GEOLOGICAL SURVEY CIRCULAR 407

FLOODS OF JUNE–JULY 1957 IN INDIANA

Prepared in cooperation with the
State of Indiana

REPRINTED 1959

UNITED STATES DEPARTMENT OF THE INTERIOR
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By Charles E. Schoppenhorst

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PREFACE

This report on the floods of June-July 1957 in Indiana was prepared by the U. S. Geological Survey, Water Resources Division, Luna B. Leopold, chief hydraulic engineer, under the general direction of J. V. B. Wells, chief, Surface Water Branch.

Basic records of discharge in the area covered by this report were collected in cooperation with the Indiana Flood Control and Water Resources Commission; the Indiana Department of Conservation, Division of Water Resources; and the Corps of Engineers, Department of the Army. The U. S. Weather Bureau, and several State, municipal, and private organizations supplied information included in this report and acknowledgement of the data is made at the place where the data appear.

The records of discharge were collected and computed in the district office of the Surface Water Branch under the direction of D. M. Corbett, district engineer, Indianapolis, Ind. The report was assembled by the staff of the Floods Section in Washington, D. C., Tate Dalrymple, chief.

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By Charles E. Schoppenhorst

ABSTRACT

The floods of June-July 1957 exceeded those previously known on some of the tributaries of the Wabash and White Rivers in central Indiana. Six lives were lost, 1,282 dwellings were damaged, and 125 business places were flooded.

Heavy rains of June 27 and 28 resulted from remnants of Hurricane Audrey meeting a front that lay across central Indiana. Heaviest rainfall reported for the storm period at a U. S. Weather Bureau station was 10.15 inches at Rockville.

Previous maximum stages during the period of record were exceeded at 12 gaging stations. The peak stage on Raccoon Creek at Mansfield exceeded the previous maximum known stage, which occurred in 1875. One of the notable rates of discharge recorded was 245 cfs per square mile from a drainage area of 440 square miles on Raccoon Creek at Coxville.

INTRODUCTION

Record floods were produced by precipitation that ranged from 6 to 10½ inches falling on central Indiana and east-central Illinois, June 27 and 28, 1957, when remnants of Hurricane Audrey met a front that lay across central Indiana.

Many Weather Bureau stations reported more than 3 inches of rain during a 24-hour period. Rockville received 10.15 inches of rain during the storm period, and Whitestown received 8.66 inches of rain in about 12 hours.

Extreme flooding resulted on tributary streams in the central and lower White and Wabash River basins (fig. 1)—this report describes the flooding which occurred in Indiana. The crest stage on Eagle Creek, in central Indiana, exceeded that of 1913, which was the maximum stage previously known. Raccoon Creek, in west-central Indiana, rose to the highest stage known since at least 1875. Floods were moderate on the central and lower main-stem White and Wabash Rivers, having been exceeded by several floods during the past 25 years.

Six persons were drowned in the raging waters that damaged 1,282 dwellings, flooded 125 business places, washed out dozens of highway and railroad bridges and their approaches, and flooded a million acres of crops. Thousands of acres of cultivated land were flooded to a depth of more than 6 feet.

The primary purpose of the present report is to present detailed information concerning stages and discharges of streams in central Indiana for the floods of June-July 1957, in addition to that published in the Water-Supply Papers of the Geological Survey as part of the annual series on surface-water supply of the United States.

This report presents records of stage and discharge for 32 gaging stations and peak discharge at 28 miscellaneous sites. Gaging stations and miscellaneous sites are numbered in downstream order and these identification numbers are used throughout the report.

GENERAL FEATURES OF THE STORM

At many Weather Bureau precipitation stations June was one of the wettest months of record. The weather was generally fair immediately preceding the storm of June 27 and 28. However, intermittent showers occurred over most of the state June 22-25 and a few scattered stations reported light showers on June 26. On June 27 and 28 southerly moisture-bearing winds, associated with Hurricane Audrey, collided with a front that lay across central Indiana and caused flood-producing rains (fig. 2).

Heavy flooding occurred on most tributary streams in the central White and Wabash River basins. However, the flooding was most severe over the Eagle Creek and Raccoon Creek basins. The crest stage at the gaging station on Raccoon Creek at Mansfield was the highest since the station was established in May 1939, and according to information by local residents was at least 0.3 foot higher than that of the greatest known flood in the area which occurred in 1875. The peak stage at the gage on Eagle Creek, which has been in operation since November 1938, was the maximum for the period of record and was nearly 0.4 foot higher than that of the flood of March 1913.

Most streams began to rise early on June 28 with the crest being reached on the same day. Previous maxima stages during the period of record were exceeded at 12 gaging stations. Although the peak stage on Big Walnut Creek near Reelsville was only 0.67 foot higher than the previous maximum stage during the period of record, the corresponding discharge was nearly doubled.

Essentially the entire flow in Mill Creek near Cataract, whose peak discharge of 7,180 cfs was 2,300 cfs less than that of January 5, 1950, the maximum for the period of record, was stored in Cagles Mill Reservoir (storage began December 1952) and was not released until after the crest on Eel River had passed Bowling Green. The peak discharge at Bowling Green during the present flood was 33,400 cfs which was only slightly less than that of January 4, 1950 (34,000 cfs) which was the maximum in the period of record starting in 1931.

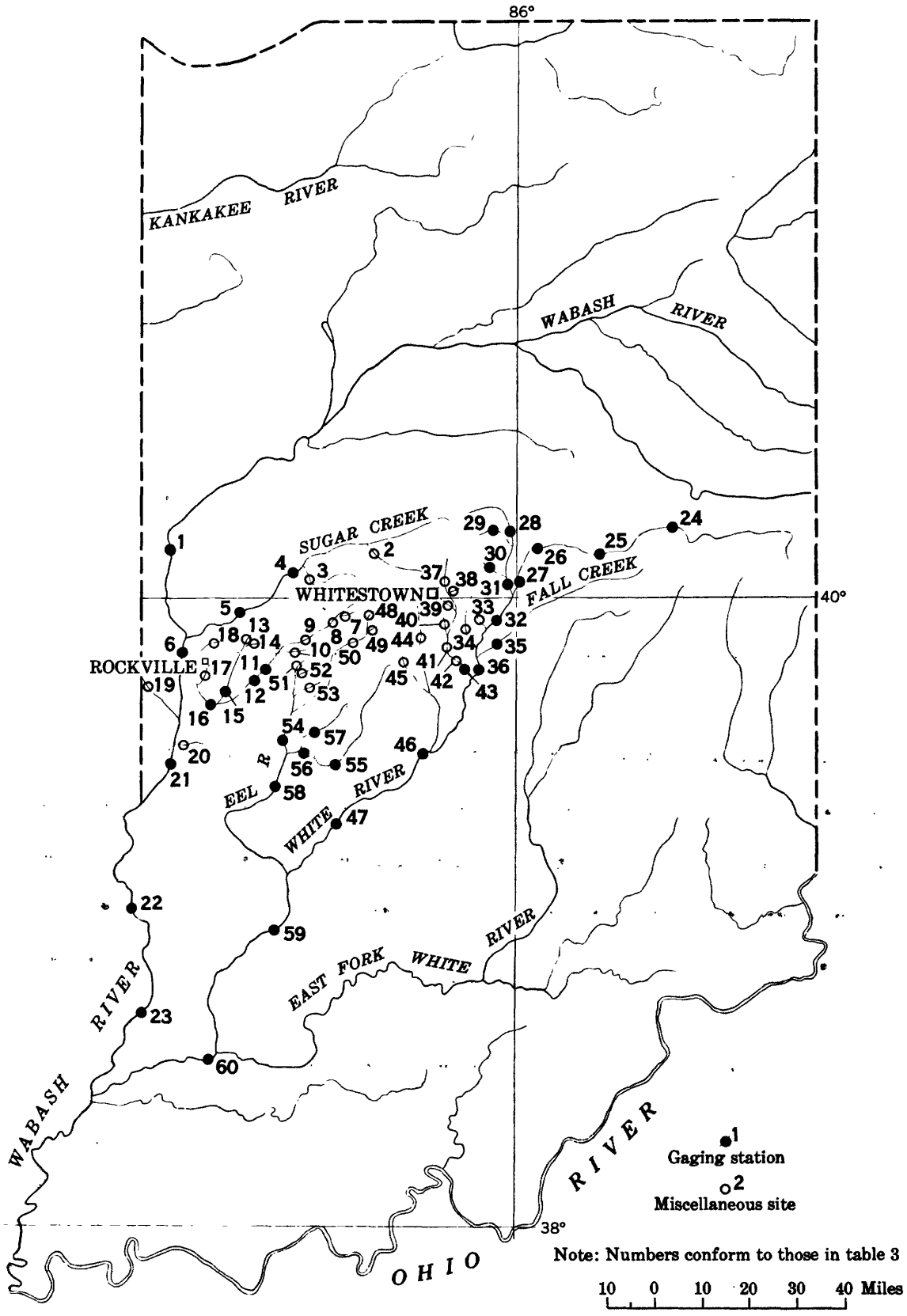

Figure 1.--Map showing location of flood-determination points.

