WATER RESOURCES INVESTIGATIONS
OPEN-FILE REPORT 81-495

Low-Flow Characteristics of Streams in the Central Wisconsin 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 Central Wisconsin River Basin, Wisconsin

W.A. GEBERT

U.S. GEOLOGICAL SURVEY
Water Resources Investigations
Open-File Report 81-495

Prepared in cooperation with the Wisconsin Department of Natural Resources

March 1982

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, *SECRETARY*

GEOLOGICAL SURVEY

Dallas L. Peck, *Director*

For additional information write to:

U. S. Geological Survey
1815 University Avenue
Madison, Wisconsin 53706

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS (continued)

TABLES

CONVERSION TABLE

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

Multiply	By	To obtain
mile (mi)	1.609	kilometer (km)
foot (ft)	0.3048	meter (m)
square mile (mi^2)	2.59	square kilometer (km^2)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
foot per mile (ft/mi)	0.1894	meter per kilometer (m/km)
inch (in.)	2.54	centimeter (cm)
cubic foot per second per square mile [$(ft^3/s)/m$]	0.01094	cubic meter per second per square kilometer [$(m^3/s)/km^2$]
gallon per day (gal/d)	0.003786	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 [$(cm^3/d)/m^2$]

Low-Flow Characteristics of Streams in the Central Wisconsin River Basin, Wisconsin

W.A. GEBERT

ABSTRACT

This report describes low-flow characteristics of streams in the central Wisconsin River basin where streamflow data have been collected and presents equations for estimating low-flow characteristics at ungaged sites. Included are estimates of low-flow frequency at 34 gaging stations, flow duration at 24 gaging stations, and low-flow frequency characteristics at 18 low-flow partial-record stations and 131 miscellaneous sites.

Due to the large variability in low-flow characteristics, the central Wisconsin River basin was divided into four areas of similar geologic and topographic conditions.

Separate equations are provided for each area to estimate low-flow characteristics at ungaged sites and at sites where one base-flow discharge measurement is available. The equations were determined from multiple-regression analyses that related the low-flow characteristics at gaging stations and at low-flow partial-record stations to basin characteristics. Drainage area (A), hydraulic conductivity (K), soil-infiltration capacity (I), forest cover (F), base-flow index (Bf), and drift thickness (H) were the most significant characteristics in explaining the variations in low flow at ungaged sites.

The standard error of estimate (SE), provided for each equation, ranged from 10 to 140 percent. Equations with the lowest SE's were for the central sand plain area that contains relatively thick sand aquifers. The highest SE's were associated with equations for the area west of the Wisconsin River where thin glacial drift with fairly low permeability overlies crystalline rock.

The low-flow characteristics determined for all types of sites in the central sand plain area have the lowest SE's compared to other basins in the State. This is due to the sand deposits which yield a high and uniform base flow.

EXPLANATION OF TERMS

Base flow--That part of the streamflow derived from ground water.

Low flow--The minimum stream discharge that occurs within a given time period.

Continuous-record gaging station--A station where continuous streamflow data are collected.

Low-flow partial-record station--A station where eight or more base-flow discharge measurements are made in at least a 2-year period to determine low-flow characteristics.

Miscellaneous site--A site where less than eight base-flow discharge measurements have been made as part of other water-resources investigations or to determine the stream's base-flow characteristic for this report.

$Q_{7,2}$--The annual minimum 7-day mean flow below which the flow will fall on the average of once in 2 years.

$Q_{7,10}$--The annual minimum 7-day mean flow below which the flow will fall on the average of once in 10 years.

Q90--The discharge at the 90 percent flow-duration point which is defined as the discharge that is exceeded 90 percent of the time.

Standard error of estimate (SE)--SE is a measure of accuracy. One SE above and below an estimate defines a range which should include the true value 67 percent of the time or at 67 percent of the sites.

$SE_{7,2}$--The standard error of estimate for the $Q_{7,2}$ discharge.

$SE_{7,10}$--The standard error of estimate for the $Q_{7,10}$ discharge.

INTRODUCTION

The purpose of this report is to describe low-flow characteristics of streams in the central Wisconsin River basin where streamflow data have been collected and to present equations for estimating low-flow characteristics at ungaged sites.

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).

The report includes: estimates of the magnitude and frequency of recurrence of low flows for various sites where systematic streamflow information has 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 and at sites with minimum streamflow data.

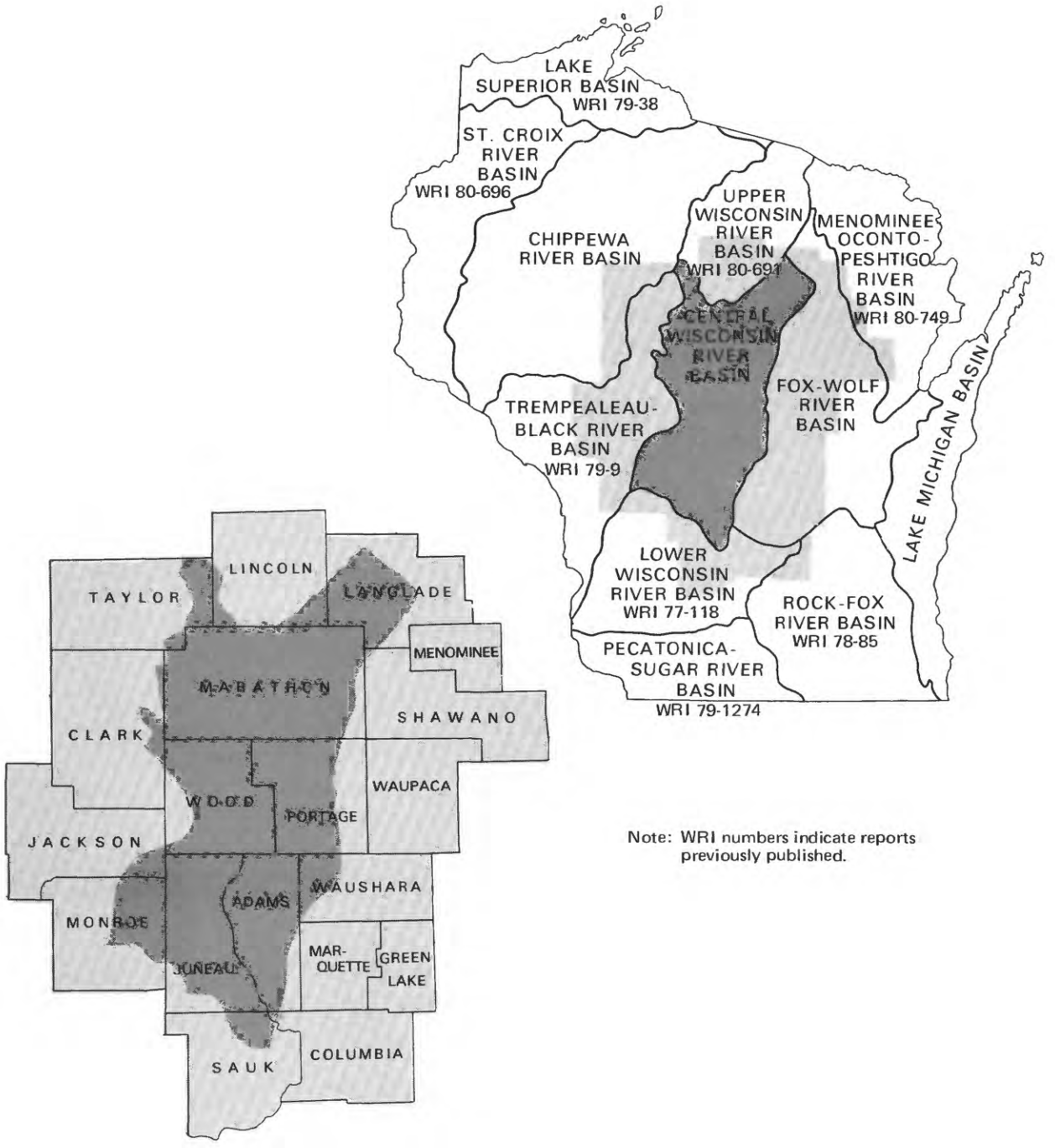


Figure 1. Location of the central Wisconsin River basin in Wisconsin.

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 hydropower, construction of impoundments for real-estate developments, and maintenance of adequate flow for canoeing. This increased demand requires an accurate determination of water resources during low-flow periods to ensure proper consideration of all users.

Low-flow frequency analyses and flow-duration analyses are presented for all current and discontinued gaging stations in the central Wisconsin River basin. Low-flow frequency analyses have been completed for 34 gaging stations and flow-duration analyses at 24 gaging stations through water year 1979. Low-flow frequency data are included in the report for 18 low-flow partial-record stations and for 131 miscellaneous sites.

Due to the large variability in low-flow characteristics, the basin was divided into four areas for the multiple-regression analyses and for the evaluation of the accuracy of low-flow characteristics determined by various methods. The basin was divided into areas having similar geologic and topographic conditions. The four areas (fig. 2) are: the northeast part of the basin which is similar to the irregular glacial landscape of rolling ground moraine and ridges of end moraine of the upper Wisconsin River basin; the area west of the Wisconsin River and north of the Lemonweir River that is mainly covered with a thin layer of till over crystalline rock; the central sand-plain area, which is an area of unpitted outwash and lake deposits; and the southwest area, which is typical of the rolling hills and wide valleys of the lower Wisconsin River basin.

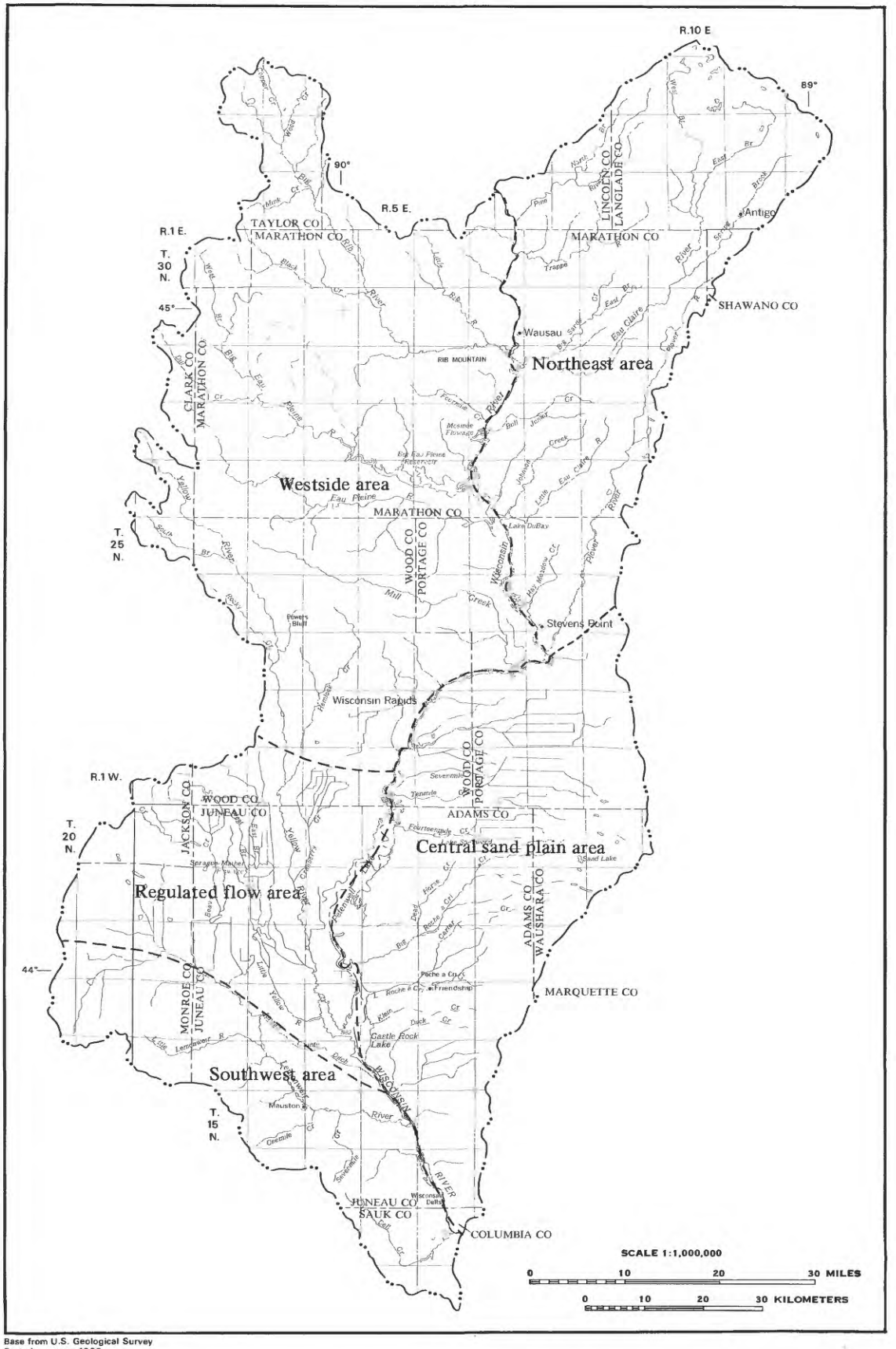
There is also one area that has been excluded for most of the analyses because of the effects of regulation. This area is northern Juneau County, southwestern Wood County, and western Jackson County. The area is shown in figure 2. This area consists of extensive cranberry bogs and several large wildlife refuges, which require management that substantially affects the low flow of most streams.

Previous reports by Holmstrom (1979) and Gebert (1971) contain preliminary information on low-flow characteristics of this basin.

I would like to acknowledge the contribution by David C. Goodrich and Jeanne M. Hackbart. They provided extremely valuable assistance in assembling and analyzing the data for this report. Dave and Jeanne worked for the Wisconsin District while attending the University of Wisconsin.

BASIN DESCRIPTION

The central Wisconsin River basin extends from Wisconsin Dells to Merrill which includes the area upstream from the gaging station on the Wisconsin River at Wisconsin Dells to the gaging station at Merrill. The drainage area of the basin is 5,050 mi^2.



Base from U.S. Geological Survey
State base map, 1968

Figure 2. Location of subareas for the central Wisconsin River basin.

The basin is mainly a rural area with a population of about 300,000 in 1978. The largest cities are Wausau, Stevens Point, Wisconsin Rapids, and Marshfield, with populations of 33,164, 23,631, 18,361, and 17,488, respectively. The economy is primarily based on agriculture and industry with some forestry and tourism. Row crops, cranberries, and dairy farming are the principal agricultural activities and the pulp-logging industry the major forest activity. The papermill industry is the largest industrial employer in the basin, with large mills in Brokaw, Mosinee, Stevens Point, Plover, Biron, Wisconsin Rapids, Port Edwards, and Nekoosa.

The mean annual precipitation in the basin is 30.9 in. (Wisconsin Statistical Reporting Service, 1967), ranging from about 30 in. in the south to 34 in. in the extreme northwest. Snowfall ranges from 40 in. in the south to more than 50 in. in Lincoln and Langlade Counties.

The topography, drainage, and surface geology is described by Devaul and Green (1971) as follows:

"The central part of the Wisconsin River drains areas of contrasting geology and hydrology; the northern part of the study area has thin, poorly permeable till overlying crystalline rock, and the southern and eastern parts have thick and extensive deposits of outwash sand, gravel, and clay. Thick permeable beds of sandstone underlie the southern part.

"In the northern part of the basin the topography is a gently rolling till plain slightly modified by stream erosion. This area has many crystalline rock outcrops that project through the glacial deposits. Major streams have branching drainage patterns, and there are fewer wetland areas or natural lakes than in the outwash plains to the south and northeast.

"The southern part of the basin is a gently sloping plain consisting of outwash and glacial lake deposits underlain by outwash. It has extensive areas of wetlands, which result from a flat topography, a high water table, and impermeable layers of silt or clay within the lake deposits. Many small buttes or mounds of bedrock project as much as 300 ft above the plain.

"Most of the surface drainage is toward the Wisconsin River. However, along the eastern and northeastern borders of the basin some of the surface drainage is into marshes or small lakes that lack surface outlets.

"The total relief in the basin is 1,100 ft--from 1,940 ft at the top of Rib Mountain near Wausau to 840 ft at Wisconsin Dells.

"Unconsolidated deposits of glacial origin cover almost the entire central Wisconsin River basin. These deposits consist of unpitted outwash, pitted outwash, lake deposits, end moraines, and ground moraines.

"Outwash deposits: Thick deposits of stratified sand, gravel, and some silt and clay form extensive outwash plains. These plains are westward extensions of pitted outwash and underlie parts of the lake deposits. Together, the lake and unpitted outwash deposits are referred to as the central sand plain. These deposits average about 100 ft in thickness, but they may be as thick as 250 ft over channels in bedrock.

"Pitted outwash deposits: An elongated band of thick, pitted outwash occurs along the eastern border of the basin between glacial end moraines. These deposits, including kame deposits, are composed of well sorted sand and gravel and poorly sorted sandy till. Their greatest known thickness is about 200 ft.

"Lake deposits: Glacial-lake deposits of fine to coarse sand, silt, and clay make up the southwestern part of the sand plain. Along their eastern and northern borders they are partly covered by unpitted outwash. The lake clays, exposed in many stream cuts or penetrated by wells, are as thick as 25 ft in Adams County.

"End-moraine deposits: Thick end-moraine deposits lie mainly in hummocky north-south ridges in the eastern part of the basin. End-moraine deposits include till and sorted sediments (kames) deposited near the glacial ice. Till deposits are composed mainly of sand; however, unsorted sediments range in size from clay to large boulders. End-moraine deposits are 200 to 400 ft thick.

"Ground-moraine deposits: Ground moraine consists of clayey and stony till and contains fragments of nearby bedrock. The deposits cover most of the northern half of the basin. They generally are less than 50 ft thick, but they thicken where they overlie channels in the bedrock."

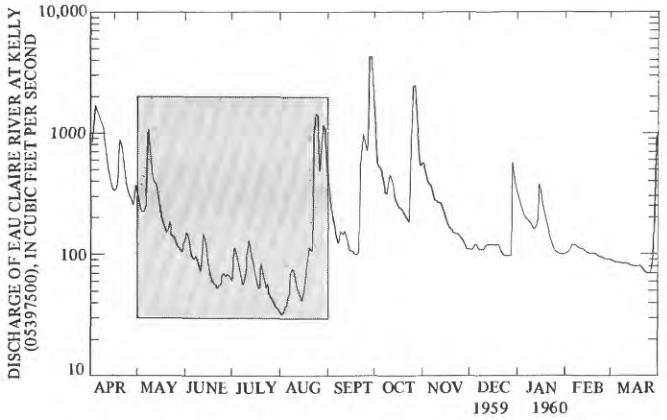
LOW-FLOW CHARACTERISTICS

Low flow generally 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 generally 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 1960 climatic year discharge hydrograph for the Eau Claire River at Kelly gaging station (fig. 3). The climatic year, which is used for low-flow analyses, starts on April 1 and extends to the following March 31 and is referenced by year of the ending date. The annual 90-day low flow for the 1960 climatic year occurred from May 23 to August 20. Although this was the lowest flow for 90 consecutive days during the year, direct runoff was substantial on many occasions during this period. Except for these rises resulting from direct runoff, the streamflow for the period was base flow (ground-water discharge).

Base flow is important for many low-flow studies because stream discharge is most stable then. Thus, low-flow characteristics can be transferred from a stream where systematic streamflow records have been collected for several years to a nearby stream where only a minimum number of base-flow discharge measurements is available.

Table 1 contains low-flow characteristics for 200 sites in the central Wisconsin River basin. Each site is identified by station number and station name. The site location, drainage area, type of site, base-flow discharge measurements, and other pertinent data are included. Characteristics included for each site depend upon the type of site: gaging station, low-flow partial-record station, or miscellaneous sites. The locations of the sites are shown on plate 1.



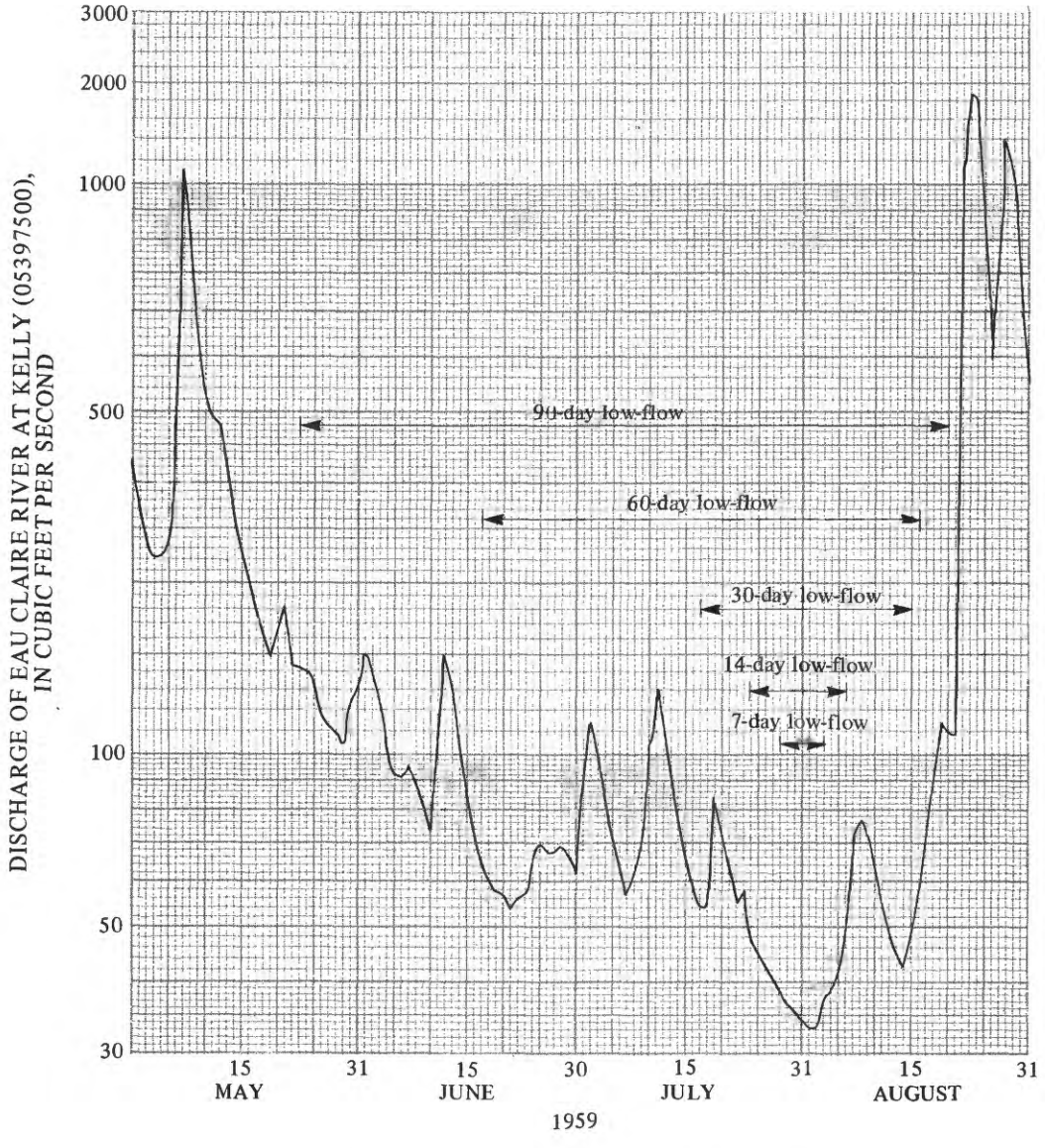


Figure 3. Daily discharge of Eau Claire River at Kelly, for 1960 climatic year, showing annual low-flow periods for various numbers of days.

Analytical techniques

Low-flow characteristics in table 1 were determined by three methods of analysis. These methods depended on the three basic types of data available: (1) continuous record of daily streamflows (continuous-record gaging stations); (2) 8 to 20 base-flow discharge measurements (low-flow partial-record stations); (3) 1 to 7 base-flow discharge measurements (miscellaneous sites).

