

FLOODS IN MARENGO SOUTH QUADRANGLE,
NORTHEASTERN ILLINOIS

Introduction.—This report presents hydrologic data that can be used to evaluate the extent, depth, and frequency of flooding that affect the economic development of flood plains in the Marengo South quadrangle, northeastern Illinois. It will aid individuals, government agencies, and others responsible for solving existing flood problems and for formulating effective flood-plan regulations that will minimize the creation of new flood problems. The report will also be useful for preparing building and zoning regulations, locating waste disposal facilities, developing recreational areas, and managing surface water in relation to the ground-water resources.

The areas inundated by floods along streams in the Marengo South quadrangle are delineated on a topographic map. The quadrangle location is shown in figure 1. The stream names and the dates of the floods as shown on the map are tabulated below:

| Crest-stage gage | Station number | Datum of stage above mean sea level (feet) | Drainage area (square miles) |
|--|----------------|--|------------------------------|
| Kishwaukee River near Franklinville (McCur Road) | 05437990 | 831.43 | 26.0 |
| South Branch Kishwaukee River (East of Union High Bridge Road) | 05438146 | 827.03 | 70.0 |
| Union Creek East at Union (Hammon Road) | 05438145 | 835.38 | 9.23 |
| Coon Creek | 05438243 | 813.43 | 56.6 |
| Near Harmony (Mena Road) | 05438247 | 805.04 | 82.2 |
| Harmony Creek | 05438244 | 864.80 | 5.52 |
| At Harmony (Harmony Road) | 05438245 | 825.38 | 7.85 |
| Coon Creek tributary near Harmony (Gerty Road) | 05438246 | 820.90 | 5.38 |
| Riley Creek near Riley (Maple Street Road) | 05438255 | 838.98 | 2.21 |

Size of the drainage basin for each station also is given in the table. The subbasin divides from which the areas were determined are shown on the flood map. The divides were defined in the usual manner of following the ridge line or highest ground elevation between adjacent streams.

Gage height and year of occurrence of each annual flood (highest peak year in each calendar year) above 748-foot elevation at the gaging station Kishwaukee River at Belvidere, during the period 1938, 1940-68 are shown in figure 2. The

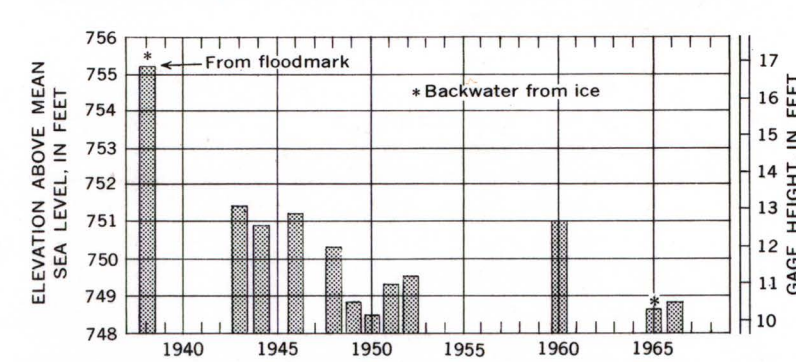


FIGURE 2.—Annual floods above 748-foot elevation, 1938, 1940-68, Kishwaukee River at Belvidere.

gaging station is at the sewage treatment plant in Belvidere, about 1.25 mile northwest of the Marengo South quadrangle, and 20.8 miles upstream from mouth of Kishwaukee River. The graph shows the history of floods at the gage and illustrates the irregular occurrence of floods on the Kishwaukee River.

Flood discharge.—The rate of discharge of a stream is the volume of flow that passes a particular location in a given period of time. Discharge rates usually are expressed in units of cubic feet per second (cfs). Peak discharge, the maximum discharge attained by a flood, generally occurs at the time of the maximum height (stage) of the flood, but if a stream is affected by variable backwater, the time of the peak discharge may not coincide with that of 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 U.S. Geological Survey gaging stations 05438250 Coon Creek at Riley and 05438500 Kishwaukee River at Belvidere were derived from streamflow records of these stations. The Coon Creek gage is at Harmony Road, 0.7 mile southwest of Riley and at mile 13.40.

The general relation between discharge and frequency is shown in figures 3 and 4 and the general relation between stage and frequency is shown in figures 5 and 6. The relation

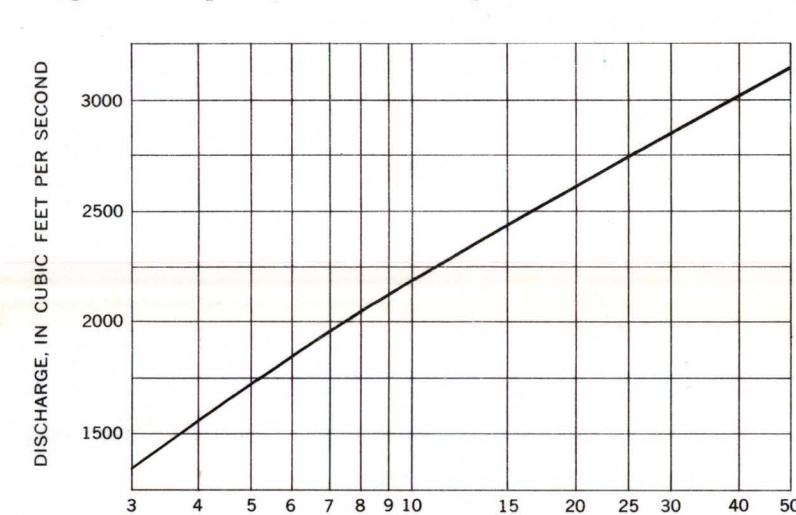


FIGURE 3.—Frequency of flood discharges on Coon Creek at Riley.

