

FLOOD OF NOVEMBER 26-27, 1979, IN ESSEX COUNTY, NEW YORK

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CONVERSION FACTORS AND ABBREVIATIONS

The following factors may be used to convert units of measurement used in this report to the International System (SI) of metric units.

<u>Multiply Inch-Pound Units</u>	<u>By</u>	<u>To obtain SI units</u>
inch (in)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi ²)	2.590	kilometer (km ²)
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)

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ABSTRACT

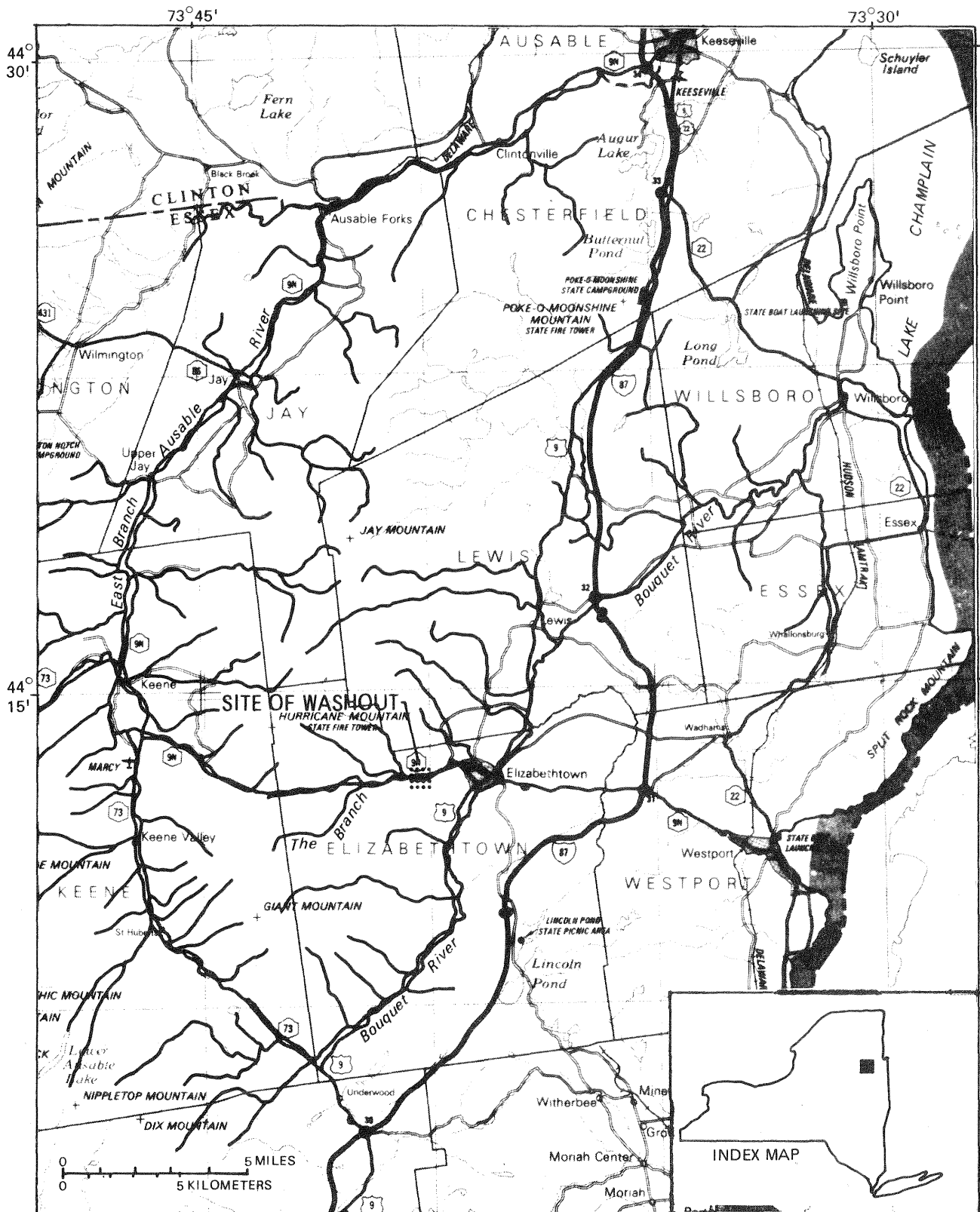
On November 26-27, 1979, flash flooding of several streams in Essex County resulted in five deaths and millions of dollars' worth in property damage. The most severe flooding was in the headwaters of the Bouquet and East Branch Ausable river basins. Peak discharge of The Branch, the Bouquet River tributary on which a section of highway washed out, was 6,600 cubic feet per second at a measurement site 1 mile west of Elizabethtown. The recurrence interval of this discharge is estimated to be greater than 100 years (exceedance probability less than 0.01).

