

FLOODS ON COOSAWATTEE, CARTECAY, AND ELLIJAY RIVERS IN THE VICINITY OF ELLIJAY, GEORGIA

This report was prepared by the U.S. Geological Survey to further the objectives of the Appalachian Regional Commission. Hydrologic data are presented that can be used to evaluate the extent, depth, and frequency of flooding that may be expected on the Coosawatee, Cartecay, and Ellijay Rivers in the vicinity of Ellijay, Ga. The technical information provided will aid in reaching decisions for sound economic management of flood-plain areas.

The areas inundated by floods having recurrence intervals of 5, 25, and 50 years are shown on the topographic map, and the flood boundaries were determined for the present (1969) channel conditions. Changes in waterway openings at bridges and culverts, improved drainage systems, increased urbanization, Soil Conservation Service detention structures, and other cultural changes may affect the boundaries of inundation by future floods.

The general procedure used in delineating the flood boundaries for the 5-, 25-, and 50-year floods was to construct flood profiles based on step-backwater studies and on floodmarks identified in the field. Flood elevations from the profiles were used to develop the boundary lines, which were positioned on the map by interpolating between the contour lines (lines of equal ground elevation) or by field investigations.

Flood height.—The height of a flood at a gaging station is usually stated in terms of gage height, or stage, which is the elevation of the water surface above a selected datum plane. Elevations shown on the map and profiles are in feet above mean sea level. Gage heights for the gaging stations shown can be converted to elevation above mean sea level by adding the gage height to the appropriate datum of gage, as listed in table 1. The drainage area for each gage is also listed on table 1.

TABLE 1.—Gaging stations in the vicinity of Ellijay

No.	Gaging-station site	Datum of gage above mean sea level (feet)	Drainage area (square miles)
2-3795	Cartecay River near Ellijay	1,255.39	135
2-3800	Ellijay River at Ellijay	1,242.52	90
2-3805	Coosawatee River near Ellijay	1,216.04	238

The gage height, elevation, and year of occurrence of annual floods (highest instantaneous peak discharge during each calendar year) exceeding a gage height of 6.6 feet at the gaging station on Cartecay River near Ellijay (2-3795) during the period of record (1938-68) are shown in figure 1. The irregular occurrence of floods is evident.

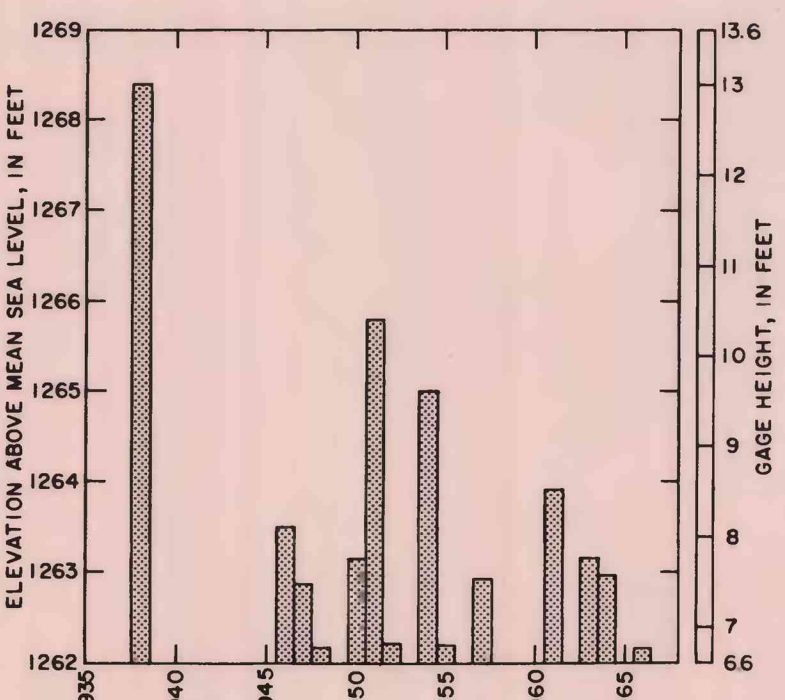


FIGURE 1.—Annual floods above 1,262-foot elevation Cartecay River near Ellijay (2-3795), 1938-68.

