Flood of January 19-20, 1996 in New York State

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 97-4252

Prepared in cooperation with the
NEW YORK STATE DEPARTMENT OF TRANSPORTATION

USGS
science for a changing world

(Cover photograph by G.K. Butch (USGS) showing Mohawk River at Cohoes Falls on January 21, 1996. USGS gaging station in foreground.)

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By Richard Lumia

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Albany, New York
1998

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CONTENTS

FIGURES

TABLES

CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
	Length	
inch (in.)	25.4	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
million gallons (Mgal)	3,785	cubic meter
billion gallons (Bgal)	3.785×10^6	cubic meter
	Flow rate	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
cubic foot per second per square mile [$(ft^3/s)/mi^2$]	0.01093	cubic meter per second per square kilometer
	Air Temperature	
degrees Fahrenheit (° F)	° C=5/9 (° F -32)	degrees Celsius (° C)

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

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ABSTRACT

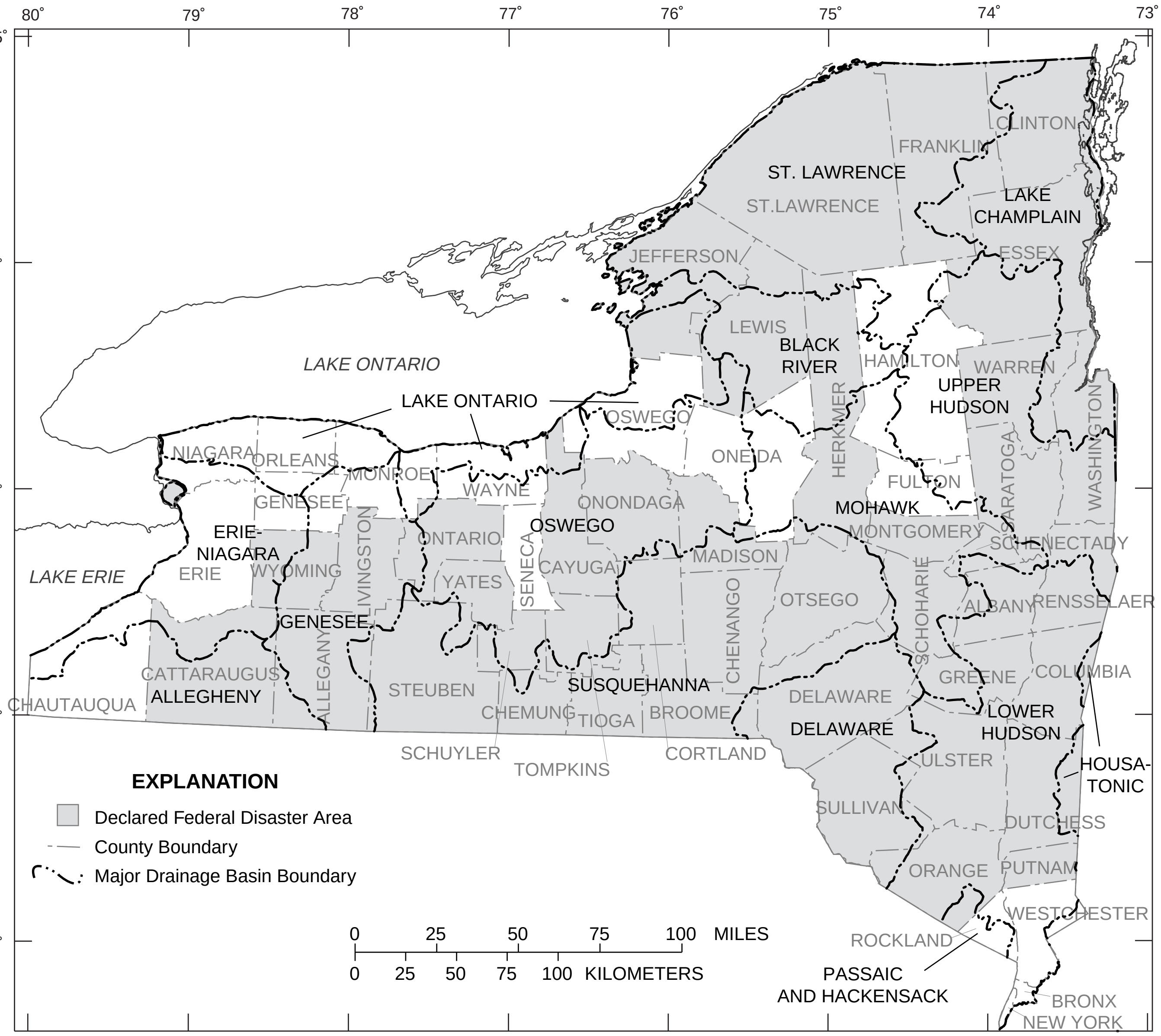
Heavy rain during January 18-19, 1996, combined with unseasonably warm temperatures that caused rapid snowmelt, resulted in widespread flooding throughout New York State. Damages to highways, bridges, and private property exceeded $100 million. The storm and flooding claimed 10 lives, stranded hundreds of people, destroyed or damaged thousands of homes and businesses, and closed hundreds of roads. Forty-one counties in New York were declared federal disaster areas. The most severely affected region was within and surrounding the Catskill Mountains. Damages and losses within Delaware County alone exceeded $20 million.

More than 4.5 inches of rain fell on at least 45 inches of melting snow in the Catskill Mountain region during January 18-19 and caused major flooding in the area. The most destructive flooding was along Schoharie Creek and the East and West Branches of the Delaware River. Record peak discharges occurred at 57 U.S. Geological Survey streamflow-gaging stations throughout New York. Maximum discharges at 15 sites, mostly within the Schoharie Creek and Delaware River basins, had recurrence intervals equal to or greater than 100 years. The storage of significant amounts of floodwater in several reservoirs sharply reduced peak discharges downstream. This report presents a summary of peak stages and discharges, precipitation maps, floodflow hydrographs, inflow-outflow hydrographs for several reservoirs, and flood profiles along 83 miles of Schoharie Creek from its headwaters in the Catskill Mountains to its mouth at the Mohawk River.

INTRODUCTION

Precipitation from a strong storm during January 18-20, 1996, combined with unseasonably warm temperatures that caused rapid snowmelt, resulted in extensive flooding throughout New York State. Damage to highways, bridges, and private property exceeded $100 million (Federal Emergency Management Agency, 1997). The storm and flooding claimed 10 lives, stranded hundreds of people, destroyed or damaged thousands of homes and businesses, and closed hundreds of roads. Forty-one counties in New York were declared Federal disaster areas (fig. 1A and table 1). The most severely affected region was within and surrounding the Catskill Mountains in southeastern New York (fig. 1B). Damages and losses within Delaware County alone exceeded $20 million.

The more than 4.5 inches of rain that fell on the Catskill Mountain region during January 18-19 (fig. 2), combined with melting of as much as 45 in. of snow (fig. 3), resulted in major flooding throughout the region. Other areas of the State also underwent major flooding as a result of similar conditions. Ice and debris contributed to the flooding where they became jammed at culverts, bridges, and natural constrictions within stream channels. The most destructive flooding was along Schoharie Creek and the East and West Branches of the Delaware River in southeastern New York (fig. 4). Record peak discharges occurred at 57 U.S. Geological Survey (USGS) streamflow-gaging stations throughout New York. Peak discharges at 15 sites had recurrence intervals equal to or greater than 100 years. Most sites at which these peak discharges occurred were within the Schoharie Creek and Delaware River basins. Reservoirs throughout New York, particularly those within the Catskill Mountain region, stored large amounts of floodwater, and, thus, sharply reduced peak discharges downstream. This study was done in cooperation with New York State Department of Transportation (NYSDOT).

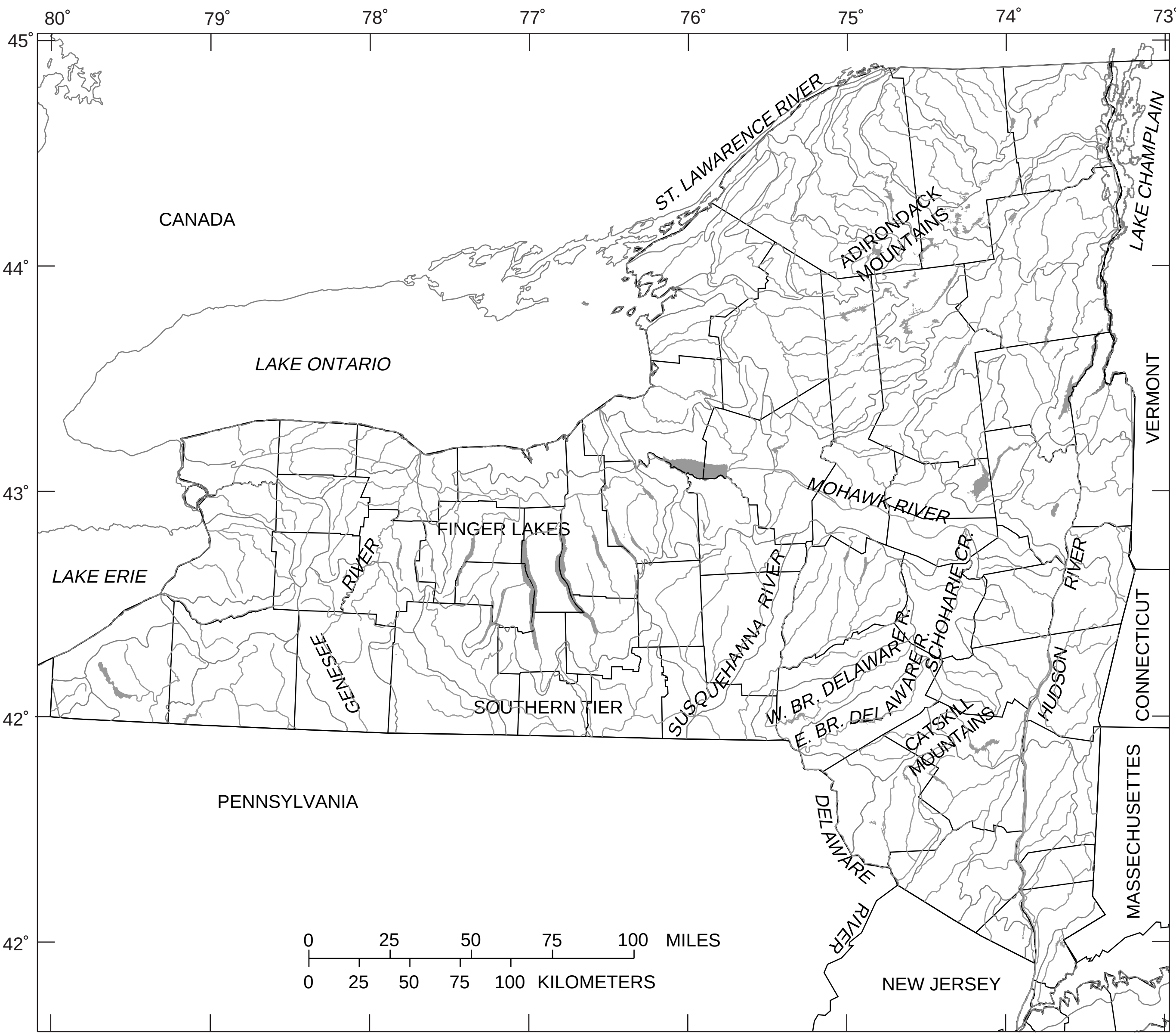


Base from U.S. Geological Survey
State base map. 1974

Figure 1A. Major drainage basins, and Federal disaster areas after the flooding of January 19-20, 1996 in New York. (Disaster areas from Federal Emergency Management Agency, 1997).

Purpose and Scope

This report, (1) describes the physiography and climate of New York and the Catskill Mountain region, and (2) documents the January 19-20, 1996 storm and subsequent flooding. It contains several tables and illustrations with data on precipitation, stages and discharges, and reservoir-storage information, and includes a series of flood profiles showing water-surface elevations along the 83-mile reach of Schoharie Creek from its headwaters in the Catskill Mountains to the mouth.



Base from U.S. Geological Survey
State base map, 1974.

Figure 1B. Selected geographic features of New York.

Acknowledgments

Most of the information presented here was provided by the Hudson River-Black River Regulating District, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, New York State Department of Environmental Conservation, New York State Department of Transportation, New York City Department of Environmental Protection, New York Power Authority, New York State Emergency Management Office, New York Canal Corporation, Federal Emergency Management Agency, Niagara Mohawk Power Corporation, the Reporter (Walton, N.Y.), the Daily Star (Oneonta, N.Y.), and several other local agencies and private organizations.

Table 1. Disaster assistance, for Counties in New York, following the floods of January 19-20, 1996.

[Data from Federal Emergency Management Agency, 1997. Locations shown in fig. 1A.]

County	Individual assistance	Public assistance	County	Individual assistance	Public assistance
Albany	$344,692	$4,275,852	Onondaga	N/A	$1,080,049
Allegany	639,703	3,852,852	Ontario	N/A	1,027,244
Broome	694,033	3,204,820	Otsego	$230,359	2,146,718
Cattaraugus	897,839	1,926,839	Orange	1,295,374	3,700,640
Cayuga	177,715	461,846	Putnam	313,995	1,517,966
Chemung	970,257	3,598,677	Rensselaer	288,803	4,600,449
Chenango	385,699	1,437,151	Saratoga	328,494	1,336,113
Clinton	210,916	498,824	Schenectady	303,655	2,069,700
Columbia	169,960	3,109,401	Schoharie	1,161,161	2,122,731
Cortland	611,343	1,511,746	Schuyler	N/A	504,936
Delaware	2,196,575	18,926,212	St. Lawrence	N/A	288,916
Dutchess	741,321	2,690,079	Steuben	936,896	5,166,423
Essex	245,288	1,075,742	Sullivan	460,402	5,695,752
Franklin	N/A	522,439	Tioga	957,662	4,526,105
Greene	916,839	4,446,055	Tompkins	260,554	1,258,344
Herkimer	N/A	1,605,615	Ulster	823,163	5,703,246
Jefferson	N/A	481,392	Warren	N/A	1,009,564
Lewis	N/A	610,555	Washington	N/A	2,996,427
Livingston	N/A	715,493	Wyoming	N/A	104,307
Madison	69,052	603,085	Yates	N/A	941,792
Montgomery	65,682	375,150			
			Total	$16,697,432	$103,727,247

NOTE: Individual assistance figures include temporary housing and individual and family grants. Public assistance figures reflect total project costs (75% Federal share plus 25% state and local share). N/A =Not Available.

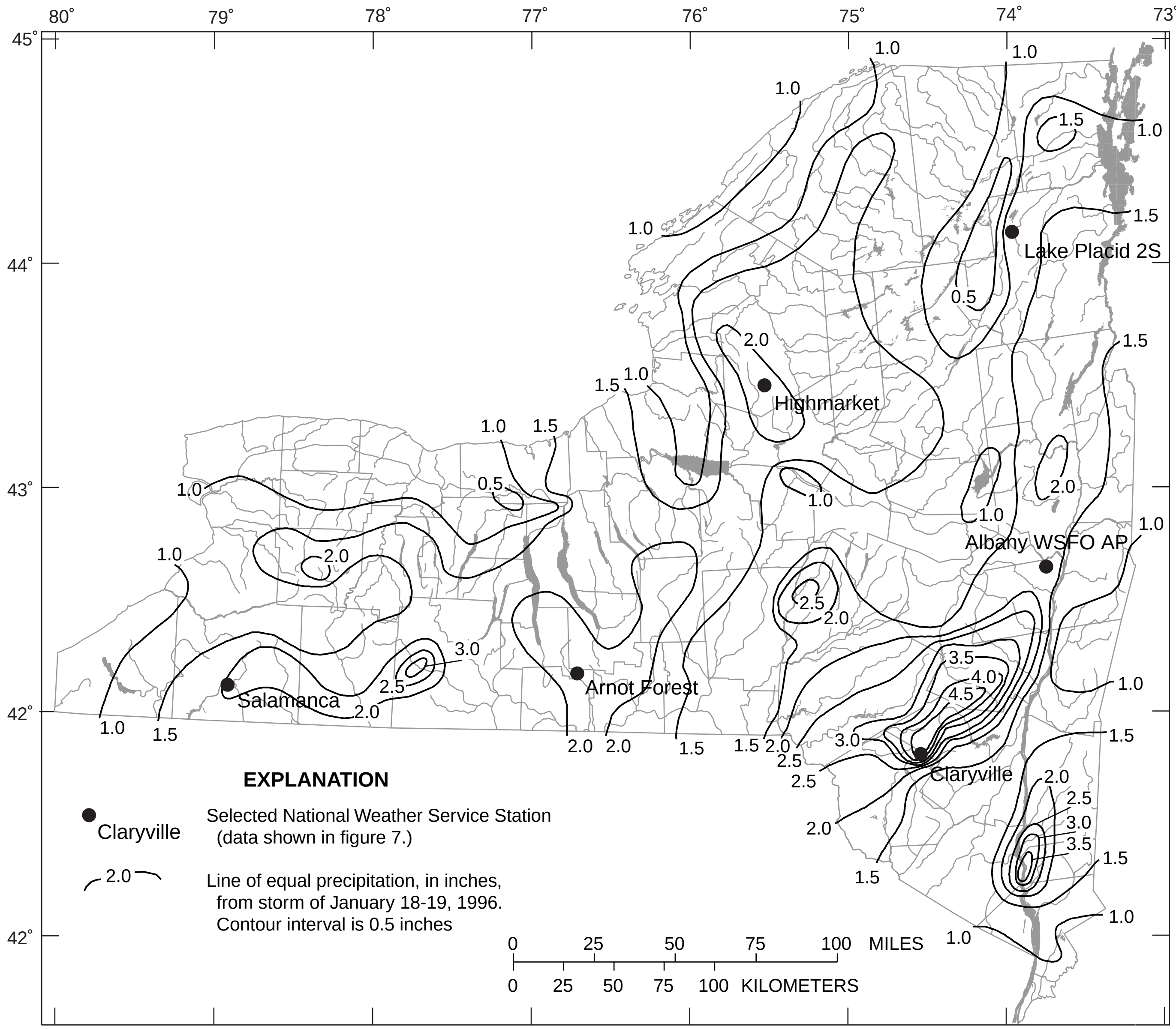
Special thanks are extended to USGS personnel (too numerous to list) for data collection under adverse field conditions, and to Amanda Ramsey and Kristin Linsey for preparation of illustrations, Patricia Murray for data compilation, and Marie Baldigo for manuscript preparation.

PHYSIOGRAPHY AND CLIMATE OF NEW YORK AND THE CATSKILL MOUNTAIN REGION

New York encompasses several types of physiographic settings and this variety affects the climate locally. The physiography and climate, in turn, strongly influence the hydrology of the area.

Physiography

Extensive areas of level and rolling plains border Lakes Erie, Ontario, and Champlain and flank the St. Lawrence and the Mohawk River Valleys. The principal mountain ranges in New York are the Adirondacks in the north (fig. 1B), where some of the peaks exceed 5,000 ft above sea level, and the Catskill Mountains in the southeast, which reach to 4,200 ft above sea level. The Southern Tier region, in western New York, has fairly high relief, whereas the Finger Lakes region (fig. 1B) is generally flat and drains mostly north to Lake Ontario. Most of Long Island consists of relatively flat coastal plain underlain by glacial outwash and experienced no significant



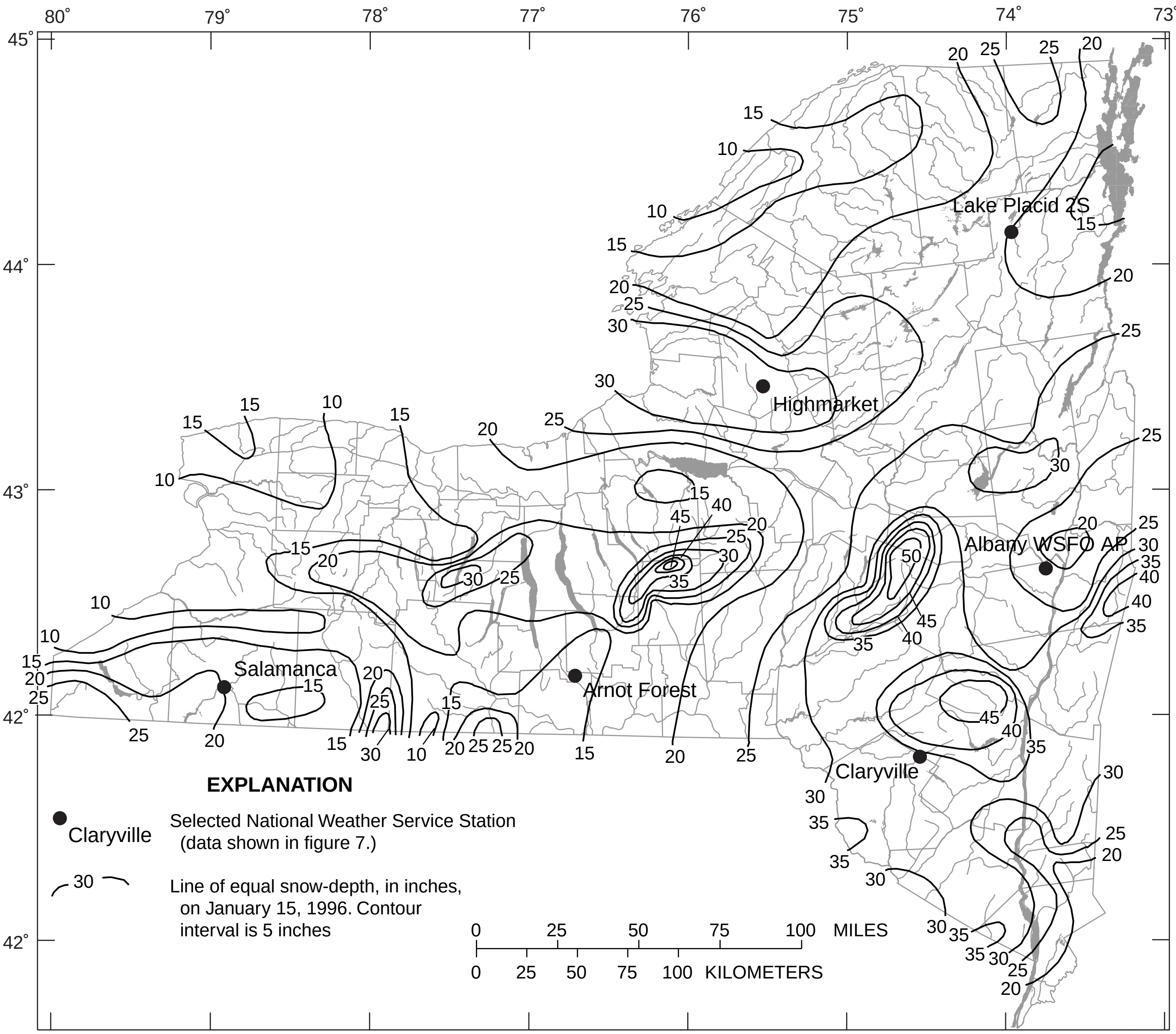
Base from U.S. Geological Survey
State base map. 1974

Figure 2. Lines of equal precipitation from the storm of January 18-19, 1996 in New York. (Data from National Oceanic and Atmospheric Administration, 1996).

flooding during January 19-20, 1996 and therefore is not discussed herein.

The most severe flooding was within and around the Catskill Mountain region, which contains steep mountains with narrow, steep-sided, V-shaped valleys. The peaks range in elevation from 500 to 4,200 ft above sea level. Bedrock is exposed in many places, and the glacially derived soil is thin and has little water-storage capacity, although it supports forest growth in most places. The Catskill Mountains separate three major river drainage basins—the Hudson, the Delaware, and the Susquehanna (fig. 4). The most severe flooding was within the Hudson and Delaware River basins.

Major streams originating in the Catskill Mountains and draining to the Hudson River include



Base from U.S. Geological Survey
State base map. 1974

Figure 3. Lines of equal snow depth on January 15, 1996 in New York. (Data from National Oceanic and Atmospheric Administration, 1996).

Catskill Creek, Esopus Creek, Rondout Creek, and Schoharie Creek (fig. 4). *Catskill Creek* drains east to the Hudson River, as does *Esopus Creek*, which feeds Ashokan Reservoir, built in 1913; 60 percent of the 425-mi^2 drainage area of Esopus Creek is upstream from the reservoir. *Rondout Creek* and its major tributary, *Walkill River*, have a total drainage area of 1,197 mi^2. Rondout Creek feeds Rondout Reservoir, which was built in 1951 and is a holding reservoir for New York City. This reservoir also receives water from Neversink, Pepacton, and Cannonsville Reservoirs through a network of tunnels. The lower most 4 mi of Rondout Creek are tidal (Zembrzuski and Evans, 1989).

Schoharie Creek drains part of the northern slopes of the Catskills. It flows north for 83 miles

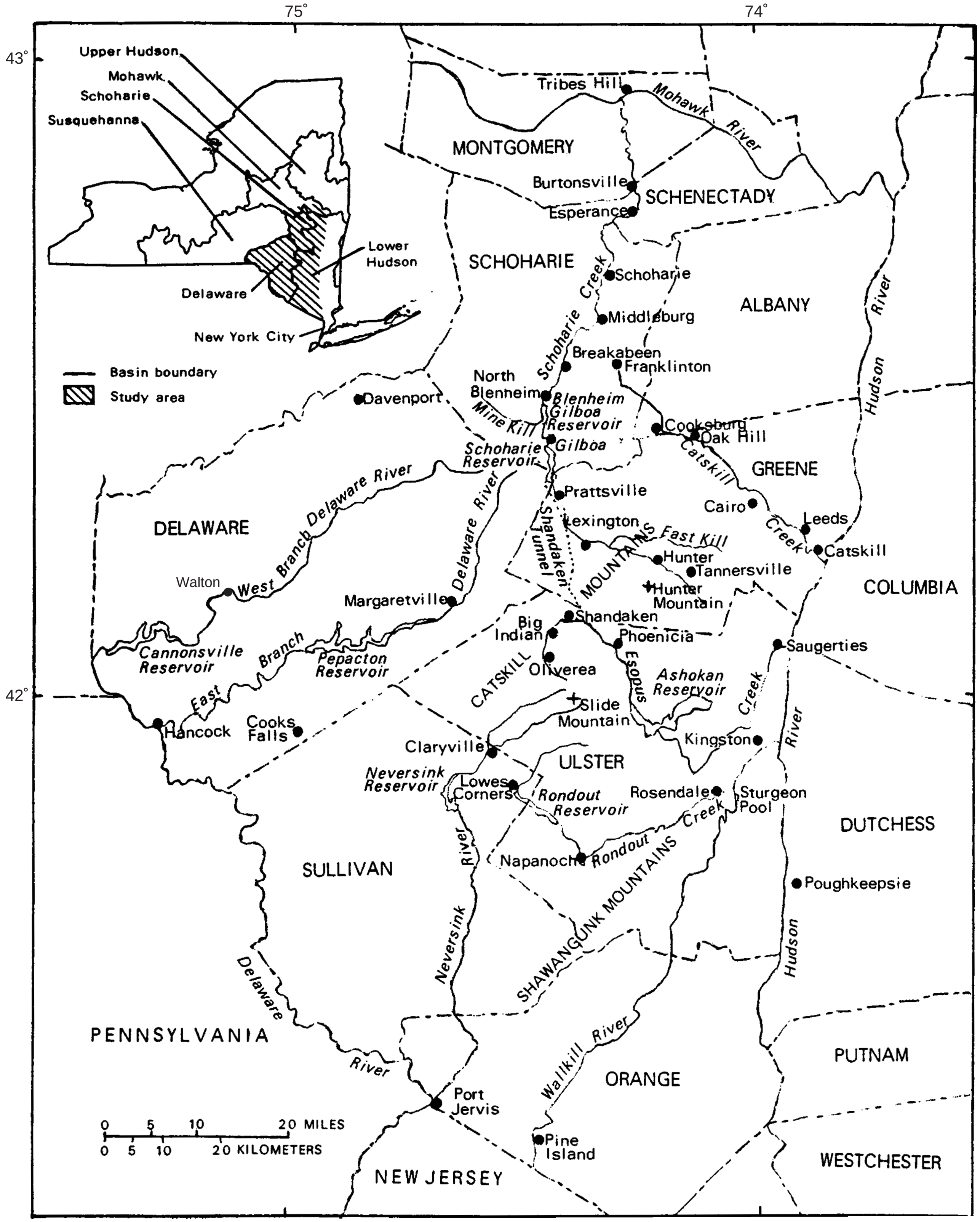


Figure 4. Major geographic features of the Catskill Mountain region in southeastern New York.

through wooded, mostly undeveloped land (923-mi^2 drainage area) to become a major tributary to the Mohawk River, and passes through the Schoharie Reservoir and the Blenheim-Gilboa Reservoir. The Schoharie Reservoir was built in 1926 and has a drainage area of 315 mi^2. The Blenheim-Gilboa Reservoir, 5.5 mi downstream, is a pumped-storage hydroelectric project where inflows are generally passed through without modification.

The *Delaware River* has its headwaters in the Catskill Mountains. The basin is 260 mi long and drains a 12,765-mi^2 area, 2,362 mi^2 of which are in New York State. The river flows southwestward in two branches, the East and West, which converge at Hancock. The main stem then flows southeastward, forming the New York-Pennsylvania border, then southward past New Jersey and Delaware to the Atlantic Ocean. The part of the Delaware River basin that lies in New York contains three major reservoirs (fig. 4) that supply water to New York City and serve to augment low flows of the Delaware River: these are Pepacton Reservoir, built in 1954 on the East Branch; Cannonsville Reservoir, built in 1963 on the West Branch; and Neversink Reservoir, built in 1953 on the Neversink River. Reservoirs are discussed in detail further on.