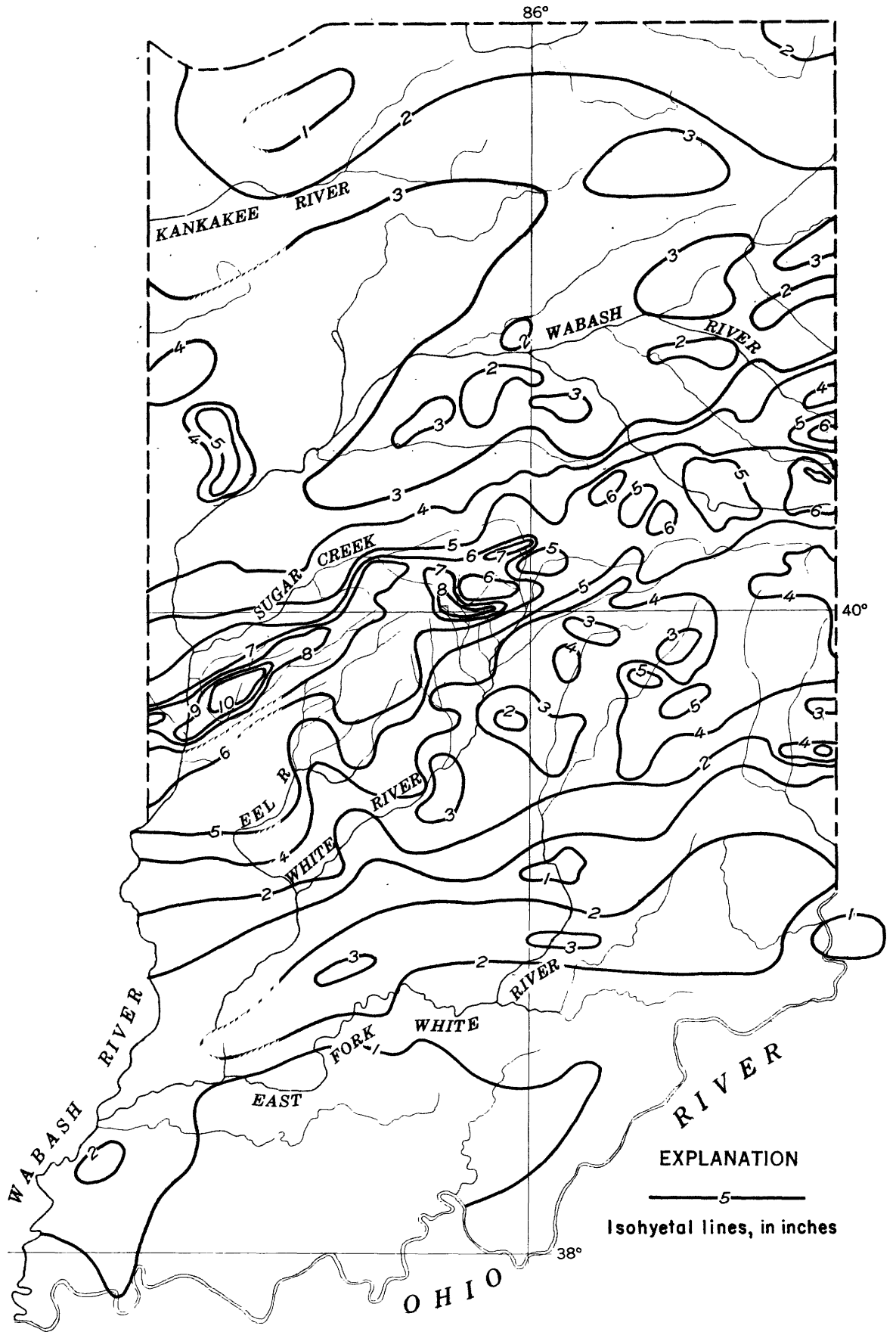

Figure 2.--Isohyetal map showing total precipitation, in inches, June 27-30, 1957.

MEASUREMENT OF FLOOD DISCHARGE

The definition of a stage-discharge relation from which discharge can be determined, when the stage is known, is a fundamental operation at a stream-gaging station. The relation is determined by current-meter measurements at varying stages over a sufficient range so that the curve of relation can be extended to maximum stage. The procedure followed in collecting the basic records of flow at Geological Survey gaging stations has been described in detail in many publications (for example, Water-Supply Paper 888).

Many of the stream channels in Indiana are subject to scour and fill during periods of flood flow, and current-meter measurements are especially needed during these times to define shifts in rating.

Measurements of peak discharge by current meter were impossible to obtain at some points where they were desired owing to the swift velocities over road approaches and other adverse conditions. Determinations of peak flow at such places and at miscellaneous sites, where runoff was excessive, have been based on measurements of flow through contracted openings, through culverts, by slope-areas, over embankments, or by a combination of these methods. A general description of these methods can be found in U. S. Geological Survey Water-Supply Paper 888, and more detailed information is available in other publications of the Geological Survey.

STAGES AND DISCHARGES

The data presented on the following pages include a description for each gaging station and each miscellaneous site in the storm area where the peak flow was determined, and a table of daily mean discharges (table 1) and a detailed discharge hydrograph of the flood period for each gaging station (figs. 3-11).

The period selected for most stations in the report is June 25 to July 9, 1957. The period for the Wabash River stations was extended to July 23 to encompass their peaks.

The description for each gaging station gives the location, size of drainage area above the gage, method of obtaining gage-height record during the flood period, datum of gage, a brief statement of the definition of the stage-discharge relation, maximum stage and discharge during the present flood, previous maximum of record, and other pertinent information. The description for each miscellaneous site gives the location, drainage area above the site, peak discharge for the flood, and method of its measurement.

Daily mean discharges in cubic feet per second and runoff in inches (table 1) for the flood period follow the group of station descriptions.

Results of current-meter measurements made at five miscellaneous sites by the Indiana Flood Control and Water Resources Commission are presented in table 2.

1. Wabash River at Covington, Ind.
(Gaging station)

Location. --Lat 40°08'24", long 87°24'20", in sec. 35, T. 20 N., R. 9 W., near center of span on downstream side of highway bridge at Covington, 2.9 miles downstream from Oppossum Run, 3.6 miles upstream from Spring Creek, and at mile 271.1.
Drainage area. --8,208 sq mi.
Gage-height record. --Graph drawn on basis of usually twice daily wire-weight gage readings. Datum of gage is 473.97 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 23, 1957: Discharge, 36,200 cfs 8 - 9 a.m. July 3 (gage height, 21.46 ft).
1939 to June 24, 1957: Discharge, 147,000 cfs May 20, 1943 (gage height, 32.44 ft).
Stage known: 35.1 ft in March 1913, determined by U. S. Weather Bureau (discharge, 200,000 cfs).

2. Prairie Creek near Thorntown, Ind.
(Miscellaneous site)

Location. --Lat 40°07', long 86°32', in NW¼ sec. 9, T. 19 N., R. 1 W., at bridge on U. S. Highway 52, 2½ miles upstream from Deer Creek and 4 miles southeast of Thorntown, Boone County.
Drainage area. --35.9 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 3,250 cfs June 28, by contracted-opening measurement.