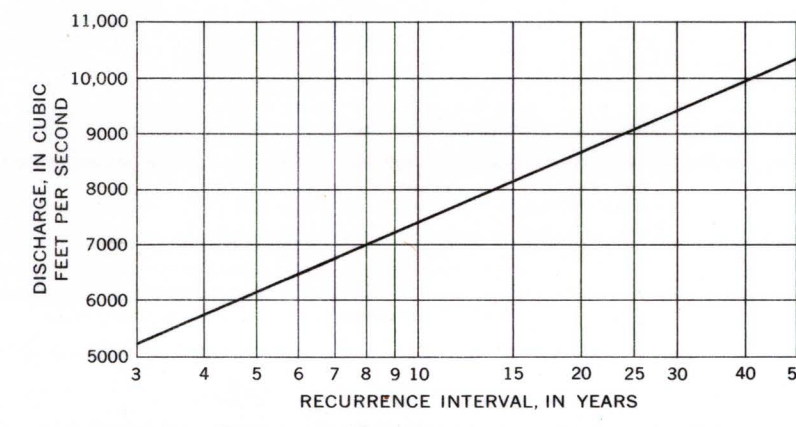


FIGURE 4.—Frequency of flood discharges on Kishwaukee River at Belvidere.

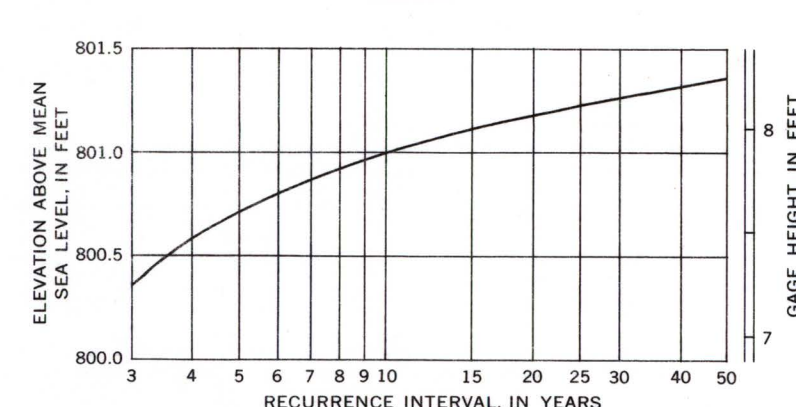


FIGURE 5.—Frequency of flood stages on Coon Creek at Riley.

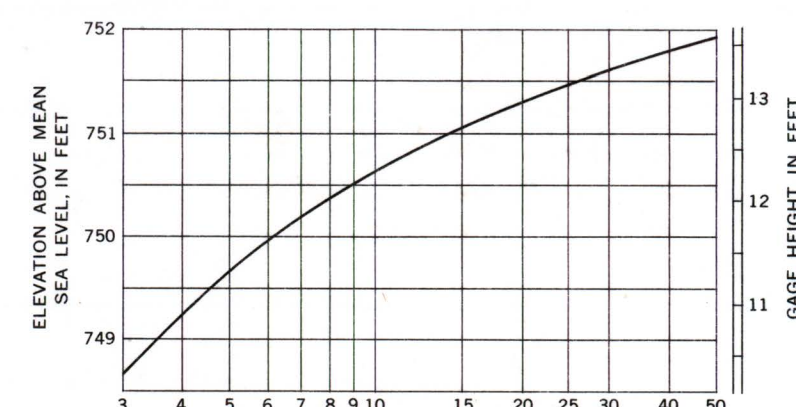
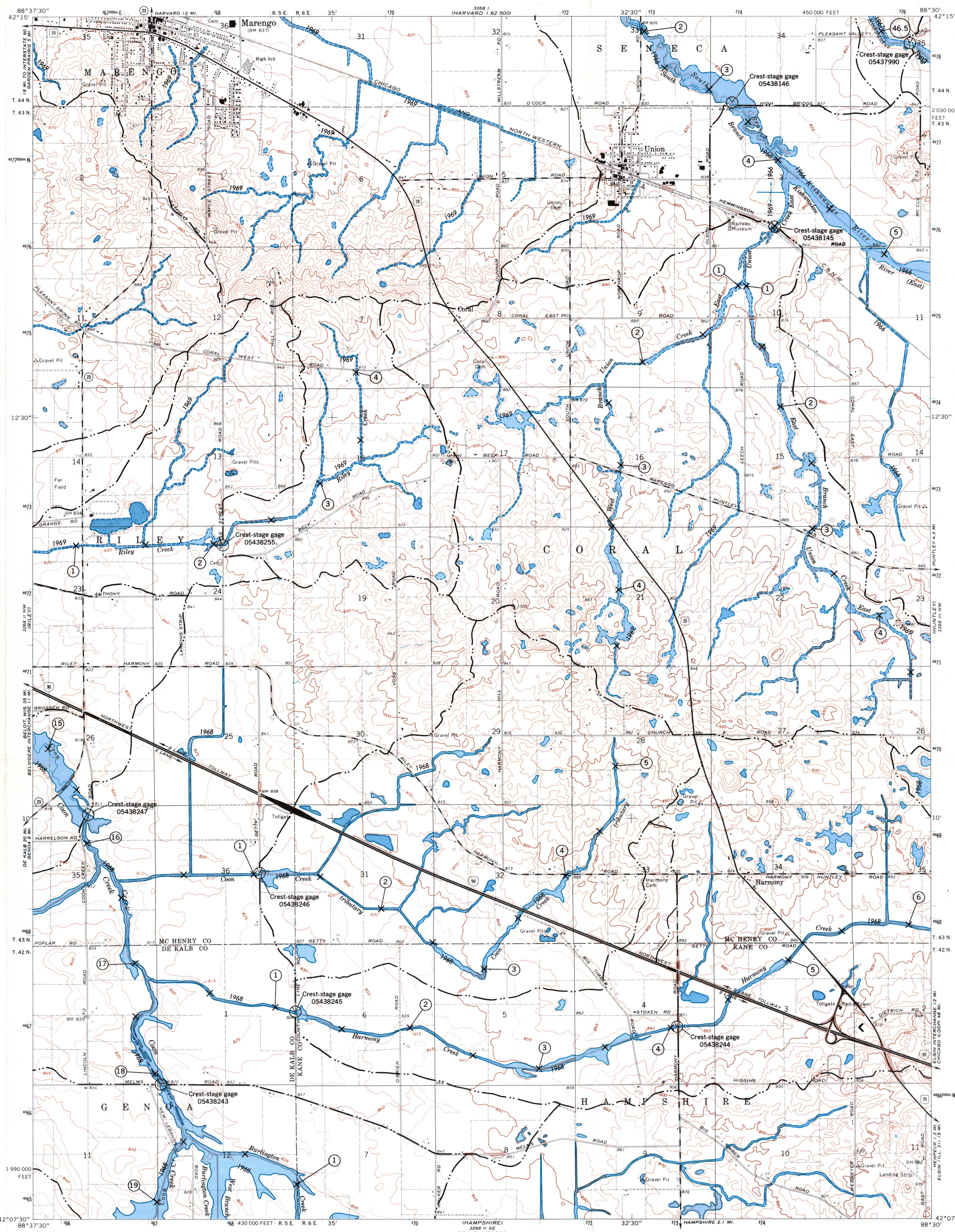