The *Neversink River* (fig. 4) is a major tributary to the Delaware River and has a drainage area of 346 mi^2. It flows southeastward from its headwaters near Slide Mountain as two branches that converge at Claryville. About 3 mi downstream it flows into Neversink Reservoir (92.5 mi^2), then southward to Port Jervis to join the Delaware River.

Climate

The climate of New York is the humid continental type; cool, dry airmasses move generally eastward through the State throughout the year, and warm, humid, maritime tropical airmasses 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.

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 wide 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. 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 small drainage basins, is generally caused by summer thunderstorms. Occasional hurricanes cause severe flooding, particularly in the southeastern parts of the State.

STORM AND FLOODS OF JANUARY 19-20, 1996

Precipitation from a strong storm during January 18-20, 1996, combined with unseasonably warm temperatures and rapidly melting snow, caused extensive flooding throughout New York State (excluding Long Island). The heaviest total rainfall, more than 4.5 in., fell over the Catskill Mountain region and, accompanied by meltwater from as much as 45 in. of snow, caused record flooding on several streams. Although flooding was widespread, the most severely affected region was within and surrounding the Catskill Mountains (fig. 4).

Antecedent Conditions

Antecedent conditions throughout much of New York were generally conducive to heavy runoff from the storm, particularly in areas within and surrounding the Catskill Mountains. A classic Nor'easter, known as "the Blizzard of '96," had brought heavy snow to southeastern New York and southern New England on January 7-8, 1996, when more than 2 ft of snow fell across southeastern New York, including the Catskill Mountains, and two additional storms on January 10 and 12 left almost another 2 ft of snow over many parts of the State, including the Catskill Mountain region. By January 15, as much as 52 in. of snow was reported on the ground in eastern New York, and at least 45 in. in the Catskills (fig. 3).

The first half of January was generally much colder than normal; therefore, the snowpack lost little moisture, and the ground was mostly frozen. Although the fall of 1995 was wet, and streamflows throughout most of the State were above normal, below-normal temperatures from mid-December through mid-January reduced streamflows to much below normal during the period. Daily discharges for two streams originating in the Catskill Mountains (fig. 5) indicate relatively large runoff from October 1995 through early December and below-normal runoff during the month preceding the flood.

Drought conditions during the summer of 1995 left most reservoirs across the State at much below normal capacity by early October; the seven reservoirs that form the New York City reservoir water-supply system were at 51 percent of capacity on October 1. (Normal is 75 percent.) Most of the runoff to these reservoirs (except the Croton Reservoir system east of the Hudson River in Westchester County, fig. 4) originates in the Catskill Mountains. The status of each reservoir from October through January is given in table 2.

The below-normal streamflow conditions prior to the flooding of January 19-20, 1996, and the large storage available in the reservoirs during the flood, helped reduce flooding and damage in the Catskill Mountain region and in many parts of the State. The effects of reservoirs on flooding are discussed further on.

Precipitation

Unseasonably warm air ahead of a storm spread over New York on January 18-19; temperatures

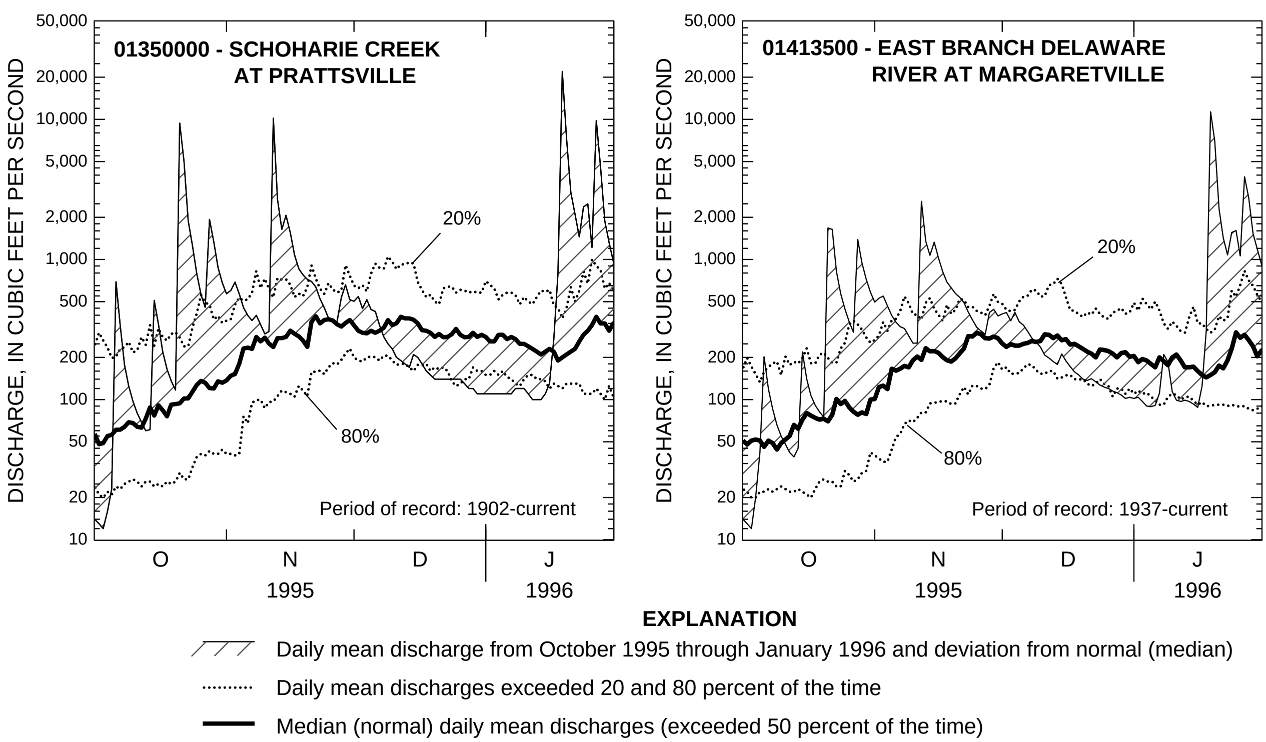


Figure 5. Daily mean discharges of two Catskill Mountain streams from October 1995 through January 1996., in relation to daily mean flows exceeded 20, 50, and 80 percent of the time. (Locations are shown in fig. 10.)

Table 2. Storage above minimum operating level * in the New York City reservoir system, October 1995 through January 1996

[All values are in percent of reservoir capacity. NA = not available. Data from New York City Department of Environmental Protection, written commun., 1996.]

Reservoir	Date (month, day, year)				
	10/1/95	11/1/95	12/1/95	1/16/96	2/1/96
Schoharie	21.8	101	101	98.5	101
Ashokan	56.7	62.5	76.2	71.0	101
Croton System	73.2	79.2	91.5	86.6	98.3
Rondout	85.6	87.8	87.7	82.0	88.4
Neversink	25.3	42.7	63.5	54.3	87.8
Pepacton	46.3	46.6	59.8	57.6	91.1
Cannonsville	25.1	39.5	63.5	65.4	103
System total	**51.0**	**59.3**	**73.2**	**N/A**	**96.6**
System normal	**75.0**	**68.8**	**70.8**	**N/A**	**81.7**

* Minimum operating level is the lowest elevation of the reservoir's water surface that will maintain a draft in the withdrawal aqueduct at its operating capacity.

statewide reached the mid-60 °F range, including a 66°F reading at Massena in extreme northern New York, and the heavy rain that followed accelerated the snowmelt. Total storm rainfall for January 18-19, 1996 is shown in figure 2. The heaviest rainfall was in the Catskill Mountain area, where as much as 4.80 in. was recorded at Claryville. Other areas with heavy rainfall were in extreme southeastern New York and in western New York. Less than 1 in. fell in areas just south of Lake Ontario and some parts of extreme northern New York.

Most of the rain fell on January 19. Hourly rainfall at Claryville and the concurrent discharge at the USGS streamflow-gaging station on the Neversink River near Claryville are plotted in figure 6. Rainfall at Claryville for selected durations, as an indication of its intensity, is summarized in table 3, and the recurrence interval, or frequency of these rainfalls for selected durations, are given in table 4. As the data indicate, the intensity of the rainfall was generally low, with less than a 2-year recurrence interval, except for the 24-hour storm (4.30 in. at Claryville), which represents a 4-year recurrence interval. The rapidly melting snow cover was therefore a major contributing factor in the record-breaking flooding in many areas. The accumulated hourly rainfall and associated air temperature and snowpack data at six selected weather stations throughout the State are shown in figure 7. Most of the rain fell on January 19, and temperatures dropped sharply by January 20.

The water equivalent of the snowpack on January 16, 1996 was plotted by New York State Department of Environmental Conservation (NYSDEC) climatologists (G. Playford, written commun., 1996) to help evaluate the effect of the snowpack on the flood runoff, as shown in figure 8. The highest water-content values are in the Catskill Mountains (8.0 in.) and Adirondack Mountains (6.0 in.); the smallest are in the Finger Lakes region and extreme western New York (2.0 in.). Most of the snow melted during the January 18-19 storm period, but more than 1 ft of snow cover remained at high elevations.

Table 3. Maximum rainfall for selected durations recorded at the Claryville, N.Y. weather station during January 18-19, 1996.

[< less than; Rainfall frequencies from U.S. Weather Bureau, 1961. Rainfall data from National Oceanic and Atmospheric Administration, 1996. Location is shown in fig. 2.]

Rainfall duration (hours)	Rainfall *(inches)	Begin date and time of rainfall during the January 1996 storm		Recurrence interval (years)
		Day	Time	
1	0.60	19	6 am	<2
2	1.00	19	5 am	<2
3	1.30	19	4 am	<2
6	2.00	19	3 am	<2
12	3.00	19	5 am	<2
24	4.30	18	11 pm	4

* Based on published hourly data

Flooding

The January 19-20, 1996 flood was the most widespread and devastating flood in New York since the floods resulting from Hurricane Agnes in June 1972. Flooding throughout the State during January 19-20, 1996 caused damage to highways, bridges, and private property in excess of $100 million (State Emergency Management Office and Federal Emergency Management Agency, written commun., 1997). Ten lives were lost during the storm and flooding. The most severely affected region was within and surrounding the Catskill Mountains; damage and losses within Delaware County alone exceeded $20 million. Five members of one family

Table 4. Rainfall-frequency relations for storms of 3-, 6-, 12-, and 24-hour duration at Claryville, NY.

[Data from U.S. Weather Bureau, 1961. Location is shown in fig. 2.]

Recurrence interval (years)	Rainfall, in inches for selected duration			
	3 hours	6 hours	12 hours	24 hours
2	1.9	2.5	3.2	3.5
5	2.5	3.0	4.0	4.6
10	2.9	3.7	4.6	5.6
25	3.4	4.3	5.4	6.5
50	3.8	5.0	6.0	7.3
100	4.1	5.5	6.7	8.1

perished when their car plunged into Chase Brook when part of Chase Brook Road near Cannonsville Reservoir washed out (fig. 9A).

The two areas of Delaware County that were most severely affected by the flooding were Margaretville and Walton, along the East and West Branches of the Delaware River, respectively.Three-fourths of the village of Margaretville (fig. 9B) was heavily damaged, and nine downtown buildings were subsequently condemned; most were along Bridge Street. More than 30 businesses were damaged as was the local high school. Residents described the aftermath of the flooding as "like somebody dropped a bomb" on their village (The Daily Star [Oneonta], 1996).

Walton fared no better. By mid-afternoon on January 19, the town was already inundated by several feet of water (fig. 9C), and the flood did not crest until nearly 10 p.m., leaving the village under 5 ft of water. Businesses along Delaware Street sustained severe damage, including a fire that destroyed two buildings during the peak of the flooding. Several Walton residents indicated that this flood was the highest since the flood of July 1935.

Disastrous flooding also occurred along Schoharie Creek, particularly within Schoharie County (fig. 9D). Two lives were lost in the village of Schoharie, and several houses throughout the County were damaged or destroyed. Hundreds of acres of farmland were reportedly damaged, and more than 100 farm animals were drowned. The floodwaters rose nearly 18 ft on January 19 at Breakabeen, peaking at 7:30 p.m., and near Esperance they rose about 10 ft over 24 hours, peaking at about 5:00 a.m. on January 20.

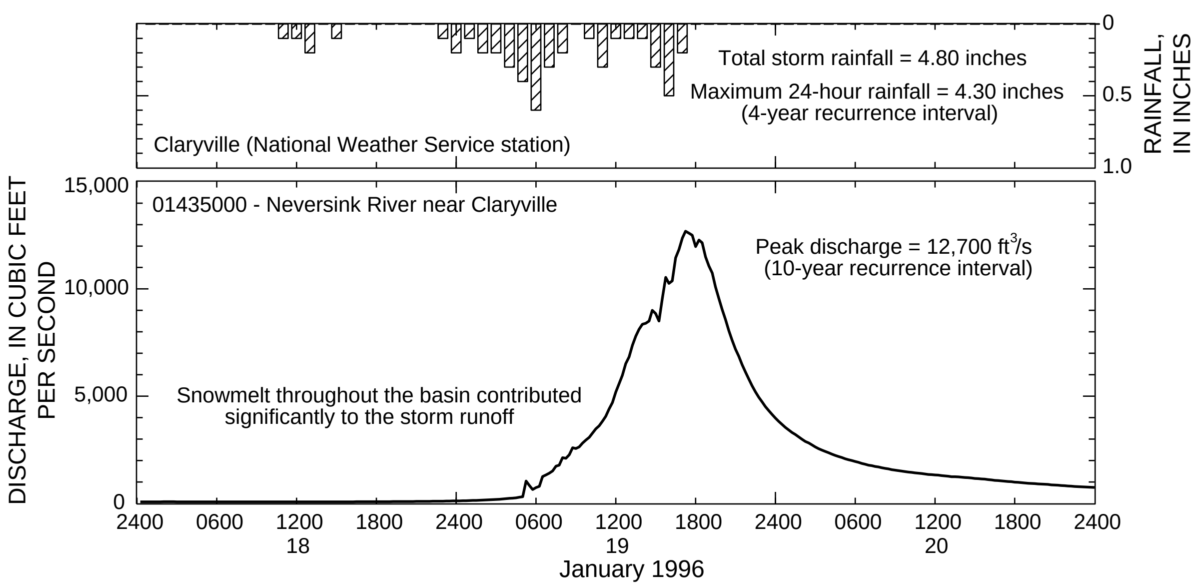


Figure 6. Rainfall and runoff at Claryville, N.Y., during the storm of January 18-20, 1996. (Locations are shown on fig. 2 and 10)

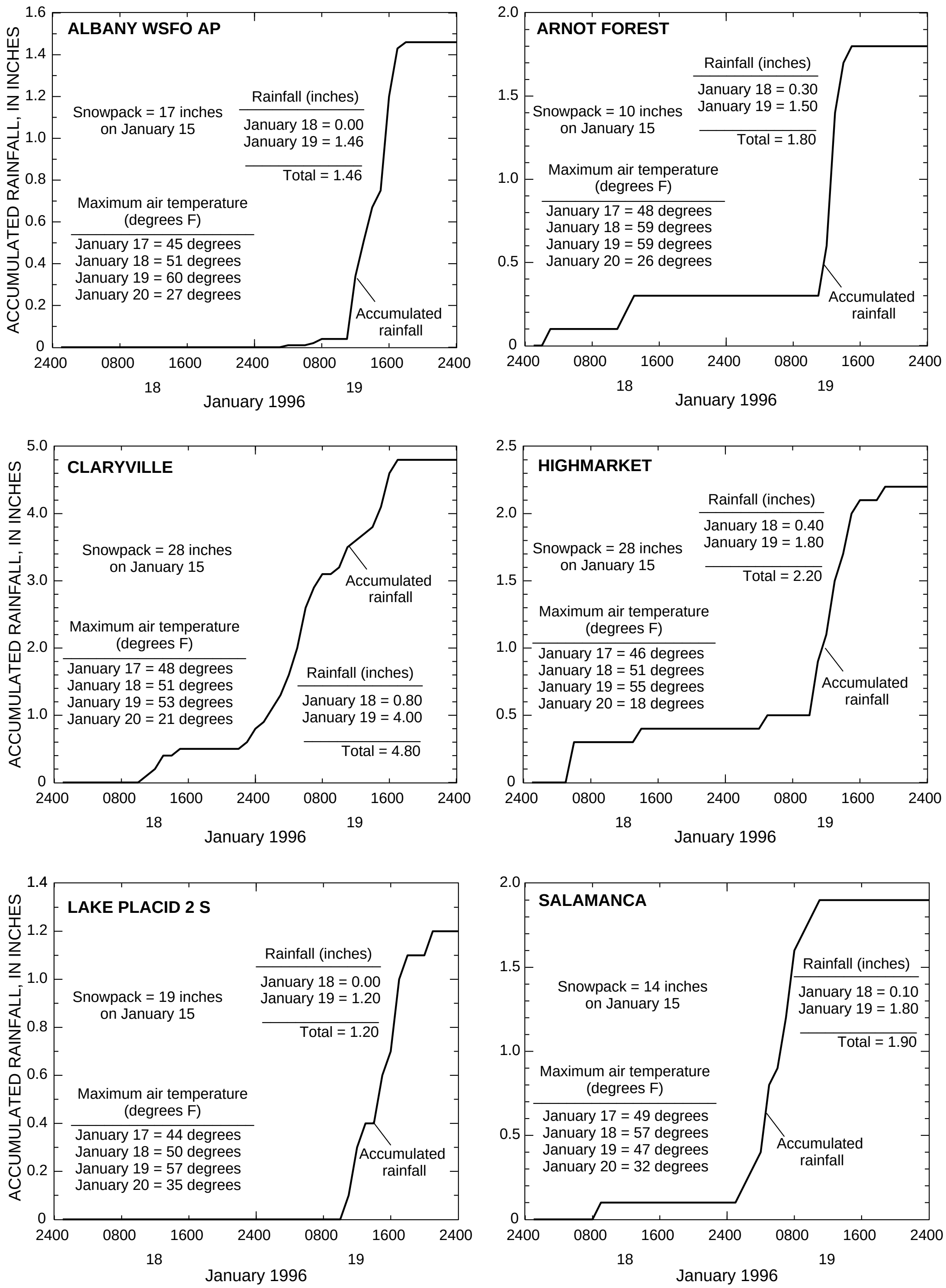


Figure 7. Snow depth, maximum air temperature, and rainfall from six selected National Weather Service stations, January 1996. (Locations are shown in fig. 2. Data from National Oceanic and Atmospheric Administration, 1996)

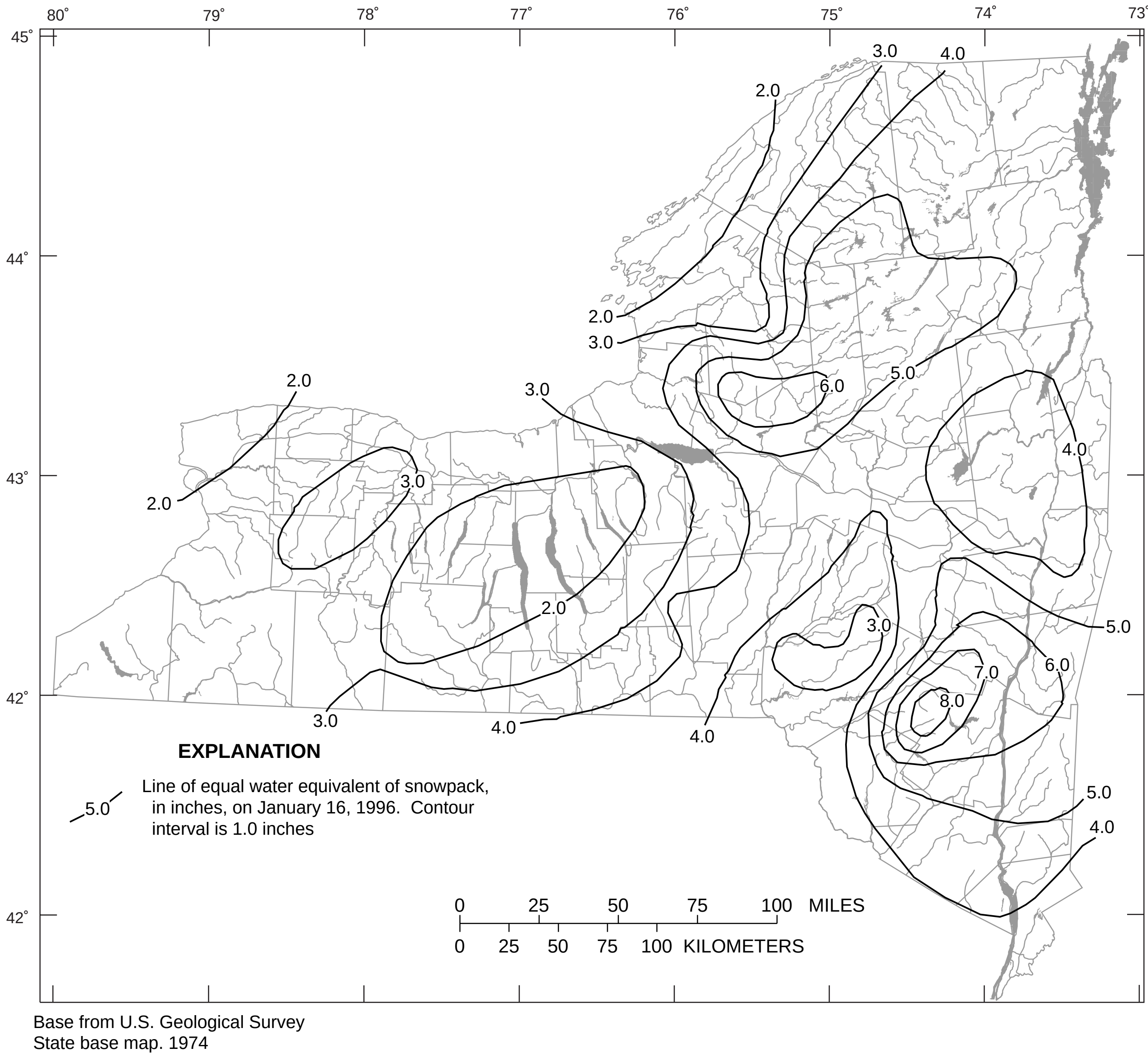


Figure 8. Lines of equal water equivalent of snowpack on January 16, 1996 in New York. (Data from New York State Department of Environmental Conservation, written commun.,1996.)

Flood Discharge and Frequency

Data for the flood of January 19-20, 1996 at 279 USGS streamflow-gaging stations in New York (excluding Long Island) are presented in table 5 (at end of report); locations of these sites are shown in figure 10. Some ungaged, miscellaneous-measurement sites are included and are noted in the table. Table 5 includes station number and name, drainage area, periods of record, historical flood peak data, date of the January 1996 flood peak, gage height, discharge, and peak discharge recurrence interval. If a lake or reservoir was still rising by the end of January 23, that day (or January 24, if the reading was obtained in the morning) is listed. The reason is that smaller storms occurred on January 24 and 27 at most locations and affected the lake or reservoir elevation. Some reservoirs continued to rise through the end of the month (see section "Effect of Reservoirs").

The previous-maximum-of-record column in table 5 may contain more than one entry. The first

Figure 9A. Washout on Chase Brook Road across Chase Brook near Cannonsville Reservoir in Delaware County, N.Y., January 19, 1996. (Photograph courtesy of the Walton Reporter, January 24, 1996, p. 6.)

entry generally includes the maximum known discharge and corresponding gage height; the second gives the previous maximum gage height if it exceeds that in the first entry. Where available and appropriate, the maximum discharge prior to the current degree of regulation and (or) prior to the period of record, is also listed.

Frequency analysis of the gaging-station flood records provides a means of estimating the probability of occurrence of a given discharge. Flood frequency is commonly expressed in terms of “recurrence interval” or “probability of being exceeded.” One is the reciprocal of the other. The 100-year flood, for example, has a probability of 0.01 (1-percent chance)

Figure 9B. Fair Street bridge over the East Branch Delaware River at Margaretville, N.Y. after the flood of January 19. 1996 (Photograph courtesy of the Oneonta Daily Star, January 30, 1996, p. 8.)

of being equaled or exceeded in any given year. These statistics reflect long-term averages; thus, rare (large-magnitude) floods can recur at short intervals, or even within the same year.

Data from sites at which systematic annual flood data have been collected were fitted to a log-Pearson Type III distribution (U.S. Water Resources Council, 1981). Results from these analyses for unregulated streams were combined (weighted) with those of regional flood-frequency analyses (Lumia, 1991) to obtain regionally weighted frequency values. Only the regional equations were used for unregulated sites with less than 10 years of record if data on basin characteristics were available. Recurrence intervals for peak discharges at sites on streams with significant regulation or storage were computed from statistical analyses (log-Pearson Type III) of annual peak discharges during the period of regulation. No adjustments were made for the amount of available storage in the reservoirs before or during floods, nor for changes in regulation procedures during the period of regulation. Other studies, such as flood-insurance studies, and other procedures, can be checked for alternative methods for determining peak-discharge recurrence intervals at these sites. Many of the peak discharges listed in table 5 were estimated because severe ice conditions and ice jamming at these sites prevent accurate computation of discharges (and associated recurrence intervals).The recurrence intervals listed in table 5 are also shown on the map in figure 10; these data indicate that the most severe floods were in the Catskill Mountain area and extended north to the Mohawk River Valley and south to the Delaware River; flooding was moderate to severe in areas along the Southern Tier of western New York as far west as the Genesee River and along several tributaries to Lake Champlain in northeast New York. New peak discharges of record were set at 57 sites, including 21 sites with at least 20 years of record. Maximum discharges during January 19-20,

Figure 9C. West Branch Delaware River overflow at Delaware Street in Walton, N.Y. on January 19, 1996. (Photograph courtesy of the Walton Reporter, January 24, 1996, p.5).

1996 at 15 of the sites listed in table 5 had recurrence intervals equal to or greater than 100 years.

Annual peak discharges through 1996 at 16 selected gaging stations are plotted in figure 11, as are the 10-, 50-, and 100-year discharges at each site and a 15-year weighted moving average of the annual peak discharges, which shows a general trend or pattern of the yearly flows (Helsel and Hirsch, 1995). The trends tend to reflect the dry periods of the 1960’s and 1980’s and the generally above-average flows of the 1970’s. The extremely high flow of January 19-20, 1996 at some locations affected the trend of the early 1990’s.

Relations between drainage area, previous maximum discharges, and peak discharges during January 19-20, 1996 (fig. 12) were assessed to further evaluate the flood data in table 5, particularly for sites within the Catskill Mountain region. Many sites within the Catskill Mountains region recorded peak discharges exceeding the previous known maximums. Most unregulated stream sites within the Schoharie Creek basin and the basins of East and West Branches of the Delaware River indicate record peak flows. The four sites on the main stem of the Delaware River (fig. 12F) show the previous maximum discharges for the current degree of significant regulation or reservoir storage. The three major storage reservoirs in the Delaware River basin are Neversink, Pepacton, and Cannonsville Reservoirs, completed in 1953, 1954, and 1963, respectively. The January 19-20, 1996 peak flows at these four Delaware River gages were much

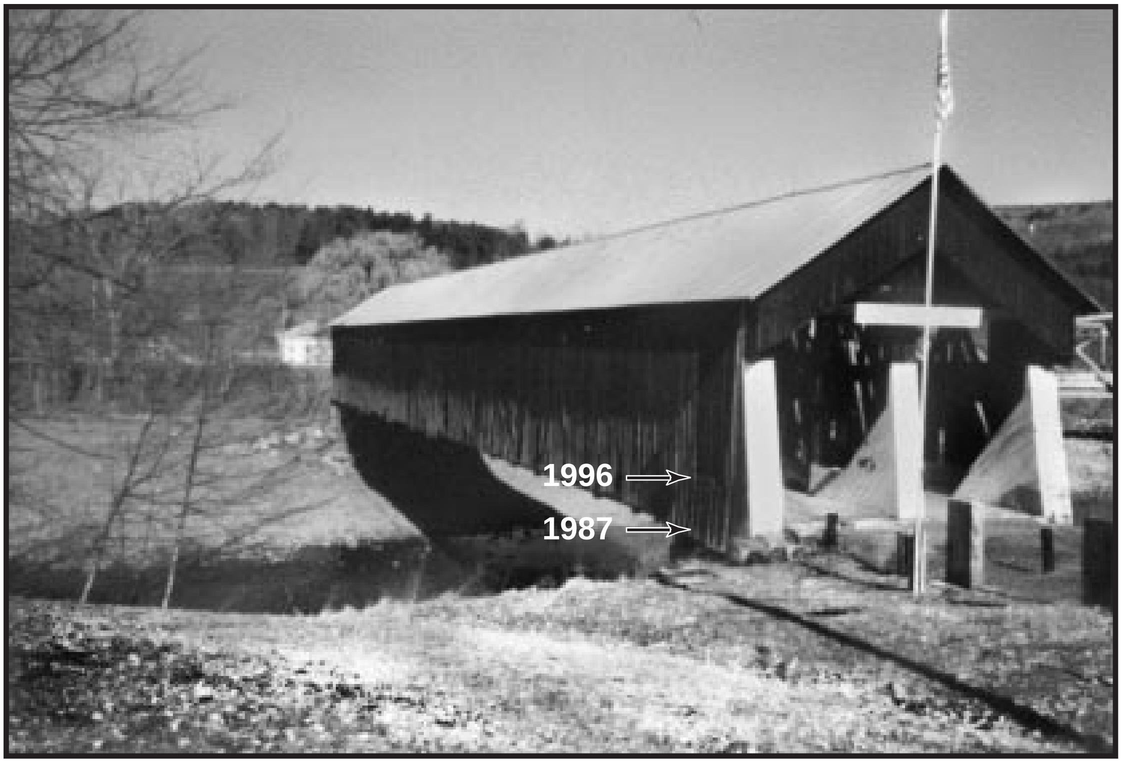


Figure 9D. Covered bridge over Schoharie Creek in North Blenheim, N.Y., with the height of the January 19, 1996 and April 1987 floods. (Photograph by Frank Dalton, U.S. Geological Survey, 1996.)

