | 164 | 113 |
| Cfsm | - | - | - | - | - | - | - | - | - | - | - | - |
| In. | - | - | - | - | - | - | - | - | - | - | - | - |
| Calendar year 1959: Max | 918 | | | | Min 60 | Mean 327 | Cfsm 1.40 | In. 18.95 | | | | |
| Water year 1959-60: Max | 1,010 | | | | Min 63 | Mean 389 | Cfsm 1.66 | In. 22.61 | | | | |

2800. Poultney River below Fair Haven, Vt.

Location.--Lat 43°37'40", long 73°18'50", on right bank a third of a mile downstream from Carver Falls, 1.9 miles upstream from Hubbardton River, and 3½ miles northwest of Fair Haven, Rutland County.

Drainage area.--187 sq mi.

Records available.--October 1928 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 155 ft (from topographic map).

Average discharge.--32 years, 246 cfs.

Extremes.--Maximum discharge during year, 8,360 cfs Nov. 28 (gage height, 19.26 ft), from rating curve extended above 2,400 cfs as explained below; minimum daily, 7.7 cfs Aug. 13.

1928-60: Maximum discharge, 14,800 cfs July 20, 1945 (gage height, 24.26 ft, from high-water mark in gage well), from rating curve extended above 2,400 cfs on basis of computations of peak flow over dam at gage heights 16.10, 21.40, and 24.36 ft; minimum daily, 2.9 cfs Oct. 13, 1935.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Flow regulated by powerplant above station and by Lake Bomoseen.

Revisions (water years).--WSP 1114: 1929(M), 1932-35.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Nov. 28 | | | | | Nov. 29 to Sept. 30 | | | | |
|-------------------|-----|------|-------|--|---------------------|-----|-----|-----|--|
| 2.0 | 26 | 6.0 | 914 | | 1.6 | 6.6 | 2.2 | 47 | |
| 2.3 | 52 | 10.0 | 2,040 | | 1.7 | 10 | 2.6 | 97 | |
| 2.7 | 107 | 14.0 | 4,030 | | 1.9 | 22 | 3.0 | 165 | |
| 3.0 | 165 | 16.0 | 5,480 | | | | | | |
| 4.0 | 400 | | | | | | | | |

Note.--Same as preceding table above 3.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|--------|-------|-------|--------|-------|-------|---------|---------|---------|
| 1 | 85 | 289 | 1,000 | 230 | 130 | 240 | 3,520 | 445 | *120 | 51 | 89 | 8.9 |
| 2 | 118 | 308 | 748 | 150 | 180 | 235 | 1,900 | 485 | 104 | 8.9 | 72 | 9.6 |
| 3 | 61 | 288 | 651 | 1,000 | 160 | 230 | 1,820 | 415 | 104 | 42 | 68 | 10 |
| 4 | 33 | 278 | 599 | 2,500 | 160 | 235 | 3,520 | 378 | 111 | 31 | 49 | 10 |
| 5 | 84 | 288 | 538 | 1,300 | 160 | 230 | 3,330 | 345 | 89 | 42 | 61 | 13 |
| 6 | 97 | 372 | 492 | 900 | 130 | 220 | 2,160 | 310 | 127 | 38 | 9.2 | 27 |
| 7 | 113 | 675 | 492 | 600 | 100 | 210 | 1,470 | 217 | 86 | 61 | 38 | 24 |
| 8 | 244 | 475 | *512 | 450 | 130 | 215 | 1,140 | 177 | 73 | 41 | 57 | 23 |
| 9 | 212 | 400 | 455 | 350 | 190 | 190 | 999 | 178 | 73 | 40 | *32 | 28 |
| 10 | 143 | 362 | 422 | 250 | 180 | 185 | 867 | 153 | 72 | 8.9 | 40 | 8.1 |
| 11 | 124 | 325 | 392 | 210 | 750 | 180 | 651 | 180 | 58 | 45 | 34 | 8.9 |
| 12 | 166 | 302 | 435 | *260 | 1,500 | 160 | 666 | 173 | 50 | 39 | 36 | 99 |
| 13 | 150 | 280 | 1,980 | 260 | 700 | 185 | 625 | 167 | 56 | 38 | 7.7 | *508 |
| 14 | 151 | 263 | 1,300 | 280 | 450 | 170 | 610 | 184 | 55 | 27 | 11 | 230 |
| 15 | 147 | 268 | 900 | 240 | 360 | 179 | 628 | 165 | 73 | 56 | 46 | 208 |
| 16 | 142 | 263 | 700 | 160 | *310 | 169 | 545 | 185 | 92 | 44 | 41 | 169 |
| 17 | 93 | 285 | 600 | 140 | 280 | 179 | 492 | 168 | 63 | *34 | 23 | 90 |
| 18 | 80 | 350 | 520 | 170 | 260 | 167 | 480 | 160 | 72 | 44 | 28 | 86 |
| 19 | 132 | 318 | 470 | 210 | 270 | 108 | 584 | 147 | 74 | 44 | 8.5 | 119 |
| 20 | 122 | 295 | 350 | 180 | 250 | 91 | 462 | 126 | 63 | 29 | 10 | 145 |
| 21 | 129 | 285 | 320 | 200 | 230 | 154 | *425 | 114 | 72 | 29 | 17 | 147 |
| 22 | 143 | 275 | 300 | 200 | 240 | *167 | 430 | 122 | 44 | 31 | 25 | 130 |
| 23 | 158 | 268 | 250 | 130 | 275 | 171 | 328 | 107 | 51 | 39 | 37 | 119 |
| 24 | 259 | 285 | 290 | 110 | 270 | 165 | 352 | 158 | 55 | 12 | 34 | 67 |
| 25 | 440 | 1,280 | 290 | 130 | 255 | 155 | 795 | 243 | 78 | 44 | 39 | 36 |
| 26 | 270 | 898 | 290 | 190 | 255 | 105 | 711 | 294 | 54 | 36 | 11 | 92 |
| 27 | 207 | 698 | 290 | 185 | 270 | 130 | 651 | 256 | 54 | 36 | 14 | 119 |
| 28 | 183 | 5,330 | 280 | 180 | 255 | 140 | 709 | 207 | 56 | 8.5 | 15 | 119 |
| 29 | 205 | 3,170 | 280 | 175 | 250 | 171 | 623 | 183 | 56 | 28 | 32 | 111 |
| 30 | 207 | 1,600 | 280 | 120 | ----- | 482 | 475 | 180 | 44 | 63 | 31 | 127 |
| 31 | 171 | ----- | 280 | 95 | ----- | 3,720 | ----- | 128 | ----- | 202 | 19 | ----- |
| Total | 4,869 | 20,771 | 16,708 | 11,555 | 8,950 | 9,338 | 31,968 | 6,730 | 2,179 | 1,292.3 | 1,044.4 | 2,891.5 |
| Mean | 157 | 692 | 539 | 373 | 309 | 301 | 1,066 | 217 | 72.6 | 41.7 | 33.7 | 96.4 |
| Cfsm | 0.840 | 3.70 | 2.68 | 1.99 | 1.65 | 1.61 | 5.70 | 1.16 | 0.388 | 0.223 | 0.180 | 0.516 |
| In. | 0.97 | 4.13 | 3.32 | 2.30 | 1.78 | 1.86 | 6.36 | 1.34 | 0.43 | 0.26 | 0.21 | 0.58 |

Calendar year 1959: Max 5,330 Min 6.2 Mean 265 Cfsm 1.42 In. 19.22
 Water year 1959-60: Max 5,330 Min 7.7 Mean 323 Cfsm 1.73 In. 23.54

Peak discharge (base, 2,600 cfs).--Nov. 28 (4 p.m.) 8,360 cfs (19.26 ft); Dec. 13 (12 m.) 2,740 cfs (11.71 ft); Jan. 4 (time unknown) about 3,000 cfs; Mar. 31 (10 p.m.) 5,830 cfs (16.44 ft); Apr. 4 (1 p.m.) 4,120 cfs (14.13 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 30, Dec. 1, Dec. 14 to Feb. 6, Feb. 13-15; discharge estimated on basis of 1 discharge measurement, weather records, powerplant records, and records for Otter Creek at Center Rutland. Stage-discharge relation affected by ice Feb. 7 to Mar. 14, Mar. 24-27, and during much of period of no gage-height record Dec. 14 to Feb. 6.

2815. East Creek at Rutland, Vt.

Location.--Lat 43°37'40", long 72°59'20", on left bank on grounds of Rutland Country Club, at Rutland, Rutland County, 280 ft downstream from Grove Street Bridge and 2 miles upstream from mouth.

Drainage area.--51.1 sq mi.

Records available.--August 1940 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 570 ft (from topographic map).

Average discharge.--20 years, 100 cfs (adjusted for diversion and storage).

Extremes.--Maximum discharge during year, 1,510 cfs Nov. 28 (gage height, 4.34 ft), from rating curve extended above 670 cfs on basis of computation of flow over dam and slope-area measurement at gage height 7.10 ft; minimum daily, 7.8 cfs Aug. 28, Sept. 10.
1940-60: Maximum discharge, 36,500 cfs June 3, 1947 (gage height, 27.3 ft, from high-water mark in gage house), mean of two slope-area measurements, caused by failure of East Pittsford Dam 5.8 miles upstream; minimum daily, 3.1 cfs Nov. 8, 1947.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diversion above station from Mendon Brook for municipal supply of Rutland. Flow regulated by powerplants and Chittenden Reservoir (usable capacity, 819,800,000 cu ft); prior to June 3, 1947, also regulated by East Pittsford Reservoir (usable capacity, 150,000,000 cu ft).

Revisions (water years).--WSP 1307: 1941-42(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-----|
| 0.9 | 7.0 | 1.6 | 108 |
| 1.0 | 12 | 2.0 | 223 |
| 1.1 | 19 | 2.5 | 425 |
| 1.2 | 30 | 3.0 | 655 |
| 1.3 | 43 | 3.5 | 940 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------|---------|
| 1 | 104 | 154 | 193 | 36 | 140 | 171 | 515 | 122 | *100 | 18 | 30 | 63 |
| 2 | 92 | 143 | 182 | 104 | 148 | 170 | 299 | 207 | 94 | 18 | 24 | 82 |
| 3 | 28 | 104 | 172 | 312 | 150 | a170 | 338 | 183 | 113 | 59 | 30 | 14 |
| 4 | 22 | 100 | 163 | 211 | 144 | 176 | 770 | 165 | 43 | 56 | 30 | 12 |
| 5 | 84 | 122 | 86 | 146 | 148 | a40 | 732 | 158 | 40 | 38 | 27 | 16 |
| 6 | 114 | 198 | 77 | 134 | 39 | 45 | 327 | 151 | 90 | 38 | 12 | 57 |
| 7 | 108 | 168 | 384 | 127 | 54 | 124 | 210 | 63 | 28 | 24 | 13 | 61 |
| 8 | 129 | 87 | *237 | 129 | 142 | a120 | 165 | 61 | 28 | 20 | 87 | 50 |
| 9 | 97 | 128 | 175 | 118 | 153 | 121 | 140 | 151 | 40 | 15 | *57 | 88 |
| 10 | 56 | 109 | 162 | b30 | 159 | a110 | 130 | 115 | 63 | 15 | 82 | 7.8 |
| 11 | 38 | 50 | 148 | b115 | 385 | 125 | 131 | 117 | 23 | 65 | 83 | 23 |
| 12 | 104 | 121 | 129 | *b130 | 252 | 38 | 187 | 118 | 23 | 29 | 64 | 332 |
| 13 | 83 | 126 | 385 | 130 | 93 | 42 | 183 | 124 | 64 | 12 | 15 | *199 |
| 14 | 83 | 43 | 206 | 128 | 68 | 123 | 287 | 56 | 63 | 54 | 11 | 103 |
| 15 | 78 | 94 | 177 | 132 | 173 | 123 | 524 | 96 | 81 | 16 | 85 | 59 |
| 16 | 82 | 127 | 161 | 42 | *177 | 123 | 294 | 207 | 50 | 8.3 | 60 | 59 |
| 17 | 18 | 120 | 162 | 31 | 130 | 133 | 318 | 125 | 56 | 11 | 94 | 26 |
| 18 | 34 | 124 | 154 | 187 | 107 | 120 | 492 | 131 | 61 | 43 | 75 | 26 |
| 19 | 97 | 112 | 144 | 152 | 169 | 43 | 258 | 135 | 32 | *32 | 48 | 74 |
| 20 | 78 | 112 | 56 | 152 | 57 | 33 | 166 | 122 | 63 | 41 | 10 | 94 |
| 21 | 86 | 40 | 111 | 157 | 52 | 130 | *123 | 44 | 55 | 11 | 16 | 82 |
| 22 | 68 | 48 | 114 | 156 | 119 | 113 | 268 | 48 | 52 | 30 | 74 | 83 |
| 23 | 95 | 128 | b110 | 24 | 145 | 96 | 160 | 133 | 23 | 12 | 72 | 66 |
| 24 | 211 | 126 | b95 | 33 | 126 | 95 | 220 | 250 | 43 | 12 | 60 | 26 |
| 25 | 186 | 278 | 29 | 154 | 152 | 91 | 470 | 237 | 35 | 27 | 69 | 25 |
| 26 | 117 | 109 | 107 | 155 | 165 | 28 | 270 | 170 | 24 | 42 | 61 | 68 |
| 27 | 106 | 147 | 36 | 140 | 54 | 28 | 274 | 143 | 31 | 54 | 9.3 | 66 |
| 28 | 97 | 843 | 115 | 155 | 53 | 102 | 254 | 48 | 27 | 40 | 7.8 | 58 |
| 29 | 67 | 303 | 113 | 153 | 155 | 102 | 211 | 52 | 30 | 46 | 61 | 62 |
| 30 | 89 | 217 | 94 | 23 | ----- | 285 | 195 | 48 | 21 | 65 | 88 | 80 |
| 31 | 93 | ----- | 98 | 33 | ----- | 894 | ----- | 89 | ----- | 74 | 70 | ----- |
| Total | 2,734 | 4,561 | 4,595 | 3,697 | 3,909 | 4,094 | 8,859 | 3,870 | 1,496 | 1,025.3 | 1,495.1 | 2,021.8 |
| Mean | 88.2 | 153 | 148 | 119 | 135 | 132 | 295 | 125 | 49.9 | 33.1 | 48.2 | 67.4 |
| (†) | +19.5 | +63.0 | -12.9 | -28.1 | -56.4 | -29.7 | +167 | -1.64 | +6.48 | +4.44 | -24.8 | -9.92 |

Adjusted for diversion and change in reservoir contents

| | Mean | Cfsm | In. |
|---------------------|---------|-----------|-----------|
| Mean | 108 | 216 | 135 |
| Cfsm | 2.11 | 4.23 | 2.64 |
| In. | 2.43 | 4.71 | 3.05 |
| Observed | | | |
| Calendar year 1959: | Max 843 | Min 15 | Mean 88.6 |
| Water year 1959-60: | Max 894 | Min 7.8 | Mean 116 |
| Adjusted | | | |
| Calendar year 1959: | Max 102 | Cfsm 2.00 | In. 27.01 |
| Water year 1959-60: | Max 124 | Cfsm 2.43 | In. 32.96 |

* Discharge measurement made on this day.

† Change in content in Chittenden Reservoir and diversion from Mendon Brook for municipal supply of Rutland, equivalent in cubic feet per second. Records furnished by Central Vermont Public Service Corp. and city of Rutland.

a No gage-height record; discharge estimated on basis of weather records, fragmentary gage-height record, and records for stations on nearby streams.

b Stage-discharge relation affected by ice.

2820. Otter Creek at Center Rutland, Vt.

Location.--Lat 43°36'15", long 73°00'50", on right bank at downstream side of bridge on U. S. Highway 4 at Center Rutland, Rutland County, 200 ft downstream from dam, 1.2 miles downstream from East Creek, and 1½ miles west of Rutland.

Drainage area.--307 sq mi.

Records available.--May 1928 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 475.80 ft above mean sea level, datum of 1929. Prior to July 22, 1929, chain gage at same site and datum.

Average discharge.--32 years, 554 cfs.

Extremes.--Maximum discharge during year, 7,690 cfs Apr. 5 (gage height, 10.26 ft); minimum daily, 80 cfs Sept. 10.

1928-60: Maximum discharge, 13,700 cfs Sept. 22, 1938 (gage height, 12.45 ft), from rating curve extended above 7,400 cfs on basis of computation of peak flow over dam; minimum daily, 45 cfs Sept. 21, 1947.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated by powerplants and Chittenden Reservoir on East Creek (usable capacity, 819,800,000 cu ft); prior to June 3, 1947, also regulated by East Pittsford Reservoir (usable capacity, 150,000,000 cu ft).

Revisions (water years).--WSP 1084: 1929.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 0.4 | 80 | 4.0 | 1,630 |
| .7 | 127 | 6.0 | 2,940 |
| 1.0 | 187 | 8.0 | 4,650 |
| 1.5 | 320 | 10.0 | 7,300 |
| 2.0 | 500 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|
| 1 | 212 | 1,010 | 1,620 | 310 | 357 | 394 | 6,270 | 982 | *513 | 211 | 444 | 145 |
| 2 | 424 | 892 | 1,240 | 380 | 369 | 384 | 3,910 | 1,100 | 588 | 216 | 262 | 130 |
| 3 | 279 | *695 | 1,070 | 1,330 | 358 | 383 | 3,190 | 916 | 497 | 216 | 216 | 93 |
| 4 | 204 | 576 | 964 | 2,530 | 341 | 379 | 5,260 | 808 | 1,500 | 404 | 209 | 88 |
| 5 | 216 | 698 | 796 | 1,680 | 352 | 285 | 7,280 | 725 | 1,730 | 311 | 199 | 113 |
| 6 | 240 | 918 | 715 | 1,260 | 267 | 287 | *4,950 | 660 | 966 | 240 | 153 | 146 |
| 7 | 342 | 1,150 | 1,490 | 900 | 324 | 350 | 2,940 | 509 | 562 | 194 | 132 | 133 |
| 8 | 475 | 826 | *1,850 | 780 | 418 | 343 | 2,020 | 472 | 439 | 178 | 211 | 118 |
| 9 | 369 | 710 | 1,240 | 580 | 425 | 310 | 1,640 | 570 | 387 | 124 | *195 | 146 |
| 10 | 396 | 581 | 970 | 420 | 439 | 291 | 1,370 | 702 | 361 | 116 | 202 | 80 |
| 11 | 273 | 459 | 820 | 500 | 1,330 | 305 | 1,230 | 627 | 290 | 179 | 241 | 89 |
| 12 | 297 | 513 | 844 | *450 | 1,680 | 235 | 1,320 | 576 | 268 | 174 | 219 | 801 |
| 13 | 245 | 515 | 2,020 | 500 | 1,250 | 244 | 1,660 | 558 | 294 | 135 | 138 | *1,990 |
| 14 | 231 | 394 | 1,930 | 500 | 760 | 304 | 1,880 | 548 | 277 | 438 | 100 | 1,770 |
| 15 | 211 | 743 | 1,420 | 490 | 700 | 309 | 2,700 | 745 | 396 | 358 | 185 | 773 |
| 16 | 207 | 695 | 1,140 | 390 | *650 | 298 | 3,640 | 988 | 703 | 219 | 170 | 459 |
| 17 | 122 | 603 | 1,010 | 345 | 572 | 316 | 2,760 | 790 | 485 | 180 | 147 | 317 |
| 18 | 123 | 664 | 892 | 463 | 518 | 299 | 3,080 | 637 | 466 | *189 | 161 | 262 |
| 19 | 190 | 529 | 802 | 452 | 610 | 246 | 3,580 | 582 | 383 | 159 | 145 | 289 |
| 20 | 204 | 470 | 584 | 445 | 456 | 228 | 2,140 | 510 | 345 | 186 | 96 | 346 |
| 21 | 214 | 377 | 486 | 447 | 414 | 309 | *1,550 | 393 | 296 | 138 | 92 | 390 |
| 22 | 209 | 369 | 467 | 433 | 432 | *318 | 1,680 | 352 | 284 | 132 | 190 | 325 |
| 23 | 256 | 444 | 361 | 294 | 480 | 310 | 1,730 | 460 | 209 | 206 | 206 | 274 |
| 24 | 774 | 496 | 375 | 290 | 439 | 298 | 1,610 | 855 | 220 | 221 | 165 | 186 |
| 25 | 1,800 | 1,430 | 330 | 397 | 439 | 282 | 2,210 | 1,410 | 1,150 | 209 | 158 | 167 |
| 26 | 1,680 | 1,290 | 455 | 401 | 464 | 199 | 2,470 | 1,050 | 825 | 167 | 148 | 231 |
| 27 | 922 | 952 | 377 | 383 | 363 | 234 | 1,970 | 745 | 445 | 150 | 92 | 225 |
| 28 | 615 | 4,280 | 445 | 388 | 330 | 325 | 1,650 | 492 | 317 | 143 | 87 | 216 |
| 29 | 456 | *940 | 433 | 387 | 422 | 484 | 1,350 | 416 | 262 | 143 | 129 | 213 |
| 30 | 408 | 2,530 | 426 | 262 | --- | 1,150 | 1,140 | 372 | 244 | 192 | 177 | 286 |
| 31 | 408 | --- | 413 | 244 | --- | 4,230 | --- | 422 | --- | 928 | 165 | --- |
| Total | 13,002 | 30,749 | 28,004 | 18,831 | 15,959 | 14,329 | 80,160 | 20,974 | 15,682 | 7,058 | 5,434 | 10,811 |
| Mean | 419 | 1,025 | 903 | 607 | 550 | 462 | 2,672 | 677 | 523 | 228 | 175 | 360 |
| Cfs/m | 1.36 | 3.34 | 2.94 | 1.98 | 1.79 | 1.50 | 8.70 | 2.21 | 1.70 | 0.743 | 0.570 | 1.17 |
| In. | 1.58 | 3.72 | 3.39 | 2.28 | 1.93 | 1.74 | 9.71 | 2.54 | 1.90 | 0.86 | 0.66 | 1.31 |
| (†) | +15.8 | +59.3 | -16.9 | -32.3 | -60.5 | -33.8 | +163 | -5.97 | +1.47 | -0.49 | -30.3 | -14.8 |

Calendar year 1959: Max 4,940 Min 61 Mean 568 Cfs/m 1.85 In. 25.10 † +8.44

Water year 1959-60: Max 7,280 Min 80 Mean 713 Cfs/m 2.32 In. 31.62 † +3.50

Peak discharge (base, 3,400 cfs).--Nov. 28 (11 p.m.) 6,350 cfs (9.35 ft); Apr. 1 (1 a.m.) 7,260 cfs (9.97 ft); Apr. 5 (10 a.m.) 7,690 cfs (10.26 ft); Apr. 16 (7 to 8 a.m.) 3,880 cfs (7.17 ft); Apr. 19 (4 a.m.) 3,990 cfs (7.31 ft).

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Chittenden Reservoir, furnished by Central Vermont Public Service Corp.

Note.--Stage-discharge relation affected by ice Dec. 24, 25, Jan. 1, 2, 7-17, Feb. 13-15, Mar. 11, 12.

2825. Otter Creek at Middlebury, Vt.

Location.--Lat 44°00'45", long 73°10'05", on right bank 150 ft upstream from highway bridge in Middlebury, Addison County, and $3\frac{1}{2}$ miles downstream from Middlebury River.

Drainage area.--628 sq mi.

Records available.--April 1903 to April 1907, October 1910 to January 1920, October 1928 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 335.75 ft above mean sea level, datum of 1929. Apr. 1, 1903, to Apr. 30, 1907, and Oct. 5, 1910, to Jan. 31, 1920, chain gage at site 1,800 ft upstream at datum 10 ft lower, and Oct. 1, 1928, to Oct. 17, 1933, at present datum.

Average discharge.--44 years (1903-6, 1910-19, 1928-60), 982 cfs.

Extremes.--Maximum discharge during year, 8,200 cfs Apr. 7, 8 (gage height, 8.62 ft); minimum daily, 190 cfs Aug. 29.

1903-7, 1910-20, 1928-60: Maximum discharge, 11,000 cfs Mar. 20, 21, 1936 (gage height, 10.3 ft); minimum daily, 100 cfs Dec. 28, 1914.

Maximum discharge known, 13,600 cfs Nov. 4, 1927 (gage height, 13.3 ft, present datum, at chain-gage site 1,800 ft upstream), from rating curve extended above 9,000 cfs by logarithmic plotting.

Remarks.--Records good except those for periods of ice effect or backwater from aquatic vegetation, which are fair. Some regulation by Chittenden Reservoir (usable capacity, 819,800,000 cu ft) on East Creek.

Revisions (water years).--WSP 434: 1903-4. WSP 684: 1913(M), drainage area. WSP 1114: 1913. WSP 1207: 1929, 1931.

Rating table, water year 1959-60, except periods of ice effect or backwater from aquatic vegetation (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|-----|-------|
| 1.2 | 188 | 5.0 | 3,150 |
| 1.5 | 281 | 7.0 | 5,700 |
| 2.0 | 555 | 9.0 | 8,810 |
| 3.0 | 1,280 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 453 | 1,260 | 3,150 | b760 | b465 | b725 | 3,160 | 3,170 | 1,050 | 549 | 985 | 285 |
| 2 | 1,400 | 1,480 | 3,490 | b630 | b590 | b715 | 3,190 | 3,030 | *1,530 | 484 | 688 | 267 |
| 3 | 807 | 1,450 | 3,710 | bl,000 | b610 | b695 | 3,880 | 2,810 | 1,400 | 402 | 478 | 252 |
| 4 | 611 | *1,310 | 3,720 | 1,630 | b610 | b630 | 5,350 | 2,590 | 1,290 | 709 | *385 | 249 |
| 5 | 404 | 1,200 | 3,590 | 1,730 | b605 | 860 | 6,360 | 2,370 | 1,600 | 716 | 364 | 214 |
| 6 | 461 | 1,330 | 3,370 | 1,810 | 597 | 646 | 7,130 | 2,160 | 1,820 | 611 | 364 | 201 |
| 7 | 849 | 1,700 | 3,130 | 1,890 | 597 | 611 | 8,030 | 1,900 | 1,730 | 529 | 315 | 259 |
| 8 | 1,340 | 1,700 | 2,970 | bl,920 | b620 | b630 | 8,060 | 1,530 | 1,380 | 435 | 277 | *267 |
| 9 | 1,170 | 1,580 | *2,760 | bl,900 | 723 | b620 | 7,430 | 1,200 | 1,020 | 396 | 324 | 263 |
| 10 | 1,010 | 1,420 | 2,630 | 1,710 | 758 | b580 | 6,570 | 1,110 | 779 | 364 | g339 | 249 |
| 11 | 828 | 1,240 | 2,510 | bl,400 | 1,650 | b570 | 5,790 | 1,130 | 702 | 339 | g329 | 209 |
| 12 | 681 | 1,060 | 2,430 | bl,150 | 2,080 | b555 | 5,050 | 1,100 | 611 | 380 | g329 | 312 |
| 13 | 674 | 1,000 | *985 | 1,980 | 529 | 4,330 | 1,070 | 494 | 369 | g329 | 1,670 | |
| 14 | 597 | 985 | 2,640 | b920 | 1,980 | 460 | 3,860 | 1,020 | 555 | 374 | g281 | 1,770 |
| 15 | 529 | 1,140 | 2,600 | 888 | 1,940 | 516 | 3,690 | 1,080 | 611 | 516 | g230 | 1,760 |
| 16 | 484 | 1,200 | 2,600 | 865 | 1,630 | 555 | 3,510 | 1,340 | 821 | 478 | g302 | 1,620 |
| 17 | 454 | 1,240 | 2,590 | 800 | *1,890 | 583 | 3,400 | 1,510 | 948 | *360 | g302 | 1,200 |
| 18 | 388 | 1,320 | 2,540 | b670 | 1,530 | 569 | 3,450 | 1,400 | 940 | 329 | g277 | 695 |
| 19 | 320 | 1,250 | 2,430 | 695 | 1,400 | 562 | 3,510 | 1,220 | 872 | 359 | 270 | 460 |
| 20 | 413 | 1,100 | 2,260 | 765 | 1,280 | 516 | 3,550 | 1,080 | 744 | 430 | 274 | 448 |
| 21 | 436 | 985 | 2,000 | 779 | 1,140 | 466 | 3,660 | 948 | 653 | 364 | 249 | 484 |
| 22 | 430 | 850 | bl,650 | 772 | b960 | 562 | *3,740 | 779 | 569 | 344 | 217 | 510 |
| 23 | 472 | 807 | bl,500 | 737 | 880 | *604 | 3,690 | 737 | 529 | 334 | 302 | 448 |
| 24 | 868 | 925 | bl,350 | 618 | 940 | 604 | 3,590 | 967 | 590 | 324 | 315 | 396 |
| 25 | 1,620 | 1,710 | bl,150 | b550 | 940 | 555 | 3,800 | 1,740 | 978 | 344 | 311 | 349 |
| 26 | 1,760 | 1,960 | b950 | 653 | 918 | 510 | 3,690 | 1,820 | 1,260 | 359 | 302 | 311 |
| 27 | 1,310 | 2,010 | 932 | b680 | 855 | 450 | 3,710 | 1,780 | 1,400 | 320 | 270 | 359 |
| 28 | 1,730 | 2,890 | 865 | 688 | 807 | 484 | 3,410 | 1,550 | 800 | 324 | 217 | 354 |
| 29 | 1,500 | 3,040 | 807 | 674 | b730 | 723 | 3,350 | 1,160 | 611 | 320 | 190 | 354 |
| 30 | 1,210 | 2,960 | 828 | 660 | ----- | 1,440 | 3,270 | 865 | 529 | 327 | 263 | 349 |
| 31 | 1,010 | ----- | b810 | b515 | ----- | 2,850 | ----- | 779 | ----- | 855 | 285 | ----- |
| Total | 26,379 | 44,072 | 70,762 | 31,444 | 31,745 | 21,185 | 134,990 | 46,945 | 28,546 | 13,404 | 10,363 | 16,564 |
| Mean | 851 | 1,469 | 2,283 | 1,014 | 1,095 | 683 | 4,500 | 1,514 | 952 | 432 | 334 | 552 |
| Cfsm | 1.36 | 2.34 | 3.64 | 1.61 | 1.75 | 1.09 | 7.17 | 2.41 | 1.52 | 0.688 | 0.532 | 0.873 |
| In. | 1.56 | 2.61 | 4.19 | 1.86 | 1.88 | 1.25 | 7.99 | 2.78 | 1.69 | 0.79 | 0.61 | 0.98 |
| (†) | +15.8 | +59.3 | -16.9 | -32.3 | -60.5 | -33.8 | +163 | -5.97 | +1.47 | -0.49 | -30.3 | -14.8 |
| Calendar year 1959: Max | 4,950 | Min | 162 | Mean | 1,052 | Cfsm | 1.68 | In. | 22.75 | † | +8.44 | |
| Water year 1959-60: Max | 8,060 | Min | 190 | Mean | 1,302 | Cfsm | 2.07 | In. | 28.19 | † | +3.50 | |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Chittenden Reservoir, furnished by Central Vermont Public Service Corp.

b Stage-discharge relation affected by ice.

g Computed from twice-daily tape-gage readings.

Note.--Backwater from aquatic vegetation June 6 to Aug. 21, Aug. 23-27, Aug. 30 to Sept. 4, Sept. 7-9, 12-30.

2840. Jail Branch at East Barre, Vt.

Location.--Lat 44°09'40", long 72°27'00", on right bank 75 ft downstream from highway bridge, at East Barre, Washington County, 0.6 mile downstream from East Barre Detention Reservoir, and 3.9 miles upstream from mouth.

Drainage area.--40.4 sq mi.

Records available.--August 1920 to September 1923, October 1933 to September 1960. October 1933 monthly discharge only, published in WSP 1307. Prior to October 1922, published as Jail Brook at East Barre.

Gage.--Water-stage recorder. Datum of gage is 1,071.59 ft above mean sea level (levels by Corps of Engineers). Aug. 14, 1920, to Sept. 30, 1923, staff gage at site a quarter of a mile upstream at different datum. Nov. 1, 1933, to Jan. 25, 1935, staff gage at present site and datum.

Average discharge.--30 years, 55.4 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 432 cfs Mar. 31 (gage height, 1.25 ft); maximum gage height, 2.93 ft Feb. 11 (ice jam); minimum discharge, 0.4 cfs July 27 (gage height, -1.98 ft, from graph based on twice-daily staff-gage readings).

1920-23, 1933-60: Maximum discharge, 1,820 cfs Oct. 1, 1920 (gage height, 9.50 ft, from graph based on gage readings, site and datum then in use), from rating curve extended above 900 cfs; minimum, 0.1 cfs Aug. 18, 1950, Aug. 3, 4, 31, Sept. 1, 3, 1953.

Remarks.--Records fair. Discharge affected by East Barre Detention Reservoir since 1935 (see p. 395). At times, diurnal fluctuation at low flow caused by mill above station. Diversion from reservoir of Orange Brook, a tributary above station for city of Barre.

Revisions (water years).--WSP 564: 1922. WSP 1034: Drainage area. WSP 1307: 1921-23(M).

