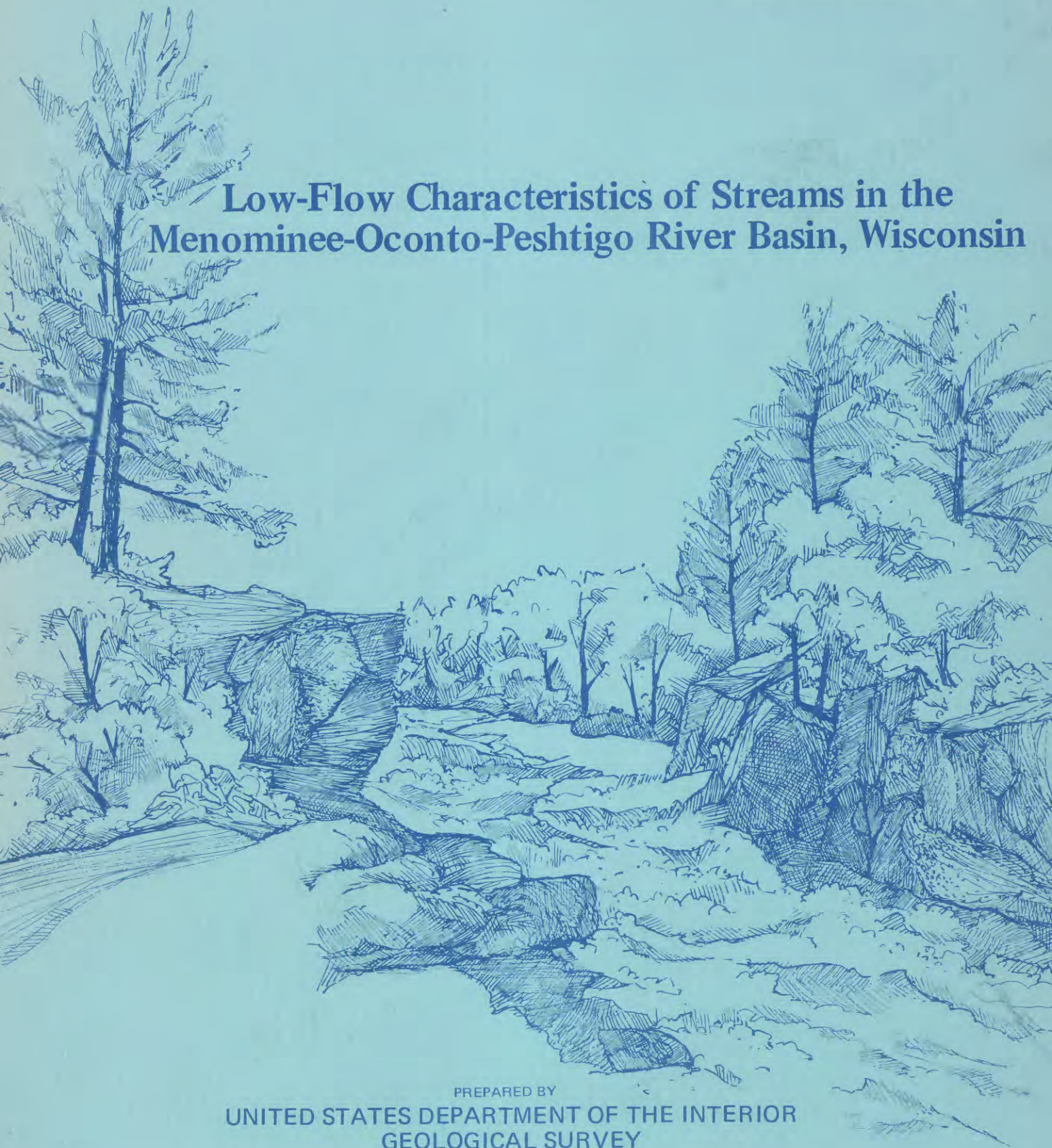
WATER RESOURCES INVESTIGATIONS
OPEN-FILE REPORT 80-749

Low-Flow Characteristics of Streams in the Menominee-Oconto-Peshtigo River Basin, Wisconsin



PREPARED BY
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
IN COOPERATION WITH
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Low-Flow Characteristics of Streams in the Menominee-Oconto-Peshtigo River Basin, Wisconsin

B.K. HOLMSTROM

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UNITED STATES DEPARTMENT OF THE INTERIOR

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Low-Flow Characteristics of Streams in the Menominee-Oconto-Peshtigo River Basin, Wisconsin

B.K. HOLMSTROM

ABSTRACT

The purpose of this report is to describe low-flow characteristics of streams in the Menominee-Oconto-Peshtigo River basin where streamflow data have been collected and to present equations for estimating low-flow characteristics at ungaged sites. Included are estimates of low-flow frequency at 12 gaging stations, flow duration at 10 gaging stations, and low-flow frequency characteristics at 37 low-flow partial-record stations and 127 miscellaneous sites.

Four equations are provided to estimate low-flow characteristics at ungaged sites and at sites where one base-flow discharge measurement is available. The low-flow characteristics determined are the annual minimum 7-day mean flow below which the flow will fall on an average of once in 2 years ($Q_{7,2}$) and once in 10 years ($Q_{7,10}$). The equations were determined from multiple-regression analyses that related the low-flow characteristics at gaging stations and low-flow partial-record stations to basin characteristics. Drainage area (A), slope (S), and transmissivity (T) were the most significant characteristics in explaining the variations in low flow for ungaged sites. The equations and standard error of estimates (SE) for ungaged sites are:

$$Q_{7,2} = 9.14X10^{-5}A^{0.870}S^{0.862}T^{0.532} \qquad SE_{7,2} = 60 \text{ percent}$$

$$Q_{7,10} = 1.22X10^{-5}A^{0.894}S^{1.06}T^{0.619} \qquad SE_{7,10} = 78 \text{ percent}$$

For sites where one base-flow measurement has been made, drainage area (A) and base-flow index (Bf) were the most significant characteristics. The equations and standard error of estimate are:

$$Q_{7,2} = 0.886A^{1.04}Bf^{1.25} \qquad SE_{7,2} = 32 \text{ percent}$$

$$Q_{7,10} = 0.627A^{1.08}Bf^{1.45} \qquad SE_{7,10} = 49 \text{ percent}$$

INTRODUCTION

In recent years, a great demand has been placed on water resources in Wisconsin by increased multiple uses such as: maintenance of fish and wildlife habitat, irrigation of crops, dilution and assimilation of wastes, production of hydroelectric power, construction of impoundments for real-estate developments, and maintenance of adequate flow for boating. This increased demand requires an accurate determination of water resources during low-flow periods to ensure proper consideration of all users.

This report describes the low-flow characteristics of streams in the Menominee-Oconto-Peshtigo River basin (fig. 1) where streamflow data have been collected and presents equations for estimating low-flow characteristics at ungaged sites. The report includes: estimates of the magnitude and frequency of recurrence of low flow for various sites where streamflow information has

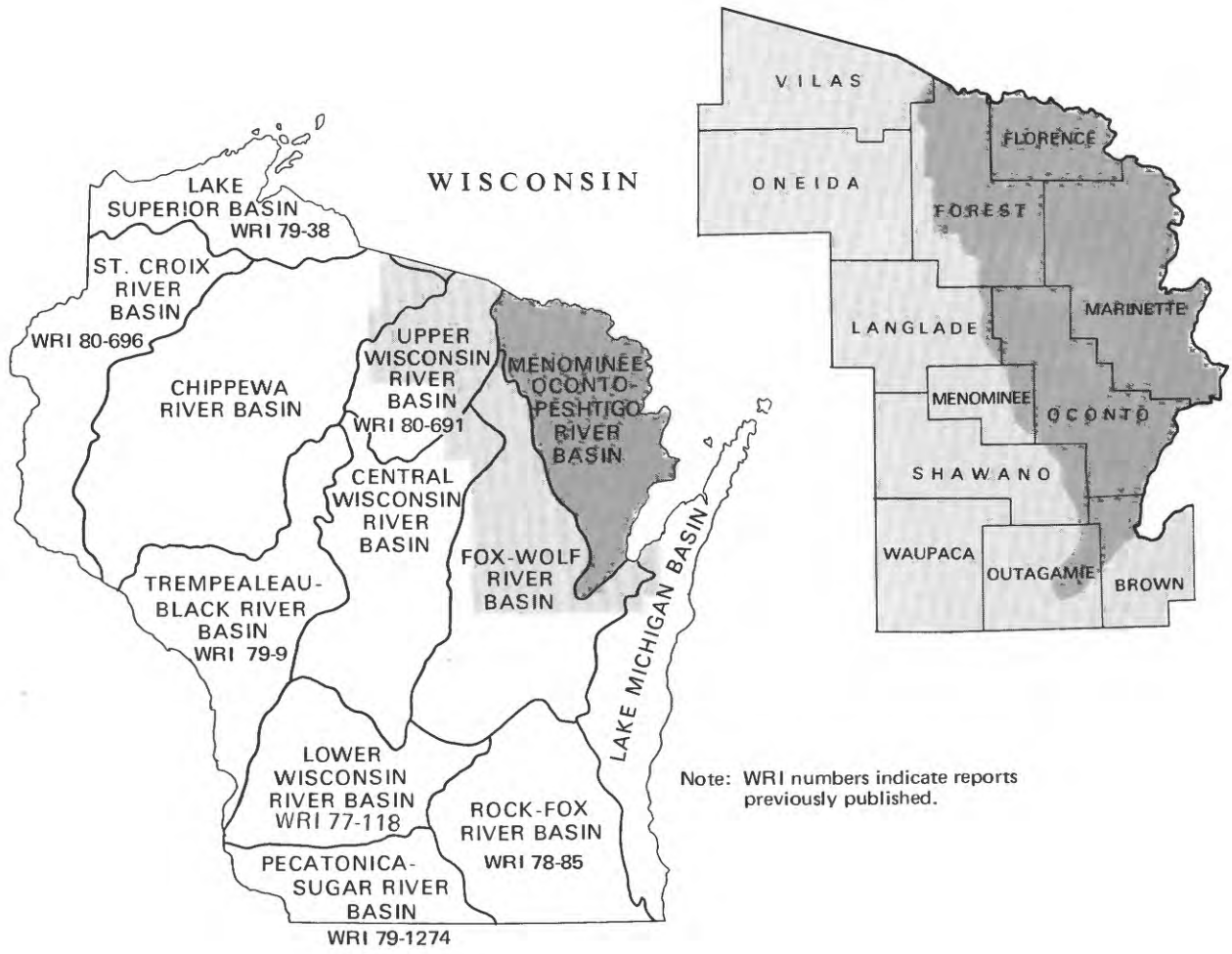

Figure 1. Location of the Menominee-Oconto-Peshtigo River basin in Wisconsin.

been collected, low-flow discharge measurements that have been obtained at numerous sites throughout the basin, and a method to estimate low-flow characteristics at ungaged sites.

Low-flow frequency analyses and flow-duration analyses are presented for all current and discontinued gaging stations in the basin. Low-flow frequency analyses for 12 gaging stations and flow duration analyses for 10 gaging stations have been completed through water year 1977. Low-flow frequency data are included in the report for 37 low-flow partial-record stations and for 127 miscellaneous sites.

Previous reports by Gebert (1971), Holmstrom (1979, p. 31-33, 53, 56-57, 61-62), Oakes and Hamilton (1973, sheet 3), and Oakes and others (1973) contain preliminary low-flow data for this basin.

This study was done in cooperation with the Wisconsin Department of Natural Resources. This report is part of a series of 12 planned reports to describe low-flow characteristics of the major basins in Wisconsin (fig. 1).

For the convenience of readers who prefer metric units, the data may be converted by using the following factors:

Multiply	By	To obtain
mile (mi)	1.609	kilometer (km)
foot (ft)	3.048×10^{-1}	meter (m)
inch (in.)	25.4	millimeter (mm)
square mile (mi^2)	2.59	square kilometer (km^2)
cubic foot per second (ft^3/s)	2.832×10^{-2}	cubic meter per second (m^3/s)
foot per mile (ft/mi)	1.894×10^{-1}	meter per kilometer (m/km)
cubic foot per second per square mile $\{(ft^3/s)/mi^2\}$	1.094×10^{-2}	cubic meter per second per square kilometer $\{(m^3/s)/km^2\}$
gallon per day (gal/d)	3.786×10^{-3}	cubic meter per day (m^3/d)
gallon per day per square foot $\{(gal/d)/ft^2\}$	3.517×10^{-4}	cubic meter per day per square meter $\{(m^3/d)/m^2\}$

BASIN DESCRIPTION

The Menominee-Oconto-Peshtigo River basin is located in northeastern Wisconsin. It includes the area in Wisconsin drained by the Menominee, Peshtigo, Oconto, Pensaukee, Little Suamico, and Suamico Rivers, Duck Creek, and small tributaries to Green Bay. The drainage area of the basin in Wisconsin is about 4,300 mi^2 (Oakes and Hamilton, 1973) or about 7.7 percent of the State.

The 1970 population of the basin was approximately 115,000. The largest cities are Marinette, Howard, and Oconto with 1976 populations of 12,198, 6,738, and 5,005 (Wisconsin Legislative Reference Bureau, 1977).

The mean annual precipitation for the basin is 29.0 in., ranging from less than 26 in. in the southern part to more than 31 in. in the northwestern part (Wisconsin Statistical Reporting Service, 1967, p. 18). Snowfall is 15 to 20 percent of the mean annual precipitation. The mean annual runoff is 10.7 in.,

the mean annual evapotranspiration is 18.0 in., and net underflow leaving the basin through the ground-water reservoir is 0.3 in. (Oakes and Hamilton, 1973, sheet 1).

The topography is irregularly rolling glacial terrane. Local relief is generally less than 100 ft. Along the west edge, central, and northern parts the drift consists of extensive outwash and ice-contact deposits and is a major ground-water reservoir. In the southern and southeastern parts the drift consists of ground moraine and lake deposits and is a poor aquifer (Oakes and Hamilton, 1973, sheet 1).

General gradients for major rivers in the basin range from 7 to 30 ft/mi. The average gradient of the Menominee River is approximately 7 ft/mi with some reaches having gradients up to 20 to 30 ft/mi; the lower 40 mi has a slope of 2 ft/mi. The Pine and Pike Rivers have general gradients of 10 to 15 ft/mi, and the Pine River has gradients of 1 ft/mi in its headwaters and near the mouth. The Oconto and Peshtigo have gradients of 10 to 30 ft/mi in most reaches (Oakes and Hamilton, 1973, sheet 1).

The Pine, Pike, and Popple Rivers have been designated as "wild rivers" by the State of Wisconsin (Wisconsin Legislature, 1965). These rivers will be preserved in a free-flowing state and will be protected from development.

LOW-FLOW CHARACTERISTICS

Low flow refers to the low range of stream discharge. A probability of occurrence and a time period can be specified for a more precise definition. Low flow is usually ground-water discharge or base flow, although a 30-, 60-, or 90-day low flow could contain some direct or storm runoff.

A typical low-flow period is illustrated by the discharge hydrograph for the Oconto River near Gillett gaging station (fig. 2). The annual 90-day low flow prevailed from June 13 to September 10. Although this was the lowest flow for 90 consecutive days during the year, direct runoff occurred many times. Except for these rises in stream discharge, the remainder of streamflow for the period was predominantly base flow (ground-water discharge).

Table 1 contains low-flow data for 209 sites. Each site is identified by station number and station name. The site location, drainage area, type of site, and other pertinent data are included. Low-flow data included for each site depend upon the type of site: gaging station, low-flow partial-record station, or miscellaneous site. The locations of the sites are shown on plate 1.

ANALYTICAL TECHNIQUES

Low-flow characteristics in table 1 were determined by three methods. The method used at a given site depended on the type of data available: (1) continuous record of daily streamflows (continuous-record gaging stations); (2) 8 to 18 base-flow discharge measurements (low-flow partial-record stations); (3) 1 to 6 base-flow discharge measurements (miscellaneous sites).

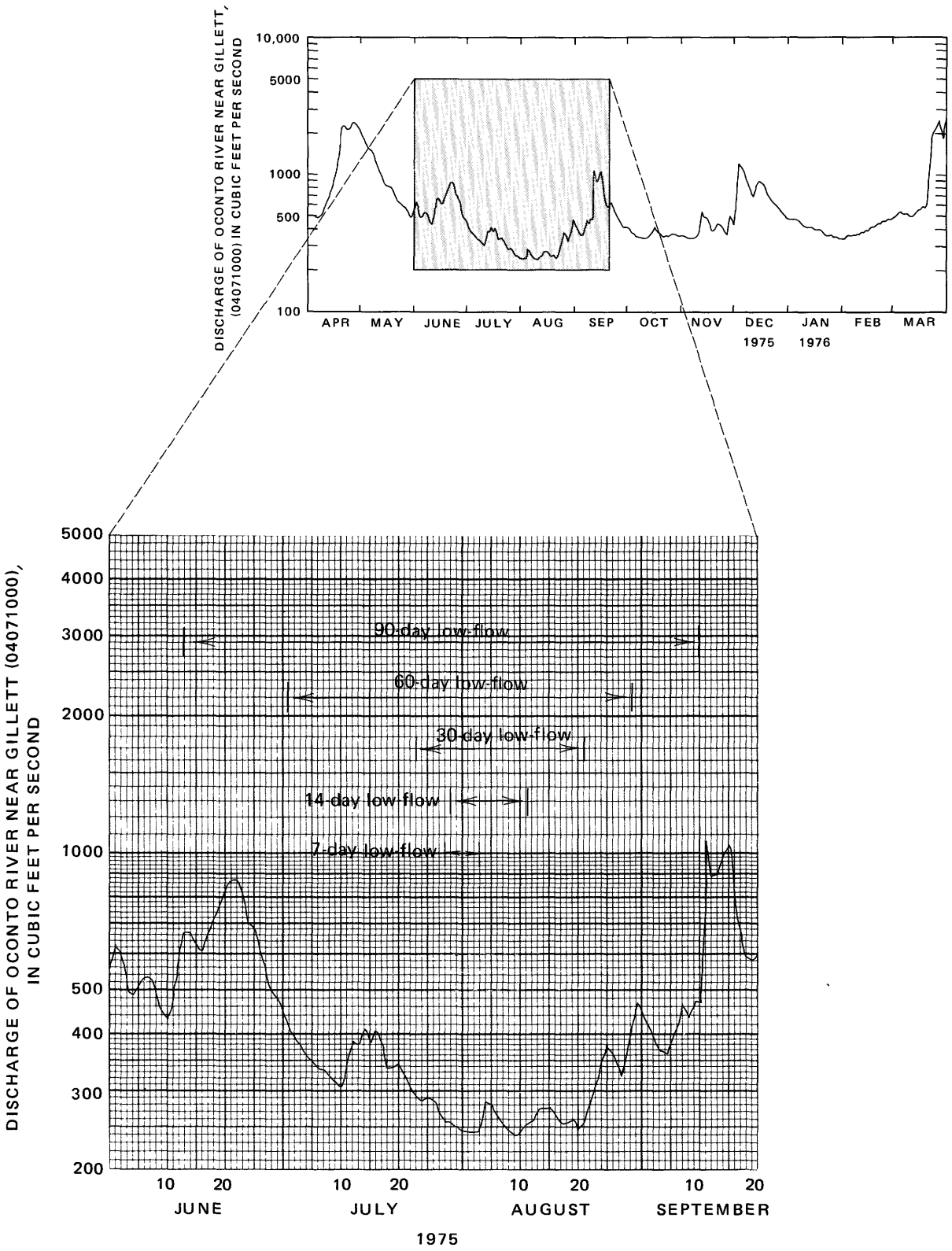

Figure 2. Daily discharge of the Oconto River near Gillett for 1976 climatic year showing annual low-flow periods for various number of days.

Gaging stations

Low-flow characteristics of a stream where systematic streamflow records have been collected can be determined by flow-duration analysis or frequency analysis. The two analyses serve different purposes. The flow-duration curve indicates the percentage of time that a daily mean flow exceeds a given discharge, and the low-flow frequency curve indicates the probability that a 7-day, 14-day, 30-day, 60-day, and 90-day consecutive mean flow will be exceeded in any given year. The more generally used analysis for most low-flow applications is the low-flow frequency analysis. In the basin the annual minimum 7-day mean flow below which the flow will fall on the average of once in 2 years ($Q_{7,2}$) is approximately equal to 93 percent flow duration. The $Q_{7,10}$ is about equal to 99 percent flow duration.

