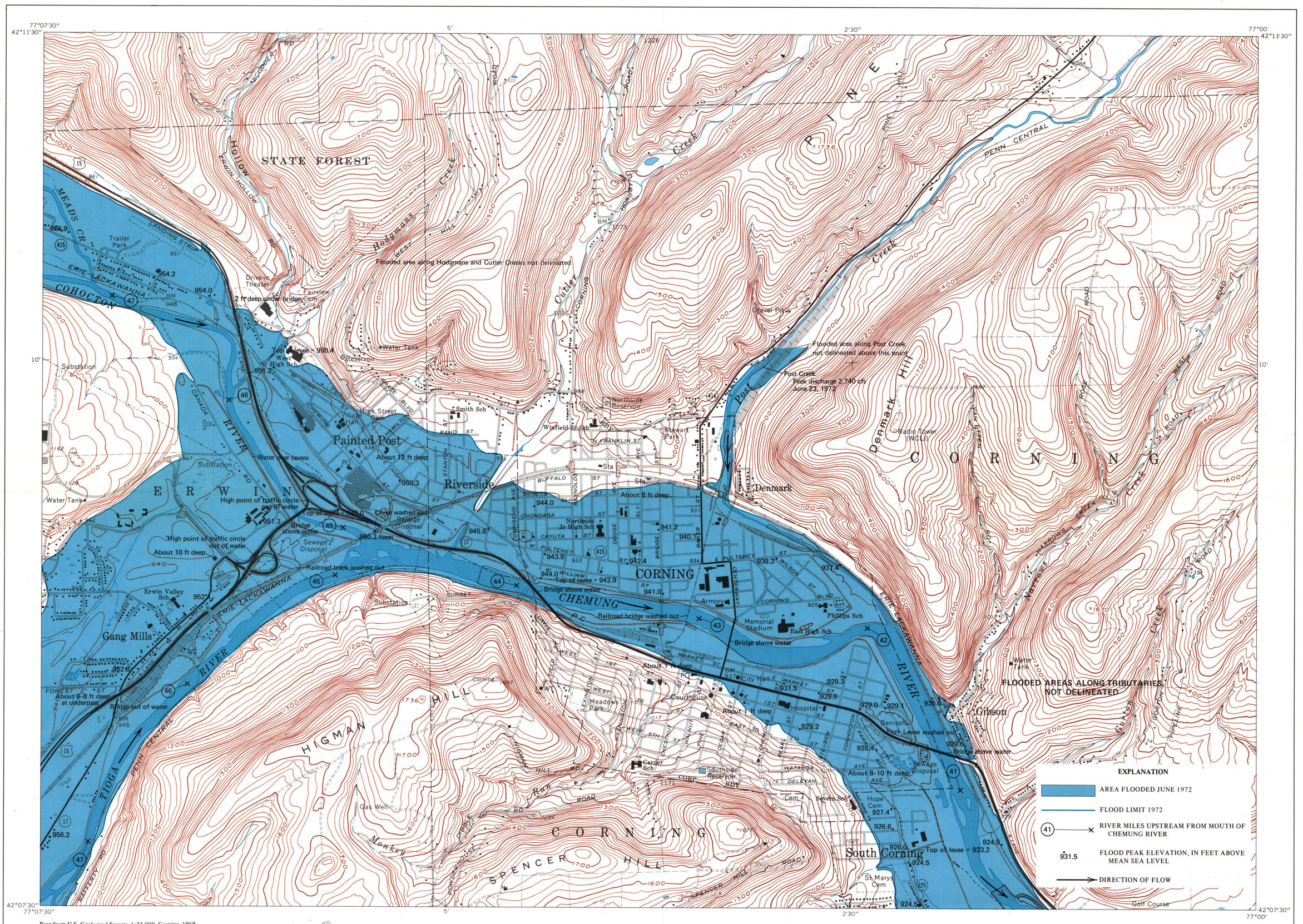
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

HYDROLOGIC INVESTIGATIONS
ATLAS HA-519



FLOOD OF JUNE 1972 AT CORNING, NEW YORK

Introduction.—The greatest flood disaster in the history of New York occurred during late June 1972 as a result of torrential rains brought by the remnants of Tropical Storm Agnes. The city of Corning, in southwest-central New York, was subjected to the full fury of the flood as crests from the Tioga, Canisteo, and Cohocton Rivers moved into the Chemung River at Corning. Heavy loss of life and property were sustained in the city of Corning and in nearby communities of Gang Mills, Painted Post, Riverside, and South Corning. According to newspaper reports, at least 18 persons lost their lives during the flood at Corning.