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| Oct. 1 to Feb. 11 | | | | Feb. 12 to Sept. 30 | | | |
|-------------------|----|-----|-----|---------------------|-----|------|-----|
| -1.0 | 12 | 0.0 | 79 | -2.0 | 0.4 | -1.3 | 4.9 |
| -.9 | 15 | .4 | 136 | -1.9 | .7 | -1.1 | 8.7 |
| -.6 | 30 | .8 | 238 | -1.8 | 1.1 | -.9 | 16 |
| -.3 | 51 | 1.2 | 405 | -1.6 | 2.2 | -0.5 | 37 |
| | | | | | | | 1.2 |
| | | | | | | | 405 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 52 | 131 | 154 | g27 | 21 | 24 | 381 | 93 | 55 | 6.6 | 17 | g1.2 |
| 2 | 104 | 104 | 115 | g24 | 20 | 22 | 331 | 100 | 56 | g5.2 | 10 | g1.2 |
| 3 | 67 | 75 | 110 | 100 | 20 | 21 | 220 | 80 | 40 | g6.7 | 7.6 | g1.1 |
| 4 | 18 | 60 | *109 | 170 | 19 | 21 | 308 | 69 | 34 | 20 | 6.3 | g1.6 |
| 5 | 13 | 59 | 100 | 120 | 19 | 23 | 381 | 59 | 28 | 10 | *g6.0 | g2.0 |
| 6 | 34 | 94 | 99 | 80 | 20 | 22 | 371 | 52 | 29 | 9.8 | 11 | g2.0 |
| 7 | 75 | 138 | 190 | 70 | 25 | 21 | 335 | 45 | 19 | 7.6 | 7.0 | g1.7 |
| 8 | 109 | 88 | 159 | 60 | 23 | 21 | 200 | 42 | 15 | g5.1 | g5.2 | g2.2 |
| 9 | 89 | 66 | 102 | 45 | 22 | 20 | 151 | 70 | 14 | 7.9 | g4.9 | *g1.3 |
| 10 | 48 | g59 | 89 | 39 | 22 | 19 | 144 | 134 | 13 | g4.9 | g4.1 | g1.3 |
| 11 | 22 | g57 | 77 | *38 | 90 | 20 | 133 | 81 | 13 | g4.4 | g4.5 | g1.1 |
| 12 | 21 | g57 | 90 | 38 | *200 | 22 | 171 | 64 | 14 | g3.9 | g3.9 | 59 |
| 13 | 18 | g54 | 245 | 36 | 100 | 21 | 219 | 74 | 12 | g3.8 | g3.7 | 155 |
| 14 | 15 | g58 | 135 | 35 | 70 | 21 | 219 | 67 | 10 | 23 | g3.9 | 34 |
| 15 | 14 | 106 | 100 | 32 | 54 | 19 | 289 | 82 | 31 | 8.8 | g3.9 | 18 |
| 16 | 14 | g64 | 93 | 31 | 42 | 20 | 305 | 106 | 32 | g5.6 | g4.5 | 12 |
| 17 | 13 | 70 | 87 | 28 | 38 | 21 | 285 | 100 | 18 | g4.6 | g3.7 | 8.7 |
| 18 | 18 | 69 | 79 | 25 | 36 | *22 | 317 | 76 | 42 | g3.8 | g2.8 | 7.6 |
| 19 | 17 | g57 | 74 | 26 | 40 | 20 | 313 | 59 | 21 | g5.9 | g2.1 | 7.4 |
| 20 | 15 | g58 | 60 | 26 | 38 | 20 | *183 | 52 | 14 | g5.1 | g2.1 | 9.4 |
| 21 | 16 | g55 | 50 | 25 | 36 | 20 | 146 | 39 | 12 | g4.9 | g2.2 | 10 |
| 22 | 14 | g53 | 45 | 24 | 35 | 19 | 146 | 35 | 9.8 | g4.0 | g2.3 | 11 |
| 23 | 59 | g55 | 37 | 23 | 32 | 19 | 132 | 34 | 8.3 | g3.6 | g2.8 | g6.6 |
| 24 | 225 | 82 | 36 | 23 | 31 | 18 | 139 | 87 | 14 | g3.0 | g2.9 | g6.6 |
| 25 | 367 | 229 | 36 | 22 | 29 | 18 | 270 | 146 | 65 | g2.7 | g2.2 | g6.3 |
| 26 | 205 | 126 | 36 | 22 | 31 | 17 | 204 | *69 | 28 | g.9 | g1.6 | g6.4 |
| 27 | 103 | 84 | g34 | 21 | 33 | 17 | 142 | 44 | 14 | g.6 | g1.1 | g5.9 |
| 28 | 80 | 326 | g31 | 21 | 30 | 16 | 127 | 34 | 10 | *g1.2 | g1.3 | g5.1 |
| 29 | *59 | 386 | g31 | 21 | 27 | 19 | 103 | 23 | 7.9 | g2.1 | g1.4 | g5.2 |
| 30 | g55 | 351 | g31 | 21 | ----- | 50 | 89 | 26 | 7.0 | g2.6 | g1.5 | g6.6 |
| 31 | g73 | ----- | g30 | 21 | ----- | 350 | ----- | 26 | ----- | 104 | g1.1 | ----- |
| Total | 2,032 | 3,249 | 2,664 | 1,294 | 1,203 | 983 | 6,754 | 2,060 | 686.0 | 305.7 | 134.4 | 397.5 |
| Mean | 65.5 | 108 | 85.9 | 41.7 | 41.5 | 31.7 | 225 | 66.5 | 22.9 | 9.86 | 4.34 | 13.2 |
| (+) | 0 | +2.73 | -3.28 | 0 | 0 | +22.8 | -25.4 | -0.24 | -0.12 | +0.07 | -0.19 | 0 |

Adjusted for change in contents in East Barre Detention Reservoir

| | | | | | | | | | | | | | | |
|---------------------|------|------|----------|------|------|------|------|----------|-------|-------|-------|-------|-----|-------|
| Mean | 65.5 | 111 | 82.6 | 41.7 | 41.5 | 54.5 | 202 | 66.2 | 22.7 | 9.94 | 4.15 | 13.2 | | |
| Cfsm | 1.62 | 2.75 | 2.04 | 1.03 | 1.03 | 1.35 | 5.00 | 1.64 | 0.562 | 0.246 | 0.103 | 0.327 | | |
| In. | 1.87 | 3.07 | 2.36 | 1.19 | 1.11 | 1.56 | 5.57 | 1.89 | 0.63 | 0.28 | 0.12 | 0.37 | | |
| | | | Observed | | | | | Adjusted | | | | | | |
| Calendar year 1959: | | | Max | 540 | Min | 1.8 | Mean | 55.6 | Mean | 55.6 | Cfsm | 1.33 | In. | 18.71 |
| Water year 1959-60: | | | Max | 386 | Min | 0.6 | Mean | 59.5 | Mean | 59.4 | Cfsm | 1.47 | In. | 20.02 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in East Barre Detention Reservoir.

g Computed from twice-daily staff-gage readings.

Note.--Stage-discharge relation affected by ice Dec. 20 to Jan. 13, Jan. 20 to Feb. 16, Feb. 20-23, Feb. 29 to Mar. 3, Mar. 10-17, 21, 22, 25, 26, 29-31.

2855. North Branch Winooski River at Wrightsville, Vt.

Location.--Lat 44°18'00", long 72°34'45", on right bank at Wrightsville, Washington County, three-quarters of a mile downstream from Wrightsville Detention Reservoir and 3½ miles upstream from mouth.

Drainage area.--69.2 sq mi.

Records available.--October 1933 to September 1960.

Gage.--Water-stage recorder and concrete control. Datum of gage is 550.53 ft above mean sea level (levels by Corps of Engineers). Prior to Nov. 21, 1934, staff gage at same site and datum.

Average discharge.--27 years, 132 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 785 cfs Apr. 18, 19 (gage height, 6.59 ft); minimum daily, 3.0 cfs Sept. 8, 9.

1933-60: Maximum discharge, 2,170 cfs Apr. 12, 1934 (gage height, 6.53 ft), from rating curve extended above 920 cfs; minimum daily, 0.2 cfs Aug. 13, 1941.

Maximum discharge known, 17,200 cfs Nov. 3, 1927, by computation of peak flow over dam three-quarters of a mile above gage.

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are fair. Discharge affected since 1935 by Wrightsville Detention Reservoir (see following page). Diurnal fluctuation at low flow caused by small mill above station.

Revisions (water years).--WSP 1237: 1934-39.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 18

Apr. 19 to Sept. 30

| | | | | | |
|-----|----|-----|-----|-----|-----|
| 0.5 | 17 | 0.1 | 2.1 | 1.0 | 66 |
| .7 | 31 | .2 | 4.5 | 1.5 | 138 |
| 1.0 | 66 | .3 | 7.7 | 2.0 | 240 |
| | | .5 | 17 | 3.0 | 515 |
| | | .7 | 30 | 3.6 | 790 |

Note.--Same as following table above 1.0 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 17 | 212 | 645 | 64 | 47 | 61 | 580 | 268 | 66 | 44 | 70 | 4.0 |
| 2 | 56 | 252 | *596 | 70 | 46 | 60 | 610 | 201 | 92 | 34 | 39 | 3.7 |
| 3 | 49 | 216 | 535 | 120 | 46 | 58 | 614 | 151 | 84 | 25 | *22 | 3.5 |
| 4 | 37 | 170 | 468 | 270 | 45 | 62 | 668 | 128 | 74 | 23 | 12 | 3.5 |
| 5 | 29 | 156 | 390 | 230 | 45 | 58 | 750 | 116 | 63 | 24 | 3.7 | 3.7 |
| 6 | 45 | 198 | 297 | *170 | 43 | 54 | 735 | 104 | 52 | 22 | 19 | 3.5 |
| 7 | 228 | 390 | 227 | 140 | 47 | 52 | *705 | 92 | 41 | 20 | 25 | *3.2 |
| 8 | 406 | 377 | 247 | 130 | 52 | 50 | 676 | 85 | 33 | 17 | 20 | 3.0 |
| 9 | 366 | 317 | 210 | 110 | 50 | 50 | 636 | 84 | 27 | a15 | 16 | 3.0 |
| 10 | 300 | 229 | 170 | 100 | *48 | 50 | 591 | 194 | 24 | a15 | 14 | 3.2 |
| 11 | 178 | 156 | 143 | 90 | 70 | 48 | 543 | 193 | 21 | a13 | 12 | 3.2 |
| 12 | 130 | 130 | 128 | 90 | 200 | 46 | 512 | 147 | 19 | a12 | 10 | 21 |
| 13 | 108 | 124 | 242 | 92 | 230 | 45 | 543 | 140 | 17 | a12 | 8.9 | 248 |
| 14 | 95 | 114 | 302 | 94 | 190 | 42 | 578 | 158 | 15 | 11 | 7.7 | 174 |
| 15 | 78 | 197 | 227 | 90 | 160 | *41 | 658 | 210 | 18 | *10 | 7.0 | 97 |
| 16 | 65 | 203 | 195 | 82 | 120 | 41 | 720 | 245 | 32 | 8.9 | 6.3 | 58 |
| 17 | 56 | 170 | 170 | 78 | 100 | 41 | 735 | 282 | 34 | 7.7 | 6.0 | 33 |
| 18 | 86 | 182 | 147 | 74 | 95 | 40 | 765 | 229 | 56 | 6.3 | 5.7 | 22 |
| 19 | 104 | 156 | 130 | 70 | 90 | 40 | *780 | 170 | 69 | 5.4 | 5.4 | 17 |
| 20 | 88 | 128 | 112 | 66 | 84 | 42 | 765 | 128 | 56 | 5.7 | 5.4 | 15 |
| 21 | 84 | 116 | 85 | 63 | 80 | 41 | 735 | 104 | 37 | 6.0 | 5.7 | 14 |
| 22 | 76 | 107 | 80 | 60 | 76 | 40 | 705 | 84 | 26 | 6.6 | 7.7 | 12 |
| 23 | 108 | 100 | 76 | 57 | 73 | 38 | 676 | 75 | 20 | 6.6 | 6.0 | 12 |
| 24 | 316 | 106 | 76 | 55 | 70 | 37 | 645 | *91 | 18 | 6.3 | 3.9 | 11 |
| 25 | 527 | 277 | 76 | 54 | 63 | 36 | 622 | 191 | 116 | 6.0 | 4.8 | 11 |
| 26 | 543 | 366 | 74 | 52 | 65 | 35 | 596 | 162 | 133 | 5.4 | 4.5 | 10 |
| 27 | *504 | 326 | 72 | 50 | 66 | 37 | 551 | 120 | 92 | 5.7 | 4.5 | 9.7 |
| 28 | 440 | 554 | 70 | 48 | 64 | 44 | 501 | 94 | 63 | 5.7 | 4.5 | 9.3 |
| 29 | 352 | 700 | 70 | 48 | 62 | 58 | 440 | 76 | 39 | 5.7 | 4.5 | 8.9 |
| 30 | 242 | 686 | 70 | 48 | ----- | 90 | 363 | 63 | 35 | 13 | 4.2 | 9.3 |
| 31 | 154 | ----- | 66 | 48 | ----- | 285 | ----- | 53 | ----- | 85 | 4.0 | ----- |
| Total | 5,867 | 7,415 | 6,396 | 2,813 | 1,722 | 1,722 | 8,998 | 4,436 | 1,472 | 463.0 | 369.4 | 829.7 |
| Mean | 189 | 247 | 206 | 90.7 | 85.8 | 55.5 | 633 | 143 | 49.1 | 15.6 | 11.9 | 27.7 |
| (†) | +5.47 | +57.7 | -60.6 | -0.41 | +0.44 | +17.3 | -8.80 | -9.17 | -0.21 | +1.14 | -1.72 | -0.39 |

Adjusted for change in contents in Wrightsville Detention Reservoir

| Mean | 195 | 305 | 146 | 90.3 | 86.2 | 72.8 | 624 | 134 | 48.9 | 16.7 | 10.2 | 27.3 |
|-------|------|------|------|------|------|------|-------|------|-------|-------|-------|-------|
| Cfs/m | 2.82 | 4.41 | 2.11 | 1.30 | 1.25 | 1.05 | 9.02 | 1.94 | 0.707 | 0.241 | 0.147 | 0.395 |
| In. | 3.24 | 4.91 | 2.43 | 1.50 | 1.34 | 1.21 | 10.07 | 2.23 | 0.79 | 0.28 | 0.17 | 0.44 |

| | Observed | | | | | Adjusted | | | | | | |
|---------------------|----------|-----|-----|-----|------|----------|------|-----|-------|------|-----|-------|
| Calendar year 1959: | Max | 775 | Min | 3.2 | Mean | 144 | Mean | 144 | Cfs/m | 2.08 | In. | 28.22 |
| Water year 1959-60: | Max | 780 | Min | 3.0 | Mean | 146 | Mean | 146 | Cfs/m | 2.11 | In. | 28.61 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Wrightsville Detention Reservoir. A no gage-height record; discharge estimated on basis of weather records and records for Mad River near Moretown, Dog River at Northfield Falls, and other nearby streams.

Note.--Stage-discharge relation affected by ice Dec. 21-27, Dec. 29 to Apr. 2.

Reservoirs in Winooski River basin above Montpelier, Vt.

2835. East Barre Detention Reservoir.--Lat 44°09'20", long 72°26'40", at reservoir on Jail Branch at East Barre, Washington County, $4\frac{1}{2}$ miles upstream from mouth of Jail Branch. Staff gage read once daily during high-water periods in April; prior to 1930 generally read once daily throughout the year. Datum of gage is 1,127.9 ft above mean sea level (levels by Corps of Engineers). Drainage area, 38.8 sq mi. Records available, March and April 1936, September 1938 to September 1960. Maximum gage height during year, 16.1 ft Mar. 31, from graph based on observed readings; minimum not determined. Maximum gage height observed during period 1936, 1938-60, 36.0 ft Mar. 22, 1933; minimum not determined, occurred in summer of 1960 after lowering of bottom of outlet opening.

Reservoir is formed by earthfill dam completed by Corps of Engineers in 1935 for flood control. Usable capacity of reservoir, 506,000,000 cu ft between bottom of outlet opening and 37.1 ft (crest of spillway). Dam has no gates; below gage height 37.1 ft, outflow from reservoir is dependent on capacity of outlet opening near base of dam. Outlet opening enlargement and reservoir-construction modifications completed in November 1959. Size of opening since enlargement, height, 7 ft and average width, 3 2/3 ft. Gage read by employee of State of Vermont Water Conservation Board.

2850. Wrightsville Detention Reservoir.--Lat 44°18'35", long 72°34'30", at reservoir on North Branch Winooski River at Wrightsville, Washington County, a third of a mile downstream from Long Meadow Brook and $4\frac{1}{2}$ miles upstream from mouth. Staff gage read once daily Oct. 1 to July 27. Water-stage recorder July 28 to Sept. 30. Datum of gage is 612.75 ft above mean sea level (levels by Corps of Engineers). Drainage area, 66.5 sq mi. Records available, March and April 1936, September 1938 to September 1960. Maximum gage height observed during year, 40.0 ft Apr. 19; minimum observed, 0.8 ft July 19, 20, 23-30. Maximum gage height during period 1936, 1938-60, 63.7 ft Mar. 22, 1936, from graph based on gage readings; minimum observed, 0.2 ft Aug. 17, 1949, and Aug. 17-19, 1950.

Reservoir is formed by earthfill dam completed by Corps of Engineers in 1935 for flood control. Capacity of reservoir, 873,500,000 cu ft between gage heights 0.0 ft (bottom of outlet opening) and 72.25 ft (crest of spillway). Dam has no gates; below gage height 72.25 ft, outflow from reservoir is dependent on capacity of outlet opening, 5 $\frac{1}{4}$ ft square, near base of dam. Gage read by employee of State of Vermont Water Conservation Board.

Month-end gage height and contents, water year October 1959 to September 1960

| Date | Gage height (feet) [†] | Contents (millions of cubic feet) | Change in contents | |
|----------------------------------|------------------------------------|---|---------------------------|--------------------------------------|
| | | | Millions of cubic feet | Equivalent, cubic feet per second |
| East Barre Detention Reservoir | | | | |
| Sept. 30..... | 3.6 | 2.39 | - | - |
| Oct. 31..... | 3.6 | 2.39 | 0 | 0 |
| Nov. 30..... | 8.4 | 9.46 | +7.07 | +2.73 |
| Dec. 31..... | 1.3 | .68 | -8.78 | -3.28 |
| Calendar year 1959..... | - | - | 0 | 0 |
| Jan. 31..... | 1.3 | .68 | 0 | 0 |
| Feb. 29..... | 1.3 | .68 | 0 | 0 |
| Mar. 31..... | 16.1 | 61.83 | +61.15 | +22.8 |
| Apr. 30..... | 2.2 | 1.26 | -60.57 | -23.4 |
| May 31..... | 1.2 | .62 | -.64 | -.24 |
| June 30..... | .6 | .30 | -.32 | -.12 |
| July 31..... | 1.0 | .50 | +.20 | +.07 |
| Aug. 31..... | - | *0 | -.50 | -.19 |
| Sept. 30..... | - | *0 | 0 | 0 |
| Water year 1959-60..... | - | - | -2.39 | -.08 |
| Wrightsville Detention Reservoir | | | | |
| Sept. 30..... | 1.9 | 4.55 | - | - |
| Oct. 31..... | 6.5 | 19.2 | +14.65 | +5.47 |
| Nov. 30..... | 28.9 | 168.7 | +149.5 | +57.7 |
| Dec. 31..... | 2.6 | 6.45 | -162.25 | -60.6 |
| Calendar year 1959..... | - | - | +3.0 | +0.1 |
| Jan. 31..... | 2.2 | 5.35 | -1.10 | -.41 |
| Feb. 29..... | 2.6 | 6.45 | +1.10 | +.44 |
| Mar. 31..... | 14.0 | 52.7 | +46.25 | +17.3 |
| Apr. 30..... | 9.2 | 29.9 | -22.8 | -8.80 |
| May 31..... | 2.2 | 5.35 | -24.55 | -9.17 |
| June 30..... | 2.0 | 4.80 | -.55 | -.21 |
| July 31..... | 3.1 | 7.85 | +3.05 | +1.14 |
| Aug. 31..... | 1.4 | 3.25 | -4.60 | -1.72 |
| Sept. 30..... | 1.0 | 2.25 | -1.00 | -.39 |
| Water year 1959-60..... | - | - | -2.30 | -.07 |

* Estimated.

[†] Gage height at 12 p.m. for East Barre Detention Reservoir determined from graph based on observer's available readings and records for station on river below reservoir. Gage height at 12 p.m. for Wrightsville Detention Reservoir prior to July 31 determined from graph based on observer's readings and records for station on river below reservoir, thereafter from water-stage recorder.

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER

2860. Winooski River at Montpelier, Vt.

Location.--Lat 44°15'25", long 72°35'35", on right bank 0.4 mile upstream from Dog River and 1 mile downstream from depot at Montpelier, Washington County.

Drainage area.--397 sq mi.

Records available.--May 1909 to June 1914 (fragmentary), July 1914 to September 1923, August 1928 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 499.99 ft above mean sea level, datum of 1929. Prior to June 16, 1914, chain gage at site 0.9 mile upstream at different datum. June 16 to July 3, 1914, staff gage at present site and datum.

Average discharge.--41 years (1914-23, 1928-60), 585 cfs (adjusted for storage since October 1935).

Extremes.--Maximum discharge during year, 6,600 cfs Nov. 28 (gage height, 12.02 ft), from rating curve extended above 2,700 cfs by logarithmic plotting; minimum daily, 46 cfs Sept. 11.

1909-23, 1928-60: Maximum discharge, 17,200 cfs Apr. 7, 1912 (gage height, 17.31 ft, from floodmarks, present datum), from rating curve extended above 6,900 cfs by logarithmic plotting; minimum daily, 17 cfs Sept. 3, 1933.

Maximum discharge known, 57,000 cfs Nov. 3, 1927 (gage height, 27.1 ft), from rating curve extended above 6,900 cfs by logarithmic plotting.

Remarks.--Records good except those for periods of ice effect, which are fair. Flow regulated by several small powerplants above station, by Peacham Pond and, since 1926, by Mollys Falls Reservoir (combined usable capacity, 492,000,000 cu ft), which regulate runoff from 24 sq mi, and by East Barre and Wrightsville Detention Reservoirs since 1935 (see preceding page).

Revisions (water years).--WSP 424: 1915. WSP 894: Drainage area. WSP 1437: 1912-14(M), 1915-18, 1919(M), 1920, 1921(M), 1922-23, 1929, 1933, 1934(M), 1936, 1937(M), 1938, 1946(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Sept. 28-30; backwater from bridge construction Nov. 25, 26, 30, Dec. 3-9, 13, 14)

| | | | |
|-----|-----|------|-------|
| 2.8 | 37 | 4.5 | 560 |
| 3.0 | 61 | 5.0 | 830 |
| 3.2 | 96 | 8.0 | 3,030 |
| 3.5 | 175 | 11.0 | 5,870 |
| 4.0 | 340 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1 | 248 | 908 | 1,900 | 380 | 280 | 450 | 3,800 | 956 | 616 | 303 | 272 | 53 |
| 2 | 570 | 908 | 1,550 | 350 | 400 | 360 | 3,050 | 1,020 | 665 | 263 | 193 | 51 |
| 3 | 265 | 770 | *1,460 | 814 | 350 | 470 | 2,870 | 830 | 525 | 142 | 159 | 48 |
| 4 | 151 | 600 | 1,360 | 1,540 | 320 | 480 | 3,950 | 714 | 458 | 196 | 111 | 51 |
| 5 | 124 | 545 | 1,140 | 1,040 | 320 | 470 | *2,940 | 648 | 300 | 178 | *69 | 54 |
| 6 | 245 | 630 | 944 | 780 | 310 | 320 | 3,450 | 575 | 318 | 220 | 169 | 53 |
| 7 | 966 | 1,270 | 1,280 | *690 | 290 | 310 | *2,790 | 510 | 360 | 212 | 175 | 51 |
| 8 | 1,520 | 896 | 1,400 | 610 | 320 | 430 | 2,340 | 460 | 325 | 170 | 138 | 51 |
| 9 | 896 | 709 | 1,000 | 540 | 400 | 410 | 2,080 | 501 | 252 | 157 | 114 | *48 |
| 10 | 643 | 616 | 860 | 400 | 330 | 360 | 1,930 | 968 | 233 | 112 | 134 | 47 |
| 11 | 388 | 492 | 786 | 400 | *850 | 450 | 1,780 | 824 | 202 | 119 | 129 | 46 |
| 12 | 344 | 420 | 764 | 440 | 2,000 | 400 | 1,920 | 670 | 142 | 156 | 94 | 235 |
| 13 | 342 | 460 | 1,800 | 460 | 1,100 | 350 | 2,250 | 665 | 160 | *149 | 63 | 1,070 |
| 14 | 322 | 452 | 1,410 | 430 | 800 | 340 | 2,180 | 748 | 233 | 224 | 69 | 488 |
| 15 | 356 | 616 | 1,030 | 410 | 720 | *360 | 2,560 | 872 | 300 | 199 | 82 | 303 |
| 16 | 366 | 632 | 1,010 | 450 | 660 | 320 | 2,640 | 1,030 | 384 | 166 | 60 | 211 |
| 17 | 214 | 670 | 914 | 380 | 620 | 350 | 2,490 | 1,060 | 303 | 90 | 84 | 137 |
| 18 | 262 | 770 | 775 | 320 | 620 | 330 | 2,720 | 854 | 376 | 94 | 65 | 114 |
| 19 | 411 | 590 | 687 | 380 | 560 | 270 | 2,740 | 704 | 307 | 183 | 60 | 110 |
| 20 | 450 | 510 | 520 | 400 | 600 | 240 | *2,120 | 590 | 265 | 181 | 54 | 110 |
| 21 | 422 | 488 | 470 | 400 | 480 | 250 | 1,880 | 496 | 300 | 191 | 61 | 112 |
| 22 | 379 | 412 | 500 | 390 | 450 | 290 | 1,840 | 396 | 249 | 190 | 94 | 105 |
| 23 | 593 | 416 | 420 | 390 | 580 | 290 | 1,720 | 388 | 249 | 157 | 92 | 96 |
| 24 | 2,080 | 575 | 410 | 320 | 560 | 260 | 1,620 | 693 | 284 | 83 | 79 | 88 |
| 25 | 2,920 | 1,390 | 380 | 320 | 500 | 210 | 2,250 | *1,110 | 585 | 83 | 69 | 81 |
| 26 | 1,930 | 1,290 | 348 | 410 | 500 | 250 | 1,970 | 770 | 427 | 70 | 65 | 81 |
| 27 | 1,460 | 842 | 370 | 390 | 520 | 180 | 1,640 | 610 | 292 | 82 | 49 | 76 |
| 28 | *1,040 | 4,320 | 360 | 390 | 380 | 190 | 1,550 | 488 | 307 | 91 | 54 | 83 |
| 29 | 824 | 3,630 | 390 | 400 | 360 | 320 | 1,310 | 333 | 265 | 63 | 69 | 90 |
| 30 | 645 | 2,380 | 380 | 380 | ----- | 550 | 1,100 | 282 | 265 | 137 | 69 | 83 |
| 31 | 555 | ----- | 396 | 270 | ----- | 3,200 | ----- | 303 | ----- | 533 | 56 | ----- |
| Total | 21,929 | 29,207 | 27,014 | 15,284 | 16,180 | 13,460 | 71,280 | 21,068 | 9,927 | 5,261 | 3,073 | 4,226 |
| Mean | 707 | 974 | 871 | 493 | 558 | 434 | 2,376 | 680 | 331 | 168 | 99.1 | 141 |
| (†) | +7.13 | +80.8 | -81.5 | -29.0 | -28.5 | +23.0 | +73.3 | +6.04 | -68.2 | -31.2 | -1.32 | +12.8 |

Adjusted for change in reservoir contents

| | Mean | 715 | 1,054 | 790 | 464 | 529 | 457 | 2,449 | 686 | 263 | 137 | 97.8 | 154 |
|------|------|------|-------|------|------|------|------|-------|-------|-------|-------|-------|-----|
| Cfsm | 1.80 | 2.65 | 1.99 | 1.17 | 1.33 | 1.15 | 6.17 | 1.73 | 0.662 | 0.345 | 0.246 | 0.388 | |
| In. | 2.07 | 2.96 | 2.29 | 1.35 | 1.44 | 1.33 | 6.88 | 1.99 | 0.74 | 0.40 | 0.28 | 0.43 | |

| Observed | | | | | | Adjusted | | | | | |
|---------------------|-----|-------|-----|----|------|----------|------|-----|------|------|-----------|
| Calendar year 1959: | Max | 4,880 | Min | 38 | Mean | 580 | Mean | 581 | Cfsm | 1.46 | In. 19.85 |
| Water year 1959-60: | Max | 4,940 | Min | 46 | Mean | 650 | Mean | 647 | Cfsm | 1.63 | In. 22.16 |

Peak discharge (base, 3,900 cfs).--Nov. 28 (4 p.m.) 6,600 cfs (12.02 ft); Mar. 31 (9 p.m.) 4,810 cfs (10.04 ft); Apr. 5 (7:30 a.m.) 5,470 cfs (10.78 ft).

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Peacham Pond, Mollys Falls Reservoir, and East Barre and Wrightsville Detention Reservoirs. Part of records furnished by Vermont Water Conservation Board and Green Mountain Power Corp.

Note.--Stage-discharge relation affected by ice Dec. 15, Dec. 22-25, 27, 29, 30, Jan. 1, 2, Jan. 5 to Mar. 31.

2870. Dog River at Northfield Falls, Vt.

Location.--Lat 44°10'55", long 72°38'30", on right bank 1 mile downstream from Northfield Falls, Washington County, and 1½ miles downstream from Cox Branch.

Drainage area.--76.1 sq mi.

Records available.--October 1934 to September 1960. Monthly discharge only for October 1934, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 603.00 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--26 years, 121 cfs.

Extremes.--Maximum discharge during year, 4,950 cfs Nov. 28 (gage height, 7.81 ft), from rating curve extended above 1,500 cfs by method explained below; minimum, 6.4 cfs Aug. 29, 30.

1934-60: Maximum discharge, 9,750 cfs Sept. 21, 1938 (gage height, 11.53 ft), from rating curve extended above 1,500 cfs on basis of computation of flow over dam at gage height 8.49 ft and slope-area measurements at gage heights 8.96 and 11.53 ft; minimum, 4.3 cfs Aug. 31, Sept. 7, 1942.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Some regulation at low flow by powerplant above station.

Revisions (water years).--WSP 1237: 1935-37.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 0.6 | 7.9 | 2.5 | 420 |
| .8 | 16 | 3.0 | 655 |
| 1.0 | 32 | 4.0 | 1,230 |
| 1.2 | 54 | 5.0 | 1,900 |
| 1.5 | 106 | 6.0 | 2,800 |
| 2.0 | 240 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 142 | 249 | 298 | 70 | 54 | 72 | 948 | 194 | 134 | 28 | a35 | 9.6 |
| 2 | 170 | 234 | *255 | 75 | 53 | 70 | 600 | 191 | 128 | 25 | a25 | 9.2 |
| 3 | 65 | 191 | 228 | 240 | 52 | 70 | 537 | 164 | 108 | 25 | *21 | 8.5 |
| 4 | 48 | 167 | 210 | 260 | 50 | 74 | 1,160 | 148 | 98 | 47 | 18 | 9.6 |
| 5 | 37 | 156 | 191 | 175 | 52 | 71 | 1,480 | 136 | 83 | 37 | 21 | 11 |
| 6 | 72 | 175 | 180 | *145 | 54 | 69 | 710 | 124 | 80 | 32 | 29 | 10 |
| 7 | 321 | 199 | 303 | 140 | 58 | 67 | 468 | 111 | 67 | 28 | 21 | *9.6 |
| 8 | 416 | 161 | 280 | 130 | 55 | 66 | 396 | 106 | 61 | 26 | 19 | 9.2 |
| 9 | 191 | 144 | 216 | 100 | 54 | 63 | 344 | 118 | 56 | 28 | 17 | 9.2 |
| 10 | 136 | 128 | 194 | 90 | *54 | 62 | 322 | 156 | 51 | 28 | 16 | 10 |
| 11 | 104 | 116 | 175 | 90 | 220 | 63 | 306 | 124 | 48 | 22 | 17 | 9.2 |
| 12 | 102 | 114 | 163 | 91 | 320 | 64 | 462 | 116 | 44 | *20 | 15 | 103 |
| 13 | 83 | 106 | 371 | 93 | 180 | 62 | 665 | 156 | 41 | 20 | 14 | 172 |
| 14 | 73 | 104 | 258 | 94 | 160 | 62 | 733 | 159 | 37 | 26 | 14 | 58 |
| 15 | 64 | 141 | 207 | 91 | 140 | *61 | 1,280 | 159 | 71 | 22 | 14 | 35 |
| 16 | 60 | 118 | 207 | 85 | 125 | 60 | 864 | 151 | 67 | 18 | 17 | 25 |
| 17 | 55 | 126 | 194 | 80 | 110 | 62 | 810 | 141 | 47 | 17 | 14 | 20 |
| 18 | 61 | 126 | 172 | 75 | 105 | 64 | 854 | 126 | 57 | 17 | 14 | 18 |
| 19 | 56 | 106 | 161 | 74 | 110 | 61 | *514 | 116 | 48 | 18 | 13 | 18 |
| 20 | 54 | 96 | 130 | 72 | 100 | 61 | 368 | 102 | 40 | 20 | 12 | 19 |
| 21 | 54 | 93 | 110 | 68 | 90 | 60 | 312 | 89 | 36 | 17 | 13 | 20 |
| 22 | 52 | 91 | 100 | 66 | 90 | 56 | 348 | 82 | 32 | 15 | 14 | 18 |
| 23 | 99 | 89 | 90 | 63 | 90 | 57 | 288 | 76 | 29 | 15 | 14 | 16 |
| 24 | 684 | 100 | 88 | 80 | 84 | 53 | 282 | *257 | 38 | a15 | 13 | 15 |
| 25 | 735 | 274 | 88 | 59 | 78 | 49 | 600 | 356 | 96 | a14 | 12 | 15 |
| 26 | 347 | 188 | 88 | 58 | 82 | 45 | 400 | 199 | 54 | a13 | 15 | 15 |
| 27 | *258 | 168 | 82 | 56 | 80 | 49 | 319 | 148 | 41 | a13 | 10 | 15 |
| 28 | 196 | 2,240 | 82 | 56 | 77 | 53 | 274 | 121 | 33 | 15 | 11 | 16 |
| 29 | 161 | 684 | 82 | 56 | 75 | 64 | 237 | 104 | 28 | a15 | 7.9 | 14 |
| 30 | 141 | 384 | 76 | 56 | ----- | 130 | 207 | 93 | 30 | a60 | 8.2 | 15 |
| 31 | 176 | ----- | 73 | 55 | ----- | 838 | ----- | 96 | ----- | a130 | 9.6 | ----- |
| Total | 5,215 | 7,268 | 5,372 | 2,923 | 2,652 | 2,758 | 17,150 | 4,419 | 1,783 | 826 | 493.7 | 732.1 |
| Mean | 168 | 242 | 173 | 94.3 | 98.3 | 89.0 | 572 | 143 | 59.4 | 26.6 | 15.9 | 24.4 |
| Cfsm | 2.21 | 3.18 | 2.27 | 1.24 | 1.29 | 1.17 | 7.52 | 1.88 | 0.781 | 0.350 | 0.209 | 0.321 |
| In. | 2.55 | 3.55 | 2.63 | 1.43 | 1.39 | 1.35 | 8.38 | 2.16 | 0.87 | 0.40 | 0.24 | 0.36 |

Calendar year 1959: Max 2,240 Min 6.4 Mean 127 Cfsm 1.67 In. 22.73
Water year 1959-60: Max 2,240 Min 7.9 Mean 142 Cfsm 1.87 In. 25.31

Peak discharge (base, 1,600 cfs).--Oct. 24 (7 p.m.) 1,760 cfs (4.83 ft); Nov. 28 (12 m.) 4,950 cfs (7.81 ft); Apr. 5 (4 to 5 a.m.) 1,950 cfs (5.06 ft).

* Discharge measurement made on this day.
a No gage-height record; discharge estimated on basis of weather records, recorded range in stage, and records for Mad River near Moretown.