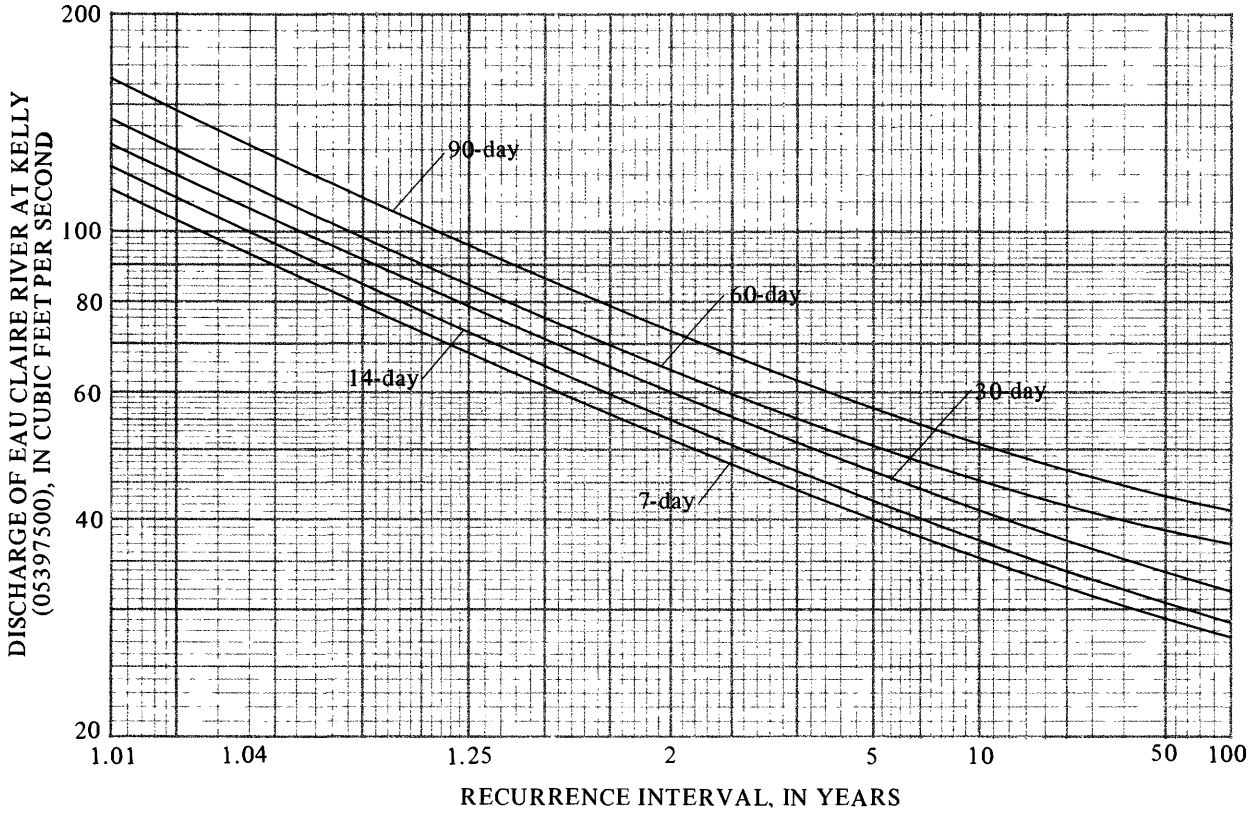


Figure 4. Low-flow frequency curves of the annual lowest mean discharge for the indicated number of consecutive days, at Eau Claire River at Kelly during the period 1914-26, 1939-79.

Low-flow characteristics of a stream where continuous 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 an annual minimum 7-day, 14-day, 30-day, 60-day, and 90-day consecutive mean flow will be less than an indicated discharge in any given year. The more generally

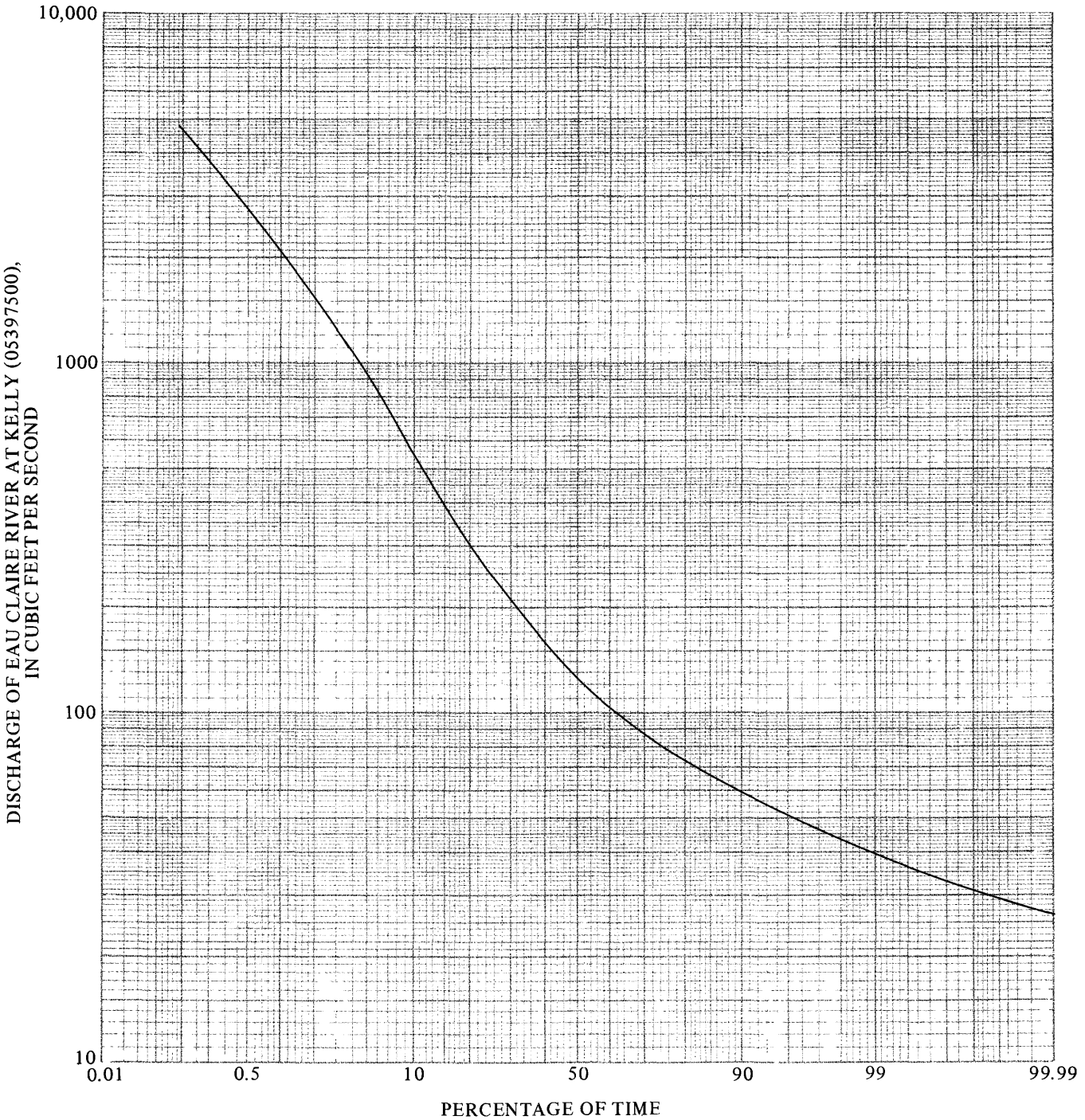


Figure 5. Flow-duration curve showing the percentage of time a given discharge was exceeded for the Eau Claire River at Kelly.

used analysis for most low-flow applications is the low-flow frequency analysis. For unregulated streams in the central Wisconsin River 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 the 91 percent discharge on the flow-duration curve. The annual minimum 7-day mean flow below which the flow will fall on the average of once in 10 years ($Q_{7,10}$) is about equal to the discharge at 99 percent on the flow-duration curve.

Low-flow frequency and flow-duration analyses were completed for all continuous-record gaging stations that have at least 10 years of record. Low-flow frequency values are listed in table 1 showing the magnitude and frequency of annual low flows for 3, 7, 14, 30, 60, and 90 consecutive days. Table 1 also lists flow-duration values showing the percentage of time that specified discharges were exceeded.

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). If the results of the two analyses were substantially different, the plotting position analysis was generally used to determine the various low-flow characteristics. Figure 4 is an example of a low-flow frequency curve for the Eau Claire River near Kelly gaging station, and figure 5 is a flow-duration curve for the same site.

For 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 20 low-flow partial-record stations. Characteristics were determined from a relation line established by a graphical regression using 8 to 20 base-flow discharge measurements at low-flow partial-record stations with concurrent discharges at continuous-record gaging stations in the area (Gebert, 1971). 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 6 is an example of this type of analysis for Buena Vista Creek near Kellner.

Miscellaneous sites

Base-flow measurements have been obtained at 148 miscellaneous sites in the central Wisconsin River 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.

Estimates of $Q_{7,2}$ and $Q_{7,10}$ were made at 45 sites by the same type of analysis that was used for partial-record stations (Gebert and Holmstrom, 1974) for the following conditions: if at least three base-flow discharge measurements were available and a well-defined relationship was indicated between the

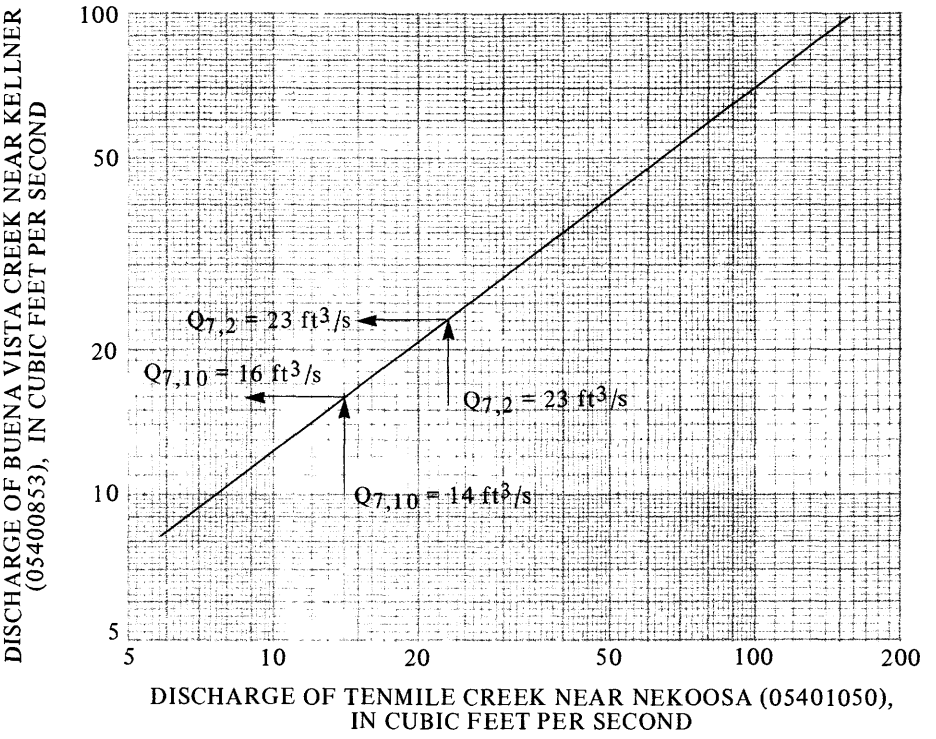


Figure 6. Method of estimating $Q_{7,2}$ and $Q_{7,10}$ at low-flow partial-record stations.

measured discharge and the concurrent daily mean discharge at a nearby gaging station. Figure 7 illustrates this type of analysis for Plainville Creek near Wisconsin Dells.

The slope of the relation line for miscellaneous sites was compared to established relation lines of nearby low-flow partial-record stations and other miscellaneous sites for uniformity. Generally the relation line 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 slope was adjusted to agree more closely with the better established relation line at a low-flow partial-record station.

A second method was used for 86 miscellaneous sites that have less than 3 discharge measurements. At these sites the low-flow characteristics were estimated by regression equations. The regression equations used and discussion of their development are presented later in the report (p. 15-30).

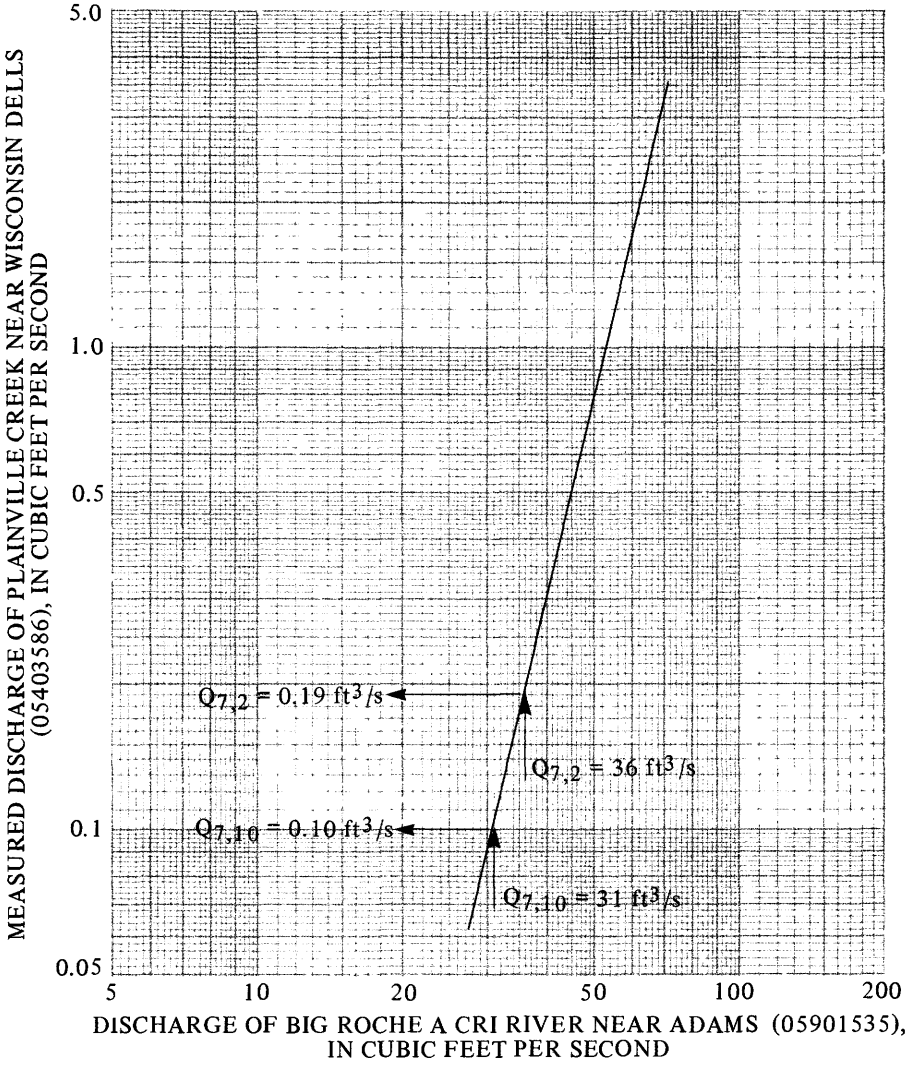


Figure 7. Method of estimating $Q_{7,2}$ and $Q_{7,10}$ at miscellaneous sites.

Low-flow characteristics were not estimated at 17 miscellaneous sites for one or more of the following reasons: discharge measurements were affected by upstream regulation or contained substantial effluent from industrial or sewage-treatment-plant discharge, less than 3 discharge measurements were available but the site had a drainage area greater than 150 mi^2, or regression equations could not be used because the measurements were made during a base-flow condition that had too high a discharge.

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, dependent on the amount and kind of data and the analytical method. Two major sources of error are the time-sampling error in streamflow records and the error in the analytical method.

The expected degree of accuracy for the $Q_{7,2}$ and $Q_{7,10}$ estimates are presented in table 1 for each site. The accuracy is presented as the standard error of estimate for the 7-day, 2-year low flow ($SE_{7,2}$) and for the 7-day, 10-year low flow ($SE_{7,10}$). The standard error of estimate defines a range which should include the true values 67 percent of the time or 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 relative guide to indicate a general level of confidence. In addition, there may be greater error associated with accuracy estimates for low-flow estimates that approach 0 ft^3/s.

Gaging stations

Accuracy of low-flow characteristics at gaging stations was determined by a method described by Hardison and Moss (1969). An average $SE_{7,2}$ of 8 percent and $SE_{7,10}$ of 12 percent was determined for the 14 gaging stations on unregulated streams in the central Wisconsin River basin that had greater than 10 years of unregulated-streamflow record.

A common length of record (10 years) was used to compare the accuracy of low-flow characteristics determined from recorded discharge at gaging stations in the central Wisconsin River basin with that of 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 17 percent was determined for the central Wisconsin River basin as compared with an $SE_{7,10}$ of 16 percent for gaging stations throughout the State. A more detailed listing of the $SE_{7,10}$ for each of the four areas is presented in tables 3-6.

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). Using this method, an average $SE_{7,10}$ of 22 percent was found for 18 low-flow partial-record stations in the central Wisconsin River basin. This compares to an average $SE_{7,10}$ of 29 percent for 265 low-flow partial-record stations throughout the State. The average $SE_{7,10}$ for low-flow partial-record stations in each area is listed in table 3.

Miscellaneous sites

The accuracy of low-flow characteristics that were determined by graphical regression using discharge measurements at the 45 miscellaneous sites is an average value for the entire basin. It was determined by analyzing data collected at low-flow partial-record stations. Three random base-flow measurements were selected from the 8 to 20 measurements available at 20 low-flow partial-record stations. Low-flow characteristics were determined from these three measurements using 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 20 measurements and the SE determined. The overall SE includes the SE determined by the plotted relationship and the SE associated with the low-flow estimates based on 8 to 20 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. For the central Wisconsin River basin, this resulted in an average $SE_{7,10}$ of 32 percent for the miscellaneous sites. An average $SE_{7,10}$ for each of the areas is presented in tables 3-6 and is listed for the miscellaneous sites in table 1 as the average area accuracy.

The average $SE_{7,10}$ value should be used cautiously for any particular site since the actual value 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 regression equations at the other 86 miscellaneous sites is also an average value for each of the 4 areas in the basin. It was determined as part of the regression analysis and is discussed later in the report (p. 15-30).

ESTIMATING LOW-FLOW CHARACTERISTICS AT UNGAGED SITES

A method is required 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 climatic, topographic, and aquifer characteristics of the drainage basin by multiple-regression analysis. Characteristics used in the multiple-regression analysis and the equations determined 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 these characteristics for 41 sites in the central Wisconsin River basin. The streamflow characteristics are the dependent variables in the multiple-regression analyses.

Basin characteristics

Differences in streamflow for various locations and times are caused by the differences in precipitation patterns and the differences in runoff characteristics. Climatic, topographic, and aquifer characteristics are quantified to explain the variation in low flow. These indices are the independent variables in the multiple-regression analysis.

Basin characteristics were selected for the analyses because of their known influence on the rainfall-runoff process. The following list of the drainage-basin characteristics contains a brief discussion of their effect on low flow and how the indices were determined.

Drainage area (A).--Size of the drainage area is the most significant characteristic in explaining differing streamflow between sites. Because low flow is ground-water runoff, the contributing area is defined by the ground-water divide of a basin, which can be determined from potentiometric maps. Because detailed potentiometric maps are not available for most areas in the central Wisconsin River basin, the surface-water divide was used to define the contributing surface drainage area. An exception was the central sand plain area. Detailed potentiometric maps from Holt (1965) and Weeks and Stangland (1971) showed a major difference in the surface and ground-water divides in that area. Therefore, the potentiometric maps from these reports were used to determine drainage areas for sites in the central sand plain.

Drainage areas, in square miles, based on surface-water divides were computed from U.S. Geological Survey topographic maps. Most of this drainage-area data were obtained from Holmstrom (1972).

Main-channel slope (S).--Main-channel slope (Benson, 1962 and 1964) is a characteristic that relates to the change 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 by a digitizer, divider, or other means.

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 may not be 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. In the central sand plain area of Wisconsin, Weeks and Stangland (1971) found that converting 10 percent of the headwater drainage area from grassland to forest would reduce the late summer streamflow by about 5 percent.

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 aquifers 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 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 (fig. 8) by Devaul and Green (1971).

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) 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 discharge measurement during base-flow conditions is a good indicator of a stream's low-flow potential. Base-flow measurements provide considerable information about characteristics of aquifers which provide base flow of the stream. To use base-flow measurements, it is necessary to relate them to a nearby continuous-record gaging station because measurements are obtained at various flow durations with different drainage areas. 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

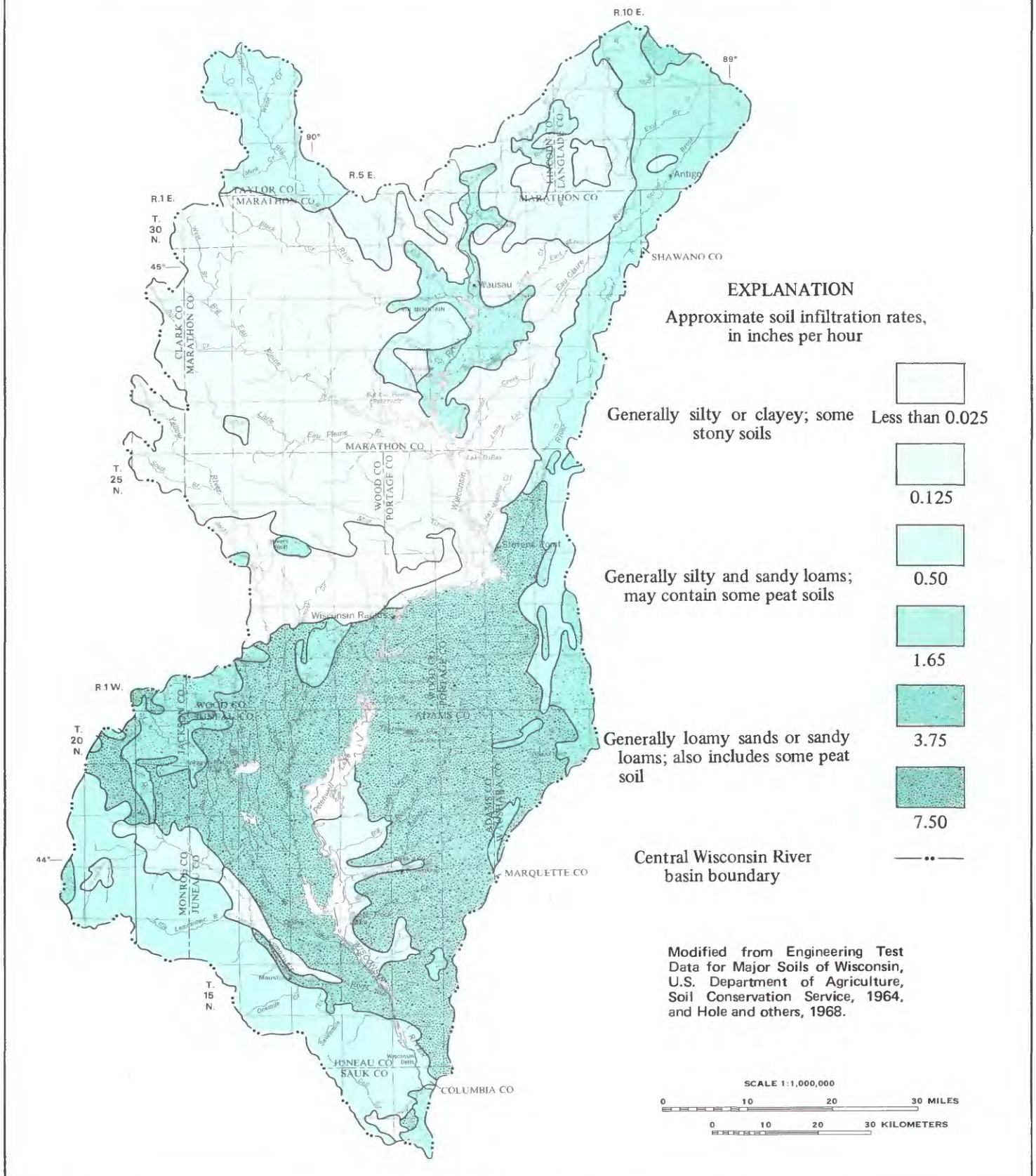


Figure 8. Soil-infilitration rate in the central Wisconsin River basin, Wisconsin.

this study, sites were selected that had discharge measurements previously obtained for other low-flow investigations.

