

Prepared in cooperation with the  
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL MANAGEMENT,  
OFFICE OF WATER RESOURCES, and the  
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION,  
OFFICE OF WATERSHED MANAGEMENT

# **Streamflow Measurements, Basin Characteristics, and Streamflow Statistics for Low-Flow Partial-Record Stations Operated in Massachusetts from 1989 Through 1996**

Water-Resources Investigations Report 99-4006

**U.S. Department of the Interior  
U.S. Geological Survey**

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By KERNELL G. RIES, III

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Northborough, Massachusetts  
1999

U.S. DEPARTMENT OF THE INTERIOR  
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY  
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## CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATIONS

### CONVERSION FACTORS

Multiply	By	To Obtain
cubic feet per second (ft <sup>3</sup> /s)	0.02832	cubic meter per second
foot (ft)	0.3048	meter
inch (in.)	25.4	millimeter
mile (mi)	1.609	kilometer
square mile (mi <sup>2</sup> )	2.590	square kilometer
Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows: $^{\circ}\text{C} = 5/9 \times (^{\circ}\text{F} - 32).$		

### VERTICAL DATUM

**Sea Level:** In this report “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

### ABBREVIATIONS

#### Organizations

USGS	U.S. Geological Survey
MOWR	Massachusetts Department of Environmental Management, Office of Water Resources

#### Miscellaneous

LFPR	Low-flow partial-record station
GIS	Geographic information system computer software
DEM	Digital elevation model
MOVE.1	Maintenance Of Variance Extension, type 1, method of correlation

# Streamflow Measurements, Basin Characteristics, and Streamflow Statistics for Low-Flow Partial-Record Stations Operated in Massachusetts from 1989 Through 1996

By Kernell G. Ries, III

## Abstract

A network of 148 low-flow partial-record stations was operated on streams in Massachusetts during the summers of 1989 through 1996. Streamflow measurements (including historical measurements), measured basin characteristics, and estimated streamflow statistics are provided in the report for each low-flow partial-record station. Also included for each station are location information, streamflow-gaging stations for which flows were correlated to those at the low-flow partial-record station, years of operation, and remarks indicating human influences of streamflows at the station. Three or four streamflow measurements were made each year for three years during times of low flow to obtain nine or ten measurements for each station. Measured flows at the low-flow partial-record stations were correlated with same-day mean flows at a nearby gaging station to estimate streamflow statistics for the low-flow partial-record stations. The estimated streamflow statistics include the 99-, 98-, 97-, 95-, 93-, 90-, 85-, 80-, 75-, 70-, 65-, 60-, 55-, and 50-percent duration flows; the 7-day, 10- and 2-year low flows; and the August median flow. Characteristics of the drainage basins for the stations that theoretically relate to the response of the station to climatic variations were measured from digital map data by use of an automated geographic information system procedure. Basin characteristics measured include drainage area; total stream

length; mean basin slope; area of surficial stratified drift; area of wetlands; area of water bodies; and mean, maximum, and minimum basin elevation. Station descriptions and calculated streamflow statistics are also included in the report for the 50 continuous gaging stations used in correlations with the low-flow partial-record stations.

## INTRODUCTION

Streamflow statistics are useful for design and operation of reservoirs for water supply and hydroelectric generation, sewage-treatment facilities, commercial and industrial facilities, agriculture, maintenance of streamflows for fisheries and wildlife, and recreational users. These statistics provide indications of reliability of water resources, especially during times when water conservation practices are most likely to be needed to protect instream flow and other uses. In 1988, the U.S. Geological Survey (USGS) began the first of three studies to determine streamflow statistics for Massachusetts streams. These studies, done in cooperation with the Massachusetts Department of Environmental Management, Office of Water Resources (MOWR), were referred to as the Basin Yield studies. Three reports have been published previously as a result of the Basin Yield studies (Ries, 1994a, 1994b, 1997). Each report describes regression equations that were developed for use in estimating streamflow statistics for sites on streams where no data are available, and provides basin characteristics and estimated streamflow statistics for selected stations. The MOWR uses the information provided in the

reports to develop water management plans for the 27 water-resources planning basins in the State. The completed plans are used by communities, regional planners, and other State agencies to manage the water resources in the basins, and to make decisions regarding permitting of new water withdrawals and interbasin transfers.

A network of low-flow partial-record (LFPR) stations was established at the beginning of the first Basin Yield study and continued through the second and third Basin Yield studies. Streamflow measurements were collected systematically over a period of years at the LFPR stations, and were used to estimate streamflow statistics for the stations. Selected basin characteristics were measured for the stations from digital maps by use of a Geographic Information System (GIS). The streamflow statistics and basin characteristics determined for the LFPR stations were used to develop regression equations for predicting streamflow statistics at ungaged sites where no data are available, and to provide a better understanding of the physical mechanisms that cause streamflow to vary in time and space.

Regression equations were developed for each Basin Yield study. Initially, data for only a small number of historical LFPR stations were available for use along with data for continuous streamflow-gaging stations in the regression analyses. As more data for the network LFPR stations were used in the regression analyses, the validity and applicability of the equations for estimating streamflow statistics for ungaged streams increased.

The first Basin Yield study (Ries, 1994a) developed regression equations for estimating the 99-, 98-, and 95-percent duration discharges (streamflows exceeded 99, 98, and 95 percent of the time). These equations were developed before data from the LFPR network were available. Streamflow statistics and basin characteristics for 41 stations were used in the analysis; of these stations, 36 were continuous streamflow-gaging stations and 5 were historical LFPR stations.

The second Basin Yield study (Ries, 1994b) also developed regression equations for estimating the 99-, 98-, and 95-percent duration discharges. The analyses for these equations included 61 stations, 37 continuous streamflow-gaging stations and 24 LFPR stations, 19 of which were part of the network established during the first study.

During the third Basin Yield study (Ries, 1997), but before data for all stations in the network were available, a regression equation was developed to predict the August median streamflow. The analysis for this equation included 96 stations; 37 were continuous streamflow-gaging stations and 59 were LFPR stations, of which 54 were part of the network. This equation is applicable to ungaged streams with a much larger range of basin characteristics than the flow-duration equations developed for the first study.

This report describes the network of 148 LFPR stations operated in Massachusetts as part of the Basin Yield studies between the summers of 1989 and 1996. The description includes station selection and operation of the network, selection and measurement of basin characteristics, and methods used to estimate the streamflow statistics. Streamflow measurements (including historical measurements), basin characteristics and estimated streamflow statistics are provided in this report for each of the LFPR stations. Location information, streamflow-gaging stations for which flows were correlated to those at the LFPR station, years of operation, and remarks indicating human influences on streamflows are also provided for each station. The estimated streamflow statistics include the 99-, 98-, 97-, 95-, 93-, 90-, 85-, 80-, 75-, 70-, 65-, 60-, 55-, and 50-percent duration flows; the 7-day, 10- and 2-year low flows; and the August median flow. Basin characteristics measured include drainage area; total stream length; mean basin slope; area of surficial stratified drift; area of wetlands; area of water bodies; and mean, maximum, and minimum basin elevation. Location information and streamflow statistics also are provided for 50 continuous streamflow-gaging stations used for correlation with the LFPR stations.

Streamflow statistics and basin characteristics for many stations on Massachusetts streams were published previously in a series of gazetteers published as Water Resources Investigations Reports, in a series of Hydrologic Atlas reports (see U.S. Geological Survey, 1987, for a complete listing of both series), in a series of ground-water assessment reports published as Water Resources Investigations Reports (Olimpio and DeLima, 1984; Lapham, 1988; Myette and Simcox, 1992; DeLima, 1991; Hanson and Lapham, 1992; Persky, 1993; Bratton and Parker, 1995; Bent, 1995; Friesz, 1996; Klinger, 1996), and in the three previous Basin Yield study reports by Ries (1994a, 1994b,

1997). Many of the stations for which streamflow statistics are provided in the previous reports are also included in this report. Where the values are different, streamflow statistics published in this report supersede those published in the previous reports.

The author would like to thank the MOWR for its long-term support of this work, especially Peter Phippen for his support and assistance in selecting the stations for the network. The author would also like to express his appreciation to the numerous employees of the USGS Massachusetts–Rhode Island District who assisted with streamflow data collection, analysis, and interpretation; measurements of basin characteristics; and preparation of this report. In addition, the author thanks Philip Mackey, formerly of the Environmental Careers Organization, who made many of the streamflow measurements, entered data into the database, and helped in many aspects of the analyses.

## PHYSICAL SETTING

Massachusetts encompasses an area of 8,093 mi<sup>2</sup>. Located in the northeastern United States, Massachusetts has a humid climate, with an average annual precipitation of about 45 in. and average annual temperatures that range from 50°F in coastal areas to 45°F in the western mountains. Precipitation is distributed fairly evenly throughout the year. Average monthly temperatures in coastal areas range from about 30°F in February to about 71°F in July, with average monthly temperatures in the western parts of the State that range from about 20°F in January to about 68°F in July (U.S. Commerce Department, National Oceanic and Atmospheric Administration, 1989).

Elevations range from sea level along the coast in eastern Massachusetts to almost 3,500 ft in the western mountains. Basin relief and mean basin slope, which are highly related, also tend to increase from east to west in Massachusetts. Ries (1997) attributed the higher relief in western Massachusetts than in eastern Massachusetts as a major reason that August median streamflows per unit area were generally higher in the western part of the State than in the eastern part of the State. Ries noted that relief is the driving force that causes ground water to flow from aquifers to streams.

Except during and for a short time after storms, summertime flow in Massachusetts streams comes from ground water discharged by aquifers in

unconsolidated deposits adjacent to the streams. This discharge is termed base flow. High-yielding aquifers usually are in stratified drift, sand and gravel deposits along the valley floors of inland river basins and in coastal areas of southeastern Massachusetts. The extent of coarse-grained stratified drift, as a proportion of total basin area, generally decreases from east to west. The stratified-drift deposits usually are surrounded by upland areas underlain by till with exposed bedrock outcrops. Till is an unsorted glacial deposit that consists of material ranging in size from clay to large boulders. Till yields little water to adjacent streams in comparison to yields from coarse-grained stratified drift. As a result, during summertime, streams in till areas tend to have less flow per unit of drainage area than streams in areas of stratified drift, and some small streams in till areas may go dry.

The extent of lakes, ponds, and wetlands, as a proportion of total basin area, also generally decreases from east to west in Massachusetts. The lakes, ponds, and wetlands provide more opportunity for evapotranspiration than drier land surfaces. As a result, streams that have drainage areas with large proportions of lakes, ponds, and wetlands may have lower low flows per unit area than other streams.

## STREAMFLOW MEASUREMENTS

Stations were selected for inclusion in the network by the USGS in consultation with the MOWR. Most stations had natural flow conditions, but some stations in eastern Massachusetts were affected by urbanization, flow regulation, diversions, or a combination of these factors. These stations were included in the network because water-use activities within the basins for the stations made knowledge of streamflow characteristics important to MOWR. In some cases, water-use activities affected streamflows at these stations to the extent that streamflow statistics could not be estimated accurately.

The stations were selected to provide maximum areal distribution and variation in drainage area size, surficial geology, water bodies, relief, and other basin characteristics. Efforts were made to have an equal distribution of stations among the 27 planning basins in the State; however, no stations were established on the islands of Nantucket and Martha's Vineyard because few streams there are large enough to measure, and travel costs were prohibitive.

Each of the 148 stations included in the network was measured three or four times during three consecutive summers for a total of nine or ten measurements. When a station had been measured the requisite number of times, it was retired from the network and a new station was added. Thirty stations were measured during the first year of the network, then 60 stations were operated during each of the following years through 1994, when the last new stations were added. Forty-six stations were measured during 1995, and 33 stations were measured during 1996, the last year of network operation.

Low-flow measurements were collected at the stations in accordance with standard USGS methods prescribed by Rantz and others (1982) and Riggs (1972). Rainfall at selected U.S. National Oceanographic and Atmospheric Administration, National Weather Service stations and streamflow at selected USGS continuous streamflow-gaging stations were monitored to determine when low-flow measurements should be collected. Measurements were made at least 3 days after any substantial precipitation, when there was no longer surface runoff and base flow conditions existed. In addition, measurements generally were made during separate recession periods to assure independence of the data with respect to time. Occasionally, when a recession period lasted for a few weeks or more (this is rare in New England), two measurements were made during the same recession because the flow during the second measurement was substantially lower than during the first measurement. In these cases, the better definition of the very low flow condition was more important than assuring independence of the data with respect to time. The ranges of the previously-collected data at the LFPR stations were also considered in determining when to collect additional measurements. Streamflow measurements had been made at many of the stations before the Basin Yield studies were done. All measurements, including historical measurements, were stored in the National Water Information System (NWIS) streamflow database of the USGS.

## **BASIN CHARACTERISTICS**

Differences in basin characteristics account to a large extent for differences in flow magnitudes of Massachusetts streams. The effects of some basin characteristics on streamflows were discussed in the Physical Setting section of this report. Basin

characteristics provided in this report were selected for measurement on the basis of their theoretical relation to differences in flow magnitudes of streams, and on the ability to measure them.

All basin characteristics were measured from digital-map data by use of a GIS automated procedure developed for the Basin Yield studies. The automated procedure uses the AML programming language of the ARC/INFO GIS software (Environmental Systems Research Institute, Inc., 1987). The automated procedure determines the drainage-basin boundary for any selected site on a Massachusetts stream, and creates a digital data layer of the basin boundary. The procedure calculates the drainage area for the site (in square miles), then overlays the basin boundary on the other digital data layers to determine the other basin characteristics for the site.

Ries (1994a, p. 25–28) and MassGIS, the State GIS agency (1997, p. 55–57), described a digital data layer of drainage-basin boundaries for locations on Massachusetts streams, and how the data layer was developed from 1:24,000-scale USGS topographic quadrangle maps. Drainage-basin boundaries for virtually all streamflow and water-quality data-collection sites that existed in the State through 1982 were included in the data layer. The data layer includes boundaries for every 4.5 mi<sup>2</sup> of drainage area, on average, in the State, and also includes drainage-basin boundaries for selected areas outside the State that drain into Massachusetts. This data layer was used in the automated procedure to aid in determining drainage-basin boundaries for the LFPR stations. Boundaries for many of the LFPR stations were already included in the data layer, and drainage areas for these stations were determined directly from the available boundaries by the automated procedure.

Drainage-basin boundaries for LFPR stations that were not already in the digital data layer were determined by the automated procedure partly from the USGS's 1:250,000-scale Digital Elevation Model (DEM) data (Ellassal and Caruso, 1983) and partly from the drainage-basin boundary data layer. The automated procedure utilized a series of ARC/INFO commands to determine basin boundaries for new stations based on differences in elevation of the points in the DEM grid. The automated procedure defined the new basin boundary from the DEM grid until the new boundary intersected an existing boundary in the statewide drainage-basin boundary data layer, and from that point, the existing boundary was used. In this way,

errors introduced by use of the DEM data to determine the boundaries were minimized. Boundaries for some small streams were determined entirely from the DEM data if the delineated boundary did not intersect an existing boundary. New boundaries determined by use of the automated procedure were checked visually against USGS topographic maps for the area. Drainage-basin boundaries for some stations were digitized from the topographic maps because the DEM-derived boundaries were incorrect. Digitizing was needed most often in coastal and other flat areas, where the resolution of the 1:250,000-scale DEM data was inadequate. Mean basin slope (in percent) and mean, maximum, and minimum basin elevations (in feet) also were determined by the automated procedure, but from the 1:25,000-scale DEM data.