Low-flow frequency and flow-duration analyses were completed for all continuous-record gaging stations that have 10 or more years of record (10 stations). Values for the magnitude and frequency of annual low flows for 7, 14, 30, 60, and 90 consecutive days are listed in table 1. Table 1 also lists flow-duration values showing the percentage of time that specified discharges were exceeded.

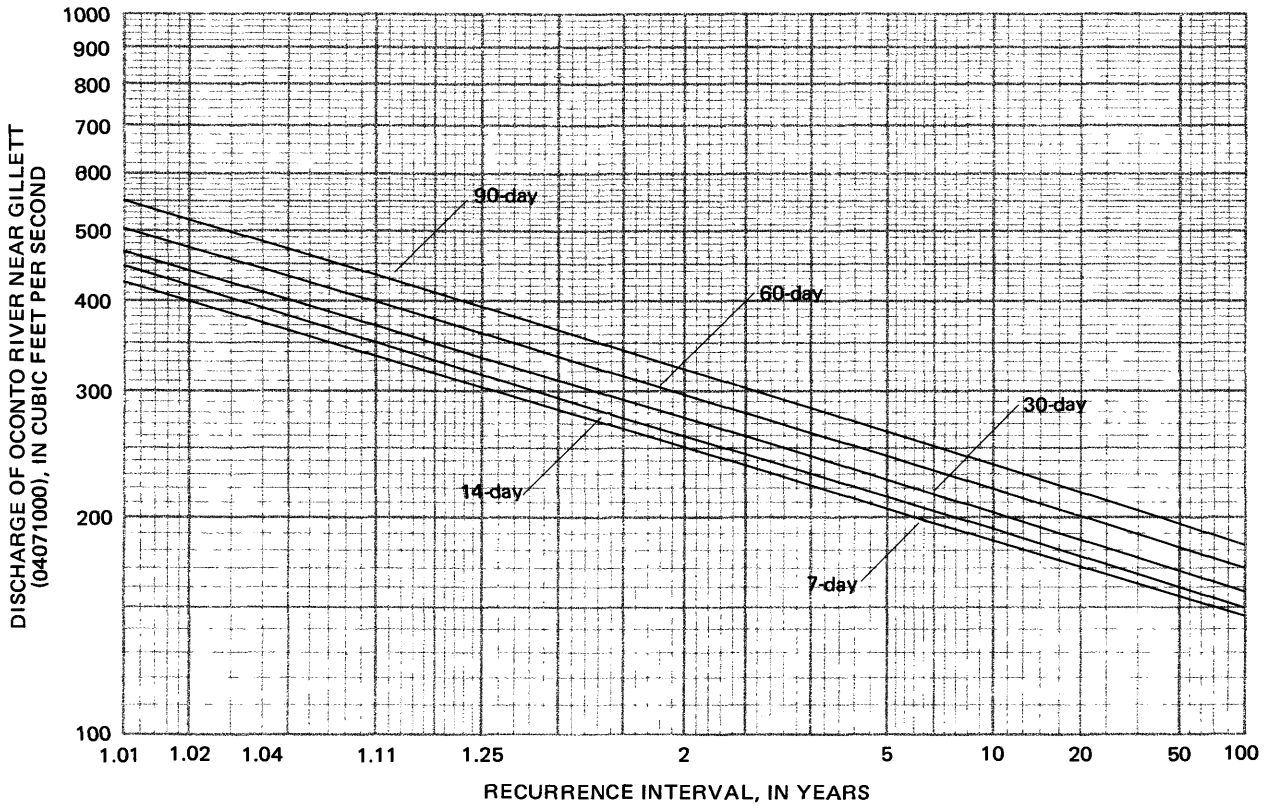

Figure 3. Low-flow frequency curves for the indicated number of consecutive days at Oconto River near Gillett.

The low-flow frequency characteristics were determined from the daily discharge records using a log-Pearson Type III probability distribution or a plotting position analysis (Riggs, 1972, p. 1-8). If results of the two analyses were substantially different, the plotting position analysis was used. Figure 3 is an example of a low-flow frequency curve for Oconto River near Gillett, and figure 4 is a flow-duration curve for the same site.

For the two gaging stations that have insufficient data for low-flow frequency analysis or flow duration, the low-flow characteristics were determined by a procedure similar to that outlined in the following section for low-flow partial-record stations.

Low-flow partial-record stations

Low-flow characteristics determined for low-flow partial-record stations are $Q_{7,2}$ and $Q_{7,10}$. Estimates of $Q_{7,2}$ and $Q_{7,10}$ are presented in table 1 for 37 low-flow partial-record stations. Characteristics were determined from graphical regressions established by plotting 8 to 18 base-flow discharge measurements at low-flow partial-record stations against concurrent discharges at continuous-record gaging stations in the area (Gebert, 1971). A relation line was established through the plotted points. The $Q_{7,2}$ and $Q_{7,10}$ at the continuous-record gaging station then were transferred through the relation line to estimate $Q_{7,2}$ and $Q_{7,10}$ for the partial-record station. Figure 5 is an example of this type of analysis for Pecore Creek near Hayes.

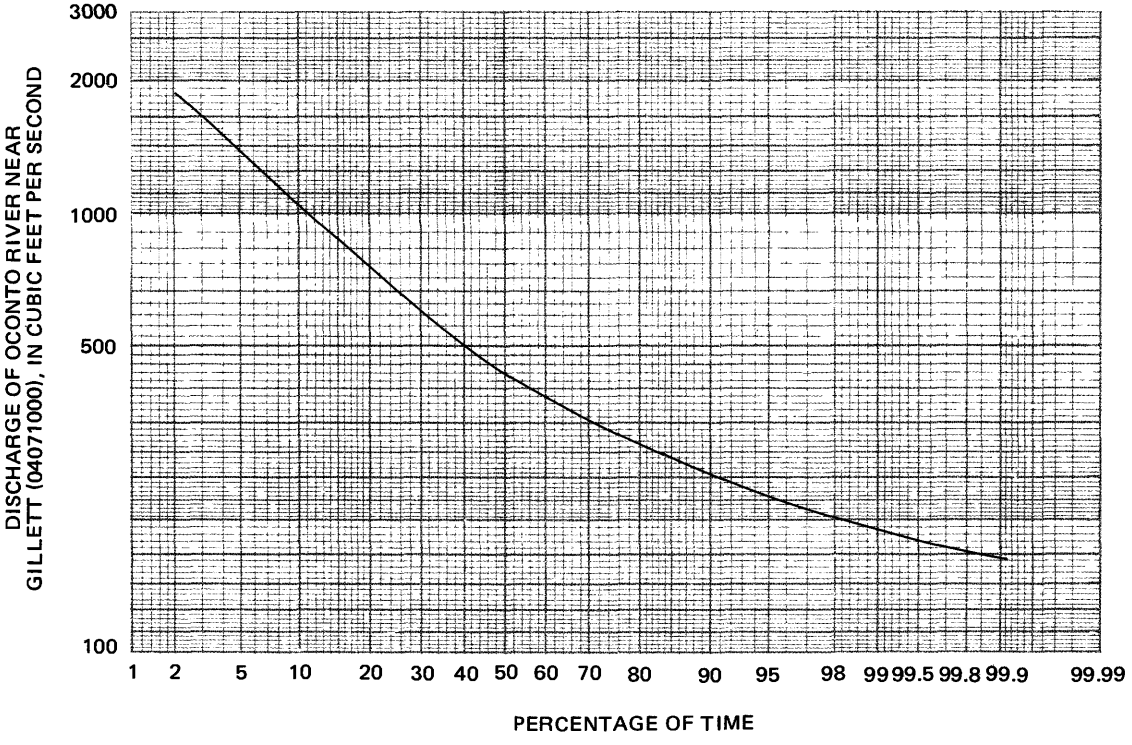

Figure 4. Flow-duration curve showing the percentage of time a given discharge was exceeded for the Oconto River near Gillett.

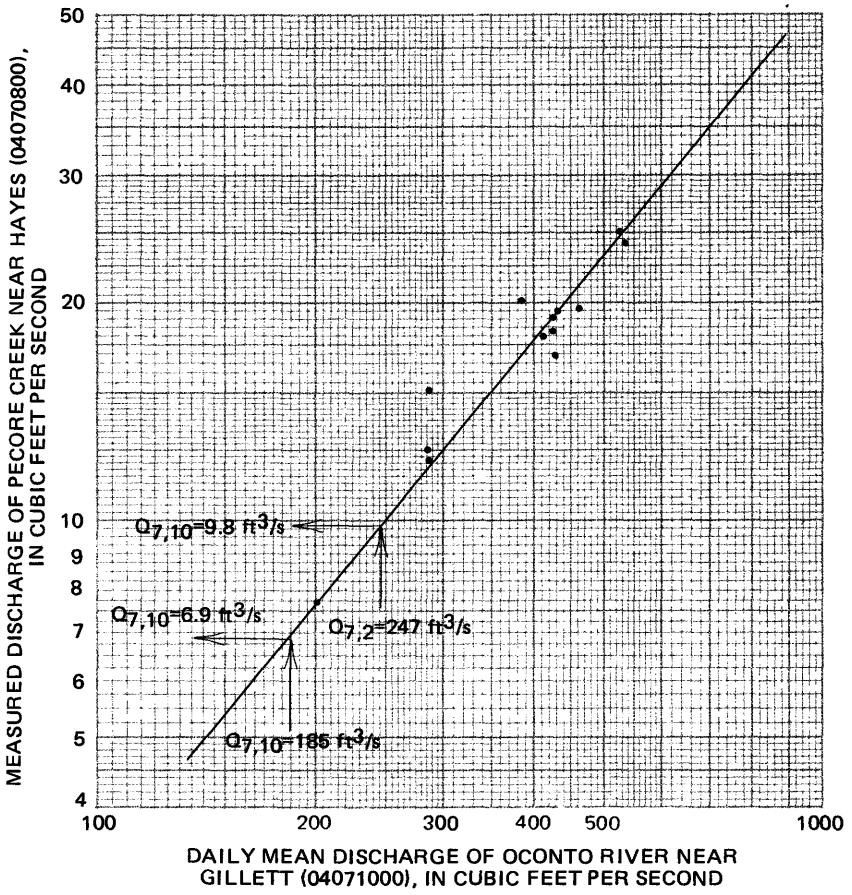

Figure 5. Method of estimating $Q_{7,2}$ and $Q_{7,10}$ at low-flow partial-record stations.

Miscellaneous sites

Base-flow measurements have been obtained at 160 miscellaneous sites in the basin as part of other water-resources investigations. Low-flow characteristics were estimated for most of these sites (table 1) by one of two methods.

Low-flow characteristics were estimated at 18 sites where at least 3 base-flow discharge measurements were available and a well-defined relationship existed between the measured discharge and the concurrent daily mean discharge at a nearby gaging station. Estimates of $Q_{7,2}$ and $Q_{7,10}$ were made by the same type of analysis that was used for partial-record stations. Figure 6 illustrates this type of analysis for McCaslin Brook near Lakewood. The slopes of the relation lines for miscellaneous sites were compared to established relation lines of nearby low-flow partial-record stations and other miscellaneous sites for uniformity. Generally, the relation lines should have approximately the same slope if the factors that influence low flow are uniform for the area. If the relation line at the site being studied was defined by three discharge measurements that had significant scatter, the line was adjusted to agree more closely with the better established relation line at a low-flow partial-record station.

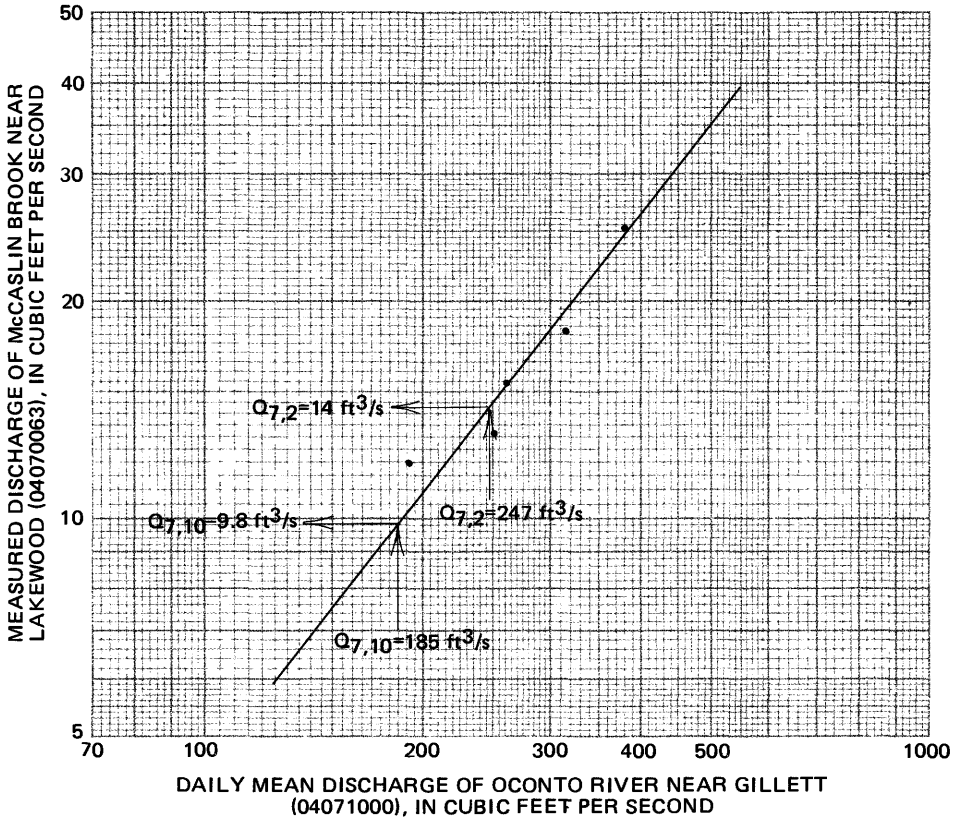

Figure 6. Method of estimating $Q_{7,2}$ and $Q_{7,10}$ at miscellaneous sites.

For 109 miscellaneous sites that have less than 3 discharge measurements, the low-flow characteristics were estimated by multiple-regression equations and are listed in table 1. The multiple-regression equations used and discussion of their development is presented later in the report.

Low-flow characteristics were not estimated at 33 miscellaneous sites for the following reasons: fewer than 3 discharge measurements were available, and the site had a drainage area greater than 150 mi^2, or multiple-regression equations provided estimates that were obviously poor when compared with data from nearby sites. Base-flow discharge measurements are listed for these sites.

ACCURACY

The low-flow characteristics in table 1 are estimates of flow expected in the future. Low-flow characteristics like other streamflow characteristics are only estimates, with their true value being difficult or impossible to determine. The estimates are based on data collected at each site and analyzed by several methods. Each estimate has an error associated with it. The error depends on the amount and kinds of data and on the analytical method. Two major sources of error are the time-sampling error in streamflow records and the error in the analytical method.

The accuracy of the low-flow estimates is approximated by the standard error of estimate (SE). The standard errors associated with the $Q_{7,2}$ ($SE_{7,2}$) and $Q_{7,10}$ ($SE_{7,10}$) are presented in table 1. One standard error above and below an estimate defines a range which should include the true value at 67 percent of the sites.

The methods used to obtain the standard errors are not precise, and the standard errors presented in the table should be used as a guide to indicate only a general level of confidence. In addition, there may be larger errors associated with low-flow estimates that approach zero.

Gaging stations

Accuracy of low-flow characteristics at gaging stations was determined according to Hardison and Moss (1972, p. 38).

A common length of record was used to compare the accuracy of low-flow characteristics determined from recorded discharge at gaging stations in the basin with that from gaging stations throughout the State. This analysis assumed that 10 years of record was available at each gaging station to determine the $Q_{7,10}$ discharge. An $SE_{7,10}$ of 10 percent was determined for the basin as compared with an $SE_{7,10}$ of 16 percent for gaging stations throughout the State.

Low-flow partial-record stations

The accuracy of low-flow characteristics at low-flow partial-record stations was determined by a method developed by Hardison and Moss (1972, p. 28). By this method, an average $SE_{7,10}$ of 32 percent was found for the 34 low-flow partial-record stations in the basin with $Q_{7,10}$ estimates greater than 0.1 ft^3/s. This compares to an average $SE_{7,10}$ of 29 percent for 265 low-flow partial-record stations throughout the State.

Miscellaneous sites

The accuracy of low-flow characteristics at miscellaneous sites was determined as an average value for the entire basin by analyzing data collected at low-flow partial-record stations. Three random base-flow measurements were selected from the 8 to 18 measurements available at each of the 34 low-flow partial-record stations with $Q_{7,10}$ estimates greater than 0.1 ft^3/s. Low-flow characteristics were determined from these three measurements by the same procedure used for miscellaneous sites. Then low-flow characteristics determined by this method were plotted against the low-flow characteristics based on 8 to 18 measurements. The SE between the two methods was determined from this plotted relationship. The overall SE includes the SE determined by the plotted relationship and the SE associated with the low-flow estimates based on 8 to 18 measurements. Assuming the two errors are independent, the overall SE can be approximated by taking the square root of the sum of the squares of the two different SE's. Use of this method resulted in an $SE_{7,2}$ of 27 percent and an $SE_{7,10}$ of 39 percent which is listed in table 1 as the average basin accuracy.

The average $SE_{7,2}$ and $SE_{7,10}$ values should be used cautiously for any particular site because the actual values for a subbasin could be significantly different from the mean for the basin. If the low-flow characteristics are

based on more than three discharge measurements, the accuracy will probably be improved and should approach the accuracy at low-flow partial-record stations as additional measurements are obtained.

The accuracy of the low-flow characteristics that were determined by multiple-regression equations at 109 miscellaneous sites is also an average value for the basin. The accuracy was determined as part of the multiple-regression analysis and is discussed later in the report (p. 14-16).

ESTIMATING LOW-FLOW CHARACTERISTICS AT UNGAGED SITES

A method is needed to transfer low-flow characteristics from gaged sites to ungaged sites because it is impossible to obtain actual streamflow data for all sites where the information is needed. The most practical transfer method relates low-flow characteristics to topographic, climatic, and aquifer characteristics of the drainage basin by multiple-regression analysis. Characteristics used and equations determined from the multiple-regression analysis are discussed in the following paragraphs. The method is outlined in detail by Thomas and Benson (1970).

STREAMFLOW CHARACTERISTICS

Streamflow characteristics that were studied are the $Q_{7,2}$ and $Q_{7,10}$, which are widely used to describe low flow. The multiple-regression analysis included low-flow characteristics for 35 low-flow partial-record stations and gaging stations, with $Q_{7,10}$ values larger than 0.1 ft^3/s. The streamflow characteristics are the dependent variable in the multiple-regression analysis.

BASIN CHARACTERISTICS

Differences in streamflow for various locations and times are caused by the differences in precipitation patterns and runoff characteristics. Climatic, topographic, and aquifer features are basin characteristics that were quantified to explain the variation in low flow. These indices are the independent variables in the multiple-regression analysis. The following list of basin characteristics contains a brief discussion of their effect on low flow and how the indices were determined.

Values for these basin characteristics for low-flow partial-record stations and selected gaging stations in the basin are listed in table 2.

Drainage area (A).--Size of the drainage area is one of the most significant characteristics in explaining differing streamflow between sites. The drainage area of a stream is that area, measured in a horizontal plane, that is enclosed by a drainage divide. Drainage areas, in square miles, were computed from U.S. Geological Survey topographic maps. Most drainage-area data for this study were obtained from Holmstrom (1972, 17a-19h).

Main-channel slope (S).--Main-channel slope (Benson, 1962 and 1964) is a characteristic that relates to differences in streamflow for different basins. The index of slope used in this analysis is the average slope, in feet per mile, between points 10 percent and 85 percent of the distance upstream from the gaged site to the drainage-basin divide.