Flood discharge.—Discharge is the rate at which water flows, expressed as volume per unit of time, usually cubic feet per second (cfs). Peak discharge is the maximum discharge during a flood.

Flood frequency.—Frequency of flooding (figs. 2-4) at the gaging stations on Cartecay River near Ellijay (2-3795), Ellijay River at Ellijay (2-3800), and Coosawatee River near Ellijay (2-3805) has been derived from a statistical evaluation of annual flood peaks. The relation between elevation and frequency is dependent on the relation of elevation and discharge, which is affected by changes in the physical conditions of stream channels and constrictions. The frequency curves shown in figures 2-4 are based on channel conditions of 1969. Extrapolation of the curves beyond the limits shown is not recommended.

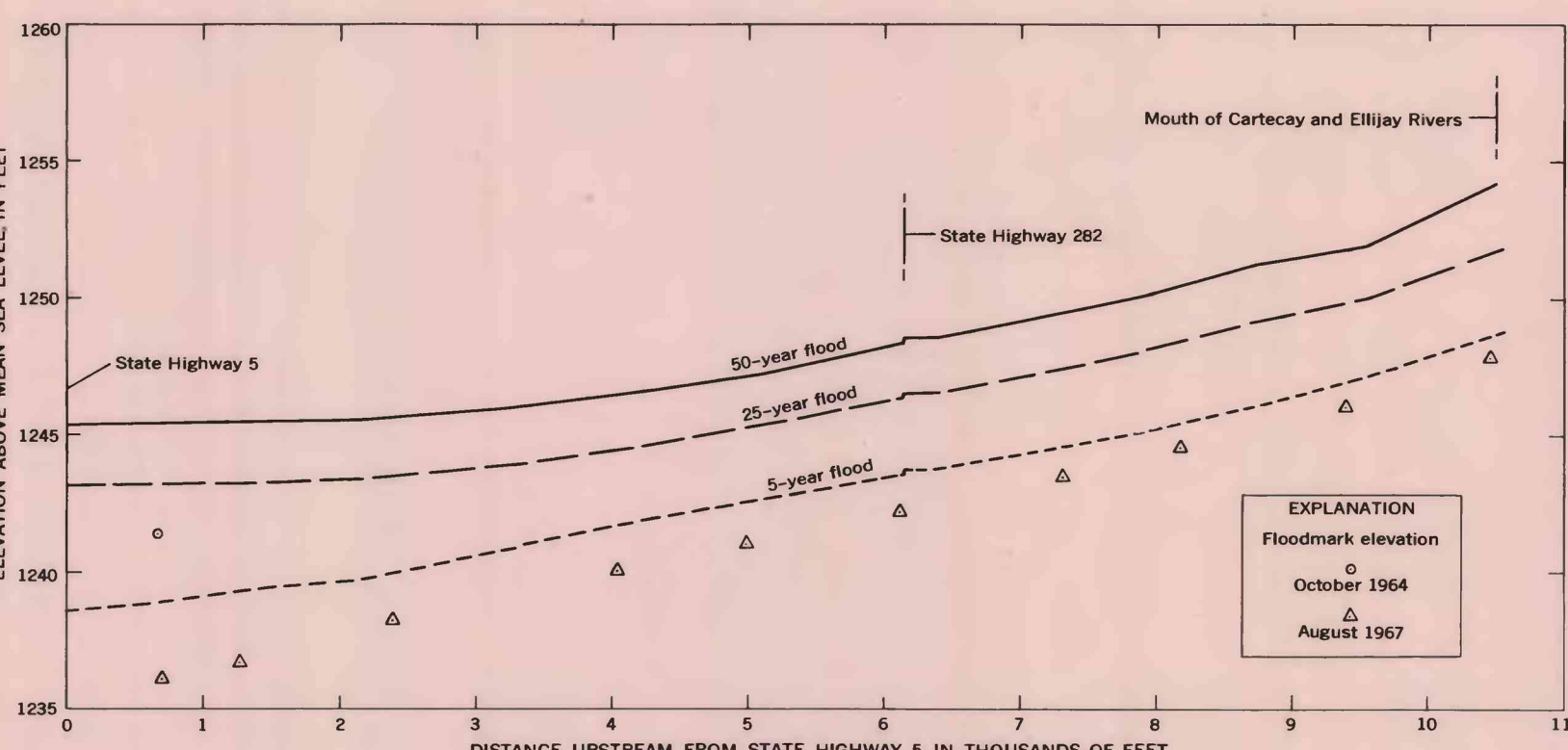


FIGURE 5.—Profiles of Coosawatee River.