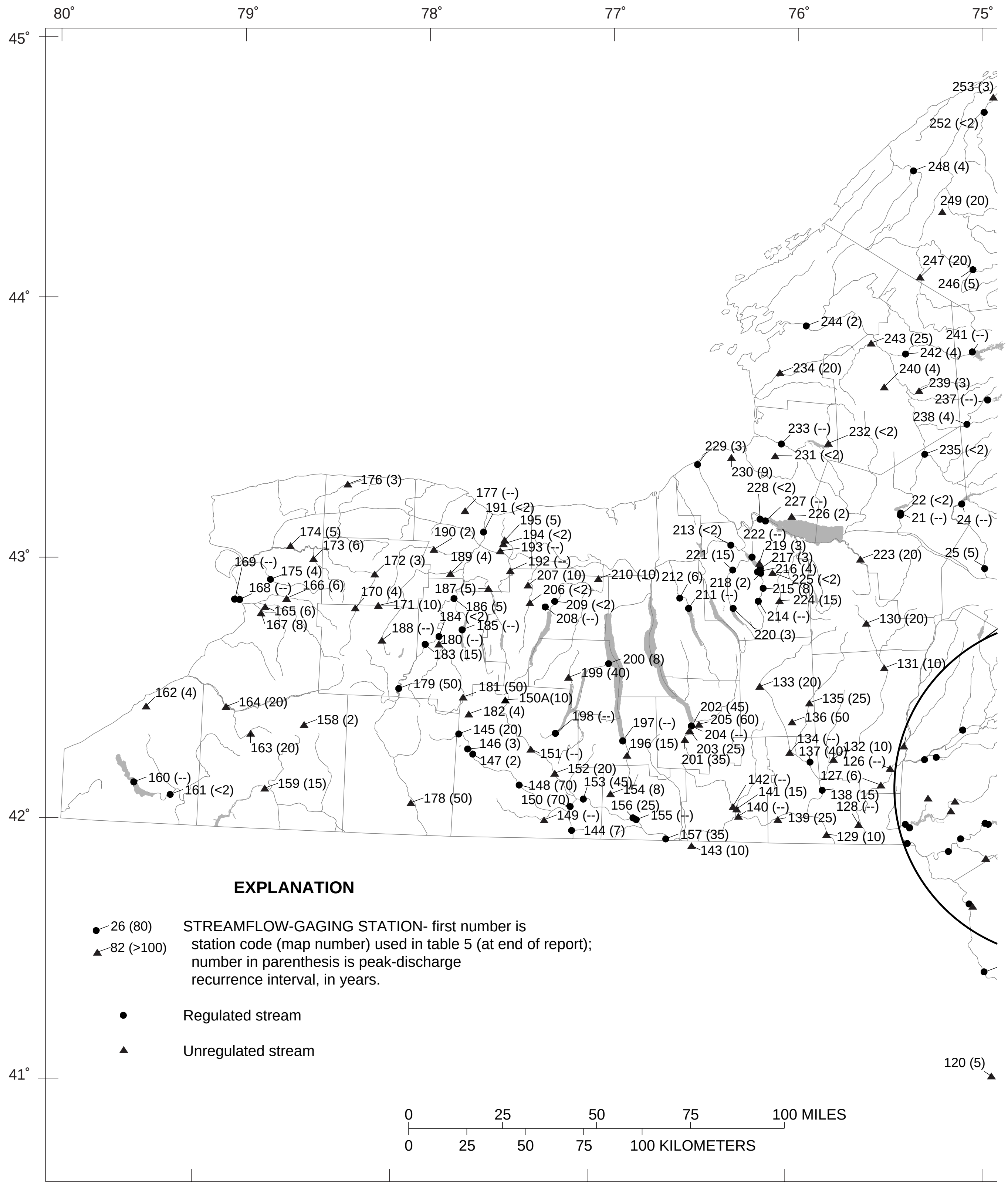
greater than any others recorded in the previous 33 years of current regulation.

Peak discharge of the January 19-20, 1996 flood at gaging stations along the main stem of Schoharie Creek are plotted in figure 13 in relation to drainage area above each site. A general relation is apparent from Prattsville to Breakabeen. From Breakabeen (station 01350355) to Burtonsville (station 01351500), however, the drainage area doubles but the increase in peak discharge is less than 2 percent. This attenuation of the peak discharge is attributed to significant overbank flow and channel storage as well as less runoff per square mile in the lower reaches of Schoharie Creek.

Storm Runoff

Computed volumes of storm runoff at all recording gaging stations in New York (excluding Long Island) during January 18-23, 1996 was computed; results are depicted in figure 14. Flows at most sites were still receding on January 23, but this was used as the end date for comparison purposes because subsequent storms occurred on January 24 and 27. As shown in figure 14, the greatest runoff (more than 6.5 in.) occurred within the Catskill Mountain region, and the smallest (1 in.) occurred south of Lake Ontario and throughout extreme northeastern New York. Other areas of considerable runoff were the western Adirondack Mountain area and the eastern Finger Lakes region (more than 4 in. in each area).

Discharge hydrographs for six sites within the Catskill Mountain region are shown in figure 15; also shown are the hydrographs of the previous maximum flood and the flood of April 4-5, 1987. The time of the peak discharge of each hydrograph was set to match the time of the January 19-20, 1996 peak for plotting purposes and comparison. The January 1996 flood was the largest at each site except for Esopus Creek at Coldbrook, where the March 1980 flood was much larger. The April 1987 flood was the most recent major



Base from U.S. Geological Survey
State base map, 1974.

Figure 10. Locations of streamflow gaging stations and peak discharge recurrence intervals for the floods of January 19-20, 1996 in New York. (Data given in table 5 at the end of the report).

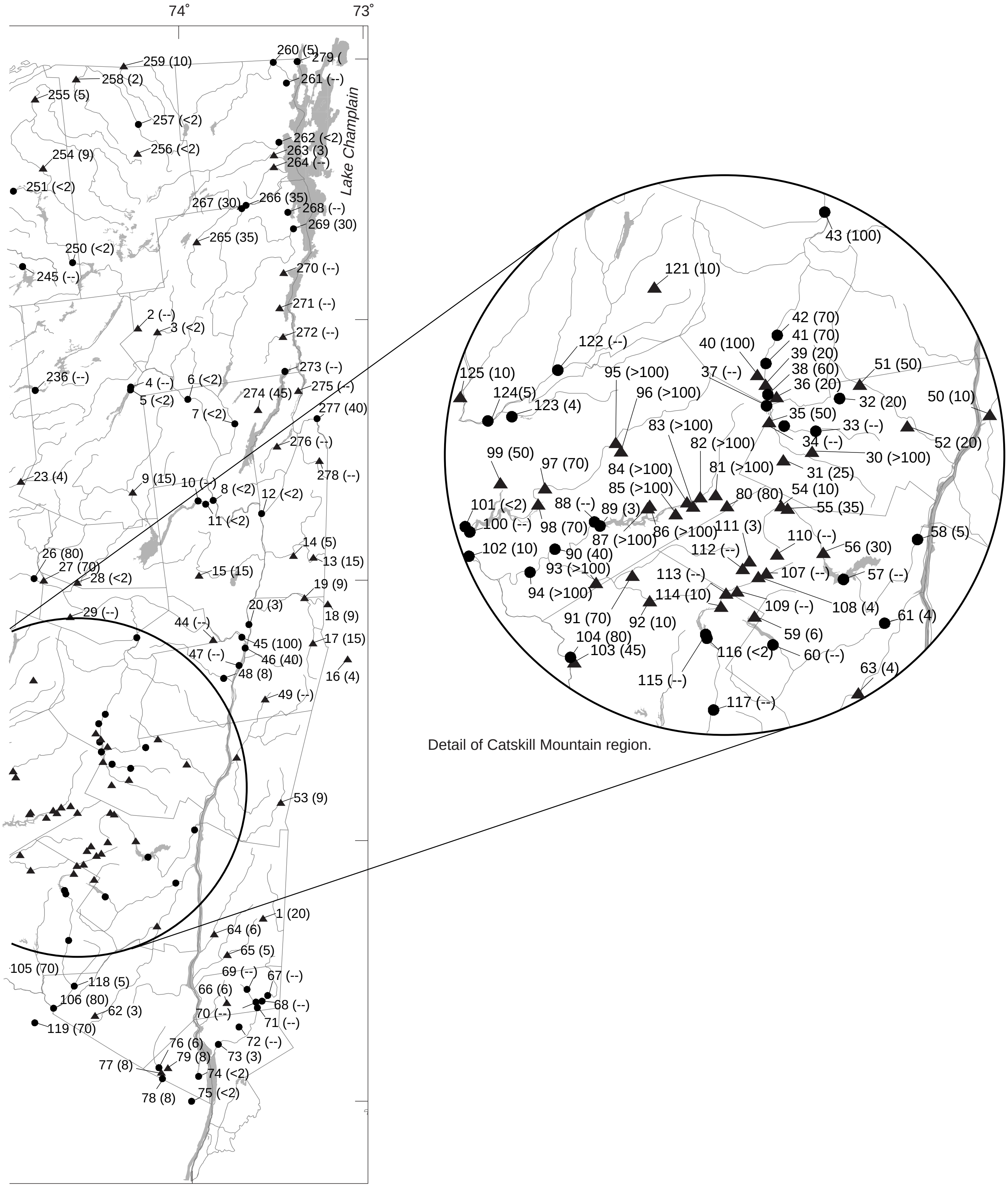


Figure 10. (Continued) Locations of streamflow gaging stations and peak discharge recurrence intervals for the floods of January 19-20, 1996 in New York. (Data given in table 5 at the end of the report).

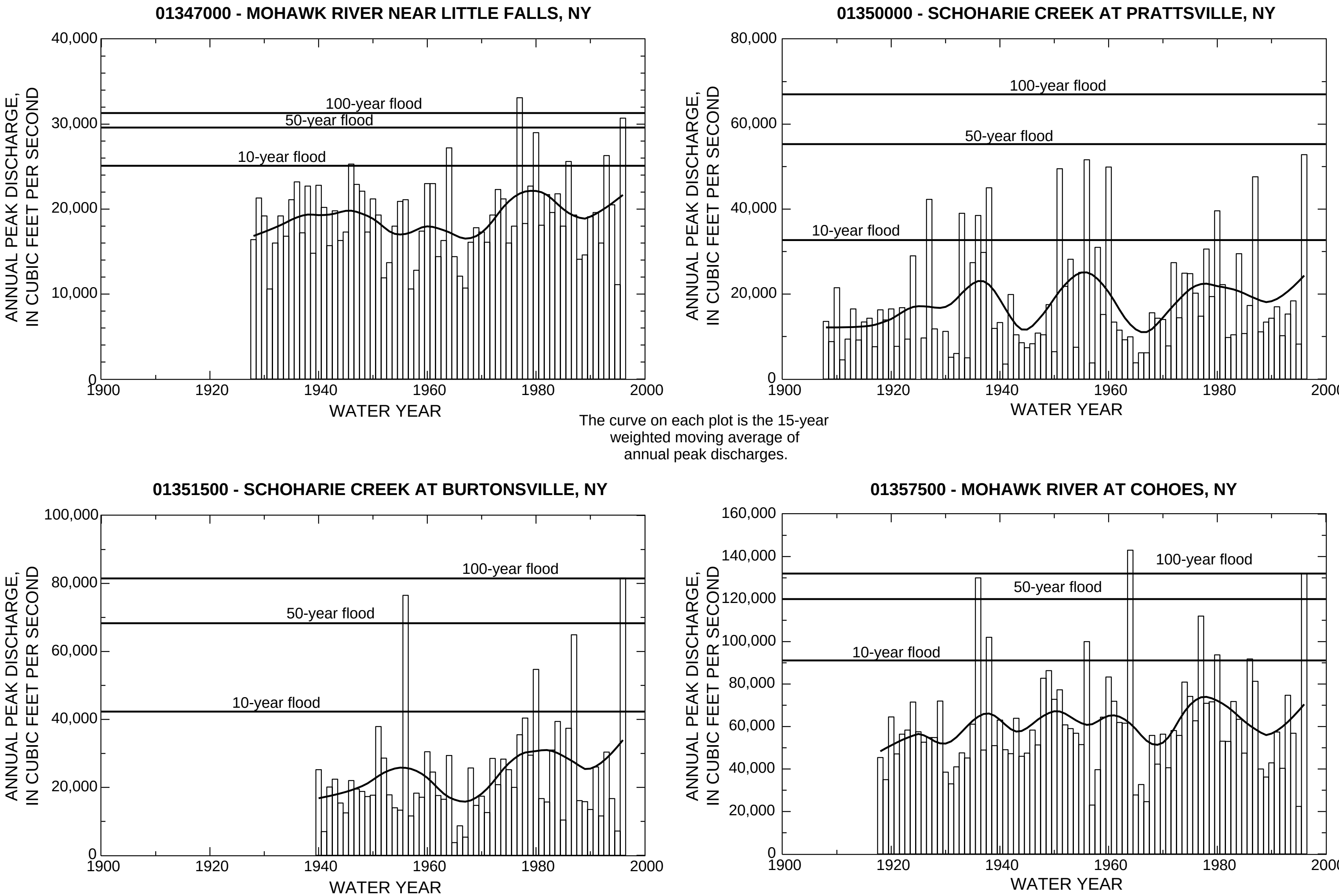


Figure 11. Annual peak discharges through 1996, and discharges of 10-, 50-, and 100- year recurrence intervals, for 16 selected gaging stations. (Station locations are shown on fig. 10; January 1996 flood data are given in table 5 at end of report.)

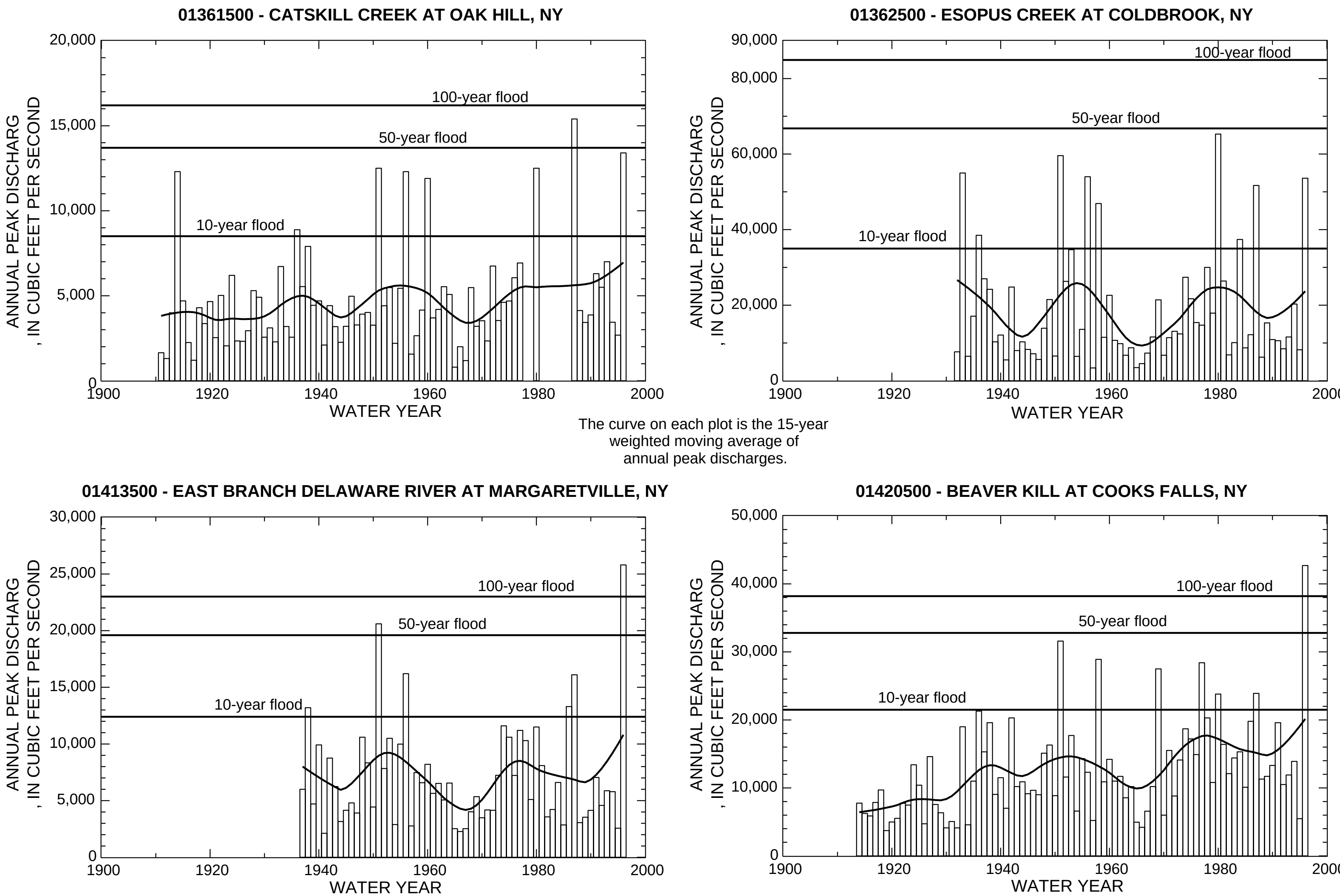


Figure 11. (continued) Annual peak discharges, through 1996, and discharges of 10-, 50-, and 100-year recurrence intervals, for 16 selected gaging stations. (Stations locations are shown on fig. 10; January 1996 flood data are given in table 5 at end of report.)

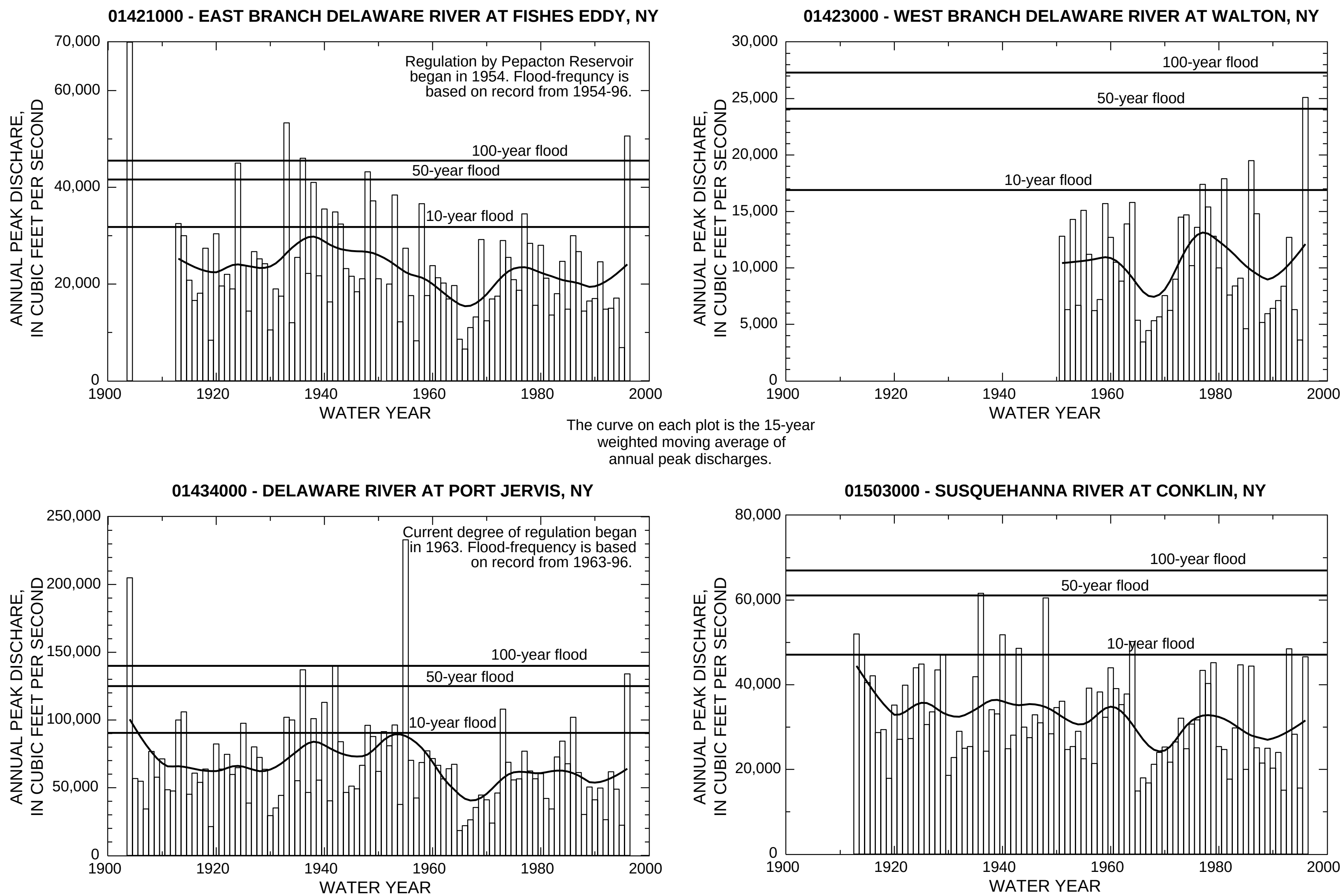


Figure 11. (continued) Annual peak discharges, through 1996, and discharges of 10-, 50-, and 100-year recurrence intervals, for 16 selected gaging stations. (Stations locations are shown on fig. 10; January 1996 flood data are given in table 5 at end of report.)

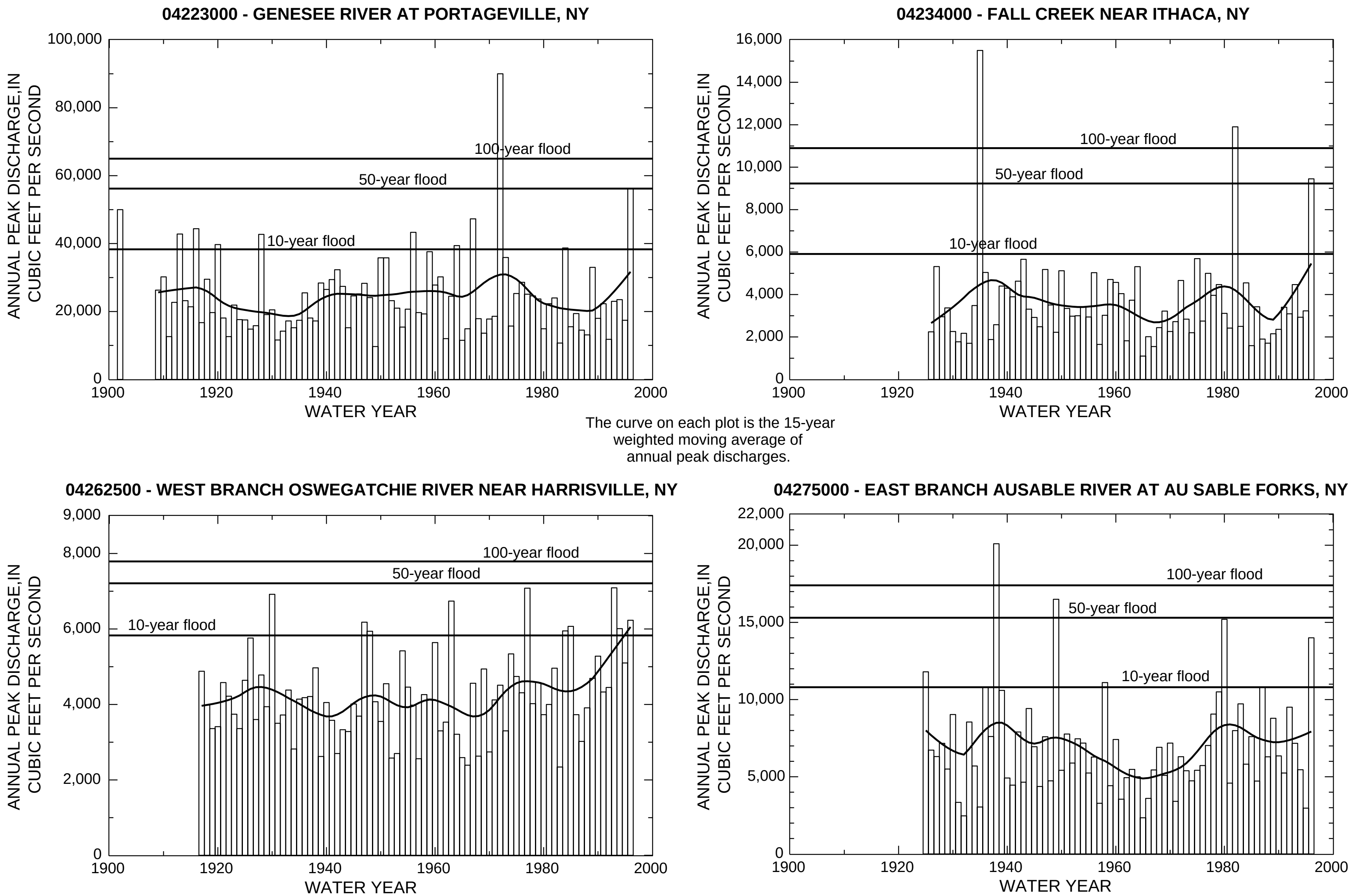


Figure 11.(Continued) Annual peak discharges through 1996, and discharges of 10-, 50-, and 100- year recurrence intervals, for 16 selected gaging stations. (Station locations are shown on fig. 10; January 1996 flood data are given in table 5 at end of report.)

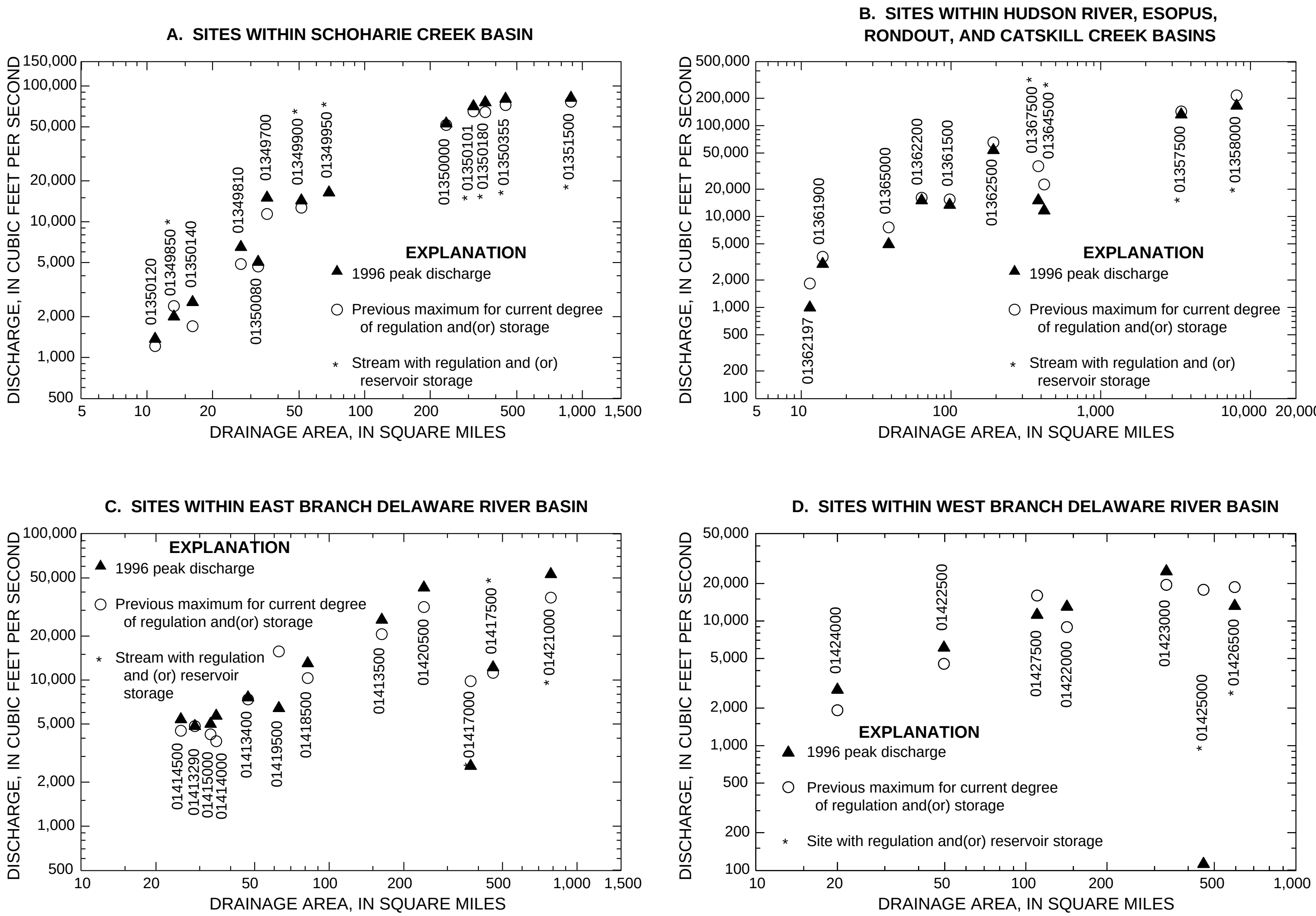


Figure 12A-D. Peak discharge as a function of drainage area during the flood of January 19-20, 1996 at sites within the Catskill Mountain region. (Station names are given in Table 5 at the end of the report; locations are shown in fig. 10.)