The base-flow index values were determined by the equation:

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

where: Bf = base-flow index for low-flow partial-record station or miscellaneous site, in cubic feet per second per square mile;

Q_m = measured discharge at low-flow partial-record station or miscellaneous site, in cubic feet per second;

A = drainage area at low-flow partial-record station or miscellaneous site, in square miles;

Q_{90} = 90 percent flow-duration discharge at the correlating continuous-record station, in cubic feet per second; and

Q_r = discharge recorded at the continuous-record station the day that Q_m was made at the partial-record station or miscellaneous site, in cubic feet per second.

In effect, the measured discharge (Q_m) is converted to a unit discharge by dividing the value by the drainage area (A). This value is then adjusted to the 90 percent flow duration by multiplying it by the ratio of that day's Q_{90}/Q_r at the continuous recording station.

Plate 2 shows the locations of 117 sites with base-flow index values, their respective drainage-area outlines, and their computed base-flow index values. This plate can be used to estimate base-flow index values for sites where low-flow estimates are required and streamflow data are not available.

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 drift deposits in the central Wisconsin River basin and are:

	Hydraulic conductivity [(gal/d)/ft^2]
Ground moraine (till; consists of clay, silt, sand, gravel, and boulders)	10
End moraine (sandy to clayey till)	100
Pitted outwash (well-sorted sand and gravel to unsorted stratified sandy till)	250
Outwash (sand and gravel)	2,500
Glacial-lake deposits (mainly fine to coarse sand)	2,500
No glacial deposits (mainly silt)	100

Average values of hydraulic conductivity were obtained for each of the subbasins by the following procedures: (1) outline subbasin divide on glacial geology map (Devaul and Green, 1971, sheet 1) (fig. 9), (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 is an aquifer that stores water for release to streams in the basin. The thickness of drift ranges from zero in various parts of the basin to 400 ft in other parts. An average drift thickness for each subbasin was determined from the glacial geology and drift thickness map by Devaul and Green (1971, sheet 1) (fig. 9).

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.

Values for these basin characteristics for low-flow partial-record stations and selected gaging stations (drainage areas less than 150 mi^2) in the central Wisconsin River basin are listed in table 2.

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;

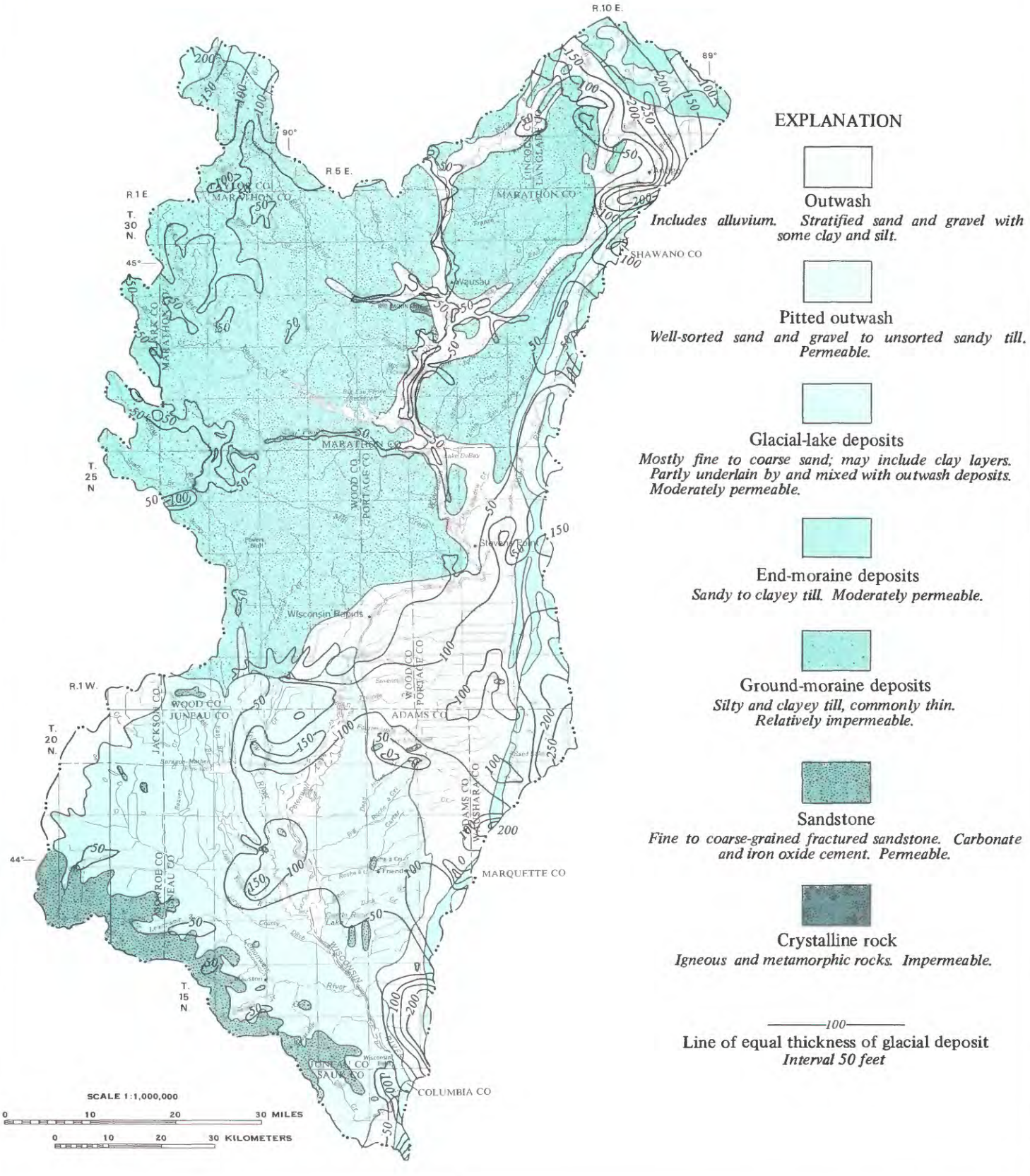
a is a regression constant defined by the regression analysis;

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 analytical method 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. Discharges estimated by the regression equations should be within one standard error of estimate of the true discharge 67 percent of the time and within twice this range for 95 percent of the time.



Base from U.S. Geological Survey
State base map, 1968

Geology from Thwaites (1956)

Figure 9. Glacial geology and drift thickness in the central Wisconsin River basin, Wisconsin.

Step-backwater regression analyses were done by digital computer through procedures outlines by Thomas and Benson (1970). 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.

The central Wisconsin River basin was separated into four areas for the analysis after a preliminary regression analysis for the entire basin indicated difficulty in quantifying low-flow characteristics for the wide range in geologic and topographic conditions in the basin.

Regression analyses were not done for the northeast area because of the small number (eight) of stations. As the area is similar in topography and geologic conditions to the upper Wisconsin River basin, the equations developed for that report by Gebert (1980) were used for this report. The applicability of these equations to the area was tested by using them to compute low-flow characteristics at the eight stations. This analysis provided estimates within the reported SE's for the equations.

The southwest area contains only six stations. Equations developed by Gebert (1977) for the lower Wisconsin River basin were used for this area because of the similarity in the two areas. Using these equations to compute low-flow characteristics at the six stations also provided estimates well within the SE's reported for the equations.

For each area, two separate equations were developed, one for sites without base-flow data available and one for sites with some base-flow data available. The first analysis included all the drainage-basin characteristics except for base-flow index, and the second analysis contained all the drainage-basin characteristics, including the base-flow index.

The results of the regression analyses are presented in the following section. In general, drainage area, drift thickness, hydraulic conductivity, slope, soil infiltration rate, forest cover, and base-flow index were found the most significant characteristics in explaining the differences in low flow. Although other characteristics may logically explain or quantify the precipitation-runoff process, they do not differ across the area studied and therefore cannot explain the differences in low flow. Mean annual precipitation is an example of this type of characteristic that does not differ enough across the basin.

Sites without base-flow data

Two equations were selected from the analyses for sites where base-flow data were not available. The equations and their respective standard errors of estimate for each area are:

Equation	Standard error	
Northeast area		
$Q_{7,2} = 1.82 \times 10^{-3} A^{0.782} H^{0.804} K^{0.254}$	$SE_{7,2}$ = 81 percent	(1)
$Q_{7,10} = 4.94 \times 10^{-4} A^{0.817} H^{0.909} K^{0.295}$	$SE_{7,10}$ = 110 percent	(2)
Westside area		
$Q_{7,2} = 3.33 \times 10^{-3} A^{0.686} K^{0.671}$	$SE_{7,2}$ = 140 percent	(3)
$Q_{7,10} = 1.48 \times 10^{-3} A^{0.626} K^{0.717}$	$SE_{7,10}$ = 150 percent	(4)
Central sand plain area		
$Q_{7,2} = 0.830 A^{0.832}$	$SE_{7,2}$ = 26 percent	(5)
$Q_{7,10} = 0.543 A^{0.863}$	$SE_{7,10}$ = 40 percent	(6)
Southwest area		
$Q_{7,2} = 0.218 A^{1.05}$	$SE_{7,2}$ = 44 percent	(7)
$Q_{7,10} = 0.165 A^{1.04}$	$SE_{7,10}$ = 52 percent	(8)

$Q_{7,2}$ 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;

H is the average thickness of glacial drift within a basin, in feet;

K is the hydraulic conductivity, in gallons per day per square foot;

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

F is percentage of drainage area covered by forests plus 1.00.

Equations 1 to 8 are proposed for use at sites draining less than 150 mi^2 where base-flow data are not available.

Sites with some base-flow data

The following equations were selected from the analyses for sites where some base-flow data (one or two streamflow measurements) were available.

Equation	Standard error	
Northeast area		
$Q_{7,2} = 0.242A^{0.971}K^{0.140}Bf^{0.711}$	$SE_{7,2}$ = 36 percent	(9)
$Q_{7,2} = 0.808A^{0.917}Bf^{0.827}$	$SE_{7,2}$ = 46 percent	(10)
$Q_{7,10} = 0.156A^{1.04}K^{0.144}Bf^{0.881}$	$SE_{7,10}$ = 48 percent	(11)
$Q_{7,10} = 0.541A^{0.986}Bf^{1.00}$	$SE_{7,10}$ = 56 percent	(12)
Westside area		
$Q_{7,2} = 2.18A^{0.893}Bf^{1.24}$	$SE_{7,2}$ = 40 percent	(13)
$Q_{7,10} = 1.12A^{0.815}Bf^{1.23}$	$SE_{7,10}$ = 61 percent	(14)
Central sand plain area		
$Q_{7,2} = 1.01A^{0.922}Bf^{0.662}$	$SE_{7,2}$ = 10 percent	(15)
$Q_{7,10} = 0.700A^{0.985}Bf^{0.900}$	$SE_{7,10}$ = 24 percent	(16)
Southwest area		
$Q_{7,2} = 0.262A^{1.00}F^{0.338}I^{0.123}Bf^{0.911}$	$SE_{7,2}$ = 23 percent	(17)
$Q_{7,2} = 0.571A^{1.07}Bf^{0.870}$	$SE_{7,2}$ = 28 percent	(18)
$Q_{7,10} = 0.172A^{0.981}F^{0.451}I^{0.187}Bf^{1.02}$	$SE_{7,10}$ = 32 percent	(19)
$Q_{7,10} = 0.463A^{1.07}Bf^{0.948}$	$SE_{7,10}$ = 38 percent	(20)

$Q_{7,2}$, $Q_{7,10}$, A, and F are as defined for equations 1 through 8,

I is soil-infiltration rate, in inches per hour, and

Bf is the base-flow index, in cubic feet per second per square mile; methods of defining these are given in the section on "Basin Characteristics".

For the northeast area and the southwest area, two sets of equations were provided for each low-flow characteristic. While equations 9, 11, 17, and 19 have lower standard errors than 10, 12, 18, and 20, respectively, the latter equations are easier to apply and may be adequate for most purposes.

Equations 9 through 20 should provide estimates of $Q_{7,2}$ and $Q_{7,10}$ at approximately the SE indicated for sites where base-flow discharge measurements have been made during low or medium base-flow conditions. See next section for details describing the required low or medium base-flow conditions for each area. In addition, for sites where base-flow data were not available,

equations 9 through 20 should provide more reliable estimates than equations 1 through 8 for the following conditions:

1. For ungaged sites in an area where the degree of uniformity among Bf values is high (within $\pm$0.15), as shown on plate 2.

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

If these conditions exist, equations 9-20 should be used and values of Bf estimated from plate 2.

Equations 9 through 20 are applicable for use at sites having drainage areas of less than 150 mi^2.

Verification of regression equations that use base-flow index

The effect of variability of computed Bf on the reliability of equations 9, 12, 13, 14, 15, 16, 17, and 19 was tested using base-flow measurements at low-flow partial-record stations. Periods selected for analyses were: a low base-flow period (flow durations greater than 80 percent); a medium one (between 60 and 80 percent); and a high one (between 40 and 60 percent). Values of Bf were computed as outlined previously. Substituting these new values of Bf into the equations listed above, 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 for each area.

Regression analysis equations	SE from regression analysis	SE using various flow conditions to determine Bf		
		Low base flow	Medium base flow	High base flow
Northeast area				
Equation 9	36 percent	35 percent	42 percent	60 percent
Equation 11	48 percent	46 percent	47 percent	66 percent
Westside area				
Equation 13	40 percent	40 percent	66 percent	57 percent
Equation 14	61 percent	58 percent	42 percent	120 percent
Central sand plain area				
Equation 15	10 percent	11 percent	29 percent	18 percent
Equation 16	24 percent	13 percent	29 percent	31 percent
Southwest area				
Equation 17	23 percent	7 percent	12 percent	12 percent
Equation 19	32 percent	21 percent	11 percent	21 percent

As illustrated, the regression equations provide satisfactory results for: all equations at low base-flow conditions, most equations at medium base-flow conditions, and only equations 17 and 19 at high base-flow conditions. For high base-flow conditions the SE for equations 15 and 16 is greater than the indicated values but they are still recommended for use since they have a very low SE.

Application of estimating procedures

Sites without base-flow data

Low-flow characteristics at an ungaged site may be computed as follows:

1. If the conditions listed on pages 24 and 25 are met, use equations 9 through 20 (page 24).

2. Compute drainage area as indicated on page 16.

3. As required for the selected equation, compute hydraulic conductivity as indicated on pages 19 and 20, forest cover as indicated on page 17, and soil-infiltration rate as indicated on page 17.

4. Determine base-flow index from plate 2.

5. Substitute these values into the selected equations and solve for the low-flow characteristics.

6. If the conditions outlined on pages 24 and 25 cannot be met, use equations 1 through 8 (page 23).

7. Compute the drainage area as indicated on page 16.

8. Determine hydraulic conductivity, as indicated on pages 19 and 20; drift thickness, as indicated on page 20; forest cover, as indicated on page 17; and slope, as indicated on page 16.

9. Substitute drainage area, hydraulic conductivity, drift thickness, and forest cover values as needed into the selected equations and solve for the low-flow characteristics.

For ungaged sites in areas where the degree of uniformity of base-flow index values is high, Bf can be estimated from plate 2, and equations 9 through 20 can be used to determine the low-flow characteristics. For example, to determine the low-flow characteristics for Black Creek at the confluence with the Big Rib River (in the westside area), the applicable equations are:

$$Q_{7,2} = 2.18A^{0.893}Bf^{1.24} \quad (13)$$

$$Q_{7,10} = 1.12A^{0.815}Bf^{1.23} \quad (14)$$

Drainage area was determined as outlined on page 16 and is 82.5 mi^2.

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

$$Bf = \frac{A_1 Bf_1 + A_2 Bf_2 + A_3 Bf_3}{A_1 + A_2 + A_3}$$

where: A_1 = drainage area at station 05395850 = 25.4 mi^2,

Bf_1 = base-flow index at station 05395850 = 0.020,

A_2 = intervening drainage area between station 05395850 and station 05395870 = 14.5 mi^2,

Bf_2 = base-flow index for intervening area between station 05395850 and station 05395870 = 0.05,

A_3 = intervening drainage area between station 05395870 and point of interest at mouth of Black Creek = 42.6, and

Bf_3 = base-flow index for intervening area between station 05395900 and point of interest at mouth = 0.07.

then:

$$Bf = \frac{25.4(0.020) + 14.5(0.05) + 42.6(0.07)}{25.4 + 14.5 + 42.6}$$

$$Bf = \frac{4.22}{82.5}$$

Bf = 0.051 at mouth of Black Creek

Substituting these values into their respective equations:

$$Q_{7,2} = 2.18A^{0.893}Bf^{1.24}$$

$$= 2.18(82.5)^{0.893}(0.051)^{1.24}$$

$$= 2.18(51.5)(0.025)$$

$$= 2.8 \text{ ft}^3/\text{s}$$

$$Q_{7,10} = 1.12A^{0.815}Bf^{1.23}$$

$$= 1.12(82.5)^{0.815}(0.051)^{1.23}$$

$$= 1.12(36.5)(0.026)$$

$$= 1.05 \text{ ft}^3/\text{s}$$

Low-flow characteristics for ungaged sites in which conditions on pages 24 and 25 are not met can be determined by regression equations 1 through 8. The low-flow characteristics of Big Sandy Creek at the confluence with the Eau Claire River are determined to illustrate the procedure.

The applicable equations for an ungaged area in the northeast area are:

$$Q_{7,2} = 1.82X10^{-3}A^{0.782}H^{0.804}K^{0.254} \quad (1)$$

$$Q_{7,10} = 4.94X10^{-4}A^{0.817}H^{0.909}K^{0.295} \quad (2)$$

The drainage area is 73.5 mi^2. The average drift thickness for the Big Sandy Creek drainage area from figure 9 is about 50 ft. The drainage area of Big Sandy Creek was determined from figure 9 to be outwash and ground moraine. The following calculations were made to determine values of hydraulic conductivity from figure 9.

(1) Glacial deposits	(2) Hydraulic conductivity [(gal/d)/ft^2]	(3) Surface area of glacial deposit (mi^2)	Columns (2)X(3)
Ground moraine	10	68.1	681
Outwash	2,500	5.4	13,500
		73.5	14,181

Hydraulic conductivity (K) = $\frac{14,200}{73.5}$ = 193 (gal/d)/ft^2

Substituting these values into the respective equation:

$$Q_{7,2} = 1.82X10^{-3}A^{0.782}H^{0.804}K^{0.254}$$

$$= (1.82X10^{-3})(73.5)^{0.782}(50)^{0.804}(193)^{0.254}$$

$$= (1.82X10^{-3})(28.8)(23.2)(3.81)$$

$$= 4.6 \text{ ft}^3/\text{s}$$

$$Q_{7,10} = 4.94X10^{-4}A^{0.817}H^{0.909}K^{0.295}$$

$$= (4.94X10^{-4})(73.5)^{0.817}(50)^{0.909}(193)^{0.295}$$

$$= (4.94X10^{-4})(33.5)(35.0)(4.72)$$

$$= 2.7 \text{ ft}^3/\text{s}$$

Sites with some base-flow data

The following is an example of how to determine low-flow characteristics at sites where some base-flow measurements are available or can be made before computation of characteristics.

1. Select from equations 9 through 20 listed on page 24 the ones for the appropriate area.
2. If not available, obtain a base-flow measurement at the required site. Check base-flow conditions to make sure measurement will be or was made during required base-flow conditions for each area, as indicated on page 25.
3. If the streamflow measurements have been made during proper base-flow conditions, the Bf should be determined as outlined on pages 17 and 19. If not, use equations 1 through 8.
4. Compute the other basin characteristics, drainage area, hydraulic conductivity, forest cover, and soil-infiltration rate as required in the equations as outlined on pages 16-20.
5. Substitute values determined in steps 3 and 4 into the appropriate equations.

Low-flow characteristics are presented for sites in table 1 that are computed from base-flow measurements which meet criteria outlined in 2 above. As an example of how to determine low-flow characteristics at sites where base-flow data will be obtained by some other source than this report, Dead Horse Creek near Arkdale (05401550) is used to illustrate the procedure.

The applicable equations for the central sand plain are:

$$Q_{7,2} = 1.01A^{0.922}Bf^{0.662} \quad (15)$$

$$Q_{7,10} = 0.700A^{0.985}Bf^{0.900} \quad (16)$$

Drainage area (A) obtained from table 1, page 80, is 30.7 mi^2.

Following the same general procedure as outlined on pages 17 and 19, a Bf value was determined by the equation:

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

where: Q_m is the measured discharge, 2.00 ft^3/s, of Dead Horse Creek near Arkdale on October 11, 1966;

$A = 30.7$ mi^2,

Q_r is the recorded daily mean discharge at a nearby continuous-record gaging station. Referring to plate 1, station 05401535, Big Roche a Cri Creek near Adams is the closest unregulated gaging station. From U.S. Geological Survey (1968) the average daily discharge for October 11, 1966, was 38 ft^3/s; which is at the 88 percent flow-duration point (duration value determined from table 1, p. 79); and the

Q_{90} for Big Roche a Cri Creek near Adams is 37 ft^3/s, obtained from table 1, p. 79.

Substituting these values in the equation:

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

$$= \frac{(2.00)(37)}{(30.7)(38)}$$

$$= 0.063$$

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

$$Q_{7,2} = 1.01A^{0.922}Bf^{0.662}$$

$$= (1.01)(30.7)^{0.922}(0.063)^{0.662}$$

$$= (1.01)(23.5)(0.160)$$

$$= 3.8\ ft^3/s$$

$$Q_{7,10} = 0.700A^{0.985}Bf^{0.900}$$

$$= (0.700)(30.7)^{0.985}(0.063)^{0.900}$$

$$= (0.70)(29.2)(0.083)$$

$$= 1.7\ ft^3/s$$

COMPARISON OF METHODS

Tables 3 through 6 compare the methods available from this report in terms of: 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. As illustrated in the tables, if a high degree of reliability is required and sufficient time is available for data collection, a gaging station or low-flow partial-record station should be operated. If a lesser degree of reliability is acceptable at a site or time and money are limited, three base-flow discharge measurements can be obtained. For the minimum effort, and reliability, use equations 1-8.

SUMMARY

Low-flow characteristics were determined for 34 gaging stations, 18 low-flow partial-record stations, and 148 miscellaneous sites in the central Wisconsin River basin.

Because of the large variability in low-flow characteristics, the basin was divided into four areas for some analyses. The division was based on areas having similar geologic conditions.

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 a gaging station with 10 or more years of record was determined by a log-Pearson Type III frequency analysis or plotting-position analysis. At a low-flow partial-record station (eight or more discharge measurements) or miscellaneous site (three or more discharge measurements) a graphical relationship was used to determine the $Q_{7,2}$ and $Q_{7,10}$. At miscellaneous sites (one or two discharge measurements) and 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 8 percent for gaging stations in the southwest area to 61 percent for the multiple-regression equation in the westside area. The methods used to determine the standard errors are not precise and should be used as a relative guide to indicate a general level of confidence.

The multiple-regression equations developed made it possible to determine the low-flow characteristics at ungaged sites with an acceptable degree of accuracy for some purposes. Two sets of equations were determined, one for use at sites without any base-flow data and the other for sites with base-flow measurements. The latter equations had an $SE_{7,10}$ that ranged from 24 to 61 percent, depending upon the area, compared with a range of 40 to 142 percent for the former. The most significant characteristics in explaining the variation in low flow were size of drainage area, hydraulic conductivity, drift thickness, slope, forest cover, soil-infiltration rate, and base-flow index.

Generally, the standard error of estimate of the 7-day, 10-year low flow ($SE_{7,10}$) was low for most methods of analysis in the basin when compared to other basins in the State. The $SE_{7,10}$ of 24 percent for the multiple-regression equation in the central sand plain area is the lowest value determined for any of the 10 basins that have been completed. The low $SE_{7,10}$ reflects the ability of the equation to define the basin characteristics that affect low flow. In this area, the low flows are fairly high and uniform because of the consistency of the thick sand-and-gravel aquifers.

An exception to the low $SE_{7,10}$ was apparent in the results for the westside area. For this area, the $SE_{7,10}$ values for all methods was moderately high. The $Q_{7,10}$ discharge is very low for many streams in this area due to the thinness or absence of glacial aquifers and the presence of crystalline rock underlying the drift or at the surface for much of this area.

REFERENCES

Benson, M. A., 1962 [1963], Factors influencing the occurrence of floods in a humid region of diverse terrain: U.S. Geological Survey Water-Supply Paper 1580-B, 64 p.

_____1964, Factors affecting the occurrence of floods in the Southwest: U.S. Geological Survey Water-Supply Paper 1580-D, 72 p.

Devaul, R. W., and Green, J. H., 1971, Water resources of Wisconsin--central Wisconsin River basin: U.S. Geological Survey Hydrologic Investigations Atlas HA-536.