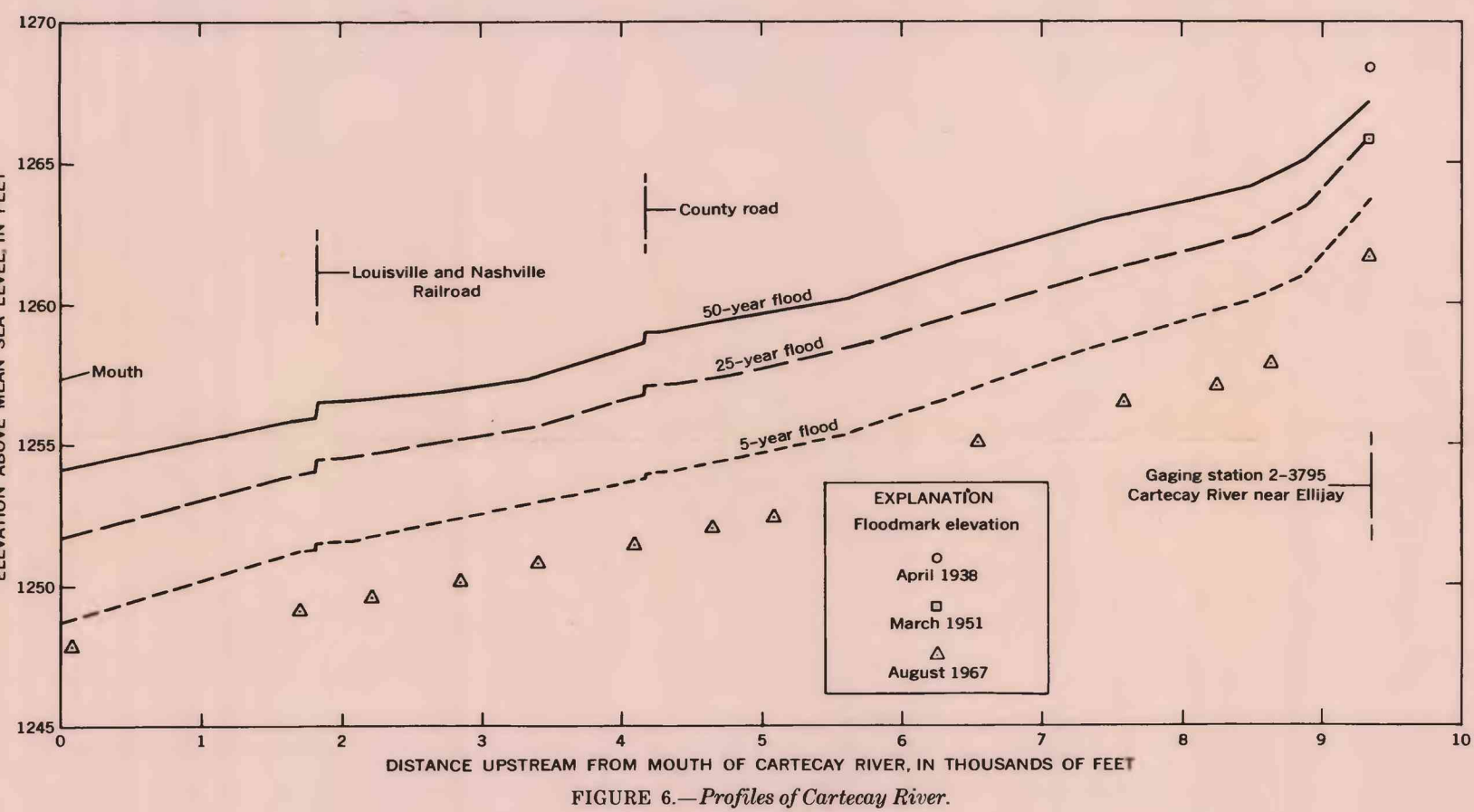


FIGURE 6.—Profiles of Cartecay River.

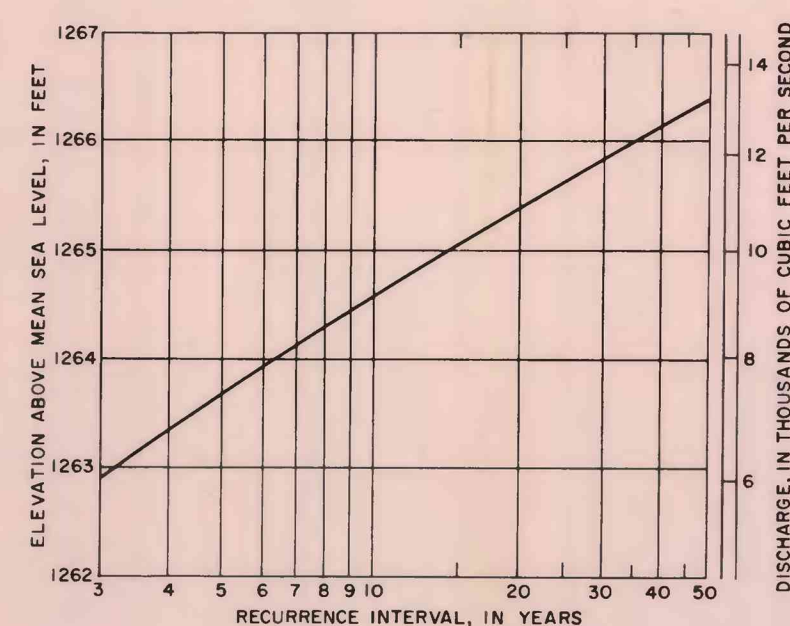


FIGURE 2.—Frequency of flooding on Cartecay River near Ellijay (2-3795).

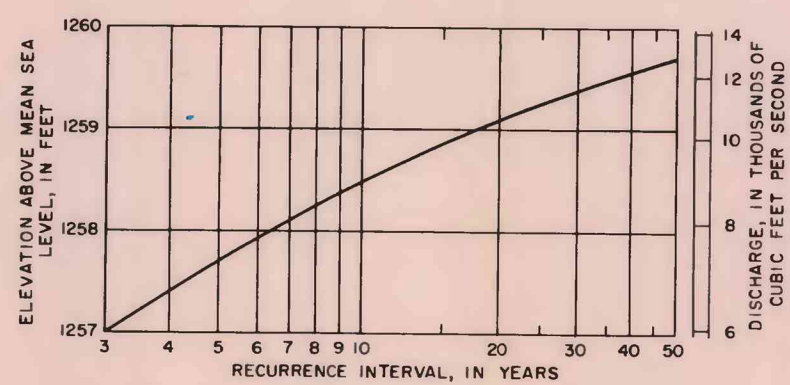


FIGURE 3.—Frequency of flooding on Ellijay River at Ellijay (2-3800).

