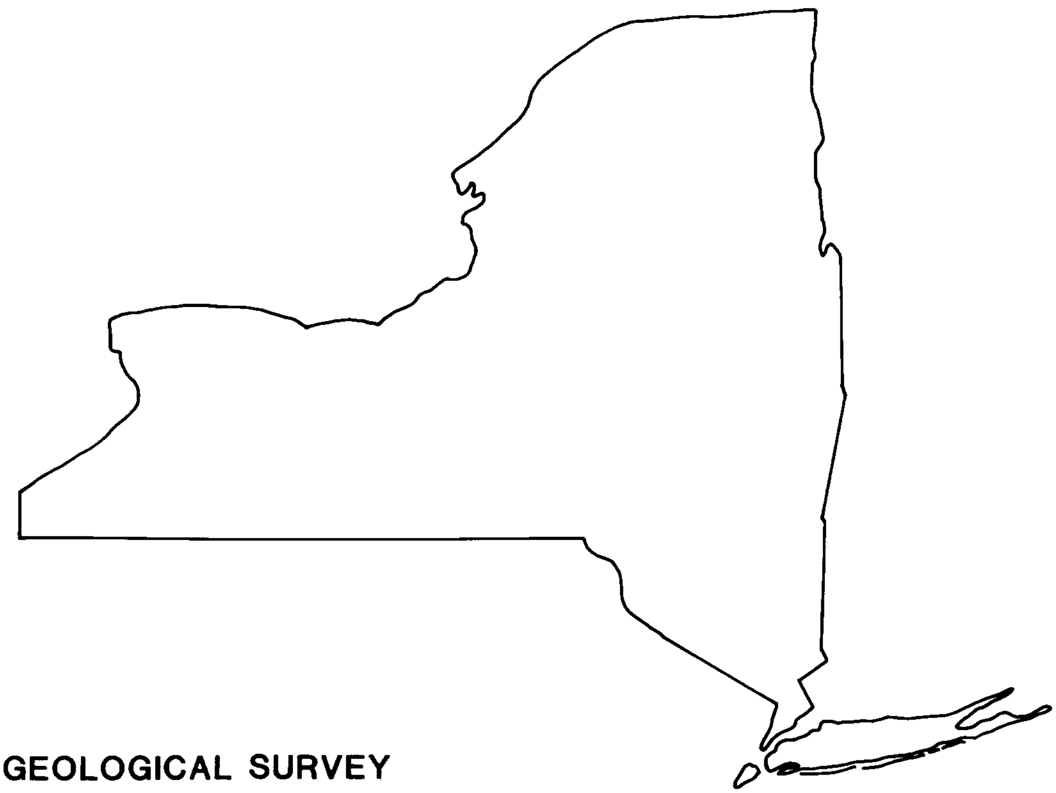
Regionalization of Flood Discharges for Rural, Unregulated Streams in New York, excluding Long Island



U.S. GEOLOGICAL SURVEY
Water-Resources Investigations
Report 90-4197

Prepared in cooperation with the
NEW YORK STATE DEPARTMENT
OF TRANSPORTATION

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By Richard Lumia

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 90-4197

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NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Albany, New York

1991

DEPARTMENT OF THE INTERIOR
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Multiply	*By*	*To obtain*
	Length	
inch (in)	25.40	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi^2)	2.590	square kilometer
	Volume	
cubic foot (ft^3)	0.02832	cubic meter
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

Sea Level: In this report, "sea level" refers to the National Geodetic Vertical Datum 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.

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REGIONALIZATION OF FLOOD DISCHARGES FOR RURAL, UNREGULATED STREAMS IN NEW YORK, EXCLUDING LONG ISLAND

By Richard Lumia

Abstract

Techniques are presented for estimating the magnitude and frequency of flood discharges on rural, unregulated streams in New York, excluding Long Island. Peak discharge-frequency data and basin characteristics from 313 streamflow-gaging stations in New York and adjacent States were used to develop multiple linear regression equations for floods with recurrence intervals of 2 to 500 years. A generalized least-squares (GLS) procedure was used to develop the regression equations. A separate set of equations was developed for each of eight hydrologic regions of New York; standard errors of prediction range from 17 to 51 percent. Significant explanatory variables included in the regression equations are drainage area, main-channel slope, percent basin storage, mean annual precipitation, percent forested area, average main-channel elevation, and a basin-shape index. Drainage areas for sites used in the analyses ranged from 0.41 to 4,773 square miles.

Methods of computing peak discharges differ, depending on whether the estimate is for a gaged or ungaged basin, and whether the basin crosses hydrologic-region boundaries. Examples of computations are included. Results of the GLS equations were statistically and graphically compared with those obtained from previously (1979) published equations and were found to be unbiased and generally more accurate.

Basin characteristics, log-Pearson Type III statistics, and regression and weighted estimates of the discharge-frequency relations are tabulated for the gaging stations used in the regression analyses. Sensitivity analyses showed that mean-annual precipitation and drainage area are the variables to which computed discharges are most sensitive in the regression equations.

INTRODUCTION

Flood damage is a constant threat along flood plains and thus is a concern for local and regional managers and planners. The effective management of flood-prone areas and the design of structures along rivers and streams requires knowledge of the magnitude and frequency of floods. Although several U.S. Geological Survey reports provide techniques for estimating the magnitude and frequency of floods on rural, unregulated streams in New York by the index-flood method (Robison, 1961; Speer and Gamble, 1965; Tice, 1968; Wiitala, 1965), and by ordinary least-squares multiple-regression techniques (Darmer, 1970, and Zembrzuski and Dunn, 1979), an additional 12 years of annual peak-discharge data, new guidelines for computing station flood-frequency curves as outlined in U.S. Water Resources Council Bulletin 17B (1981), and new statistical methods as applied to multiple-regression analysis warranted revision of techniques given previously.

Since the completion of the study by Zembrzuski and Dunn (1979), the U.S. Geological Survey, in cooperation with New York State Department of Transportation, has been developing improved methods for estimating the magnitude and frequency of floods at gaged or ungaged sites on rural, unregulated streams in New York, excluding Long Island. Peak-discharge characteristics can be estimated through multiple regression equations based on measured basin and climatic characteristics within the drainage area upstream from the site of interest. Procedures for estimating peak discharges with recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years differ according to whether the estimate is for a gaged or ungaged basin, and whether the basin crosses hydrologic-region boundaries or State lines. In this study, regression equations were developed for eight hydrologic regions of New York from data collected through September 1987 at 313 gaged sites in and adjacent to New York. Estimated standard errors of prediction for the regression equations range from 17 to 51 percent.

Development of techniques for estimating peak discharges on regulated streams, urbanized basins, and streams on Long Island was beyond the scope of this study. Peak discharges for urban areas can be estimated through techniques of Sauer and others (1983), Stedfast (1986), and Lumia (1984) if the effects of urbanization can be quantified.

Purpose and Scope

This report presents techniques to estimate the magnitude and frequency of floods on rural, unregulated streams within eight hydrologic regions of New York at gaged sites, ungaged sites, and ungaged sites on gaged streams. It supersedes previous U.S. Geological Survey reports that provide techniques for estimation of flood magnitude and frequency on rural, unregulated streams in New York.

The report discusses the delineation of the eight hydrologic regions through statistical and hydrologic analyses and presents sets of equations for each of the eight hydrologic regions. It also describes use of the equations and includes sample computations as well as tables of selected flood and basin characteristics and summaries of statistical analyses.

Acknowledgments

The New York State Department of Environmental Conservation, the U.S. Army Corps of Engineers, the Hudson River - Black River Regulating District, the New York Power Authority, Niagara Mohawk Power Corporation, New York City Department of Environmental Protection, Cornell University, and several other municipal and county governments provided support for data-collection programs.

STUDY AREA

Physiographic and geologic characteristics were considered in delineation of hydrologic-region boundaries. These factors influence the timing and magnitude of flood response, although many were not directly included in the regression equations.

Physiography

New York (excluding Long Island) encompasses parts or all of eight physiographic provinces (fig. 1), which range from high relief in the Adirondack and Catskill Mountains to low relief along the Great Lakes, the St. Lawrence River valley, and the Hudson and Mohawk River valleys. In northern New York, the Adirondack province covers about 10,000 mi^2. The western half of the province and parts of the southern and northern margins are plateaulike. Lakes and ponds are abundant (about 2,000), especially in and near the mountains. The eastern half of the Adirondack province is mountainous; some elevations exceed 5,000 ft above sea level (Fenneman, 1938). The St. Lawrence Valley of extreme northern New York is a smooth glacial plain with elevations dropping below 200 ft along the St. Lawrence River. The Mohawk Valley, just south of the Adirondack province, drains parts of the southern Adirondacks to the Hudson River.

The two major physiographic divisions of western New York are the Central Lowlands and the Appalachian Plateau. The Central Lowlands in New York extend east from Lake Erie, north of the Finger Lakes region adjacent to Lake Ontario, to just west of the Mohawk and St. Lawrence Valleys and the Adirondacks. South of Lake Ontario, the lowland plain abuts against the northern escarpment of the Appalachian Plateau, while east of Lake Ontario the plain comes to an end against the Tug Hill plateau. Drainage throughout the Central Lowlands is generally toward Lakes Erie and Ontario. The Appalachian Plateau extends throughout the southern part of western New York east to and including the Catskill Mountains and southern sections of the Mohawk River basin. The Appalachian Plateau is characterized by hilly terrain; its highest elevations are in the Allegheny and Catskill Mountains.

Physiographic divisions in eastern and southeastern New York include the Valley and Ridge province, the New England province, and the Piedmont province. The Valley and Ridge province extends from the New Jersey border, north through the lower Hudson River Valley to the southern end of Lake Champlain. Longitudinal drainage is prominent in the Hudson-Champlain section of the province. The New England province also extends from the New Jersey border northward, crossing the southern part of the Hudson River. It includes the Taconic Mountains, running along the southeastern border of New York north to just south of Lake Champlain. The Piedmont province includes a small lowland area in southeastern New York just north of New Jersey.

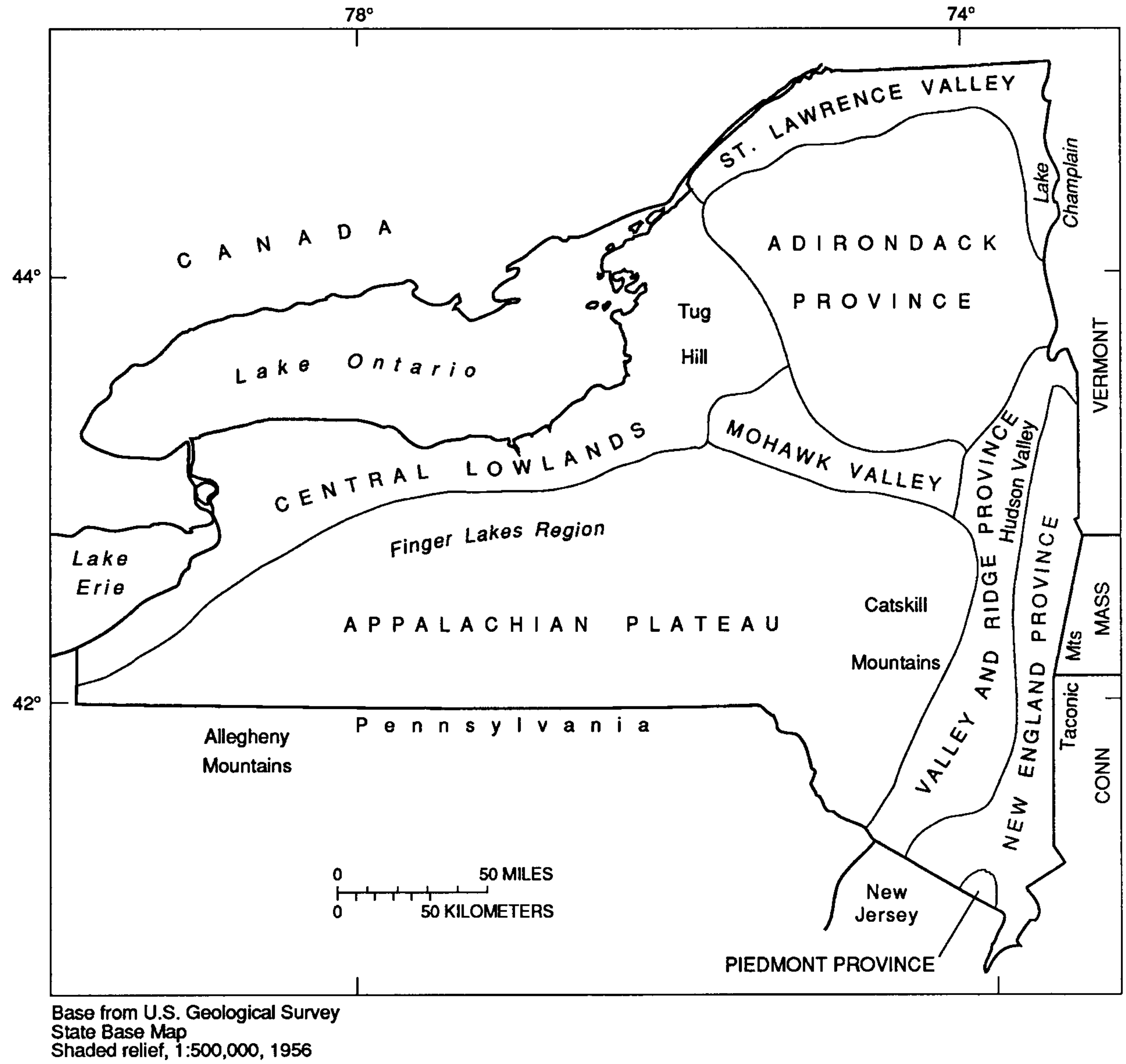


Figure 1.--Physiographic provinces of New York. (Modified from Lyford and others, 1984, fig. 2).

Geology

Crystalline rocks dominate the Adirondack and New England provinces but contain carbonate rocks in outcrop fringes (escarpments) along the northern and eastern edges of the Appalachian Plateau province, in isolated areas of the St. Lawrence Valley, and in eastern New York. The general distribution of major bedrock units in New York is depicted in figure 2. Shale, the most extensive bedrock unit, predominates in the Appalachian Plateau, western Central Lowland, the Mohawk Valley, and the Valley and Ridge province. Sandstone dominates in the Piedmont, St. Lawrence Valley, and eastern Central Lowland provinces.

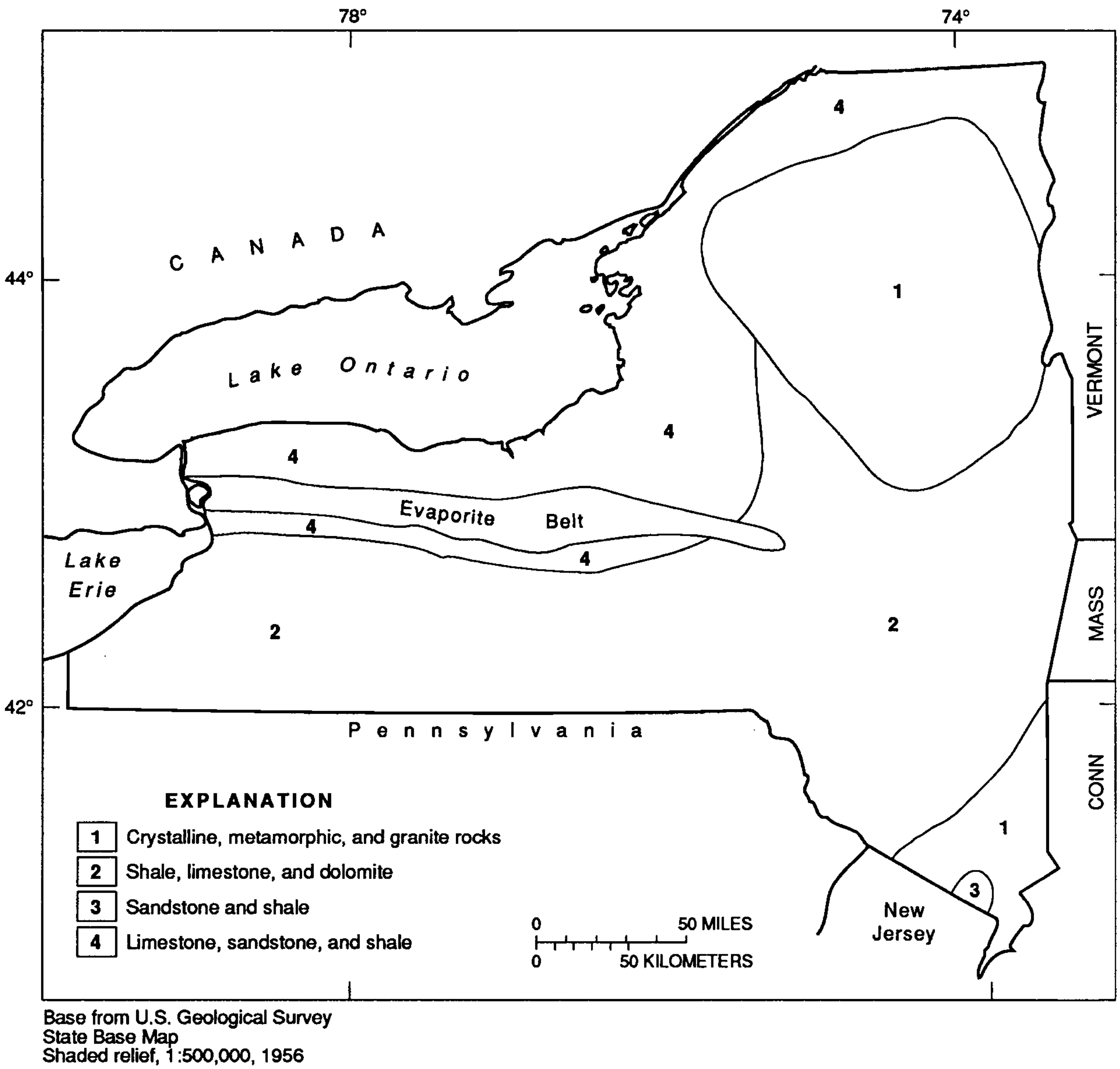
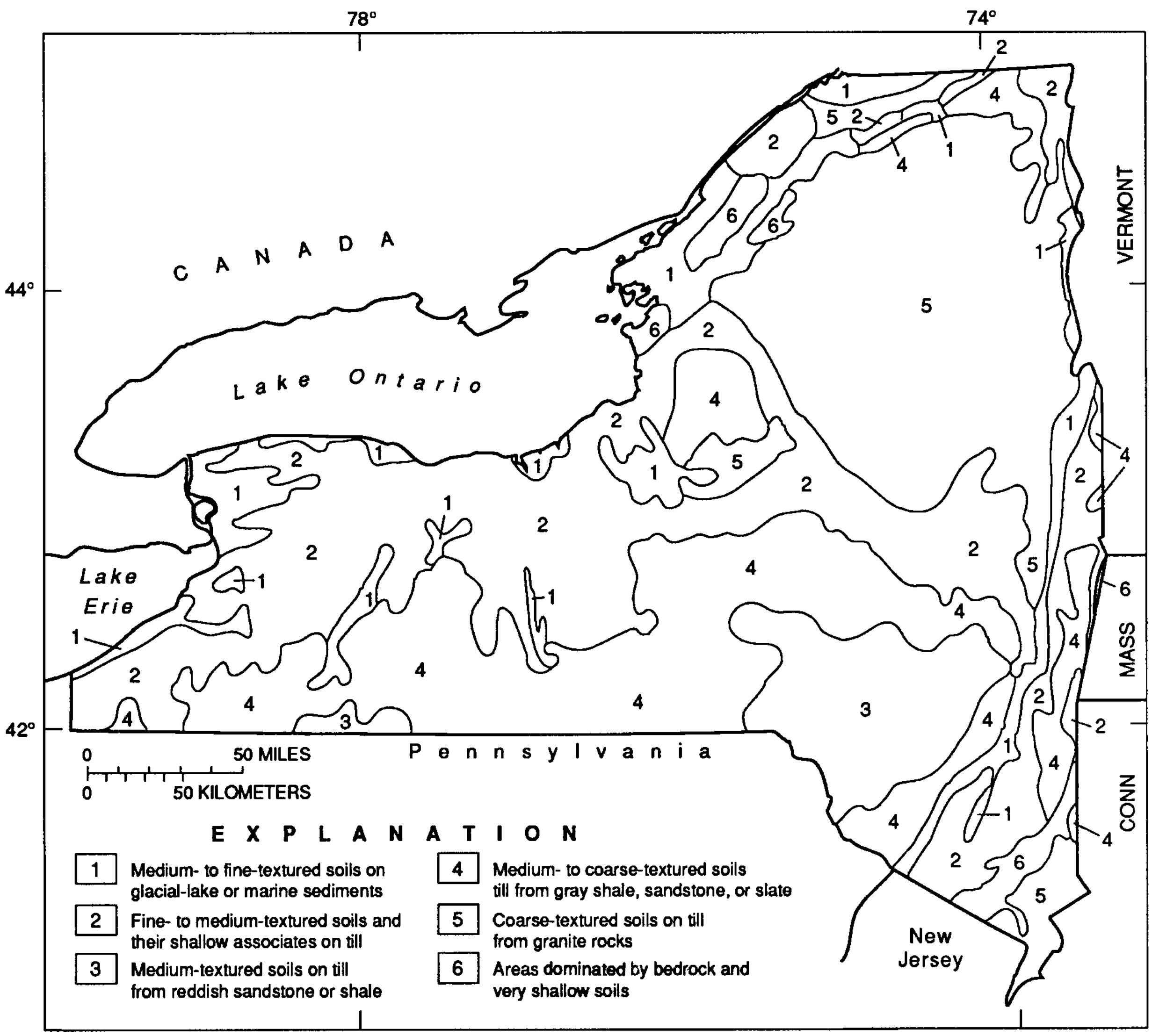


Figure 2.--Distribution of major bedrock types in New York. (Modified from Lyford and others, 1984, fig. 6)

Bedrock in New York (excluding Long Island) is covered with glacial deposits of till and stratified drift of variable thickness. The generalized distribution of soil associations in New York is shown in figure 3. The till mantles the uplands and small tributary valleys and generally is found beneath stratified drift in the larger valleys. Stratified drift forms the floors of large valleys and flat plains or terraces where bedrock relief is low. The stratified drift includes clay, silt, sand, and meltwater deposits of sand and gravel. The sand and gravel deposits form the principal aquifer systems of New York.



Base from U.S. Geological Survey
State Base Map
Shaded relief, 1:500,000, 1956

Figure 3.--Generalized distribution of soil associations in New York. (Modified from Cline, 1961, pl. 1.)

Climate

The climate of New York is the humid continental type; cool, dry air masses move generally eastward through the State throughout the year, and warm, humid, maritime tropical air masses from the south move northeastward during the summer. Mean annual precipitation ranges from almost 30 in. along Lakes Ontario and Champlain to about 60 in. in the southern Catskill Mountains (pl. 1).

The areal distribution of precipitation reflects the topographic relief and the general eastward-to-northeastward storm movements. New York has a fairly uniform distribution of precipitation during the year and has no distinct rainy or dry season.

Regional differences in topography, elevation, and proximity to large bodies of water result in a great variation of snowfall throughout the State. Maximum seasonal snowfall, averaging more than 175 in., occurs on the western and southwestern slopes of the Adirondacks and Tug Hill (National Oceanic and Atmospheric Administration, 1980). A secondary maximum of more than 150 in. prevails some 10 to 30 mi inland from Lake Erie. The minimum seasonal snowfalls (25 to 35 in.) occur in extreme southeastern New York, and the minimum upstate snowfalls (40 to 50 in.) occur in the Chemung and mid-Genesee River Valleys and near the Hudson River in Orange, Rockland, and Westchester Counties up to southern Albany County. (Locations are shown on pl. 1). On average, some of the winter snowpack is still unmelted by mid-March over all but the extreme southeastern part of the State. In mid-March, as much as 10 in. of water content can still remain in the snowpack of the Adirondack Mountains and in the highlands to the east of Lake Ontario.

The greatest potential for floods is in the early spring, when substantial rains combine with rapid melting of snow to produce heavy runoff. Almost half of the State's annual runoff occurs from mid-February through mid-May. Local flooding, primarily within smaller drainage basins, is generally caused by summer thunderstorms. Occasionally hurricanes can cause severe flooding, particularly in southeastern parts of the State.

DATA BASE FOR REGRESSION EQUATIONS

The regression equations that provide estimates of the streamflow characteristics in this study were developed from peak-discharge and basin-characteristic data from gaging stations in New York and adjacent States.

Annual Peak-Discharge Records

The flood-frequency analyses for this study are based on annual peak-discharge data collected through September 1987 from 313 continuous-record and partial-record gaging stations (pl. 2). Of these sites, 284 are in New York, and 29 are in adjacent States. Periods of peak-discharge record for these stations range from 10 to 84 years.

Annual peaks from gaging stations having at least 10 consecutive years of unregulated, non-urbanized record were selected for the analysis. If more than 20 percent of the drainage area at a gaging station was upstream from a controlled reservoir, the stream was considered regulated, in accordance with analyses of Zembrzuski and Dunn (1979). Similarly, if more than 15 percent of a site's drainage area was affected by manmade changes (impervious area, channelization, diversions, and so forth), the stream was considered urbanized (Sauer and others, 1983).

The drainage areas of the 313 gaging stations selected for the analysis ranged from 0.41 to 4,773 mi^2. A list of gaging stations used in the study, as well as selected peak-discharge records, is given in table 8 (at end of report). Much of the information in table 8 was obtained from Robideau and others (1984).

Discharge-Frequency Relations

The discharge-frequency relation of a streamflow-measurement site is usually expressed in terms of exceedance probability, or recurrence interval. Exceedance probability is the probability that a flood of specified magnitude will be equaled or exceeded in any 1 year. Recurrence interval, the reciprocal of exceedance probability, is the average time interval between occurrences of a flood of equal or greater magnitude. For example, a 100-year flood has a 1-percent chance of occurring in any 1-year period.

The representation of a discharge-frequency relation on a graph is known as a flood-frequency curve; an example is depicted in figure 4. Discharge-frequency relations for each of the 313 gaging stations included in the study were developed by fitting the logarithms of the annual peak-discharges to a Pearson Type III distribution according to guidelines recommended by U.S. Water Resources Council (1981); the resulting data were analyzed by means of U.S. Geological Survey flood-frequency programs (Kirby, 1981). Adjustments to the frequency curves were made to account for historical information and high and low outliers. The coefficient of skewness was estimated as a weighted average of the systematic (station) skew and a generalized map skew (U.S Water Resources Council, 1981). Results of the discharge-frequency analyses for each gaging station are summarized in table 9 (at end of report).

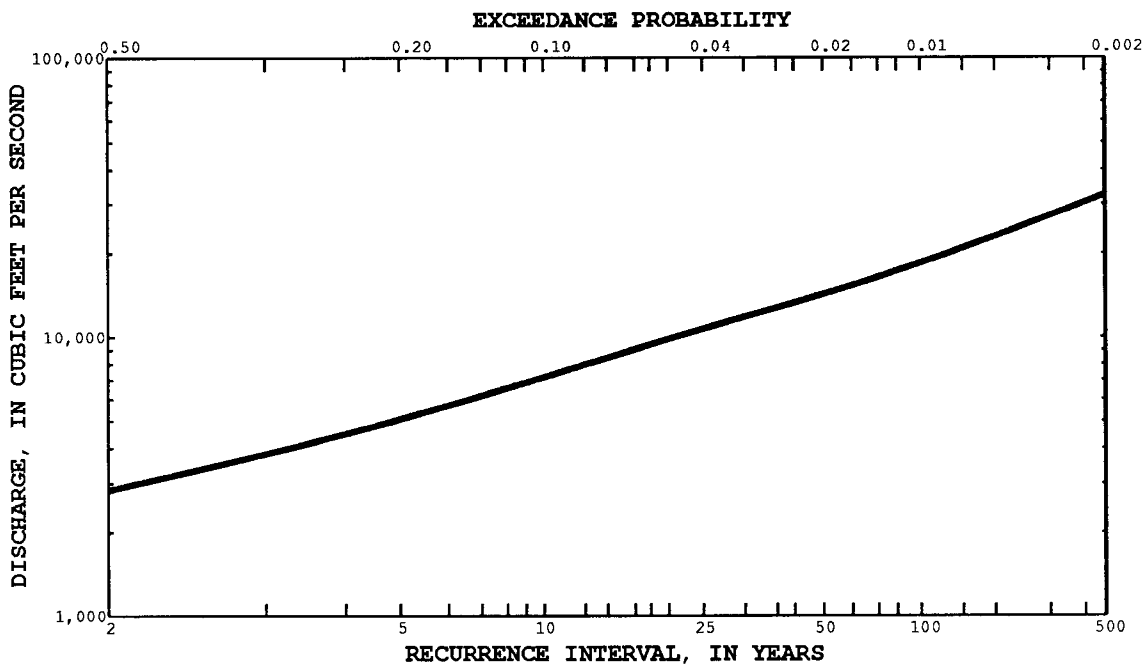


Figure 4.--Flood-frequency curve for Wappinger Creek near Wappingers Falls (station 01372500).

Caution should be exercised in using information from some of the stations listed in table 9 because several of the streams are now regulated. As noted in table 9, all data entries for these streams reflect preregulation periods and are not generally applicable to present conditions.

The boundaries for selected recurrence intervals for five of the most severe floods in New York since 1913 are shown on the maps in figure 5; most streams in the State were ungaged before 1913 (U.S. Geological Survey, in press). Flood severity was evaluated in terms of magnitude, extent, loss of life, and property damage. Of the five floods illustrated, three (1913, 1949, and 1984) were caused by winter/spring storms, and two (1955 and 1972) by summer/fall storms (hurricanes). Figure 6 shows annual peak discharges at eight selected gaging stations in New York. Of note are the occurrences of 100-year floods in two consecutive years (1955-56) at Wallkill River at Gardiner, and no 100-year flood at Schoharie Creek at Prattsville during its 78 years of record. The regions indicated on figure 6 are discussed in the section "Regionalization of Flood-frequency Estimates." The maximum known discharges and associated recurrence intervals for all gaging stations used in the analysis are listed in table 8 (at end of report).

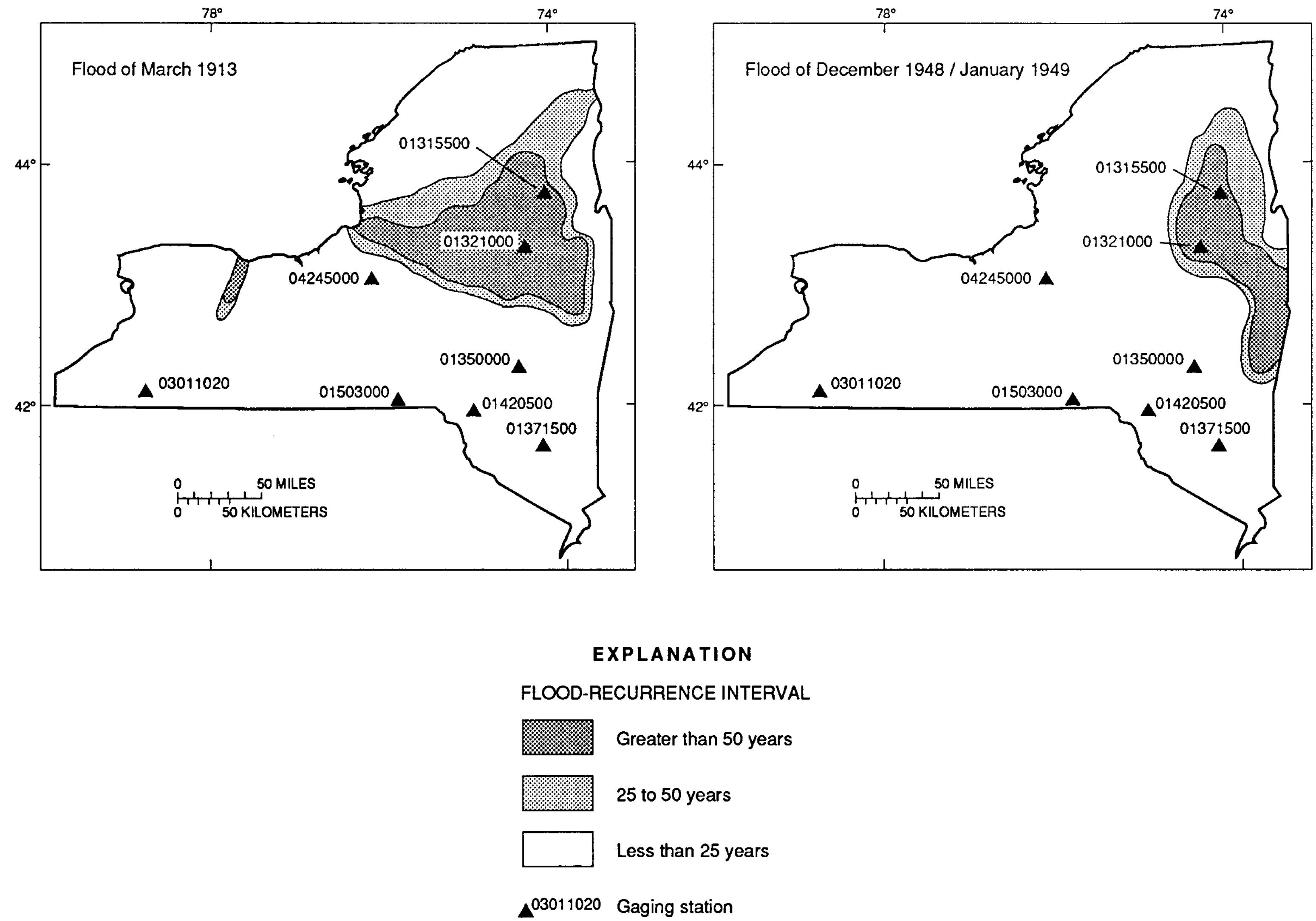


Figure 5.--Flood-boundary delineations for five selected storms, 1913-85. (Station names are given in fig. 6).

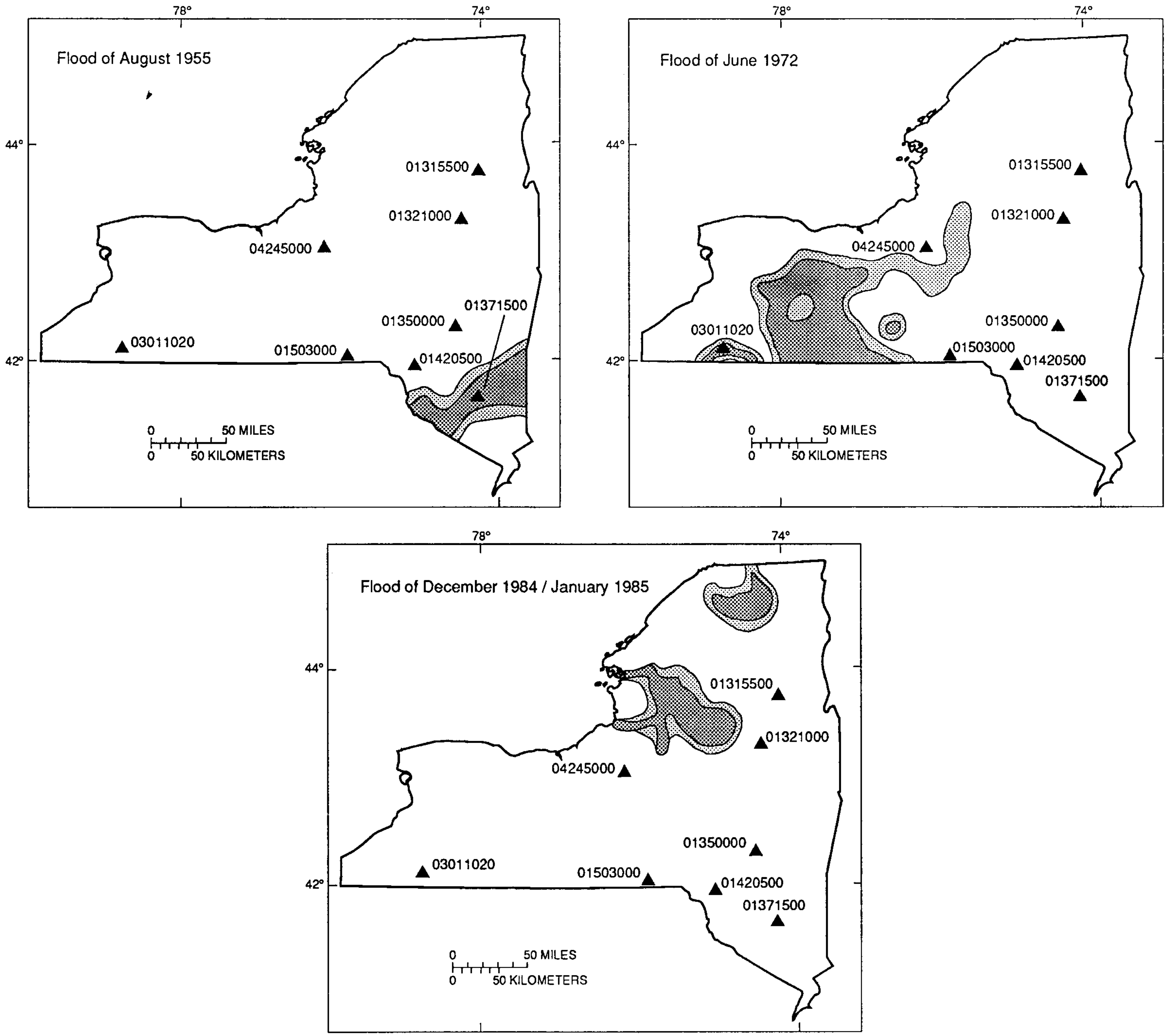


Figure 5 (continued).--Flood-boundary delineations for five selected storms, 1913-85. (Station names are given in fig. 6).