FIGURE 6.—Frequency of flood stages on Kishwaukee River at Belvidere.

between stage and frequency is dependent on the relation of stage to discharge which is affected by physical conditions of stream channels and constrictions. The frequency curves shown in figures 5 and 6 are based on channel conditions existing in 1970. Longer records and future changes in channel conditions may define somewhat different flood-frequency curves. Extrapolation of the curves beyond the limits shown is not recommended.

Recurrence intervals.—As applied to flood events, recurrence interval is the average interval of time within which a given flood will be equaled or exceeded once. Frequencies of floods can be stated in terms of their probabilities of occurrence (virtually, reciprocals of their recurrence intervals for floods with recurrence intervals greater than 10 years). 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, or a flood with a 50-year recurrence interval would have a 2-percent chance of being equaled or exceeded in any given year.



Base from U.S. Geological Survey, 1968
10,000-foot grid based on Illinois coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks,
zone 16, shown in blue

| Recurrence interval (years) | Elevation above mean sea level (feet) Coon Creek at Riley | Elevation above mean sea level (feet) Kishwaukee River at Belvidere |
|-----------------------------|--|--|
| 50..... | 801.4 | 751.9 |
| 20..... | 801.3 | 751.6 |
| 10..... | 801.2 | 751.3 |
| 5..... | 801.0 | 750.6 |
| 3..... | 800.7 | 749.6 |
| 2..... | 800.4 | 748.6 |

It is emphasized that recurrence intervals are average figures - the average number of years between occurrences of floods that equal or exceed a given magnitude. The fact that a major flood is experienced in one year does not reduce the probability of that flood being exceeded during the next year or even during the next week.

Flood profiles.—Profiles of the water surface, based primarily on elevations of the marks left by floods of February 1966, June 1967, August 1968 and July 1969 are shown in figures 7-15.

Where floodmarks could not be identified, the profiles were constructed on the basis of flood crests determined from photographs and from reports by local residents, and on

elevations of streambeds and lower flood stages. River miles used for the profiles correspond to those marked along the streams on the flood 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 in figures 7-15. The approximate ground elevation can be determined from contours on the map, although more accurate elevations can be obtained by leveling from nearby bench marks.

Additional data.—Other information pertaining to floods in the Marengo South quadrangle can be obtained at the office of the U.S. Geological Survey, Oak Park, Ill.

EXPLANATION

- Area flooded
- Boundary of 1966 flood
- Boundary of 1967 flood
- Boundary of 1968 flood
- Boundary of 1969 flood
- Drainage divide
- River mile measured along stream channel
- Inundated areas defined by different floods, upstream and downstream

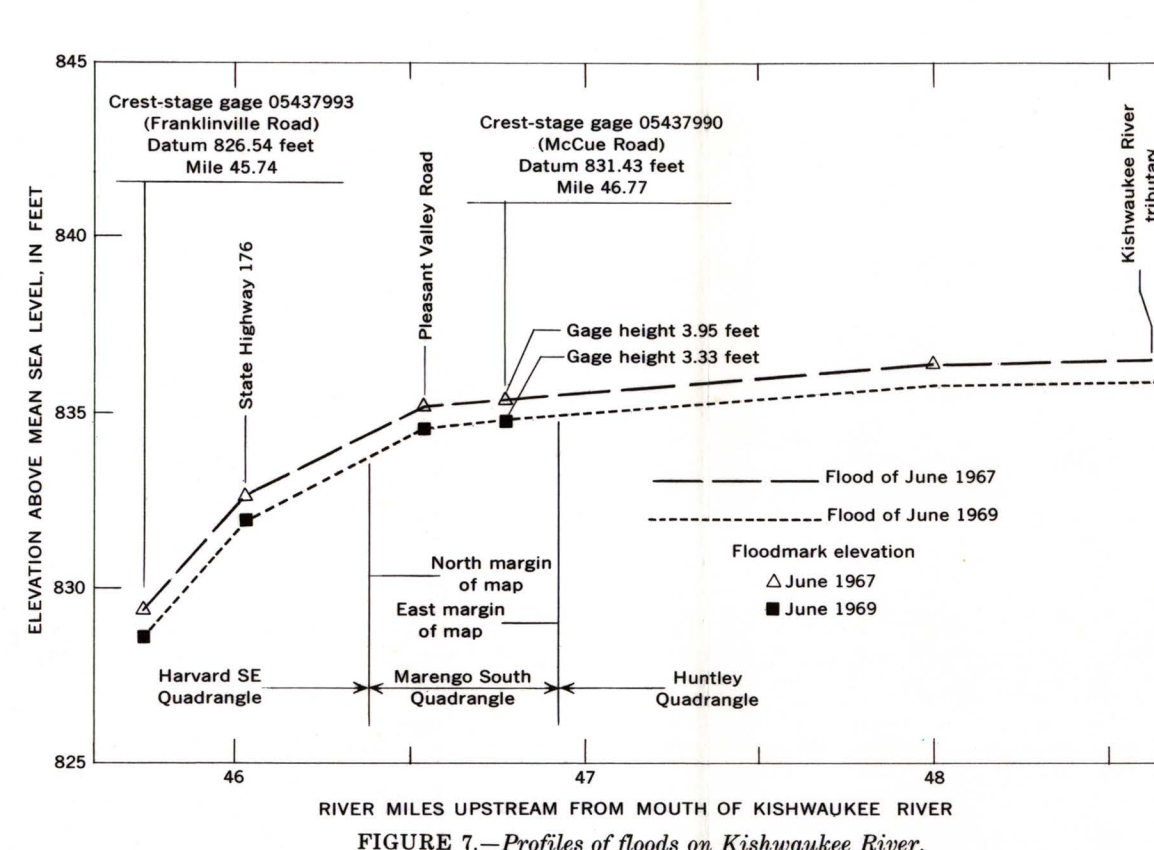


FIGURE 7.—Profile of floods on Kishwaukee River.