Main-channel length (L).--Main-channel length is another landform characteristic that indicates basin shape in conjunction with drainage area of the basin. In estimating ground-water runoff to the stream, L can be viewed as describing the length of the vertical cross-sectional area of the porous aquifer material through which the flow occurs. Channel length was obtained from the U.S. Geological Survey topographic maps by measuring the total indicated blue-line length.

Basin storage (Bs).--Basin storage is that part of total drainage area occupied by lakes and marshes. Variations in streamflow can be caused by retention and release of water from basin storage. For some streams, runoff is delayed by storage, but total runoff is not reduced; whereas, on other streams prolonged retention allows increased evapotranspiration that results in decreased runoff. Essentially, the basin storage index is used in the analysis to reflect the effect of evapotranspiration on low flow.

The basin storage area was obtained from U.S. Geological Survey topographic maps. A value of 1.00 percent was added to all values of basin storage to avoid problems of using zero in the regression analysis.

Forest cover (F).--Forests affect streamflow in several ways. Their major influences on low flow are their transpiration and intercepting precipitation before it reaches the ground.

The forest cover index used in this analysis is the percentage of drainage area covered by forests as shown on U.S. Geological Survey topographic maps. A value of 1.00 percent was added to all values of forest cover to avoid problems of using zero in the regression analysis.

Mean annual precipitation (P).--Mean annual precipitation of a basin expresses the amount of water available for potential runoff. The precipitation that infiltrates the soil and passes through the unsaturated zone to the ground-water reservoir is the source of base flow for a stream. The mean annual precipitation, in inches, for each basin was computed from an isohyetal map determined from precipitation recorded at U.S. Weather Bureau stations (Wisconsin Statistical Reporting Service, 1967, p. 18).

A constant value of 20 in. was subtracted from each value for use in the regression analysis. This reduction provides constants and exponents in the regression equation that are more manageable.

Soil-infiltration rate (I).--Soil permeability influences the amount of direct runoff from a storm and the amount of water that infiltrates the soil. The permeability used is an average rate for the basin under average soil and moisture conditions.

Soil types and average permeability, in inches per hour, for each basin were determined from maps by Oakes and Hamilton (1973, sheet 1).

Mean annual snowfall (Sn).--Mean annual snowfall, like mean annual precipitation, is an indicator of water available for runoff. For each basin an average mean annual snowfall, in inches, was determined from an isohyetal map determined from snowfall recorded during 1930-59 (Wisconsin Statistical Reporting Service, 1970, p. 1) and average snowfall values from National Weather Service weather

stations in the basin (Wisconsin Crop Reporting Service, 1961). A constant of 20 in. was subtracted from each value to provide more manageable constants and exponents in the equations.

Base-flow index (Bf).--A good indicator of a stream's low-flow potential is a discharge measurement made during base-flow conditions, that is, when the streamflow is sustained entirely by ground-water discharge. Base-flow measurements provide considerable information about the characteristics of the aquifers supplying outflow to the stream. To use base-flow measurements, it is necessary to convert them to a uniform basis because measurements are generally obtained at various points on the base-flow recession curves. Discharge at the 90 percent flow duration was selected to represent the base-flow index value. To evaluate the technique and develop the necessary relationships for this study, sites were selected that had discharge measurements obtained for a low-flow investigation during August 12-15, 1969 (U.S. Geological Survey, 1971).

Measured discharges (Q_m) at low-flow partial-record stations and miscellaneous sites were converted to a unit discharge by dividing the values by their respective drainage areas (A). These values then were adjusted by a basin ratio to determine the base-flow index for each site. Basin ratios were determined for gaging stations on unregulated streams within the basin by dividing the discharge at 90 percent flow duration (Q_{90}) by the observed average daily discharge during August 12-15, 1969 (Q_r). Thus, base-flow index values were determined by the equation:

$$Bf = \frac{Q_m \, Q_{90}}{A \, Q_r}$$

Plate 2 shows the locations of 89 sites with base-flow index values, their respective drainage-area outlines, and their computed base-flow index values.

Hydraulic conductivity (K).--Hydraulic conductivity of an aquifer is the volume of water at the existing kinematic viscosity that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow. Average values of hydraulic conductivity were given to the drift in the basin; they are:

	Hydraulic conductivity {(gal/d)/ft^2}
Lake deposits (clay, silt, and sand)	1
Ground moraine (till; consists of clay, silt, sand, pebbles, cobbles, and boulders)	10
End moraine (till; includes some minor ice-contact stratified drift)	100
Outwash and ice-contact deposits (sand, sand and gravel)	2,500

Average values of hydraulic conductivity were obtained for each of the subbasins by the following procedures: (1) outline subbasin divide on glacial geology map (Oakes and Hamilton, 1973, sheet 1), (2) determine the subbasin for each of the drift types, (3) multiply these subareas by the hydraulic conductivity values assigned to the drift, and (4) divide the sum of these products by the sum of the subareas.

Drift thickness (H).--Drift serves as an aquifer that stores water for release to streams in the basin. The thickness of drift is generally less than 100 ft in most of the basin, but is as much as 500 ft at Gillett (Thwaites, 1943, p. 118). An average drift thickness for each subbasin was determined from the glacial geology and drift thickness map by Oakes and Hamilton (1973, sheet 1).

Transmissivity (T).--The water-transmitting capability of an aquifer is expressed in terms of transmissivity. Values of transmissivity were obtained by the product of hydraulic conductivity and drift thickness.

REGRESSION ANALYSIS

Multiple-regression analysis was used to determine the relationship between the low-flow characteristics (dependent variables) and the basin characteristics (independent variables). The analysis provides an equation, or series of equations, relating the dependent to the independent variables. This analysis defined mathematical equations of the form:

$$Q_T = a\, A^{b_1} B^{b_2} C^{b_3} \ldots\ldots\ldots\ldots\ldots N^{b_n},$$

where:

Q_T is a 7-day low-flow characteristic having a T-year recurrence interval, in cubic feet per second;

a is a regression constant defined by the regression analysis;

ABC.....N are drainage-basin characteristics; and

$b_1 b_2 b_3 \ldots\ldots b_n$ are regression coefficients defined by regression analysis.

The analysis also defined the standard error of estimate (SE) of the dependent variables and the statistical significance of each variable in the equation.

The standard error of estimate is a measure of the accuracy of the regression relationships. It describes the error between the defined relationship and the data included in the analysis. Values estimated by the regression equations are within one standard error above and below the true value at 67 percent of the sites.

Step-backward regression analyses were done by digital computer through the use of procedures outlined by Thomas and Benson (1970, p. 26-31). The equations with the lowest standard error of estimate with all variables significant at the 95 percent confidence level were selected as the best equations for prediction.

Two separate sets of analyses were done to develop prediction equations. One analysis included all basin characteristics except for base-flow index, and these equations are to be applied in areas where no streamflow data are available. The other analysis contained all basin characteristics, including the base-flow index. These equations are applicable for sites with 1 or 2 base-flow discharge measurements. All equations are applicable for sites with drainage areas less than 150 mi^2.

Sites without streamflow data

Two equations were selected from the analyses for sites without streamflow data. The equations and their respective standard errors of estimate are:

Equation	Standard error	
$Q_{7,2} = 9.14X10^{-5}A^{0.870}S^{0.862}T^{0.532}$	$SE_{7,2}$ = 60 percent	(1)
$Q_{7,10} = 1.22X10^{-5}A^{0.894}S^{1.06}T^{0.619}$	$SE_{7,10}$ = 78 percent	(2)

$Q_{7,2}$ is the 7-day, 2-year low flow, in cubic feet per second;

$Q_{7,10}$ is the 7-day, 10-year low flow, in cubic feet per second;

A is drainage area, in square miles;

S is main channel slope, in feet per mile; and

T is transmissivity, in gallons per day per foot.

Equations 1 and 2 apply to sites without streamflow data and for drainage areas less than 150 mi^2.

Sites with minimum streamflow data

Two equations were selected from the analyses for sites with minimum streamflow data (one or two base-flow discharge measurements) available. The equations and their respective standard errors of estimate are:

Equation	Standard error	
$Q_{7,2} = 0.886A^{1.04}Bf^{1.25}$	$SE_{7,2}$ = 32 percent	(3)
$Q_{7,10} = 0.627A^{1.08}Bf^{1.45}$	$SE_{7,10}$ = 49 percent	(4)

$Q_{7,2}$, $Q_{7,10}$, and A are as defined for equations 1 and 2;

Bf is the base-flow index, in cubic feet per second per square mile.

Equations 3 and 4 should provide estimates of $Q_{7,2}$ and $Q_{7,10}$ at approximately the SE indicated for sites where one or two base-flow discharge measurements have been made. In addition, for sites without streamflow data and not on small tributaries, equations 3 and 4 should provide more reliable estimates than equations 1 and 2 for the following conditions:

1. For ungaged sites in an area where the degree of uniformity among Bf values is high, as shown on plate 2.

2. For ungaged sites within the indicated subbasins on plate 2.

Equations 3 and 4 are applicable for use at sites with drainage areas less than 150 mi^2.

Verification of regression equations that use base-flow index

To test the validity of equations 3 and 4 for other flow conditions and time periods, the following comparison was done through the use of streamflow data collected at low-flow partial-record stations. Periods selected for analyses were: a low base-flow period (flow durations greater than 80 percent); a medium base-flow period (flow durations 60 to 80 percent); and a high base-flow period (flow durations less than 60 percent). Values of Bf were obtained as outlined previously. Substituting these new values of Bf into equations 3 and 4, estimates of $Q_{7,2}$ and $Q_{7,10}$ were determined for low-flow partial-record stations. When compared to the $Q_{7,2}$ and $Q_{7,10}$ values listed in table 1, the following SE's were determined for the estimated low-flow characteristics.

Regression analysis equations	SE from regression analysis	SE using various flow conditions to determine Bf		
		Low base flow	Medium base flow	High base flow
Equation 3	32 percent	32 percent	46 percent	47 percent
Equation 4	49 percent	39 percent	57 percent	54 percent

As illustrated, equation 4 provides results fairly close to the SE from the regression analysis for the three sets of flow conditions tested. The SE for equation 3 was greater than that predicted by the regression analysis for medium and high base-flow conditions. Hence, the equations provided $Q_{7,2}$ and $Q_{7,10}$ estimates within the predicted SE's from the regression analysis for low base-flow conditions and had slightly higher SE's for medium and high base-flow conditions.

Use of base-flow index values from plate 2 in equation 4 was also tested for application at sites without base-flow discharge measurements. The $Q_{7,10}$ values were computed for 15 miscellaneous sites (3 or more discharge measurements) using Bf values from plate 2 and equation 4 and compared to the observed $Q_{7,10}$ values (determined by graphical regressions) for these sites. The computed $Q_{7,10}$ values were compared graphically to the observed $Q_{7,10}$ values and this analysis resulted in an $SE_{7,10}$ of 66 percent for the 15 sites tested. This is slightly higher than the $SE_{7,10}$ of 49 percent predicted for equation 4.

APPLICATION OF ESTIMATING PROCEDURES

Sites without streamflow data

Computation of low-flow characteristics at an ungaged site may be made as follows:

1. If the conditions listed on page 16 are met, use steps 2 through 4 and equations 3 and 4 (page 15) to determine the low-flow characteristics at ungaged sites; otherwise go to step 5.

2. Determine base-flow index from plate 2.

3. Compute drainage area as indicated on page 11.

4. Substitute these values into equations 3 and 4 and solve for the low-flow characteristics.

5. Use equations 1 and 2 (page 15) to determine low-flow characteristics for sites where the conditions outlined on page 16 cannot be met.

6. Compute the drainage area (page 11), slope (page 11), and transmissivity (page 14).

7. Substitute the values obtained in step 6 into equations 1 and 2 and solve for the low-flow characteristics.

For ungaged sites where the degree of uniformity of base-flow index values is high, Bf can be determined from plate 2 and equations 3 and 4 can be used to determine the low-flow characteristics. For example, to determine the low-flow characteristics for North Fork Thunder River just upstream from its confluence with South Fork Thunder River near Lakewood, the applicable equations are:

$$Q_{7,2} = 0.886A^{1.04}Bf^{1.25} \quad (3)$$

$$Q_{7,10} = 0.627A^{1.08}Bf^{1.45} \quad (4)$$

Drainage area was determined as outlined on page 11 and is 30.8 mi^2.

The base-flow index is determined from plate 2 and is a weighted average based on drainage area:

$$Bf = \frac{A_1Bf_1 + A_2Bf_2}{A_1 + A_2}$$

where: A_1 = drainage area at station 04068100 = 17.0 mi^2,

Bf_1 = base-flow index at station 04068100 = 0.49,

A_2 = intervening drainage area between site of interest and station 04068100 = 13.8 mi^2,

Bf_2 = base-flow index for intervening area between site of interest and station 04068100 = 0.48.

$$Bf = \frac{A_1Bf_1 + A_2Bf_2}{A_1 + A_2}$$

$$Bf = \frac{17.0(0.49) + 13.8(0.48)}{17.0 + 13.8}$$

$$Bf = \frac{8.33 + 6.62}{30.8} = \frac{15.0}{30.8}$$

$$Bf = 0.49$$

Substituting these values into their respective equations:

$$Q_{7,2} = 0.886A^{1.04}Bf^{1.25}$$
$$= 0.886(30.8)^{1.04}(0.49)^{1.25}$$
$$= 0.886(35.3)(0.41)$$
$$= 13 \text{ ft}^3/\text{s}$$

$$Q_{7,10} = 0.627A^{1.08}Bf^{1.45}$$
$$= 0.627(30.8)^{1.08}(0.49)^{1.45}$$
$$= 0.627(40.5)(0.36)$$
$$= 9.1 \text{ ft}^3/\text{s}$$

Low-flow characteristics for ungaged sites in which conditions on page 16 are not met can be determined by regression equations 1 and 2. The low-flow characteristics of Medicine Brook at mouth near Athelstane are determined to illustrate the application of equations 1 and 2.

The applicable equations for an ungaged area are:

$$Q_{7,2} = 9.14X10^{-5}A^{0.870}S^{0.862}T^{0.532} \quad (1)$$

$$Q_{7,10} = 1.22X10^{-5}A^{0.894}S^{1.06}T^{0.619} \quad (2)$$

The drainage area for this site as outlined on page 11 is 12.1 mi^2.

The slope (page 11) is 15.7 ft/mi.

The hydraulic conductivity and drift thickness are determined as outlined on pages 13 and 14. Approximately 9.5 mi^2 of the basin contains outwash and

ice-contact deposits {K = 2,500 (gal/d)/ft^2} and 2.6 mi^2 contains end moraine {K = 100 (gal/d)/ft^2}. The weighted average value of hydraulic conductivity (K) for the basin is about $\frac{9.5X2,500 + 2.6X100}{12.1}$ = 2,000 (gal/d)/ft^2. The drift thickness (H) is about 100 ft. Therefore, transmissivity (T) = (K)(H) = 2,000X100 = 200,000 (gal/d)/ft.

Substituting these values into their respective equations:

$$Q_{7,2} = 9.14X10^{-5}A^{0.870}S^{0.862}T^{0.532}$$
$$= 9.14X10^{-5}(12.1)^{0.870}(15.7)^{0.862}(200,000)^{0.532}$$
$$= 9.14X10^{-5}(8.75)(10.7)(660)$$
$$= 5.6 \text{ ft}^3/\text{s}$$

$$Q_{7,10} = 1.22X10^{-5}A^{0.894}S^{1.06}T^{0.619}$$
$$= 1.22X10^{-5}(12.1)^{0.894}(15.7)^{1.06}(200,000)^{0.619}$$
$$= 1.22X10^{-5}(9.29)(18.5)(1,900)$$
$$= 4.0 \text{ ft}^3/\text{s}$$

Sites with minimum streamflow data

Computation of the low-flow characteristics at sites with minimum streamflow data available is made as follows:

1. Use equations 3 and 4 listed on page 15 to determine the low-flow characteristics.
2. Determine from plate 1 and table 1 the type of streamflow data that are available.
3. If the streamflow measurements are made during base-flow conditions, the BF should be determined as outlined on page 13.
4. Compute drainage area as outlined on page 11.
5. Substitute values determined in steps 3 and 4 into equations 3 and 4.

To determine low-flow characteristics at sites using streamflow measurements, the following procedure at the site, Lilypad Creek near Tipler (station number 040636535), is used as an example.

The applicable equations are:

$$Q_{7,2} = 0.886A^{1.04}Bf^{1.25}$$

$$Q_{7,10} = 0.627A^{1.08}Bf^{1.45}$$

Drainage area (A) obtained from table 1, page 32, is 10.0 mi^2.

Following the same general procedure indicated on page 13, a Bf value was determined by the equation:

$$Bf = \frac{Q_m \, Q_{90}}{A \, Q_r}$$

where: Q_m is the measured discharge, 3.26 ft^3/s, of Lilypad Creek near Tipler on September 23, 1966;

A is the drainage area, 10.0 mi^2, of Lilypad Creek near Tipler;

Q_r is the recorded discharge at a nearby continuous-record gaging station. Referring to plate 1, station 04063700, Popple River near Fence is the closest unregulated gaging station. From U.S. Geological Survey, 1967, the daily mean discharge for September 23, 1966, was 31 ft^3/s; and the

Q_{90} for Popple River near Fence is 33 ft^3/s, obtained from table 1.

Substituting these values in the equation:

$$Bf = \frac{Q_m \, Q_{90}}{A \, Q_r}$$

$$= \frac{(3.26)(33)}{(10.0)(31)}$$

$$= 0.347$$

The low-flow characteristics then can be determined by substituting these values in their respective equations.

$$Q_{7,2} = 0.886A^{1.04}Bf^{1.25}$$

$$= (0.886)(10.0)^{1.04}(0.347)^{1.25}$$

$$= (0.886)(11.0)(0.266)$$

$$= 2.6 \text{ ft}^3/\text{s}$$

$$Q_{7,10} = 0.627A^{1.08}Bf^{1.45}$$

$$= (0.627)(10.0)^{1.08}(0.347)^{1.45}$$

$$= (0.627)(12.0)(0.216)$$

$$= 1.6 \text{ ft}^3/\text{s}$$

COMPARISON OF METHODS

If estimates of low-flow characteristics are required at sites other than those presented in this report, the user interested in the data can evaluate the need for the low-flow information and then select a method based on following criteria. Generally the most important criteria in choosing a method are: accuracy requirements of the low-flow characteristics; time available to collect and analyze data; and cost of data collection and analyses.

Table 3 compares the methods available and provides: type of data required; number of sites where required data are available; time required to collect data; analytical method used to determine the low-flow characteristics; and standard error of estimate associated with the method. If a high degree of reliability is required of low-flow characteristics and sufficient time is available for data collection, a gaging station or low-flow partial-record station can be operated. If a lesser degree of reliability is acceptable at a site or if if time and money are limited, three base-flow discharge measurements can be obtained or one of the regression equations may be sufficient.

SUMMARY

Low-flow characteristics were determined for 12 gaging stations, 37 low-flow partial-record stations, and 127 miscellaneous sites.

The method used in estimating the low-flow characteristics was dependent on the amount of discharge data available at the site. The low-flow characteristics at gaging stations having 10 or more years of record were determined by a log-Pearson Type III frequency analysis or plotting-position analysis. At low-flow partial-record stations (10 or more discharge measurements) or miscellaneous sites with 3 or more discharge measurements, a graphical regression was used to determine the $Q_{7,2}$ and $Q_{7,10}$. At miscellaneous sites with one or two discharge measurements and at ungaged sites (no discharge measurements), multiple-regression equations were developed to determine the low-flow characteristics. The standard error of estimate of the 7-day, 10-year low flow ($SE_{7,10}$) ranged from 6 to 78 percent, depending on the type of data available. The methods used to determine the standard errors are not precise and are only a relative guide to indicate a general level of confidence.

Multiple-regression equations were developed to determine the low-flow characteristics at ungaged sites (no discharge measurements) and at sites with minimum streamflow data (1 or 2 base-flow discharge measurements). The equation for sites with minimum streamflow data available had an $SE_{7,10}$ of 49 percent compared with 78 percent for the equation for ungaged sites. The most significant characteristics in explaining the variation in low flow were drainage area, slope, transmissivity, and base-flow index.