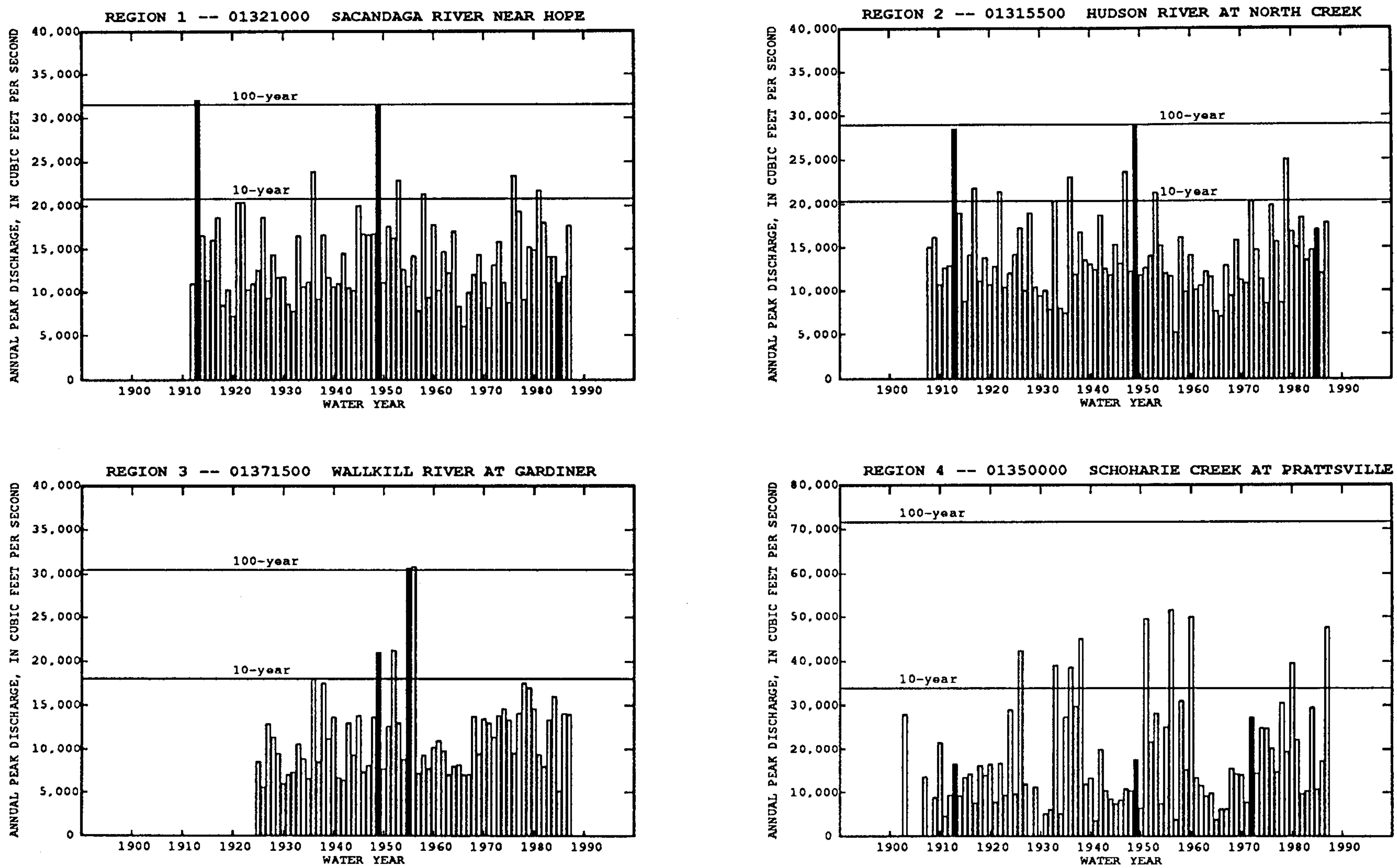


Figure 6.--Annual peak discharges and 10- and 100-year recurrence intervals for selected gaging stations in each of eight hydrologic regions of New York. (Solid bars are annual peaks for the floods indicated in fig. 5; station locations are shown in fig. 5).

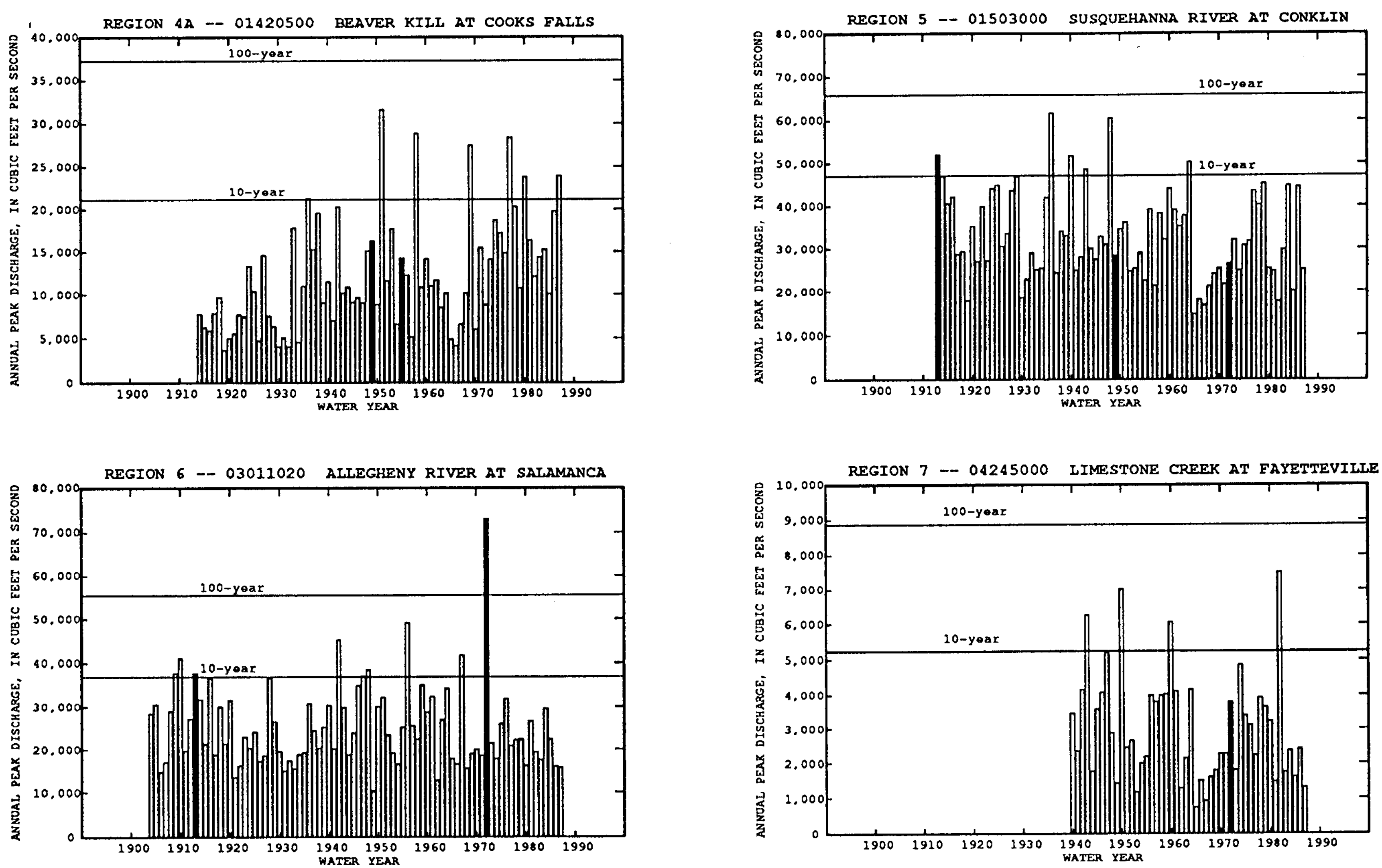


Figure 6 (continued).--Annual peak discharges and 10- and 100-year recurrence intervals for selected gaging stations in each of eight hydrologic regions of New York. (Solid bars are annual peaks for the floods indicated in fig. 5; station locations shown in fig. 5).

Basin Characteristics

To transfer peak-discharge information to ungaged sites, multiple regression analysis was used to relate streamflow characteristics to selected topographic and climatic characteristics for each drainage basin. The following basin characteristics were tested for significance during regression analyses; those with abbreviations are the variables used in the final regression equations:

Drainage area (A), in square miles.--The area of a basin (watershed) upstream from the gage or site of interest delineated on 7.5- or 15-minute U.S. Geological Survey topographic maps and then determined by planimetering or digitizing the basin outline (Wagner, 1982).

Main channel stream length, in miles.--The distance measured along the main stream channel from the gage or point of interest to the drainage divide.

Main channel slope (SL), in feet per mile.--The difference in elevation (feet) between points 10 percent and 85 percent of the distance along the main stream channel from the gage or site of interest to the basin divide, divided by the distance (miles) between the two points.

Basin storage (ST), in percent.--The percentage of the total drainage area shown as lakes, ponds, and swamps as determined from 7.5- or 15-minute topographic maps by grid sampling, planimetering, or digitizing. Some basin storage values used in the study were obtained from the New York State Land Use and Natural Resources (LUNR) Inventory (Zembrzuski and Dunn, 1979).

Mean annual precipitation (P), in inches.--The average value of mean annual precipitation over the basin of interest, determined from plate 1.

Average main stream channel elevation (EL), in feet.--The average of stream-channel elevations at points located 10 percent and 85 percent of the length of the main stream channel from the gage or point of interest to the drainage divide.

Basin forested area (F), in percent.--The percentage of the total drainage area shown as forest cover, as determined from 7.5- or 15-minute topographic maps by grid sampling, planimetering, or digitizing.

Basin shape index (SH), in mile per mile.--The calculated ratio of the square of the main-channel stream length, in miles, to drainage area, in square miles (ratio of basin length to average basin width).

Precipitation intensity, in inches.--The average value of the maximum 24-hour precipitation over the basin with a recurrence interval of 2 years. (From U.S. Department of Commerce, 1961).

January minimum temperature, in degrees Fahrenheit.--The average value of the mean minimum January temperature over the basin, as determined from a National Oceanic and Atmospheric Administration (1980) map.

Mean basin elevation, in feet.--The average elevation of 20 equally spaced points over the basin as measured by a transparent grid from 7.5- or 15-minute topographic maps. This characteristic was tested for a subset of about three-fourths of the study basins.

Water equivalent of snow cover, in inches.--The average value of the mean water equivalent of snow cover over the basin for the first week of March, as determined from a map prepared by the U.S. Geological Survey (unpublished map on file in U.S. Geological Survey office in Albany, N.Y.).

The basin-characteristics data are stored in the U.S. Geological Survey National Water Storage and Retrieval System (WATSTORE) (Dempster, 1983). Selected basin characteristics for the gaging stations used in the analysis are listed in table 10 (at end of report).

REGRESSION ANALYSIS

Multiple regression analysis was used to develop the relations between peak discharges of selected recurrence intervals (dependent variable) and drainage-basin characteristics (explanatory variables). Previous regression analyses for New York used ordinary least squares (OLS) methods (Zembrzuski and

Dunn, 1979). The OLS estimates are appropriate when all onsite flow estimates are equally reliable, the natural variability is the same for each site, and observed concurrent flows at every pair of sites are independent. In practice, the analyst usually does not have such a uniform set of data with which to work.

Recent research by Stedinger and Tasker (1985) and Tasker and Stedinger (1989) indicates that generalized least squares (GLS) may be more appropriate for hydrologic regression than OLS. In this approach, the regression coefficients are estimated by taking into consideration the time-sampling error (length of record at each site) and the cross correlation of annual peak-discharges between sites. The above research has shown that the GLS technique was superior to OLS when streamflow data were cross correlated and(or) of differing record lengths.

In GLS regressions, each watershed in the analysis is weighted in accordance with the variance (time-sampling error) and spatial correlation structure of the streamflow characteristic (annual peak discharges). In addition, the time-sampling error in the streamflow characteristic is accounted for when the accuracy of the regression equation is evaluated. The prediction error for ungaged sites is partitioned into model error (error in assuming an incomplete model form) and sampling error (including both time- and spatial-sampling errors). The model error cannot be reduced by additional data collection, but the sampling error can be reduced through extended operation of existing stations or installation of new stations, or some combination of both.

For the GLS regression analysis used in this study, logarithmic (base 10) transformations were made on all streamflow and basin characteristics to obtain a constant variance of the residuals about the regression line, and to linearize the relation between the dependent variable (peak-discharge) and explanatory variables (basin characteristics) for linear least-squares regression techniques. The multiple-regression equations based on logarithmic transformation of the variables are of the form:

$$\log_{10} Y = b_0 + b_1 \log_{10} X_1 + b_2 \log_{10} X_2 + ... + b_n \log_{10} X_n,$$

or, after taking antilogs,

$$Y = 10^{b_0} (X_1^{b_1}) (X_2^{b_2}).....(X_n^{b_n}),$$

where:

Y = dependent variable (peak-discharge for selected recurrence interval)
X_1 to X_n = explanatory variables (basin characteristics)
b_0 to b_n = regression model coefficients estimated through GLS procedures

Selection of final explanatory variables for each model was based on stepwise regression algorithms and all-possible-subsets regression (SAS Institute, 1982; Minitab, 1985). Final regression equations were selected on the basis of several factors, including: standard error of the estimate, Mallow's Cp statistic, statistical significance of the explanatory variables, r^2 (coefficient of determination), ease of measurement of explanatory variables, and the PRESS statistic (an index of the prediction error associated with the regression equation). Multicollinearity in the regression models was assessed by the VIF (variance inflation factor) and the correlation between explanatory variables.

REGIONALIZATION OF FLOOD-FREQUENCY ESTIMATES

Regression analysis provides a means of relating peak discharge to basin characteristics. Variability of the relation between peak discharge and basin characteristics among gaged sites can be reduced by regionalization, a process in which an area is divided into hydrologic regions to account for regional differences in peak-discharge response and in topographic and climatic variables that affect streamflow. Hydrologic regions refer to areas in which streamflow-gaging stations indicate a similarity of peak-discharge response that differs from the peak-discharge response in adjacent regions. These similarities and differences are defined by the regression residuals, which are the differences between the peak discharges calculated from station records and the values computed through the regression equation.

Delineation of Hydrologic Regions

The initial step toward delineating hydrologic regions was to develop a statewide regression equation through OLS(ordinary least-squares) analysis. Significant explanatory variables for the statewide model (equation) included drainage area, main-channel slope, basin storage, mean annual precipitation, and March water-equivalent of snow cover. The dependent variable for the statewide regression was the 50-year peak discharge.

Hydrologic regions within New York were delineated primarily through inspection of the areal distribution of the statewide regression residuals. Regions where the regression equation consistently overestimated or underestimated the peak-discharge response were delineated as separate hydrologic regions, and separate GLS regression equations were developed to estimate peak discharges in each region. (Originally seven regions were delineated for New York, but because residuals for region 4, in the Catskill Mountain area, indicated need for an additional division, region 4 was divided into hydrologic regions 4 and 4A.) Regional differences in geologic and physiographic conditions were also considered during hydrologic-region delineation. Generally, the hydrologic-region boundaries coincide with drainage-basin divides; the resulting delineations are shown on plate 2.

The distribution of regression residuals for each hydrologic region before and after regionalization are shown in box plots in figure 7. The upper plot summarizes the results of the statewide regression and indicates the clustering of residuals within the final eight hydrologic regions before regionalization; the lower plot shows the distribution of the final GLS regression residuals for the eight hydrologic regions of New York. The 50-year peak-discharge was the dependent variable for this analysis.

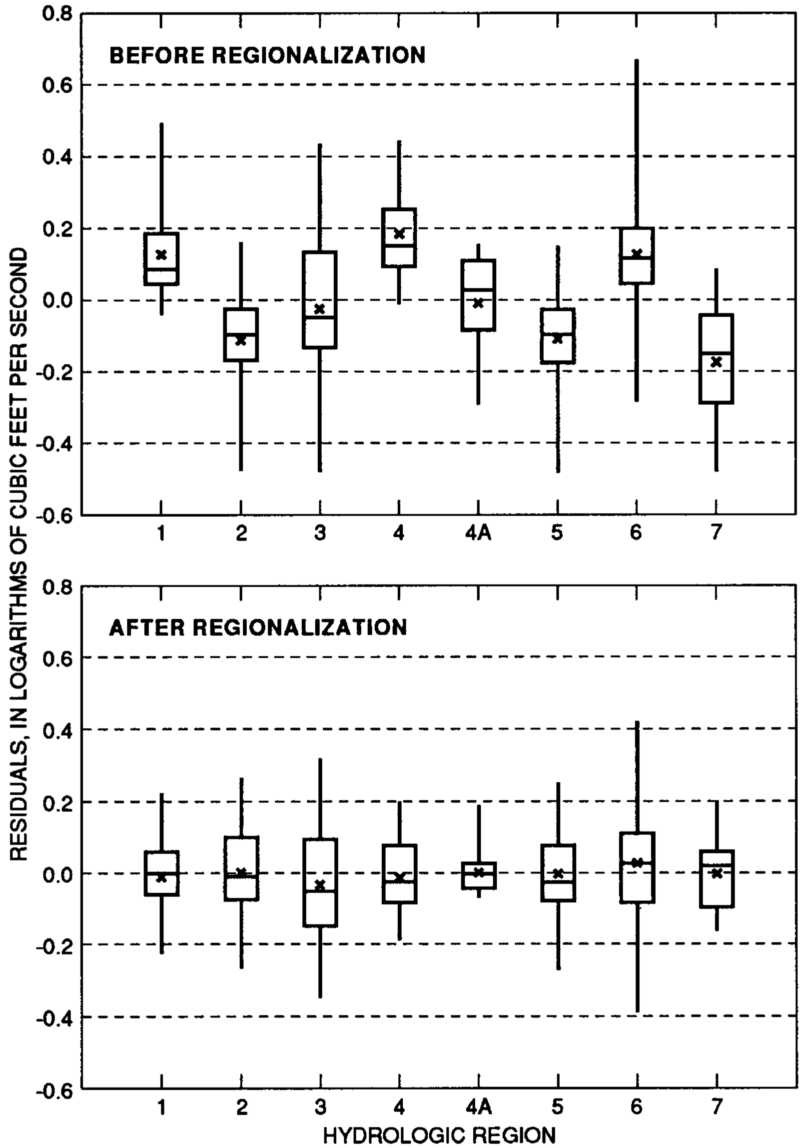
To further evaluate the delineations of the hydrologic regions, the Wilcoxon Signed Ranks test (Iman and Conover, 1983) was used to compare residuals between regions (Tasker, 1982). This method tests the statistical significance of a cluster of regression residuals. The test hypothesis is that the median residual in a hydrologic region is not significantly different from the median residual for the entire State (which is zero). Delineation of an area as a separate hydrologic region is supported if the test hypothesis is rejected. Results of the test are summarized in table 1.

The median residual in six of the eight hydrologic regions was different from zero at a probability level less than 0.001. The median residuals for the other two regions (3 and 4A) were not significantly different from zero, but the sign and magnitude of the residuals, differences in topographic and geologic conditions, and hydrologic judgment indicated delineation of these areas as separate hydrologic regions.

Table 1.--Results of Wilcoxon Signed Ranks test on the 50-year peak-discharge regression residuals for eight hydrologic regions in New York

[Hydrologic regions are delineated in pl. 2. < = less than. ft^3/s = cubic feet per second.]

Hydrologic region	Median of residuals (logarithms of ft^3/s)	Sum of positive ranks (percent of total)	Sum of negative ranks (percent of total)	Observed peak discharge relative to predicted peak discharge	Probability level	Number of stations
1	+0.090	97	3	High	<0.001	31
2	-.102	7	93	Low	<.001	49
3	-.052	39	61	Low	.218	42
4	+.151	99	1	High	<.001	23
4A	+.027	54	46	High	.813	17
5	-.090	11	89	Low	<.001	48
6	+.117	86	14	High	<.001	73
7	-.162	5	95	Low	<.001	30



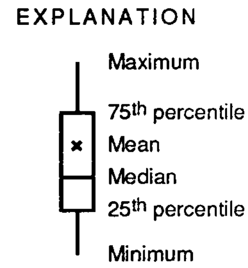


Figure 7.
Comparison of 50-year peak-discharge residuals from the statewide regression for gaging stations within eight hydrologic regions of New York, before and after egionalization. (Locations of regions are shown on pl. 2)

Regional Basin and Peak-Discharge Characteristics

To summarize and evaluate differences between hydrologic regions, basin and peak-discharge characteristics were compared among regions (figs. 8-12). Box plots in figures 8 and 9 summarize regional basin and peak-discharge characteristics, respectively. Explanatory variables from the regional and statewide regressions are included in figure 8; regional statistical summaries of annual peak-discharge data used in the analysis as well as regional 50-year peak-discharge runoff rates are given in figure 9.

Regions 4 and 4A include basins with the greatest main channel slopes (fig. 8B) and mean annual precipitation (fig. 8D), and regions 1 and 3 have the greatest basin-storage values (fig. 8C). Basin-shape index values are greatest for basins in regions 1 and 7 (greater basin elongation); basins in region 4A tend to be rounded, as indicated by the low index values (fig. 8H).

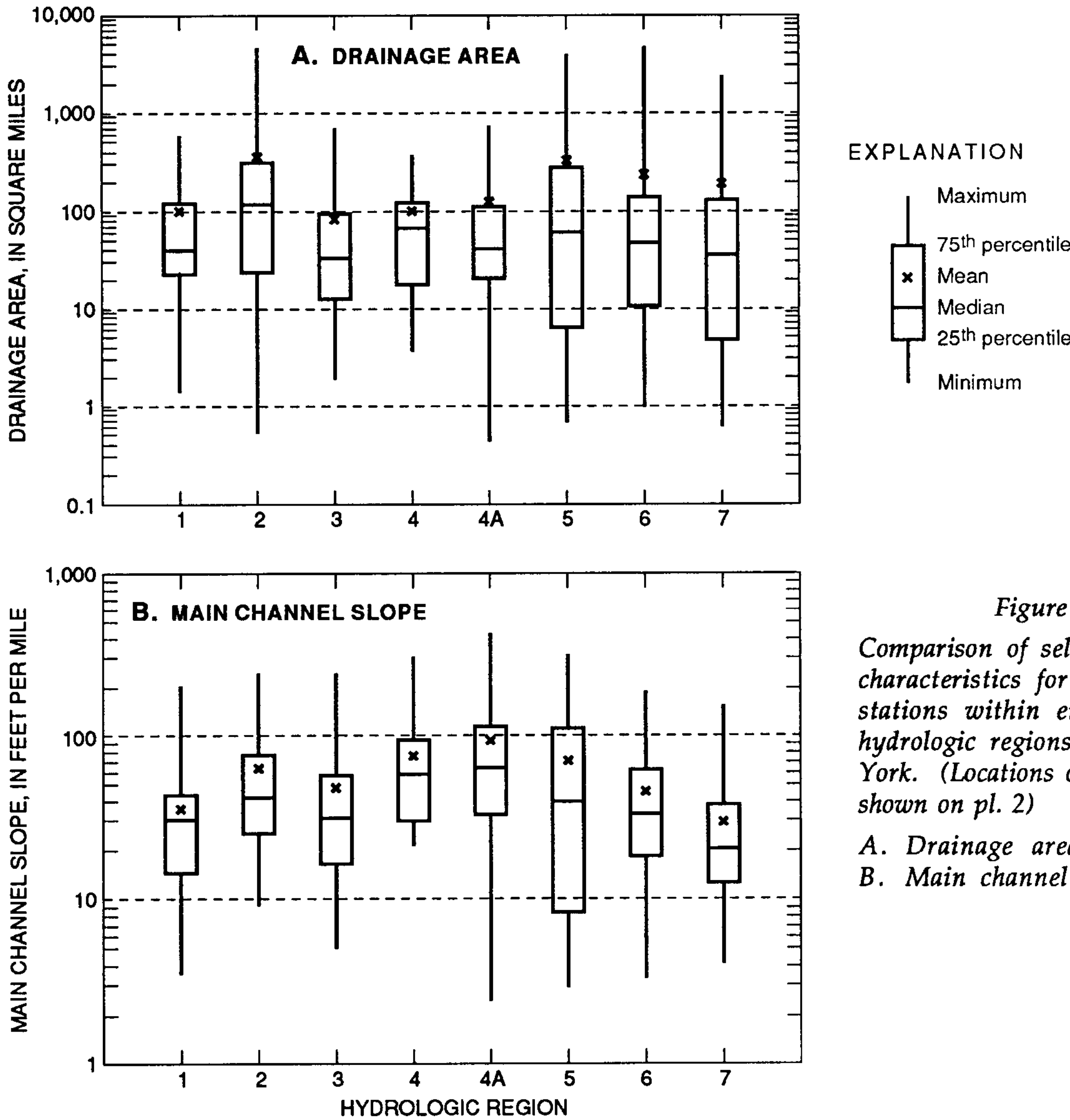


Figure 8.

Comparison of selected basin characteristics for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2)

A. Drainage area.
B. Main channel slope.

The statistics of annual peak discharges (fig. 9) show that the greatest mean (fig. 9A) and standard deviations (fig. 9B) for basins used in the study are in hydrologic region 4, as is the maximum 50-year peak-discharge runoff rate (fig. 9F). Basins within regions 2 and 4A have the greatest median number of years of annual peak-discharge record, whereas those in regions 1 and 7 have the least (fig. 9E).

The distribution of gaging stations by length of period of annual peak-discharge record and by drainage-area size is shown in figure 10. Region 2 has the most stations with long-term record (greater than 55 years), and region 7 has none (fig. 10A). Region 5 and 6 have the greatest number of stations with drainage areas less than 15 mi^2, and region 4 had no basins greater than 386 mi^2 (fig. 10B).

As an indication of the seasonality of floods, a comparison of the monthly frequency of annual peak discharges for each hydrologic region and for New York was made (figs. 11, 12). Most annual peak-discharges for each hydrologic region and for all ranges of drainage area occur in March and April. (Note again that these graphs include data from 29 out-of-State gaging stations.)

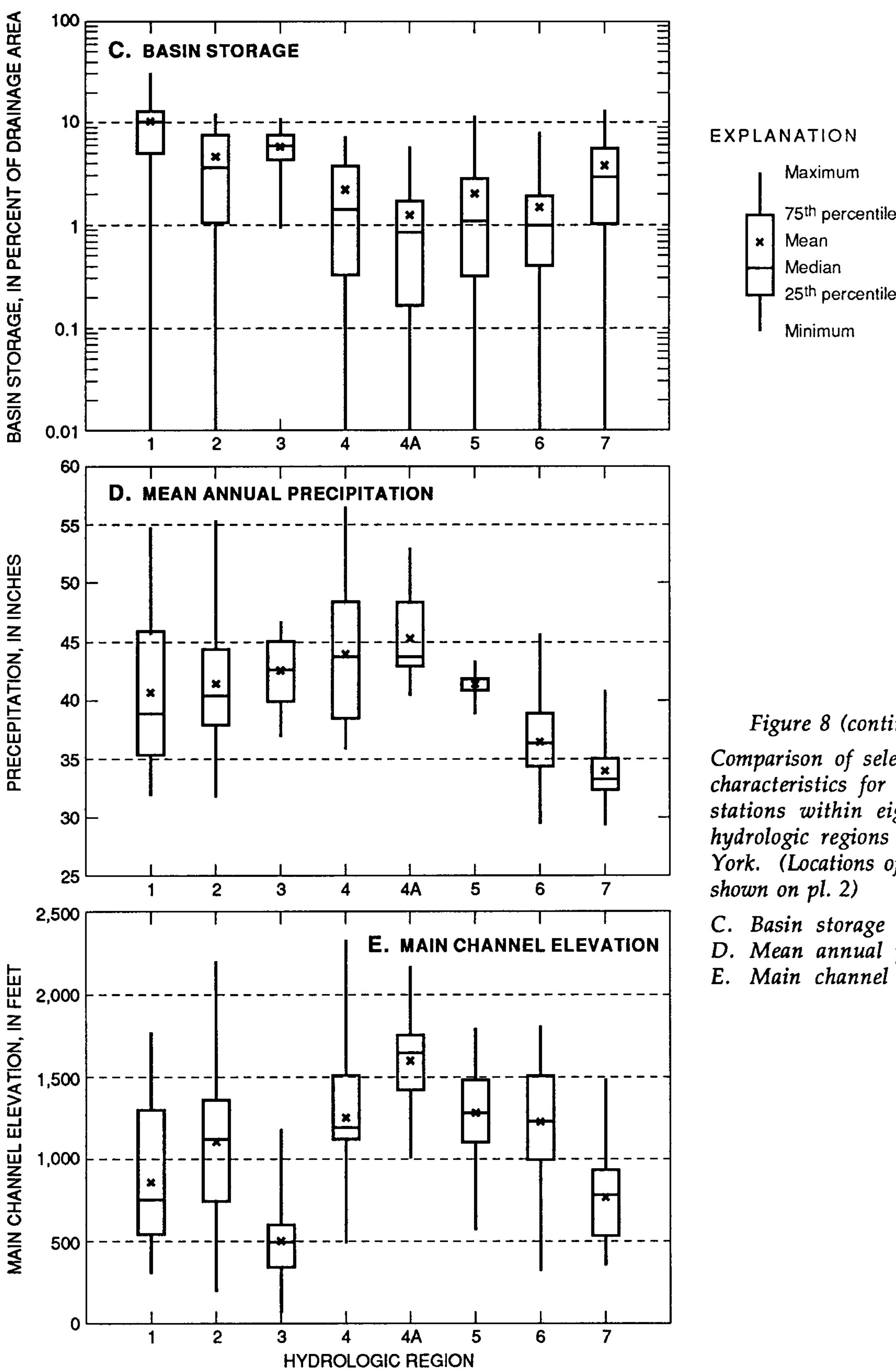


Figure 8 (continued).

Comparison of selected basin characteristics for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2)

C. Basin storage
D. Mean annual precipitation
E. Main channel elevation

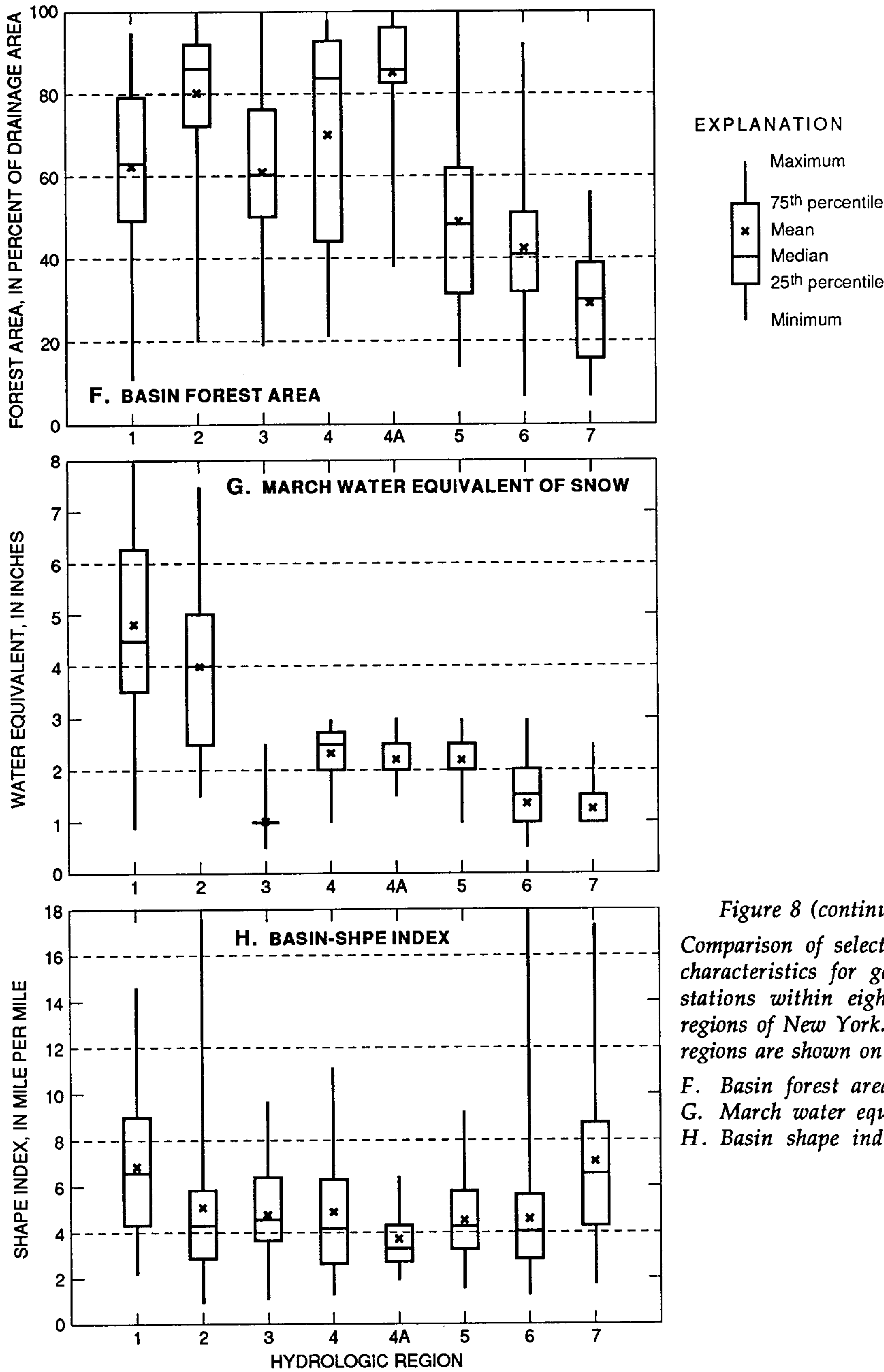


Figure 8 (continued).

Comparison of selected basin characteristics for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2)

F. Basin forest area
G. March water equivalent of snow
H. Basin shape index

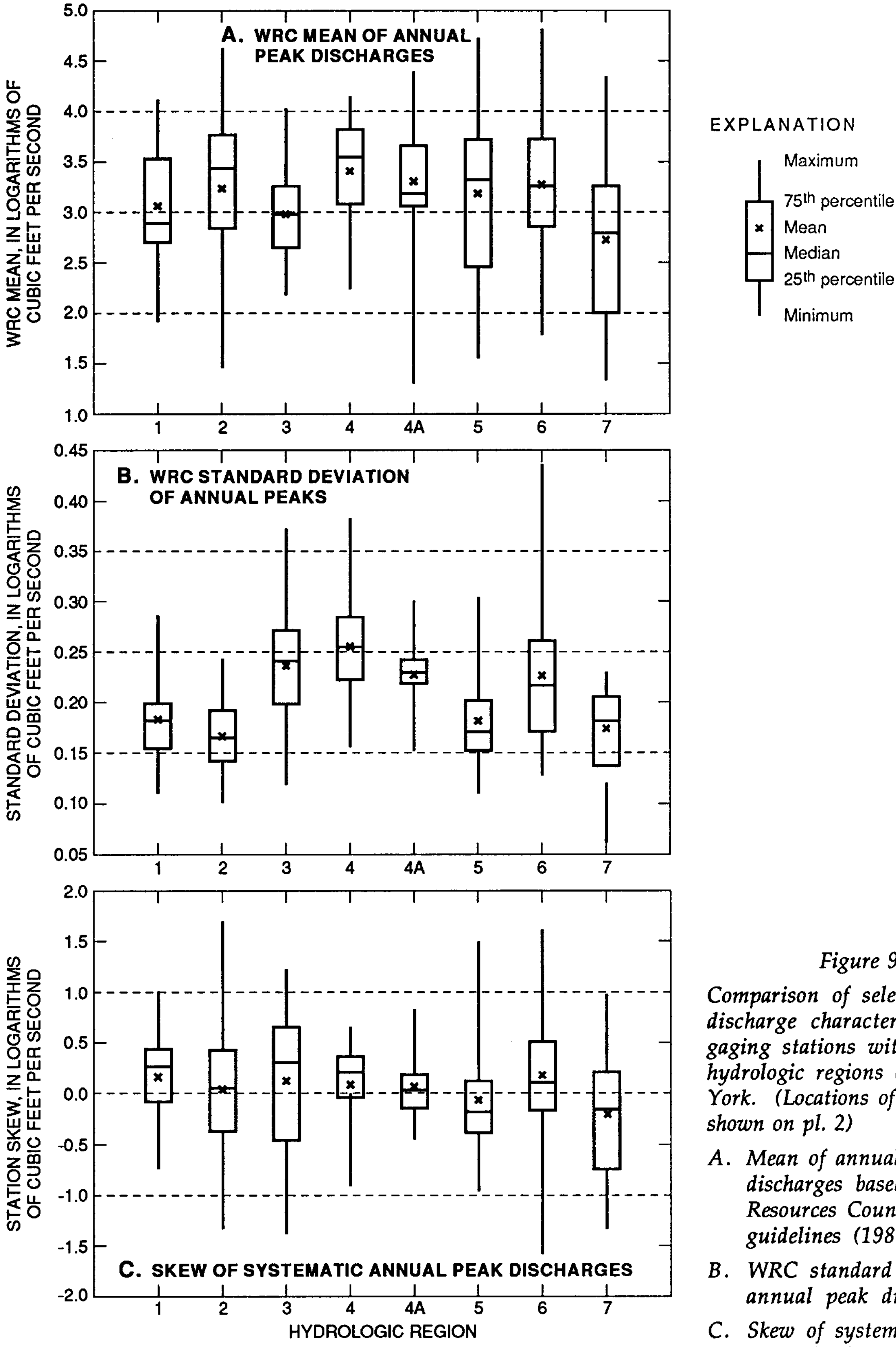


Figure 9.