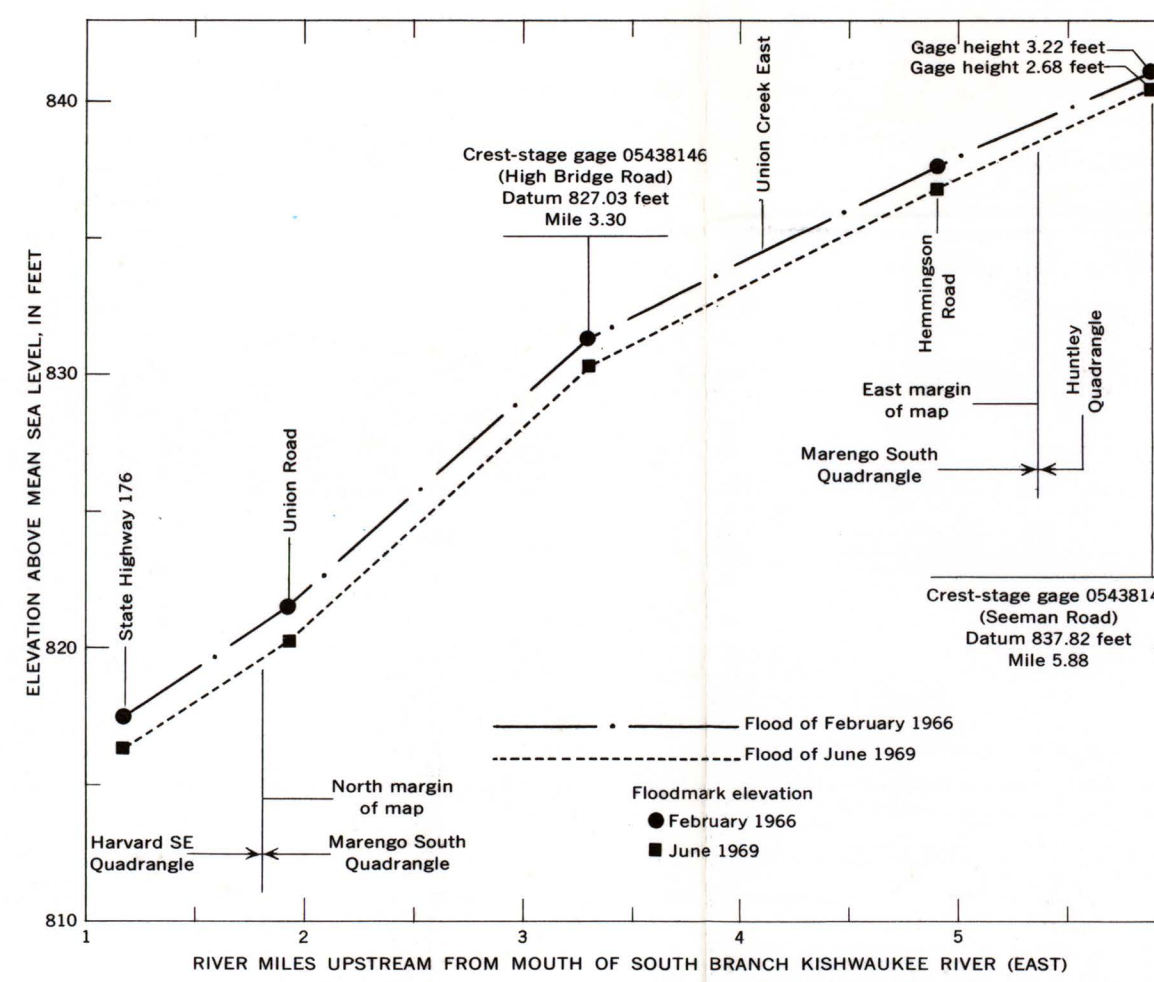


FIGURE 8.—Profile of floods on South Branch Kishwaukee River (East).