Many floodmarks were identified along the Chemung River in Corning and along the Tioga and Cohocton Rivers. The latter two rivers merge to form the Chemung River just west of Corning. Elevations of the floodmarks were determined by leveling to benchmarks. The flood boundary was delineated from field surveys made soon after the flood.

This atlas presents high-water elevations, extent of flooding, streamflow information of the June 1972 flood at Corning, and historic data of previous floods. It will aid individuals, government agencies, and others responsible for alleviating existing flood problems. The atlas should be useful to officials responsible for flood-zoning decisions and for the design of facilities to be built in the proximity of major streams.

Precipitation.—The flood was produced by intense rainfall, resulting from Tropical Storm Agnes, which fell over the entire Chemung River basin during the period June 20–25. Precipitation was virtually continuous during a 50-hour period beginning late on June 20, but its intensity was greatest in the two periods midnight to 8 a.m. on June 21 and 4 p.m. to midnight on June 22. As a result, many streams experienced two peaks during the flood. Twenty-four hour precipitation totals exceeded 7 inches in the western Chemung River and the eastern Genesee River basins. National Weather Service records indicated rainfall totals of more than 13 inches from June 20 to 25 in the western part of the Chemung River basin, and unofficial estimates of as much as 16 inches were reported. The precipitation at Hornell illustrates the rainfall pattern that occurred in the headwaters of the Chemung River basin. Amounts of bi-hourly (every 2 hours) precipitation at Hornell are plotted in figure 1 for the period June 20–23, 1972.

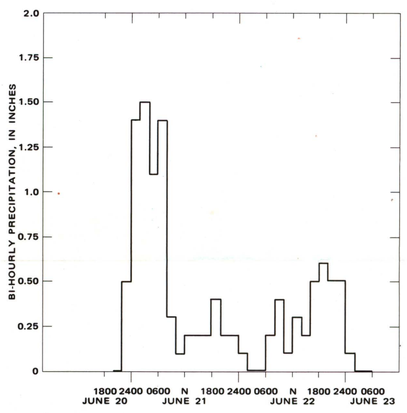


Figure 1. — *Bi-hourly (every 2 hours) precipitation at Hornell, New York, June 20–23, 1972.*

Flood heights.—The peak water level at a gaging station is commonly stated in terms of gage height (stage), which is the height in feet above an arbitrary datum plane chosen to provide convenient readings over the range in stage at the site. Stages may be converted to elevations above mean sea level by adding the appropriate datum shown in table 1 to the gage height.

Flood discharge.—In most engineering studies, the discharge, or quantity of water passing a given river section in a unit of time, is the most useful type of stream information. Discharge is commonly expressed in cubic feet per second (cfs). The peak discharge is the maximum discharge that occurs during a flood and generally occurs at the same time as the peak stage unless the stream is affected by backwater.

Streamflow records available.—No continuous-record gaging stations are in operation in the area covered by this atlas. However, continuous records are available for the Chemung River at Chemung (30 miles downstream from Corning) and for the major tributaries that join to form the Chemung River. Peak discharges were measured at ungaged sites on Canisteo River near Erwins, on Post Creek at Corning, and on Sing Sing Creek near Big Flats. In addition, the National Weather Service has obtained periodic high-water gage readings since 1913 from a gage at Bridge Street in Corning. Historical data for this site dating back to 1865 have been compiled by the U.S. Army Corps of Engineers.

A summary of the gaging sites and the 1972 peak stage and discharge is given in table 1.