INTRODUCTION

On the evening of November 26, 1979, flash flooding of several streams in Essex County resulted in five deaths and millions of dollars' worth in damage to highways, bridges, and private property (Brady, 1979). The fatalities occurred on The Branch, a tributary to the Bouquet River, at a washout of New York State Highway 9N about 2 miles west of Elizabethtown (fig. 1). The storm was localized; runoff patterns indicate that its heaviest intensity was at the headwaters of the Bouquet and East Branch Ausable Rivers. At the gaging station on East Branch Ausable River at Au Sable Forks (station 04275000), the flood was the largest since the New Year's Flood of 1949, and, at the crest-stage gage on the Bouquet River at New Russia (04276200), it was the largest in the gage's 31-year period of operation.

The severity was not evident from the precipitation gage data. A total of 2.73 inches (0.96 inches on November 25 and 1.77 inches on November 26) was measured at the National Weather Service (NWS) nonrecording precipitation gage in Elizabethtown, but a survey made by NWS after the storm indicates that rainfall totals could have exceeded 5 inches in the mountains south and west of Elizabethtown.

Figure 1 shows location of major streams and highways in the area; figure 2 shows the collapsed part of Highway 9N.



Base from N.Y.S. Department of Transportation, 1980
NORTH SHEET, 1:250,000

Figure 1.--Major geographic features of Bouquet River and
The Branch basins, Elizabethtown, N.Y.



Figure 2.--Washout of New York State Highway 9N along The Branch near Elizabethtown, N.Y., November 26-27, 1979. Top, view from highway, looking east; bottom, view from river bank, looking west.

Purpose and Scope

As part of a continuing program with the New York State Department of Transportation to document major floods in New York State, the U.S. Geological Survey compiled hydrologic data on this flood from both active and discontinued stream-gaging stations in northeastern New York and made an indirect discharge measurement to determine peak flow of The Branch 0.7 mile downstream from the site of the washout on Highway 9N. This report presents data on the 1979 flood in comparison to record floods within the region and gives the recurrence interval of the peak discharges of selected streams.

Acknowledgments

Rainfall data for the November 26-27 storm were provided by the National Weather Service in Albany, N.Y., and the Atmospheric Sciences Research Center, Albany, N.Y.

FLOOD DISCHARGES

Although the most severe floods were in the Bouquet and East Branch Ausable River basins (fig. 1), high water occurred throughout much of northeastern New York. Peak-discharge data collected at gaging stations are presented in table 1; location of the gaging stations is shown in figure 3.

In addition to the compilations mentioned above, an indirect discharge measurement was made by the slope-area method (Dalrymple and Benson, 1967) on The Branch 1.0 mi west of Elizabethtown and 0.7 mi downstream from the washout on Highway 9N. The slope-area reach had four sections and a computed discharge of 6,600 ft³/s. Average cross-sectional flow velocities in the slope-area reach ranged from 12.2 ft/s to 14.2 ft/s.

FLOOD FREQUENCY

The discharge-frequency relationship of a streamflow-measurement site is generally expressed in terms of recurrence interval or exceedance probability. (Recurrence interval is, conceptually, the average time interval between actual occurrences of a flood of equal or greater magnitude. Exceedance probability, the reciprocal of recurrence interval, is the probability that a flood of specified magnitude will be equaled or exceeded in any one year.)

Table 1.--Summary of flood discharges in northeastern New York during flood of November 26-27, 1979

[Station locations are shown in fig. 3]