3. Walnut Fork near Mace, Ind.
(Miscellaneous site)

Location. --Lat 40°01', long 86°49', sec. 12, T. 18 N., R. 4 W., at U. S. Highway 136 bridge, 1¼ miles northwest of Mace, Montgomery County, and 7 3/4 miles upstream from mouth.
Drainage area. --32.4 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 5,710 cfs June 28, by contracted-opening measurement.

4. Sugar Creek at Crawfordsville, Ind.
(Gaging station)

Location. --Lat 40°03', long 86°54', in NW¼ sec. 32, T. 19 N., R. 4 W., on left bank 327 ft upstream from Crawfordsville Electric Light and Power Co.'s dam, half a mile upstream from bridge on State Highway 43, and 1 mile downstream from Walnut Fork.
Drainage area. --509 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 657.77 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 26,300 cfs 1 p. m. June 28 (gage height, 14.48 ft).
1938 to June 24, 1957: Discharge, 24,000 cfs May 18, 1943 (gage height, 14.02 ft).
Stage known: 17.3 ft in March 1913, from information by local resident (discharge, 36,000 cfs).

5. Sugar Creek near Byron, Ind.
(Gaging station)

Location. --Lat 39°55'52", long 87°07'33", in SW¼ sec. 8, T. 17 N., R. 6 W., on right bank 30 ft upstream from highway bridge, 2½ miles northwest of Byron, and 5 miles downstream from Indian Creek.
Drainage area. --668 sq mi.
Gage-height record. --Water-stage recorder graph except 11 p. m. June 29 to July 9 when clock was stopped. Datum of gage is 538.92 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge during period of no gage-height record computed on basis of weather records and hydrographic comparison with Sugar Creek at Crawfordsville.
Maxima. --June 25 to July 9, 1957: Discharge, 32,200 cfs 2 p. m. June 28 (gage height, 22.98 ft).
1940 to June 24, 1957: Discharge 28,700 cfs May 18, 1943 (gage height, 20.68 ft).

6. Wabash River at Montezuma, Ind.
(Gaging station)

Location. --Lat 39°47'33", long 87°22'26", in sec. 35, T. 16 N., R. 9 W., in downstream side of first pier from left bank of bridge on U. S. Highway 36 at Montezuma, 2.0 miles upstream from Raccoon Creek, 4.9 miles downstream from Sugar Creek, and at mile 240.
Drainage area. --11,100 sq mi, approximately.
Gage-height record. --Water-stage recorder graph June 25 to 6 p. m. June 28, and July 17-23. Graph based on usually once daily wire-weight gage readings 6 p. m. June 28 to July 16. Datum of gage is 457.75 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 23, 1957: Discharge, 77,100 cfs 1-2 p. m. June 29 (gage height, 26.11 ft).
1927 to June 24, 1957: Discharge, 184,000 cfs May 20, 1943 (gage height, 32.83 ft).
Stage known: 34.0 ft Mar. 27, 1913 (discharge, 230,000 cfs).

7. Little Raccoon Creek near Ladoga, Ind.
(Miscellaneous site)

Location. --Lat 39°55', long 86°45', in sec. 14, T. 17 N., R. 3 W., at bridge on State Highway 234, 3¼ miles east of Ladoga, Montgomery County, and 3½ miles upstream from mouth.
Drainage area. --4.62 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 3,230 cfs June 28, by contracted-opening measurement.

8. Raccoon Creek at Ladoga, Ind.
(Miscellaneous site)

Location. --I at 39°55', long 86°48', in sec. 18, T. 17 N., R. 3 W., at Monon Railroad bridge, at south edge of Ladoga, Montgomery County, and 3/4 mile downstream from Little Raccoon Creek.
Drainage area. --54.4 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 9,820 cfs June 28, by contracted-opening measurement.

9. Raccoon Creek near Fincastle, Ind.
(Miscellaneous site)

Location. --Lat 39°50'44", long 86°54'46", in NW¼ sec. 12, T. 16 N., R. 5 W., 1 mile southwest of Raccoon, Putnam County, 1.2 miles downstream from U. S. Highway 231, 3 miles north of Fincastle, and 5.7 miles upstream from gaging station (established July 30, 1957).
Drainage area. --122 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 38,400 cfs June 28, by slope-area measurement.

10. Ramp Creek at Fincastle, Ind.
(Miscellaneous site)

Location. --Lat 39°48'06", long 86°53'47", in sec. 30, T. 16 N., R. 4 W., at bridge on U. S. Highway 231, 0.4 mile downstream from confluence of North Ramp Creek and South Ramp Creek, 0.4 mile south of Fincastle, Putnam County, and 3.6 miles above mouth.
Drainage area. --25.2 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 12,900 cfs (estimated) June 28.

11. Raccoon Creek at Ferndale, Ind.
(Gaging station)

Location. --Lat 39°41'44", long 87°05'01", in SW¼ sec. 33, T. 15 N., R. 6 W., on right bank 1.2 miles southwest of Ferndale, 1.7 miles northeast of Mansfield, and 2.0 miles upstream from Rocky Fork Creek.
Drainage area. --215 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 582.36 ft above mean sea level, datum of 1929 (Corps of Engineers bench mark).
Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,200 cfs and extended above on basis of records for Raccoon Creek at Mansfield, 2.7 miles downstream. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 40,500 cfs 6-7 p. m. June 28 (gage height, 19.87 ft).
1956 to June 24, 1957: Discharge, 5,690 cfs May 11, 1957 (gage height, 12.09 ft).

12. Raccoon Creek at Mansfield, Ind.
(Gaging station)

Location. --Lat 39°41', long 87°07', in sec. 8, T. 14 N., R. 6 W., on left bank at downstream side of covered bridge at Mansfield, 3/4 of a mile downstream from Rocky Fork Creek.
Drainage area. --240 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 564.71 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 38,400 cfs 9 p. m. June 28 (gage height. 21.54 ft).
1939 to June 24, 1957: Discharge 20,000 cfs May 18, 1943 (gage height, 19.5 ft, from graph based on gage readings).
Stage previously known: 21.2 ft in 1875, from information by local resident.

13. Little Raccoon Creek at Guion, Ind.
(Miscellaneous site)

Location. --Lat 39°50'30", long 87°06'20", in SE¼ sec. 7, T. 16 N., R. 6 W., at Baltimore and Ohio Railroad bridge, 0.4 mile east of Guion, Parke County, and 0.6 mile upstream from South Fork Little Raccoon Creek.
Drainage area. --30.7 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 23,700 cfs (estimated) June 28.

14. South Fork Little Raccoon Creek at Guion, Ind.
(Miscellaneous site)

Location. --Lat 39°50'08", long 87°06'15", on line between secs. 17 and 18, T. 16 N., R. 6 W., at bridge on State Highway 59, 0.4 mile above mouth, and 0.6 mile southeast of Guion, Parke County.
Drainage area. --28.6 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 21,600 cfs June 28, by contracted-opening measurement.

15. Little Raccoon Creek near Catlin, Ind.
(Gaging station)

Location. --Lat 39°40'38", long 87°13'38", in NW¼ sec. 7, T. 14 N., R. 7 W., on left bank at downstream side of highway bridge, 300 ft downstream from unnamed tributary, 0.4 mile upstream from Sunderland Branch, 1.2 miles southeast of Catlin, 2.4 miles upstream from Weisner Creek, and 3.8 miles upstream from the mouth.
Drainage area. --133 sq mi.
Gage-height record. --Water-stage recorder graph June 28 to 10 a.m. June 30 and 1 a.m. to 12 m. July 5. Graph drawn for period of missing record on basis of trend of recorder graph. Datum of gage is 515.5 ft above mean sea level, datum of 1929 (levels from damaged USC and GS bench mark).
Discharge record. --Stage-discharge relation defined by current-meter measurements below 6,000 cfs and by discharge of 53,400 cfs based on indirect measurement at site upstream with drainage area of 960 sq mi.
Maxima. --June 25 to July 9, 1957: Discharge, 53,400 cfs 8 a.m. June 28 (gage height, 18.27 ft).
1956 to June 24, 1957: Discharge, 4,180 cfs Apr. 4, 1957 (gage height, 13.24 ft).