Note.--Stage-discharge relation affected by ice Dec. 20 to Mar. 13, Mar. 21-30.

2880. Mad River near Moretown, Vt.

Location.--Lat 44°16'40", long 72°44'35", on left bank at downstream side of highway bridge, 2.4 miles downstream from Moretown, Washington County, and 3.8 miles upstream from mouth.

Drainage area.--139 sq mi.

Records available.--July to November 1910, October 1928 to September 1960. Monthly discharge only for October 1928, published in WSP 1307.

Gage.--Water-stage recorder. Concrete control since Oct. 13, 1933. Altitude of gage is 545 ft (from topographic map). July 6 to Nov. 4, 1910, staff gage at same site at different datum. Nov. 20, 1928, to Sept. 27, 1930, chain gage at same site and present datum.

Average discharge.--32 years (1928-60), 250 cfs.

Extremes.--Maximum discharge during year, 7,760 cfs Nov. 28 (gage height, 10.15 ft), from rating curve extended above 2,700 cfs as explained below; maximum gage height, 12.67 ft Mar. 31 (ice jam); minimum discharge, 15 cfs Aug. 20, Sept. 8, 10; minimum daily, 16 cfs Sept. 10.

1910, 1928-60: Maximum discharge, 18,400 cfs Sept. 22, 1938 (gage height, 16.34 ft, from floodmarks), from rating curve extended above 2,700 cfs on basis of computations of flow over dam at gage heights 9.98, 11.51, 16.34, and 19.4 ft; minimum, 1.4 cfs Oct. 1, 1930.

Maximum discharge known, 23,000 cfs Nov. 3, 1927 (gage height, 19.4 ft, from floodmarks), by computation of peak flow over dam.

Remarks.--Records good except those for periods of ice effect, no gage-height record, or shifting control, which are fair. Regulation at low flow caused by mill in Moretown.

Revisions (water years).--WSP 744: Drainage area. WSP 854: 1934(M). WSP 1114: 1929, 1930(M), 1938-37.

Rating table, water year 1959-60, except periods of ice effect or shifting control (gage height, in feet, and discharge, in cubic feet per second)

| | | | | | |
|-----|-----|-----|-----|-----|-------|
| 2.6 | 9.9 | 3.2 | 99 | 4.5 | 830 |
| 2.7 | 19 | 3.5 | 190 | 5.0 | 1,240 |
| 2.8 | 31 | 3.8 | 320 | 6.0 | 2,220 |
| 3.0 | 60 | 4.1 | 520 | 8.0 | 4,610 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|-------|----------|--------|-----------|-------|-----------|-------|-------|
| 1 | 359 | 646 | 500 | 125 | 98 | 130 | 1,600 | 356 | 170 | 51 | 77 | 18 |
| 2 | 485 | 527 | 440 | 135 | 96 | 130 | 1,100 | 350 | 230 | 48 | 54 | 17 |
| 3 | 141 | 387 | *387 | 580 | 94 | 130 | 1,000 | 280 | 169 | 46 | 45 | 17 |
| 4 | 85 | 310 | 356 | 820 | 90 | 135 | 2,000 | 250 | 137 | 74 | *39 | 17 |
| 5 | 63 | 310 | 305 | 450 | 96 | 130 | 2,700 | 238 | 115 | 67 | 44 | 24 |
| 6 | *226 | 506 | 285 | 350 | 98 | 130 | 1,300 | 218 | 107 | *35 | 80 | 23 |
| 7 | 981 | 687 | 829 | *290 | 105 | 125 | *798 | 198 | 88 | 52 | 50 | 19 |
| 8 | 1,070 | 401 | 646 | 240 | 100 | 120 | 614 | 186 | 77 | 48 | 41 | *18 |
| 9 | 490 | 310 | 422 | 200 | 98 | 115 | 534 | 202 | 70 | 67 | 39 | 17 |
| 10 | 314 | 262 | 344 | 180 | 95 | 110 | 485 | 300 | 67 | 52 | 37 | 16 |
| 11 | 216 | 234 | 295 | 165 | 480 | 115 | 464 | 254 | 63 | 44 | 37 | 19 |
| 12 | 234 | 230 | 328 | 170 | 650 | 115 | 859 | 238 | 60 | 39 | 32 | 544 |
| 13 | 179 | 208 | 1,040 | 170 | 350 | 115 | 1,030 | 234 | 56 | 41 | 29 | 890 |
| 14 | *145 | 194 | 555 | 175 | 300 | 110 | 1,250 | 246 | 51 | 48 | 29 | 292 |
| 15 | 120 | 599 | 410 | 165 | 260 | 110 | 2,630 | 246 | 111 | 41 | 27 | 136 |
| 16 | 106 | 315 | 408 | 155 | 240 | 110 | 1,710 | 375 | 155 | *35 | 32 | 90 |
| 17 | 102 | 315 | 356 | 150 | 220 | 110 | 1,840 | 401 | 88 | 31 | 30 | 68 |
| 18 | 149 | 332 | 305 | 140 | 195 | 115 | 2,350 | 300 | 156 | 31 | 26 | 62 |
| 19 | 128 | 254 | 275 | 135 | 200 | 110 | 1,150 | 258 | 112 | 32 | 24 | 58 |
| 20 | 112 | 226 | 220 | 130 | 180 | 110 | *742 | 226 | 81 | 41 | 24 | 62 |
| 21 | 140 | 208 | 200 | 125 | 170 | 110 | 598 | 194 | 70 | 37 | 25 | 65 |
| 22 | 115 | 198 | 180 | 115 | 160 | 105 | 992 | 169 | 62 | 30 | 26 | 56 |
| 23 | 250 | 190 | 170 | 115 | 160 | 100 | 806 | 162 | 56 | 30 | 42 | 51 |
| 24 | 1,700 | 234 | 165 | 110 | 155 | 93 | 787 | 445 | 61 | 30 | 32 | 45 |
| 25 | 1,680 | 935 | 165 | 105 | 140 | 86 | 1,680 | *646 | 242 | 27 | 27 | 44 |
| 26 | 774 | 478 | 165 | 105 | 150 | 80 | 942 | 332 | 112 | 25 | 25 | 42 |
| 27 | 548 | 456 | 150 | 100 | 145 | 90 | 670 | 234 | 75 | 24 | 23 | 41 |
| 28 | *387 | 4,440 | 145 | 100 | 145 | 98 | 541 | 190 | 63 | 25 | 20 | 38 |
| 29 | 290 | 1,400 | 145 | 100 | 140 | 110 | 443 | 159 | 54 | 25 | 19 | 37 |
| 30 | 242 | 650 | 140 | 100 | ----- | 250 | 374 | 137 | 52 | 120 | 19 | 39 |
| 31 | 403 | ----- | 135 | 100 | ----- | 2,000 | ----- | 131 | ----- | 236 | 21 | ----- |
| Total | 12,234 | 16,438 | 10,466 | 5,900 | 5,410 | 5,497 | 33,989 | 8,154 | 3,010 | 1,622 | 1,075 | 2,865 |
| Mean | 395 | 548 | 338 | 190 | 187 | 177 | 1,133 | 263 | 100 | 52.3 | 34.7 | 95.5 |
| Cfsm | 2.84 | 3.94 | 2.43 | 1.37 | 1.35 | 1.27 | 8.15 | 1.89 | 0.719 | 0.376 | 0.250 | 0.687 |
| In. | 3.27 | 4.40 | 2.80 | 1.58 | 1.45 | 1.47 | 9.09 | 2.18 | 0.81 | 0.43 | 0.29 | 0.77 |
| Calendar year 1959: Max | 4,440 | | | Min 19 | | Mean 269 | | Cfsm 1.94 | | In. 26.23 | | |
| Water year 1959-60: Max | 4,440 | | | Min 16 | | Mean 291 | | Cfsm 2.09 | | In. 28.54 | | |

Peak discharge (base, 3,400 cfs).--Oct. 24 (8 p.m.) 4,340 cfs (7.79 ft); Nov. 28 (1 p.m.) 7,760 cfs (10.15 ft); Apr. 5 (about 5 a.m.) about 4,500 cfs; Sept. 12 (12 p.m.) 3,570 cfs (7.18 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 29 to Dec. 2, Feb. 13 to Mar. 16, Apr. 2-6; discharge estimated on basis of weather records and records for Dog River at Northfield Falls. Stage-discharge relation affected by ice Dec. 15, Dec. 20 to Apr. 2. Shifting-control method used Oct. 1-16.

2885. Waterbury Reservoir near Waterbury, Vt.

Location.--Lat 44°22'55", long 72°46'15", at dam on Waterbury River, 2 2/3 mile upstream from mouth and 3½ miles north of Waterbury, Washington County.

Drainage area.--109 sq mi.

Records available.--September 1937 to September 1960. Month-end contents only for September 1937 to August 1938, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers). Prior to Dec. 10, 1938, staff gage at same site and datum.

Extremes.--Maximum elevation during year, 597.85 ft Nov. 28; minimum, 534.51 ft Mar. 29. 1937-60: Maximum elevation, 613.45 ft May 4, 1940; minimum observed, 501.3 ft Oct. 16, 1938.

Remarks.--Reservoir is formed by earthfill dam completed by Corps of Engineers during summer of 1937 for conservation and flood control. Total usable capacity for flood control, 2,812,300,000 cu ft between elevations 500.0 ft (bottom of lowest outlet) and 617.5 ft (crest of spillway) above mean sea level. Usable capacity for conservation, 1,582,700,000 cu ft between elevations 500.0 and 592.0 ft (sill of taintor gate) above mean sea level.

Capacity table, water year 1959-60 (elevation, in feet, and contents, in millions of cubic feet)

| | | | |
|-------|-------|-------|---------|
| 530.0 | 180.8 | 570.0 | 891.9 |
| 540.0 | 302.7 | 580.0 | 1,168.5 |
| 550.0 | 461.7 | 590.0 | 1,505.0 |
| 560.0 | 658.8 | 600.0 | 1,913.4 |

Elevation, in feet, at 12 p.m., water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|---------|---------|
| 1 | 579.69 | 590.36 | 593.64 | 585.33 | 577.02 | 563.51 | 554.17 | 591.22 | 591.50 | 590.49 | 590.91 | 581.27 |
| 2 | 579.82 | 590.40 | 592.64 | 585.29 | 576.44 | 561.92 | 557.89 | 590.68 | 591.58 | 590.61 | 590.82 | 580.71 |
| 3 | 579.94 | 590.44 | 591.85 | 586.48 | 575.80 | 560.25 | 560.91 | 590.07 | 591.63 | 590.77 | 590.58 | 580.76 |
| 4 | 580.03 | 590.41 | 591.42 | 586.92 | 575.15 | 558.87 | 565.98 | 589.71 | 591.83 | 590.91 | 590.35 | 580.78 |
| 5 | 579.75 | 590.63 | 591.48 | 586.77 | 574.44 | 558.90 | 570.44 | 589.55 | 591.83 | 590.87 | 589.94 | 580.85 |
| 6 | 580.06 | 591.97 | 591.52 | 586.52 | 574.30 | 558.88 | 571.50 | 589.29 | 591.74 | 590.92 | 590.08 | 580.24 |
| 7 | 582.47 | 592.18 | 591.60 | 586.18 | 574.38 | 557.23 | 571.63 | 589.21 | 591.52 | 590.94 | 590.17 | 579.67 |
| 8 | 583.34 | 591.66 | 591.17 | 585.97 | 573.71 | 555.45 | 571.27 | 589.74 | 591.31 | 590.95 | 589.71 | 579.07 |
| 9 | 583.91 | 591.23 | 590.83 | 586.12 | 573.10 | 553.55 | 570.81 | 589.46 | 591.19 | 591.08 | 589.31 | 578.35 |
| 10 | 584.25 | 591.21 | 590.47 | 586.06 | 572.40 | 551.64 | 570.75 | 589.20 | 591.01 | 591.18 | 588.87 | 578.15 |
| 11 | 584.56 | 591.03 | 589.99 | 585.68 | 573.60 | 550.53 | 570.57 | 588.85 | 591.11 | 590.74 | 588.42 | 577.98 |
| 12 | 584.87 | 591.01 | 589.77 | 584.06 | 575.51 | 551.00 | 571.08 | 588.38 | 591.21 | 590.58 | 587.98 | 579.30 |
| 13 | 585.10 | 590.70 | 590.47 | 583.65 | 576.33 | 550.92 | 572.21 | 588.41 | 591.12 | 590.57 | 588.04 | 581.51 |
| 14 | 585.14 | 591.06 | 590.25 | 582.15 | 576.97 | 549.04 | 573.84 | 588.79 | 590.96 | 590.57 | 588.09 | 582.11 |
| 15 | 584.86 | 591.40 | 589.92 | 582.62 | 576.94 | 547.27 | 578.98 | 588.26 | 591.02 | 590.56 | 587.57 | 582.21 |
| 16 | 584.76 | 591.22 | 589.70 | 582.74 | 576.71 | 545.60 | 581.82 | 589.12 | 591.16 | 590.61 | 587.10 | 582.19 |
| 17 | 584.81 | 591.24 | 589.40 | 582.65 | 576.16 | 543.76 | 584.77 | 589.33 | 591.33 | 590.70 | 586.62 | 582.30 |
| 18 | 585.49 | 591.38 | 589.07 | 582.20 | 575.68 | 542.99 | 589.75 | 589.41 | 591.95 | 590.62 | 586.19 | 582.33 |
| 19 | 585.10 | 591.23 | 588.71 | 581.66 | 575.19 | 543.59 | 590.70 | 589.34 | 591.80 | 590.79 | 585.83 | 581.86 |
| 20 | 584.90 | 591.02 | 588.77 | 581.19 | 574.99 | 543.61 | 590.67 | 589.46 | 591.39 | 591.00 | 585.89 | 581.50 |
| 21 | 584.67 | 591.12 | 588.18 | 580.68 | 574.68 | 542.03 | 590.51 | 589.76 | 591.53 | 591.05 | 585.97 | 581.13 |
| 22 | 584.33 | 591.37 | 587.60 | 580.20 | 573.41 | 540.38 | 591.76 | 590.04 | 591.32 | 591.05 | 585.48 | 580.87 |
| 23 | 585.01 | 590.77 | 587.02 | 580.32 | 572.20 | 538.90 | 592.46 | 589.44 | 591.31 | 591.14 | 584.98 | 580.62 |
| 24 | 588.44 | 590.24 | 586.65 | 580.38 | 571.45 | 537.34 | 592.61 | 589.90 | 591.76 | 591.22 | 584.52 | 580.74 |
| 25 | 590.12 | 591.20 | 586.84 | 579.69 | 570.76 | 536.33 | 593.36 | 590.57 | 591.92 | 591.08 | 584.18 | 580.84 |
| 26 | 590.14 | 591.76 | 586.88 | 579.08 | 569.52 | 536.99 | 592.95 | 590.88 | 591.61 | 590.86 | 583.76 | 580.58 |
| 27 | 589.80 | 591.68 | 587.09 | 578.46 | 568.14 | 536.81 | 592.54 | 591.08 | 591.28 | 590.60 | 583.74 | 580.14 |
| 28 | 589.69 | 591.34 | 586.57 | 577.84 | 566.66 | 535.59 | 592.24 | 591.35 | 591.05 | 590.34 | 583.78 | 579.68 |
| 29 | 589.46 | 591.05 | 586.13 | 577.57 | 565.07 | 534.68 | 591.96 | 591.56 | 590.74 | 590.01 | 582.96 | 579.23 |
| 30 | 589.20 | 595.07 | 585.48 | 577.53 | ----- | 537.10 | 591.60 | 591.76 | 590.52 | 590.24 | 582.43 | 578.72 |
| 31 | 589.60 | ----- | 585.08 | 577.81 | ----- | 547.99 | ----- | 591.54 | ----- | 590.85 | 581.85 | ----- |
| (†) | 1,490.8 | 1,702.6 | 1,331.1 | 1,105.0 | 772.7 | 427.7 | 1,567.1 | 1,564.8 | 1,525.2 | 1,538.0 | 1,227.5 | 1,131.4 |
| (‡) | +124 | +81.7 | -139 | -84.4 | -133 | -129 | +440 | -0.86 | -15.3 | +4.78 | -116 | -37.1 |

Calendar year 1959..... † +15.0

Water year 1959-60..... ‡ -0.83

† Contents, in millions of cubic feet, at end of month.

‡ Change in contents, equivalent in cubic feet per second.

2890. Waterbury River near Waterbury, Vt.

Location.--Lat 44°22'10", long 72°46'10", on right bank 1 mile downstream from Waterbury Reservoir, 1 2/3 miles upstream from mouth, and 2 1/2 miles north of Waterbury, Washington County.

Drainage area.--111 sq mi.

Records available.--July to October 1910 (gage heights only), October 1935 to September 1960. October, November 1935 monthly discharge only, published in WSP 1307.

Gage.--Water-stage recorder. Concrete control since Dec. 8, 1937. Datum of gage is 428.00 ft above mean sea level (levels by Corps of Engineers). July 7 to Oct. 31, 1910, staff gage at site 2 miles upstream at different datum.

Average discharge.--25 years, 231 cfs (adjusted for storage).

Extremes.--Maximum discharge during year, 1,640 cfs Nov. 30 (gage height, 9.78 ft); minimum daily, 4.9 cfs Mar. 26.

1935-60: Maximum discharge, 6,520 cfs Mar. 18, 1936 (gage height, 19.38 ft); minimum daily, 0.6 cfs several times during summers of 1938-39, 1941, and 1944.

Remarks.--Records good. Flow completely regulated by Waterbury Reservoir (see preceding page).

Revisions (water years).--WSP 824: 1936.

Rating table, water year 1959-60 (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 5.0 | 4.2 | 7.0 | 287 |
| 5.1 | 6.8 | 7.5 | 450 |
| 5.3 | 14 | 8.0 | 665 |
| 5.6 | 34 | 9.0 | 1,230 |
| 6.0 | 77 | 10.0 | 1,740 |
| 6.5 | 163 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|------------|--------------|--------------|------------|-------|------------|-----------|------------|------------|------------|------------|------------|
| 1 | 113 | 84 | <u>1,000</u> | 25 | 343 | 510 | 304 | 588 | 175 | 95 | 50 | 224 |
| 2 | 64 | 297 | 742 | 119 | 277 | 506 | 24 | 593 | 106 | <u>5.9</u> | 92 | 217 |
| 3 | <u>5.9</u> | 195 | 616 | 37 | 284 | 498 | <u>18</u> | 593 | 89 | 5.9 | 157 | 5.7 |
| 4 | 7.4 | 219 | 463 | 275 | 284 | 468 | 362 | 524 | 7.1 | 6.2 | 142 | 20 |
| 5 | 145 | 228 | 236 | 305 | 290 | 103 | 552 | 407 | 83 | 84 | *256 | 5.7 |
| 6 | 74 | 337 | 201 | 287 | 143 | 110 | 509 | 407 | 147 | 45 | 7.1 | 235 |
| 7 | 52 | 532 | 389 | *309 | 120 | 470 | 493 | 280 | 166 | 51 | 6.2 | 211 |
| 8 | 17 | 562 | 566 | 284 | 310 | 474 | 530 | 9.2 | 156 | 63 | 266 | 224 |
| 9 | 20 | 438 | 409 | 69 | 299 | 482 | 518 | 421 | 114 | 8.0 | 231 | *266 |
| 10 | 7.7 | 230 | 382 | 143 | 311 | 478 | 395 | 557 | 137 | 6.2 | 225 | 89 |
| 11 | 7.7 | 240 | 416 | 289 | 187 | 323 | 395 | 404 | 5.9 | 229 | 213 | 87 |
| 12 | 58 | 204 | 347 | 446 | 134 | 5.9 | 527 | 405 | <u>5.7</u> | <u>136</u> | 211 | 182 |
| 13 | 90 | 296 | 401 | 507 | 33 | 113 | 534 | 324 | 92 | 96 | 5.9 | 71 |
| 14 | 106 | 70 | 414 | 296 | 17 | 449 | 532 | 163 | 118 | 78 | 5.7 | 43 |
| 15 | 186 | 266 | 398 | 313 | 201 | 422 | 547 | 584 | 94 | 54 | 251 | 81 |
| 16 | 117 | 280 | 396 | 75 | 247 | *399 | 566 | 308 | 61 | 5.9 | 213 | 81 |
| 17 | 101 | 252 | 383 | 140 | 328 | 400 | 552 | 314 | 195 | 5.9 | 222 | 6.9 |
| 18 | 8.3 | 176 | 365 | 267 | 298 | 258 | 538 | 236 | 415 | 79 | 196 | 51 |
| 19 | 291 | 245 | 350 | 299 | 320 | 6.2 | 584 | 231 | 248 | 75 | 175 | 210 |
| 20 | 222 | 246 | 143 | 274 | 221 | 71 | 593 | 124 | 295 | 62 | 5.9 | 175 |
| 21 | 269 | 131 | 357 | 277 | 201 | 357 | 598 | 8.3 | 24 | 44 | 5.7 | 174 |
| 22 | 242 | <u>48</u> | 346 | 268 | 502 | 351 | 546 | 7.7 | 162 | 52 | 217 | 149 |
| 23 | 111 | 388 | 330 | 69 | 457 | 299 | 598 | 380 | 71 | 6.2 | 222 | 127 |
| 24 | 24 | 475 | 261 | 81 | 338 | 296 | 665 | 190 | 180 | 5.9 | 183 | 5.7 |
| 25 | 298 | 311 | 50 | 330 | 330 | 232 | 814 | *101 | <u>436</u> | 98 | 158 | <u>5.2</u> |
| 26 | <u>410</u> | 94 | 113 | 298 | 489 | <u>4.9</u> | 890 | 75 | 389 | 136 | 181 | 126 |
| 27 | 410 | 341 | <u>44</u> | 305 | 514 | 102 | 726 | 59 | 279 | 144 | 33 | 186 |
| 28 | *269 | 622 | 348 | 307 | 514 | 316 | 629 | 7.4 | 199 | 153 | <u>5.4</u> | 192 |
| 29 | 258 | 1,010 | 315 | 182 | 506 | 320 | 567 | 6.8 | 212 | 170 | <u>331</u> | 190 |
| 30 | 238 | <u>1,360</u> | 370 | 121 | ----- | 169 | 598 | <u>6.5</u> | 214 | 106 | 210 | 213 |
| 31 | 86 | ----- | 275 | <u>8.3</u> | ----- | 291 | ----- | 212 | ----- | 6.8 | 230 | ----- |
| Total | 4,308.0 | 10,177 | 11,426 | 7,005.3 | 8,498 | 9,304.0 | 15,674 | 8,525.9 | 4,875.7 | 2,112.9 | 4,706.9 | 3,852.2 |
| Mean | 139 | 339 | 369 | 226 | 293 | 300 | 522 | 275 | 163 | 69.2 | 152 | 128 |
| (†) | +124 | +81.7 | -139 | -84.4 | -133 | -129 | +440 | -0.66 | -15.3 | +4.78 | -116 | -37.1 |

Adjusted for change in contents in Waterbury Reservoir

| Mean | 263 | 421 | 230 | 142 | 160 | 171 | 962 | 274 | 147 | 72.9 | 35.9 | 91.3 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Cfsm | 2.37 | 3.79 | 2.07 | 1.28 | 1.44 | 1.54 | 8.67 | 2.47 | 1.32 | 0.657 | 0.323 | 0.923 |
| In. | 2.73 | 4.23 | 2.39 | 1.47 | 1.56 | 1.78 | 9.67 | 2.85 | 1.48 | 0.76 | 0.37 | 0.92 |

| | Observed | | | | | Adjusted | | | | | | |
|---------------------|----------|-------|-----|-----|------|----------|------|-----|------|------|-----|-------|
| Calendar year 1959: | Max | 1,360 | Min | 4.9 | Mean | 214 | Mean | 229 | Cfsm | 2.06 | In. | 27.97 |
| Water year 1959-60: | Max | 1,360 | Min | 4.9 | Mean | 247 | Mean | 246 | Cfsm | 2.22 | In. | 30.21 |

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Waterbury Reservoir.

2905. Winooski River near Essex Junction, Vt.

Location.--Lat 44°28'40", long 73°08'20", on right bank half a mile downstream from Muddy Brook and 2 miles southwest of Essex Junction, Chittenden County.

Drainage area.--1,044 sq mi.

Records available.--October 1928 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 185 ft (from topographic map).

Average discharge.--32 years, 1,669 cfs (adjusted for storage since October 1938).

Extremes.--Maximum discharge during year, 24,100 cfs Nov. 28 (gage height, 14.00 ft); minimum daily, 86 cfs Sept. 3.

1928-60: Maximum discharge, 45,300 cfs Mar. 19, 1936 (gage height, 23.54 ft), from rating curve extended above 27,000 cfs on basis of computations of flow over dam at gage heights 18.72, 23.54, and 50.4 ft, and slope-area measurement at gage height 50.4 ft; minimum daily, 65 cfs Sept. 20, 1959.

Maximum discharge known, 113,000 cfs Nov. 4, 1927 (gage height, 50.4 ft, from flood-marks), from rating curve extended above 27,000 cfs by method explained above.

Remarks.--Records excellent except those for periods of ice effect, which are fair. Flow regulated by powerplants above station, by Peacham Pond and Mollys Falls Reservoir (combined usable capacity, 492,000,000 cu ft), by Waterbury Reservoir since 1937 (see p. 395), and by East Barre and Wrightsville Detention Reservoirs since 1935 (see p. 395).
Revisions (water years).--WSP 714: 1930(M). WSP 894: Drainage area. WSP 1307: 1929(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 0.2 | 80 | 2.5 | 1,630 |
| .3 | 101 | 3.0 | 2,380 |
| .6 | 180 | 4.0 | 4,400 |
| 1.0 | 329 | 6.0 | 9,250 |
| 1.5 | 620 | 8.0 | 13,000 |
| 2.0 | 1,060 | 11.0 | 18,000 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 272 | 2,340 | 5,340 | 1,200 | 950 | 1,400 | 16,300 | 2,930 | 1,040 | 666 | 712 | 472 |
| 2 | 1,190 | 2,930 | 4,130 | 1,100 | 1,050 | 1,400 | 7,940 | 2,930 | 1,580 | 558 | 569 | 380 |
| 3 | 1,080 | 2,450 | 3,770 | 1,100 | 1,000 | 1,400 | 7,410 | 2,700 | 1,360 | 388 | 437 | 86 |
| 4 | 236 | 1,920 | 3,380 | 1,500 | 1,050 | 1,300 | 11,100 | 2,360 | 1,140 | 252 | 394 | 90 |
| 5 | 464 | 1,820 | 2,870 | 3,500 | 1,000 | 1,200 | 16,700 | 1,990 | 854 | 612 | 598 | 95 |
| 6 | 566 | 2,270 | 2,380 | 2,800 | 850 | 1,000 | 11,400 | 1,820 | *872 | 441 | 304 | 386 |
| 7 | 1,890 | 4,540 | 3,920 | 2,500 | 850 | 1,070 | 6,920 | 1,700 | 658 | 471 | 359 | 363 |
| 8 | 4,230 | 3,280 | 4,750 | 2,000 | 1,000 | 1,360 | 5,710 | 1,480 | 723 | *502 | 657 | 404 |
| 9 | 2,560 | 2,510 | 3,260 | 1,800 | 1,100 | 1,250 | 4,870 | 1,240 | 795 | 372 | 505 | 394 |
| 10 | 1,750 | 1,960 | 2,720 | 1,300 | 1,000 | 1,250 | 4,420 | 1,990 | 704 | 289 | 606 | 100 |
| 11 | 1,380 | 1,680 | 2,490 | 1,600 | 3,000 | 1,150 | 3,910 | 2,230 | 530 | 597 | 610 | 95 |
| 12 | 1,080 | 1,540 | 2,330 | 1,550 | 5,000 | 1,100 | 4,490 | 1,900 | 181 | 374 | *566 | 788 |
| 13 | 1,090 | 1,350 | 4,370 | 1,600 | 3,500 | 802 | 6,220 | 1,820 | 592 | 436 | 190 | 3,380 |
| 14 | 813 | 1,550 | 4,990 | 1,600 | 2,100 | 1,020 | 6,170 | 1,770 | 488 | 500 | 106 | *2,170 |
| 15 | 630 | 2,240 | 3,260 | 1,350 | 2,000 | 1,190 | 9,490 | 2,300 | 697 | 468 | 354 | 417 |
| 16 | 740 | 2,190 | 2,850 | 1,350 | 1,900 | 1,150 | 9,620 | 2,620 | 930 | 342 | 282 | 634 |
| 17 | 676 | 1,980 | 2,820 | 1,100 | 1,800 | 1,130 | 8,180 | 2,950 | 940 | 250 | 324 | 320 |
| 18 | 505 | 2,230 | 2,600 | 1,500 | 1,700 | 1,130 | 9,670 | 2,380 | 1,430 | 289 | 316 | 120 |
| 19 | 833 | *1,830 | 2,280 | 1,350 | 1,700 | 783 | 8,200 | 1,900 | 1,490 | 512 | 424 | 590 |
| 20 | 936 | 1,580 | 2,000 | 1,200 | 1,550 | 632 | 5,480 | 1,580 | 796 | 461 | 128 | 475 |
| 21 | 962 | 1,500 | 1,200 | 1,300 | 1,500 | 1,030 | 4,580 | 1,320 | 699 | 368 | 106 | 458 |
| 22 | 967 | 1,310 | 1,300 | 1,300 | 1,450 | 1,080 | 5,060 | 1,120 | 628 | 406 | 394 | 428 |
| 23 | 984 | 1,320 | 1,600 | 1,150 | 1,500 | 1,090 | 4,870 | 980 | 554 | 326 | 449 | 431 |
| 24 | 2,330 | 1,510 | 1,500 | 900 | 1,550 | 1,060 | 4,380 | 1,400 | 753 | 222 | 338 | 206 |
| 25 | 8,530 | 3,360 | 1,500 | 1,200 | 1,500 | 1,020 | 6,710 | 3,290 | 1,480 | 316 | 358 | 195 |
| 26 | *5,420 | 3,410 | 1,150 | 1,150 | 1,450 | 560 | 6,790 | 2,350 | 1,620 | 317 | 374 | 386 |
| 27 | 3,420 | 2,490 | 1,200 | 1,350 | 1,500 | 620 | 4,800 | 1,680 | 1,330 | 346 | 107 | 418 |
| 28 | 2,820 | 16,000 | 1,100 | 1,200 | 1,550 | 1,100 | 4,240 | 1,420 | 745 | 284 | 97 | 384 |
| 29 | 2,150 | 14,300 | 1,300 | 1,100 | 1,400 | 1,400 | *5,600 | 1,130 | 759 | 363 | 432 | 440 |
| 30 | 1,800 | 6,760 | 1,500 | 1,000 | 2,800 | 2,800 | 3,200 | 820 | 755 | 674 | 434 | 593 |
| 31 | 1,580 | | 1,300 | 800 | ----- | 10,000 | ----- | 884 | ----- | 1,080 | 356 | ----- |
| Total | 53,884 | 96,150 | 81,220 | 48,250 | 47,500 | 44,577 | 212,430 | 58,984 | 27,083 | 13,482 | 11,914 | 15,698 |
| Mean | 1,738 | 3,205 | 2,620 | 1,556 | 1,638 | 1,438 | 7,081 | 1,903 | 903 | 435 | 384 | 523 |
| (†) | +131 | +163 | -220 | -113 | -161 | -106 | +513 | +5.18 | -83.4 | -26.5 | -117 | -24.3 |

Adjusted for change in reservoir contents

| | Mean | Cfs/m | In. |
|-------|-------|-------|-------|
| Mean | 1,870 | 3,368 | 2,400 |
| Cfs/m | 1.79 | 3.23 | 2.30 |
| In. | 2.06 | 3.60 | 2.65 |
| | | | 1.43 |
| | | | 1.41 |
| | | | 1.53 |
| | | | 1.32 |
| | | | 1.28 |
| | | | 1.47 |
| | | | 7.594 |
| | | | 7.27 |
| | | | 1.85 |
| | | | 0.784 |
| | | | 2.11 |
| | | | 0.88 |
| | | | 0.45 |
| | | | 0.29 |
| | | | 0.53 |

| | Observed | | | | Adjusted | | | | | | | |
|---------------------|----------|--------|-----|----|----------|-------|------|-------|-------|------|-----|-------|
| Calendar year 1959: | Max | 18,000 | Min | 65 | Mean | 1,776 | Mean | 1,792 | Cfs/m | 1.72 | In. | 23.28 |
| Water year 1959-60: | Max | 16,700 | Min | 86 | Mean | 1,943 | Mean | 1,939 | Cfs/m | 1.86 | In. | 25.28 |

Peak discharge (base, 12,500 cfs).--Nov. 28 (11 p.m.) 24,100 cfs (14.00 ft); Apr. 1 (5 a.m.) 19,400 cfs (11.71 ft); Apr. 5 (2 to 3 p.m.) 18,000 cfs (10.98 ft).

* Discharge measurement made on this day.

† Change in contents, equivalent in cubic feet per second, in Peacham Pond, Mollys Falls Reservoir, East Barre and Wrightsville Detention Reservoirs, and Waterbury Reservoir. Part of record furnished by State of Vermont Conservation Board and Green Mountain Power Corp.

Note.--Stage-discharge relation affected by ice Dec. 21 to Mar. 5, Mar. 9-12, 26-31.

2920. Lamoille River at Johnson, Vt.

Location.--Lat 44°37'20", long 72°40'50", on right bank at falls, 0.7 mile upstream from bridge in Johnson, Lamoille County, and 0.8 mile upstream from Ghon River.

Drainage area.--310 sq mi.

Records available.--July to December 1910, June 1911 to December 1913 (monthly discharge only, January to March 1912, February 1913), September 1928 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 495 ft (from topographic map). Prior to Dec. 31, 1913, chain gage at bridge 0.7 mile downstream at different datum.

Average discharge.--34 years (1911-13, 1928-60), 525 cfs.

Extremes.--Maximum discharge during year, 8,800 cfs Nov. 28 (gage height, 13.63 ft); minimum, 77 cfs Oct. 4, 5; minimum daily, 80 cfs Oct. 4.
1910-13, 1928-60: Maximum discharge, 13,000 cfs Mar. 18, 1936 (gage height, 16.48 ft), from rating curve extended above 8,500 cfs on basis of computation of peak flow over dam; minimum, 11 cfs Sept. 2, 1935; minimum daily, 16 cfs Oct. 26, 1947.

Remarks.--Records excellent except those for periods of ice effect and doubtful or no gage-height record, which are fair. Flow regulated by powerplant above station.

Revisions (water years).--WSP 894: Drainage area. WSP 1114: 1933, 1934(M). WSP 1237: 1912(M), 1930, 1932(M).

