

FLOODS ON SCIOTO RIVER AND DARBY CREEK AT CIRCLEVILLE, OHIO, IN 1959

Hydrologic data pertaining to the depth and frequency of flooding along the Scioto River and Darby Creek in the vicinity of Circleville, Ohio, are presented in this atlas. The map and flood data provide a technical basis for making land-use decisions commensurate with the degree and probability of flooding. No recommendations or suggestions for land-use regulations are made and no solutions of existing flood problems are proposed.

The approximate area inundated during the flood of January 22, 1959, is shown on a topographic map to record the flood hazard in graphic form. Greater floods are possible but no attempt has been made to define their probable overflow limits. The flood of January 1959, although reduced somewhat by storage in reservoirs upstream, was the highest on the Scioto River since the flood of March 26, 1913. The 1913 flood was the greatest since at least 1800. Future protective works may reduce the frequency of flooding in the area but will not necessarily eliminate flooding. The inundation pattern of future floods may be affected by new highways, bridges, and other cultural changes.

Cooperation and acknowledgment.—The preparation of this flood map is a part of an investigative program financed through a cooperative agreement between the Ohio Department of Natural Resources, Fred E. Morr, director, and the U.S. Geological Survey, Thomas B. Nolan, director.

Data for the 1959 flood profile were furnished by the Corps of Engineers.

The 1913 flood profile of Scioto River was obtained from the 1916 report "Flood Relief for Scioto Valley" to the Franklin County Conservancy District, by permission of Alvord, Burdick, and Howson, Consulting Engineers, Chicago, Ill.

Gage height record for Scioto River at U.S. Highway 22 bridge was furnished by the U.S. Weather Bureau.

The explanatory text was written by George W. Edelen, Jr., the flood boundaries were defined by Frederick H. Ruggles, Jr., and the flood-frequency relation was derived by William P. Cross, Geological Survey.

Flood height.—The height of a flood at a gaging station usually is stated in terms of the gage height or stage, which is the elevation of the water surface above a selected datum plane. Elevations shown on the map are in feet above mean sea level. Gage heights or stages at the U.S. Weather Bureau gaging station on Scioto River at Circleville, located at the U.S. Highway 22 bridge, can be converted to elevations above mean sea level by adding 643.03 feet.

Gage height and year of each annual flood (highest momentary peak discharge in each calendar year) that exceeded elevation 663 feet at the U.S. Highway 22 bridge on Scioto River at Circleville during the period 1913, 1916-60, are shown in figure 1. The irregular occurrence

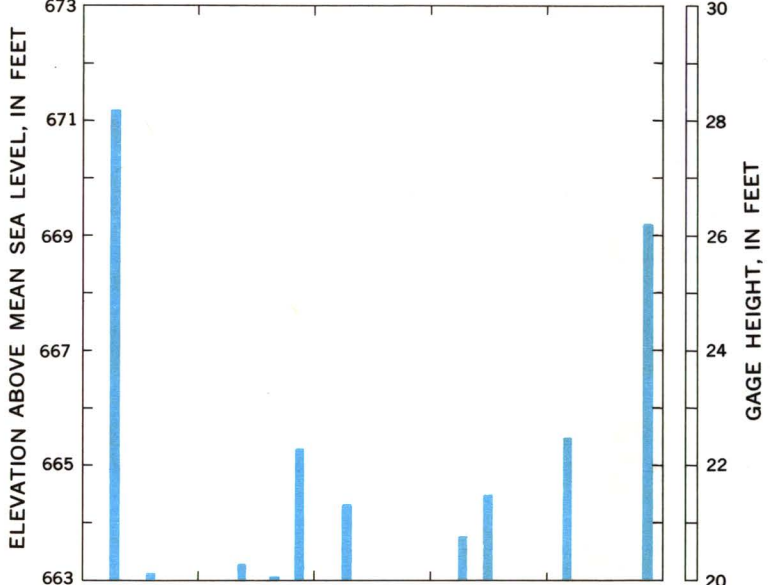


FIGURE 1.—Annual floods above 663-foot elevation, 1913, 1916-60, Scioto River at Circleville, (U.S. Highway 22 bridge).

of floods is evident. Floods above 663-foot elevation occurred 10 times in the 46-year period, an average of about one flood each 4 1/2 years. Although no flood of this magnitude occurred in 30 of the years, there were 4 floods this great during the 10-year period 1924-33.