Dutton, C. E., and Bradley, R. E., 1970, Lithologic, geophysical, and mineral community maps of Precambrian rocks in Wisconsin: U.S. Geological Survey Miscellaneous Investigations Series I-631.

Gebert, W. A., 1971, Low-flow frequency of Wisconsin streams: U.S. Geological Survey Hydrologic Investigations Atlas HA-390.

_____1978, Low-flow characteristics of streams in the lower Wisconsin River basin: U.S. Geological Survey Water-Resources Investigations 77-118, 80 p.

_____1980, Low-flow characteristics of streams in the upper Wisconsin River basin: U.S. Geological Survey Water-Resources Investigations 80-691, 60 p.

Gebert, W. A., and Holmstrom, B. K., 1977, Low-flow characteristics at gaging stations on the Wisconsin, Fox, and Wolf Rivers, Wisconsin: U.S. Geological Survey Water-Resources Investigations 77-27, 20 p.

Hardison, C. H., 1969, Accuracy of streamflow characteristics, in Geological Survey Research 1969: U.S. Geological Survey Professional Paper 650-D, p. D210-D214.

Hardison, C. H., and Moss, M. E., 1972, Accuracy of low-flow characteristics estimated by correlation of base-flow measurements: U.S. Geological Survey Water-Supply Paper 1542-B, 55 p.

Holmstrom, B. K., 1972, Drainage-area data for Wisconsin streams: U.S. Geological Survey open-file report.

_____1979, Low-flow characteristics of Wisconsin streams at sewage-treatment plants and industrial plants: U.S. Geological Survey Water-Resources Investigations 79-31, 123 p.

Holt, C. L. R., Jr., 1965, Geology and water resources of Portage County, Wisconsin: U.S. Geological Survey Water-Supply Paper 1796, 77 p.

Riggs, H. C., 1972, Low-flow investigations: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 4, Chapter B1, 18 p.

Thomas, D. M., and Benson, M. A., 1970, Generalization of streamflow characteristics from drainage-basin characteristics: U.S. Geological Survey Water-Supply Paper 1975, 55 p.

Thwaites, F. T., 1956, Glacial features of Wisconsin: Wisconsin Geological and Natural History Survey open-file map.

U.S. Geological Survey, 1968, Water resources data for Wisconsin, 1967: U.S. Geological Survey annual data report.

Weeks, E. P., and Stangland, H. G., 1971, Effects of irrigation on streamflow in the central sand plain of Wisconsin: U.S. Geological Survey open-file report, 113 p.

Wisconsin Crop Reporting Service, 1961, Wisconsin climatological data: Madison, Wisconsin Department of Agriculture, 166 p.

Wisconsin Statistical Reporting Service, 1967, Wisconsin weather: Madison, Wisconsin Statistical Reporting Service, 31 p.

_____1970, Snow and frost in Wisconsin: Madison, Wisconsin Statistical Reporting Service, 28 p.

Table 1.--Low-flow characteristics for sites in the central Wisconsin River basin

05395030 Pine River near Merrill, Wis.

Location.--NW¼NW¼ sec. 11, T. 31 N., R. 8 E., Lincoln County, at bridge on County Trunk X, 10.8 mi east of Merrill.

Drainage area.--55.2 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--2.12 ft^3/s, Aug. 22, 1962.

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

Basis of estimate.--Graphical regression with Prairie River near Merrill using 13 discharge measurements made during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 15 percent, $SE_{7,10}$ = 20 percent.

05395063 Pine River near Merrill, Wis.

Location.--SW¼NE¼ sec. 22, T. 31 N., R. 7 E., Lincoln County, at town road, 4.5 mi southeast of Merrill.

Drainage area.--118 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 16.6 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 8.0 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05395068 County Line Creek near Merrill, Wis.

Location.--NW¼NE¼ sec. 11, T. 30 N., R. 7 E., Marathon County, at bridge on town road, 5.6 mi south of Merrill.

Drainage area.--12.7 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 2.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 0.79 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05395130 Trappe River near Wausau, Wis.

Location.--SW¼NW¼ sec. 21, T. 30 N., R. 8 E., Marathon County, at bridge on County Trunk WW, 8.4 mi north of Wausau.

Drainage area.--73.6 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--1.80 ft^3/s, Sept. 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 2.1 ft^3/s, $Q_{7,10}$ = 1.3 ft^3/s.

Basis of estimate.--Graphical regression with Prairie River near Merrill using 13 discharge measurements made during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 15 percent, $SE_{7,10}$ = 20 percent.

05395312 Trappe River near Brokaw, Wis.

Location.--NW¼NW¼ sec. 19, T. 30 N., R. 8 E., Marathon County, just east of County Trunk W, 4.0 mi northeast of Brokaw.

Drainage area.--79.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 7.91 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.7 ft^3/s, $Q_{7,10}$ = 2.1 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05395504 Sheep Ranch Creek at Rib Lake, Wis.

Location.--SW¼NE¼ sec. 27, T. 33 N., R. 2 E., Taylor County, at culvert on private road, at Rib Lake.

Drainage area.--7.84 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.21 ft^3/s, July 31, 1975.

Low-flow frequency.--$Q_{7,2}$ = 0.43 ft^3/s, $Q_{7,10}$ = 0.18 ft^3/s.

Basis of estimate.--Graphical regression with Spirit River at Spirit Falls using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 17 percent, $SE_{7,10}$ = 28 percent.

05395550 Wood Creek near Rib Lake, Wis.

Location.--SE¼SE¼ sec. 17, T. 32 N., R. 3 E., Taylor County, at twin culverts on town road, 6.0 mi southeast of Rib Lake.

Drainage area.--31.4 mi^2. Tributary to.--Rib River.

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

Minimum discharge measured.--1.80 ft^3/s, Sept. 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 4.2 ft^3/s, $Q_{7,10}$ = 2.6 ft^3/s.

Basis of estimate.--Graphical regression with Rib River near Rib Falls using 11 discharge measurements made during the period 1962-67.

Accuracy.--$SE_{7,2}$ = 9 percent, $SE_{7,10}$ = 13 percent.

05395580 Rib River near Goodrich, Wis.

Location.--NE¼NW¼ sec. 33, T. 32 N., R. 3 E., Taylor County, at bridge on County Trunk M, 5.4 mi northwest of Goodrich.

Drainage area.--71.8 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 27.7 ft^3/s, Aug. 26, 1969, 9.41 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.5 ft^3/s, $Q_{7,10}$ = 2.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05395650 Rib River at Goodrich, Wis.

Location.--NE¼NW¼ sec. 25, T. 31 N., R. 3 E., Taylor County, at bridge on State Highway 64, 1.0 mi east of Goodrich.

Drainage area.--131 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 46.5 ft^3/s, Aug. 26, 1969, 15.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 9.5 ft^3/s, $Q_{7,10}$ = 3.4 ft^3/s.

Basis of estimate.--Multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05395700 Rib River near Hamburg, Wis.

Location.--NW¼NE¼ sec. 14, T. 30 N., R. 4 E., Marathon County, at bridge on County Trunk F, 5.4 mi west of Hamburg.

Drainage area.--159 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 45.2 ft^3/s; Aug. 27, 1969, 18.4 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 9.9 ft^3/s, $Q_{7,10}$ = 3.5 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05395750 Rib River near Athens, Wis.

Location.--NW¼NE¼ sec. 31, T. 30 N., R. 5 E., Marathon County, at bridge on County Trunk A, 5.9 mi east of Athens.

Drainage area.--193 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 55.0 ft^3/s; Aug. 26, 1969, 19.1 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 11 ft^3/s, $Q_{7,10}$ = 3.9 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05395850 Black Creek above Beaver Creek near Athens, Wis.

Location.--NW¼SW¼ sec. 22, T. 30 N., R. 3 E., Marathon County, at bridge on County Trunk M, 3.9 mi northwest of Athens.

Drainage area.--25.4 mi^2. Tributary to.--Big Rib River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 2.98 ft^3/s; Aug. 26, 1969, 0.50 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.31 ft^3/s, $Q_{7,10}$ = 0.13 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05395870 Black Creek at Athens, Wis.

Location.--SW¼SE¼ sec. 31, T. 30 N., R. 4 E., Marathon County, at bridge on State Highway 97, at Athens.

Drainage area.--39.9 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.40 ft^3/s, July 31, 1975.

Low-flow frequency.--$Q_{7,2}$ = ~~0.72~~ 0.90 ft^3/s, $Q_{7,10}$ = ~~0.19~~ 0.28 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 7 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 21 percent, $SE_{7,10}$ = 38 percent.

05395900 Black Creek near Athens, Wis.

Location.--NW¼NE¼ sec. 4, T. 29 N., R. 4 E., Marathon County, 2.1 mi upstream from Drewek Creek, 2.2 mi east of Athens.

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

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 24, 1968, 7.01 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = ~~0.31~~ 0.65 ft^3/s, $Q_{7,10}$ = ~~0.13~~ 0.25 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05396000 Rib River at Rib Falls, Wis.

Location.--NW¼NW¼ sec. 27, T. 29 N., R. 5 E., Marathon County, at bridge on County Trunk S, in Rib Falls.

Drainage area.--303 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1925-57.

Average discharge.--32 years, 289 ft^3/s.

Extremes.--Maximum discharge, 23,800 ft^3/s Aug. 31, 1938; minimum discharge, 3 ft^3/s Jan. 23, 1930.

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	18	12	9.3	7.8	6.3	5.5
14	19	13	10	8.7	7.1	6.3
30	22	15	12	10	8.5	7.6
60	27	19	16	14	12	10
90	34	23	19	17	15	14

Accuracy.--$SE_{7,2}$ = 9 percent, $SE_{7,10}$ = 12 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	2,550	1,330	680	280	150	90	62
Percent	60	70	80	90	95	98	99.9
ft^3/s	45	37	30	22	17	13	8.0

05396015 Rib River near Marathon, Wis.

Location.--SW¼SW¼ sec. 36, T. 29 N., R. 5 E., Marathon County, at bridge on State Highway 29, 1.4 mi northwest of Marathon.

Drainage area.--316 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 13, 1976, 48.4 ft^3/s.

05396060 Scotch Creek at Edgar, Wis.

Location.--SE¼SE¼ sec. 7, T. 28 N., R. 5 E., Marathon County, at bridge on town road, 0.7 mi east of County Trunk H, in Edgar.

Drainage area.--16.9 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.13 ft^3/s, Aug. 31, 1975.

Low-flow frequency.--$Q_{7,2}$ = 0.23 ft^3/s, $Q_{7,10}$ = 0.04 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 7 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 30 percent, $SE_{7,10}$ = 56 percent.

05396200 Rib River at Marathon, Wis.

Location.--NE¼SW¼ sec. 6, T. 28 N., R. 6 E., Marathon County, at bridge on State Highway 107, at Marathon.

Drainage area.--365 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--21.2 ft^3/s, July 8, 1976.

Low-flow frequency.--$Q_{7,2}$ = 28 ft^3/s, $Q_{7,10}$ = 18 ft^3/s.

Basis of estimate.--Graphical regression with Spirit River at Spirit Falls using 6 discharge measurements made during the period 1968-76.

Accuracy.--$SE_{7,2}$ = 16 percent, $SE_{7,10}$ = 23 percent.

05396400 Little Rib River near Hamburg, Wis.

Location.--NE¼NE¼ sec. 10, T. 29 N., R. 6 E., Marathon County, at bridge on County Trunk O, 7.4 mi southeast of Hamburg.

Drainage area.--51.0 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 14.8 ft^3/s; Aug. 27, 1969, 4.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.0 ft^3/s, $Q_{7,10}$ = 1.2 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05396500 Little Rib River near Wausau, Wis.

Location.--SW¼SE¼ sec. 29, T. 29 N., R. 7 E., Marathon County, at bridge on town road, 3.5 mi west of Wausau.

Drainage area.--79.1 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Minimum discharge recorded.--4 ft^3/s, Feb. 21-28, 1914.

Period of record.--January 1914 to July 1916.

Low-flow frequency.--$Q_{7,2}$ = 7.8 ft^3/s, $Q_{7,10}$ = 5.6 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 9 values of daily discharge during 1914-16 and 2 discharge measurements made during the period 1968-69.

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

05396510 Little Rib River near Wausau, Wis.

Location.--NE¼NE¼ sec. 32, T. 29 N., R. 7 E., Marathon County, at bridge on State Highway 29, 3.2 mi west of Wausau Post Office.

Drainage area.--79.8 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 13, 1976, 12.7 ft^3/s.

05396550 Little Rib River near Wausau, Wis.

Location.--SE¼SW¼ sec. 33, T. 29 N., R. 7 E., Marathon County, at mouth, 2.7 mi west of Wausau.

Drainage area.--80.1 mi^2. Tributary to.--Rib River.

Type of site.--Miscellaneous site.

Discharge measurement.--Dec. 1, 1972, 37.8 ft^3/s.

05396800 East Branch Eau Claire River near Kempster, Wis.

Location.--NW¼SE¼ sec. 30, T. 33 N., R. 11 E., Langlade County, at bridge on U.S. Highway 25 and State Highway 47, 1.7 mi north of Kempster.

Drainage area.--15.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 4.08 ft^3/s.

Low-flow frequency.--Regression equations provided estimates that appear high compared to station downstream. Additional discharge measurements required.

05396830 East Branch Eau Claire River near Kempster, Wis.

Location.--NE¼SW¼ sec. 35, T. 33 N., R. 11 E., Langlade County, at bridge on fire lane, 4.0 mi east of Kempster.

Drainage area.--38.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 10, 1974, 3.75 ft^3/s; July 15, 1975, 0.57 ft^3/s; Aug. 1, 1975, 0.05 ft^3/s; Aug. 16, 1977, 0.144 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.07 ft^3/s, $Q_{7,10}$ = 0.01 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 4 discharge measurements made during the period 1974-77.

Accuracy.--$SE_{7,2}$ = 35 percent, $SE_{7,10}$ = 35 percent.

05396860 East Branch Eau Claire River near Neva, Wis.

Location.--NE¼SE¼ sec. 15, T. 32 N., R. 11 E., Langlade County, at bridge on town road, 1.4 mi northeast of Neva.

Drainage area.--76.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 16.3 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear low compared to other stations on the East Branch Eau Claire River. Additional discharge measurements are required.

05396900 East Branch Eau Claire River near Neva, Wis.

Location.--SW¼NW¼ sec. 21, T. 32 N., R. 11 E., Langlade County, at bridge on town road, 1.0 mi west of Neva.

Drainage area.--78.5 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 18.6 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear low compared to other stations on the East Branch Eau Claire River. Additional discharge measurements are required.

05396920 East Branch Eau Claire River at Deerbrook, Wis.

Location.--NE¼NE¼ sec. 30, T. 32 N., R. 11 E., Langlade County, at bridge on County Trunk C, at Deerbrook.

Drainage area.--81.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 19.6 ft^3/s; Sept. 17, 1974, 28.6 ft^3/s; Oct. 10, 1974, 22.0 ft^3/s; Nov. 25, 1974, 19.1 ft^3/s.

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

Basis of estimate.--Graphical regression with East Branch Eau Claire River near Antigo using 4 discharge measurements made during 1974.

Accuracy.--$SE_{7,10}$ = 35 percent (basin average).

05396950 East Branch Eau Claire River near Neva Corners, Wis.

Location.--SE¼SW¼ sec. 25, T. 32 N., R. 10 E., Langlade County, at bridge on County Trunk B, 2.2 mi west of Neva Corners.

Drainage area.--83.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 30.6 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear low compared to other stations on the East Branch Eau Claire River. Additional discharge measurements are required.

05396980 East Branch Eau Claire River near Neva Corners, Wis.

Location.--SW¼SW¼ sec. 35, T. 32 N., R. 10 E., Langlade County, at bridge on County Trunk I, 3.6 mi southwest of Neva Corners.

Drainage area.--95.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 27.5 ft^3/s; Sept. 17 1974, 37.2 ft^3/s; Oct. 10, 1974, 29.9 ft^3/s; Nov. 25, 1974, 26.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 19 ft^3/s, $Q_{7,10}$ = 15 ft^3/s.

Basis of estimate.--Graphical regression with East Branch Eau Claire River near Antigo using 4 discharge measurements made during 1974.

Accuracy.--$SE_{7,10}$ = 35 percent (basin average).

05397000 East Branch Eau Claire River near Antigo, Wis.

Location.--NE¼SE¼ sec. 3, T. 31 N., R. 10 E., Langlade County, near right bank on downstream side of town road bridge, 4.6 mi upstream from West Branch Eau Claire River, 4 mi northwest of Antigo.

Drainage area.--96.8 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1950-1955, 1963-64, 1966-

Low-flow frequency.--$Q_{7,2}$ = 20 ft^3/s, $Q_{7,10}$ = 16 ft^3/s.

Basis of estimate.--Based on 6 years of recorded discharge and 39 years of estimated discharge that was determined by a graphical regression with Eau Claire River near Kelly.

05397010 East Branch Eau Claire River near Antigo, Wis.

Location.--NW¼SE¼ sec. 10, T. 31 N., R. 10 E., Langlade County, at bridge on County Trunk H, 3.6 mi upstream from mouth of West Branch Eau Claire River, 4.8 mi northwest of Antigo.

Drainage area.--97.7 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 31.7 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear low compared to other stations on the East Branch Eau Claire River. Additional discharge measurements are required.

05397015 East Branch Eau Claire River near Antigo, Wis.

Location.--SW¼SW¼ sec. 15, T. 31 N., R. 10 E., Langlade County, at bridge on town road, 4.6 mi west of Antigo.

Drainage area.--102 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Low-flow frequency.--$Q_{7,2}$ = 22 ft^3/s, $Q_{7,10}$ = 18 ft^3/s.

Basis of estimate.--Graphical regression with East Branch Eau Claire River near Antigo using 3 discharge measurements made during 1974.

Accuracy.--$SE_{7,10}$ = 35 percent (basin average).

05397016 East Branch Eau Claire River near Antigo, Wis.

Location.--NW¼NE¼ sec. 28, T. 31 N., R. 10 E., Langlade County, at bridge on State Highway 64, 0.4 mi above mouth of West Branch Eau Claire River, 4.6 mi west of Antigo.

Drainage area.--104 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 32.3 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear low compared to other stations on the East Branch Eau Claire River. Additional discharge measurements are required.

05397025 West Branch Eau Claire River near Kempster, Wis.

Location.--SE¼SE¼ sec. 31, T. 33 N., R. 10 E., Langlade County, at bridge on County Trunk J, 6.1 mi west of Kempster.

Drainage area.--17.0 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 3.98 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397030 Sucker Creek near Kempster, Wis.

Location.--SE¼NE¼ sec. 16, T. 32 N., R. 10 E., Langlade County, at bridge on town road, 0.4 mi upstream from mouth, 4.4 mi southwest of Kempster.

Drainage area.--6.93 mi^2. Tributary to.--West Branch Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 10, 1974, 1.23 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397035 West Branch Eau Claire River near Kempster, Wis.

Location.--SE¼SW¼ sec. 15, T. 32 N., R. 10 E., Langlade County, 150 ft north of county road, 0.6 mi downstream from mouth of Sucker Creek, 4.4 mi southwest of Kempster.

Drainage area.--36.0 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 9.04 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397040 West Branch Eau Claire River near Deerbrook, Wis.

Location.--SE¼SW¼ sec. 22, T. 32 N., R. 10 E., Langlade County, at bridge on County Trunk C, 2.5 mi downstream from mouth of Sucker Creek, 3.8 mi west of Deerbrook.

Drainage area.--50.6 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 15.3 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397045 West Branch Eau Claire River near Antigo, Wis.

Location.--SE¼SE¼ sec. 28, T. 32 N., R. 10 E., Langlade County, at bridge on County Trunk B, 7.0 mi northwest of Antigo.

Drainage area.--51.9 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 18.1 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397050 West Branch Eau Claire River near Antigo, Wis.

Location.--SE¼SW¼ sec. 33, T. 32 N., R. 10 E., Langlade County, at bridge on County Trunk I, 6.7 mi northwest of Antigo.

Drainage area.--54.1 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 17.6 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397055 West Branch Eau Claire River near Antigo, Wis.

Location.--SW¼NE¼ sec. 9, T. 31 N., R. 10 E., Langlade County, at county road bridge, 3.7 mi upstream from Black Brook, 5.5 mi northwest of Antigo.

Drainage area.--56.5 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 18.8 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397060 West Branch Eau Claire River near Antigo, Wis.

Location.--SW¼SW¼ sec. 16, T. 31 N., R. 10 E., Langlade County, at bridge on town road, 5.4 mi west of Antigo.

Drainage area.--57.8 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 17.4 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397080 West Branch Eau Claire River near Antigo, Wis.

Location.--SE¼SE¼ sec. 20, T. 31 N., R. 10 E., Langlade County, at bridge on State Highway 64, 5.2 mi west of Antigo.

Drainage area.--58.8 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 18.8 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for downstream stations. Additional discharge measurements are required.

05397085 Black Brook tributary near Antigo, Wis.

Location.--SE¼NW¼ sec. 8, T. 31 N., R. 10 E., Langlade County, at bridge on town road, 2.2 mi upstream from Black Brook, 6.5 mi northwest of Antigo.

Drainage area.--11.4 mi^2. Tributary to.--Black Brook.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 1.22 ft^3/s .

Low-flow frequency.--$Q_{7,2}$ = 0.68 ft^3/s, $Q_{7,10}$ = 0.33 ft^3/s.

Basis of estimate.--Used multiple regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05397090 West Branch Eau Claire River near Antigo, Wis.

Location.--SW¼NW¼ sec. 28, T. 31 N., R. 10 E., Langlade County, at bridge on town road, 0.8 mi downstream from Black Brook, 1.2 mi upstream from confluence with East Branch Eau Claire River, 5.1 mi west of Antigo.

Drainage area.--89.7 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 10.8 ft^3/s; Sept. 17, 1974, 58.6 ft^3/s; Oct. 10, 1974, 24.9 ft^3/s; Nov. 25, 1974, 42.6 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 4.0 ft^3/s, $Q_{7,10}$ = 1.9 ft^3/s.

Basis of estimate.--Graphical regression with East Branch Eau Claire River near Antigo using 4 discharge measurements made during 1974.

Accuracy.--$SE_{7,10}$ = 35 percent (basin average).

05397100 Eau Claire River near Antigo, Wis.

Location.--SW¼NW¼ sec. 27, T. 31 N., R. 10 E., Langlade County, just south of State Highway 64 where stream parallels the highway, 0.2 mi below confluence of East and West Branches Eau Claire River, 4.2 mi west of Antigo.

Drainage area.--194 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 37.4 ft^3/s; Sept. 17, 1974, 102 ft^3/s; Oct. 10, 1974, 57.3 ft^3/s; Nov. 25, 1974, 74.9 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 29 ft^3/s, $Q_{7,10}$ = 19 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 4 discharge measurements made in 1974.

Accuracy.--$SE_{7,10}$ = 35 percent (basin average).

05397110 Eau Claire River near Antigo, Wis.

Location.--SE¼NW¼ sec. 34, T. 31 N., R. 10 E., Langlade County, at bridge on County Trunk Y, 2.0 mi downstream from confluence of East and West Branches Eau Claire River, 4.2 mi west of Antigo.

Drainage area.--200 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1974-1980

Minimum discharge recorded.--23 ft^3/s, Feb. 8-11 and 15-19, 1977 and Sept. 14-15, 1977.

Low-flow frequency.--$Q_{7,2}$ = 31 ft^3/s, $Q_{7,10}$ = 20 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 14 discharge measurements made during the period 1975-79.

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

05397120 Eau Claire River tributary near Antigo, Wis.

Location.--SE¼NE¼ sec. 34, T. 31 N., R. 10 E., Langlade County, at bridge on County Trunk Y, 1.0 mi upstream from mouth, 3.6 mi west of Antigo.

Drainage area.--15.0 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 1.70 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.5 ft^3/s, $Q_{7,10}$ = 0.79 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05397140 Eau Claire River near Antigo, Wis.

Location.--SW¼SE¼ sec. 11, T. 30 N., R. 10 E., Marathon County, at bridge on County Trunk G, 3.5 mi upstream from Spring Brook, 6.2 mi southwest of Antigo.

Drainage area.--230 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1974, 67.5 ft^3/s.

05397190 Spring Brook near Antigo, Wis.

Location.--SE¼NE¼ sec. 4, T. 30 N., R. 11 E., Langlade County, upstream from sewage-treatment plant, 2.1 mi southwest of Antigo.