16. Raccoon Creek at Coxville, Ind.
(Gaging station)

Location. --Lat 39°39'09", long 87°17'37", in SW¼ sec. 15, T. 14 N., R. 8 W., on right bank at downstream side of covered bridge at Coxville, 0.8 mile upstream from Rock Run, 1.5 miles downstream from Little Raccoon Creek, and 2.1 miles northwest of Rosedale.
Drainage area. --440 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 494.00 ft above mean sea level, datum of 1929 (Indiana Flood Control and Water Resources Commission bench mark).
Discharge record. --Stage-discharge relation defined by current-meter measurements below 35,000 cfs and by an estimate of 108,000 cfs based on slope-area study.
Maxima. --June 25 to July 9, 1957: Discharge, 108,000 cfs 2:30 p.m. June 28 (gage height, 21.23 ft).
1956 to June 24, 1957: Discharge, 10,100 cfs Apr. 4, 1957 (gage height, 13.86 ft).

17. Rock Run near Mecca, Ind.
(Miscellaneous site)

Location. --Lat 39°43'56", long 87°17'05", in sec. 22, T. 15 N., R. 8 W., at bridge on U. S. Highway 41, 2½ miles east of Mecca, Parke County, and 7.0 miles upstream from mouth.
Drainage area. --9.38 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 6,450 cfs June 28, by contracted-opening measurement.

18. Leatherwood Creek at Bloomingdale, Ind.
(Miscellaneous site)

Location. --Lat 39°50'04", long 87°14'09", on line between secs. 13 and 18, T. 16 N., R. 7 W., at bridge on U. S. Highway 41, and 0.8 mile east of Bloomingdale, Parke County.
Drainage area. --5.67 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 2,430 cfs June 28, by contracted-opening measurement.

19. Brouilletts Creek near Blanford, Ind.
(Miscellaneous site)

Location. --Lat 39°41'02", long 87°31'35", in SE¼ sec. 4, T. 14 N., R. 10 W., at Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, 0.3 mile upstream from State Highway 71, 0.4 mile downstream from Illinois-Indiana state line, and 1.3 miles north of Blanford, Vermillion County.
Drainage area. --263 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 35,200 cfs June 28, by contracted-opening measurement.

20. Otter Creek at North Terre Haute, Ind.
(Miscellaneous site)

Location. --Lat 39°31'54", long 87°21'38", in sec. 36, T. 13 N., R. 9 W., at Chicago and Eastern Illinois Railroad bridge at North Terre Haute, Vigo County, 0.8 mile upstream from U. S. Highway 41, and 4.8 miles upstream from mouth.
Drainage area. --118 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 13,800 cfs June 28, by contracted-opening measurement.

21. Wabash River at Terre Haute, Ind.
(Gaging station)

Location. --Lat 39°28'00", long 87°25'08", in NW¼ sec. 21, T. 12 N., R. 9 W., on left bank at upstream side of Wabash Avenue Bridge at Terre Haute, 2.2 miles upstream from Sugar Creek, 4 miles downstream from Lost Creek, and at mile 214.4.
Drainage area. --12,200 sq mi, approximately.
Gage-height record. --Water-stage recorder graph. Datum of gage is 442.90 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 23, 1957: Discharge, 82,000 cfs 12 p.m. June 29 to 4 a.m. June 30 (gage height, 25.04 ft).
1927 to June 24, 1957: Discharge 189,000 cfs May 20, 1943 (gage height, 30.50 ft).
Stage known: 31.1 ft Mar. 27, 1913 (discharge, 245,000 cfs).
Remarks. --Flood flows not appreciably affected by diversion above gage for municipal supply of Terre Haute.

22. Wabash River at Riverton, Ind.
(Gaging station)

Location. --Lat 39°01'13", long 87°34'07", in sec. 30, T. 7 N., R. 10 W., on left bank at downstream side of Illinois Central Railroad bridge at Riverton, 0.6 mile downstream from Turtle Creek and at mile 162.0.
Drainage area. --13,100 sq mi, approximately.
Gage-height record. --Water-stage recorder graph. Datum of gage is 414.65 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 23, 1957: Discharge, 81,800 cfs 3 p.m. July 2 (gage height, 22.00 ft).
1938 to June 24, 1957: Discharge, 201,000 cfs May 21, 1943 (gage height, 29.36 ft).
Flood of Mar. 28, 1913, reached a stage of 26.4 ft, from graph based on once-daily gage readings by Illinois Central Railroad Co. (discharge, 250,000 cfs).

23. Wabash River at Vincennes, Ind.
(Gaging station)

Location. --Lat 38°40'52", long 87°32'04", near center of span on downstream side of bridge on U. S. Highway 50 at Vincennes, Knox County, 4.8 miles downstream from Maria Creek, 5.8 miles upstream from Embarass River, and at mile 127.8.
Drainage area. --13,700 sq mi, approximately.
Gage-height record. --Graph drawn on basis of usually twice daily wire-weight gage readings. Datum of gage is 394.43 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge computed by the normal-fall method 10 p.m. June 29 to 12 m. June 30, 8 a.m. July 2 to 12 m. July 23. Shifting-control method used at times; backwater from downstream tributaries at times.
Maxima. --June 25 to July 23, 1957: Discharge, 69,400 cfs 3 a.m. July 4; gage height, 23.70 ft 7-10 a.m. July 4.
1929 to June 24, 1957: Discharge, 189,000 cfs May 22, 23, 1943 (gage height, 29.33 ft).
Flood of Mar. 29, 1913, reached a stage of 26.3 ft, determined by Corps of Engineers (discharge, 255,000 cfs).

24. White River at Muncie, Ind.
(Gaging station)

Location. --Lat 40°12', long 85°23', in sec. 10, T. 20 N., R. 10 E., on right bank 200 ft downstream from Walnut Street Bridge in Muncie and 6 miles upstream from Bell Creek.
Drainage area. --242 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 920.10 ft above mean sea level (city of Muncie bench mark).
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 9, 1957: Discharge, 5,880 cfs 9-11 a.m. June 29 (gage height, 8.35 ft).
1930 to June 24, 1957: Discharge, 11,500 cfs Jan. 15, 1937 (gage height, 18.07 ft).
Stage known: 19.6 ft in March 1913 (discharge, 20,000 cfs).
Remarks. --Flood flows not appreciably affected by diversion 2.5 miles above gage by city of Muncie.

25. White River at Anderson, Ind.
(Gaging station)

Location. --Lat 40°06', long 85°41', in sec. 18, T. 19 N., R. 8 E., on left bank at Municipal water-supply plant in Anderson, 1 mile upstream from Killbuck Creek.
Drainage area. --401 sq mi.
Gage-height record. --Graph drawn on basis of usually twice daily staff gage readings. Datum of gage is 825.02 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 9,590 cfs 6 a. m. June 29 (gage height, 17.66 ft).
1925-26, 1931 to June 24, 1957: Discharge, 17,100 cfs Jan. 15, 1937 (gage height, 18.63 ft).
Stage known: 23.6 ft Mar. 25, 1913, based on determination by U. S. Weather Bureau (discharge, 28,000 cfs).
Remarks. --Flows not appreciably affected by diversion above station for municipal supply of city of Anderson.

26. White River near Noblesville, Ind.
(Gaging station)

Location. --Lat 40°07', long 85°58', in sec. 4, T. 19 N., R. 5 E., near center of span on downstream side of highway bridge, 1 mile west of Strawtown, 7 miles northeast of Noblesville, and 9.5 miles upstream from Cicero Creek.
Drainage area. --814 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 763.08 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 20,800 cfs 6 - 7 p. m. June 29 (gage height, 15.93 ft).
1915 to June 24, 1957: Discharge, 27,200 cfs Mar. 21, 1927 (gage height, 16.3 ft, from graph based on gage readings).