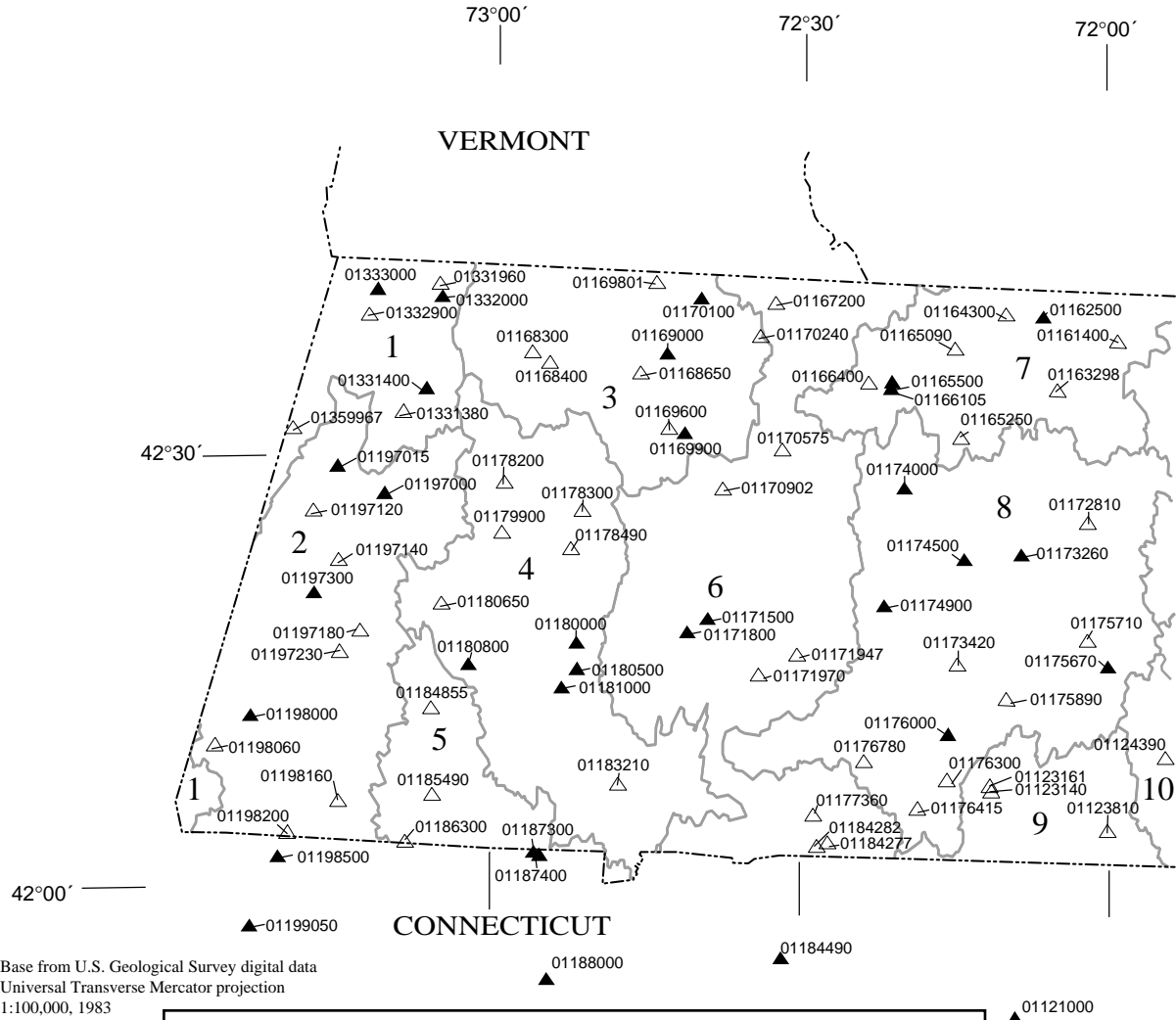
Stream lengths and areas of wetlands and water bodies were determined by the automated procedure from digital versions of the hydrography shown on USGS topographic maps. Separate data layers of streams, wetlands, and water bodies were developed by MassGIS from scanned Mylar maps of the three separate types of hydrography from the most-recently available 1:25,000 USGS topographic maps. The scanned maps were joined together electronically to produce a single statewide data layer for each of the hydrography types. Center lines were digitized through double-line streams, ponds, and wetlands to make connections through these features in the stream data layer. Areas of stratified drift, in square miles, were determined by the automated procedure from a statewide surficial-geology data layer described by Ries (1994a, p. 29) and MassGIS (1997, p. 71).

Since the basin characteristics were measured for the LFPR stations, the automated procedure has been updated to use the 1:25,000-scale DEM data for delineating the drainage basin boundaries. Boundaries delineated by use of the 1:25,000-scale DEM data generally are slightly different and slightly more accurate than those delineated by use of the 1:250,000-scale DEM data. Time constraints did not allow the updated automated procedure to be run for all LFPR stations in the network. However, limited comparisons indicate that percent differences in total drainage areas determined by use of the two DEM data layers generally are minimal.

## STREAMFLOW STATISTICS

Streamflow statistics were determined for the LFPR stations by correlation of measured discharges at the stations to same-day mean discharges at selected nearby continuous streamflow-gaging stations. Lines or curves of relation were developed between the same-day discharges at the LFPR stations and the selected gaging stations, and then the streamflow statistics for the gaging stations were entered into the relations to determine the corresponding streamflow statistics for the LFPR stations. Brief descriptions of the 50 gaging stations used for correlation with the LFPR stations are provided in table 1 (at back of report). Streamflow statistics for the gaging stations are listed in table 2 (at back of report). Locations of all the LFPR stations and the gaging stations are shown in figure 1, along with locations of the 27 major drainage basins of Massachusetts.

The flow-duration and low-flow frequency statistics were computed for the gaging stations using standard USGS methods described in Searcy (1959) and Riggs (1972), respectively. The flow-duration statistics (99- through 50-percent duration) were computed for the gaging stations from the series of daily mean flows at the stations. These statistics indicate the percent of time streamflows are equaled or exceeded at the station. For example, if the flow at the 90-percent duration is given for a location as 5 cubic feet per second, then the flow at that location is greater than or equal to that number 90 percent of the time. The low-flow frequency statistics (7-day, 2- and 10-year recurrence intervals) were computed for the gaging stations from series of annual minimum 7-day mean streamflows at the stations. Flows equal to or less than the 7-day, 2-year low flow occur on average once every 2 years, whereas flows equal to or less than the 7-day, 10-year low flow occur on average once every 10 years. These flows have a 50 percent and 10 percent chance of occurring in any given year, respectively. August median streamflows were computed for the gaging stations from the daily mean streamflows for all complete Augusts for the period of record, as described by Ries (1997). The August daily mean flows were ordered from highest to lowest, and the flow at which half the values are higher and half the values are lower is the August median flow.



EXPLANATION			
—————	BASIN BOUNDARY	▲	STREAMFLOW GAGING STATION AND NUMBER
- - - - -	SUBBASIN BOUNDARY	△	LOW-FLOW PARTIAL RECORD STATION AND NUMBER

PLANNING BASINS			
1. Hudson	11. Nashua	18. North Coastal	22. Cape Cod
2. Housatonic	12. Blackstone	19. Boston Harbor	23. Islands
3. Deerfield	13. Merrimack	a. Mystic	24. Buzzards Bay
4. Westfield	14. Concord	b. Neponset	25. Taunton
5. Farmington	a. Assabet	c. Weymouth and Wier	26. Narragansett Bay and Mt. Hope Bay Shore
6. Connecticut	b. Concord and Sudbury	20. Charles	27. Ten Mile
7. Millers	15. Shawsheen	21. South Coastal	
8. Chicopee	16. Parker	a. North and South River	
9. Quinebaug	17. Ipswich	b. South Coastal Shore	
10. French			

**Figure 1.** Locations of low-flow partial-record stations in the network operated in Massachusetts during 1989 through 1996, streamflow-gaging stations used for correlation with the low-flow partial-record stations, and boundaries of the 27 major river basins in Massachusetts.



All gaging stations used for correlations with the LFPR stations would ideally have entirely natural flow conditions. Few gaging stations in Massachusetts have entirely natural flow conditions, however, and many of the gaging stations used for this study were affected to some extent by regulations, diversions, or both (table 1). Regulations or diversions affecting the gaging stations used for the correlations did not substantially affect the streamflow statistics for the stations, or they were consistent enough that the daily mean discharges and streamflow statistics computed for the stations were useful for the correlations. In all cases, when gaging stations were selected for use in the correlations, those with natural flows were preferred over those affected by regulations or diversions.

Two methods were used to develop the relations between measured streamflows at the LFPR stations and same-day mean streamflows at selected gaging stations: a mathematical method developed by Hirsch (1982), and a graphical method described by Riggs (1972) and Searcy (1959). These methods were recommended for use by the USGS Office of Surface Water in Technical Memorandum No. 86.02, Low-Flow Frequency Estimation at Partial-Record Sites, issued December 16, 1985. Plots of the logarithms-base 10 of the same-day discharges were made to determine whether the relations between the discharges were linear or non-linear. Most relations were linear; for these, the mathematical method, termed the MOVE.1 (Maintenance Of Variance Extension, type 1) method, was used. The graphical method was used when the relations were non-linear. The MOVE.1 method was used most often. A thorough explanation of the MOVE.1 method is provided by Ries (1994a, p. 21–24).

Selection of individual gaging stations for relation to a LFPR station was based on distance between the stations and similarity of basin characteristics between the stations. Usually the measured streamflows at the LFPR stations correlated well with more than one gaging station. When this happened, MOVE.1 or graphical relations between a given LFPR station and each of several gaging stations were developed to estimate the streamflow statistics for the LFPR station. This process resulted in multiple estimates of the streamflow statistics for a single LFPR station when only a single best estimate was desired.

Single best estimates of the streamflow statistics for each LFPR station were determined through a process suggested by Tasker (1975). Tasker stated that when multiple estimates of streamflow statistics are

available for a single station, the best estimate can be obtained by weighting each individual estimate by its variance and averaging the weighted estimates. This final weighted estimate is best because its variance is less than or equal to the variances of each of the individual estimates.

Calculated variances for each individual estimate of the streamflow statistics for each LFPR station were needed to obtain the final best estimates for the stations. Variances were calculated by use of the equation

$$V_{S,U} = \frac{V_R}{M} \left[ 1 + \frac{1}{M-3} + \frac{z^2 M}{M-3} + \left( \frac{SE_{S,G}}{S_{B,G}} \right)^2 \left( \frac{M}{M-3} \right) \right] + b^2 V_{S,G}, \quad (1)$$

where:

$V_{S,U}$  is the variance of the streamflow statistic at the LFPR station, in log units;

$V_{S,G}$  is the variance of the streamflow statistic at the gaging station, in log units;

$V_R$  is the variance about the MOVE.1 or graphical line of relation;

$M$  is the number of base-flow measurements;

$SE_{S,G}$  is the standard error of the streamflow statistic at the gaging station, which equals the square root of  $V_{S,G}$ ;

$b$  is computed as  $r(S_{B,U}/S_{B,G})$ , where  $r$  is the correlation coefficient between the low streamflow measurements made at the LFPR station and the same-day mean discharges at the gaging station, and  $S_{B,U}$  is the standard deviation of the logarithms-base 10 of the low streamflow measurements made at the LFPR station;

$S_{B,G}$  is the standard deviation of the logarithms-base 10 of the mean discharges at the gaging station on the same days the low-flow measurements were made at the ungaged site; and

$z$  is the number of standard deviation units between the mean of the logarithms-base 10 of the same-day mean discharges at the gaging station and the logarithm-base 10 of the streamflow statistic at the gaging station.

Equation 1 is modified from an equation developed by Hardison and Moss (1972) to determine the variance of estimates of 7-day, T-year low flows obtained from an ordinary-least-squares (OLS) regression of the logarithms-base 10 of base-flow measurements at a

LFPR station to the logarithms-base 10 of same-day mean discharges at a nearby, hydrologically-similar gaging station. Modifications to the Hardison and Moss equation were needed to generalize its use for other streamflow statistics and to allow for the MOVE.1 or graphical methods of line fitting to be used rather than the ordinary-least-squares method of line fitting. The modifications to the Hardison and Moss equation are more fully described in Ries (1997), along with assumptions for use of both the original and the modified equations.

For LFPR stations where estimates were obtained from relations with more than one streamflow-gaging station, the individual estimates were weighted by their variances, determined from equation 1, then the weighted estimates were averaged to obtain minimum-variance estimates for each of the statistics. Weighted final variances ( $V_w$ ) were also determined for each of the statistics. Standard errors, ( $SE_f$ ), in percent, for the final weighted estimates were obtained from the equation (Tasker, written communication, 1992)

$$SE_f = 100 \sqrt{\exp(5.3018V_w) - 1}. \quad (2)$$

Equation 1 does not account for errors inherent in the discharge measurements made at the LFPR station or in the mean daily discharges determined for the gaging stations. As a result, the true standard errors for the estimates are somewhat larger than those determined by use of equation 2, and are unknown.

## PRESENTATION OF DATA

Table 3 (at the back of the report) presents a page of data for each of the 148 stations in the LFPR station network operated in Massachusetts from 1989 to 1996. The pages for the stations are grouped by major basin, and are listed in the order consistent with the USGS downstream ordering system (Socolow and others, 1998, p. 10).

Descriptive information, measured basin characteristics, streamflow-gaging stations correlated to the LFPR station, streamflow measurements (including historical measurements), and estimated streamflow statistics are provided for each station. The descriptive information includes the USGS station identification number, station name, major drainage basin name, location, period of record, and remarks. Location information includes latitude, longitude, county, and the location of the gage with respect to

cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name. The period of record includes all years during which at least one streamflow measurement was collected. Remarks include whether the station is affected by flow regulations, municipal or industrial-supply wells, or diversions, and any other pertinent information regarding the station. Basin characteristics presented in table 3 are those described in the Basin Characteristics section of this report. The gaging stations correlated to the LFPR station are listed by their USGS station identification numbers (see table 1). The discharge measurements are listed in chronological order. Standard errors of estimate, in percent, are listed along with the streamflow statistics.

## SUMMARY

A network of 148 low-flow partial-record stations was operated in Massachusetts during the summers of 1989 through 1996. The network was operated to provide data that could be used by State agencies for water-resources planning and for decisions on permitting of water withdrawals and diversions. The network also was operated to provide data that could be used for regional analyses to determine equations for predicting streamflow statistics for ungaged streams in Massachusetts.

Descriptive information, measured basin characteristics, streamflow-gaging stations correlated to the LFPR station, streamflow measurements (including historical measurements), and estimated streamflow statistics are provided in this report for each LFPR station. Station descriptions and calculated streamflow statistics are also included in this report for the 50 continuous gaging stations used in correlations with the LFPR stations.

The measured flows at the LFPR stations were correlated with same-day mean flows at nearby gaging stations to estimate streamflow statistics for the LFPR stations. The estimated streamflow statistics include the 99-, 98-, 97-, 95-, 93-, 90-, 85-, 80-, 75-, 70-, 65-, 60-, 55-, and 50-percent duration flows; the 7-day, 10- and 2-year low flows; and the August median flow. Standard errors of estimate are provided in the report for each estimate. Streamflow statistics could not be estimated for some stations because flow regulations, water withdrawals, or diversions caused poor correlations between the measured flows for the LFPR station and daily mean flows for nearby gaging stations.

Characteristics of the drainage basins for the LFPR stations that theoretically relate to the response of the station to climatic variations were measured from digital map data by use of an automated GIS procedure. Basin characteristics measured include drainage area; total stream length; mean basin slope; area of surficial stratified drift; area of wetlands; area of water bodies; and mean, maximum, and minimum basin elevation.

