Triplett Creek flood at Morehead, Ky., July 3, 1960. Looking south along South Wilson Street toward Chesapeake and Ohio Railway

Photograph by Maxwell Hoffman, photographer

Triplett Creek flood at Morehead, Ky., July 3, 1960. Looking south from Chesapeake and Ohio Railway track to Ashland Oil bulk station




Base from U.S. Geological Survey, 1953

SCALE 1:12 000

0 ½ 1 MILE

0 .5 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT HALF INTERVAL CONTOURS
DATUM IS MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1969

## BENCH MARK DESCRIPTION

Description of bench marks in the area are as follows:

Morehead, Ky., 2.2 miles NE along Chesapeake and Ohio Railroad, from passenger station, on SE end of NE abutment of overpass over private road; a chiseled square. Elev. 762.07. feet.

Morehead, Ky., 1.8 miles NE of, 0.2 miles SE along State Highway 32 from junction with U.S. Highway 60, on SW end of NW abutment of bridge over Triplett Creek; a chiseled square. Elev. 753.92 feet.

Morehead, Ky., along the Chesapeake and Ohio Railroad, at station, across the tracks and street SE of the south corner of passenger station, 6 feet SW of a line extended from SW wall of station, 2.7 feet SE of fireplug, 2.3 feet NE of power pole, 1.8 feet east of another pole, about level with track, a standard USC&GS tablet in concrete post, stamped "A 37 1935 722.482." Elev. 722.48 feet.

Morehead, Ky., 1.6 miles SW along Chesapeake and Ohio Railroad from passenger station, 45 feet north along railroad from culvert over Rockwall Hollow 25 feet east of east side of U.S. Highway 60, on east side of railroad, on NW corner of concrete base to signal post 5792, a chiseled square. Elev. 716.36 feet.

Morehead, Ky., 2.2 miles SW along U.S. Highway 60 from post office, thence 0.3 mile south on dirt road to railroad crossing of the Chesapeake and Ohio Railroad, 86 feet west of center of road 57 feet NE of milepost 580, 28.6 feet north of north rail 1.2 feet south of the north right-of-way fence, 4.7 feet below level of track, a standard USC&GS tablet set in concrete post, stamped "B 37 1935 718.414". Elev. 718.414 feet.

Morehead, Ky., from post office at, go SW on U.S. Highway 60 for 0.85 mile to junction of State Highway 519, turn left and follow route 519 SE for 0.5 mile to side road left, turn left cross tracks, then turn left for 0.1 mile to bench mark across tracks set vertical in the wall at the NE corner of a concrete building, and 3.5 feet above the tracks, a standard USC&GS tablet stamped "719.880 T10 1928". Elev. 719.880 feet.

# FLOODS ON TRIPLETT CREEK IN VICINITY OF MOREHEAD, KENTUCKY

This report was prepared by the U.S. Geological Survey to further the objectives of the Appalachian Regional Commission. It presents hydrologic data that can be used to evaluate the extent, depth, and frequency of floods that affect the economic development of flood plains of Triplett Creek and its tributaries in a selected area at Morehead, Kentucky. The data provide a technical basis for solving existing flood-plain problems and formulating regulations for land use and development that will reduce future flood damage. The report will be useful for preparing building and zoning regulations, locating waste disposal and water treatment facilities, and developing recreational areas.

The approximate areas that would be inundated by floods with 5-, 25-, and 50-year recurrence intervals on Triplett Creek and its tributaries in the vicinity of Morehead are shown on the topographic map.

According to reports of local residents, some of whom could remember as far back as 80 years, the July 5, 1939, flood was the highest that they observed on Triplett Creek and its tributaries and was 3.8 feet higher than the flood of July 3, 1960. The flood of July 3, 1960, at the gaging station Triplett Creek at Morehead has a recurrence interval of 50 years.

The procedure used to define flood boundaries was to construct flood profiles from elevation of floodmarks identified in the field and from existing data. Elevations of the 5-, 25-, and 50-year floods were derived from the flood profiles by interpolating between floods of known recurrence intervals. The extent of flooding by these three floods delineated on the topographic map was determined by interpolation between contours (lines of equal ground elevations). Overflow boundaries were identified during field investigations and surveys. The portrayal of flood boundaries is consistent with the scale of the map (1 inch = 1,000 feet; contour interval 20 feet).