Comparison of selected peak-discharge characteristics for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2)

A. Mean of annual peak discharges based on Water Resources Council (WRC) guidelines (1981).

B. WRC standard deviation of annual peak discharges.

C. Skew of systematic annal peak discharges.

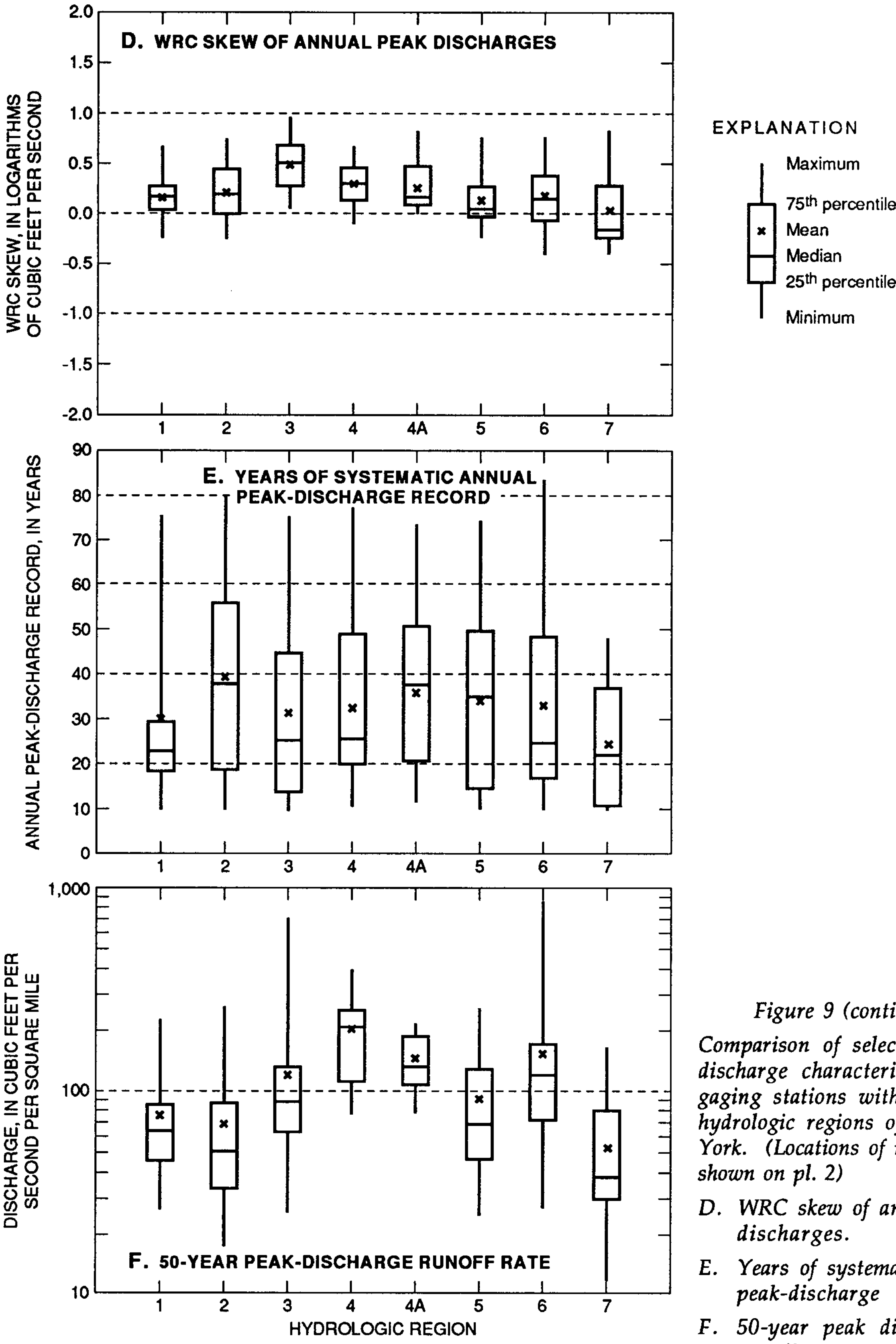
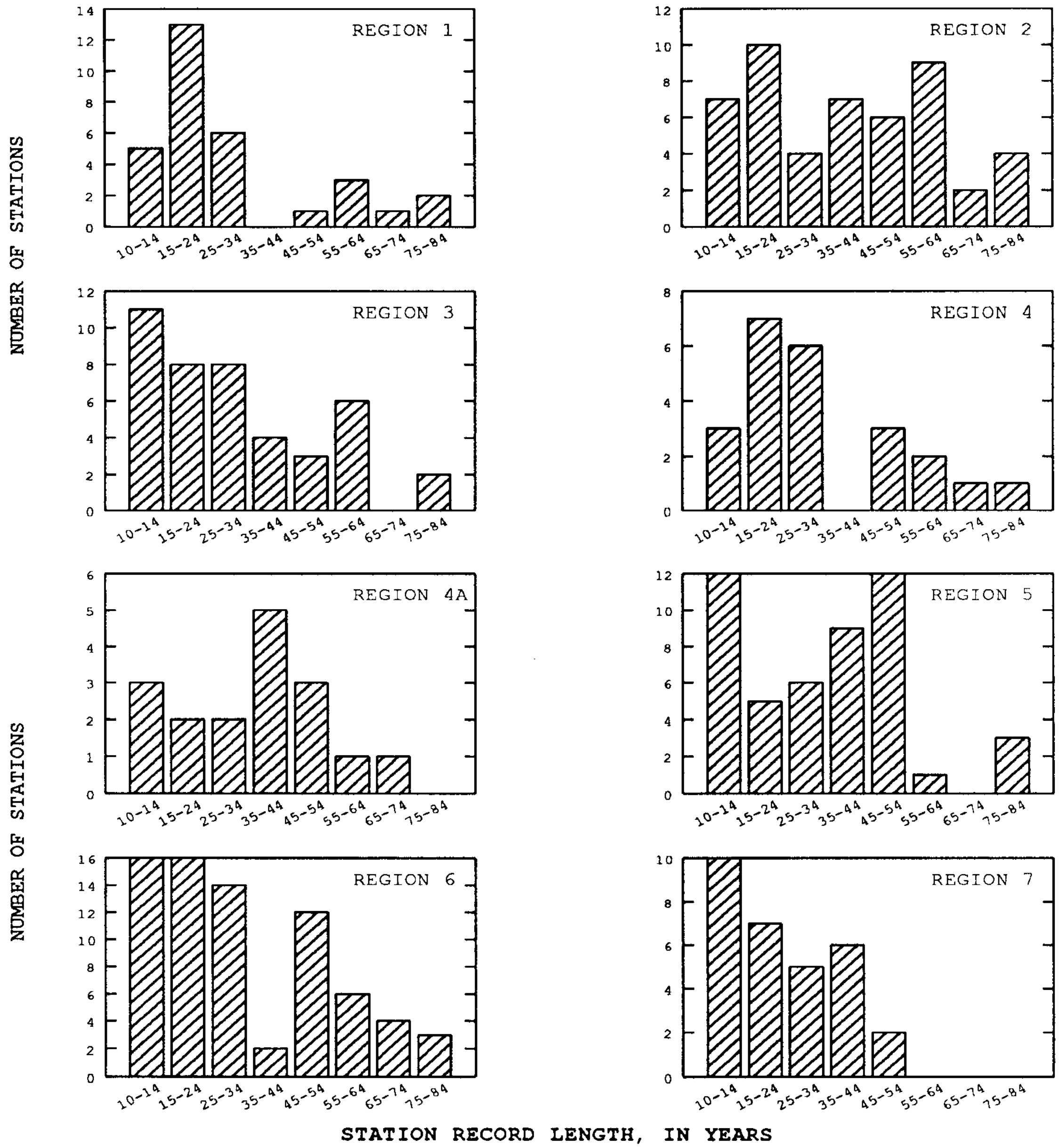


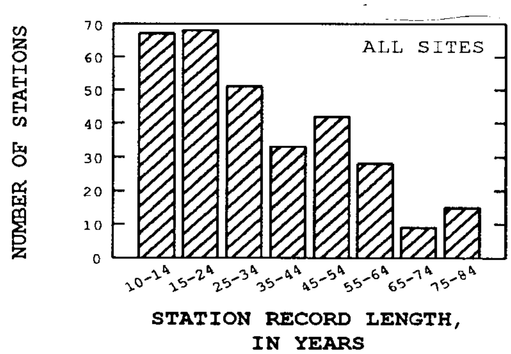
Figure 9 (continued). Comparison of selected peak-discharge characteristics for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2)

D. WRC skew of annual peak discharges.

E. Years of systematic annual peak-discharge record.

F. 50-year peak discharge runoff rate.



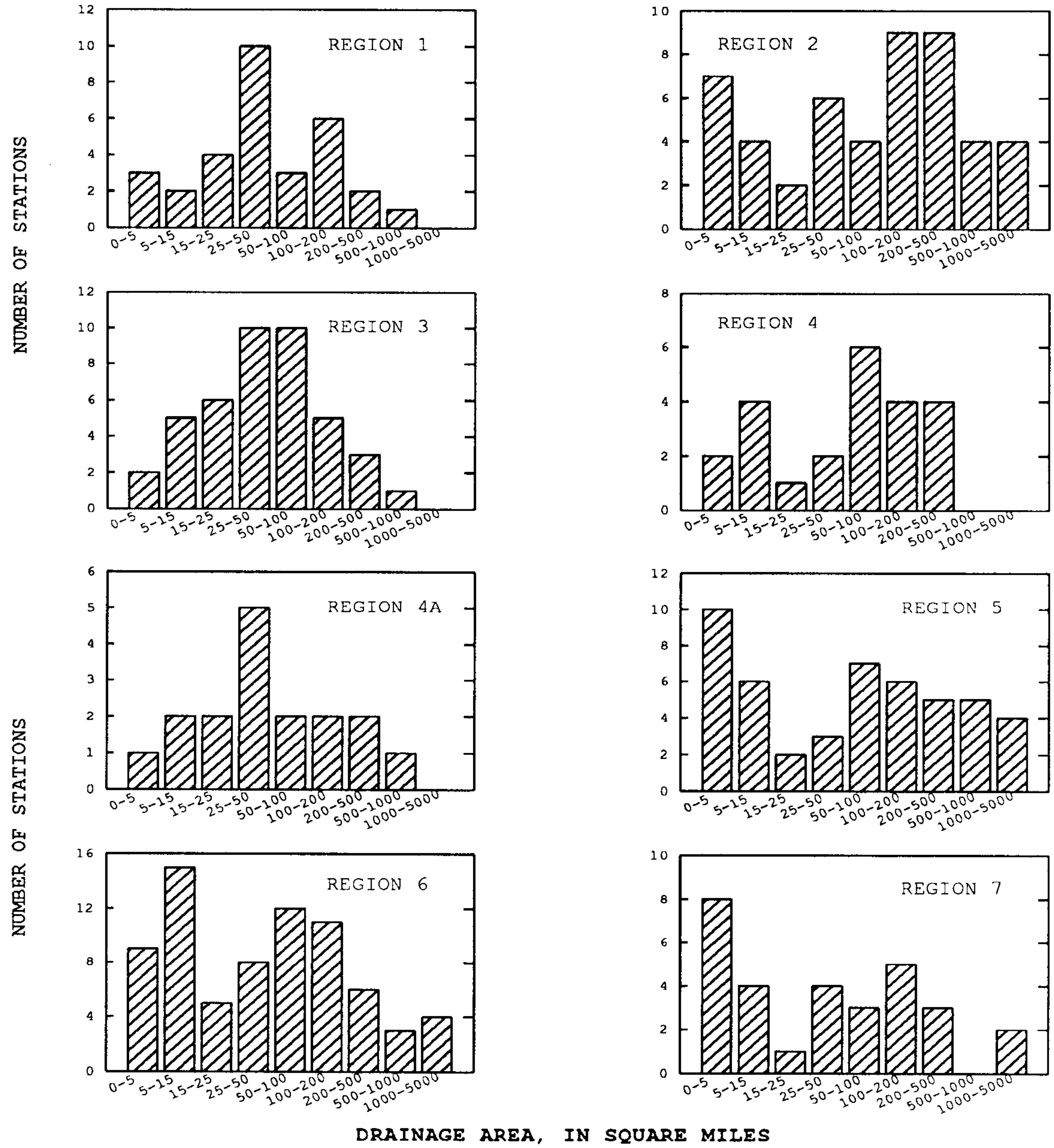


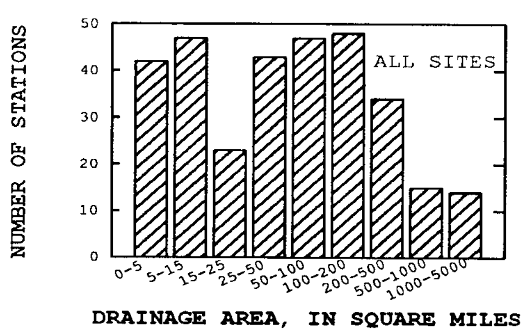
EXPLANATION

Number of stations with length of period of record within indicated interval of years.

Region	Number of stations	Average length of record
1	31	29.9
2	49	39.5
3	42	31.4
4	23	32.7
4A	17	36.2
5	48	34.2
6	73	33.6
7	30	24.7
All Sites	313	33.2

Figure 10A.--Distribution of stations, by length of period of record, within each of the eight hydrologic regions in New York and for all stations combined. (Locations of regions are shown on pl. 2).



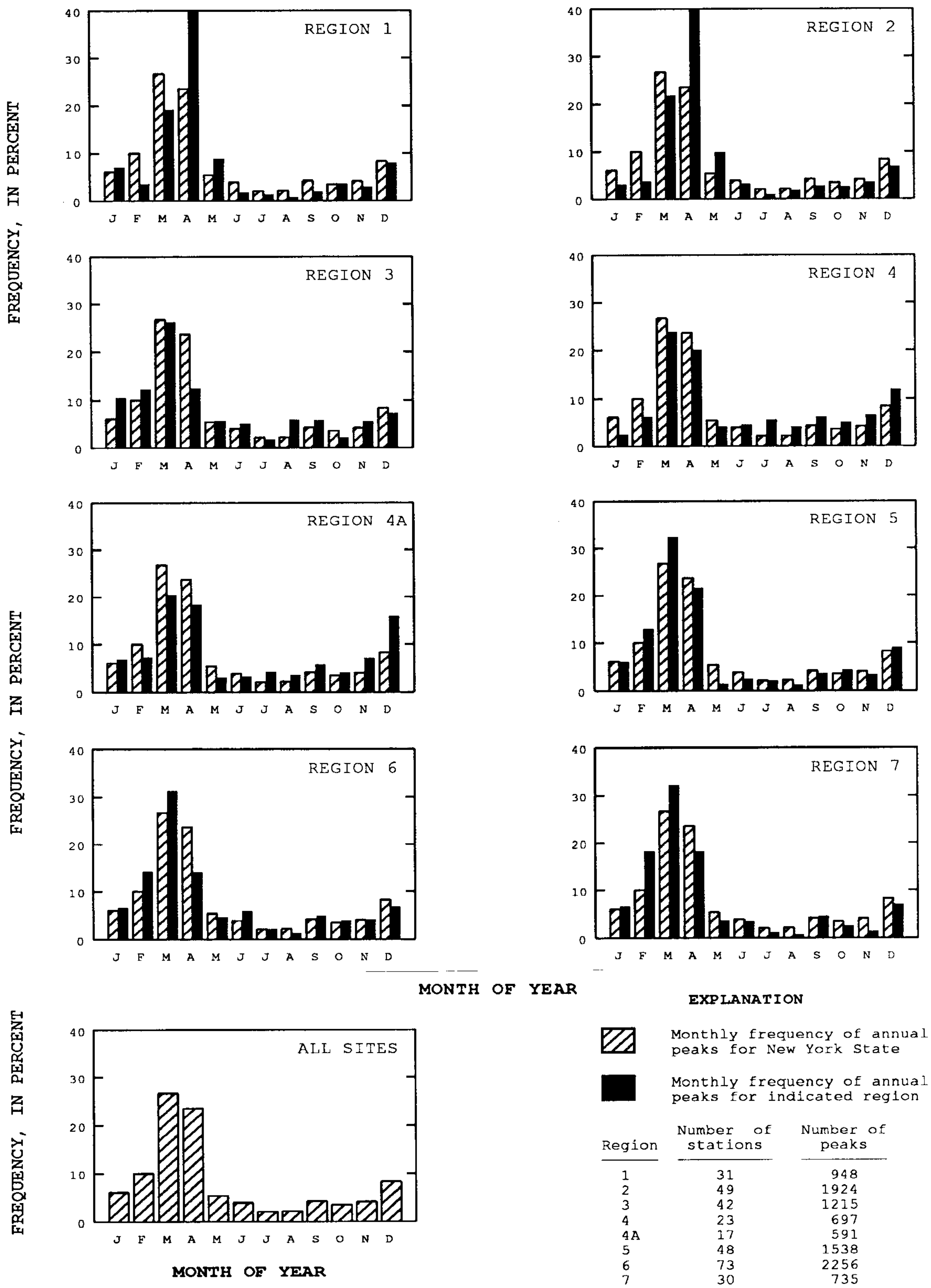


EXPLANATION

Number of stations with drainage basin size within indicated interval of drainage area.

Region	Number of stations	Range in regional drainage areas
1	31	1.34 - 612
2	49	0.54 - 4500
3	42	1.93 - 711
4	23	3.61 - 386
4A	17	.41 - 784
5	48	.70 - 3941
6	73	1.02 - 4773
7	30	.58 - 2467
All sites	313	.41 - 4773

Figure 10B.--Distribution of stations, by drainage-area size, within each of the eight hydrologic regions in New York and for all station combined. (Locations of regions are shown on pl. 2.)



Region	Number of stations	Number of peaks
1	31	948
2	49	1924
3	42	1215
4	23	697
4A	17	591
5	48	1538
6	73	2256
7	30	735
All Sites	313	9904

Figure 11.--Comparison of the monthly frequency of annual peak flows within each of the eight hydrologic regions in New York and for all stations combined. (Locations of regions are shown on pl. 2).

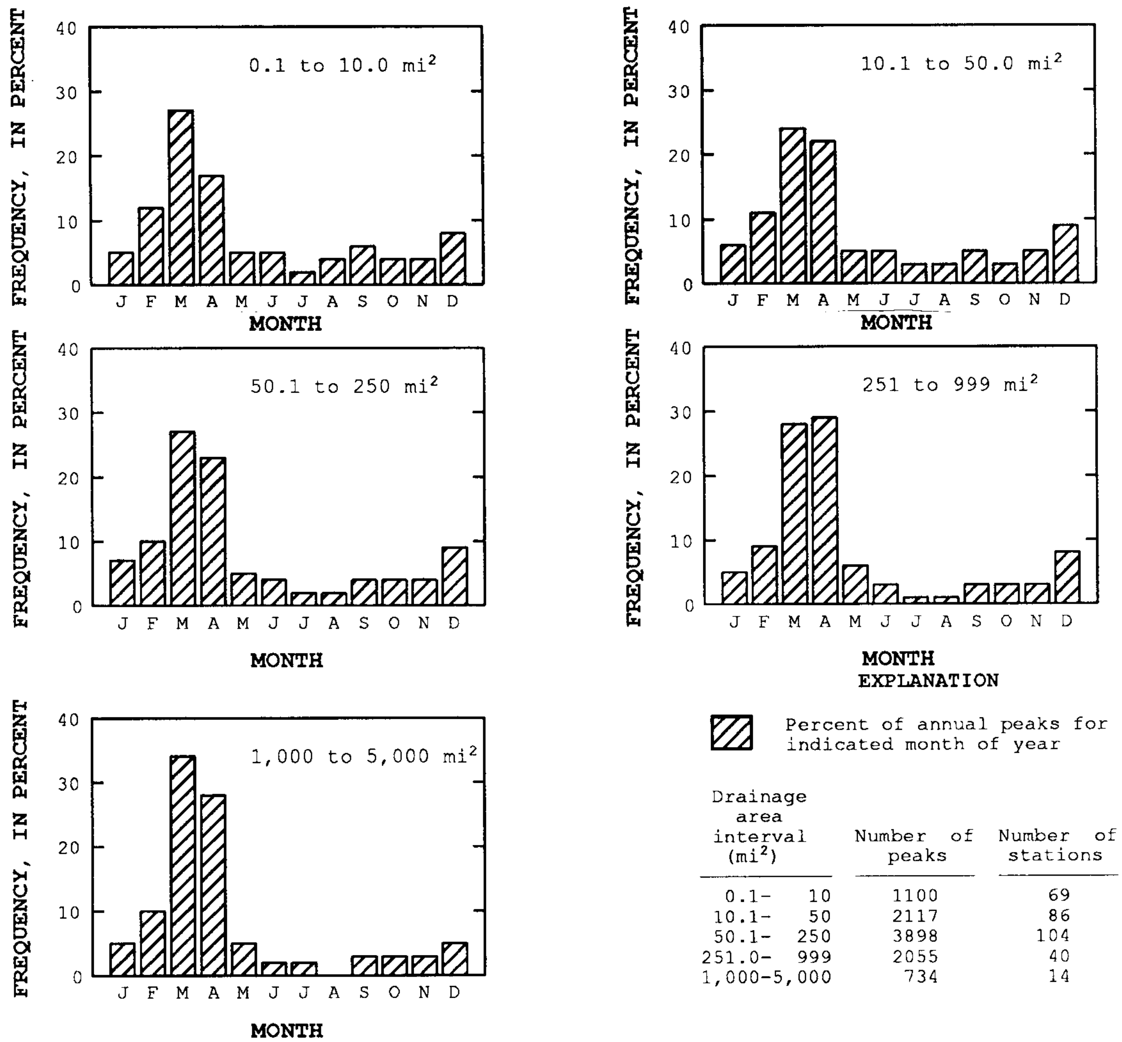


Figure 12.--Monthly frequency of annual peak flows at gaging stations used in the study, for selected drainage-area sizes.

REGIONAL REGRESSIONS

Regression equations were developed for each of the eight hydrologic regions from (1) all statistically significant explanatory variables (full regression equations) and (2) drainage area only. GLS procedures were used for all regional-regression analyses.

Full-Regression Equations

Regression equations to estimate peak discharges with recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years in each of the eight hydrologic regions, developed through GLS procedures, are presented in table 2. Also included in table 2 are estimates of the standard error of prediction and equivalent years of record for each regression equation (Hardison, 1971). The prediction error indicates the expected accuracy of the regression equations when applied to ungaged sites not used in the regression analyses. Peak-discharge estimates for ungaged sites should be within one standard error (of prediction) of the true value about 68 percent of the time. An additional overall measure of predictive ability of the models is the equivalent years of record (table 2). Equivalent years of record is a function of the average variability and skew of the annual peak-discharge series at sites in a hydrologic region, the accuracy of the regression equation, and the recurrence interval in question (Tasker and Stedinger, 1989). Equivalent years of record represent the number of years of gage data required to achieve results with accuracy comparable to that given by the regression equations. Regression estimates used to determine peak discharge at gaged sites and at ungaged sites near gaged sites are weighted by the equivalent years of record for the equation. (See section "Computations of peak discharge.")

A summary of the full-regression equations is given in table 3 (p. 28). The standard error of estimate for the regional models ranges from 10 to 43 percent. (Standard error of estimate is a measure of how well the sample data fit the relation derived through a regression analysis.) Table 3 also includes statistically significant explanatory variables for the regional equations. Several of the variables require addition or subtraction of constants before the equation is applied. These constants were determined through sensitivity analyses, normality of the distribution of a variable within its region, improvement in standard error of estimate, coefficient of determination (r^2), and the PRESS statistic (an index for prediction error).

The equations in table 2 were developed from logs (base 10) of the variables to help linearize the relations. To make the equation useful for prediction requires a detransformation; taking the antilog of the predicted logarithm of peak-discharge results in an estimate of the median response rather than the mean (Choquette, 1988). Biased estimates can result; therefore, a bias-correction factor was computed for each equation in table 2 and is presented in table 4 (p. 28). These factors, which range from 1.005 to 1.088, are based on the standard error of estimate of each equation, and, when the regression estimate is multiplied by the bias-correction factor, the resultant discharge will correspond to the mean value expected for the particular set of variables in question (Koch and Smillie, 1986). The mean value will be a more conservative estimate than the median value in terms of minimizing risk of flood damage. Use of the bias-correction factor is left to the discretion of the user. The factor was not applied to data in any tables or examples used in this report.

The final generalized least squares (GLS) full equations (table 2) were compared with equations previously developed for New York by Zembrzuski and Dunn (1979). The 50-year estimating equation from each study was applied to stations within each of the eight hydrologic regions, and residuals were computed. The sum of the squares of the GLS residuals were in each case significantly less than those derived through the Zembrzuski and Dunn equation, which indicates that the GLS equations are more accurate. As a further comparison of the two sets of equations, observed 50-year peak discharges were plotted against predicted values for stations within each of the eight hydrologic regions computed from both sets of equations (fig. 13A, 13B). The 1979 equations showed significant bias and error for several of the regions (fig. 13A); they gave a general underprediction for sites in hydrologic regions 1 and 4 and a significant overprediction for sites in regions 2, 5, and 7. This bias and error can be attributed to the smaller number of stations, shorter periods of record, and the use of only three hydrologic regions in the 1979 study. The GLS results from this study (fig. 13B) are based on improved statistical methods that were unavailable during the 1979 work and indicate no significant bias and less error.

Drainage-Area-Only Equations

Alternative GLS regression equations for each of the eight hydrologic regions that contain only the most significant basin characteristic (drainage area) and have higher standard errors than the GLS full-regression equations are given in table 5 (p. 29). An indication of their accuracy is shown in figure 13C. The observed and predicted 50-year peak discharges are given for the drainage-area-only equations (table 5) and also for the GLS full-regression equations (table 2) for comparison. The illustration shows no significant bias for the drainage-area-only relations, but generally more error. Bias-correction factors, standard errors of prediction, and equivalent years of record are included in table 5.

The drainage-area-only equations (table 5) are intended to provide estimates of peak discharges that are easier to calculate, although less accurate, than those computed by the full equations. The drainage-area exponents for each region (table 5) can be useful in transferring peak-discharge information upstream or downstream from a gaged site according to the ratio of the ungaged site's drainage area to the gaged site's drainage area, raised to the exponent power (Wandle, 1983).

Table 2.--Full-regression equations for estimating peak discharges for streams in each of eight hydrologic regions of New York.

[A = Drainage area, in square miles, SL = main channel slope, in feet per mile, ST = basin storage, in percent, P = mean annual precipitation, in inches, F = basin forested area, in percent, EL = average main stream channel elevation, in feet, and, SH = basin-shape index, in mile per mile. Region locations are shown on pl. 2]

Regression equation	Standard error of prediction (percent)	Equivalent years of record
REGION 1		
$Q_2 = 34.9(A)^{0.909}\ (ST+5)^{-0.489}\ (P-20)^{1.047}\ (F+10)^{-0.420}$	21.1	4
$Q_5 = 84.4(A)^{0.890}\ (ST+5)^{-0.513}\ (P-20)^{0.984}\ (F+10)^{-0.466}$	20.9	6
$Q_{10} = 130.(A)^{0.881}\ (ST+5)^{-0.526}\ (P-20)^{0.961}\ (F+10)^{-0.490}$	21.2	8
$Q_{25} = 197.(A)^{0.872}\ (ST+5)^{-0.538}\ (P-20)^{0.937}\ (F+10)^{-0.506}$	22.2	11
$Q_{50} = 250.(A)^{0.868}\ (ST+5)^{-0.544}\ (P-20)^{0.919}\ (F+10)^{-0.510}$	23.4	12
$Q_{100} = 306.(A)^{0.864}\ (ST+5)^{-0.548}\ (P-20)^{0.899}\ (F+10)^{-0.508}$	24.7	13
$Q_{500} = 441.(A)^{0.858}\ (ST+5)^{-0.553}\ (P-20)^{0.853}\ (F+10)^{-0.496}$	27.2	16
REGION 2		
$Q_2 = 3.87(A)^{0.905}\ (SL)^{0.260}\ (ST+1)^{-0.160}\ (P-20)^{0.976}\ (EL)^{-0.219}$	25.4	2
$Q_5 = 7.09(A)^{0.896}\ (SL)^{0.257}\ (ST+1)^{-0.189}\ (P-20)^{1.000}\ (EL)^{-0.255}$	25.4	3
$Q_{10} = 9.77(A)^{0.891}\ (SL)^{0.251}\ (ST+1)^{-0.209}\ (P-20)^{1.019}\ (EL)^{-0.273}$	25.5	5
$Q_{25} = 13.5(A)^{0.888}\ (SL)^{0.242}\ (ST+1)^{-0.236}\ (P-20)^{1.046}\ (EL)^{-0.291}$	26.4	6
$Q_{50} = 16.3(A)^{0.887}\ (SL)^{0.236}\ (ST+1)^{-0.256}\ (P-20)^{1.066}\ (EL)^{-0.302}$	27.3	8
$Q_{100} = 19.1(A)^{0.887}\ (SL)^{0.230}\ (ST+1)^{-0.275}\ (P-20)^{1.086}\ (EL)^{-0.311}$	28.6	9
$Q_{500} = 25.6(A)^{0.889}\ (SL)^{0.218}\ (ST+1)^{-0.318}\ (P-20)^{1.134}\ (EL)^{-0.327}$	30.6	11
REGION 3		
$Q_2 = 45.6(A)^{0.723}\ (ST+1)^{-0.390}\ (P-20)^{0.491}\ (SH)^{-0.273}$	30.7	3
$Q_5 = 33.0(A)^{0.718}\ (ST+1)^{-0.405}\ (P-20)^{0.806}\ (SH)^{-0.347}$	32.5	6
$Q_{10} = 29.2(A)^{0.717}\ (ST+1)^{-0.424}\ (P-20)^{0.977}\ (SH)^{-0.401}$	34.6	8
$Q_{25} = 27.4(A)^{0.717}\ (ST+1)^{-0.452}\ (P-20)^{1.155}\ (SH)^{-0.470}$	37.9	10
$Q_{50} = 27.5(A)^{0.717}\ (ST+1)^{-0.475}\ (P-20)^{1.263}\ (SH)^{-0.521}$	40.6	11
$Q_{100} = 28.5(A)^{0.718}\ (ST+1)^{-0.499}\ (P-20)^{1.354}\ (SH)^{-0.571}$	43.6	12
$Q_{500} = 33.1(A)^{0.722}\ (ST+1)^{-0.557}\ (P-20)^{1.529}\ (SH)^{-0.682}$	50.9	14
REGION 4		
$Q_2 = 14.1(A)^{0.880}\ (ST+1)^{-0.225}\ (P-20)^{0.614}$	26.4	5
$Q_5 = 17.2(A)^{0.852}\ (ST+1)^{-0.294}\ (P-20)^{0.771}$	24.0	10
$Q_{10} = 19.6(A)^{0.835}\ (ST+1)^{-0.335}\ (P-20)^{0.853}$	24.3	14
$Q_{25} = 22.3(A)^{0.816}\ (ST+1)^{-0.381}\ (P-20)^{0.948}$	25.5	18
$Q_{50} = 24.0(A)^{0.804}\ (ST+1)^{-0.410}\ (P-20)^{1.014}$	27.0	21
$Q_{100} = 25.3(A)^{0.794}\ (ST+1)^{-0.435}\ (P-20)^{1.075}$	28.9	23
$Q_{500} = 27.5(A)^{0.774}\ (ST+1)^{-0.482}\ (P-20)^{1.205}$	33.6	25

Table 2.--Full-regression equations for estimating peak discharges for streams in each of eight hydrologic regions of New York (continued).

[A = Drainage area, in square miles, SL = main channel slope, in feet per mile, ST = basin storage, in percent, P = mean annual precipitation, in inches, F = basin forested area, in percent, EL = average main stream channel elevation, in feet, and, SH = basin-shape index, in mile per mile. Region locations are shown on pl. 2]

Regression equation	Standard error of prediction (percent)	Equivalent years of record
REGION 4A		
$Q_2 = 2.09(A)^{0.904}\ (P\text{-}20)^{1.051}$	18.3	8
$Q_5 = 2.18(A)^{0.879}\ (P\text{-}20)^{1.207}$	17.4	14
$Q_{10} = 2.35(A)^{0.865}\ (P\text{-}20)^{1.278}$	16.9	21
$Q_{25} = 2.55(A)^{0.850}\ (P\text{-}20)^{1.354}$	16.7	32
$Q_{50} = 2.64(A)^{0.841}\ (P\text{-}20)^{1.407}$	16.7	41
$Q_{100} = 2.68(A)^{0.833}\ (P\text{-}20)^{1.459}$	16.9	51
$Q_{500} = 2.62(A)^{0.821}\ (P\text{-}20)^{1.574}$	17.4	72
REGION 5		
$Q_2 = 20.3(A)^{0.971}\ (SL)^{0.232}\ (ST+1)^{-0.176}\ (SH)^{-0.093}$	29.3	2
$Q_5 = 26.4(A)^{0.979}\ (SL)^{0.272}\ (ST+1)^{-0.189}\ (SH)^{-0.130}$	27.2	4
$Q_{10} = 30.2(A)^{0.981}\ (SL)^{0.295}\ (ST+1)^{-0.196}\ (SH)^{-0.141}$	26.5	6
$Q_{25} = 35.2(A)^{0.980}\ (SL)^{0.316}\ (ST+1)^{-0.204}\ (SH)^{-0.147}$	26.2	8
$Q_{50} = 39.2(A)^{0.978}\ (SL)^{0.329}\ (ST+1)^{-0.211}\ (SH)^{-0.150}$	26.4	10
$Q_{100} = 43.4(A)^{0.976}\ (SL)^{0.339}\ (ST+1)^{-0.217}\ (SH)^{-0.152}$	26.9	12
$Q_{500} = 53.5(A)^{0.972}\ (SL)^{0.357}\ (ST+1)^{-0.231}\ (SH)^{-0.158}$	29.0	14
REGION 6		
$Q_2 = 8.80(A)^{0.870}\ (SL)^{0.233}\ (ST+1)^{-0.217}\ (P\text{-}20)^{0.481}$	38.3	2
$Q_5 = 13.3(A)^{0.869}\ (SL)^{0.302}\ (ST+1)^{-0.216}\ (P\text{-}20)^{0.408}$	33.6	3
$Q_{10} = 16.2(A)^{0.869}\ (SL)^{0.334}\ (ST+1)^{-0.217}\ (P\text{-}20)^{0.379}$	32.4	5
$Q_{25} = 19.7(A)^{0.869}\ (SL)^{0.360}\ (ST+1)^{-0.220}\ (P\text{-}20)^{0.360}$	32.8	7
$Q_{50} = 22.1(A)^{0.869}\ (SL)^{0.374}\ (ST+1)^{-0.224}\ (P\text{-}20)^{0.356}$	34.1	9
$Q_{100} = 24.1(A)^{0.870}\ (SL)^{0.385}\ (ST+1)^{-0.228}\ (P\text{-}20)^{0.359}$	36.0	9
$Q_{500} = 27.5(A)^{0.872}\ (SL)^{0.406}\ (ST+1)^{-0.244}\ (P\text{-}20)^{0.380}$	42.1	10
REGION 7		
$Q_2 = 92.3(A)^{0.998}\ (SL)^{0.460}\ (ST+1)^{-0.311}\ (P\text{-}20)^{0.737}\ (EL)^{-0.755}\ (SH)^{0.243}$	30.4	2
$Q_5 = 98.7(A)^{1.005}\ (SL)^{0.509}\ (ST+1)^{-0.311}\ (P\text{-}20)^{0.829}\ (EL)^{-0.784}\ (SH)^{0.267}$	28.4	3
$Q_{10} = 94.5(A)^{1.009}\ (SL)^{0.528}\ (ST+1)^{-0.312}\ (P\text{-}20)^{0.892}\ (EL)^{-0.788}\ (SH)^{0.275}$	28.1	4
$Q_{25} = 83.7(A)^{1.014}\ (SL)^{0.543}\ (ST+1)^{-0.312}\ (P\text{-}20)^{0.964}\ (EL)^{-0.781}\ (SH)^{0.281}$	28.9	5
$Q_{50} = 74.5(A)^{1.019}\ (SL)^{0.550}\ (ST+1)^{-0.313}\ (P\text{-}20)^{1.011}\ (EL)^{-0.770}\ (SH)^{0.282}$	30.0	6
$Q_{100} = 65.6(A)^{1.024}\ (SL)^{0.555}\ (ST+1)^{-0.313}\ (P\text{-}20)^{1.054}\ (EL)^{-0.758}\ (SH)^{0.283}$	31.6	7
$Q_{500} = 48.4(A)^{1.038}\ (SL)^{0.568}\ (ST+1)^{-0.313}\ (P\text{-}20)^{1.148}\ (EL)^{-0.730}\ (SH)^{0.281}$	36.2	7

Table 3.--Summary of full-regression equations (table 2) for estimating peak discharges in New York, based on information from GLS regression models for estimating 2, 5, 10, 25, 50, 100, and 500-year peak discharges.

[Locations of hydrologic regions are shown on pl. 2]

Hydrologic region	Explanatory variables[1]	Standard error of the estimate (percent)	Estimated standard error of prediction (percent)	Number of gaging stations
1	A, (ST+5), (P-20), (F+10)	18 - 22	21 - 27	31
2	A, SL, (ST+1), (P-20), EL	23 - 27	25 - 31	49
3	A, (ST+1), (P-20), SH	28 - 43	31 - 51	42
4	A, (ST+1), (P-20)	20 - 25	24 - 34	23
4A	A, (P-20)	10 - 16	17 - 18	17
5	A, SL, (ST+1), SH	24 - 27	26 - 29	48
6	A, SL, (ST+1), (P-20)	30 - 39	32 - 42	73
7	A, SL, (ST+1), (P-20), EL, SH	24 - 30	28 - 36	30

1 A = drainage area of the basin, in square miles.
SL = main-channel slope, in feet per mile.
ST = basin storage, in percent of total basin drainage area.
P = mean annual precipitation, in inches.
F = basin forest cover, in percent of total basin drainage area.
EL = average main-channel elevation, in feet.
SH = basin shape index, in mile per mile.

Several of these variables require a constant value to be added or subtracted before discharge computation (for example, for each equation with mean annual precipitation (P) included as a significant explanatory variable, a constant of 20 should be subtracted from the plate 1 value of P before computations).

Table 4.---Correction factors to adjust regional full-regression equations for transformation bias.

[Full-regression equations are given in table 2. Locations of hydrologc regions are shown in pl. 2.].

Recurrence interval (years)	Hydrologic Region							
	1	2	3	4	4A	5	6	7
2	1.017	1.027	1.038	1.026	1.012	1.037	1.064	1.034
5	1.016	1.027	1.041	1.020	1.010	1.031	1.049	1.029
10	1.016	1.027	1.045	1.019	1.009	1.029	1.045	1.028
25	1.017	1.028	1.052	1.020	1.008	1.028	1.046	1.029
50	1.019	1.030	1.059	1.021	1.007	1.028	1.049	1.031
100	1.021	1.032	1.067	1.024	1.006	1.028	1.054	1.033
500	1.024	1.036	1.088	1.032	1.005	1.032	1.073	1.043

Table 5.--Regional flood-frequency equations based on drainage area only.