Station number	Stream and measurement site	Drainage area (mi ²)	Period of record	Maximum flood previously known			Maximum during November 1979					
				Date	Gage height (ft)	Discharge		Date	Time	Gage height (ft)	Discharge	
						ft ³ /s	(ft ³ /s)/mi ²				ft ³ /s	(ft ³ /s)/mi ²
HUDSON RIVER BASIN												
01312000	Hudson River at Newcomb	192	1925-	01-01-49	11.40	7,440	38.8	26	2400	7.14	3,370	17.6
01315000	Indian River near Indian Lake	132	1912-14 1915-	03-28-13	7.8	3,460	26.2	26	2000	2.76	486	3.7
01315500	Hudson River at North Creek	792	1907-	12-31-48	12.14	28,900	36.5	27	1230	8.98	13,300	16.8
01318500	Hudson River at Hadley	1664	1921-	01-01-49	21.21	42,700	25.7	27	2100	10.44	16,400	9.9
01319800	West Branch Sacandaga River at Arietta	28.9	1963-	03-05-64	12.73	1,860	64.4	27	-	11.02	1,050	36.3
01321000	Sacandaga River near Hope	491	1911-	03-27-13	11.0	32,000	65.2	27	0230	7.93	14,900	30.3
01327750	Hudson River at Ft. Edward	2817	1976-	04-29-79	28.09	34,000	12.1	28	0300	25.12	20,900	7.4
01328000	Bond Creek at Dunham Basin	14.7	1943-	12-31-48	8.52	1,370	93.2	27	0115	3.63	207	14.1
ST. LAWRENCE RIVER BASIN												
04261000	Oswegatchie River at Cranberry Lake	144	1923-	05-13-43	7.70	1,940	13.5	30	1800	5.79	630	4.4
04266500	Raquette River at Piercefield	722	1908-	05-08-72	12.25	8,360	11.6	30	0330	8.12	3,000	4.2
04270000	Salmon River at Chasm Falls	132	1925-	04-25-26	5.0	2,890	21.9	27	0745	2.99	939	7.1
STREAMS DRAINING INTO LAKE CHAMPLAIN												
04273500	Saranac River at Plattsburg	608	1903-30 1943-	04-08-28	-	11,500	18.9	27	1600	5.46	2,210	3.6
04273700	Saranac River at South Plattsburg	61.9	1960-68, 69, 71-	03-05-74	5.60	1,600	25.8	27	0600	2.55	230	3.7
04274000	West Branch Ausable River near Lake Placid	116	1916-17 1919-68	09-22-38	12.20	10,800	93.1	27	0100	8.36	4,260	36.7
04275000	East Branch Ausable River at Au Sable Forks	198	1924-	09-22-38	12.91	20,100	102	27	0300	11.13	15,200	76.8
04275500	Ausable River near Au Sable Forks	448	1910-68	09-22-38	11.65	24,200	54.0	27	-	10.13	18,000	40.2
04276200	Bouquet River at New Russia	37.6	1949, 51, 53, 56-63, 65-67, 71-73, 77	12-21-57	13.50	4,480	119	26	-	16.76	6,400	170
04276215	The Branch near Elizabethtown	19.1	-	-	-	-	-	26	-	-	6,600	345
04276500	Bouquet River at Willsboro	275	1923-68	10-01-24	10.85	11,800	42.9	27	-	9.6	9,300	33.8
04278300	Northwest Bay Brook near Bolton Landing	23.4	1965-	12-21-73	6.15	1,650	70.5	26	2215	4.42	769	32.9