Greater floods than the 50-year flood whose boundaries are shown on the map are possible. The flood boundaries reflect channel conditions existing prior to 1967. Subsequent changes in channel conditions, highways and bridges, urban development, and other cultural changes may affect the inundation pattern of future floods. Planned protective works may reduce the area and frequency of flooding but may not eliminate all future flooding.

*Flood height.*—The height of a flood at a stream-gaging station is usually 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, datum of 1929. Gage heights at the gage on Triplett Creek at Morehead can be converted to elevations above mean sea level by adding 708.26 feet.

Elevation and year of occurrence of each annual flood (highest peak in each water year) above 715.0-foot elevation at the gaging station during the period 1939–66 are shown in figure 1. The graph illustrates the irregular occurrence of floods on Triplett Creek and typifies the probable relative magnitude of floods in the Morehead area.

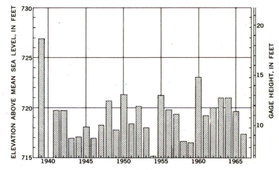



FIGURE 1.—*Annual floods above 715.0-foot elevation, 1939–66, Triplett Creek at Morehead*

*Flood discharge.*—The rate of discharge of a stream is the volume of flow that passes a particular site in a given period of time. Discharge rates usually are expressed in units of cubic feet per second (cfs). The maximum or peak discharge attained by a flood generally occurs at the time of the maximum height (stage) of the flood, but if the stream is affected by variable backwater, the maximum discharge may not occur at the same time as the maximum stage. For example, backwater from an ice or debris jam may cause a high stage during a period of relatively low discharge.

*Flood frequency.*—Frequency of floods at the gaging station on Triplett Creek at Morehead is based on the partial-duration series for this report. The partial-duration series is computed on the basis of all momentary peak discharges above a selected base discharge. The general relation between frequency and discharge is shown in figure 2, and the general relation between frequency and stage is shown in figure 3. The frequency curves shown are based on channel conditions existing in 1966. Future changes in channel conditions would likely change the frequency relations. The relation between frequency and stage is dependent on the relation of stage to discharge. Any changes in the stage-discharge relation, caused by channel filling or dredging, straightening stream channel, and building of floodwalls in the immediate vicinity of the gage could alter stage-discharge relations and hence frequency-stage relations. Changes upstream such as construction of reservoirs or floodwalls and filling or dredging the stream channel will alter the frequency-discharge relations. Extrapolation of the curves beyond the limits shown is not recommended because of the possible large errors.

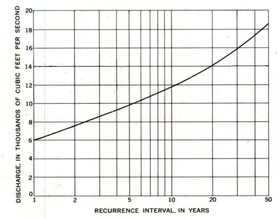



FIGURE 2.—*Frequency of flood discharges on Triplett Creek at Morehead*

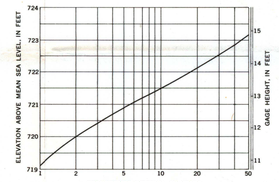



FIGURE 3.—*Frequency of flood stages on Triplett Creek at Morehead*

*Recurrence intervals.*—As applied to flood events, recurrence interval is the average number of years within which a given flood will be equaled or exceeded once. It is emphasized that recurrence intervals are average figures—the fact that a 10-year flood has occurred does not preclude the occurrence of a flood equal to or greater than the 10-year flood next year or even next week. Another way of comparing frequency of floods is in terms of their probabilities of occurrence (virtually the reciprocal of their recurrence intervals for floods greater than the 10-year flood). For example, a flood with a 25-year recurrence interval would have a 4-percent chance of being equaled or exceeded in any given year.

The general relation between recurrence interval and flood height at the gaging station on Triplett Creek at Morehead (fig. 3) is tabulated below:

| Recurrence interval (years) | Elevation above mean sea level (feet) |
|---|---|
| 50 | 723.1 |
| 25 | 722.3 |
| 10 | 721.5 |
| 5 | 720.9 |

*Flood profiles.*—Profiles of the water surface for the 5-, 25-, and 50-year floods, based on profiles of the floods of July 3, 1960, March 3 and 7, 1967, are shown in figure 4. Where floodmarks could not be obtained for the two highest floods, the profiles were constructed on the basis of flood crests determined from photographs, reports of local residents, and elevations of streambeds and lower flood stages. River miles used for the profiles correspond to those marked along the streams on the topographic map.