Flood discharge.—The rate of discharge of a stream is the volume of flow that passes a specific location in a given period of time. Peak discharge is the maximum value of the discharge reached during a flood. Discharge rates usually are expressed in units of cubic feet per second (cfs).

Regulation.—The flow of Scioto River is subject to regulation by the following reservoirs:

Reservoir	Stream	Beginning of operation
Griggs	Scioto River	1905
O'Shaughnessy	Scioto River	1924
Delaware	Olentangy River	1951
Hoover	Jig Walnut Creek	1954

The three water-supply reservoirs, Griggs, O'Shaughnessy, and Hoover, do not include flood storage capacities in their designs and their effects on flood peaks at Circleville are negligible. The effect of the Delaware Reservoir on annual flood peaks at Circleville is usually small, but was substantial during the January 1959 flood.

Flood frequency.—Frequency of flooding at the U.S. Highway 22 bridge on Scioto River at Circleville has been derived for conditions of natural flow without the effect of storage in reservoirs upstream. The frequency derivation is based on records from the U.S. Geological Survey gaging station on Scioto River near Circleville, located at a bridge on Circleville-Commercial Point Road (river mile 101.64), combined with a regional flood frequency relation for all streams in Ohio except those in the Maumee River basin. The relation between stage and frequency is dependent on the relation of stage to discharge which is affected by changes in physical conditions of channels and constrictions. The frequency curve shown in figure 2 is based on channel conditions existing in 1959. Large errors may result if the flood-frequency curve is extrapolated beyond the limits shown. Frequency of flooding on Darby Creek has not been determined.

Recurrence intervals.—As applied to flood events, recurrence interval is the number of years, on the average, within which a given flood height will be equaled or exceeded once. It is inversely related to the probability of a specific flood being equaled or exceeded in any one year. Thus a 20-year flood would have 1 chance in 20, or a 5-percent chance, of being equaled or exceeded in any one year.

The general relationship between recurrence interval and both flood height and flood discharge at the U.S. Highway 22 bridge gaging station on Scioto River at Circleville (fig. 2) is tabulated below. The curve represents natural conditions of flow, uninfluenced by the effect of storage in reservoirs upstream.

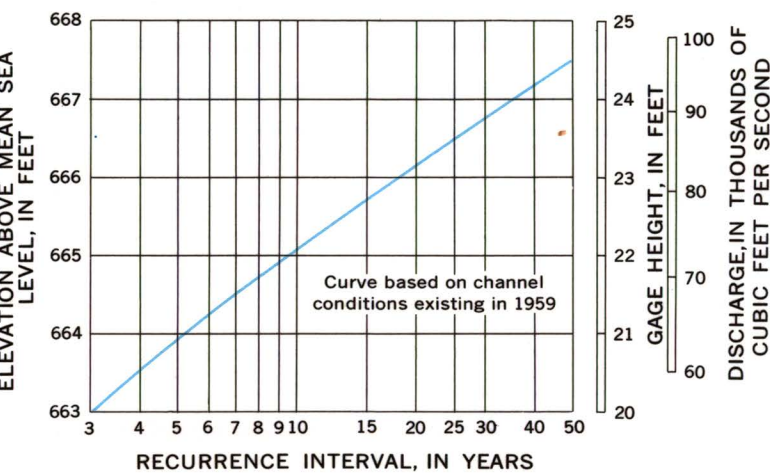


FIGURE 2.—Frequency of floods above 663-foot elevation, Scioto River at Circleville (U.S. Highway 22 bridge).