27. White River at Noblesville, Ind.
(Gaging station)

Location. --Lat 40°02'50", long 86°01'00", in SE¼ sec. 36, T. 19 N., R. 4 E., on right bank at downstream side of Logan Street Bridge in Noblesville, 1½ miles upstream from Cicero Creek and 3½ miles downstream from dam at Clare.
Drainage area. --837 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 738.16 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times; backwater from Cicero Creek at times.
Maxima. --June 25 to July 9, 1957: Discharge, 21,100 cfs 2 a. m. June 30 (gage height, 19.94 ft).
1946 to June 24, 1957: Discharge, 19,500 cfs Jan. 5, 1950 (gage height, 18.97 ft).
Stage known: 23.8 ft Mar. 25, 1913, present site and datum, from U. S. Weather Bureau records.
Remarks. --Flood flow not appreciably affected by regulation by powerplant above station.

28. Cicero Creek near Arcadia, Ind.
(Gaging station)

Location. --Lat 40°11', long 86°00', on line between secs. 18 and 19, T. 20 N., R. 5 E., on left bank, on downstream side of county bridge, 1½ miles east of Arcadia and 5 miles upstream from Little Cicero Creek.
Drainage area. --131 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 815.12 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,300 cfs. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 6,720 cfs 1 p. m. June 29 (gage height, 11.86 ft).
1955 to June 24, 1957: Discharge, 1,540 cfs July 21, 1956 (gage height, 8.98 ft).
Stage known: 15.6 ft (probably the flood of January 1937) from information by local residents.

29. Little Cicero Creek near Arcadia, Ind.
(Gaging station)

Location. --Lat 40°10', long 86°03', on line between secs. 14 and 23, T. 20 N., R. 4 E., on left bank on downstream side of county road bridge, 0.5 mile downstream from Taylor Creek, 1.3 miles west of Arcadia, 3.9 miles upstream from mouth, and 9.3 miles northwest of Noblesville.
Drainage area. --44.7 sq mi.
Gage-height record. --Water-stage recorder graph. Altitude of gage is 840 ft (by barometer).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 3,980 cfs 12 m. June 28 (gage height, 8.69 ft).
1955 to June 24, 1957: Discharge, 1,100 cfs April 4, 1957 (gage height, 5.98 ft).

30. Hinkle Creek near Cicero, Ind.
(Gaging station)

Location. --Lat 40°06'05", long 86°05'10", on line between secs. 9 and 16, T. 19 N., R. 4 E., on left bank, on downstream side of county road bridge, 3.7 miles upstream from mouth, 4.0 miles upstream from Morse Reservoir Dam on Cicero Creek, 4.2 miles southwest of Cicero, and 5.7 miles northwest of Noblesville.
Drainage area. --16.3 sq mi.
Gage-height record. --Water-stage recorder graph. Altitude of gage is 820 ft (from topographic map).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 4,920 cfs 8:30 a.m. June 28 (gage height, 8.45 ft).
1955 to June 24, 1957: Discharge, 714 cfs April 3, 1957 (gage height, 5.13 ft).

31. Cicero Creek at Noblesville, Ind.
(Gaging station)

Location. --Lat 40°03'20", long 86°02'30", in sec. 35, T. 19 N., R. 4 E., on right bank 150 ft downstream from bridge on State Highway 38, 1 mile northwest of Noblesville, 1½ miles downstream from Hinkle Creek, and 2½ miles upstream from mouth.
Drainage area. --219 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 750.00 ft above mean sea level, datum of 1929 (levels by Indiana Flood Control and Water Resources Commission).
Discharge record. --Stage-discharge relation defined by current-meter measurements below 5,500 cfs.
Maxima. --June 25 to July 9, 1957: Discharge, 9,800 cfs 6 - 7 p.m. June 28 (gage height 15.26 ft).
1950 to June 24, 1957: Discharge, 3,660 cfs Apr. 4, 1957 (gage height, 12.37 ft).

32. White River near Nora, Ind.
(Gaging station)

Location. --Lat 39°54'35", long 86°06'20", in sec. 20, T. 17 N., R. 4 E., on downstream side of center pier of bridge on State Highway 100, 2 miles east of Nora and 14 miles upstream from Fall Creek.
Drainage area. --1,200 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 710.94 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 30,400 cfs 11 a.m. to 2 p.m. June 30 (gage height 18.04 ft).
1925-26, 1929 to June 24, 1957: Discharge, 32,400 cfs May 19, 1943 (gage height, 18.19 ft).
Flood of Mar. 26, 1913, reached a stage of 22.4 ft, determined by State Highway Department of Indiana (discharge, 58,500 cfs).
Remarks. --Flood flow not appreciably affected by Morse Reservoir on Cicero Creek (capacity, 6.9 billion gallons).

33. Williams Creek near Augusta, Ind.
(Miscellaneous site)

Location. --Lat 39°54'44", long 86°10'28", on line between secs. 15 and 22, T. 17 N., R. 3 E., at bridge on State Highway 100, 2½ miles northwest of Augusta, Marion County, and 3.8 miles upstream from mouth.
Drainage area. --17.4 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 4,170 cfs June 28, by contracted-opening measurement.

34. Crooked Creek at Augusta, Ind.
(Miscellaneous site)

Location. --Lat 39°53'43", long 86°12'53", in NE¼ NW¼ sec. 29, T. 17 N., R. 3 E., at bridge on U. S. Highway 421 and 0.4 mile north of Augusta, Marion County.
Drainage area. --7.22 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 2,160 cfs June 28, by contracted-opening measurement.

35. Fall Creek at Millersville, Ind.
(Gaging station)

Location. --Lat 39°51'05", long 86°05'20", in sec. 9, T. 16 N., R. 4 E., on left bank 20 ft downstream from highway bridge at Millersville and 8.5 miles upstream from mouth.
Drainage area. --313 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 722.16 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 9, 1957: Discharge, 4,590 cfs 2 - 3 a.m. June 30 (gage height, 9.91 ft).
1925-26, 1929 to June 24, 1957: Discharge, 12,900 cfs May 28, 1956 (gage height, 13.53 ft).
Stage known: 16.3 ft Mar. 26, 1913 (discharge, 22,000 cfs).
Remarks. --Flood flow not appreciably affected by Geist Reservoir, 8.5 miles upstream (capacity, 6.9 billion gallons).

36. White River at Indianapolis, Ind.
(Gaging station)

Location. --Lat 39°45'05", long 86°10'30", on downstream side of second pier from right bank of Morris Street Bridge in Indianapolis, 2½ miles downstream from Fall Creek.
Drainage area. --1,627 sq mi.
Gage-height record. --Water-stage recorder graph except 4 a.m. June 27 to 8 a.m. June 29 when graph was drawn on basis of telemark readings. Datum of gage is 2.26 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 28,000 cfs 5 - 6 p.m. June 30 (gage height, 679.03 ft).
1904-06, 1930 to June 24, 1957: 37,200 cfs May 18, 1943; gage height, 681.57 ft Jan. 16, 1937.
Flood of Mar. 26, 1913, reached a stage of 690.0 ft, determined by Indianapolis Water Co. (discharge 70,000 cfs).
Remarks. --Flood flow not appreciably affected by Morse and Geist Reservoirs on tributaries (combined capacity, 13.8 billion gallons) or by diversion for municipal supply.

37. Eagle Creek at Rosston, Ind.
(Miscellaneous site)

Location. --Lat 40°02'27", long 86°17'02", on line between secs. 3 and 34, on line between Tps. 18 and 19 N., R. 2 E., at bridge on State Highway 32 and 0.6 mile southeast of Rosston, Boone County.
Drainage area. --26.4 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 8,040 cfs June 28, by contracted-opening and flow-over-embankment measurement.

38. Fenley Creek at Northfield, Ind.
(Miscellaneous site)

Location. --Lat 40°01'32", long 86°16'40", in NW¼ sec. 11, T. 18 N., R. 2 E., at bridge on U. S. Highway 421, 0.4 mile upstream from mouth, and 0.4 mile southeast of Northfield, Boone County.
Drainage area. --9.37 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 2,650 cfs June 28, by contracted-opening measurement.

39. Jackson Run near Zionsville, Ind.
(Miscellaneous site)

Location. --Lat 39°59'34", long 86°17'02", in NE¼ sec. 22, T. 18 N., R. 2 E., at highway bridge, 0.4 mile upstream from mouth, and 2.7 miles northwest of Zionsville, Boone County.
Drainage area. --6.53 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 2,880 cfs June 28, by contracted-opening and flow-over-embankment measurement.