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|-------|
| 1.5 | 75 | 6.0 | 1,990 |
| 2.0 | 188 | 9.0 | 4,000 |
| 3.0 | 550 | 11.0 | 5,800 |
| 4.0 | 1,000 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|--------|--------|--------|--------|--------|----------|--------|------------|-------|-----------|-------|-------|
| 1 | 122 | 514 | 1,100 | 280 | 230 | 320 | 4,320 | *530 | 250 | 233 | 386 | 171 |
| 2 | 157 | 730 | 896 | 340 | 230 | 300 | a3,500 | 654 | 270 | 203 | 229 | 168 |
| 3 | 118 | 680 | 666 | 700 | 240 | 290 | a2,800 | 535 | 290 | 193 | 211 | 167 |
| 4 | 80 | 510 | 480 | 1,350 | 210 | 280 | 4,420 | 324 | 250 | 193 | 202 | 152 |
| 5 | 87 | 504 | 654 | 840 | 210 | 270 | 5,230 | 482 | 200 | 223 | 202 | 188 |
| 6 | 161 | 808 | 667 | 610 | 230 | 260 | 2,950 | 454 | 220 | 211 | 214 | 178 |
| 7 | 702 | 1,820 | 860 | *510 | 240 | 280 | 1,740 | 390 | 250 | 183 | 174 | 177 |
| 8 | 887 | 901 | 1,000 | 450 | 280 | 270 | 1,360 | 295 | 210 | 180 | 245 | 158 |
| 9 | 605 | 649 | 798 | 390 | 270 | 220 | 1,080 | 390 | 190 | *191 | 226 | 166 |
| 10 | 374 | 482 | 703 | 350 | 250 | 240 | 1,030 | 490 | 170 | 153 | *200 | 168 |
| 11 | 303 | 387 | 613 | 330 | 580 | 250 | 964 | 502 | 165 | 188 | 200 | 148 |
| 12 | 402 | 417 | 510 | 320 | 1,700 | 230 | 1,120 | 398 | 160 | 206 | 190 | 418 |
| 13 | 331 | 418 | 1,350 | 300 | 1,500 | 220 | 1,660 | 446 | 155 | 249 | 179 | 1,800 |
| 14 | 291 | 361 | 1,110 | 290 | 800 | 260 | 1,970 | 590 | 150 | 214 | 162 | *829 |
| 15 | 155 | 803 | 716 | 280 | 680 | 240 | 2,800 | 878 | 150 | 193 | 201 | 522 |
| 16 | 214 | 680 | 793 | 270 | 540 | 240 | 3,280 | 1,040 | 239 | 160 | 208 | 288 |
| 17 | 167 | 510 | 744 | 270 | *500 | 240 | 3,060 | 1,170 | 258 | 142 | 166 | 149 |
| 18 | 225 | 656 | 626 | 260 | 450 | 230 | 3,820 | 820 | 798 | 198 | 176 | 138 |
| 19 | 301 | 506 | 508 | 270 | 450 | 230 | 3,790 | 600 | 554 | 230 | 170 | 137 |
| 20 | 211 | *386 | 450 | 260 | 370 | 240 | 1,720 | 500 | 394 | 298 | 182 | 200 |
| 21 | 288 | 365 | 362 | 280 | 330 | 280 | 1,310 | 420 | 245 | 217 | 164 | 200 |
| 22 | 211 | 315 | 316 | 270 | 370 | 260 | 1,380 | 350 | 202 | 178 | 181 | 200 |
| 23 | 318 | 408 | 340 | 240 | 360 | 270 | 1,270 | 330 | 205 | 189 | 205 | 164 |
| 24 | 1,010 | 494 | 350 | 230 | 350 | 240 | 1,100 | 380 | 369 | 150 | 183 | 175 |
| 25 | *4,420 | 1,500 | 240 | 280 | 310 | 260 | 1,640 | 450 | 1,190 | 184 | 175 | 167 |
| 26 | *1,370 | 1,440 | 260 | 270 | 330 | *230 | 1,740 | 400 | 798 | 173 | 162 | 170 |
| 27 | 793 | 1,010 | 280 | 250 | 310 | a200 | 1,210 | 340 | 486 | 151 | 174 | 164 |
| 28 | 556 | 5,500 | 380 | 250 | 260 | a230 | 1,090 | 290 | 274 | 170 | 148 | 160 |
| 29 | 212 | a4,100 | 330 | 240 | 320 | a340 | 942 | 210 | 214 | 172 | 173 | 162 |
| 30 | 301 | a1,350 | 320 | 240 | ----- | a410 | 501 | 200 | 236 | 240 | 172 | 157 |
| 31 | 350 | ----- | 290 | 230 | ----- | 1,150 | ----- | 230 | ----- | 654 | 154 | ----- |
| Total | 13,722 | 29,184 | 18,710 | 11,450 | 12,700 | 8,980 | 64,797 | 15,068 | 9,532 | 6,562 | 6,014 | 8,041 |
| Mean | 443 | 973 | 604 | 369 | 438 | 290 | 2,160 | 486 | 318 | 212 | 194 | 268 |
| Cfs/m | 1.43 | 3.14 | 1.95 | 1.19 | 1.41 | 0.935 | 6.97 | 1.57 | 1.03 | 0.664 | 0.626 | 0.865 |
| In. | 1.65 | 3.50 | 2.24 | 1.37 | 1.52 | 1.08 | 7.77 | 1.81 | 1.14 | 0.79 | 0.72 | 0.96 |
| Calendar year 1959: Max | 5,500 | | | Min 80 | | Mean 506 | | Cfs/m 1.63 | | In. 22.17 | | |
| Water year 1959-60: Max | 5,500 | | | Min 80 | | Mean 560 | | Cfs/m 1.81 | | In. 24.55 | | |

Peak discharge (base, 5,400 cfs).--Nov. 28 (5 p.m.) 8,800 cfs (13.63 ft); Apr. 1 (8:30 a.m.) 5,970 cfs (11.17 ft); Apr. 5 (10 a.m.) 5,670 cfs (10.87 ft).

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records, recorded range in stage when available, and records for station at East Georgia.

Note.--Doubtful or no gage-height record May 18 to June 15; discharge estimated on basis of 2 discharge measurements, appearance of recorder chart, weather records, and records for station at East Georgia. State-discharge relation affected by ice Dec. 23 to Jan. 3, Jan. 5 to Mar. 30.

2925. Lamoille River at East Georgia, Vt.

Location.--Lat 44°40'45", long 73°04'20", on right bank at East Georgia, Franklin County, 0.5 mile upstream from railroad bridge and 1 mile downstream from Beaver Meadow Brook.

Drainage area.--686 sq mi.

Records available.--August 1929 to September 1960. Prior to December 1937, published as "near Milton."

Gage.--Water-stage recorder. Altitude of gage is 285 ft (from topographic map). Prior to December 1937, at site $3\frac{1}{2}$ miles downstream at different datum.

Average discharge.--31 years, 1,314 cfs, adjusted to present drainage area.

Extremes.--Maximum discharge during year, 14,300 cfs Nov. 29 (gage height, 10.33 ft); maximum gage height, 16.65 ft Mar. 31 (ice jam); minimum daily discharge, 220 cfs Oct. 5. 1929-60: Maximum discharge, 23,200 cfs Mar. 19, 1936 (gage height, 12.52 ft, site and datum then in use), by computation of peak flow over dam; maximum gage height, 18.81 ft Apr. 3, 1959 (ice jam); minimum daily discharge, 91 cfs July 30, 1933.

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are fair. Low flow regulated by powerplants above station.

Revisions.--WSP 894: Drainage area.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-------|------|--------|
| 2.5 | 216 | 5.0 | 2,010 |
| 3.0 | 390 | 7.0 | 5,050 |
| 3.5 | 665 | 9.0 | 9,930 |
| 4.0 | 1,030 | 10.0 | 13,100 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| 1 | 260 | 1,300 | 2,790 | 780 | 580 | 660 | 9,500 | 1,340 | 546 | 552 | 870 | 284 |
| 2 | 314 | 1,580 | 2,440 | 750 | 550 | 670 | 8,000 | 1,510 | 588 | 480 | 632 | 252 |
| 3 | 358 | 1,590 | 1,770 | 1,700 | 540 | 640 | 6,500 | 1,360 | 639 | 412 | 392 | 256 |
| 4 | 250 | 1,210 | 1,490 | 3,000 | 520 | 660 | 9,500 | 1,090 | 512 | 394 | 385 | 254 |
| 5 | 220 | 1,240 | 1,610 | 2,200 | 510 | 680 | 11,000 | 1,050 | 440 | 430 | 341 | 261 |
| 6 | 228 | 2,490 | 1,600 | 1,700 | 520 | 630 | 6,600 | 1,090 | *483 | 440 | 378 | 290 |
| 7 | 1,010 | 5,170 | 1,970 | 1,300 | 620 | 580 | 3,900 | 1,010 | 570 | 408 | 358 | 262 |
| 8 | 2,230 | 2,690 | 2,670 | 1,100 | 700 | 580 | 3,000 | 898 | 440 | *341 | 348 | 352 |
| 9 | 1,230 | 1,570 | 1,910 | 950 | 670 | 550 | 2,400 | 838 | 388 | 390 | 454 | 279 |
| 10 | 875 | 1,260 | 1,620 | 860 | 640 | 520 | 2,300 | 1,230 | 353 | 374 | 412 | 318 |
| 11 | 672 | 1,060 | 1,410 | 800 | 1,300 | 500 | 2,200 | 1,160 | 346 | 318 | 358 | 258 |
| 12 | 691 | 966 | 1,500 | 760 | 3,800 | 520 | 2,500 | 966 | 275 | 354 | 324 | 354 |
| 13 | 830 | 1,030 | 3,910 | 750 | 3,100 | 530 | 3,700 | 990 | 382 | 404 | 302 | 3,480 |
| 14 | 717 | 1,430 | 2,920 | 720 | 2,000 | 540 | 4,500 | 1,130 | 338 | 445 | 268 | 2,220 |
| 15 | 632 | 3,830 | 1,750 | 700 | 1,600 | 580 | 6,000 | 1,640 | 340 | 370 | 303 | *1,190 |
| 16 | 411 | 2,350 | 1,880 | 700 | 1,300 | 520 | 7,500 | 2,530 | 448 | 320 | 331 | 822 |
| 17 | 428 | 1,870 | 1,800 | 620 | 1,200 | 540 | 6,800 | 2,880 | 485 | 280 | 316 | 408 |
| 18 | 434 | 2,140 | 1,490 | 620 | 1,100 | 500 | 8,000 | 1,790 | 2,000 | 263 | 284 | 356 |
| 19 | 613 | *1,520 | 1,290 | 660 | 1,050 | 510 | 9,000 | 1,350 | 1,510 | 442 | 273 | 362 |
| 20 | 632 | 1,180 | 1,050 | 660 | 950 | 560 | 3,800 | 1,100 | 869 | 751 | 271 | 342 |
| 21 | 582 | 1,090 | 920 | 640 | 850 | 520 | 2,900 | 935 | 678 | 613 | 276 | 390 |
| 22 | 691 | 1,050 | 800 | 640 | 770 | 560 | 3,000 | 800 | 512 | 430 | 298 | 362 |
| 23 | 613 | 990 | 750 | 600 | 860 | 550 | 2,800 | 724 | 445 | 310 | 322 | 362 |
| 24 | 1,810 | 1,360 | 780 | 610 | 850 | 530 | 2,500 | 852 | 1,320 | 390 | 320 | 312 |
| 25 | *4,530 | 2,600 | 760 | 590 | 800 | 510 | 3,600 | 1,060 | 3,890 | 330 | 291 | 308 |
| 26 | 3,530 | 3,440 | 650 | 600 | 740 | 470 | 4,000 | 966 | 2,430 | 309 | 270 | 271 |
| 27 | 1,940 | 2,140 | 760 | 590 | 780 | 450 | 2,700 | 779 | 1,200 | 324 | 259 | 280 |
| 28 | 1,380 | 8,330 | 800 | 570 | 750 | 530 | 2,400 | 672 | 860 | 242 | 248 | 279 |
| 29 | 998 | 12,600 | 840 | 580 | 660 | 620 | *2,100 | 529 | 639 | 286 | 250 | 278 |
| 30 | 710 | 4,590 | 840 | 540 | 800 | 800 | 1,660 | 438 | 512 | 300 | 258 | 303 |
| 31 | 765 | ----- | 830 | 580 | ----- | 2,500 | ----- | 507 | ----- | 1,010 | ----- | ----- |
| Total | 30,574 | 75,666 | 47,300 | 27,870 | 30,290 | 19,510 | 144,360 | 35,214 | 24,438 | 12,712 | 10,644 | 15,705 |
| Mean | 986 | 2,522 | 1,526 | 899 | 1,044 | 629 | 4,812 | 1,136 | 815 | 410 | 343 | 524 |
| Cfsm | 1.44 | 3.68 | 2.22 | 1.31 | 1.52 | 0.917 | 7.01 | 1.66 | 1.19 | 0.598 | 0.500 | 0.764 |
| In. | 1.66 | 4.10 | 2.56 | 1.51 | 1.64 | 1.06 | 7.83 | 1.91 | 1.52 | 0.69 | 0.58 | 0.85 |

Calendar year 1959: Max 12,600 Min 134 Mean 1,202 Cfsm 1.75 In. 23.79
Water year 1959-60: Max 12,600 Min 220 Mean 1,296 Cfsm 1.89 In. 25.71

Peak discharge (base, 10,400 cfs).--Nov. 29 (6 a.m.) 14,300 cfs (10.33 ft); Mar. 31 (about 11 p.m.) about 12,000 cfs; Apr. 5 (9 a.m. to 12 m.) 11,800 cfs (9.59 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Apr. 2-29; discharge estimated on basis of weather records, 1 discharge measurement, and records for Lamoille River at Johnson and Missisquoi River near Richford. Stage-discharge relation affected by ice Dec. 15, Dec. 20 to Apr. 1, and during early part of period of no gage-height record.

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER

2930. Missisquoi River near North Troy, Vt.

Location.--Lat 44°58'20", long 72°23'15", on right bank 200 ft upstream from Big Falls, 1½ miles downstream from Jay Branch, and 2¼ miles upstream from North Troy, Troy County.

Drainage area.--131 sq mi.

Records available.--August 1931 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 580 ft (from topographic map).

Average discharge.--29 years, 269 cfs.

Extremes.--Maximum discharge during year, 5,180 cfs Nov. 28 (gage height, 10.33 ft); minimum, 26 cfs Sept. 9; minimum daily, 26 cfs Sept. 9.
1931-60: Maximum discharge, 7,980 cfs May 3, 1940 (gage height, 12.87 ft), from rating curve extended above 3,600 cfs by logarithmic plotting, verified by computation of flow over dam at gage height 11.70 ft; minimum, 9.4 cfs Aug. 28, 1949; minimum daily, 11 cfs Aug. 28, 1949, Aug. 30, 1953.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Some regulation by small powerplant above station.

Revisions (water years).--WSP 924: 1940. WSP 1114: 1933(M), 1936-39.

Rating tables, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

Oct. 1 to Apr. 18

Apr. 19 to Sept. 30

| | | | |
|-----|-----|-----|-------|
| 1.5 | 46 | 3.0 | 352 |
| 1.9 | 92 | 5.0 | 1,170 |
| 2.2 | 144 | 7.0 | 2,350 |
| 2.5 | 213 | 9.0 | 3,950 |

| | | | |
|-----|----|-----|-----|
| 1.1 | 24 | 2.0 | 114 |
| 1.3 | 37 | 2.5 | 213 |
| 1.6 | 62 | | |

Note.--Same as preceding table above 2.5 ft.

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 55 | 359 | 396 | 115 | 110 | 130 | 2,700 | 343 | 165 | 92 | 132 | 35 |
| 2 | 126 | 392 | 312 | 110 | 110 | 125 | 2,200 | 330 | 270 | 73 | 79 | 34 |
| 3 | 73 | 340 | 284 | 200 | 105 | 125 | 2,000 | 262 | 144 | 71 | 62 | 32 |
| 4 | 60 | 244 | 301 | 750 | 105 | 130 | 2,890 | 247 | 116 | 69 | 55 | 33 |
| 5 | 47 | 413 | 295 | *370 | 100 | 125 | 2,700 | 231 | *105 | 71 | 49 | 38 |
| 6 | 242 | 1,330 | 327 | 250 | 105 | 120 | 2,000 | 216 | 132 | 106 | 70 | 36 |
| 7 | 864 | 1,660 | 438 | 230 | 120 | 115 | 1,200 | 176 | 104 | *73 | 53 | 31 |
| 8 | 717 | 525 | 476 | 190 | 125 | 110 | 800 | 159 | 78 | 64 | 73 | 29 |
| 9 | 273 | 333 | 301 | 170 | 125 | 105 | 600 | 138 | 62 | 66 | 90 | 26 |
| 10 | 179 | 260 | 249 | 155 | 120 | 105 | 500 | 178 | 73 | 61 | 60 | 36 |
| 11 | 122 | 221 | 210 | 150 | 350 | 110 | 600 | 153 | 62 | 61 | 50 | 34 |
| 12 | 181 | 273 | 190 | 145 | 700 | 110 | 1,000 | 138 | 61 | 57 | 43 | 365 |
| 13 | 172 | 262 | 840 | 140 | 500 | 105 | 1,409 | 178 | 59 | 55 | 39 | 2,240 |
| 14 | 130 | 445 | 476 | 135 | 400 | 100 | 1,500 | 258 | 55 | 50 | 37 | 459 |
| 15 | 103 | 1,290 | 250 | 135 | *280 | 98 | 2,720 | 1,100 | 84 | 46 | 40 | 183 |
| 16 | 86 | 465 | 406 | 130 | 220 | 96 | 2,300 | 2,080 | 127 | 42 | 39 | 115 |
| 17 | 81 | 413 | 368 | 130 | 200 | 96 | 2,500 | 695 | 68 | 40 | 38 | 93 |
| 18 | 163 | *406 | 250 | 125 | 190 | 100 | 2,800 | 382 | 410 | 41 | 37 | 106 |
| 19 | 165 | 262 | 223 | 125 | 180 | 105 | 2,200 | 262 | 209 | 158 | 36 | 120 |
| 20 | 167 | 208 | 170 | 125 | 170 | 105 | 1,200 | 199 | 147 | 116 | 35 | 93 |
| 21 | 321 | 208 | 160 | 125 | 160 | 105 | 900 | 167 | 118 | 86 | 45 | 84 |
| 22 | 170 | 196 | 150 | 120 | 150 | 100 | 900 | 138 | 84 | 59 | 80 | 75 |
| 23 | *297 | 196 | 140 | 120 | 155 | 100 | 800 | 132 | 75 | 63 | 130 | 69 |
| 24 | 1,160 | 417 | 140 | 115 | 145 | 88 | 700 | 151 | 200 | 65 | *50 | 62 |
| 25 | 1,560 | 1,060 | 140 | 115 | 140 | 92 | 1,000 | 242 | 1,000 | 49 | 43 | 59 |
| 26 | 737 | 669 | 140 | 115 | 140 | 90 | 750 | 163 | 461 | 41 | 39 | 57 |
| 27 | 480 | 385 | 135 | 110 | 145 | *96 | 550 | 128 | 203 | 40 | 36 | 56 |
| 28 | 321 | 3,200 | 135 | 110 | 140 | 105 | *450 | 106 | 128 | 40 | 34 | 55 |
| 29 | 231 | 1,940 | 135 | 110 | 135 | 160 | 406 | 99 | 98 | 38 | 33 | 54 |
| 30 | 176 | 537 | 135 | 110 | ----- | 300 | 352 | 91 | 96 | 110 | 35 | 62 |
| 31 | 196 | ----- | 130 | 110 | ----- | 1,500 | ----- | 95 | ----- | 524 | 39 | ----- |
| Total | 9,655 | 18,909 | 8,302 | 5,140 | 5,625 | 4,951 | 42,618 | 9,235 | 4,994 | 2,527 | 1,679 | 4,771 |
| Mean | 311 | 630 | 268 | 166 | 194 | 160 | 1,421 | 298 | 166 | 81.5 | 54.2 | 159 |
| Cfsm | 2.37 | 4.81 | 2.05 | 1.27 | 1.48 | 1.22 | 10.8 | 2.27 | 1.27 | 0.632 | 0.414 | 1.21 |
| In. | 2.74 | 5.37 | 2.36 | 1.46 | 1.60 | 1.41 | 12.10 | 2.62 | 1.42 | 0.72 | 0.48 | 1.35 |

Calendar year 1959: Max 3,200 Min 26 Mean 288 Cfsm 2.20 In. 29.83
Water year 1959-60: Max 3,200 Min 26 Mean 324 Cfsm 2.47 In. 33.63

Peak discharge (base, 3,300 cfs).--Nov. 28 (8:30 p.m.) 5,180 cfs (10.33 ft); Apr. 4 (8 to 8:30 p.m.) 3,330 cfs (8.27 ft); Apr. 18 (3:30 to 4 p.m.) 3,350 cfs (8.29 ft); Sept. 13 (12:30 a.m.) 3,700 cfs (8.71 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Apr. 2, 3, 5-14, 16-28, June 25, Aug. 16-24, 29, 30; discharge estimated on basis of 2 discharge measurements, weather records, recorded range in stage when available, and records for station near Richford. Stage-discharge relation affected by ice Dec. 11, 12, 15, 18, Dec. 20 to Apr. 1.

2935. Missisquoi River near Richford, Vt.

Location.--Lat 44°57'30", long 72°41'55", on left bank 1 2/3 miles upstream from Trout River, 3 miles south of Richford, Franklin County, and 3 3/4 miles downstream from North Branch.

Drainage area.--479 sq mi.

Records available.--July 1911 to September 1923, October 1928 to September 1960. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Altitude of gage is 410 ft (from topographic map). Prior to Aug. 1, 1915, chain gage at site a quarter of a mile downstream at datum 4.35 ft lower. Aug. 1, 1915, to Sept. 30, 1923, water-stage recorder at present site and datum. Oct. 1, 1928, to Sept. 30, 1929, chain gage at former site at datum 4.6 ft lower.

Average discharge.--44 years (1911-23, 1928-60), 911 cfs.

Extremes.--Maximum discharge during year, 10,200 cfs Apr. 5 (gage height, 12.21 ft); maximum gage height, 17.67 ft Apr. 2 (ice jam); minimum discharge, 64 cfs Oct. 1, Sept. 8, 9, 1911-23, 1928-60: Maximum discharge, 17,200 cfs May 4, 1940 (gage height, 15.15 ft), from rating curve extended above 9,300 cfs on basis of computation of peak flow over dam at gage height 14.70 ft, slope-area measurement at gage height 12.90 ft, and study of discharge per foot of width at measuring section; maximum gage height, 18.92 ft Mar. 15, 1946 (ice jam); minimum discharge observed, 8 cfs July 14, 1911. Maximum discharge known, 45,000 cfs during flood of November 1927 (gage height, 23.1 ft, from floodmarks), from rating curve extended above 9,300 cfs as explained above.

Remarks.--Records excellent except those for periods of ice effect, which are fair. Diurnal fluctuation at low flow prior to 1934.

Revisions (water years).--WSP 784: Drainage area. WSP 1237: 1913-14(M), 1922(M), 1923, 1929-30. WSP 1307: 1916(M). WSP 1437: 1912.

Rating table, water year 1959-60, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|------|-------|
| 2.5 | 53 | 4.0 | 665 |
| 2.7 | 93 | 6.0 | 2,330 |
| 3.0 | 185 | 9.0 | 5,520 |
| 3.5 | 390 | 12.0 | 9,910 |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-------|-------|--------|
| 1 | 88 | 1,000 | 2,200 | 460 | 430 | 520 | 9,000 | *950 | 349 | 267 | 554 | 82 |
| 2 | 274 | 1,210 | 1,530 | 440 | 430 | 500 | 7,000 | 972 | 500 | 225 | 271 | 75 |
| 3 | 284 | 1,190 | 1,250 | 600 | 420 | 480 | 5,500 | 822 | 473 | 189 | 189 | 69 |
| 4 | 189 | 682 | 1,260 | 2,500 | 410 | 470 | 8,760 | 737 | 349 | 185 | 151 | 71 |
| 5 | 158 | 1,000 | 1,220 | 2,000 | 410 | 460 | 9,700 | 678 | *296 | 175 | 136 | 78 |
| 6 | 182 | 3,120 | 1,260 | *1,100 | 410 | 450 | 6,840 | 617 | 288 | 182 | 142 | 76 |
| 7 | 867 | 4,350 | 1,470 | 900 | 470 | 450 | 3,980 | 561 | 304 | *207 | 145 | 71 |
| 8 | 2,080 | 2,860 | 1,790 | 800 | 490 | 450 | 2,680 | 490 | 265 | 182 | 148 | 67 |
| 9 | 1,100 | 1,446 | 1,390 | 680 | 490 | 410 | 2,080 | 456 | 225 | 178 | 178 | 66 |
| 10 | 665 | 1,040 | 1,110 | 620 | 480 | 400 | 1,770 | 440 | 192 | 161 | 165 | 78 |
| 11 | 490 | 850 | 900 | 600 | 1,500 | 390 | 1,500 | 451 | 189 | 148 | 136 | 89 |
| 12 | 451 | 912 | 820 | 570 | 2,500 | 380 | 2,180 | 415 | 175 | 142 | 115 | 155 |
| 13 | 506 | 965 | 2,500 | 560 | 1,900 | 380 | 3,460 | 410 | 158 | 161 | *96 | 3,290 |
| 14 | 440 | 1,380 | 1,900 | 540 | 1,400 | 370 | 3,570 | 522 | 151 | 148 | 91 | 3,110 |
| 15 | 549 | 3,810 | 1,450 | 540 | 1,100 | 360 | 5,890 | 2,300 | 158 | 123 | 89 | 1,230 |
| 16 | 284 | 2,570 | 1,440 | 520 | *950 | 350 | 6,930 | 6,000 | 236 | 101 | 89 | *704 |
| 17 | 263 | 1,690 | 1,650 | 510 | 900 | 360 | 6,470 | 4,700 | 280 | 89 | 89 | 517 |
| 18 | 304 | *1,670 | 1,150 | 500 | 800 | 360 | 7,360 | 2,280 | 440 | 91 | 89 | 435 |
| 19 | 395 | 1,220 | 960 | 500 | 780 | 370 | 7,010 | 1,350 | 641 | 254 | 86 | 435 |
| 20 | 395 | 950 | 660 | 480 | 740 | 370 | 4,400 | 965 | 446 | 506 | 80 | 390 |
| 21 | 635 | 852 | 600 | 480 | 680 | 380 | 2,460 | 744 | 435 | 540 | 93 | 358 |
| 22 | 594 | 779 | 570 | 480 | 640 | 360 | 2,520 | 611 | 431 | 229 | 175 | 313 |
| 23 | 522 | 744 | 560 | 480 | 630 | 380 | 2,420 | 534 | 255 | 178 | 251 | 271 |
| 24 | *1,600 | 1,430 | 560 | 470 | 600 | 380 | 2,050 | 508 | 229 | 161 | 196 | 244 |
| 25 | 3,140 | 3,120 | 560 | 460 | 560 | 370 | 2,460 | 659 | 1,000 | 148 | 129 | 217 |
| 26 | 2,720 | 3,100 | 560 | 460 | 560 | *350 | 2,540 | 629 | 1,520 | 136 | 104 | 192 |
| 27 | 1,830 | 2,010 | 540 | 450 | 560 | 370 | 1,740 | 484 | 859 | 120 | 91 | 165 |
| 28 | 1,370 | 6,460 | 540 | 450 | 550 | 410 | 1,400 | 395 | 415 | 106 | 80 | 175 |
| 29 | 950 | 8,040 | 540 | 450 | 540 | 500 | 1,190 | 358 | 509 | 98 | 73 | 165 |
| 30 | 717 | 4,400 | 540 | 440 | 800 | 1,020 | 313 | 271 | 106 | 75 | 171 | |
| 31 | 647 | | 510 | 430 | 5,000 | | 292 | | 593 | 80 | | |
| Total | 24,489 | 65,004 | 34,010 | 20,470 | 22,330 | 17,600 | 125,860 | 31,641 | 11,537 | 5,929 | 4,406 | 13,379 |
| Mean | 790 | 2,187 | 1,097 | 660 | 770 | 568 | 4,195 | 1,021 | 385 | 191 | 142 | 446 |
| Cfs/m | 1.65 | 4.52 | 2.29 | 1.38 | 1.61 | 1.19 | 8.76 | 2.13 | 0.804 | 0.399 | 0.296 | 0.931 |
| In. | 1.90 | 5.05 | 2.64 | 1.59 | 1.73 | 1.37 | 9.77 | 2.46 | 0.90 | 0.46 | 0.34 | 1.04 |

Calendar year 1959: Max 11,000 Min 58 Mean 954 Cfs/m 1.99 In. 27.06
Water year 1959-60: Max 9,700 Min 66 Mean 1,029 Cfs/m 2.15 In. 29.25

Peak discharge (base, 7,600 cfs).--Nov. 28 (3 p.m.) 9,590 cfs (11.80 ft); Apr. 1 or 2 about 9,000 cfs; Apr. 5 (7 a.m.) 10,200 cfs (12.21 ft); Apr. 18 (7 to 8 p.m.) 8,530 cfs (11.12 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 20, Dec. 1, 11-15, Dec. 18 to Apr. 3.

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER

2945. Lake Champlain at Burlington, Vt.

Location.--Lat 44°29'00", long 73°13'30", 50 ft south of Gulf Oil Co. dock at Burlington, Chittenden County, 0.1 mile north of Burlington Water Department pumping station, and 0.6 mile north of railroad station.

Records available.--May 1907 to September 1960.

Gage.--Water-stage recorder. Datum of gage is 92.86 ft above mean sea level, datum of 1929. Prior to July 20, 1937, staff gage at site three-quarters of a mile south, and July 20, 1937, to Sept. 7, 1939, float gage at site 0.1 mile south, both at present datum.

Extremes.--Maximum gage height during year not determined; minimum, 0.70 ft Oct. 5, affected by seiche.
1907-60: Maximum gage height observed, 8.65 ft Mar. 27, 28, 1936; minimum observed, -0.25 ft Dec. 7, 1908.

Revisions (water years).--WSP 684: 1912-29 (datum correction). WSP 1207: 1938 (datum correction).

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|------|------|-------|------|------|-------|------|-------|------|-------|------|------|-------|
| 1 | 0.85 | 1.79 | 3.88 | 3.99 | 3.08 | 3.31 | 3.45 | 7.06 | 4.56 | 3.14 | 2.08 | 1.40 |
| 2 | .89 | 1.82 | 3.82 | 3.89 | 3.05 | 3.27 | 3.94 | 7.01 | 4.50 | 3.09 | 2.04 | 1.36 |
| 3 | .85 | 1.83 | 3.96 | 3.83 | 3.02 | 3.25 | 4.39 | 6.91 | 4.42 | 3.01 | 2.04 | 1.35 |
| 4 | .81 | 1.81 | 3.99 | 3.88 | 2.99 | 3.21 | 4.82 | 6.81 | 4.37 | 2.95 | 2.03 | 1.34 |
| 5 | .85 | 1.81 | 3.96 | 3.91 | 2.95 | 3.20 | 5.47 | 6.70 | 4.30 | 2.90 | 2.02 | 1.31 |
| 6 | .91 | 1.90 | 4.01 | 3.92 | 2.92 | 3.16 | 5.98 | 6.56 | 4.25 | 2.87 | 2.00 | 1.29 |
| 7 | .99 | 2.05 | 4.11 | 3.90 | 2.90 | 3.11 | 6.20 | 6.40 | 4.18 | 2.84 | 1.95 | 1.25 |
| 8 | 1.09 | 2.20 | 4.18 | 3.90 | 2.87 | 3.08 | 6.34 | 6.32 | 4.11 | 2.77 | 1.91 | 1.23 |
| 9 | 1.13 | 2.26 | 4.21 | 3.90 | 2.83 | 3.04 | 6.41 | 6.24 | 4.04 | 2.74 | 1.91 | 1.22 |
| 10 | 1.18 | 2.28 | 4.24 | 3.88 | 2.82 | 3.00 | 6.45 | 6.13 | 3.97 | 2.69 | 1.92 | 1.22 |
| 11 | 1.17 | 2.16 | 4.27 | 3.86 | 2.85 | 2.97 | 6.45 | 6.03 | 3.90 | 2.65 | 1.89 | 1.19 |
| 12 | 1.16 | 2.20 | 4.29 | 3.83 | 3.10 | 2.91 | 6.45 | 5.95 | 3.82 | 2.62 | 1.82 | 1.24 |
| 13 | 1.17 | 2.21 | 4.43 | 3.80 | 3.31 | 2.88 | 6.47 | 5.85 | 3.73 | 2.61 | 1.76 | 1.42 |
| 14 | 1.18 | 2.19 | 4.57 | 3.76 | 3.44 | 2.84 | 6.54 | 5.78 | 3.65 | 2.59 | 1.73 | 1.49 |
| 15 | 1.17 | 2.30 | 4.59 | 3.71 | 3.49 | 2.81 | 6.61 | 5.69 | 3.56 | 2.56 | 1.75 | 1.50 |
| 16 | 1.13 | 2.40 | 4.80 | 3.69 | 3.51 | 2.78 | 6.80 | 5.65 | 3.52 | 2.51 | 1.75 | 1.53 |
| 17 | 1.08 | 2.42 | 4.83 | 3.65 | 3.51 | 2.72 | 6.95 | 5.64 | 3.48 | 2.45 | 1.73 | 1.47 |
| 18 | 1.13 | 2.47 | 4.65 | 3.62 | 3.51 | 2.70 | 7.06 | 5.62 | 3.52 | 2.42 | 1.68 | 1.44 |
| 19 | 1.09 | 2.49 | 4.64 | 3.60 | 3.56 | 2.69 | 7.15 | 5.55 | 3.49 | 2.42 | 1.65 | 1.46 |
| 20 | 1.04 | 2.51 | 4.60 | 3.56 | 3.55 | 2.66 | 7.24 | 5.45 | 3.46 | 2.41 | 1.64 | 1.49 |
| 21 | 1.07 | 2.50 | 4.55 | 3.53 | 3.52 | 2.65 | 7.19 | 5.37 | 3.43 | 2.38 | 1.61 | 1.49 |
| 22 | 1.03 | 2.46 | 4.49 | 3.49 | 3.51 | 2.60 | 7.22 | 5.22 | 3.37 | 2.34 | 1.61 | 1.46 |
| 23 | 1.01 | 2.44 | 4.41 | 3.45 | 3.48 | 2.57 | 7.20 | 5.15 | 3.32 | 2.29 | 1.63 | 1.43 |
| 24 | 1.13 | 2.46 | 4.36 | 3.40 | 3.46 | 2.54 | 7.17 | 5.13 | 3.30 | 2.25 | 1.59 | 1.43 |
| 25 | 1.34 | 2.48 | 4.28 | 3.35 | 3.41 | 2.51 | 7.25 | 5.12 | 3.31 | 2.25 | 1.58 | 1.37 |
| 26 | 1.54 | 2.56 | 4.23 | 3.30 | 3.39 | 2.47 | 7.34 | 5.05 | 3.31 | 2.18 | 1.51 | 1.35 |
| 27 | 1.85 | 2.67 | 4.17 | 3.26 | 3.38 | 2.43 | 7.37 | 5.01 | 3.30 | 2.06 | 1.47 | 1.35 |
| 28 | 1.71 | 2.83 | 4.14 | 3.24 | 3.36 | 2.42 | 7.35 | 4.93 | 3.25 | 2.06 | 1.45 | 1.36 |
| 29 | 1.74 | 3.39 | 4.14 | 3.21 | 3.33 | 2.44 | 7.27 | 4.85 | 3.18 | 2.07 | 1.43 | 1.35 |
| 30 | 1.76 | 3.80 | 4.10 | 3.17 | ----- | 2.49 | 7.19 | 4.75 | 3.14 | 2.08 | 1.43 | 1.35 |
| 31 | 1.74 | ----- | 4.04 | 3.13 | ----- | 2.78 | ----- | 4.65 | ----- | 2.09 | 1.43 | ----- |
| Mean | 1.18 | 2.36 | 4.28 | 3.63 | 3.24 | 2.82 | 6.46 | 5.76 | 5.72 | 2.53 | 1.74 | 1.37 |

Calendar year 1959: Max 6.97 Min 0.72 Mean 2.80

Water year 1959-60: Max 7.37 Min 0.81 Mean 3.26

Note.--Gage heights for periods Nov. 20-30, Jan. 5, 6, Feb. 22 to Mar. 24, Mar. 26 to Apr. 28 computed on basis of weather records, recorded range in stage when available, and records for Richelieu River (Lake Champlain) at Rouses Point, N. Y., adjusted for wind direction and velocity.