[Full equations are given in table 2. Region locations are shown in pl. 2]

Regression equation	Bias Correction factor	Standard error of prediction (percent)	Equivalent years of record
REGION 1			
$Q_2 = 48.9(A)^{0.841}$	1.084	43.6	1
$Q_5 = 76.8(A)^{0.818}$	1.079	42.5	2
$Q_{10} = 96.9(A)^{0.809}$	1.076	41.7	2
$Q_{25} = 124.(A)^{0.801}$	1.073	41.0	3
$Q_{50} = 145.(A)^{0.797}$	1.072	40.8	4
$Q_{100} = 167.(A)^{0.794}$	1.071	40.8	5
$Q_{500} = 221.(A)^{0.789}$	1.072	41.4	7
REGION 3			
$Q_2 = 75.5(A)^{0.700}$	1.056	35.5	2
$Q_5 = 127.(A)^{0.687}$	1.056	36.0	4
$Q_{10} = 167.(A)^{0.686}$	1.060	37.5	6
$Q_{25} = 225.(A)^{0.687}$	1.067	40.0	8
$Q_{50} = 273.(A)^{0.689}$	1.073	42.2	9
$Q_{100} = 326.(A)^{0.691}$	1.080	44.3	11
$Q_{500} = 466.(A)^{0.698}$	1.098	50.0	13

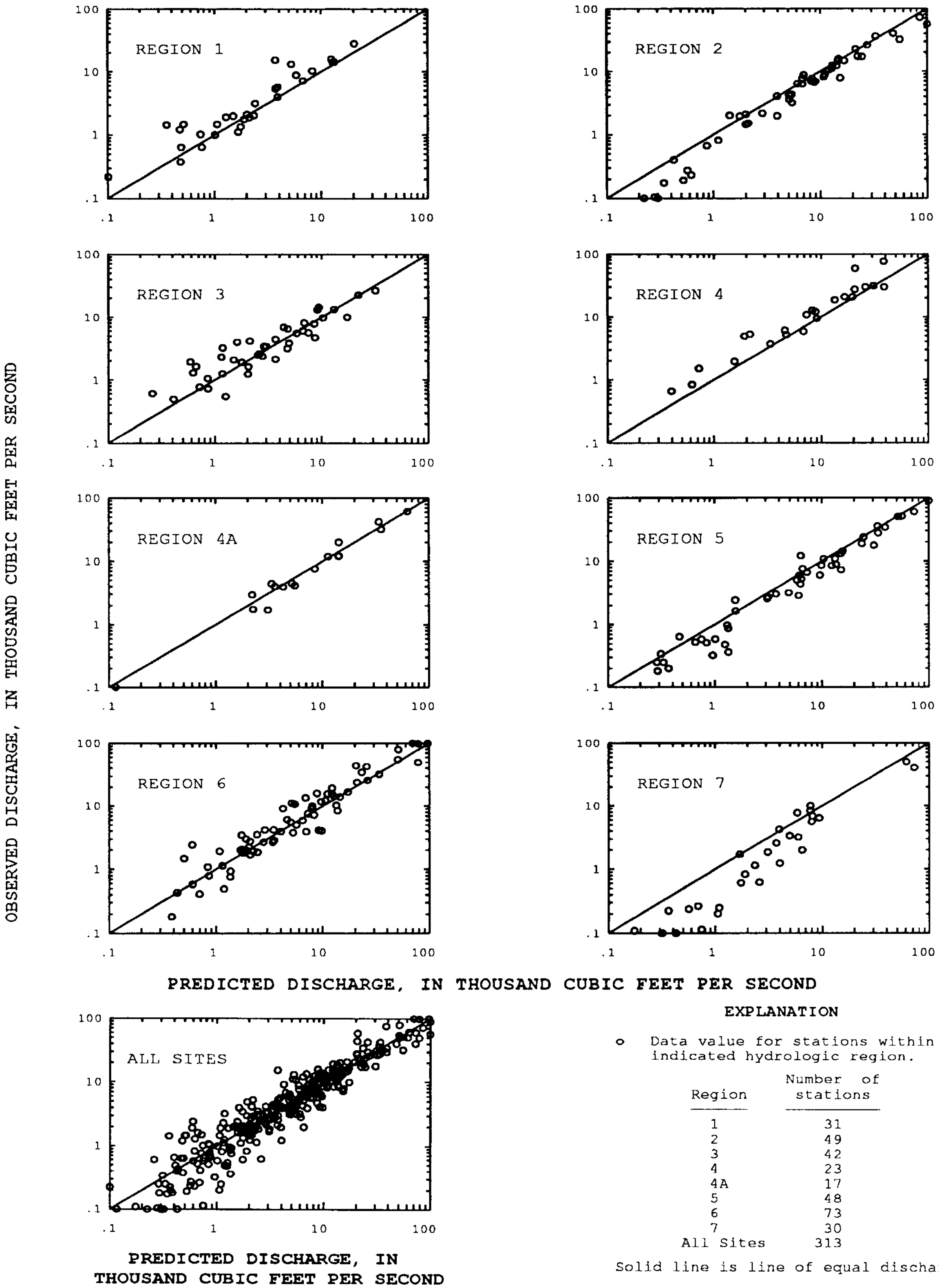
Regression equation	Bias Correction factor	Standard error of prediction (percent)	Equivalent years of record
REGION 2			
$Q_2 = 51.4(A)^{0.816}$	1.073	40.1	1
$Q_5 = 75.9(A)^{0.803}$	1.074	40.2	1
$Q_{10} = 93.4(A)^{0.796}$	1.074	40.5	2
$Q_{25} = 116.(A)^{0.789}$	1.076	41.2	3
$Q_{50} = 134.(A)^{0.786}$	1.078	41.7	3
$Q_{100} = 152.(A)^{0.783}$	1.079	42.2	4
$Q_{500} = 194.(A)^{0.778}$	1.083	43.4	6
REGION 4			
$Q_2 = 68.3(A)^{0.914}$	1.057	36.5	3
$Q_5 = 126.(A)^{0.887}$	1.059	37.5	4
$Q_{10} = 178.(A)^{0.872}$	1.063	39.3	5
$Q_{25} = 259.(A)^{0.856}$	1.072	42.3	7
$Q_{50} = 330.(A)^{0.846}$	1.079	44.8	8
$Q_{100} = 410.(A)^{0.839}$	1.087	47.3	9
$Q_{500} = 630.(A)^{0.827}$	1.108	53.4	10

Table 5.--Regional flood-frequency equations based on drainage area only (continued).

[Full equations are given in table 2. Region locations are shown in pl. 2]

Regression equation	Bias Correction factor	Standard error of prediction (percent)	Equivalent years of record
REGION 4A			
$Q_2 = 58.2(A)^{0.921}$	1.021	22.7	5
$Q_5 = 100.(A)^{0.898}$	1.019	22.0	9
$Q_{10} = 136.(A)^{0.883}$	1.016	20.4	15
$Q_{25} = 191.(A)^{0.866}$	1.013	19.4	24
$Q_{50} = 237.(A)^{0.855}$	1.012	19.0	32
$Q_{100} = 288.(A)^{0.846}$	1.011	18.7	42
$Q_{500} = 422.(A)^{0.830}$	1.011	20.3	53
REGION 6			
$Q_2 = 90.5(A)^{0.783}$	1.088	43.9	1
$Q_5 = 157.(A)^{0.755}$	1.077	41.3	2
$Q_{10} = 207.(A)^{0.742}$	1.077	41.4	3
$Q_{25} = 274.(A)^{0.730}$	1.083	43.2	4
$Q_{50} = 326.(A)^{0.724}$	1.091	45.3	5
$Q_{100} = 379.(A)^{0.719}$	1.101	47.9	6
$Q_{500} = 508.(A)^{0.712}$	1.132	55.2	6

Regression equation	Bias Correction factor	Standard error of prediction (percent)	Equivalent years of record
REGION 5			
$Q_2 = 67.0(A)^{0.800}$	1.053	34.1	2
$Q_5 = 105.(A)^{0.777}$	1.053	34.1	2
$Q_{10} = 135.(A)^{0.764}$	1.053	34.4	3
$Q_{25} = 178.(A)^{0.748}$	1.055	35.2	5
$Q_{50} = 212.(A)^{0.738}$	1.057	35.9	6
$Q_{100} = 249.(A)^{0.728}$	1.059	36.8	6
$Q_{500} = 341.(A)^{0.710}$	1.064	38.4	8
REGION 7			
$Q_2 = 34.1(A)^{0.828}$	1.117	52.2	1
$Q_5 = 47.8(A)^{0.829}$	1.121	53.1	1
$Q_{10} = 57.0(A)^{0.831}$	1.126	54.4	1
$Q_{25} = 68.4(A)^{0.834}$	1.134	56.3	2
$Q_{50} = 76.8(A)^{0.837}$	1.140	57.8	2
$Q_{100} = 85.1(A)^{0.841}$	1.147	59.4	2
$Q_{500} = 103.(A)^{0.849}$	1.163	63.3	3



EXPLANATION

o Data value for stations within indicated hydrologic region.

Region	Number of stations
1	31
2	49
3	42
4	23
4A	17
5	48
6	73
7	30
All Sites	313

Solid line is line of equal discharge.

Figure 13A.--Observed 50-year discharges and 50-year discharges predicted from equations of Zembrzuski and Dunn (1979) for stations within the eight hydrologic regions of New York. (Locations of regions are shown on pl. 2.)

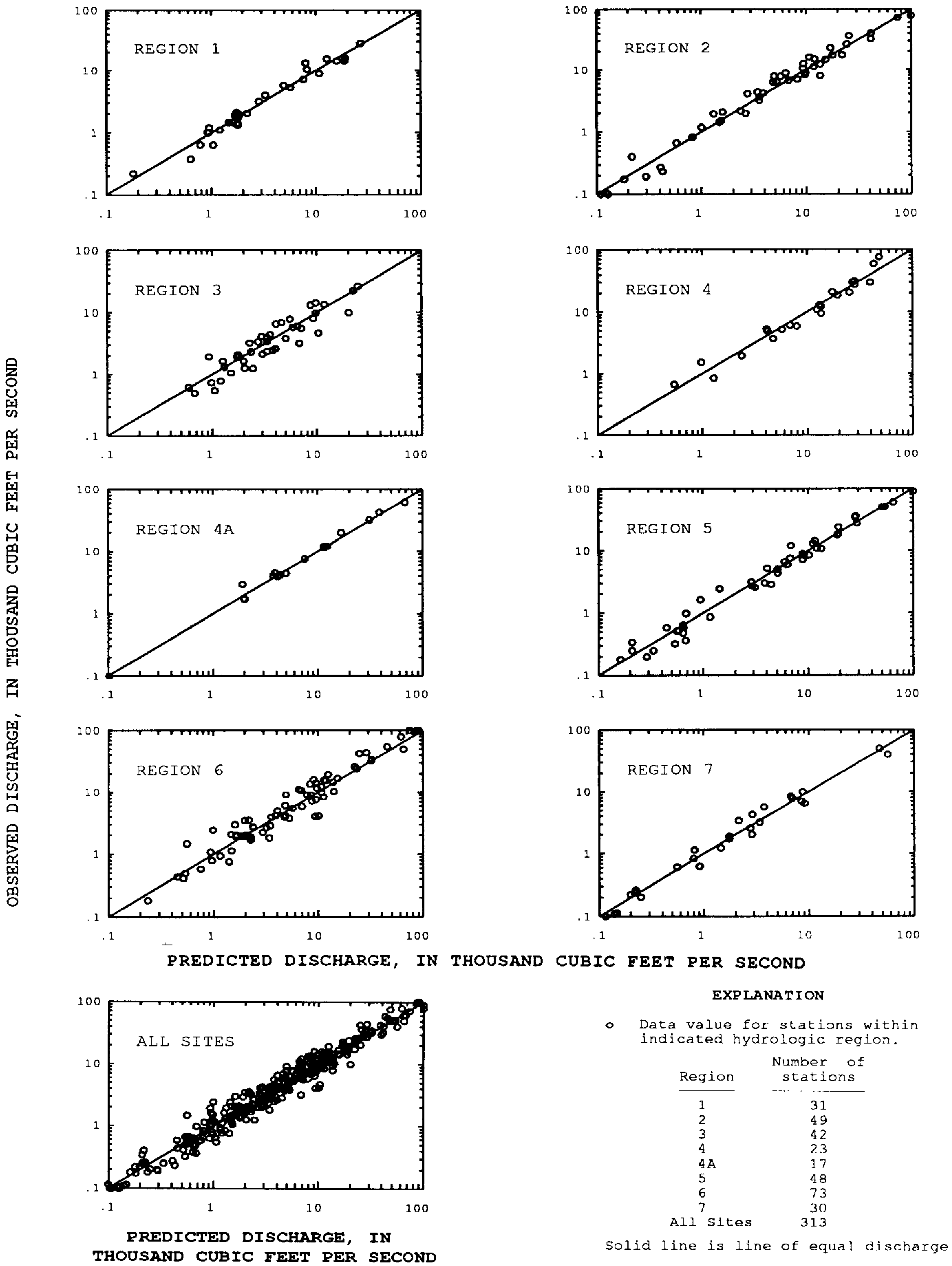


Figure 13B.--Observed 50-year discharges and 50-year discharges predicted from GLS (generalized least squares) full regression equations for stations within the eight hydrologic regions of New York. (Locations of regions are shown on pl. 2.)

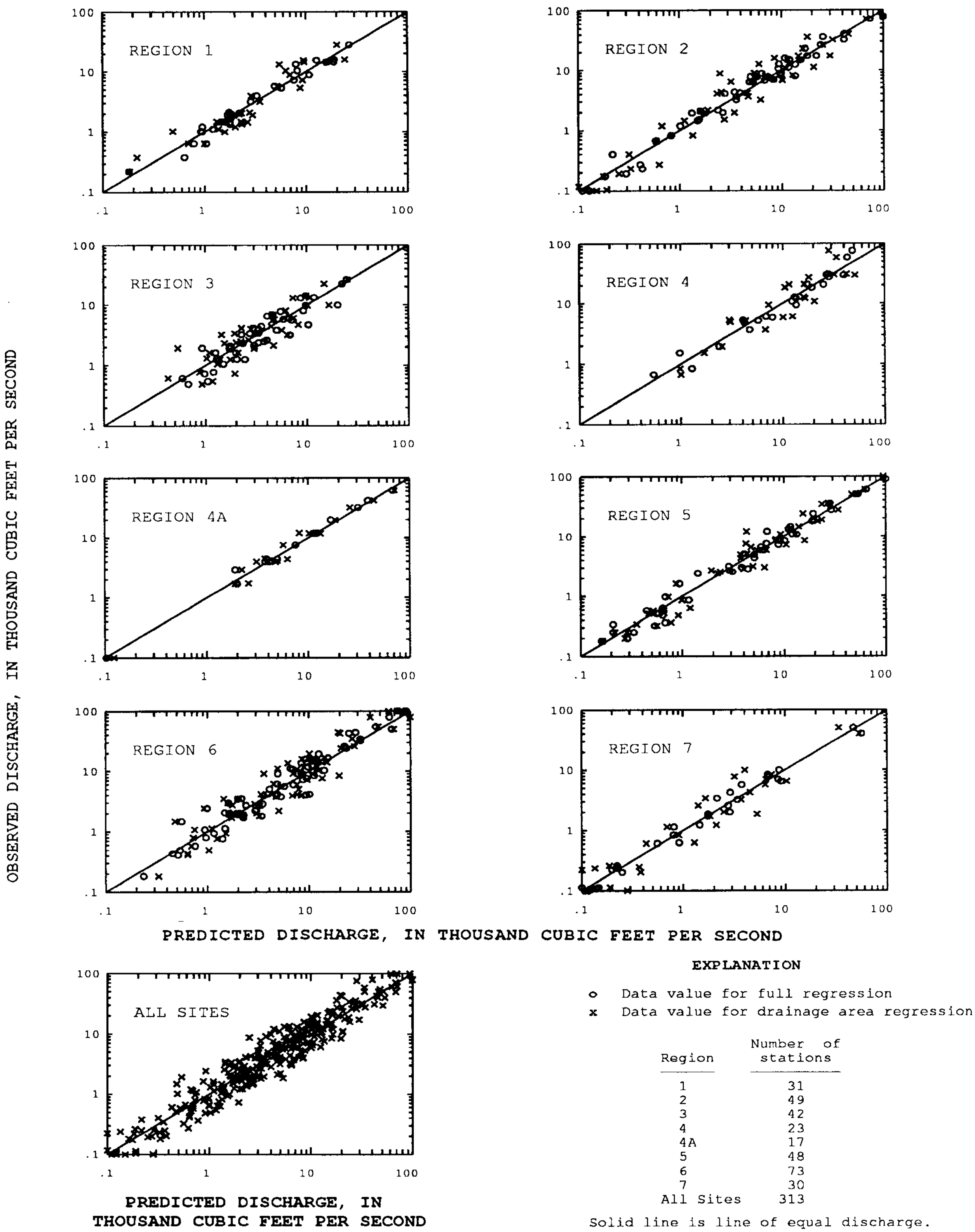


Figure 13C.--Observed 50-year discharges and 50-year discharges predicted from full- and drainage-area-only GLS (generalized least squares) regression equations for stations within the eight hydrologic regions of New York. (Locations of regions are shown on pl. 2.)

COMPUTATION OF PEAK DISCHARGE

Methods for computing a peak discharge for a selected recurrence interval at a specific site depend on whether the site is gaged or ungaged and whether the drainage area crosses hydrologic-region boundaries or State lines. Methods for gaged and ungaged sites are given below with examples of each technique.

Gaged Sites

The GLS regional-regression equations can be used to improve gaging-station estimates (based on flood-frequency analysis of the gaged record) by using a weighted average of the two estimates (regression and gaged). Incorporating the regression estimate into the weighted average tends to decrease time sampling errors that result for sites with short periods of record. The station number, peak-discharge statistics, and gaged, regression, and weighted flood-frequency values for gaging stations used in the study are given in table 9 (at end of report). The weighted discharges generally give the best estimate.

The weighted average discharge is computed from the equation,

$$Q_{T(w)} = \frac{Q_{T(g)}(N) + Q_{T(r)}(E)}{N + E}$$

where:

$Q_{T(w)}$ = weighted peak discharge, in ft^3/s, for the T-year recurrence interval;

$Q_{T(g)}$ = peak discharge at gage, in ft^3/s, calculated through frequency analysis (log-Pearson Type III) of the station's peak discharge record, for the T-year recurrence interval;

N = number of years of annual peak-discharge record used to calculate $Q_{T(g)}$ at the gaging station;

$Q_{T(r)}$ = regional regression estimate of the peak discharge, in ft^3/s, for the T-year recurrence interval; and

E = average equivalent years of record associated with the regression equation (table 2) that was used to calculate $Q_{T(r)}$.

Ungaged Sites

The following methods may be used to estimate peak discharges of selected recurrence intervals for sites on ungaged streams, depending on whether (1) the drainage area is within a single hydrologic region, (2) the drainage area crosses a hydrologic-region boundary or State boundary, or (3) the ungaged site is near a gaged site on the same stream. Procedures for each of these conditions are described below:

(1) If the drainage area of an ungaged site lies entirely within a single hydrologic region (pl. 2), peak discharges for selected recurrence intervals are computed from the regression equations (table 2) for that region.

(2) If the drainage area of an ungaged site crosses a hydrologic-region boundary or State boundary, the percentage of drainage within each region and(or) State is determined. Peak-discharge estimates are computed for the entire drainage basin through each of the appropriate regional or State equations, and the drainage-area percentages are used as weighting factors by multiplying the percentages by the corresponding peak-discharge estimate; the resulting values are then summed to compute the peak discharge for the entire basin. Out-of-state equations are given in U.S. Geological Survey or State flood-frequency reports for New Jersey (Stankowski, 1974 with update by R. Schopp in progress), Pennsylvania (Flippo, 1977), Connecticut (Weiss, 1983), Massachusetts (Wandle, 1983), and Vermont (Johnson and Tasker, 1974).

(3) If the ungaged site for which flood-frequency estimates are needed is on a gaged stream, and if the site's drainage area is between 50 and 150 percent of the drainage area of the stream at the gage, the following procedure (Choquette, 1988) is suggested:

(a) Estimate the peak discharge ($Q_{T(w)}$) at the gaged site by the procedure given in the preceding section, "Gaged Sites."

(b) Compute the following ratio for the gaged site, as follows:

$$C_g = Q_{T(w)} / Q_{T(r)}$$

where:

C_g = correction-factor ratio for the gaged site,
$Q_{T(w)}$ = weighted peak-discharge estimate for the gaged site; and
$Q_{T(r)}$ = regression peak-discharge estimate for the gaged site.

(c) Compute the following ratio for the ungaged site:

$$C_u = C_g - [2(|A_g - A_u|)/A_g](C_g - 1)$$

where:

C_u = correction factor ratio for the ungaged site,
C_g = correction factor ratio for the gaged site,
A_g = drainage area of the gaged site,
A_u = drainage area of the ungaged site (must be within 50 and 150 percent of the drainage area at the gaged site), and
$|A_g - A_u|$ = absolute value of the difference between drainage areas for the gaged and ungaged sites.

(d) Compute the weighted peak-discharge estimate at the ungaged site, as follows:

$$Q_{T(w)} = C_u(Q_{T(r)}),$$

where:

$Q_{T(w)}$ = weighted peak-discharge estimate for the ungaged site,
C_u = correction factor ratio for the ungaged site, and
$Q_{T(r)}$ = regression peak-discharge estimate for the ungaged site.

As the difference in drainage area between the gaged site and the ungaged site approaches either 50 or 150 percent of the drainage area at the gaged site, the value of C_u approaches 1, in which case the adjustment has no effect on the regression estimate for the ungaged site.

Sample Computations

The following examples illustrate use of the methods described previously.

Example 1. Gaged site with drainage area within a single hydrologic region: Estimate the 50-year peak discharge at the gage site on Canaseraga Creek near Dansville (04225000).

Given:
a) Gaged basin is in hydrologic region 6 (pl. 2)
b) Drainage area = 152.0 mi^2 (table 10)
c) Main channel slope = 33.50 ft/mi (table 10)
d) Area (in percent of total drainage area) of lakes, ponds, and swamps (basin storage) = 0.84 percent (table 10)
e) Mean annual precipitation = 33.0 in. (pl. 1 and table 10)
f) The 50-year peak-discharge ($Q_{50(g)}$) based on the gaged record = 10,300 ft^3/s (table 9)
g) Number of years (N) of annual peak-discharge record used to determine $Q_{50(g)}$ = 61 years (table 9)

Solution:

The regression estimate ($Q_{50(r)}$) for station 04225000 is computed by the following equation for region 6 (table 2):

$$Q_{50(r)} = 22.1\,(A)^{0.869}\,(SL)^{0.374}\,(ST+1)^{-0.224}\,(P-20)^{0.356}$$

From the given basin characteristics:

$$Q_{50(r)} = 22.1\,(152)^{0.869}\,(33.5)^{0.374}\,(0.84+1)^{-0.224}\,(33.0-20)^{0.356}$$
$$Q_{50(r)} = 14{,}100 \text{ ft}^3/\text{s (also in table 9)}$$

The equivalent years of record (E) for $Q_{50(r)}$ for region 6 is 9 years (table 2). Therefore, the weighted peak-discharge $Q_{50(w)}$ for station 04225000 (method for gaged sites) is:

$$Q_{50(W)} = \frac{Q_{50(g)}\,(N) + Q_{50(r)}\,(E)}{N+E}$$

$$Q_{50(W)} = \frac{(10{,}300)(61) + (14{,}100)\,(9)}{61+9}$$

$$Q_{50(w)} = 10{,}800 \text{ ft}^3/\text{s}$$

Example 2. Drainage area crosses hydrologic region boundaries: Compute the 50-year peak-discharge regression estimate for Genesee River at Rochester (04232000). For this example, assume this site is ungaged.

Given:
a) Drainage area at the site is 2,467 mi^2, and the site is in hydrologic region 7 (pl. 2)
b) The upper 53.5 percent (1,321 mi^2) of the basin is in hydrologic region 6.
c) Main channel slope = 8.13 ft/mi (table 10).
d) Area of lakes, ponds, and swamps = 3.17 percent (table 10)
e) Mean annual precipitation = 33.5 in (pl. 1 and table 10)
f) Average channel elevation = 1,006 ft (table 10)
g) Stream length = 158.5 mi (table 10)

Solution:

Percentage of total drainage area within hydrologic region 6 is 53.5 percent, and
Percentage of total drainage area within hydrologic region 7 is 46.5 percent.
These are the weighting factors after computing 50-year peak-discharges at the gaged site through regression equations for regions 6 and 7.

$Q_{50(r)}$ (region 6) = $22.1\,(A)^{0.869}\,(SL)^{0.374}\,(ST+1)^{-0.224}\,(P-20)^{0.356}$ (table 2)
$Q_{50(r)}$ (region 6) = $22.1\,(2{,}467)^{0.869}\,(8.13)^{0.374}\,(3.17+1)^{-0.224}\,(33.5-20)^{0.356}$
$Q_{50(r)}$ (region 6) = 78,700 ft^3/s

The basin-shape index (SH) is computed as the stream length squared, divided by the drainage area.

$$SH = \frac{(158.5)^2}{2{,}467}$$

SH = 10.18 (also in table 10)

$Q_{50(r)}$ (region 7) = $74.5(A)^{1.019}\,(SL)^{0.550}\,(ST+1)^{-0.313}\,(P-20)^{1.011}\,(EL)^{-0.770}\,(SH)^{0.282}$ (table 2)
$Q_{50(r)}$ (region 7) = $74.5(2{,}467)^{1.019}\,(8.13)^{0.550}\,(3.17+1)^{-0.313}\,(33.5-20)^{1.011}\,(1{,}006)^{-0.770}\,(10.18)^{0.282}$
$Q_{50(r)}$ (region 7) = 56,300 ft^3/s

Use drainage-area percentages as weighting factors to compute final 50-year regression estimate at station 04232000:

$Q_{50(r)}$ = (78,700)(0.535) + (56,300)(0.465) = 68,300 ft^3/s (also in table 9)

Region 6 (78,700)(0.535); Region 7 (56,300)(0.465)

Note that the Genesee River at Rochester is currently regulated, and the above information represents preregulation conditions. The example is for illustration purposes only and is not applicable to present conditions at this station.

Example 3. Ungaged site near a gaged site on the same stream: Estimate the 50-year peak-discharge at the ungaged site Canaseraga Creek at Groveland.

Given
a) This site's basin is in hydrologic region 6 downstream from the gaged site of Canaseraga Creek near Dansville (station 04225000, drainage area = 152 mi^2).
b) Drainage area at Groveland = 180 mi^2 (from 7.5-minute topographic maps)
c) Main channel slope = 29.0 ft/mi (from 7.5-minute topographic maps)
d) Area of lakes, ponds and swamps = 0.97 percent of basin (from 7.5-minute topographic maps)
e) Mean annual precipitation = 32.0 in. (pl. 1)

Solution:

The drainage area of Canaseraga Creek at Groveland is between 50 and 150 percent of the drainage area at the gage near Dansville; use the method for an ungaged site near a gaged site on the same stream.

The correction factor ratio for the gaged site near Dansville (04225000) is:

$C_g = Q_{50(w)}/Q_{50(r)}$

C_g = 10,800/14,100 (data from example 1 and table 9)

$C_g = 0.766$

The correction factor ratio for the ungaged site at Groveland is

$C_u = C_g - [2(|A_g - A_u|)/A_g](C_g - 1)$

$C_u = 0.766 - [2(|152-180|)/152](0.766-1)$

$C_u = 0.852$

From the given basin characteristics, the 50-year regression estimate ($Q_{50(r)}$) for the ungaged site at Groveland is computed from the following equation for region 6 (table 2):

$Q_{50(r)} = 22.1\ (A)^{0.869}\ (SL)^{0.374}\ (ST+1)^{-0.224}\ (P-20)^{0.356}$

$Q_{50(r)} = 22.1\ (180)^{0.869}\ (29.0)^{0.374}\ (0.97+1)^{-0.224}\ (32.0-20)^{0.356}$

$Q_{50(r)}$ = 14,800 ft^3/s,

The weighted 50-year peak-discharge estimate at the ungaged site at Groveland is:

$Q_{50(w)} = Cu(Q_{50(r)})$

$Q_{50(w)}$ = 0.852 (14,800)

$Q_{50(w)}$ = 12,600 ft^3/s.

LIMITATIONS, ACCURACY, AND SENSITIVITY OF REGRESSION EQUATIONS

The regression equations developed in this study apply to streams in New York where peak discharge is not significantly affected by stream regulation (no more than 20 percent of the drainage area is upstream from a controlled reservoir), or by diversion or other manmade influences. The equations are not applicable to basins in urban areas (where more than 15 percent of the basin is urbanized) unless the effects of urbanization on high flow are insignificant. Channelization, channel structures or constrictions, and significant withdrawals from the stream may alter peak discharges and cause them to differ from those expected under natural conditions. If the effects of urbanization can be quantified, adjustments to the "rural" peak-discharge estimates can be made through procedures outlined by Sauer and others (1983) to estimate peak discharge for urban areas. Lumia (1984) developed peak-discharge profiles for several streams in Rockland County, including many urbanized basins.

The relation between peak discharge and basin characteristics (actually the logarithms of these variables) given by the multiple linear regression equation is assumed to be linear only within the range of characteristics that define that relation. The suitability of the regional equations is undefined for streams having values beyond the ranges used, and extrapolation requires extreme caution or may be infeasible . The range of each basin characteristic for each region is given in table 6.

In flood-frequency analyses, the gaged record is assumed to be representative of long-term conditions; sampling error results from limitations on the number of years of gaged record available and from hydrologic conditions during the particular period sampled. The use of generalized least-squares regression minimizes but does not prevent this type of error.

The standard error of estimate and estimated prediction error are indices of the expected accuracy of the regression estimates. If all assumptions for applying regression are met, the discrepancy between the regression estimate and actual streamflow will be within one standard error about 68 percent of the time.

The basin characteristics used in the estimating equations must be computed or estimated from maps or other sources of data and therefore are subject to error in measurement and judgment. To determine how much variability is introduced by error in computing the basin characteristics, sensitivity tests were conducted on the 50-year peak-discharge regression equation for each hydrologic region; results (table 7) should be indicative of the relative magnitude of the sensitivities of the remaining equations. The data presented in table 7 were computed by varying only one basin characteristic at a time while holding all others in that equation constant. Each characteristic was increased 10, 20, and 30 percent, then decreased 10, 20, and 30 percent; the resulting changes in computed peak discharge are given in

Table 6.--Range in regional basin characteristics used in the regression analyses for eight hydrologic regions in New York.

[Hydrologic region locations are shown in pl. 2.]

Hydrologic region	Basin characteristics: Area (A) (square miles)	Slope (SL) (feet per mile)	Storage (ST) (percent)	Precipitation (P) (inches)	Elevation (EL) (feet)	Forest area (F) (percent)	Shape index (SH) (mile per mile)
1	1.34 - 612	3.60 - 204	0.01 - 31.6	32.0 - 55.0	304 - 1,780	11.0 - 95.0	2.27 - 14.7
2	.54 - 4,500	9.20 - 252	.01 - 12.2	32.0 - 55.5	205 - 2,209	20.0 - 99.0	1.09 - 17.8
3	1.93 - 711	5.00 - 248	.94 - 11.2	37.0 - 47.0	56 - 1,200	19.0 - 99.0	1.31 - 9.77
4	3.61 - 386	21.8 - 316	.01 - 7.42	36.0 - 57.5	485 - 2,340	21.0 - 98.0	1.29 - 11.2
4A	.41 - 784	9.30 - 435	.01 - 5.87	40.5 - 54.0	1,005 - 2,180	38.0 - 100	1.98 - 6.48
5	.70 - 3,941	3.00 - 326	.01 - 12.0	39.0 - 43.5	553 - 1,810	14.0 - 100	1.66 - 9.28
6	1.02 - 4,773	3.40 - 194	.00 - 7.82	29.5 - 46.0	330 - 1,818	7.00 - 92.0	1.43 - 18.0
7	.58 - 2,467	4.10 - 156	.01 - 13.4	29.5 - 41.0	349 - 1,489	7.00 - 56.0	1.79 - 17.5

percent. To test variables without a constant added to or subtracted from them (for example, drainage area), the regional mean value of each variable was used to compute a "base" 50-year peak discharge. The variable being tested was then varied by the above percentages, and the resulting changes (in percent) of 50-year peak-discharge were tabulated. For variables to which constants were added or subtracted, such as mean annual precipitation (P) and storage (ST), a regional "low" and "high" value was used to compute a "base" 50-year peak-discharge because errors in computed discharges will be affected differently, depending on the magnitude of the basin characteristic being tested. For testing purposes, regional 10th- and 90th-percentile values of these characteristics were used as low and high values. As table 7 shows, mean annual precipitation was the variable to which peak discharges were most sensitive, and drainage area was the next. Although mean annual precipitation is the most sensitive variable, selection of a precipitation value from plate 1 that is in error by more than 10 percent is unlikely.

SUGGESTIONS FOR FURTHER STUDY

Standard errors of the regional estimating equations presented in this study are less than those obtained from equations published in 1979 as a result of the addition of small-stream gaging stations to the network, extended record of annual peak discharges, and improved analytical methods. The study of several factors related to flood-frequency relations, discussed below, could decrease errors in future analyses still further, however.

Skewness Coefficient

Weighting the skewness coefficient computed from station records with a generalized skewness coefficient reduces the bias caused by stations with relatively short periods of record (U.S. Water Resources Council, 1981). This study used 178 gaging stations on rural, unregulated streams with 25 or more years of record; these included records for streams before reservoir construction. A comparison of skew values from the U.S. Water Resources Council (1981) national generalized skew map with systematic-record station skews, for stations in each of the eight hydrologic regions of New York, is given in figure 14 (p. 42). Some regional bias and significant errors are indicated by these graphs; therefore a regionalized State skew map is needed before future updates of the New York flood-frequency relations are undertaken.

Precipitation Maps

The flood-frequency relations for New York show mean annual precipitation to be a critical factor in determining peak discharges. An improved mean-annual-precipitation map and maps of shorter duration precipitation (such as a 24-hour, 2-year rainfall-intensity map) could significantly increase the accuracy and predictive ability of the flood-frequency relations.

Small-Stream Data

Historical flood data on small streams could alter and improve the current flood-frequency relations but is generally unavailable. Additional information might be available from flood-insurance studies, government agencies, public libraries, or engineering records; such information would be best collected and documented in a format similar to that used by Robideau and others (1984).

Expansion of the current annual peak-discharge gaging-station network to include additional small-stream sites (particularly sites with drainage areas less than 1.0 mi^2) could improve the accuracy of computed peak discharges for these sites. A rainfall-runoff data network with subsequent modeling could be used to supplement the peak-discharge data base for very small streams.

Table 7.-Results of sensitivity analysis showing percent change in computed 50-year peak discharges within each of eight hydrologic regions of New York.

[Region locations are shown in pl. 2]

Explanatory variable[1]	Percent error in explanatory variable						
	+30	+20	+10	0	-10	-20	-30
Region 1							
A	25.6	17.1	8.6	0.0	-8.7	-17.6	-26.6
ST (low)	-4.4	-3.0	-1.5	.0	1.6	3.3	5.0
ST (high)	-11.2	-7.9	-4.2	.0	4.7	10.2	16.5
P (low)	68.3	45.8	23.1	.0	-23.6	-47.9	-73.2
P (high)	44.0	29.5	14.8	.0	-15.0	-30.3	-45.9
F (low)	-9.6	-6.7	-3.5	.0	3.9	8.4	13.4
F (high)	-11.5	-8.1	-4.3	.0	4.9	10.7	17.4
Region 2							
A	26.2	17.6	8.8	.0	-8.9	-18.0	-27.1
SL	6.4	4.4	2.3	.0	-2.5	-5.1	-8.1
ST (low)	-1.7	-1.1	-0.6	.0	.6	1.2	1.9
ST (high)	-6.0	-4.2	-2.2	.0	2.5	5.3	8.5
P (low)	76.4	50.7	25.2	.0	-24.7	-49.0	-72.4
P (high)	55.1	36.5	18.2	.0	-18.0	-35.7	-53.1
EL	-7.6	-5.4	-2.8	.0	3.2	7.0	11.4
Region 3							
A	20.7	14.0	7.1	.0	-7.3	-14.8	-22.6
ST (low)	-8.0	-5.6	-2.9	.0	3.2	6.8	10.7
ST (high)	-10.7	-7.5	-4.0	.0	4.6	9.8	16.1
P (low)	81.9	53.5	26.2	.0	-24.8	-48.0	-69.2
P (high)	70.7	46.3	22.7	.0	-21.7	-42.2	-61.3
SH	-12.8	-9.1	-4.8	.0	5.6	12.3	20.4
Region 4							
A	23.5	15.8	8.0	.0	-8.1	-16.4	-24.9
ST (low)	-1.1	-.7	-0.4	.0	.4	0.8	1.1
ST (high)	-8.7	-6.1	-3.2	.0	3.6	7.8	12.5
P (low)	68.4	45.5	22.7	.0	-22.7	-45.3	-67.9
P (high)	49.3	32.9	16.4	.0	-16.4	-32.8	-49.1

Table 7.--Results of sensitivity analysis showing percent change in computed 50-year peak discharges within each of eight hydrologic regions of New York (continued).

Explanatory variable[1]	Percent error in explanatory variable +30	+20	+10	0	-10	-20	-30
Region 4A							
A	24.7	16.6	8.3	0.0	-8.5	-17.1	-25.4
P (low)	90.4	58.5	28.3	.0	-26.1	-49.7	-70.5
P (high)	76.1	49.3	24.0	.0	-22.4	-43.0	-61.7
Region 5							
A	29.3	19.5	9.8	.0	-9.8	-19.6	-29.4
SL	9.0	6.2	3.2	.0	-3.4	-7.1	-11.1
ST (low)	-.1	-.0	-.0	.0	.0	.0	.1
ST (high)	-4.7	-3.3	-1.7	.0	1.9	4.0	6.5
SH	-3.9	-2.7	-1.4	.0	1.6	3.4	5.5
Region 6							
A	25.6	17.2	8.6	.0	-8.7	-17.6	-26.7
SL	10.3	7.1	3.6	.0	-3.9	-8.0	-12.5
ST (low)	-.1	.0	.0	.0	.0	.0	.1
ST (high)	-4.7	-3.3	-1.7	.0	1.9	4.0	6.3
P (low)	22.3	15.7	8.4	.0	-9.9	-22.3	-40.0
P (high)	17.8	12.5	6.6	.0	-7.4	-16.2	-26.9
Region 7							
A	30.7	20.4	10.2	.0	-10.2	-20.4	-30.5
SL	15.5	10.5	5.4	.0	-5.6	-11.5	-17.8
ST (low)	-1.5	-1.0	-.5	.0	.5	1.1	1.6
ST (high)	-7.2	-5.1	-2.7	.0	3.0	6.4	10.4
P (low)	85.7	57.1	28.5	.0	-28.4	-56.7	-84.8
P (high)	62.9	41.9	20.9	.0	-20.9	-41.7	-62.5
EL	-18.3	-13.1	-7.1	.0	8.5	18.7	31.6
SH	7.7	5.3	2.7	.0	-2.9	-6.1	-9.6

[1] A = Drainage area
SL = Main-channel slope
ST = Percent basin storage
P = Mean annual precipitation
F = Percent basin forest cover
EL = Average main-channel elevation
SH = Basin-shape index

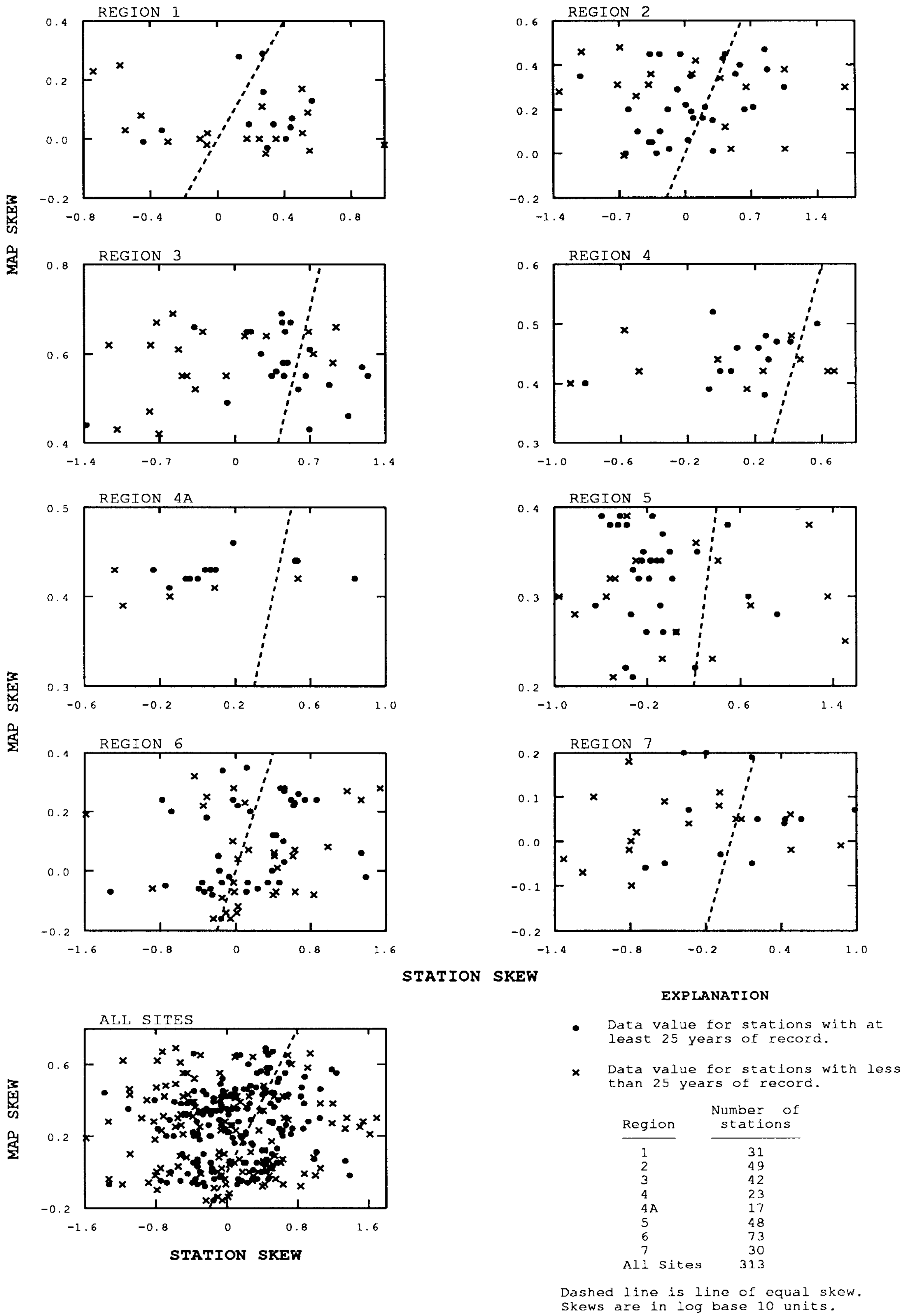


Figure 14.--Comparison of station skews with generalized map skews from U.S. Water Resources Council (1981) for gaging stations within eight hydrologic regions of New York. (Locations of regions are shown on pl. 2.)