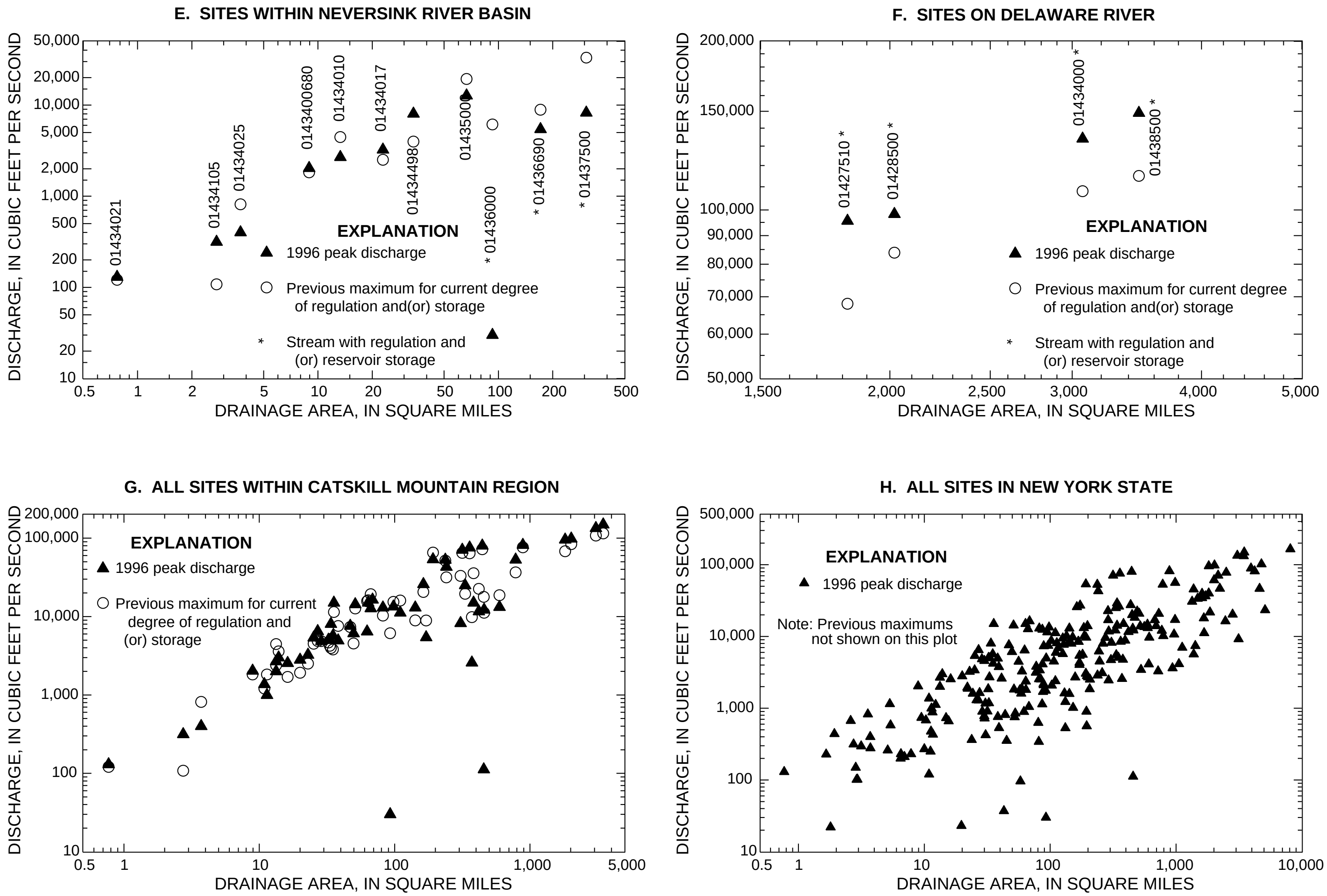


Figure 12E-H. Peak discharge as a function of drainage area during the flood of January 19-20, 1996 at sites within the Catskill Mountain region. (Station names are given in Table 5 at the end of the report; locations are shown in fig. 10.)

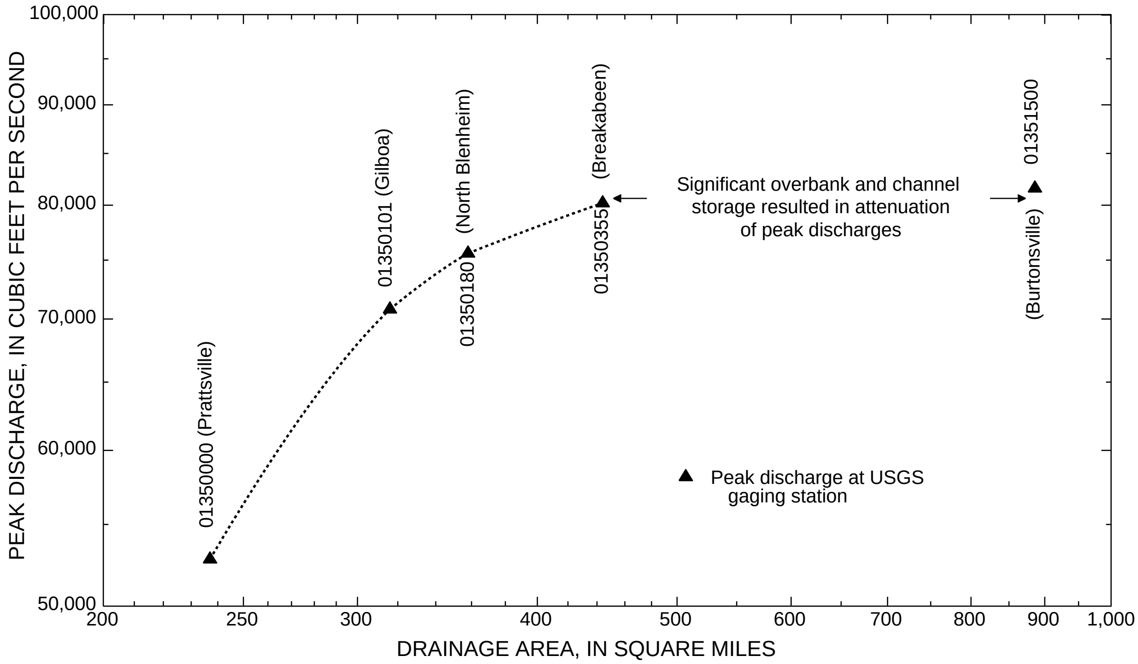


Figure 13. Peak discharge as a function of drainage area for sites on Schoharie Creek during the flood of January 19-20, 1996. (Locations are shown in fig. 10.)

flood in the Catskill Mountain area but was generally of a much lower magnitude than the January 1996 flood. All hydrographs at each site are of similar shape, and the hydrographs for the West Branch Delaware River at Walton shows a generally long duration of high flows, which may be a result of a relatively low main-channel slope and overbank storage during high flows. The previous maximum discharge recorded at this site was 19,500 ft^3/s on March 15, 1986. The discharge of the January 19-20, 1996 flood exceeded this rate for nearly 16 hours.

Some of the most damaging flooding in the State occurred in the Schoharie Creek and Delaware River basins. Hydrographs for gaging stations along the Delaware River and its major tributaries, and Schoharie Creek (fig. 16), show the magnitude, duration, and timing of flows during January 18-21 at each site. The sites on the West and East Branches of the Delaware River (fig. 16A) are the gages farthest downstream from Cannonsville and Pepacton Reservoirs, respectively. These reservoirs stored significant amounts of water and thereby decreased the magnitude of downstream flows.

Effect of Reservoirs

Reservoirs and lakes throughout New York had a significant mitigating effect on flooding during the January 1996 storm and subsequent period of runoff. Data from selected lakes and reservoirs in New York are given in table 6. The change in contents during the period of storm runoff represents the time from just before the lake or reservoir began to rise, to the time when the maximum elevation was observed or recorded. Although several reservoirs continued to rise through at least the end of the month, the end date of January 23 or 24 (if a reading was obtained in the morning) was used for the maximum elevation, as stated previously, because subsequent rain affected lake and reservoir water-surface elevations.

Large amounts of storm runoff were stored in most reservoirs within the Catskill Mountain area except Schoharie Reservoir, which was nearly full before the storm and therefore could store little more before it began to spill. The water level of Cannonsville Reservoir on the West Branch Delaware River rose nearly 23 ft during January 18-23; the reservoir stored 4.0 in. of runoff during this period and began to spill on January 25. Pepacton Reservoir on the East Branch Delaware River stored 4.6 in. of

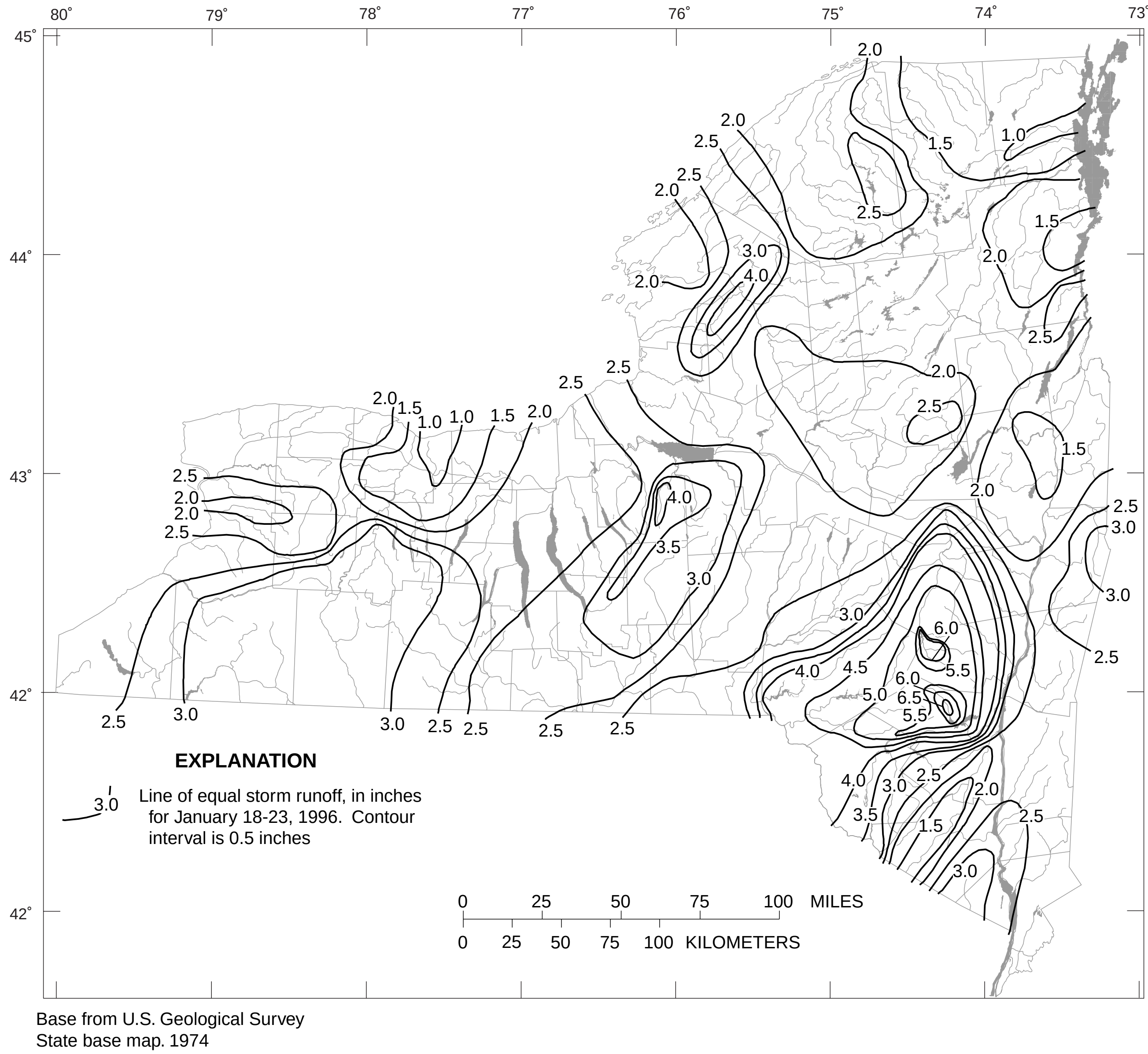


Figure 14. Lines of equal storm runoff for January 18-23, 1996 in New York.

runoff during a nearly 20-ft rise in water level during January 18-23, and the level continued to rise into February. Ashokan Reservoir on Esopus Creek stored 5.1 in. of runoff, the most of any reservoir in the State during the same period.

Hydrographs of daily inflow, outflow, and lake or reservoir elevations for January 15-31, 1996 at selected lakes and reservoirs in New York are shown in figure 17. Outflows include releases, spillage, and diversions or withdrawals from the reservoir. The hydrographs also show the duration and magnitude of the flood at these sites, the relations between daily inflows, outflows, and lake or reservoir elevations, and the amount of water stored during the runoff period (indicated by the shaded area on each plot).

Water levels in Cannonsville and Pepacton Reservoirs, two of the largest reservoirs within the New York City water-supply reservoir system, were below normal just before the January 19-20 flood; storage was 65 and 58 percent of capacity, respectively (table 2). The degree to which these

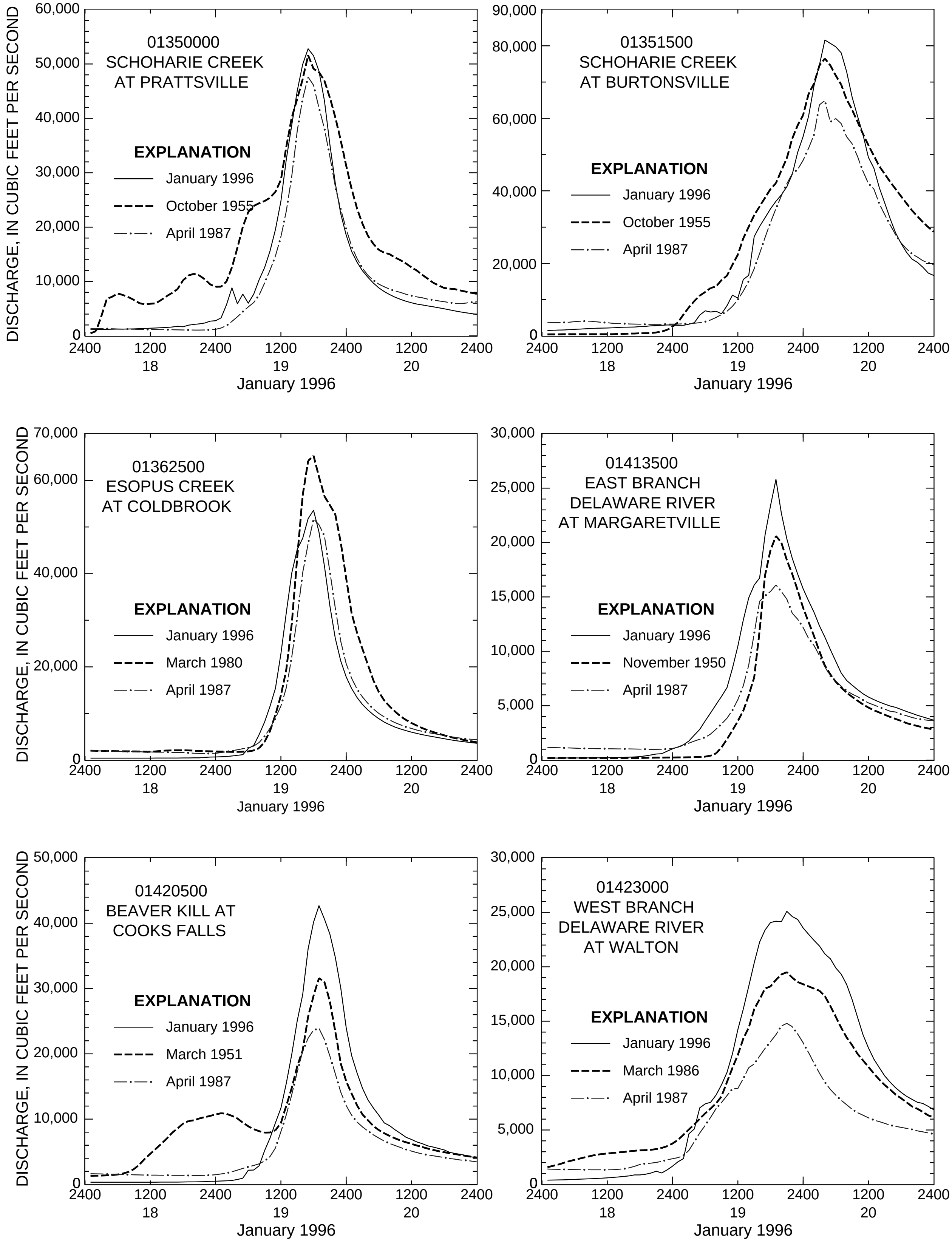


Figure 15. Discharge hydrographs of the January 1996 flood, the previous maximum flood, and the April 1987 flood at six continuous-record streamflow-gaging stations in the Catskill Mountain region of New York. (Locations are shown in fig. 10.)

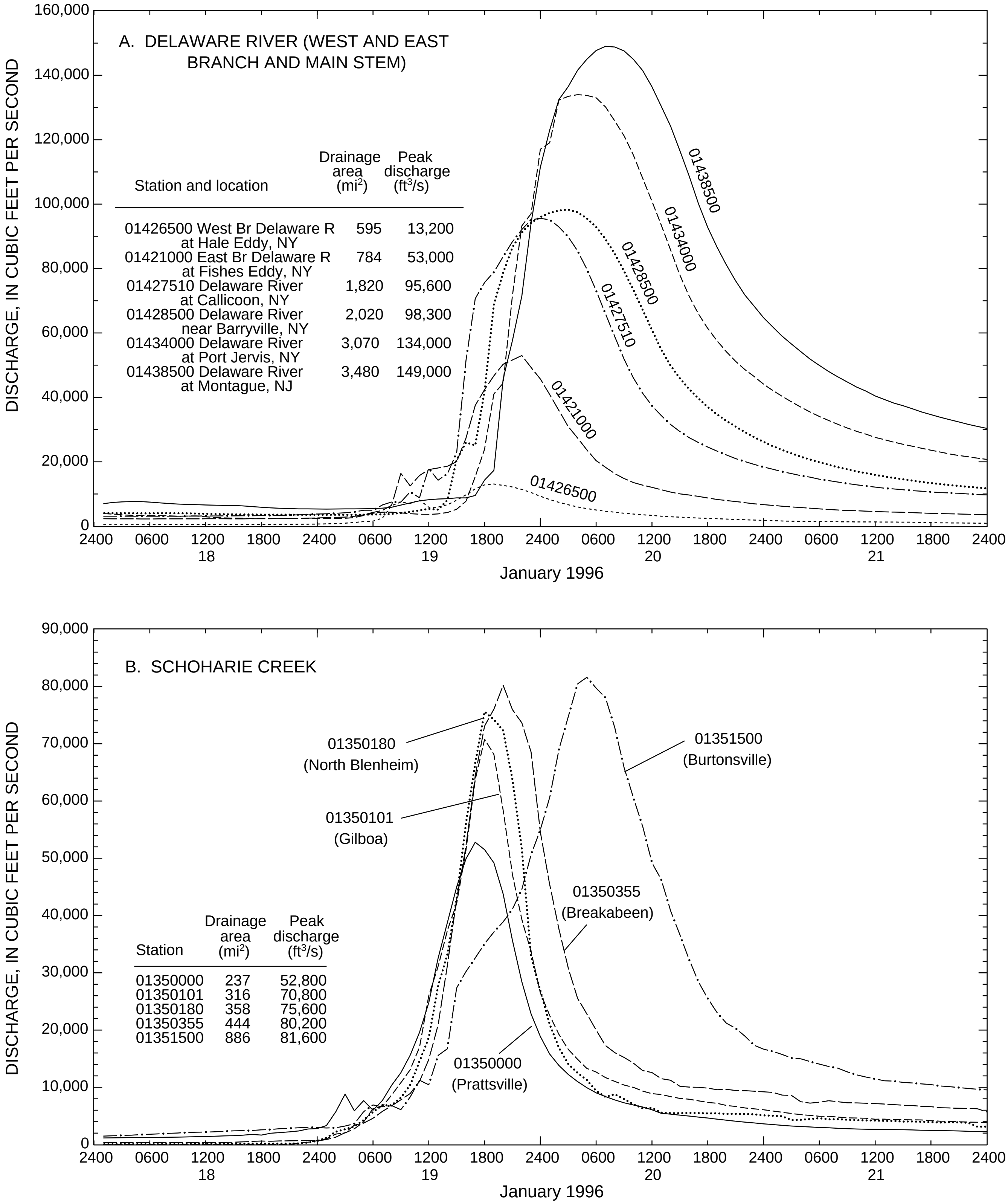


Figure 16. Discharge hydrographs for selected gaging stations in the Catskill Mountain region, N.Y., January 18-21, 1996. (Locations are shown in fig. 10; station names are given in table 5 at end of report.)

Table 6. Data on selected lakes and reservoirs in New York during the runoff period of the January 1996 storm
[mi^2, square miles, ft, feet, ft^3, cubic feet. Locations are shown in fig. 10.]

				Change in lake or reservoir contents during period of storm runoff						Spillway crest	
Data source*	Station number	Station name	Drainage area (mi^2)	Date	Water-surface elevation† (ft)	Contents (million ft^3)	Percentage of usable capacity	Change in contents (million ft^3)	Runoff stored (inches)	Elevation† (ft)	Capacity (million ft^3)
1	01314500	Indian Lake near Indian Lake	131	1/19	[a]1,640.33	2,786	59.7	399.0	1.3	1,651.29	4,668
				1/24	[a]1,640.78	3,185	68.2				
2	01323500	Great Sacandaga Lake at Conklingville	1,044	1/18	[b]750.98	[c]16,832	44.6	3,678.0	1.5	771.00	[c]37,720
				1/23	[b]754.90	[c]20,510	54.4				
3	01335900	Delta Reservoir near Rome	148	1/19	[a]541.50	1,890	67.5	515.0	1.5	550.00	2,800
				1/22	[a]546.50	2,405	85.9				
4	01343900	Hinckley Reservoir at Hinckley	372	1/17	[b]1,197.45	933	28.1	1,367.0	1.6	1,225.00	3,320
				1/23	[b]1,215.44	2,300	69.3				
	01350100	Schoharie Reservoir near Grand Gorge	315	1/17	[b]1,129.26	2,583	98.7	390.0	[d]0.05/	1,130.00	2,618
				1/19	1,136.68	2,973	113.6		[e]0.5		
5	01363400	Ashokan Reservoir at Ashokan	256	1/18	[a,f]573.60	[g]12,289	[g]71.9	[g]3,017.0	[g]5.1	[f]587.10	[g]17,095
				1/24	[a,f]580.01	[g]12,306	[g]89.5				
5	01366400	Rondout Reservoir at Lackawack	95.4	1/18	[a]826.25	5,492	82.1	357.0	1.6	840.00	6,691
				1/22	[a]830.48	5,849	87.4				
5	01416900	Pepacton Reservoir near Downsville	372	1/18	[a]1,243.04	11,255	60.0	3,960.0	4.6	1,280.00	18,743
				1/24	[a]1,262.76	15,215	81.2				
5	01424997	Cannonsville Reservoir at Cannonsville	454	1/18	[a]1,126.15	8,485	66.3	4,244.0	4.0	1,150.00	12,796
				1/24	[a]1,149.00	12,729	99.5				
5	01435900	Neversink Reservoir at Neversink	92.5	1/18	[a]1,401.69	2,575	55.1	797.0	3.7	1,440.00	4,672
				1/24	[a]1,417.25	3,372	72.2				
	04224000	Mount Morris Lake near Mount Morris	1,080	1/17	[b,h]597.00	[h]187	1.3	7,481.0	3.0	760.00	14,671
				1/23	703.70	7,668	52.3				
	04238500	Onondaga Reservoir near Nedrow	67.7	1/17	[b]460.89	0.2	0.03	181.6	1.2	504.50	792.8
				1/20	481.83	181.8	22.9				
2	04253300	Sixth Lake near Old Forge	18.6	1/18	[a]1,782.30	180	60.7	32.0	0.7	1,786.00	296.6
				1/20	[a]1,783.30	212	71.5				
2	04253400	First Lake at Old Forge	53.6	1/18	[a]1,703.00	373	41.6	130.0	1.0	1,707.00	895.6
				1/24	[a]1,704.04	503	56.2				
2	04256500	Stillwater Reservoir near Beaver River	171	1/19	[a]1,668.83	2,199	47.6	486.0	1.2	1,679.30	4,623
				1/24	[a]1,671.22	2,685	58.1				
6	04260990	Cranberry Lake at Cranberry Lake	140	1/18	[i]1,484.15	1,814	71.7	454.0	1.4	1,486.43	2,530
				1/24	[i]1,485.85	2,268	89.6				

* Data sources:

1 Indian River Company
2 Hudson River-Black River Regulating District
3 New York Thruway Authority
4 New York Power Authority; elevations are to Barge Canal Datum
5 New York City Department of Environmental Protection
6 Oswegatchie River-Cranberry Reservoir Commission

Footnotes:

† Feet above sea level unless noted otherwise
[a] Reading at 0800 hours
[b] Reading at 2400 hours
[c] Includes dead storage of 4,600 million ft^3
[d] At 100 percent usable capacity (prior to spillage)
[e] At time of maximum lake or reservoir water-surface elevation
[f] East Reservoir
[g] Combined total of East and West basin
[h] About
[i] Reading at 1200 hours

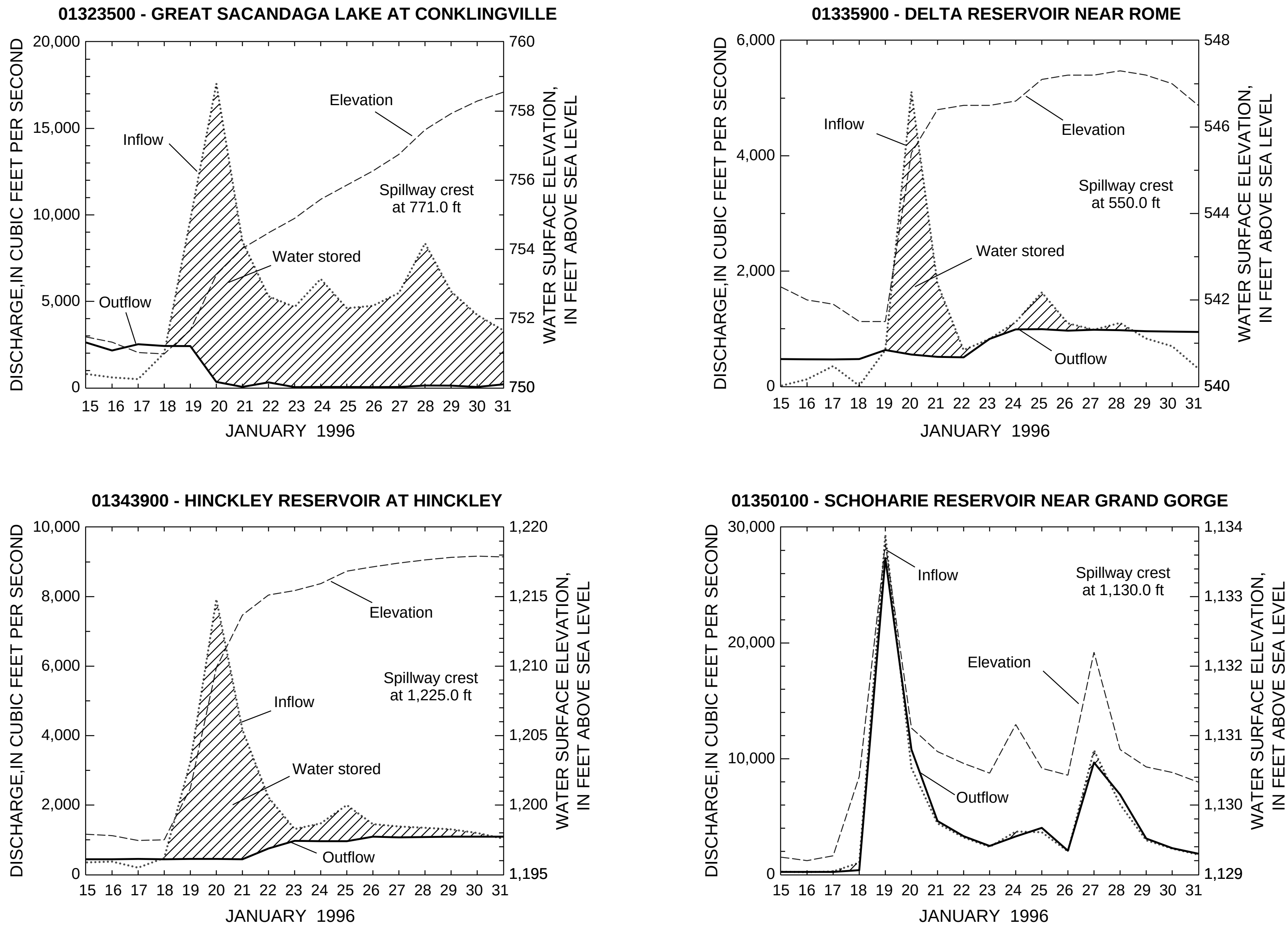


Figure 17. Hydrographs of daily inflow, outflow, and lake or reservoir water-surface elevation for selected sites in New York for January 15-31. (Shaded areas are amounts of water stored during runoff period. Locations are shown in fig. 10).