Drainage area.--39.6 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--3.84 ft^3/s, Aug. 16, 1977.

Low-flow frequency.--$Q_{7,2}$ = 4.6 ft^3/s, $Q_{7,10}$ = 2.5 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 7 discharge measurements made during the period 1972-77.

Accuracy.--$SE_{7,2}$ = 52 percent, $SE_{7,10}$ = 83 percent.

05397200 Spring Brook near Antigo, Wis.

Location.--NW¼NW¼ sec. 19, T. 30 N., R. 11 E., Langlade County, at culvert on County Trunk H, 5.9 mi southwest of Antigo.

Drainage area.--63.9 mi^2. Tributary to.--Eau Claire River.

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

Minimum discharge measured.--9.6 ft^3/s, July 10, 1963.

Low-flow frequency.--$Q_{7,2}$ = 6.8 ft^3/s, $Q_{7,10}$ = 4.3 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 13 discharge measurements made during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 19 percent, $SE_{7,10}$ = 21 percent.

05397500 Eau Claire River at Kelly, Wis.

Location.--SW¼SW¼ sec. 10, T. 28 N., T. 8 E., Marathon County, on right bank 50 ft downstream from County Trunk SS bridge, 0.7 mi northeast of Kelly, 1.3 mi upstream from Big Sandy Creek, 4.5 mi upstream from mouth, 5 mi southeast of Wausau.

Drainage area.--375 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1914-26, 1939-79.

Average discharge.--51 years, 249 ft^3/s.

Extremes.--Maximum discharge, 8,300 ft^3/s, Aug. 21, 1926; minimum discharge, 8 ft^3/s, July 17, 1944.

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	52	41	36	32	29	27
14	55	43	38	35	31	29
30	60	47	42	38	34	32
60	65	52	47	43	39	37
90	73	58	52	47	43	41

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	1,490	910	540	290	200	150	120
Percent	60	70	80	90	95	98	99.9
ft^3/s	100	85	72	59	51	44	30

Accuracy.--$SE_{7,2}$ = 4 percent, $SE_{7,10}$ = 5 percent.

05397600 Big Sandy Creek near Wausau, Wis.

Location.--SE¼SW¼ sec. 31, T. 30 N., R. 9 E., Marathon County, at bridge on State Highway 52, 10 mi northeast of Wausau.

Drainage area.--11.5 mi^2. Tributary to.--Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 29, 1963, 0.01 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 multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05397755 Eau Claire River near Wausau, Wis.

Location.--SW¼NW¼ sec. 9, T. 28 N., R. 8 E., Marathon County, at Camp Phillips, 3.65 mi southeast of high school, at Wausau.

Drainage area.--450 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 16, 1976, 99.2 ft^3/s.

05398000 Wisconsin River at Rothschild, Wis.

Location.--NW¼NE¼ sec. 26, T. 28 N., R. 7 E., Marathon County, on left bank at Rothschild, 0.5 mi downstream from Rothschild Dam, 2.0 mi downstream from Eau Claire River, 5.0 mi upstream from Black Creek, 5.5 mi south of bridge on State Highway 29, in Wausau.

Drainage area.--4,020 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1946-79.

Average discharge.--34 years, 3,417 ft^3/s.

Extremes.--Maximum discharge, 49,200 ft^3/s, Apr. 12, 1965; minimum discharge, 670 ft^3/s, Dec. 9, 1976.

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	1,560	1,210	1,050	917	782	700
14	1,650	1,270	1,080	944	799	711
30	1,750	1,350	1,160	1,010	861	768
60	1,900	1,470	1,270	1,100	935	831
90	2,010	1,560	1,340	1,160	982	870

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	13,800	9,000	6,400	3,900	3,000
Percent	40	50	60	70	80
ft^3/s	2,600	2,500	2,300	2,100	1,800
Percent	90	95	98	99.9	
ft^3/s	1,500	1,300	1,064	760	

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 8 percent.

Remarks.--Flow regulated by 20 reservoirs and 12 powerplants above station. See Gebert and Holmstrom (1977) for additional analyses.

05398100 Black Creek near Mosinee, Wis.

Location.--SE¼NE¼ sec. 4, T. 27 N., R. 7 E., Marathon County, at bridge on County Trunk KK, 4.3 mi north of Mosinee.

Drainage area.--13.4 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--0.42 ft^3/s, Aug. 22, 1962.

Low-flow frequency.--$Q_{7,2}$ = 0.60 ft^3/s, $Q_{7,10}$ = 0.12 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 11 discharge measurements made during the period 1962-67.

Accuracy.--$SE_{7,2}$ = 34 percent, $SE_{7,10}$ = 62 percent.

05398233 Fourmile Creek near Mosinee, Wis.

Location.--NE¼NW¼ sec. 8, T. 27 N., R. 7 E., Marathon County, 0.2 mi downstream from County Trunk KK, 3.3 mi north of Mosinee.

Drainage area.--24.3 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 16, 1976, 11.4 ft^3/s

Low-flow frequency.--$Q_{7,2}$ = 3.5 ft^3/s, $Q_{7,10}$ = 1.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05398500 Bull Junior Creek near Rothschild, Wis.

Location.--NW¼SW¼ sec. 7, T. 27 N., R. 8 E., Marathon County, at bridge on County Trunk X, 4 mi south of Rothschild.

Drainage area.--27.4 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1945-51.

Low-flow frequency.--$Q_{7,2}$ = 1.3 ft^3/s, $Q_{7,10}$ = 0.45 ft^3/s.

Basis of estimate.--Low-flow frequency analysis using 7 years of recorded discharge and 24 years of estimated discharge based on a graphical regression with Eau Claire River at Kelly.

Accuracy.--$SE_{7,2}$ = 16 percent, $SE_{7,10}$ = 22 percent.

05398509 Bull Junior Creek at Mosinee, Wis.

Location.--SE¼SW¼ sec. 21, T. 27 N., R. 7 E., Marathon County, at bridge on town road, 1.5 mi northeast of high school in Mosinee.

Drainage area.--36.1 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Jan. 16, 1976, 7.55 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 5.3 ft^3/s, $Q_{7,10}$ = 3.3 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05398641 West Branch Big Eau Pleine River near Stetsonville, Wis.

Location.--SW¼SW¼ sec. 20, T. 30 N., R. 2 E., Taylor County, at bridge on country road, 1.3 mi southeast of Stetsonville.

Drainage area.--3.31 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 9, 1972, no flow; July 11, 1973, 0 ft^3/s; Aug. 5, 1973, flow too small to measure; Oct. 2, 1973, 0.009 ft^3/s.

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

Basis of estimate.--Observation of no flow on three occasions.

Accuracy.--Not applicable.

05398800 West Branch Big Eau Pleine River near Abbotsford, Wis.

Location.--NW¼NW¼ sec. 27, T. 29 N., R. 2 E., Marathon County, at bridge on town road, 3.4 mi northeast of Abbotsford.

Drainage area.--33.1 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 2.12 ft^3/s; Aug. 27, 1969, 0.33 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.18 ft^3/s, $Q_{7,10}$ = 0.08 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05398950 Big Eau Pleine River near Abbotsford, Wis.

Location.--NE¼NW¼ sec. 10, T. 28 N., R. 2 E., Marathon County, at bridge on town road, 3.4 mi southeast of Abbotsford.

Drainage area.--73.1 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 6.12 ft^3/s; Aug. 27, 1969, 0.54 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.25 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05399000 Big Eau Pleine River near Colby, Wis.

Location.--NW¼NW¼ sec. 24, T. 28 N., R. 2 E., Marathon County, at bridge on County Trunk N, 5.0 mi east of Colby.

Drainage area.--78.1 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1941-54.

Average discharge.--13 years, 57.1 ft^3/s.

Extremes.--Maximum discharge, 9,370 ft^3/s, June 27, 1943; minimum discharge, no flow in 1941, 1947-50, 1952-54.

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	0.13	0.02	0	0	0	0
14	0.24	0.10	0.02	0	0	0
30	0.51	0.15	0.08	0.04	0.02	0.01
60	1.1	0.61	0.46	0.37	0.30	0.26
90	1.6	0.85	0.67	0.56	0.49	0.45

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	810	290	120	34	15	8.0	5.1
Percent	60	70	80	90	95	98	99.9
ft^3/s	3.0	1.9	1.2	0.60	0.30	0.15	0

05399030 Randall Creek near Milan, Wis.

Location.--SE¼NE¼ sec. 21, T. 29 N., R. 3 E., Marathon County, at bridge on town road, 1.9 mi east of Milan.

Drainage area.--3.93 mi^2. Tributary to.--Big Eau Pleine River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 8, 1976, 0 ft^3/s (dry); Sept. 13, 1976, 0 ft^3/s (dry); Aug. 15, 1977, 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.--Observations of no flow on three occasions.

Accuracy.--Not applicable.

05399210 Randall Creek near Colby, Wis.

Location.--SE¼SW¼ 18, T. 28 N., R. 3 E., Marathon County, at bridge on County Trunk N, 6.2 mi east of Colby.

Drainage area.--30.9 mi^2. Tributary to.--Big Eau Pleine River.

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

Low-flow frequency.--$Q_{7,2}$ = 0.20 ft^3/s, $Q_{7,10}$ = 0 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 14 discharge measurements and 1 observation of dry channel during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 31 percent, $SE_{7,10}$ = Not applicable.

05399250 Dill Creek at Colby, Wis.

Location.--NW¼SW¼ sec. 13, T. 28 N., R. 1 E., Clark County, at bridge on County Trunk N, 0.9 mi west of State Highway 13 in Colby.

Drainage area.--12.3 mi^2. Tributary to.--Big Eau Pleine River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s, Sept. 7, 1972.

Low-flow frequency.--$Q_{7,2}$ = 0.19 ft^3/s, $Q_{7,10}$ = 0.09 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 8 discharge measurements made during the period 1972-77.

Accuracy.--$SE_{7,2}$ = 22 percent, $SE_{7,10}$ = 42 percent.

05399280 Elm Brook at Abbotsford, Wis.

Location.--SE¼SW¼ sec. 31, T. 29 N., R. 2 E., Marathon County, at bridge on State Highway 29 in Abbotsford.

Drainage area.-- 0.31 mi^2. Tributary to.--Dill Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 7, 1972, 0.182 ft^3/s; July 11, 1973, 0.033 ft^3/s; Aug. 15, 1973, <0.03 ft^3/s (estimated); Oct. 2, 1973, 0.056 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = <0.01 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 4 discharge measurements made during the period 1972-73.

Accuracy.--Not applicable.

05399350 Dill Creek near Unity, Wis.

Location.--NW¼SW¼ sec. 36, T. 28 N., R. 2 E., Marathon County, at bridge on County Trunk F, 4.9 mi east of Unity.

Drainage area.--46.7 mi^2. Tributary to.--Big Eau Pleine River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 4.3 ft^3/s; Aug. 27, 1969, 0.70 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.43 ft^3/s, $Q_{7,10}$ = 0.17 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05399400 Big Eau Pleine River at March Rapids near Stratford, Wis.

Location.--SE¼NW¼ sec. 4, T. 27 N., R. 3 E., Marathon County, at bridge on County Trunk E, 4.9 mi northwest of Stratford.

Drainage area.--174 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 19.6 ft^3/s; Aug. 27, 1969, 2.54 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 0.50 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05399431 Hamann Creek near Stratford, Wis.

Location.--SW¼SE¼ sec. 11, T. 28 N., R. 3 E., Marathon County, at bridge on town road, 7.8 mi north of Stratford.

Drainage area.--Not determined. Tributary to.--Big Eau Pleine River.

Type of site.--Gaging station.

Period of record.--1976-79.

Minimum discharge recorded.--0.02 ft^3/s, Jan. 24-Feb. 23, 1977.

Low-flow frequency.--$Q_{7,2}$ = 0.15 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 12 recorded daily discharges during the period 1976-79.

Accuracy.--$SE_{7,2}$ = 55 percent, $SE_{7,10}$ = 55 percent.

05399500 Big Eau Pleine River near Stratford, Wis.

Location.--NW¼SW¼ sec. 18, T. 27 N., R. 4 E., Marathon County, at bridge on State Highway 97, 1.2 mi north of Stratford.

Drainage area.--224 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1916-79.

Average discharge.--52 years, 170 ft^3/s.

Extremes.--Maximum discharge, 41,000 ft^3/s, Sept. 9, 1938; minimum discharge, no flow, Aug. 17, 1947, Jan. 22-Feb. 5, 1961.

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	2.8	1.2	0.79	0.53	0.33	0.24
14	3.5	1.6	1.0	0.70	0.45	0.34
30	4.6	2.1	1.4	0.93	0.60	0.44
60	6.8	3.1	2.0	1.4	0.86	0.63
90	9.6	4.5	3.0	2.1	1.5	1.1

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	1,800	800	360	120	58	34	22
Percent	60	70	80	90	95	98	99.9
ft^3/s	15	10	7.0	4.1	2.6	1.6	0.20

Accuracy.--$SE_{7,2}$ = 13 percent, $SE_{7,10}$ = 20 percent.

05399525 Fenwood Creek at Fenwood, Wis.

Location.--SW¼SW¼ sec. 34, T. 28 N., R. 4 E., Marathon County, at bridge on County Trunk P, at Fenwood.

Drainage area.--13.2 mi^2. Tributary to.--Big Eau Pleine River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 8, 1976, 0 ft^3/s (ponded); Sept. 13, 1976, 0 ft^3/s (ponded); Aug. 15, 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.--No flow observed on three occasions.

Accuracy.--Not applicable.

05399550 Fenwood Creek near Stratford, Wis.

Location.--SW¼SE¼ sec. 24, T. 27 N., R. 4 E., Marathon County, at bridge on State Highway 153, 5.3 mi east of Stratford.

Drainage area.--36.9 mi^2. Tributary to.--Big Eau Pleine River Reservoir.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 5.7 ft^3/s; Aug. 27, 1969, 0.12 ft^3/s; Nov. 29, 1972, 9.23 ft^3/s; Aug. 15, 1977, 0 ft^3/s (ponded).

Low-flow frequency.--$Q_{7,2}$ = 0.04 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 4 discharge measurements made during the period 1968-77.

Accuracy.--$SE_{7,10}$ = 45 percent (basin average).

05399580 Freeman Creek near Halder, Wis.

Location.--NW¼NW¼ sec. 36, T. 27 N., R. 5 E., Marathon County, at bridge on town road, 1.0 mi southeast of Halder.

Drainage area.--26.5 mi^2. Tributary to.--Big Eau Pleine Reservoir.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 7.81 ft^3/s; Aug. 28, 1969, 1.60 ft^3/s; Nov. 29, 1972, 17.3 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.3 ft^3/s, $Q_{7,10}$ = 0.41 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 3 discharge measurements made during the period 1968-72.

Accuracy.--$SE_{7,10}$ = 45 percent (basin average).

05400000 Wisconsin River at Knowlton, Wis.

Location.--NE¼NW¼ sec. 29, T. 26 N., R. 7 E., Marathon County, at bridge for State Highway 34 and Chicago, Milwaukee, St. Paul, and Pacific Railroad, 1.0 mi southwest of Knowlton.

Drainage area.--4,530 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1921-42.

Average discharge.--21 years, 4,199 ft^3/s.

Extremes.--Maximum discharge, 54,300 ft^3/s, Sept. 2, 1941; minimum discharge, 317 ft^3/s, Aug. 8, 1932.

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	1,400	988	809	678	551	476
14	1,480	1,080	900	770	642	566
30	1,580	1,170	1,000	874	749	675
60	1,680	1,290	1,130	1,030	927	869
90	1,820	1,400	1,230	1,120	1,000	940

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	20,000	13,000	8,600	4,900	4,800
Percent	40	50	60	70	80
ft^3/s	4,100	2,700	2,300	2,000	1,700
Percent	90	95	98	99.9	
ft^3/s	1,400	1,200	940	440	

Accuracy.--$SE_{7,2}$ = 8 percent, $SE_{7,10}$ = 4 percent.

Remarks.--Flow regulated by 21 storage reservoirs and several powerplants above station. See Gebert and Holmstrom (1977) for additional analyses.

05400005 Peplin Creek near Mosinee, Wis.

Location.--SE¼SW¼ sec. 35, T. 27 N., R. 7 E., Marathon County, at bridge on country road, 3.3 mi southeast of Mosinee.

Drainage area.--6.37 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s, Oct. 11, 1972, Sept. 6, 1972, Oct. 7, 1973, July 23, 1974, and July 8, 1976.

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

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 7 discharge measurements made during the period 1972-76.

Accuracy.--Not applicable.

05400030 Johnson Creek near Knowlton, Wis.

Location.--SE¼SE¼ sec. 23, T. 26 N., R. 7 E., Marathon County, at bridge on County Trunk C, 2.6 mi east of Knowlton.

Drainage area.--28.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 15, 1976, 1.68 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.94 ft^3/s, $Q_{7,10}$ = 0.45 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05400040 Little Eau Claire River near Knowlton, Wis.

Location.--SW¼NW¼ sec. 6, T. 25 N., R. 8 E., Portage County, at bridge on County Trunk X, 4.5 mi southeast of Knowlton.

Drainage area.--49.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 1.54 ft^3/s.

Low-flow frequency.--Additional discharge measurements should be obtained to determine low-flow characteristics.

05400041 Little Eau Claire River tributary near Dancy, Wis.

Location.--NW¼SW¼ sec. 6, T. 25 N., R. 8 E., Portage County, at bridge on County Trunk X, 4.7 mi southeast of Knowlton.

Drainage area.--3.95 mi^2. Tributary to.--Little Eau Claire River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 0.921 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.72 ft^3/s, $Q_{7,10}$ = 0.39 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05400045 Little Eau Claire River at Unity, Wis.

Location.--SW¼NE¼ sec. 1, T. 27 N., R. 1 E., Clark County, at sewage-disposal lagoon, 0.5 mi northwest of Unity.

Drainage area.--7.42 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s (water ponded), Sept. 9, 1972, July 11, 1973, Aug. 15, 1973, July 23, 1974, July 8, 1976.

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

Basis of estimate.--Observations of no flow on five occasions.

Accuracy.--Not applicable.

05400050 Little Eau Pleine River near Spencer, Wis.

Location.--NE¼NW¼ sec. 3, T. 26 N., R. 2 E., Marathon County, at bridge on County Trunk F, 2.5 mi northeast of Spencer.

Drainage area.--28.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 1.58 ft^3/s; Aug. 26, 1969, 0.04 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.01 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400066 Tributary to Little Eau Pleine River tributary at Spencer, Wis.

Location.--SW¼SE¼ sec. 5, T. 26 N., R. 2 E., Marathon County, at bridge on County Trunk C, 0.6 mi east of Spencer.

Drainage area.--1.05 mi^2. Tributary to.--Little Eau Pleine River tributary.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.006 ft^3/s, Oct. 2, 1973.

Low-flow frequency.--$Q_{7,2}$ = <0.01 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford usign 6 discharge measurements made during the period 1972-76.

Accuracy.--Not applicable.

05400100 Little Eau Pleine River near Marshfield, Wis.

Location.--SW¼NW¼ sec. 24, T. 26 N., R. 3 E., Marathon County, at bridge on State Highway 97, 5.2 mi northeast of Marshfield.

Drainage area.--78.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--Apr. 2, 1964 to Jan. 6, 1970.

Minimum discharge measured.--0.08 ft^3/s, Aug. 25-31, 1969.

Low-flow frequency.--$Q_{7,2}$ = 0.08 ft^3/s, $Q_{7,10}$ = 0.01 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 12 discharge measurements made during the period 1968-70.

Accuracy.--$SE_{7,10}$ = 45 percent.

05400150 Little Eau Pleine River near Rozellville, Wis.

Location.--NW¼SW¼ sec. 27, T. 26 N., R. 4 E., Marathon County, at bridge on County Trunk M, 2.6 mi south of Rozellville.

Drainage area.--119 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 10.6 ft^3/s; Aug. 26, 1969, 0.99 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.39 ft^3/s, $Q_{7,10}$ = 0.14 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400200 Little Eau Pleine River near Auburndale, Wis.

Location.--NE¼SE¼ sec. 29, T. 26 N., R. 5 E., Marathon County, at bridge on town road, 5.8 mi north of Auburndale.

Drainage area.--147 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 15.5 ft^3/s; Aug. 26, 1969, 0.67 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.26 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400225 Little Bear Creek at Auburndale, Wis.

Location.--NE¼SE¼ sec. 23, T. 25 N., R. 4 E., Wood County, at sewage-disposal ponds, 1.0 mi northeast of Auburndale.

Drainage area.--1.50 mi^2. Tributary to.--Bear Creek.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s, July 7, 1976.

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

Basis of estimate.--No flow observed during seven visits to the site during the period 1972-76.

Accuracy.--Not applicable.

05400250 Little Eau Pleine River near Milladore, Wis.

Location.--SW¼SW¼ sec. 24, T. 26 N., R. 5 E., Marathon County, at bridge on County Trunk S, 7.7 mi north of Milladore.

Drainage area.--200 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 30.9 ft^3/s; Aug. 26, 1969, 3.45 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.7 ft^3/s, $Q_{7,10}$ = 0.60 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400300 Hay Meadow Creek near Stevens Point, Wis.

Location.--SE¼SE¼ sec. 7, T. 24 N., R. 8 E., Portage County, at bridge on abandoned section of U.S. Highway 51, 3.3 mi north of Stevens Point.

Drainage area.--30.4 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--1.39 ft^3/s, Sept. 26, 1966.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.27 ft^3/s.

Basis of estimate.--Graphical regression with Bull Junior Creek near Rothschild using 11 discharge measurements made during the period 1962-67.

Accuracy.--$SE_{7,2}$ = 24 percent, $SE_{7,10}$ = 34 percent.

05400330 Plover River near Aniwa, Wis.

Location.--SW¼NW¼ sec. 31, T. 30 N., R. 11 E., Langlade County, at culvert on County Trunk HH, 2.1 mi north of Aniwa.

Drainage area.--6.86 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s (water ponded), Aug. 16, 1977.

Low-flow frequency.--$Q_{7,2}$ = 0.02 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Eau Claire River at Kelly using 7 discharge measurements made during the period 1972-77.

Accuracy.--$SE_{7,2}$ = 73 percent, $SE_{7,10}$ = 120 percent.

05400370 Plover River near Aniwa, Wis.

Location.--SE¼SW¼ sec. 15, T. 29 N., R. 10 E., Marathon County, at bridge on County Trunk Z, 3.4 mi southwest of Aniwa.

Drainage area.--19.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 9.87 ft^3/s; Aug. 8, 1974, 10.4 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.0 ft^3/s, $Q_{7,10}$ = 4.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05400410 Plover River at Hatley, Wis.

Location.--NW¼NW¼ sec. 30, T. 28 N., R. 10 E., Marathon County, at bridge on State highway 29, at Hatley.

Drainage area.--47.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 27.5 ft^3/s; Aug. 8, 1974, 23.2 ft^3/s.

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

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05400440 Plover River at Bevent, Wis.

Location.--SW¼SE¼ sec. 34, T. 27 N., R. 9 E., Marathon County, at bridge on State Highway 153, 2.8 mi downstream from Pike Lake Creek, at Bevent.

Drainage area.--80.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1974, 51.7 ft^3/s; Aug. 8, 1974, 52.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 28 ft^3/s, $Q_{7,10}$ = 24 ft^3/s.

Basis of estimate.--Used multiple-regression equations 9 and 11.

Accuracy.--$SE_{7,2}$ = 36 percent, $SE_{7,10}$ = 48 percent.

05400500 Plover River near Stevens Point, Wis.

Location.--SW¼SW¼ sec. 6, T. 24 N., R. 9 E., Portage County, at bridge on town road, 5 mi northeast of Stevens Point.

Drainage area.--145 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1914-19, 1944-51.

Average discharge.--12 years (1914-19, 1944-51), 143 ft^3/s.

Extremes.--Maximum discharge, 1,570 ft^3/s, June 5, 1914; minimum discharge, 32 ft^3/s, Aug. 5, 6, 1945.

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
7	62	54	51	49
14	66	58	55	53
30	71	62	59	57
60	76	66	62	60
90	82	71	67	63

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	390	320	250	160	150	130	120
Percent	60	70	80	90	95	98	99.9
ft^3/s	110	92	82	71	64	58	41

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 6 percent.

Remarks.--Flow occasionally regulated by two small dams above station.

05400513 Plover River at Stevens Point, Wis.

Location.--NW¼NE¼ sec. 34, T. 24 N., R. 8 E., Portage County, at U.S. Highway 10 bridge in Stevens Point.