Table 1.—*Peak stages and discharges, Chemung River basin, flood of June 23, 1972*

Station	Drainage area (square miles)	Gage height (feet)	Peak discharge (cfs)	Datum of gage above mean sea level (feet)
Tioga River at Lindley	771	26.27	128,000	963.94
Canisteo River at Erwins	551	.....	52,000	.....
Tioga River near Erwins	1,377	26.74	[1]190,000	931.24
Cohocton River near Campbell	470	11.16	31,000	1,016.58
Chemung River at Corning	2,013	27.7	[1]215,000	913.3
Post Creek at Corning	31.6	.....	2,740	.....
Sing Sing Creek near Big Flats	14.6	.....	3,000	.....
Chemung River at Chemung	2,506	31.62	189,000	778.63

[1] Estimated.

Flood history.—Flood data compiled by the U.S. Army Corps of Engineers and records for the U.S. Geological Survey gaging station at Chemung indicate that the 1972 flood on the Chemung River was the greatest one known in the Corning area since at least 1865. At the Bridge Street gage in Corning, the gage height of the 1972 flood was 27.7 feet (941.0 feet above mean sea level) as compared with 24.4 feet for the flood of May 1946 and 21.8 feet for the flood of June 1889. Flood stages above a gage height of 18 feet for the Bridge Street gage for 1865 to 1972 are shown in figure 2.

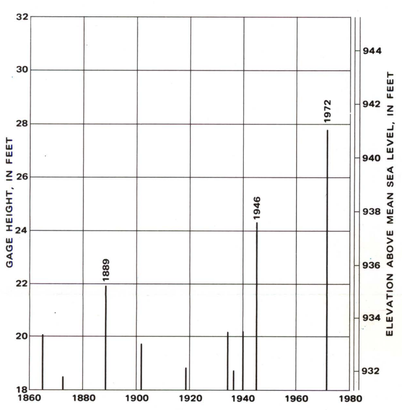


Figure 2. — *Peak flood stages above gage height 18.0 feet, Chemung River at Corning, New York, 1865–1972.*

At the gaging station on Tioga River near Erwins, the largest gaged tributary above Corning, the 1972 flood reached a stage of 26.74 feet (discharge, about 190,000 cfs) as compared with the previous high since 1918 of 23.54 feet (discharge, 94,000 cfs).

***The flood at Corning.*—Floods of the Chemung River at Corning are produced by three major streams that converge west-southwest of the city. The relative time of occurrence of the peak in each of these streams as well as the manmade controls of the floodflow and the vast amount of water temporarily stored on the flood plain result in a complex flood pattern at Corning. Figure 3 is a schematic illustration of the peak flows and the approximate time of occurrence of the June 1972 flood near Corning. The Tioga River contributed the greatest amount of the floodflow at Corning. The accompanying photograph illustrates the severity of the flooding in Corning.**

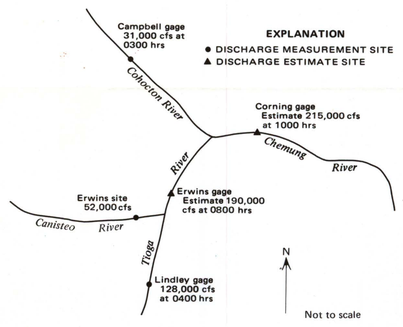


Figure 3. — *Schematic diagram of the floodflows entering Chemung River at Corning, flood of June 23, 1972.*

Flood frequency.—Flood-frequency analyses for the major Chemung River basin gaging stations are presented in figure 4. Data through 1971 were used to develop the frequency curves, but the 1972 peaks are plotted to illustrate their great magnitude. On the basis of historical information (fig. 2), the 1972 peak at Chemung is the greatest flood at Chemung since at least 1865.

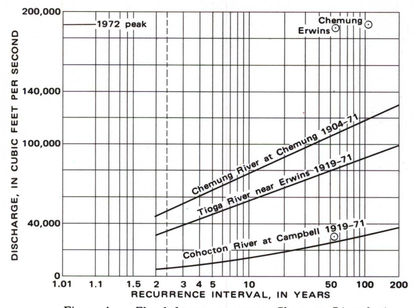


Figure 4. — *Flood-frequency curves, Chemung River basin, New York.*

Recurrence interval.—The recurrence interval, as applied to flood events, is the average interval of time within which a given flood will be exceeded once. It is inversely related to the percent chance of occurrence. Thus a flood with a 50-year recurrence interval would have 1 chance in 50 of being exceeded in any year or a 2-percent chance of occurrence in any year.