2950. Richelieu River (Lake Champlain) at Rouses Point, N. Y.

Location.--Lat 44°59'45", long 73°21'40", on left bank at outlet of Lake Champlain 90 ft north of Rutland Railway bridge at Rouses Point, Clinton County, and 1 mile south of Fort Montgomery.

Drainage area.--8,277 sq mi.

Records available.--October 1863 to December 1870 (maximum and minimum monthly gage heights at St. Johns, Quebec, published in WSP 97) and March 1871 to September 1960 (daily gage heights; those for 1871-1907 published in WSP 894). January 1875 to September 1916 (monthly discharge) at Chambly, Quebec, published in WSP 424. Gage heights prior to Oct. 1, 1925, published as Richelieu River at Fort Montgomery, Rouses Point.

Gage.--Water-stage recorder. Datum of gage is 93.00 ft above mean sea level, datum of 1929. March 1871 to May 1923, staff gage located in Fort Montgomery at present datum. May 1923 to October 1938, staff gage at present site and datum.

Extremes.--Maximum gage height during year, 7.38 ft May 1; minimum, 0.38 ft Oct. 2. 1871-1960: Maximum gage height observed, 8.80 ft Mar. 30, 1903; minimum observed, -0.83 ft Oct. 23, 1941.
Observations at St. Johns, Quebec, indicate a maximum gage height of 8.83 ft (computed) during April 1869.

Mean gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------------------------|------|-------|------|------|----------|------|-----------|------|-------|------|------|-------|
| 1 | 0.61 | 1.69 | 3.74 | 3.85 | 3.01 | 3.14 | 3.29 | 7.09 | 4.49 | 3.02 | 1.97 | 1.30 |
| 2 | .68 | 1.67 | 3.93 | 3.90 | 2.92 | 3.12 | 3.85 | 6.87 | 4.42 | 2.97 | 1.95 | 1.20 |
| 3 | 1.06 | 1.85 | 3.90 | 3.75 | 2.90 | 3.10 | 4.32 | 6.85 | 4.44 | 3.06 | 1.91 | 1.21 |
| 4 | .76 | 1.89 | 3.93 | 3.75 | 2.89 | 3.03 | 4.74 | 6.70 | 4.30 | 2.90 | 1.87 | 1.28 |
| 5 | .76 | 1.94 | 4.05 | 3.78 | 2.85 | 3.03 | 5.36 | 6.61 | 4.26 | 2.85 | 1.89 | 1.20 |
| 6 | .70 | 1.87 | 3.95 | 3.85 | 2.80 | 3.01 | 5.85 | 6.55 | 4.11 | 2.75 | 1.93 | 1.20 |
| 7 | .88 | 1.88 | 4.02 | 3.73 | 2.78 | 2.98 | 6.10 | 6.45 | 4.04 | 2.76 | 1.97 | 1.28 |
| 8 | .92 | 2.06 | 4.11 | 3.79 | 2.74 | 2.93 | 6.23 | 6.23 | 3.96 | 2.75 | 1.96 | 1.21 |
| 9 | 1.19 | 2.14 | 4.29 | 3.75 | 2.75 | 2.89 | 6.27 | 6.10 | 3.88 | 2.62 | 1.81 | 1.26 |
| 10 | 1.06 | 2.22 | 4.13 | 3.74 | 2.72 | 2.84 | 6.29 | 6.03 | 3.93 | 2.65 | 1.77 | 1.12 |
| 11 | 1.23 | 2.67 | 4.11 | 3.74 | 2.76 | 2.80 | 6.38 | 5.90 | 3.75 | 2.64 | 1.79 | 1.22 |
| 12 | 1.14 | 2.12 | 4.15 | 3.73 | 2.97 | 2.76 | 6.37 | 5.79 | 3.67 | 2.57 | 1.87 | 1.02 |
| 13 | 1.03 | 2.30 | 4.21 | 3.65 | 3.17 | 2.73 | 6.32 | 5.75 | 3.61 | 2.49 | 1.84 | 1.35 |
| 14 | 1.02 | 2.26 | 4.43 | 3.63 | 3.28 | 2.71 | 6.46 | 5.65 | 3.58 | 2.35 | 1.78 | 1.40 |
| 15 | 1.08 | 2.06 | 4.66 | 3.62 | 3.39 | 2.68 | 6.47 | 5.61 | 3.62 | 2.41 | 1.62 | 1.41 |
| 16 | 1.11 | 2.28 | 4.53 | 3.56 | 3.41 | 2.63 | 6.72 | 5.54 | 3.53 | 2.41 | 1.61 | 1.42 |
| 17 | 1.11 | 2.33 | 4.52 | 3.53 | 3.40 | 2.63 | 6.88 | 5.54 | 3.55 | 2.38 | 1.61 | 1.66 |
| 18 | .95 | 2.39 | 4.50 | 3.49 | 3.40 | 2.60 | 6.93 | 5.48 | 3.42 | 2.34 | 1.61 | 1.47 |
| 19 | .94 | 2.38 | 4.47 | 3.48 | 3.35 | 2.58 | 7.01 | 5.42 | 3.44 | 2.40 | 1.58 | 1.39 |
| 20 | 1.02 | 2.42 | 4.41 | 3.43 | 3.39 | 2.55 | 7.13 | 5.37 | 3.35 | 2.29 | 1.64 | 1.38 |
| 21 | .89 | 2.41 | 4.37 | 3.40 | 3.39 | 2.50 | 7.11 | 5.30 | 3.30 | 2.24 | 1.59 | 1.35 |
| 22 | 1.06 | 2.32 | 4.29 | 3.36 | 3.38 | 2.46 | 7.08 | 5.32 | 3.28 | 2.33 | 1.55 | 1.41 |
| 23 | 1.24 | 2.84 | 4.27 | 3.33 | 3.35 | 2.42 | 7.06 | 5.10 | 3.22 | 2.20 | 1.44 | 1.39 |
| 24 | 1.09 | 2.38 | 4.21 | 3.29 | 3.33 | 2.41 | 7.06 | 5.01 | 3.26 | 2.15 | 1.43 | 1.33 |
| 25 | 1.21 | 2.40 | 4.19 | 3.28 | 3.30 | 2.35 | 7.11 | 4.98 | 3.22 | 2.11 | 1.44 | 1.47 |
| 26 | 1.43 | 2.43 | 4.07 | 3.22 | 3.31 | 2.39 | 7.21 | 4.96 | 3.21 | 2.23 | 1.53 | 1.35 |
| 27 | 1.47 | 2.58 | 4.04 | 3.16 | 3.27 | 2.33 | 7.26 | 4.89 | 3.23 | 2.30 | 1.43 | 1.31 |
| 28 | 1.54 | 2.68 | 3.96 | 3.10 | 3.22 | 2.29 | 7.19 | 4.82 | 3.21 | 1.99 | 1.41 | 1.25 |
| 29 | 1.59 | 3.24 | 3.96 | 3.09 | 3.18 | 2.32 | 7.14 | 4.74 | 3.31 | 1.98 | 1.42 | 1.30 |
| 30 | 1.64 | 3.71 | 3.93 | 3.04 | ----- | 2.41 | 7.11 | 4.64 | 3.13 | 1.96 | 1.31 | 1.28 |
| 31 | 1.72 | ----- | 3.90 | 3.01 | ----- | 2.70 | ----- | 4.58 | ----- | 1.97 | 1.31 | ----- |
| Mean | 1.10 | 2.31 | 4.17 | 3.52 | 3.12 | 2.69 | 6.34 | 5.67 | 3.65 | 2.45 | 1.67 | 1.31 |
| Calendar year 1959: Max | 6.82 | | | | Min 0.61 | | Mean 2.72 | | | | | |
| Water year 1959-60: Max | 7.26 | | | | Min 0.61 | | Mean 3.17 | | | | | |

2955. Lake Memphremagog at Newport, Vt.

Location--Lat 44°56'10", long 72°12'15", on east side of bridge on U. S. Highway 5 at Newport, Orleans County.

Records available--May 1931 to September 1960.

Gage--Chain gage read once daily. Datum of gage is 673.00 ft above mean sea level, datum of 1929. Prior to July 21, 1934, chain gage on highway bridge 0.1 mile south-east at same datum.

Extremes--Maximum gage height observed during year, 11.04 ft Dec. 1; minimum observed, 7.36 ft Mar. 25.

1931-60: Maximum gage height observed, 12.92 ft Apr. 20, 1933; minimum observed, 6.69 ft Nov. 4, 1934.

Remarks--Elevation of lake regulated by powerplant and gates at Magog, Quebec.

Gage height, in feet, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-----|------|-------|-------|-------|-------|------|-------|-------|-------|------|------|-------|
| 1 | 7.74 | 9.83 | 11.04 | 10.08 | 10.14 | 8.49 | 7.87 | 10.14 | 9.71 | 9.36 | 9.04 | 7.76 |
| 2 | 7.75 | 9.91 | 10.98 | 10.08 | 10.14 | 8.47 | 8.40 | 10.12 | 9.69 | 9.34 | 9.02 | 7.70 |
| 3 | 7.75 | 9.98 | 10.89 | 10.08 | 10.14 | 8.47 | 8.89 | 10.10 | 9.68 | 9.31 | 8.99 | 7.62 |
| 4 | 7.75 | 10.02 | 10.80 | 10.10 | 9.17 | 8.47 | 9.32 | 10.09 | 9.66 | 9.28 | 8.96 | 7.60 |
| 5 | 7.77 | 10.04 | 10.72 | 10.13 | 9.19 | 8.46 | 9.96 | 10.07 | 9.65 | 9.25 | 8.91 | 7.57 |
| 6 | 7.83 | 10.04 | 10.61 | 10.16 | 9.21 | 8.39 | 10.17 | 10.04 | 9.59 | 9.21 | 8.86 | 7.55 |
| 7 | 7.99 | 10.09 | 10.48 | 10.17 | 9.18 | 8.34 | 10.37 | 10.01 | 9.51 | 9.19 | 8.82 | 7.53 |
| 8 | 8.11 | 10.13 | 10.39 | 10.17 | 9.10 | 8.28 | 10.42 | 10.01 | 9.44 | 9.16 | 8.74 | 7.50 |
| 9 | 8.18 | 10.13 | 10.30 | 10.17 | 9.04 | 8.24 | 10.43 | 10.00 | 9.39 | 9.13 | 8.69 | 7.49 |
| 10 | 8.25 | 10.12 | 10.23 | 10.17 | 9.01 | 8.20 | 10.36 | 10.00 | 9.35 | 9.10 | 8.64 | 7.47 |
| 11 | 8.28 | 10.11 | 10.16 | 10.17 | 8.96 | 8.16 | 10.23 | 9.99 | 9.31 | 9.04 | 8.59 | 7.45 |
| 12 | 8.30 | 10.09 | 10.12 | 10.17 | 9.01 | 8.13 | 10.22 | 9.99 | 9.30 | 8.93 | 8.53 | 7.62 |
| 13 | 8.31 | 10.07 | 10.10 | 10.17 | 9.18 | 8.10 | 10.21 | 9.98 | 9.29 | 8.87 | 8.50 | 7.78 |
| 14 | 8.32 | 10.06 | 10.08 | 10.17 | 9.18 | 8.08 | 10.20 | 9.98 | 9.27 | 8.85 | 8.50 | 7.91 |
| 15 | 8.33 | 10.05 | 10.06 | 10.17 | 9.17 | 8.07 | 10.28 | 10.07 | 9.27 | 8.82 | 8.51 | 7.96 |
| 16 | 8.34 | 10.01 | 10.03 | 10.17 | 9.15 | 8.06 | 10.46 | 10.22 | 9.26 | 8.81 | 8.49 | 8.02 |
| 17 | 8.35 | 9.99 | 10.00 | 10.16 | 9.14 | 8.04 | 10.61 | 10.29 | 9.24 | 8.82 | 8.45 | 7.92 |
| 18 | 8.38 | 10.01 | 9.99 | 10.16 | 9.13 | 8.03 | 10.79 | 10.42 | 9.23 | 8.84 | 8.41 | 7.94 |
| 19 | 8.42 | 10.00 | 9.96 | 10.16 | 9.12 | 8.02 | 10.94 | 10.53 | 9.21 | 8.86 | 8.39 | 7.96 |
| 20 | 8.47 | 9.98 | 9.94 | 10.16 | 9.11 | 7.95 | 10.95 | 10.48 | 9.19 | 8.90 | 8.36 | 7.98 |
| 21 | 8.51 | 9.96 | 9.92 | 10.16 | 9.10 | 7.84 | 10.92 | 10.21 | 9.26 | 8.93 | 8.32 | 7.96 |
| 22 | 8.54 | 9.94 | 9.91 | 10.16 | 9.08 | 7.67 | 10.82 | 10.07 | 9.32 | 8.97 | 8.28 | 7.95 |
| 23 | 8.57 | 9.99 | 9.90 | 10.16 | 9.05 | 7.53 | 10.69 | 9.98 | 9.37 | 9.00 | 8.24 | 7.93 |
| 24 | 8.60 | 10.02 | 9.89 | 10.16 | 9.02 | 7.38 | 10.58 | 9.96 | 9.43 | 9.06 | 8.20 | 7.92 |
| 25 | 8.70 | 10.11 | 9.89 | 10.15 | 8.98 | 7.36 | 10.57 | 9.99 | 9.49 | 9.05 | 8.16 | 7.91 |
| 26 | 8.89 | 10.23 | 9.90 | 10.14 | 8.94 | 7.44 | 10.51 | 9.93 | 9.51 | 9.03 | 8.08 | 7.89 |
| 27 | 9.05 | 10.30 | 9.93 | 10.14 | 8.90 | 7.50 | 10.43 | 9.89 | 9.49 | 9.01 | 8.01 | 7.88 |
| 28 | 9.31 | 10.59 | 9.99 | 10.14 | 8.82 | 7.51 | 10.37 | 9.85 | 9.46 | 9.03 | 7.92 | 7.87 |
| 29 | 9.45 | 10.64 | 9.99 | 10.14 | 8.66 | 7.49 | 10.28 | 9.81 | 9.42 | 9.05 | 7.88 | 7.85 |
| 30 | 9.56 | 10.94 | 10.00 | 10.14 | ----- | 7.47 | 10.23 | 9.77 | 9.38 | 9.07 | 7.84 | 7.84 |
| 31 | 9.68 | ----- | 10.06 | 10.14 | ----- | 7.49 | ----- | 9.73 | ----- | 9.06 | 7.80 | ----- |

Note.--Gage heights for periods Dec. 24-29, Jan. 1 to Feb. 3, Feb. 13 to Mar. 28 were taken to top of ice.

2960. Black River at Coventry, Vt.

Location.--Lat 44°52'08", long 72°16'14", on right bank 15 ft downstream from highway bridge, 800 ft upstream from Stony Brook, and 0.35 mile northwest of Coventry, Orleans County.

Drainage area.--122 sq mi.

Records available.--October 1951 to September 1960.

Gage.--Water-stage recorder. Altitude of gage is 725 ft (from topographic map).

Average discharge.--9 years, 197 cfs.

Extremes.--Maximum discharge during year, 3,010 cfs Nov. 28 or 29 (gage height, 7.20 ft, from floodmark); minimum daily, 22 cfs Sept. 11.

1951-60: Maximum discharge, that of Nov. 28 or 29, 1959; minimum daily, 11 cfs Aug. 29 to Sept. 1, 1953.

Remarks.--Records excellent except those for periods of ice effect or no gage-height record, which are fair. Flow regulated by mill above station.

Rating table, water year 1959-60, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

| | | | |
|-----|-----|-----|-------|
| 1.7 | 22 | 4.0 | 490 |
| 2.0 | 44 | 5.0 | 970 |
| 2.4 | 94 | 6.0 | 1,690 |
| 3.0 | 210 | 7.0 | 2,750 |
| 3.5 | 331 | | |

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 1 | 33 | 228 | 750 | 100 | 90 | 110 | 1,360 | 221 | 107 | 69 | 156 | 26 |
| 2 | 52 | 270 | 550 | 95 | 88 | 105 | 1,100 | 234 | 167 | 62 | 68 | 25 |
| 3 | 50 | 265 | 580 | 190 | 87 | 100 | 1,000 | 219 | 129 | 58 | 42 | 24 |
| 4 | 44 | 195 | 315 | 370 | 86 | 100 | 2,000 | 185 | *90 | 55 | 40 | 24 |
| 5 | 56 | 195 | 300 | *320 | 84 | 100 | 2,550 | 165 | 76 | 56 | 58 | 25 |
| 6 | 104 | 333 | 313 | 280 | 83 | 96 | 1,890 | 150 | 89 | 57 | 36 | 24 |
| 7 | 342 | 633 | 347 | 210 | 92 | 94 | 1,250 | 131 | 85 | *54 | 36 | 24 |
| 8 | 422 | 438 | 392 | 170 | 105 | 90 | 1,030 | 116 | 71 | 52 | 41 | 25 |
| 9 | 292 | 323 | 328 | 150 | 100 | 87 | 838 | 110 | 58 | 44 | 45 | 24 |
| 10 | 214 | 217 | 280 | 140 | 92 | 84 | 705 | 129 | 56 | 42 | 42 | 24 |
| 11 | 110 | 179 | 241 | 130 | 160 | 86 | 615 | 139 | 55 | 48 | 38 | 22 |
| 12 | 101 | 179 | 217 | 125 | 440 | 83 | 790 | 122 | 53 | 43 | 35 | 64 |
| 13 | 108 | 185 | 454 | 125 | 420 | 80 | 1,020 | 131 | 52 | 39 | 32 | 502 |
| 14 | 90 | 173 | 434 | 125 | 350 | 80 | 1,050 | 189 | 49 | 32 | 32 | 292 |
| 15 | 71 | 258 | 334 | 115 | *280 | 80 | 1,430 | 655 | 48 | 35 | 32 | 194 |
| 16 | 69 | 241 | 375 | 115 | 210 | 78 | 1,600 | 1,130 | 68 | 43 | *30 | *85 |
| 17 | 67 | *225 | 361 | 115 | 180 | 78 | 1,520 | 606 | 97 | 34 | 29 | 58 |
| 18 | 82 | 210 | 288 | 110 | 165 | 81 | 1,380 | 448 | 326 | 43 | 29 | 48 |
| 19 | 99 | 195 | 241 | 110 | 160 | 82 | 1,400 | 290 | 217 | 47 | 28 | 46 |
| 20 | 96 | 180 | 180 | 105 | 150 | 82 | 970 | 200 | 148 | 44 | 28 | 43 |
| 21 | 129 | 165 | 120 | 105 | 140 | 81 | 725 | 165 | 85 | 42 | 30 | 42 |
| 22 | 99 | 155 | 105 | 105 | 140 | 78 | 602 | 142 | 65 | 43 | 34 | 41 |
| 23 | *150 | 150 | 105 | 105 | 135 | 78 | 526 | 131 | 58 | 41 | 35 | 36 |
| 24 | 538 | 165 | 115 | 100 | 130 | 76 | 452 | 131 | 314 | 44 | 35 | 37 |
| 25 | 740 | 550 | 120 | 100 | 125 | 73 | 610 | 150 | 792 | 50 | 34 | 34 |
| 26 | 579 | 350 | 120 | 98 | 125 | 70 | 562 | 135 | 377 | 52 | 30 | 33 |
| 27 | 456 | 270 | 120 | 97 | 120 | *74 | 479 | 110 | 220 | 42 | 28 | 32 |
| 28 | 268 | 2,600 | 125 | 96 | 115 | 81 | *389 | 91 | 110 | 35 | 26 | 32 |
| 29 | 175 | 2,000 | 125 | 95 | 115 | 95 | 305 | 84 | 76 | 34 | 27 | 32 |
| 30 | 140 | 1,100 | 120 | 94 | ----- | 170 | 253 | 79 | 72 | 54 | 26 | 33 |
| 31 | 140 | ----- | 110 | 92 | ----- | 720 | ----- | 80 | ----- | 177 | 26 | ----- |
| Total | 5,896 | 12,627 | 8,365 | 4,287 | 4,567 | 3,372 | 30,601 | 6,868 | 4,210 | 1,571 | 1,188 | 1,953 |
| Mean | 190 | 421 | 270 | 138 | 157 | 109 | 1,020 | 222 | 140 | 50.7 | 38.3 | 65.1 |
| Cfsm | 1.56 | 3.45 | 2.21 | 1.13 | 1.29 | 0.893 | 8.36 | 1.82 | 1.15 | 0.416 | 0.314 | 0.534 |
| In. | 1.80 | 3.85 | 2.55 | 1.31 | 1.39 | 1.03 | 9.33 | 2.09 | 1.28 | 0.48 | 0.36 | 0.60 |

Calendar year 1959: Max 2,600 Min 16 Mean 203 Cfsm 1.66 In. 22.63
 Water year 1959-60: Max 2,600 Min 22 Mean 234 Cfsm 1.92 In. 26.07

Peak discharge (base, 1,700 cfs).--Nov. 28 or 29 (time unknown) 3,010 cfs (7.20 ft); Apr. 5 (3 a.m.) 2,680 cfs (6.94 ft); Apr. 18 (10 to 11 p.m.) 1,710 cfs (6.02 ft); May 15 (11 p.m.) 1,710 cfs (6.02 ft).

* Discharge measurement made on this day.

Note.--No gage-height record Nov. 17 to Dec. 1; discharge estimated on basis of floodmark, 1 discharge measurement, weather records, and records for Missisquoi River near North Troy. Stage-discharge relation affected by ice Dec. 20 to Apr. 4.

2965. Clyde River at Newport, Vt.

Location.--Lat 44°56'20", long 72°11'25", on right bank in Newport, Orleans County, just downstream from small tributary entering from north, 1 mile upstream from mouth.

Drainage area.--142 sq mi.

Records available.--May 1909 to September 1919, May 1920 to August 1922, October 1922 to September 1924, November 1928 to May 1936, September 1938 to September 1960. Prior to November 1928, published as "at West Derby."

Gage.--Water-stage recorder; and, since Mar. 6, 1957, records of power generation. Datum of gage is 682.36 ft above mean sea level, datum of 1929. May 25, 1903, to Sept. 20, 1915, staff or chain gage and Sept. 21, 1915, to Sept. 30, 1924, Nov. 16, 1928, to May 4, 1936, water-stage recorder, at site 0.65 mile upstream at different datum.

Average discharge.--41 years (1909-19, 1920-21, 1922-24, 1929-35, 1938-60), 250 cfs.

Extremes.--Maximum discharge during year, 1,900 cfs Apr. 18; minimum daily, 23 cfs Jan. 31, Mar. 12, Aug. 28.

1909-24, 1928-36, 1938-60: Maximum discharge, 3,900 cfs Mar. 20, 1936 (gage height, 5.76 ft, site and datum then in use), from rating curve extended above 2,800 cfs on basis of computation of peak flow over dam; minimum daily, 2.6 cfs June 18, 1956.

Remarks.--Records fair. Flow regulated by powerplant and reservoirs above station. Diversion around station, through canal and penstock of powerplant below station, computed from relation of kilowatt-hour output and discharge measurements. Since Mar. 6, 1957, discharge computed by adding river flow and flow diverted through powerplant.

Cooperation.--Records of power generation furnished by Citizens Utilities Co.

Revisions (water years).--WSP 744: 1913(M), drainage area. WSP 924: 1940. WSP 1307: 1913-15(M).

Discharge, in cubic feet per second, water year October 1959 to September 1960

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|-------|-------|--------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|
| 1 | 134 | 415 | 1,180 | 98 | 227 | 279 | 465 | 707 | 269 | 394 | 127 | 88 |
| 2 | 118 | 458 | 950 | 182 | 221 | 274 | 501 | 684 | 244 | 330 | 126 | 25 |
| 3 | 36 | 328 | 778 | 189 | 228 | 250 | 766 | 631 | 248 | 381 | 133 | 24 |
| 4 | 145 | 400 | 683 | 277 | 195 | 163 | 1,180 | 596 | *244 | 313 | 134 | 25 |
| 5 | 220 | 406 | 622 | 375 | 154 | 85 | 1,410 | 555 | 63 | 245 | 136 | 25 |
| 6 | 220 | 403 | 578 | *365 | 90 | 27 | 1,390 | 514 | 236 | 169 | 25 | 25 |
| 7 | 225 | 436 | 547 | 228 | 138 | 245 | 1,180 | 469 | 240 | 220 | 37 | 74 |
| 8 | 210 | 432 | 537 | 252 | 284 | 247 | 931 | 461 | 237 | 212 | 139 | 25 |
| 9 | 260 | 435 | 531 | 215 | 265 | 229 | 762 | 457 | 186 | 42 | 70 | 25 |
| 10 | 350 | 427 | 514 | 220 | 182 | 166 | 659 | 405 | 209 | 28 | 74 | 25 |
| 11 | 360 | 479 | 491 | 289 | 173 | 154 | 585 | 280 | 64 | 220 | 70 | 25 |
| 12 | 200 | 470 | 500 | 275 | 253 | 23 | 564 | 281 | 61 | 215 | 61 | 30 |
| 13 | 170 | 458 | 490 | 265 | 268 | 33 | 564 | 291 | 130 | 215 | 24 | 209 |
| 14 | 240 | 474 | 526 | 243 | *181 | 240 | 566 | 81 | 144 | 180 | 24 | 212 |
| 15 | 310 | 478 | 513 | 290 | 286 | 238 | 602 | 345 | 129 | 215 | *88 | 212 |
| 16 | 400 | 429 | 481 | 87 | 296 | 146 | 669 | 502 | 108 | 55 | 90 | *94 |
| 17 | 25 | 440 | 447 | 81 | 301 | 235 | 821 | 826 | 167 | 35 | 94 | 25 |
| 18 | 80 | 394 | 442 | 271 | 413 | 144 | 1,340 | 879 | 249 | 199 | 86 | 62 |
| 19 | 215 | 350 | 441 | a270 | 381 | 25 | 1,560 | 815 | 150 | 82 | 89 | 209 |
| 20 | 225 | 460 | 424 | a220 | 153 | 25 | 1,240 | 735 | 216 | 28 | 36 | 208 |
| 21 | 215 | 248 | 453 | a230 | 26 | 233 | 1,600 | 654 | 219 | 28 | 26 | 214 |
| 22 | 215 | 373 | 447 | a250 | 270 | 230 | 1,340 | 560 | 214 | 28 | 44 | 36 |
| 23 | 225 | 315 | 456 | a220 | 255 | 144 | 1,100 | 477 | 251 | 28 | 88 | 90 |
| 24 | 25 | 334 | 474 | 92 | 264 | 163 | 968 | 443 | 287 | 26 | 85 | 34 |
| 25 | 370 | 435 | 31 | 197 | 258 | 228 | 973 | 448 | 379 | 138 | 84 | 25 |
| 26 | 436 | 448 | 86 | 273 | 251 | 39 | 967 | 443 | 369 | 170 | 86 | 25 |
| 27 | 454 | 440 | 24 | 252 | 97 | *23 | *952 | 407 | 382 | 172 | 25 | 87 |
| 28 | 567 | 576 | 344 | 238 | 30 | 239 | 905 | 181 | 363 | 174 | 23 | 95 |
| 29 | 529 | 1,080 | 351 | 245 | 271 | 213 | 839 | 139 | 450 | 195 | 79 | 112 |
| 30 | 508 | 1,290 | 230 | 95 | ----- | 143 | 775 | 256 | 426 | 40 | 88 | 76 |
| 31 | 483 | ----- | 221 | 23 | ----- | 285 | ----- | 269 | ----- | 32 | 89 | ----- |
| Total | 8,170 | 14,112 | 14,792 | 6,785 | 6,399 | 5,168 | 28,174 | 14,771 | 6,914 | 4,855 | 2,380 | 2,501 |
| Mean | 264 | 470 | 477 | 219 | 221 | 167 | 939 | 476 | 230 | 157 | 76.8 | 83.4 |
| Cfs/m | 1.86 | 3.31 | 3.36 | 1.54 | 1.56 | 1.18 | 6.61 | 3.35 | 1.62 | 1.11 | 0.541 | 0.587 |
| In. | 2.14 | 3.70 | 3.87 | 1.78 | 1.68 | 1.35 | 7.38 | 3.87 | 1.81 | 1.27 | 0.62 | 0.66 |

Calendar year 1959: Max 1,290 Min 20 Mean 300 Cfs/m 2.11 In. 28.64
 Water year 1959-60: Max 1,600 Min 23 Mean 314 Cfs/m 2.21 In. 30.15

* Discharge measurement made on this day.

a No gage-height record; discharge estimated on basis of weather records and powerplant records.

Note.--Discharge in cubic feet per second per square mile and runoff in inches may not represent natural flow because of regulation.

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a third table.

Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. Most of these measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during water year 1960

| Drainage measurements made at low flow periods, except as noted, during water year 1960 | | | | | | |
|---|--|---|-----------------------|------------------|--|--|
| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Measurements | |
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Superior | | | | | | |
| 189 | East Two Rivers near Iron Junction, Minn. | Lat 47°23'34", long 92°39'51", at culvert on State Highway 216, 2.2 miles southwest of Iron Junction. | 34.5 | 1958-60 | 7- 6-60 7-27-60 8-24-60 9-20-60 | 12.8 47.9 16.4 9.79 |
| 403 | Lake Fanny Hooe Outlet near Copper Harbor, Mich. | SE $\frac{1}{4}$ sec.33, T.59 N., R.28 W., in Fort Wilkins State Park at Copper Harbor. | 15.5 | 1960 | 10-13-58 7-27-60 | 25.1 4.53 |
| 433 | Iron River near Big Bay, Mich. | SW $\frac{1}{4}$ sec.13, T.51 N., R.27 W., at outlet of Lake Independence, near Big Bay. | 88.1 | 1946-60 | 10-14-58 | 71.1 |
| Streams tributary to Lake Michigan | | | | | | |
| 458 | Carp River near Trout Lake, Mich. | NW $\frac{1}{4}$ sec.35, T.44 N., R.6 W., near Trout Lake. | a15 | 1959-60 | 10-14-59 3-24-60 7-21-60 | 32.2 90.2 21.5 |
| 569 | Big Spring near Manistique, Mich. | S $\frac{1}{2}$ sec.25, T.42 N., R.17 W., at Palms Brook State Park, 7 miles northwest of Manistique. | - | 1950-60 | 10-15-58 5-23-60 6-24-60 | 21.7 48.1 31.8 |
| 573 | Sturgeon River near Munising, Mich. | SE $\frac{1}{4}$ sec.14, T.45 N., R.20 W., at outlet of Sixteenmile Lake, about 11 miles southwest of Munising. | 7.34 | 1960 | 10- 8-59 6- 3-60 8-19-60 | 2.16 8.69 4.51 |
| 984 | Fawn River near Howe, Ind. | SW $\frac{1}{4}$ sec.18, T.38 N., R.10 E., at county highway bridge, 1 $\frac{1}{2}$ miles north of Howe. | 161 | 1960 | 9-14-60 | 114 |
| 1004.9 | Turkey Creek at New Paris, Ind. | SW $\frac{1}{4}$ sec.9, T.35 N., R.6 E., at county highway bridge, 0.4 mile west of New Paris. | 160 | 1960 | 9-14-60 | 54.7 |
| 1257 | Bear Creek near Brethren, Mich. | NE $\frac{1}{4}$ sec.18, T.22 N., R.14 W., near Potter's Bridge, 1.5 miles northwest of Brethren. | a170 | 1958, 1960 | 7-12-60 | 102 |
| Streams tributary to Lake Huron | | | | | | |
| 1323 | Hunt Creek near Lewiston, Mich. | SW $\frac{1}{4}$ sec.25, T.29 N., R.2 E., 8 miles east-southeast of Lewiston. | a11 | 1943-60 | 10- 5-59 11- 2-59 12- 2-59 1- 7-60 2- 3-60 3- 2-60 9- 1-60 | 24.4 25.2 24.9 23.5 23.9 23.0 22.9 |
| 1357 | South Branch Au Sable River near Luzerne, Mich. | SE $\frac{1}{4}$ sec.29, T.26 N., R.1 W., 10 miles west of Luzerne. | a300 | 1951-60 | 10-27-59 4-29-60 7-15-60 | 355 430 149 |
| 1358 | North Branch Au Sable River near Lovells, Mich. | SE $\frac{1}{4}$ sec.16, T.27 N., R.1 W., 5 miles southeast of Lovells. | a140 | 1951, 1953-60 | 10-27-59 4-29-60 7-15-60 | 201 275 157 |
| 1359 | Big Creek near Lovells, Mich. | SW $\frac{1}{4}$ sec.23, T.27 N., R.1 W., 7 miles southeast of Lovells. | a180 | 1951-60 | 10-27-59 4-29-60 7-15-60 | 126 136 67.9 |

a Approximately.