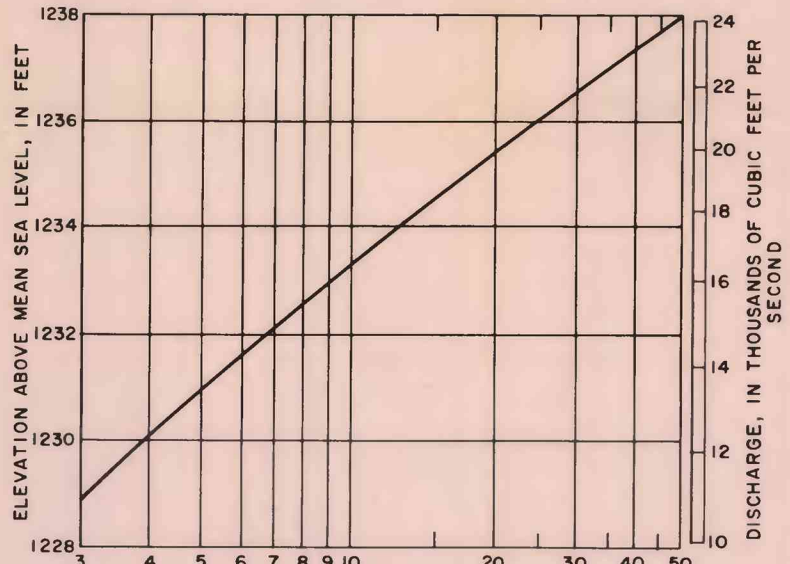


FIGURE 4.—Frequency of flooding on Coosawatee River near Ellijay (2-3805).

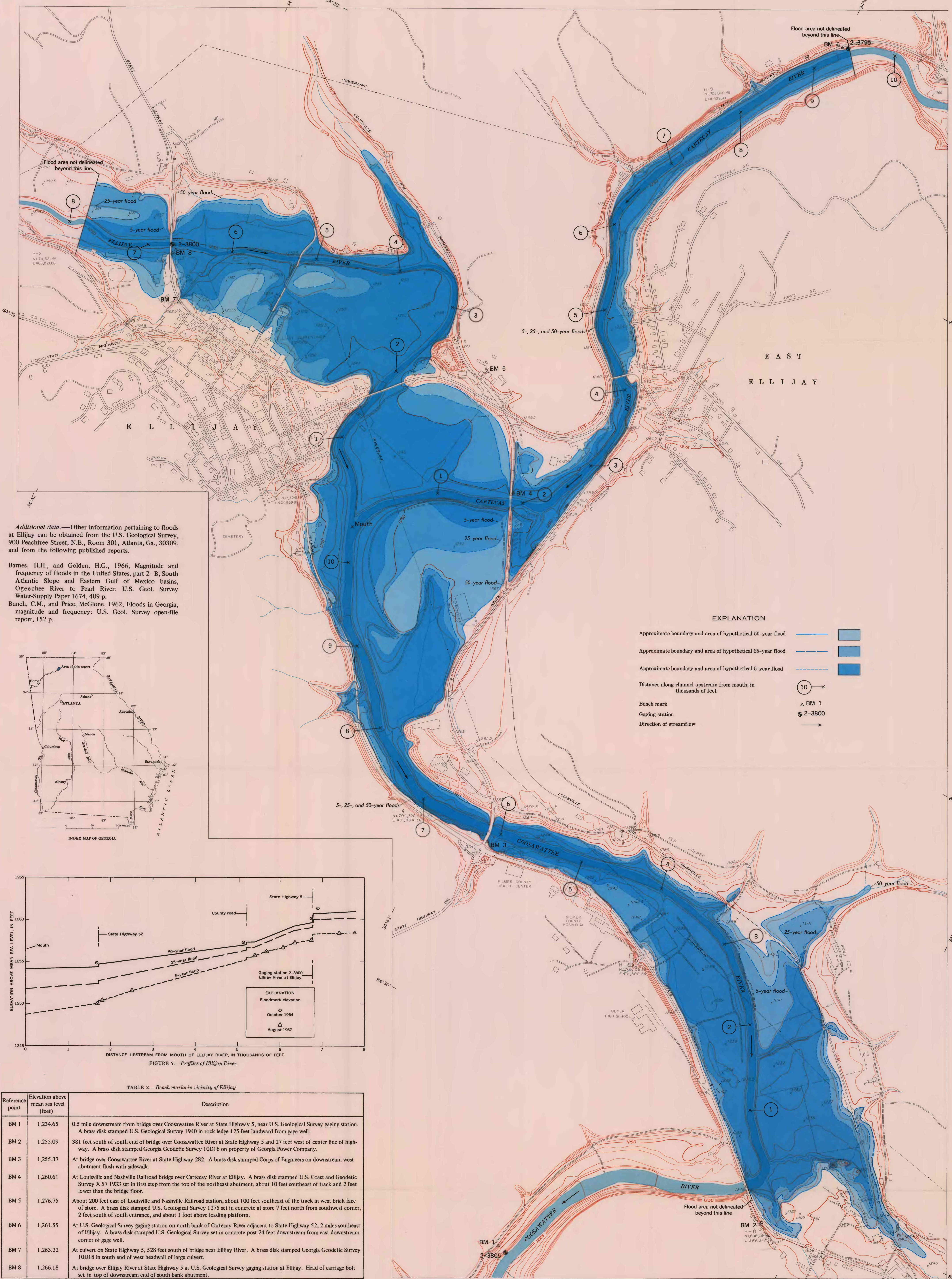
Recurrence intervals.—As applied to flood events, the recurrence interval is the average length of time between occurrences of a flood of a given magnitude. Frequency can also be stated as a probability, which is virtually the reciprocal of the recurrence interval for floods greater than the 10-year flood. Thus, a 50-year flood would have one chance in 50, or a 2-percent chance, of being exceeded in any given year. Because the 50-year flood can occur in any year or even in successive years, any inference that such a flood will occur only once during a 50-year period or at regular intervals would be misleading.