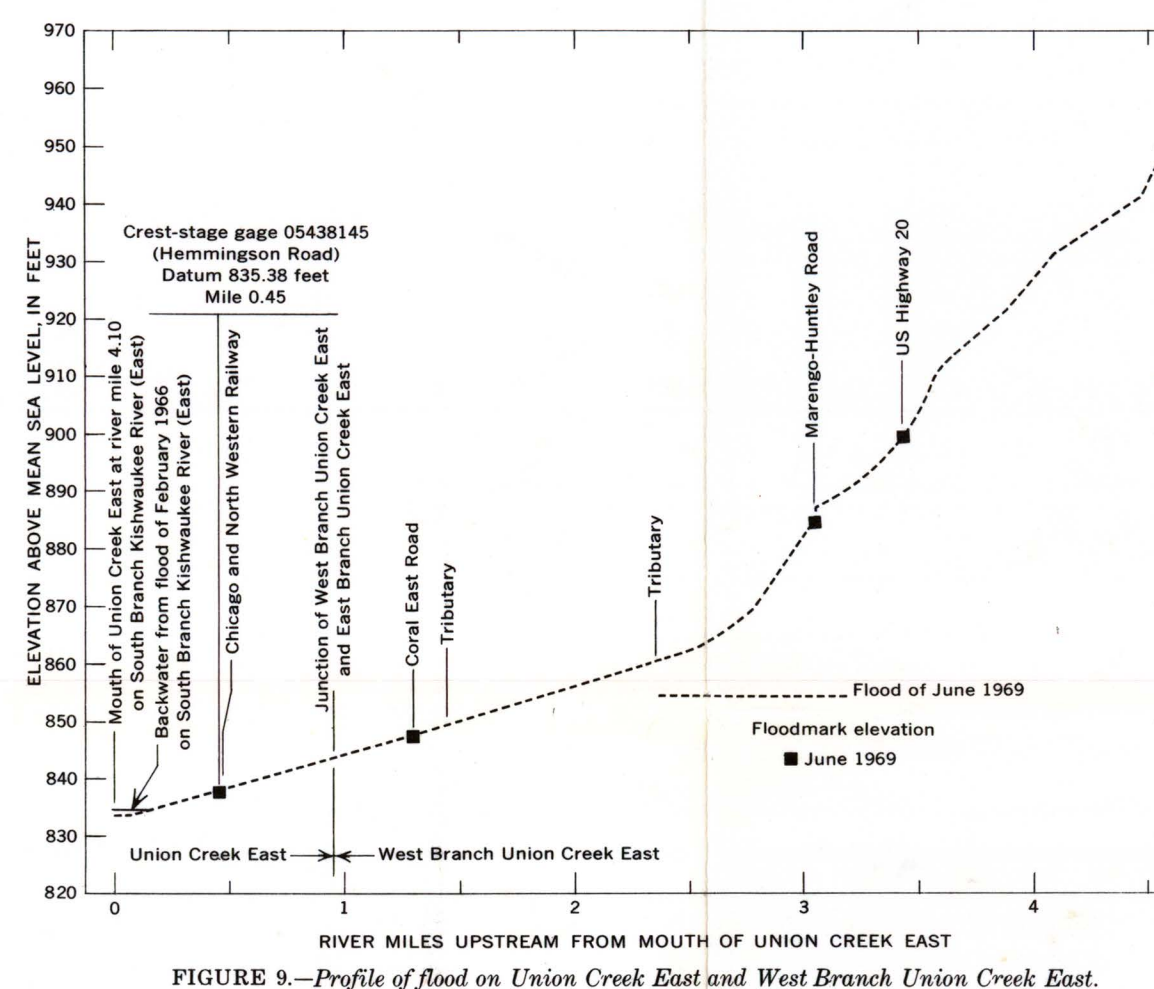


FIGURE 9.—Profile of flood on Union Creek East and West Branch Union Creek East.

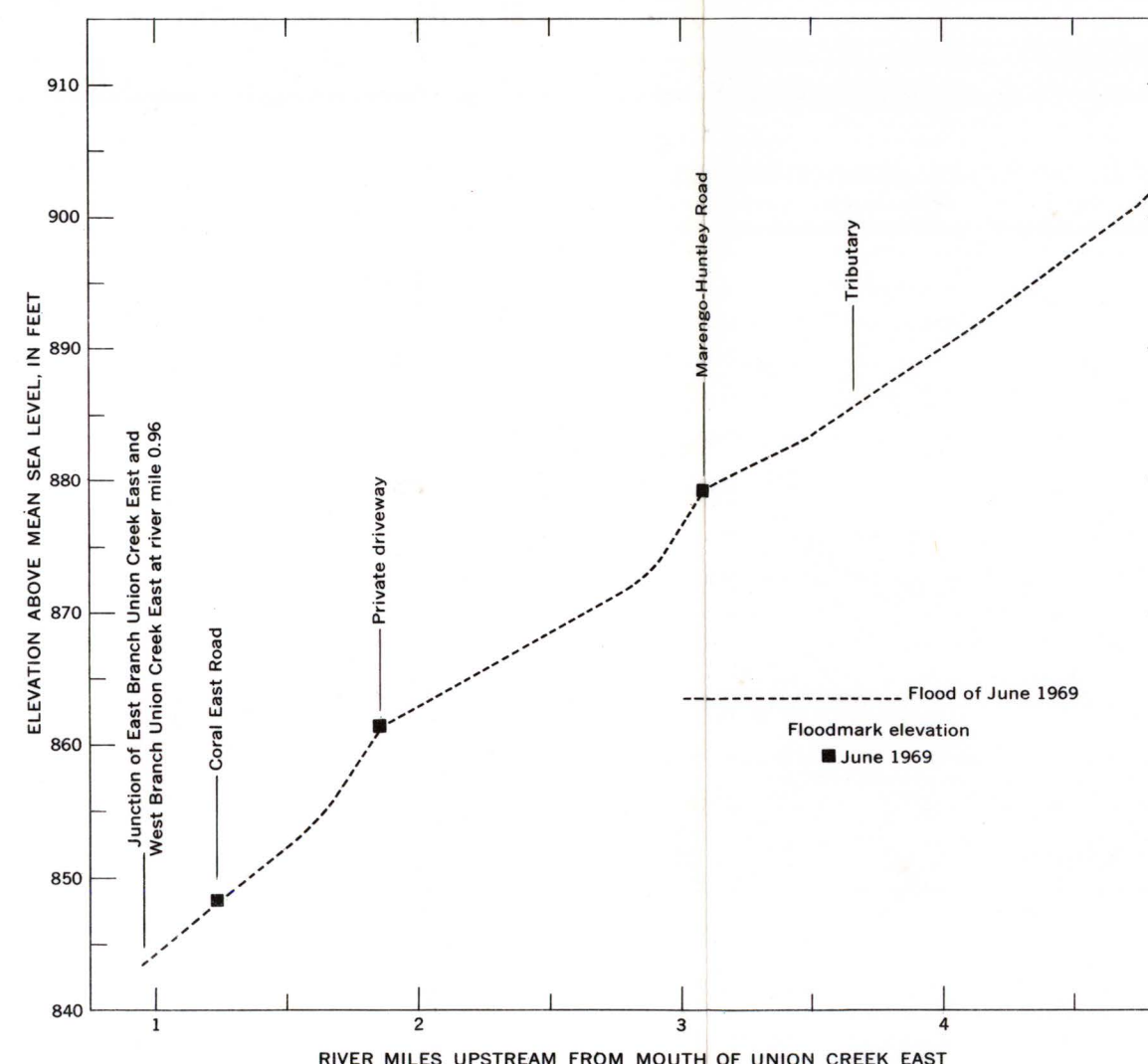


FIGURE 10.—Profile of flood on East Branch Union Creek East.