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Tables 1 through 3

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**Table 1.** Descriptions of streamflow-gaging stations used for correlation with the low-flow partial record stations

[Periods of record shown are based on climatic years, which begin on April 1 of the year noted; No., number; USGS, U.S. Geological Survey.]

USGS station No.	Latitude ° ' "	Longitude ° ' "	Station name	Period of record	Remarks
01073000	43 08 55	70 57 56	Oyster River near Durham, N.H.	1935–present	--
01096000	42 38 03	71 39 30	Squannacook River near West Groton, Mass.	1950–present	Occasional regulation by mill upstream.
01096910	42 27 04	71 34 39	Boulder Brook at East Bolton, Mass.	1972–82	--
01097300	42 30 39	71 24 25	Nashoba Brook near Acton, Mass.	1964–present	--
01100700	42 48 41	71 01 59	East Meadow Brook near Haverhill, Mass.	1963–73	--
01101000	42 45 10	70 56 46	Parker River at Byfield, Mass.	1946–present	Occasional regulation by mill and ponds.
01105600	42 11 25	70 56 43	Old Swamp River near South Weymouth, Mass.	1966–present	--
01105730	42 06 02	70 49 23	Indian Head River at Hanover, Mass.	1967–present	Some regulation by mills and ponds.
01105870	41 59 27	70 44 03	Jones River at Kingston, Mass.	1967–present	Regulation by pond and cranberry bogs. Ground- and surface-water drainage boundaries are not coincident.
011058837	41 35 32	70 30 30	Quashnet River at Waquoit Village, Mass.	1989–present	Some regulation by cranberry bog. Ground- and surface-water drainage boundaries are not coincident.
01106000	41 33 30	71 07 47	Adamsville Brook at Adamsville, R.I.	1941–77	--
01107000	42 03 41	71 03 59	Dorchester Brook near Brockton, Mass.	1963–73	--
01109000	41 56 51	71 10 38	Wading River near Norton, Mass.	1926–present	Regulation by lakes and ponds. Diversions to and from basin for municipal supplies.
01109200	41 52 46	71 15 18	West Branch Palmer River near Rehoboth, Mass.	1962–73	--
01109403	41 49 51	71 21 06	Ten Mile River at East Providence, R.I.	1987–present	Regulations and diversions from reservoir.
01111200	42 06 17	71 36 28	West River at West Hill Dam near Uxbridge, Mass.	1962–89	Flood-control dam upstream.
01111300	41 58 52	71 41 11	Nipmuc River near Harrisville, R.I.	1964–90	--
01118000	41 29 53	71 43 01	Wood River at Hope Valley, R.I.	1942–present	Seasonal regulation by pond since 1968. Regulation at low flow until 1952.
01121000	41 50 37	72 10 10	Mount Hope River near Warrenville, Conn.	1941–present	Occasional regulation by ponds.
01162500	42 40 57	72 06 56	Priest Brook near Winchendon, Mass.	1919–present	No daily record during August 1936.
01165500	42 36 10	72 21 36	Moss Brook at Wendell Depot, Mass.	1917–81	
01166105	42 35 39	72 21 41	Whetstone Brook at Wendell Depot, Mass.	1986–90	--
01169000	42 38 18	72 43 32	North River at Shattuckville, Mass.	1940–present	Occasional small diurnal fluctuation.
01169900	42 32 31	72 41 39	South River near Conway, Mass.	1967–present	Small diurnal fluctuation since 1982.
01170100	42 42 12	72 40 16	Green River near Colrain, Mass.	1969–present	--

**Table 1.** Descriptions of streamflow-gaging stations used for correlation with the low-flow partial record stations—*Continued*

USGS station No.	Latitude ° ' "	Longitude ° ' "	Station name	Period of record	Remarks
01171500	42 19 05	72 39 21	Mill River at Northampton, Mass.	1940–present	--
01171800	42 18 09	72 41 16	Bassett Brook near Northampton, Mass.	1963–73	--
01173260	42 23 52	72 08 51	Moose Brook near Barre, Mass.	1963–73	--
01174000	42 28 42	72 20 05	Hop Brook near New Salem, Mass.	1948–81	--
01174500	42 23 36	72 14 21	East Branch Swift River near Hardwick, Mass.	1938–present	--
01174900	42 20 08	72 22 12	Cadwell Creek near Belchertown, Mass.	1962–present	--
01175670	42 15 54	72 00 19	Sevenmile River near Spencer, Mass.	1961–present	Occasional regulation by ponds upstream.
01176000	42 10 56	72 15 51	Quaboag River at West Brimfield, Mass.	1913–present	Flood-retarding reservoirs upstream.
01180000	42 17 27	72 52 15	Sykes Brook at Knightville, Mass.	1946–72	--
01180500	42 15 31	72 52 23	Middle Branch Westfield River at Goss Heights, Mass.	1910–89	Data for August 1965–66 not used due to construction of flood-control reservoir upstream.
01180800	42 15 49	73 02 48	Walker Brook near Becket Center, Mass.	1963–76	--
01181000	42 14 14	72 53 46	West Branch Westfield River at Huntington, Mass.	1936–present	--
01184490	41 54 50	72 33 00	Broad Brook at Broad Brook, Conn.	1962–present	Regulation by reservoir and mill.
01187300	42 02 14	72 56 22	Hubbard River near West Hartland, Conn.	1939–55, 1957–present	--
01187400	42 02 03	72 55 49	Valley Brook near West Hartland, Conn.	1941–71	--
01188000	41 47 10	72 57 55	Burlington Brook near Burlington, Conn.	1932–present	--
01197000	42 28 10	73 11 49	East Branch Housatonic River at Coltsville, Mass.	1936–present	Flow regulated by powerplants and reservoir. Diversion for municipal supply.
01197015	42 31 12	73 13 48	Town Brook at Bridge Street, Lanesborough, Mass.	1980–82	--
01197300	42 20 59	73 17 56	Marsh Brook at Lenox, Mass.	1963–73	--
01198000	42 11 31	73 23 28	Green River near Great Barrington, Mass.	1952–70	--
01198500	42 01 26	73 20 32	Blackberry Brook at Canaan, Conn.	1950–71	--
01199050	41 56 32	73 23 29	Salmon Creek at Lime Rock, Conn.	1962–present	--
01331400	42 35 20	73 06 48	Dry Brook near Adams, Mass.	1963–73	--
01332000	42 42 08	73 05 37	North Branch Hoosic River at North Adams, Mass.	1932–89	Infrequent small diurnal fluctuation.
01333000	42 42 32	73 11 50	Green River at Williamstown, Mass.	1950–present	Infrequent small diurnal fluctuation.

**Table 2.** Streamflow statistics for the gaging stations used for correlation with the low-flow partial-record stations

[Streamflow statistics are in cubic feet per second. 7Q10 and 7Q2 are the 7-day mean low flows at the 10- and 2-year recurrence intervals. No., number; \*, not calculated.]

Station No.	Years of record	Discharge equaled or exceeded at the given percentage of the time														7Q10	7Q2	August median
		99	98	97	95	93	90	85	80	75	70	65	60	55	50			
01073000	62	0.60	0.69	0.76	0.90	1.00	1.20	1.60	2.10	2.80	3.80	5.00	6.40	8.20	10.0	0.50	0.90	1.60
01096000	47	6.40	7.80	9.20	11.0	13.0	15.0	18.0	22.0	27.0	32.0	39.0	48.0	58.0	69.0	6.52	11.7	19.0
01096910	11	.04	.06	.08	.10	.12	0.15	.24	.34	.47	.69	.95	1.30	1.80	2.20	.03	.08	.22
01097300	32	.19	.29	.43	.71	.96	1.40	2.10	3.10	4.10	5.20	6.50	7.90	9.50	12.0	.12	.67	2.30
01100700	11	.15	.22	.28	.41	.49	0.60	.78	1.10	1.40	1.80	2.40	3.20	4.00	4.90	.15	.36	.67
01101000	50	.21	.30	.39	.64	.95	1.60	2.70	4.20	6.00	8.70	11.0	15.0	19.0	23.0	.16	.74	3.05
01105600	30	.20	.29	.35	.48	.63	0.83	1.20	1.70	2.20	2.71	3.40	4.10	4.80	5.40	.16	.44	1.40
01105730	30	2.40	3.20	3.88	5.00	5.96	7.30	9.70	13.0	16.6	21.0	26.0	31.0	36.0	41.0	1.66	4.83	11.0
01105870	30	4.60	5.50	6.10	7.10	8.00	9.00	11.0	12.0	14.0	16.0	18.0	19.0	22.0	24.0	4.02	7.44	14.0
011058837	7	8.00	8.40	8.77	9.50	10.0	11.0	11.0	12.0	12.0	12.0	13.0	13.0	13.0	14.0	*	*	13.0
01106000	37	.07	.08	.09	.12	.18	.30	.63	1.20	2.20	3.40	4.90	6.50	7.80	9.20	.05	.15	.65
01107000	11	.02	.03	.04	.07	.10	.17	.32	.60	1.00	1.60	2.50	3.70	4.70	5.50	.01	.06	.19
01109000	70	2.40	3.00	3.70	4.70	5.50	6.90	9.30	12.0	16.0	21.0	27.0	34.0	42.0	51.0	1.93	4.99	11.0
01109200	10	.02	.04	.05	.09	.11	.16	.29	.48	.78	1.50	2.40	3.40	4.30	5.00	.01	.02	.26
01109403	10	15.0	16.0	18.0	20.0	21.0	24.0	28.0	33.0	37.0	43.0	51.0	58.0	67.0	77.0	13.1	21.1	27.0
01111200	28	2.10	2.50	2.70	3.20	3.70	4.50	6.10	7.90	10.0	13.0	16.0	20.0	24.0	29.0	1.80	3.23	6.80
01111300	29	0.50	.66	0.86	1.00	1.30	1.80	2.60	3.90	5.60	7.60	9.80	12.0	15.0	18.0	.25	1.16	2.40
01118000	55	20.0	23.0	25.0	28.0	31.0	35.0	41.0	49.0	57.9	67.0	79.0	92.0	105	120	19.4	28.6	44.0
01121000	55	1.20	1.60	2.00	2.60	3.10	4.10	6.00	8.10	11.0	14.0	17.0	22.0	26.0	31.0	.96	2.26	5.30
01162500	76	.50	.80	1.00	1.50	1.90	2.40	3.50	4.90	6.50	8.20	10.0	12.0	14.0	17.0	.45	1.48	3.80
01165500	65	0.70	.87	1.00	1.20	1.40	1.70	2.30	3.00	3.90	4.90	6.00	7.40	8.80	10.0	.62	1.19	2.20
01166105	5	.99	1.10	1.20	1.40	1.70	2.00	2.50	2.90	3.40	4.00	4.50	5.10	5.70	6.30	*	*	2.60
01169000	57	9.20	11.0	12.0	15.0	17.0	21.0	27.0	33.0	40.0	49.0	58.0	68.0	80.0	92.0	8.46	13.9	27.4
01169900	30	3.70	4.32	4.90	5.70	6.40	7.40	9.10	11.0	13.0	16.0	18.0	22.0	25.0	30.0	3.32	5.37	9.60
01170100	29	6.03	7.10	7.80	8.80	9.80	12.0	14.6	17.6	21.0	26.0	31.0	36.0	42.0	49.0	4.81	7.61	15.0
01171500	57	6.70	7.80	8.70	10.0	12.0	14.0	17.0	21.0	25.0	29.0	35.0	40.0	47.6	55.0	6.31	10.0	18.0
01171800	11	.55	.63	.65	.79	.91	1.10	1.40	1.70	2.00	2.30	2.90	3.60	4.30	4.80	.46	.89	1.50
01173260	9	.00	.01	.02	.04	.09	.15	.34	.56	.88	1.40	2.00	2.60	3.10	3.60	.01	.11	.26
01174000	34	.02	.05	.07	.14	.20	.31	.56	.81	1.14	1.55	2.00	2.50	3.00	3.60	.02	.10	.50
01174500	60	.60	1.40	2.40	3.80	5.18	7.05	10.0	14.0	18.0	22.0	27.0	32.0	37.0	44.0	0.60	3.61	11.0

**Table 2.** Streamflow statistics for the gaging stations used for correlation with the low-flow partial-record stations—*Continued*

Station No.	Years of record	Discharge equaled or exceeded at the given percentage of the time														7Q10	7Q2	August median
		99	98	97	95	93	90	85	80	75	70	65	60	55	50			
01174900	35	0.11	0.13	0.15	0.21	0.26	0.34	0.52	0.72	1.00	1.30	1.70	2.10	2.60	3.00	0.09	0.18	0.55
01175670	35	.28	.35	.44	.61	.81	1.00	1.80	2.60	3.40	4.30	5.50	6.70	8.00	9.40	.23	.56	1.90
01176000	83	16.0	20.0	24.0	30.0	35.0	42.0	52.0	65.0	78.0	93.0	110	126	145	168	15.8	32.8	65.0
01180000	28	.07	.08	.09	.11	.13	.16	.22	.28	.38	.53	.71	.86	1.00	1.20	.06	.11	.21
01180500	79	2.90	3.60	4.20	5.30	6.50	8.00	11.0	15.0	19.0	24.0	30.0	36.0	43.0	50.0	1.40	5.33	11.2
01180800	14	.26	.30	.34	.40	.45	.54	.74	1.00	1.30	1.60	2.10	2.50	2.90	3.40	.21	.34	.80
01181000	60	7.10	8.90	10.0	12.0	14.0	18.0	24.0	30.0	38.0	46.0	57.0	70.0	82.0	96.0	5.79	11.0	23.0
01184490	28	6.0	6.90	7.40	8.00	8.80	9.60	11.0	12.0	12.1	13.0	14.0	15.0	17.0	18.0	5.52	9.38	13.0
01187300	56	.50	.84	1.10	1.50	1.90	2.30	3.30	4.70	6.30	8.20	10.0	13.0	16.0	19.0	.48	1.33	3.10
01187400	31	.30	.40	.40	.50	.60	.80	1.00	1.60	2.20	3.00	4.00	5.00	6.10	7.20	.24	.46	1.00
01188000	64	.66	.80	.90	1.10	1.20	1.30	1.70	2.00	2.40	2.80	3.30	3.80	4.30	5.00	.58	1.08	1.80
01197000	61	14.0	15.0	17.0	19.0	21.0	23.0	27.0	31.0	35.0	38.0	42.0	47.0	53.0	60.0	12.4	18.8	29.0
01197015	2	1.20	1.30	1.30	1.40	1.50	1.60	2.17	2.70	3.60	4.40	6.35	8.34	9.20	9.90	*	*	2.35
01197300	9	.01	.02	.03	.06	.12	.21	.38	.55	.83	1.10	1.30	1.60	2.00	2.40	.01	.67	0.47
01198000	21	3.20	3.70	4.20	4.70	5.30	6.40	8.50	12.0	15.0	19.0	25.0	30.4	36.0	42.0	3.11	5.30	9.10
01198500	21	3.40	4.40	5.00	6.20	7.30	9.00	11.0	14.0	18.0	22.0	26.0	30.0	35.0	40.0	2.99	6.66	12.0
01199050	34	3.90	4.60	5.20	6.20	7.30	8.60	11.0	14.0	16.0	19.0	22.0	25.0	28.0	32.0	3.19	6.58	12.0
01331400	10	.17	.27	.38	.57	.79	1.10	1.60	2.00	2.60	3.37	4.30	5.20	6.20	7.30	.06	1.00	1.90
01332000	58	5.70	6.50	7.20	8.50	9.60	11.0	14.4	19.0	23.0	28.0	32.0	37.0	42.0	49.0	5.21	7.77	14.0
01333000	47	4.80	5.60	6.20	7.80	9.10	11.0	14.0	18.2	23.0	27.0	31.0	36.0	42.0	48.0	4.57	8.19	15.0

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996

[ft, foot; ft<sup>3</sup>/s, cubic foot per second; mi, mile; mi<sup>2</sup>, square mile]

**NORTH COASTAL BASIN**  
**01073860 Smallpox Brook at Salisbury, MA**

LOCATION.--Lat 42°05'00", long 70°41'59", Essex County, at culvert on U.S. Highway 1, 0.6 mi north of Salisbury.