Discharge measurements made at low-flow partial-record stations during water year 1960--Continued

| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Measurements | |
|--|--|---|-----------------------|------------------|--|---|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Huron--Continued | | | | | | |
| 1459.45 | Spring Bank Creek near Ortonville, Mich. | NW $\frac{1}{4}$ sec.28, T.6 N., R.9 E., at Jasmond Rd., $3\frac{1}{2}$ miles south of Hadley and 5 miles northeast of Ortonville. | 2.05 | 1955-60 | 4-22-60 8- 2-60 | 1.68 .12 |
| 1459.5 | Spring Bank Creek near Hadley, Mich. | NW $\frac{1}{4}$ sec.20, T.6 N., R.9 E., at Hegel Rd., 3 miles southwest of Hadley. | 3.18 | 1955-60 | 4-22-60 8- 2-60 | 3.50 .40 |
| 1481 | Lime Lake Outlet near Ortonville, Mich. | SE $\frac{1}{4}$ sec.31, T.6 N., R.9 E., at outlet of lake, 2 miles north of Ortonville. | .61 | 1955-60 | 4-22-60 8- 2-60 | .70 .43 |
| 1481.9 | Swartz Creek near Five Points, Mich. | SW $\frac{1}{4}$ sec.25, T.5 N., R.7 E., at Mackey Rd., $1\frac{1}{2}$ miles southeast of Five Points and 2 miles east of Holly. | 2.48 | 1955-60 | 4-22-60 8- 2-60 | 2.49 .12 |
| 1481.95 | Swartz Creek at Five Points, Mich. | NE $\frac{1}{4}$ sec.22, T.5 N., R.7 E., at Fagan Rd., $\frac{1}{2}$ mile north of Five Points and 2 miles north-east of Holly. | 6.17 | 1955-60 | 4-22-60 8- 2-60 | 8.40 .85 |
| 1483.95 | Thread Creek near Davisburg, Mich. | NE $\frac{1}{4}$ sec.29, T.5 N., R.8 E., at McGinnis Rd., $\frac{1}{2}$ miles north of Davisburg and 5 miles east of Holly. | 7.56 | 1955-60 | 4-22-60 8- 2-60 | 3.41 1.10 |
| 1484 | Thread Creek near Holly, Mich. | SE $\frac{1}{4}$ sec.18, T.5 N., R.8 E., at Groveland Mills, $5\frac{1}{2}$ miles northeast of Holly. | 12.2 | 1955-60 | 10-15-59 11-14-59 12-22-59 2-20-60 3-22-60 4-16-60 6-24-60 7-20-60 8-12-60 9-15-60 | 4.14 19.3 4.02 4.66 5.57 14.2 4.53 1.76 2.23 1.16 |
| Streams tributary to St. Clair River | | | | | | |
| 1593 | Black River near Crosswell, Mich. | SE $\frac{1}{4}$ sec.8, T.9 N., R.16 E., $3\frac{1}{2}$ miles south of Crosswell. | 370 | 1956-60 | 10- 5-59 7-13-60 8- 9-60 9- 8-60 | 18.2 27.1 38.0 12.0 |
| Streams tributary to Lake St. Clair | | | | | | |
| 1615.2 | Trout Creek near Lake Orion, Mich. | SE $\frac{1}{4}$ sec.24, T.4 N., R.10 E., at Greenshield Rd., 3 miles southeast of Lake Orion. | 7.83 | 1955-60 | 4-22-60 8- 2-60 | 11.0 1.44 |
| 1615.22 | Trout Creek tributary near Lake Orion, Mich. | NW $\frac{1}{4}$ sec.19, T.4 N., R.11 E., at outlet of Michigan Conservation Dept. (Fish Division) pond, 3 miles southeast of Lake Orion. | 2.35 | 1955-60 | 4-22-60 8- 2-60 | 3.82 .95 |
| 1615.98 | West Branch Stony Creek near Lake Orion, Mich. | SW $\frac{1}{4}$ sec.5, T.4 N., R.11 E., at Harmon Rd., 2 miles east of Lake Orion. | 11.7 | 1955-60 | 4-22-60 8- 2-60 | 5.76 .75 |
| *1616 | West Branch Stony Creek near Lakeville, Mich. | SE $\frac{1}{4}$ sec.5, T.4 N., R.11 E., at Predmore Rd., $2\frac{1}{2}$ miles east of Lake Orion and 3 miles southwest of Lakeville. | 14.8 | 1955-60 | 10-15-59 11-18-59 12-17-59 1-23-60 2-20-60 3-23-60 4-22-60 6-16-60 7-14-60 8-11-60 9-15-60 | 5.61 7.38 6.84 6.36 5.32 5.06 11.3 4.81 1.47 1.16 .28 |
| *bl640.1 | North Branch Clinton River at Almont, Mich. | NW $\frac{1}{4}$ sec.27, T.6 N., R.12 E., at bridge on State Highway 53 in Almont. | 9.56 | 1959-60 | 6- 9-60 8-18-60 | 2.42 1.19 |
| *bl640.5 | North Branch Clinton River near Romeo, Mich. | SW $\frac{1}{4}$ sec.30, T.5 N., R.13 E., 50 ft upstream from bridge on 33-Mile Rd. and 2.2 miles northeast of Romeo. | 49.7 | 1959-60 | 6- 9-60 8-18-60 | 11.0 4.00 |
| *bl642 | Coon Creek near Armada, Mich. | SW $\frac{1}{4}$ sec.1, T.4 N., R.13 E., at bridge on North Rd., 3.4 miles south of Armada. | 10.0 | 1959-60 | 6- 9-60 8-18-60 | 1.35 .34 |
| *bl643.5 | Highbank Creek near Armada, Mich. | SW $\frac{1}{4}$ sec.31, T.5 N., R.14 E., 500 ft upstream from bridge on 32-Mile Rd. and 3 miles south-east of Armada. | 14.9 | 1959-60 | 6- 9-60 8-18-60 | .64 .06 |
| *bl643.6 | East Branch Coon Creek near New Haven, Mich. | SW $\frac{1}{4}$ sec.18, T.4 N., R.14 E., at bridge on 29-Mile Rd., 3.4 miles northwest of New Haven. | 36.1 | 1959-60 | 6- 9-60 8-18-60 | 1.98 0 |
| *bl644 | Deer Creek near Meade, Mich. | NW $\frac{1}{4}$ sec.6, T.3 N., R.14 E., at bridge on 25 $\frac{1}{2}$ -Mile Rd., 0.9 mile southeast of Meade. | 12.7 | 1959-60 | 6- 9-60 8-18-60 9- 8-60 | .59 .12 .10 |
| *bl646 | Middle Branch Clinton River near Macomb, Mich. | SW $\frac{1}{4}$ sec.1, T.3 N., R.12 E., at bridge on Schoenherr Rd., 2.0 miles west of Macomb. | 22.2 | 1959-60 | 6- 9-60 8-18-60 | 5.30 2.69 |
| *bl648 | Middle Branch Clinton River at Macomb, Mich. | SW $\frac{1}{4}$ sec.5, T.3 N., R.13 E., at bridge on Romeo Plank Rd., 0.4 mile north of Macomb. | 41.0 | 1959-60 | 6- 9-60 8-18-60 | 6.62 1.93 |

* Also a crest-stage station.

b See p. 426,427 for other measurements in North Branch Clinton River basin.

Discharge measurements made at low-flow partial-record stations during water year 1960--Continued

| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Measurements | |
|-----------------------------------|---|---|-----------------------|--|---|--|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Erie | | | | | | |
| 1706 | Mann Creek near Brighton, Mich. | NW $\frac{1}{4}$ sec.27, T.2 N., R.6 E., 3 miles east of Brighton. | 18.4 | 1955-60 | 10- 7-59 11- 2-59 12-10-59 1- 7-60 2- 4-60 3-25-60 4-21-60 5-25-60 6-23-60 7-14-60 8-18-60 9-15-60 | 44.6 10.9 4.12 13.7 13.1 11.2 25.4 12.8 14.8 5.05 7.01 7.03 |
| 1724 | South Lake Outlet near Unadilla, Mich. | NE $\frac{1}{4}$ sec.9, T.1 S., R.3 E., at Boyce Rd., 2 miles southwest of Unadilla. | 14.3 | 1955-60 | 4-22-60 8- 2-60 | 19.0 2.17 |
| 1724.3 | Gosling Lake Outlet near Pinckney, Mich. | NW $\frac{1}{4}$ sec.32, T.1 N., R.4 E., 3 miles southwest of Pinckney. | 1.34 | 1955-60 | 4-22-60 8- 2-60 | .53 0 |
| 1724.6 | Crooked Lake Outlet near Pinckney, Mich. | SE $\frac{1}{4}$ sec.32, T.1 N., R.4 E., 3 $\frac{1}{2}$ miles southwest of Pinckney. | 2.08 | 1955-60 | 4-22-60 8- 2-60 | 1.38 .13 |
| 1726 | Portage River tributary near Pinckney, Mich. | NW $\frac{1}{4}$ sec.11, T.1 S., R.4 E., at Stinchfield Woods Rd., 3 $\frac{1}{2}$ miles south of Pinckney. | 2.44 | 1955-60 | 4-22-60 8- 2-60 | 2.29 .07 |
| 1733 | North Fork Mill Creek near Chelsea, Mich. c/ | SE $\frac{1}{4}$ sec.2, T.2 S., R.3 E., at highway bridge, 1 $\frac{1}{2}$ miles northwest of Chelsea. | 7.73 | 1955-60 | 4-22-60 8- 2-60 | 17.2 1.14 |
| *1905 | Roller Creek at Ohio City, Ohio. | Lat 40°46'15", long 84°38'15", at bridge, $\frac{1}{4}$ mile west of Ohio City, Van Wert County. | 4.94 | 1947-48*, 1949-60 | 10-15-59 11- 9-59 12-16-59 12-30-59 1-21-60 3- 3-60 4-18-60 5-26-60 7-13-60 8-17-60 9-28-60 | .52 .59 4.30 6.14 2.01 .14 3.20 .58 2.65 0 0 |
| *1975 | Havens Creek at Havens, Ohio. | Lat 41°17'40", long 83°11'55", at bridge on State Highway 12, $\frac{1}{2}$ mile southwest of Havens, Sandusky County, and 1 $\frac{1}{2}$ miles above mouth. | 5.00 | 1947-49*, 1950-60 | 10-14-59 11-10-59 12-17-59 1-15-60 2-24-60 3-15-60 4- 7-60 5-17-60 7- 8-60 8- 4-60 9-14-60 | .01 .04 2.12 47.8 .78 .28 3.87 .63 .63 .002 0 |
| 2129 | Conneaut Creek near Conneautville, Pa. | Lat 41°46'25", long 80°22'49", at bridge on Conneautville-Beaver Creek road, 1 $\frac{1}{2}$ miles north of Conneautville. | 37.8 | 1959-60 | 4-19-60 | 36.7 |
| 2142 | Eighteenmile Creek at North Boston, N. Y. | Lat 42°41'04", long 78°46'40", at bridge on Zimmerman St. (State Highway 277) at North Boston. | 37.1 | 1957-60 | 8-26-60 9- 8-60 | 2.41 1.59 |
| Streams tributary to Lake Ontario | | | | | | |
| 2201 | Oak Orchard Creek, at Shelby, N. Y. | Lat 43°11'25", long 78°23'14", at bridge on Main St., at Shelby. | 154 | 1949, 1957-60 | 7-13-60 9- 9-60 | 1.36 .69 |
| 2216 | Van Campen Creek at Friendship, N. Y. | Lat 42°12'22", long 78°07'46", at bridge on Moss Brook St., at Friendship. | 45.8 | 1954-55, 1957-60 | 8-25-60 | 2.12 |
| 2217 | Angelica Creek near Angelica, N. Y. | Lat 42°18'38", long 78°02'16", at bridge on State Highway 408, 1.2 miles west of Angelica. | 61.3 | 1954-55, 1957-60 | 8-25-60 | 1.33 |
| 2218 | Black Creek at Rockville, N. Y. | Lat 42°18'08", long 78°09'49", at bridge on State Highway 305 at Rockville. | 21.3 | 1957-60 | 8-24-60 | .61 |
| 2227 | Wiseco Creek at Pike, N. Y. | Lat 42°33'19", long 78°09'19", at bridge on Allegany Rd., at Pike. | 43.9 | 1957-60 | 8-24-60 | 17.7 |
| 2260 | Keshequa Creek at Craig Colony, Sonyea, N. Y. | Lat 42°40'53", long 77°49'45", at bridge at Craig Colony, Sonyea. | 69.1 | 1910-12*, 1917-32*, 1954, 1957-60 | 9-28-60 | 3.80 |
| 2322 | Catherine Creek at Montour Falls, N. Y. | Lat 42°19'42", long 76°50'40", at bridge, 0.4 mile south of Montour Falls. | 41.1 | 1957-60 | 7- 5-60 7-13-60 7-19-60 7-26-60 9-15-60 9-22-60 | 14.3 11.1 12.1 9.44 9.71 9.55 |

* Also a crest-stage station.

* Operated as a continuous-record gaging station.

c Published as Mill Creek 1955-56.

Discharge measurements made at low-flow partial-record stations during water year 1960--Continued

| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Measurements | |
|--|--|---|-----------------------|--|--|------------------------------|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Ontario--Continued | | | | | | |
| 2326 | Marsh Creek at Geneva, N. Y. | Lat 42°52'32", long 76°58'35", at bridge on East North St., Geneva. | 8.37 | 1957-60 | 9-15-60 | 0.06 |
| 2332 | Endfield Creek near Ithaca, N. Y. | Lat 42°23'54", long 76°32'45", at bridge on State Highway 13, 0.2 mile above mouth and 3.6 miles southwest of Ithaca. | 27.9 | 1956-60 | 8- 8-60 9-26-60 | 3.90 2.30 |
| 2333 | Sixmile Creek near Ithaca, N. Y. | Lat 42°24'11", long 76°26'07", at bridge on German Cross Rd., 3.4 miles southeast of Ithaca. | 39.3 | 1955-60 | 8-29-60 | 5.60 |
| 2336 | Cascadilla Creek near Ithaca, N. Y. | Lat 42°26'33", long 76°28'13", at bridge at entrance to Cornell fish hatchery, 1.9 miles east of Ithaca. | 12.7 | 1955-60 | 8- 8-60 9-26-60 | 10.6 .91 |
| 2337 | Virgil Creek at Freeville, N. Y. | Lat 42°30'18", long 76°21'01", at bridge on Johnson St., 0.6 mile southwest of Freeville. | 40.4 | 1955-60 | 9-10-59 8-29-60 | 5.42 6.46 |
| 2338 | Salmon River at Myers, N. Y. | Lat 42°32'18", long 76°32'34", at Timber Bridge, Myers, 0.3 mile above mouth. | 89.3 | 1956-60 | 8- 8-60 9-26-60 | 4.87 4.07 |
| 2412 | West Branch Fish Creek near Blossvale, N. Y. | Lat 43°16'26", long 75°38'58", at bridge, 0.4 mile southwest of Blossvale. | 203 | 1957, 1959-60 | 8- 5-60 8-30-60 | 92.9 80.3 |
| 2417 | East Branch Fish Creek at Swancott Mills, N. Y. | Lat 43°27'44", long 75°35'51", at bridge on Osceola-West Leydon road, 0.3 mile east of Swancott Mills. | 95.7 | 1957-60 | 8-11-60 8-30-60 9-28-60 | 32.3 13.6 19.3 |
| 2492 | North Branch Salmon River at Redfield, N. Y. | Lat 43°32'32", long 75°48'51", at highway bridge on Harvester Mill Rd., 0.7 mile northeast of Redfield. | 82.5 | 1957, 1959-60 | 8-11-60 8-30-60 9-28-60 | 12.4 2.82 7.81 |
| 2506 | South Sandy Creek near Wardwell, N. Y. | Lat 43°45'22", long 76°05'18", at highway bridge, 1.2 miles southwest of Wardwell. | 80.6 | 1957, 1959-60 | 8-30-60 9-28-60 | 4.16 3.69 |
| 2530 | Sugar River at Talcottville, N. Y. | Lat 43°32'08", long 75°22'03", at bridge on State Highway 12D, 0.3 mile north of Talcottville. | 41.5 | 1926-32*, 1957-60 | 8- 8-60 8- 9-60 8-31-60 9-29-60 | 5.86 6.22 3.84 3.73 |
| 2532 | Otter Creek near Glenfield, N. Y. | Lat 43°42'59", long 75°22'04", at bridge on Glenfield-Donnattsburg road at Otter Creek, 1.8 miles northeast of Glenfield. | 65.6 | 1924-33*, 1953, 1957-58, 1960 | 8-30-60 | 26.2 |
| 2562 | Roaring Brook at Martinsburg, N. Y. | Lat 43°44'00", long 75°28'13", at bridge on State Highways 12D and 26, at Martinsburg. | 21.8 | 1957-60 | 8- 9-60 9-29-60 | 3.33 2.58 |
| 2572 | Sunday Creek near Number Four, N. Y. | Lat 43°52'19", long 75°07'03", at bridge on Moshier power-plant road, 3.1 miles east of Number Four. | 9.07 | 1954-55, 1957-60 | 9-27-60 | 4.82 |
| Streams tributary to St. Lawrence River | | | | | | |
| 2718 | Little Chazy River near Chazy, N. Y. | Lat 44°50'46", long 73°27'24", at bridge on Slosson Rd., 1.5 miles west of U.S. Highway 9, 3.2 miles southwest of Chazy. | 35.4 | 1956-60 | 8-30-60 9-28-60 | .70 2.20 |
| 2722 | North Branch Saranac River near Clayburg, N. Y. | Lat 44°35'33", long 73°52'34", at bridge on State Highways 3 and 365, 2.0 miles west of Clayburg. | 124 | 1956-60 | 8-30-60 9-28-60 | 78.8 67.5 |
| 2738 | Little Ausable River near Valcour, N. Y. | Lat 44°35'39", long 73°29'48", at bridge on town road, at Laphams Mills, 2.8 miles south-west of Valcour. | 67.8 | 1956-60 | 8-30-60 9-28-60 | 3.44 7.45 |
| 2748 | East Branch Ausable River at Keene Valley, N. Y. | Lat 44°11'31", long 73°47'08", at bridge on village park road, at Keene Valley. | 49.2 | 1957-60 | 8-23-60 | 15.0 |
| *2762 | Bouquet River at New Russia, N. Y. | Lat 44°09'51", long 73°36'30", at bridge on county road, 0.2 mile east of U.S. Highway 9, at New Russia. | 37.6 | 1954, 1957-60 | 8-23-60 | 6.51 |

* Also a crest-stage station.

† Operated as a continuous-record gaging station.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

| Annual maximum discharge at crest-stage partial-record stations | | | | | | | |
|---|---|--|-----------------------|-------------------|----------------|--------------------|-----------------|
| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Annual maximum | | |
| | | | | | Date | Gage height (feet) | Discharge (cfs) |
| Streams tributary to Lake Superior | | | | | | | |
| 151.5 | Crow Creek near Silver Creek, Minn. | SW $\frac{1}{4}$ sec.23, T.54 N., R.10 W., at culvert on County Road 3, 2.3 miles northeast of Silver Creek and 4.0 miles above mouth. | - | 1960 | 4-13-67 | 9.61 | (+) |
| 152 | Encampment River tributary at Silver Creek, Minn. | NE $\frac{1}{4}$ sec.33, T.54 N., R.10 W., at culvert on County Road 3, 0.3 mile north of Silver Creek and 1.4 miles above mouth. | - | 1960 | 4-13-67 | 8.65 | 72 |
| 153 | Little Stewart River near Two Harbors, Minn. | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.24, T.53 N., R.11 W., at culvert on county road, 2.0 miles above mouth and 2.7 miles north of Two Harbors. | - | 1960 | 4-13-67 | 10.80 | 140 |
| 154 | Miller Creek at Duluth, Minn. | SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.13, T.50 N., R.15 W., at culvert on U.S. Highway 53, 0.2 mile northwest of Duluth city limits. | - | 1960 | 5-20-60 | 15.55 | 154 |
| 177 | McKinley Lake tributary at McKinley, Minn. | SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.18, T.58 N., R.16 W., at culvert on State Highway 135 at west edge of McKinley. | - | 1960 | 4-13-60 | 8.21 | 13 |
| 187 | Mud Hen Creek tributary near Central Lakes, Minn. | SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.14, T.56 N., R.17 W., at culvert on U.S. Highway 53, 0.3 mile upstream from mouth and 3.2 miles north of Central Lakes. | - | 1960 | 5-29-60 | 7.66 | (+) |
| 188 | East Two River tributary at Virginia, Minn. | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.12, T.58 N., R.18 W., at culvert on U.S. Highway 169, 0.2 mile west of Virginia city limits and 1.1 miles above mouth. | 4.26 | 1959-60 | 7-16-60 | ae.59 | (+) |
| 244 | Stony Brook near Superior, Wis. | SE $\frac{1}{4}$ sec.4, T.47 N., R.14 W., at box culvert on State Highway 35, 12 $\frac{1}{2}$ miles south of bridge on U.S. Highways 2 and 35 at St. Louis River in Superior. | 2.20 | 1959-60 | 4-23-60 | 13.71 | (+) |
| 252 | Pearson Creek near Maple, Wis. | On common boundary of secs. 11 and 14, T.48 N., R.11 W., at box culvert on State Highway 13, 4 miles north of Maple. | 4.55 | 1957-60 | 9- 2-60 | 14.13 | 400 |
| 262 | Sand River tributary near Red Cliff, Wis. | NE $\frac{1}{4}$ sec.14, T.51 N., R.5 W., at box culvert on State Highway 13, 8 miles northwest of Red Cliff. | b1.7 | 1959-60 | 4-24-60 | 10.56 | (+) |
| 263 | Stoux River near Washburn, Wis. | NE $\frac{1}{4}$ sec.35, T.49 N., R.5 W., on County Trunk C., 2 $\frac{1}{2}$ miles west of Washburn. | 17.5 | 1959-60 | 4-24-60 | 17.48 | 1,620 |
| 264 | Spillieberg Creek near Cayuga, Wis. | NW $\frac{1}{4}$ sec.21, T.43 N., R.2 W., at concrete culvert pipe on State Highway 13, 4 $\frac{1}{4}$ miles southeast of Cayuga. | b6.6 | 1958-60 | 9- 1-60 | 12.32 | 84 |
| 267 | Trout Brook tributary near Marengo, Wis. | NE $\frac{1}{4}$ sec.7, T.45 N., R.3 W., at box culvert on State Highway 13, 2.6 miles southeast of Marengo. | b.6 | 1960 | 4-24-60 | 11.99 | (+) |
| 272 | Pearl Creek at Grandview, Wis. | NE $\frac{1}{4}$ sec.22, T.45 N., R.6 W., at box culvert on U.S. Highway 63, 0.8 mile east of Grandview. | 15.9 | 1960 | 4-24-60 | 12.99 | 278 |
| 297 | Boomer Creek near Saxon, Wis. | N $\frac{1}{2}$ sec.3, T.46 N., R.1 E., at concrete culvert pipe on U.S. Highway 2, 3 miles east of Saxon. | 6.73 | 1958-60 | 4-24-60 | 16.60 | 349 |
| 410 | Perch River near Sidnaw, Mich. | NE $\frac{1}{4}$ sec.34, T.48 N., R.35 W., at State Highway 28, 2 $\frac{1}{2}$ miles east of Sidnaw. | 63.1 | 1913-15†, 1957-60 | 4-24-60 | 11.07 | 1,100 |
| 423 | Sturgeon River near Pelkie, Mich. | On line between secs. 2 and 11, T.51 N., R.34 W., 2 $\frac{1}{2}$ miles northeast of Pelkie. | 506 | 1958-60 | 4-25-60 | 12.40 | 8,600 |
| Streams tributary to Lake Michigan | | | | | | | |
| 599 | Allen Creek tributary near Alvin, Wis. | North boundary of sec.7, T.40 N., R.14 E., at culvert on State Highway 70, 2.2 miles southeast of Alvin. | b1.9 | 1960 | 5-17-60 | 10.65 | (+) |
| 638 | Woods Creek near Fence, Wis. | SE $\frac{1}{4}$ sec.29, T.39 N., R.17 E., at box culvert on State Highway 101, 6 miles north of Fence. | 42.3 | 1958-60 | 5- 8-60 | 11.65 | (+) |

† Discharge not determined.

‡ Operated as a continuous-record gaging station.

a Affected by backwater from debris.

b Approximately.

Annual maximum discharge at crest-stage partial-record stations--Continued

| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Annual maximum | | |
|---|--|---|-----------------------|------------------|----------------|--------------------|-----------------|
| | | | | | Date | Gage height (feet) | Discharge (cfs) |
| Streams tributary to Lake Michigan--Continued | | | | | | | |
| 663 | Cole Creek near Dunbar, Wis. | South boundary of sec.34, T.37 N., R.19 E., at culvert on U.S. Highway 8, 3.6 miles southeast of Dunbar. | b3.2 | 1960 | 5- 7-60 | 11.60 | (†) |
| 667 | McCall Creek at Wausaukee, Wis. | NW $\frac{1}{4}$ sec.1, T.33 N., R.20 E., at culvert on U.S. Highway 141, 1 mile south of Wausaukee. | .38 | 1959-60 | 4-13-60 | 11.93 | (†) |
| 678 | Armstrong Creek near Armstrong Creek, Wis. | W $\frac{1}{2}$ sec.27, T.37 N., R.16 E., at bridge on U.S. Highway 8, 1 $\frac{1}{2}$ miles northwest of Armstrong Creek. | 23.1 | 1958-60 | 5- 7-60 | 11.05 | (†) |
| 717 | North Branch Little River near Coleman, Wis. | On common boundary of secs. 2 and 3, T.29 N., R.20 E., at bridge on U.S. Highway 141, 3 $\frac{1}{2}$ miles south of Coleman. | 23.3 | 1958-60 | 5- 7-60 | 13.72 | (†) |
| 728 | Bird Creek at Wautoma, Wis. | S $\frac{1}{2}$ sec.34, T.19 W., R.10 E., at concrete culvert on State Highway 21, $\frac{1}{2}$ mile west of Wautoma. | b4.4 | 1959-60 | 12-28-59 | 12.25 | 94 |
| 747 | Hunting River near Elcho, Wis. | N $\frac{1}{2}$ sec.24, T.34 N., R.10 E., at twin culverts on U.S. Highway 45 and State Highway 47, 1 $\frac{1}{2}$ miles south of Elcho. | b6.0 | 1958-60 | 5- 8-60 | 12.41 | 120 |
| 752 | Evergreen Creek near Langlade, Wis. | NW $\frac{1}{4}$ sec.18, T.31 N., R.14 E., at culvert on State Highway 64, 3 $\frac{1}{2}$ miles southwest of Langlade. | b8.0 | 1959-60 | 8- 7-60 | 11.27 | (†) |
| 797 | Spaulding Creek near Big Falls, Wis. | On common boundary of secs. 14 and 15, T.25 N., R.12 E., at concrete culvert, 1.5 miles north of Big Falls. | b4.9 | 1959-60 | 5- 7-60 | 11.64 | (†) |
| 810.1 | Waupaca River tributary near Waupaca, Wis. | NW $\frac{1}{4}$ sec.1, T.21 N., R.12 E., at culvert on U.S. Highway 10, 5 miles southeast of Waupaca. | b1.0 | 1960 | 12-28-59 | 12.96 | (†) |
| 850.3 | Apple Creek near Kaukauna, Wis. | On west boundary of sec.2, T.21 N., R.18 E., at bridge on State Highway 55, 3 $\frac{1}{2}$ miles northeast of Kaukauna. | 14.6 | 1960 | 9-19-60 | 14.58 | (†) |
| 851 | East River tributary at Greenleaf, Wis. | NE $\frac{1}{4}$ sec.8, T.21 N., R.20 E., at railroad box culvert, $\frac{1}{2}$ mile south of Greenleaf. | 8.00 | 1958-60 | 3-30-60 | 14.15 | (†) |
| 852 | Kewaunee River near Kewaunee, Wis. | SW $\frac{1}{4}$ sec.14, T.23 N., R.24 E., at bridge on County Trunk F, 2.3 miles west of Kewaunee. | 129 | 1958-60 | 3-30-60 | 16.03 | (†) |
| 853 | Neshota River tributary near Denmark, Wis. | NE $\frac{1}{4}$ sec.7, T.22 N., R.22 E., at box culvert on U.S. Highway 141, 3 $\frac{1}{2}$ miles northeast of Denmark. | 3.08 | 1959-60 | 4-17-60 | 14.20 | (†) |
| 857 | Sheboygan River tributary near Plymouth, Wis. | On common boundary of secs. 2 and 11, T.15 N., R.21 E., at concrete culvert on County Trunk J, 3 $\frac{1}{2}$ miles northeast of Plymouth. | 5.51 | 1959-60 | 4-17-60 | 11.19 | (†) |
| 870.5 | Little Menomonee River near Freistadt, Wis. | On common boundary of secs. 29 and 32, T.9 N., R.21 E., at bridge on Donges Bay Rd., 2 miles south of Freistadt. | b9.3 | 1958-60 | 9-19-60 | 12.70 | (†) |
| 871 | Honey Creek at Milwaukee, Wis. | NW $\frac{1}{4}$ sec.15, T.6 N., R.21 E., 400 ft downstream from bridge on West Morgan Ave. and 6 miles southwest from mouth of Milwaukee River in Milwaukee. | 3.60 | 1959-60 | 8- 2-60 | 15.42 | (†) |
| 872 | Oak Creek near South Milwaukee, Wis. | On common boundary of secs. 21 and 22, T.5 N., R.22 E., at bridge on West Nicholson Rd., 3 miles southwest of South Milwaukee. | c13.9 | 1958-60 | 3-30-60 | 17.49 | 1,100 |
| 872.5 | Pike River near Kenosha, Wis. | W $\frac{1}{2}$ sec.27, T.2 N., R.22 E., at box culvert on State Highway 43, 3 miles northwest of Kenosha. | b7.2 | 1960 | 3-30-60 | 16.86 | (†) |
| 873 | Lake Michigan tributary at Winthrop Harbor, Ill. | SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.3, T.46 N., R.23 E., at culvert on State Highway 42, $\frac{1}{2}$ mile north of center of Winthrop Harbor. | c1.72 | 1956-60 | 4-17-60 | 12.85 | (†) |
| 877 | Little Calumet River at Calumet City, Ill. | N $\frac{1}{2}$ NE $\frac{1}{4}$ sec.29, T.36 N., R.15 E., at Wentworth Avenue Bridge at south edge of Calumet City. | - | 1954-60 | 2-11-60 | 9.74 | (†) |
| 907 | Thorn Creek near Lansing, Ill. | W $\frac{1}{2}$ sec.25, T.36 N., R.14 E., at end of Bernice Rd., $\frac{1}{2}$ mile south of 167th St. and 1 mile northwest of Lansing. | - | 1954-60 | 1-13-60 | 5.38 | (†) |
| 919 | Midlothian Creek near Tinley Park, Ill. | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.28, T.36 N., R.13 E., at bridge on 167th St. 0.6 mile west of State Highway 50 and 2 miles northeast of Tinley Park. | - | 1954-60 | 3-27-60 | 5.92 | (†) |

Streams tributary to Lake Huron

| | | | | | | | |
|------|-----------------------------------|---|------|------------------|---------|------|-----|
| 1386 | Gamble Creek at Lupton, Mich. | SW $\frac{1}{4}$ sec.36, T.24 N., R.3 E., at bridge, $\frac{1}{2}$ mile south of Lupton. | 8.86 | 1953-56, 1959-60 | | - | (†) |
| 1387 | Bixby Creek near Rose City, Mich. | NW $\frac{1}{4}$ sec.31, T.24 N., R.3 E., at bridge on State Highway 33, 1 mile north of Rose City. | 3.20 | 1953-60 | 3-31-60 | 2.49 | 74 |

† Discharge not determined.

b Approximately.

c Revised.

