FLOODS AT AMESVILLE, OHIO

This report was prepared by the U.S. Geological Survey to further the objectives of the Appalachian Regional Commission. It provides technical guidance for those who plan the economic uses of flood plain lands. Hydrologic data are presented that can be used to evaluate the extent and depth of flooding that can be expected along Federal Creek, McDougall Branch, Sharps Fork, and Linscott Run in the vicinity of Amesville, Athens County, Ohio. The approximate boundaries of inundation by hypothetical floods having average recurrence intervals of 5, 25, and 50 years are shown on a topographic map.

The residents of Amesville experienced a flood in March 1963 that was 5 feet higher than the 50-year frequency flood. Water was 7 feet deep on the main street. A covered bridge 6 miles downstream, and presumed to be more than 100 years old, was destroyed. A flood of similar magnitude (3 inches lower in Amesville) occurred in the early 1920's.

Flood boundaries and profiles.— The procedure used in defining the flood boundaries was to construct flood profiles from elevations of floodmarks identified in the field and from a surveyed low-water profile. Sixteen cross sections were surveyed on Federal Creek, three on Sharps Fork and two on McDougall Branch. Standard step-backwater methods were used to define the water-surface profiles for 5-, 25-, and 50-year frequency discharges in the study reaches. The extent of flooding delineated on the topographic map was derived from the profiles by interpolation between contours and plotting overflow boundaries identified during field surveys. The extent of the area indicating flood inundation is consistent with the scale of the map (1 inch = 1,000 feet) and the contour interval (20 feet).

Recurrence intervals.— As applied to flood events, the recurrence interval is the average interval of time within which a given flood will be equaled or exceeded once. Frequency of floods can be stated in terms of their probabilities of occurrence (virtually reciprocals of their recurrence intervals for floods greater than the 10-year flood). For example, on the average for a long period of time, 20 floods of at least the magnitude of a 5-year flood can be expected to occur in a 100-year period, and 4 floods of at least the magnitude of a 25-year flood can be expected to occur in a 100-year period.

Recurrence intervals, however, are only average figures. The fact that a major flood is experienced in one year does not reduce the probability that a flood of equal or greater magnitude may occur in the next year, or even in the next week.

Flood frequency.— Because there are no gaging-station records for Federal Creek or any of its tributaries, computation of flood-frequency discharges was by regionalization methods outlined by Cross and Webber (1959) and Speer and Gamble (1965).

Elevations and discharges computed for 12 designated sites in the study area are shown in table 1; figure 1 shows the relation between flood elevation and recurrence interval at seven sites.

Depth of flooding.— Depths of flooding resulting from 5-, 25-, and 50-year floods at selected cross sections are shown in figures 2-4. Depth of flooding at other points by floods of these magnitudes can be estimated by subtracting ground elevations from the water-surface elevations shown in figures 5 and 6. The approximate ground elevation can be determined from contours on the map; more accurate ground elevations can be determined by leveling to nearby bench marks.

Acknowledgments.— The selection of the site for this project was made in collaboration with the Appalachian Regional Commission and the Ohio Department of Natural Resources. Coordination of planning with the district office of the Corps of Engineers was made through the Office of Appalachian Studies, Corps of Engineers.

This report was prepared by the U.S. Geological Survey under the administrative direction of John J. Molloy, district chief, Ohio District, Water Resources Division.

Acknowledgement is made to the U.S. Soil Conservation Service and to the State of Ohio for hydrologic data, and to local residents who provided information concerning the flood of March 1963.

REFERENCES

Cross, W. P., and Webber, E. E., 1959, Floods in Ohio, magnitude and frequency: Ohio Dept. Nat. Resources, Div. Water Bull. 32, 325 p.

Speer, P. R., and Gamble, C. R., 1965, Magnitude and frequency of floods in the United States, part 3-A, Ohio River basin except Cumberland and Tennessee River basins: U.S. Geol. Survey Water-Supply Paper 1675, 630 p.