40. Fishback Creek near Traders Point, Ind.
(Miscellaneous site)

Location. --Lat 39°54'35", long 86°18'50", on line between secs. 16 and 21, T. 17 N., R. 2 E., at covered bridge on 86th Street, 1½ miles northwest of Traders Point, Marion County, and 3¼ miles upstream from mouth.
Drainage area. --18.0 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 6,020 cfs June 28, by contracted-opening and flow-over-embankment measurement.

41. Eagle Creek near Clermont, Ind.
(Miscellaneous site)

Location. --Lat 39°51'08", long 86°18'15", on line between secs. 3 and 10, T. 16 N., R. 2 E., at bridge on 56th Street, 2.5 miles north of Clermont, Marion County, 6 miles northwest of corporate limits of Indianapolis, and 8½ miles upstream from gaging station at Lynhurst Drive, Indianapolis.
Drainage area. --155 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 42,400 cfs June 28, by contracted-opening measurement.

42. Eagle Creek at Speedway, Ind.
(Miscellaneous site)

Location. --Lat 39°47'13", long 86°16'02", in SW¼ NE¼ sec. 36, T. 16 N., R. 2 E., at Baltimore and Ohio Railroad bridge, 0.5 mile west of Speedway, Marion County, and 1.2 miles upstream from gaging station at Lynhurst Drive, Indianapolis.
Drainage area. --176 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 25,200 cfs (estimated) June 28.

43. Eagle Creek at Indianapolis, Ind.
(Gaging station)

Location. --Lat 39°46'40", long 86°15'02", in NW¼ sec. 6, T. 15 N., R. 3 E., on right bank at downstream side of bridge on Lynhurst Drive, 3.0 miles above Little Eagle Creek, 5.0 miles west of Monument Circle in Indianapolis, Marion County, 6.7 miles upstream from mouth.
Drainage area. --179 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 706.21 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements below 9,000 cfs and by combined current-meter measurement and slope-area measurement at 28,800 cfs.
Maxima. --June 25 to July 9, 1957: Discharge, 28,800 cfs 6 p.m. June 28 (gage height, 16.38 ft).
1938 to June 24, 1957: Discharge, 9,920 cfs May 28, 1956 (gage height, 13.62 ft).
Stage previously known: 16.0 ft in March 1913, from information by local residents.

44. White Lick Creek at Brownsburg, Ind.
(Miscellaneous site)

Location. --Lat 39°50'38", long 86°24'02", in sec. 11, T. 16 N., R. 1 E., at bridge on U. S. Highway 136, and at Brownsburg, Hendricks County.
Drainage area. --33.2 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 6,020 cfs June 28, by contracted-opening measurement.

45. West Fork White Lick Creek at Danville, Ind.
(Miscellaneous site)

Location. --Lat 39°45'53", long 86°31'01", in SW¼ sec. 3, T. 15 N., R. 1 W., at highway bridge, at Danville, Hendricks County, and ½ mile upstream from U. S. Highway 36.
Drainage area. --28.7 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 6,660 cfs June 28, by contracted-opening measurement.

46. White River near Centerton, Ind.
(Gaging station)

Location. --Lat 39°30'02", long 86°24'24", in SW¼ SE¼ sec. 3, T. 12 N., R. 1 E., on right bank three-eighths of a mile downstream from highway bridge, 1 mile south of Centerton, 1 1/8 miles downstream from White Lick Creek, and at mile 202.6.
Drainage area. --2,435 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 595.44 ft above mean sea level, datum of 1929 (Corps of Engineers bench mark, levels by Indianapolis Power and Light Co.).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 34,700 cfs 8 a.m. June 30 (gage height, 16.06 ft).
1930-32, 1946 to June 24, 1957: Discharge, 43,000 cfs Jan. 6 or 7, 1950 (gage height, 17.2 ft, from floodmark, at site three-eighths of a mile upstream).
Flood of March 1913 reached a stage of 22.8 ft at site 8½ miles downstream, at different datum, from information by State Highway Department of Indiana (discharge, 90,000 cfs).
Remarks. --Flood flow not appreciably affected by Morse and Geist Reservoirs on tributaries (combined capacity, 13.8 billion gallons).

47. White River at Spencer, Ind.
(Gaging station)

Location. --Lat 39°16'49", long 86°45'42", in sec. 29, T. 10 N., R. 3 W., on downstream side of center pier of highway bridge at Spencer, 3.3 miles upstream from McBrides Creek, and at mile 165.9.
Drainage area. --2,980 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 526.04 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 37,700 cfs 5-6 p.m. July 1 (gage height, 21.50 ft).
1925 to June 24, 1957: Discharge, 59,400 cfs Jan. 16, 1937, May 15, 1933 (gage height, 23.2 ft).
Stage known: 28.5 ft Mar. 26, 1913 (discharge, 100,000 cfs).
Remarks. --Flood flow not appreciably affected by Geist, Morse, and Bloomington Reservoirs on tributaries.

48. Big Walnut Creek at Jamestown, Ind.
(Miscellaneous site)

Location. --Lat 39°55'14", long 86°36'58", in NW¼ sec. 14, T. 17 N., R. 2 W., at bridge on U. S. Highway 136, 160 ft downstream from New York Central Railroad bridge, and ¼ mile southeast of Jamestown, Boone County.
Drainage area. --37.5 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 4,370 cfs (estimated) June 28.

49. Middle Fork Big Walnut Creek at North Salem, Ind.
(Miscellaneous site)

Location. --Lat 39°52', long 86°38', in NE¼ sec. 4, T. 16 N., R. 2 W., at bridge on State Highway 236, at North Salem, Hendricks County, and 1¼ miles upstream from mouth.
Drainage area. --11.6 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 6,860 cfs June 28, by contracted-opening and flow-over-embankment measurement.

50. Big Walnut Creek near Barnard, Ind.
(Miscellaneous site)

Location. --Lat 39°50', long 86°41', in NE¼ sec. 13, T. 16 N., R. 3 W., at bridge on Putnam-Hendricks county line, 1 mile downstream from East Fork Big Walnut Creek, and 1¼ miles southwest of Barnard, Putnam County.
Drainage area. --120 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 23,800 cfs June 28, by contracted-opening measurement.

51. Owl Creek near Morton, Ind.
(Miscellaneous site)

Location. --Lat 39°44'21", long 86°55'02", in SW¼ sec. 13, T. 15 N., R. 5 W., at highway bridge 1 mile upstream from unnamed tributary, 2 miles southeast of Morton, Putnam County, and 3.1 miles upstream from mouth.
Drainage area. --6.99 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 5,550 cfs June 28, by flow-through-culvert and flow-over-embankment measurement.

52. Owl Creek Tributary at Morton, Ind.
(Miscellaneous site)

Location. --Lat 39°45'07", long 86°55'40", in sec. 11, T. 15 N., R. 5 W., at highway bridge, 0.9 mile southeast of Morton, Putnam County, and 2.0 miles upstream from Owl Creek.
Drainage area. --2.64 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 2,870 cfs June 28, by contracted-opening measurement.

53. Jones Creek at Brick Chapel, Ind.
(Miscellaneous site)

Location. --Lat 39°42', long 86°52', in SE¼ sec. 29, T. 15 N., R. 4 W., at bridge on U. S. Highway 231, at Brick Chapel, Putnam County, and 4½ miles upstream from mouth.
Drainage area. --2.06 sq mi.
Maximum. --June 25 to July 9, 1957: Discharge, 1,460 cfs June 28, by contracted-opening measurement.

54. Big Walnut Creek near Reelsville, Ind.
(Gaging station)

Location. --Lat 39°32'11", long 86°58'35", in NW¼ SE¼ sec. 28, T. 13 N., R. 5 W., on left bank at highway bridge, 1½ miles southwest of Reelsville and 3 miles upstream from Mill Creek.
Drainage area. --338 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 588.24 ft above mean sea level, datum of 1929 (levels by Indiana Flood Control and Water Resources Commission).
Discharge record. --Stage-discharge relation defined by current-meter measurements below 19,000 cfs. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 30,700 cfs 7 p. m. June 28 (gage height, 18.63 ft).
1949 to June 24, 1957: Discharge, 15,700 cfs June 22, 1952 (gage height, 17.96 ft).
Remarks. --Published as Eel River near Reelsville 1953-56.

