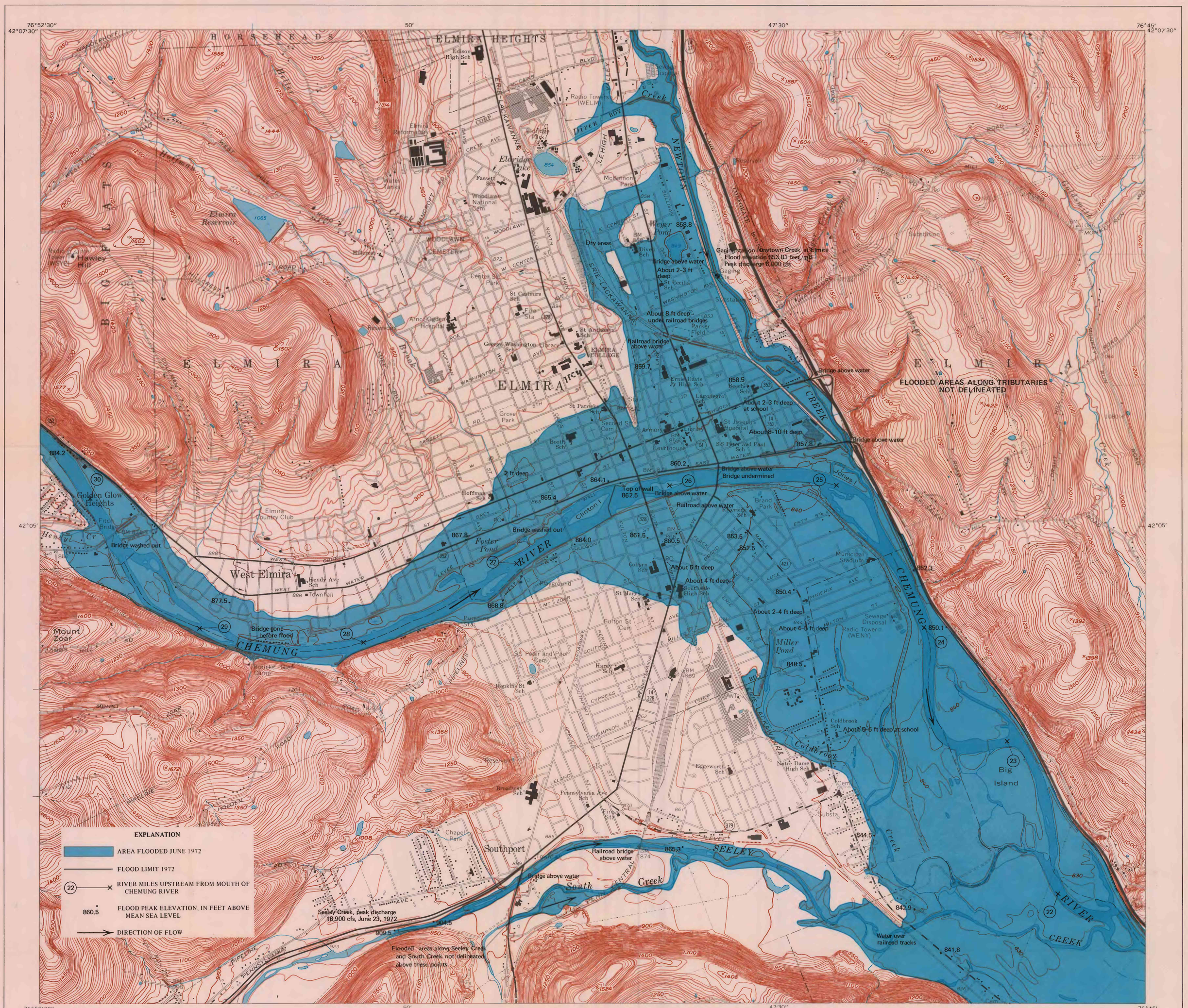

Base from U.S. Geological Survey, 1:24,000, Elmira, 1962

SCALE 1:18 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

NEW YORK
QUADRANGLE LOCATION

FLOOD OF JUNE 1972 AT ELMIRA, 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 Elmira, in southwest-central New York, sustained the most extensive flooding of any populated area in the flood zone of New York. Flooding was primarily due to Chemung River, but Newtown Creek and Seeley Creek also experienced high flows.

Floodmarks were identified at more than 150 locations in Elmira and along the 9.1-mile reach of the Chemung River shown on the flood map. Elevations of the floodmarks were determined by leveling to bench marks. Flood boundaries were delineated from field surveys made soon after the flood. Elevations of representative floodmarks are shown on the map.