PERIOD OF RECORD.--1974, 1991-93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 1.83 mi <sup>2</sup>	Area of water bodies = 0.0 mi <sup>2</sup>	Minimum elevation = 26 ft
Area of stratified drift = 1.80 mi <sup>2</sup>	Total length of streams = 4.21 mi	Maximum elevation = 115 ft
Area of wetlands = 0.0 mi <sup>2</sup>	Mean basin slope = 0.84 percent	Mean elevation = 50 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01097300, 01096000, 01073000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-22-74	0.42	7-11-91	0.38	7-28-92	0.43	7-02-93	0.29
8-02-74	.20	7-18-91	.31	8-24-92	.47	7-08-93	.19
8-23-74	.20	9-12-91	.46	9-17-92	.39	7-19-93	.00

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.17	12.7	70	0.51	10.0
98	.18	11.0	65	.58	12.0
97	.20	9.7	60	.66	14.0
95	.23	7.9	55	.73	15.8
93	.25	6.8	50	.81	17.5
90	.28	5.8	August median	.34	5.7
85	.33	5.6	7Q10	.15	14.5
80	.38	6.5	7Q2	.23	8.1
75	.44	8.1			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01094340 Whitman River near Westminster, MA

LOCATION.--Lat 42°33'35", long 71°52'02", Worcester County, at State Highway 2A, 2.5 mi northeast of Westminster.

PERIOD OF RECORD.--1973–74, 1991–93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 21.7 mi <sup>2</sup>	Area of water bodies = 0.77 mi <sup>2</sup>	Minimum elevation = 670 ft
Area of stratified drift = 3.78 mi <sup>2</sup>	Total length of streams = 38.6 mi	Maximum elevation = 1,340 ft
Area of wetlands = 0.70 mi <sup>2</sup>	Mean basin slope = 4.57 percent	Mean elevation = 1,000 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
3-19-73	173	1-08-74	40.0	9-04-91	8.58	7-02-93	3.17
7-30-73	7.9	7-12-91	6.06	8-24-92	10.9	7-09-93	2.88
8-27-73	12.0	7-19-91	1.7	9-17-92	5.97	7-23-93	1.23
8-29-73	11.0						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.05	22.9	70	13.0	14.3
98	1.33	19.5	65	16.3	16.6
97	1.60	17.2	60	20.4	19.0
95	2.21	13.7	55	24.9	21.0
93	2.82	11.5	50	30.4	23.1
90	3.78	9.7	August median	5.82	9.0
85	5.40	8.8	7Q10	.887	25.4
80	7.53	9.9	7Q2	2.29	14.2
75	10.0	12.0	70	13.0	14.3

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01094396 Philips Brook at Fitchburg, MA

LOCATION.--Lat 42°34'28", long 71°50'15", Worcester County, at bridge on Westminster Street, 2.0 mi west of Fitchburg.

PERIOD OF RECORD.--1994-96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 15.8 mi <sup>2</sup>	Area of water bodies = 0.25 mi <sup>2</sup>	Minimum elevation = 567 ft
Area of stratified drift = 1.40 mi <sup>2</sup>	Total length of streams = 32.3 mi	Maximum elevation = 1,580 ft
Area of wetlands = 0.40 mi <sup>2</sup>	Mean basin slope = 6.41 percent	Mean elevation = 1,050 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01096000, 01097300, 01162500, 01175670, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-12-94	1.09	6-20-95	4.63	8-22-95	0.31	8-21-96	1.34
8-10-94	2.64	8-11-95	1.75	8-07-96	5.22	9-05-96	.86
9-08-94	1.37						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.44	22.5	70	4.98	18.1
98	.58	18.5	65	6.43	20.8
97	.71	15.9	60	8.16	23.3
95	1.04	12.7	55	10.1	25.6
93	1.35	11.5	50	12.7	27.9
90	1.69	11.3	August median	2.34	12.2
85	2.20	11.8	7Q10	.39	25.3
80	2.95	13.5	7Q2	1.08	14.1
75	3.87	15.7	70	4.98	18.1

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01095220 Stillwater River near Sterling, MA

LOCATION.--Lat 42°24'39", long 71°47'30", Worcester County, on left bank at downstream side of bridge on Muddy Pond Road, 1.5 mi upstream of mouth and 2.5 mi southwest of Sterling.

PERIOD OF RECORD.--1971–73, 1991–93, continuous record station April 1994 to present.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 30.4 mi <sup>2</sup>	Area of water bodies = 0.47 mi <sup>2</sup>	Minimum elevation = 403 ft
Area of stratified drift = 5.41 mi <sup>2</sup>	Total length of streams = 50.7 mi	Maximum elevation = 2,000 ft
Area of wetlands = 0.80 mi <sup>2</sup>	Mean basin slope = 5.80 percent	Mean elevation = 1,150 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01096000, 01097300, 01175670, 01162500, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-26-71	2.40	10-05-72	5.20	9-04-91	18.1	4-29-94	51.0
9-09-71	3.20	9-11-73	3.80	7-28-92	7.32	6-13-94	17.7
9-30-71	3.60	9-13-73	3.50	8-24-92	18.4	8-01-94	32.1
10-20-71	5.60	1-08-74	55.0	9-17-92	7.28	9-14-94	4.52
8-23-72	6.10	7-11-91	8.54	7-01-93	2.90	9-23-94	24.2
9-28-72	5.70	7-19-91	3.75	7-08-93	2.73		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.23	7.6	70	12.7	3.7
98	1.65	6.9	65	15.9	3.8
97	2.06	6.4	60	19.6	4.0
95	2.79	5.7	55	23.8	4.2
93	3.48	5.2	50	28.9	4.4
90	4.39	4.7	August median	6.42	4.3
85	5.99	4.2	7Q10	1.06	12.0
80	7.97	3.8	7Q2	2.73	8.6
75	10.1	3.7			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01095380 Trout Brook near Holden, MA

LOCATION.--Lat 42°23'00", long 71°50'12", Worcester County, at culvert on Manning Street, 2.2 mi north of Holden.

PERIOD OF RECORD.--1971–73, 1991–93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 6.79 mi <sup>2</sup>	Area of water bodies = 0.02 mi <sup>2</sup>	Minimum elevation = 532 ft
Area of stratified drift = 1.95 mi <sup>2</sup>	Total length of streams = 11.6 mi	Maximum elevation = 1,080 ft
Area of wetlands = 0.41 mi <sup>2</sup>	Mean basin slope = 3.99 percent	Mean elevation = 806 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01175670, 01097300, 01096000, 01162500, 01111300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-26-71	0.14	9-27-72	1.20	7-11-91	1.05	9-17-92	0.84
9-27-71	.31	10-05-72	.96	7-19-91	.45	7-01-93	.52
9-29-71	.44	9-11-73	.45	9-14-91	2.17	7-08-93	.72
10-19-71	1.10	9-13-73	.43	7-28-92	1.51	7-23-93	.11
8-23-72	.97	9-14-73	.43	8-24-92	5.22		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.061	19.2	70	3.06	12.4
98	.096	15.9	65	4.52	14.9
97	.13	13.6	60	6.56	17.2
95	.22	10.4	55	9.19	19.2
93	.33	8.3	50	13	21.4
90	.49	6.8	August median	.94	7.0
85	.83	6.5	7Q10	.051	24.4
80	1.35	8.0	7Q2	.22	13.8
75	2.09	10.2		3.06	12.4

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01095928 Trapfall Brook near Ashby, MA

LOCATION.--Lat 42°40'24", long 71°46'39", Middlesex County at bridge on unmarked road off State Highway 119, 2.2 mi east of Ashby.

PERIOD OF RECORD.--1993–95.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 5.89 mi <sup>2</sup>	Area of water bodies = 0.02 mi <sup>2</sup>	Minimum elevation = 482 ft
Area of stratified drift = 0.66 mi <sup>2</sup>	Total length of streams = 13.3 mi	Maximum elevation = 1,300 ft
Area of wetlands = 0.22 mi <sup>2</sup>	Mean basin slope = 4.93 percent	Mean elevation = 893 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01162500, 01175670, 01096000, 01097300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-01-93	0.53	9-08-94	0.60	6-20-95	1.35	8-21-95	0.021
7-09-93	.74	9-15-94	.32	7-14-95	.13	8-22-95	0
7-19-93	.08	10-20-94	1.24	8-11-95	.49	8-30-95	.004
7-12-94	.54	5-23-95	5.42	8-14-95	.20	9-13-95	.01
8-10-94	.42	6-19-95	2.03				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.030	15.8	70	2.69	15.2
98	.054	13.4	65	3.97	16.8
97	.085	11.9	60	5.66	18.2
95	.16	10.4	55	7.86	19.5
93	.24	9.9	50	11.3	21.0
90	.36	9.8	August median	.74	11.2
85	.65	10.6	7Q10	.020	24.2
80	1.15	12.1	7Q2	.16	16.0
75	1.82	13.7		2.69	15.2

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
**01096504 Reedy Brook near East Pepperell, MA**

LOCATION.--Lat 42°40'03", long 71°33'55", Middlesex County at culvert on Lowell Road, at East Pepperell.

PERIOD OF RECORD.--1971–73, 1991–93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 1.92 mi <sup>2</sup>	Area of water bodies = 0.02 mi <sup>2</sup>	Minimum elevation = 181 ft
Area of stratified drift = 1.52 mi <sup>2</sup>	Total length of streams = 3.26 mi	Maximum elevation = 425 ft
Area of wetlands = 0.30 mi <sup>2</sup>	Mean basin slope = 1.93 percent	Mean elevation = 300 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01096000, 01097300, 01162500, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-27-71	0.66	8-23-72	1.50	7-11-91	0.68	9-17-92	0.54
9-09-71	.46	9-26-72	.96	7-18-91	.52	7-01-93	.70
9-29-71	.74	10-05-72	.89	9-12-91	.82	7-09-93	.68
10-04-71	.58	8-31-73	.80	7-28-92	.42	7-19-93	.35
10-21-71	.64	9-13-73	.64	8-24-92	.84		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.26	12.8	70	1.25	8.6
98	.31	10.5	65	1.40	9.9
97	.37	8.7	60	1.60	11.4
95	.45	6.5	55	1.78	12.6
93	.53	5.0	50	2.00	13.9
90	.63	3.9	August median	.81	4.4
85	.77	4.1	7Q10	.24	14.7
80	.92	5.4	7Q2	.46	7.1
75	1.08	7.0		1.25	8.6

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NASHUA RIVER BASIN**  
01096505 Unkety Brook near Pepperell, MA

LOCATION.--Lat 42°41'23", long 71°32'54", Middlesex County at culvert on River Street, 2.5 mi northeast of Pepperell.

PERIOD OF RECORD.--1971–74, 1991–93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 6.84 mi <sup>2</sup>	Area of water bodies = 0.02 mi <sup>2</sup>	Minimum elevation = 177 ft
Area of stratified drift = 4.62 mi <sup>2</sup>	Total length of streams = 12.7 mi	Maximum elevation = 514 ft
Area of wetlands = 0.52 mi <sup>2</sup>	Mean basin slope = 2.28 percent	Mean elevation = 332 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01096000, 01097300, 01162500, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-27-71	0.93	9-26-72	2.40	8-30-73	1.40	8-24-92	3.06
9-09-71	1.10	10-05-72	2.10	1-10-74	6.00	9-17-92	1.46
9-29-71	1.80	3-21-73	27.0	7-11-91	2.36	7-01-93	4.13
10-04-71	1.10	7-31-73	3.60	7-18-91	1.01	7-09-93	.94
10-21-71	1.80	8-01-73	3.60	9-12-91	1.86	7-19-93	.63
8-23-72	2.70	8-28-73	2.30	7-28-92	14.5		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.50	12.0	70	3.50	6.4
98	.64	10.4	65	4.16	7.2
97	.76	9.3	60	4.98	8.1
95	.97	7.9	55	5.81	8.9
93	1.16	7.0	50	6.80	9.8
90	1.41	6.2	August median	1.94	5.5
85	1.82	5.5	7Q10	.46	14.5
80	2.34	5.4	7Q2	.97	9.2
75	2.89	5.8			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**MERRIMACK RIVER BASIN**  
01096515 Salmon Brook at Main Street at Dunstable, MA

LOCATION.--Lat 42°40'41", long 71°29'38", Middlesex County, at culvert on Main Street, at Dunstable.

PERIOD OF RECORD.--1975–78, 1993–95.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 8.48 mi <sup>2</sup>	Area of water bodies = 0.62 mi <sup>2</sup>	Minimum elevation = 200 ft
Area of stratified drift = 5.80 mi <sup>2</sup>	Total length of streams = 10.8 mi	Maximum elevation = 514 ft
Area of wetlands = 0.01 mi <sup>2</sup>	Mean basin slope = 2.93 percent	Mean elevation = 332 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01162500, 01101000, 01096000, 01073000, 01097300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-25-75	12.0	7-26-78	8.20	7-09-93	7.19	9-08-94	4.91
8-31-76	6.70	8-18-78	9.50	7-19-93	3.38	6-19-95	5.87
9-09-76	4.50	9-07-78	5.70	7-12-94	8.86	8-11-95	3.47
5-05-77	38.0	7-01-93	8.06	8-10-94	13.1	8-22-95	1.40
9-01-77	4.50						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	2.55	11.8	70	13.3	9.3
98	3.06	10.2	65	15.8	10.5
97	3.48	9.1	60	18.6	11.8
95	4.32	7.8	55	21.6	13.0
93	5.03	7.0	50	25.0	14.2
90	5.98	6.6	August median	7.76	6.7
85	7.41	6.6	7Q10	2.34	13.4
80	9.18	7.2	7Q2	4.49	8.4
75	11.2	8.2		13.3	9.3

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
01096805 North Brook near Berlin, MA

LOCATION.--Lat 42°21'15", long 71°37'40", Worcester County, at culvert on Whitney Street, 2.0 mi south of Berlin.

PERIOD OF RECORD.--1975–78, 1990–92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 15.4 mi <sup>2</sup>	Area of water bodies = 0.15 mi <sup>2</sup>	Minimum elevation = 216 ft
Area of stratified drift = 3.43 mi <sup>2</sup>	Total length of streams = 42.6 mi	Maximum elevation = 701 ft
Area of wetlands = 0.57 mi <sup>2</sup>	Mean basin slope = 4.54 percent	Mean elevation = 450 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01175670, 01097300, 01162500, 01096000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-24-75	3.70	8-17-78	3.80	8-30-90	4.29	9-12-91	1.96
8-26-76	1.10	9-06-78	1.10	9-07-90	1.86	7-28-92	7.47
8-31-77	1.40	7-11-90	1.64	7-11-91	2.55	8-24-92	11.2
7-10-78	2.80	8-03-90	.83	7-18-91	.64	9-17-92	3.86

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.65	14.9	70	5.61	9.5
98	.77	13.2	65	6.95	11.0
97	.92	11.7	60	8.34	12.4
95	1.19	9.7	55	9.87	13.6
93	1.47	8.3	50	11.7	14.8
90	1.85	7.1	August median	2.73	6.7
85	2.62	6.4	7Q10	.54	19.3
80	3.50	6.9	7Q2	1.09	12.4
75	4.53	8.2			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
01096855 Danforth Brook at Hudson, MA

LOCATION.--Lat 42°23'57", long 71°34'00", Middlesex County, at culvert on Cox Street, Hudson.