Other Factors

Study of several other factors could potentially improve the flood-frequency relations for New York. These factors include (1) the effect of mixed populations in annual peak-discharge data analysis (for example, floods caused by thunderstorms combined with floods from snowmelt or hurricanes), (2) effects of additional basin characteristics (for example, basin lag factors, channel width, indices from land-use maps, rainfall indices) in the regression analyses to account for unexplained variability in peak discharges, and (3) the effect of regulation, with development of a criterion for selecting or rejecting peak-discharge records on the basis of storage effects.

SUMMARY

This report presents regional regression equations based on generalized least-squares regression analysis for calculating the magnitude and frequency of floods on rural, unregulated streams in New York, excluding Long Island. Procedures for estimating peak discharges with recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years for eight hydrologic regions of New York are given; the procedures depend on whether the estimate is for a gaged or ungaged basin and whether the basin crosses hydrologic region boundaries or extends into an adjacent State. Estimated standard error of prediction for the regression equations range from 17 to 51 percent. Tables and illustrations summarize the data and give final estimates of peak discharges at the 313 gaging stations used for the analyses. Examples of discharge computations are provided, as are discussions of the limitations and accuracy of the estimating equations and the relative importance of the significant variables (sensitivity analysis).

Several suggestions for additional study are discussed, including development of a generalized skew map for New York. Alternative peak-discharge estimating equations, based on drainage area only, are included. These equations provide estimates of peak discharges that are easier to compute, but less accurate, than those calculated through the full-regression equations.

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Table 8. -- Gaging stations and selected peak-discharge records used in the study.

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
Housatonic River Basin								
01199050	Salmon Creek at Lime Rock, CT	Litchfield,CT	29.4	1962-87	08-19-55	6,300a	214	>100b
01199400	Webatuck Creek nr South Amenia, NY	Dutchess	81.0	1962-76,84	05-29-84	3,400c	42.0	25
01199420	Tenmile River nr Wassaic, NY	Dutchess	120	1960-76,84	05-29-84	5,500c	45.8	30
01199477	Stony Brook nr Dover Plains, NY	Dutchess	1.93	1976-87	04-04-87	532	276	35
01200000	Tenmile River nr Gaylordsville, CT	Dutchess	203	1930-87	08-19-55	17,400a	85.7	>100
01208990	Saugatuck River nr Redding, CT	Fairfield,CT	21.0	1962-87	03-25-69	2,160	103	20b
Hudson River Basin								
01312000	Hudson River nr Newcomb, NY	Essex	192	1926-87	01-01-49	7,440	38.8	70
01313500	Cedar R below Chain Lakes nr Indian Lake,NY	Hamilton	160	1931-69	09-28-42	10,200	63.8	>100
01314000	Hudson River at Gooley nr Indian Lake, NY	Essex	419	1917-68	01-01-49	15,000	35.8	70
01315500	Hudson River at North Creek, NY	Warren	792	1908-87	12-31-48	28,900	36.5	100
01318500	Hudson River at Hadley, NY	Saratoga	1,664	1908-20,22-87[2]	03-27-13	49,000cd	29.4	>100
01319000	E Br Sacandaga River at Griffin, NY	Hamilton	114	1934-78	12-31-48	10,700	93.9	80
01319800	W Br Sacandaga R at Arietta, NY	Hamilton	28.9	1963-85	03-25-79	1940	67.1	20
01319950	Sand Lake Outlet nr Piseco, NY	Hamilton	7.16	1962-83,85	04-09-80	475	66.3	10
01321000	Sacandaga River nr Hope, NY	Hamilton	491	1912-87	03-27-13	32,000	65.2	>100
01325000	Sacandaga R at Stewarts Bridge nr Hadley,NY	Saratoga	1,055	1908-29	03-28-13	35,500	33.6	100

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01326500	Hudson River at Spier Falls, NY	Warren	2,779	1900-22	03-28-13	89,100	32.1	>100
01328000	Bond Creek at Dunham Basin, NY	Washington	14.7	1948-82,84	12-31-48	1370	93.2	40
01329000	Batten Kill at Arlington, VT	Bennington,VT	152	1929-84	03-18-36	11,100	73.0	>100b
01329500	Batten Kill at Battenville, NY	Washington	394	1904,13,23-68, 1977,84,87	11-04-27	21,300	54.1	>100
01329780	Sessions Brook at Porter Corners, NY	Saratoga	1.04	1968-86	03-14-77	80c	76.9	25
01329900	Glowegee Creek Trib at Mosherville, NY	Saratoga	1.42	1968-86	03-14-77	139	97.9	20
01330000	Glowegee Creek at West Milton, NY	Saratoga	26.0	1949-63,71-72	12-31-48	1,670	64.2	40
01330500	Kayaderosseras Creek nr West Milton, NY	Saratoga	90.0	1927-87	03-18-36	4,710	52.3	100
01330880	Saratoga Lake Trib nr Bemis Heights, NY	Saratoga	2.98	1968-87	08-07-86	448	150	>100
01331400	Dry Brook nr Adams, MA	Berkshire,MA	7.67	1963-74	12-21-73	947	124	10b
01332000	N Br Hoosic River at North Adams, MA	Berkshire,MA	40.9	1928,1932-87	11- -27	9,890d	242	80b
01332500	Hoosic River nr Williamstown, MA	Berkshire,MA	126	1941-87	12-31-48	13,000	103	90b
01333000	Green River at Williamstown, MA	Berkshire,MA	42.6	1949-87	12-21-73	4,060e	95.3	50b
01333367	Little Hoosic River at Cherryplain, NY	Rensselaer	2.22	1976-86	04-19-83	167	75.2	8
01333500	Little Hoosic River at Petersburg, NY	Rensselaer	56.1	1949,1952-87	12-31-48	7,470d	133	100
01334000	Walloomsac River nr North Bennington, VT	Bennington,VT	111	1932-87	09-21-38	8,450a	76.1	35b
01334500	Hoosic River nr Eagle Bridge, NY	Rensselaer	510	1911-87	12-31-48	55,400	109	>100

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01335500	Hudson River at Mechanicville, NY	Saratoga	4,500	1869,1888-1929	03-28-13	120,000	26.7	>100
01342730	Steele Creek at Ilion, NY	Herkimer	26.2	1965-85	02-20-81	1,810	69.1	10
01342800	West Canada Creek at Nobleboro, NY	Herkimer	193	1946,1958-76, 1985,87	12-29-84	20,000d	104	>100
01346820	Mohawk River Trib at Indian Castle, NY	Herkimer	1.36	1974-86	03-22-80	210	154	30
01347460	Spruce Lake Trib nr Salisbury Center, NY	Herkimer	0.54	1975-86	10-17-77	72	133	10
01348000	East Canada Creek at East Creek, NY	Herkimer	289	1898,1900,02, 1913,28-87[2]	03-26-13 10-02-45	15,700cd 24,000df	54.3 83.0	100 >100
01348420	North Creek nr Ephratah, NY	Fulton	6.52	1975-87	06-29-82	540	82.8	25
01349000	Otsquago Creek at Fort Plain, NY	Montgomery	59.2	1950-87	10-28-81	10,400	176	40
01349360	Van Wie Creek Trib nr Randall, NY	Montgomery	1.00	1974-86	03-21-80	219	219	45
01349850	Batavia Kill at Hensonville, NY	Greene	13.5	1955,60,65,68, 1972-87	08-13-55 09-12-60	5,000ad 5,000ad	370 370	50 50
01350000	Schoharie Creek at Prattsville, NY	Greene	236	1904,1908-87	10-16-55	51,600	219	40
01350120	Platter Kill at Gilboa, NY	Schoharie	11.1	1976-87	04-04-87	1,210	109	9
01350140	Mine Kill nr North Blenheim, NY	Schoharie	16.3	1975-87	05-29-84	1,320	81.0	10
01350900	Beaverdam Creek nr Knox, NY	Albany	6.91	1963-86	03-27-63	1,400	203	80
01351000	Fox Creek at West Berne, NY	Albany	73.0	1925-32,63-74, 1987	12-21-73	6,400	87.7	60

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [$(ft^3/s)/mi^2$]	Recurrence interval (years)
01354300	Plotter Kill at Rynex Corners, NY	Schenectady	3.70	1958-86	09-12-60	725a	196	100
01355405	Indian Kill nr Glenville Center, NY	Schenectady	3.11	1968-86	03-22-80	200c	64.3	10
01358500	Poesten Kill nr Troy, NY	Rensselaer	89.4	1924-68,77,84	09-22-38	11,900a	133	>100
01359519	Normans Kill nr Westmere, NY	Albany	131	1956,68-84,87	10-16-55	10,800cd	82.4	40
01359750	Moordener Kill at Castleton-on-Hudson, NY	Rensselaer	32.6	1958-87	03-15-86	1,850	56.7	60
01359902	Coeymans Creek nr Selkirk, NY	Albany	35.1	1968-77	06-30-73	3,240	92.3	35
01359924	Hannicrois Creek nr New Baltimore, NY	Greene	61.6	1968-77	07-01-73	1,780	28.9	10
01361000	Kinderhook Creek at Rossman, NY	Columbia	329	1909-10,13, 1928-68,84	12-31-48	29,800	90.6	100
01361200	Claverack Creek at Claverack, NY	Columbia	60.6	1961-80,84	06-30-73	5,590	92.2	50
01361453	Catskill Creek Trib at Franklinton, NY	Schoharie	3.61	1968-87	04-04-87	1,100c	305	50
01361500	Catskill Creek at Oak Hill, NY	Greene	98.0	1911-77,80,87	04-04-87	15,400	157	100
01361570	Tenmile Creek at Oak Hill, NY	Greene	35.3	1960,1969-78, 1980,87	03-21-80	3,800d	108	40
01361900	Shingle Kill at Cairo, NY	Greene	13.9	1953,55-56,60, 1967-87	03-21-80	3,600	259	20
01362100	Roeliff Jansen Kill nr Hillsdale, NY	Columbia	27.5	1958-87	06-30-73	3,280	119	70
01362197	Bushnellsville Creek at Shandaken, NY	Ulster	11.4	1951,56,72, 1976-87	10-15-55	1,830d	160	50

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01362198	Esopus Creek at Shandaken, NY	Ulster	59.5	1951,64-87	03-30-51 04-04-87	20,000cdg 16,100	336 271	70 40
01362500	Esopus Creek at Coldbrook, NY	Ulster	192	1932-87	03-21-80	65,300	340	50
01365000	Rondout Creek nr Lowes Corners, NY	Sullivan	38.5	1937-87	07-22-38	7,600	197	20
01365500	Chestnut Creek at Grahamsville, NY	Sullivan	20.9	1939-87	10-15-55	4,640	222	30
01366500	Rondout Creek nr Lackawack, NY	Ulster	100	1928,32-51	08-26-28	26,700d	267	>100
01366650	Sandburg Creek at Ellenville, NY	Ulster	56.7	1957-77	08-19-60	4,660	82.2	10
01367500	Rondout Creek at Rosendale, NY	Ulster	378	1910,15-16,18, 1927-51	10-16-55 08-27-28	35,800h 27,300	94.7 72.2	60 20
01368000	Wallkill River nr Unionville, NY	Sussex,NJ	140	1938-81,84	08-19-55	6,880a	49.1	100b
01368500	Rutgers Creek at Gardnerville, NY	Orange	59.7	1944-68,84,87	08-19-55	8,490a	142	>100
01369000	Pochuck Creek nr Pine Island, NY	Orange	98.0	1938-77,84	10-16-55	3,090	31.5	20
01369500	Quaker Creek at Florida, NY	Orange	9.69	1938-79,84	09-21-38	1,050a	108	30
01370000	Wallkill River at Pellets Island, NY	Orange	385	1920-68,84	03-14-36	12,400	32.2	60
01371000	Shawangunk Kill at Pine Bush, NY	Ulster	102	1925-32,52, 1955-75,84	08-19-55 10-16-55	9,700ac 9,700c	95.1 95.1	20 20
01371500	Wallkill River at Gardiner, NY	Ulster	711	1925-87	10-16-55	30,800	43.3	90
01372040	Crum Elbow Creek at Hyde Park, NY	Dutchess	17.3	1960-76	07-21-75	600	34.7	15
01372200	Wappinger Creek nr Clinton Corners, NY	Dutchess	92.4	1956-82,84	06-30-73	8,510	92.1	60

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01372300	Little Wappinger Creek at Salt Point, NY	Dutchess	32.9	1956-75,84	07-21-75	1,590	48.3	25
01372500	Wappinger Creek nr Wappingers Falls, NY	Dutchess	181	1929-87	08-19-55	18,600a	103	>100
01372800	Fishkill Creek at Hopewell Junction, NY	Dutchess	57.3	1964-75,84,87	12-21-73	2,770	48.3	15
01373500	Fishkill Creek at Beacon, NY	Dutchess	190	1882-1902, 1945-68,84	03-01-02	13,700d	72.1	>100
01373690	Woodbury Creek nr Highland Mills, NY	Orange	11.2	1966-72,77-84	04-05-84	1,940	173	20
01374130	Canopus Creek at Oscawana Corners, NY	Putnam	8.30	1975-86	04-06-84	416	50.1	7
01374250	Peekskill Hollow Cr at Tompkins Corners, NY	Putnam	14.9	1975-87	05-30-84	916	61.5	8
01374440	Cedar Pond Brook at Stony Point, NY	Rockland	17.3	1960-68,75-79	11-08-77	2,600c	150	25
01374460	S Br Minisceongo Creek at Thiells, NY	Rockland	5.86	1960-76,78	11-08-77	400c	68.3	15
01376280	Sparkill Creek at Sparkill, NY	Rockland	10.7	1960-68,75-79	11-08-77	1,040	97.2	20
Hackensack River Basin								
01376690	E Br Hackensack River nr Congers, NY	Rockland	6.90	1960,68-80	11-08-77	820	119	10
Passaic River Basin								
01384500	Ringwood Creek nr Wanaque, NJ	Passaic,NJ	19.1	1935-78,86-87	03-30-51	1,150	60.2	15b
01387250	Ramapo River at Sloatsburg, NY	Rockland	60.1	1956,60-63, 1975-79	10-16-55	5,970cd	99.3	35
01387300	Stony Brook at Sloatsburg, NY	Rockland	18.2	1960-69	05-29-68	1,760	96.7	15

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01387350	Nakoma Brook at Sloatsburg, NY	Rockland	5.40	1960-78	11-08-77	550c	102	15
01387410	Torne Brook at Ramapo, NY	Rockland	2.60	1960-87	11-08-77	1,520	585	45
01387450	Mahwah River nr Suffern, NY	Rockland	12.3	1959-87	11-08-77	1,840	150	25
01387500	Ramapo River nr Mahwah, NJ	Bergen,NJ	120	1904-14,23-87	04-05-84	15,500	129	100b
01387880	Pond Brook at Oakland, NJ	Bergen,NJ	6.76	1968-71,76-87	05-29-68	1,300	192	35b
01390500	Saddle River at Ridgewood, NJ	Bergen,NJ	21.6	1945,55-87	07-23-45	6,800cd	315	>100b
Delaware River Basin								
01413500	E Br Delaware River at Margaretville, NY	Delaware	163	1937-87	11-25-50	20,600	126	80
01414000	Platte Kill at Dunraven, NY	Delaware	35.0	1942-62	11-25-50	3,810	109	30
01414500	Mill Brook nr Dunraven, NY	Delaware	25.2	1937-87	09-21-38	4,500a	179	70
01415000	Tremper Kill nr Andes, NY	Delaware	33.2	1937-87	09-21-38	4,250a	128	60
01415500	Terry Clove Kill nr Pepacton, NY	Delaware	13.6	1937-62	05-23-42	4,010	295	>100
01417185	Campbell Brook Trib nr Downsville, NY	Delaware	0.41	1975-86	11-26-79	57	139	10
01417500	E Br Delaware River at Harvard, NY	Delaware	458	1935-54	09-22-38	31,400a	68.6	20
01418000	Beaver Kill nr Turnwood, NY	Ulster	40.8	1949-59	11-25-50	7,400	181	45
01418500	Beaver Kill at Craigie Clair, NY	Sullivan	81.9	1937-74	09-27-42	10,300	126	30
01419500	Willowemoc Creek nr Livingston Manor, NY	Sullivan	62.6	1938-74	07-28-69	15,700	251	>100

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01420000	Little Beaver Kill nr Livingston Manor, NY	Sullivan	20.1	1925-81	08-26-28	3,420	170	30
01420500	Beaver Kill at Cooks Falls, NY	Delaware	241	1914-87	03-31-51	31,600	131	50
01421000	E Br Delaware River at Fishs Eddy, NY	Delaware	784	1904,13-54	10-09-03	70,000acd	89.3	70
01422000	W Br Delaware River at Delhi, NY	Delaware	142	1937-74	09-21-38	8,940a	63.0	50
01422500	Little Delaware River nr Delhi, NY	Delaware	49.7	1938-74	08-13-53	4,530	91.1	50
01423000	W Br Delaware River at Walton, NY	Delaware	332	1951-87	03-15-86	19,500	58.7	20
01423500	Dryden Creek nr Granton, NY	Delaware	8.10	1952-67	04-04-60	633	78.1	10
01424000	Trout Creek nr Rockroyal, NY	Delaware	20.0	1952-67	11-28-59	1,920	96.0	10
01424500	Trout Creek at Cannonsville, NY	Delaware	49.5	1941-63	03-22-48	4,600	92.9	35
01425500	Cold Spring Brook at China, NY	Delaware	1.49	1935-68	10-30-35	335	225	>100
01425675	Oquaga Creek nr North Sanford, NY	Broome	4.69	1970-81	02-11-81	480	102	30
01426000	Oquaga Creek at Deposit, NY	Broome	67.6	1941-73	07-04-70	7,170	106	90
01426500	W Br Delaware River at Hale Eddy, NY	Delaware	595	1904,13-63	10-10-03	46,000acd	77.3	>100
01427500	Callicoon Creek at Callicoon, NY	Sullivan	110	1940-82,87	08-17-47	16,000	146	>100
01428000	Tenmile River at Tusten, NY	Sullivan	45.6	1946-73	08-19-55	6,850a	150	>100
01435000	Neversink River nr Claryville, NY	Sullivan	66.6	1938-49,51-87[2]	11-25-50	23,400d	351	70
01436500	Neversink River at Woodbourne, NY	Sullivan	113	1938-53	11-26-50	22,000	195	25

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [$(ft^3/s)/mi^2$]	Recurrence interval (years)
01437000	Neversink River at Oakland Valley, NY	Sullivan	223	1928-53	11-26-50 08-19-55	23,300 23,800ah	104 107	25 25
01437500	Neversink River at Godeffroy, NY	Orange	307	1938-53	11-26-50 08-19-55	23,900 33,000ah	77.8 108	20 70
01440000	Flat Brook nr Flatbrookville, NJ	Sussex,NJ	64.0	1924-87	08-19-55	9,560a	149	>100b
Susquehanna River Basin								
01496370	Mink Creek at Richfield Springs, NY	Otsego	10.4	1969-86	03-19-86	498	47.9	10
01496500	Oaks Creek at Index, NY	Otsego	102	1930-32,37-87	10-17-77	3,320	32.5	60
01497500	Susquehanna River at Colliersville, NY	Otsego	349	1924-72	03-19-36	8,740	25.0	50
01497800	Schenevus Creek at Schenevus, NY	Otsego	54.2	1963-76	03-05-64	2,200	40.6	10
01497805	Little Elk Creek nr Westford, NY	Otsego	3.73	1978-87	10-17-77	202	54.2	5
01498500	Charlotte Creek at West Davenport, NY	Delaware	167	1938-75	09-22-38	14,000a	83.8	>100
01499000	Otego Creek nr Oneonta, NY	Otsego	108	1941-75	12-30-42	6,000	55.6	45
01500500	Susquehanna River at Unadilla, NY	Otsego	982	1935-36,38-87	03-18-36	31,300d	31.9	100
01501000	Unadilla River nr New Berlin, NY	Chenango	199	1924-72	03-05-64	6,940	34.9	30
01501015	Mill Brook at New Berlin, NY	Chenango	4.64	1975-86	03-30-77 10-17-77	450 450	97.0 97.0	10 10
01501140	Wharton Creek Trib nr Edmeston, NY	Otsego	2.02	1976-86	09-27-85	290	144	70
01501500	Sage Brook nr South New Berlin, NY	Chenango	0.70	1933-68	07-22-45	287	410	>100

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01502000	Butternut Creek at Morris, NY	Otsego	59.7	1938-87	10-17-77	5,980	100	>100
01502500	Unadilla River at Rockdale, NY	Chenango	520	1930-33,35, 1937-87	12-31-42	17,400	33.5	40
01502701	Susquehanna River at Afton, NY	Chenango	1,716	1972,77,79-87	03-07-79	42,000	24.5	15
01502714	Ouaquaga Creek nr Belden, NY	Broome	3.37	1975-86	08-02-86	496	147	35
01503000	Susquehanna River at Conklin, NY	Broome	2,232	1913-87	03-18-36	61,600	27.6	60
01503960	Electric Light Stream nr Morrisville, NY	Madison	7.21	1976-86	10-09-76	400	55.5	9
01503980	Chenango River at Eaton, NY	Madison	24.3	1964-65,67-87	03-06-64	2,350	96.7	100
01505000	Chenango River at Sherburne, NY	Chenango	263	1936,38-87	03-18-36	12,500	47.5	100
01505017	Cold Brook nr North Norwich, NY	Chenango	5.80	1975-86[2]	03-05-79	300cd	51.7	6
01505500	Canasawacta Creek nr South Plymouth, NY	Chenango	57.9	1945-75,77	02-25-61	6,980	121	35
01507000	Chenango River at Greene, NY	Chenango	593	1937-87	12-31-42	18,900	31.9	50
01507500	Genegantslet Cr at Smithville Flats, NY	Chenango	82.3	1938-71	12-30-42	5,890	71.6	45
01508000	Shackham Brook nr Truxton, NY	Cortland	2.95	1933-68	06-03-47	487	165	35
01508500	Albright Creek at East Homer, NY	Cortland	6.81	1939-76	09-26-75	2,480a	364	>100
01508803	W Br Tioughnioga River at Homer, NY	Cortland	71.5	1967-68,73-87	10-28-81	2,710	37.9	25
01508946	Otter Cr Trib at St Hwy 222 nr Cortland, NY	Cortland	2.85	1976-86	10-28-81	690	242	60
01509000	Tioughnioga River at Cortland, NY	Cortland	292	1939-87	03-05-64	13,000	44.5	45

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01510000	Otselic River at Cincinnatus, NY	Cortland	147	1938-64,70-87	12-30-42	8,390	57.1	35
01510500	Otselic River nr Upper Lisle, NY	Cortland	217	1935,37-69	07-08-35	15,400d	71.0	>100
01510610	Merrill Creek Trib nr Texas Valley, NY	Cortland	5.32	1976-81,83-87	09-21-77	790	148	30
01511500	Tioughnioga River at Itaska, NY	Broome	730	1930-41	07-08-35	61,100	83.7	>100
01512500	Chenango River nr Chenango Forks, NY	Broome	1,483	1913-87	07-08-35	96,000	64.7	>100
01513500	Susquehanna River at Vestal, NY	Broome	3,941	1936-72,74-87	03- -36	107,000	27.2	45
01513712	Nanticoke Creek Trib at Nanticoke, NY	Broome	1.70	1975-86	07-11-76	1,780	1047	>100
01513790	Nanticoke Creek at Union Center, NY	Broome	90.7	1956,63-64, 1966-77	06-23-72	13,500a	149	45
01514000	Owego Creek nr Owego, NY	Tioga	185	1930-87	07-08-35	23,500	127	>100
01515000	Susquehanna River nr Waverly, NY	Bradford,PA	4,773	1936-87	03- -36	128,000d	26.8	35b
01516500	Corey Creek nr Mainesburg, PA	Tioga,PA	12.2	1954-87	06-23-72	5,580a	457	>100b
01516800	Manns Creek nr Mansfield, PA	Tioga,PA	3.01	1960-66,68-77	06-22-72	715a	238	25b
01517000	Elk Run nr Mainesburg, PA	Tioga,PA	10.2	1955-78	06-22-72	3,940a	367	>100b
01518000	Tioga River at Tioga, PA	Tioga,PA	282	1938-87	06-22-72	59,000a	209	>100b
01518500	Crooked Creek at Tioga, PA	Tioga,PA	122	1954-74	06-23-72	21,000a	172	>100b
01520000	Cowanesque River nr Lawrenceville, PA	Tioga,PA	298	1951-87	09-26-75	43,700	147	80b
01520500	Tioga River at Lindley, NY	Steuben	771	1930-79	06-23-72	128,000a	166	>100

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

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Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
01521596	Big Creek nr Howard, NY	Steuben	6.32	1977-87	09-13-87	580	91.8	10
01522500	Karr Valley Creek at Almond, NY	Allegany	27.4	1935,37-68, 1971-73	06-23-72	10,900a	398	>100
01523500	Canacadea Creek nr Hornell, NY	Steuben	57.9	1927-28,35, 1939-87	07-08-35	21,000	363	>100
01526000	Tuscarora Creek nr South Addison, NY	Steuben	114	1937-70,72	06-23-72	18,700a	164	50
01526500	Tioga River nr Erwins, NY	Steuben	1,377	1919-78	06-23-72	190,000a	138	>100
01527000	Cohocton River at Cohocton, NY	Steuben	52.2	1951-87	06-23-72	2,260a	43.3	>100
01528000	Fivemile Creek nr Kanona, NY	Steuben	66.8	1937-87	06-23-72	5,110a	76.5	>100
01529500	Cohocton River nr Campbell, NY	Steuben	470	1919-87	07-08-35	41,100	87.4	>100
01530301	Cuthrie Run nr Big Flats, NY	Chemung	5.39	1976,79-87	06-19-76	800	148	10
01530500	Newtown Creek at Elmira, NY	Chemung	77.5	1938-87	06-23-72	4,000ac	51.6	20
01531000	Chemung River at Chemung, NY	Chemung	2,506	1904-87	06-23-72	189,000a	75.4	>100
01531250	N Br Sugar Creek Trib nr Columbia Cross Roads, PA	Bradford,PA	8.83	1963-72,75-81	06-22-72	2,410a	273	45b
01533250	Tuscarora Creek nr Silvara, PA	Bradford,PA	11.8	1963-87	06-22-72	1,610a	136	25b
Allegheny River Basin								
03008000	Newell Creek nr Port Allegany, PA	McKean,PA	7.79	1960-78	09-14-77	3,060	393	50b
03010500	Allegheny River at Eldred, PA	McKean,PA	550	1916-87	06-23-72	65,400a	119	>100b

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Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

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					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
03010800	Olean Creek nr Olean, NY	Cattaraugus	198	1958-87	09-29-67	18,200	91.9	>100
03011000	Great Valley Creek nr Salamanca, NY	Cattaraugus	137	1951-68,72, 1977-87	09-28-67	28,600	209	>100
03011020	Allegheny River at Salamanca, NY	Cattaraugus	1,608	1904-87	06-23-72	73,000a	45.4	>200
03011800	Kinzua Creek nr Guffey, PA	McKean,PA	46.4	1966-87	06-22-72	5,220a	112	40
03013000	Conewango Creek at Waterboro, NY	Chautauqua	290	1939-87	04-07-47	8,600	29.7	45
03013800	Ball Creek at Stow, NY	Chautauqua	9.06	1974-87	09-14-79	2,000a	221	90
03015390	Hare Creek nr Corry, PA	Erie,PA	12.3	1964-87	09-19-77	2,240	182	90b
Lake Erie Basin								
04213040	Raccoon Creek nr West Springfield, PA	Erie,PA	2.53	1961-87	12-28-68	408	161	35b
04213200	Mill Creek at Erie, PA	Erie,PA	9.16	1964,69-87	07-15-70	1,730	189	30b
04213490	S Br Cattaraugus Creek nr Otto, NY	Cattaraugus	25.1	1963-87	09-14-79	4,350a	173	80
04213500	Cattaraugus Creek at Gowanda, NY	Erie	436	1940-87	03-07-56	34,600	79.4	60
04214040	Delaware Creek nr Angola, NY	Erie	8.32	1963-86	02-24-85	672	80.8	10
04214200	Eighteenmile Creek at North Boston, NY	Erie	37.2	1963-76	09-29-67	5,790	156	60
04214250	Smoke Creek at Lackawanna, NY	Erie	14.3	1953,55,63-68, 1970-74,76	03-01-55	2,330d	163	>100
04214400	Buffalo Creek nr Wales Hollow, NY	Erie	76.9	1963-74	09-28-67	9,260	120	25

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

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					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
04214410	Hunter Creek at Colegrave, NY	Erie	14.0	1964-86	09-28-67	1,680	120	25
04214500	Buffalo Creek at Gardenville, NY	Erie	142	1937,39-87	06- -37	16,000cd	113	>100
04214980	Little Buffalo Cr at East Lancaster, NY	Erie	24.0	1963,66-73, 1976-80	03-17-63 09-14-79	2,140 2,140a	89.2 89.2	20 20
04215000	Cayuga Creek nr Lancaster, NY	Erie	96.4	1937,39-68, 1971-87	06- -37	18,000cd	187	>100
04215500	Cazenovia Creek at Ebenezer, NY	Erie	135	1941-87	03-01-55	13,500	100	35
Niagara River Basin								
04216400	Tonawanda Creek nr Johnsonburg, NY	Wyoming	23.7	1962-86	06-23-72	1,850e	78.1	25
04216418	Tonawanda Creek at Attica, NY	Wyoming	76.9	1972,78-87	06-23-72	6,000acd	78.0	40
04216500	Little Tonawanda Creek at Linden, NY	Genesee	22.1	1913-68,70- 72,1978-87	03-07-56	2,700	122	70
04216875	Little Tonawanda Cr Trib nr Batavia, NY	Genesee	1.02	1976-86	09-25-77	156	153	15
04217000	Tonawanda Creek at Batavia, NY	Genesee	171	1942,45-87	03- -42	10,000cd	58.5	>100
04217500	Tonawanda Creek nr Alabama, NY	Genesee	231	1956-87	03-31-60	7,980	34.5	25
04217700	Murder Creek at Pembroke, NY	Genesee	43.6	1962-86	03-18-63 02-24-85	1,870 1,870	42.9 42.9	15 15
04218000	Tonawanda Creek at Rapids, NY	Niagara	349	1956-65,79-87	04-01-60	6,280	18.0	20
04218518	Ellicott Creek below Williamsville, NY	Erie	81.6	1936,56-87[2]	03-17-36	6,840cd	83.8	>100

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

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Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
Lake Ontario Basin								
04219645	Fourmile Creek nr Youngstown, NY	Niagara	4.88	1969-73,76-80, 1982-86	01-31-69	480	98.4	40
04219738	Eighteenmile Creek Trib nr Lockport, NY	Niagara	2.53	1977-86	02-19-81	365	144	15
04219900	Johnson Creek nr Lyndonville, NY	Orleans	87.7	1954,62-70, 1972-73,76-87	02-17-54	5,430d	61.9	>100
04219922	Oak Orchard Cr at Barrville Rd nr Elba, NY	Genesee	6.48	1976-86	03-22-78	205	31.6	15
04220150	Oak Orchard Creek at Medina, NY	Orleans	157	1962-76	03-20-63	1,480	9.43	15
04221500	Genesee River at Scio, NY	Allegany	308	1917-87[2]	06-23-72	41,000a	133	>100
04221769	Black Cr at Hyder Flats Rd, Black Creek, NY	Allegany	10.7	1978-87	09-14-79	1,800a	168	60
04222600	Wiscoy Creek at Bliss, NY	Wyoming	22.0	1962-86	06-23-72	1,850a	84.1	45
04223000	Genesee River at Portageville, NY	Wyoming	984	1909-87	06-23-72	90,000ac	91.5	>100
04224700	Sugar Creek nr Ossian, NY	Livingston	10.0	1964-86	06-18-84	1,460	146	25
04224775	Canaseraga Creek above Dansville, NY	Livingston	88.9	1975-87	09-20-77	2,870	32.3	5
04224807	Stony Brook Trib at South Dansville, NY	Steuben	3.15	1977-82,84-87	08-03-81	790	251	25
04224900	Mill Creek at Patchinville, NY	Steuben	4.22	1964-86	03-05-64	1,860	441	40
04225000	Canaseraga Creek nr Dansville, NY	Livingston	152	1911-12,16-68, 1971-76	06-23-72	9,600a	63.2	30

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [$(ft^3/s)/mi^2$]	Recurrence interval (years)
04226000	Keshequa Cr at Craig Colony at Sonyea, NY	Livingston	68.3	1916,18-32, 1975-77	09-25-77	6,280	91.9	15
04227500	Genesee River nr Mount Morris, NY	Livingston	1,424	1890,93-94, 1904-06,09-14, 1916-51	05-17-16	55,100	38.7	70
04229500	Honeoye Creek at Honeoye Falls, NY	Monroe	196	1946-70,72-87	06-23-72	6,600ac	33.7	>100
04230380	Oatka Creek at Warsaw, NY	Wyoming	39.1	1964-87	06-23-72	4,010a	103	>100
04230500	Oatka Creek at Garbutt, NY	Monroe	200	1946-87	03-31-60	7,050	35.2	45
04231000	Black Creek at Churchville, NY	Monroe	130	1946-87	03-31-60	4,880	37.5	>100
04231040	Hotel Cr at Griffin Rd nr Churchville, NY	Monroe	4.57	1976-86	03-05-79	88	19.3	60
04232000	Genesee River at Rochester, NY	Monroe	2,467	1785,1836-37, 1854,57,65,67, 1873,75,79,89, 1896,1902,13, 1916,20-51	03- -1854 03-18-1865	54,000d 54,000cd	21.9 21.9	>100 >100
042320527	Mill Creek Trib nr Webster, NY	Monroe	1.95	1971-72,76-86	09-29-86	211	108	25
042320578	Bear Creek at Ontario, NY	Wayne	6.74	1971-73,75-87	03-05-79	189	28.0	25
04232071	Second Creek Trib at Alton, NY	Wayne	1.07	1970,73,76-86	09-19-86	57	53.3	9
04232087	Red Creek Trib No. 16 nr Red Creek, NY	Cayuga	2.90	1969,76-86	01-31-69	250d	86.2	50
04232100	Sterling Creek at Sterling, NY	Cayuga	44.4	1958-87	03-22-80	1,760	39.6	60
04232460	Sugar Creek at Guyanoga, NY	Yates	28.9	1966-87	01-20-86	459	15.9	9

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3] Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
04232630	Kendig Creek nr MacDougall, NY	Seneca	13.8	1965-87	07-10-68	953	69.1	25
04233000	Cayuga Inlet nr Ithaca, NY	Tompkins	35.2	1937-87	06-23-72	4,800a	136	80
04233255	Cayuga Inlet at Ithaca, NY	Tompkins	86.7	1971-72,75-87	06-23-72	11,800a	136	100
04233310	Sixmile Creek above Ithaca, NY	Tompkins	42.0	1967-69,71-73, 1976-86	10-28-81	7,600	181	25
04233676	Virgil Creek at Mill St at Dryden, NY	Tompkins	20.7	1966-70,72, 1975-86	10-28-81	4,670	226	>100
04233700	Virgil Creek at Freeville, NY	Tompkins	40.3	1974-86	10-27-81	7,000c	174	>100
04234000	Fall Creek nr Ithaca, NY	Tompkins	126	1926-87	07-08-35	15,500c	123	>100
042340202	Cayuga Lake Trib No. 8 nr Jacksonville, NY	Tompkins	1.36	1977-86	02-15-84	144	106	9
042340588	Yawger Creek Trib nr Auburn, NY	Cayuga	1.76	1976-86	11-27-79	88	50.0	15
04234138	Schaeffer Creek nr Canandaigua, NY	Ontario	7.84	1977-87	03-05-79	520c	66.3	25
04234200	Mud Creek at East Victor, NY	Ontario	64.2	1958,61-68,72, 1976-87	06-22-72	1,800a	28.0	15
04234363	Marbletown Creek Trib nr Newark, NY	Wayne	0.58	1976-86	02-17-76	31	53.4	25
04235250	Flint Creek at Phelps, NY	Ontario	102	1960-87	03-30-60	2,940	28.8	30
04235255	Canadaigua Outlet Trib nr Alloway, NY	Ontario	2.94	1978-87	01-20-86	97	33.0	10
04235276	Black Brook at Tyre, NY	Seneca	19.0	1966-73,75-87	12-14-77	786	41.4	35
04235300	Owasco Inlet at Moravia, NY	Cayuga	106	1961-70,72	06-24-69	6,000c	56.6	10