Recurrence intervals are average figures—the average number of years that elapse between floods that exceed a given magnitude. The fact that a major flood occurs does not reduce the probability of a flood as great or greater occurring in the next year or even the next week.

Flood profiles.—Profiles of the water surface of the Chemung River and of short reaches of the Cohocton and Tioga Rivers above their confluence, representing the maximum level of the June 1972 flood, are shown in figure 5. Floodmarks were located and marked soon after the flood, and levels were later run to refer these marks to mean sea level datum. Selected floodmarks near the main channel of the river are plotted. The very steep gradients of the floodwater surface in some areas are partly due to levees, walls, and other manmade influences. A few floodmark elevations are shown on the map to illustrate the variation in flood levels. The floodmarks indicate an appreciable difference in elevation from one bank of the stream to the other. In following the curve of the river valley, the river became much higher on the outside of bends. Floodmarks plotted in figure 5 are denoted as being on the left or right bank. (This designation is made with the observer looking downstream.) The profile as drawn is approximately that of the main channel of the river.

The profile of the flood of May 1946 for the Chemung River, the maximum known before 1972, is also shown in figure 5. This profile is adapted from data compiled by the U.S. Army Corps of Engineers.

Additional data.—Other information pertaining to the June 1972 flood, as well as that for earlier floods, may be obtained at the office of the U.S. Geological Survey, Albany, N.Y.

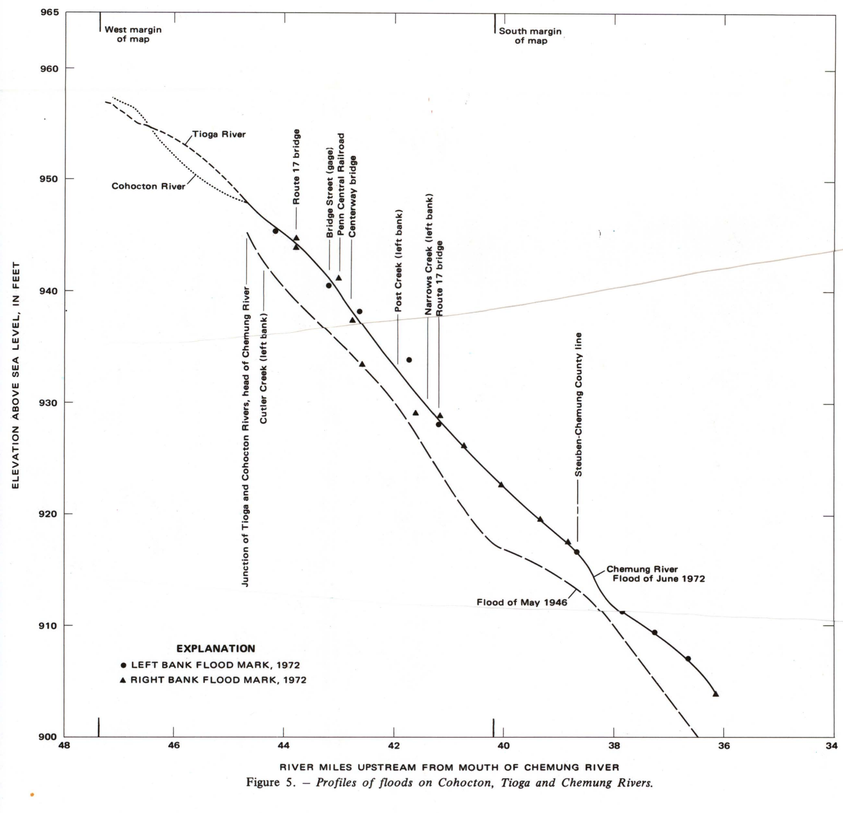


Figure 5. — *Profiles of floods on Cohocton, Tioga and Chemung Rivers.*

Photograph by Corning Glass Works.

Photograph — *Flooding in vicinity of Warren and East William Streets in Corning, flood of June 1972.*

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By

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1973

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