Annual maximum discharge at crest-stage partial-record stations--Continued

| Annual maximum discharge at cross-section partial record stations--Continued | | | | | | | |
|--|-------------------------------------|--|-----------------------|------------------|----------------|--------------------|-----------------|
| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Annual maximum | | |
| | | | | | Date | Gage height (feet) | Discharge (cfs) |
| Streams tributary to Lake Huron--Continued | | | | | | | |
| 1388 | Houghton Creek at Rose City, Mich. | NE $\frac{1}{4}$ sec.6, T.23 N., R.3 E., at bridge, $\frac{1}{2}$ mile east of Rose City. | 11.2 | 1953-60 | 3-31-67 | 1.77 | 184 |
| 1389 | Wilkins Creek near Rose City, Mich. | NE $\frac{1}{4}$ sec.7, T.23 N., R.3 E., at bridge on State Highway 33, 1 mile south of Rose City. | 8.22 | 1953-60 | 3-31-67 | 2.10 | 115 |
| 1397 | Prior Creek near Rose City, Mich. | NE $\frac{1}{4}$ sec.19, T.23 N., R.3 E., at bridge on State Highway 33, $\frac{3}{4}$ miles south of Rose City. | 5.22 | 1953-60 | 3-31-67 | 1.54 | 44 |
| 1399 | Ammond Creek near Selkirk, Mich. | NW $\frac{1}{4}$ sec.32, T.33 N., R.3 E., at bridge, 3 miles northwest of Selkirk. | 3.05 | 1953-60 | 3-31-67 | 2.42 | 156 |
| 1402 | Klacking Creek near Selkirk, Mich. | NE $\frac{1}{4}$ sec.2, T.22 N., R.2 E., at bridge, $\frac{3}{4}$ miles northwest of Selkirk. | 7.42 | 1953-60 | 6-23-67 | 1.72 | 71 |
| 1411 | Shepards Creek near Selkirk, Mich. | SE $\frac{1}{4}$ sec.8, T.22 N., R.3 E., at bridge, 1 mile southwest of Selkirk. | 4.51 | 1953-60 | 3-31-67 | 4.26 | 206 |
| 1455 | Bad River near Brant, Mich. | NW $\frac{1}{4}$ sec.3, T.10 N., R.2 E., at Hemlock Rd., $2\frac{1}{2}$ miles north of Brant. | b89 | 1948-59*, 1960 | 3-29-67 | 14.90 | (†) |

Streams tributary to Lake St. Clair

| | | | | | | | |
|---------|--|--|------|---------|---------|-------|-------|
| *1616 | West Branch Stony Creek near Lakeville, Mich. | See previous table. | 14.8 | 1957-60 | 3-29-67 | 1.98 | 27 |
| *1640.1 | North Branch Clinton River at Almont, Mich. | See previous table. | 9.56 | 1959-60 | 3-28-67 | 4.46 | 140 |
| *1640.5 | North Branch Clinton River near Romeo, Mich. | See previous table. | 49.7 | 1959-60 | 3-28-67 | 4.52 | 750 |
| *1641.5 | North Branch Clinton River near Meade, Mich. | NE $\frac{1}{4}$ sec.34, T.4 N., R.13 E., at bridge 1.9 miles northwest of Meade, and 2.8 miles east of Davis. | 89.6 | 1959-60 | 3-29-60 | 7.17 | 1,430 |
| *1642 | Coon Creek near Armada, Mich. | See previous table. | 10.0 | 1959-60 | 3-28-67 | 5.10 | 270 |
| *1643.5 | Highbank Creek near Armada, Mich. | See previous table. | 14.9 | 1959-60 | 3-29-60 | 15.41 | 410 |
| *1643.6 | East Branch Coon Creek near New Haven, Mich. | See previous table. | 36.1 | 1959-60 | 4-25-67 | 6.15 | 950 |
| *1644 | Deer Creek near Meade, Mich. | See previous table. | 12.7 | 1959-60 | 4-25-60 | 6.8 | 320 |
| *1646 | Middle Branch Clinton River near Macomb, Mich. | See previous table. | 22.2 | 1959-60 | 3-28-60 | 9.00 | d450 |
| *1648 | Middle Branch Clinton River at Macomb, Mich. | See previous table. | 41.0 | 1959-60 | 3-28-60 | 13.36 | d850 |

Streams tributary to Lake Erie

| | | | | | | | |
|-------|--|--|------|-------------------|---------|-------|-----|
| 1769 | Hill ditch near Richards, Ohio. | Lat 41°39'50", long 83°40'05", at culvert on U.S. Highway 20, 3.4 miles north of intersection of U.S. Highway 20 and State Highway 2 and 1.4 miles west of Richards, Lucas County. | 3.23 | 1947-60 | 7- -60 | 10.97 | 38 |
| 1774 | Eagle Creek tributary near Montpelier, Ohio. | Lat 41°35'10", long 84°40'50", at culvert on State Highway 107, 3.5 miles west of Montpelier, Williams County. | 1.56 | 1947-60 | 4-16-60 | 11.17 | 82 |
| 1891 | Tiderishi Creek near Jenera, Ohio. | Lat 40°55'50", long 83°43'40", at culvert on State Highway 698, 2.2 miles north of Jenera, Hancock County. | 4.51 | 1947-60 | 1960 | 14.17 | 350 |
| *1905 | Roller Creek at Ohio City, Ohio. | See previous table. | 4.94 | 1947-48*, 1949-60 | 3-27-60 | 6.00 | 123 |
| 1967 | St. James Run near Upper Sandusky, Ohio. | Lat 40°46'55", long 83°18'10", at bridge on State Highway 67, 3.5 miles southwest of Upper Sandusky, Wyandot County. | 5.35 | 1947-60 | 1960 | 9.81 | 102 |
| *1975 | Havens Creek at Havens, Ohio. | See previous table. | 5.00 | 1947-49*, 1950-60 | 1-12-60 | 4.01 | 75 |
| 1981 | Norwalk Creek at Norwalk, Ohio. | Lat 41°14'00", long 82°32'30", at county road bridge, 300 ft south of junction of State Highways 601 and 18, 4 miles southeast of Norwalk, Huron County, and 6 miles above mouth. | 4.18 | 1947-60 | 1960 | 12.74 | 223 |
| 2001 | Plum Creek at Oberlin, Ohio. | Lat 41°17'15", long 72°13'10", at bridge on Professor St., in Oberlin, Lorain County. | 4.88 | 1947-60 | 1960 | 11.49 | 172 |

* Also a low-flow partial-record station.

† Discharge not determined.

* Operated as a continuous-record gaging station.

b Approximately.

d Estimated.

| Annual maximum discharge at crest-stage partial-record stations--Continued | | | | | | | |
|--|---------------------------------------|--|-----------------------|---------------------------|----------------|--------------------|-----------------|
| Station No. | Station name | Location | Drainage area (sq mi) | Period of record | Annual maximum | | |
| | | | | | Date | Gage height (feet) | Discharge (cfs) |
| Streams tributary to Lake Erie--Continued | | | | | | | |
| 2101 | Hoskins Creek at Hartsgrove, Ohio. | Lat 41°36'20", long 80°58'00" at bridge on State Highway 6, 0.7 mile west of Hartsgrove, Ashtabula County. | 6.94 | 1947-60 | 1960 | 12.64 | 97 |
| Streams tributary to St. Lawrence River | | | | | | | |
| 2607 | Chaumont River near Depauville, N. Y. | Lat 44°10'30", long 76°00'57", at highway bridge, 3.6 miles northeast of Depauville. | 18.3 | 1958-60 | 4- 4-60 | 15.95 | (†) |
| *2762 | Bouquet River at New Russia, N. Y. | See previous table. | 37.6 | 1949, 1951, 1953, 1956-60 | 4- 4-60 | 10.38 | 1,830 |

* Also a low-flow partial-record station.

† Discharge not determined.

Measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations or partial-record stations are given in the following table. Those that are measurements of base flow are designated by an asterisk (*); measurements of peak flow by a dagger (†).

| Discharge measurements made at miscellaneous sites during water year 1960 | | | | | | |
|---|-------------------------------|--|-----------------------|-----------------------------------|--|----------------------------------|
| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Superior | | | | | | |
| Elbow Creek.. | St. Louis River. | Lat 47°24'05", long 92°36'35", at culvert on State Highway 216, 1½ miles south of Iron Junction, Minn. | - | 1958-59 | 7- 6-60 7-27-60 8-24-60 9-20-60 | *2.76 *7.82 *2.02 *3.25 |
| Bois Brule River. | Lake Superior | NE¼ sec.34, T.47 N., R.10 W., at bridge on county highway, 2 miles upstream from gaging station at Brule and 2½ miles south of Brule, Wis. | - | | 5-12-60 7-14-60 | *116 *95.0 |
| Bad River.... |do..... | E½ sec.26, T.48 N., R.3 W., at railroad bridge at Odanah, Wis. | a970 | | 4-24-60 | †45,600 |
| Sturgeon River. | Portage Lake. | SW¼ sec.4, T.53 N., R.33 W., at bridge on U.S. Highway 41, 1 mile southeast of Chassell, Mich. | 726 | 1945,1955, 1957 | 4-19-60 4-28-60 | 6,100 4,700 |
| Snake River.. |do..... | SW¼ sec.10, T.53 N., R.33 W., at bridge on U.S. Highway 41, 3 miles southeast of Chassell, Mich. | - | 1955,1957 | 4-19-60 4-28-60 | 362 542 |
| Laughing Whitefish River. | Lake Superior | NW¼ sec.13, T.47 N., R.22 W., at bridge on State Highway 28, near Au Train, Mich. | - | | 9-16-60 | *16.0 |
| Rock River... | Shelter Bay.. | SW¼ sec.22, T.47 N., R.21 W., at bridge on State Highway 28, near Au Train, Mich. | - | | 9-16-60 | *26.6 |
| Anna River... | South Bay.... | NE¼ sec.11, T.46 N., R.19 W., at bridge on State Highway 28, at Munising, Mich. | - | 1949-50 | 9-16-60 | *38.7 |
| Hurricane River. | Lake Superior | N½ sec.10, T.49 N., R.15 W., at bridge on Truck Trail, near Grand Marais, Mich. | - | | 9-16-60 | *16.1 |
| Streams tributary to Lake Michigan | | | | | | |
| Black River.. | Middle Branch Escanaba River. | NE¼ sec.2, T.46 N., R.29 W., at county road crossing, 4 miles east of Republic, Mich. | - | | 9-12-60 | *28.5 |
| Pine River... | Lake Poygan.. | N½ sec.23, T.20 N., R.10 E., at bridge on town road, 2 miles northwest of Wild Rose, Wis. | - | | 10-23-59 | 1.94 |
| Do..... |do..... | SW¼ sec.19, T.20 N., R.11 E., at bridge at Wild Rose, Wis. | - | 1958 | 10-23-59 | 9.81 |
| Do..... |do..... | Near west line of sec.17, T.20 N., R.11 E., 2 miles north-east of Wild Rose, Wis. | - | | 10-23-59 | 26.2 |
| Milwaukee River. | Lake Michigan | SE¼ sec.24, T.10 N., R.21 E., at bridge on State Highway 57, at Grafton, Wis. | - | | 4- 1-60 | 4,330 |
| Menomonee River. | Milwaukee River. | NW¼ sec.8, T.7 N., R.21 E., at bridge on State Highway 100, at Wauwatosa, Wis. | - | | 3-31-60 | 1,460 |
| Kinnickinnic River. |do..... | SE¼ sec.12, T.6 N., R.21 E., at bridge on South 27th St., in Milwaukee, Wis. | 17.6 | | 3-30-60 | †1,780 |
| Root River... | Lake Michigan | NE¼ sec.3, T.5 N., R.21 E., at bridge on State Highway 36, 2½ miles southeast of Hales Corners, Wis. | - | | 3-31-60 | 427 |
| Do..... |do..... | Between secs. 22 and 27, T.5 N., R.21 E., at bridge on State Highway 100, 5¼ miles southeast of Hales Corners, Wis. | 49.0 | 1955-56 | 3-30-60 | †5,130 |
| Rocky River.. | St. Joseph River. | Sec.12, T.6 S., R.12 W., near bridge on U.S. Highway 131, 1 mile north of Three Rivers, Mich. | - | 1931,1950 | 9-16-60 | *93.9 |
| Klinger Lake Outlet. | Fawn River... | SE¼ sec.35, T.7 S., R.11 W., Michigan meridian, 5 miles east of White Pigeon, Mich. | - | 1941-59 | 11- 4-59 5- 9-60 | *17.4 24.4 |
| White Pigeon River. | St. Joseph River. | NW¼ sec.11, T.8 S., R.12 W., Michigan meridian, 2 miles west of White Pigeon, Mich. | - | 1940-41, 1955 | 9-14-60 | *186 |
| Dowagiac River. |do..... | NE¼ sec.30, T.6 S., R.16 W., 1 mile north of Sumnerville, Mich. | - | | 9-16-60 | *133 |
| Allen Creek.. | Kalamazoo River. | Sec.36, T.2 S., R.11 W., at bridge on Cork Rd., at Kalamazoo, Mich. | - | | 9- 9-60 | *2.8 |
| Portage Creek |do..... | NW¼ sec.19, T.3 S., R.11 W., at 12th St., 3.0 miles west of Portage, Mich. | - | | 12- 1-59 | *.20 |
| Portage Creek tributary. | Portage Creek | SE¼SE¼ sec.19, T.3 S., R.11 W., 2.3 miles southwest of Portage, Mich. | - | | 12- 1-59 | *2.34 |

* Base flow.

† Peak flow.

a Approximately.

Discharge measurements made at miscellaneous sites during water year 1960--Continued

| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
|---|----------------------|--|-----------------------------|--|--|---------------------------------|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Michigan--Continued | | | | | | |
| Portage Creek | Kalamazoo River. | SE $\frac{1}{4}$ sec.20, T.3 S., R.11 W., 1.5 miles southwest of Portage, Mich. | - | | 12- 1-59 | *10.1 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.16, T.3 S., R.11 W., at bridge on U.S. Highway 131, at Portage, Mich. | - | | 12- 1-59 | *15.5 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.3, T.3 S., R.11 W., 2.1 miles north of Portage, Mich. | - | | 12- 1-59 | *29.3 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.34, T.2 S., R.11 W., just above confluence with West Fork Portage Creek, at Lovers Lane at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *29.1 *30.8 |
| West Fork Portage Creek. | Portage Creek | SW $\frac{1}{4}$ sec.6, T.3 S., R.11 W., at bridge on 12th St., at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *7.37 *7.33 |
| Do..... |do..... | SW $\frac{1}{4}$ sec.32, T.2 S., R.11 W., above creek from Asylum Lake at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *8.68 *8.28 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.32, T.2 S., R.11 W., at bridge on Angling Rd., at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *8.34 *7.98 |
| Do..... |do..... | NW $\frac{1}{4}$ sec.4, T.3 S., R.11 W., at Morningside Drive, at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *7.50 *7.67 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.34, T.2 S., R.11 W., just above mouth at rail- road bridge at Kalamazoo, Mich. | - | | 11-10-59 12- 1-59 | *6.72 *4.56 |
| Gun Lake Outlet. b/ | Gun River.... | NW $\frac{1}{4}$ sec.6, T.2 N., R.10 W., near Shelbyville, Mich. | - | 1943-44, 1946-59 | 11- 6-59 2- 4-60 5-13-60 8-12-60 | 30.8 *40.4 48.6 6.81 |
| Bosch and Hulst drain. | Black River.. | SW $\frac{1}{4}$ sec.13, T.5 N., R.15 W., 1 mile west of Zeeland, Mich. | - | | 9- 9-60 | *1.21 |
| Do..... |do..... | Sec.23, T.5 N., R.15 W., at bridge on State Highway 21, 1 mile southwest of Zeeland, Mich. | - | | 9- 9-60 | *2.69 |
| Grand River.. | Lake Michigan | NE $\frac{1}{4}$ sec.4, T.5 S., R.1 W., at Vicary Rd., 1.5 miles north- west of Somerset Center, Mich. | - | | 9- 6-60 | *.24 |
| Portage River | Grand River.. | NW $\frac{1}{4}$ sec.3, T.2 S., R.1 E., 7 miles northeast of Jackson, Mich. | - | | 9- 7-60 9-29-60 | *10.1 *21.1 |
| Sandstone Creek. |do..... | NE $\frac{1}{4}$ sec.21, T.1 S., R.2 W., at Tomkins Center, Mich. | - | 1955 | 9- 6-60 9-29-60 | *21.2 *27.5 |
| Spring Brook. |do..... | NE $\frac{1}{4}$ sec.8, T.1 N., R.3 W., at Spicerville Highway, 1 mile southwest of Eaton Rapids, Mich. | - | | 9- 6-60 9-29-60 | *6.40 *8.93 |
| Carrier Creek |do..... | S $\frac{1}{2}$ sec.3, T.4 N., R.3 W., at mouth, 0.5 mile southwest of Delta Mills, Mich. | - | | 8-17-60 | *.41 |
| Maple River.. |do..... | SE $\frac{1}{4}$ sec.11, T.7 N., R.1 W., at Ovid, Mich. | - | 1931, 1940-41 | 9-15-60 | *8.63 |
| Pine Creek... | Maple River.. | SW $\frac{1}{4}$ sec.9, T.9 N., R.3 W., at State Highway 57, $\frac{1}{2}$ mile southeast of Perrington, Mich. | - | 1955,1958 | 9-15-60 9-28-60 | *3.33 *2.65 |
| Hayworth Creek. |do..... | NW $\frac{1}{4}$ sec.18, T.8 N., R.3 W., $\frac{1}{2}$ miles southwest of Maple Rapids, Mich. | - | | 9-15-60 9-28-60 | *11.5 *12.7 |
| Fish Creek... |do..... | SE $\frac{1}{4}$ sec.23, T.9 N., R.5 W., 2 miles south of Carson City, Mich. | 145 | 1936-38, 1955 | 9-28-60 | *44.8 |
| Muskrat Creek | Stony Creek.. | SE $\frac{1}{4}$ sec.31, T.7 N., R.3 W., 8.5 miles southwest of St. Johns, Mich. | - | | 9-15-60 | *2.83 |
| Stony Creek.. | Maple Creek.. | NE $\frac{1}{4}$ sec.16, T.7 N., R.5 W., 2.0 miles east of Muir, Mich. | - | | 9-27-60 | *18.9 |
| Libhart Creek | Grand River.. | SW $\frac{1}{4}$ sec.24, T.7 N., R.6 W., 1.0 mile west of Lyons, Mich. | - | 1955,1958 | 9-27-60 | *8.69 |
| Prairie Creek |do..... | Sec.16, T.7 N., R.6 W., 1 mile northeast of Ionia, Mich. | - | 1955 | 9- 8-60 9-27-60 | *23.7 *27.6 |
| Little Thornapple River. c/ | Thornapple River. | NW $\frac{1}{4}$ sec.9, T.4 N., R.7 W., 2 miles southwest of Lake Odessa, Mich. | 26.2 | 1946-59 | 11-12-59 12-22-59 2-13-60 6-22-60 | *8.06 *17.3 35.8 *19.7 |

* Base flow.

† Operated as a continuous-record gaging station.

b Published as Gun River 1943.

c Published as Jordan Lake Outlet 1946-57.

Discharge measurements made at miscellaneous sites during water year 1960--Continued

| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
|---|------------------|---|-----------------------|-----------------------------------|---|----------------------------|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Michigan--Continued | | | | | | |
| Indian Creek. | Grand River.. | SW $\frac{1}{4}$ sec.10, T.7 N., R.12 W., at Walker Drive at Grand Rapids, Mich. | 13.0 | 1952-53 | 9- 9-60 | *3.22 |
| Rush Creek... |do..... | SE $\frac{1}{4}$ sec.13, T.6 N., R.13 W., at Jenison, Mich. | 61.4 | 1952-53 | 8-31-60 | *17.8 |
| Sand Creek... |do..... | NW $\frac{1}{4}$ sec.27, T.7 N., R.13 W., at State Highway 50, 6 miles west of Grand Rapids, Mich. | - | 1953-55 | 8-31-60 | *13.2 |
| South Branch Townline Creek. | Townline Creek. | Sec.10, T.20 N., R.4 W., 8 miles north of Harrison, Mich. | - | | 9-20-60 | 2.05 |
| Townline Creek. | Muskegon River. | Sec.31, T.21 N., R.4 W., 11 miles north of Harrison, Mich. | - | | 9-20-60 | 11.2 |
| Clam River... |do..... | NE $\frac{1}{4}$ sec.27, T.21 N., R.6 W., at highway bridge, 1.3 miles west of Vogel Center, Mich. | a270 | | 10-28-59 1-14-60 4-15-60 7- 8-60 | 148 130 399 *83.1 |
| Betsie River. | Lake Michigan | Sec.5, T.25 N., R.12 W., 1 mile northwest of Karlin, Mich. | 44.7 | 1944-59 | 10-27-59 1-25-60 | 50.9 *75.2 |
| Do..... |do..... | NW $\frac{1}{4}$ sec.19, T.25 N., R.14 W., 50 ft upstream from bridge on State Highway 115 and 4 $\frac{1}{2}$ miles southeast of Benzonia, Mich. | 158 | 1958 | 10-28-59 1-13-60 4-16-60 | 209 265 348 |
| Platte River. |do..... | SE $\frac{1}{4}$ sec.12, T.26 N., R.14 W., at U.S. Highway 31, 4 miles east of Honor, Mich. | 91.9 | 1958 | 10-27-59 1-25-60 4-18-60 | 83.6 *61.5 99.7 |
| Jordan River. | Lake Charlevoix. | NW $\frac{1}{4}$ sec.7, T.31 N., R.6 W., at highway bridge, 4 miles southeast of East Jordan, Mich. | a75 | | 11-19-59 1-26-60 4-29-60 | *182 *176 *192 |

Streams tributary to Lake Huron

| | | | | | | |
|---------------------|-----------------------------|--|------|---------------|----------------------------------|-----------------------|
| Black River.. | Cheboygan River. | NW $\frac{1}{4}$ sec.29, T.32 N., R.1 E., 13.7 miles northwest of Atlanta, Mich. | a65 | | 11-12-59 11-25-59 12-14-59 | 73.6 85.6 *62.5 |
| Guiley Creek. | East Branch Au Gres River. | W $\frac{1}{2}$ sec.9, T.22 N., R.6 E., 7 miles northeast of Whittemore, Mich. | 21 | 1944-59 | 10-20-59 1-12-60 6-13-60 | 13.4 18.8 20.8 |
| Gamble Creek. | Rifle River.. | SW $\frac{1}{4}$ sec.36, T.24 N., R.3 E., at bridge, $\frac{1}{2}$ mile south of Lupton, Mich. d/ | 8.86 | 1959 | 7-12-60 | *9.02 |
| Bixby Creek.. | Houghton Creek. | NW $\frac{1}{4}$ sec.31, T.24 N., R.3 E., at bridge on State Highway 33, 1 mile north of Rose City, Mich. d/ | 3.20 | 1952-54 | 7-12-60 | *.55 |
| Houghton Creek. | Rifle River.. | NE $\frac{1}{4}$ sec.6, T.23 N., R.3 E., at bridge, $\frac{1}{2}$ mile east of Rose City, Mich. d/ | 11.2 | 1952-54 | 7-12-60 | *17.5 |
| Wilkins Creek | Houghton Creek. | NE $\frac{1}{4}$ sec.7, T.23 N., R.3 E., at bridge on State Highway 33, 1 mile south of Rose City, Mich. d/ | 8.22 | 1952-55 | 7-12-60 | *17.4 |
| Prior Creek.. | Rifle River.. | NE $\frac{1}{4}$ sec.19, T.23 N., R.3 E., at bridge on State Highway 33, $\frac{3}{4}$ miles south of Rose City Mich. d/ | 5.22 | 1952-54 | 7-12-60 | *3.70 |
| Ammond Creek. | Prior Creek.. | NW $\frac{1}{4}$ sec.32, T.33 N., R.3 E., at bridge, 3 miles northwest of Selkirk, Mich. d/ | 3.05 | 1952-53, 1955 | 7-12-60 | *1.01 |
| Klacking Creek. | Rifle River.. | NE $\frac{1}{4}$ sec.2, T.22 N., R.2 E., at bridge, $\frac{3}{4}$ miles northwest of Selkirk, Mich. d/ | 7.42 | 1952-53 | 7-12-60 | *12.7 |
| Shepards Creek. |do..... | SE $\frac{1}{4}$ sec.8, T.22 N., R.3 E., at bridge, 1 mile southwest of Selkirk, Mich. d/ | 4.51 | 1952-54 | 7-12-60 | *.24 |
| Sugar River.. | Tittabawassee River. | Sec.13, T.19 N., R.1 W., at bridge on State Highway 30, 6.9 miles northeast of Gladwin, Mich. | - | 1958 | 9-21-60 | 22.0 |
| Elm Creek.... | South Branch Tobacco River. | SE $\frac{1}{4}$ sec.16, T.17 N., R.5 W., 2.8 miles northwest of Farwell, Mich. | - | | 9-19-60 | 3.40 |
| Creek. e/ |do..... | SE $\frac{1}{4}$ sec.12, T.17 N., R.5 W., 2.8 miles north of Farwell, Mich. | 31.1 | 1958 | 9-19-60 | 23.3 |
| Loon Creek. | Loon Lake Creek. | SE $\frac{1}{4}$ sec.10, T.17 N., R.5 W., 2.9 miles northwest of Farwell, Mich. | - | | 9-19-60 | 4.26 |
| Loon Lake Creek. e/ | South Branch Tobacco River. | SE $\frac{1}{4}$ sec.30, T.17 N., R.4 W., at U.S. Highway 10, 1.6 miles east of Farwell, Mich. | 43.7 | 1958 | 9-22-60 | 27.5 |
| McCuran Creek |do..... | SE $\frac{1}{4}$ sec.12, T.17 N., R.4 W., 4.0 miles north of Clare, Mich. | - | | 9-20-60 | 1.36 |

* Base flow.

a Approximately.

d At crest-stage partial-record station.

e Published as South Branch Tobacco River 1958.

Discharge measurements made at miscellaneous sites during water year 1960--Continue

| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
|--|------------------------------|--|-----------------------|-----------------------------------|--|--|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Huron--Continued | | | | | | |
| Sanford Creek | McCuran Creek | SE $\frac{1}{4}$ sec.14, T.17 N., R.4 W., at Eberhart Rd., 3.2 miles north of Clare, Mich. | 4.16 | 1958 | 9-20-60 | 2.64 |
| McCuran Creek | South Branch Tobacco River, | SE $\frac{1}{4}$ sec.24, T.17 N., R.4 W., at Colonville Rd., 2.6 miles northeast of Clare, Mich. | 9.92 | 1958 | 9-20-60 | 7.44 |
| South Branch Tobacco River tributary. |do..... | NE $\frac{1}{4}$ sec.28, T.17 N., R.3 W., at Colonville Rd., 3.5 miles north of Loomis, Mich. | 4.57 | 1958 | 9-22-60 | .45 |
| Rillett drain |do..... | SE $\frac{1}{4}$ sec.18, T.17 N., R.2 W., 5.0 miles west of Beaverton, Mich. | - | | 9-22-60 | .01 |
| South Branch Tobacco River. | Tobacco River | NE $\frac{1}{4}$ sec.16, T.17 N., R.2 W., 3.0 miles west of Beaverton, Mich. | - | | 9-21-60 | 73.7 |
| Lyle drain... | South Branch Tobacco River. | NW $\frac{1}{4}$ sec.22, T.17 N., R.2 W., 3.0 miles southwest of Beaverton, Mich. | - | | 9-22-60 | .03 |
| Middle Branch Tobacco River. | Tobacco River | NE $\frac{1}{4}$ sec.25, T.18 N., R.4 W., 7.9 miles north of Clare, Mich. | - | | 9-20-60 | 12.9 |
| Clear Creek.. | Middle Branch Tobacco River. | NE $\frac{1}{4}$ sec.24, T.18 N., R.4 W., 8.9 miles north of Clare, Mich. | - | | 9-20-60 | 3.04 |
| Middle Branch Tobacco River. | Tobacco River | SE $\frac{1}{4}$ sec.30, T.18 N., R.3 W., 5.6 miles east of Hatton, Mich. | 16.4 | 1958 | 9-20-60 | 19.9 |
| Do..... |do..... | NE $\frac{1}{4}$ sec.28, T.18 N., R.3 W., 9.6 miles west of Beaver- ton, Mich. | 23.1 | 1958 | 9-21-60 | 19.2 |
| Do..... |do..... | NE $\frac{1}{4}$ sec.35, T.18 N., R.3 W., 7.3 miles west of Beaver- ton, Mich. | 27.9 | 1958 | 9-21-60 | 21.6 |
| Do..... |do..... | SE $\frac{1}{4}$ sec.3, T.17 N., R.2 W., 2.2 miles west of Beaver- ton, Mich. | 33.8 | 1958 | 9-21-60 | 24.9 |
| North Branch Tobacco River. |do..... | SE $\frac{1}{4}$ sec.7, T.18 N., R.3 W., 6.0 miles southeast of Harrison, Mich. | - | | 9-20-60 | 27.7 |
| Do..... |do..... | NE $\frac{1}{4}$ sec.17, T.18 N., R.3 W., 7.0 miles southeast of Harrison, Mich. | 46.3 | 1958 | 9-21-60 | 31.4 |
| Streams tributary to St. Clair River | | | | | | |
| Belle River.. | St. Clair River. | SE $\frac{1}{4}$ sec.33, T.7 N., R.12 E., 4.3 miles north of Almont, Mich. | - | | 9- 9-60 | *5.17 |
| Streams tributary to Lake Erie | | | | | | |
| Saline River. | River Raisin. | SW $\frac{1}{4}$ sec.35, T.3 S., R.5 E., 1.5 miles west of Saline, Mich. | - | 1940,1944 | 9- 9-60 | *4.87 |
| Miami and Erie Canal. | Jennings Creek. | Lat 40°50'45", long 84°20'45", at Third Street Bridge in Delphos, Allen County, Ohio. | - | 1928-33, 1934-35, 1945-59 | 10-15-59, 11- 9-59, 12-16-59, 1-22-60, 3-22-60, 4-19-60, 6- 7-60, 7-14-60, 9-28-60 | 5.28, 4.85, 1.66, .31, .22, 1.67, 5.70, 11.8, 7.71 |
| Cedar Creek.. | Lake Erie.... | Lat 41°36'45", long 83°23'50", at highway bridge, 1 $\frac{1}{2}$ miles southwest of Curtice, Ottawa County, Ohio. | 37.9 | 1959 | 9-20-60 | *.86 |
| Crane Creek.. |do..... | Lat 41°36'45", long 83°20'20", at highway bridge, $\frac{1}{2}$ mile north of Williston, Ottawa County, Ohio. | 37.3 | 1959 | 9-20-60 | *.16 |
| Turtle Creek. |do..... | Lat 41°35'00", long 83°16'55", at highway bridge at Trow- bridge, Ottawa County, Ohio. | 20.2 | 1959 | 9-20-60 | *1.01 |
| Toussaint Creek. | Toussaint River. | Lat 41°32'55", long 83°14'30", at highway bridge, 1 $\frac{1}{2}$ miles west of Limestone, Ottawa County, Ohio. | 74.7 | 1959 | 9-20-60 | *1.76 |
| Packer Creek. |do..... | Lat 41°34'20", long 83°13'20", at highway bridge, $\frac{1}{2}$ miles north of Limestone, Ottawa County, Ohio. | 31.0 | 1959 | 9-20-60 | *.26 |
| Middle Branch Portage River. | South Branch Portage River. | Lat 41°17'55", long 83°39'00", at bridge on U.S. Highway 25 at Merrill, Wood County, Ohio. | 93.6 | 1959 | 9-20-60 | *.06 |
| Rocky Fork... | Middle Branch Portage River. | Lat 41°17'05", long 83°37'50", at highway bridge, 1.2 miles southeast of Merrill, Wood County, Ohio. | 69.1 | 1959 | 9-20-60 | *.48 |

* Base flow.

* Operated as a continuous-record gaging station.

Discharge measurements made at miscellaneous sites during water year 1960--Continued

| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
|---|--------------------------|--|-----------------------|-----------------------------------|--------------|-----------------|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Erie--Continued | | | | | | |
| South Branch Portage River. | Portage River | Lat 41°18'45", long 83°30'35", at highway bridge, 3 miles northeast of Six Points, Wood County, Ohio. | 102 | 1959 | 9-20-60 | *2.75 |
| Do..... |do..... | Lat 41°22'45", long 83°28'35", at highway bridge, 2½ miles southwest of Pemberville, Wood County, Ohio. | 334 | 1930-35*, 1959 | 9-19-60 | *8.47 |
| North Branch Portage River. |do..... | Lat 41°23'20", long 83°33'40", at highway bridge, 5 miles northeast of Bowling Green, Wood County, Ohio. | 54.0 | 1924-32*, 1959 | 9-20-60 | *f3.41 |
| Portage River | Lake Erie.... | Lat 41°29'30", long 83°13'20", at bridge on State Highway 590, 2½ miles southwest of Rocky Ridge, Ottawa County, Ohio. | 505 | 1959 | 9-20-60 | *13.0 |
| Muddy Creek.. |do..... | Lat 41°27'10", long 83°08'45", at bridge on State Highway 19, 2½ miles northwest of Kingsway, Sandusky County, Ohio. | 66.7 | | 9-21-60 | *.04 |
| Spicer Creek. | Sandusky River. | Lat 41°09'40", long 83°06'30", at bridge on State Highway 101, 4½ miles northeast of Tiffin, Seneca County, Ohio, and 3½ miles above mouth. | 7.09 | 1959 | 8- 5-60 | *.15 |
| Wolf Creek... |do..... | Lat 41°14'55", long 83°13'50", at highway bridge at east edge of Bettsville, Seneca County, Ohio, 4 miles above mouth. | 64.0 | 1959 | 8- 5-60 | *.61 |
| East Branch Wolf Creek. | Wolf Creek... | Lat 41°15'35", long 83°11'10", at highway bridge, 3 miles east of Burgoon, Sandusky County, Ohio, and 1½ miles above mouth. | 82.4 | 1959 | 8- 5-60 | *2.90 |
| Pickereel Creek. | Lake Erie.... | Lat 41°23'10", long 82°57'25", at highway bridge, 1½ miles northwest of Vickery, Sandusky County, Ohio, and 3 miles above mouth. | 21.4 | 1959 | 9-26-60 | *2.47 |
| Pipe Creek... |do..... | Lat 41°24'25", long 82°42'15", at highway bridge on Strub Rd., 2½ miles south of Sandusky, Erie County, Ohio, and 4½ miles above mouth. | 19.3 | 1959 | 9-26-60 | *.10 |
| West Branch Huron River. | Huron River.. | Lat 41°04'05", long 82°39'10", at highway bridge on Townline Rd., 3 miles northeast of New Haven, Huron County, Ohio. | 72.9 | | 9-27-60 | *3.51 |
| Do..... |do..... | Lat 41°16'40", long 82°40'30", at highway bridge on Lamoreau Rd., 2½ miles northeast of Monroeville, Huron County, Ohio, and 2½ miles upstream from mouth. | 226 | | 9-26-60 | *8.07 |
| East Branch Huron River. |do..... | Lat 41°11'20", long 82°39'45", at highway bridge on Remelle Rd., 1½ miles northwest of Peru (Macksville), Huron County, Ohio. | 33.3 | | 9-27-60 | *2.23 |
| Norwalk Creek | East Branch Huron River. | Lat 41°14'00", long 82°32'30", at county road bridge, 300 ft south of junction of State Highways 601 and 18, 4 miles southeast of Norwalk, Huron County, Ohio, and 6 miles above mouth. d/ | 4.18 | 1948-50, 1952-54 | 9-27-50 | *.007 |
| East Branch Huron River. | Huron River.. | Lat 41°14'58", long 82°38'52", at highway bridge, 1½ miles northwest of Norwalk, Huron County, Ohio, and 1½ miles below mouth of Cole Creek. | 84.9 | 1924-35*, 1953-54, 1957 | 9-26-60 | *3.32 |
| Vermillion River. | Lake Erie.... | Lat 41°11'45", long 82°24'55", at highway bridge on Zenobia Rd., at Clarksfield, Huron County, Ohio. | 132 | | 9-27-60 | *.64 |
| East Branch Vermillion River. | Vermillion River. | Lat 41°10'30", long 82°22'40", at highway bridge on Ferry Rd., 2½ miles southeast of Clarksfield, Huron County, Ohio, and 4½ miles upstream from mouth. | 30.1 | | 9-27-60 | *.13 |
| East Branch Black River. | Black River.. | Lat 41°11'25", long 82°05'50", at highway bridge on Foster Rd., 2 miles northeast of Penfield, Lorain County, Ohio. | 135 | | 9-26-60 | *1.29 |

* Base flow.

* Operated as a continuous-record gaging station.

d At crest-stage partial-record station.

f Includes sewage flow of 2.91 cfs.