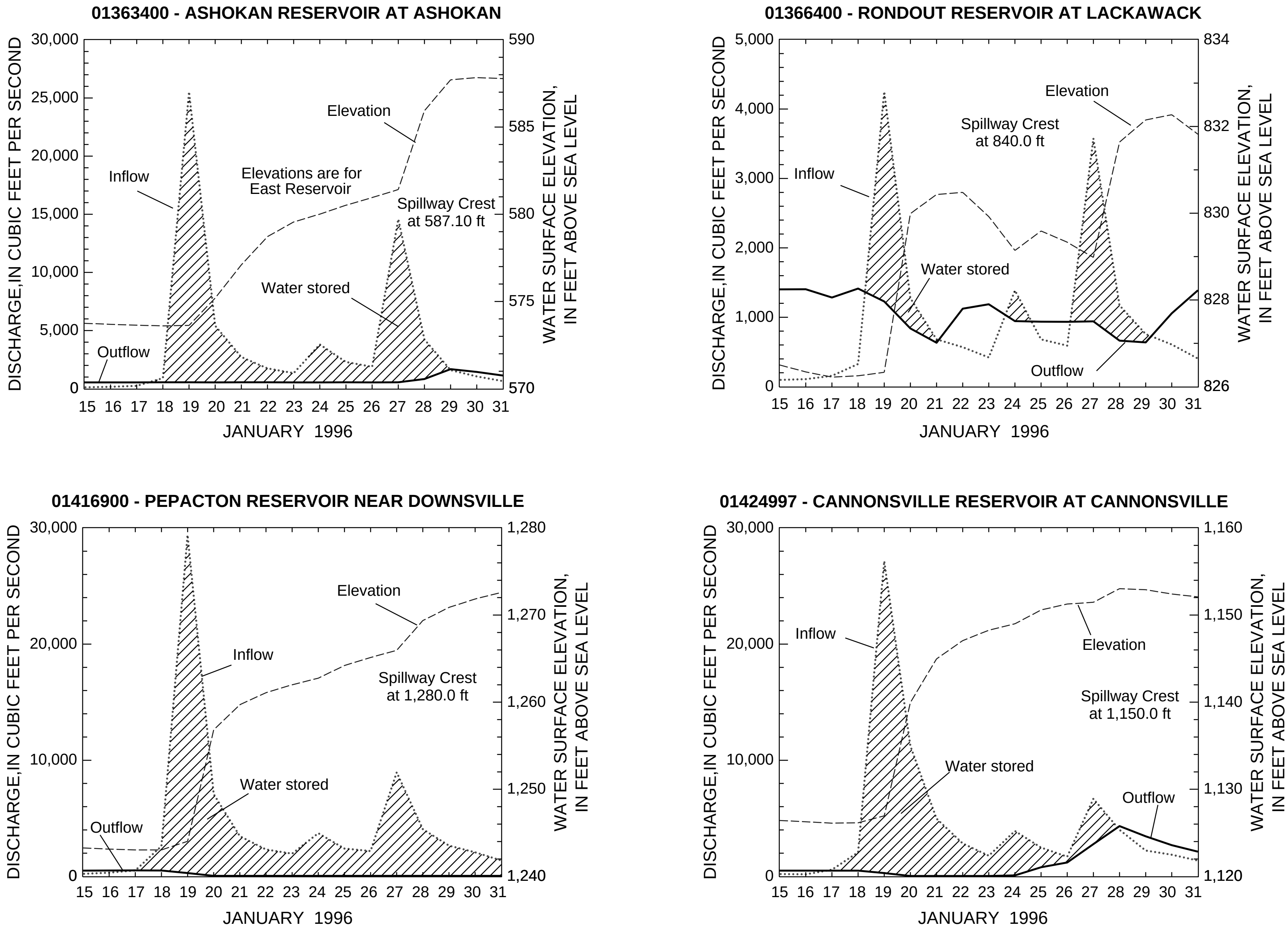


Figure 17. (Continued) Hydrographs of daily inflow, outflow, and lake or reservoir water-surface elevation for selected sites in New York for January 15-31, 1996. (Shaded areas are amounts of water stored during runoff period. Locations are shown in fig. 10)

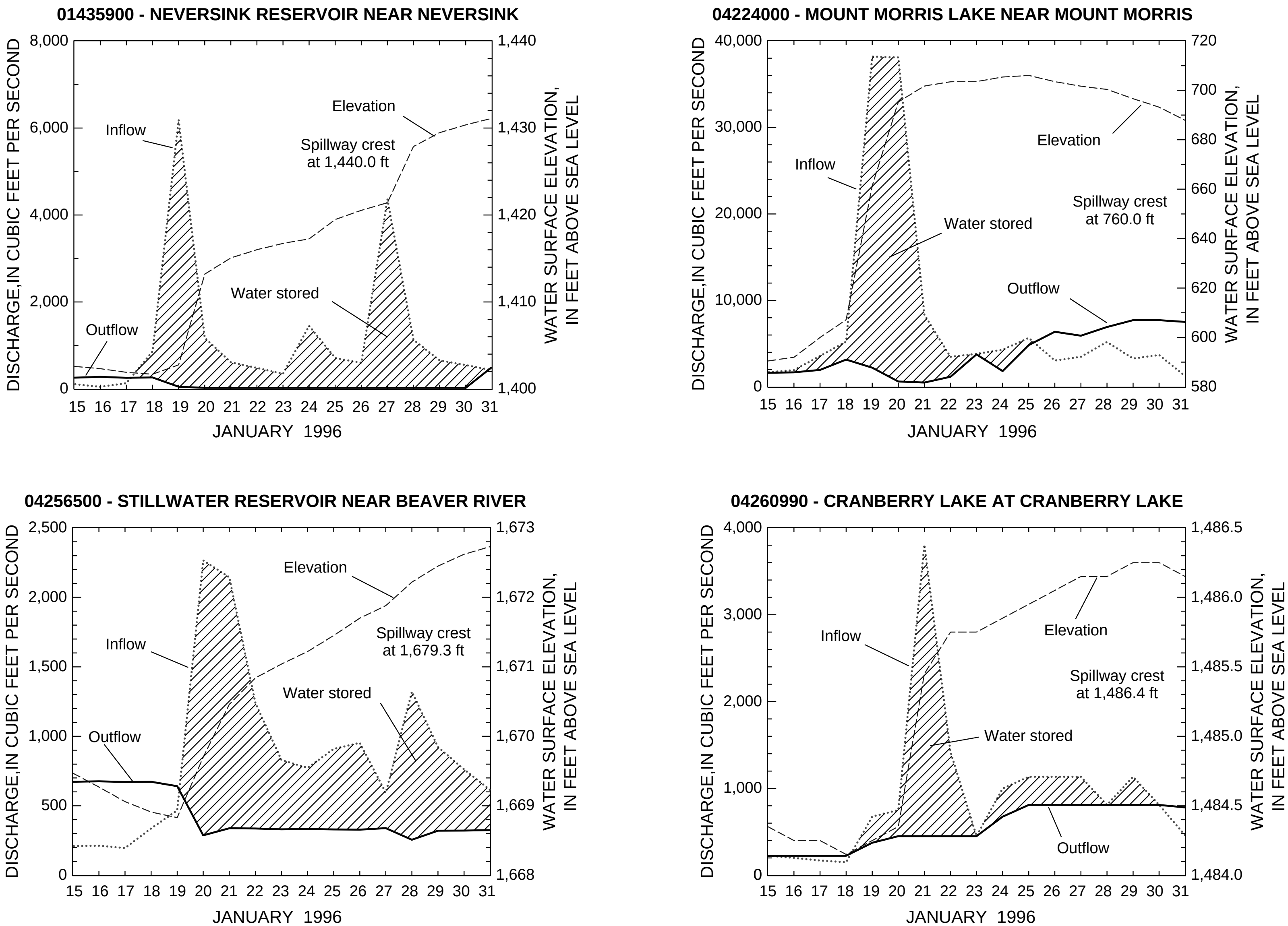


Figure 17. (Continued) Hydrographs of daily inflow, outflow, and lake or reservoir water-surface elevation for selected sites in New York for January 15-31, 1996. (Shaded areas are amounts of water stored during runoff period. Locations are shown in fig. 10)

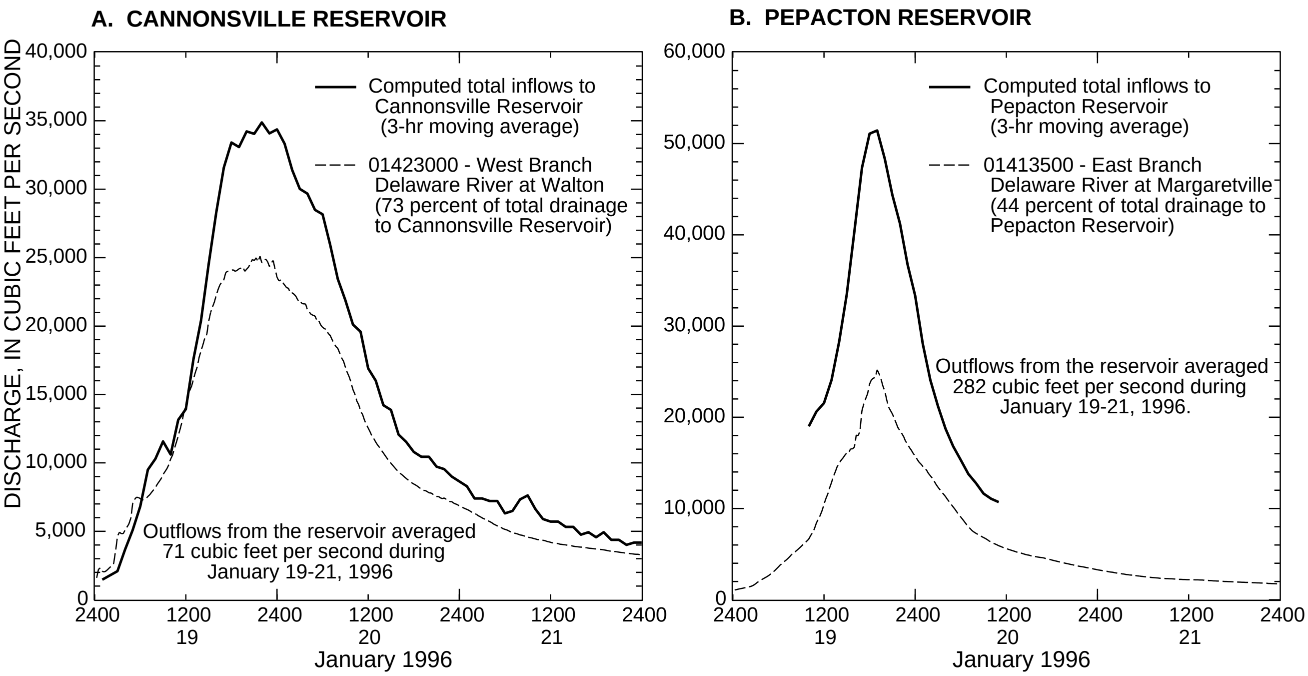


Figure 18. Inflows to Cannonsville and Pepacton Reservoirs during January 19-21, 1996. (Locations are shown in fig. 10.)

reservoirs attenuate and delay flood peaks is a function of available storage at the onset of flooding; the reservoirs have no provision for planned regulation of floodflows, and the amount they are able to divert through water-supply tunnels is inconsequential in relation to flood volumes. Inflows to these two reservoirs were computed from hourly reservoir-level data provided by the New York City Department of Environmental Protection. A 3-hour moving average was applied to the inflows to smooth the effects of wind and seiche on the reservoir levels; the resulting hydrographs are shown in figures 18A and 18B. Hydrographs for USGS streamflow gaging stations on the main streams entering each reservoir are included for comparison. Outflows are noted on each illustration and were held at relatively insignificant amounts because nearly all the inflow was stored during January 19-21. The peak inflow to Pepacton Reservoir (fig. 18B) (greater than 50,000 ft^3/s) occurred at 7:00 p.m. on January 19; the outflow at that time was about 1,800 ft^3/s. Without the reservoir storage, communities downstream from the reservoirs would have experienced far greater flooding and much more damage and destruction. By the end of January, Pepacton Reservoir was nearly full (91 percent of capacity), and Cannonsville Reservoir had already begun to spill (table 2). The total amount of floodwater stored (95.5 Bgal) in the Catskill Mountain part of the New York City Reservoir system (all reservoirs listed in table 2, excluding the Croton system in Westchester County) during January 18-23, 1996 (most during January 19-20) was enough water to supply the 6.9 million New York City residents for 3.5 months (D. Lumia, U.S. Geological Survey, written commun., 1997).

Flood Profiles of Schoharie Creek

Floodmarks (flood-crest stages) were obtained along an 83-mi reach of Schoharie Creek from the headwaters (near Hunter) to the mouth (near Fort Hunter) to help document and evaluate the extent and severity of the flood. A generalized profile of the entire study reach showing the floodmarks, low-water profile, and locations of major communities is given in figure 19; a map showing the location of USGS streamflow gaging stations, communities, and major geographic features along Schoharie Creek is given in figure 20.

After the January 19-20, 1996 flood, the U.S. Geological Survey surveyed high-water marks along

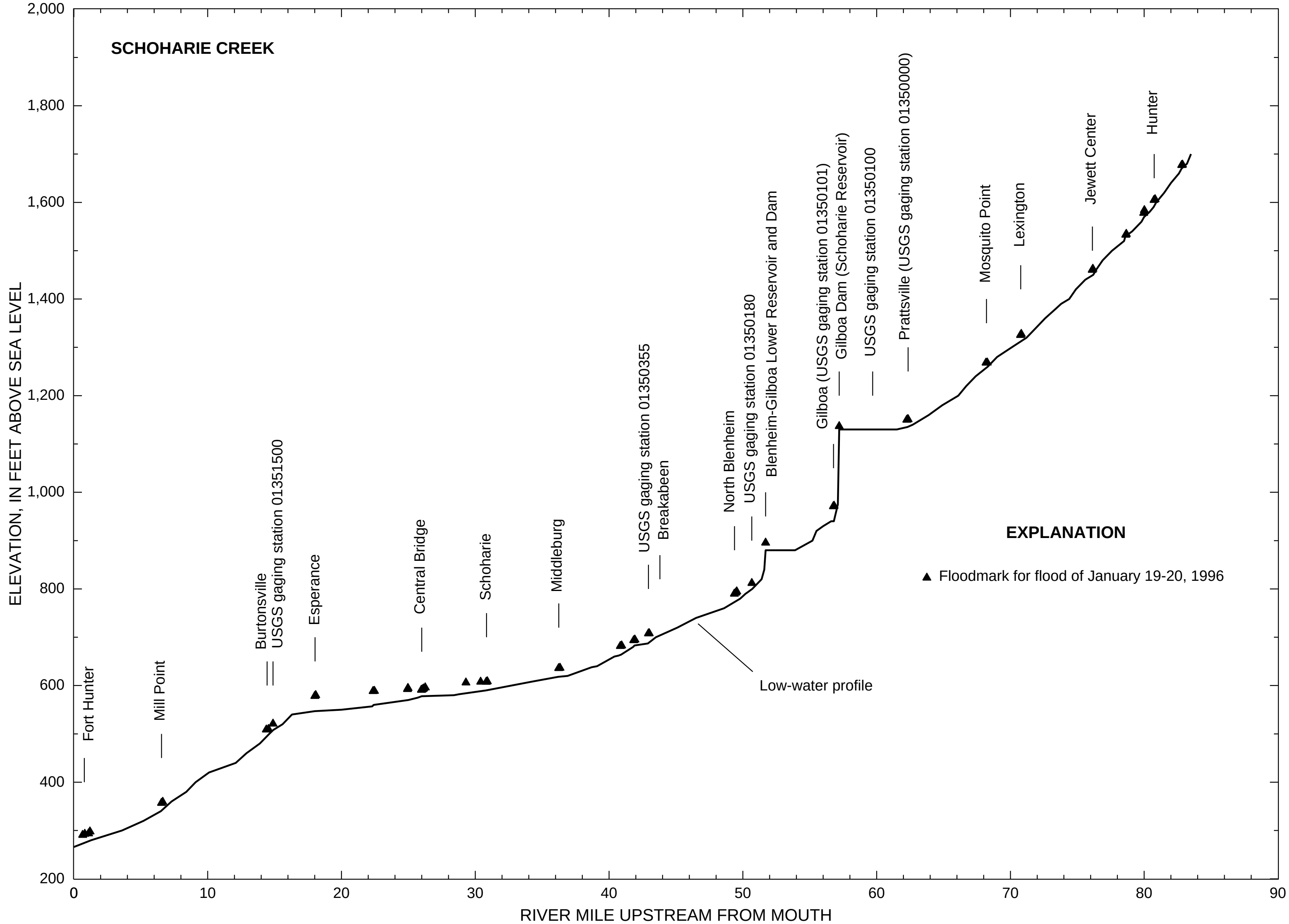
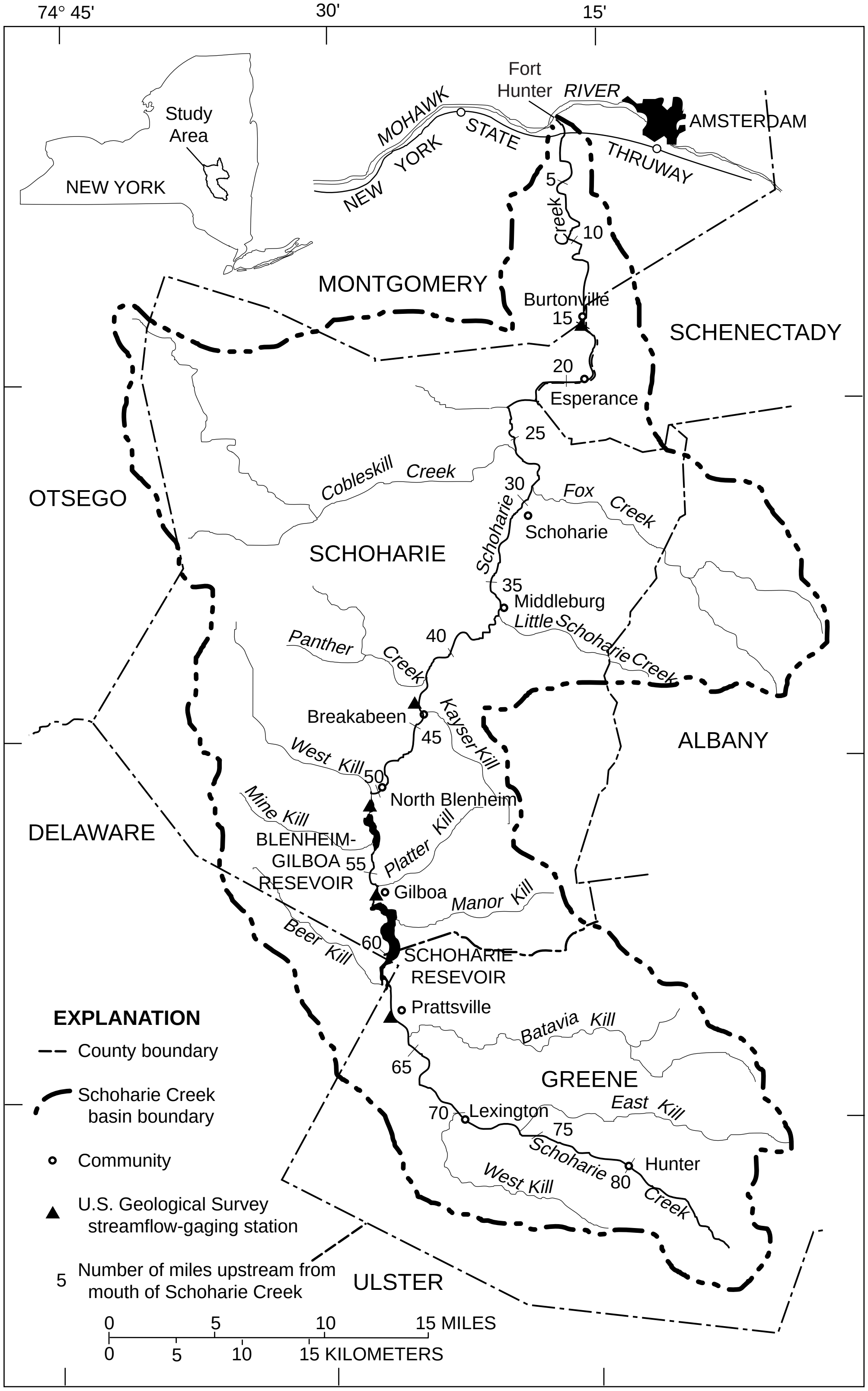
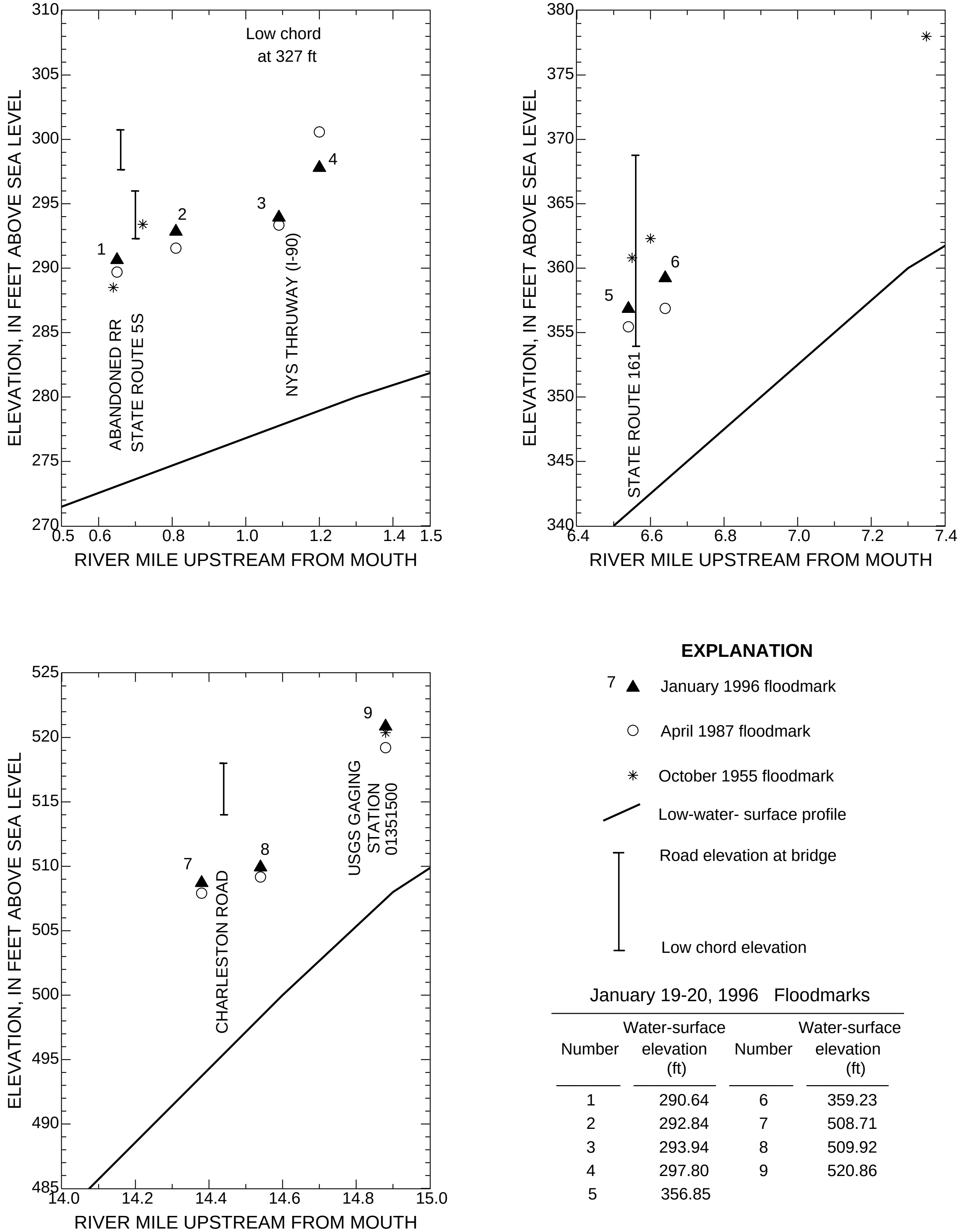


Figure 19. Profile of Schoharie Creek showing locations of major communities, USGS gaging stations, dams, and January 1996 floodmarks (corresponding map is shown in fig. 20; detaied flood profiles shown in fig. 21.)



Base from U.S. Geological Survey
Binghamton, NY, 1:250,000, 1948

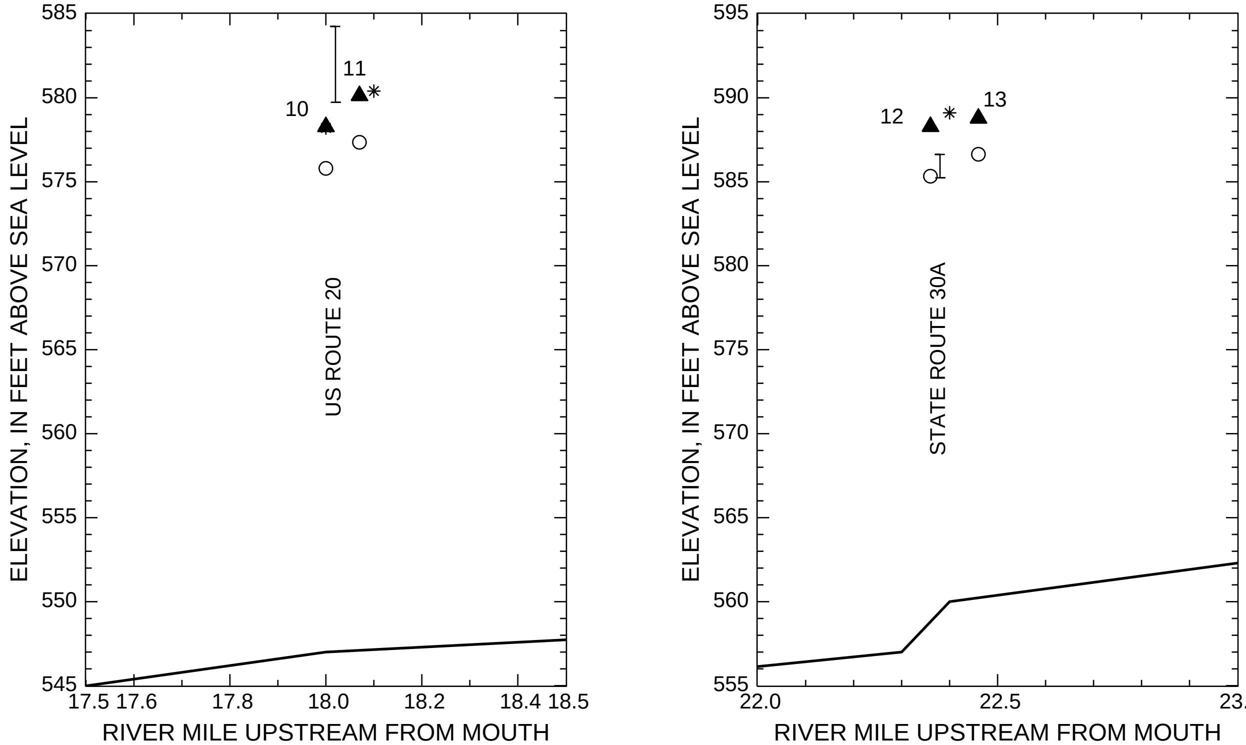
Figure 20. Locations of streamflow-gaging stations and major geographic features along Schoharie Creek (Profiles of the study reach are shown in fig. 19 and 21.)