55. Mill Creek near Cataract, Ind.
(Gaging station)

Location. --Lat 39°26', long 86°46', in SE¼ sec. 32, T. 12 N., R. 3 W., on left bank at downstream side of bridge on State Highway 43, 3 miles east of Cataract.
Drainage area. --241 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 706.40 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 9, 1957: Discharge, 7,180 cfs 3 p. m. June 29 (gage height, 19.64 ft).
1949 to June 24, 1957: Discharge, 9,480 cfs Jan. 5, 1950 (gage height, 21.35 ft).

56. Mill Creek near Manhattan, Ind.
(Gaging station)

Location. --Lat 39°29', long 86°55', in sec. 11, T. 12 N., R. 5 W., on left bank 200 ft downstream from Cagles Mill, three-quarters of a mile downstream from Cagles Mill Reservoir, three-quarters of a mile upstream from Deer Creek, and 5 3/4 miles south of Manhattan.
Drainage area. --292 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 581.83 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements. Backwater from Deer Creek and Big Walnut Creek at times.
Maxima. --June 25 to July 9, 1957: Discharge, 2,540 cfs 6 p. m. June 27; gage height, 15.18 ft 7-8 p. m. June 28 (backwater).
1938 to June 24, 1957: Discharge, 8,960 cfs Jan. 5, 1950 (gage height, 18.38 ft).
Remarks. --Flow affected by Cagles Mill Reservoir (capacity, 228,100 acre-ft).

57. Deer Creek near Putnamville, Ind.
(Gaging station)

Location. --Lat 39°34'04", long 86°52'00", in NW¼ sec. 16, T. 13 N., R. 4 W., on left bank at upstream side of State Highway 243 bridge, 0.4 mile southwest of Putnamville, 0.4 mile downstream from small tributary and 0.8 mile downstream from Limestone Creek.
Drainage area. --59.0 sq mi.
Gage-height record. --Graph drawn on basis of twice daily wire-weight gage readings until 10 a.m. July 3; water-stage recorder graph used thereafter. Datum of gage is 630.73 ft above mean sea level, datum of 1929.
Discharge record. --Defined by current-meter measurements below 3,000 cfs and extended by logarithmic plotting. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 4,930 cfs 12 m. June 28 (gage height, 13.34 ft, from graph based on gage readings).
1954 to June 24, 1957: Discharge, 4,200 cfs Sept. 29, 1955 (gage height, 12.05 ft).
Flood in spring of 1951 reached a stage of 14.65 ft, from information by local resident.

58. Eel River at Bowling Green, Ind.
(Gaging station)

Location. --Lat 39°23'02", long 87°01'12", in NW¼ sec. 24, T. 11 N., R. 6 W., on left bank at Bowling Green, 500 ft downstream from bridge on State Highway 46 and 0.5 mile downstream from Jordan Creek.
Drainage area. --844 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 548.02 ft above mean sea level, datum of 1929 (levels by Corps of Engineers).
Discharge record. --Stage-discharge relation defined by current-meter measurements. Shifting-control method used at times.
Maxima. --June 25 to July 9, 1957: Discharge, 33,400 cfs 8 a.m. June 29 (gage height, 23.39 ft).
1931 to June 24, 1957: Discharge, 34,000 cfs Jan. 4, 1950 (gage height, 23.53 ft).
Stage known: About 30.0 ft in 1875, from information by Corps of Engineers.
Remarks. --Flow affected by Cagles Mill Reservoir on Mill Creek (capacity, 228,100 acre-ft).

59. White River at Newberry, Ind.
(Gaging station)

Location. --Lat 38°55'42", long 87°01'00", in sec. 25, T. 6 N., R. 6 W., on right bank 500 ft upstream from bridge on State Highway 57 at Newberry, 2.3 miles downstream from Doans Creek, and at mile 118.0.
Drainage area. --4,696 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 465.59 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 9, 1957: Discharge, 52,700 cfs 6 a.m. July 3 (gage height, 22.09 ft).
1928 to June 24, 1957: Discharge, 76,900 cfs May 21, 1943 (gage height, 24.19 ft).
Stage known since at least 1875: 27.5 ft Mar. 27, 1913, determined by State Highway Department of Indiana.
Remarks. --Flood flow not appreciably affected by four reservoirs above station on tributaries.

60. White River at Petersburg, Ind.
(Gaging station)

Location. --Lat 38°30'39", long 87°17'22", in SW¼ sec. 15, T. 1 N., R. 8 W., on left bank 300 ft downstream from bridge on State Highway 61, three-eighths of a mile upstream from Prides Creek, 1 mile north of Petersburg, and at mile 47.7.
Drainage area. --11,139 sq mi.
Gage-height record. --Water-stage recorder graph. Datum of gage is 400.00 ft above mean sea level, datum of 1929.
Discharge record. --Stage-discharge relation defined by current-meter measurements.
Maxima. --June 25 to July 9, 1957: Discharge, 63,200 cfs 2-4 a.m. July 6 (gage height, 22.16 ft).
1927 to June 24, 1957: Discharge, 183,000 cfs Jan. 22, 1937 (gage height, 31.58 ft at bridge 29 miles downstream at datum 16.77 ft lower).
Stage known: 29.5 ft in March 1913, determined by Corps of Engineers (discharge, 235,000 cfs).

Table 1. --Daily discharge, in cubic feet per second, and runoff, in inches, at gaging stations

June-July 1957	Station number							June-July 1957	Station number	
	1	4	5	6	11	12	15		1	6
25	4,450	348	480	7,940	181	184	58	Cont.		
26	4,020	298	441	7,040	149	156	44	10	21,300	26,500
27	3,980	308	400	6,650	152	159	59	11	15,900	23,100
28	10,500	16,400	21,600	32,900	22,600	23,700	18,700	12	10,700	17,100
29	20,600	20,100	24,400	73,100	10,700	13,100	1,950	13	12,800	16,600
30	25,400	9,520	14,200	68,300	2,550	2,550	810	14	21,300	24,500
1	30,000	3,940	5,460	53,100	994	850	438	15	18,000	26,600
2	34,200	2,090	2,830	44,100	612	525	344	16	12,700	24,100
3	35,700	1,470	2,020	41,500	461	410	271	17	9,480	19,000
4	32,500	1,210	1,660	40,700	1,020	645	255	18	17,400	18,500
5	27,000	1,710	2,320	41,200	2,210	1,970	1,060	19	19,300	21,400
6	23,300	1,100	1,470	37,800	560	484	305	20	13,200	19,500
7	24,200	763	1,020	30,100	363	344	208	21	8,940	14,600
8	25,900	551	740	28,000	270	292	162	22	7,040	11,200
9	25,000	446	586	27,700	285	284	163	23	12,800	12,300
Runoff	------	4.40	4.43	------	7.46	7.07	6.94	---	2.39	2.73

June-July 1957	Station number						June-July 1957	Station number		
	16	21	22	23	24	25		21	22	23
25	330	9,160	11,500	14,200	141	282	Cont.			
26	310	8,500	10,300	10,600	113	280	10	31,500	41,600	44,700
27	288	8,040	9,350	8,990	131	328	11	30,000	38,800	41,000
28	51,400	30,500	20,500	11,300	3,480	4,010	12	25,600	36,000	38,000
29	29,100	72,400	38,500	26,500	5,460	8,870	13	19,800	32,700	35,500
30	6,170	79,900	52,500	36,200	2,710	6,050	14	24,700	28,000	32,100
1	2,090	69,200	72,500	46,400	709	1,980	15	29,200	27,900	29,900
2	1,260	55,200	81,300	60,600	438	1,040	16	30,000	30,700	31,400
3	932	47,300	78,300	67,600	313	761	17	27,000	32,100	31,900
4	783	43,400	70,500	68,600	429	678	18	22,600	31,000	32,000
5	3,860	42,200	62,300	64,900	938	1,360	19	23,700	27,900	30,300
6	1,440	40,900	56,100	60,000	479	1,030	20	24,000	26,600	28,100
7	835	37,300	51,600	55,500	290	614	21	19,900	25,100	26,800
8	631	34,000	48,500	51,800	223	475	22	14,700	20,700	24,300
9	593	32,400	45,300	48,400	188	408	23	13,000	17,100	21,200
Runoff	8.45	------	------	------	2.46	2.61	---	2.88	3.19	2.93