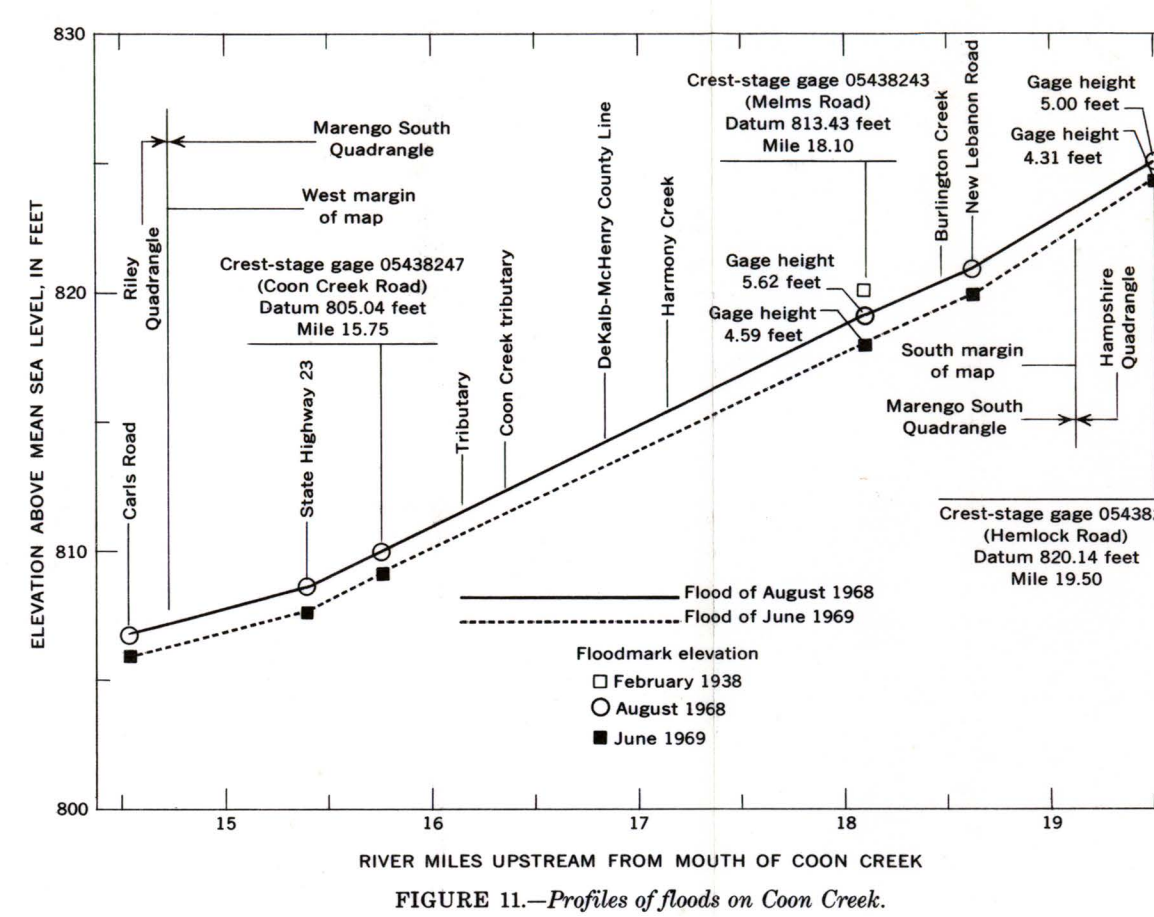


FIGURE 11.—Profiles of floods on Coon Creek.

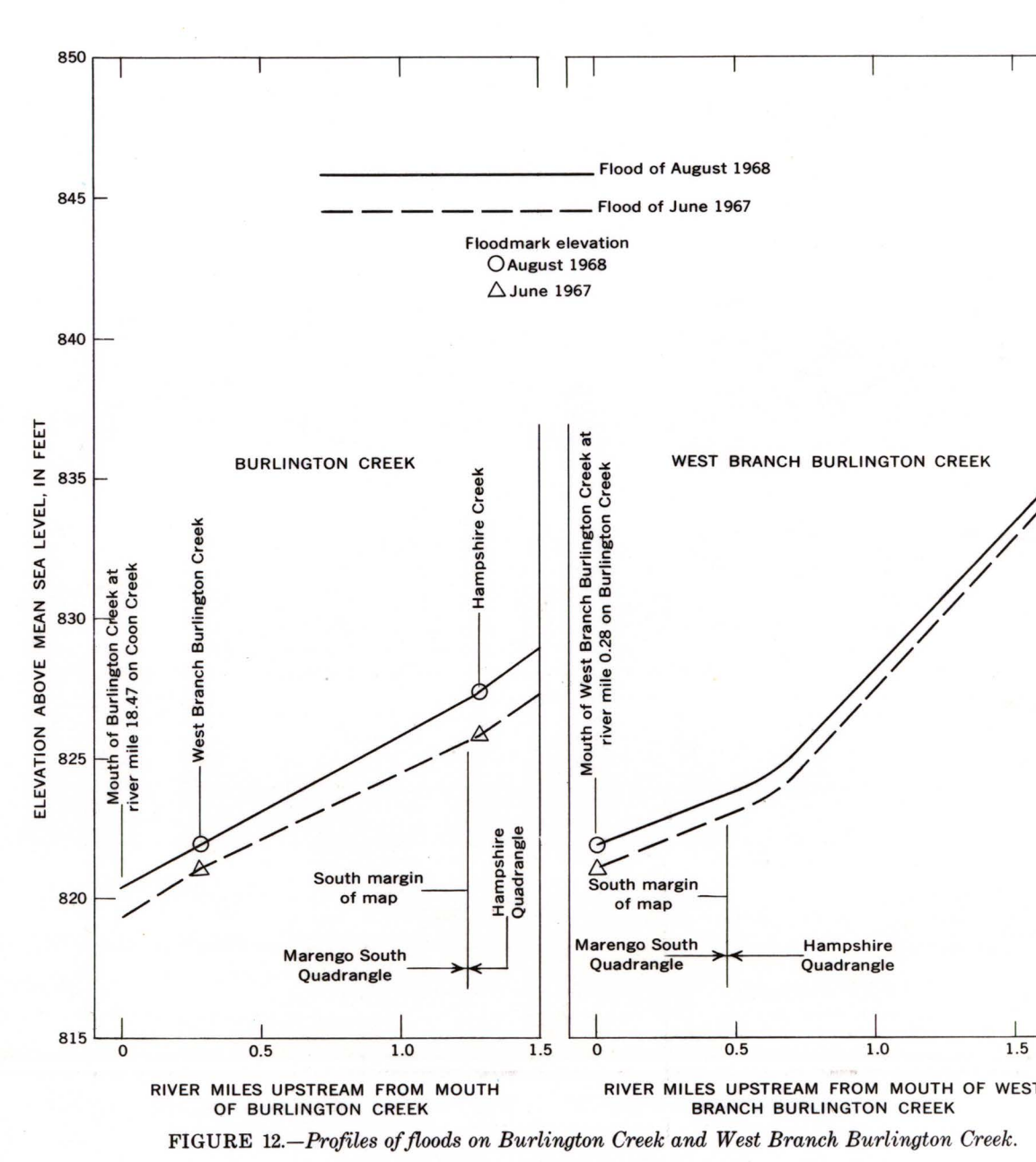


FIGURE 12.—Profile of floods on Burlington Creek and West Branch Burlington Creek.