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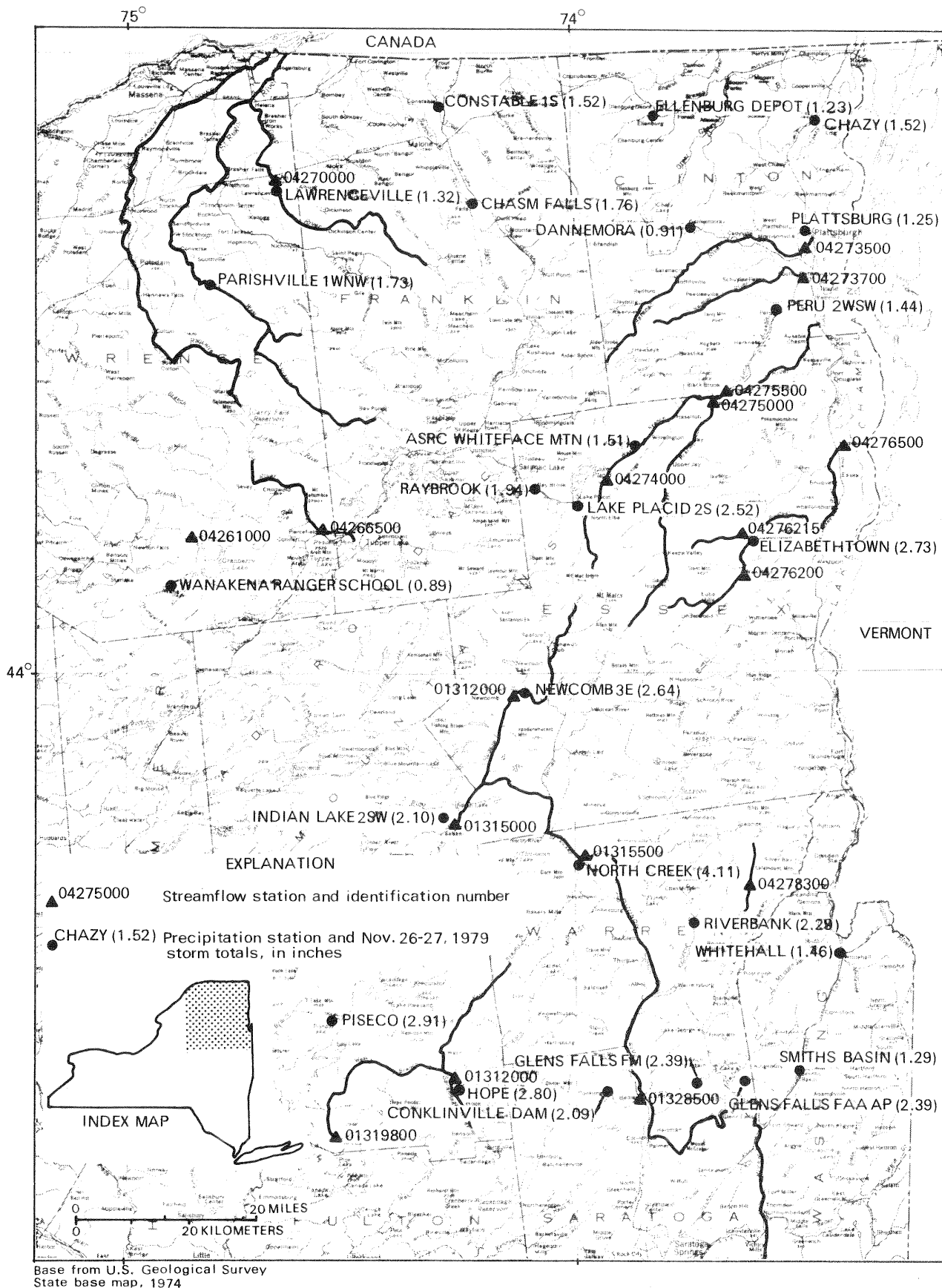


Figure 3.--Location of gaging stations and precipitation gages in northeastern New York.

Recurrence intervals were assigned to the discharges on the gaged streams that had the most severe flooding (recurrence interval equal to or greater than 2 years). These probabilities, listed in table 2, are based on the frequency curves computed for these stations by Zembrzuski and Dunn (1979).

A flood-frequency curve was developed for The Branch at the site of the indirect measurement by procedures outlined by Zembrzuski and Dunn (1979) for ungaged rural streams (fig. 4). This curve indicates that the recurrence interval of the November 26 flood was greater than 100 years.

Table 2.--Recurrence interval of discharges of selected streams during flood of November 26-27, 1979, Elizabethtown, N.Y.

[Station locations are shown in fig. 3]

Station Number	Stream name and Location	Discharge (ft ³ /s)	Recurrence interval
01315500	Hudson River at North Creek	13,300	2
01319800	West Branch Sacandaga River at Arietta	1,050	2
01321000	Sacandaga River near Hope	14,900	3
04274000	West Branch Ausable River near Lake Placid	4,260	5
04275000	East Branch Ausable River at Au Sable Forks	15,200	50
04275500	Ausable River near Au Sable Forks	18,000	15
04276200	Bouquet River at New Russia	6,400	>100
04276215	The Branch near Elizabethtown	6,600	>100
04276500	Bouquet River at Willsboro	9,300	25

PRECIPITATION

Location of precipitation gages in the region and their measured totals from the November 25-26, 1979 storm are given in figure 2. It is difficult to estimate the intensity of that storm because, in areas of most severe flooding, no recording rainfall gages have been installed. The recording precipitation gage closest to Elizabethtown is at the Atmospheric Sciences Research Center on Whiteface Mountain, about 20 miles north of Elizabethtown. The heaviest rain fell during a 3-hour period, beginning at about 1700 hours on November 26, during which time 0.80 inch was recorded.