Flood profiles.—Profiles of the water surface of Coosawatee, Cartecay, and Ellijay Rivers are shown in figures 5-7 for hypothetical floods of 5-, 25-, and 50-year recurrence intervals. These profiles were based on standard step-backwater methods and from elevations of floodmarks identified in the field.

Generally, abrupt changes in the profiles are caused by differences in water-surface elevations between the upstream and downstream sides of bridges caused by constriction of the channel at the bridge structure. The base line for the profiles is located along the centerline of the streams. Distances along the channel, which were used to define the profiles, correspond to those shown on the map.

Flood depths.—Depth of flooding at any point can be estimated by subtracting the ground elevation from the water-surface elevation at the same point, indicated by the profiles of figures 5-7. The approximate ground elevation can be determined from contours on the map; more accurate elevations can be obtained by leveling from nearby bench marks. The locations and elevations of these bench marks are described in table 2.

Acknowledgments.—The selection of the site for this project was made in collaboration with the Appalachian Regional Commission. Coordination of planning with the District Office of the Corps of Engineers was accomplished through the Office of Appalachian Studies, Corps of Engineers. This report was prepared by the Water Resources Division, U.S. Geological Survey, under the administrative direction of John R. George, district chief.



Additional data.—Other information pertaining to floods at Ellijay can be obtained from the U.S. Geological Survey, 900 Peachtree Street, N.E., Room 301, Atlanta, Ga. 30309, and from the following published reports:

Barnes, H.H., and Golden, H.G., 1966, Magnitude and frequency of floods in the United States, part 2-B, South Atlantic Slope and Eastern Gulf of Mexico basins, Ogeechee River to Pearl River. U.S. Geol. Survey Water-Supply Paper 1674, 409 p.