PERIOD OF RECORD.--1975–78, 1994–96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 6.62 mi <sup>2</sup>	Area of water bodies = 0.05 mi <sup>2</sup>	Minimum elevation = 244 ft
Area of stratified drift = 1.76 mi <sup>2</sup>	Total length of streams = 18.5 mi	Maximum elevation = 605 ft
Area of wetlands = 0.57 mi <sup>2</sup>	Mean basin slope = 3.71 percent	Mean elevation = 387 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01096000, 01175670, 01105600, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-24-75	0.92	8-17-78	0.79	9-21-94	0.56	8-22-95	0.01
8-26-76	.40	9-06-78	.21	6-19-95	1.41	8-06-96	1.55
8-31-77	.24	7-13-94	.36	7-24-95	.24	8-20-96	.14
7-14-78	.53	8-10-94	.06	8-11-95	.34	9-05-96	.21

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.16	17.2	70	1.02	13.4
98	.18	14.8	65	1.27	15.7
97	.21	12.9	60	1.55	17.8
95	.26	10.5	55	1.87	19.7
93	.32	8.9	50	2.25	21.6
90	.39	7.9	August median	.53	8.3
85	.50	8.0	7Q10	.14	19.8
80	.65	9.3	7Q2	.25	11.5
75	.82	11.3			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
**01096935 Elizabeth Brook at Wheeler Street at Stow, MA**

LOCATION.--Lat 42°25'47", long 71°30'56", Middlesex County, at culvert on Wheeler Street, 1.0 mi southwest of Stow.

PERIOD OF RECORD.--1975–76, 1990–92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 17.2 mi <sup>2</sup>	Area of water bodies = 0.37 mi <sup>2</sup>	Minimum elevation = 205 ft
Area of stratified drift = 5.55 mi <sup>2</sup>	Total length of streams = 42.4 mi	Maximum elevation = 640 ft
Area of wetlands = 0.71 mi <sup>2</sup>	Mean basin slope = 3.92 percent	Mean elevation = 422 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01096000, 01175670, 01111200, 01111300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-25-75	6.70	7-11-90	4.28	9-07-90	3.58	9-12-91	2.77
8-27-76	1.60	8-03-90	4.74	7-10-91	2.47	7-28-92	5.30
9-01-76	2.60	8-30-90	8.08	7-11-91	2.28	8-24-92	9.99

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.91	19.8	70	6.69	8.7
98	1.07	17.4	65	8.40	10.8
97	1.24	15.4	60	10.5	12.9
95	1.54	12.8	55	12.8	14.9
93	1.88	10.7	50	15.7	16.9
90	2.39	8.5	August median	3.36	6.5
85	3.19	6.6	7Q10	.76	23.1
80	4.05	6.0	7Q2	1.55	13.7
75	5.24	6.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
01097050 Assabet River at Main Street near Concord, MA

LOCATION.--Lat 42°27'23", long 71°23'26", Middlesex County, at bridge on State Highway 62, 0.1 mi upstream from railroad bridge, 2.1 mi west of Concord.

PERIOD OF RECORD.--1968, 1990–92.

REMARKS.-- Flow affected by regulation by mills and reservoirs upstream, municipal well withdrawals, and wastewater treatment plant discharges.

**BASIN CHARACTERISTICS.--**

Drainage area = 121 mi <sup>2</sup>	Area of water bodies = 0.35 mi <sup>2</sup>	Minimum elevation = 127 ft
Area of stratified drift = 50.0 mi <sup>2</sup>	Total length of streams = 293 mi	Maximum elevation = 748 ft
Area of wetlands = 7.27 mi <sup>2</sup>	Mean basin slope = 3.50 percent	Mean elevation = 345 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01096000, 01175670, 01105600, 01111300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
12-11-68	160	8-31-90	75.3	9-12-91	51.7	8-25-92	91.3
7-19-90	49.3	7-12-91	62.6	7-29-92	51.0	9-17-92	21.2
8-03-90	40.3	7-18-91	36.9				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	34.5	13.5	70	87	6.9
98	36.2	11.5	65	105	8.2
97	37.5	10.2	60	125	9.6
95	40.3	8.6	55	147	10.8
93	43.0	7.3	50	168	11.9
90	47.0	6.3	August median	57.1	5.7
85	54.2	5.6	7Q10	33.4	15.3
80	64.1	5.6	7Q2	39.6	9.5
75	74.9	6.1			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
01097280 Fort Pond Brook at West Concord, MA

LOCATION.--Lat 42°28'07", long 71°24'31", Middlesex County, at bridge on State Highway 2, 400 ft upstream from confluence with Nashoba Brook, 1.0 mi northwest of West Concord.

PERIOD OF RECORD.--1975–78, 1990–92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 24.9 mi <sup>2</sup>	Area of water bodies = 0.49 mi <sup>2</sup>	Minimum elevation = 126 ft
Area of stratified drift = 7.70 mi <sup>2</sup>	Total length of streams = 57.4 nmi	Maximum elevation = 470 ft
Area of wetlands = 1.56 mi <sup>2</sup>	Mean basin slope = 2.28 percent	Mean elevation = 295 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01105600, 01109000, 01111200, 01111300

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-25-75	4.60	8-17-78	7.00	8-30-90	14.3	9-12-91	5.71
9-10-76	2.60	9-06-78	3.10	9-07-90	3.25	7-29-92	1.27
9-27-76	3.40	7-12-90	3.96	7-12-91	1.41	8-24-92	14.1
8-31-77	2.30	8-03-90	2.59	7-18-91	1.79	9-17-92	5.29
7-14-78	5.00						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.11	14.3	70	6.77	7.7
98	1.33	12.5	65	8.14	9.1
97	1.51	11.2	60	9.60	10.4
95	1.78	9.7	55	11.2	11.7
93	2.11	8.3	50	13.0	13.0
90	2.60	6.9	August median	3.65	5.8
85	3.42	5.8	7Q10	.89	17.6
80	4.40	5.7	7Q2	1.83	10.3
75	5.49	6.5			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

CONCORD RIVER BASIN

01098860 Sudbury River at Nashawtuc Street at Concord, MA

LOCATION.--Lat 42°27'35", long 71°21'35", Middlesex County, at bridge on Nashawtuc Street, 0.5 mi upstream from mouth, at Concord.

PERIOD OF RECORD.--1984, 1990–92.

REMARKS.-- Flow affected by regulation by reservoirs upstream, municipal well withdrawals, wastewater treatment plant discharges, and diversions into and out of the basin.

BASIN CHARACTERISTICS.--

Drainage area = 162 mi <sup>2</sup>	Area of water bodies = 6.70 mi <sup>2</sup>	Minimum elevation = 118 ft
Area of stratified drift = 87.6 mi <sup>2</sup>	Total length of streams = 344 mi	Maximum elevation = 699 ft
Area of wetlands = 10.5 mi <sup>2</sup>	Mean basin slope = 2.63 percent	Mean elevation = 256ft

STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--

01097300, 01096000, 01175670

DISCHARGE MEASUREMENTS.--

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
5-22-84	395	7-12-90	78.4	7-11-91	71.7	7-29-92	47.1
7-31-84	169	8-03-90	123	7-18-91	70.7	8-25-92	300
8-01-84	184	8-31-90	260	9-12-91	112	9-17-92	94.3

ESTIMATED STREAMFLOW STATISTICS.--

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	25.9	28.1	70	205	9.8
98	32.4	24.5	65	248	11.2
97	39.5	21.4	60	304	13.0
95	50.2	17.6	55	371	14.9
93	59.8	14.9	50	459	17.0
90	73.1	12.2	August median	111	8.5
85	103	8.6	7Q10	24.7	31.4
80	150	8.2	7Q2	51.1	19.0
75	176	8.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CONCORD RIVER BASIN**  
01099400 River Meadow Brook at Lowell, MA

LOCATION.--Lat 42°37'29", long 71°19'11", Middlesex County, at bridge on Plain Street, at Lowell.

PERIOD OF RECORD.--1975, 1978, 1990-92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 25.6 mi <sup>2</sup>	Area of water bodies = 0.47 mi <sup>2</sup>	Minimum elevation = 98 ft
Area of stratified drift = 15.8 mi <sup>2</sup>	Total length of streams = 48.1 mi	Maximum elevation = 403 ft
Area of wetlands = 16.0 mi <sup>2</sup>	Mean basin slope = 2.01 percent	Mean elevation = 249 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01096000, 01101000, 01105600

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-25-75	8.10	8-03-90	3.39	7-11-91	2.35	7-28-92	2.90
7-26-78	4.50	8-31-90	11.6	7-18-91	2.25	8-24-92	18.5
9-07-78	4.40	9-07-90	6.08	9-12-91	11.7	9-17-92	12.7
7-12-90	10.2						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.17	25.1	70	14.2	13.1
98	1.61	20.9	65	17.7	15.3
97	1.9	18.4	60	22.1	17.6
95	2.54	14.6	55	26.8	19.6
93	3.24	12.1	50	32.2	21.5
90	4.22	9.7	August median	6.52	8.5
85	5.93	8.3	7Q10	.98	28.8
80	8.28	9.0	7Q2	2.45	16.1
75	11.0	10.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**SHAWSHEEN RIVER BASIN**  
01100608 Meadow Brook near Tewksbury, MA

LOCATION.--Lat 42°37'14", long 71°12'44", Middlesex County, at culvert on Pinnacle Street 1.2 mi northeast of Tewksbury.

PERIOD OF RECORD.--1973–75, 1994–96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 4.09 mi <sup>2</sup>	Area of water bodies = 0.13 mi <sup>2</sup>	Minimum elevation = 104 ft
Area of stratified drift = 2.17 mi <sup>2</sup>	Total length of streams = 10.2 mi	Maximum elevation = 354 ft
Area of wetlands = 0.12 mi <sup>2</sup>	Mean basin slope = 1.37 percent	Mean elevation = 229 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01073000, 01096000, 01097300, 01105600, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-10-73	1.70	10-10-74	1.40	6-19-95	0.82	8-06-96	1.63
9-28-73	.97	7-12-94	.34	6-20-95	.46	8-20-96	.59
7-25-74	.30	8-10-94	.17	8-10-95	1.27	9-06-96	.97
8-08-74	.20	9-08-94	.11	8-22-95	.24		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.18	17.0	70	1.52	13.5
98	.24	14.4	65	1.88	15.3
97	.28	12.9	60	2.30	17.0
95	.36	10.8	55	2.78	18.6
93	.44	9.6	50	3.36	20.2
90	.55	8.9	August median	.78	9.3
85	.73	9.1	7Q10	.15	19.6
80	.96	10.2	7Q2	.36	11.5
75	1.23	11.8			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**PARKER RIVER BASIN**  
01101100 Mill River near Rowley, MA

LOCATION.--Lat 42°43'31", long 70°54'54", Essex County, at bridge on Wethersfield Street, 2.0 mi west of Rowley.

PERIOD OF RECORD.--1991-93.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 7.70 mi <sup>2</sup>	Area of water bodies = 0.07 mi <sup>2</sup>	Minimum elevation = 26 ft
Area of stratified drift = 5.51 mi <sup>2</sup>	Total length of streams = 25.6 mi	Maximum elevation = 252 ft
Area of wetlands = 0.56 mi <sup>2</sup>	Mean basin slope = 4.67 percent	Mean elevation = 130 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01097300, 01073000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-11-91	0.81	7-28-92	1.81	9-17-92	1.84	7-09-93	1.01
7-18-91	1.31	8-24-92	4.29	7-02-93	1.38	7-19-93	.57
9-12-91	1.50						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.45	13.4	70	2.81	9.3
98	.53	11.6	65	3.21	10.5
97	.61	10.4	60	3.76	12.0
95	.77	8.3	55	4.27	13.3
93	.93	6.9	50	4.75	14.3
90	1.20	5.6	August median	1.64	5.9
85	1.55	5.6	7Q10	.39	17.0
80	1.93	6.5	7Q2	.81	10.0
75	2.32	7.8			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**IPSWICH RIVER BASIN**

01101740 Fish Brook at Lockwood Lane near Boxford, MA

LOCATION.--Lat 42°38'39", long 70°59'20", Essex County, at bridge on Lockwood Lane, 1.3 mi south of Boxford.

PERIOD OF RECORD.--1993-95.

REMARKS.-- Flow affected by municipal well withdrawals and regulation by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 14.7 mi <sup>2</sup>	Area of water bodies = 0.27 mi <sup>2</sup>	Minimum elevation = 45 ft
Area of stratified drift = 2.63 mi <sup>2</sup>	Total length of streams = 30.8 mi	Maximum elevation = 396 ft
Area of wetlands = 1.18 mi <sup>2</sup>	Mean basin slope = 1.75 percent	Mean elevation = 219 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01073000, 01096000, 01097300, 01101000, 01162500.

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-02-93	0.96	7-07-94	0.81	6-20-95	2.44	8-10-95	0.74
7-09-93	.49	7-12-94	.77	7-24-95	.15	8-22-95	.050
7-19-93	.022	8-10-94	.36				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.12	21.4	70	3.90	22.6
98	.16	17.7	65	5.86	25.9
97	.20	15.1	60	8.83	29.1
95	.30	12.0	55	13.0	32.0
93	.42	10.7	50	19.4	35.1
90	.60	10.7	August median	1.11	13.4
85	.98	12.6	7Q10	.10	26.9
80	1.63	15.8	7Q2	.34	15.5
75	2.59	19.4			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**IPSWICH RIVER BASIN**

01101850 Pye Brook (Head of Howlett Brook) near Topsfield, MA

LOCATION.--Lat 42°39'17", long 70°57'12", Essex County, at bridge on Haverhill Street 1.2 mi north of Topsfield.

PERIOD OF RECORD.--1970–71, 1994–96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 6.66 mi <sup>2</sup>	Area of water bodies = 0.32 mi <sup>2</sup>	Minimum elevation = 59 ft
Area of stratified drift = 5.13 mi <sup>2</sup>	Total length of streams = 15.6 mi	Maximum elevation = 308 ft
Area of wetlands = 0.73 mi <sup>2</sup>	Mean basin slope = 1.12 percent	Mean elevation = 181 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01073000, 01096000, 01097300, 01105600, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-08-70	7.20	7-12-94	5.46	7-24-95	0.53	8-06-96	1.77
8-27-70	1.50	8-10-94	.09	8-10-95	.93	8-20-96	1.88
5-24-71	23.0	6-20-95	3.90	8-22-95	.11	9-06-96	.82
7-07-94	6.91						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.25	29.8	70	10.0	27.6
98	.38	25.4	65	14.5	30.6
97	.48	22.7	60	21.7	33.7
95	.74	19.4	55	31.8	36.5
93	1.07	17.5	50	46.4	39.0
90	1.61	16.8	August median	3.17	19.1
85	2.70	18.1	7Q10	.20	34.4
80	4.51	21.2	7Q2	.77	21.5
75	6.90	24.5			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**NORTH COASTAL BASIN**  
01102053 Crane Brook at Danvers, MA

LOCATION.--Lat 42°33'34", long 70°56'55", Essex County, on Pine Street, 0.5 mi southwest of Danvers center.