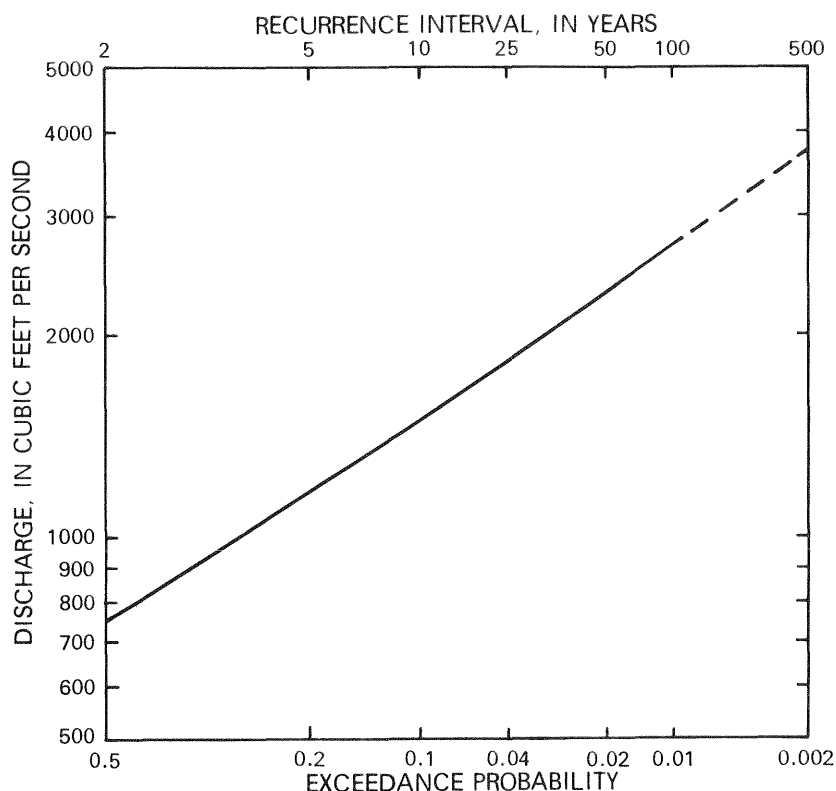


Figure 4.--Flood-frequency curve for station 04276215
The Branch near Elizabethtown, N.Y.

The National Weather Service observer in Elizabethtown measured 1.45 inches between 1300 hours on November 26 and 0800 hours the next day. At North Creek, where the greatest storm total was recorded, the observer noted that 1.52 inches fell on November 26 between 1300 and 1730 hours, and that an additional 0.83 inches fell between 1730 and 1900 hours.

NWS made an inspection trip after the storm in an attempt to further document rainfall totals but achieved only slight success because the mountains surrounding the flooded areas are sparsely populated. A container found 1 mile south of Keene (fig. 1) had collected 5 inches of rain during the storm. Data from the precipitation-gage network do not corroborate the severity of the floods on some of the streams. Rainfall-frequency relationships for storms of 3-hour and 6-hour duration (U.S. Weather Bureau, 1961) are given in table 3.

Much higher intensities and storm totals are likely in the headwaters of the Bouquet River basin and its tributaries than were indicated by the precipitation gages.

Table 3.--Rainfall-frequency relationships for storms of 3- and 6-hour duration, Essex County, N.Y.

[Data from U.S. Weather Bureau, 1961]

Recurrence interval (years)	Depth for 3-hour duration (inches)	Depth for 6-hour duration (inches)
1	1.2	1.5
2	1.5	1.8
5	1.9	2.3
10	2.2	2.6
25	2.5	3.0
50	2.9	3.5
100	3.2	3.8

SUMMARY

A storm on November 25 and 26, 1979, in northeastern New York, resulted in flash flooding of several streams in Essex County. Floodwaters from The Branch, a tributary to the Bouquet River, caused a washout of State Highway 9N, 2 miles west of Elizabethtown, that claimed five lives. Peak discharge of The Branch at a measurement site 0.7 mile downstream from the washout was 6,600 ft³/s; peak discharge at the crest-stage gage on the Bouquet River at New Russia (station 04276200), was 6,400 ft³/s, the highest in its 31-year period of record. The recurrence interval of both discharges is greater than 100 years. The recurrence interval of the flood on East Branch Ausable River at Au Sable Forks (station 04275000) is 50 years.

Rainfall data from the precipitation-gage network do not corroborate the severity of the floods on some of the streams. Although only 2.73 inches was measured at the gage in Elizabethtown, an unofficial report from the mountains west of Elizabethtown indicates that rainfall totals could have exceeded 5 inches in some areas.

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