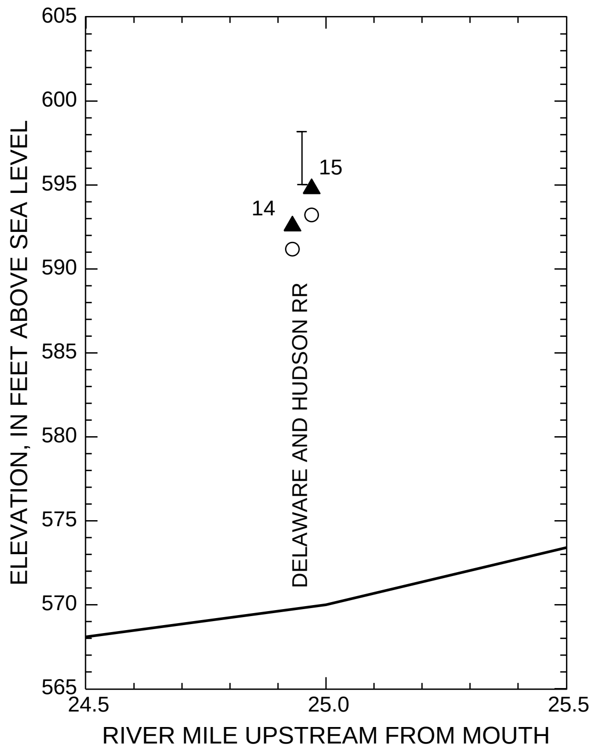


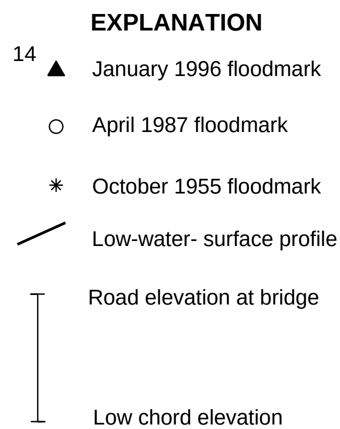
January 19-20, 1996 Floodmarks

Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
1	290.64	6	359.23
2	292.84	7	508.71
3	293.94	8	509.92
4	297.80	9	520.86
5	356.85		

Figure 21. Water surface profiles of Schoharie Creek during the flood of January 19-20, 1996.



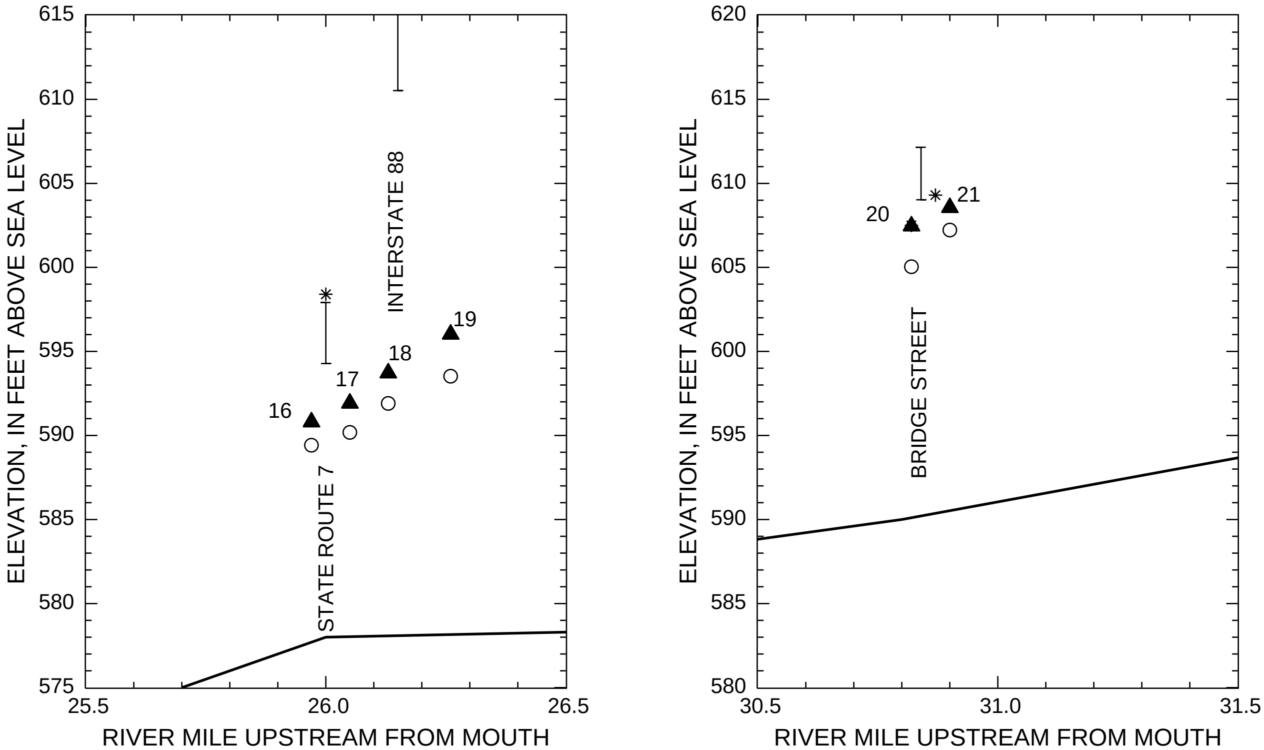


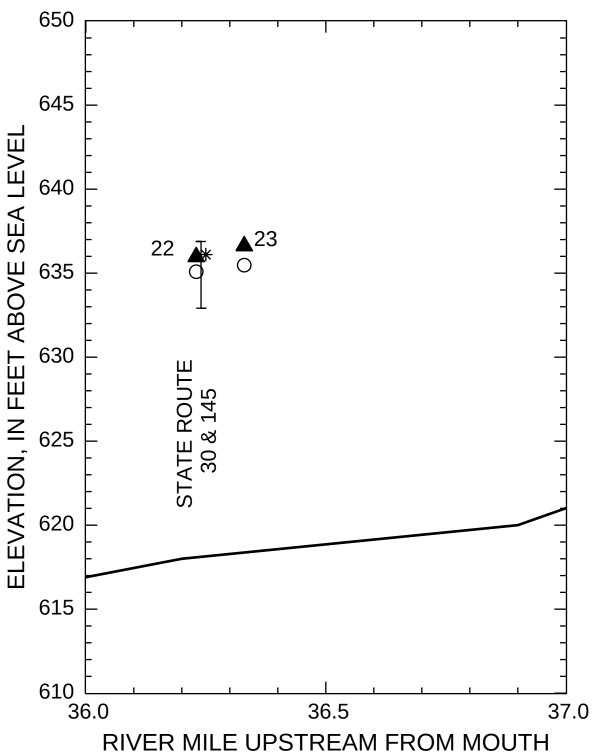


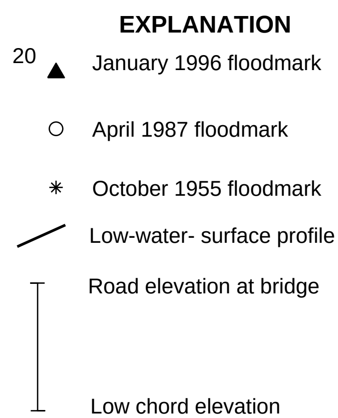
January 19-20, 1996 Floodmarks

Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
10	578.27	13	588.78
11	580.12	14	592.56
12	588.28	15	594.78

Figure 21. (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.



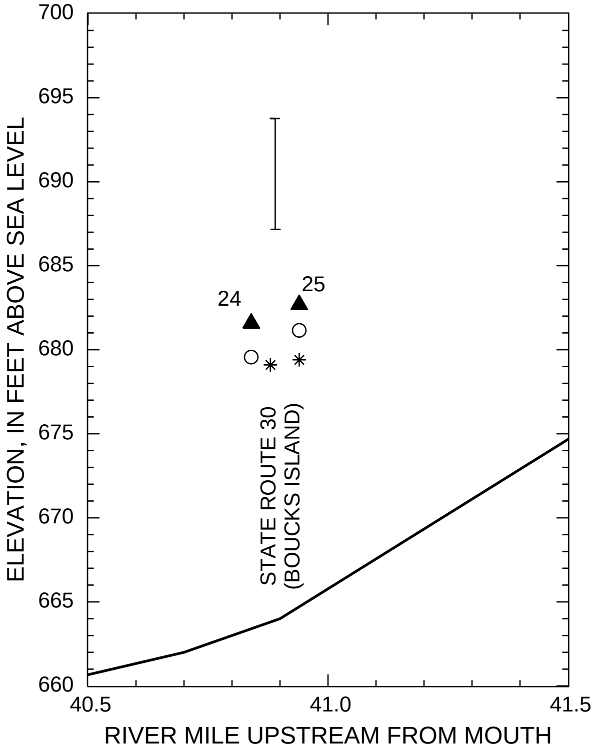


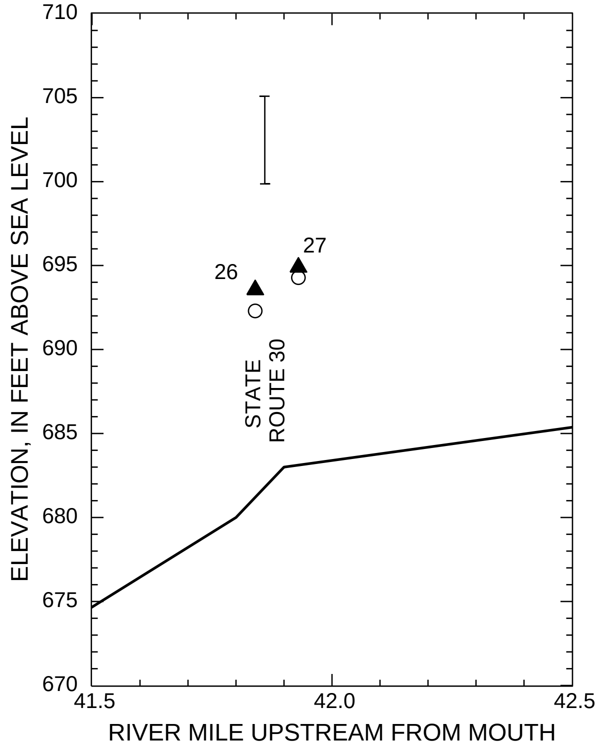


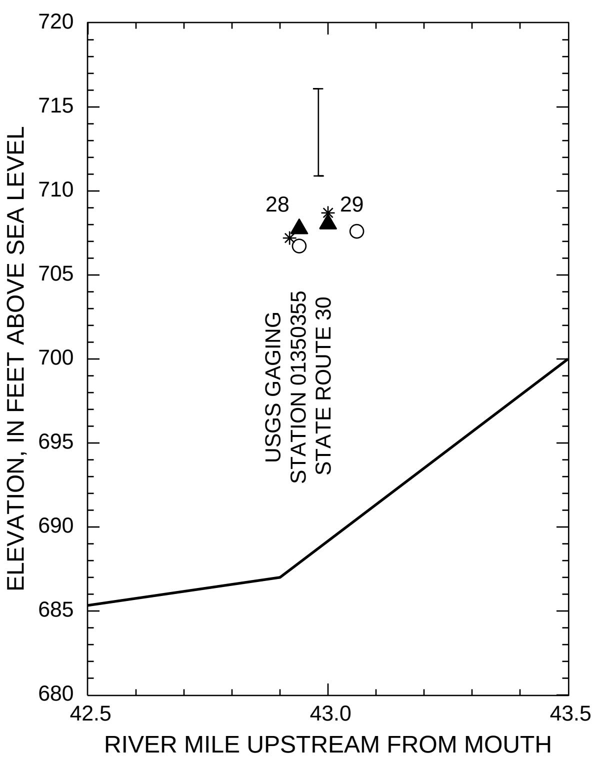
January 19-20, 1996 Floodmarks

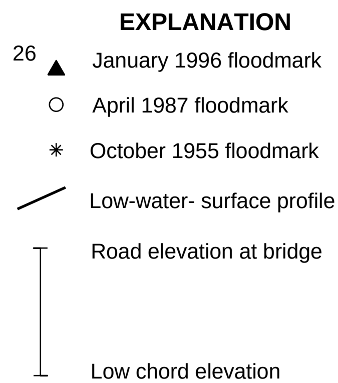
Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
16	590.80	20	607.46
17	591.92	21	608.56
18	593.72	22	635.97
19	596.02	23	636.62

Figure 21. (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.





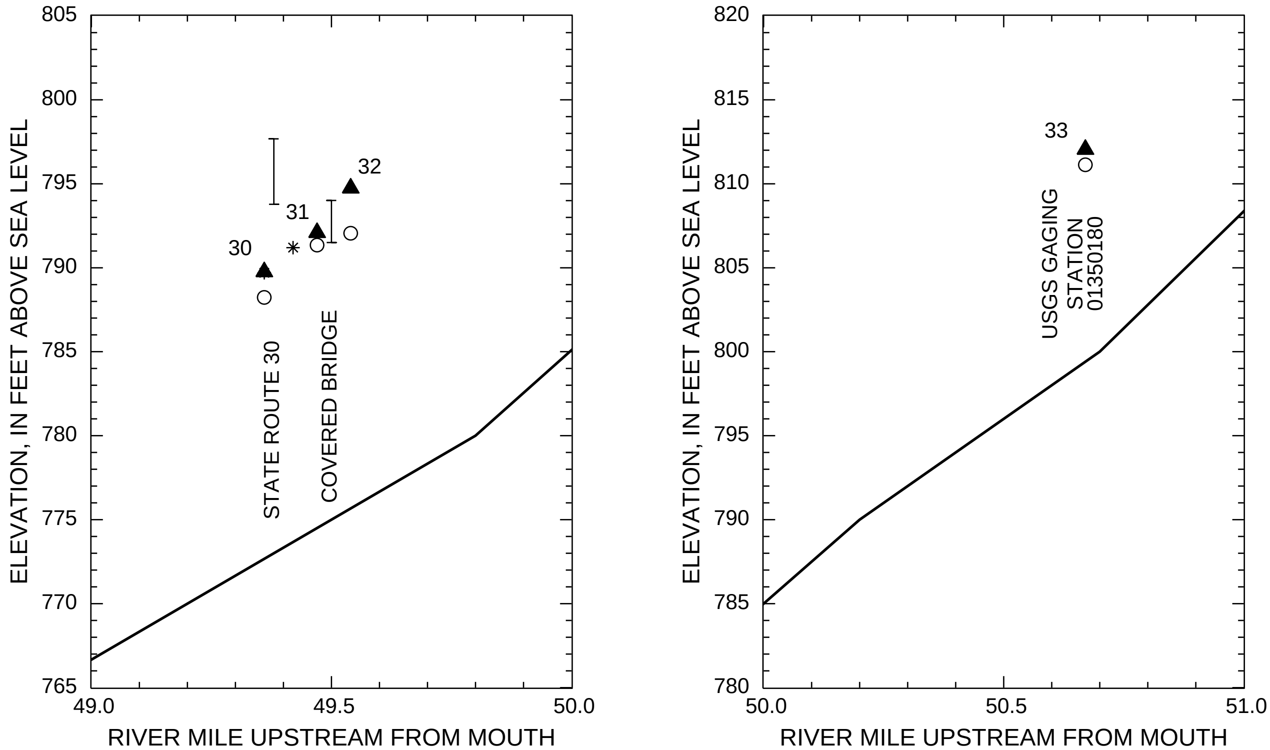


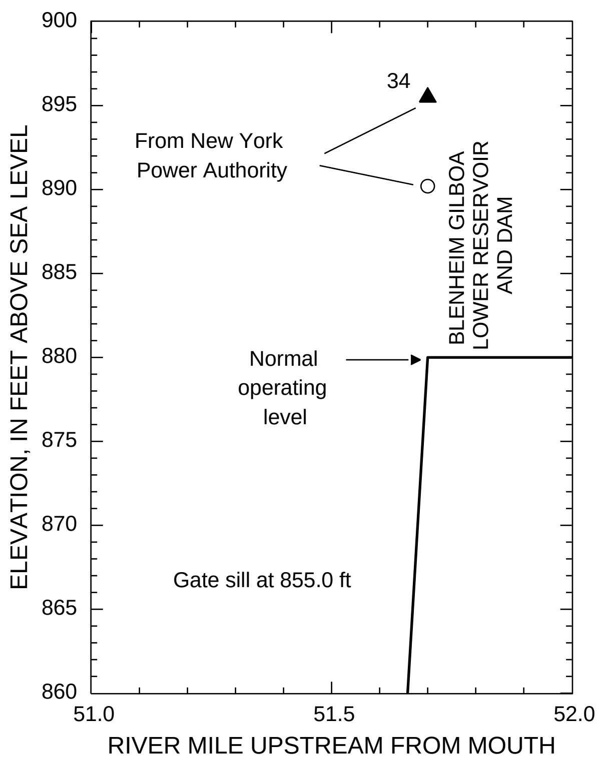


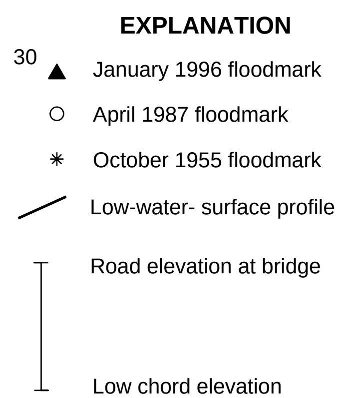
January 19-20, 1996 Floodmarks

Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
24	681.58	27	694.90
25	682.68	28	707.75
26	693.56	29	708.04

Figure 21. (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.



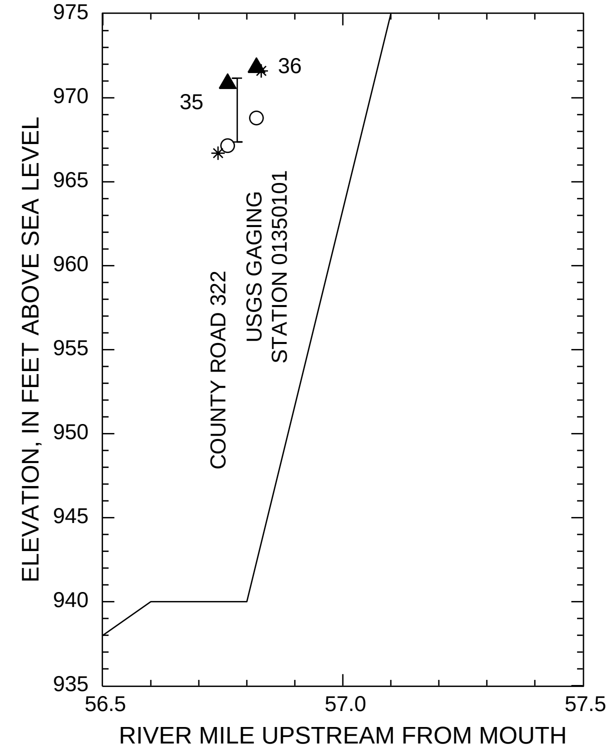


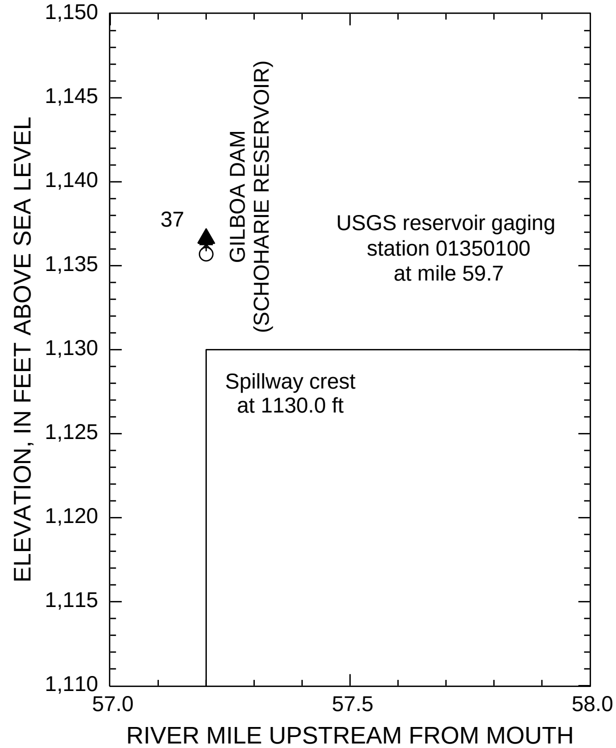


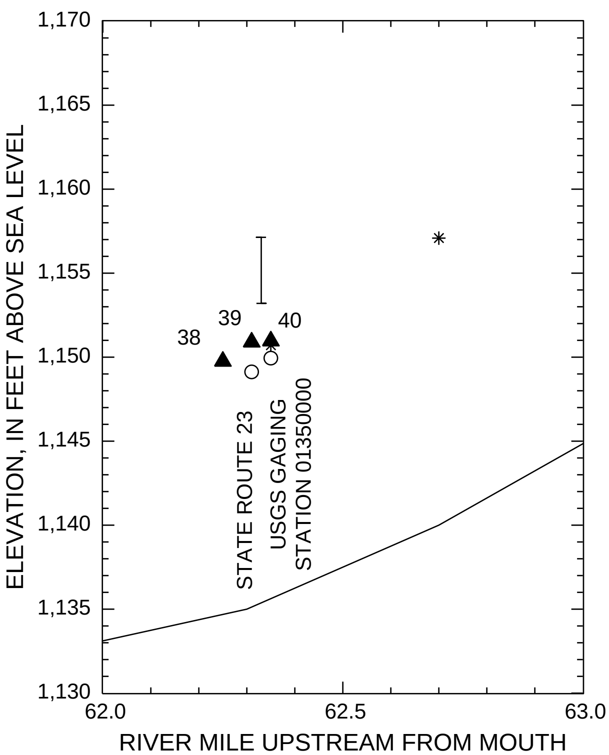
January 19-20, 1996 Floodmarks

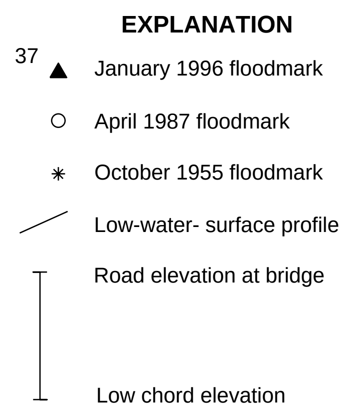
Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
30	789.76	33	812.04
31	792.09	34	895.50
32	794.74		

Figure 21. (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.





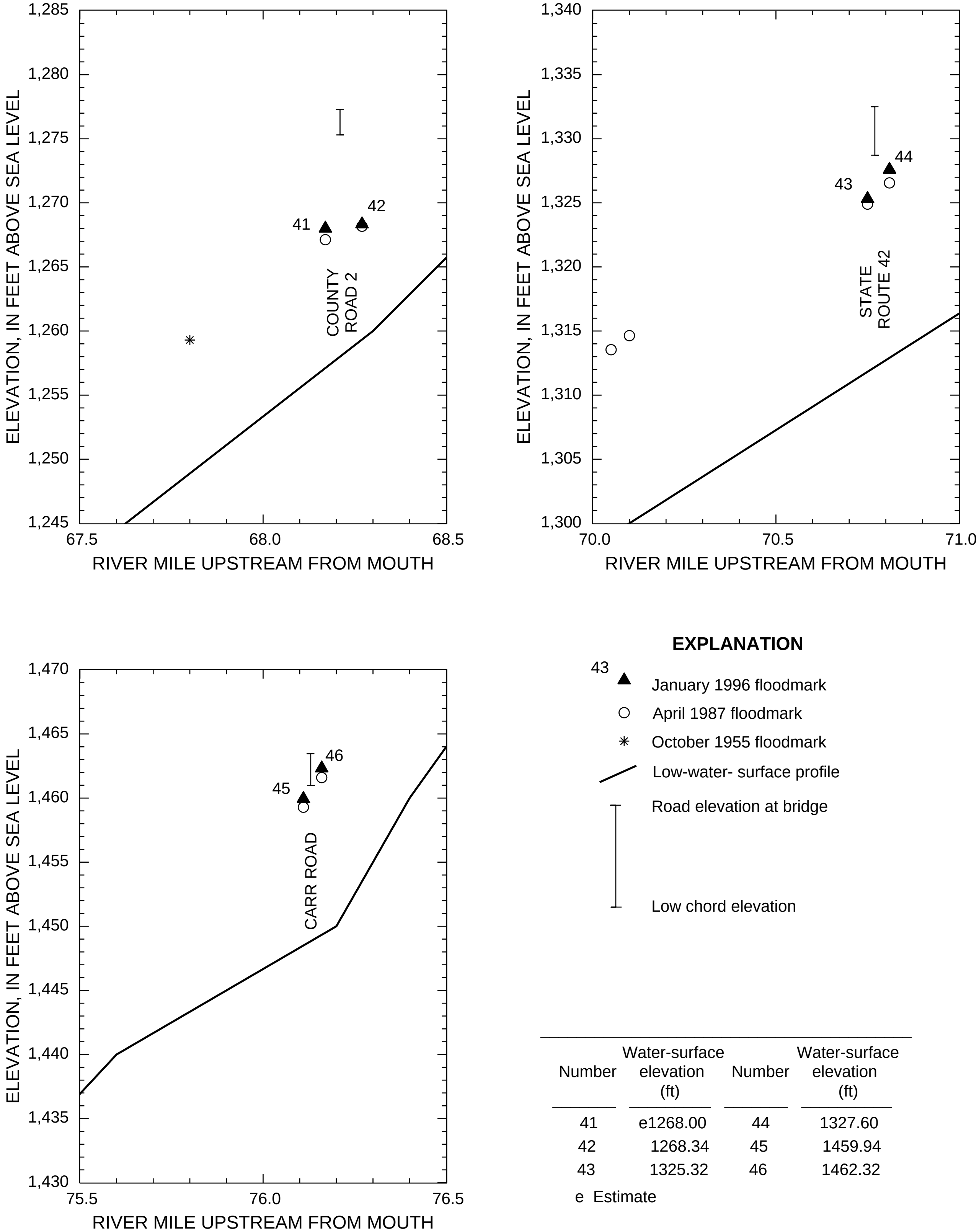




January 19-20, 1996 Floodmarks

Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
35	970.84	38	1149.75
36	971.80	39	1150.89
37	1136.62	40	1150.96

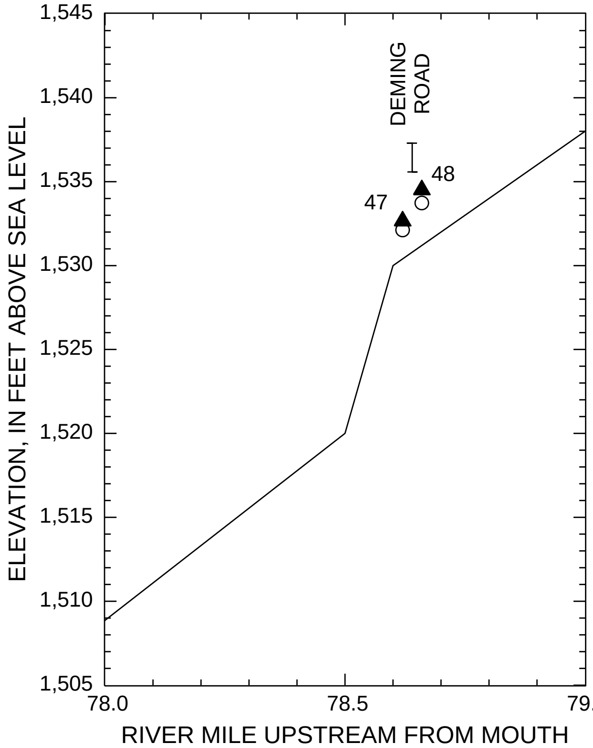
Figure 21 (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.

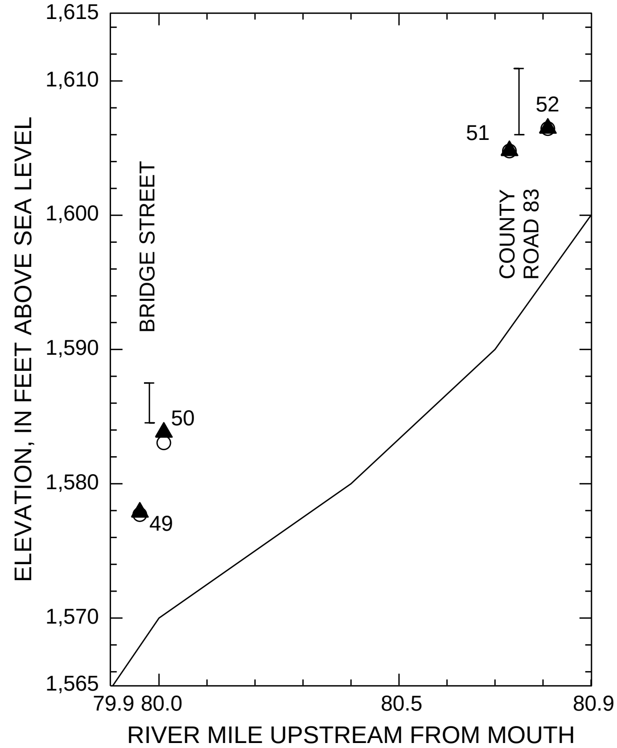


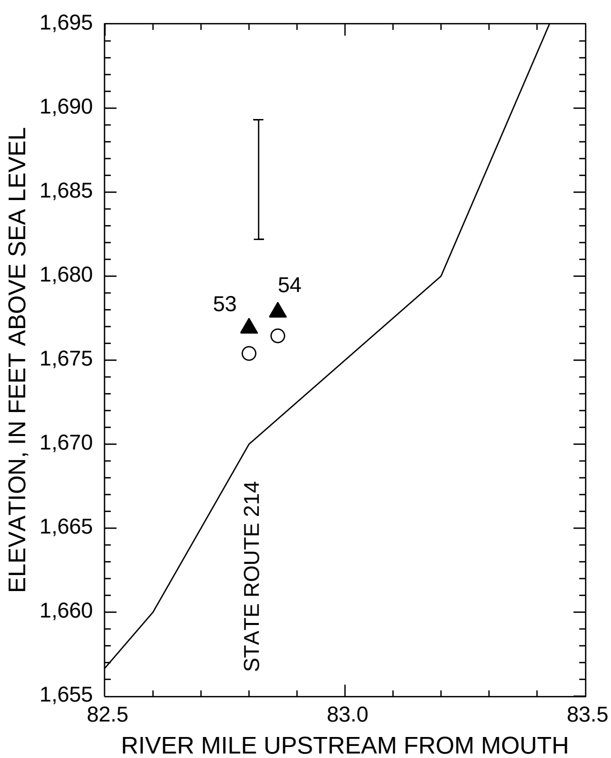
Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
41	e1268.00	44	1327.60
42	1268.34	45	1459.94
43	1325.32	46	1462.32

e Estimate

Figure 21 (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.