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Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin

04059800 Brule Creek near Alvin, Wis.

Location.--NE¼NW¼ sec. 34, T. 41 N., R. 13 E., Forest County, on U.S. Forest Service Road 2458, 1.6 mi northwest of Alvin.

Drainage area.--35.6 mi^2. Tributary to.--Elvoy Creek.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--12.1 ft^3/s, Oct. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 15 ft^3/s, $Q_{7,10}$ = 12 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 12 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 20 percent, $SE_{7,10}$ = 21 percent.

04059900 Allen Creek near Alvin, Wis.

Location.--NE¼NW¼ sec. 7, T. 40 N., R. 14 E., Forest County, on State Highway 70, 2.2 mi southeast of Alvin.

Drainage area.--1.22 mi^2. Tributary to.--Allen Creek.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--1.17 ft^3/s, Oct. 7, 1964.

Low-flow frequency.--$Q_{7,2}$ = 1.3 ft^3/s, $Q_{7,10}$ = 0.85 ft^3/s.

Basis of estimate.--Related to Brule River near Florence using 13 discharge measurements made during the period 1962-70.

Accuracy.--$SE_{7,2}$ = 13 percent, $SE_{7,10}$ = 23 percent.

04060990 Montagne Creek near Florence, Wis.

Location.--SE¼SW¼ sec. 11, T. 40 N., R. 17 E., Florence County, at country road, 4.8 mi northwest of Florence.

Drainage area.--14.6 mi^2. Tributary to.--Brule River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--3.97 ft^3/s, Oct. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 4.3 ft^3/s, $Q_{7,10}$ = 3.3 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 12 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 28 percent.

04061000 Brule River near Florence, Wis.

Location.--SE¼SE¼ sec. 11, T. 41 N., R. 32 W., Iron County, Mich., and Florence County, Wis., on left bank 40 ft upstream from highway bridge, 1.1 mi upstream from Paint River, 2.6 mi north of Florence.

Drainage area.--380 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--January 1914 to February 1916, June 1944 to September 1977.

Average discharge.--34 years, 358 ft^3/s.

Extremes.--Maximum discharge, 4,700 ft^3/s July 2, 1953; minimum discharge, 118 ft^3/s Dec. 2, 1963 (discharge measurement).

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	205	178	166	157	148	143
14	211	183	171	162	152	147
30	220	191	179	170	161	155
60	231	203	190	181	172	166
90	240	210	197	186	176	169

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time

Percent	2	5	10	20	30	40	50
ft^3/s	1,100	770	575	425	360	323	298
Percent	60	70	80	90	95	98	99.9
ft^3/s	275	252	230	209	193	181	160

Accuracy.--$SE_{7,2}$ = 3 percent, $SE_{7,10}$ = 4 percent.

Remarks.--Discharge contains some mine pumpage.

04063000 Menominee River near Florence, Wis.

Location.--SW¼NE¼ sec. 16, T. 41 N., R. 31 W., Iron County, Mich., on left bank, 0.5 mi downstream from confluence of Brule and Michigamme Rivers, 3.5 mi northeast of Florence.

Drainage area.--1,760 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--January 1914 to September 1977.

Average discharge.--63 years, 1,793 ft^3/s.

Extremes.--Maximum discharge, 19,500 ft^3/s Apr. 26, 1960; minimum discharge, 38 ft^3/s Aug. 21, 1962; minimum daily discharge, 57 ft^3/s Sept. 26, 1975.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	824	624	525	449	371	324
14	856	683	604	545	483	446
30	915	744	669	612	555	520
60	991	808	730	673	615	581
90	1,050	865	788	733	678	646

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time

Percent	2	5	10	20	30
ft^3/s	5,800	4,300	3,160	2,210	1,860
Percent	40	50	60	70	80
ft^3/s	1,620	1,430	1,280	1,120	990
Percent	90	95	98	99.9	
ft^3/s	840	730	640	375	

Accuracy.--$SE_{7,2}$ = 4 percent, $SE_{7,10}$ = 7 percent.

Remarks.--Flow regulated by powerplants, Michigamme reservoir on Michigamme River, and by many smaller reservoirs upstream from station.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063600 Pine River near Three Lakes, Wis.

Location.--SE¼NW¼ sec. 30, T. 39 N., R. 13 E., Forest County, on U.S. Forest Service Road 2182, 12.4 mi northeast of Three Lakes.

Drainage area.--14.5 mi^2. Tributary to.--Menominee River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.15 ft^3/s, Aug. 5, 1975; 0 ft^3/s, ponded from beaver dam downstream, Sept. 1, 1976 and Oct. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 0.35 ft^3/s, $Q_{7,10}$ = 0.13 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 14 discharge measurements made during the period 1966-77.

Accuracy.--$SE_{7,2}$ = 77 percent, $SE_{7,10}$ = 113 percent.

04063602 Kimball Creek near Three Lakes, Wis.

Location.--SW¼NW¼ sec. 27, T. 39 N., R. 12 E., Forest County, at U.S. Forest Service Road 2176, 9.3 mi northeast of Three Lakes.

Drainage area.--3.09 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 0.48 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.34 ft^3/s, $Q_{7,10}$ = 0.18 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063604 Kimball Creek near Three Lakes, Wis.

Location.--SE¼SW¼ sec. 19, T. 39 N., R. 13 E., Forest County, at mouth, 12.7 mi northeast of Three Lakes.

Drainage area.--13.2 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 4.21 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 0.74 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063606 Pine River near Alvin, Wis.

Location.--NW¼NW¼ sec. 20, T. 39 N., R. 13 E., Forest County, at U.S. Forest Service Road 2174, 9.7 mi southwest of Alvin.

Drainage area.--30.0 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 5.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.1 ft^3/s, $Q_{7,10}$ = 2.4 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063610 McDonald Creek near Alvin, Wis.

Location.--NW¼NE¼ sec. 17, T. 39 N., R. 13 E., Forest County, at U.S. Forest Service Road 2174, 8.8 mi southwest of Alvin.

Drainage area.--11.6 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 6.93 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.4 ft^3/s, $Q_{7,10}$ = 4.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063611 McDonald Creek near Alvin, Wis.

Location.--SE¼NW¼ sec. 16, T. 39 N., R. 13 E., Forest County, 8.9 mi southwest of Alvin.

Drainage area.--13.5 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 9.21 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics. Additional discharge measurements are required.

04063630 Pine River near Alvin, Wis.

Location.--SE¼SW¼ sec. 35, T. 40 N., R. 13 E., Forest County, end of trail, 6.1 mi south of Alvin.

Drainage area.--50.9 mi^2. Tributary to.--Menominee River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--15.1 ft^3/s, Feb. 16, 1967.

Low-flow frequency.--$Q_{7,2}$ = 11 ft^3/s, $Q_{7,10}$ = 7.6 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 17 daily mean discharges and discharge measurements made during the period 1967-68.

Accuracy.--$SE_{7,2}$ = 13 percent, $SE_{7,10}$ = 16 percent.

Remarks.--The station was operated as a continuous-record gaging station during the period October 1966-May 1968. The records were not published.

04063631 Pine River near Alvin, Wis.

Location.--SE¼NW¼ sec. 35, T. 40 N., R. 13 E., Forest County, at trail, 5.3 mi south of Alvin.

Drainage area.--51.5 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 15.9 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 8.8 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063635 North Branch Pine River near Alvin, Wis.

Location.--NW¼NE¼ sec. 26, T. 40 N., R. 12 E., Forest County, at U.S. Forest Service Road 2176, 7.5 mi southwest of Alvin.

Drainage area.--12.6 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 7, 1966, 1.22 ft^3/s, Aug. 17, 1967, 4.93 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.55 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063637 North Branch Pine River near Alvin, Wis.

Location.--NW¼SE¼ sec. 18, T. 40 N., R. 13 E., Forest County, at trail, 4.8 mi southwest of Alvin.

Drainage area.--19.7 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 11.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.9 ft^3/s, $Q_{7,10}$ = 2.4 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063638 North Branch Pine River near Alvin, Wis.

Location.--SW¼SW¼ sec. 16, T. 40 N., R. 13 E., Forest County, near U.S. Forest Service Road 2174, 2.9 mi upstream from East Boundary Road, 3.9 mi southwest of Alvin.

Drainage area.--23.9 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 4, 1966, 13.0 ft^3/s; Aug. 17, 1967, 13.6 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.0 ft^3/s, $Q_{7,10}$ = 3.9 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063639 North Branch Pine River near Alvin, Wis.

Location.--SW¼NE¼ sec. 21, T. 40 N., R. 13 E., Forest County, near U.S. Forest Service Road 2174, 4.0 mi southwest of Alvin.

Drainage area.--26.8 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 4, 1966, 13.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 7.8 ft^3/s, $Q_{7,10}$ = 4.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Remarks.--$Q_{7,2}$ estimate may be too high. See station 04063639.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063640 North Branch Pine River near Alvin, Wis.

Location.--NE¼SE¼ sec. 21, T. 40 N., R. 13 E., Forest County, on right bank, 10 ft upstream from bridge on forest road at Windsor Dam, 4.0 mi southwest of Alvin.

Drainage area.--27.8 mi^2. Tributary to.--Pine River.

Type of site.--Low-flow partial-record station.

Minimum discharge recorded.--8.9 ft^3/s, Dec. 2, 1966.

Low-flow frequency.--$Q_{7,2}$ = 7.0 ft^3/s, $Q_{7,10}$ = 4.9 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 18 daily mean discharges and discharge measurements made during the period 1967-68.

Accuracy.--$SE_{7,2}$ = 16 percent, $SE_{7,10}$ = 21 percent.

Remarks.--This station was operated as a continuous-record gaging station during the period October 1966-May 1968. The records were not published.

04063641 North Branch Pine River near Alvin, Wis.

Location.--NE¼NW¼ sec. 23, T. 40 N., R. 13 E., Forest County, 3.2 mi south of Alvin.

Drainage area.--31.1 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 4, 1966, 18.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 11 ft^3/s, $Q_{7,10}$ = 7.3 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063643 Pine River near Alvin, Wis.

Location.--NE¼NE¼ sec. 35, T. 40 N., R. 13 E., Forest County, at State Highway 55, 0.5 mi downstream from North Branch, 5.2 mi south of Alvin.

Drainage area.--86.0 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 22.7 ft^3/s; Aug. 17, 1967, 44.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 21 ft^3/s, $Q_{7,10}$ = 14 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 3 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

04063644 Pine River near Alvin, Wis.

Location.--NE¼NE¼ sec. 1, T. 39 N., R. 13 E., Forest County, at trail, 6.3 mi south of Alvin.

Drainage area.--89.6 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 46.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 24 ft^3/s, $Q_{7,10}$ = 16 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063646 Pine River near Alvin, Wis.

Location.--SE¼NE¼ sec. 18, T. 39 N., R. 14 E., Forest County, 0.2 mi upstream from Pine Creek, 8.7 mi south of Alvin.

Drainage area.--93.3 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 48.4 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063647 Sawyer Creek near Alvin, Wis.

Location.--SW¼SW¼ sec. 14, T. 39 N., R. 13 E., Forest County, at U.S. Forest Service Road 2182, 9.1 mi south of Alvin.

Drainage area.--1.48 mi^2. Tributary to.--Jones Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 0.56 ft^3/s; Aug. 17, 1967, 0.94 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.36 ft^3/s, $Q_{7,10}$ = 0.22 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063648 Jones Creek near Alvin, Wis.

Location.--SE¼NE¼ sec. 13, T. 39 N., R. 13 E., Forest County, at U.S. Forest Service Road 3854, 8.7 mi south of Alvin.

Drainage area.--13.6 mi^2. Tributary to.--Pine Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 6.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.1 ft^3/s, $Q_{7,10}$ = 1.2 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063649 Pine Creek near Alvin, Wis.

Location.--SE¼NE¼ sec. 18, T. 39 N., R. 14 E., Forest County, at mouth, 8.9 mi south of Alvin.

Drainage area.--19.2 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 7.20 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.8 ft^3/s, $Q_{7,10}$ = 1.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063650 Pine River near Long Lake, Wis.

Location.--SE¼NE¼ sec. 18, T. 39 N., R. 14 E., Forest County, at forest road, 5.5 mi northwest of Long Lake.

Drainage area.--113 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 20, 1966, 28.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 26 ft^3/s, $Q_{7,10}$ = 18 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063652 Pine River near Long Lake, Wis.

Location.--NW¼NW¼ sec. 15, T. 39 N., R. 14 E., Forest County, downstream from Kingstone Creek, 3.5 mi west of Long Lake.

Drainage area.--124 ft^3/s. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 62.3 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics. Additional discharge measurements are required.

040636525 Pine River near Long Lake, Wis.

Location.--NW¼SW¼ sec. 11, T. 39 N., R. 14 E., Forest County, 3.0 mi northwest of Long Lake.

Drainage area.--125 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 6, 1966, 56.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 34 ft^3/s, $Q_{7,10}$ = 24 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063653 Pine River near Long Lake, Wis.

Location.--NW¼SE¼ sec. 12, T. 39 N., R. 14 E., Forest County, at U.S. Forest Service Road 2169, 2.2 mi northwest of Long Lake.

Drainage area.--127 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 20, 1966, 47.1 ft^3/s; Aug. 17, 1967, 64.5 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 34 ft^3/s, $Q_{7,10}$ = 24 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 3 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

040636535 Lilypad Creek near Tipler, Wis.

Location.--SE¼SE¼ sec. 14, T. 40 N., R. 14 E., Forest County, at U.S. Forest Service Road 2423, 3.6 mi northwest of Tipler.

Drainage area.--10.0 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 23, 1966, 3.26 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.6 ft^3/s, $Q_{7,10}$ = 1.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063654 Stevens Creek near Tipler, Wis.

Location.--SE¼SW¼ sec. 19, T. 40 N., R. 15 E., Florence County, on trail, 1.6 mi west of Tipler.

Drainage area.--18.2 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 22, 1966, 5.81 ft^3/s; Aug. 18, 1967, 11.1 ft^3/s; Aug. 15, 1969, 6.89 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.7 ft^3/s, $Q_{7,10}$ = 3.3 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 3 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

040636545 Meadowbrook Creek near Tipler, Wis.

Location.--SW¼SE¼ sec. 35, T. 40 N., R. 14 E., Forest County, at U.S. Forest Service Road 2169, 3.7 mi southwest of Tipler.

Drainage area.--8.98 mi^2. Tributary to.--Stevens Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 23, 1966, 2.45 ft^3/s; Aug. 18, 1967, 3.66 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.5 ft^3/s, $Q_{7,10}$ = 0.90 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063655 Stevens Creek near Long Lake, Wis.

Location.--SW¼NW¼ sec. 6, T. 39 N., R. 15 E., Florence County, at mouth, 3.2 mi north of Long Lake.

Drainage area.--30.9 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 15.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 5.4 ft^3/s, $Q_{7,10}$ = 3.3 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

040636555 Pine River tributary near Tipler, Wis.

Location.--SW¼NW¼ sec. 5, T. 39 N., R. 15 E., Florence County, at mouth, 2.4 mi southwest of Tipler.

Drainage area.--3.97 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 0.51 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.11 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063656 Johnson Creek near Tipler, Wis.

Location.--NE¼SE¼ sec. 5, T. 39 N., R. 15 E., Florence County, at mouth, 2.5 mi south of Tipler.

Drainage area.--7.95 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 3.89 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.2 ft^3/s, $Q_{7,10}$ = 0.72 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063657 Pine River near Tipler, Wis.

Location.--SW¼SW¼ sec. 4, T. 39 N., R. 15 E., Florence County, at U.S. Forest Service Road 2155, 2.6 mi south of Tipler.

Drainage area.--171 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 66.6 ft^3/s; Aug. 18, 1967, 92.3 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

040636575 Coldwater Creek near Long Lake, Wis.

Location.--SW¼NW¼ sec. 25, T. 39 N., R. 14 E., Forest County, at U.S. Forest Service Road 2404, 1.5 mi southwest of Long Lake.

Drainage area.--3.59 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 1.05 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.29 ft^3/s, $Q_{7,10}$ = 0.14 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063658 Long Lake outlet at Long Lake, Wis.

Location.--NE¼NW¼ sec. 19, T. 39 N., R. 15 E., Florence County, at U.S. Forest Service Road 2168, at Long Lake.

Drainage area.--10.1 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 5.11 ft^3/s; Aug. 17, 1967, 6.30 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.4 ft^3/s, $Q_{7,10}$ = 2.2 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

040636585 Fay Lake outlet near Long Lake, Wis.

Location.--SE¼NW¼ sec. 15, T. 39 N., R. 15 E., Florence County, at forest road, 3.3 mi northeast of Long Lake.

Drainage area.--20.1 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 20, 1966, 6.21 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.6 ft^3/s, $Q_{7,10}$ = 2.9 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063659 Fay Lake outlet near Tipler, Wis.

Location.--SE¼NE¼ sec. 10, T. 39 N., R. 15 E., Florence County, at mouth, 3.6 mi southeast of Tipler.

Drainage area.--22.2 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 10.8 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

040636595 Pine River tributary near Tipler, Wis.

Location.--NE¼NE¼ sec. 10, T. 39 N., R. 15 E., Florence County, at mouth, 3.2 mi southeast of Tipler.

Drainage area.--4.16 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 1.47 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.42 ft^3/s, $Q_{7,10}$ = 0.22 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063660 Pine River near Tipler, Wis.

Location.--NW¼NE¼ sec. 1, T. 39 N., R. 15 E., Florence County, at U.S. Forest Service Road 2156, 4.1 mi southeast of Tipler.

Drainage area.--204 mi^2. Tributary to.--Menominee River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--65 ft^3/s, Sept. 13, 1967.

Low-flow frequency.--$Q_{7,2}$ = 48 ft^3/s, $Q_{7,10}$ = 34 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 17 daily mean discharges and discharge measurements made during the period 1967-68.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent.

Remarks.--The station was operated as a continuous-record gaging station during the period October 1966-May 1968. The records were not published.

04063662 Lauterman Creek near Florence, Wis.

Location.--SE¼NE¼ sec. 32, T. 40 N., R. 16 E., Florence County, at U.S. Forest Service Road 2154, 6.0 mi southeast of Tipler, 12 mi west of Florence.

Drainage area.--14.0 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 2.55 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063663 Lauterman Creek near Tipler, Wis.

Location.--SW¼NE¼ sec. 4, T. 39 N., R. 16 E., Florence County, at mouth, 6.8 mi east of Tipler.

Drainage area.--14.5 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 0.90 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063664 Pine River near Tipler, Wis.

Location.--SE¼NE¼ sec. 4, T. 39 N., R. 16 E., Florence County, 600 ft downstream from Lauterman Creek, 6.9 mi east of Tipler.

Drainage area.--227 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 104 ft^3/s.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

040636645 Kieper Creek near Florence, Wis.

Location.--SW¼SW¼ sec. 35, T. 40 N., R. 16 E., Florence County, at mouth, 10.4 mi west of Florence.

Drainage area.--3.06 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 0.98 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.27 ft^3/s, $Q_{7,10}$ = 0.14 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063665 Wakefield Creek near Florence, Wis.

Location.--NW¼SW¼ sec. 25, T. 40 N., R. 16 E., Florence County, at State Highway 70, 9.2 mi west of Florence.

Drainage area.--2.58 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 0.76 ft^3/s; Aug. 19, 1967, 1.19 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.49 ft^3/s, $Q_{7,10}$ = 0.28 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

040636655 Pine River near Florence, Wis.

Location.--SW¼NW¼ sec. 31, T. 40 N., R. 17 E., Florence County, at forest road, 8.4 mi west of Florence.

Drainage area.--239 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 120 ft^3/s.

04063666 Sevenmile Creek near Florence, Wis.

Location.--SE¼SE¼ sec. 28, T. 40 N., R. 17 E., Florence County, at State Highway 70, 5.6 mi west of Florence.

Drainage area.--1.66 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 0.39 ft^3/s; Aug. 19, 1967, 0.84 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.28 ft^3/s, $Q_{7,10}$ = 0.16 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063667 Pine River near Florence, Wis.

Location.--SW¼NE¼ sec. 3, T. 39 N., R. 17 E., Florence County, at end of trail, 5.2 mi southwest of Florence.