Bunch, C.M., and Price, McGlone, 1962, Floods in Georgia, magnitude and frequency: U.S. Geol. Survey open-file report, 152 p.

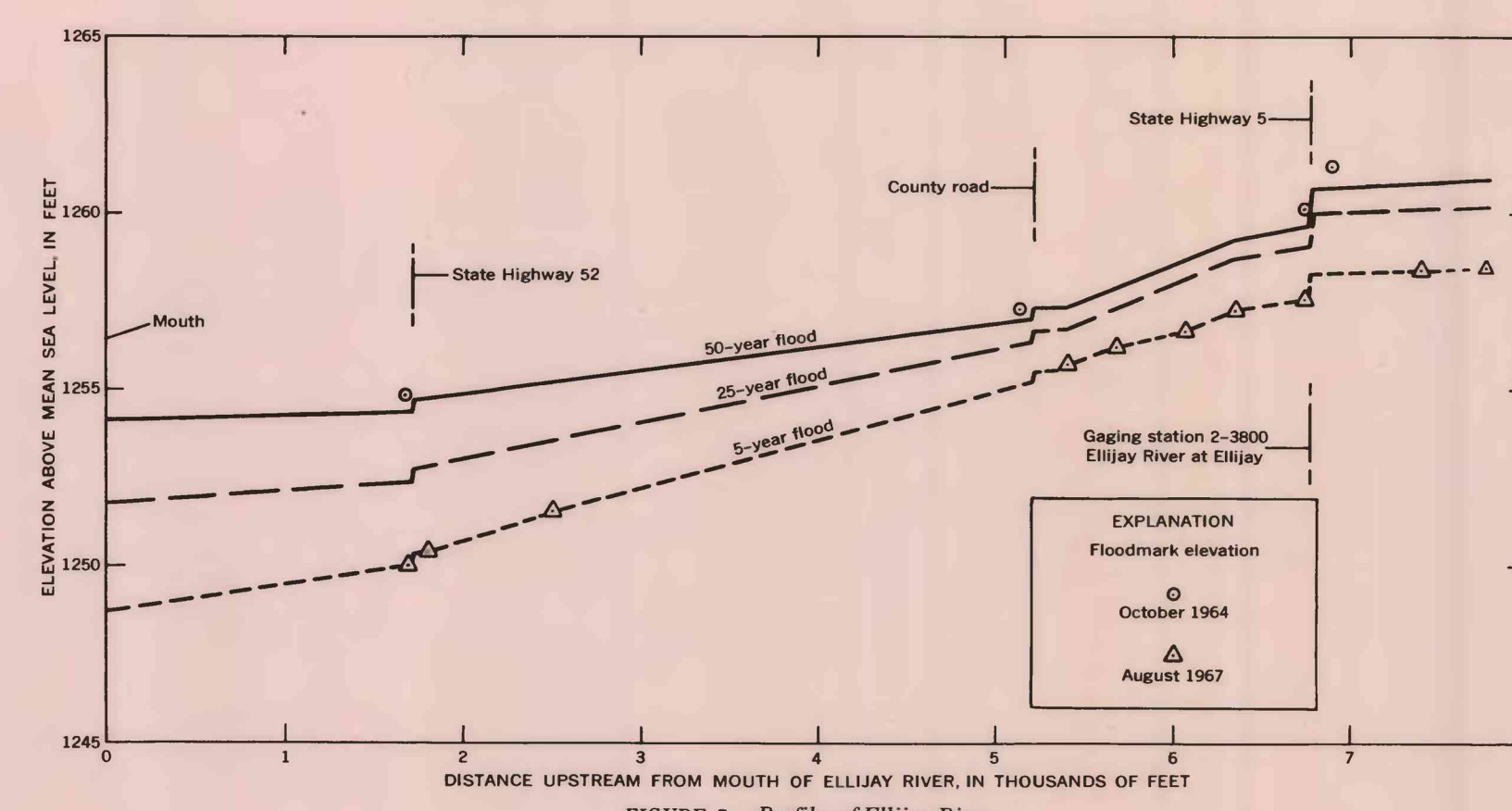
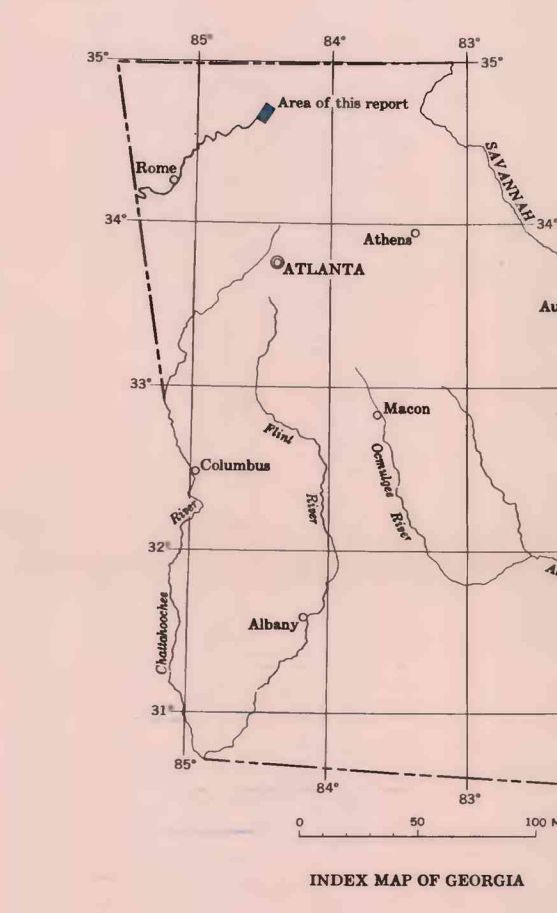