No profiles are shown for floods on Dry Creek. Major flooding on Dry Creek in the area of this report is caused by backwater from Triplett Creek.

The abrupt changes in the profiles shown at some road crossings and at the dam indicate the difference in water surface elevations at the upstream and downstream sides of bridges or dam. The drop in water surface through bridge openings during future floods may be different from that shown on the profiles. An increase in channel capacity through a bridge opening would reduce the flood height on the upstream side. An ice or debris jam in the channel or at a bridge would tend to increase the upstream flood height. Channel changes may also change the overflow pattern of future floods.

*Flood depths.*—Depth of flooding at any point can be estimated for the three hypothetical floods (5-, 25-, and 50-year floods) by subtracting the ground elevation from the water-surface elevation at that point as indicated by the profiles in figure 4. Flood depth along Dry Creek can be determined by subtracting ground elevations from the water-surface elevation at Dry Creek on the profile of figure 4. The approximate ground elevation can be determined by interpolating between contours on the map; more accurate elevations can be obtained by leveling from nearby bench marks.

Cross sections in figures 5–7 illustrate the depth of flooding at various sites for the hypothetical floods.

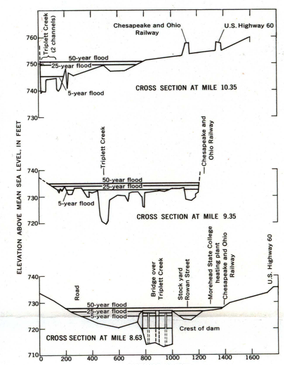



FIGURE 5.—*Cross sections of Triplett Creek at miles 10.35, 9.35, and 8.63*

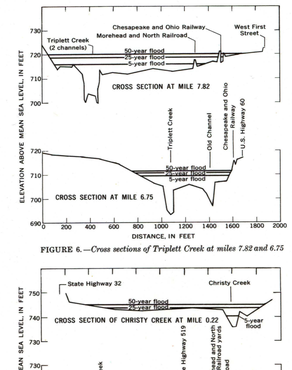



FIGURE 6.—*Cross sections of Triplett Creek at miles 7.82 and 6.75*




FIGURE 7.—*Cross sections of Christy Creek and Dry Creek*

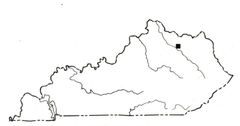
*Acknowledgments.*—The selection of the site for this project was made in collaboration with the Appalachian Regional Commission and the Division of Water, Kentucky Department of Natural Resources. Coordination of planning with the district office of the Corps of Engineers was accomplished through the office of Appalachian Studies, Corps of Engineers. Additional flood data were obtained from residents in the area and from field investigations.

*Additional data.*—Other information pertaining to floods in Rowan County, Kentucky, can be obtained at the office of the U.S. Geological Survey, Louisville, Kentucky, and from the following published reports:

Hannum, C. H., 1968, Floods on Triplett Creek in vicinity of Morehead, Kentucky: U.S. Geol. Survey open-file report, 17 p.

McCabe, J. A., 1962, Floods in Kentucky, magnitude and frequency: Kentucky Geol. Survey, Inf. Circ. 9, ser. 10, 196 p.

Schrader, F. F., 1943, Notable local floods of 1939, pt. 2. Flood of July 5, 1939, in eastern Kentucky: U.S. Geol. Survey Water-Supply Paper 967-B, 59 p.



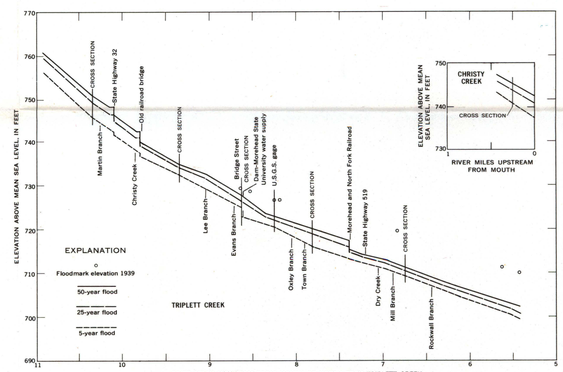




FIGURE 4.—*Profiles of Triplett Creek and Christy Creek*

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# FLOODS IN TRIPLETT CREEK IN VICINITY OF MOREHEAD, KENTUCKY

By
C. H. Hannum

1969

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