Drainage area.--166 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14. 1976, 118 ft^3/s.

Low-flow frequency.--Additional discharge measurements should be obtained to determine low-flow characteristics.

05400593 Little Plover River near Arnott, Wis.

Location.--NW¼NW¼ sec. 19, T. 23 N., R. 9 E., Portage County, 500 ft above Kennedy Road, 2.1 mi northwest of Arnott.

Drainage area.--1.51 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.54 ft^3/s, Mar. 7, 1961.

Low-flow frequency.--$Q_{7,2}$ = 0.72 ft^3/s, $Q_{7,10}$ = 0.45 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 7 discharge measurements made during the period 1960-61.

Accuracy.--$SE_{7,2}$ = 11 percent, $SE_{7,10}$ = 21 percent.

05400597 Little Plover River tributary near Arnott, Wis.

Location.--NW¼NW¼ sec. 19, T. 23 N., R. 9 E., Portage County, 100 ft above mouth, 500 ft east of Kennedy Road, 2.1 mi northwest of Arnott.

Drainage area.--0.47 mi^2. Tributary to.--Little Plover River.

Type of site.--Gaging station.

Minimum discharge measured.--0.36 ft^3/s, Mar. 7, 1961.

Low-flow frequency.--$Q_{7,2}$ = 0.47 ft^3/s, $Q_{7,10}$ = 0.28 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 9 discharge measurements made during the period 1960-61.

Accuracy.--$SE_{7,2}$ = 12 percent, $SE_{7,10}$ = 22 percent.

05400599 Little Plover River tributary near Arnott, Wis.

Location.--NW¼NW¼ sec. 19, T. 23 N., R. 9 E., Portage County, flowing parallel to and 10 ft east of Kennedy Road, 100 ft above mouth, 2.2 mi northwest of Arnott.

Drainage area.--0.18 mi^2. Tributary to.--Little Plover River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.20 ft^3/s, Mar. 7, 1961.

Low-flow frequency.--$Q_{7,2}$ = 0.42 ft^3/s, $Q_{7,10}$ = 0.09 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 9 discharge measurements made during the period 1960-61.

Accuracy.--$SE_{7,2}$ = 31 percent, $SE_{7,10}$ = 50 percent.

05400600 Little Plover River near Arnott, Wis.

Location.--NE¼NE¼ sec. 24, T. 23 N., R. 8 E., Portage County, at Kennedy Road bridge, 2.2 mi northwest of Arnott, 3.5 mi upstream from mouth.

Drainage area.--2.24 mi^2 (the drainage area based on the ground-water divide is 7.25 mi^2). Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1959-75.

Average discharge.--16 years, 4.03 ft^3/s.

Extremes.--Maximum discharge, 72 ft^3/s, Mar. 7, 1973; minimum discharge, 0.8 ft^3/s, for many days in July, August, and September 1959.

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
7	2.1	1.5	1.2	1.0
14	2.2	1.5	1.3	1.1
30	2.3	1.6	1.4	1.2
60	2.4	1.8	1.5	1.3
90	2.5	1.8	1.6	1.4

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	12	8.9	6.8	5.1	4.2	3.8	3.4
Percent	60	70	80	90	95	98	99.9
ft^3/s	3.1	2.8	2.4	1.9	1.6	1.3	1.0

Accuracy.--$SE_{7,2}$ = 11 percent, $SE_{7,10}$ = 16 percent.

05400617 Little Plover River near Plover, Wis.

Location.--SE¼SW¼ sec. 13, T. 23 N., R. 8 E., Portage County, 0.6 mi upstream from Eisenhower Avenue, 2.2 mi east of Plover.

Drainage area.--2.75 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--2.42 ft^3/s, Sept. 28, 1961.

Low-flow frequency.--$Q_{7,2}$ = 3.4 ft^3/s, $Q_{7,10}$ = 1.6 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 7 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,2}$ = 17 percent, $SE_{7,10}$ = 37 percent.

05400619 Little Plover River near Plover, Wis.

Location.--SE¼SW¼ sec. 13, T. 23 N., R. 8 E., Portage County, 0.5 mi upstream from Eisenhower Avenue, 2.1 mi east of Plover.

Drainage area.--16.4 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--2.46 ft^3/s, Sept. 28, 1961.

Low-flow frequency.--$Q_{7,2}$ = 3.4 ft^3/s, $Q_{7,10}$ = 1.6 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 6 discharge measurements made during 1961.

Accuracy.--$SE_{7,2}$ = 16 percent, $SE_{7,10}$ = 24 percent.

05400628 Little Plover River near Plover, Wis.

Location.--SE¼SE¼ sec. 14, T. 23 N., R. 8 E., Portage County, 800 ft downstream from Eisenhower Avenue, 1.8 mi northeast of Plover.

Drainage area.--16.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Nov. 13, 1961, 4.38 ft^3/s; Nov. 14, 1961, 4.22 ft^3/s; Nov. 14, 1961, 4.05 ft^3/s; Nov. 14, 1961, 4.25 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.6 ft^3/s, $Q_{7,10}$ = 2.2 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 4 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,10}$ = 19 percent (basin average).

05400630 Little Plover River near Plover, Wis.

Location.--SE¼SE¼ sec. 14, T. 23 N., R. 8 E., Portage County, 0.25 mi downstream from Eisenhower Avenue bridge, 1.5 mi east of Plover.

Drainage area.--16.7 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--4.08 ft^3/s, Nov. 14, 1961.

Low-flow frequency.--$Q_{7,2}$ = 4.0 ft^3/s, $Q_{7,10}$ = 2.9 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Arnott using 3 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,10}$ = 19 percent (basin average).

05400635 Little Plover River near Plover, Wis.

Location.--SW¼SE¼ sec. 14, T. 23 N., R. 8 E., Portage County, 0.7 mi upstream from Hoover Avenue, 1.5 mi northeast of Plover.

Drainage area.--17.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--6.56 ft^3/s, July 30, 1963.

Low-flow frequency.--$Q_{7,2}$ = 4.8 ft^3/s, $Q_{7,10}$ = 3.5 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Plover using 5 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,10}$ = 19 percent (basin average).

05400640 Little Plover River near Plover, Wis.

Location.--NE¼SW¼ sec. 14, T. 23 N., R. 8 E., Portage County, 0.5 mi above Hoover Avenue, 1.4 mi northeast of Plover.

Drainage area.--18.0 mi^2. Tributary to.--Plover River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--7.66 ft^3/s, Oct. 5, 1961.

Low-flow frequency.--$Q_{7,2}$ = 5.9 ft^3/s, $Q_{7,10}$ = 4.2 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Plover using 5 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,10}$ = 19 percent (basin average).

05400645 Little Plover River near Plover, Wis.

Location.--NW¼SW¼ sec. 14, T. 23 N., R. 8 E., 0.3 mi above Hoover Avenue, 1.3 mi northeast of Plover.

Drainage area.--18.1 mi^2. Tributary to.--Plover River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--8.35 ft^3/s, July 30, 1963.

Low-flow frequency.--$Q_{7,2}$ = 6.3 ft^3/s, $Q_{7,10}$ = 4.7 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River near Plover using 5 discharge measurements made during the period 1961-63.

Accuracy.--$SE_{7,10}$ = 19 percent (basin average).

05400650 Little Plover River at Plover, Wis.

Location.--NW¼SW¼ sec. 14, T. 23 N., R. 8 E., Portage County, at bridge on town road, 1.0 mi northeast of Plover.

Drainage area.--19 mi^2 (the drainage area based on the ground-water divide is 23.8 mi^2.

Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1961-79.

Average discharge.--19 years, 10.26 ft^3/s.

Extremes.--Maximum discharge, about 99 ft^3/s, Mar. 7, 1973; minimum discharge, 1.4 ft^3/s, Nov. 16, 1974.

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	6.4	5.4	4.8	4.4	4.0	3.7
14	6.6	5.5	5.0	4.5	4.0	3.8
30	6.8	5.8	5.2	4.8	4.3	3.9
60	7.2	6.1	5.5	5.0	4.5	4.2
90	7.4	6.3	5.7	5.2	4.7	4.4

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	23	19	16	13	11	9.9	9.1
Percent	60	70	80	90	95	98	99.9
ft^3/s	8.5	7.9	7.3	6.5	6.0	5.3	4.2

Accuracy.--$SE_{7,2}$ = 4 percent, $SE_{7,10}$ = 8 percent.

05400651 Little Plover River at Plover, Wis.

Location.--NE¼SE¼ sec. 16, T. 23 N., R. 8 E., Portage County, at Green Bay and Western Railroad bridge, at Plover.

Drainage area.--21.3 mi^2.

Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 14, 1976, 8.64 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 8.0 ft^3/s, $Q_{7,10}$ = 5.1 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400658 Mill Creek near Marshfield, Wis.

Location.--NE¼SE¼ sec. 18, T. 25 N., R. 3 E., Wood County, at culvert on town road, 1.5 mi south of post office in Marshfield.

Drainage area.--2.03 mi^2.

Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.104 ft^3/s, Oct. 1, 1973.

Low-flow frequency.--Low-flow characteristics could not be estimated because discharge from upstream powerplant affected graphical relationship with other stations. Nine discharge measurements were made ranging from 0.22 to 0.62 ft^3/s during the period 1972-77.

05400662 Mill Creek near Marshfield, Wis.

Location.--SE¼NE¼ sec. 20, T. 25 N., R. 3 E., Wood County, at bridge on Washington Avenue, 2.2 mi southeast of Marshfield.

Drainage area.--Not determined. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Nov. 21, 1974, 5.62 ft^3/s.

05400663 Mill Creek near Marshfield, Wis.

Location.--NE¼SE¼ sec. 21, T. 25 N., R. 3 E., Wood County, at bridge on County Highway A, 2.9 mi southeast of Marshfield.

Drainage area.--Not determined. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Nov. 21, 1974, 4.78 ft^3/s.

05400664 Mill Creek near Hewitt, Wis.

Location.--NE¼SE¼ sec. 22, T. 25 N., R. 3 E., Wood County, at bridge on Stadt Road, 1.5 mi southwest of Hewitt.

Drainage area.--Not determined. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Nov. 21, 1974, 4.62 ft^3/s.

05400665 Mill Creek near Hewitt, Wis.

Location.--SW¼SW¼ sec. 24, T. 25 N., R. 3 E., Wood County, at bridge on County Trunk T, 1.2 mi south of Hewitt.

Drainage area.--11.4 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Aug. 27, 1969, 3.20 ft^3/s; Sept. 19, 1974, 4.67 ft^3/s; Nov. 21, 1974, 4.17 ft^3/s;

Low-flow frequency.--Low-flow characteristics could not be estimated because discharge from upstream powerplant at Marshfield affected graphical relationships with other stations.

05400670 Mill Creek near Auburndale, Wis.

Location.--NW¼NW¼ sec. 3, T. 24 N., R. 4 E., Wood County, at bridge on State Highway 186, 2.3 mi southwest of Auburndale.

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

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 4.66 ft^3/s; Aug. 27, 1969, 5.06 ft^3/s.

Low-flow frequency.--Low-flow characteristics could not be estimated because discharge from upstream powerplant at Marshfield affected graphical relationships with other stations.

05400685 Mill Creek at Sherry, Wis.

Location.--NE¼NW¼ sec. 9, T. 24 N., R. 5 E., Wood County, at bridge on County Trunk F, at Sherry.

Drainage area.--41.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 23, 1968, 5.20 ft^3/s; Aug. 27, 1969, 3.75 ft^3/s; Sept. 13, 1976, 1.64 ft^3/s; Aug. 15, 1977, 3.59 ft^3/s.

Low-flow frequency.--Low-flow characteristics could not be estimated because discharge from upstream powerplant at Marshfield affected graphical relationships with other stations.

05400692 Mill Creek tributary near Milladore, Wis.

Location.--NW¼NE¼ sec. 12, T. 24 N., R. 5 E., Wood County, at bridge on country road, 1.5 mi south of Milladore.

Drainage area.--2.63 mi^2. Tributary to.--Mill Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--July 11, 1972, no flow; Sept. 5, 1972, no flow; July 10, 1973, 0 ft^3/s; Aug. 14, 1973, 0 ft^3/s; Oct. 1, 1973, 0 ft^3/s.

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

Basis of estimate.--No flow observed during five visits to the site.

Accuracy.--Not applicable.

05400700 Mill Creek near Junction City, Wis.

Location.--NE¼NE¼ sec. 20, T. 24 N., R. 6 E., Portage County, at bridge on State Highway 34, 3.3 mi southwest of Junction City.

Drainage area.--68.7 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--0.32 ft^3/s, July 9, 1976 (no flow with ponded water observed Sept. 13, 1976 and Aug. 15, 1977).

Low-flow frequency.--$Q_{7,2}$ = 1.2 ft^3/s, $Q_{7,10}$ = 0.29 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 15 discharge measurements made during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 25 percent, $SE_{7,10}$ = 44 percent.

05400703 Mill Creek tributary at Junction City, Wis.

Location.--NE¼NW¼ sec. 11, T. 24 N., R. 6 E., Portage County, at sewage-disposal ponds, 0.5 mi south of Junction City.

Drainage area.--1.40 mi^2. Tributary to.--Mill Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--July 10, 1972, no flow.

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

Basis of estimate.--No flow observed on July 10, 1972.

Accuracy.--Not applicable.

05400707 Mill Creek Ditch near Stevens Point, Wis.

Location.--NW¼NW¼ sec. 27, T. 24 N., R. 7 E., Portage County, at culvert beside County Trunk M, 4.7 mi northwest of courthouse at Stevens Point.

Drainage area.--1.14 mi^2. Tributary to.--Mill Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 25, 1968, 1.57 ft^3/s; Aug. 29, 1969, 0.47 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.1 ft^3/s, $Q_{7,10}$ = 0.57 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400710 Mill Creek near Stevens Point, Wis.

Location.--NW¼SW¼ sec. 34, T. 24 N., R. 7 E., Portage County, at bridge on County Trunk C, 4.5 mi west of courthouse at Stevens Point.

Drainage area.--102 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--June 1968 to Sept. 1969.

Minimum discharge observed.--1.6 ft^3/s, Aug. 29-31, 1969.

Low-flow frequency.--$Q_{7,2}$ = 3.6 ft^3/s, $Q_{7,10}$ = 1.3 ft^3/s.

Basis of estimate.--Graphical regression with Big Eau Pleine River near Stratford using 12 values of observed discharge recorded during 1968-69.

Accuracy.--$SE_{7,2}$ = 50 percent, $SE_{7,10}$ = 50 percent.

05400719 Mill Creek near Meehan, Wis.

Location.--NW¼NE¼ sec. 22, T. 23 N., R. 7 E., Portage County, at bridge on County Trunk P, 2.0 mi north of Meehan.

Drainage area.--129 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Jan. 13, 1976, 14.2 ft^3/s.

Low-flow frequency.--Additional discharge measurements required to estimate low-flow characteristics.

05400725 Wisconsin River tributary at Rudolph, Wis.

Location.--SE¼NW¼ sec. 9, T. 23 N., R. 6 E., Wood County, at sewage-disposal pond, at Randolph.

Drainage area.--0.31 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Sept. 5, 1972, no measurable flow; July 10, 1973, 0 ft^3/s; Oct. 1, 1977, no measurable flow; July 23, 1978, dry; July 9, 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.--No flow observed on several occasions.

Accuracy.--Not applicable.

05400750 Mosquito Creek near Rudolph, Wis.

Location.--SE¼SE¼ sec. 19, T. 23 N., R. 6 E., Wood County, at bridge on country road, 3.2 mi southwest of Rudolph.

Drainage area.--16.3 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 10, 1973, 1.24 ft^3/s; Aug. 14, 1973, 0.927 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.24 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05400751 Mosquito Creek near Wisconsin Rapids, Wis.

Location.--NE¼NW¼ sec. 33, T. 23 N., R. 6 E., Wood County, at bridge on County Trunk D, 3.2 mi north of Wisconsin Rapids.

Drainage area.--17.4 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Jan. 13, 1976, 1.81 ft^3/s.

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

05400757 Quinnell Creek near Wisconsin Rapids, Wis.

Location.--SW¼SE¼ sec. 3, T. 22 N., R. 6 E., Wood County, at bridge on U.S. Highway 54, 2.9 mi northeast of Wisconsin Rapids.

Drainage area.--4.02 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Jan. 13, 1976, 1.37 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.5 ft^3/s, $Q_{7,10}$ = 0.82 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400800 Wisconsin River at Wisconsin Rapids, Wis.

Location.--SE¼SW¼ sec. 24, T. 22 N., R. 5 E., Wood County, at Centralia powerplant of Nekoosa-Edwards Paper Company, 1.6 mi downstream from Chicago and Northwestern Railroad bridge, in Wisconsin Rapids.

Drainage area.--5,430 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1914-50, 1957-79.

Average discharge.--56 years, 4,907 ft^3/s.

Extremes.--Maximum discharge, 70,400 ft^3/s, Sept. 12, 1938; minimum discharge, 26 ft^3/s, Sept. 7, 1942.

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	1,860	1,420	1,230	1,080	926	833
14	1,970	1,520	1,310	1,150	990	892
30	2,090	1,620	1,400	1,240	1,070	971
60	2,270	1,750	1,520	1,340	1,170	1,060
90	2,390	1,840	1,590	1,400	1,200	1,100

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	22,000	15,000	9,700	5,800	4,500
Percent	40	50	60	70	80
ft^3/s	3,800	3,300	2,900	2,600	2,200
Percent	90	95	98	99.9	
ft^3/s	1,800	1,500	1,100	580	

Accuracy.--$SE_{7,2}$ = 4 percent, $SE_{7,10}$ = 6 percent.

Remarks.--Flow regulated by 21 reservoirs and many powerplants above station. See Gebert and Holmstrom, (1977) for additional analyses.

05400830 Ditch No. 3 near Kellner, Wis.

Location.--SE¼NE¼ sec. 27, T. 22 N., R. 7 E., Portage County, at check dam, 3.8 mi east of Kellner.

Drainage area.--Not determined. Tributary to.--Fourmile Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 11, 1966, 9.74 ft^3/s.

05400835 Ditch No. 4 near Kellner, Wis.

Location.--SW¼SE¼ sec. 27, T. 22 N., R. 7 E., Portage County, at culvert on town road, 3.5 mi east of Kellner.

Drainage area.--Not determined. Tributary to.--Fourmile Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 11, 1966, 1.83 ft^3/s; Oct. 26, 1966, 3.18 ft^3/s.

05400838 Fourmile Creek near Kellner, Wis.

Location.--SW¼NW¼ sec. 27, T. 22 N., R. 7 E., Portage County, at check dam, 3.0 mi east of Kellner.

Drainage area.--73.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 12, 1966, 11.9 ft^3/s.

Low-flow frequency.--Additional discharge measurements required to estimate low-flow characteristics.

05400840 Fourmile Creek near Kellner, Wis.

Location.--SW¼NE¼ sec. 20, T. 22 N., R. 7 E., Portage County, on left bank upstream from bridge on country road, 1.2 mi upstream from Buena Vista Creek, 1.5 mi northeast of Kellner, 6.5 mi east of Wisconsin Rapids.

Drainage area.--75.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--Mar. 1964 to Sept. 1967.

Minimum discharge measured.--4.0 ft^3/s, Feb. 4 and 5, 1965.

Low-flow frequency.--$Q_{7,2}$ = 14 ft^3/s, $Q_{7,10}$ = 7.4 ft^3/s.

Basis of estimate.--Graphical regression with Tenmile Creek near Nekoosa using 16 values of daily discharge recorded during the period 1964-67.

Accuracy.--$SE_{7,2}$ = 11 percent, $SE_{7,10}$ = 19 percent.

05400842 Ditch No. 2 near Bancroft, Wis.

Location.--SE¼NE¼ sec. 14, T. 22 N., R. 8 E., Portage County, at check dam 7, 5.5 mi north of Bancroft.

Drainage area.--1.35 mi^2. Tributary to.--Fourmile Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 11, 1966, 3.42 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.4 ft^3/s, $Q_{7,10}$ = 2.9 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400843 Ditch No. 2 tributary near Bancroft, Wis.

Location.--NE¼NE¼ sec. 14, T. 22 N., R. 8 E., Portage County, at bridge on town road, 5.9 mi north of Bancroft.

Drainage area.--3.24 mi^2. Tributary to.--Ditch No. 2.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 11, 1966, 5.73 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.9 ft^3/s, $Q_{7,10}$ = 5.1 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400844 Ditch No. 2 near Bancroft, Wis.

Location.--SE¼NW¼ sec. 14, T. 22 N., R. 8 E., Portage County, at culvert on U.S. Highway 51, 5.5 mi north of Bancroft.

Drainage area.--5.57 mi^2. Tributary to.--Fourmile Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 10.3 ft^3.

Low-flow frequency.--$Q_{7,2}$ = 11 ft^3/s, $Q_{7,10}$ = 9.0 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400846 Ditch No. 1 near Plover, Wis.

Location.--SE¼SE¼ sec. 5, T. 22 N., R. 8 E., Portage County, at check dam 2, 3.5 mi southwest of Plover.

Drainage area.--21.1 mi^2. Tributary to.--Buena Vista Creek.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 10, 1966, 5.59 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 8.3 ft^3/s, $Q_{7,10}$ = 5.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400850 Buena Vista Creek near Wisconsin Rapids, Wis.

Location.--SW¼SW¼ sec. 14, T. 22 N., R. 7 E., Portage County, at bridge on County Trunk F, 9.0 mi east of Wisconsin Rapids.

Drainage area.--45.7 mi^2. Tributary to.--Fourmile Creek.

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

Minimum discharge measured.--18.0 ft^3/s, Oct. 23, 1963.

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

Basis of estimate.--Graphical regression with Tenmile Creek near Nekoosa using 8 discharge measurements made during the period 1962-66.

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

05400853 Buena Vista Creek near Kellner, Wis.

Location.--Center of section 20, T. 22 N., R. 7 E., Portage County, on left bank, upstream from highway bridge, 1.2 mi upstream from Fourmile Creek, 1.7 mi northeast of Kellner.

Drainage area.--53.1 mi^2. Tributary to.--Fourmile Creek.

Type of site.--Gaging station.

Minimum discharge measured.--14 ft^3/s, Feb. 3-5, 9, 25-28, 1966.

Period of record.--Mar. 1964-Sept. 1967.

Low-flow frequency.--$Q_{7,2}$ = 23 ft^3/s, $Q_{7,10}$ = 16 ft^3/s.

Basis of estimate.--Graphical regression with Tenmile Creek near Kekoosa using 15 values of daily discharge recorded during the period 1964-67.

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

05400885 Twomile Creek near Meehan, Wis.

Location.--SW¼SW¼ sec. 3, T. 22 N., R. 7 E., Portage County, at bridge on 110th Street, 2.1 mi southwest of Meehan.

Drainage area.--2.79 mi^2. Tributary to.--Fourmile Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Dec. 7, 1973, 0.49 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.67 ft^3/s, $Q_{7,10}$ = 0.30 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400905 Fourmile Creek at Wisconsin Rapids, Wis.

Location.--NE¼SE¼ sec. 36, T. 22 N., R. 5 E., Wood County, at mouth, 3.6 mi south of post office at Wisconsin Rapids.

Drainage area.--165 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Jan. 13, 1976, 43.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 33 ft^3/s, $Q_{7,10}$ = 20 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05400950 Moccasin Creek at Nekoosa, Wis.

Location.--SE¼NW¼ sec. 34, T. 22 N., R. 5 E., Wood County, at bridge on State Highway 54, 1.9 mi north of Nekoosa.

Drainage area.--22.3 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--2.32 ft^3/s, Sept. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 3.3 ft^3/s, $Q_{7,10}$ = 2.5 ft^3/s.

Basis of estimate.--Graphical regression with Yellow River near Babcock using 14 discharge measurements made during the period 1962-77.

Accuracy.--$SE_{7,2}$ = 10 percent, $SE_{7,10}$ = 12 percent.

05400980 Wisconsin River near Nekoosa, Wis.

Location.--NW¼SE¼ sec. 15, T. 21 N., R. 5 E., Wood County, 1.5 mi downstream from Nekoosa, 4.0 mi upstream from Tenmile Creek.

Drainage area.--5,640 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1914-49.

Average discharge.-35 years, 4,942 ft^3/s.

Extremes.--Maximum discharge, 70,400 ft^3/s, Sept. 12, 1938; minimum discharge, 26 ft^3/s, Sept. 7, 1942.