FIGURE 7.—Profiles of Ellijay River.

TABLE 2.—Bench marks in vicinity of Ellijay

Reference point	Elevation above mean sea level (feet)	Description
BM 1	1,234.65	0.5 mile downstream from bridge over Coosawatee River at State Highway 5, near U.S. Geological Survey gaging station. A brass disk stamped U.S. Geological Survey 1940 in rock ledge 1.25 feet landward from gage well.
BM 2	1,255.09	381 feet south of south end of bridge over Coosawatee River at State Highway 5 and 27 feet west of center line of highway. A brass disk stamped Georgia Geodetic Survey 10D16 on property of Georgia Power Company.
BM 3	1,255.37	At bridge over Coosawatee River at State Highway 282. A brass disk stamped Corps of Engineers on downstream west abutment flush with sidewalk.
BM 4	1,260.61	At Louisville and Nashville Railroad bridge over Cartecay River at Ellijay. A brass disk stamped U.S. Coast and Geodetic Survey X 57 1933 set in first step from the top of the northeast abutment, about 10 feet southeast of track and 2 feet lower than the bridge floor.
BM 5	1,276.75	About 200 feet east of Louisville and Nashville Railroad station, about 100 feet southeast of the track in west brick face of store. A brass disk stamped U.S. Geological Survey 1275 set in concrete at store 7 feet north from southwest corner, 2 feet south of south entrance, and about 1 foot above loading platform.
BM 6	1,261.55	At U.S. Geological Survey gaging station on north bank of Cartecay River adjacent to State Highway 52, 2 miles southeast of Ellijay. A brass disk stamped U.S. Geological Survey set in concrete post 24 feet downstream from east downstream corner of gage well.
BM 7	1,263.22	At culvert on State Highway 5, 528 feet south of bridge near Ellijay River. A brass disk stamped Georgia Geodetic Survey 10D18 in south end of west headwall of large culvert.
BM 8	1,266.18	At bridge over Ellijay River at State Highway 5 at U.S. Geological Survey gaging station at Ellijay. Head of carriage bolt set in top of downstream end of south bank abutment.

Base from American Air Surveys, Inc.