PERIOD OF RECORD.--1994-96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 2.72 mi <sup>2</sup>	Area of water bodies = 0.01 mi <sup>2</sup>	Minimum elevation = 59 ft
Area of stratified drift = 1.72 mi <sup>2</sup>	Total length of streams = 0.54 mi	Maximum elevation = 253 ft
Area of wetlands = 0.02 mi <sup>2</sup>	Mean basin slope = 2.41 percent	Mean elevation = 149 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01073000, 01096000, 01097300, 01105600, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-07-94	0.89	6-20-95	1.32	8-22-95	0.43	8-20-96	0.62
7-12-94	.98	7-24-95	.54	8-06-96	1.13	9-06-96	.69
8-10-94	.71	8-10-95	.66				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.46	7.4	70	1.36	6.9
98	.49	6.3	65	1.64	8.0
97	.52	5.4	60	2.00	9.0
95	.57	4.5	55	2.39	10.0
93	.62	3.9	50	2.85	10.9
90	.69	3.7	August median	.84	4.3
85	.78	4.0	7Q10	.47	9.4
80	.94	4.9	7Q2	.58	5.9
75	1.13	6.0			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Mystic River subbasin)  
01102470 Sweetwater Brook at Stoneham, MA**

LOCATION.--Lat 42°28'45", long 71°06'44", Middlesex County, at culvert on Maple Street, 0.6 mi west of Stoneham.

PERIOD OF RECORD.--1973–74, 1994–96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 2.08 mi <sup>2</sup>	Area of water bodies = 0.00 mi <sup>2</sup>	Minimum elevation = 59 ft
Area of stratified drift = 0.32 mi <sup>2</sup>	Total length of streams = 0.54 mi	Maximum elevation = 253 ft
Area of wetlands = 0.00 mi <sup>2</sup>	Mean basin slope = 2.41 percent	Mean elevation = 149 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01097300, 01105600

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-11-73	0.93	10-16-73	0.13	8-10-94	0.27	8-22-95	0.020
6-14-73	1.20	7-29-74	.10	6-20-95	.49	8-06-96	.52
8-06-73	1.00	7-07-94	.33	7-24-95	.088	8-20-96	.32
8-09-73	.78	7-12-94	.31	8-10-95	.11	9-06-96	.25
9-28-73	.22						

**ESTIMATED STREAMFLOW STATISTICS.---**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.050	15.4	70	0.55	9.1
98	.066	13.5	65	.66	9.9
97	.080	12.1	60	.79	10.8
95	.11	10.3	55	.92	11.6
93	.14	9.1	50	1.09	12.6
90	.19	8.1	August median	.29	7.9
85	.27	7.7	7Q10	.043	19.4
80	.36	7.8	7Q2	.12	12.6
75	.45	8.4			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Mystic River subbasin)**  
**01102480 Aberjona River at Swanton Street, at Winchester, MA**

LOCATION.--Lat 42°27'39", long 71°08'15", Middlesex County, 20 ft upstream from bridge on Swanton Street, 0.6 mi north of Winchester.

PERIOD OF RECORD.--1973–75, 1989–90.

REMARKS.-- Flow affected by municipal and industrial diversions and regulation by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 13.4 mi <sup>2</sup>	Area of water bodies = 0.11 mi <sup>2</sup>	Minimum elevation = 20 ft
Area of stratified drift = 6.70 mi <sup>2</sup>	Total length of streams = 15.1 mi	Maximum elevation = 277 ft
Area of wetlands = 0.27 mi <sup>2</sup>	Mean basin slope = 1.98 percent	Mean elevation = 138 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01097300, 01105600

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-12-73	7.30	3-27-74	21.0	10-09-74	3.20	9-07-89	3.89
6-14-73	22.0	7-29-74	2.80	10-10-74	2.90	7-11-90	5.05
8-07-73	8.30	8-09-74	1.30	7-25-89	4.38	8-30-90	14.3
10-15-73	2.30	9-13-74	1.30	8-28-89	5.36	9-06-90	9.05
10-16-73	2.10						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.47	30.4	70	5.96	10.2
98	.64	26.7	65	7.08	11.0
97	.82	23.9	60	8.49	12.1
95	1.18	20.0	55	9.89	13.2
93	1.51	17.4	50	11.4	14.5
90	2.04	14.4	August median	3.12	11.3
85	2.84	11.8	7Q10	.37	34.4
80	3.86	10.3	7Q2	1.16	21.0
75	4.83	9.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Mystic River subbasin)  
01102490 Shaker Glen Brook near Woburn, MA**

LOCATION.--Lat 42°28'16", long 71°10'34", Middlesex County, at culvert on Lexington Street, 1.3 mi west of Woburn.

PERIOD OF RECORD.--1973-74, 1992-94.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 3.05 mi <sup>2</sup>	Area of water bodies = 0.01 mi <sup>2</sup>	Minimum elevation = 15 ft
Area of stratified drift = 0.34 mi <sup>2</sup>	Total length of streams = 5.06 mi	Maximum elevation = 377 ft
Area of wetlands = 0.04 mi <sup>2</sup>	Mean basin slope = 3.21 percent	Mean elevation = 194 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01105600, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-09-73	2.20	8-09-74	0.56	9-17-92	0.73	7-12-94	0.45
10-02-73	.81	9-13-74	.76	7-02-93	.42	8-03-94	.27
10-27-73	.85	8-24-92	1.57	7-19-93	.17	8-10-94	.25
7-29-74	.84						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.19	15.4	70	1.45	12.5
98	.24	13.1	65	1.67	13.9
97	.28	11.7	60	1.95	15.4
95	.36	9.6	55	2.22	16.7
93	.45	8.3	50	2.47	17.8
90	.58	7.6	August median	.83	8.5
85	.77	8.0	7Q10	.17	18.3
80	.99	9.4	7Q2	.37	10.8
75	1.20	10.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Mystic River subbasin)  
01103015 Mill Brook at Arlington, MA**

LOCATION.--Lat 42°25'20", long 71°08'59", Middlesex County, 1,200 ft upstream from mouth, 0.4 mi northeast of Arlington.

PERIOD OF RECORD.--1973–74, 1989–91.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 5.35 mi <sup>2</sup>	Area of water bodies = 0.05 mi <sup>2</sup>	Minimum elevation = 15 ft
Area of stratified drift = 2.26 mi <sup>2</sup>	Total length of streams = 10.5 mi	Maximum elevation = 377 ft
Area of wetlands = 0.13 mi <sup>2</sup>	Mean basin slope = 3.21 percent	Mean elevation = 194 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01097300, 01105600, 01101000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-06-73	3.90	10-02-73	1.60	7-26-89	1.22	8-30-90	3.98
6-11-73	3.40	10-27-73	1.20	8-29-89	1.35	9-06-90	2.95
6-15-73	4.10	7-29-74	.83	9-07-89	1.37	7-12-91	1.10
8-06-73	3.90	8-09-74	.64	7-11-90	2.38	7-18-91	1.00
8-09-73	3.20	9-13-74	3.40	8-03-90	1.83	9-13-91	1.16

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.45	15.4	70	2.79	6.8
98	.57	13.2	65	3.17	7.6
97	.67	11.7	60	3.6	8.5
95	.87	9.6	55	4.01	9.3
93	1.04	8.2	50	4.48	10.2
90	1.29	6.8	August median	1.76	5.8
85	1.64	5.8	7Q10	.38	18.2
80	2.04	5.7	7Q2	.84	11.0
75	2.41	6.1			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103200 Charles River at Bellingham, MA

LOCATION.--Lat 42°05'38", long 71°28'56", Norfolk County, at bridge on Depot Street, 800 ft downstream from Box Pond, 0.6 mi northwest of Bellingham.

PERIOD OF RECORD.--1967, 1969–70, 1982, 1989–90.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 14.5 mi <sup>2</sup>	Area of water bodies = 0.38 mi <sup>2</sup>	Minimum elevation = 222 ft
Area of stratified drift = 3.74 mi <sup>2</sup>	Total length of streams = 33.9 mi	Maximum elevation = 583 ft
Area of wetlands = 0.46 mi <sup>2</sup>	Mean basin slope = 2.92 percent	Mean elevation = 359 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-24-67	4.25	9-17-69	4.01	8-26-70	9.40	7-25-89	16.4
9-07-67	4.73	10-31-69	5.10	9-14-70	2.30	8-28-89	11.5
10-02-68	1.69	4-06-70	80.0	8-24-82	5.30	9-05-89	8.25
10-18-68	2.19	4-21-70	32.0	8-30-82	6.00	7-11-90	3.54
4-02-69	38.2	7-29-70	2.80	9-13-82	2.60	8-30-90	13.3
5-28-69	10.7	8-12-70	4.00	9-20-82	6.70	9-06-90	8.49

**ESTIMATED STREAMFLOW STATISTICS.**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.50	6.8	70	8.88	3.6
98	1.83	6.2	65	10.5	3.8
97	2.12	5.7	60	12.3	4.1
95	2.57	5.1	55	14.1	4.4
93	3.02	4.7	50	16.2	4.7
90	3.69	4.2	August median	5.12	3.8
85	4.76	3.8	7Q10	1.18	9.2
80	6.06	3.6	7Q2	2.53	6.4
75	7.38	3.5			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103217 Hopping Brook near West Medway, MA

LOCATION.--Lat 42°08'31", long 71°27'21", Norfolk County, at culvert on West Street, 1.2 mi west of West Medway.

PERIOD OF RECORD.--1968-71, 1983, 1989-90.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 10.1 mi <sup>2</sup>	Area of water bodies = 0.06 mi <sup>2</sup>	Minimum elevation = 206 ft
Area of stratified drift = 3.95 mi <sup>2</sup>	Total length of streams = 22.9 mi	Maximum elevation = 511 ft
Area of wetlands = 0.76 mi <sup>2</sup>	Mean basin slope = 2.35 percent	Mean elevation = 338 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-30-68	0.060	9-17-69	0.64	8-17-83	0.53	7-10-90	1.42
9-24-68	.040	9-25-69	.81	7-25-89	10.8	8-30-90	8.72
10-03-68	.020	10-31-69	1.30	8-28-89	5.57	9-06-90	3.58
7-11-69	.28	4-22-71	20.0	9-06-89	2.74		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.009	12.4	70	3.71	7.2
98	.029	11.0	65	5.24	8.0
97	.061	10.2	60	7.31	9.0
95	.13	9.0	55	9.78	9.9
93	.23	8.2	50	12.7	10.9
90	.40	7.3	August median	1.11	7.4
85	.86	6.5	7Q10	.005	23.1
80	1.49	6.4	7Q2	.13	16.0
75	2.38	6.6		3.71	7.2

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103240 Mine Brook near Franklin, MA

LOCATION.--Lat 42°07'29", long 71°25'52", Norfolk County, at bridge on Pond Street, 3.4 mi northwest of Franklin.

PERIOD OF RECORD.--1968–70, 1983, 1989–91.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 14.1 mi <sup>2</sup>	Area of water bodies = 0.20 mi <sup>2</sup>	Minimum elevation = 180 ft
Area of stratified drift = 6.98 mi <sup>2</sup>	Total length of streams = 26.8 mi	Maximum elevation = 478 ft
Area of wetlands = 0.87 mi <sup>2</sup>	Mean basin slope = 2.44 percent	Mean elevation = 328 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-24-68	4.75	10-31-69	5.60	8-17-83	4.20	8-30-90	13.3
10-02-68	3.73	4-06-70	91.0	8-24-83	3.90	9-06-90	5.57
4-02-69	63.5	4-21-70	28.0	7-26-89	15.5	6-26-91	1.28
7-10-69	3.33	7-29-70	3.10	8-28-89	14.4	7-18-91	1.00
9-17-69	6.73	8-12-70	4.40	9-05-89	11.5	9-12-91	6.09
9-25-69	6.28	8-26-70	5.50	7-10-90	5.07		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.63	7.7	70	10.1	4.5
98	1.98	7.0	65	12.1	4.8
97	2.29	6.4	60	14.2	5.1
95	2.78	5.8	55	16.5	5.4
93	3.28	5.4	50	19.0	5.8
90	4.02	4.9	August median	5.68	4.5
85	5.22	4.5	7Q10	1.33	9.9
80	6.67	4.3	7Q2	2.81	6.9
75	8.24	4.3			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103253 Chicken Brook near West Medway, MA

LOCATION.--Lat 42°08'27", long 71°25'26", Norfolk County, at culvert on Cottage Street, 3.5 mi southeast of West Medway.

PERIOD OF RECORD.--1968–71, 1983, 1989–91.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 7.23 mi <sup>2</sup>	Area of water bodies = 0.06 mi <sup>2</sup>	Minimum elevation = 172 ft
Area of stratified drift = 1.09 mi <sup>2</sup>	Total length of streams = 18.5 mi	Maximum elevation = 445 ft
Area of wetlands = 0.36 mi <sup>2</sup>	Mean basin slope = 2.29 percent	Mean elevation = 306 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-30-68	0.38	10-12-70	0.71	8-25-83	0.54	8-30-90	4.66
9-24-68	.44	6-24-83	3.70	7-25-89	4.85	9-06-90	2.65
10-03-68	.44	7-11-83	1.20	8-28-89	3.78	6-27-91	.74
7-10-69	.45	7-19-83	.56	9-06-89	2.84	7-18-91	.28
9-17-69	.96	8-10-83	.38	7-10-90	1.69	9-12-91	.95
9-25-69	1.94	8-17-83	.64				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.26	9.9	70	2.53	7.2
98	.32	8.8	65	3.28	8.3
97	.39	8.0	60	4.18	9.4
95	.46	7.2	55	5.22	10.6
93	.56	6.5	50	6.41	11.6
90	.72	5.7	August median	1.04	5.4
85	.99	5.2	7Q10	.18	14.8
80	1.36	5.4	7Q2	.48	9.7
75	1.86	6.1			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103300 Mill River near Norfolk, MA

LOCATION.--Lat 42°07'21", long 71°21'59", Norfolk County, at bridge on Miller Street, 0.9 mi above mouth, 2.1 mi west of Norfolk.

PERIOD OF RECORD.--1968–69, 1971, 1983, 1989–90.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 13.8 mi <sup>2</sup>	Area of water bodies = 0.68 mi <sup>2</sup>	Minimum elevation = 139 ft
Area of stratified drift = 9.79 mi <sup>2</sup>	Total length of streams = 24.2 mi	Maximum elevation = 456 ft
Area of wetlands = 0.49 mi <sup>2</sup>	Mean basin slope = 2.61 percent	Mean elevation = 295 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-30-68	6.33	9-17-69	9.57	8-24-83	11.0	7-10-90	16.0
10-01-68	7.58	9-25-69	8.60	9-06-89	18.8	8-30-90	10.8
10-18-68	6.50	10-08-70	4.20	9-13-89	15.5	9-07-90	9.85
7-10-69	11.1	4-22-71	26.0				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	5.40	7.8	70	15.7	4.9
98	6.14	6.8	65	17.4	5.6
97	6.75	6.0	60	19.2	6.3
95	7.72	5.1	55	20.9	7.0
93	8.56	4.5	50	22.7	7.7
90	9.63	4.1	August median	11.5	3.8
85	11.0	3.8	7Q10	4.71	9.4
80	12.4	3.9	7Q2	7.62	5.5
75	13.9	4.3			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103330 Stop River near Medfield, MA

LOCATION.--Lat 42°09'03", long 71°18'18", Norfolk County, at culvert on Seekonk Street, 2.5 mi south of Medfield.