EXPLANATION

53 ▲ January 1996 floodmark

○ April 1987 floodmark

Low-water- surface profile

Road elevation at bridge

Low chord elevation

January 19-20, 1996 Floodmarks

Number	Water-surface elevation (ft)	Number	Water-surface elevation (ft)
47	1532.65	51	1604.80
48	1534.51	52	1606.47
49	1577.88	53	1676.90
50	1583.84	54	1677.86

Figure 21. (continued) Water-surface profiles of Schoharie Creek during the flood of January 19-20, 1996.

the creek at 25 bridges, 2 dams, and 6 USGS gaging stations. The 54 marks were later referenced to National Geodetic Vertical Datum of 1929 (sea level) and are plotted with those from the floods of April 1987 and October 1955 in figure 21. The locations (river mile) of bridges, dams, and elevations of the low-water-surface profile were obtained from USGS topographic maps. Low-chord and road elevations of bridges were measured in the field or obtained from New York State Department of Transportation.

Several floodmarks were obtained during January 1996 and April 1987 (Zembrzuski and Evans, 1989) upstream and downstream from bridges, but for clarity, only two marks are shown at most bridges in figure 21. All surveyed marks from the October 1955 flood are shown (Bogart, 1960).

The flood profiles shown in figure 21 indicate that the January 1996 flood elevations were generally higher than those of April 1987. One exception is at the New York State Thruway (Interstate 90) bridge at river mile 1.2, where the flood elevation at the upstream side of the bridge during the April 1987 flood was nearly 3 ft higher than that found after the January 1996 flood. This bridge collapsed during the April 1987 flood, and claimed 10 lives. The physical and hydraulic characteristics of the replacement bridge resulted in less backwater (lower flood water-surface elevation) during the more severe 1996 flood. Replacement or refurbishment of several other bridges along the study reach since the April 1987 flood makes comparisons with the 1996 flood difficult. At many locations, the flood elevations from the October 1955 flood are comparable to those of the January 1996 flood.

SUMMARY

Precipitation from a strong storm during January 18-20, 1996, combined with unseasonably warm temperatures that caused rapid snowmelt, resulted in extensive flooding throughout New York State. Damages to highways, bridges, and private property exceeded $100 million. The storm and flooding claimed 10 lives, stranded hundreds of people, destroyed or damaged thousands of homes and businesses, and closed hundreds of roads. Forty-one counties in New York were declared Federal disaster areas. The most severely affected region was within and surrounding the Catskill Mountains in southeastern New York. Damages and losses within Delaware County alone exceeded $20 million.

More than 4.5 in. of rain falling on as much as 45 in. of melting snow in the Catskill Mountain region during January 18-19 resulted in major flooding throughout the region. Flooding in other parts of the State was significant but less severe than that in southeastern New York. Ice and debris jamming at culverts and bridges contributed to the flooding in many areas. The most destructive flooding occurred along the Schoharie Creek and the East and West Branches of the Delaware River. New peak discharges of record occurred at 57 USGS streamflow gaging stations throughout New York. Maximum discharges at 15 sites, most within the Schoharie Creek and Delaware River basins, had recurrence intervals equal to or greater than 100 years.

Reservoirs throughout New York, but particularly those within the Catskill Mountain region, stored significant amounts of floodwater, resulting in several sharply reduced peak discharges downstream. The New York City reservoir system (excluding the Croton System in Westchester County) stored 95.5 Bgal of floodwater (mostly during January 19-20), enough to supply the 6.9 million city residents for 3.5 months.

Peak water-surface elevations were obtained along an 83-mi reach of Schoharie Creek to help document the flooding throughout the area. The profiles indicate that the January 1996 flood elevations were generally higher than those of April 1987 and were similar to those of the October 1955 flood. One exception was at the New York State Thruway bridge (Interstate 90), where the January 1996 floodwater-surface upstream from the bridge was nearly 3 ft lower than that found after the April 1987 flood, when the bridge collapsed, killing 10 people.

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FOOTNOTES FOR TABLE 5

- * Significant regulation and(or) storage possible in lakes and reservoirs upstream from site provides possible attenuation of peak discharge
- a Mean sea level
- b Maximum daily value
- c From floodmark
- d About
- e Ice-jam release
- f Ice jam (backwater from ice)
- g Different site and datum than most recent
- h Prior to current degree of regulation
- i From gage at Spier Falls
- j Affected by dam failure
- k Calculated by indirect methods
- m Undetermined amount of flow bypassing bridge at gage
- n From U.S. Army Corps of Engineers
- p Tide affected
- q Different datum than most recent
- r From National Weather Service
- s Different site than most recent
- t Affected by backwater from downstream lake or river
- \# Drainage area = 263,700 mi^2
- u International Great Lakes Datum
- v From records of Village of Attica
- w From records of City of Batavia
- x Does not include a discharge of 4,320 ft^3/s estimated by U.S. Army Corps of Engineers to have bypassed gage
- y From New York State Department of Transportation
- z Gage height from at least 200 ft upstream from gage
- aa 2.8 mi upstream (drainage area = 156 mi^2)
- bb From marks at railroad bridge near present gage
- ** Recurrence intervals for peak discharges at sites on streams with significant regulation or storage were calculated from statistical analyses of annual peak discharges during the regulated period. No adjustments were made for the amount of available storage in the reservoirs before or during floods, nor for changes in regulation procedures during the period of regulation. Other studies, such as flood-insurance studies, and other procedures, can be checked for alternative methods for determining peak discharge recurrence intervals at these sites. Many of the peak discharges were estimated because of ice conditions and ice jamming at these sites; thus, the values could be significantly in error.

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996

[Basin locations shown in fig. 1A; station locations in fig.10; mi^2, square miles; ft^3/s, cubic feet per second; RI, recurrence interval; misc, miscellaneous; dashes indicate data unavailable. Footnotes are given on p.47.]

No. on map		Station no.	Station name	Drainage area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [(ft^3/s)/mi^2]	**RI (yrs)
HOUSATONIC RIVER BASIN													
1		01199477	STONY BK NR DOVER PLAINS	1.93	1976-	04/04/87	6.40	532	19	6.32	440	228.0	20
HUDSON RIVER BASIN													
2		01311992	ARBUTUS POND OUTLET NR NEWCOMB	1.22	1991-	04/17/94	2.13	26	20	1.59	95	7.4	--
3		01312000	HUDSON RIVER NR NEWCOMB	192	1926-	01/01/49	11.40	7,440	21	6.46	3,040	15.8	<2
4	*	01314500	INDIAN LAKE NR INDIAN LAKE	131	1900-	03/28/13	[a,b]1,656.71	--	24	[a,b]1,642.78	--	--	--
5	*	01315000	INDIAN RIVER NR INDIAN LAKE	132	1912-	03/28/13	7.8	3,460	19	2.91	530	4.0	<2
6	*	01315500	HUDSON RIVER AT NORTH CREEK	792	1907-	12/31/48	12.14	28,900	19	7.88	10,200	12.9	<2
7	*	01317000	SCHROON RIVER AT RIVERBANK	527	1908-70, 1987-	03/21/36	[c]12.18	12,100	19	[c]6.44	3,450	6.5	<2
8	*	01318500	HUDSON RIVER AT HADLEY	1,664	1921-	03/27/13 01/01/49	-- 21.21	[d]49,000 42,700	20	[e]11.69	[d,e]18,000	10.8	<2
9		01321000	SACANDAGA RIVER NR HOPE	491	1911-	03/27/13 03/01/55	[c]11.0 [f]13.32	32,000 --	19	9.29	22,400	45.6	15
10	*	01323500	GREAT SACANDAGA LAKE AT CONKLINGVILLE	1,044	1930-	05/04/93	[a]773.29	--	23	[a]754.90	--	--	--
11	*	01325000	SACANDAGA RIVER AT STEWARTS BRIDGE NR HADLEY	1,055	1907-	03/28/13 05/04/83	[g]12.36 9.68	[d,h]35,500 13,300	19	5.41	4,140	3.9	<2
12	*	01327750	HUDSON RIVER AT FORT EDWARD	2,817	1899-1908, 1976-	03/28/13 05/03/83	-- 28.34	[h,i]89,100 35,200	20	25.21	20,300	7.2	<2
13		01329154	STEELE BK AT SHUSHAN	2.85	1979-	01/26/90	5.62	118	19	6.56	149	52.3	15
14		01329500	BATTEN KILL AT BATTENVILLE	394	1923-68,1987-	11/04/27	[c]17.7	21,300	20	[f]12.19	[d]8,800	22.3	5
15		01330000	GLOWEGEE CR AT WEST MILTON	26.0	1948-63,1990-	12/31/48	7.04	1,670	19	7.01	1,300	50.0	15
16		01332500	HOOSIC RIVER NR WILLIAMSTOWN MA	126	1940-	12/31/48	[g]14.85	13,000	19	10.25	5,730	45.5	4
17		01333500	LITTLE HOOSIC RIVER AT PETERSBURG	56.1	1951-	12/31/48	[c]9.4	7,470	19	[c]8.77	[d]4,400	78.4	15
18		01334000	WALLOOMSAC RIVER NR NORTH BENNINGTON VT	111	1931-	09/21/38	12.04	8,450	19	9.87	5,960	53.7	9
19		01334500	HOOSIC RIVER NR EAGLE BRIDGE	510	1910-	12/31/48	[c]21.15	55,400	20	14.16	20,900	41.0	9

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drain-age area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [(ft^3/s)/mi^2]	**RI (yrs)
20	*	01335754	HUDSON RIVER ABOVE LOCK 1 NR WATERFORD	4,611	1976-	03/15/77 03/30/84	-- 36.38	71,800 --	20	32.49	46,400	10.1	3
MOHAWK RIVER BASIN													
21	*	01335900	DELTA RESERVOIR NR ROME	148	1913-	06/22/72 04/17/94	[a,b]552.8 [a,b]552.8	-- --	22	[a,b]546.50	--	--	--
22	*	01336000	MOHAWK RIVER BELOW DELTA DAM NR ROME	152	1921-	10/02/45	11.18	8,560	24	3.90	1,020	6.7	<2
23		01342800	WEST CANADA CR AT NOBLEBORO	193	1958-76,1987-	12/29/84	[c]13.93	20,000	19	9.51	9,680	50.2	4
24	*	01343900	HINCKLEY RESERVIOR AT HINCKLEY	372	1914-	10/02/45	[a,b]1,230.2	--	23	[a,b]1215.44	--	--	--
25	*	01346000	WEST CANADA CR AT KAST BRIDGE	560	1907-18,1920-	03/26/13	-	[h]23,300	19	6.82	13,600	24.3	5
26	*	01347000	MOHAWK RIVER NR LITTLE FALLS	1,342	1927-	03/14/77	[c]19.17	33,100	19	18.47	30,700	22.9	80
27		01348000	EAST CANADA CR AT EAST CR	289	1945-1995	10/02/45 12/29/84	[c]9.00 7.68	[j]24,000 13,600	19	[c]8.32	17,000	58.8	70
28		01348420	NORTH CR NR EPHRATAH	6.52	1975-	06/29/82	8.95	540	19	5.90	230	35.3	<2
29		01349150	CANAJOHARIE CR NR CANAJOHARIE	59.7	1993-	03/30/93	[f]8.81	2,890	19	[f]8.69	3,280	54.9	--
30		01349700	EAST KILL NR JEWETT CENTER	35.6	1965-74	04/04/87	[c]11.18	11,400	19	[c,d]12.5	[d]15,000	421.3	>100
31		01349810	WEST KILL NR WEST KILL	27.0	misc.	10/16/55	--	4,880	19	--	[k]6,500	240.7	25
32	*	01349850	BATAVIA KILL AT HENSONVILLE	13.5	1972-93	08/13/55 09/12/60 04/04/87	[c]7.8 [c]8.7 5.51	[h]5,000 [h]5,000 2,390	19	[c]5.1	[d]2,000	150.4	20
33	*	01349900	BATAVIA KILL NR ASHLAND	51.2	1991-	04/04/87	[c]14.82	[k]12,700	19	[d]15.5	[d,k]14,300	279.3	--
34	*	01349950	BATAVIA KILL AT RED FALLS NR PRATTSVILLE	68.6	misc.	--	--	--	19	--	[k]16,400	239.1	--
35		01350000	SCHOHARIE CR AT PRATTSVILLE	237	1902-	10/16/55 03/05/79	19.14 [f]19.57	[m]51,600 --	19	19.39	[m]52,800	222.8	[d]50
36		01350080	MANOR KILL AT WEST CONESVILLE NR GILBOA	32.4	1986-	04/04/87	[c]10.9	4,680	19	10.20	5,050	155.9	20
37	*	01350100	SCHOHARIE RESERVOIR NR GRAND GORGE	315	1973-	10/16/55	[a]1,136.26	--	19	[a]1,136.68	--	--	--
38	*	01350101	SCHOHARIE CR AT GILBOA	316	1975-	10/16/55 04/04/87	-- [c]30.2	[d,k]65,000 56,400	19	30.60	[k]70,800	224.1	60
39		01350120	PLATTER KILL AT GILBOA	10.9	1975-	04/04/87	[c]6.4	1,210	19	[c]6.7	[k]1,370	125.7	20

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drainage area (mi^2)	Period of record	Previous maximum of record: Date	Gage height (ft)	Discharge (ft^3/s)	Flood of January 1996: Day	Gage height (ft)	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	**RI (yrs)
40		01350140	MINE KILL NR NORTH BLENHEIM	16.2	1974-	07/16/95	[c]4.57	1,700	19	[c]5.2	[k]2,550	157.4	100
41	*	01350180	SCHOHARIE CR AT NORTH BLENHEIM	358	1970-	04/04/87	[c]16.70	64,200	19	[c]17.61	75,600	211.2	70
42	*	01350355	SCHOHARIE CR AT BREAKABEEN	444	1975-	04/05/87	[d]19.5	72,200	19	20.51	80,200	180.6	70
43	*	01351500	SCHOHARIE CR AT BURTONSVILLE	886	1939-	10/16/55	12.39	76,500	20	12.88	81,600	92.1	100
44		01356190	LISHA KILL NORTHWEST OF NISKAYUNA	15.6	1993-	01/02/94 04/14/94	[f]3.47 --	-- [d]300	19	[f]6.36	662	42.4	--
45	*	01357500	MOHAWK RIVER AT COHOES	3,450	1917-	03/06/64	23.15	[e]143,000	20	22.68	132,000	38.3	100
HUDSON RIVER BASIN													
46	*	01358000	HUDSON RIVER AT GREEN ISLAND	8,090	1946-	03/19/36 12/31/48	[c]29.48 [c]27.05	[n]215,000 181,000	20	26.22	165,000	20.4	40
47	*	01359139	HUDSON RIVER AT ALBANY	8,288	1972-76,1981-	03/28/13 03/30/93	[a]21.45 [a]10.14	[d,h,p]240,000 --	20	[a]15.49	--	--	--
48	*	01359528	NORMANS KILL AT ALBANY	168	1980-83,1992-	03/22/80	13.41	11,600	19	[c]11.6	8,460	50.4	8
49		01360640	VALATIE KILL NR NASSAU	9.48	1990-	03/30/93	4.81	482	19	5.85	738	77.8	--
50		01361000	KINDERHOOK CR AT ROSSMAN	329	1906-14,1929-68,1988-	12/31/48	[c]19.8	29,800	19	10.69	12,200	37.1	10
51		01361500	CATSKILL CR AT OAK HILL	98.0	1929-77,1987-	04/04/87	[c]16.6	15,400	19	15.35	13,400	136.7	50
52		01361900	SHINGLE KILL AT CAIRO	13.9	1965-87	03/21/80	10.80	3,600	19	[c,d]9.9	[d]3,000	215.8	20
53		01362100	ROELIFF JANSEN KILL NR HILLSDALE	27.5	1958-	06/30/73	9.78	3,280	19	6.55	1,640	59.6	9
54		01362197	BUSHNELLSVILLE CR AT SHANDAKEN	11.4	1972-87,1994-	10/15/55	[c]12.40	[k]1,830	19	10.64	996	87.4	10
55		01362200	ESOPUS CR AT ALLABEN	63.7	1963-	04/04/87	[c,g]13.70	16,100	19	13.58	15,000	235.5	35
56		01362500	ESOPUS CR AT COLDBROOK	192	1914-	03/21/80	21.94	65,300	19	20.33	53,600	279.2	30
57	*	01363400	ASHOKAN RESERVOIR AT ASHOKAN	256	1913-	03/31/51	[a,b]592.23	--	24	[a,b]580.01	--	--	--
58	*	01364500	ESOPUS CR AT MOUNT MARION	419	1907-18,1970-	04/26/10 04/05/87	[q]25.10 24.78	[h]28,000 22,500	20	[c]21.72	11,600	27.7	5
59		01365000	RONDOUT CR NR LOWES CORNERS	38.3	1937-	07/22/38 04/04/87	[g]8.20 [c]10.6	7,600 6,610	19	8.61	4,950	129.2	6
60	*	01366400	RONDOUT RESERVOIR AT LACKAWACK	95.4	1951-	04/05/87	[a,b]841.49	--	22	[a,b]830.48	--	--	--

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drain-age area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [(ft^3/s)/mi^2]	**RI (yrs)
61	*	01367500	RONDOUT CR AT ROSENDALE	383	1901-03,1905-19,1926-	10/16/55	[c]36.8	35,800	20	18.95	15,000	39.2	4
62		01368500	RUTGERS CR AT GARDNERVILLE	59.7	1944-68,1987-90,1994-	08/19/55	[c]12.38	8,490	19	6.35	1,850	31.0	3
63		01371500	WALLKILL RIVER AT GARDINER	695	1924-	10/16/55	19.81	30,800	20	[f]16.36	[d]14,000	20.1	4
64		01372500	WAPPINGER CR NR WAPPINGERS FALLS	181	1928-	08/19/55	[c]19.60	18,600	20	10.33	5,600	30.9	6
65		01372800	FISHKILL CR AT HOPEWELL JUNCTION	57.3	1958-75,1987-	12/21/73 04/05/87	9.19 [c]9.62	2,770 2,710	19	[f]11.71	1,780	31.1	5
66		01374250	PEEKSKILL HOLLOW CR AT TOMPKINS CORNERS	14.9	1975-	08/07/90	4.77	1,120	19	4.11	733	49.2	6
67	*	01374505	E BR CROTON RIVER AT BREWSTER	81.2	1994-	03/30/94	5.57	998	19	4.31	342	4.2	--
68	*	01374531	E BR CROTON RIVER NR CROTON FALLS	86.4	1994-	01/20/95	4.25	781	19	4.56	1,140	13.2	--
69	*	0137462010	W BR CROTON RIVER NR CARMEL	42.9	1994-	04/04/95	2.45	146	20	1.45	37	0.9	--
70	*	01374701	W BR CROTON RIVER NR CROTON FALLS	80.4	1994-	03/29/94	3.19	753	19	2.98	630	7.8	--
71	*	01374821	TITICUS RIVER AT PURDYS STATION	23.8	1994-	01/16/95	3.83	349	20	4.41	364	15.3	--
72	*	01374941	MUSCOOT RIVER BELOW DAM AT AMAWALK	19.7	1994-	03/29/94	9.87	201	19	8.78	23	1.2	--
73	*	01375000	CROTON RIVER AT NEW CROTON DAM NR CROTON-ON-HUDSON	378	1933-	10/16/55	[c]18.44	45,400	20	6.88	4,770	12.6	3
HACKENSACK RIVER BASIN													
74	*	01376800	HACKENSACK RIVER AT WEST NYACK	30.7	1958-	02/03/73 05/30/84	[c]9.38 10.52	1,550 1,440	20	6.28	423	13.8	<2
75	*	01377000	HACKENSACK RIVER AT RIVERDALE NJ	58.0	1941-	05/17/89	8.08	2,530	19	2.04	96	1.7	<2
PASSAIC RIVER BASIN													
76	*	01387400	RAMAPO RIVER AT RAMAPO	86.9	1979-	04/05/84	13.82	10,700	20	8.34	4,120	47.4	6
77		01387410	TORNE BK AT RAMAPO	2.60	1960-	11/08/77	11.02	1,520	19	[f]7.48	[d]670	257.7	8
78	*	01387420	RAMAPO RIVER AT SUFFERN	93.0	1979-	04/05/84	15.38	12,300	20	10.99	4,970	53.4	8
79		01387450	MAHWAH RIVER NR SUFFERN	12.3	1959-95	11/08/77	9.91	1,840	19	6.87	1,120	91.1	8
DELAWARE RIVER BASIN													
80		01413290	DRY BK SOUTHEAST OF ARKVILLE	28.7	misc.	--	--	--	19	--	[k]4,840	168.6	80

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drain-age area (mi²)	Period of record	Previous maximum of record			Flood of January 1996				
						Date	Gage height (ft)	Discharge (ft³/s)	Day	Gage height (ft)	Discharge (ft³/s)	Discharge [(ft³/s)/mi²]	**RI (yrs)
81		01413400	BUSH KILL AT ARKVILLE	47.0	misc.	11/25/50	--	[k]7,370	19	--	[k]7,600	161.7	>100
82		01413500	E BR DELAWARE RIVER AT MARGARETVILLE	163	1937-	11/25/50	13.84	[m]20,600	19	14.88	[k]25,800	158.3	>100
83		0141385004	E BR DELAWARE RIVER BELOW MARGARETVILLE	173	misc.	--	--	--	19	--	[k]27,100	156.6	>100
84		01414000	PLATTE KILL AT DUNRAVEN	35.0	1942-62	11/25/50	8.01	3,810	19	[c]11.2	[k]5,690	162.6	>100
85		01414500	MILL BK NR DUNRAVEN	25.2	1937-	09/21/38 11/15/50	[c,g]7.60 9.92	4,500 3,820	19	12.56	k5,380	213.5	>100
86		01414900	TREMPER KILL SOUTH OF ANDES	30.0	misc.	--	--	--	19	--	[k]4,590	153.0	>100
87		01415000	TREMPER KILL NR ANDES	33.2	1937-	09/21/38 01/26/76	7.12 [f]7.92	4,250 --	19	[c]7.69	[k]5,000	150.6	>100
88	*	01416900	PEPACTON RESERVOIR NR DOWNSVILLE	372	1954-	04/05/60	[a,b]1,282.27	--	24	[a,b]1262.76	--	--	--
89	*	01417000	E BR DELAWARE RIVER AT DOWNSVILLE	372	1941-	11/26/50 05/30/84	[g]14.52 8.91	[h]23,900 9,820	19	4.95	2,580	6.9	3
90	*	01417500	E BR DELAWARE RIVER AT HARVARD	458	1934-67,1977-	09/22/38 05/30/84	[g]16.93 11.78	[h]31,400 11,100	19	12.63	12,200	26.6	40
91		01418500	BEAVER KILL AT CRAIGIE CLAIR	81.9	1938-74	09/27/42	10.74	10,300	19	[c]11.83	13,000	158.7	70
92		01419500	WILLOWEMOC CR NR LIVINGSTON MANOR	62.6	1938-74	07/28/69	11.03	15,700	19	[c]7.2	6,420	102.6	10
93		01420500	BEAVER KILL AT COOKS FALLS	241	1913-	03/31/51	16.02	31,600	19	[c]17.79	42,900	178.0	>100
94	*	01421000	E BR DELAWARE RIVER AT FISHS EDDY	784	1912-	10/09/03 12/21/57	[c,g]23.6 [g]17.32	[d,h]70,000 36,600	19	[c]16.88	53,000	67.6	>100
95		01422000	W BR DELAWARE RIVER AT DELHI	142	1937-74	09/21/38	8.81	8,940	19	[c]d9.8	[d]13,000	91.5	>100
96		01422500	LITTLE DELAWARE RIVER NR DELHI	49.7	1938-74	09/21/38 08/13/53	[c]8.50 7.78	3,280 4,530	19	[c]8.51	[d]6,100	122.7	>100
97		01423000	W BR DELAWARE RIVER AT WALTON	332	1950-	03/15/86	[c]14.84	19,500	19	16.36	[k]25,000	75.3	70
98		01423010	W BR DELAWARE RIVER AT BEERSTON	352	misc.	--	--	--	19	--	[k]26,200	74.4	70
99		01424000	TROUT CR NR ROCKROYAL	20.0	1953-67	11/28/59	7.57	1,920	19	[c]10.06	[d]2,800	140.0	50
100	*	01424997	CANNONSVILLE RESERVOIR AT CANNONSVILLE	454	1963-	03/16/86	[a,b]1,156.73	--	24	[a,b]1149.00	--	--	--
101	*	01425000	W BR DELAWARE RIVER AT STILESVILLE	456	1952-	03/16/86	13.07	17,800	19	6.64	112	0.2	<2

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drainage area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [$(ft^3/s)/mi^2$]	**RI (yrs)
102	*	01426500	W BR DELAWARE RIVER AT HALE EDDY	595	1912-	10/10/03 03/15/86	[c]20.30 13.63	[d,h]46,000 18,700	19	11.51	13,200	22.2	10
103		01427500	CALLICOON CR AT CALLICOON	110	1941-	08/17/47	9.68	16,000	19	8.42	11,200	101.8	45
104	*	01427510	DELAWARE RIVER AT CALLICOON	1,820	1975-	01/09/79 03/15/86	[f]14.83 13.42	-- 68,000	19	16.31	95,600	52.5	80
105	*	01428500	DELAWARE RIVER ABV LACKAWAXEN RIVER NR BARRYVILLE	2,020	1940-	08/19/55	[c]26.40	130,000	20	22.18	98,300	48.7	70
106	*	01434000	DELAWARE RIVER AT PORT JERVIS	3,070	1904-	08/19/55 02/12/81	[c]23.91 [c]f26.6	233,000 --	20	18.37	134,000	43.6	80
107		0143400680	E BR NEVERSINK RIVER NORTHEAST OF DENNING	8.93	1990-	11/28/93	5.88	1,830	19	6.21	2,030	227.3	--
108		01434010	E BR NEVERSINK RIVER AT DENNING	13.3	1984-	04/04/87	[c]6.39	4,460	19	4.87	2,680	201.5	4
109		01434017	E BR NEVERSINK RIVER NR CLARYVILLE	22.9	1991-	11/28/93	10.47	2,510	19	11.25	3,240	141.5	--
110		01434021	W BR NEVERSINK RIVER AT WINNISOOK LAKE NR FROST VALLEY	0.77	1991-	03/29/93 11/28/93	[f]2.74 2.39	-- 121	19	2.54	130	168.8	--
111		01434025	BISCUIT BK ABOVE PIGEON BK AT FROST VALLEY	3.72	1983-	04/04/87	4.37	815	19	[f]3.78	[d]400	107.5	3
112		01434105	HIGH FALLS BK AT FROST VALLEY	2.74	1990-95	11/10/90 01/01/95	2.01 [f]2.30	108 --	19	2.77	315	115.0	--
113		01434498	W BR NEVERSINK RIVER AT CLARYVILLE	33.8	1991-	11/28/93	10.00	3,970	19	11.83	8,020	237.3	--
114		01435000	NEVERSINK RIVER NR CLARYVILLE	66.6	1951-	11/25/50 04/04/87	[c,d]15.0 13.26	23,400 19,300	19	13.10	12,700	190.7	10
115	*	01435900	NEVERSINK RESERVOIR NR NEVERSINK	92.5	1953-	04/17/93	[a,b]1,441.68	--	24	[a,b]1417.25	--	--	--
116	*	01436000	NEVERSINK RIVER AT NEVERSINK	92.6	1941-	11/25/50 06/23/72	[g]11.23 8.20	[h]22,300 6,130	19	3.05	30	0.3	<2
117	*	01436690	NEVERSINK RIVER AT BRIDGEVILLE	171	1993-	04/17/93	11.70	5,400	19	11.72	5,420	31.7	--
118	*	01437500	NEVERSINK RIVER AT GODEFFROY	307	1937-	08/19/55	12.49	33,000	19	8.86	8,220	26.8	5
119	*	01438500	DELAWARE RIVER AT MONTAGUE NJ	3,480	1936-	08/19/55	35.15	250,000	20	26.66	149,000	42.8	70
120		01440000	FLAT BK NR FLATBROOKVILLE NJ	64.0	1923-	08/19/55	[c]12.58	9,560	20	6.58	2,370	37.0	5
SUSQUEHANNA RIVER BASIN													
121		01497805	LITTLE ELK CR NR WESTFORD	3.73	1978-	10/17/77	18.54	202	19	19.92	278	74.5	10