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
04242500	E Br Fish Creek at Taberg, NY	Oneida	188	1924-87	12-29-84	21,600i	115	>100
					12-29-84	16,000c	85.1	80
04242795	Canada Creek Trib nr Lee Center, NY	Oneida	1.34	1977-86	10-09-76	165	123	20
04243500	Oneida Creek at Oneida, NY	Oneida	113	1950-87	10-09-76	9,110	80.6	35
04245000	Limestone Creek at Fayetteville, NY	Onondaga	85.5	1940-87	10-28-81	7,490	87.6	45
04245200	Butternut Creek nr Jamesville, NY	Onondaga	32.2	1959-87	07-03-74	2,820	87.6	80
04245840	Scriba Creek nr Constantia, NY	Oswego	38.4	1966-69,71-87	09-26-75	1,310a	34.1	20
04249050	Catfish Creek at New Haven, NY	Oswego	31.7	1962-87	03-18-73	1,560	49.2	60
042490673	N Br Grindstone Cr nr Altmar, NY	Oswego	11.2	1976-87	03-13-77	482	43.0	5
04250750	Sandy Creek nr Adams, NY	Jefferson	128	1958-87	02-25-85	7,690	60.1	15
04252500	Black River nr Boonville, NY	Oneida	304	1911-87	04-18-82	12,800	42.1	60
					12-30-84	12,800	42.1	60
04254500	Moose River at McKeever, NY	Herkimer	363	1902,05-70,82, 1985,87	06-03-47	18,700f	51.5	>100
					12-29-84	15,800d	43.5	100
04256000	Independence River at Donnattsburg, NY	Lewis	88.7	1928-87[2]	12-30-84	9,420	106	>100
04256040	Mill Creek Trib nr Lowville, NY	Lewis	1.66	1976-86	03-05-79	312	188	9
04258700	Deer River at Deer River, NY	Lewis	94.8	1930-87[2]	09-01-41	15,400cd	162	>100
04260575	Horse Creek Trib nr Dexter, NY	Jefferson	4.59	1976-86	03-13-77	700	152	15

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [$(ft^3/s)/mi^2$]	Recurrence interval (years)
St. Lawrence River Main Stem								
04262500	W Br Oswegatchie R nr Harrisville, NY	St. Lawrence	244	1917-87	03-15-77	7,080	29.0	50
04263000	Oswegatchie River nr Heuvelton, NY	St. Lawrence	965	1917-87	04-06-60	19,600	20.3	90
04263445	Birch Creek at Pierces Corners, NY	St. Lawrence	1.56	1976-86	04-03-78	85	54.5	10
04264300	Brandy Brook nr Waddington, NY	St. Lawrence	27.0	1959-67,71-86	03-13-77	941	34.9	25
04264700	N Br Grass River nr Clare, NY	St. Lawrence	46.3	1959-69,85	12-29-84	1,420d	30.7	40
04265000	Grass River at Pyrites, NY	St. Lawrence	333	1925-77,85	11-18-27	8,300c	24.9	50
04265100	Elm Creek nr Hermon, NY	St. Lawrence	32.6	1959-87	04-06-74	1,270c	39.0	25
04265200	Tanner Creek at Stellaville, NY	St. Lawrence	30.3	1959-69	06-02-60	1,580	52.1	20
04265300	Little River nr Canton, NY	St. Lawrence	42.4	1959-76,85	04-05-74	3,300	77.8	30
04267600	Cold Brook nr South Colton, NY	St. Lawrence	18.7	1962-76,85	03-29-63	768	41.1	35
04267700	Parkhurst Brook nr Potsdam, NY	St. Lawrence	16.8	1959-77	04-05-74	1,200	71.4	70
04267800	Trout Brook at Allen Corners, NY	St. Lawrence	54.2	1959-86	04-05-74	3,350	61.8	80
04268200	Plum Brook at Grantville, NY	St. Lawrence	43.9	1959-68,71-87	03-30-63	1,920	43.7	70
04268720	Hopkinton Brook at Hopkinton, NY	St. Lawrence	20.0	1962,64-69, 1971-86	12-29-84	804	40.2	15
04268800	W Br St. Regis River nr Parishville, NY	St. Lawrence	171	1959-87	12-29-84	5,960	34.9	80
04269000	St. Regis River at Brasher Center, NY	St. Lawrence	612	1911-87	04-06-37	16,800	27.5	60

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [$(ft^3/s)/mi^2$]	Recurrence interval (years)
04269050	Allen Brook nr Brasher Falls, NY	St. Lawrence	16.0	1962-86	12-09-80	1,270	79.4	25
04269100	Lawrence Brook nr Moira, NY	Franklin	25.7	1959-64,69-86	08-08-86	1,940c	75.5	60
04269500	Deer River at Brasher Iron Works, NY	St. Lawrence	182	1913-16,59-80, 1985	01-17-13	9,700	53.3	>100
04270000	Salmon River at Chasm Falls, NY	Franklin	132	1926-82,85,87	12-29-84	3,700d	28.0	>100
04270100	W Br Deer Cr at Fort Covington Center, NY	Franklin	32.4	1962-74,76-86	04-05-74	2,050	63.3	50
04270150	E Br Deer Cr at Fort Covington Center, NY	Franklin	23.9	1962,66-74, 1976-86	03-14-77	1,740	72.8	50
04270162	E Br Little Salmon River nr Skerry, NY	Franklin	7.11	1978-87	06-20-78	240	33.8	10
04270200	Little Salmon River at Bombay, NY	Franklin	92.2	1959-87	04-04-74	3,250	35.2	25
04270700	Trout River at Trout River, NY	Franklin	107	1960-87	04-05-74	6,490	60.7	90
04270800	English River nr Mooers Forks, NY	Clinton	40.8	1960-69,71-79	03-15-74	2,000c	49.0	60
04271500	Great Chazy River at Perry Mills, NY	Clinton	247	1929-68,85,87	04-07-37	6,000	24.3	25
04273500	Saranac River at Plattsburgh, NY	Clinton	608	1928,44-87	04-08-28	11,500	18.9	60
04273700	Salmon River at South Plattsburgh, NY	Clinton	61.9	1960-86	12-14-83	1,890	30.5	30
04274000	W Br Ausable River nr Lake Placid, NY	Essex	116	1920-68,83-87	09-22-38	10,800a	93.1	>100
04275000	E Br Ausable River at Au Sable Forks, NY	Essex	198	1925-87	09-22-38	20,100a	102	>100
04275500	Ausable River nr Au Sable Forks, NY	Clinton	448	1911-68	09-22-38	24,200a	54.0	80

Footnotes at the end of table, (p. 66).

Table 8. -- Gaging stations and selected peak-discharge records used in the study (continued).

[[Station locations shown in pl. 2. mi^2 = square miles, ft^3/s = cubic feet per second, > = greater than.]

Station number	Station name[1]	County	Drainage area (mi^2)	Period of unregulated record (water years)	Maximum known discharge and recurrence interval[3]			
					Date	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	Recurrence interval (years)
04276200	Bouquet River at New Russia, NY	Essex	37.6	1949-80	11-26-79	6,400c	170	>100
04276500	Bouquet River at Willsboro, NY	Essex	275	1924-68,85,87	10-01-24	11,800	42.9	100
04278300	Northwest Bay Brook nr Bolton Landing, NY	Warren	23.4	1966-87	02-11-81	1,770	75.6	25

1
- nr = near
- Br = Branch
- Cr = Creek
- R = River
- Trib = Tributary
- N = North
- S = South
- E = East
- W = West

2 Annual peak-discharge record was combined with record (adjusted for drainage area) from a nearby gaging station on the same stream.

3
- a Hurricane-related storm.
- b Based on weighted discharges obtained through New York generalized least-squares full-regression equations. Out-of-state flood-frequency report and associated relations should be consulted.
- c Discharge is an estimate.
- d Discharge is a historic peak obtained outside the period of systematic record.
- e Stage was nearly 2 feet higher on 12-31-48; discharge unknown.
- f Discharge affected by dam failure.
- g Discharge estimated based on peak stage information supplied by local residents.
- h Discharge determined during a period of regulation; effect of storage undetermined.
- i Result of release of upstream debris jam; reconstructed maximum discharge was 16,000 ft^3/s after adjusting for storage effects.

Table 9. --Selected flood characteristics for gaging stations used in the study.

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second): Recurrence interval (years) 2	5	10	25	50	100	500	Peak-discharge statistics (log 10 units): WRC estimate Mean	WRC estimate Standard deviation	WRC estimate Skew	Station record Mean	Station record Standard deviation	Station record Skew	Years of peak-discharge record: Gaged	Historic
01199050[a]	641	1230	1820	2890	3980	5400	10500	2.845	0.312	0.733	2.820	0.275	0.383	25	39
3	841	1350	1790	2470	3070	3750	5780								
	662	1250	1810	2770	3700	4870	8810								
01199400	1460	2080	2550	3240	3820	4460	6230	3.183	.169	.617	3.149	.195	-.490	15	25
3	1490	2300	2970	3980	4820	5770	8500								
	1470	2140	2690	3530	4250	5040	7320								
01199420	2430	3530	4290	5290	6070	6870	8850	3.388	.189	.057	3.375	.182	-.446	16	27
3	1860	2930	3820	5190	6360	7670	11500								
	2340	3370	4130	5250	6190	7210	10100								
01199477	154	252	339	478	607	761	1240	2.216	.236	.703	2.216	.236	.912	12	--
3	155	252	336	471	592	730	1150								
	154	252	337	475	599	745	1190								
01200000	3030	5250	7220	10400	13200	16700	27300	3.503	.269	.487	3.503	.269	.450	57	--
3	3630	5660	7370	10000	12300	14900	22700								
	3060	5290	7240	10300	13100	16400	26400								
01208990[a]	722	1190	1550	2060	2480	2930	4130	2.861	.254	.072	2.861	.254	-.376	25	--
3	818	1420	1960	2840	3620	4530	7300								
	732	1240	1650	2280	2830	3450	5270								
01312000	3650	4720	5410	6270	6910	7540	9020	3.565	.131	.094	3.565	.131	.066	62	--
2	4130	5480	6350	7440	8170	8910	10800								
	3670	4750	5480	6370	7050	7710	9280								

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[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01313500	3690	4950	5790	6850	7640	8430	10300	3.568	.152	.050	3.574	.161	.211	36	75
2	2750	3690	4320	5130	5680	6240	7660								
	3640	4850	5610	6600	7280	7990	9680								
01314000	8200	10500	12000	13700	14900	16100	18800	3.912	.130	-.080	3.912	.130	-.182	52	--
2	5740	7670	9000	10700	11900	13200	16300								
	8110	10300	11700	13400	14500	15700	18400								
01315500	13300	17500	20300	23800	26400	28900	35000	4.124	.143	.046	4.124	.143	.008	80	--
2	12000	15900	18600	22100	24400	26900	33300								
	13300	17400	20200	23700	26200	28700	34800								
01318500	20000	26200	30400	36000	40200	44700	55600	4.309	.133	.338	4.306	.139	.059	79	--
2	20000	26800	31400	37500	41800	46200	57700								
	20000	26200	30500	36100	40300	44900	55900								
01319000	4140	5950	7240	8980	10300	11800	15400	3.623	.183	.173	3.623	.183	.130	45	--
1	3650	5030	5990	7270	8270	9310	11800								
	4100	5840	7050	8640	9870	11200	14400								
01319800	1170	1520	1730	1980	2160	2320	2680	3.063	.140	-.224	3.049	.171	-1.335	23	--
2	1080	1470	1740	2070	2300	2530	3100								
	1160	1510	1730	2000	2200	2380	2820								
01319950	274	393	471	569	640	710	872	2.432	.192	-.188	2.432	.192	-.579	23	--
1	316	445	535	658	750	846	1070								
	280	403	487	597	677	759	952								
01321000[c]	13100	17600	20800	24900	28100	31500	39800	4.123	.148	.276	4.123	.148	.271	76	--
1	12300	16300	19100	22800	25700	28700	35700								
	13100	17500	20600	24600	27800	31100	39100								

Footnotes at end of table (p. 107).

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines) (continued).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01325000[cd]	15500	20400	23900	28600	32300	36200	46200	4.200	.134	.479	4.200	.134	.648	22	--
2	25500	34400	40700	49000	55600	62300	79100								
	16700	22900	27800	34400	39700	45000	58900								
01326500[cd]	34900	45200	52800	63400	72100	81400	106000	4.558	.123	.759	4.558	.123	1.694	23	--
2	39800	53200	62300	74800	83900	93400	118000								
	35400	46300	54700	66100	75400	85000	110000								
01328000	683	926	1090	1290	1450	1600	1960	2.835	.156	.039	2.823	.188	-1.110	35	--
2	500	782	999	1300	1530	1770	2410								
	673	914	1080	1290	1470	1640	2070								
01329000[a]	3190	4470	5440	6790	7910	9120	12400	3.518	.164	.516	3.519	.165	.582	56	60
2	5500	7850	9530	11800	13600	15400	20200								
	3270	4640	5780	7280	8620	9980	13700								
01329500[a]	5960	8720	10900	14300	17200	20400	29900	3.796	.183	.690	3.801	.190	.871	47	84
2	7200	10300	12600	15800	18100	20600	27300								
	6010	8820	11100	14500	17300	20400	29400								
01329780	27	43	55	73	88	105	151	1.452	.220	.359	1.452	.220	.374	19	--
2	44	68	86	111	129	148	197								
	28	46	61	82	100	119	168								
01329900	80	110	130	155	174	192	237	1.902	.165	-.008	1.902	.165	-.360	19	--
2	71	106	130	163	186	208	266								
	79	109	130	156	177	197	247								
01330000	736	1080	1320	1660	1940	2220	2970	2.874	.191	.215	2.874	.191	.075	17	--
2	592	831	994	1200	1330	1470	1790								
	720	1040	1250	1540	1750	1960	2510								

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines) (continued).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01330500	1610	2300	2820	3550	4160	4820	6600	3.222	.172	.485	3.222	.172	.536	61	--
2	1720	2420	2910	3530	3970	4400	5490								
	1610	2310	2830	3550	4140	4770	6430								
01330880	99	164	222	314	400	502	823	2.023	.243	.654	2.023	.243	1.055	17	--
2	83	124	154	192	219	245	310								
	97	158	206	282	342	413	621								
01331400	505	826	1080	1550	2000	2510	3900	2.681	.191	.021	2.681	.191	-.688	12	--
2	422	604	730	893	1010	1120	1420								
	493	781	977	1330	1600	1920	2710								
01332000[a]	2400	3900	5150	7050	8730	10700	16300	3.398	.238	.447	3.392	.233	.402	56	118
2	2300	3370	4170	5280	6120	7020	9450								
	2400	3870	5070	6880	8400	10200	15200								
01332500[a]	4050	6190	7890	10400	12500	14900	21500	3.623	.208	.439	3.623	.208	.425	47	--
2	3630	5250	6440	8110	9350	10700	14200								
	4030	6130	7750	10100	12000	14200	20100								
01333000[a]	1520	2270	2840	3640	4300	5000	6880	3.190	.202	.273	3.181	.220	-.268	38	--
2	1350	1960	2400	3010	3460	3920	5160								
	1510	2250	2790	3550	4150	4790	6490								
01333367	116	142	158	178	192	207	240	2.068	.100	.191	2.050	.134	-1.097	10	--
2	120	175	214	264	300	335	426								
	116	149	176	210	240	267	337								
01333500	2010	3080	3950	5240	6350	7610	11200	3.322	.207	.522	3.300	.218	-.370	36	50
2	2100	3060	3740	4660	5340	6040	7900								
	2010	3080	3920	5160	6170	7300	10400								

Footnotes at end of table (p. 107).

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01334000[a]	3300	4920	6080	7640	8870	10200	13400	3.521	.204	.074	3.521	.204	-.047	55	--
2	4220	5980	7200	8840	10000	11300	14500								
	3330	4970	6170	7760	9020	10300	13600								
01334500[a]	11300	17100	22000	29600	36300	44100	67300	4.075	.200	.720	4.077	.203	.844	76	91
2	10300	14700	18000	22500	25900	29600	39300								
	11300	17000	21800	29100	35300	42600	63800								
01335500[acd]	40100	51200	59200	69800	78200	87100	110000	4.615	.118	.589	4.622	.132	1.049	42	119
2	55300	73500	85900	103100	115000	128000	162000								
	40900	52900	62200	74400	84400	94600	121000								
01342730	710	1230	1620	2140	2560	2980	4030	2.840	.294	-.230	2.840	.294	-.823	18	--
5	1110	1690	2120	2680	3120	3570	4640								
	750	1310	1740	2300	2760	3220	4300								
01342800	8330	10400	11600	13200	14300	15500	18000	3.922	.111	.111	3.914	.100	-.738	20	86
1	7090	9530	11200	13500	15200	17000	21200								
	8130	10200	11500	13300	14700	16100	19400								
01346820	80	112	136	170	199	231	317	1.921	.159	.628	1.921	.159	1.355	13	--
5	89	140	180	234	280	326	442								
	81	118	150	194	234	277	381								
01347460	43	61	73	88	99	110	137	1.630	.181	-.053	1.630	.181	-.517	12	--
2	39	59	74	95	110	126	166								
	42	60	73	90	103	116	151								
01348000[b]	8480	10600	11900	13500	14700	15800	18400	3.929	.114	.047	3.926	.111	-.080	59	90
2	7080	9650	11400	13600	15200	16800	20800								
	8430	10600	11900	13500	14800	15900	18800								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01348420	246	370	458	576	668	764	1000	2.391	.210	.015	2.391	.210	-.383	13	--
2	250	360	435	529	593	657	813								
	246	368	451	561	639	720	914								
01349000	4780	7000	8540	10500	12100	13700	17500	3.679	.197	-.018	3.679	.197	-.182	38	--
5	2480	3740	4670	5880	6840	7810	10100								
	4670	6690	8010	9700	11000	12300	15500								
01349360	88	131	164	211	250	293	409	1.956	.197	.368	1.956	.197	.412	12	--
5	65	102	131	170	203	237	320								
	84	123	153	194	228	265	361								
01349850	942	1760	2550	3910	5270	6970	12800	3.006	.301	.642	2.966	.263	.671	14	37
4	889	1620	2260	3260	4150	5120	7820								
	928	1700	2400	3540	4600	5820	9610								
01350000	14100	25000	33900	47300	58800	71700	108000	4.156	.289	.126	4.156	.289	.057	78	--
4	11500	19400	25800	35300	43500	52300	76100								
	13900	24400	32700	45000	55500	67300	100000								
01350120	339	702	1020	1510	1940	2420	3770	2.524	.381	-.096	2.524	.381	-.901	12	--
4	603	1040	1400	1940	2400	2910	4260								
	416	853	1220	1770	2240	2740	4100								
01350140	835	1130	1320	1560	1740	1930	2360	2.923	.153	.054	2.923	.153	-.395	13	--
4A	623	971	1250	1630	1940	2250	3010								
	754	1050	1280	1610	1890	2180	2910								
01350900	378	649	874	1210	1510	1850	2820	2.590	.270	.257	2.590	.270	.152	22	--
4	292	466	603	798	960	1130	1570								
	362	591	768	1020	1240	1480	2150								

Footnotes at end of table (p. 107).

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Station number and hydrologic region	Peak-discharge (cubic feet per second), Recurrence interval (years)							Peak-discharge statistics (log 10 units), WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01351000[b]	2770	3780	4470	5370	6060	6770	8500	3.447	.157	.161	3.437	.177	-.813	61	87
4	2390	3600	4500	5720	6720	7740	10300								
	2740	3760	4480	5450	6230	7040	9020								
01354300	238	352	438	559	659	766	1050	2.386	.196	.306	2.386	.196	.257	26	--
4	161	257	333	441	532	626	871								
	225	325	401	511	602	700	962								
01355405	94	134	162	201	232	264	347	1.981	.176	.243	1.981	.176	.114	17	--
2	157	238	296	374	431	489	638								
	100	149	192	246	295	342	461								
01358500	2220	3410	4470	6190	7800	9740	15900	3.379	.203	.978	3.375	.234	.693	45	75
3	1530	2430	3190	4380	5400	6550	9950								
	2180	3290	4280	5860	7330	9070	14500								
01359519[b]	4080	5870	7230	9170	10800	12500	17300	3.625	.177	.479	3.603	.156	.248	18	39
4	4280	6470	8100	10300	12100	14000	18700								
	4120	6080	7610	9750	11500	13300	18100								
01359750	712	1050	1300	1630	1900	2180	2900	2.857	.198	.146	2.836	.254	-1.378	29	--
3	597	893	1120	1460	1730	2020	2820								
	701	1020	1260	1590	1850	2130	2870								
01359902	1710	2200	2550	3020	3400	3800	4840	3.247	.120	.636	3.222	.167	-.705	10	--
3	1120	1670	2130	2860	3490	4220	6380								
	1570	2000	2360	2940	3450	4030	5740								
01359924	1130	1450	1660	1930	2130	2330	2810	3.058	.126	.188	3.035	.169	-1.093	10	--
3	1040	1510	1880	2430	2870	3360	4710								
	1110	1470	1760	2180	2520	2890	3920								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01361000	5400	8910	12100	17400	22400	28600	48600	3.764	.238	.817	3.773	.251	1.055	41	79
3	5410	8870	12000	17200	21900	27600	45500								
	5400	8910	12100	17400	22300	28400	47800								
01361200	1820	3020	3980	5360	6530	7810	11300	3.267	.257	.155	3.243	.304	-.792	20	--
3	1150	1800	2330	3160	3850	4630	6900								
	1730	2740	3510	4630	5580	6620	9490								
01361453	161	291	415	626	834	1090	1970	2.240	.284	.690	2.221	.257	.633	19	28
4	261	485	687	1010	1290	1610	2490								
	181	358	530	811	1070	1370	2260								
01361500	3780	6190	8030	10600	12700	15000	21000	3.579	.253	.047	3.581	.255	-.008	68	87
4	3960	6350	8220	10900	13100	15500	21500								
	3790	6210	8060	10700	12800	15100	21100								
01361570	1430	2030	2490	3140	3680	4270	5860	3.170	.171	.506	3.129	.196	-.491	11	37
4	1440	2300	2970	3920	4720	5550	7710								
	1430	2160	2760	3630	4360	5140	7150								
01361900	1130	1960	2690	3850	4910	6170	10000	3.072	.271	.456	3.072	.271	.470	24	--
4	910	1660	2310	3330	4240	5240	7990								
	1090	1870	2550	3630	4600	5710	8980								
01362100	808	1230	1580	2120	2610	3180	4870	2.932	.200	.738	2.917	.231	-.072	29	--
3	972	1590	2130	3010	3800	4730	7610								
	823	1290	1700	2350	2940	3630	5760								
01362197	490	810	1060	1410	1700	2020	2870	2.693	.257	.077	2.665	.238	-.438	13	37
4A	579	944	1240	1660	2000	2360	3260								
	523	879	1170	1590	1930	2290	3200								

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	Recurrence interval (years)							WRC estimate			Station record				
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01362198[c]	3850	7240	10100	14600	18500	22900	35400	3.589	.323	.077	3.583	.323	-.022	24	114
4	3550	6180	8430	11800	14800	18000	27000								
	3790	6890	9400	13200	16400	19900	29800								
01362500[c]	13700	26500	38300	57700	76000	98000	167000	4.154	.327	.323	4.154	.327	.280	56	--
4	10900	19000	25800	36000	45100	55000	82400								
	13500	25300	35700	52000	66700	83900	136000								
01365000	2680	4450	5820	7770	9360	11100	15700	3.430	.261	.046	3.430	.261	-.074	51	--
4	2760	5150	7250	10600	13600	17000	26500								
	2690	4560	6130	8500	10600	12900	19300								
01365500	1170	2090	2870	4100	5200	6470	10200	3.082	.287	.289	3.082	.287	.221	49	--
4	1320	2360	3240	4610	5820	7150	10900								
	1180	2140	2950	4240	5390	6690	10400								
01366500[d]	4610	8080	11200	16200	20800	26300	43600	3.686	.274	.496	3.677	.268	.417	19	80
4	4800	7990	10500	14300	17500	20900	30200								
	4650	8050	10900	15300	19100	23400	36000								
01366650	1870	3000	3830	4960	5860	6790	9140	3.270	.246	-.056	3.270	.246	-.578	21	--
4	2420	3900	5040	6670	8060	9520	13400								
	1980	3290	4310	5750	6960	8220	11400								
01367500[d]	11600	16500	20200	25400	29800	34600	47700	4.080	.169	.539	4.080	.169	.571	25	--
4	13400	20500	25800	33200	39300	45700	62400								
	11900	17700	22200	28700	34200	39900	55100								
01368000	1700	2420	3010	3910	4690	5600	8240	3.255	.167	.892	3.257	.171	1.184	44	52
3	2580	4190	5580	7810	9760	12000	18800								
	1760	2630	3410	4630	5700	6970	10800								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01368500	1550	2420	3180	4410	5540	6900	11200	3.220	.212	.853	3.233	.234	1.238	26	52
3	1740	2880	3890	5520	6970	8670	13900								
	1570	2510	3350	4720	5970	7460	12100								
01369000[a]	1200	1710	2110	2690	3160	3690	5120	3.093	.176	.521	3.093	.176	.488	40	--
3	1730	2860	3840	5390	6720	8250	12800								
	1240	1860	2400	3230	3930	4740	7110								
01369500	370	551	689	886	1050	1230	1710	2.580	.197	.354	2.580	.197	.242	42	--
3	348	589	796	1130	1410	1740	2710								
	368	555	706	932	1130	1340	1960								
01370000[a]	3960	5530	6740	8480	9940	11500	16000	3.614	.161	.632	3.617	.166	.698	49	68
3	5090	8310	11100	15600	19500	24100	37800								
	4030	5830	7350	9690	11700	14000	20900								
01371000	3410	5640	7390	9940	12100	14500	20900	3.540	.253	.168	3.540	.253	-.050	27	--
4	4200	6700	8630	11400	13700	16200	22600								
	3530	5930	7820	10500	12800	15300	21700								
01371500[ac]	10500	14800	18000	22600	26400	30500	41600	4.033	.169	.481	4.033	.169	.456	63	--
3	10120	15400	19600	25800	30900	36500	52400								
	10500	14900	18200	23100	27200	31600	43800								
01372040	245	380	479	617	727	844	1150	2.393	.223	.089	2.393	.223	-.367	17	--
3	366	549	687	885	1040	1200	1640								
	263	424	545	716	850	993	1370								
01372200[b]	1560	2790	3980	6040	8080	10600	19500	3.227	.279	.760	3.227	.279	.879	59	--
3	2170	3630	4970	7200	9240	11700	19500								
	1590	2870	4100	6210	8260	10800	19500								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01372300b	505	850	1150	1630	2080	2600	4230	2.727	.252	.568	2.727	.252	.589	59	--
3	608	923	1170	1520	1810	2110	2950								
	510	856	1150	1610	2040	2520	3980								
01372500	2830	5080	7190	10700	14200	18400	32300	3.481	.283	.625	3.481	.283	.658	59	--
3	2690	4250	5570	7620	9380	11400	17300								
	2820	5000	7000	10300	13400	17200	29400								
01372800	1020	1800	2460	3490	4410	5460	8540	3.020	.285	.267	3.020	.285	-.081	13	--
3	1060	1670	2180	2930	3560	4250	6190								
	1030	1760	2350	3250	4020	4880	7320								
01373500	2210	3740	5150	7480	9710	12400	21300	3.376	.252	.748	3.368	.246	.730	24	106
3	2630	4300	5700	7890	9760	11900	18100								
	2260	3850	5290	7600	9730	12200	20100								
01373690	513	1070	1590	2430	3230	4170	7060	2.718	.372	.132	2.718	.372	-.524	13	--
3	461	824	1160	1710	2220	2830	4710								
	503	992	1430	2120	2770	3520	5840								
01374130	225	316	382	471	542	616	807	2.359	.171	.274	2.331	.228	-1.169	12	--
3	272	456	608	841	1040	1250	1850								
	234	362	472	639	778	932	1370								
01374250	396	621	794	1040	1240	1460	2060	2.606	.226	.210	2.583	.267	-.783	13	--
3	508	905	1260	1840	2370	2970	4800								
	417	710	972	1390	1760	2180	3480								
01374440	697	1230	1730	2570	3380	4370	7660	2.873	.274	.667	2.873	.274	.688	14	--
3	587	1010	1390	2000	2550	3170	5070								
	677	1170	1610	2330	3010	3820	6360								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01374460	148	238	307	407	490	580	824	2.177	.239	.172	2.177	.239	-.298	18	--
3	187	315	419	578	711	855	1260								
	153	257	341	468	573	690	1010								
01376280[a]	346	552	729	1010	1260	1560	2470	2.564	.224	.669	2.535	.282	-.575	14	--
3	436	750	1030	1470	1870	2320	3680								
	361	611	837	1200	1530	1910	3070								
01376690	310	538	733	1030	1300	1610	2530	2.506	.274	.324	2.475	.330	-.727	12	--
3	307	565	808	1220	1610	2070	3550								
	309	547	763	1120	1450	1840	3080								
01384500[a]	425	700	934	1300	1620	2000	3140	2.649	.243	.505	2.649	.243	.441	45	--
3	509	845	1130	1560	1930	2340	3520								
	430	717	963	1350	1680	2070	3230								
01387250[b]	1400	2530	3560	5270	6880	8830	15100	3.171	.288	.513	3.171	.288	.468	75	--
3	1160	1960	2640	3700	4610	5630	8590								
	1390	2490	3470	5090	6590	8390	14100								
01387300	622	1030	1370	1900	2370	2900	4490	2.812	.247	.427	2.812	.247	.092	10	--
3	658	1190	1670	2480	3220	4090	6820								
	630	1090	1500	2190	2820	3550	5850								
01387350	157	285	402	592	772	987	1670	2.218	.292	.461	2.218	.292	.293	19	--
3	250	459	650	971	1270	1610	2680								
	169	326	475	722	953	1230	2100								
01387410	332	654	955	1460	1930	2510	4350	2.539	.336	.321	2.539	.336	.111	27	--
3	167	305	430	639	828	1050	1730								
	315	590	835	1240	1610	2060	3460								

Footnotes at end of table (p. 107).

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01387450	565	969	1310	1840	2310	2850	4440	2.767	.267	.340	2.767	.267	.149	29	--
3	478	838	1160	1690	2160	2710	4370								
	556	946	1280	1800	2270	2810	4420								
01387500[a]	2870	5030	6970	10100	13100	16700	28100	3.483	.271	.556	3.483	.271	.519	76	--
3	2080	3560	4850	6900	8690	10700	16800								
	2840	4920	6770	9730	12500	15900	26300								
01387880[a]	427	685	914	1280	1630	2040	3330	2.659	.226	.777	2.659	.226	.942	15	--
3	257	453	625	899	1140	1410	2210								
	398	618	813	1130	1420	1760	2790								
01390500[a]	966	1640	2240	3220	4140	5240	8740	3.012	.254	.640	3.008	.248	.437	33	64
3	672	1140	1540	2180	2740	3380	5280								
	941	1560	2100	2980	3790	4740	7710								
01413500	6100	9830	12700	16700	20100	23700	33200	3.789	.243	.107	3.789	.243	.002	51	--
4A	5900	8890	11200	14300	16700	19300	25500								
	6070	9630	12300	15800	18600	21500	28700								
01414000	1460	2160	2700	3480	4140	4870	6880	3.180	.190	.479	3.180	.190	.534	21	--
4A	1400	2180	2800	3650	4330	5020	6750								
	1440	2170	2750	3590	4260	4980	6780								
01414500	1450	2270	2890	3760	4470	5240	7250	3.166	.228	.140	3.166	.228	.041	51	--
4A	1190	1900	2460	3260	3900	4570	6250								
	1410	2190	2770	3570	4220	4910	6670								
01415000	1360	2110	2650	3380	3950	4550	6070	3.134	.225	.001	3.134	.225	-.149	51	--
4A	1340	2090	2670	3490	4140	4810	6460								
	1360	2100	2660	3420	4030	4680	6300								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01415500	713	1190	1620	2310	2950	3720	6130	2.879	.248	.639	2.879	.248	.836	26	--
4A	583	926	1200	1590	1890	2210	3000								
	682	1100	1430	1910	2300	2720	3830								
01417185	20	36	50	70	89	110	170	1.305	.300	.165	1.305	.300	-.146	12	--
4A	25	43	59	83	102	123	175								
	22	40	56	79	99	121	174								
01417500[d]	13900	21500	27300	35600	42400	49800	69600	4.152	.218	.237	4.152	.218	.092	20	--
4A	14600	21400	26600	33400	38700	44100	57600								
	14100	21500	26900	34300	39900	45700	60200								
01418000[b]	2230	3620	4700	6280	7600	9050	13000	3.357	.242	.202	3.357	.242	.097	38	--
4A	2210	3580	4680	6240	7490	8820	12200								
	2230	3610	4690	6260	7540	8920	12500								
01418500	3990	6160	7790	10100	12000	14000	19300	3.608	.218	.183	3.608	.218	.070	38	--
4A	3790	5970	7680	10100	12000	13900	19000								
	3960	6110	7750	10100	12000	14000	19100								
01419500	3200	5260	7010	9710	12100	14900	23300	3.525	.242	.489	3.525	.242	.518	37	--
4A	3580	5840	7630	10200	12200	14400	20100								
	3270	5420	7230	9920	12200	14600	21200								
01420000	1300	2050	2600	3380	4000	4650	6350	3.115	.234	.053	3.115	.234	-.062	57	--
4A	1080	1770	2330	3120	3760	4440	6170								
	1270	2000	2530	3290	3900	4550	6250								
01420500	10600	16600	21100	27200	32100	37200	50500	4.028	.230	.050	4.028	.230	-.040	74	--
4A	10400	16100	20400	26400	31100	36000	48700								
	10600	16500	20900	27000	31700	36700	49600								

Footnotes at end of table (p. 107).