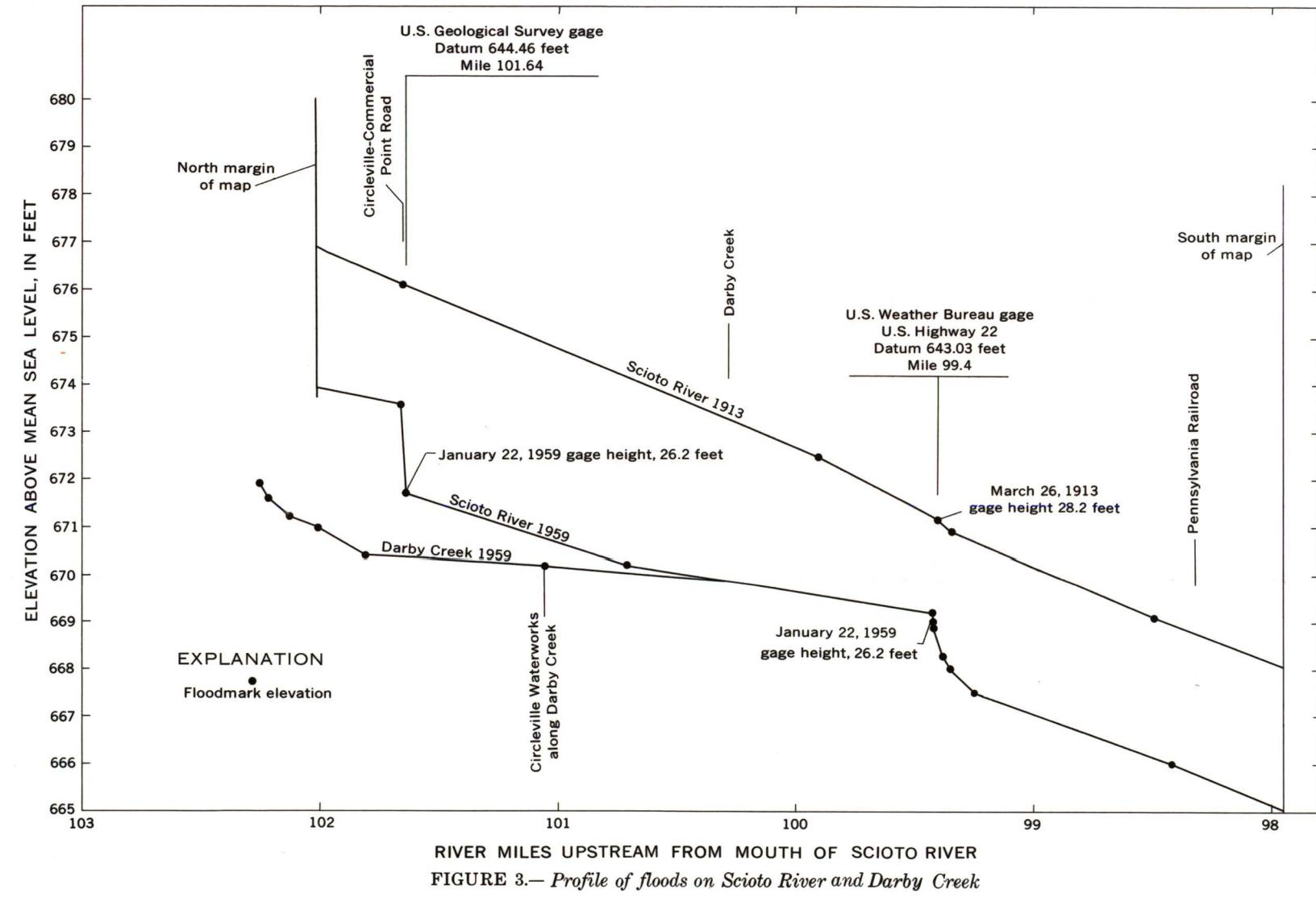
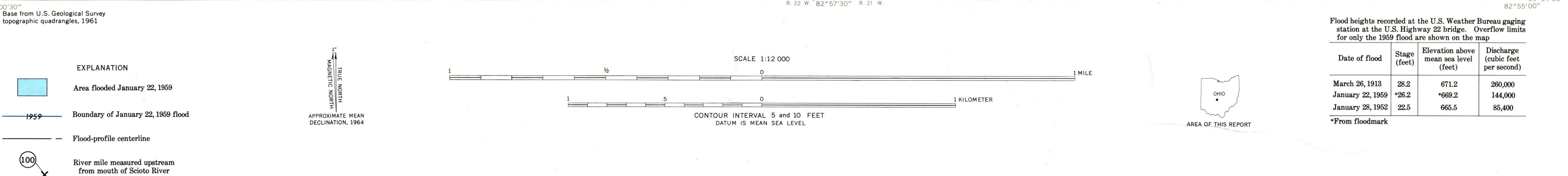
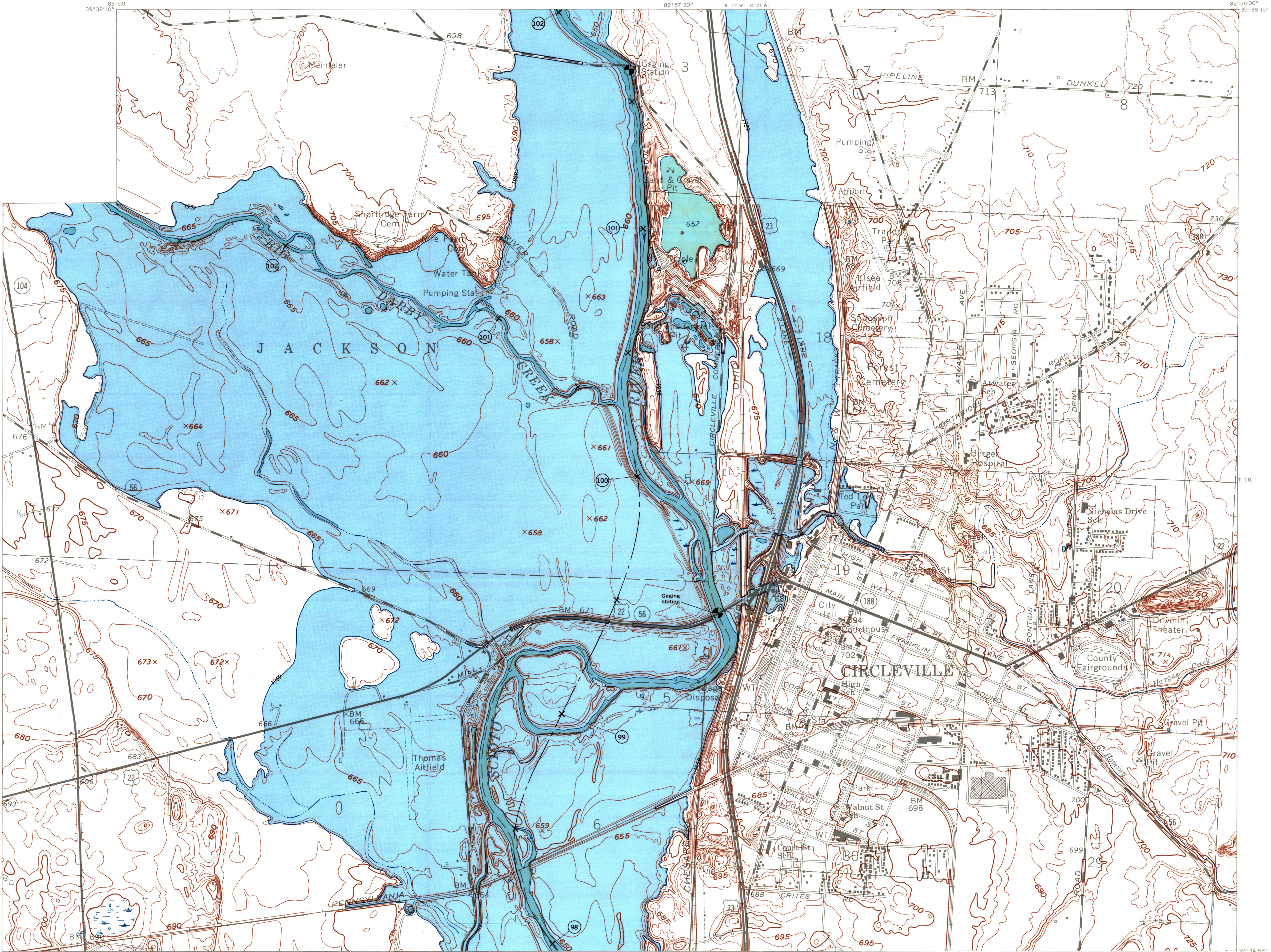


FIGURE 3.—Profile of floods on Scioto River and Darby Creek



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