Drainage area.--248 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 129 ft^3/s.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

040636675 Pine River near Florence, Wis.

Location.--NE¼NW¼ sec. 11, T. 39 N., R. 17 E., Florence County, at cabin 5.2 mi southwest of Florence.

Drainage area.--249 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 91.6 ft^3/s.

04063668 Pine River tributary near Florence, Wis.

Location.--NE¼SE¼ sec. 2, T. 39 N., R. 17 E., Florence County, at forest road, 4.4 mi southwest of Florence.

Drainage area.--7.43 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 0.71 ft^3/s; Aug. 17, 1967, 3.81 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.41 ft^3/s, $Q_{7,10}$ = 0.20 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063669 Seidel Creek near Fence, Wis.

Location.--NE¼SE¼ sec. 15, T. 39 N., R. 17 E., Florence County, at forest road, 8.7 mi northeast of Fence.

Drainage area.--4.37 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 0.42 ft^3/s; Aug. 18, 1967, 1.31 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.32 ft^3/s, $Q_{7,10}$ = 0.16 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063670 Pine River near Florence, Wis.

Location.--SW¼SE¼ sec. 15, T. 39 N., R. 17 E., Florence County, at State Highway 101, 6.3 mi southwest of Florence.

Drainage area.--265 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 97.5 ft^3/s.

04063671 Pine River near Florence, Wis.

Location.--SW¼SW¼ sec. 23, T. 39 N., R. 17 E., Florence County, just upstream from Popple River, 7.1 mi southwest of Florence.

Drainage area.--266 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 16, 1967, 143 ft^3/s.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063672 Popple River near Newald, Wis.

Location.--SW¼SW¼ sec. 4, T. 38 N., R. 14 E., Forest County, at U.S. Forest Service Road 2167, 4.7 mi northwest of Newald.

Drainage area.--36.5 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 3.24 ft^3/s; Aug. 17, 1967, 13.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.0 ft^3/s, $Q_{7,10}$ = 1.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

040636725 Little Popple River at Newald, Wis.

Location.--SE¼SE¼ sec. 27, T. 38 N., R. 14 E., Forest County, at U.S. Forest Service Road 2166, 0.6 mi west of Newald.

Drainage area.--9.29 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 20, 1966, 0.52 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.25 ft^3/s, $Q_{7,10}$ = 0.11 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063673 Little Popple River near Newald, Wis.

Location.--SW¼NE¼ sec. 12, T. 38 N., R. 14 E., Forest County, at country road, 3.7 mi north of Newald.

Drainage area.--14.0 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 20, 1966, 0.46 ft^3/s; Aug. 17, 1967, 4.46 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.19 ft^3/s, $Q_{7,10}$ = 0.08 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063674 Popple River near Long Lake, Wis.

Location.--SE¼SW¼ sec. 6, T. 38 N., R. 15 E., Florence County, at State Highway 139, 3.2 mi south of Long Lake.

Drainage area.--58.8 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 4.62 ft^3/s; Aug. 17, 1967, 17.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.0 ft^3/s, $Q_{7,10}$ = 2.2 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063675 Popple River near Newald, Wis.

Location.--SE¼SW¼ sec. 15, T. 38 N., R. 15 E., Florence County, at U.S. Forest Service Road 2398, 5.0 mi northeast of Newald.

Drainage area.--68.0 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 19, 1967, 21.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 8.0 ft^3/s, $Q_{7,10}$ = 4.7 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063677 Riley Creek near Long Lake, Wis.

Location.--NE¼NW¼ sec. 10, T. 38 N., R. 15 E., Florence County, at U.S. Forest Service Road 2161, 4.6 mi southeast of Long Lake.

Drainage area.--2.22 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 1.84 ft^3/s; Aug. 19, 1967, 2.69 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 1.0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063679 Morgan Creek near Fence, Wis.

Location.--SE¼SE¼ sec. 18, T. 38 N., R. 16 E., Florence County; at U.S. Forest Service Road 2161, 5.1 mi northwest of Fence.

Drainage area.--6.61 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 20, 1966, 1.22 ft^3/s; Aug. 18, 1967, 1.83 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.66 ft^3/s, $Q_{7,10}$ = 0.36 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063680 Popple River near Fence, Wis.

Location.--NW¼SW¼ sec. 20, T. 38 N., R. 16 E., Florence County, at U.S. Forest Service Road 2159, 0.2 mi upstream from South Branch, 5.0 mi west of Fence.

Drainage area.--85.4 mi^2. Tributary to.--Pine River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--14 ft^3/s, Sept. 14, 1967.

Low-flow frequency.--$Q_{7,2}$ = 12 ft^3/s, $Q_{7,10}$ = 7.7 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 16 daily mean discharges and discharge measurements made during the period 1967-69.

Accuracy.--$SE_{7,2}$ = 21 percent, $SE_{7,10}$ = 29 percent.

Remarks.--This station was operated as a continuous-record gaging station during the period October 1966-May 1968. The records were not published.

04063690 South Branch Popple River near Fence, Wis.

Location.--NW¼SE¼ sec. 25, T. 38 N., R. 15 E., Florence County, on U.S. Forest Service Road 2159, 6.5 mi west of Fence.

Drainage area.--12.3 mi^2. Tributary to.--Popple River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--3.58 ft^3/s, Aug. 5, 1975.

Low-flow frequency.--$Q_{7,2}$ = 4.4 ft^3/s, $Q_{7,10}$ = 3.4 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 14 discharge measurements made during the period 1966-77.

Accuracy.--$SE_{7,2}$ = 25 percent, $SE_{7,10}$ = 26 percent.

04063693 Simpsons Creek near Fence, Wis.

Location.--NE¼NW¼ sec. 36, T. 38 N., R. 15 E., Florence County, at U.S. Forest Service Road 2159, 0.2 mi north of Newald fire tower, 6.7 mi southwest of Fence.

Drainage area.--15.4 mi^2. Tributary to.--South Branch Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 5.25 ft^3/s; Aug. 18, 1967, 10.1 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.1 ft^3/s, $Q_{7,10}$ = 2.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063695 South Branch Popple River near Fence, Wis.

Location.--SE¼SE¼ sec. 19, T. 38 N., R. 16 E., Florence County, at U.S. Forest Service Road 2383, 0.6 mi upstream from mouth, 5.3 mi west of Fence.

Drainage area.--32.1 mi^2. Tributary to.--Popple River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--10.7 ft^3/s, Feb. 14, 1967.

Low-flow frequency.--$Q_{7,2}$ = 8.8 ft^3/s, $Q_{7,10}$ = 6.6 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 16 daily mean discharges and discharge measurements made during the period 1967-68.

Accuracy.--$SE_{7,2}$ = 14 percent, $SE_{7,10}$ = 18 percent.

Remarks.--This station was operated as a continuous-record gaging station during the period October 1966-May 1968. The records were not published.

04063696 Rock Creek near Fence, Wis.

Location.--SW¼SE¼ sec. 29, T. 38 N., R. 16 E., Florence County, at U.S. Forest Service Road 2383, 4.3 mi west of Fence.

Drainage area.--5.03 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 2.82 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.5 ft^3/s, $Q_{7,10}$ = 1.7 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063697 Rock Creek near Fence, Wis.

Location.--NW¼NW¼ sec. 27, T. 38 N., R. 16 E., Florence County, at mouth, 3.0 mi west of Fence.

Drainage area.--6.53 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 4.06 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063699 Mud Creek near Fence, Wis.

Location.--NE¼NW¼ sec. 27, T. 38 N., R. 16 E., Florence County, at mouth, 2.6 mi west of Fence.

Drainage area.--7.55 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 3.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.57 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063700 Popple River near Fence, Wis.

Location.--NW¼NW¼ sec. 23, T. 38 N., R. 16 E., Florence County, at U.S. Forest Service Road 2159, 1.8 mi downstream from Mud Creek, 2.6 mi northwest of Fence.

Drainage area.--139 mi^2. Tributary to.--Pine River.

Type of site.--Gaging station.

Period of record.--October 1963 to September 1977.

Average discharge.--14 years, 119 ft^3/s.

Extremes.--Maximum discharge, 1,310 ft^3/s May 2, 1972; minimum discharge, 5.9 ft^3/s (result of temporary storage from beaver dam).

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	29	24	21	19	18	17
14	32	25	22	21	19	18
30	35	27	24	22	20	19
60	40	32	29	27	25	24
90	43	35	31	29	26	25

Accuracy.--$SE_{7,2}$ = 8 percent, $SE_{7,10}$ = 10 percent.

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time							
Percent	2	5	10	20	30	40	50
ft^3/s	590	410	269	159	112	85	69
Percent	60	70	80	90	95	98	99.9
ft^3/s	56	48	40	33	28	24	19

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063710 Hendricks Creek near Fence, Wis.

Location.--SE¼SW¼ sec. 6, T. 38 N., R. 17 E., Florence County, at forest road, 3.5 mi north of Fence.

Drainage area.--13.0 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 7.86 ft^3/s; Aug. 18, 1967, 8.33 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 5.3 ft^3/s, $Q_{7,10}$ = 3.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063718 Popple River tributary near Fence, Wis.

Location.--NE¼SW¼ sec. 5, T. 38 N., R. 17 E., Florence County, at mouth, 4.1 mi north of Fence.

Drainage area.--0.29 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 0.53 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.23 ft^3/s, $Q_{7,10}$ = 0.15 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063720 Popple River near Fence, Wis.

Location.--NE¼SW¼ sec. 5, T. 38 N., R. 17 E., Florence County, at State Highway 101, 4.1 mi northeast of Fence.

Drainage area.--161 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 38.5 ft^3/s; Aug. 18, 1967, 73.6 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063730 Popple River near Fence, Wis.

Location.--SW¼NE¼ sec. 4, T. 38 N., R. 17 E., Florence County, just upstream from Lamon Tangue Creek, 4.9 mi northeast of Fence.

Drainage area.--163 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 22, 1966, 36.6 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063740 Lamon Tangue Creek near Fence, Wis.

Location.--SE¼SW¼ sec. 14, T. 38 N., R. 17 E., Florence County, at County Trunk C, 4.4 mi northeast of Fence.

Drainage area.--14.4 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 8.30 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.1 ft^3/s, $Q_{7,10}$ = 1.9 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063750 Lamon Tangue Creek near Fence, Wis.

Location.--NE¼SE¼ sec. 4, T. 38 N., R. 17 E., Florence County, on forest road, 0.5 mi upstream from mouth, 4.8 mi northeast of Fence.

Drainage area.--23.9 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 15, 1969, 13.6 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04063752 Lamon Tangue Creek near Fence, Wis.

Location.--SW¼NE¼ sec. 4, T. 38 N., R. 17 E., Florence County, at mouth, 4.9 mi northeast of Fence.

Drainage area.--24.1 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 12.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.8 ft^3/s, $Q_{7,10}$ = 3.0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063760 Woods Creek near Long Lake, Wis.

Location.--NE¼NE¼ sec. 27, T. 39 N., R. 15 E., Florence County, at U.S. Forest Service Road 2156, 3.5 mi east of Long Lake.

Drainage area.--2.42 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 20, 1966, 0.22 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.11 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063765 Woods Creek near Long Lake, Wis.

Location.--NE¼NW¼ sec. 25, T. 39 N., R. 15 E., Florence County, at U.S. Forest Service Road 2156, 4.9 mi east of Long Lake.

Drainage area.--5.39 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 20, 1966, 1.38 ft^3/s; Aug. 19, 1967, 1.88 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.78 ft^3/s, $Q_{7,10}$ = 0.44 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063780 Haley Creek near Fence, Wis.

Location.--SE¼NW¼ sec. 23, T. 39 N., R. 16 E., Florence County, at mouth, 7.3 mi north of Fence.

Drainage area.--5.32 mi^2. Tributary to.--Woods Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 2.90 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.61 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063782 Woods Creek near Fence, Wis.

Location.--SE¼NW¼ sec. 23, T. 39 N., R. 16 E., Florence County, just downstream from Haley Creek, 7.3 mi north of Fence.

Drainage area.--28.7 mi^2. Tributary to.--Popple River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 6.68 ft^3/s; Aug. 18, 1967, 12.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.7 ft^3/s, $Q_{7,10}$ = 2.8 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063790 Patten Creek near Fence, Wis.

Location.--NE¼SE¼ sec. 19, T. 39 N., R. 17 E., Florence County, at country road, 7.1 mi north of Fence.

Drainage area.--5.67 mi^2. Tributary to.--Woods Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 21, 1966, 2.00 ft^3/s; Aug. 18, 1967, 3.50 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 0.88 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04063800 Woods Creek near Fence, Wis.

Location.--NE¼SE¼ sec. 29, T. 39 N., R. 17 E., Florence County, on State Highway 101, 6 mi north of Fence.

Drainage area.--41.9 mi^2. Tributary to.--Popple River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--7.71 ft^3/s, Aug. 6, 1963.

Low-flow frequency.--$Q_{7,2}$ = 10 ft^3/s, $Q_{7,10}$ = 6.1 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 14 discharge measurements made during the period 1961-69.

Accuracy.--$SE_{7,2}$ = 9 percent, $SE_{7,10}$ = 15 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04063990 Popple River near Florence, Wis.

Location.--SW¼SW¼ sec. 23, T. 39 N., R. 17 E., Florence County, at mouth, 7.1 mi southwest of Florence.

Drainage area.--244 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 16, 1967, 126 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04064000 Pine River near Florence, Wis.

Location.--SE¼SW¼ sec. 23, T. 39 N., R. 17 E., Florence County, just downstream from Popple River, 7.1 mi southwest of Florence.

Drainage area.--509 mi^2. Tributary to.--Menominee River.

Type of site.--Gaging station.

Period of record.--October 1913 to September 1923.

Average discharge.--10 years, 489 ft^3/s.

Extremes.--Maximum discharge, 4,570 ft^3/s Apr. 23, 1966; minimum daily, 112 ft^3/s Mar. 31, 1923, caused by powerplant regulation.

Low-flow frequency.--Unable to determine low-flow characteristics at station. The low-flow characteristics based on 9 years of record are too large when compared to values at station 04064500, Pine River below the Pine River powerplant near Florence.

04064100 Halls Creek near Fence, Wis.

Location.--NW¼NW¼ sec. 12, T. 38 N., R. 17 E., Florence County, at forest road, 5.9 mi northeast of Fence.

Drainage area.--2.92 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 4.32 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.9 ft^3/s, $Q_{7,10}$ = 1.3 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064200 Halls Creek near Florence, Wis.

Location.--NE¼NE¼ sec. 31, T. 39 N., R. 18 E., Florence County, at end of trail, 7.3 mi south of Florence.

Drainage area.--6.77 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 22, 1966, 3.28 ft^3/s; Aug. 18, 1967, 5.36 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.4 ft^3/s, $Q_{7,10}$ = 1.5 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04064300 Pine River tributary near Florence, Wis.

Location.--NE¼SW¼ sec. 8, T. 39 N., R. 18 E., Florence County, at County Trunk D, 3.7 mi south of Florence.

Drainage area.--2.48 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 2.07 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.0 ft^3/s, $Q_{7,10}$ = 1.4 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064350 Tributary to Pine River tributary near Florence, Wis.

Location.--NW¼SE¼ sec. 8, T. 39 N., R. 18 E., Florence County, at County Trunk D, 3.5 mi south of Florence.

Drainage area.--3.22 mi^2. Tributary to.--Pine River tributary.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 21, 1966, 0.26 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.14 ft^3/s, $Q_{7,10}$ = 0.06 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064400 Pine River tributary near Florence, Wis.

Location.--SW¼NE¼ sec. 17, T. 39 N., R. 18 E., Florence County, at trail 4.4 mi south of Florence.

Drainage area.--7.77 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 3.80 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04064500 Pine River near Florence, Wis.

Location.--SW¼SE¼ sec. 22, T. 39 N., R. 18 E., Florence County, at County Trunk N, 6.0 mi south of Florence.

Drainage area.--533 mi^2. Tributary to.--Menominee River.

Type of site.--Gaging station.

Period of record.--October 1923 to December 1975.

Average discharge.--52 years, 430 ft^3/s.

Extremes.--Maximum daily discharge, 4,380 ft^3/s Apr. 9, 1929; no flow at times during 1924, 1926-27, 1930-31, 1933, and 1940.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	135	84	66	55	45	40
14	144	101	82	68	55	48
30	156	113	94	81	67	60
60	174	132	114	101	88	80
90	189	147	130	117	105	97

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time

Percent	2	5	10	20	30	40	50
ft^3/s	1,660	1,240	910	600	440	350	290
Percent	60	70	80	90	95	98	99.9
ft^3/s	240	202	178	144	117	83	2.0

Accuracy.--$SE_{7,2}$ = 6 percent, $SE_{7,10}$ = 11 percent.

Remarks.--Flow regulated by Pine River powerplant 1.9 mi upstream from station.

04064525 Johnson Creek near Florence, Wis.

Location.--NE¼NW¼ sec. 23, T. 39 N., R. 18 E., Florence County, at trail, 0.2 mi upstream from mouth, 5.5 mi southeast of Florence.

Drainage area.--4.63 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 1.05 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.30 ft^3/s, $Q_{7,10}$ = 0.15 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064530 Pine River near Florence, Wis.

Location.--NW¼NE¼ sec. 23, T. 39 N., R. 18 E., Florence County, 0.2 mi downstream from Johnson Creek, 5.7 mi southeast of Florence.

Drainage area.--540 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 280 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04064550 Pine Creek near Florence, Wis.

Location.--SE¼NE¼ sec. 24, T. 39 N., R. 18 E., Florence County, at mouth, 6.4 mi southeast of Florence.

Drainage area.--5.64 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 0.90 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.21 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064570 Deadman Creek near Spread Eagle, Wis.

Location.--SE¼NW¼ sec. 1, T. 39 N., R. 18 E., Florence County, at trail, 2.3 mi west of Spread Eagle.

Drainage area.--3.81 mi^2. Tributary to.--Lepage Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 18, 1967, 0.80 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.22 ft^3/s, $Q_{7,10}$ = 0.11 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064580 Lepage Creek near Spread Eagle, Wis.

Location.--NE¼NW¼ sec. 19, T. 39 N., R. 19 E., Florence County, at mouth, 2.8 mi southwest of Spread Eagle.

Drainage area.--9.84 mi^2. Tributary to.--Pine River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 5.71 mi^2.

Low-flow frequency.--$Q_{7,2}$ = 1.9 ft^3/s, $Q_{7,10}$ = 1.2 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064600 Pine River near Spread Eagle, Wis.

Location.--NE¼SE¼ sec. 20, T. 39 N., R. 19 E., Florence County, at end of trail, 0.9 mi upstream from mouth, 3.0 mi south of Spread Eagle.

Drainage area.--563 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 17, 1967, 317 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04064787 South Branch Little Popple River near Dunbar, Wis.

Location.--SW¼SE¼ sec. 34, T. 38 N., R. 18 E., Florence County, at town road, 5.5 mi northwest of Dunbar.

Drainage area.--0.71 mi^2. Tributary to.--Little Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 11, 1970, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimated.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04064789 South Branch Little Popple River near Dunbar, Wis.

Location.--SW¼NE¼ sec. 34, T. 38 N., R. 18 E., Florence County, 6.0 mi northwest of Dunbar.

Drainage area.--1.31 mi^2. Tributary to.--Little Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 11, 1970, 0.75 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.69 ft^3/s, $Q_{7,10}$ = 0.46 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04064792 South Branch Little Popple River tributary near Dunbar, Wis.

Location.--SE¼NW¼ sec. 35, T. 38 N., R. 18 E., Florence County, 5.7 mi north of Dunbar.

Drainage area.--0.16 mi^2. Tributary to.--South Branch Little Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 11, 1970, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04064795 South Branch Little Popple River near Aurora, Wis.

Location.--NW¼NW¼ sec. 25, T. 38 N., R. 18 E., Florence County, at bridge on country road, 6.0 mi southwest of Aurora.

Drainage area.--6.69 mi^2. Tributary to.--Little Popple River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 11, 1970, 1.32 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.57 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04064900 Little Popple River near Aurora, Wis.

Location.--NE¼NW¼ sec. 3, T. 38 N., R. 19 E., Florence County, at mouth, 2.1 mi northwest of Aurora.