PERIOD OF RECORD.--1967–71, 1983, 1989–90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 12.8 mi <sup>2</sup>	Area of water bodies = 0.31 mi <sup>2</sup>	Minimum elevation = 115 ft
Area of stratified drift = 7.43 mi <sup>2</sup>	Total length of streams = 27.0 mi	Maximum elevation = 358 ft
Area of wetlands = 0.95 mi <sup>2</sup>	Mean basin slope = 1.76 percent	Mean elevation = 236 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-24-67	5.98	10-16-68	5.72	10-07-69	13.0	9-07-89	12.9
9-08-67	6.00	4-02-69	88.3	10-12-70	3.80	7-11-90	7.09
8-30-68	2.72	7-11-69	3.85	8-24-83	8.20	8-30-90	15.5
9-25-68	3.77	9-19-69	8.59	7-25-89	6.29	9-07-90	15.9
10-03-68	3.13	9-25-69	6.53	8-28-89	18.3		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	2.44	7.2	70	13.0	4.6
98	2.91	6.5	65	15.5	5.1
97	3.31	5.9	60	18.1	5.6
95	3.95	5.3	55	21.0	6.1
93	4.61	4.9	50	24.0	6.7
90	5.59	4.4	August median	7.59	4.1
85	7.08	4.0	7Q10	2.03	9.5
80	8.79	4.0	7Q2	4.02	6.4
75	10.8	4.2			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103395 Bogastow Brook, Orchard Street, near Millis, MA

LOCATION.--Lat 42°11'17", long 71°21'46", Norfolk County, 100 ft downstream from bridge on Orchard Street, 200 ft downstream from outlet of Bogastow Pond, and 1.5 mi north of Millis.

PERIOD OF RECORD.--1967, 1989–90.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 23.4 mi <sup>2</sup>	Area of water bodies = 0.35 mi <sup>2</sup>	Minimum elevation = 119 ft
Area of stratified drift = 9.64 mi <sup>2</sup>	Total length of streams = 65.7 mi	Maximum elevation = 444 ft
Area of wetlands = 2.36 mi <sup>2</sup>	Mean basin slope = 2.09 percent	Mean elevation = 270 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-24-67	5.20	7-25-89	4.66	9-07-89	6.78	8-30-90	12.6
9-08-67	5.04	8-28-89	12.50	7-10-90	4.49	9-06-90	6.12

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	3.80	17.2	70	7.42	5.1
98	3.86	15.0	65	8.92	6.2
97	3.95	13.6	60	11.0	7.6
95	4.05	11.8	55	13.7	8.9
93	4.19	10.2	50	17.1	10.3
90	4.41	8.4	August median	5.19	5.9
85	4.89	6.2	7Q10	3.72	21.2
80	5.64	4.9	7Q2	4.10	12.9
75	6.34	4.6			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103400 Charles River near Medfield, MA

LOCATION.--Lat 42°12'36", long 71°21'09", Norfolk County, at old highway bridge, 600 ft upstream from bridge on State Highway 27, 2.9 mi northwest of Medfield.

PERIOD OF RECORD.--1969–70, 1982–83, 1989–90.

REMARKS.-- Flow affected by municipal well withdrawals and regulation by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 140 mi <sup>2</sup>	Area of water bodies = 2.71 mi <sup>2</sup>	Minimum elevation = 114 ft
Area of stratified drift = 65.6 mi <sup>2</sup>	Total length of streams = 333 mi	Maximum elevation = 583 ft
Area of wetlands = 10.6 mi <sup>2</sup>	Mean basin slope = 2.20 percent	Mean elevation = 314 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
4-03-69	1,030	4-21-70	285	8-31-82	49.0	8-29-89	143
6-03-69	186	7-28-70	42.0	9-10-82	49.0	9-06-89	128
7-11-69	36.8	8-12-70	25.0	9-13-82	42.0	7-11-90	33.0
9-17-69	64.3	8-26-70	136	9-20-82	30.0	8-30-90	182
9-25-69	50.3	9-14-70	27.0	7-20-83	37.0	9-06-90	84.9
4-07-70	1,160	8-25-82	60.0	8-25-83	47.0		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	16.6	6.7	70	111	3.7
98	20.4	6.1	65	133	3.8
97	23.7	5.7	60	158	4.1
95	28.8	5.2	55	184	4.4
93	34.4	4.7	50	214	4.7
90	42.6	4.3	August median	61.7	3.9
85	56.6	3.8	7Q10	12.6	9.6
80	73.8	3.6	7Q2	28.4	6.8
75	91.2	3.6			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103435 Waban Brook at Wellesley, MA

LOCATION.--Lat 42°17'13", long 71°18'05", Norfolk County, on access road of Wellesley College Golf course, 800 ft upstream from State Highway 16, 0.8 mi southwest of Wellesley.

PERIOD OF RECORD.--1983, 1989–90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 10.2 mi <sup>2</sup>	Area of water bodies = 0.50 mi <sup>2</sup>	Minimum elevation = 110 ft
Area of stratified drift = 6.24 mi <sup>2</sup>	Total length of streams = 19.0 mi	Maximum elevation = 370 ft
Area of wetlands = 0.48 mi <sup>2</sup>	Mean basin slope = 1.81 percent	Mean elevation = 236 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
6-24-83	5.50	8-10-83	0.62	9-08-89	3.77	8-30-90	12.4
7-11-83	1.00	8-18-83	.57	9-13-89	3.04	9-06-90	5.50
7-19-83	.75	8-26-83	.54	7-19-90	2.94		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.25	21.7	70	4.68	10.5
98	.33	19.2	65	6.95	12.7
97	.43	17.3	60	10.1	15.0
95	.51	15.4	55	14.1	17.2
93	.67	13.4	50	19.6	19.3
90	.96	11.2	August median	1.51	9.4
85	1.46	9.4	7Q10	.13	29.8
80	2.05	8.7	7Q2	.54	18.2
75	2.94	8.8			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01103440 Fuller Brook at Wellesley, MA

LOCATION.--Lat 42°17'45", long 71°17'18", Norfolk County, at Brook Street bridge at Wellesley.

PERIOD OF RECORD.--1959–60, 1968–71, 1983, 1989, 1991.

REMARKS.-- None.

BASIN CHARACTERISTICS.--Not available.

STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

DISCHARGE MEASUREMENTS.--

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-30-68	0.65	9-15-69	1.04	8-10-70	0.30	7-25-89	2.82
9-24-68	.20	9-23-69	.97	10-09-70	.63	8-28-89	1.80
10-15-68	.32	10-07-69	1.40	4-22-71	5.00	9-07-89	2.00
7-07-69	.46	7-27-70	.44	8-18-83	.16	7-18-91	.09
8-25-69	.48	7-31-70	.47				

ESTIMATED STREAMFLOW STATISTICS.--

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.15	14.6	70	1.70	10.7
98	.19	12.9	65	2.18	12.2
97	.23	11.5	60	2.74	13.7
95	.30	10.1	55	3.40	15.1
93	.38	9.1	50	4.18	16.6
90	.50	8.3	August median	.74	8.0
85	.70	7.9	7Q10	.11	19.1
80	.95	8.3	7Q2	.31	11.8
75	1.27	9.3			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

CHARLES RIVER BASIN

01103445 Fuller Brook at Wellesley College Golf Course at Wellesley, MA

LOCATION.--Lat 42°17'00", long 71°17'57", Norfolk County, at furthest downstream footbridge on Wellesley College Golf Course, 200 ft upstream from confluence with Waban Brook, 0.9 mi southwest of Wellesley.

PERIOD OF RECORD.--1989-91.

REMARKS.-- None.

BASIN CHARACTERISTICS.--

Drainage area = mi <sup>2</sup>	Area of water bodies = mi <sup>2</sup>	Minimum elevation = ft
Area of stratified drift = mi <sup>2</sup>	Total length of streams = mi	Maximum elevation = ft
Area of wetlands = mi <sup>2</sup>	Mean basin slope = percent	Mean elevation = ft

STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--

01097300, 01105600, 01111200, 01111300, 01109000, 01105730

DISCHARGE MEASUREMENTS.--

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-25-89	8.10	9-07-89	3.12	8-30-90	4.43	9-12-91	0.89
8-28-89	3.99	7-19-90	1.80	9-06-90	2.52		

ESTIMATED STREAMFLOW STATISTICS.--

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.34	30.6	70	3.76	6.3
98	.46	26.6	65	4.44	6.5
97	.57	23.9	60	5.56	7.8
95	.77	20.2	55	6.93	9.7
93	1.01	17.2	50	8.51	11.8
90	1.41	13.6	August median	2.67	8.4
85	2.32	9.0	7Q10	.24	36.1
80	3.08	7.9	7Q2	.73	21.7
75	3.29	7.0			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**CHARLES RIVER BASIN**  
01104470 Stony Brook at Waltham, MA

LOCATION.--Lat 42°22'04", long 71°16'16", Middlesex County, at railroad bridge, 0.5 mi upstream from Stony Brook Reservoir, 1.0 mi west of Waltham.

PERIOD OF RECORD.--1989-90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 22.3 mi <sup>2</sup>	Area of water bodies = 0.29 mi <sup>2</sup>	Minimum elevation = 90 ft
Area of stratified drift = 10.6 mi <sup>2</sup>	Total length of streams = 40.4 mi	Maximum elevation = 358 ft
Area of wetlands = 1.15 mi <sup>2</sup>	Mean basin slope = 2.85 percent	Mean elevation = 199 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-25-89	12.3	9-08-89	39.1	8-30-90	10.4	9-06-90	5.90
8-28-89	2.40	7-11-90	15.9				

ESTIMATED STREAMFLOW STATISTICS.-- Not determined because correlations of streamflow measurements at Stony Brook with same-day mean streamflows at nearby streamflow-gaging stations were poor.

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01104840 Neponset River at Walpole, MA**

LOCATION.--Lat 42°08'28", long 71°15'25", Norfolk County, at culvert on Main Street, 0.4 mi southwest of Walpole.

PERIOD OF RECORD.--1967–68, 1989–90.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 11.4 mi <sup>2</sup>	Area of water bodies = 0.65 mi <sup>2</sup>	Minimum elevation = 147 ft
Area of stratified drift = 8.42 mi <sup>2</sup>	Total length of streams = 22.0 mi	Maximum elevation = 470 ft
Area of wetlands = 1.04 mi <sup>2</sup>	Mean basin slope = 2.47 percent	Mean elevation = 305 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
10-06-66	2.74	6-07-67	19.7	9-06-67	11.5	9-06-89	8.24
12-19-66	8.19	7-06-67	19.4	9-20-67	5.96	7-11-90	3.61
1-25-67	10.6	8-10-67	15.5	10-12-67	7.15	8-30-90	13.5
3-23-67	23.9	8-17-67	8.82	7-25-89	6.00	9-07-90	7.78
5-02-67	21.2	8-21-67	7.45	8-28-89	10.2		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	1.98	12.1	70	8.97	4.1
98	2.35	10.9	65	10.3	4.0
97	2.69	10.0	60	11.8	4.2
95	3.24	8.9	55	13.3	4.6
93	3.73	8.0	50	15.0	5.1
90	4.45	7.0	August median	5.83	5.6
85	5.49	5.9	7Q10	1.63	14.0
80	6.65	5.0	7Q2	3.21	9.3
75	7.74	4.4			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01104850 Mine Brook at Walpole, MA**

LOCATION.--Lat 42°09'14", long 71°15'25", Norfolk County, at inlet to Turner Pond, 0.75 mi northwest of Walpole.

PERIOD OF RECORD.--Continuous record during 1967–68, 1985–87, 1989–91.

REMARKS.-- Flow affected by municipal well withdrawals.

**BASIN CHARACTERISTICS.--**

Drainage area = 5.99 mi <sup>2</sup>	Area of water bodies = 0.07 mi <sup>2</sup>	Minimum elevation = 144 ft
Area of stratified drift = 3.64 mi <sup>2</sup>	Total length of streams = 11.0 mi	Maximum elevation = 436 ft
Area of wetlands = 0.70 mi <sup>2</sup>	Mean basin slope = 2.91 percent	Mean elevation = 283 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-16-66	0.81	8-20-68	0.18	5-19-86	3.40	7-11-90	2.10
9-12-66	.79	8-22-68	.03	7-22-86	4.00	8-30-90	7.54
10-06-66	1.28	8-27-68	.00	7-30-87	.28	9-07-90	4.58
5-01-67	19.7	10-18-68	.00	7-25-89	6.09	6-27-91	.72
9-06-67	3.79	5-02-85	4.20	8-28-89	8.85	7-18-91	.22
9-20-67	3.02	4-22-86	7.20	9-06-89	6.40	9-12-91	2.72
8-19-68	.26	5-14-86	3.90				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.11	25.3	70	4.52	13.4
98	.16	22.3	65	6.48	14.9
97	.22	20.2	60	8.97	16.6
95	.33	17.7	55	12.1	18.4
93	.48	15.7	50	16.0	20.1
90	.74	13.7	August median	1.49	12.2
85	1.27	12.2	7Q10	.079	30.2
80	2.04	11.8	7Q2	.33	19.0
75	3.07	12.2		4.52	13.4

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01104980 Hawes Brook at Norwood, MA**

LOCATION.--Lat 42°10'26", long 71°12'31", Norfolk County, at culvert on Washington Street, at Norwood, MA.

PERIOD OF RECORD.--1967-68, 1986-87, 1989-90, 1994.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 8.64 mi <sup>2</sup>	Area of water bodies = 0.46 mi <sup>2</sup>	Minimum elevation = 59 ft
Area of stratified drift = 2.20 mi <sup>2</sup>	Total length of streams = 15.5 mi	Maximum elevation = 396 ft
Area of wetlands = 0.31 mi <sup>2</sup>	Mean basin slope = 2.27 percent	Mean elevation = 222 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
10-06-66	0.74	7-07-67	11.6	7-29-87	1.00	8-30-90	10.4
12-19-66	2.68	8-11-67	6.41	7-25-89	8.07	9-07-90	2.88
1-25-67	3.98	10-12-67	2.76	8-28-89	4.62	7-19-94	.76
3-23-67	21.8	10-31-85	.50	9-06-89	3.66	8-16-94	1.00
6-07-67	11.7	8-14-86	4.00	7-12-90	2.86	10-18-94	1.23

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.38	10.7	70	3.60	3.8
98	.47	9.8	65	4.59	3.7
97	.53	9.2	60	5.85	3.9
95	.67	8.3	55	7.24	4.2
93	.81	7.6	50	8.93	4.7
90	1.05	6.7	August median	1.71	5.6
85	1.51	5.6	7Q10	.29	15.0
80	2.07	4.8	7Q2	.66	10.5
75	2.71	4.2			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01105270 Massapoag Brook at Canton, MA**

LOCATION.--Lat 42°08'59", long 71°08'58", Norfolk County, 25 ft upstream from bridge on Walnut Street, 0.7 mi south of Canton.

PERIOD OF RECORD.--1986–87, 1989–90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 10.4 mi <sup>2</sup>	Area of water bodies = 0.72 mi <sup>2</sup>	Minimum elevation = 104 ft
Area of stratified drift = 6.45 mi <sup>2</sup>	Total length of streams = 29.4 mi	Maximum elevation = 490 ft
Area of wetlands = 0.73 mi <sup>2</sup>	Mean basin slope = 2.50 percent	Mean elevation = 284 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
5-19-86	3.60	7-26-89	3.27	9-07-89	5.06	8-30-90	1.70
7-24-86	4.90	8-28-89	6.93	7-11-90	1.49	9-06-90	1.37
7-29-87	1.30						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.32	46.5	70	3.50	12.8
98	.44	39.9	65	4.37	14.7
97	.54	35.5	60	5.49	17.6
95	.73	29.6	55	6.78	20.8
93	.95	25.1	50	8.28	24.2
90	1.30	20.0	August median	2.10	14.5
85	1.89	15.3	7Q10	.24	54.0
80	2.43	13.3	7Q2	.70	30.3
75	2.87	12.5			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01105300 Steep Hill Brook at Canton, MA**

LOCATION.--Lat 42°08'39", long 71°08'14", Norfolk County, at culvert on Bailey Street, 1.0 mi southeast of Canton.