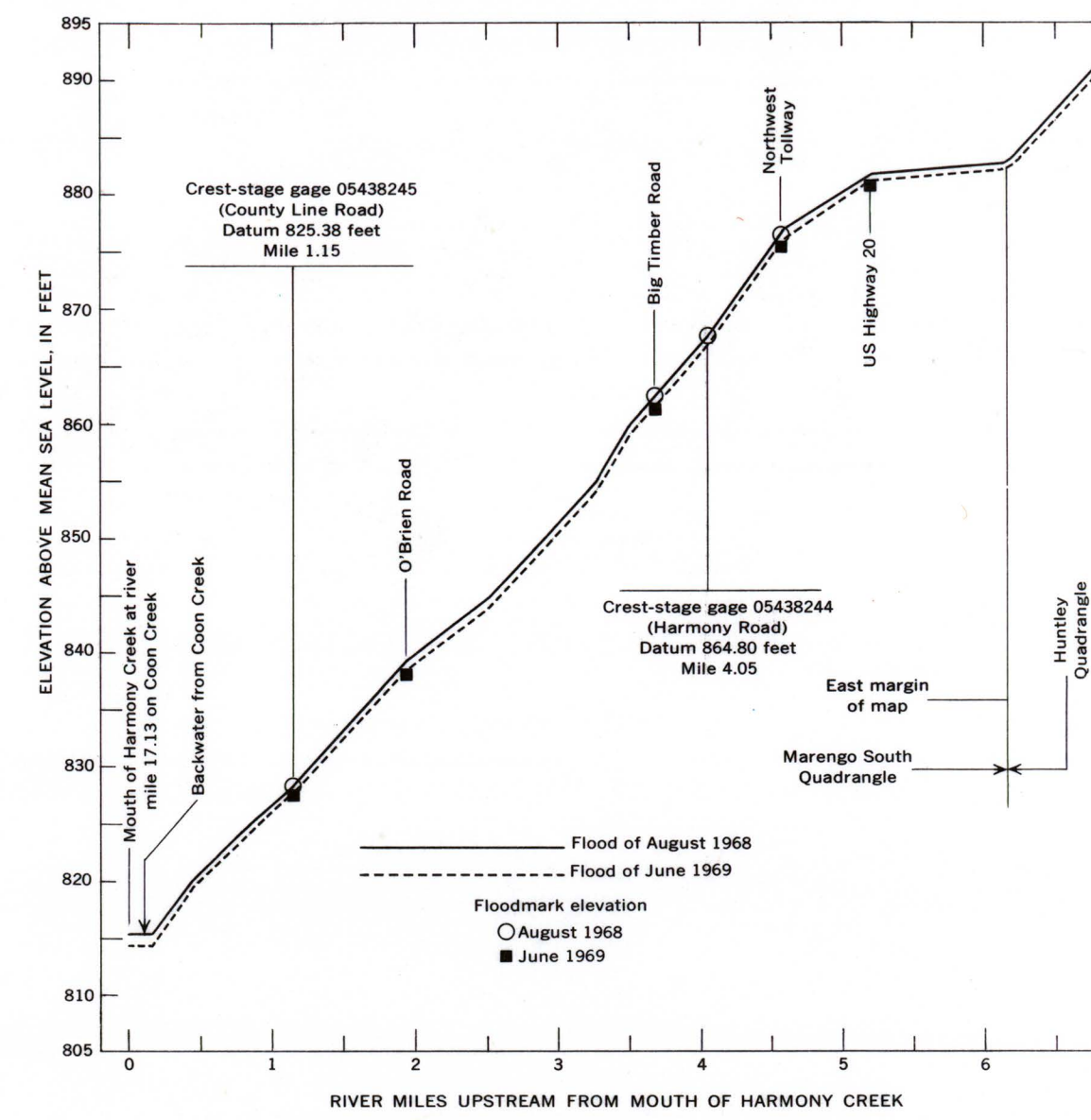


FIGURE 13.—Profile of floods on Harmony Creek.