Drainage area.--41.3 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 15.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 10 ft^3/s, $Q_{7,10}$ = 6.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04065950 North Branch Pemebonwon River near Pembine, Wis.

Location.--NE¼SE¼ sec. 22, T. 37 N., R. 21 E., Marinette County, on country road, 6.8 mi northeast of Pembine.

Drainage area.--77.5 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 13.5 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 7.2 ft^3/s, $Q_{7,10}$ = 4.1 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04065970 South Branch Pemebonwon River near Pembine, Wis.

Location.--SE¼SE¼ sec. 19, T. 37 N., R. 20 E., Marinette County, on County Trunk O, 2.8 mi northwest of Pembine.

Drainage area.--26.1 mi^2. Tributary to.--Pemebonwon River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--1.92 ft^3/s, Aug. 12, 1970.

Low-flow frequency.--$Q_{7,2}$ = 2.7 ft^3/s, $Q_{7,10}$ = 1.3 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 13 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 15 percent, $SE_{7,10}$ = 24 percent.

04065975 South Branch Pemebonwon River near Pembine, Wis.

Location.--SW¼NW¼ sec. 4, T. 36 N., R. 20 E., Marinette County, at bridge on U.S. Highway 8, 1.5 mi southwest of Pembine.

Drainage area.--40.9 mi^2. Tributary to.--Pemebonwon River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 3, 1974, 24.4 ft^3/s; July 8, 1975, 19.6 ft^3/s; Aug. 5, 1975, 13.9 ft^3/s; Oct. 13, 1976, 8.23 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 7.5 ft^3/s, $Q_{7,10}$ = 3.5 ft^3/s.

Basis of estimate.-- Related to Pike River near Amberg using 4 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

04065980 South Branch Pemebonwon River near Pembine, Wis.

Location.--SE¼SW¼ sec. 25, T. 37 N., R. 20 E., Marinette County, at country road, 1.5 mi west of Smith Lake, 2.2 mi east of Pembine.

Drainage area.--54.4 mi^2. Tributary to.--Pemebonwon River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 15.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 9.2 ft^3/s, $Q_{7,10}$ = 5.7 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04066000 Menominee River near Pembine, Wis.

Location.--NW¼ sec. 21, T. 37 N., R. 28 W., Menominee County, Mich., Marinette County, Wis., Michigan meridian, 0.1 mi upstream from Pemene Creek, 4.0 mi west of Nathan, Mich., 10.9 mi southeast of Pembine.

Drainage area.--3,110 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--October 1949 to September 1977.

Average discharge.--28 years, 2,960 ft^3/s.

Extremes.--Maximum discharge, 26,900 ft^3/s May 8, 1960; minimum discharge, 694 ft^3/s Sept. 3, 1969.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	1,300	941	755	612	455	383
14	1,350	1,010	832	697	560	475
30	1,430	1,080	905	773	635	556
60	1,560	1,230	1,070	951	835	752
90	1,640	1,320	1,170	1,060	940	877

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time						
Percent	2	5	10	20	30	40
ft^3/s	10,600	7,150	5,200	3,600	2,970	2,560
Percent	50	60	70	80	90	95
ft^3/s	2,290	2,090	1,900	1,700	1,440	1,260
Percent	98	99.9				
ft^3/s	1,100	900				

Accuracy.--Not applicable due to large amount of regulation.

Remarks.--The frequency analyses for the 7-, 14-, 30-, 60-, and 90-day low flows are based on the extension of record with 04067000 Menominee River near Koss, Mich. (1915-77 CY). All correlation coefficients were larger than 0.91. Duration table is based on period of record. Flow is regulated by powerplants, by the Michigamme Reservoir and Peavy Pond on the Michigamme River, and by many smaller reservoirs upstream from station.

04066015 Miscauno Creek near Pembine, Wis.

Location.--NE¼SE¼ sec. 22, T. 36 N., R. 21 E., Marinette County, on country road, 1.0 mi upstream from mouth, 7.9 mi southeast of Pembine.

Drainage area.--20.4 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 9.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 5.5 ft^3/s, $Q_{7,10}$ = 3.5 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04066050 Chemical Creek at Goodman, Wis.

Location.--SW¼NE¼ sec. 3, T. 36 N., R. 17 E., Marinette County, just upstream from sewage-treatment plant, at Goodman.

Drainage area.--4.66 mi^2. Tributary to.--Menominee River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.54 ft^3/s, Aug. 5, 1975.

Low-flow frequency.--$Q_{7,2}$ = 0.73 ft^3/s, $Q_{7,10}$ = 0.44 ft^3/s.

Basis of estimate.-- Related to Pike River near Amberg using 8 discharge measurements made during the period 1972-77.

Accuracy.--$SE_{7,2}$ = 29 percent, $SE_{7,10}$ = 50 percent.

04066250 South Branch Pike River near Dunbar, Wis.

Location.--NE¼SE¼ sec. 36, T. 36 N., R. 18 E., Marinette County, on country road, 6.9 mi south of Dunbar.

Drainage area.--79.9 mi^2. Tributary to.--Menominee River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--15.3 ft^3/s, Aug. 12, 1970.

Low-flow frequency.--$Q_{7,2}$ = 18 ft^3/s, $Q_{7,10}$ = 11 ft^3/s.

Basis of estimate.-- Related to Pike River near Amberg using 13 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 6 percent, $SE_{7,10}$ = 10 percent.

04066280 North Branch Pike River near Goodman, Wis.

Location.--SW¼NW¼ sec. 33, T. 37 N., R. 18 E., Marinette County, at culvert on U.S. Highway 8, 4.9 mi east of Goodman.

Drainage area.--33.5 mi^2. Tributary to.--Pike River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 29.5 ft^3/s; Aug. 4, 1971, 21.6 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 22 ft^3/s, $Q_{7,10}$ = 17 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04066290 North Branch Pike River near Dunbar, Wis.

Location.--NW¼SW¼ sec. 36, T. 37 N., R. 18 E., Marinette County, on country road, 1.5 mi southwest of Dunbar.

Drainage area.--57.2 mi^2. Tributary to.--Pike River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 48.4 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 37 ft^3/s, $Q_{7,10}$ = 28 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04066300 Cole Creek near Dunbar, Wis.

Location.--SE¼SE¼ sec. 34, T. 37 N., R. 19 E., Marinette County, on U.S. Highway 8, 3.6 mi southeast of Dunbar.

Drainage area.--3.62 mi^2. Tributary to.--North Branch Pike River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.31 ft^3/s, Aug. 5, 1963.

Low-flow frequency.--$Q_{7,2}$ = 0.42 ft^3/s, $Q_{7,10}$ = 0.22 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 16 discharge measurements made during the period 1961-69.

Accuracy.--$SE_{7,2}$ = 35 percent, $SE_{7,10}$ = 35 percent.

04066400 North Branch Pike River near Amberg, Wis.

Location.--NW¼NE¼ sec. 29, T. 36 N., R. 20 E., Marinette County, on country road, 4.8 mi north of Amberg.

Drainage area.--107 mi^2. Tributary to.--South Branch Pike River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 14, 1969, 74.3 ft^3/s; Aug. 4, 1971, 70.7 ft^3/s; Sept. 14, 1971, 63.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 57 ft^3/s, $Q_{7,10}$ = 44 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04066500 Pike River at Amberg, Wis.

Location.--SW¼SW¼ sec. 15, T. 35 N., R. 20 E., Marinette County, on left bank 500 ft upstream from railroad bridge, 0.2 mi south of Amberg, 1.2 mi downstream from confluence of North and South Branches of Pike River.

Drainage area.--255 mi^2. Tributary to.--Menominee River.

Type of site.--Gaging station.

Period of record.--February 1914 to September 1970.

Average discharge.--56 years, 216 ft^3/s.

Extremes.--Maximum discharge, 2,800 ft^3/s Apr. 10, 1922; minimum observed, 26 ft^3/s Dec. 27, 1925.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	94	79	72	66	60	57
14	98	83	77	72	67	63
30	103	89	83	79	74	71
60	111	95	89	84	80	77
90	118	101	94	89	84	82

Accuracy.--$SE_{7,2}$ = 3 percent, $SE_{7,10}$ = 4 percent.

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time							
Percent	2	5	10	20	30	40	50
ft^3/s	710	540	400	282	223	189	164
Percent	60	70	80	90	95	98	99.9
ft^3/s	147	130	117	101	94	85	64

04066550 Pike River near Wausaukee, Wis.

Location.--SE¼NE¼ sec. 4, T. 34 N., R. 21 E., Marinette County, on country road, 1.6 mi upstream from mouth, 6.5 mi northeast of Wausaukee.

Drainage area.--287 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 136 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04066690 Wausaukee River near Wausaukee, Wis.

Location.--NW¼SE¼ sec. 31, T. 34 N., R. 21 E., Marinette County, on country road, 1.4 mi east of Wausaukee.

Drainage area.--52.9 mi^2. Tributary to.--Menominee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 26.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 17 ft^3/s, $Q_{7,10}$ = 12 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04067000 Menominee River near Koss, Mich.

Location.--Sec. 9, T. 34 N., R. 27 W., Menominee County, Mich., Michigan meridian on left bank of powerplant of Wisconsin Public Service Corp., 0.5 mi upstream from Little Cedar River, 3.6 mi southeast of Koss.

Drainage area.--3,730 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--July 1907 to March 1909 (published as "at Koss"); July 1913 to September 1977.

Average discharge.--65 years, 3,134 ft^3/s.

Extremes.--Maximum daily discharge, 33,000 ft^3/s May 10, 1960; minimum daily, 162 ft^3/s Sept. 15, 1931.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	1,370	993	796	643	490	401
14	1,440	1,070	879	733	584	494
30	1,510	1,150	968	830	687	600
60	1,610	1,270	1,110	988	862	784
90	1,710	1,380	1,220	1,110	990	917

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time						
Percent	2	5	10	20	30	40
ft^3/s	11,000	8,000	6,000	4,100	3,110	2,650
Percent	50	60	70	80	90	95
ft^3/s	2,310	2,080	1,840	1,620	1,370	1,200
Percent	98	99.9				
ft^3/s	1,000	408				

Accuracy.--Not applicable due to large amount of regulation.

Remarks.--Flow regulated by powerplants, by Michigamme Reservoir and Peavy Pond on Michigamme River, and by many smaller reservoirs upstream from station.

04067500 Menominee River near McAllister, Wis.

Location.--SW¼SE¼ sec. 17, T. 33 N., R. 23 E., Marinette County, 300 ft upstream from bridge on County Trunk JJ, 2.9 mi east of McAllister.

Drainage area.--3,930 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--March 1945 to September 1961.

Average discharge.--16 years, 3,384 ft^3/s.

Extremes.--Maximum discharge, 32,500 ft^3/s May 9, 1960; minimum discharge, 538 ft^3/s Oct. 6, 1946.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	1,450	1,040	833	673	510	420
14	1,510	1,110	917	765	605	517
30	1,590	1,200	1,010	869	720	630
60	1,680	1,310	1,150	1,020	895	809
90	1,790	1,430	1,270	1,150	1,030	953

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time						
Percent	2	5	10	20	30	40
ft^3/s	12,100	8,400	6,100	4,250	3,390	2,850
Percent	50	60	70	80	90	95
ft^3/s	2,480	2,200	2,020	1,840	1,620	1,460
Percent	98	99.9				
ft^3/s	1,300	950				

Accuracy.--Not applicable due to large amount of regulation.

Remarks.--Flow regulated by powerplants, by Michigamme Reservoir and Peavy Pond on the Michigamme River, and by many smaller reservoirs upstream from station. The frequency analysis for the 7-, 14-, 30-, 60-, and 90-day low flows are based on extension of records with 04067000 Menominee River below Koss (1915-77 CY). All correlation coefficients were larger than 0.97. The duration table is based on period of record.

04067690 South Branch Peshtigo River near Argonne, Wis.

Location.--NE¼NE¼ sec. 35, T. 37 N., R. 13 E., Forest County, on County Trunk G, 2.7 mi east of Argonne.

Drainage area.--38.5 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 17.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 11 ft^3/s, $Q_{7,10}$ = 7.3 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04067700 North Branch Peshtigo River near Argonne, Wis.

Location.--NW¼SW¼ sec. 24, T. 37 N., R. 13 E., Forest County, on U.S. Forest Service Road 2387, 2.9 mi northeast of Argonne.

Drainage area.--33.6 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--5.86 ft^3/s, Sept. 1, 1976.

Low-flow frequency.--$Q_{7,2}$ = 5.9 ft^3/s, $Q_{7,10}$ = 4.5 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 11 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 18 percent, $SE_{7,10}$ = 30 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04067750 Camp Eight Creek near Cavour, Wis.

Location.--NE¼NE¼ sec. 36, T. 37 N., R. 14 E., Forest County, on County Trunk G, 2.3 mi west of Cavour.

Drainage area.--13.6 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--2.11 ft^3/s, Aug. 4, 1975.

Low-flow frequency.--$Q_{7,2}$ = 2.0 ft^3/s, $Q_{7,10}$ = 1.0 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 11 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 22 percent, $SE_{7,10}$ = 37 percent.

04067790 Peshtigo River near Armstrong Creek, Wis.

Location.--NW¼NE¼ sec. 33, T. 36 N., R. 16 E., Forest County, on U.S. Forest Service Road 2134, 0.4 mi upstream from Armstrong Creek, 7.2 mi southwest of town of Armstrong Creek.

Drainage area.--203 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 87.0 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04067800 Armstrong Creek near Armstrong Creek, Wis.

Location.--SE¼NW¼ sec. 27, T. 37 N., R. 16 E., Forest County, on U.S. Highway 8, 1.8 mi west of Armstrong Creek.

Drainage area.--23.2 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--3.42 ft^3/s, Aug. 31, 1976.

Low-flow frequency.--$Q_{7,2}$ = 4.1 ft^3/s, $Q_{7,10}$ = 2.8 ft^3/s.

Basis of estimate.--Related to Popple River near Fence using 16 discharge measurements made during the period 1961-76.

Accuracy.--$SE_{7,2}$ = 11 percent, $SE_{7,10}$ = 14 percent.

04067840 Peshtigo River near Blackwell, Wis.

Location.--NW¼SE¼ sec. 13, T. 35 N., R. 16 E., Forest County, at U.S. Forest Service Road 2136, 8.6 mi east of Blackwell.

Drainage area.--268 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 125 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04067870 Peshtigo River near Goodman, Wis.

Location.--SW¼SE¼ sec. 35, T. 35 N., R. 17 E., Marinette County, on town road, 11.4 mi south of Goodman.

Drainage area.--297 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 139 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04067882 Rat River at Laona, Wis.

Location.--SW¼NW¼ sec. 31, T. 36 N., R. 15 E., Forest County, at culverts on County Trunk H, at Laona.

Drainage area.--32.0 mi^2. Tributary to.--Peshtigo River.

Type of site.-- Low-flow partial-record station.

Minimum discharge measured.--17.3 ft^3/s, Oct. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 7.6 ft^3/s.

Basis of estimate.-- Related to Pike River near Amberg using 8 discharge measurements made during the period 1972-77.

Accuracy.--$SE_{7,2}$ = 34 percent, $SE_{7,10}$ = 57 percent.

04067890 Rat River near Laona, Wis.

Location.--NE¼NE¼ sec. 7, T. 35 N., R. 15 E., Forest County, on country road, 2.1 mi southeast of Laona.

Drainage area.--42.8 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 37.3 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04067900 Rat River near Wabeno, Wis.

Location.--NW¼SE¼ sec. 28, T. 35 N., R. 16 E., Forest County, on U.S. Forest Service Road 2134, 8.0 mi northeast of Wabeno.

Drainage area.--82.1 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--33.6 ft^3/s, Aug. 27, 1969.

Low-flow frequency.--$Q_{7,2}$ = 32 ft^3/s, $Q_{7,10}$ = 20 ft^3/s.

Basis of estimate.-- Related to Pike River near Amberg using 12 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 17 percent, $SE_{7,10}$ = 26 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04067920 Rat River near Wabeno, Wis.

Location.--SW¼SE¼ sec. 10, T. 34 N., R. 17 E., Marinette County, at town road, about 17 mi east of Wabeno.

Drainage area.--105 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 79.6 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics, additional discharge measurements are required.

04067950 Otter Creek near Lakewood, Wis.

Location.--SE¼NW¼ sec. 22, T. 34 N., R. 17 E., Marinette County, on country road, 1.2 mi upstream from mouth, 11.2 mi northeast of Lakewood.

Drainage area.--32.1 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 23.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 18 ft^3/s, $Q_{7,10}$ = 13 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04067990 Eagle Creek near Athelstane, Wis.

Location.--NE¼NE¼ sec. 25, T. 34 N., R. 18 E., Marinette County, on County Trunk C, 4.5 mi southwest of Athelstane.

Drainage area.--37.5 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--11.0 ft^3/s, Aug. 6, 1975.

Low-flow frequency.--$Q_{7,2}$ = 9.5 ft^3/s, $Q_{7,10}$ = 5.6 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 11 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 19 percent, $SE_{7,10}$ = 30 percent.

04068000 Peshtigo River near Crivitz, Wis.

Location.--SE¼NW¼ sec. 1, T. 32 N., R. 18 E., Marinette County, at High Falls powerhouse of W.P.S.C., 1.0 mi upstream from Thunder River, 10.5 mi west of Crivitz.

Drainage area.--537 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--August 1912 to January 1957.

Average discharge.--44 years, 475 ft^3/s.

Extremes.--Maximum daily discharge, 3,670 ft^3/s Apr. 11, 1922; minimum discharge, no flow for several days during 1925, 1928, 1929, 1932, and 1933.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	109	48	29	18	10	6.5
14	152	82	56	39	25	18
30	183	117	90	71	54	44
60	212	152	127	109	92	82
90	235	177	153	135	118	107

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time

Percent	2	5	10	20	30	40	50
ft^3/s	1,630	1,280	970	690	535	440	380
Percent	60	70	80	90	95	98	99.9
ft^3/s	313	250	179	88	21	6.2	---

Accuracy.--Not applicable due to large amount of regulation.

Remarks.--Flow regulated by storage in High Falls service pond and Caldron Falls service pond. The low-flow frequency and flow-duration data are affected by regulation, and possibly by different operation criteria throughout the period of record. Therefore, the low-flow frequency data and flow-duration data (flow durations larger than 90 percent) given in the tables may not be indicative of present operating procedures.

04068100 North Fork Thunder River near Lakewood, Wis.

Location.--SE¼NE¼ sec. 23, T. 33 N., R. 17 E., Oconto River, at U.S. Forest Service Road 2101, 9.7 mi east of Lakewood.

Drainage area.--17.0 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--8.39 ft^3/s, Aug. 27, 1969.

Low-flow frequency.--$Q_{7,2}$ = 7.6 ft^3/s, $Q_{7,10}$ = 5.8 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 10 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 21 percent, $SE_{7,10}$ = 34 percent.

04068190 South Fork Thunder River near Mountain, Wis.

Location.--SW¼NW¼ sec. 5, T. 32 N., R. 18 E., Marinette County, just upstream from falls at Thunder River Fish Hatchery, 13.6 mi northeast of Mountain.

Drainage area.--21.0 mi^2. Tributary to.--Thunder River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 10, 1975, 11.8 ft^3/s; Aug. 6, 1975, 7.17 ft^3/s; Sept. 2, 1976, 9.58 ft^3/s; Oct. 13, 1976, 6.82 ft^3/s; July 25, 1977, 10.5 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 7.6 ft^3/s, $Q_{7,10}$ = 5.8 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 5 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04068200 Thunder River near Lakewood, Wis.

Location.--SW¼NE¼ sec. 4, T. 32 N., R. 18 E., Marinette County, on country road, 13.1 mi east of Lakewood.

Drainage area.--53.3 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 31.2 ft^3/s

Low-flow frequency.--$Q_{7,2}$ = 22 ft^3/s, $Q_{7,10}$ = 16 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069200 Middle Inlet at Middle Inlet, Wis.

Location.--SE¼SW¼ sec. 26, T. 33 N., R. 20 E., Marinette County, at country road, 0.9 mi east of Middle Inlet.