Discharge measurements made at miscellaneous sites during water year 1960--Continued

| Discharge measurements made at miscellaneous sites during water year 1960--Continued | | | | | | |
|--|--------------------------|---|-----------------------|-----------------------------------|--------------------|-----------------|
| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Lake Erie--Continued | | | | | | |
| East Branch Black River tributary. | East Branch Black River. | Lat 41°18'50", long 82°02'05", at culvert on State Highway 82, $\frac{1}{2}$ mile west of Eaton and $2\frac{1}{2}$ miles southeast of Laporte, Lorain County, Ohio. | 0.8 | | 4-4-60 | 11.4 |
| East Branch Black River. | Black River.. | Lat 41°20'51", long 82°05'40", at Fuller Street Bridge, $1\frac{1}{2}$ miles southeast of center of Elyria, Lorain County, Ohio, and 3 miles above confluence with West Branch. | 211 | 1922-35*, 1943-44, 1956 | 9-27-60 | *1.61 |
| West Branch Black River. |do..... | Lat 41°15'55", long 82°10'50", at highway bridge at corner of Kipton Nickel Plate Rd. and West Rd., $2\frac{1}{2}$ miles southeast of Oberlin, Lorain County, Ohio. | 83.5 | | 9-26-60 | *.26 |
| Wellington Creek. | West Branch Black River. | Lat 41°14'15", long 82°10'00", at bridge on State Highway 303, $2\frac{1}{2}$ miles west of Lagrange, Lorain County, Ohio, and $2\frac{1}{2}$ miles upstream from mouth. | 28.1 | | 9-26-60 | *.022 |
| Plum Creek... |do..... | Lat 41°17'15", long 82°13'10", at bridge on Professor St., in Oberlin, Lorain County, Ohio. d/ | 4.88 | 1948, 1950, 1956, 1958-59 | 9-26-60 | .09 |
| West Branch Rocky River. | Rocky River.. | Lat 41°21'00", long 81°54'15", at bridge on State Highway 252, at West View, Ohio, on Cuyahoga-Lorain County line. | 148 | 1951 | 9-26-60 | *1.44 |
| Plum Creek... | West Branch Rocky River. | Lat 41°21'05", long 81°55'45", at highway bridge on Sprague Rd., $1\frac{1}{2}$ miles west of West View, Ohio, on Cuyahoga-Lorain County line. | 14.5 | | 9-26-60 | 0 |
| East Branch Rocky River. | Rocky River.. | Lat 41°18'50", long 81°47'55", at bridge on State Highway 82, 2 miles east of Strongsville, Lorain County, Ohio. | 55.8 | 1951 | 9-26-60 | *3.10 |
| Elton Creek.. | Cattaraugus Creek. | Lat 42°27'48", long 78°26'42", at highway bridge, 3.2 miles upstream from confluence with Lime Lake Outlet and 1.2 miles northwest of Elton, N. Y. | 33.3 | | 9-22-60 | *6.06 |
| Lime Lake Outlet. |do..... | Lat 42°29'19", long 78°29'12", 100 ft downstream from highway bridge and 0.4 mile upstream from confluence with Elton Creek, at Delevan, N. Y. | 17.6 | | 9-22-60 | *9.38 |
| Elton Creek.. |do..... | Lat 42°29'39", long 78°29'13", 200 ft below confluence with Lime Lake Outlet at Delevan, N. Y. | 54.1 | | 9-22-60 | *16.9 |
| Eighteenmile Creek. | Lake Erie.... | Lat 42°42'46", long 78°52'40", 200 ft above Hamburg Sewer Treatment Plant Outlet, 2.2 miles upstream from confluence with South Branch Eighteenmile Creek, and 1.6 miles west of Hamburg, N. Y. | 62.6 | | 8-18-60 9-15-60 | *3.06 *1.28 |
| Do..... |do..... | Lat 42°42'32", long 78°57'48", at highway bridge on New York State Route 5, 0.8 mile upstream from mouth and about $\frac{1}{2}$ mile east of Highland-on-the-Lake, N. Y. | 117 | 1951 | 8-18-60 | *5.72 |
| Smoke Creek.. |do..... | Lat 42°48'13", long 78°46'15", 5.2 miles upstream from confluence with South Branch, at Berg Rd., town line of West Seneca and Orchard Park, and 2.7 miles east of Blasdell, N. Y. | 11.3 | | 8-18-60 | *.59 |
| Streams tributary to Niagara River | | | | | | |
| Scajaquada Creek. | Niagara River | Lat 42°55'05", long 78°46'34", 0.7 mile upstream from Harlem Rd., at confluence with unnamed tributary, and 1.2 miles east of Buffalo, N. Y. | 13.6 | | 8-18-60 | *.17 |
| Ransom Creek. | Tonawanda Creek. | Lat 43°01'37", long 78°41'24", 1.4 miles upstream from confluence with Got Creek, at Miles Rd., and about 3 miles west-northwest of Clarence Center, N. Y. | 17.1 | | 8-19-60 | *.89 |

* Base flow.

* Operated as a continuous-record gaging station.

d At crest-stage partial-record station.

Discharge measurements made at miscellaneous sites during water year 1960--Continued

| Stream | Tributary to | Location | Drainage area (sq mi) | Measured previously (water years) | Measurements | |
|---|------------------|--|-----------------------|-----------------------------------|---|---|
| | | | | | Date | Discharge (cfs) |
| Streams tributary to Niagara River--Continued | | | | | | |
| Got Creek.... | Ransom Creek. | Lat 43°00'44", long 78°41'16", about 2.3 miles upstream from mouth at Clarence Rd. and about 2.5 miles west of Clarence Center, N. Y. | 10.0 | | 8-19-60 | *3.10 |
| Ellicott Creek. | Tonawanda Creek. | Lat 42°58'56", long 78°45'55", at North Forest Rd. highway bridge, about 11 miles above mouth and 1 mile north-northwest of Williamsville, N. Y. | 82.6 | 1958 | 8-18-60 | *7.74 |
| Streams tributary to Lake Ontario | | | | | | |
| Oak Orchard Creek. | Lake Ontario. | Lat 43°07'14", long 78°19'31", about 15 miles above Erie (Barge) Canal and 2 miles north-northeast of Wheatville, N. Y. | 119 | | 4-13-60 | †317 |
| Do..... |do..... | Lat 43°10'27", long 78°23'13", about 4½ miles above Erie (Barge) Canal, at Harrison Rd. highway bridge, and 1 mile south of Shelby, N. Y. | 150 | 1903, 1949-50, 1955 | 4-13-60 | †550 |
| Shequaga Creek. | Catherine Creek. | Lat 42°20'44", long 76°51'04", 0.4 mile above mouth, at Montour Falls, N. Y. | 12.7 | | 7- 5-60 7-13-60 7-19-60 7-26-60 9-15-60 | *2.43 *1.57 *1.88 *.94 *.80 |
| Big Stream... | Seneca Lake.. | Lat 42°31'36", long 76°58'30", 4.2 miles above mouth, at highway bridge on New York State Route 14A, at Dundee, N. Y. | 27.4 | | 9- 7-60 9-15-60 9-22-60 | *.82 *6.61 *5.91 |
| Do..... |do..... | Lat 42°29'30", long 76°54'47", 0.1 mile above mouth, at Glenora Point, and 3.5 miles southeast of Dundee, N. Y. | 36.6 | | 9- 7-60 9-15-60 9-22-60 | *1.54 *11.1 *8.43 |
| Cayuga Inlet. | Seneca River. | Lat 42°28'11", long 76°31'03", 1.9 miles above mouth, at Clinton Street Bridge, at Ithaca, N. Y. | g94.2 | 1958 | 4- 4-60 | †661 |
| Do..... |do..... | Lat 42°28'24", long 76°30'44", 1.4 miles above mouth, at Seneca Street Bridge, at Ithaca, N. Y. | 144 | | 4- 6-57 4- 4-60 | †1,200 †1,130 |
| Streams tributary to St. Lawrence River | | | | | | |
| Mettawee River. | Lake Champlain. | Lat 43°24'25", long 73°15'45", at bridge on State Highway 22, at Granville, N. Y. | 115 | | 9- 2-60 | *24.3 |

* Base flow.

† Peak flow.

g Revised.

Low-flow investigations in North Branch Clinton River basin near
Mount Clemens, Mich.

Two series of base-flow discharge measurements were made in the North Branch Clinton River basin as part of a comprehensive program now being carried on in cooperation with the Macomb County Board of Supervisors and the Macomb County Road Commission to investigate the surface water resources of the county. The first series was made on June 9, as soon as conditions were suitable for high base flow. The second series was made on Aug. 18, under conditions of low base flow. The data collected in these series of measurements, along with that already collected and to be collected in the future, will provide the basis for determining the base-flow yields of various parts of the basin.

Weather records at Mount Clemens near the southern part of the area and at Romeo near the west-central part, show that no precipitation occurred for five days prior to June 9 and four days prior to Aug. 18. Therefore, the measurements are considered to represent base flow.

The measurements on each stream are listed in order proceeding downstream, and each tributary is inserted in the order in which it enters the main stream. Drainage areas shown were determined from recent U.S. Geological Survey topographic maps of a scale of 1:24,000 and contour interval of 5 to 10 ft. See WSP 1627, page 407 for listing of previous series of measurements.

Discharge measurements of North Branch Clinton River and tributaries near Mount Clemens, Mich.,
June 9 and Aug. 18, 1960

| Stream | Location | Drainage area (sq mi) | Date | Discharge (cfs) | Cfs per square mile |
|-----------------------------|---|-----------------------------|--------------------|--------------------|------------------------------|
| North Branch Clinton River. | NW $\frac{1}{4}$ sec.27, T.6 N., R.12 E., at State Highway 53, in Almont. | 9.56 | 6- 9-60 8-18-60 | 2.42 1.19 | 0.253 .124 |
| Do..... | NW $\frac{1}{4}$ sec.1, T.5 N., R.12 E., at Macomb-Lapeer County line, 2.8 miles southeast of Almont. | 17.1 | 6- 9-60 8-18-60 | 3.34 1.26 | .195 .074 |
| Apel drain..... | NW $\frac{1}{4}$ sec.15, T.5 N., R.12 E., at McKay Rd., 0.5 mile above mouth and 3.8 miles north of Romeo. | 4.04 | 6- 9-60 8-18-60 | .93 .48 | .230 .119 |
| Newland drain..... | SW $\frac{1}{4}$ sec.19, T.5 N., R.13 E., at mouth, 2.8 miles northeast of Romeo. | 9.39 | 6- 9-60 8-18-60 | 2.11 .60 | .225 .064 |
| Mahaffy drain..... | NW $\frac{1}{4}$ sec.25, T.5 N., R.12 E., at Mack Rd. (34-Mile), 0.6 mile above mouth and 2.1 miles northeast of Romeo. | 2.64 | 6- 9-60 8-18-60 | .52 .05 | .197 .019 |
| North Branch Clinton River. | SW $\frac{1}{4}$ sec.30, T.5 N., R.13 E., at 33-Mile Rd., 2.2 miles north-east of Romeo. | 49.7 | 6- 9-60 8-18-60 | 11.0 4.00 | .221 .080 |
| East Pond Creek..... | SW $\frac{1}{4}$ sec.7, T.5 N., R.12 E., at Dewey Rd. (36-Mile), 3.5 miles northeast of Lakeville. | 9.49 | 6- 9-60 8-18-60 | 1.87 .06 | .197 .006 |
| Do..... | SW $\frac{1}{4}$ sec.29, T.5 N., R.12 E., at Schooley Rd. (35-Mile), 3.1 miles northwest of Romeo. | 14.2 | 6- 9-60 8-18-60 | 4.24 1.47 | .299 .104 |
| Do..... | NE $\frac{1}{4}$ sec.27, T.5 N., R.12 E., at gaging station at bridge on State Highway 53, 1.4 miles north of Romeo. | 21.8 | 6- 9-60 8-18-60 | 8.13 3.10 | .373 .142 |
| Do..... | NW $\frac{1}{4}$ sec.6, T.4 N., R.13 E., at Powell Rd., 0.5 mile above mouth and 1.6 miles east of Romeo. | 24.5 | 6- 9-60 8-18-60 | 8.52 3.43 | .348 .140 |
| North Branch Clinton River. | NW $\frac{1}{4}$ sec.16, T.4 N., R.13 E., at 30-Mile Rd., 2.0 miles north-west of Ray Center. | 80.5 | 6- 9-60 8-18-60 | 18.2 5.77 | .226 .072 |
| Coon Creek..... | NE $\frac{1}{4}$ sec.21, T.5 N., R.13 E., at Armada Center Rd., 2.1 miles west of Armada. | 3.98 | 6- 9-60 8-18-60 | .75 .33 | .189 .083 |
| Do..... | SW $\frac{1}{4}$ sec.1, T.4 N., R.13 E., at North Rd., 3.4 miles south of Armada. | 10.0 | 6- 9-60 8-18-60 | 1.35 .34 | .135 .034 |
| Do..... | SW $\frac{1}{4}$ sec.25, T.4 N., R.13 E., at North Rd., 1.4 miles north of Meade. | 15.2 | 6- 9-60 8-18-60 | 1.26 .05 | .083 .003 |
| Tupper Brook..... | NW $\frac{1}{4}$ sec.11, T.4 N., R.13 E., at 31-Mile Rd., 3.7 miles south of Armada. | 4.21 | 6- 9-60 8-18-60 | 0 0 | 0 0 |
| Do..... | NW $\frac{1}{4}$ sec.23, T.4 N., R.13 E., at 29-Mile Rd., at Ray Center. | 8.62 | 6- 9-60 8-18-60 | 0 0 | 0 0 |
| East Branch Coon Creek. | SE $\frac{1}{4}$ sec.2, T.5 N., R.13 E., at Pratt Rd., 3.0 miles north of Armada. | 8.34 | 6- 9-60 8-18-60 | .50 .04 | .060 .005 |
| Do..... | NE $\frac{1}{4}$ sec.23, T.5 N., R.13 E., at gaging station at bridge on Prospect St., at Armada. | 13.0 | 6- 9-60 8-18-60 | .71 .06 | .055 .005 |
| Do..... | SW $\frac{1}{4}$ sec.6, T.4 N., R.14 E., at Omo Rd., 3.7 miles south of Armada. | 19.6 | 6- 9-60 8-18-60 | 1.26 .10 | .064 .005 |
| Highbank Creek..... | SW $\frac{1}{4}$ sec.20, T.5 N., R.14 E., at Armada Ridge Rd., 2.5 miles east of Armada. | 4.34 | 6- 9-60 8-18-60 | .06 0 | .014 0 |
| Do..... | NE $\frac{1}{4}$ sec.31, T.5 N., R.14 E., above mouth of Cemetery Creek, at 33-Mile Rd., 2.3 miles southeast of Armada. | 5.06 | 6- 9-60 8-18-60 | .07 0 | .014 0 |

Low-flow investigations in North Branch Clinton River basin near
Mount Clemens, Mich.--Continued

Discharge measurements of North Branch Clinton River and tributaries near Mount Clemens, Mich.,
June 9 and Aug. 18, 1960--Continued

| Stream | Location | Drainage area (sq mi) | Date | Discharge (cfs) | Cfs per square mile |
|---------------------------------|---|-----------------------------|--------------------|--------------------|------------------------------|
| Cemetery Creek..... | NW $\frac{1}{4}$ sec.31, T.5 N., R.14 E., at mouth at 33-Mile Rd., 2.3 miles southeast of Armada. | 6.44 | 6- 9-60 8-18-60 | 0.47 .09 | 0.073 .014 |
| Highbank Creek..... | SW $\frac{1}{4}$ sec.31, T.5 N., R.14 E., at 32-Mile Rd., 3.0 miles south- east of Armada. | 14.9 | 6- 9-60 8-18-60 | .64 .06 | .043 .004 |
| East Branch Coon Creek. | SW $\frac{1}{4}$ sec.18, T.4 N., R.14 E., at 29-Mile Rd., 3.4 miles north- west of New Haven. | 36.1 | 6- 9-60 8-18-60 | 1.88 0 | .055 0 |
| Coon Creek..... | NE $\frac{1}{4}$ sec.2, T.5 N., R.13 E., at 25-Mile Rd., 0.3 mile west of Meade and 2.0 miles above mouth. | 71.8 | 6- 9-60 8-18-60 | 3.48 0 | .048 0 |
| Deer Creek..... | NE $\frac{1}{4}$ sec.31, T.4 N., R.14 E., at 27-Mile Rd., 1.7 miles west of New Haven. | 10.3 | 6- 9-60 8-18-60 | .36 .09 | .035 .009 |
| Do..... | NW $\frac{1}{4}$ sec.6, T.3 N., R.14 E., at 25 $\frac{1}{2}$ -Mile Rd., 0.9 miles south- east of Meade. | 12.7 | 6- 9-60 8-18-60 | .59 .12 | .046 .009 |
| McBride drain..... | NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.16, T.3 N., R.13 E., at 24-Mile Rd., 2.2 miles southeast of Macomb. | 5.79 | 6- 9-60 8-18-60 | .15 0 | .026 0 |
| Hart drain..... | NE $\frac{1}{4}$ sec.26, T.3 N., R.13 E., at mouth at North Ave., 3.0 miles north of northern limit of Mount Clemens. | 4.80 | 6- 9-60 8-18-60 | .07 0 | .015 0 |
| Middle Branch Clinton River. | NW $\frac{1}{4}$ sec.16, T.3 N., R.12 E., at 24-Mile Rd., 4.0 miles north of Utica. | 4.81 | 6- 9-60 8-18-60 | 1.86 1.04 | .387 .216 |
| Keller drain..... | NW $\frac{1}{4}$ sec.2, T.3 N., R.12 E., at mouth at Jewell Rd., 3.0 miles west of Macomb. | 8.42 | 6- 9-60 8-18-60 | 1.77 .66 | .210 .078 |
| Middle Branch Clinton River. | SW $\frac{1}{4}$ sec.1, T.3 N., R.12 E., at Schoenherr Rd., 2.0 miles west of Macomb. | 22.2 | 6- 9-60 8-18-60 | 5.30 2.69 | .239 .121 |
| Healy drain..... | SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.4 N., R.13 E., at 26-Mile Rd., 0.5 mile above mouth and 1.1 miles north of Macomb. | 16.8 | 6- 9-60 8-18-60 | 1.10 .18 | .065 .011 |
| Middle Branch Clinton River. | SW $\frac{1}{4}$ sec.5, T.3 N., R.13 E., at Romeo Plank Rd., 0.4 mile north of Macomb. | 41.0 | 6- 9-60 8-18-60 | 6.62 1.93 | .161 .047 |
| Dunn drain..... | NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.31, T.3 N., R.13 E., at mouth at Tilch Rd., 1.9 miles southwest of Waldenburg. | 7.60 | 6- 9-60 8-18-60 | 1.02 0 | .134 0 |
| Gloede ditch..... | SW $\frac{1}{4}$ sec.32, T.3 N., R.13 E., 500 ft above bridge on State Highway 59, 2.2 miles south of Waldenburg. | 16.0 | 6- 9-60 8-18-60 | 1.61 .25 | .101 .016 |
| Middle Branch Clinton River. | Private Claim 546, T.2 N., R.13 E., at Heydereich Rd., near mouth, just above Miller drain, 1.0 mile west of Mount Clemens. | 74.7 | 6- 9-60 8-18-60 | 8.88 2.71 | .119 .036 |

Low-flow investigation in East Branch Au Sable River basin near Grayling, Mich.

An investigation in the East Branch Au Sable River basin was made on July 11, 1960, for the purpose of determining the base-flow yields of various parts of the basin. The Michigan Department of Conservation, which sponsored the investigation, intends to use the data collected in planning watershed and channel improvement work in the basin, one of the main objectives being the improvement of habitat for trout. Results of base-flow investigations such as this are used to determine which portions of the basin are adapted to successful improvement work and to appraise the results of such work later on. Weather records at Grayling and Gaylord, which are located in and near the basin, show that there was no precipitation for the week preceding July 11; therefore, measurements represent base flow.

The measurements on each stream are listed in order proceeding downstream, and each tributary is inserted in the order in which it enters the main stream. Drainage areas shown were determined from U.S. Geological Survey topographic maps (contour interval, 10 ft), dated 1951.

Discharge measurements of East Branch Au Sable River and tributaries near Grayling, Mich., July 11, 1960

| Stream | Location | Drainage area (sq mi) | Discharge (cfs) | Cfs per square mile |
|-----------------------------|---|-----------------------|-----------------|---------------------|
| East Branch Au Sable River. | NW $\frac{1}{4}$ sec.18, T.28 N., R.2 W., 12.6 miles northeast of Grayling. | 12.6 | 5.50 | 0.437 |
| Do..... | SE $\frac{1}{4}$ sec.19, T.28 N., R.2 W., 11.5 miles northeast of Grayling. | 16.6 | 11.2 | .675 |
| Do..... | SW $\frac{1}{4}$ sec.30, T.28 N., R.2 W., 15 ft upstream from bridge on County Highway 612 and 10.3 miles northeast of Grayling. | 18.9 | 15.7 | .831 |
| Unnamed tributary..... | SW $\frac{1}{4}$ sec.36, T.28 N., R.3 W., 300 ft upstream from mouth and 9.0 miles northeast of Grayling. | 3.32 | 1.74 | .524 |
| East Branch Au Sable River. | SW $\frac{1}{4}$ sec.36, T.28 N., R.3 W., 700 ft downstream from unnamed tributary and 8.9 miles northeast of Grayling. | 24.4 | 16.5 | .676 |
| Do..... | NW $\frac{1}{4}$ sec.1, T.27 N., R.3 W., 8.5 miles northeast of Grayling. | 25.2 | 19.6 | .778 |
| Do..... | On line between secs. 2 and 11, T.27 N., R.3 W., 5 ft downstream from culvert on truck trail and 7.6 miles northeast of Grayling. | 26.7 | 22.4 | .839 |
| Do..... | SW $\frac{1}{4}$ sec.14, T.27 N., R.3 W., 150 ft upstream from culverts on truck trail and 5.6 miles northeast of Grayling. | 32.7 | 24.8 | .758 |
| Do..... | SE $\frac{1}{4}$ sec.22, T.27 N., R.3 W., at culverts on truck trail, 4.9 miles northeast of Grayling. | 33.9 | 25.9 | .764 |
| Do..... | NE $\frac{1}{4}$ sec.28, T.27 N., R.3 W., 150 ft upstream from end of truck trail and 3.9 miles northeast of Grayling. | 35.1 | 26.3 | .749 |
| Unnamed tributary..... | SE $\frac{1}{4}$ sec.29, T.27 N., R.3 W., 130 ft upstream from mouth and 2.7 miles north of Grayling. | 21.1 | 4.38 | .208 |
| East Branch Au Sable River. | SE $\frac{1}{4}$ sec.29, T.27 N., R.3 W., 300 ft downstream from unnamed tributary and 2.7 miles north of Grayling. | 60.0 | 32.9 | .548 |
| Do..... | SW $\frac{1}{4}$ sec.32, T.27 N., R.3 W., 1.0 miles upstream from unnamed tributary and 1.7 miles north of Grayling. | 60.4 | 37.2 | .616 |
| Do..... | NW $\frac{1}{4}$ sec.8, T.26 N., R.3 W., at south boundary of State fish hatchery area at Grayling, 0.4 mile upstream from mouth. | 76.0 | 40.4 | .532 |

For several years records of the water-surface elevation of many of the lakes in Indiana have been collected by the Geological Survey under cooperative agreements with the Indiana Department of Conservation, Division of Water Resources. Basic data for a few selected lakes have been published in WSP 1363, entitled "Hydrology of Indiana Lakes." Records which have not been published are available in the files of the District Office of the Geological Survey in Indianapolis, Ind. In general, the records are based on once-daily readings of a staff gage by a local observer and consist of daily, monthly, and yearly mean water-surface elevations as well as graphs showing the fluctuation in elevation. Discharge measurements, made at the outflow, are also available in some instances.

The lakes for which records have been collected are listed in the following table. The established level, sometimes referred to as the legal level, is that elevation set by the courts to which the average level of the lake is to be held; it is normally set at about the average level that has prevailed for a number of years prior to the establishment of the level.

Lakes in Indiana in the St. Lawrence River basin for which records are available

| Lake | County | Drainage area (square miles) | Surface area (acres) | Established level† | Records available |
|--|----------|------------------------------|----------------------|--------------------|-------------------|
| Adams Lake near Wolcottville..... | Lagrange | 5.69 | 293 | 953.53 | 1945-60 |
| Atwood Lake near Wolcottville..... | Lagrange | 1.31 | 170 | 895.99 | 1947-52 |
| Bass Lake near Angola..... | Steuben | .60 | 56 | - | 1954-60 |
| Bear Lake at WolfLake..... | Noble | 6.12 | 136 | 894.60 | 1942-60 |
| Big Long Lake near Stroh..... | Lagrange | 4.13 | 366 | - | 1953-60 |
| Big Otter Lake near Fremont..... | Steuben | 19.8 | 69 | 965.18 | 1945-52 |
| Big Turkey Lake at Stroh..... | Lagrange | 34.6 | 450 | 926.61 | 1945-60 |
| Bixler Lake at Kendallville..... | Noble | 5.63 | 112 | 965.65 | 1945-60 |
| Blackman Lake near Wolcottville..... | Lagrange | 1.4 | 67 | 974.20 | 1953-59 |
| Bower Lake near Pleasant Lake..... | Steuben | 87.5 | 25 | 948.50 | 1945-60 |
| Cedar Lake near Ontario..... | Lagrange | 1.66 | 120 | 871.90 | 1948-51 |
| Cedar Lake near Waterloo..... | De Kalb | 21.8 | 28 | 896.76 | 1943-55 |
| Clear Lake at Clear Lake..... | Steuben | 7.25 | 800 | 1,037.38 | 1943-60 |
| Cree Lake near Kendallville..... | Noble | 4.90 | 58 | 945.23 | 1949-60 |
| Crooked Lake at Crooked Lake..... | Steuben | 11.9 | 802 | 988.17 | 1945-60 |
| Dallas Lake near Wolcottville..... | Lagrange | 39.4 | 263 | 897.36 | 1945-60 |
| Dewart Lake near Leesburg..... | Warrick | 7.88 | 67 | 867.70 | 1945-60 |
| Diamond Lake near Wawaka..... | Noble | 2.82 | 105 | - | 1945-60 |
| Dumond Lake near Cromwell a/..... | Noble | 11.0 | 21 | 876.68 | 1952-60 |
| Eagle Lake near Kimmel..... | Noble | 1.77 | 81 | - | 1945-48 |
| Emma Lake near Emma..... | Lagrange | 14.8 | 42 | - | 1954-60 |
| Engle Lake near Ligonier..... | Noble | 3.22 | 48 | - | 1955-60 |
| Fish Lake near Plato..... | Lagrange | 10.8 | 100 | 936.50 | 1945-60 |
| Fish Lake near Scott..... | Lagrange | 6.14 | 139 | - | 1954-60 |
| Fox Lake near Angola..... | Steuben | 1.13 | 142 | 1,018.83 | 1945-52 |
| Golden Lake near Pleasant Lake..... | Steuben | 92.4 | 119 | 948.50 | 1945-60 |
| Gordy Lake near Cromwell..... | Noble | 8.82 | 31 | 876.68 | 1952-60 |
| Hackenburg Lake near Wolcottville..... | Lagrange | 54.8 | 42 | 897.36 | 1945-60 |
| Hamilton Lake at Hamilton..... | Steuben | 12.8 | 802 | 898.83 | 1943-60 |
| Harper Lake near Washington Center..... | Noble | 2.67 | 11 | 878.25 | 1945-60 |
| Heaton Lake near Elkhart..... | Elkhart | 8.78 | 87 | 767.30 | 1945-52 |
| Hindman Lake near Washington Center..... | Noble | 8.00 | 13 | 878.25 | 1945-60 |
| Hogback Lake near Angola..... | Steuben | 102.0 | 146 | 948.50 | 1945-60 |
| Howard Lake near Angola..... | Steuben | 5.94 | 34 | - | 1954-60 |
| Hudson Lake at Hudson Lake..... | La Porte | 3.06 | 432 | 763.09 | 1945-60 |
| Hunter Lake near Middlebury..... | Elkhart | .72 | 99 | 853.90 | 1945-52 |
| Indian Lake near Corunna..... | De Kalb | 3.50 | 54 | - | 1957 |
| Indian Lake near Bristol..... | Elkhart | .53 | 122 | 759.73 | 1945-52 |
| Jimerson Lake at Nevada Mills..... | Steuben | 47.0 | 203 | 964.66 | 1945-60 |
| Knapp Lake near Washington Center..... | Noble | 5.64 | 88 | 873.25 | 1945-60 |
| Lake Gage at Panama..... | Steuben | 17.2 | 327 | 954.25 | 1945-60 |
| Lake George at Hobart..... | Lake | 125.0 | 282 | 607.23 | 1945-60 |
| Lake George at Jamestown..... | Steuben | 12.3 | 509 | 985.28 | 1945-60 |
| Lake James at Lake James..... | Steuben | 43.0 | 1,318 | 964.96 | 1942-49 |
| Lake Pleasant near Nevada Mills..... | Steuben | 2.51 | 287 | - | 1954-60 |
| Lake of the Woods near Helmer..... | Lagrange | 5.62 | 136 | 951.09 | 1951-60 |
| Latta Lake near Rome City..... | Noble | 4.37 | 35 | - | 1954-60 |
| Lime Lake at Panama..... | Steuben | 17.4 | - | 954.25 | 1945-60 |
| Little Long Lake at Kendallville..... | Noble | 4.34 | 66 | - | 1954-60 |
| Little Otter Lake near Fremont..... | Steuben | 19.8 | 34 | 965.18 | 1945-52 |
| Little Turkey Lake at Elmira..... | Lagrange | 59.0 | 135 | 923.72 | 1945-60 |
| Long Lake at Moonlight..... | Steuben | 70.8 | 92 | - | 1945-60 |
| Long Lake near Burr Oak..... | Noble | 11.5 | 40 | - | 1954-60 |
| Loon Lake near Angola..... | Steuben | 2.73 | 138 | - | 1954-60 |
| Lower Long Lake near Albion..... | Noble | 3.98 | 66 | 889.81 | 1945-52 |
| Martin Lake near Valentine..... | Lagrange | 5.36 | 22 | 897.45 | 1945-60 |
| Messick Lake near Wolcottville..... | Lagrange | 55.8 | 68 | 897.36 | 1945-60 |
| Moss Lake near Washington Center..... | Noble | 5.90 | 9 | 873.25 | 1945-60 |
| Mud Lake near Orland..... | Steuben | 1.64 | 25 | - | 1956-60 |
| Muncie Lake near Burr Oak..... | Noble | 43.4 | 41 | - | 1954-60 |
| North Twin Lake near Howe..... | Lagrange | 1.99 | 135 | 843.56 | 1953-60 |
| Olin Lake near Valentine..... | Lagrange | 6.12 | 95 | 895.45 | 1945-60 |
| Oliver Lake near Valentine..... | Lagrange | 11.3 | 371 | 897.45 | 1945-60 |
| Otter Lake near Flint..... | Steuben | 6.82 | 115 | - | 1954-60 |
| Pigeon Lake near Angola..... | Steuben | 30.6 | 61 | - | 1954-60 |
| Pleasant Lake at Pleasant Lake..... | Steuben | .94 | 53 | 963.52 | 1945-60 |
| Pleasant Lake near WolfLake..... | Noble | .30 | - | - | 1951-53 |
| Pretty Lake near Stroh..... | Lagrange | 2.91 | 184 | 965.50 | 1945-52 |
| Rider Lake near Cromwell..... | Noble | 9.73 | 5 | - | 1952-60 |
| River Lake near Burr Oak..... | Noble | 18.7 | 22 | - | 1954-60 |
| Round Lake at Clear Lake..... | Steuben | 7.25 | 30 | 1,037.38 | 1943-60 |
| Round Lake at Kendallville..... | Noble | 3.60 | 89 | - | 1954-60 |
| Royer Lake near Plato..... | Lagrange | 4.91 | 69 | 935.50 | 1952-60 |
| Sackrider Lake near Kendallville..... | Noble | 2.42 | 40 | - | 1954-60 |
| Sand Lake near Burr Oak..... | Noble | 15.0 | 47 | 895.56 | 1945-51 |
| Sandford Lake near Cosperville..... | Noble | 104.0 | 114 | - | 1947-60 |

† Elevation, in feet, above mean sea level.

a Formerly published as Duley Lake near Cromwell.

Lakes in Indiana in the St. Lawrence River basin for which records are available--Continued

| Lake | County | Drainage area (square miles) | Surface area (acres) | Estab- lished level† | Records avail- able |
|--|-----------|---------------------------------------|----------------------------|----------------------------|---------------------------|
| Saugany Lake near Rolling Prairie..... | La Porte | 0.82 | 74 | 781.21 | 1945-50 |
| Shipshewana Lake near Shipshewana..... | Lagrange | 4.00 | 202 | 852.04 | 1951-60 |
| Silver Lake near Angola..... | Steuben | 3.72 | 238 | 959.40 | 1945-52 |
| Silver Lake near Rolling Prairie..... | La Porte | .82 | 54 | 795.20 | 1945-60 |
| Silver Lake near Wolf Lake..... | Noble | .32 | 29 | - | 1952-60 |
| Simonton Lake near Elkhart..... | Elkhart | 4.37 | 282 | 772.13 | 1945-60 |
| Skinner Lake near Albion..... | Noble | 13.8 | 125 | 927.74 | 1945-60 |
| Snow Lake at Lake James..... | Steuben | 36.3 | - | 964.96 | 1942-49 |
| South Twin Lake near Howe..... | Lagrange | 3.13 | 116 | 843.56 | 1953-60 |
| Sparta Lake at Kimmel..... | Noble | .26 | 31 | 888.50 | 1945-51 |
| Steinbarger Lake near Cosperville..... | Noble | 25.3 | 73 | - | 1947-60 |
| Stone Lake near Scott..... | Lagrange | 1.32 | 116 | - | 1954-60 |
| Story Lake near Hudson..... | De Kalb | 2.48 | 77 | - | 1945- 1954-60 |
| Sylvan Lake at Rome City..... | Noble | 31.5 | 630 | 916.20 | 1942-60 |
| Syracuse Lake at Syracuse..... | Kosciusko | 37.3 | 367 | 859.87 | 1945-60 |
| Tamarack Lake near Cosperville..... | Noble | 15.1 | 50 | - | 1947-60 |
| Upper Long Lake near Wolf Lake..... | Noble | 2.03 | 86 | - | 1955-60 |
| Village Lake near Cromwell..... | Noble | 11.6 | 12 | 876.68 | 1952-60 |
| Wabec Lake near Milford..... | Kosciusko | 13.4 | 187 | 829.79 | 1945-52 |
| Wall Lake near Orland..... | Noble | 131.0 | 216 | - | 1947-60 |
| Wall Lake near Orland..... | Lagrange | 1.43 | 141 | 942.25 | 1953-55 |
| Wawasee Lake near Wawasee..... | Kosciusko | 36.1 | 2,620 | 858.99 | 1942-60 |
| Westler Lake near Wolcottville..... | Lagrange | 37.3 | 68 | 897.36 | 1945-60 |
| Witmar Lake near Wolcottville..... | Lagrange | 35.8 | 204 | 897.36 | 1945-60 |
| Wolf Lake near Goshen..... | Elkhart | .87 | 100 | 813.00 | 1947-57 |
| Wolf Lake at Hammond..... | Lake | 5.72 | 999 | - | 1946-48 |

† Elevation, in feet, above mean sea level.

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