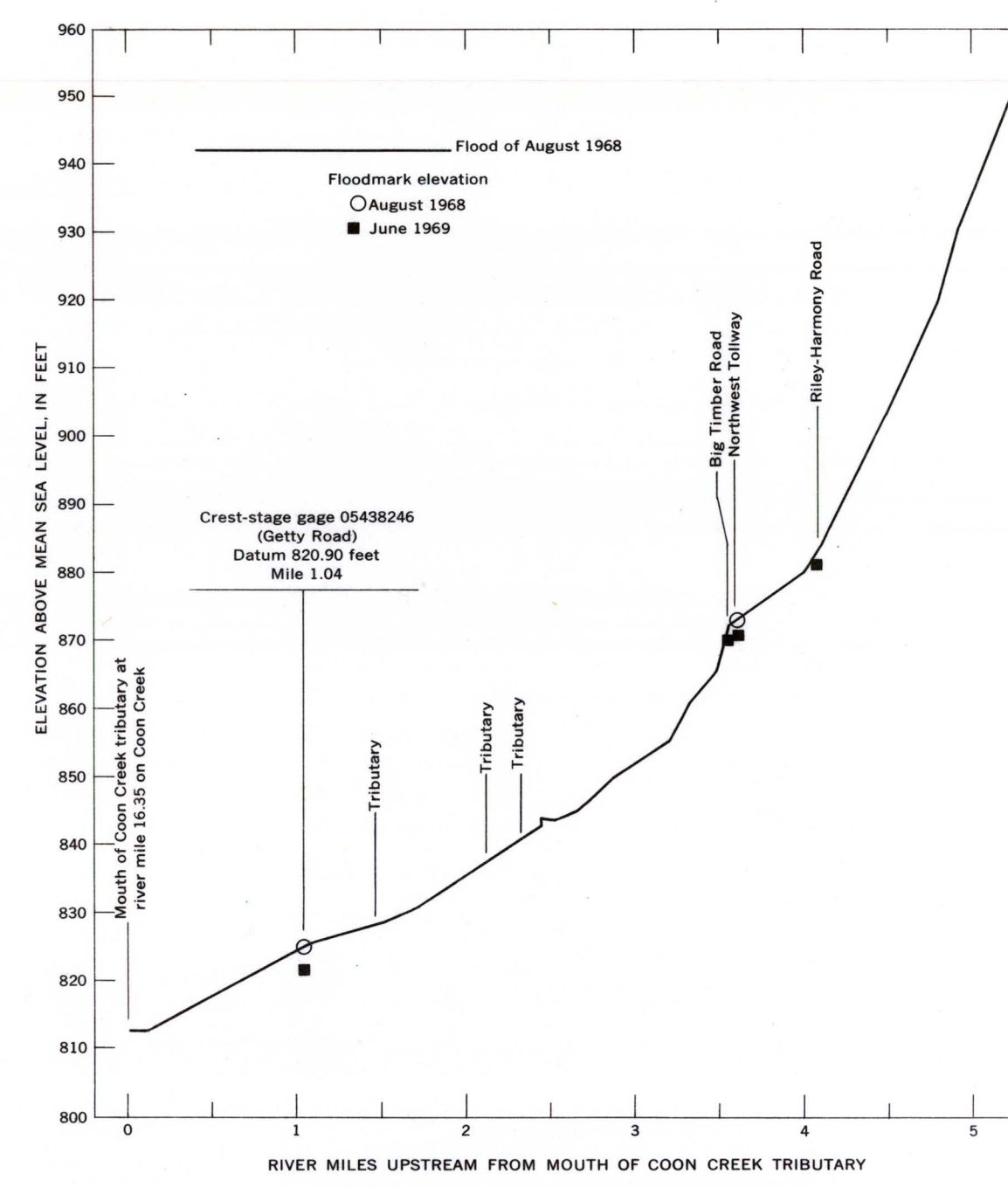


FIGURE 14.—Profile of flood on Coon Creek tributary.

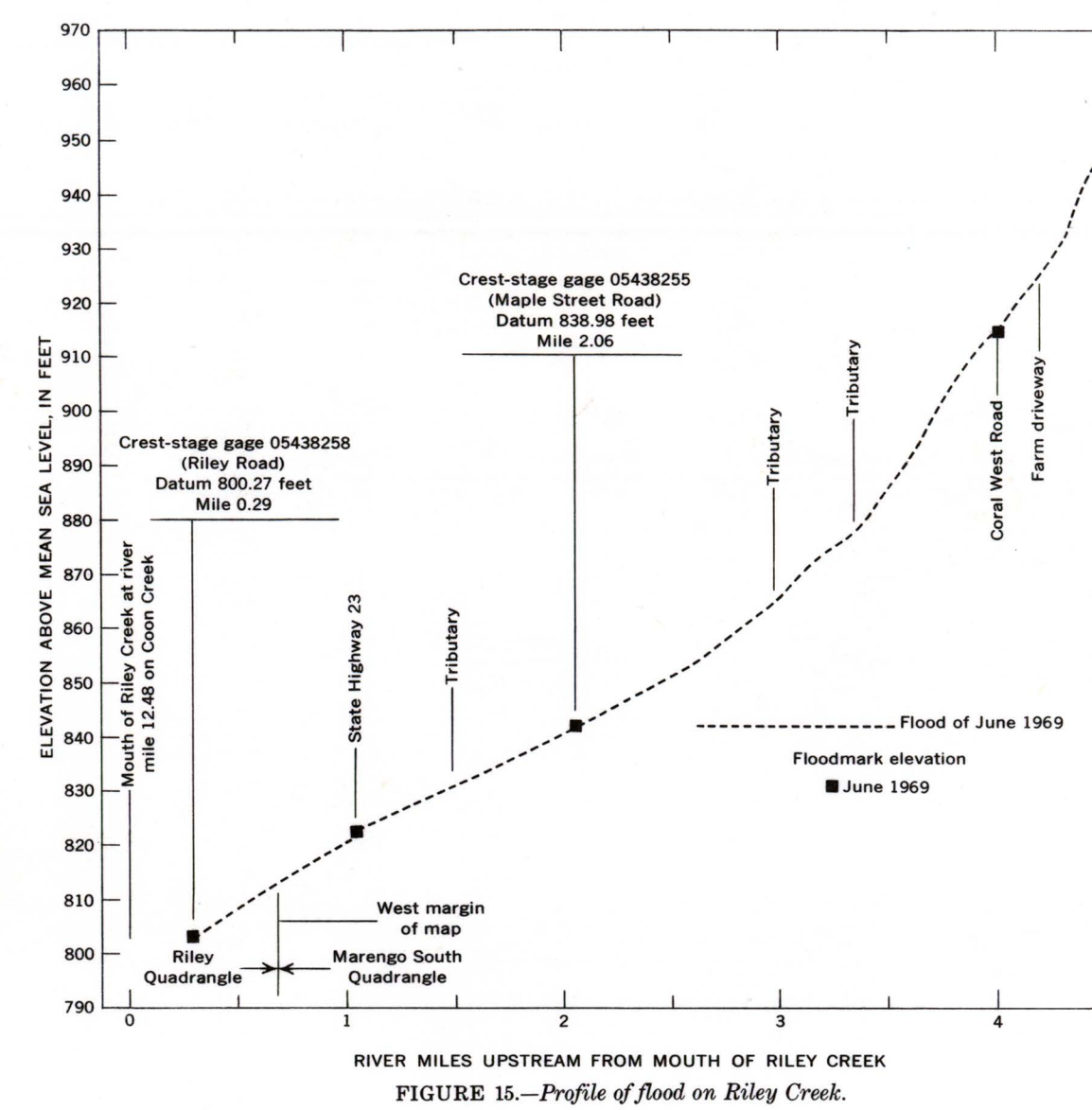


FIGURE 15.—Profile of flood on Riley Creek.

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