Drainage area.--32.6 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 25.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 19 ft^3/s, $Q_{7,10}$ = 15 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069290 Middle Inlet near Middle Inlet, Wis.

Location.--SW¼SW¼ sec. 30, T. 33 N., R. 21 E., Marinette County, on County Trunk X, 2.7 mi east of Middle Inlet.

Drainage area.--59.2 mi^2.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--20.5 ft^3/s, Aug. 7, 1975.

Low-flow frequency.--$Q_{7,2}$ = 24 ft^3/s, $Q_{7,10}$ = 19 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 10 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 10 percent, $SE_{7,10}$ = 16 percent.

04069295 Upper Inlet near McAllister, Wis.

Location.--NW¼NW¼ sec. 36, T. 33 N., R. 21 E., Marinette County, on County Trunk X, 0.4 mi downstream from Lake Julia, 6.0 mi southwest of McAllister.

Drainage area.--7.35 mi^2. Tributary to.--Lake Noquebay.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 1.44 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.54 ft^3/s, $Q_{7,10}$ = 0.27 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04069297 Smith Creek near Crivitz, Wis.

Location.--SW¼SE¼ sec. 10, T. 32 N., R. 20 E., Marinette County, at bridge on U.S. Highway 141, 1.7 mi northeast of Crivitz.

Drainage area.--11.3 mi^2. Tributary to.--Lower Middle Inlet.

Type of site.--Miscellaneous site.

Minimum discharge measured.--2.63 ft^3/s, Aug. 7, 1975.

Low-flow frequency.--$Q_{7,2}$ = 2.9 ft^3/s, $Q_{7,10}$ = 2.2 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 6 discharge measurements made during the period 1973-76.

Accuracy.--$SE_{7,2}$ = 34 percent, $SE_{7,10}$ = 34 percent.

04069343 South Branch Beaver Creek near Pound, Wis.

Location.--SW¼NE¼ sec. 31, T. 31 N., R. 20 E., Marinette County, at bridge on country road, 2.0 mi northwest of Pound.

Drainage area.--44.7 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 4, 1972, 22.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 9.1 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069346 South Branch Beaver Creek tributary at Pound, Wis.

Location.--NE¼NW¼ sec. 2, T. 30 N., R. 20 E., Marinette County, at sewage-treatment plant, 0.9 mi north of Pound.

Drainage area.--0.79 mi^2. Tributary to.--South Branch Beaver Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 28, 1973, no flow.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04069350 South Branch Beaver Creek at Beaver, Wis.

Location.--SW¼NE¼ sec. 28, T. 31 N., R. 20 E., Marinette County, on U.S. Highway 141, 0.5 mi south of Beaver.

Drainage area.--51.0 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--16.6 ft^3/s, Aug. 7, 1975.

Low-flow frequency.--$Q_{7,2}$ = 15 ft^3/s, $Q_{7,10}$ = 11 ft^3/s.

Basis of estimate.--Related to Pike River near Amberg using 10 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 26 percent, $SE_{7,10}$ = 41 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04069360 North Branch Beaver Creek at Beaver, Wis.

Location.--SE¼NE¼ sec. 21, T. 31 N., R. 20 E., Marinette County, at U.S. Highway 141, 0.7 mi northeast of Beaver.

Drainage area.--19.7 mi^2. Tributary to.--Beaver Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 11.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 8.2 ft^3/s, $Q_{7,10}$ = 5.7 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069380 Little Peshtigo River above Jones Creek near Coleman, Wis.

Location.--NW¼SW¼ sec. 21, T. 30 N., R. 20 E., Marinette County, on country road, 0.1 mi upstream from Jones Creek, 2.5 mi southwest of Coleman.

Drainage area.--21.3 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 15, 1969, 10.4 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics; additional discharge measurements are required.

04069383 Jones Creek near Coleman, Wis.

Location.--NW¼SW¼ sec. 21, T. 30 N., R. 20 E., Marinette County, at country road, 0.1 mi upstream from mouth, 2.5 mi southwest of Coleman.

Drainage area.--0.70 mi^2. Tributary to.--Little Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 15, 1969, 0.23 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.09 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069387 Little Peshtigo River at Coleman, Wis.

Location.--NE¼NW¼ sec. 14, T. 30 N., R. 20 E., Marinette County, at bridge on U.S. Highway 141, 0.8 mi north of Coleman.

Drainage area.--34.3 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--4.22 ft^3/s, Aug. 7, 1975.

Low-flow characteristics.--$Q_{7,2}$ = 3.6 ft^3/s, $Q_{7,10}$ = 2.1 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 6 discharge measurements made during the period 1972-75.

Accuracy.--$SE_{7,2}$ = 38 percent, $SE_{7,10}$ = 54 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04069390 Little Peshtigo River near Coleman, Wis.

Location.--SE¼SW¼ sec. 18, T. 30 N., R. 21 E., Marinette County, on County Trunk B, 1.9 mi east of Coleman.

Drainage area.--41.6 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--2.64 ft^3/s, Sept. 3, 1976.

Low-flow frequency.--$Q_{7,2}$ = 4.1 ft^3/s, $Q_{7,10}$ = 2.3 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 10 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 18 percent, $SE_{7,10}$ = 28 percent.

04069400 Little Peshtigo River near Harmony, Wis.

Location.--NW¼NE¼ sec. 33, T. 31 N., R. 21 E., Marinette County, on County Trunk W, 3.8 mi northwest of Harmony.

Drainage area.--70.5 mi^2. Tributary to.--Peshtigo River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 16.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.4 ft^3/s, $Q_{7,10}$ = 3.6 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04069480 Trout Creek near Peshtigo, Wis.

Location.--SE¼NE¼ sec. 23, T. 30 N., R. 22 E., Marinette County, on country road, 1.5 mi west of Peshtigo.

Drainage area.--24.4 mi^2. Tributary to.--Peshtigo River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0 ft^3/s, 4 observations of no flow.

Low-flow frequency.--$Q_{7,2}$ = 0.03 ft^3/s, $Q_{7,10}$ = 0.00 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 11 discharge measurements made during the period 1969-76.

Accuracy.--Not applicable.

04069500 Peshtigo River at Peshtigo, Wis.

Location.--NE¼NE¼ sec. 30, T. 30 N., R. 23 E., Marinette County, on left bank, 75 ft downstream from railroad bridge, 0.5 mi downstream from WPSC powerplant in Peshtigo, 11.5 mi upstream from mouth.

Drainage area.--1,080 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--June 1953 to September 1977.

Average discharge.--24 years, 917 ft^3/s.

Extremes.--Maximum discharge, 9,790 ft^3/s May 9, 1960; minimum discharge, 17 ft^3/s Nov. 29, 1966; minimum daily discharge, 84 ft^3/s Aug. 5, 1957.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	296	236	211	192	173	162
14	323	265	241	224	208	198
30	361	300	275	258	241	231
60	407	344	320	303	287	278
90	457	379	345	321	295	280

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time						
Percent	2	5	10	20	30	40
ft^3/s	3,610	2,560	1,850	1,180	910	760
Percent	50	60	70	80	90	95
ft^3/s	650	560	490	420	345	295
Percent	98	99.9				
ft^3/s	244	130				

Accuracy.--$SE_{7,2}$ = 6 percent, $SE_{7,10}$ = 7 percent.

Remarks.--Diurnal fluctuation caused by two powerplants upstream.

04069690 North Branch Oconto River at Wabeno, Wis.

Location.--NW¼SW¼ sec. 8, T. 34 N., R. 15 E., Forest County, at bridge on County Trunk H, at Wabeno.

Drainage area.--31.3 mi^2. Tributary to.--Lake Michigan.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--8.89 ft^3/s, Aug. 5, 1975.

Low-flow frequency.--$Q_{7,2}$ = 7.5 ft^3/s, $Q_{7,10}$ = 4.5 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 8 discharge measurements made during the period 1972-76.

Accuracy.-- $SE_{7,2}$ = 30 percent, $SE_{7,10}$ = 49 percent.

04069800 North Branch Oconto River near Carter, Wis.

Location.--NE¼SW¼ sec. 25, T. 34 N., R. 15 E., Forest County, at end of road between two wooden footbridges on Mack property, 2.9 mi east of Carter.

Drainage area.--58.2 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 34.6 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 17 ft^3/s, $Q_{7,10}$ = 12 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04069900 North Branch Oconto River near Lakewood, Wis.

Location.--NW¼SE¼ sec. 14, T. 33 N., R. 16 E., Oconto County, at bridge on country road, 0.2 mi upstream from County Trunk F, 4.2 mi northeast of Lakewood.

Drainage area.--98.3 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 81.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 45 ft^3/s, $Q_{7,10}$ = 33 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070060 McCaslin Brook at Lakewood, Wis.

Location.--NW¼NE¼ sec. 32, T. 33 N., R. 16 E., Oconto County, on country road, at Lakewood.

Drainage area.--47.2 mi^2. Tributary to.--North Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 28.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 14 ft^3/s, $Q_{7,10}$ = 9.3 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070063 McCaslin Brook near Lakewood, Wis.

Location.--SW¼NE¼ sec. 33, T. 33 N., R. 16 E., Oconto County, at bridge on County Trunk F, 1.2 mi west of Lakewood.

Drainage area.--53.1 mi^2. Tributary to.--North Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 1, 1974, 25.3 ft^3/s; July 9, 1975, 18.1 ft^3/s; Aug. 6, 1975, 15.5 ft^3/s; Aug. 30, 1976, 12.0 ft^3/s; Oct. 12, 1976, 13.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 14 ft^3/s, $Q_{7,10}$ = 9.8 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 5 discharge measurements.

Accuracy.--$SE_{7,2}$ = 6 percent, $SE_{7,10}$ = 11 percent.

04070100 North Branch Oconto River near Mountain, Wis.

Location.--SW¼SW¼ sec. 23, T. 32 N., R. 16 E., Oconto County, on U.S. Forest Service Road 2106, 3.3 mi north of Mountain.

Drainage area.--174 mi^2. Tributary to.--Lake Michigan.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--62.8 ft^3/s, July 26, 1977.

Low-flow frequency.--$Q_{7,2}$ = 76 ft^3/s, $Q_{7,10}$ = 56 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 14 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 7 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04070300 Waupee Creek near Mountain, Wis.

Location.--SW¼SW¼ sec. 30, T. 31 N., R. 17 E., Oconto County, at bridge on State Highways 32 and 64, 4.2 mi southeast of Mountain.

Drainage area.--51.4 mi^2. Tributary to.--North Branch Oconto River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--9.14 ft^3/s, July 26, 1977.

Low-flow frequency.--$Q_{7,2}$ = 12 ft^3/s, $Q_{7,10}$ = 8.0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 14 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 11 percent, $SE_{7,10}$ = 17 percent.

04070420 South Branch Oconto River near Langlade, Wis.

Location.--SW¼SW¼ sec. 6, T. 31 N., R. 15 E., Langlade County, on State Highway 64, 2.7 mi east of Langlade.

Drainage area.--24.0 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 19.4 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 10 ft^3/s, $Q_{7,10}$ = 7.1 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070458 Dalton Creek near Langlade, Wis.

Location.--SE¼SE¼ sec. 2, T. 31 N., R. 14 E., Langlade County, at culvert on road to fish hatchery, 1.5 mi east of Langlade.

Drainage area.--10.6 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 1, 1974, 6.79 ft^3/s; July 9, 1975, 3.58 ft^3/s; Aug. 6, 1975, 5.53 ft^3/s; Aug. 30, 1976, 1.44 ft^3/s; Oct. 12, 1976, 4.16 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.7 ft^3/s, $Q_{7,10}$ = 1.4 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 5 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

04070460 Dalton Creek near Langlade, Wis.

Location.--SE¼SW¼ sec. 1, T. 31 N., T. 14 E., Langlade County, on State Highway 64, 2.0 mi east of Langlade.

Drainage area.--11.5 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 7.67 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.7 ft^3/s, $Q_{7,10}$ = 2.4 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04070600 Hills Pond Creek near Langlade, Wis.

Location.--NE¼SE¼ sec. 4, T. 31 N., R. 15 E., Oconto County, on State Highway 64, 5.5 mi east of Langlade.

Drainage area.--8.92 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--8.07 ft^3/s, July 26, 1976.

Low-flow frequency.--$Q_{7,2}$ = 9.0 ft^3/s, $Q_{7,10}$ = 7.7 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 14 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 13 percent, $SE_{7,10}$ = 14 percent.

04070640 Second South Branch Oconto River near Mountain, Wis.

Location.--NE¼NW¼ sec. 26, T. 31 N., R. 15 E., Oconto County, on County Trunk W, 6.4 mi southwest of Mountain.

Drainage area.--19.7 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 23.9 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 14 ft^3/s, $Q_{7,10}$ = 10 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070680 First South Branch Oconto River near Mountain, Wis.

Location.--SE¼SE¼ sec. 32, T. 32 N., R. 16 E., Oconto County, on State Highway 64, 2.6 mi northwest of Mountain.

Drainage area.--20.2 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 16.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 8.4 ft^3/s, $Q_{7,10}$ = 5.8 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070720 South Branch Oconto River near Breed, Wis.

Location.--SW¼SW¼ sec. 23, T. 30 N., R. 16 E., Menominee County, at town road, 4.9 mi west of Breed.

Drainage area.--143 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 131 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 76 ft^3/s, $Q_{7,10}$ = 58 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04070760 South Branch Oconto River near Hayes, Wis.

Location.--SW¼SW¼ sec. 33, T. 30 N., R. 17 E., Oconto County, on country road, 2.2 mi northwest of Hayes.

Drainage area.--164 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 150 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics; additional discharge measurements are required.

04070800 Pecore Creek near Hayes, Wis.

Location.--SE¼NE¼ sec. 8, T. 29 N., R. 17 E., Oconto County, on country road, 1.2 mi northwest of Hayes.

Drainage area.--31.2 mi^2. Tributary to.--South Branch Oconto River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--7.74 ft^3/s, July 26, 1977.

Low-flow frequency.--$Q_{7,2}$ = 9.8 ft^3/s, $Q_{7,10}$ = 6.9 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 13 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 6 percent, $SE_{7,10}$ = 9 percent.

04070860 Peshtigo Brook near Suring, Wis.

Location.--SW¼SW¼ sec. 29, T. 30 N., R. 18 E., Oconto County, at town road, 3.4 mi north of Suring.

Drainage area.--109 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 13, 1969, 19.9 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 7.5 ft^3/s, $Q_{7,10}$ = 4.2 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04070950 Linzy Creek near Underhill, Wis.

Location.--NE¼SE¼ sec. 8, T. 28 N., R. 17 E., Oconto County, on County Trunk HH, 4.4 mi northwest of Underhill.

Drainage area.--35.8 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 24.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 8.7 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071000 Oconto River near Gillett, Wis.

Location.--NE¼NW¼ sec. 34, T. 28 N., R. 18 E., Oconto County, on left bank at bridge on County Trunk BB, 2.0 mi upstream from Christy Brook, 1.8 mi south of Gillett.

Drainage area.--705 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--June 1906 to March 1909, October 1913 to September 1977. Monthly discharge only for some records.

Average discharge.--66 years, 579 ft^3/s.

Extremes.--Maximum discharge, 8,400 ft^3/s Apr. 10, 1922, caused by failure of dam at Pulcifer 4 mi upstream from station; minimum discharge 93 ft^3/s Nov. 26, 1941, flow retarded by anchor ice upstream from station.

Period of consecutive days	Magnitude and frequency of annual low flow. Discharge, in cubic feet per second, for indicated recurrence interval, in years					
	2	5	10	20	50	100
7	247	204	185	171	156	147
14	258	212	191	175	159	150
30	272	223	201	184	167	156
60	292	240	217	199	181	169
90	317	259	233	213	193	180

Duration table of daily flow. Discharge, in cubic feet per second, which was exceeded for indicated percent of time						
Percent	2	5	10	20	30	40
ft^3/s	1,970	1,420	1,060	750	590	495
Percent	50	60	70	80	90	95
ft^3/s	435	385	342	300	253	230
Percent	98	99.9				
ft^3/s	205	161				

Accuracy.--$SE_{7,2}$ = 3 percent, $SE_{7,10}$ = 4 percent.

04071090 Christie Brook at Gillett, Wis.

Location.--NE¼NW¼ sec. 22, T. 28 N., R. 18 E., Oconto County, at culvert on town road, at Gillett.

Drainage area.--7.27 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 1, 1974, 1.33 ft^3/s; July 7, 1975, 1.65 ft^3/s; Aug. 4, 1975, 0.50 ft^3/s; Aug. 30, 1976, 0.23 ft^3/s; Oct. 12, 1976, 0.31 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.41 ft^3/s, $Q_{7,10}$ = 0.17 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 5 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

04071100 Christie Brook near Gillett, Wis.

Location.--NW¼NE¼ sec. 26, T. 28 N., R. 18 E., Oconto County, on country road, 1.0 mi upstream from mouth, 1.7 mi southeast of Gillett.

Drainage area.--12.7 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 3.50 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics; additional discharge measurements are required.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071700 North Branch Little River near Coleman, Wis.

Location.--SE¼SE¼ sec. 3, T. 29 N., R. 20 E., Oconto County, at U.S. Highway 141, 3.8 mi south of Coleman.

Drainage area.--21.4 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Sept. 9, 1961, 0.63 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.19 ft^3/s, $Q_{7,10}$ = 0.07 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071703 North Branch Little River near Lena, Wis.

Location.--SE¼NE¼ sec. 11, T. 29 N., R. 20 E., Oconto County, on country road, 3.8 mi north of Lena.

Drainage area.--23.2 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 2.41 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.78 ft^3/s, $Q_{7,10}$ = 0.36 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071730 Kelly Brook near Lena, Wis.

Location.--SE¼NE¼ sec. 22, T. 29 N., R. 20 E., Oconto County, on U.S. Highway 141, 1.5 mi north of Lena.

Drainage area.--80.0 mi^2. Tributary to.--Little River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--2.76 ft^3/s, July 25, 1977.

Low-flow frequency.--$Q_{7,2}$ = 3.7 ft^3/s, $Q_{7,10}$ = 1.9 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 12 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 33 percent, $SE_{7,10}$ = 52 percent.

04071746 Little River tributary at Lena, Wis.

Location.--NE¼SW¼ sec. 26, T. 29 N., R. 20 E., Oconto County, at culvert on U.S. Highway 141, at Lena.

Drainage area.--2.41 mi^2. Tributary to.--Little River.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0 ft^3/s, Aug. 3, 1972, and Oct. 18, 1972.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 8 discharge measurements made during the period 1972-76.

Accuracy.--Not applicable.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071760 Little River near Stiles, Wis.

Location.--SE¼NE¼ sec. 24, T. 28 N., R. 20 E., Oconto County, on State Highway 22, 2.8 mi northeast of Stiles.

Drainage area.--170 mi^2. Tributary to.--Oconto River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 13.6 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics; additional discharge measurements are required.

04071788 Pensaukee River near Zachow, Wis.

Location.--SE¼NE¼ sec. 24, T. 26 N., R. 17 E., Shawano County, at bridge on County Trunk F, 1.3 mi south of Zachow, Wis.

Drainage area.--19.3 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.51 ft^3/s, Oct. 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 0.11 ft^3/s, $Q_{7,10}$ = 0.03 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 138 percent, $SE_{7,10}$ = 285 percent.

04071800 Pensaukee River near Pulaski, Wis.

Location.--NE¼NE¼ sec. 1, T. 26 N., R. 18 E., Shawano County, at State Highway 32, at Krakow, 6.3 mi north of Pulaski.

Drainage area.--48.8 mi^2. Tributary to.--Lake Michigan.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.06 ft^3/s, Aug. 17, 1964.

Low-flow frequency.--$Q_{7,2}$ = 0.19 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 18 discharge measurements made during the period 1961-77.

Accuracy.--$SE_{7,2}$ = 29 percent, $SE_{7,10}$ = 47 percent.

04071820 North Branch Pensaukee River near Advance, Wis.

Location.--SE¼SE¼ sec. 18, T. 27 N., R. 18 E., Shawano County, at bridge on country road, 1.8 mi northwest of Advance.

Drainage area.--4.80 mi^2. Tributary to.--Pensaukee River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1975, 0 ft^3/s (ponded); July 14, 1976, 0 ft^3/s (dry); Oct. 14, 1976, 0 ft^3/s (ponded).