PERIOD OF RECORD.--1966–68, 1985–90.

REMARKS.-- Flow affected by regulation by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 6.68 mi <sup>2</sup>	Area of water bodies = 0.16 mi <sup>2</sup>	Minimum elevation = 106 ft
Area of stratified drift = 5.57 mi <sup>2</sup>	Total length of streams = 12.7 mi	Maximum elevation = 299 ft
Area of wetlands = 0.14 mi <sup>2</sup>	Mean basin slope = 2.13 percent	Mean elevation = 204 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-13-66	2.13	8-23-67	5.99	10-31-85	4.69	8-28-89	17.9
10-06-66	4.42	9-07-67	5.91	7-24-86	8.60	9-06-89	12.9
7-12-67	9.16	9-21-67	5.34	7-29-87	3.90	7-11-90	6.00
8-02-67	8.46	9-23-68	5.54	6-28-88	3.80	8-30-90	6.27
8-18-67	7.00	5-15-85	8.04	7-26-89	11.2	9-06-90	3.63

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	2.13	11.4	70	8.09	5.1
98	2.48	10.1	65	9.36	5.9
97	2.77	9.1	60	10.7	6.8
95	3.19	8.0	55	12.1	7.7
93	3.56	7.2	50	13.5	8.6
90	4.09	6.2	August median	5.26	4.9
85	4.92	5.1	7Q10	1.78	13.6
80	5.84	4.6	7Q2	3.2.0	8.3
75	6.86	4.6		8.09	5.1

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Neponset River subbasin)  
01105554 Neponset River near Dedham, MA**

LOCATION.--Lat 42°12'33", long 71°08'47", Norfolk County, 5 ft upstream from bridge on Green Lodge Street, 0.1 mi upstream from State Highway 128, 2.9 mi southeast of Dedham.

PERIOD OF RECORD.--1989-90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 88.5 mi <sup>2</sup>	Area of water bodies = 3.28 mi <sup>2</sup>	Minimum elevation = 49 ft
Area of stratified drift = 51.2 mi <sup>2</sup>	Total length of streams = 188 mi	Maximum elevation = 490 ft
Area of wetlands = 6.43 mi <sup>2</sup>	Mean basin slope = 2.48 percent	Mean elevation = 265 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01101000, 01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-26-89	112	9-06-89	54.4	8-30-90	101	9-06-90	54.1
8-29-89	89.7	7-19-90	34.5				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	7.20	30.1	70	65.3	5.4
98	9.42	26.7	65	78.0	5.4
97	11.4	24.4	60	97.9	6.8
95	14.6	21.4	55	120	8.7
93	17.7	18.9	50	145	10.8
90	22.3	16.0	August median	35	10.8
85	30.7	12.0	7Q10	5.14	35.8
80	42.5	8.5	7Q2	14.3	22.6
75	54.4	6.4		65.3	5.4

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Weymouth–Weir Rivers subbasin)  
01105568 Cochato River at Holbrook, MA**

LOCATION.--Lat 42°09'19", long 71°01'37", Norfolk County, at culvert on Union Street, 0.9 mi west of Holbrook.

PERIOD OF RECORD.--1992–94.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 4.31 mi <sup>2</sup>	Area of water bodies = 0.05 mi <sup>2</sup>	Minimum elevation = 118 ft
Area of stratified drift = 2.04 mi <sup>2</sup>	Total length of streams = 6.53 mi	Maximum elevation = 241 ft
Area of wetlands = 0.05 mi <sup>2</sup>	Mean basin slope = 1.30 percent	Mean elevation = 180 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01105600, 01097300, 01105730, 01109000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-14-92	0.68	7-01-93	0.30	8-25-93	0.12	8-02-94	0.14
7-29-92	.53	7-22-93	.18	7-13-94	.45	8-11-94	.14
8-24-92	1.53						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.12	20.5	70	1.21	23.2
98	.15	17.0	65	1.52	26.2
97	.19	14.8	60	1.85	29.0
95	.24	12.7	55	2.22	31.5
93	.30	11.9	50	2.65	34.1
90	.38	11.9	August median	.60	15.1
85	.53	13.8	7Q10	.093	24.9
80	.73	17.0	7Q2	.25	14.0
75	.96	20.2			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Weymouth-Weir Rivers subbasin)  
01105582 Monatiquot River at Braintree, MA**

LOCATION.--Lat 42°13'25", long 70°59'49", Norfolk County, at bridge on Middle Street, 0.7 mi northeast of Braintree.

PERIOD OF RECORD.--1967, 1989–90.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 27.4 mi <sup>2</sup>	Area of water bodies = 1.01 mi <sup>2</sup>	Minimum elevation = 59 ft
Area of stratified drift = 10.8 mi <sup>2</sup>	Total length of streams = 48.7 mi	Maximum elevation = 630 ft
Area of wetlands = 1.86 mi <sup>2</sup>	Mean basin slope = 2.33 percent	Mean elevation = 330 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01105600, 01097300, 01105730, 01109000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
8-18-67	11.3	9-20-67	4.26	9-07-89	15.7	8-30-90	14.0
8-21-67	7.36	7-25-89	31.9	7-11-90	1.64	9-06-90	6.33
9-06-67	8.95	8-28-89	21.5				

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.38	53.3	70	17.0	15.1
98	.64	44.5	65	25.1	18.7
97	.93	38.5	60	36.3	23.0
95	1.62	30.6	55	50.2	27.3
93	2.44	25.1	50	66.7	31.3
90	4.01	19.3	August median	8.15	14.1
85	6.92	14.6	7Q10	.22	64.4
80	9.83	13.8	7Q2	1.50	32.9
75	12.4	13.7			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Weymouth-Weir Rivers subbasin)  
01105610 Whitmans Pond Outlet at East Weymouth, MA**

LOCATION.--Lat 42°12'45", long 70°55'32", Norfolk County, at culvert on Pleasant Street, 0.9 mi southeast of Weymouth.

PERIOD OF RECORD.--1966–67, 1989–91.

REMARKS.-- Flow affected by regulations by dam.

**BASIN CHARACTERISTICS.--**

Drainage area = 12.5 mi <sup>2</sup>	Area of water bodies = 0.88 mi <sup>2</sup>	Minimum elevation = 26 ft
Area of stratified drift = 4.61 mi <sup>2</sup>	Total length of streams = 21.6 mi	Maximum elevation = 255 ft
Area of wetlands = 0.91 mi <sup>2</sup>	Mean basin slope = 1.88 percent	Mean elevation = 141 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-13-66	2.60	8-22-67	1.13	8-29-89	3.13	9-06-90	2.11
10-10-66	1.79	9-07-67	3.75	9-07-89	2.52	6-27-91	2.67
5-02-67	21.1	9-20-67	.49	7-11-90	1.15	7-18-91	.67
8-18-67	1.23	7-26-89	5.52	8-30-90	5.28	8-29-91	1.82

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.39	18.0	70	4.30	9.7
98	.52	15.6	65	5.38	10.9
97	.64	13.9	60	6.58	12.3
95	.85	11.9	55	7.91	13.6
93	1.08	10.4	50	9.37	14.9
90	1.42	9.0	August median	2.20	8.1
85	1.98	8.0	7Q10	.28	21.6
80	2.66	8.1	7Q2	.84	12.7
75	3.40	8.7			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Weymouth-Weir Rivers subbasin)  
01105630 Crooked Meadow River near Hingham Center, MA**

LOCATION.--Lat 42°12'53", long 70°53'06", Plymouth County, at culvert on Main Street, 1.3 mi south of Hingham Center.

PERIOD OF RECORD.--1969–71, 1994–96.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 4.91 mi <sup>2</sup>	Area of water bodies = 0.06 mi <sup>2</sup>	Minimum elevation = 29 ft
Area of stratified drift = 3.64 mi <sup>2</sup>	Total length of streams = 10.9 mi	Maximum elevation = 180 ft
Area of wetlands = 0.21 mi <sup>2</sup>	Mean basin slope = 1.63 percent	Mean elevation = 104 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01097300, 01105600, 01107530, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-23-69	1.70	10-12-70	0.85	8-11-94	0.25	8-07-96	1.79
10-15-69	1.45	7-09-71	.51	6-20-95	1.70	8-21-96	1.10
7-22-70	1.05	7-13-94	.95	8-11-95	1.05	9-05-96	2.89
9-11-70	.76	8-02-94	1.29	8-22-95	.03		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.35	14.0	70	3.19	13.4
98	.46	11.2	65	3.98	15.6
97	.56	9.4	60	4.82	17.5
95	.73	7.4	55	5.71	19.3
93	.89	6.4	50	6.71	21.0
90	1.08	6.0	August median	1.55	7.3
85	1.40	6.6	7Q10	.27	18.1
80	1.92	8.8	7Q2	.71	8.8
75	2.50	11.1			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**BOSTON HARBOR BASIN (Weymouth-Weir Rivers subbasin)  
01105640 Weir River near Hingham, MA**

LOCATION.--Lat 42°14'31", long 70°51'36", Plymouth County, at culvert on Macadam Road, 0.3 mi above Foundry Pond, 1.5 mi east of Hingham.

PERIOD OF RECORD.--1969–71, 1989–91.

REMARKS.-- Flow affected by regulations by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 14.6 mi <sup>2</sup>	Area of water bodies = 0.33 mi <sup>2</sup>	Minimum elevation = 16 ft
Area of stratified drift = 9.65 mi <sup>2</sup>	Total length of streams = 31.9 mi	Maximum elevation = 239 ft
Area of wetlands = 0.79 mi <sup>2</sup>	Mean basin slope = 1.45 percent	Mean elevation = 127 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01109000, 01105600, 01105730, 01111300, 01111200

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-17-69	1.18	10-12-70	1.10	9-07-89	6.92	6-27-91	1.58
10-15-69	1.90	7-09-71	.82	7-11-90	3.60	7-18-91	.22
7-20-70	2.20	7-26-89	7.02	8-30-90	6.96	8-29-91	2.36
9-11-70	1.10	8-28-89	8.95	9-06-90	3.09		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.47	13.8	70	5.19	7.3
98	.61	12.0	65	6.73	8.6
97	.76	10.6	60	8.54	9.9
95	.98	9.1	55	10.6	11.1
93	1.22	7.9	50	12.9	12.3
90	1.62	6.6	August median	2.51	6.0
85	2.26	5.8	7Q10	.33	18.1
80	2.99	5.8	7Q2	.99	10.7
75	3.90	6.3			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**SOUTH COASTAL BASIN**  
**01105670 Satuit River at Scituate, MA**

LOCATION.--Lat 42°11'35", long 70°43'44", Plymouth County, at bridge on Old Parish Road, at Scituate.

PERIOD OF RECORD.--1990–92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 1.61 mi <sup>2</sup>	Area of water bodies = 0.00 mi <sup>2</sup>	Minimum elevation = 6 ft
Area of stratified drift = 0.15 mi <sup>2</sup>	Total length of streams = 2.47 mi	Maximum elevation = 124 ft
Area of wetlands = 0.06 mi <sup>2</sup>	Mean basin slope = 0.81 percent	Mean elevation = 65 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01105600, 01105730, 01105870

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
7-20-90	0.22	6-27-91	0.34	8-29-91	0.28	7-29-92	0.38
8-30-90	.47	7-18-91	.13	7-14-92	.48	8-25-92	.60
9-06-90	.49						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.14	19.9	70	0.58	13.0
98	.17	16.3	65	.67	15.3
97	.19	14.4	60	.75	17.0
95	.23	11.8	55	.84	19.0
93	.26	10.0	50	.91	20.4
90	.30	8.8	August median	.41	8.8
85	.36	8.4	7Q10	.12	23.5
80	.43	9.5	7Q2	.22	13.0
75	.50	11.0			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

**SOUTH COASTAL BASIN**  
**01105810 Third Herring Brook at Hanover, MA**

LOCATION.--Lat 42°07'01", long 70°48'35", Plymouth County, at culvert on River Street, 0.5 mi northeast of Hanover.

PERIOD OF RECORD.--1969–71, 1987, 1990–92.

REMARKS.-- Flow affected by regulations by dams.

**BASIN CHARACTERISTICS.--**

Drainage area = 9.80 mi <sup>2</sup>	Area of water bodies = 0.12 mi <sup>2</sup>	Minimum elevation = 49 ft
Area of stratified drift = 5.57 mi <sup>2</sup>	Total length of streams = 18.0 mi	Maximum elevation = 197 ft
Area of wetlands = 1.08 mi <sup>2</sup>	Mean basin slope = 1.07 percent	Mean elevation = 110 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01105600, 01105730, 0115870, 01109000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-17-69	2.10	7-09-71	0.60	8-30-90	4.63	8-29-91	1.78
10-15-69	2.37	8-14-87	.72	9-07-90	1.08	7-14-92	1.57
7-22-70	.76	8-25-87	.10	6-27-91	.75	7-29-92	1.00
9-11-70	.34	7-19-90	1.11	7-18-91	.51	8-24-92	7.14
10-13-70	.54						

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.22	15.6	70	3.98	14.0
98	.32	13.0	65	5.39	16.2
97	.41	11.4	60	6.88	18.1
95	.57	9.6	55	8.75	20.0
93	.72	8.6	50	10.6	21.6
90	.96	8.1	August median	1.80	9.5
85	1.42	8.5	7Q10	.15	20.8
80	2.03	9.9	7Q2	.55	11.9
75	2.88	11.9			

**Table 3.** Descriptive information, measured basin characteristics, streamflow-gaging stations used for correlations, discharge measurements, and streamflow statistics for the low-flow partial-record stations in the network operated in Massachusetts from 1989 to 1996—*Continued*

### SOUTH COASTAL BASIN

#### 01105820 Second Herring Brook at Norwell, MA

LOCATION.--Lat 42°09'36", long 70°47'20", Plymouth County, at culvert on State Highway 123, at Norwell.

PERIOD OF RECORD.--1969–71, 1990–92.

REMARKS.-- None.

**BASIN CHARACTERISTICS.--**

Drainage area = 3.17 mi <sup>2</sup>	Area of water bodies = 0.05 mi <sup>2</sup>	Minimum elevation = 49 ft
Area of stratified drift = 0.77 mi <sup>2</sup>	Total length of streams = 6.09 mi	Maximum elevation = 197 ft
Area of wetlands = 0.28 mi <sup>2</sup>	Mean basin slope = 1.14 percent	Mean elevation = 114 ft

**STATION IDENTIFICATION NUMBERS OF GAGING STATIONS USED FOR CORRELATION.--**

01105600,01105730, 01105870, 01109000

**DISCHARGE MEASUREMENTS.--**

Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)	Date	Discharge (ft <sup>3</sup> /s)
9-17-69	0.61	10-12-70	0.26	9-06-90	0.20	7-14-92	0.56
10-15-69	.66	7-09-71	.21	6-27-91	.14	7-29-92	.13
7-20-70	.38	7-19-90	.45	7-18-91	.02	8-25-92	1.32
9-11-70	.32	8-30-90	.96	8-29-91	.47		

**ESTIMATED STREAMFLOW STATISTICS.--**

Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)	Exceedance probability (percent)	Estimated discharge (ft <sup>3</sup> /s)	Standard error (percent)
99	0.047	24.2	70	1.29	18.7
98	.071	19.9	65	1.81	21.9
97	.094	17.3	60	2.37	24.6
95	.14	14.1	55	3.08	27.4
93	.18	12.1	50	3.80	29.6
90	.26	10.8	August median	.53	12.2
85	.41	11.0	7Q10	.033	29.9
80	.62	13.0	7Q2	.14	16.1
75	.91	15.7		1.29	18.7