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	1,780	1,360	1,180	1,040	905	821
14	1,890	1,460	1,270	1,120	978	889
30	1,990	1,560	1,360	1,220	1,070	985
60	2,150	1,680	1,480	1,340	1,200	1,120
90	2,280	1,780	1,560	1,410	1,250	1,160

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	21,000	15,000	10,000	6,100	4,500
Percent	40	50	60	70	80
ft^3/s	3,800	3,200	2,800	2,400	2,100
Percent	90	95	98	99.9	
ft^3/s	1,700	1,500	1,200	580	

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 8 percent.

Remarks.--Flow regulated by 21 reservoirs and several powerplants above station.

05401013 North Branch Tenmile Creek near Bancroft, Wis.

Location.--SE¼SE¼ sec. 14, T. 21 N., R. 8 E., Portage County, at town road bridge, 1.4 mi south of Bancroft.

Drainage area.--4.42 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Dec. 7, 1973, 1.32 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.4 ft^3/s, $Q_{7,10}$ = 0.76 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401020 Tenmile Creek Ditch 5 near Bancroft, Wis.

Location.--NE¼NE¼ sec. 16, T. 21 N., R. 8 E., Portage County, at bridge on town road, 1.25 mi west of U.S. Highway 51, and 1.75 mi southwest of Bancroft.

Drainage area.--9.73 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1965-73.

Average discharge.--9 years, 8.12 ft^3/s.

Extremes.--Maximum discharge, 332 ft^3/s, Mar. 7, 1973; minimum discharge, 2.2 ft^3/s, Aug. 11, 13, 14, 17-19, 1967, and Aug. 27, 1970.

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
7	3.6	2.9	2.6
14	3.7	3.0	2.7
30	4.0	3.3	3.0
60	4.6	3.9	3.5
90	5.0	4.1	3.7

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	23	17	14	11	9.0	7.7	6.7
Percent	60	70	80	90	95	98	99.9
ft^3/s	5.9	5.3	4.6	3.8	3.3	2.9	2.5

05401023 Ditch 5 near Kellner, Wis.

Location.--NE¼NE¼ sec. 15, T. 21 N., R. 7 E., Portage County, at check dam, 5.3 mi southeast of Kellner.

Drainage area.--Not determined. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 11, 1966, 1.97 ft^3/s; Oct. 22, 1966, 3.33 ft^3/s.

05401031 South Branch Tenmile Creek near Plainfield, Wis.

Location.--SE¼SW¼ sec. 36, T. 21 N., R. 8 E., Portage County, at culvert on town road, 2.1 mi north of Plainfield.

Drainage area.--1.79 mi^2. Tributary to.--Tenmile Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 10, 1966, 0 ft^3/s.

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

Basis of estimate.--No flow observed on Oct. 10, 1966.

Accuracy.--Not applicable.

05401050 Tenmile Creek near Nekoosa, Wis

Location.--NE¼NE¼ sec. 32, T. 21 N., R. 6 E., Wood County, at bridge on State Highway 13, 6.0 mi southeast of Nekoosa.

Drainage area.--73.3 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1964-79.

Average discharge.--15 years, 58.7 ft^3/s.

Extremes.--Maximum discharge, 411 ft^3/s, Mar. 15, 1973; minimum discharge, 9.5 ft^3/s, Dec. 16, 1964.

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
7	23	17	14	12
14	24	17	14	12
30	26	18	15	12
60	29	20	16	13
90	32	21	17	14

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	170	140	110	85	70	60	52
Percent	60	70	80	90	95	98	99.9
ft^3/s	44	37	30	22	17	15	10

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

Remarks.--Approximately 40 mi of drainage ditches and 22 check dams are used to control the water table in in the basin. Sprinkler irrigation from ground-water sources affects the natural flow of creek.

05401075 Ditch No. 7 near New Rome, Wis.

Location.--NE¼NW¼ sec. 4, T. 20 N., R. 7 E., Adams County, at bridge on State Highway 73, 10.3 mi east of New Rome.

Drainage area.--10.8 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 0.04 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.27 ft^3/s, $Q_{7,10}$ = 0.06 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401085 Fourteenmile Creek tributary near Hancock, Wis.

Location.--NE¼NE¼ sec. 30, T. 20 N., R. 7 E., Adams County, at dam, 9.5 mi west of Hancock.

Drainage area.--9.58 mi^2. Tributary to.--Fourteenmile Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 12, 1966, 1.66 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.0 ft^3/s, $Q_{7,10}$ = 1.7 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401087 Tributary to Fourteenmile Creek tributary near New Rome, Wis.

Location.--NE¼NE¼ sec. 19, T. 20 N., R. 7 E., Adams County, at culvert on town road, 8.7 mi east of New Rome.

Drainage area.--6.51 mi^2. Tributary to.--Fourteenmile Creek tributary.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 12, 1966, 2.34 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 multiple-regression equations 15 and 16.

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

05401095 Fourteenmile Creek near New Rome, Wis.

Location.--SE¼NE¼ sec. 14, T. 20 N., R. 6 E., Adams County, at bridge on town road, 6.8 mi east of New Rome.

Drainage area.--77.0 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 12, 1966, 9.43 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 15 ft^3/s, $Q_{7,10}$ = 9.2 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401100 Fourteenmile Creek near New Rome, Wis.

Location.--NW¼SE¼ sec. 17, T. 20 N., R. 6 E., Adams County, 50 ft above twin culverts on State Highway 13, 3.7 mi southeast of New Rome.

Drainage area.--91.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1965-79.

Average discharge.--14 years, 41.7 ft^3/s.

Extremes.--Maximum discharge, 546 ft^3/s, May 9, 1973; minimum discharge, 0.65 ft^3/s, Jan. 25-27, 1968 (probably caused by regulation of upstream dam).

Low-flow frequency.--$Q_{7,2}$ = 14 ft^3/s, $Q_{7,10}$ = 9.0 ft^3/s (for period 1964-67 which was prior to construction of dam 300 ft upstream).

Basis of estimate.--Graphical regression with Big Roche a Cri Creek near Adams using 13 daily discharge values recorded during the period 1964-67.

Accuracy.--$Q_{7,2}$ = 30 percent, Q7,10 = 30 percent.

Note.--Following low-flow and flow-duration values are for the period 1969-70. During this period flow was regulated by a recreation dam constructed in 1968, 300 ft upstream of the gage.

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
7	4.5	2.4	1.8	1.4
14	5.6	3.2	2.4	1.8
30	6.6	3.7	2.6	2.0
60	9.1	4.7	3.3	2.5
90	11	6.5	5.0	4.1

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	190	130	87	61	48	37	29
Percent	60	70	80	90	95	98	99.9
ft^3/s	22	18	13	7.5	4.9	2.6	1.5

Accuracy.--$SE_{7,2}$ = 21 percent, $SE_{7,10}$ = 25 percent.

Remarks.--Records good. Some regulation caused by manipulation of gates at recreational dam 300 ft upstream.

05401110 Fourteenmile Creek near New Rome, Wis.

Location.--SW¼NW¼ sec. 18, T. 20 N., R. 6 E., Adams County, at bridge on town road, 2.2 mi southeast of New Rome.

Drainage area.--98.8 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 12, 1966, 23.1 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 18 ft^3/s, $Q_{7,10}$ = 10 ft^3/s (represents flow condition before construction of dam 300 ft upstream).

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401149 Fourteenmile Creek at New Rome, Wis.

Location.--NW¼SE¼ sec. 10, T. 20 N., R. 5 E., Adams County, at bridge on County Trunk Z, 0.2 mi southwest of New Rome.

Drainage area.--102 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 22, 1976, 31.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 28 ft^3/s, $Q_{7,10}$ = 18 ft^3/s (represents flow conditions before construction of dam 300 ft upstream in 1968).

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401500 Wisconsin River near Necedah, Wis.

Location.--SE¼NE¼ sec. 9, T. 18 N., R. 4 E., Juneau County, at bridge on State Highway 21, 3.0 mi northeast of Necedah, 5.0 mi upstream from Big Roche a Cri Creek.

Drainage area.--5,990 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1902-14, 1944-50.

Average discharge.--Not available.

Extremes.--Maximum discharge, 93,300 ft^3/s, June 10, 1905; minimum discharge, 70 ft^3/s, Nov. 9, 1949.

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	2,200	1,580	1,310	1,110	914	798
14	2,300	1,670	1,390	1,190	981	859
30	2,380	1,770	1,490	1,280	1,060	936
60	2,510	1,900	1,600	1,380	1,160	1,020
90	2,590	1,970	1,690	1,480	1,270	1,140

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	24,000	17,100	12,800	8,500	5,790
Percent	40	50	60	70	80
ft^3/s	4,570	3,790	3,250	2,850	2,370
Percent	90	95	98	99.9	
ft^3/s	1,890	1,620	1,350	820	

Accuracy.--$SE_{7,2}$ = 9 percent, $SE_{7,10}$ = 14 percent.

Remarks.--Flow regulated by 21 reservoirs and several powerplants above station.

05401510 Big Roche a Cri Creek near Hancock, Wis.

Location.--SW¼SW¼ sec. 29, T. 20 N., R. 8 E., Waushara County, at bridge on town road, 4.0 mi northwest of Hancock.

Drainage area.--9.61 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--Oct. 1963 to Sept. 1967.

Minimum discharge measured.--4.1 ft^3/s, Jan. 31 to Feb. 2, 1965.

Low-flow frequency.--$Q_{7,2}$ = 6.0 ft^3/s, $Q_{7,10}$ = 5.2 ft^3/s.

Basis of estimate.--Graphical regression with Big Roche a Cri Creek near Adams using 24 values of observed daily discharge during the period 1963-67.

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

05401516 Big Roche a Cri Creek near Hancock, Wis.

Location.--SW¼SE¼ sec. 29, T. 20 N., R. 7 E., Adams County, at bridge on town road, 8.4 mi northwest of Hancock.

Drainage area.--23.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 13.7 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 13 ft^3/s, $Q_{7,10}$ = 9.3 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401520 Big Roche a Cri Creek tributary near Hancock, Wis.

Location.--NE¼NE¼ sec. 12, T. 19 N., R. 6 E., Adams County, at mouth, 9.8 mi west of Hancock.

Drainage area.--15.7 mi^2. Tributary to.--Big Roche a Cri Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 5.26 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 6.1 ft^3/s, $Q_{7,10}$ = 3.8 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401522 Big Roche a Cri Creek near Hancock, Wis.

Location.--NE¼NE¼ sec. 12, T. 19 N., R. 6 E., Adams County, at bridge on town road, 9.8 mi west of Hancock.

Drainage area.--44.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 21.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 20 ft^3/s, $Q_{7,10}$ = 15 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401530 Big Roche a Cri Creek near Friendship, Wis.

Location.--SW¼SW¼ sec. 14, T. 19 N., R. 6 E., Adams County, at bridge on County Trunk C, 10.4 mi north of Friendship.

Drainage area.--51.4 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--37.1 ft^3/s, Oct. 8, 1963.

Low-flow frequency.--$Q_{7,2}$ = 34 ft^3/s, $Q_{7,10}$ = 28 ft^3/s.

Basis of estimate.--Graphical regression with Little Plover River at Plover using 7 discharge measurements made during period 1962-63.

Accuracy.--$SE_{7,2}$ = 8 percent, $SE_{7,10}$ = 15 percent.

05401535 Big Roohe a Cri Creek near Adams, Wis.

Location.--SW¼SW¼ sec. 22, T. 19 N., R. 6 E., Adams County, at culverts on town road, 10.0 mi north of Adams.

Drainage area.--52.8 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1964-78.

Average discharge.--15 years, 603 ft^3/s.

Extremes.--Maximum discharge, 623 ft^3/s, Mar. 9, 1973; minimum discharge, 21 ft^3/s, Mar. 9, 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
7	36	32	31	29	28
14	36	33	31	30	29
30	37	34	32	31	30
60	40	36	34	32	30
90	42	37	35	33	31

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	140	120	93	73	64	58	53
Percent	60	70	80	90	95	98	99.9
ft^3/s	49	45	41	37	35	32	30

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

05401545 Big Roche a Cri Creek near Arkdale, Wis.

Location.--SW¼SW¼ sec. 6, T. 18 N., R. 6 E., Adams County, at bridge on town road, 3.1 mi east of Arkdale.

Drainage area.--107 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 56.8 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 48 ft^3/s, $Q_{7,10}$ = 38 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401550 Dead Horse Creek near Arkdale, Wis.

Location.--SE¼SE¼ sec. 1, T. 18 N., R. 5 E., Adams County, at bridge on town road, 2.9 mi east of Arkdale.

Drainage area.--30.7 mi^2. Tributary to.--Roche a Cri Creek.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 2.0 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.8 ft^3/s, $Q_{7,10}$ = 1.7 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401558 Big Roche a Cri Creek near Arkdale, Wis.

Location.--SW¼NW¼ sec. 20, T. 18 N., R. 5 E., Adams County, at bridge on County Trunk Z, 2.6 mi west of Arkdale.

Drainage area.--151 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 12, 1976, 109 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 68 ft^3/s, $Q_{7,10}$ = 54 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401560 Big Roche a Cri Creek near Friendship, Wis.

Location.--SE¼SE¼ sec. 24, T. 18 N., R. 4 E., Adams County, at bridge on town road, 8.1 mi northwest of Friendship.

Drainage area.--152 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Oct. 11, 1966, 80.1 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 66 ft^3/s, $Q_{7,10}$ = 53 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401580 Little Roche a Cri Creek at Friendship, Wis.

Location.--SW¼NW¼ sec. 5, T. 17 N., R. 6 E., Adams County, just downstream from dam, at Friendship.

Drainage area.--57.5 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--18.2 ft^3/s, Sept. 13, 1976.

Low-flow frequency.--$Q_{7,2}$ = 22 ft^3/s, $Q_{7,10}$ = 19 ft^3/s.

Basis of estimate.--Graphical regression with Big Roche a Cri Creek near Adams using 8 discharge measurements made during the period 1972-76.

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

05401608 Little Roche a Cri near Adams, Wis.

Location.--SE¼NE¼ sec. 4, T. 17 N., R. 5 E., Adams County, at bridge on County Trunk J, 4.2 mi west of Adams.

Drainage area.--133 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--Jan. 12, 1976, 64.2 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 46 ft^3/s, $Q_{7,10}$ = 33 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05401630 Yellow River near Spencer, Wis.

Location.--NE¼NE¼ sec. 35, T. 26 N., R. 1 E., Clark County, at bridge on town road, 4.5 mi southwest of Spencer.

Drainage area.--27.6 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 1.73 ft^3/s; Aug. 28, 1969, 0.06 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.02 ft^3/s, $Q_{7,10}$ = 0.01 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05401700 East Branch Yellow River near Marshfield, Wis.

Location.--SE¼SE¼ sec. 10, T. 25 N., R. 2 E., Wood County, at bridge on County Trunk H, 3.0 mi west of Marshfield.

Drainage area.--15.3 mi^2. Tributary to.--Yellow River.

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

Minimum discharge measured.--0.03 ft^3/s, Aug. 6, 1964.

Low-flow frequency.--$Q_{7,2}$ = 0.11 ft^3/s, $Q_{7,10}$ = 0.02 ft^3/s.

Basis of estimate.--Graphical regression with Black River at Neillsville using 10 discharge measurements made during the period 1962-67.

Accuracy.--$SE_{7,2}$ = 24 percent, $SE_{7,10}$ = 55 percent.

05401710 Yellow River near Marshfield, Wis.

Location.--NW¼NE¼ sec. 27, T. 25 N., R. 2 E., Wood County, at bridge on County Trunk B, 4.7 mi southwest of Marshfield.

Drainage area.--62.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 5.18 ft^3/s; Aug. 28, 1969, 0.30 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.12 ft^3/s, $Q_{7,10}$ = 0.05 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05401750 South Branch Yellow River near Marshfield, Wis.

Location.--SE¼NW¼ sec. 27, T. 25 N., R. 2 E., Wood County, at bridge on County Trunk B, 4.9 mi southwest of Marshfield.

Drainage area.--36.0 mi^2. Tributary to.--Yellow River.

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

Minimum discharge measured.--0.34 ft^3/s, Aug. 6, 1964.

Low-flow frequency.--$Q_{7,2}$ = 0.58 ft^3/s, $Q_{7,10}$ = 0.19 ft^3/s.

Basis of estimate.--Graphical regression with Black River at Neillsville using 12 discharge measurements made during the period 1962-69.

Accuracy.--$SE_{7,2}$ = 15 percent, $SE_{7,10}$ = 33 percent.

05401755 Yellow River near Bakersville, Wis.

Location.--SW¼SW¼ sec. 36, T. 25 N., R. 2 E., Wood County, at bridge on U.S. Highway 10, 2.0 mi south of Bakersville.

Drainage area.--102 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--No flow (water ponded) July 23, 1974, and July 7, 1976.

Low-flow frequency.--$Q_{7,2}$ = 0.37 ft^3/s, $Q_{7,10}$ = 0.09 ft^3/s.

Basis of estimate.--Graphical regression with Yellow River near Babcock using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 28 percent, $SE_{7,10}$ = 49 percent.

05401770 Yellow River near Arpin, Wis.

Location.--NW¼NW¼ sec. 28, T. 24 N., R. 3 E., Wood County, at bridge on County Trunk N, 6.1 mi west of Arpin.

Drainage area.--128 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 9.03 ft^3/s; Aug. 28, 1969, 1.95 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.69 ft^3/s, $Q_{7,10}$ = 0.25 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05401880 Rocky Creek near Pittsville, Wis.

Location.--NE¼NW¼ sec. 16, T. 23 N., R. 3 E., Wood County, at bridge on town road, 3.2 mi northwest of Pittsville.

Drainage area.--21.9 mi^2. Tributary to.--Yellow River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 1.86 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.--Observation of no flow during a period when other stations in the area had flow greater than the $Q_{7,2}$ discharge.

Accuracy.--Not applicable.

05401890 Yellow River near Pittsville, Wis.

Location.--SW¼SE¼ sec. 21, T. 23 N., R. 3 E., Wood County, at bridge on State Highways 13 and 73, 1.5 mi northwest of Pittsville.

Drainage area.--180 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.69 ft^3/s, July 7, 1976.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.24 ft^3/s.

Basis of estimate.--Graphical regression with Yellow River at Babcock using 6 discharge measurements made during the period 1972-76.

Accuracy.--$SE_{7,2}$ = 37 percent, $SE_{7,10}$ = 65 percent.

05401900 Yellow River at Pittsville, Wis.

Location.--NE¼NW¼ sec. 34, T. 23 N., R. 3 E., Wood County, at bridge on County Trunk E, at Pittsville.

Drainage area.--185 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 15.8 ft^3/s; Aug. 28, 1969, 1.49 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.40 ft^3/s, $Q_{7,10}$ = 0.15 ft^3/s.

Basis of estimate.--Used multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05402000 Yellow River at Babcock, Wis.

Location.--SW¼NW¼ sec. 14, T. 21 N., R. 3 E., Wood County, on right bank at downstream side of bridge on State Highway 80, at Babcock.

Drainage area.--215 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1944-79.

Average discharge.--34 years, 144 ft^3/s.

Extremes.--Maximum discharge, 11,600 ft^3/s, Apr. 2, 1952; minimum discharge, 1.0 ft^3/s, Oct. 1, 1948.

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	6.8	4.4	3.4	2.8	2.1	1.8
14	7.4	4.8	3.7	3.0	2.3	2.0
30	8.6	5.4	4.2	3.4	2.7	2.4
60	11	6.8	5.2	4.2	3.4	2.9
90	14	8.0	6.2	5.1	4.0	3.5

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	1,460	655	290	110	61	38	26
Percent	60	70	80	90	95	98	99.9
ft^3/s	19	14	11	7.7	6.0	4.9	1.8

Accuracy.--$SE_{7,2}$ = 8 percent, $SE_{7,10}$ = 14 percent.

Remarks.--There is a large recreation dam about 5.0 mi upstream.

05402050 Hemlock Creek at Arpin, Wis.

Location.--SE¼SE¼ sec. 21, T. 24 N., R. 4 E., Wood County, at bridge on State Highway 186, 0.5 mi east of Arpin.

Drainage area.--5.38 mi^2. Tributary to.--Yellow River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0 ft^3/s (dry), July 7, 1976.

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

Basis of estimate.--No flow observed on 6 occasions.

Accuracy.--Not applicable.

05402170 Hemlock Creek at Vesper, Wis.

Location.--SW¼SE¼ sec. 12, T. 23 N., R. 4 E., Wood County, just downstream from dam, at Verper.

Drainage area.--41.2 mi^2. Tributary to.--Yellow River.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.006 ft^3/s, July 7, 1976.

Low-flow frequency.--$Q_{7,2}$ = <0.01 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Yellow River at Babcock using 7 discharge measurements made during the period 1972-76.

Accuracy.--Not applicable.

05402200 Hemlock Creek near Pittsville, Wis.

Location.--SE¼SE¼ sec. 22, T. 23 N., R. 4 E., Wood County, at bridge on State Highways 13 and 73, 6.1 mi east of Pittsville.

Drainage area.--49.0 mi^2. Tributary to.--Yellow River.

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

Minimum discharge measured.--0.01 ft^3/s, Aug. 22, 1967.

Low-flow frequency.--$Q_{7,2}$ = <0.01 ft^3/s, $Q_{7,10}$ = <0.01 ft^3/s.

Basis of estimate.--Graphical regression with Yellow River near Babcock using 13 discharge measurements made during the period 1962-67.

Accuracy.--Not applicable.

05402300 Hemlock Creek near Dexterville, Wis.

Location.--NE¼SE¼ sec. 5, T. 22 N., R. 4 E., Wood County, at bridge on town road, 4.1 mi northeast of Dexterville

Drainage area.--77.2 mi^2. Tributary to.--Yellow River.

Type of site.--Miscellaneous site.

Discharge measurements.--Oct. 24, 1968, 4.72 ft^3/s; Aug. 28, 1969, 0.16 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 multiple-regression equations 13 and 14.

Accuracy.--$SE_{7,2}$ = 40 percent, $SE_{7,10}$ = 61 percent.

05402500 Yellow River at Sprague, Wis.

Location.--SW¼SW¼ sec. 2, T. 19 N., R. 3 E., Juneau County, at town road, 1.1 mi southeast of Sprague.

Drainage area.--392 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1926-40.

Average discharge.--14 years, 227 ft^3/s.

Extremes.--Maximum discharge, 5,920 ft^3/s, Sept. 11, 1938; minimum discharge, 5.4 ft^3/s, Sept. 9, 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	14	7.9	6.2	5.2	4.3	3.8
14	14	8.1	6.3	5.2	4.3	3.8
30	16	9.0	7.0	5.9	4.8	4.3
60	19	11	8.0	6.5	5.2	4.5
90	25	13	9.4	7.3	5.5	4.7

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	1,105	650	290	170	110	74
Percent	60	70	80	90	95	98	99.9
ft^3/s	50	31	21	14	10	8.0	5.6

Accuracy.--$SE_{7,2}$ = 19 percent, $SE_{7,10}$ = 22 percent.

05403000 Yellow River at Necedah, Wis.

Location.--SW¼SW¼ sec. 18, T. 18 N., R. 4 E., Juneau County, at powerplant of Wisconsin Power and Light Company at Necedah, 5.0 mi downstream from Cranberry Creek.

Drainage area.--526 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1940-57.

Average discharge.--17 years, 350 ft^3/s.

Extremes.--Maximum discharge, 12,800 ft^3/s, Apr. 3, 1952; minimum discharge, 1 ft^3/s, Aug. 22 and Aug. 26-Sept. 1, 1942, Aug. 12, 1943

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	34	15	8.7	5.2	2.7	1.7
14	41	19	12	7.1	3.8	2.4
30	43	24	18	13	9.9	8.0
60	54	32	25	20	16	14
90	67	40	31	25	20	17

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	2,440	1,420	790	400	270	200	140
Percent	60	70	80	90	95	98	99.9
ft^3/s	100	81	61	34	15	8.8	2.4

Accuracy.--$SE_{7,2}$ = 21 percent, $SE_{7,10}$ = 49 percent.

Remarks.--Water diverted periodically from Wisconsin River into Cranberry Creek basin for cranberry culture.

05403230 Campbell Creek near Easton, Wis.

Location.--SW¼NE¼ sec. 27, T. 16 N., R. 6 E., Adams County, at culvert on County Trunk A, 2.0 mi east of Easton.