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 3 discharge measurements.

Accuracy.--Not applicable.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071822 North Branch Pensaukee River near Advance, Wis.

Location.--NE¼NE¼ sec. 20, T. 27 N., R. 18 E., Shawano County, at bridge on County Trunk C, 1.5 mi north of Advance.

Drainage area.--9.52 mi^2. Tributary to.--Pensaukee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 23, 1975, 0 ft^3/s (ponded).

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04071843 North Branch Pensaukee River near Sampson, Wis.

Location.--SE¼SE¼ sec. 23, T. 27 N., R. 19 E., Oconto County, at bridge on County Trunk E, 2.5 mi northeast of Sampson.

Drainage area.--39.9 mi^2. Tributary to.--Pensaukee River.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 14, 1969, 2.61 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.76 ft^3/s, $Q_{7,10}$ = 0.33 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071850 Pensaukee River near Abrams, Wis.

Location.--NW¼NW¼ sec. 26, T. 27 N., R. 20 E., Oconto County, at bridge on U.S. Highway 141, 1.1 mi northeast of Abrams.

Drainage area.--116 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Minimum discharge measured.--4.06 ft^3/s, July 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 2.8 ft^3/s, $Q_{7,10}$ = 1.0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 73 percent, $SE_{7,10}$ = 127 percent.

04071855 Pensaukee River near Brookside, Wis.

Location.--SW¼NE¼ sec. 18, T. 27 N., R. 21 E., Oconto County, at bridge on County Trunk J, 0.6 mi north of Brookside.

Drainage area.--126 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 6.71 ft^3/s.

Low-flow frequency.--Unable to determine low-flow characteristics; additional discharge measurements are required.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071856 Brookside Creek near Brookside, Wis.

Location.--NE¼NW¼ sec. 25, T. 27 N., R. 20 E., Oconto County, at culvert on country road, 1.6 mi southwest of Brookside.

Drainage area.--1.86 mi^2. Tributary to.--Pensaukee River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1975, 0.31 ft^3/s; July 14, 1976, 0 ft^3/s (ponded); Oct. 14, 1976, <0.10 ft^3/s (estimate); July 27, 1977, 0.04 ft^3/s (estimate).

Low-flow frequency.--$Q_{7,2}$ = 0.05 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 4 discharge measurements.

Accuracy.--Not applicable.

04071858 Pensaukee River near Pensaukee, Wis.

Location.--NW¼NE¼ sec. 16, T. 27 N., R. 21 E., Oconto County, 300 ft downstream from town road bridge, 1.0 mi upstream from U.S. Highway 41 bridge.

Drainage area.--134 mi^2. Tributary to.--Lake Michigan.

Type of site.--Gaging station.

Period of record.--October 1972 to September 1977.

Average discharge.--5 years, 88.4 ft^3/s.

Extremes.--Maximum discharge, 3,880 ft^3/s May 29, 1973; minimum daily discharge, 1.0 ft^3/s Aug. 31, 1977.

Low-flow frequency.--$Q_{7,2}$ = 3.0 ft^3/s, $Q_{7,10}$ = 1.1 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 28 daily mean flows and discharge measurements made during the period 1973-77.

Accuracy.--$SE_{7,2}$ = 70 percent, $SE_{7,10}$ = 70 percent.

04071885 Tibbet Creek at Little Suamico, Wis.

Location.--NW¼NE¼ sec. 19, T. 26 N., R. 21 E., Oconto County, on country road, 0.6 mi east of Little Suamico.

Drainage area.--13.4 mi^2. Tributary to.--Green Bay.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 0.02 ft^3/s; Aug. 27, 1969, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04071888 Little Suamico River near Pulaski, Wis.

Location.--NW¼NE¼ sec. 33, T. 26 N., R. 19 E., Oconto County, at culvert on Jaworski Road, 2.2 mi northeast of Pulaski.

Drainage area.--9.73 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Minimum discharge required.--0.22 ft^3/s, Oct. 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 0.19 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 43 percent, $SE_{7,10}$ = 71 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071891 Little Suamico River near Pulaski, Wis.

Location.--SE¼NW¼ sec. 34, T. 26 N., R. 19 E., Oconto County, on country road, 3.2 mi east of Pulaski.

Drainage area.--10.1 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 0.40 ft^3/s; Aug. 27, 1969, 0.40 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.12 ft^3/s, $Q_{7,10}$ = 0.04 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071894 Little Suamico River tributary near Pulaski, Wis.

Location.--SE¼SW¼ sec. 27, T. 26 N., R. 19 E., Oconto County, near mouth, at country road, 3.2 mi east of Pulaski.

Drainage area.--9.05 mi^2. Tributary to.--Little Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 0.17 ft^3/s; Aug. 27, 1969, 0.20 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.04 ft^3/s, $Q_{7,10}$ = 0.02 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071899 Little Suamico River tributary near Pulaski, Wis.

Location.--SE¼NW¼ sec. 34, T. 26 N., R. 19 E., Oconto County, at mouth, 3.2 mi east of Pulaski.

Drainage area.--6.87 mi^2. Tributary to.--Little Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 0.18 ft^3/s; Aug. 27, 1969, 0.19 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.05 ft^3/s, $Q_{7,10}$ = 0.02 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071903 Little Suamico River near Sobieski, Wis.

Location.--NE¼NE¼ sec. 24, T. 26 N., R. 19 E., Oconto County, on country road, 3.0 mi west of Sobieski.

Drainage area.--39.8 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 1.67 ft^3/s; Aug. 27, 1969, 1.27 ft^3/s; July 8, 1976, 1.28 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.78 ft^3/s, $Q_{7,10}$ = 0.45 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 3 discharge measurements.

Accuracy.--$SE_{7,2}$ = 27 percent, $SE_{7,10}$ = 39 percent (basin average).

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071906 Little Suamico River at Sobieski, Wis.

Location.--SE¼SE¼ sec. 21, T. 26 N., R. 20 E., Oconto County, at bridge on Cross Road, 0.7 mi south of Sobieski.

Drainage area.--45.9 mi^2. Tributary to.--Green Bay.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.55 ft^3/s, July 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.54 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 8 discharge measurements made during the period 1969-76.

Accuracy.--$SE_{7,2}$ = 45 percent, $SE_{7,10}$ = 76 percent.

04071915 Little Suamico River at Little Suamico, Wis.

Location.--SE¼SE¼ sec. 24, T. 26 N., R. 20 E., Oconto County, at bridge on County Trunk J, 0.3 mi south of Little Suamico.

Drainage area.--59.5 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.29 ft^3/s, July 14, 1976.

Remarks.--Eight discharge measurements were made during the period 1969-76. Unable to determine low-flow characteristics due to seiche effect from Lake Michigan.

04071950 South Branch Suamico River at Kunesh, Wis.

Location.--SE¼NW¼ sec. 22, T. 25 N., R. 19 E., Brown County, on country road, 0.7 mi northeast of Kunesh.

Drainage area.--15.6 mi^2. Tributary to.--Green Bay.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0.22 ft^3/s; Aug. 28, 1969, 0.12 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.04 ft^3/s, $Q_{7,10}$ = 0.01 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071965 Suamico River tributary at Kunesh, Wis.

Location.--SE¼NW¼ sec. 22, T. 25 N., R. 19 E., Brown County, at mouth, 0.7 mi northeast of Kunesh.

Drainage area.--11.4 mi^2. Tributary to.--Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0 ft^3/s; Aug. 28, 1969, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04071971 Potter Creek near Kunesh, Wis.

Location.--SE¼NW¼ sec. 15, T. 25 N., R. 19 E., Brown County, on country road, 1.7 mi north of Kunesh.

Drainage area.--9.24 mi^2. Tributary to.--Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0.74 ft^3/s; Aug. 28, 1969, 0.16 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.13 ft^3/s, $Q_{7,10}$ = 0.06 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04071981 Suamico River tributary near Flintville, Wis.

Location.--SE¼SW¼ sec. 12, T. 25 N., R. 19 E., Brown County, on County Trunk B, 1.3 mi west of Flintville.

Drainage area.--6.70 mi^2. Tributary to.--Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0.70 ft^3/s; Aug. 28, 1969, 0.55 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.22 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04072000 Suamico River at Suamico, Wis.

Location.--NW¼ sec. 22, T. 25 N., R. 20 E., Brown County, at bridge on County Trunk B, 0.5 mi west of Suamico.

Drainage area.--60.7 mi^2. Tributary to.--Lake Michigan.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0.98 ft^3/s, July 27, 1977.

Low-flow frequency.--$Q_{7,2}$ = 1.6 ft^3/s, $Q_{7,10}$ = 0.88 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 11 discharge measurements made during the period 1969-77.

Accuracy.--$SE_{7,2}$ = 24 percent, $SE_{7,10}$ = 37 percent.

04072005 Haller Creek at Suamico, Wis.

Location.--SE¼SE¼ sec. 15, T. 25 N., R. 20 E., Brown County, on County Trunk B, at Suamico.

Drainage area.--6.31 mi^2. Tributary to.--Suamico River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 13, 1969, 0.24 ft^3/s; Aug. 28, 1969, 0.04 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.03 ft^3/s, $Q_{7,10}$ = 0.01 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04072015 Duck Creek near Black Creek, Wis.

Location.--SE¼NE¼ sec. 8, T. 22 N., R. 18 E., Outagamie County, on County Trunk C, 8.0 mi southeast of Black Creek.

Drainage area.--35.4 mi^2. Tributary to.--Green Bay.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04072021 Duck Creek tributary near Mackville, Wis.

Location.--SE¼NE¼ sec. 20, T. 22 N., R. 18 E., Outagamie County, on County Trunk C, 4.2 mi east of Mackville.

Drainage area.--7.60 mi^2. Tributary to.--Duck Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04072024 Duck Creek near Freedom, Wis.

Location.--SE¼SE¼ sec. 16, T. 22 N., R. 18 E., Outagamie County, at bridge on Vine Road, 1.4 mi southwest of Freedom.

Drainage area.--48.2 mi^2. Tributary to.--Lake Michigan.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 17, 1972, 4.53 ft^3/s; Oct. 21, 1975, <0.05 ft^3/s; July 14, 1976, 0 ft^3/s (dry).

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 3 discharge measurements.

Accuracy.--Not applicable.

04072031 Duck Creek near Freedom, Wis.

Location.--NW¼NE¼ sec. 11, T. 22 N., R. 18 E., Outagamie County, on country road, 1.1 mi north of Freedom.

Drainage area.--50.5 mi^2. Tributary to.--Green Bay.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04072041 Duck Creek tributary near Oneida, Wis.

Location.--SE¼SE¼ sec. 19, T. 23 N., R. 19 E., Outagamie County, on County Trunk EE, 4.6 mi southwest of Oneida.

Drainage area.--17.1 mi^2. Tributary to.--Duck Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Aug. 12, 1969, 7.69 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--Not applicable.

04072050 Duck Creek near Oneida, Wis.

Location.--NW¼SE¼ sec. 17, T. 23 N., R. 19 E., Outagamie County, at country road, 2.9 mi southwest of Oneida.

Drainage area.--95.5 mi^2. Tributary to.--Green Bay.

Type of site.--Low-flow partial-record station.

Minimum discharge measured.--0 ft^3/s, July 27, 1977.

Low-flow frequency.--$Q_{7,2}$ = 0.04 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 12 discharge measurements made during the period 1969-77.

Accuracy.--Not applicable.

04072150 Duck Creek near Howard, Wis.

Location.--SW¼SW¼ sec. 19, T. 24 N., R. 20 E., Brown County, on country road, 2.2 mi southwest of Howard.

Drainage area.--108 mi^2. Tributary to.--Green Bay.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 11, 1969, 0.94 ft^3/s; Aug. 27, 1969, 0 ft^3/s; July 7, 1976, <0.01 ft^3/s (est.)

Low-flow frequency.--$Q_{7,2}$ = 0 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Related to Oconto River near Gillett using 3 discharge measurements.

Accuracy.--Not applicable.

04072185 Trout Creek near Howard, Wis.

Location.--NE¼SE¼ sec. 24, T. 24 N., R. 19 E., Brown County, on country road, 2.2 mi southwest of Howard.

Drainage area.--15.4 mi^2. Tributary to.--Duck Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 11, 1969, 0.43 ft^3/s; Aug. 27, 1969, 0.24 ft^3/s; July 8, 1976, 0.70 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.08 ft^3/s, $Q_{7,10}$ = 0.02 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 1.--Low-flow characteristics for sites in the Menominee-Oconto-Peshtigo River basin--Continued

04072225 Beaver Dam Creek near Howard, Wis.

Location.--SE¼SW¼ sec. 15, T. 24 N., R. 20 E., Brown County, on country road, 1.3 mi east of Howard.

Drainage area.--6.98 mi^2. Tributary to.--Duck Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0.71 ft^3/s; Aug. 27, 1969, 0.54 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.22 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

04072235 Duck Creek tributary near Howard, Wis.

Location.--SW¼SE¼ sec. 9, T. 24 N., R. 20 E., Brown County, on County Trunk AA, 1.3 mi north of Howard.

Drainage area.--11.2 mi^2. Tributary to.--Duck Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 12, 1969, 0.47 ft^3/s; Aug. 27, 1969, 0.14 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.07 ft^3/s, $Q_{7,10}$ = 0.02 ft^3/s.

Basis of estimate.--Used regression equations 3 and 4.

Accuracy.--$SE_{7,2}$ = 32 percent, $SE_{7,10}$ = 49 percent.

Table 2.--Basin characteristics for low-flow partial-record stations and selected gaging stations in the Menominee-Oconto-Peshtigo River basin

Station number	Station name	Drainage area (mi^2) A	Main-channel slope (ft/mi) S	Main-channel length (mi) L	Basin storage (percent) Bs	Forest cover (percent) F
04059800	Brule Creek near Alvin	35.6	7.53	12.7	81.5	85.5
04059900	Allen Creek tributary near Alvin	1.22	12.0	1.00	5.6	81.2
04060990	Montagne Creek near Florence	14.6	18.9	7.41	21.4	86.1
04063600	Pine River near Three Lakes	14.5	2.76	9.14	57.9	91.7
04063690	Soutn Branch Popple River near Florence	12.3	10.6	9.18	30.2	90.3
04063700	Popple River near Fence	139	5.69	37.0	29.8	91.6
04063800	Woods Creek near Fence	41.9	5.4	49.6	12.0	92.7
04065970	South Branch Pemebonwon River near Pembine	26.1	16.0	14.1	20.1	87.4
04066250	South Branch Pike River near Dunbar	79.9	15.2	21.4	19.5	90.7
04066300	Cole Creek near Dunbar	3.62	27.4	2.90	19.1	85.3
04067700	North Branch Peshtigo River near Argonne	33.6	15.9	19.1	36.5	89.4
04067750	Camp Eight Creek near Cavour	13.6	7.44	7.35	34.8	88.8
04067800	Armstrong Creek near Armstrong Creek	23.2	7.52	5.90	36.5	61.5
04067900	Rat River near Wabeno	82.1	12.3	24.2	24.1	82.9
04067990	Eagle Creek near Athelstane	37.5	17.0	14.6	35.8	87.0
04068100	North Fork Thunder River near Lakewood	17.0	17.8	14.9	16.2	92.1
04069290	Middle Inlet near Middle Inlet	59.2	14.6	21.4	19.9	74.0
04069350	South Branch Beaver Creek at Beaver	51.0	15.8	15.1	17.5	37.5
04069390	Little Peshtigo River near Coleman	41.6	6.86	18.2	21.6	29.9
04069480	Trout Creek near Peshtigo	24.4	9.24	14.0	17.0	17.8
04070100	North Branch Oconto River near Mountain	174	15.0	39.0	11.5	91.9
04070300	Waupee Creek near Mountain	51.4	8.01	14.6	26.7	92.6
04070600	Hills Pond Creek near Langlade	8.92	30.1	6.69	20.3	83.9
04070800	Pecore Creek near Hayes	31.2	6.39	16.3	21.3	84.1
04071730	Kelly Brook near Lena	80.0	6.18	25.7	17.0	28.8
04071800	Pensaukee River near Pulaski	48.8	11.0	13.2	6.5	3.5
04071858	Pensaukee River near Pensaukee	134	5.75	44.0	11.4	22.4
04072000	Suamico River at Suamico	60.7	11.8	21.7	1.1	13.0
04072050	Duck Creek near Oneida	95.5	4.81	25.8	1.0	6.7

Table 2.--Basin characteristics for low-flow partial-record stations and selected gaging stations in the Menominee-Oconto-Peshtigo River basin

Mean annual precipitation (in.) P	Soil infiltration rate (in/hr) I	Mean annual snowfall (in.) Sn	Base-flow index {$(ft^3/s)/mi^2$} Bf	Hydraulic conductivity {$(gal/d)/ft^2$} K	Drift thickness (ft) H	Transmissivity {(gal/d)/ft} T
30.9	2.40	55.5	0.48	997	135	135,000
30.6	3.52	56.3	1.44	2,500	130	325,000
30.2	1.65	57.0	.30	1,980	86	170,000
30.5	2.81	56.2	.06	2,500	28	70,000
30.0	2.22	57.8	.36	2,500	72	180,000
29.9	1.26	57.7	.24	2,500	66	165,000
30.0	1.65	57.5	.34	1,950	69	135,000
29.2	5.40	51.5	.14	1,670	42	70,100
29.2	3.94	50.6	.26	1,630	99	161,000
29.1	2.58	49.1	.11	151	25	3,780
29.8	1.55	58.0	.23	2,500	58	145,000
29.9	1.65	58.5	.20	2,300	90	207,000
29.7	1.86	58.6	.23	2,500	220	550,000
29.6	1.64	53.5	.66	2,220	180	400,000
28.9	6.49	51.4	.27	2,050	84	172,000
29.1	2.97	50.0	.49	1,190	110	131,000
28.8	.50	49.5	.47	1,750	79	138,000
28.8	.50	44.6	.31	424	130	55,100
28.9	.50	44.1	.20	288	110	31,700
28.3	.64	43.1	.00	8.5	54	460
29.5	1.78	47.4	.48	1,600	150	240,000
29.2	4.89	52.4	.31	2,190	53	116,000
29.8	3.37	47.5	.85	1,500	150	225,000
29.7	2.00	44.0	.36	1,570	100	157,000
28.7	.75	42.2	.06	78	130	10,100
28.0	.56	42.5	.01	234	52	12,200
28.0	.85	42.5	.03	380	41	15,600
26.6	.97	39.9	.04	69	44	3,040
26.0	.39	42.7	.003	12	50	600

Table 3.--Comparison of methods available to estimate low-flow characteristics in the Menominee-Oconto-Peshtigo River basin

Type of site	Type of data	Number of sites with data	Approximate time required to collect data	Analytical method to determine $Q_{7,10}$	Standard error of 10-year low flow ($SE_{7,10}$)
Gaging station	10 years or more recorded streamflow (unregulated)	5	10 or more years	Frequency analysis	6 percent
Gaging station	10 years recorded streamflow	None[1]	10 years	Frequency analysis	10 percent
Low-flow partial-record stations	10-18 base-flow discharge measurements	25	3-10 years	Graphical regression analysis	32 percent
Miscellaneous measurement sites	3 base-flow discharge measurements	--	1- 2 years	Graphical regression analysis	39 percent
Miscellaneous measurement sites	1 base-flow discharge measurement and drainage-basin characteristics	109	1 day	Multiple-regression analysis	49 percent
Ungaged sites	Mapped Bf values from plate 2 and drainage area	Limited to sites meeting conditions on page 16	1 hour	Multiple-regression analysis	Undefined[2]
Ungaged sites with drainage areas less than 150 mi^2	Drainage-basin characteristics	Unlimited	1 hour	Multiple-regression analysis	78 percent

[1]This example was presented to illustrate the accuracy that could be obtained from 10 years of recorded streamflow in the basin. Data from existing gaging stations were adjusted to represent 10 years of recorded streamflow for the analysis.

[2]Limited number of sites were tested. Computed $Q_{7,10}$ values were compared graphically with observed $Q_{7,10}$ values for 15 sites and resulted in an $SE_{7,10}$ of 66 percent (p. 16).

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