This atlas presents high-water elevations, extent of flooding, streamflow information on the flood of June 1972 at Elmira 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 precipitation that produced this record flood in the Chemung River basin occurred during the period June 20–25. It ranged from 6 inches in the eastern edge of the basin to more than 14 inches in the western edge. Heaviest amounts were reported on June 21 and June 23, and many of the smaller streams experienced two separate peaks. Cumulative precipitation from June 16 to 26 in the area from Alfred on the western edge of the basin to Elmira on the eastern edge is plotted in figure 1. (Data were obtained from the Climatological Data Report of the National Oceanic and Atmospheric Administration for June 1972.)

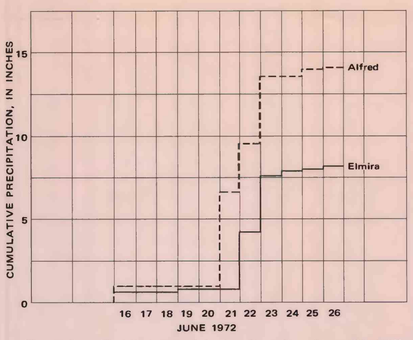

Figure 1. – *Cumulative precipitation from June 16 to 26, 1972, at Alfred and Elmira.*

Flood heights.—The peak water surface at a gaging station is commonly referred to as a peak gage height (stage), which is the height above an arbitrary datum plane chosen to provide convenient readings over the range in stage at the site. At most gaging stations, the mean sea level elevation of the gage datum has been determined.

Flood discharge.—In most engineering studies of floods, 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). 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. For example, during the 1972 flood on Newtown Creek water from Chemung River backed up Newtown Creek and altered the normal relationship between stage and discharge at the gaging station. The peak discharge for the gaging station site was estimated on the basis of a discharge measurement of Newtown Creek at Horseheads, upstream from backwater effect.

Streamflow records available.—One continuous-record gaging station, on Newtown Creek, has been in operation in the area covered by this atlas since 1938. At another site in this area, the peak discharge of Seeley Creek at Southport was determined for the June 1972 flood. The long-term gaging station on the Chemung River at Chemung (records since 1903), about 13 miles downstream from Elmira, provides the most useful information on which to evaluate the flood characteristics in the report area. The National Weather Service has obtained stage records of Chemung River at Elmira for the past 31 years.

Flood history.—Flood data compiled by the U.S. Army Corps of Engineers indicate that the flood in June 1972 was the greatest one known in the Elmira area since at least 1865. On June 23, 1972, the Chemung River at the Chemung gaging station crested at a stage of 31.62 feet corresponding to an elevation of 810.25 feet above mean sea level (discharge 189,000 cfs). The previous maximum stage at this station was 23.97 feet corresponding to an elevation of 802.60 feet above mean sea level (discharge 132,000 cfs) on May 28, 1946. Gage height and year of occurrence of each annual flood (highest peak discharge each year) above a stage of 19 feet since 1904 for the Chemung gage are shown in figure 2. Although floods above 19 feet occurred during 11 of the years, the erratic occurrence of floods is apparent in that no flood above 19 feet occurred from 1904 until 1935.

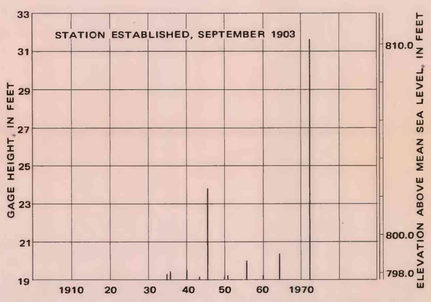

Figure 2. – *Annual floods above gage height 19.0 feet, 1904–72, Chemung River at Chemung, New York.*

The contrast between the intense runoff from the tributary area southwest of Elmira and the less intense runoff from the area northeast of the city is of interest. Southwest of Elmira at Southport, the peak discharge of Seeley Creek was 18,900 cfs on about June 23, 1972, and the peak discharge per square mile of drainage area of Seeley Creek was 198 cfsm (cubic feet per second per square mile). Northeast of Elmira at the Newtown Creek gaging station, peak discharge was 6,000 cfs (stage 18.28 feet corresponding to an elevation of 853.81 feet above mean sea level) on June 23, 1972, and the peak discharge per square mile of drainage area was only 92 cfsm. The maximum stage at Newtown Creek gaging station since 1938 was 17.06 feet on October 16, 1955, which corresponded to an elevation of 851.59 feet above mean sea level; the previous maximum discharge was 3,460 cfs on December 30, 1942.

Flood frequency.—Flood-frequency analyses for Newtown Creek and Chemung River gaging stations are presented in figures 3 and 4. Data through 1971 were used to develop the frequency curves, but the 1972 peak is plotted to illustrate its outstanding frequency of occurrence. The curves indicate that the 1972 discharge at Chemung was 1.8 times the discharge of a 50-year flood, whereas the 1972 peak discharge for Newtown Creek was 1.7 times the discharge of a 50-year flood.