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drain-age area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [(ft^3/s)/mi^2]	**RI (yrs)
122	*	01498620	SUSQUEHANNA RIVER SOUTHWEST OF ONEONTA	678	1988-90	02/17/90	8.58	8,270	20	[f]13.27	[d]15,000	22.1	--
123	*	01500000	OULEOUT CR AT EAST SIDNEY	103	1940-	07/09/35 04/07/60	-- 6.19	[d,h,j]16,700 4,000	23	4.90	2,080	20.2	4
124	*	01500500	SUSQUEHANNA RIVER AT UNADILLA	982	1938-	03/18/36 03/14/77	[c]16.6 14.64	[n]31,300 23,500	19	[f]14.24	[d]17,100	17.4	5
125		01502500	UNADILLA RIVER AT ROCKDALE	520	1929-33,1937-	12/31/42	12.98	17,400	19	[f]12.24	[d]13,900	26.7	10
126		01502632	SUSQUEHANNA RIVER AT BAINBRIDGE	1,610	1988-	03/31/93	20.17	36,600	20	[f]21.04	[d]34,500	21.4	--
127		01502701	SUSQUEHANNA RIVER AT AFTON	1,716	1972,1977, 1979-90	03/07/79 01/25/87	17.90 [f]18.34	42,000 --	20	[c,f]17.11	[d]36,500	21.3	6
128		01502731	SUSQUEHANNA RIVER AT WINDSOR	1,820	1988-	04/01/93	19.45	37,200	20	[f]21.22	[d]40,000	22.0	--
129		01503000	SUSQUEHANNA RIVER AT CONKLIN	2,232	1912-	03/18/36	20.14	61,600	20	[f]17.55	[d]46,600	20.9	10
130		01503980	CHENANGO RIVER AT EATON	24.3	1964-65,1967-	03/06/64	c8.12	[j]2,350	19	[f]8.51	[d]1,600	65.8	20
131		01505000	CHENANGO RIVER AT SHERBURNE	263	1938-	03/18/36 03/06/79	[r]10.60 9.94	[d]12,500 10,400	19	[f]10.47	[d]8,000	30.4	10
132		01507000	CHENANGO RIVER AT GREENE	593	1937-	12/31/42	18.33	18,900	20	15.89	14,700	24.8	10
133		01509000	TIOUGHNIOGA RIVER AT CORTLAND	292	1938-	03/05/64	12.49	13,000	20	13.02	11,800	40.4	20
134		01509520	TIOUGHNIOGA RIVER AT LISLE	453	1988-	04/10/93	9.31	12,100	20	[f]10.50	[d]12,900	28.5	--
135		01510000	OTSELIC RIVER AT CINCINNATUS	147	1938-64,1969-	12/30/42	10.67	8,390	19	[f]10.89	[d]8,000	54.4	25
136		01510610	MERRILL CR TRIB NR TEXAS VALLEY	5.32	1976-81,1983-	11/11/90	4.65	1,120	19	[f]6.64	[d]1,150	216.2	50
137	*	01511500	TIOUGHNIOGA RIVER AT ITASKA	730	1930-	07/08/35 02/26/61	[c]16.61 11.15	[h]61,100 22,600	19	10.77	20,800	28.5	40
138	*	01512500	CHENANGO RIVER NR CHENANGO FORKS	1,483	1912-	07/08/35 12/30/42	[c,s]20.30 14.00	[h]96,000 41,000	20	12.48	33,700	22.8	15
139		01513500	SUSQUEHANNA RIVER AT VESTAL	3,941	1936-72,1974-	03/ /36 03/22/48	[c,d]30.50 27.73	107,000 92,400	20	27.86	89,100	22.6	25
140		01513831	SUSQUEHANNA RIVER AT OWEGO	4,216	1988-	04/11/93	31.97	76,300	20	32.97	81,400	19.3	--
141		01514000	OWEGO CR NR OWEGO	185	1930-	07/08/35	[c,s]11.50	23,500	20	[f]11.66	[d]13,200	71.4	15
142		01514801	CATATONK CR NR OWEGO	151	1988-	10/24/90	12.41	5,560	20	14.83	9,740	64.5	--

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

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143		01515000	SUSQUEHANNA RIVER NR WAVERLY	4,773	1937-	03/ /36 06/23/72	[c,d]21.40 21.24	128,000 121,000	20	20.35	102,000	21.4	10
144	*	01520500	TIOGA RIVER AT LINDLEY	771	1930-	06/23/72 03/05/79	[c]26.27 [f]14.05	[h]128,000 [d]16,000	19	12.63	13,400	17.4	7
145	*	01521500	CANISTEO RIVER AT ARKPORT	30.6	1937-	07/08/35 02/11/66	-- 4.17	[h]4,820 1,740	19	3.69	1,170	38.2	20
146	*	01523500	CANACADEA CR NR HORNELL	57.9	1940-42,1944-	07/08/35 06/23/72	[c]16.61 6.14	[h]21,000 5,880	22	3.48	1,800	31.1	3
147	*	01524500	CANISTEO RIVER BELOW CANACADEA CR AT HORNELL	158	1942-	06/23/72	[c]13.45	9,560	19	[f]6.90	[d]2,700	17.1	2
148	*	01525500	CANISTEO RIVER AT WEST CAMERON	340	1930-31,1937-	06/23/72	23.48	43,000	19	20.91	29,100	85.6	70
149		01525981	TUSCARORA CR ABV SOUTH ADDISON	102	1989-	10/23/91	10.96	11,800	19	[c,f]13.49	[d]8,700	85.3	--
150	*	01526500	TIOGA RIVER NR ERWINS	1,377	1918-	06/23/72 03/05/79	[c]26.74 13.77	[h]190,000 30,200	19	16.88	45,600	33.0	70
150A		01527000	COHOCTON RIVER AT COHOCTON	52.2	1951-	06/23/72	9.82	2,260	19	6.39	754	14.4	10
151		01528320	COHOCTON RIVER AT BATH	340	1988-	04/01/93	10.18	7,000	19	13.67	14,200	41.8	--
152		01529500	COHOCTON RIVER NR CAMPBELL	470	1918-	07/08/35	[c]11.60	41,100	19	[c]11.1	18,300	38.9	20
153	*	01529950	CHEMUNG RIVER AT CORNING	2,006	1974-	06/23/72 03/05/79	[c]40.71 24.96	[d,h]228,000 46,000	19	--	[d]61,000	30.4	45
154		01530301	CUTHRIE RUN NR BIG FLATS	5.39	1979-81,1983-	06/19/76	18.52	800	19	16.92	580	107.6	8
155	*	01530332	CHEMUNG RIVER AT ELMIRA	2,162	1988-	03/25/94	14.06	41,600	19	[c]18.51	[d]71,000	32.9	--
156	*	01530500	NEWTOWN CR AT ELMIRA	77.5	1938-	06/23/72 10/24/90	[c,t]19.28 15.41	[d,h]4,000 3,050	19	16.98	3,810	49.2	25
157	*	01531000	CHEMUNG RIVER AT CHEMUNG	2,506	1903-	06/23/72 03/06/79	[c]31.62 18.24	[h]189,000 61,500	20	19.71	77,800	31.0	35
ALLEGHENY RIVER BASIN													
158		03010734	ISCHUA CR TRIB NR MACHIAS	5.12	1978-81,1983-	09/14/79	10.59	570	19	10.33	260	50.8	2
159		03011020	ALLEGHENY RIVER AT SALAMANCA	1,608	1903-	06/23/72	[c]24.01	73,000	19	16.41	39,600	24.6	15
160	*	03013946	CHAUTAUQUA LAKE AT BEMUS POINT	189	1972-	03/05/76	[a]1,311.23	--	20	[a]1,308.52	--	--	--
161	*	03014500	CHADAKOIN RIVER AT FALCONER	194	1934-	09/14/79	4.93	2,250	24	2.52	900	4.6	<2

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

					Previous maximum of record			Flood of January 1996				
No. on map	Station no.	Station name	Drain-age area (mi^2)	Period of record	Date	Gage height (ft)	Discharge (ft^3/s)	Day	Gage height (ft)	Discharge (ft^3/s)	Discharge [(ft^3/s)/mi^2]	**RI (yrs)
LAKE ERIE BASIN												
162	04213376	CANADAWAY CR AT FREDONIA	32.9	1987-	08/07/79 01/29/94	-- [f]5.60	[d,k]12,000 --	19	5.90	3,020	91.8	4
163	04213490	S BR CATTARAUGUS CR NR OTTO	25.1	1963-	09/14/79	11.18	4,350	19	[f]9.23	[d]3,400	135.4	20
164	04213500	CATTARAUGUS CR AT GOWANDA	436	1939-	03/07/56	14.03	34,600	19	[f]13.02	[d]27,500	63.1	20
165	04214500	BUFFALO CR AT GARDENVILLE	142	1938-	06/ /37 03/01/55	-- 9.43	[d,n]16,000 11,300	19	8.10	8,410	59.2	6
166	04215000	CAYUGA CR NR LANCASTER	96.4	1938-68,1971-	06/ /37 09/14/79	-- 10.48	[d,n]18,000 9,440	19	9.40	7,450	77.3	6
167	04215500	CAZENOVIA CR AT EBENEZER	135	1940-	03/01/55	15.82	13,500	19	12.28	10,200	75.6	8
168	* 04215900	LAKE ERIE AT BUFFALO	#	1860-	12/02/85	[b,u]581.34	--	19	[b,u]572.70	--	--	--
NIAGARA RIVER BASIN												
169	* 04216000	NIAGARA RIVER AT BUFFALO	#	1860-	12/02/85	--	[b]347,000	19	--	[b]240,000	0.9	--
170	04216418	TONAWANDA CR AT ATTICA	76.9	1977-	06/23/72 12/29/84	[c,d,v]12.00 9.25	[d]6,000 4,700	19	7.86	3,150	41.0	4
171	04216500	LITTLE TONAWANDA CR AT LINDEN	22.1	1912-72,1977- 92,1995-	06/23/89	[c]16.99	2,900	19	12.00	1,880	85.1	10
172	04217000	TONAWANDA CR AT BATAVIA	171	1944-	03/ /42 03/31/60	[d,w]14.50 12.70	[d]10,000 7,200	20	10.33	4,310	25.2	3
173	04217750	MURDER CR NR AKRON	58.8	1982-	02/25/85	7.16	3,000	21	5.80	1,610	27.4	6
174	04218000	TONAWANDA CR AT RAPIDS	349	1955-65,1979-	04/01/60	16.96	[x]6,280	22	13.86	5,080	14.6	5
175	* 04218518	ELLICOTT CR BELOW WILLIAMSVILLE	81.6	1972-	02/25/85	11.19	3,640	19	9.04	2,550	31.2	4
LAKE ONTARIO BASIN												
176	04219900	JOHNSON CR NR LYNDONVILLE	87.7	1962-70,1972- 73,1976	02/17/54 03/12/62	-- 10.29	5,430 3,540	20	6.64	1,700	19.4	3
177	0422026250	NORTHRUP CR AT NORTH GREECE	11.7	1989-	05/17/74 04/22/91	-- 3.89	758 573	19	3.66	432	36.9	--
LAKE ONTARIO BASIN GENESEE RIVER BASIN												
178	04221000	GENESEE RIVER AT WELLSVILLE	288	1955-58,1972-	06/23/72	[c]20.70	38,500	19	16.13	22,700	78.8	50

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drainage area (mi²)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft³/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft³/s)	Flood of January 1996: Discharge [(ft³/s)/mi²]	**RI (yrs)
179	*	04223000	GENESEE RIVER AT PORTAGEVILLE	984	1908-	06/23/72	[c,g]35.25	[d]90,000	20	29.12	56,200	57.1	50
180	*	04224000	MOUNT MORRIS LAKE NR MOUNT MORRIS	1,080	1952-	06/25/72	[a]755.46	--	23	[a]703.70	--	--	--
181		04224775	CANASERAGA CR ABOVE DANSVILLE	88.9	1974-	06/20/89	5.70	4,050	19	8.50	7,340	82.6	50
182		04224807	STONY BK TRIB AT SOUTH DANSVILLE	3.15	1977-82,1984-91,1993-	08/03/81	15.89	790	19	11.31	296	94.0	4
183		04227000	CANASERAGA CR AT SHAKERS CROSSING	335	1958-70,1974-	05/17/16 06/23/72	[t]23.62 --	-- [d,n]11,200	19	13.01	5,510	16.4	15
184	*	04227500	GENESEE RIVER NR MOUNT MORRIS	1,424	1903-06,1908-	05/17/16 06/24/72	25.44 24.50	[h]55,100 17,800	19	12.50	7,390	5.2	<2
185	*	04227980	CONESUS LAKE NR LAKEVILLE	69.8	1963-	06/24/72	[a]822.50	--	20	[a]818.64	--	--	--
186	*	04228500	GENESEE RIVER AT AVON	1,673	1955-	06/25/72	40.67	16,500	19	34.24	11,200	6.7	5
187		04229500	HONEOYE CR AT HONEOYE FALLS	196	1945-70,1972-	06/23/72	[d]6.30	[d]6,600	20	4.62	2,820	14.4	5
188		04230380	OATKA CR AT WARSAW	39.1	1963-	06/23/72	9.75	4,010	19	9.39	3,770	96.4	--
189		04230500	OATKA CR AT GARBUTT	200	1945-	03/31/60	8.64	7,050	20	6.79	3,340	16.7	4
190		04231000	BLACK CR AT CHURCHVILLE	130	1945-	03/31/60	9.44	4,880	20	6.72	1,620	12.5	2
191	*	04232000	GENESEE RIVER AT ROCHESTER	2,467	1904-	3/18/1865 06/25/72	-- 15.89	[d,h]54,000 29,600	21	14.00	16,400	6.6	<2
LAKE ONTARIO BASIN													
192		04232034	IRONDEQUOIT CR AT RAILROAD MILLS NR FISHERS	39.2	1991-	04/02/93	9.36	588	19	8.98	532	13.6	--
193		0423204920	E BR ALLEN CR AT PITTSFORD	6.96	1990-	08/27/92	7.18	319	19	5.53	210	30.2	--
194		04232050	ALLEN CR NR ROCHESTER	30.1	1959-	05/17/74	7.42	3,280	19	4.60	725	24.1	<2
195		0423205010	IRONDEQUOIT CR ABOVE BLOSSOM RD NR ROCHESTER	142	1980-	04/02/93	9.12	1,710	19	9.02	1,590	11.2	5
LAKE ONTARIO BASIN OSWEGO RIVER BASIN													
196		04232200	CATHARINE CR AT MONTOUR FALLS	41.1	1976-77,1987-	09/26/75	6.40	1,680	19	7.66	[d]3,030	73.7	15
197	*	04232400	SENECA LAKE AT WATKINS GLEN	704	1956-	04/26/93	[a]448.95	--	23	[a]445.53	--	--	--
198	*	04232450	KEUKA LAKE AT HAMMONDSPORT	182	1960-	06/24/72	[a]719.35	--	21	[a]714.00	--	--	--

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drain-age area (mi²)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft³/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft³/s)	Flood of January 1996: Discharge [(ft³/s)/mi²]	**RI (yrs)
199		04232460	SUGAR CR AT GUYANOGA	28.9	1966-	07/31/92	4.97	1,270	19	[f]5.88	[d]1,800	62.3	40
200	*	04232482	KEUKA LAKE OUTLET AT DRESDEN	207	1965-	06/22/72	8.37	4,000	19	7.14	2,520	12.2	8
201		04233000	CAYUGA INLET NR ITHACA	35.2	1937-	06/23/72	8.10	4,800	19	7.57	4,210	119.6	35
202		04233255	CAYUGA INLET AT ITHACA	86.7	1971-72,1975-	06/23/72	14.60	11,800	19	14.67	12,500	144.2	45
203		04233258	COY GLEN CR AT ITHACA	3.56	1983-	10/23/90	20.87	530	19	22.25	824	231.5	25
204	*	04233500	CAYUGA LAKE AT ITHACA	785	1956-	04/26/93	[a]386.46	--	23	[a]381.96	--	--	--
205		04234000	FALL CR NR ITHACA	126	1925-	07/08/35	9.52	[d]15,500	19	7.47	9,450	75.0	60
206		04234138	SCHAEFFER CR NR CANANDAIGUA	7.84	1977-	03/05/79 03/30/93	-- 12.84	[d]520 332	19	11.55	230	29.3	<2
207		04234200	MUD CR AT EAST VICTOR	64.2	1958-68,1976-	04/21/91	7.22	1,880	19	7.09	1,810	28.2	10
208	*	04234500	CANANDAIGUA LAKE AT CANANDAIGUA	184	1939-	06/24/72	[a]692.11	--	21	[a]688.53	--	--	--
209	*	04235000	CANANDAIGUA OUTLET AT CHAPIN	195	1939-	06/24/72	[s]11.08	1,710	24	5.17	564	2.9	<2
210		04235255	CANANDAIGUA OUTLET TRIB NR ALLOWAY	2.94	1978-	01/20/86	7.22	97	19	7.34	102	34.7	10
211	*	04235396	OWASCO LAKE NR AUBURN	205	1912-	03/23/36	[a]716.91	--	21	[a]713.24	--	--	--
212	*	04235500	OWASCO OUTLET NR AUBURN	206	1912-	06/23/72	6.28	3,250	20	4.17	1,850	9.0	6
213	*	04237500	SENECA RIVER AT BALDWINSVILLE	3,138	1949-	03/25/36 04/27/93	-- --	[b,y]22,100 [b]18,100	20	5.78	[b]9,190	2.9	<2
214	*	04238500	ONONDAGA RESERVOIR NR NEDROW	67.7	1952-	04/01/60	[a]485.90	--	20	[a]481.83	--	--	--
215	*	04239000	ONONDAGA CR AT DORWIN AVE SYRACUSE	88.5	1951-	07/03/74	6.48	3,260	19	5.59	2,170	24.5	8
216	*	04240010	ONONDAGA CR AT SPENCER ST SYRACUSE	110	1970-	07/03/74	8.73	4,050	19	7.68	2,400	21.8	4
217	*	04240100	HARBOR BK AT SYRACUSE	10.0	1959-	07/03/74	[g]8.34	726	19	5.63	270	27.0	3
218	*	04240105	HARBOR BK AT HIAWATHA BLVD SYRACUSE	11.3	1970-	07/03/74	7.91	824	19	6.17	475	42.0	2
219		04240120	LEY CR AT PARK STREET SYRACUSE	29.9	1972-	09/26/75 04/26/93	6.25 [t]7.02	1,310 --	19	4.42	780	26.1	3
220	*	04240180	NINEMILE CR NR MARIETTA	45.1	1964-	06/23/72	8.65	1,030	19	5.42	353	7.8	3
221	*	04240200	NINEMILE CR AT CAMILLUS	84.3	1958-82,1988-	03/30/60	8.25	2,760	19	8.92	2,530	30.0	15

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

No. on map		Station no.	Station name	Drainage area (mi^2)	Period of record	Previous maximum of record: Date	Previous maximum of record: Gage height (ft)	Previous maximum of record: Discharge (ft^3/s)	Flood of January 1996: Day	Flood of January 1996: Gage height (ft)	Flood of January 1996: Discharge (ft^3/s)	Flood of January 1996: Discharge [(ft^3/s)/mi^2]	**RI (yrs)
222	*	04240495	ONONDAGA LAKE AT LIVERPOOL	285	1970-	04/26/93	[a]369.78	--	20	[a]365.98	--	--	--
223		04243500	ONEIDA CR AT ONEIDA	113	1949-	10/09/76	15.01	9,110	19	14.51	8,110	71.8	20
224		04245200	BUTTERNUT CR NR JAMESVILLE	32.2	1958-	07/03/74 10/28/81	7.84 8.46	2,820 1,880	19	[f]8.99	[d]1,850	57.5	15
225		04245236	MEADOW BK AT HURLBURT RD SYRACUSE	2.90	1970-	07/03/74	6.51	418	19	2.99	101	34.8	<2
226		04245840	SCRIBA CR NR CONSTANTIA	38.4	1966-	09/26/75	7.33	1,310	19	5.86	760	19.8	2
227	*	04246000	ONEIDA LAKE AT BREWERTON	1,382	1951-	04/24/93	[a]373.14	--	22	[a]369.02	--	--	--
228	*	04246500	ONEIDA RIVER AT CAUGHDENOY	1382	1902-12,1947-	03/25/03	--	[b]13,800	29	8.8	[b]5,660	4.1	<2
229	*	04249000	OSWEGO RIVER AT LOCK 7 OSWEGO	5,100	1900-06,1933-	03/28/36	13.10	37,500	20	10.20	23,400	4.6	3
LAKE ONTARIO BASIN													
230		04249050	CATFISH CR AT NEW HAVEN	31.7	1962-66,1968-	03/18/73	7.85	1,350	19	6.58	906	28.6	9
231		042490673	N BR GRINDSTONE CR NR ALTMAR	11.2	1976-	03/13/77	15.03	482	19	8.94	250	22.3	<2
232		04249200	N BR SALMON RIVER AT REDFIELD	82.5	1962-64,1987-	12/29/84	[c]19.15	[k]13,600	19	15.37	3,390	41.1	<2
233	*	04250200	SALMON RIVER AT PINEVILLE	238	1992-	12/29/84	16.36	[k]24,800	20	8.40	2,870	12.1	--
234		04250750	SANDY CR NR ADAMS	128	1957-	02/25/85	11.05	7,690	19	[c]11.06	7,700	60.2	20
LAKE ONTARIO BASIN BLACK RIVER BASIN													
235	*	04252500	BLACK RIVER NR BOONVILLE	304	1911-	12/30/84 02/21/81	11.41 [f]13.10	12,800 --	20	[f]10.72	4,730	15.6	<2
236	*	04253300	SIXTH LAKE AT OLD FORGE	18.6	1911-	10/03/45	[a,b]1,787.1	--	20	[a,b]1783.30	--	--	--
237	*	04253400	FIRST LAKE AT OLD FORGE	53.6	1911-	06/17/72	[a,b]1,707.9	--	24	[a,b]1704.04	--	--	--
238	*	04254500	MOOSE RIVER AT MCKEEVER	363	1901-70,1987-	06/03/47	[c]17.45	[j]18,700	20	[f]14.57	8,500	23.4	4
239		04256000	INDEPENDENCE RIVER AT DONNATTSBURG	88.7	1942-	12/30/84	13.34	9,420	20	[f]7.86	[d]2,100	23.7	3
240		04256040	TRIB TO MILL CR TRIB NR LOWVILLE	1.66	1976-86,1993-	03/05/79	13.41	312	19	12.14	228	137.3	4
241	*	04256500	STILLWATER RESERVOIR NR BEAVER RIVER	171	1908-	05/20/69	[a,b]1,680.08	--	24	[a,b]1671.22	--	--	--
242	*	04258000	BEAVER RIVER AT CROGHAN	291	1930-	05/21/69	6.98	5,100	20	5.05	2,460	8.5	4

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

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243		04258700	DEER RIVER AT DEER RIVER	94.8	1957-	03/06/79 12/29/84	[f]11.10 [c]10.63	-- 17,200	19	8.23	11,500	121.3	25
244	*	04260500	BLACK RIVER AT WATERTOWN	1,864	1920-	04/12/93	14.2	42,600	22	9.30	21,700	11.7	2
ST. LAWRENCE RIVER MAIN STEM													
245	*	04260990	CRANBERRY LAKE AT CRANBERRY LAKE	140	1923-	05/13/71	[a,b]1,488.25	--	24	[a,b]1485.85	--	--	--
246	*	04262000	OSWEGATCHIE RIVER NR OSWEGATCHIE	259	1924-68,1987-	04/12/47	6.98	4,090	19	6.26	3,100	12.0	5
247		04262500	W BR OSWEGATCHIE RIVER NR HARRISVILLE	244	1916-	04/11/93	9.52	7,090	20	8.87	6,230	25.5	20
248	*	04263000	OSWEGATCHIE RIVER NR HEUVELTON	965	1916-	04/06/60	10.36	19,600	23	7.34	10,700	11.1	4
249		04265100	ELM CR NR HERMON	32.6	1959-	04/06/74	9.07	[d]1,270	19	8.82	1,180	36.2	20
250	*	04266500	RAQUETTE RIVER AT PIERCEFIELD	721	1908-	04/27/93	12.04	8,630	24	8.31	3,290	4.6	<2
251	*	04267500	RAQUETTE RIVER AT SOUTH COLTON	937	1953-	05/11/71	9.80	9,720	24	6.17	3,620	3.9	<2
252	*	04268000	RAQUETTE RIVER AT RAYMONDVILLE	1,125	1943-	02/22/54 04/05/74	[f]9.24 8.40	-- 13,000	20	[f]8.49	[d]7,000	7.1	<2
253		04268200	PLUM BK NR GRANTVILLE	43.9	1959-	03/30/63 03/11/92	6.94 [f]7.86	1,920 --	19	5.66	812	18.5	3
254		04268800	W BR ST. REGIS RIVER NR PARISHVILLE	171	1958-	12/29/84 02/25/85	7.37 [f]7.51	5,960 --	20	6.05	4,040	23.6	9
255		04269000	ST. REGIS RIVER AT BRASHER CENTER	612	1910-17,1919-	04/06/37 08/06/95	[d,f]15.3 20.35	16,800 33	20	10.72	9,670	15.8	5
256		04269856	DUANE STREAM SOUTHEAST OF DUANE CENTER	1.80	1995-	08/06/95	20.35	33	19	19.25	22	12.2	<2
257	*	04270000	SALMON RIVER AT CHASM FALLS	132	1925-82,1985-	12/29/84	[c]5.63	3,700	20	3.37	1,230	9.3	<2
258		04270200	LITTLE SALMON RIVER AT BOMBAY	92.2	1958-95	04/04/74	12.90	3,250	19	[c]9.21	1,770	19.2	2
259		04270700	TROUT RIVER AT TROUT RIVER	107	1960-	04/05/74 03/10/92	9.10 [f]10.43	6,490 --	20	[f]8.87	[d]4,500	42.1	10
ST. LAWRENCE RIVER MAIN STEM **LAKE CHAMPLAIN BASIN**													
260	*	04271500	GREAT CHAZY RIVER AT PERRY MILLS	247	1929-68,1986-	04/07/37 03/09/46	9.74 [c,f]11.50	6,000 --	20	[f]9.24	[d]4,500	18.2	5
261	*	04271815	LITTLE CHAZY RIVER NR CHAZY	52.8	1990-	03/17/90	9.20	766	20	[f]10.07	[d]850	16.1	--

Table 5. Peak stages and discharges for New York floods of January 19-20, 1996 (continued)

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262	*	04273500	SARANAC RIVER AT PLATTSBURGH	608	1903-30,1943-	04/08/28 12/30/84	-- 10.08	11,500 10,100	20	6.73	4,120	6.8	<2
263		04273700	SALMON RIVER AT SOUTH PLATTSBURGH	61.9	1959-86,1990-	04/03/60 03/27/92	[f]7.31 5.66	-- [e]2,220	20	[f]5.70	895	14.5	3
264		04273800	LITTLE AUSABLE RIVER NR VALCOUR	67.8	1991-	03/30/93 04/23/93	[f]5.48 4.37	-- 1,160	19	3.89	[d]1,050	15.5	--
265		04274000	W BR AUSABLE RIVER NR LAKE PLACID	116	1917,1920-68, 1983-	09/22/38	12.20	10,800	19	10.17	6,910	59.6	35
266	*	04275000	E BR AUSABLE RIVER AT AU SABLE FORKS	198	1924-	09/22/38 02/23/90	12.91 [f]13.96	20,100 --	19	[f]11.93	[d]14,000	70.7	35
267	*	04275500	AUSABLE RIVER NR AU SABLE FORKS	448	1910-68,1990-	09/22/38 03/13/90	11.65 [f,z]14.5	24,200 --	20	[f]11.02	[d]20,000	44.6	30
268	*	04276069	HIGHLANDS FORGE LAKE OUTLET NR WILLSBORO	10.9	1990-	04/04/90 03/21/94	6.21 [f]7.77	149 --	19	[f]6.29	[d]120	11.0	--
269	*	04276500	BOUQUET RIVER AT WILLSBORO	275	1923-68,1986-	10/01/24	10.85	11,800	20	[f]10.88	[d]9,600	34.9	30
270		04276645	HOISINGTON BK AT WESTPORT	6.47	1990-	08/13/90 03/11/92	5.90 [f]6.39	444 --	19	[f]6.47	[d]200	30.9	--
271		04276770	MILL BK AT PORT HENRY	27.0	1990-	04/17/93	4.22	1,240	19	4.97	1,290	47.8	--
272		04276842	PUTNAM CR EAST OF CROWN POINT CENTER	51.6	1990-	04/17/93	[d]7.5	[d]2,500	20	[f]7.32	1,830	35.5	--
273	*	04278000	LAKE GEORGE AT ROGERS ROCK	233	1913-	04/09/36	[a]321.15	--	21	[a] 319.95	--	--	--
274		04278300	NORTHWEST BAY BK NR BOLTON LANDING	22.0	1965-	02/11/81	[f]7.14	1,770	19	[f]6.58	1,950	88.6	45
275		04279040	MILL BR AT PUTNAM	10.3	1990-	10/24/90	4.67	454	19	5.19	681	66.1	--
276		04279125	MOUNT HOPE BK AT SOUTH BAY NR WHITEHALL	11.6	1990-	04/17/93	6.95	731	19	7.48	880	75.9	--
277	*	04280000	POULTNEY RIVER BELOW FAIR HAVEN VT	187	1928-	07/20/45	[c]24.36	14,800	20	20.91	10,200	54.5	40
278		04280450	METTAWEE RIVER NR MIDDLE GRANVILLE	167	1990-	05/31/84 03/29/93	-- 8.56	[aa]5,380 4,880	20	10.69	[d]7,500	44.9	--
279	*	04295000	LAKE CHAMPLAIN AT ROUSES POINT	8,277	1871-	5/04/1869 04/25/93	[a,bb]102.1 [a]101.88	-- --	23	[a,b]97.74	--	--	--