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01421000[d]	24300	35400	43200	53500	61600	70000	90800	4.388	.192	.077	4.378	.183	-.233	42	51
4A	26000	38000	47000	59000	68300	77800	102000								
	24600	36100	44500	55900	64900	74300	97800								
01422000	3760	5230	6230	7500	8460	9430	11800	3.576	.170	.023	3.576	.170	-.152	38	--
5	4160	5990	7290	8910	10200	11400	14400								
	3780	5300	6370	7750	8810	9910	12500								
01422500	2010	2760	3250	3870	4330	4790	5870	3.303	.163	-.020	3.296	.178	-.591	37	--
5	1910	2840	3530	4420	5110	5820	7500								
	2000	2770	3290	3970	4500	5040	6320								
01423000	9820	14300	17300	21100	23900	26800	33400	3.988	.198	-.135	3.988	.198	-.432	37	--
5	8370	11800	14200	17200	19400	21700	26900								
	9750	14100	16900	20400	22900	25500	31600								
01423500	323	482	595	745	862	983	1280	2.511	.205	.029	2.511	.205	-.373	16	--
5	399	611	774	988	1160	1340	1760								
	331	507	643	826	976	1140	1510								
01424000[b]	1090	1580	1920	2360	2700	3030	3850	3.034	.196	-.059	3.034	.196	-.373	27	--
5	990	1540	1950	2490	2920	3360	4420								
	1080	1570	1930	2390	2760	3130	4040								
01424500[b]	1870	2820	3480	4340	4990	5660	7260	3.269	.214	-.096	3.269	.214	-.448	27	--
5	1910	2840	3530	4410	5100	5810	7480								
	1870	2820	3490	4360	5020	5700	7340								
01425500	80	127	162	211	250	293	405	1.908	.232	.113	1.908	.232	-.003	34	--
5	104	165	213	279	334	391	531								
	81	131	169	224	269	318	441								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01425675	204	287	352	445	524	610	851	2.328	.164	.649	2.328	.164	1.197	12	--
5	205	310	390	495	578	663	867								
	204	292	364	465	548	636	859								
01426000	2580	3670	4490	5640	6590	7620	10400	3.424	.173	.450	3.424	.173	.495	33	--
5	2310	3400	4190	5190	5970	6770	8640								
	2560	3640	4440	5550	6450	7390	9880								
01426500[d]	15400	21100	25100	30300	34300	38400	48400	4.191	.161	.159	4.178	.159	-.517	51	60
5	12800	17600	20900	24900	27900	31000	38100								
	15300	20800	24700	29600	33300	37000	46200								
01427500	4370	6350	7880	10100	11900	13900	19500	3.656	.182	.500	3.656	.182	.532	44	--
4A	3950	5980	7540	9670	11300	13000	17300								
	4310	6260	7770	9920	11600	13400	18100								
01428000	1080	1780	2410	3440	4420	5590	9380	3.063	.239	.762	3.047	.270	.190	28	--
4A	1660	2540	3230	4180	4920	5680	7540								
	1210	2030	2760	3830	4710	5650	8060								
01435000[b]	5930	9690	12700	17000	20600	24600	35500	3.781	.247	.192	3.781	.247	.094	49	--
4	4890	9170	12900	18900	24300	30400	48000								
	5830	9600	12800	17500	21700	26500	39700								
01436500[bd]	6900	11600	15600	21700	27300	33700	52800	3.857	.254	.437	3.857	.254	.412	26	--
4	6630	11700	15900	22300	28000	34300	51700								
	6860	11600	15700	22000	27600	34000	52300								
01437000[d]	8840	14000	18200	24500	29900	36000	53400	3.962	.228	.400	3.953	.222	.329	26	60
4	8700	13700	17400	22700	27200	31900	44300								
	8820	13900	17900	23800	28700	34100	48900								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01437500[bd]	9840	15300	19500	25800	31100	37000	53500	4.007	.216	.379	3.998	.209	.265	26	60
4	10200	15400	19100	24100	28300	32700	44000								
	9900	15300	19300	25100	29900	35000	48800								
01440000[a]	1540	2520	3330	4560	5640	6880	10500	3.202	.243	.395	3.202	.243	.342	64	--
3	1710	2790	3710	5160	6400	7820	12000								
	1550	2540	3370	4640	5750	7030	10800								
01496370	309	423	493	578	638	696	823	2.483	.168	-.251	2.483	.168	-.961	18	--
5	268	379	460	564	643	723	905								
	304	415	484	573	639	706	859								
01496500	1390	1900	2240	2680	3010	3340	4150	3.146	.158	.092	3.146	.158	.018	54	--
5	1830	2460	2900	3440	3840	4250	5150								
	1410	1940	2310	2780	3140	3500	4360								
01497500	4350	5740	6630	7730	8530	9310	11100	3.638	.143	-.027	3.638	.143	-.170	48	--
5	4700	6210	7160	8290	9080	9890	11700								
	4360	5780	6690	7810	8620	9430	11200								
01497800	845	1350	1750	2340	2840	3390	4940	2.938	.233	.298	2.938	.233	.223	14	--
5	1760	2550	3130	3870	4450	5030	6400								
	959	1620	2160	2900	3510	4150	5670								
01497805	106	166	210	272	322	376	515	2.028	.228	.099	2.028	.228	-.295	10	--
5	188	283	356	455	536	619	819								
	119	199	265	353	429	508	692								
01498500	3980	5970	7410	9340	10900	12500	16500	3.602	.207	.072	3.602	.207	-.064	38	--
5	4850	7080	8660	10600	12100	13600	17100								
	4020	6080	7580	9560	11200	12800	16700								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01499000	2600	3650	4360	5270	5960	6660	8330	3.415	.175	.009	3.415	.175	-.162	35	--
5	2750	3850	4630	5620	6360	7120	8880								
	2610	3670	4400	5330	6050	6780	8490								
01500500	13200	17600	20700	24600	27700	30900	38800	4.129	.142	.288	4.116	.142	-.231	50	86
5	14500	19500	22600	26300	28900	31600	37500								
	13200	17700	20900	24800	27900	31000	38500								
01501000	3640	4850	5620	6560	7250	7920	9450	3.560	.149	-.075	3.560	.149	-.242	49	--
5	4100	5620	6640	7900	8850	9810	12000								
	3660	4910	5730	6750	7520	8290	10000								
01501015	275	376	442	524	585	645	786	2.438	.162	-.047	2.438	.162	-.552	12	--
5	225	342	432	550	646	744	980								
	267	367	438	534	612	694	890								
01501140	131	188	230	291	340	394	539	2.131	.176	.445	2.131	.176	.691	11	--
5	78	114	142	179	209	239	310								
	122	168	199	244	277	313	411								
01501500	33	62	90	136	181	236	417	1.550	.304	.523	1.550	.304	.671	36	--
5	50	79	102	134	161	188	256								
	33	63	91	135	176	224	372								
01502000	2100	2990	3620	4470	5150	5850	7650	3.329	.176	.221	3.322	.192	-.319	50	--
5	1700	2400	2910	3550	4050	4560	5740								
	2080	2950	3540	4340	4970	5600	7230								
01502500	9030	12000	13900	16200	17800	19400	23100	3.953	.150	-.114	3.953	.150	-.271	56	--
5	9210	12400	14500	17000	18900	20800	25200								
	9040	12000	14000	16300	18000	19700	23500								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01502701[b]	28400	36200	41000	46800	51000	55000	64200	4.453	.124	-.023	4.453	.124	-.114	75	--
5	26200	35600	41600	48600	53400	58400	69600								
	28300	36200	41000	47000	51300	55500	65000								
01502714	259	361	429	516	581	647	804	2.413	.171	-.002	2.413	.171	-.474	12	--
5	158	238	300	381	447	515	677								
	244	330	386	462	520	581	735								
01503000[a]	31300	40900	47100	54700	60300	65800	78500	4.496	.138	.009	4.496	.138	-.072	75	--
5	32600	43500	50500	58700	64500	70400	83600								
	31300	41000	47400	55100	60800	66400	79300								
01503960	278	346	389	442	480	518	604	2.447	.111	.108	2.447	.111	-.069	11	--
5	254	363	446	555	641	730	938								
	274	350	409	489	557	628	791								
01503980	822	1250	1570	2030	2410	2830	3950	2.925	.207	.301	2.925	.207	.360	23	--
5	606	855	1030	1260	1430	1600	2000								
	804	1190	1460	1830	2110	2410	3210								
01505000	4600	6520	7830	9490	10800	12000	15100	3.662	.181	-.025	3.656	.176	-.206	50	81
5	5710	8200	9880	11900	13300	14800	18200								
	4640	6640	8050	9820	11200	12500	15800								
01505017[b]	180	240	279	327	362	397	478	2.256	.149	-.020	2.256	.149	-.518	12	--
5	254	370	460	581	679	780	1020								
	190	272	339	428	506	588	770								
01505500	2660	4120	5150	6510	7560	8640	11300	3.421	.229	-.104	3.421	.229	-.339	32	--
5	2370	3670	4620	5800	6730	7670	9920								
	2640	4070	5070	6370	7360	8380	10900								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01507000	9150	12100	14200	16900	18900	21100	26300	3.967	.141	.266	3.963	.150	-.086	51	--
5	9560	12800	14900	17500	19400	21300	25500								
	9170	12200	14300	17000	19000	21100	26100								
01507500	2630	3640	4320	5210	5890	6590	8270	3.422	.166	.090	3.412	.188	-.645	34	--
5	2460	3620	4450	5490	6280	7070	8930								
	2620	3640	4340	5260	5980	6720	8460								
01508000	174	274	345	439	512	586	767	2.235	.239	-.135	2.235	.239	-.325	36	--
5	181	285	366	474	562	654	878								
	174	275	348	445	523	603	798								
01508500	392	685	930	1300	1630	1990	3050	2.603	.281	.214	2.603	.281	.213	38	--
5	334	502	631	803	942	1090	1430								
	389	667	889	1210	1490	1770	2610								
01508803	1270	1860	2260	2760	3140	3510	4400	3.101	.199	-.125	3.101	.199	-.494	17	--
5	1360	1850	2180	2580	2870	3180	3870								
	1280	1860	2240	2700	3040	3370	4160								
01508946	56	132	218	389	579	842	1880	1.786	.416	.573	1.786	.416	1.616	11	--
6	228	382	495	640	755	873	1160								
	82	185	304	486	658	856	1540								
01509000	6110	8820	10600	12800	14400	16000	19700	3.780	.195	-.201	3.780	.195	-.385	49	--
5	5420	7460	8800	10400	11600	12800	15500								
	6080	8720	10400	12500	13900	15400	18800								
01510000	4390	5840	6780	7960	8830	9700	11700	3.643	.147	.020	3.643	.147	-.062	52	--
5	3810	5350	6430	7790	8830	9880	12300								
	4370	5800	6740	7940	8830	9730	11800								

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Station number and hydrologic region	Peak-discharge (cubic feet per second), Recurrence interval (years)							Peak-discharge statistics (log 10 units), WRC estimate			Peak-discharge statistics (log 10 units), Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01510500[b]	5830	8090	9640	11700	13200	14800	18600	3.768	.167	.105	3.768	.167	.052	52	--
5	4930	6830	8170	9830	11100	12300	15200								
	5800	8000	9490	11500	12900	14300	17900								
01510610	448	610	720	864	974	1090	1360	2.656	.155	.171	2.656	.155	.051	11	--
5	248	370	463	585	685	788	1040								
	417	546	629	746	836	932	1180								
01511500[d]	14000	19600	23900	30400	35900	42100	59500	4.167	.159	.772	4.212	.231	1.503	12	86
5	13300	18200	21500	25400	28300	31100	37700								
	13900	19300	23100	28400	32400	36600	47800								
01512500	22100	29800	35600	43700	50300	57500	76500	4.359	.145	.608	4.362	.152	.920	75	123
5	24300	33300	39100	45900	50700	55600	66600								
	22200	30000	35900	43900	50300	57200	74900								
01513500[a]	51900	67200	77400	90600	101000	111000	136000	4.721	.129	.265	4.721	.129	.232	51	--
5	56500	76200	88700	103000	113000	123000	146000								
	52100	67900	78600	92300	103000	113000	138000								
01513712	219	437	659	1060	1470	2000	3890	2.375	.334	.626	2.375	.334	1.539	12	--
6	159	275	361	473	561	651	870								
	210	404	275	361	1080	1420	2520								
01513790	5680	8770	10900	13700	15900	18100	23300	3.749	.229	-.142	3.769	.246	-.436	12	32
6	3240	5000	6250	7840	9080	10400	13500								
	5330	8020	9530	11500	13000	14800	18800								
01514000	5980	8850	11000	14100	16700	19500	27100	3.789	.193	.377	3.792	.198	.478	58	86
6	6160	8940	10900	13400	15400	17500	22600								
	5990	8850	11000	14000	16500	19200	26400								

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01515000[ac]	65200	85700	99400	117000	130000	143000	175000	4.818	.138	.167	4.816	.137	.118	51	123
6	71100	95800	112000	131000	144000	158000	190000								
	65400	86400	101000	119000	132000	146000	178000								
01516500[a]	698	1280	1810	2690	3530	4550	7830	2.868	.294	.502	2.868	.294	.668	33	--
6	696	1130	1450	1850	2170	2500	3290								
	697	1270	1760	2540	3240	4110	6770								
01516800[a]	318	463	563	694	793	895	1140	2.501	.195	-.022	2.501	.195	-.306	17	--
6	263	464	615	811	966	1120	1510								
	312	463	574	728	853	974	1280								
01517000[a]	597	1040	1440	2100	2740	3520	6040	2.805	.265	.667	2.805	.265	1.187	24	--
6	699	1190	1550	2020	2390	2770	3700								
	604	1060	1460	2080	2640	3320	5350								
01518000[a]	9970	17400	24000	34400	44000	55200	89700	4.019	.274	.436	4.030	.289	.592	40	89
6	9660	15300	19400	24600	28700	33000	43300								
	9960	17300	23500	32900	41200	51100	80400								
01518500[a]	3760	6300	8560	12200	15600	19700	32700	3.602	.248	.657	3.602	.248	1.336	21	--
6	4070	6300	7870	9880	11400	13100	16900								
	3790	6300	8430	11600	14400	17700	27600								
01520000[a]	10600	17900	24100	33800	42600	52800	83400	4.044	.256	.452	4.044	.256	.630	27	--
6	9090	13800	17100	21400	24800	28300	36800								
	10500	17500	23000	31300	38100	46700	70800								

Footnotes at end of table (p. 107).

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01520500ad	20900	34800	46300	63800	79300	96900	148000	4.335	.252	.361	4.343	.264	.520	49	99
6	22400	34200	42600	53400	61900	70900	92800								
	21000	34800	46000	62500	76600	92900	139000								
01521596	146	285	406	593	759	948	1490	2.167	.343	.047	2.167	.343	-.030	11	--
6	409	701	916	1190	1410	1630	2160								
	186	374	565	826	1050	1260	1810								
01522500	2660	4480	5830	7670	9130	10700	14500	3.418	.275	-.151	3.413	.274	-.307	34	53
6	1520	2520	3250	4190	4940	5700	7570								
	2600	4320	5500	7080	8250	9650	12900								
01523500	5120	7320	9020	11500	13500	15800	22000	3.725	.174	.555	3.712	.156	.138	10	46
6	2630	4320	5550	7130	8370	9650	12700								
	4700	6630	7860	9700	11100	12900	17400								
01526000	5800	9860	12700	16500	19300	22200	28900	3.747	.289	-.342	3.737	.284	-.681	34	53
6	4130	6600	8370	10600	12400	14200	18600								
	5710	9600	12100	15500	17900	20500	26600								
01526500ad	31400	48800	62400	82300	99100	118000	169000	4.508	.219	.336	4.514	.228	.517	60	99
6	32500	48800	60300	75000	86600	98900	128000								
	31400	48800	62200	81500	97500	116000	163000								
01527000	406	610	774	1020	1230	1460	2130	2.626	.198	.550	2.632	.209	.985	37	53
7	619	865	1040	1270	1450	1630	2080								
	416	629	800	1050	1260	1490	2120								
01528000	1470	2150	2650	3360	3930	4550	6180	3.177	.189	.312	3.177	.189	.398	51	53
6	1870	2760	3370	4160	4770	5400	6840								
	1480	2180	2710	3460	4060	4680	6290								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
01529500	7120	11600	15400	20900	25800	31300	47000	3.867	.244	.352	3.867	.244	.431	69	--
6	8960	13100	15900	19500	22200	25100	31700								
	7170	11700	15400	20800	25400	30600	45100								
01530301	235	447	626	896	1130	1390	2130	2.372	.331	.008	2.372	.331	-.342	10	--
6	400	712	947	1250	1490	1730	2320								
	262	508	733	1040	1300	1550	2220								
01530500	2210	2900	3310	3790	4130	4450	5140	3.337	.146	-.268	3.332	.158	-.779	50	--
6	2790	4490	5710	7250	8460	9700	12600								
	2230	2990	3530	4220	4790	5250	6380								
01531000[a]	46400	69000	85200	107000	125000	143000	189000	4.671	.201	.117	4.673	.204	.155	75	99
6	37400	52900	63500	77100	87600	98800	124000								
	46200	68400	83800	104000	121000	138000	181000								
01531250[a]	824	1380	1820	2450	2990	3570	5160	2.922	.261	.124	2.922	.261	-.021	17	--
6	525	848	1080	1380	1610	1860	2440								
	792	1300	1650	2140	2510	2980	4150								
01533250[a]	463	833	1140	1590	1980	2410	3600	2.669	.301	.060	2.669	.301	-.138	25	--
6	654	1080	1380	1770	2080	2390	3140								
	477	859	1180	1630	2010	2410	3470								
03008000	445	960	1490	2470	3470	4780	9450	2.678	.375	.475	2.678	.375	.980	19	--
6	612	1010	1310	1690	1990	2310	3090								
	460	967	1450	2260	3000	3990	7260								
03010500[a]	7280	12300	16900	24700	32100	41200	71100	3.894	.251	.772	3.894	.251	1.338	70	--
6	13300	19000	22900	28000	32100	36400	46500								
	7450	12600	17300	25000	32100	40600	68000								

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
03010800	3560	6320	8470	11500	14000	16700	23600	3.546	.300	-.107	3.546	.300	-.172	29	--
6	4360	5970	7050	8460	9580	10800	13500								
	3610	6290	8260	10900	13000	15300	21000								
03011000	4930	7510	9620	12800	15600	18800	28000	3.713	.203	.603	3.718	.212	1.386	30	37
6	4640	6810	8310	10300	11800	13400	17300								
	4910	7450	9430	12300	14700	17600	25300								
03011020[a]	23400	31400	36900	44100	49700	55400	69700	4.375	.147	.257	4.377	.150	.388	84	123
6	29900	40700	48000	57500	65200	73400	93000								
	23600	31700	37500	45100	51200	57100	72200								
03011800	1310	2280	3110	4410	5560	6900	10900	3.131	.276	.329	3.131	.276	.610	20	--
6	2020	3120	3900	4900	5680	6510	8470								
	1370	2390	3270	4540	5600	6780	10100								
03013000	3800	5220	6200	7470	8450	9460	11900	3.583	.161	.150	3.583	.161	.233	49	--
6	5450	7220	8400	9950	11200	12500	15500								
	3860	5340	6400	7780	8870	9930	12500								
03013800	1100	1410	1620	1870	2060	2250	2690	3.044	.127	.134	3.044	.127	.400	14	--
6	529	813	1010	1270	1480	1690	2200								
	1030	1300	1460	1670	1830	2030	2490								
03015390[a]	835	1170	1420	1750	2020	2310	3040	2.931	.168	.338	2.931	.168	.831	18	--
6	695	1100	1390	1760	2050	2350	3080								
	821	1160	1410	1750	2030	2320	3050								
04213040[a]	149	234	294	374	434	496	645	2.167	.239	-.156	2.167	.239	-.154	26	--
6	148	240	306	389	454	520	672								
	148	234	295	377	439	502	652								

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	Recurrence interval (years)							WRC estimate			Station record				
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04213200[a]	778	1140	1380	1700	1940	2190	2780	2.889	.198	-.062	2.889	.198	.011	18	--
6	615	989	1260	1610	1890	2170	2880								
	761	1120	1350	1670	1920	2180	2820								
04213490	1810	2560	3060	3700	4170	4630	5730	3.254	.183	-.102	3.254	.183	-.146	25	--
6	1350	2100	2630	3310	3860	4430	5800								
	1780	2510	2990	3620	4090	4580	5750								
04213500	15000	21000	25100	30400	34500	38600	48800	4.179	.171	.081	4.179	.171	.127	48	--
6	12200	18200	22300	27700	31900	36400	46900								
	14900	20800	24800	30100	34100	38200	48500								
04214040	352	530	653	811	932	1050	1350	2.543	.215	-.122	2.543	.215	-.145	24	--
6	409	636	796	1000	1160	1330	1710								
	356	541	677	853	994	1130	1460								
04214200	2990	3960	4620	5470	6120	6780	8410	3.482	.140	.230	3.482	.140	.632	14	--
6	1710	2650	3310	4160	4830	5540	7220								
	2830	3730	4270	5030	5620	6290	7920								
04214250	658	979	1230	1600	1910	2260	3230	2.834	.194	.494	2.802	.151	-.014	12	35
6	676	1060	1330	1680	1950	2230	2880								
	660	994	1260	1630	1930	2250	3070								
04214400[b]	5160	7060	8260	9710	10700	11700	14000	3.707	.167	-.208	3.702	.163	-.390	49	84
6	2500	3840	4780	5980	6910	7880	10100								
	5060	6870	7940	9240	10100	11100	13300								
04214410	880	1200	1400	1660	1850	2040	2480	2.944	.159	-.030	2.944	.159	-.023	23	--
6	786	1230	1550	1950	2270	2610	3420								
	872	1200	1430	1730	1970	2200	2760								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04214500	6470	8470	9730	11300	12400	13500	16000	3.810	.139	-.043	3.805	.134	-.268	49	84
6	4110	6130	7530	9320	10700	12200	15600								
	6380	8340	9530	11100	12100	13300	15900								
04214980	752	1240	1630	2200	2670	3190	4600	2.883	.255	.149	2.883	.255	.427	14	--
6	1090	1730	2180	2750	3200	3670	4770								
	794	1330	1770	2380	2880	3380	4670								
04215000	5400	7430	8780	10500	11800	13100	16100	3.733	.164	.007	3.727	.155	-.333	47	84
6	3440	5340	6690	8410	9750	11200	14500								
	5320	7300	8580	10200	11500	12800	15800								
04215500	7110	9470	11000	13000	14400	15900	19400	3.854	.147	.063	3.854	.147	.114	47	--
6	5070	7750	9640	12100	14000	16000	20900								
	7030	9370	10900	12900	14300	15900	19700								
04216400	822	1120	1330	1600	1810	2030	2550	2.919	.158	.178	2.919	.158	.342	25	--
6	1040	1740	2260	2910	3410	3920	5110								
	838	1190	1480	1890	2230	2530	3280								
04216418[b]	2680	3660	4340	5240	5930	6660	8460	3.435	.155	.246	3.435	.155	.465	26	--
6	2510	3880	4840	6070	7020	8010	10300								
	2670	3680	4420	5420	6210	7010	8970								
04216500	999	1530	1890	2340	2670	2990	3750	2.989	.230	-.278	2.989	.230	-.356	67	--
6	845	1320	1650	2080	2410	2740	3520								
	994	1520	1870	2320	2640	2960	3720								
04216875	87	119	139	164	182	199	240	1.937	.162	-.116	1.937	.162	-.055	11	--
6	76	124	158	202	237	272	355								
	85	120	145	179	207	232	295								

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	Recurrence interval (years)							WRC estimate			Station record				
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04217000	3970	5310	6090	6990	7600	8160	9330	3.588	.161	-.415	3.583	.156	-.746	43	84
6	3660	5470	6710	8280	9480	10700	13500								
	3960	5320	6150	7170	7930	8600	10100								
04217500bc	4190	5670	6570	7640	8400	9120	10700	3.615	.162	-.272	3.610	.157	-.524	43	84
7	4160	6210	7630	9450	10800	12200	15400								
	4190	5700	6670	7880	8780	9630	11500								
04217700	1010	1420	1680	1990	2210	2420	2880	2.992	.189	-.330	2.973	.232	-1.327	25	--
6	1090	1670	2070	2570	2950	3340	4180								
	1020	1450	1740	2120	2410	2660	3250								
04218000bc	4180	5000	5480	6050	6440	6820	7650	3.620	.093	-.035	3.611	.100	-.678	32	45
7	4970	7160	8660	10600	12000	13500	16900								
	4230	5190	5880	6790	7530	8180	9650								
04218518b	1880	2700	3330	4260	5030	5890	8280	3.291	.175	.581	3.270	.187	-.249	31	59
6	1740	2480	2980	3610	4100	4600	5710								
	1870	2680	3280	4140	4820	5600	7650								
04219645	137	237	312	414	494	578	788	2.127	.291	-.195	2.127	.291	-.237	15	--
6	187	290	361	452	522	591	750								
	142	245	324	426	504	583	772								
04219738	229	293	333	379	412	444	514	2.358	.129	-.122	2.358	.129	-.102	10	--
6	148	254	331	430	506	582	759								
	215	284	332	400	456	509	636								
04219900	1590	2440	3060	3930	4640	5390	7340	3.207	.215	.147	3.191	.198	.025	23	34
6	1440	2100	2540	3100	3510	3940	4820								
	1580	2400	2970	3740	4320	4980	6580								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04219922	143	183	206	231	249	264	297	2.146	.136	-.396	2.129	.165	-1.178	11	--
7	107	146	171	203	225	244	291								
	137	175	196	222	240	256	294								
04220150	929	1260	1460	1700	1850	2000	2310	2.957	.170	-.396	2.957	.170	-.789	15	--
7	898	1160	1350	1580	1750	1920	2320								
	925	1240	1440	1670	1820	1970	2310								
04221500[ab]	7330	11500	14800	19700	23900	28500	41600	3.879	.222	.379	3.881	.225	.508	71	86
6	8580	13000	16200	20200	23300	26600	34300								
	7360	11600	14900	19700	23800	28300	40700								
04221769	614	977	1250	1620	1920	2240	3050	2.790	.238	.031	2.790	.238	.024	10	--
6	513	849	1090	1400	1640	1890	2450								
	597	947	1200	1530	1790	2070	2750								
04222600	819	1190	1440	1770	2010	2260	2860	2.912	.193	-.050	2.912	.193	-.070	25	--
6	660	967	1180	1440	1650	1860	2330								
	807	1170	1400	1700	1910	2150	2710								
04223000[a]	21600	30800	37700	47300	55100	63500	85700	4.345	.175	.387	4.346	.177	.517	79	86
6	19200	27300	32800	40000	45600	51500	65400								
	21500	30700	37400	46700	54100	62300	83400								
04224700	517	819	1050	1390	1680	1990	2840	2.723	.230	.248	2.723	.230	.412	23	--
6	670	1130	1480	1920	2270	2620	3500								
	529	855	1130	1510	1850	2170	3040								
04224775	1650	2460	2980	3600	4050	4470	5410	3.203	.220	-.388	3.203	.220	-.883	13	--
6	3180	5030	6350	8030	9350	10700	13900								
	1850	2940	3920	5150	6220	7020	9120								

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04224807	166	343	513	801	1080	1420	2510	2.237	.362	.275	2.237	.362	.630	10	--
6	246	441	590	781	932	1080	1450								
	179	365	538	793	1010	1260	1980								
04224900	261	623	1010	1710	2420	3350	6570	2.435	.435	.248	2.435	.435	.410	22	--
6	262	472	630	832	988	1150	1510								
	261	604	939	1500	2000	2710	4990								
04225000	3870	5840	7200	8960	10300	11600	14900	3.583	.216	-.127	3.583	.216	-.183	61	--
6	4750	7550	9540	12100	14100	16100	20900								
	3900	5920	7380	9280	10800	12200	15700								
04226000	2850	4500	5790	7630	9170	10800	15400	3.463	.229	.228	3.463	.229	.444	19	--
6	2540	4100	5220	6650	7770	8910	11600								
	2820	4450	5670	7370	8720	10200	14100								
04227500[acd]	20900	29300	35300	43500	50100	57000	74800	4.328	.168	.308	4.328	.168	.432	45	--
7	26400	38800	47300	58200	66900	78500	96900								
	21100	29900	36500	45500	52800	60100	78800								
04229500	1710	2710	3500	4660	5640	6720	9720	3.244	.230	.293	3.244	.230	.425	41	--
7	1770	2370	2790	3340	3750	4150	5180								
	1710	2690	3440	4520	5400	6350	9060								
04230380	1360	1930	2350	2920	3360	3840	5050	3.139	.178	.246	3.142	.181	.478	24	28
7	868	1250	1520	1880	2160	2420	3110								
	1320	1850	2230	2740	3120	3520	4610								
04230500	2610	3910	4810	6000	6910	7840	10100	3.414	.211	-.065	3.414	.211	-.080	42	--
7	3520	5090	6170	7540	8560	9530	12100								
	2650	3990	4930	6160	7120	8080	10400								

Footnotes at end of table (p. 107).

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04231000	1580	2340	2890	3640	4220	4840	6390	3.201	.202	.100	3.201	.202	.167	42	--
7	1340	1840	2180	2590	2900	3190	3910								
	1570	2310	2830	3530	4050	4600	6040								
04231040	64	75	81	88	93	98	107	1.808	.079	-.064	1.791	.114	-1.330	11	--
7	41	54	62	72	79	84	97								
	60	70	76	83	88	92	103								
04232000[acd]	21900	27100	30900	36000	40200	44600	56000	4.354	.101	.835	4.345	.088	.559	32	188
7	28900	40900	49100	59900	68300	76900	97800								
	22300	28300	33100	39800	45600	51100	64900								
042320527	111	155	182	215	237	259	306	2.033	.183	-.339	2.033	.183	-.807	13	--
7	98	140	167	199	219	236	274								
	109	152	178	210	231	251	294								
042320578	98	129	151	180	202	225	284	1.999	.136	.377	1.999	.136	.874	16	--
7	123	165	193	227	250	271	318								
	100	134	159	191	215	239	294								
04232071	35	48	56	65	71	77	90	1.541	.164	-.290	1.541	.164	-.748	13	--
7	44	61	72	86	95	103	120								
	36	50	59	70	78	86	100								
04232087	91	137	172	222	263	308	428	1.971	.202	.313	1.948	.183	.475	11	19
7	100	140	167	200	223	244	291								
	92	137	170	215	249	283	375								
04232100	891	1150	1330	1540	1710	1870	2260	2.953	.131	.151	2.953	.131	.212	30	--
7	771	1080	1290	1550	1750	1930	2380								
	883	1140	1330	1540	1720	1880	2280								

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04232460	232	355	439	545	624	703	887	2.357	.228	-.233	2.357	.228	-.525	22	--
7	412	568	676	812	912	1010	1240								
	247	380	475	594	685	776	973								
04232630	445	673	822	1010	1140	1270	1560	2.636	.225	-.337	2.619	.258	-1.090	23	--
7	367	511	609	727	812	888	1070								
	438	654	790	959	1070	1180	1450								
04233000	1190	1980	2590	3460	4190	4970	7070	3.078	.260	.071	3.078	.260	.021	51	--
6	1480	2480	3210	4140	4850	5590	7300								
	1200	2010	2650	3540	4290	5060	7110								
04233255[b]	3200	5080	6470	8400	9950	11600	15800	3.507	.236	.041	3.507	.236	-.026	51	--
6	3340	5540	7150	9200	10800	12400	16300								
	3210	5110	6530	8500	10100	11700	15900								
04233310	2040	3990	5740	8520	11100	14000	23000	3.320	.338	.168	3.320	.338	.100	15	--
6	2080	3400	4360	5590	6560	7560	9980								
	2050	3890	5400	7590	9400	11600	17800								
04233676[b]	889	1370	1770	2360	2870	3450	5110	2.967	.212	.504	2.973	.222	.738	62	83
6	1200	1880	2360	2990	3490	4010	5290								
	898	1390	1810	2420	2950	3520	5140								
04233700[b]	1050	1680	2210	3040	3780	4640	7220	3.045	.226	.593	3.051	.237	.862	62	83
6	1880	2900	3630	4570	5310	6080	7950								
	1080	1740	2320	3190	3970	4820	7320								
04234000	3100	4640	5850	7600	9090	10700	15300	3.506	.198	.453	3.509	.203	.617	62	83
6	3380	4980	6070	7470	8560	9690	12300								
	3110	4660	5870	7590	9020	10600	14900								

Footnotes at end of table (p. 107).

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Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
042340202	86	129	158	195	224	252	318	1.926	.216	-.172	1.926	.216	-.809	10	--
7	75	115	143	176	199	220	269								
	84	125	153	188	214	238	298								
042340588	40	60	75	94	109	125	165	1.601	.211	.029	1.601	.211	-.087	11	--
7	56	83	101	124	139	153	185								
	42	65	82	103	119	135	172								
04234138	247	350	425	527	608	694	918	2.401	.173	.298	2.401	.173	.043	11	--
7	240	340	410	495	556	612	748								
	246	348	421	517	589	662	852								
04234200	1010	1360	1580	1820	1990	2150	2480	2.992	.168	-.395	2.992	.168	-.792	22	--
7	1260	1760	2110	2550	2880	3190	3960								
	1030	1410	1660	1960	2180	2400	2840								
04234363	21	26	28	31	34	36	40	1.323	.101	-.109	1.323	.101	-.333	11	--
7	19	26	30	36	39	42	49								
	20	26	28	32	36	38	43								
04235250	1270	1830	2230	2770	3190	3630	4740	3.110	.184	.165	3.099	.205	-.333	28	--
7	1480	2070	2480	3010	3400	3770	4710								
	1280	1850	2260	2810	3230	3660	4730								
04235255	59	77	89	103	114	125	150	1.772	.137	.062	1.772	.137	.085	10	--
7	71	96	113	133	147	159	187								
	61	81	96	113	126	139	165								
04235276	320	474	582	723	833	945	1220	2.505	.203	-.014	2.505	.203	-.092	20	--
7	371	510	604	718	798	871	1040								
	324	478	585	722	825	925	1170								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04235300	3690	4910	5660	6570	7220	7850	9260	3.563	.150	-.159	3.531	.218	-1.585	11	--
6	3270	4930	6090	7560	8720	9920	12700								
	3630	4910	5790	6960	7890	8780	10900								
04242500	6780	9240	11000	13500	15400	17500	22900	3.843	.152	.443	3.843	.152	.566	64	--
1	5770	7720	9070	10900	12200	13600	16900								
	6720	9110	10800	13100	14900	16800	21700								
04242795	79	118	146	187	219	255	349	1.910	.196	.293	1.910	.196	.506	10	--
1	66	99	123	156	180	205	262								
	75	111	136	170	197	226	295								
04243500	3440	5200	6530	8410	9950	11600	16100	3.547	.205	.280	3.535	.230	-.372	38	--
7	3210	4810	5990	7550	8760	9940	13100								
	3430	5170	6480	8310	9790	11300	15600								
04245000	2680	4170	5230	6640	7740	8870	11600	3.425	.231	-.083	3.425	.231	-.195	48	--
7	2500	3780	4730	6000	6970	7930	10500								
	2670	4150	5190	6580	7650	8750	11500								
04245200	1000	1460	1780	2220	2570	2930	3860	3.007	.187	.175	3.007	.187	.166	29	--
7	1020	1520	1900	2390	2770	3140	4130								
	1000	1470	1790	2250	2610	2970	3910								
04245840	725	951	1100	1300	1440	1590	1950	2.865	.137	.195	2.865	.137	.267	21	--
1	777	1100	1320	1610	1830	2060	2600								
	733	983	1160	1410	1580	1770	2230								
04249050	551	805	994	1250	1470	1690	2280	2.750	.189	.280	2.750	.189	.446	25	--
1	682	977	1180	1450	1660	1880	2390								
	569	838	1040	1310	1530	1760	2320								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
042490673	317	425	494	577	637	696	828	2.498	.155	-.138	2.498	.155	-.455	12	--
1	416	604	737	914	1050	1190	1500								
	341	484	591	738	842	951	1210								
04250750	4960	6340	7170	8140	8810	9460	10900	3.692	.130	-.190	3.692	.130	-.332	30	--
1	4480	6400	7750	9520	10900	12200	15400								
	4900	6350	7290	8510	9400	10300	12500								
04252500	5600	7510	8890	10800	12300	13900	18200	3.761	.142	.516	3.761	.142	.629	77	--
2	6370	8590	10100	12000	13400	14700	18300								
	5620	7550	8960	10900	12400	14000	18200								
04254500	7250	9420	10900	12800	14300	15800	19600	3.867	.130	.319	3.863	.126	.275	66	86
1	8920	11900	13900	16500	18700	20800	25900								
	7350	9620	11200	13300	15000	16600	20800								
04256000	2010	2920	3660	4750	5690	6750	9790	3.323	.181	.674	3.323	.181	1.011	60	--
1	2220	3040	3600	4350	4930	5540	6970								
	2020	2930	3650	4690	5560	6540	9200								
04256040	143	209	256	322	376	432	580	2.165	.187	.265	2.165	.187	.541	11	--
1	195	320	415	542	634	726	928								
	156	248	323	432	510	591	786								
04258700[b]	5170	7450	9110	11400	13200	15200	20200	3.722	.182	.273	3.722	.182	.335	56	--
1	3450	4720	5610	6790	7690	8600	10700								
	5060	7190	8670	10600	12200	14000	18100								
04260575	281	482	635	847	1020	1200	1650	2.442	.285	-.125	2.442	.285	-.295	11	--
1	290	474	611	795	931	1070	1380								
	283	479	625	821	973	1130	1490								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04262500	3980	4980	5600	6350	6900	7430	8640	3.600	.115	.036	3.600	.115	.030	71	--
2	4090	5490	6420	7580	8360	9150	11100								
	3980	5000	5650	6450	7050	7620	8970								
04263000	9150	11800	13500	15700	17400	19100	23200	3.966	.126	.228	3.966	.126	.294	71	--
2	10800	14400	16800	19900	22000	24200	29600								
	9200	11900	13700	16000	17900	19700	24100								
04263445	56	73	83	95	104	111	129	1.741	.143	-.243	1.741	.143	-.648	10	--
2	45	68	85	107	122	137	175								
	54	71	83	99	112	123	153								
04264300	369	592	763	1010	1210	1420	2000	2.573	.239	.138	2.573	.239	.287	23	--
1	346	520	642	803	927	1060	1370								
	365	577	731	943	1110	1290	1740								
04264700	494	747	948	1250	1500	1790	2600	2.711	.201	.514	2.697	.194	1.055	11	33
2	744	1010	1190	1400	1540	1680	2010								
	532	803	1020	1300	1520	1740	2310								
04265000	4570	5840	6610	7530	8180	8800	10200	3.657	.128	-.120	3.657	.128	-.170	53	--
2	4790	6450	7540	8930	9860	10800	13100								
	4580	5870	6690	7670	8400	9090	10700								
04265100	577	801	959	1170	1340	1510	1940	2.768	.164	.242	2.768	.164	.408	29	--
1	747	1070	1300	1610	1840	2090	2680								
	597	847	1030	1290	1490	1690	2200								
04265200	774	1130	1380	1710	1980	2250	2930	2.892	.192	.100	2.892	.192	.249	11	--
1	733	1070	1310	1630	1870	2130	2730								
	763	1110	1350	1670	1920	2180	2810								

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	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04265300	1140	1850	2420	3260	3970	4750	6940	3.068	.242	.257	3.068	.242	.508	18	--
1	1290	1890	2320	2900	3340	3810	4930								
	1170	1860	2390	3120	3720	4360	5990								
04267600	357	493	588	716	816	920	1180	2.560	.161	.258	2.560	.161	.423	15	--
2	398	544	639	753	827	898	1070								
	361	501	600	726	819	911	1130								
04267700	352	543	695	918	1110	1320	1910	2.561	.213	.416	2.561	.213	.999	18	--
1	464	691	852	1070	1240	1420	1850								
	372	580	743	975	1160	1360	1880								
04267800	1030	1600	2030	2640	3140	3680	5090	3.017	.224	.166	3.017	.224	.297	28	--
1	1090	1620	1980	2470	2850	3250	4200								
	1040	1600	2020	2590	3050	3540	4770								
04268200	745	1070	1310	1630	1900	2170	2900	2.880	.181	.279	2.880	.181	.551	24	--
1	645	952	1160	1450	1670	1900	2470								
	730	1050	1270	1570	1820	2080	2730								
04268720	488	656	764	899	998	1100	1330	2.688	.153	-.025	2.688	.153	-.060	20	--
1	394	568	688	851	978	1110	1440								
	472	635	742	882	990	1110	1380								
04268800	2390	3290	3900	4700	5320	5950	7490	3.381	.162	.135	3.381	.162	.187	29	--
1	2650	3620	4270	5150	5840	6570	8300								
	2420	3350	3980	4820	5470	6140	7780								
04269000	7320	9860	11600	14000	15900	17900	22800	3.873	.147	.341	3.873	.147	.437	75	--
1	9020	12200	14300	17200	19400	21800	27500								
	7410	10000	11900	14400	16400	18500	23600								

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines) (continued).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04269050	532	825	1020	1280	1470	1660	2090	2.716	.235	-.252	2.716	.235	-.442	25	--
1	511	794	999	1270	1480	1690	2170								
	529	819	1020	1280	1470	1670	2120								
04269100	716	1070	1310	1630	1880	2130	2750	2.853	.207	-.044	2.853	.207	-.063	21	--
1	685	1030	1270	1590	1850	2110	2750								
	711	1060	1300	1620	1870	2120	2750								
04269500	2570	3790	4720	6050	7160	8360	11600	3.422	.192	.389	3.414	.185	.350	19	75
1	3290	4640	5560	6780	7760	8780	11200								
	2700	3990	4970	6320	7390	8530	11400								
04270000	1600	2140	2480	2890	3190	3480	4130	3.201	.152	-.121	3.195	.146	-.351	58	62
2	1730	2330	2730	3240	3580	3920	4770								
	1600	2150	2500	2920	3240	3540	4230								
04270100	909	1270	1510	1810	2030	2260	2790	2.957	.174	-.058	2.957	.174	-.105	21	--
1	787	1200	1480	1870	2170	2490	3250								
	889	1250	1500	1830	2080	2350	2990								
04270150	675	994	1220	1530	1770	2020	2650	2.832	.197	.096	2.832	.197	.175	21	--
1	642	981	1220	1550	1800	2060	2690								
	669	991	1220	1540	1780	2040	2670								
04270162	113	160	193	237	272	308	400	2.058	.175	.193	2.058	.175	.486	10	--
2	193	267	314	370	405	439	517								
	126	184	233	286	331	370	461								
04270200	1800	2420	2810	3270	3610	3930	4640	3.252	.156	-.183	3.252	.156	-.303	29	--
2	1570	2190	2620	3160	3530	3900	4820								
	1790	2400	2780	3250	3590	3920	4690								

Footnotes at end of table (p. 107).

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines) (continued).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04270700	2670	3810	4580	5570	6310	7070	8880	3.426	.184	-.027	3.414	.209	-.630	28	--
2	2080	2920	3500	4250	4770	5300	6650								
	2630	3720	4420	5340	5970	6640	8250								
04270800	912	1270	1510	1840	2090	2350	3000	2.965	.166	.169	2.947	.200	-.549	16	--
1	651	965	1180	1480	1710	1960	2570								
	859	1190	1400	1690	1930	2180	2790								
04271500	3410	4500	5200	6060	6690	7320	8760	3.532	.143	-.011	3.527	.155	-.380	41	--
2	3020	4150	4890	5840	6480	7120	8710								
	3390	4480	5170	6030	6660	7280	8750								
04273500	5340	7260	8500	10000	11100	12200	14700	3.725	.161	-.109	3.719	.157	-.266	44	60
2	5870	7780	9020	10600	11600	12600	15100								
	5360	7290	8550	10100	11200	12300	14800								
04273700	744	1130	1390	1720	1970	2210	2780	2.863	.224	-.238	2.863	.224	-.503	26	--
2	1060	1500	1810	2200	2480	2750	3440								
	766	1170	1460	1810	2090	2350	2980								
04274000	3280	4610	5550	6810	7790	8810	11400	3.522	.171	.200	3.524	.175	.291	54	75
2	2460	3290	3830	4520	4980	5440	6600								
	3250	4540	5400	6580	7430	8330	10600								
04275000	6210	8990	11000	13700	15800	18100	23800	3.799	.187	.180	3.799	.187	.186	63	--
2	4630	6510	7830	9620	10900	12300	15800								
	6160	8880	10800	13300	15200	17400	22600								
04275500	9780	13500	16200	19900	22800	25900	34000	4.000	.160	.362	3.995	.169	.086	58	--
2	8040	10900	12900	15400	17200	19000	23800								
	9720	13400	15900	19500	22100	25000	32400								

Table 9. --Selected flood characteristics for gaging stations used in the study. Discharge-frequency relations are presented in the following sequence: top line is computed from log-Pearson type III analyses; middle line is computed from the regression equations; bottom line shows a weighted average of the first two discharges (top and middle lines) (continued).