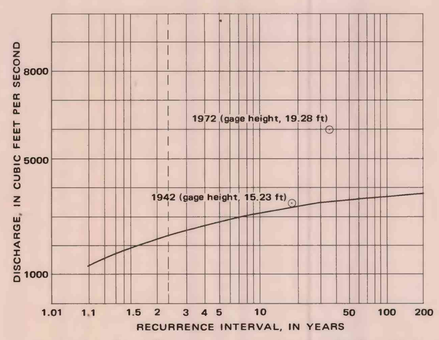

Figure 3. – *Flood-frequency curve for Newtown Creek at Elmira, 1938–71.*

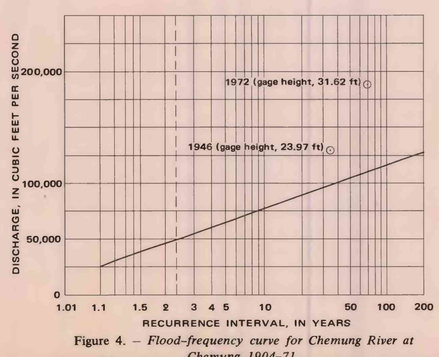

Figure 4. – *Flood-frequency curve for Chemung River at Chemung, 1904–71.*

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 will 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.—Profile of the water surface of the Chemung River representing the maximum level of the June 1972 flood is shown in figure 5. Floodmarks were located and marked soon after the flood, and levels were run later to refer these marks to mean sea level datum. Selected floodmarks near the main channel of the river are plotted. Abrupt changes in flood profiles commonly occur at channel constrictions and at bridges. In the Elmira area, because water bypassed many bridges and overtopped the levee system, abrupt drops in profile at bridges were not evident. However, the water-surface slope in South Elmira downstream from Pennsylvania Avenue and the Erie-Lackawanna Railroad tracks was steep. 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 on figure 5 are denoted as being on the left or right bank. (This designation is made with the observer looking downstream.)

The profile of the flood of May 1946, the maximum known before 1972, is also shown in figure 5. It 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.

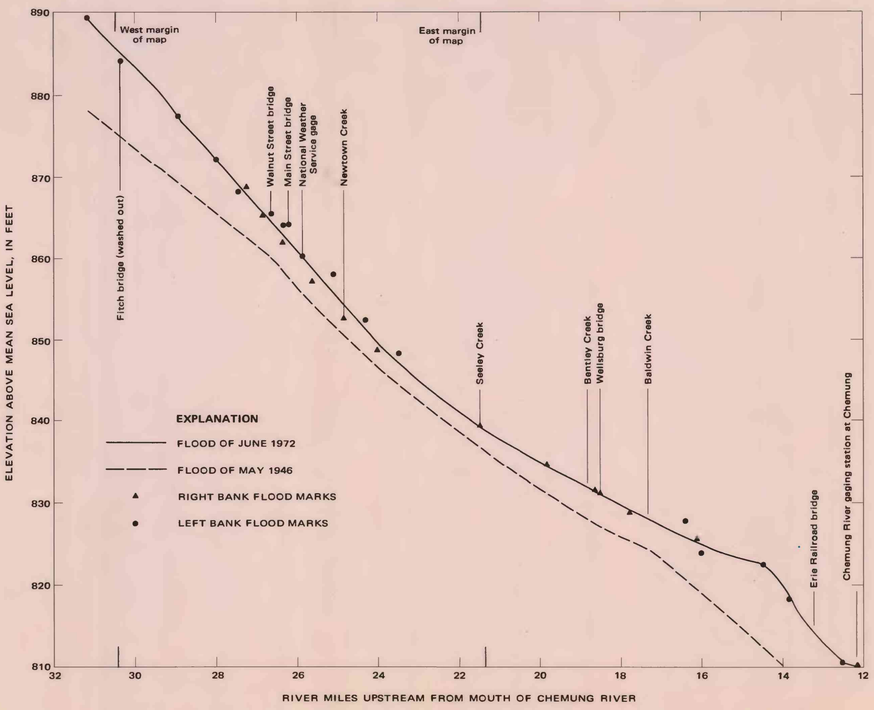

Figure 5. – *Profile of floods of June 1972 and May 1946, Chemung River from Elmira to Chemung, New York.*

Photograph by Chemung County Historical Society, Inc.

Photograph – *Looking west along Water Street in Elmira, June 23, 1972.*

Interior—Geological Survey, Washington, D.C.—1973—W73240

FLOOD OF JUNE 1972 AT ELMIRA, NEW YORK

By

Kenneth I. Darmer and Lloyd A. Wagner

1973

For sale by U.S. Geological Survey, price 75 cents