Drainage area.--12.5 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--July 19, 1971, 2.60 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.8 ft^3/s, $Q_{7,10}$ = 1.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05403250 White Creek near Friendship, Wis.

Location.--SW¼NW¼ sec. 35, T. 16 N., R. 5 E., Adams County, at twin culverts on County Trunk H, 10.9 mi south of Friendship.

Drainage area.--66.3 mi^2. Tributary to.--Wisconsin River.

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

Minimum discharge measured.--27.9 ft^3/s, Sept. 1967.

Low-flow frequency.--$Q_{7,2}$ = 26 ft^3/s, $Q_{7,10}$ = 22 ft^3/s.

Basis of estimate.--Graphical regression with Big Roche a Cri Creek near Adams using 11 discharge measurements made during the period 1962-67.

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 6 percent.

05403300 South Fork Lemonweir River at Tomah, Wis.

Location.--NE¼NE¼ sec. 33, T. 18 N., R. 1 W., Monroe County, at bridge on town road, at Tomah.

Drainage area.--35.4 mi^2. Tributary to.--Lemonweir River.

Type of site.--Miscellaneous site.

Discharge measurements.--June 14, 1973, 13.1 ft^3/s; July 26, 1973, 6.47 ft^3/s; Oct. 24, 1973, 12.5 ft^3/s; June 22, 1976, 3.71 ft^3/s; Aug. 11, 1976, 3.58 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.9 ft^3/s, $Q_{7,10}$ = 2.6 ft^3/s.

Basis of estimate.--Graphical regression with Lemonweir River at New Lisbon using 5 discharge measurements made during the period 1973-76.

Accuracy.--$SE_{7,10}$ = 26 percent (basin average).

05403308 Mud Creek at Tomah, Wis.

Location.--NE¼NW¼ sec. 28, T. 18 N., R. 1 W., Monroe County, at bridge on U.S. Highway 12, 0.3 mi south of intersection of U.S. Highway 12 and State Highway 21, just north of Tomah.

Drainage area.--7.04 mi^2. Tributary to.--South Fork Lemonweir River.

Type of site.--Miscellaneous site.

Discharge measurements.--June 22, 1976, 2.70 ft^3/s; Aug. 11, 1976, 2.44 ft^3/s; Aug. 30, 1976, 1.86 ft^3/s; July 28, 1977, 1.48 ft^3/s; Sept. 7, 1977, 1.81 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.2 ft^3/s, $Q_{7,10}$ = 0.81 ft^3/s.

Basis of estimate.--Graphical regression with Baraboo River at Baraboo using 5 discharge measurements made during the period 1976-77.

Accuracy.--$SE_{7,10}$ = 26 percent (basin average).

05403396 Allen Creek near Oakdale, Wis.

Location.--NW¼SW¼ sec. 2, T. 17 N., R. 1 E., Monroe County, at bridge on town road, 1.9 mi northeast of Oakdale.

Drainage area.--7.44 mi^2. Tributary to.--Bear Creek.

Type of site.--Miscellaneous site.

Minimum discharge measured.--0.94 ft^3/s, Oct. 14, 1976.

Low-flow frequency.--$Q_{7,2}$ = 2.5 ft^3/s, $Q_{7,10}$ = 2.0 ft^3/s.

Basis of estimate.--Graphical regression with Lemonweir River at New Lisbon using 14 discharge measurements made during the period 1973-77.

Accuracy.--$SE_{7,2}$ = 13 percent, $SE_{7,10}$ = 17 percent.

05403400 Bear Creek near Camp Douglas, Wis.

Location.--SE¼NE¼ sec. 1, T. 17 N., R. 1 E., Monroe County, at bridge on town road, 4.5 mi northwest of Camp Douglas.

Drainage area.--33.2 mi^2. Tributary to.--Lemonweir River.

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

Minimum discharge measured.--3.78 ft^3/s, Aug. 17, 1964.

Low-flow frequency.--$Q_{7,2}$ = 6.2 ft^3/s, $Q_{7,10}$ = 4.0 ft^3/s.

Basis of estimate.--Graphical regression with Lemonweir River at New Lisbon using 10 discharge measurements made during the period 1964-77.

Accuracy.--$SE_{7,2}$ = 12 percent, $SE_{7,10}$ = 19 percent.

05403480 Lemonweir River tributary at Camp Williams, Wis.

Location.--NW¼NE¼ sec. 14, T. 17 N., R. 2 E., Juneau County, at bridge on town road, 2.5 mi northeast of Camp Williams.

Drainage area.--14.1 mi^2. Tributary to.--Lemonweir River.

Type of site.--Miscellaneous site.

Discharge measurements.--June 14, 1973, 13.7 ft^3/s; July 25, 1973, 6.75 ft^3/s; Oct. 24, 1973, 6.90 ft^3/s; June 22, 1976, 5.0 ft^3/s; Aug. 11, 1976, 2.98 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 3.5 ft^3/s, $Q_{7,10}$ = 2.7 ft^3/s.

Basis of estimate.--Graphical regression with Lemonweir River at New Lisbon using 5 discharge measurements made during the period 1973-76.

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

05403500 Lemonweir River at New Lisbon, Wis.

Location.--SW¼SE¼ sec. 8, T. 16 N., R. 3 E., Juneau County, near center of span on downstream side of bridge on State Highway 80 in New Lisbon, 200 ft downstream from recreation dam, 1.0 mi upstream from Webster Creek.

Drainage area.--507 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1944-79.

Average discharge.--34 years, 362 ft^3/s.

Extremes.--Maximum discharge, 6,880 ft^3/s, May 8, 1960; minimum discharge, 29 ft^3/s, June 9, 1976.

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	79	62	55	49	44	40
14	82	64	57	51	45	42
30	92	69	60	53	46	42
60	108	78	65	56	48	43
90	126	88	72	61	50	44

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	1,970	1,250	830	490	330	250	200
Percent	60	70	80	90	95	98	99.9
ft^3/s	160	130	100	81	70	61	44

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 7 percent.

Remarks.--Occasional regulation by dam 200 ft upstream. Water diverted periodically into the basin from the Yellow and Black River basins for cranberry culture.

05403520 Webster Creek at New Lisbon, Wis.

Location.--SE¼NE¼ sec. 19, T. 16 N., R. 3 E., Juneau County, at bridge on State Highway 80, 1.2 mi south of New Lisbon.

Drainage area.--11.8 mi^2. Tributary to.--Lemonweir River.

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

Minimum discharge measured.--1.50 ft^3/s, Aug. 13, 1964.

Low-flow frequency.--$Q_{7,2}$ = 2.0 ft^3/s, $Q_{7,10}$ = 1.5 ft^3/s.

Basis of estimate.--Graphical regression with Kickapoo River at La Farge using 20 discharge measurements made during the period 1961-70.

Accuracy.--$SE_{7,2}$ = 9 percent, $SE_{7,10}$ = 16 percent.

05403550 Onemile Creek near Mauston, Wis.

Location.--NW¼SE¼ sec. 24, T. 15 N., R. 3 E., Juneau County, at bridge on State Highway 58, 2.4 mi south of Mauston.

Drainage area.--30.2 mi^2. Tributary to.--Lemonweir River.

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

Minimum discharge measured.--6.27 ft^3/s, Sept. 8, 1967.

Low-flow frequency.--$Q_{7,2}$ = 6.9 ft^3/s, $Q_{7,10}$ = 5.8 ft^3/s.

Basis of estimate.--Graphical regression with Baraboo River near Baraboo using 14 discharge measurements made during the period 1961-70.

Accuracy.--$SE_{7,2}$ = 3 percent, $SE_{7,10}$ = 5 percent.

05403576 Lyndon Creek at Lyndon Station, Wis.

Location.--SW¼NW¼ sec. 10, T. 14 N., R. 5 E., Juneau County, on southeast edge of Lyndon Station.

Drainage area.--6.11 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--June 22, 1976, 1.30 ft^3/s; Aug. 9, 1976, 1.27 ft^3/s; Aug. 30, 1976, 1.17 ft^3/s; July 28, 1977, 1.24 ft^3/s; Sept. 7, 1977, 1.10 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 1.0 ft^3/s, $Q_{7,10}$ = 0.76 ft^3/s.

Basis of estimate.--Graphical regression with Dell Creek near Lake Delton using 5 discharge measurements made during the period 1976-77.

Accuracy.--$SE_{7,10}$ = 26 percent (basin average).

05403585 Plainville Creek near Wisconsin Dells, Wis.

Location.--SW¼NW¼ sec. 10, T. 14 N., R. 6 E., Adams County, 2.3 mi above mouth, 5.6 mi north of Wisconsin Dells.

Drainage area.--5.95 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 28, 1971, 0.18 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for station 05403586. Additional discharge measurements are required.

05403586 Plainville Creek near Wisconsin Dells, Wis.

Location.--SW¼NE¼ sec. 9, T. 14 N., R. 6 E., Adams County, 1.8 mi upstream from mouth, 5.6 mi north of Wisconsin Dells.

Drainage area.--6.90 mi^2. Tributary to.--Wisconsin River.

Discharge measurements.--July 28, 1971, 0.55 ft^3/s; Oct. 4, 1973, 1.29 ft^3/s; Oct. 25, 1973, 0.78 ft^3/s; Nov. 7, 1973, 0.99 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 0.20 ft^3/s, $Q_{7,10}$ = 0.10 ft^3/s.

Basis of estimate.--Graphical regression with Big Roche a Cri near Adams using 3 discharge measurements made during the period 1971-73.

05403587 Plainville Creek near Wisconsin Dells, Wis.

Location.--NW¼NW¼ sec. 9, T. 14 N., R. 6 E., Adams County, 1.5 mi above mouth, 5.8 mi north of Wisconsin Dells.

Drainage area.--6.98 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 28, 1971, 0.85 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for station 05403586. Additional discharge measurements are required.

05403588 Plainville Creek near Wisconsin Dells, Wis.

Location.--NE¼NE¼ sec. 8, T. 14 N., R. 6 E., Adams County, at County Trunk K bridge, 1.2 mi above mouth, 6.0 mi northeast of Wisconsin Dells.

Drainage area.--7.31 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--June 11, 1971, 1.27 ft^3/s; July 28, 1971, 1.05 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for station 05403586. Additional discharge measurements are required.

05403589 Plainville Creek near Wisconsin Dells, Wis.

Location.--NW¼NE¼ sec. 8, T. 14 N., R. 6 E., Adams County, 0.8 mi above mouth, 6.0 mi northeast of Wisconsin Dells.

Drainage area.--7.39 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 28, 1971, 1.66 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for station 05403586. Additional discharge measurements are required.

05403590 Plainville Creek near Wisconsin Rapids, Wis.

Location.--NE¼NW¼ sec. 8, T. 14 N., R. 6 E., Adams County, 0.6 mi upstream from mouth, 6.1 mi northeast of Wisconsin Rapids.

Drainage area.--7.48 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 28, 1971, 1.85 ft^3/s.

Low-flow frequency.--Regression equations provided low-flow characteristics that appear high compared to values determined for station 05403586. Additional discharge measurements are required.

05403591 Plainville Creek near Wisconsin Dells, Wis.

Location.--NW¼NW¼ sec. 8, T. 14 N., R. 6 E., Adams County, at bridge on State Highway 13, 0.2 mi upstream from mouth, 6.2 mi northeast of Wisconsin Dells.

Drainage area.--7.59 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--May 20, 1959, 5.95 ft^3/s; July 28, 1971, 2.53 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.2 ft^3/s, $Q_{7,10}$ = 1.2 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05403592 Plainville Creek near Wisconsin Dells, Wis.

Location.--SW¼NW¼ sec. 8, T. 14 N., R. 6 E., Adams County, 6.1 mi northeast of Wisconsin Dells.

Drainage area.--7.66 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurement.--July 28, 1971, 2.55 ft^3/s.

Low-flow frequency.--$Q_{7,2}$ = 2.6 ft^3/s, $Q_{7,10}$ = 1.4 ft^3/s.

Basis of estimate.--Used multiple-regression equations 15 and 16.

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

05403601 Witches Gulch near Wisconsin Dells, Wis.

Location.--SE¼NW¼ sec. 21, T. 14 N., R. 6 E., Adams County, at bridge on town road, 3.6 mi northwest of Wisconsin Dells.

Drainage area.--6.76 mi^2. Tributary to.--Wisconsin River.

Type of site.--Miscellaneous site.

Discharge measurements.--Apr. 21, 1972, 1.13 ft^3/s; July 12, 1972, 1.01 ft^3/s; Aug. 28, 1972, 1.48 ft^3/s.

Low-flow frequency.--Additional discharge measurements required.

05403630 Hulburt Creek near Wisconsin Dells, Wis.

Location.--SE¼SW¼ sec. 5, T. 13 N., R. 6 E., Sauk County, at County Trunk H, 2.0 mi west of Wisconsin Dells.

Drainage area.--11.2 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--Oct. 1970 to Sept. 1977.

Low-flow frequency.--$Q_{7,2}$ = 2.4 ft^3/s, $Q_{7,10}$ = 1.8 ft^3/s.

Basis of estimate.--Graphical regression with Dell Creek near Lake Delton using 15 values of daily discharge recorded during the period 1970-77.

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

05403700 Dell Creek near Lake Delton, Wis.

Location.--NE¼NW¼ sec. 2, T. 12 N., R. 5 E., Sauk County, on right bank 50 ft upstream from highway bridge, 6.0 mi southwest of Lake Delton, 7.0 mi upstream from mouth, near Lake Delton.

Drainage area.--44.9 mi^2. Tributary to.--Wisconsin River.

Type of site.--Gaging station.

Period of record.--1958-65, 1970-79.

Average discharge.--17 years, 29.7 ft^3/s.

Extremes.--Maximum discharge, 1,130 ft^3/s, Jan. 29, 1968; minimum discharge, 11 ft^3/s, Aug. 1 and 2, 1959.

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	17	14	13	11	10	9.4
14	17	14	13	11	10	9.4
30	18	15	14	13	11	11
60	19	16	14	13	12	11
90	20	17	15	13	12	11

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	110	62	43	33	29	26	24
Percent	60	70	80	90	95	98	99.9
ft^3/s	22	21	19	16	14	13	11

Accuracy.--$SE_{7,2}$ = 5 percent, $SE_{7,10}$ = 9 percent.

05404000 Wisconsin River near Wisconsin Dells, Wis.

Location.--SW¼NW¼ sec. 14, T. 13 N., R. 6 E., Sauk County, on right bank, 0.5 mi downstream from Dell Creek, 3.0 mi downstream from Wisconsin Dells.

Drainage area.--8,090 mi^2. Tributary to.--Mississippi River.

Type of site.--Gaging station.

Period of record.--1934-79.

Average discharge.--44 years, 6,703 ft^3/s.

Extremes.--Maximum discharge, 72,200 ft^3/s, Sept. 14, 1938; minimum discharge, 1,060 ft^3/s, Aug. 19, 1936.

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	2,750	2,150	1,870	1,650	1,430	1,290
14	2,900	2,260	1,970	1,740	1,510	1,370
30	3,050	2,390	2,100	1,880	1,660	1,530
60	3,320	2,600	2,280	2,050	1,810	1,660
90	3,600	2,770	2,400	2,130	1,850	1,680

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	25,500	17,400	12,200	8,430	6,700
Percent	40	50	60	70	80
ft^3/s	5,780	5,080	4,470	3,920	3,390
Percent	90	95	98	99.9	
ft^3/s	2,830	2,490	2,150	1,400	

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

Remarks.--Flow is regulated by 24 reservoirs above station. See Gebert and Holmstrom (1977) for additional analyses.

Table 2.--Basin characteristics for low-flow partial-record stations in the central Wisconsin 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
05395030	Pine River near Merrill	55.2	14.9	18.1	11.6	81.0
05395130	Trappe River near Wausau	73.6	12.9	21.3	7.86	31.5
05395550	Wood Creek near Rib Lake	31.4	12.0	9.52	11.5	73.2
05396500	Little Rib River near Wausau	79.1	8.20	20.4	1.21	28.2
05397200	Spring Brook near Antigo	63.9	8.53	23.9	2.47	21.1
05398100	Black Creek near Mosinee	13.4	14.9	7.07	17.1	67.3
05398500	Bull Junior Creek near Rothschild	27.4	13.3	11.0	14.9	74.9
05399210	Randall Creek near Colby	30.9	14.9	12.3	4.11	16.9
05400300	Hay Meadow Creek near Stevens Point	30.4	4.81	16.9	29.2	39.5
05400500	Plover River near Stevens Point	145	5.64	45.3	19.9	41.7
05400600	Little Plover River near Arnott	2.24[1]	16.1	2.90	7.70	51.9
05400650	Little Plover River at Plover	19.0[1]	10.7	4.20	6.15	43.5
05400700	Mill Creek near Junction City	68.7	5.15	25.1	1.46	12.4
05400840	Fourmile Creek near Kellner	75.0[1]	3.92	17.7	2.43	11.9
05400853	Buena Vista Creek near Kellner	53.1[1]	4.07	19.7	2.53	15.2
05400950	Moccasin Creek at Nekoosa	22.3	13.7	17.5	2.97	15.2
05401020	Tenmile Creek Ditch 5 near Bancroft	9.73[1]	9.58	6.40	2.65	16.9
05401050	Tenmile Creek near Nekoosa	73.3[1]	5.55	22.3	9.92	21.5
05401100	Fourteenmile Creek near New Rome	91.1[1]	6.44	18.8	3.81	26.5
05401510	Big Roche a Cri Creek near Hancock	9.61[1]	5.77	4.85	2.87	13.3
05401535	Big Roche a Cri Creek near Adams	52.8[1]	4.68	25.9	2.82	31.7
05401580	Little Roche a Cri Creek at Friendship	57.5	8.80	17.1	16.1	40.3
05401700	East Branch Yellow River near Marshfield	15.3	12.2	9.82	1,07	8.6
05401750	South Branch Yellow River near Marshfield	36.0	5.19	16.7	1.22	14.8
05402200	Hemlock Creek near Pittsville	49.0	9.99	14.3	3.43	21.9
05403250	White Creek near Friendship	66.3	13.0	12.6	6.07	47.3
05403400	Bear Creek near Camp Douglas	33.2	20.9	11.7	1.03	21.5
05403520	Webster Creek at New Lisbon	11.8	19.3	7.00	1.00	42.7
05403550	Onemile Creek near Mauston	30.2	15.9	7.90	1.50	29.3
05403630	Hulburt Creek near Wisconsin Dells	11.2	27.6	6.33	1.36	35.3

[1] Drainage area adjusted for ground-water divide.

Table 2.--Basin characteristics for low-flow partial-record stations in the central Wisconsin 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
10.9	0.67	31.5	0.049	671	48.2	32,300
11.5	.40	31.5	.029	10.0	25.0	250
13.3	1.65	34.2	.152	919	114	105,000
12.5	.77	31.0	.110	347	17.2	5,970
10.6	1.63	31.9	.119	1,010	177	179,000
13.0	1.86	32.0	.053	320	29.6	9,470
13.1	1.58	30.0	.057	351	26.6	9,340
13.1	.125	31.0	.008	10.0	35.8	358
11.5	.76	28.0	.040	1,030	25.0	25,700
11.4	1.89	29.0	.490	1,230	61.7	75,800
10.9	4.13	27.5	.453	1,140	125	208,000
11.2	4.31	28.0	.586	1,490	130	93,500
11.5	.11	28.5	.021	10.0	20.5	205
10.5	5.32	24.5	.239	2,340	148	347,000
10.5	6.08	24.5	.623	2,400	104	249,000
10.8	2.00	27.0	.145	740	25.0	18,500
10.1	4.00	22.5	.936	2,350	120	282,000
10.1	6.81	22.5	.485	2,490	130	324,000
9.9	7.38	21.0	.101	2,450	106	259,000
9.8	7.5	19.0	.430	2,100	125	262,000
9.8	6.97	18.5	.664	2,400	134	280,000
9.7	7.06	25.0	.410	2,390	89.2	213,000
11.3	.125	29.0	.008	10.0	39.8	398
11.9	.125	26.0	.021	10.0	32.9	329
11.2	.34	28.5	.001	10.0	15.6	156
19.8	6.08	22.5	.377	2,290	47.8	109,000
11.0	1.41	23.5	.172	1,890	25.0	47,200
10.8	1.65	23.0	.159	1,640	30.8	50,600
10.5	1.65	23.0	.263	1,530	28.5	43,700
11.1	1.65	21.5	.159	1,990	29.7	59,200

Table 3.--Comparison of methods available to estimate low-flow characteristics in the northeast area

Type of site	Type of data	Number of sites with data	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	3	31-51 years	Frequency analysis	11 percent
Gaging station	10 years recorded streamflow	None[1]	10 years	Frequency analysis	19 percent
Low-flow partial-record stations	8-20 base-flow discharge measurements	3	3- 7 years	Graphical regression	20 percent
Miscellaneous measurement sites	3 base-flow discharge measurements	10	1- 2 years	Graphical regression	35 percent
Miscellaneous measurement sites	1 base-flow discharge measurement and drainage-basin characteristics	28	1 day	Multiple-regression equation	48 percent
Miscellaneous measurement sites	Drainage-basin characteristics	Not determined	1 hour	Multiple-regression equation	Not determined[2]
Ungaged sites with drainage areas less than 150 mi^2	Drainage-basin characteristics	Unlimited	1 hour	Multiple-regression equation	113 percent

[1]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]Not determined for this report, but for two other reports estimates by this method were found to be within the standard error for the multiple-regression equations.

Table 4.--Comparison of methods available to estimate low-flow characteristics in the westside area

Type of site	Type of data	Number of sites with data	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	5	31-50 years	Frequency analysis	15 percent
Gaging station	10 years recorded streamflow	None[1]	10 years	Frequency analysis	29 percent
Low-flow partial-record stations	8-20 base-flow discharge measurements	7	3- 7 years	Graphical regression	36 percent
Miscellaneous measurement sites	3 base-flow discharge measurements	20	1- 2 years	Graphical regression	45 percent
Miscellaneous measurement sites	1 base-flow discharge measurement and drainage-basin characteristics	24	1 day	Multiple-regression equation	61 percent
Miscellaneous measurement sites	Drainage-basin characteristics	Not determined	1 hour	Multiple-regression equation	Not determined[2]
Ungaged sites with drainage areas less than 150 mi^2	Drainage-basin characteristics	Unlimited	1 hour	Multiple-regression equation	142 percent

[1]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]Not determined for this report, but for two other reports estimates by this method were found to be within the standard error for the multiple-regression equations.

Table 5.--Comparison of methods available to estimate low-flow characteristics in the central sand-plain area

Type of site	Type of data	Number of sites with data	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	6	12-19 years	Frequency analysis	12 percent
Gaging station	10 years recorded streamflow	None[1]	10 years	Frequency analysis	15 percent
Low-flow partial-record stations	8-20 base-flow discharge measurements	4	3- 7 years	Graphical regression	13 percent
Miscellaneous measurement sites	3 base-flow discharge measurements	11	1- 2 years	Graphical regression	19 percent
Miscellaneous measurement sites	1 base-flow discharge measurement and drainage-basin characteristics	34	1 day	Multiple-regression equation	24 percent
Miscellaneous measurement sites	Drainage-basin characteristics	Not determined	1 hour	Multiple-regression equation	Not determined[2]
Ungaged sites with drainage areas less than 150 mi^2	Drainage-basin characteristics	Unlimited	1 hour	Multiple-regression equation	40 percent

[1]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]Not determined for this report, but for two other reports estimates by this method were found to be within the standard error for the multiple-regression equations.

Table 6.--Comparison of methods available to estimate low-flow characteristics in the southwest area

Type of site	Type of data	Number of sites with data	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	2	15-35 years	Frequency analysis	8 percent
Gaging station	10 years recorded streamflow	None[1]	10 years	Frequency analysis	10 percent
Low-flow partial-record stations	8-20 base-flow discharge measurements	4	3- 7 years	Graphical regression	14 percent
Miscellaneous measurement sites	3 base-flow discharge measurements	4	1- 2 years	Graphical regression	26 percent
Miscellaneous measurement sites	1 base-flow discharge measurement and drainage-basin characteristics	0	1 day	Multiple-regression equation	32 percent
Miscellaneous measurement sites	Drainage-basin characteristics	Not determined	1 hour	Multiple-regression equation	Not determined[2]
Ungaged sites with drainage areas less than 150 mi^2	Drainage-basin characteristics	Unlimited	1 hour	Multiple-regression equation	52 percent

[1]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]Not determined for this report, but for two other reports estimates by this method were found to be within the standard error for the multiple-regression equations.