[Station locations shown on pl. 2 and names listed in table 8. WRC indicates values computed through U.S. Water Resources Council (1981) guidelines. Dashes(--) indicate no historic data used.]

Station number and hydrologic region	Peak-discharge (cubic feet per second) Recurrence interval (years)							Peak-discharge statistics (log 10 units) WRC estimate			Station record			Years of peak-discharge record	
	2	5	10	25	50	100	500	Mean	Standard deviation	Skew	Mean	Standard deviation	Skew	Gaged	Historic
04276200	1410	2050	2580	3360	4040	4810	7020	3.169	.182	.700	3.168	.177	.722	29	63
2	1200	1690	2030	2470	2790	3110	3930								
	1400	2020	2500	3210	3770	4410	6170								
04276500	4430	6200	7460	9160	10500	11900	15400	3.653	.169	.242	3.638	.200	-.600	46	--
2	4070	5650	6720	8100	9060	10000	12500								
	4410	6170	7390	9040	10300	11600	14800								
04278300	997	1360	1600	1880	2080	2270	2700	2.993	.167	-.210	2.993	.167	-.715	22	--
2	746	1040	1230	1460	1610	1760	2130								
	976	1320	1530	1790	1960	2120	2510								

a Regression and weighted discharges computed from New York full-regression equations. Out-of-State flood-frequency report and relations should be consulted because part or all of the drainage basin lies in an adjacent State.

b Annual peak-discharge record extended through two-station comparison method (U.S. Water Resources Council,1981) or record was combined with record (adjusted for drainage area) from a nearby gaging station on the same stream (See table 8 for actual or combined years of unregulated gaged record).

c Station with drainage area lying within two or more hydrologic regions of New York. The regression estimate was obtained by weighting the estimates from the regional equations by the relative percentage of drainage area in each hydrologic region of New York.

d Station currently on a regulated stream. Peak discharges and statistics reflect preregulation conditions and are not generally applicable to present conditions (See table 8 for period of unregulated record).

Table 10. -- Selected basin characteristics for gaging stations used in the study.

Table 10. -- Selected basin characteristics for gaging stations used in the study.

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01199050	CT	3	29.4	41.942	73.391	11.70	13.00	3.57	40.5	1,200	70.0	4.66
01199400	NY	3	81.0	41.780	73.556	23.00	19.50	4.27	40.0	593	29.0	6.53
01199420	NY	3	120	41.796	73.559	23.20	19.20	7.05	40.0	592	51.0	4.49
01199477	NY	3	1.93	41.710	73.620	3.13	141.00	1.04	40.0	976	19.0	5.08
01200000	NY	3	203	41.659	73.529	39.80	13.40	1.83	41.0	540	52.0	7.57
01208990	CT	3	21.0	41.294	73.396	11.00	31.50	2.20	47.0	445	87.0	5.76
01312000	NY	2	192	43.970	74.130	23.10	63.50	8.81	46.0	2,130	87.0	2.78
01313500	NY	2	160	43.856	74.239	31.50	29.20	6.79	43.5	1,925	92.0	6.20
01314000	NY	2	419	43.832	74.196	27.10	13.80	7.83	44.5	1,620	92.0	1.75
01315500	NY	2	792	43.701	73.984	50.00	24.80	7.50	44.0	1,482	91.0	3.16
01318500	NY	2	1,664	43.319	73.845	91.00	16.40	6.30	41.0	1,145	90.0	4.98
01319000	NY	1	114	43.470	74.220	22.00	38.80	4.33	45.5	1,595	95.0	4.25
01319800	NY	2	28.9	43.251	74.518	8.30	93.20	6.34	52.0	1,950	94.0	2.38
01319950	NY	1	7.16	43.371	74.546	4.70	22.70	11.45	55.0	1,780	91.0	3.09
01321000	NY	1	491	43.350	74.270	35.20	33.30	7.42	46.5	1,376	91.0	2.52
01325000	NY	2	1,055	43.311	73.868	75.50	15.50	1.90	45.0	1,210	92.0	5.40
01326500	NY	2	2,779	43.244	73.747	103.10	14.90	4.53	42.5	1,130	91.0	3.82
01328000	NY	2	14.7	43.310	73.550	8.90	25.50	0.07	37.0	205	22.0	5.39
01329000	VT	2	152	43.077	73.157	22.00	62.70	0.97	49.0	1,140	81.0	3.18
01329500	NY	2	394	43.100	73.430	46.40	9.20	2.40	44.5	552	72.0	5.46
01329780	NY	2	1.04	43.160	73.880	1.97	40.60	0.01	39.0	680	86.0	3.73
01329900	NY	2	1.42	43.060	74.020	2.05	143.00	0.73	39.5	960	62.0	2.96
01330000	NY	2	26.0	43.030	73.930	11.50	42.30	7.19	39.0	682	70.0	5.09
01330500	NY	2	90.0	43.040	73.910	19.50	26.00	5.62	39.0	578	79.0	4.22
01330880	NY	2	2.98	43.000	73.720	3.75	26.70	3.36	37.0	372	51.0	4.72
01331400	MA	2	7.67	42.589	73.113	4.80	188.00	1.73	48.0	1,520	60.0	3.00
01332000	MA	2	40.9	42.700	73.090	10.60	77.40	0.22	55.5	1,210	82.0	2.75
01332500	MA	2	126	42.706	73.181	24.00	19.20	1.33	49.5	820	67.0	4.57
01333000	MA	2	42.6	42.709	73.197	27.50	33.00	1.00	46.0	1,020	78.0	17.75
01333367	NY	2	2.22	42.630	73.360	2.82	252.00	0.45	41.0	1,720	85.0	3.58

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01333500	NY	2	56.1	42.760	73.340	13.00	118.00	0.34	40.5	890	95.0	3.01
01334000	VT	2	111	42.913	73.257	15.60	125.00	1.05	45.5	1,292	65.0	2.19
01334500	NY	2	510	42.940	73.380	47.50	15.00	1.30	44.0	683	70.0	4.42
01335500	NY	2	4,500	42.912	73.679	1.42	13.70	4.60	42.0	1,273	85.0	4.48
01342730	NY	5	26.2	43.001	75.046	9.97	102.41	0.95	39.5	932	26.0	3.79
01342800	NY	1	193	43.396	74.859	29.00	37.60	5.63	52.0	840	91.0	4.38
01346820	NY	5	1.36	43.010	74.800	2.15	274.00	0.01	39.5	970	23.0	3.30
01347460	NY	2	0.54	43.180	74.810	1.27	111.00	0.01	48.0	1,460	95.0	3.04
01348000	NY	2	289	43.020	74.740	33.80	42.70	7.42	49.0	1,120	83.0	3.93
01348420	NY	2	6.52	43.010	74.570	4.02	109.00	3.60	41.0	829	66.0	2.48
01349000	NY	5	59.2	42.930	74.630	17.00	75.40	0.07	39.5	832	32.0	4.88
01349360	NY	5	1.00	42.900	74.430	1.54	219.00	0.01	39.0	553	20.0	2.30
01349850	NY	4	13.5	42.290	74.220	8.55	96.70	0.07	41.0	1,980	79.0	5.41
01350000	NY	4	236	42.320	74.440	28.80	30.30	0.61	46.0	1,514	85.0	3.51
01350120	NY	4	11.1	42.405	74.444	6.90	120.00	1.44	40.0	1,550	38.0	4.29
01350140	NY	4A	16.3	42.429	74.473	7.46	119.86	0.92	40.5	1,486	38.0	3.41
01350900	NY	4	6.91	42.650	74.130	4.45	71.90	4.20	36.0	1,180	21.0	2.87
01351000	NY	4	73.0	42.628	74.186	14.50	46.00	3.60	36.0	1,170	58.0	2.88
01354300	NY	4	3.70	42.820	74.070	3.03	94.60	5.95	36.5	1,120	47.0	2.48
01355405	NY	2	3.11	42.890	73.960	2.88	171.00	0.01	37.0	660	20.0	2.67
01358500	NY	3	89.4	42.730	73.630	18.50	89.20	7.67	40.0	952	69.0	3.83
01359519	NY	4	131	42.679	73.907	27.94	30.06	2.42	36.0	485	28.5	5.96
01359750	NY	3	32.6	42.534	73.737	14.90	29.10	7.98	38.5	332	65.0	6.81
01359902	NY	3	35.1	42.527	73.821	15.04	67.29	0.94	37.0	507	32.0	6.44
01359924	NY	3	61.6	42.439	73.811	20.98	39.40	5.11	37.0	602	51.0	7.15
01361000	NY	3	329	42.330	73.744	28.00	25.70	4.11	39.5	388	71.0	2.38
01361200	NY	3	60.6	42.215	73.729	17.00	53.60	6.21	39.5	517	51.0	4.77
01361453	NY	4	3.61	42.530	74.310	3.04	316.00	0.01	38.5	1,610	41.0	2.56
01361500	NY	4	98.0	42.400	74.150	14.30	45.70	1.30	38.5	1,922	71.0	2.09
01361570	NY	4	35.3	42.407	74.135	14.50	93.60	2.27	37.5	1,180	31.0	5.96

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01361900	NY	4	13.9	42.306	74.004	9.70	107.20	0.01	40.5	750	95.0	6.77
01362100	NY	3	27.5	42.154	73.522	10.10	54.00	2.14	40.0	816	67.0	3.72
01362197	NY	4A	11.4	42.120	74.400	5.63	256.00	0.01	46.0	1,700	96.0	2.78
01362198	NY	4	59.5	42.116	74.389	12.60	82.00	0.10	50.0	2,340	95.0	2.67
01362500	NY	4	192	42.010	74.270	24.20	50.40	0.29	51.0	1,142	96.0	3.05
01365000	NY	4	38.5	41.870	74.490	10.00	85.30	0.21	51.0	1,199	95.0	2.60
01365500	NY	4	20.9	41.840	74.540	5.20	153.00	1.05	47.0	1,202	90.0	1.29
01366500	NY	4	100	41.770	74.400	23.50	57.60	2.46	48.5	1,142	26.0	5.52
01366650	NY	4	56.7	41.715	74.389	18.00	59.30	3.91	44.0	720	87.0	5.71
01367500	NY	4	378	41.840	74.090	52.70	24.20	4.17	46.0	652	86.0	7.20
01368000	NJ	3	140	41.260	74.550	24.40	14.80	4.30	41.5	522	43.0	4.25
01368500	NY	3	59.7	41.340	74.490	17.30	33.50	1.80	42.5	694	61.0	5.01
01369000	NY	3	98.0	41.270	74.470	19.80	8.13	7.67	43.0	466	55.0	4.00
01369500	NY	3	9.69	41.340	74.360	6.06	42.00	6.45	43.0	513	50.0	3.79
01370000	NY	3	385	41.380	74.410	39.10	6.10	5.50	42.0	495	50.0	3.97
01371000	NY	4	102	41.620	74.290	29.40	21.80	3.25	44.0	580	69.0	8.47
01371500	NY	3	711	41.690	74.170	69.30	5.00	4.87	42.5	394	50.0	6.75
01372040	NY	3	17.3	41.790	73.931	13.00	16.30	7.32	40.0	300	76.0	9.77
01372200	NY	3	92.4	41.815	73.764	13.80	34.70	4.80	40.0	360	61.0	2.06
01372300	NY	3	32.9	41.806	73.794	16.20	12.60	7.58	40.0	328	71.0	7.98
01372500	NY	3	181	41.650	73.870	29.10	12.60	5.74	40.5	284	60.0	4.68
01372800	NY	3	57.3	41.573	73.807	20.30	17.40	6.30	42.5	265	60.0	7.19
01373500	NY	3	190	41.510	73.950	30.10	10.70	7.86	43.0	344	59.0	4.77
01373690	NY	3	11.2	41.367	74.105	5.10	51.50	6.25	44.5	532	66.0	2.32
01374130	NY	3	8.30	41.379	73.873	7.64	118.00	6.99	46.0	576	87.0	7.03
01374250	NY	3	14.9	41.388	73.813	6.92	82.80	7.45	46.5	540	90.0	3.21
01374440	NY	3	17.3	41.227	73.984	8.00	157.00	5.30	44.5	482	47.0	3.70
01374460	NY	3	5.86	41.204	74.032	5.70	23.90	11.20	45.0	626	32.0	5.54
01376280	NY	3	10.7	41.029	73.926	7.00	42.40	3.90	45.0	56	20.0	4.58
01376690	NY	3	6.90	41.126	73.957	3.00	57.30	11.20	44.0	201	29.0	1.31

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01384500	NJ	3	19.1	41.130	74.260	10.20	62.00	7.10	44.0	560	90.0	5.45
01387250	NY	3	60.1	41.169	74.191	17.70	16.70	8.50	46.0	477	78.0	5.21
01387300	NY	3	18.2	41.162	74.186	6.90	107.00	6.09	46.0	662	97.0	2.62
01387350	NY	3	5.40	41.154	74.194	3.35	101.60	9.53	46.0	500	93.0	2.06
01387410	NY	3	2.60	41.140	74.160	2.90	248.00	4.89	47.0	660	99.0	3.16
01387450	NY	3	12.3	41.140	74.120	6.65	28.30	5.10	45.5	150	36.0	3.60
01387500	NJ	3	120	41.100	74.160	22.80	17.20	7.53	46.0	442	77.0	4.41
01387880	NJ	3	6.76	41.029	74.237	5.50	27.40	8.80	47.0	313	74.0	4.02
01390500	NJ	3	21.6	40.980	74.090	10.00	37.90	4.60	44.0	219	53.0	4.63
01413500	NY	4A	163	42.140	74.650	19.40	15.20	0.40	44.0	1,422	85.0	2.31
01414000	NY	4A	35.0	42.130	74.690	11.70	91.50	0.01	43.0	1,658	78.0	3.91
01414500	NY	4A	25.2	42.110	74.730	10.50	120.50	0.17	46.0	1,932	93.0	4.37
01415000	NY	4A	33.2	42.120	74.820	9.70	60.70	0.95	43.0	1,595	71.0	2.83
01415500	NY	4A	13.6	42.131	74.900	5.60	114.00	0.14	42.5	1,588	99.0	2.31
01417185	NY	4A	0.41	42.040	74.980	0.90	435.00	0.01	43.0	1,750	100.0	1.98
01417500	NY	4A	458	42.020	75.120	54.40	9.80	0.26	43.5	1,255	84.0	6.48
01418000	NY	4A	40.8	42.035	74.732	13.40	65.90	0.90	51.0	2,180	95.0	4.40
01418500	NY	4A	81.9	41.960	74.870	22.30	52.70	0.72	48.5	1,932	96.0	6.07
01419500	NY	4A	62.6	41.900	74.810	14.20	64.10	1.70	54.0	1,858	99.0	3.22
01420000	NY	4A	20.1	41.870	74.800	8.10	83.80	3.79	49.0	1,760	82.0	3.26
01420500	NY	4A	241	41.950	74.980	33.20	33.40	1.99	49.5	1,742	94.0	4.57
01421000	NY	4A	784	41.970	75.170	62.20	9.30	0.88	45.5	1,225	86.0	4.93
01422000	NY	5	142	42.270	74.920	25.50	21.50	0.40	42.0	1,575	63.0	4.58
01422500	NY	5	49.7	42.250	74.900	14.60	57.60	0.36	42.5	1,720	74.0	4.29
01423000	NY	5	332	42.170	75.140	42.60	13.10	0.36	42.0	1,448	67.0	5.47
01423500	NY	5	8.10	42.120	75.250	5.40	148.00	0.68	42.0	1,535	91.0	3.60
01424000	NY	5	20.0	42.180	75.280	7.00	117.30	0.28	42.0	1,518	69.0	2.45
01424500	NY	5	49.5	42.100	75.320	13.80	50.90	0.20	42.0	1,325	78.0	3.85
01425500	NY	5	1.49	42.160	75.390	2.00	326.00	0.01	42.0	1,730	60.0	2.68
01425675	NY	5	4.69	42.174	75.440	3.55	118.00	2.13	42.0	1,668	77.0	2.69

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01426000	NY	5	67.6	42.060	75.430	17.00	40.80	0.58	42.0	1,392	81.0	4.28
01426500	NY	5	595	42.000	75.390	73.40	9.30	0.48	42.0	1,260	73.0	9.05
01427500	NY	4A	110	41.760	75.050	19.00	37.90	2.61	43.0	1,140	62.0	3.28
01428000	NY	4A	45.6	41.560	75.020	13.30	29.00	5.87	41.5	1,005	86.0	3.88
01435000	NY	4	66.6	41.890	74.590	15.10	70.60	0.37	57.5	1,500	98.0	3.42
01436500	NY	4	113	41.757	74.599	29.40	31.00	1.15	54.0	1,205	96.0	7.65
01437000	NY	4	223	41.500	74.650	49.90	27.20	4.68	48.5	1,385	84.0	11.22
01437500	NY	4	307	41.440	74.600	55.10	28.60	7.42	47.0	1,225	90.0	9.89
01440000	NJ	3	64.0	41.107	74.952	23.80	37.60	1.50	44.5	655	86.0	8.85
01496370	NY	5	10.4	42.850	75.000	7.03	49.30	12.00	41.5	1,440	22.0	4.75
01496500	NY	5	102	42.666	74.960	27.50	12.30	8.00	42.5	1,248	29.0	7.41
01497500	NY	5	349	42.500	74.980	35.60	3.00	7.40	42.0	1,192	53.0	3.63
01497800	NY	5	54.2	42.546	74.833	17.90	43.20	1.00	42.0	1,540	14.0	5.91
01497805	NY	5	3.73	42.630	74.800	4.68	148.00	0.27	42.5	1,810	23.0	5.87
01498500	NY	5	167	42.440	74.960	25.00	28.30	1.29	41.5	1,478	43.0	3.74
01499000	NY	5	108	42.450	75.110	26.10	18.70	1.31	41.5	1,246	33.0	6.31
01500500	NY	5	982	42.320	75.320	62.70	3.40	3.77	41.5	1,110	63.0	4.00
01501000	NY	5	199	42.640	75.320	32.00	7.50	1.29	41.5	1,184	33.0	5.15
01501015	NY	5	4.64	42.626	75.329	3.87	132.80	0.86	40.5	1,324	25.0	3.23
01501140	NY	5	2.02	42.710	75.220	3.35	130.00	4.45	42.0	1,480	34.0	5.56
01501500	NY	5	0.70	42.530	75.420	1.30	318.00	0.01	41.0	1,604	100.0	2.41
01502000	NY	5	59.7	42.550	75.240	21.10	27.80	1.07	42.0	1,352	42.0	7.46
01502500	NY	5	520	42.380	75.410	57.00	4.80	1.33	42.0	1,109	33.0	6.25
01502701	NY	5	1,716	42.227	75.524	79.63	3.68	3.12	41.5	1,080	58.8	3.70
01502714	NY	5	3.37	42.170	75.680	3.45	130.00	1.19	40.0	1,540	27.0	3.53
01503000	NY	5	2,232	42.040	75.800	121.80	3.60	2.64	41.0	1,012	53.0	6.65
01503960	NY	5	7.21	42.880	75.640	7.09	60.70	1.53	40.5	1,460	31.0	6.97
01503980	NY	5	24.3	42.851	75.606	10.40	30.10	6.36	41.0	1,318	41.0	4.45
01505000	NY	5	263	42.680	75.510	23.80	14.60	5.24	40.5	1,182	48.0	2.15
01505017	NY	5	5.80	42.610	75.530	7.40	97.80	0.21	41.0	1,360	28.0	9.28

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01505500	NY	5	57.9	42.560	75.550	9.80	65.40	0.79	43.0	906	50.0	1.66
01507000	NY	5	593	42.320	75.770	64.30	5.70	3.60	41.0	1,046	60.0	6.97
01507500	NY	5	82.3	42.390	75.800	16.10	40.60	2.84	42.5	1,272	58.0	3.15
01508000	NY	5	2.95	42.770	76.020	2.50	193.00	0.06	43.5	1,492	92.0	2.12
01508500	NY	5	6.81	42.670	76.100	5.70	108.00	0.01	43.0	1,440	21.0	4.77
01508803	NY	5	71.5	42.638	76.177	14.31	6.20	3.64	41.5	1,157	37.0	2.86
01508946	NY	6	2.85	42.590	76.230	3.50	112.00	1.75	41.0	1,410	12.0	4.30
01509000	NY	5	292	42.600	76.160	31.50	6.30	2.85	42.0	1,230	49.0	3.40
01510000	NY	5	147	42.540	75.900	30.40	16.20	0.64	43.5	1,240	44.0	6.29
01510500	NY	5	217	42.420	75.950	40.10	15.00	1.69	43.0	1,206	61.0	7.41
01510610	NY	5	5.32	42.470	75.990	4.85	82.50	0.01	42.5	1,320	36.0	4.42
01511500	NY	5	730	42.300	75.910	58.50	6.60	2.37	42.0	1,100	53.0	4.69
01512500	NY	5	1,483	42.220	75.850	74.10	4.70	2.94	41.5	1,024	57.0	3.70
01513500	NY	5	3,941	42.090	76.060	139.70	3.20	2.67	41.0	998	58.0	4.95
01513712	NY	6	1.70	42.280	76.050	2.17	144.00	0.59	37.5	1,260	21.0	2.77
01513790	NY	6	90.7	42.149	76.067	17.92	28.57	1.05	37.0	1,070	33.0	3.54
01514000	NY	6	185	42.130	76.270	30.30	14.30	0.27	40.0	1,020	51.0	4.96
01515000	PA	6	4,773	41.980	76.500	148.90	3.40	2.70	40.5	960	60.0	4.65
01516500	PA	6	12.2	41.790	77.010	6.69	50.40	0.02	34.5	1,498	27.0	3.65
01516800	PA	6	3.01	41.820	77.100	3.38	153.80	0.01	34.0	1,392	32.0	3.80
01517000	PA	6	10.2	41.810	76.970	7.77	100.00	0.10	35.0	1,722	29.0	5.92
01518000	PA	6	282	41.908	77.130	29.80	44.00	1.01	37.0	1,548	63.0	3.15
01518500	PA	6	122	41.900	77.150	23.00	27.80	1.00	36.0	1,305	32.0	4.34
01520000	PA	6	298	41.984	77.152	37.30	20.10	0.01	34.5	1,278	29.0	4.67
01520500	NY	6	771	42.030	77.130	44.80	24.40	0.10	36.0	1,447	44.0	2.60
01521596	NY	6	6.32	42.370	77.580	3.95	97.90	0.47	33.5	1,660	28.0	2.47
01522500	NY	6	27.4	42.310	77.750	7.20	72.20	0.22	35.5	1,678	60.0	1.89
01523500	NY	6	57.9	42.335	77.683	12.74	62.45	0.57	35.0	1,520	52.0	2.80
01526000	NY	6	114	42.070	77.280	17.50	35.80	0.18	33.0	1,383	26.0	2.69
01526500	NY	6	1,377	42.120	77.130	52.40	17.10	0.10	34.5	1,354	37.0	1.99

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
01527000	NY	7	52.2	42.500	77.500	17.40	29.90	3.43	34.0	1,489	31.0	5.80
01528000	NY	6	66.8	42.390	77.360	20.10	12.60	1.08	34.0	1,305	28.0	6.05
01529500	NY	6	470	42.250	77.220	43.40	10.20	1.76	33.5	1,232	49.0	4.01
01530301	NY	6	5.39	42.180	76.930	3.70	175.00	0.74	34.0	1,380	70.0	2.54
01530500	NY	6	77.5	42.100	76.800	18.90	45.20	1.70	35.0	1,123	28.0	4.61
01531000	NY	6	2,506	42.000	76.630	88.50	7.23	1.53	34.5	1,120	43.0	3.13
01531250	PA	6	8.83	41.840	76.827	5.41	46.60	0.01	35.0	1,248	25.0	3.31
01533250	PA	6	11.8	41.710	76.120	5.80	73.30	1.87	38.0	1,084	40.0	2.85
03008000	PA	6	7.79	41.890	78.350	5.70	87.60	0.01	39.0	1,661	52.0	4.17
03010500	PA	6	550	41.960	78.390	47.60	11.20	1.00	39.0	1,620	87.0	4.12
03010800	NY	6	198	42.120	78.420	33.50	5.60	1.52	38.5	1,550	62.0	5.67
03011000	NY	6	137	42.178	78.694	21.50	17.40	0.93	41.0	1,578	75.0	3.37
03011020	NY	6	1,608	42.156	78.716	77.50	5.50	0.72	39.5	1,540	68.0	3.74
03011800	NY	6	46.4	41.766	78.719	17.30	35.40	1.47	41.0	1,818	92.0	6.45
03013000	NY	6	290	42.170	79.070	28.90	4.20	3.69	42.5	1,302	47.0	2.88
03013800	NY	6	9.06	42.150	79.410	5.72	32.40	0.55	41.0	1,398	42.0	3.71
03015390	PA	6	12.3	41.940	79.640	8.07	50.40	1.54	41.5	1,586	58.0	5.29
04213040	PA	6	2.53	41.940	80.450	2.77	57.50	3.30	38.0	790	51.0	3.03
04213200	PA	6	9.16	42.098	80.076	8.43	54.20	0.00	38.0	973	30.0	7.76
04213490	NY	6	25.1	42.365	78.802	10.00	48.90	2.10	46.0	1,498	37.0	3.98
04213500	NY	6	436	42.470	78.940	48.50	22.30	2.20	41.5	1,240	49.0	5.40
04214040	NY	6	8.32	42.629	79.054	6.90	32.90	1.61	38.0	730	42.0	5.72
04214200	NY	6	37.2	42.684	78.778	13.50	35.10	0.97	40.0	1,004	59.0	4.90
04214250	NY	6	14.3	42.822	78.803	11.20	34.40	1.09	37.0	754	41.0	8.77
04214400	NY	6	76.9	42.748	78.509	22.10	29.00	3.30	38.5	1,161	37.0	6.35
04214410	NY	6	14.0	42.740	78.550	8.80	39.40	0.50	39.5	1,190	45.0	5.53
04214500	NY	6	142	42.850	78.760	35.00	18.40	1.93	38.0	883	37.0	8.63
04214980	NY	6	24.0	42.879	78.607	14.30	37.60	0.87	36.5	934	40.0	8.52
04215000	NY	6	96.4	42.890	78.650	23.70	29.30	0.79	36.0	974	37.0	5.83
04215500	NY	6	135	42.830	78.780	33.00	28.40	0.64	39.0	1,012	54.0	8.07

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
04216400	NY	6	23.7	42.718	78.322	8.70	89.40	5.00	37.0	1,586	51.0	3.19
04216418	NY	6	76.9	42.864	78.284	22.59	28.16	2.18	36.5	1,224	58.0	6.64
04216500	NY	6	22.1	42.880	78.160	7.40	28.80	1.68	35.0	1,174	48.0	2.48
04216875	NY	6	1.02	42.940	78.160	1.73	46.20	0.01	33.5	985	27.0	2.93
04217000	NY	6	171	43.000	78.190	35.30	16.10	5.57	35.5	1,158	45.0	7.29
04217500	NY	7	231	43.091	78.454	40.30	18.20	6.89	35.0	945	39.0	7.03
04217700	NY	6	43.6	42.994	78.436	21.20	20.90	7.82	35.0	999	31.0	10.31
04218000	NY	7	349	43.093	78.635	64.40	10.80	7.92	34.5	836	36.0	11.88
04218518	NY	6	81.6	42.978	78.764	38.30	7.70	3.37	35.0	778	35.0	17.98
04219645	NY	6	4.88	43.230	79.020	5.15	15.50	0.20	29.5	330	20.0	5.41
04219738	NY	6	2.53	43.210	78.780	4.38	68.50	0.40	30.0	508	7.0	3.34
04219900	NY	6	87.7	43.339	78.349	23.90	7.90	6.30	31.0	424	14.0	6.51
04219922	NY	7	6.48	43.100	78.150	5.80	21.80	1.85	31.5	752	8.0	5.19
04220150	NY	7	157	43.207	78.386	36.10	4.10	13.40	31.5	662	16.0	8.30
04221500	NY	6	308	42.160	77.980	25.80	22.60	1.27	36.5	1,684	49.0	2.16
04221769	NY	6	10.7	42.270	78.220	5.98	75.80	4.43	37.0	1,630	33.0	3.34
04222600	NY	6	22.0	42.583	78.238	5.60	14.00	5.00	38.5	1,728	46.0	1.43
04223000	NY	6	984	42.570	78.050	72.00	8.80	1.12	36.5	1,358	38.0	5.27
04224700	NY	6	10.0	42.514	77.803	5.90	89.30	0.01	34.5	1,622	71.0	3.48
04224775	NY	6	88.9	42.536	77.704	22.54	32.05	0.40	33.5	1,059	40.0	5.71
04224807	NY	6	3.15	42.471	77.672	2.97	170.72	0.32	32.0	1,610	35.0	2.80
04224900	NY	6	4.22	42.520	77.585	3.40	194.10	3.71	33.5	1,732	38.0	2.74
04225000	NY	6	152	42.560	77.720	22.70	33.50	0.84	33.0	1,018	55.0	3.39
04226000	NY	6	68.3	42.681	77.829	22.10	39.90	0.47	32.5	990	42.0	7.15
04227500	NY	7	1,424	42.770	77.840	96.40	13.30	1.63	35.5	1,074	52.0	6.53
04229500	NY	7	196	42.957	77.589	33.00	8.30	5.63	33.0	760	50.0	5.56
04230380	NY	7	39.1	42.744	78.138	11.50	58.00	0.79	35.0	1,270	33.0	3.38
04230500	NY	7	200	43.010	77.790	50.00	34.40	5.61	32.0	896	27.0	12.50
04231000	NY	7	130	43.100	77.880	32.60	18.00	9.16	30.5	785	14.0	8.18
04231040	NY	7	4.57	43.060	77.874	6.32	11.80	9.85	29.5	650	12.0	8.74

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
04232000	NY	7	2,467	43.180	77.630	158.50	8.13	3.17	33.5	1,006	41.0	10.18
042320527	NY	7	1.95	43.246	77.445	4.15	37.80	0.51	32.0	391	36.0	8.83
042320578	NY	7	6.74	43.225	77.283	4.87	13.70	2.23	32.5	455	18.0	3.52
04232071	NY	7	1.07	43.210	76.990	1.74	23.00	0.01	35.0	380	56.0	2.83
04232087	NY	7	2.90	43.230	76.710	3.58	16.80	1.03	37.0	392	21.0	4.42
04232100	NY	7	44.4	43.325	76.647	11.60	11.30	9.68	37.5	349	43.0	3.03
04232460	NY	7	28.9	42.623	77.158	9.40	30.50	3.43	32.5	862	39.0	3.06
04232630	NY	7	13.8	42.849	76.892	9.20	21.20	0.65	33.0	590	9.0	6.13
04233000	NY	6	35.2	42.390	76.540	8.40	77.20	2.49	34.5	732	55.0	2.00
04233255	NY	6	86.7	42.427	76.522	11.58	67.17	1.44	34.0	688	42.0	1.55
04233310	NY	6	42.0	42.409	76.454	13.85	66.70	0.91	37.5	1,114	50.0	4.57
04233676	NY	6	20.7	42.488	76.302	11.58	41.36	0.14	40.0	1,302	14.0	6.48
04233700	NY	6	40.3	42.505	76.350	15.15	33.71	0.59	39.5	1,240	20.0	5.70
04234000	NY	6	126	42.450	76.470	31.90	15.90	3.30	39.0	1,122	35.0	8.08
042340202	NY	7	1.36	42.540	76.591	3.25	156.00	1.47	35.0	790	28.0	7.77
042340588	NY	7	1.76	42.911	76.663	3.43	81.60	8.52	35.0	610	10.0	6.68
04234138	NY	7	7.84	42.910	77.370	8.25	37.20	0.01	33.0	945	27.0	8.68
04234200	NY	7	64.2	42.974	77.382	26.50	18.60	1.34	33.0	852	39.0	10.94
04234363	NY	7	0.58	43.050	77.050	1.02	39.20	0.01	32.5	510	7.0	1.79
04235250	NY	7	102	42.958	77.068	42.20	12.50	4.13	33.5	865	34.0	17.46
04235255	NY	7	2.94	43.010	77.020	3.40	19.60	0.68	32.5	530	13.0	3.93
04235276	NY	7	19.0	42.990	76.800	14.10	8.98	3.42	34.0	448	18.0	10.46
04235300	NY	6	106	42.718	76.438	17.50	21.70	2.12	38.0	872	40.0	2.89
04242500	NY	1	188	43.300	75.620	40.80	37.00	12.85	52.0	1,288	76.0	8.85
04242795	NY	1	1.34	43.330	75.530	2.63	60.80	12.70	48.5	1,010	51.0	5.16
04243500	NY	7	113	43.100	75.640	24.20	46.80	2.83	39.5	870	30.0	5.18
04245000	NY	7	85.5	43.030	76.010	29.80	37.60	3.35	41.0	935	36.0	10.39
04245200	NY	7	32.2	42.934	76.062	13.90	48.00	1.61	41.0	1,018	50.0	6.00
04245840	NY	1	38.4	43.260	76.003	13.10	13.70	31.56	42.5	481	49.0	4.47
04249050	NY	1	31.7	43.483	76.326	20.20	3.60	21.99	40.5	414	50.0	12.87

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
042490673	NY	1	11.2	43.492	76.095	7.22	22.20	12.10	46.0	535	53.0	4.65
04250750	NY	1	128	43.813	76.075	27.40	25.80	5.62	42.5	830	42.0	5.87
04252500	NY	2	304	43.510	75.310	37.10	28.10	8.58	50.0	1,439	90.0	4.53
04254500	NY	1	363	43.610	75.110	45.00	8.90	11.09	47.5	1,744	88.0	5.58
04256000	NY	1	88.7	43.750	75.330	25.40	38.90	13.16	46.0	1,502	86.0	7.27
04256040	NY	1	1.66	43.760	75.520	3.21	204.00	0.01	44.0	1,540	11.0	6.21
04258700	NY	1	94.8	43.930	75.592	31.50	38.10	10.98	51.5	1,340	63.0	10.47
04260575	NY	1	4.59	44.080	76.060	3.43	7.77	0.87	36.5	340	14.0	2.56
04262500	NY	2	244	44.190	75.330	36.00	26.70	12.21	43.5	1,102	88.0	5.31
04263000	NY	2	965	44.600	75.380	128.00	13.20	11.61	40.5	936	68.0	16.84
04263445	NY	2	1.56	44.430	75.540	3.82	29.70	1.92	35.5	422	99.0	9.35
04264300	NY	1	27.0	44.828	75.076	16.40	3.60	31.14	32.0	304	30.0	9.96
04264700	NY	2	46.3	44.429	75.052	20.50	27.40	11.38	39.0	1,151	99.0	9.08
04265000	NY	2	333	44.520	75.200	51.80	25.40	9.90	40.0	1,020	87.0	8.06
04265100	NY	1	32.6	44.437	75.214	9.70	8.50	10.00	39.0	579	74.0	2.89
04265200	NY	1	30.3	44.484	75.258	15.70	17.00	11.20	38.0	577	50.0	8.13
04265300	NY	1	42.4	44.540	75.116	9.80	40.10	1.40	37.0	542	73.0	2.27
04267600	NY	2	18.7	44.494	74.870	8.30	57.80	10.53	39.0	1,200	95.0	3.68
04267700	NY	1	16.8	44.653	74.971	10.60	47.20	2.42	36.0	610	82.0	6.69
04267800	NY	1	54.2	44.792	75.033	24.00	8.70	7.97	34.0	330	47.0	10.63
04268200	NY	1	43.9	44.879	74.914	21.50	11.60	15.56	33.0	312	51.0	10.53
04268720	NY	1	20.0	44.683	74.701	7.40	57.30	12.57	38.0	1,041	87.0	2.74
04268800	NY	1	171	44.598	74.739	38.50	15.20	21.71	40.0	1,320	77.0	8.67
04269000	NY	1	612	44.860	74.780	66.80	25.60	14.88	38.5	940	76.0	7.29
04269050	NY	1	16.0	44.802	74.728	12.10	56.50	7.00	35.0	578	22.0	9.15
04269100	NY	1	25.7	44.839	74.596	13.10	57.70	2.83	35.0	620	63.0	6.68
04269500	NY	1	182	44.890	74.690	51.80	30.90	7.94	36.5	844	75.0	14.74
04270000	NY	2	132	44.756	74.219	22.80	16.50	9.46	40.0	1,431	96.0	3.94
04270100	NY	1	32.4	44.947	74.480	15.40	27.60	2.68	33.0	366	52.0	7.32
04270150	NY	1	23.9	44.948	74.464	17.90	53.10	2.72	33.5	582	47.0	13.41

Table 10. -- Selected basin characteristics for gaging stations used in the study (continued).

[Locations shown on pl. 2. mi^2 = square miles; mi = miles; ft = feet; in. = inches; elevations are in feet above sea level.]

Station Number	State	Hydrologic region	Drainage area (mi^2)	Latitude (decimal degrees)	Longitude (decimal degrees)	Main-channel stream length (mi)	Main channel slope (ft/mi)	Basin storage (percent)	Mean annual precipitation (in)	Average channel elevation (ft)	Forested area (percent)	Basin shape index (mi/mi)
04270162	NY	2	7.11	44.787	74.370	3.67	149.00	7.88	36.5	1,180	75.0	1.89
04270200	NY	2	92.2	44.940	74.557	31.90	45.80	3.63	34.5	743	70.0	11.04
04270700	NY	2	107	44.990	74.299	26.90	62.40	2.06	35.0	863	74.0	6.76
04270800	NY	1	40.8	44.976	73.664	15.00	52.00	5.95	32.0	758	77.0	5.51
04271500	NY	2	247	45.000	73.501	42.40	32.50	5.30	33.0	718	73.0	7.28
04273500	NY	2	608	44.680	73.470	80.30	19.20	11.94	35.5	992	80.0	10.61
04273700	NY	2	61.9	44.640	73.495	19.80	54.60	1.81	32.0	668	87.0	6.33
04274000	NY	2	116	44.311	73.917	19.40	75.70	5.67	42.0	2,209	87.0	3.24
04275000	NY	2	198	44.440	73.680	35.00	53.50	1.04	40.5	1,279	94.0	6.19
04275500	NY	2	448	44.450	73.640	34.30	56.20	3.12	39.0	1,365	88.0	2.63
04276200	NY	2	37.6	44.164	73.608	14.60	173.10	0.77	38.0	1,592	98.0	5.67
04276500	NY	2	275	44.360	73.400	40.20	42.20	3.12	34.0	742	86.0	5.88
04278300	NY	2	23.4	43.663	73.604	4.90	250.00	3.58	37.0	1,180	96.0	1.03

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