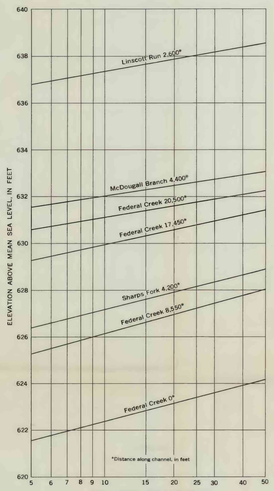

FIGURE 1.—*Frequency of flood stages at selected sites.*

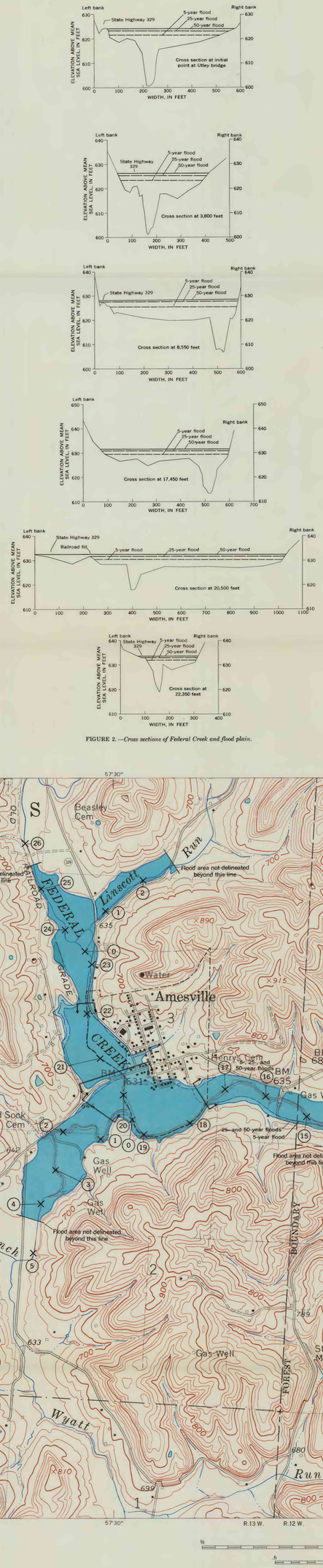

FIGURE 2.—*Cross sections of Federal Creek and flood plain.*

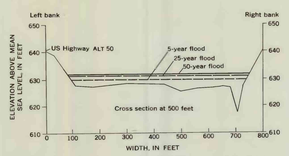

FIGURE 3.—*Cross section of McDougall Branch and flood plain.*

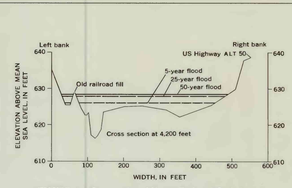

FIGURE 4.—*Cross section of Sharps Fork and flood plain.*

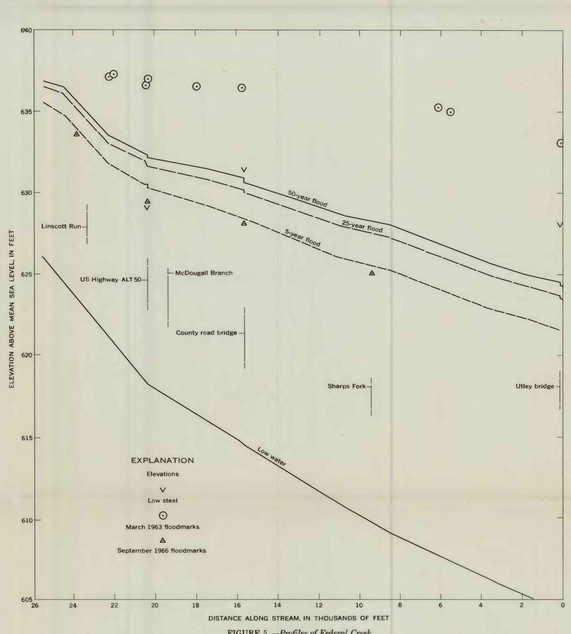

FIGURE 5.—*Profiles of Federal Creek.*

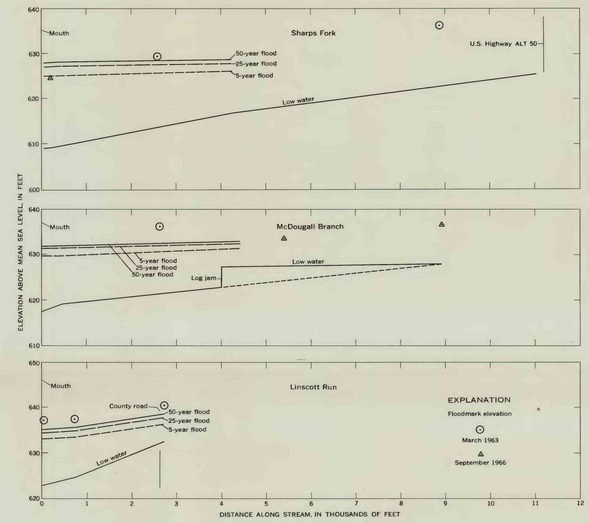

FIGURE 6.—*Profiles of Sharps Fork, McDougall Branch, and Linscott Run.*

TABLE 1.—*Frequency of floods, elevation and discharge*

Location	Distance along channel (feet)	Drainage area (sq mi)	5-year		25-year		50-year	
			Elevation above mean sea level (feet)	Discharge (cfs)	Elevation above mean sea level (feet)	Discharge (cfs)	Elevation above mean sea level (feet)	Discharge (cfs)
Federal Creek at Utley Bridge	0	108	621.5	5,300	623.5	7,900	624.2	9,100
Federal Creek	3,800	108	623.0	5,300	625.0	7,900	625.8	9,100
Do	8,550	107	625.2	5,300	627.2	7,900	628.0	9,100
Do	17,450	69.6	629.2	4,300	630.8	6,500	631.4	7,400
Do	20,500	32.0	630.5	3,000	631.8	4,500	632.3	5,100
Do	22,350	32.0	631.8	3,000	633.0	4,500	633.5	5,100
McDougall Branch	0	37.6	629.9	1,700	631.4	2,800	631.9	3,300
Do	4,400	...	631.5	1,700	632.7	2,800	633.1	3,200
Sharps Fork	0	35.7	625.5	1,600	627.4	2,700	628.2	3,150
Do	4,200	...	626.3	1,600	628.1	2,700	628.9	3,150
Linscott Run	0	5.0	633.2	...	634.4	...	634.9	...
Do	2,600	...	636.8	...	638.1	...	638.6	...

Base from U.S. Geological Survey
Amesville, 1:24,000, 1960
Drainage modified, 1969

FLOODS AT AMESVILLE, OHIO

By
Ronald I. Mayo and Earl E. Webber

1969

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1969—W68332