June-July 1957	Station number									
	26	27	28	29	30	31	32	35	36	43
25	692	696	71	23	11	102	908	264	1,370	85
26	628	645	61	19	9.5	80	826	236	1,240	72
27	586	599	59	20	11	86	795	236	1,150	105
28	8,920	8,100	2,170	2,340	1,760	5,690	8,240	2,170	10,700	8,680
29	18,100	15,500	5,560	1,040	259	6,550	22,200	4,150	22,100	6,590
30	15,300	17,600	3,470	265	107	4,810	28,400	3,980	26,300	2,040
1	8,390	10,500	1,550	150	66	2,600	21,900	1,860	23,200	975
2	3,060	3,840	648	104	50	1,080	10,400	973	13,200	622
3	2,040	2,220	435	72	38	610	3,810	667	5,430	443
4	1,740	1,790	406	60	36	455	2,820	634	4,470	507
5	2,930	2,700	530	63	44	582	3,410	990	5,340	1,000
6	3,110	3,110	348	38	26	440	4,180	623	5,270	460
7	1,830	1,960	245	27	20	306	2,950	477	4,190	303
8	1,330	1,420	179	21	17	236	2,040	377	2,890	233
9	1,120	1,150	136	17	13	200	1,690	339	2,320	193
Runoff	3.19	3.19	4.50	3.54	5.63	4.05	3.55	2.13	2.95	4.63

Table 1. --Daily discharge, in cubic feet per second, and runoff, in inches, at gaging stations - Cont.

June-July 1957	Station number								
	46	47	54	55	56	57	58	59	60
25	2,170	2,720	346	130	2,420	62	2,850	6,980	14,800
26	1,980	2,530	309	108	2,440	51	2,800	6,590	13,300
27	1,840	2,390	365	214	2,000	69	3,120	6,350	12,600
28	10,800	8,530	16,000	4,370	132	2,670	9,930	8,740	13,200
29	25,300	13,300	18,600	6,860	132	337	28,700	14,800	17,800
30	33,500	22,900	7,010	4,940	132	141	14,400	18,400	24,000
1	30,300	35,600	2,300	1,430	132	82	5,900	25,200	26,700
2	26,400	35,200	1,210	392	132	61	1,990	43,100	28,500
3	17,800	30,100	782	245	132	49	1,240	51,000	31,900
4	8,870	20,500	813	381	132	389	991	41,800	42,300
5	19,500	13,100	3,100	2,330	120	279	3,330	31,400	58,400
6	9,850	20,000	882	1,870	115	65	1,920	23,800	61,300
7	7,210	12,400	551	359	115	39	1,060	21,100	53,500
8	5,100	7,620	423	218	1,090	28	1,220	19,500	44,400
9	4,160	6,260	466	247	973	25	1,650	12,300	40,500
Runoff	3.13	2.91	5.85	3.72	1.30	2.74	3.57	2.62	1.61

Table 2. --Current-meter measurements made by Indiana Flood Control and Water Resources Commission at miscellaneous sites

Stream	Location	Time	Date	Discharge
Salamonie River	1 mile above Old State Road 67	2:30 pm	June 29	3,850 cfs
Salamonie River	Old State Road 67	9:30 pm	June 28	6,340 cfs
Salamonie River	Old State Road 67	9:30 pm	June 29	4,770 cfs
Sugar Creek and Prairie Creek	Thorntown, Ind.	2:00 pm	June 29	8,830 cfs
Eagle Creek	Zionsville, Ind.	3:00 pm	June 28	[a]11,800 cfs
Eagle Creek	Zionsville, Ind.	8:30 pm	June 28	9,200 cfs
White Lick Creek	State Road 42	1:30 pm	June 28	6,120 cfs
White Lick Creek	State Road 42	7:30 am	June 29	10,500 cfs

a Does not include overflow.

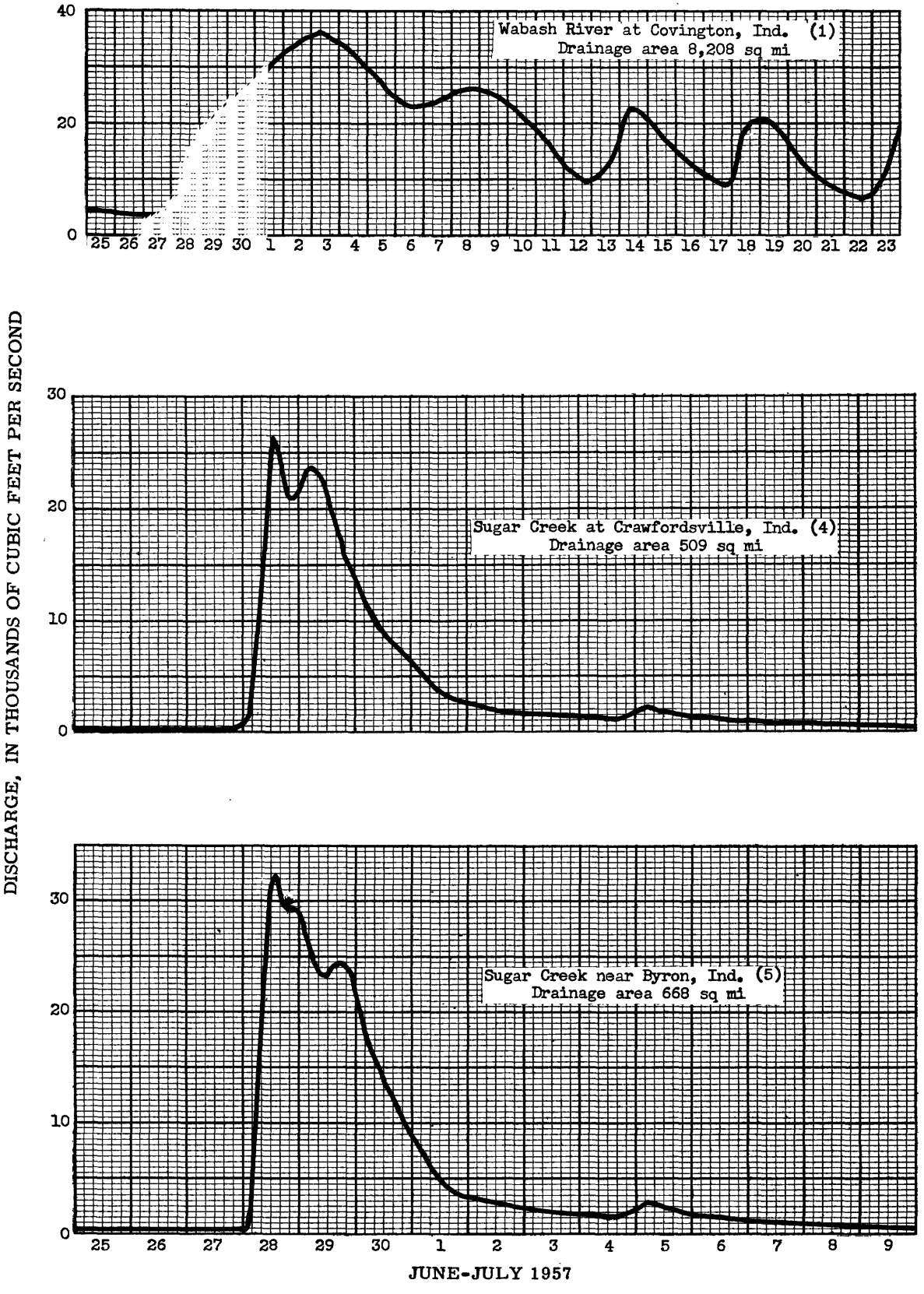

Figure 3.--Discharge hydrographs for gaging stations 1, 4, 5, June-July 1957.

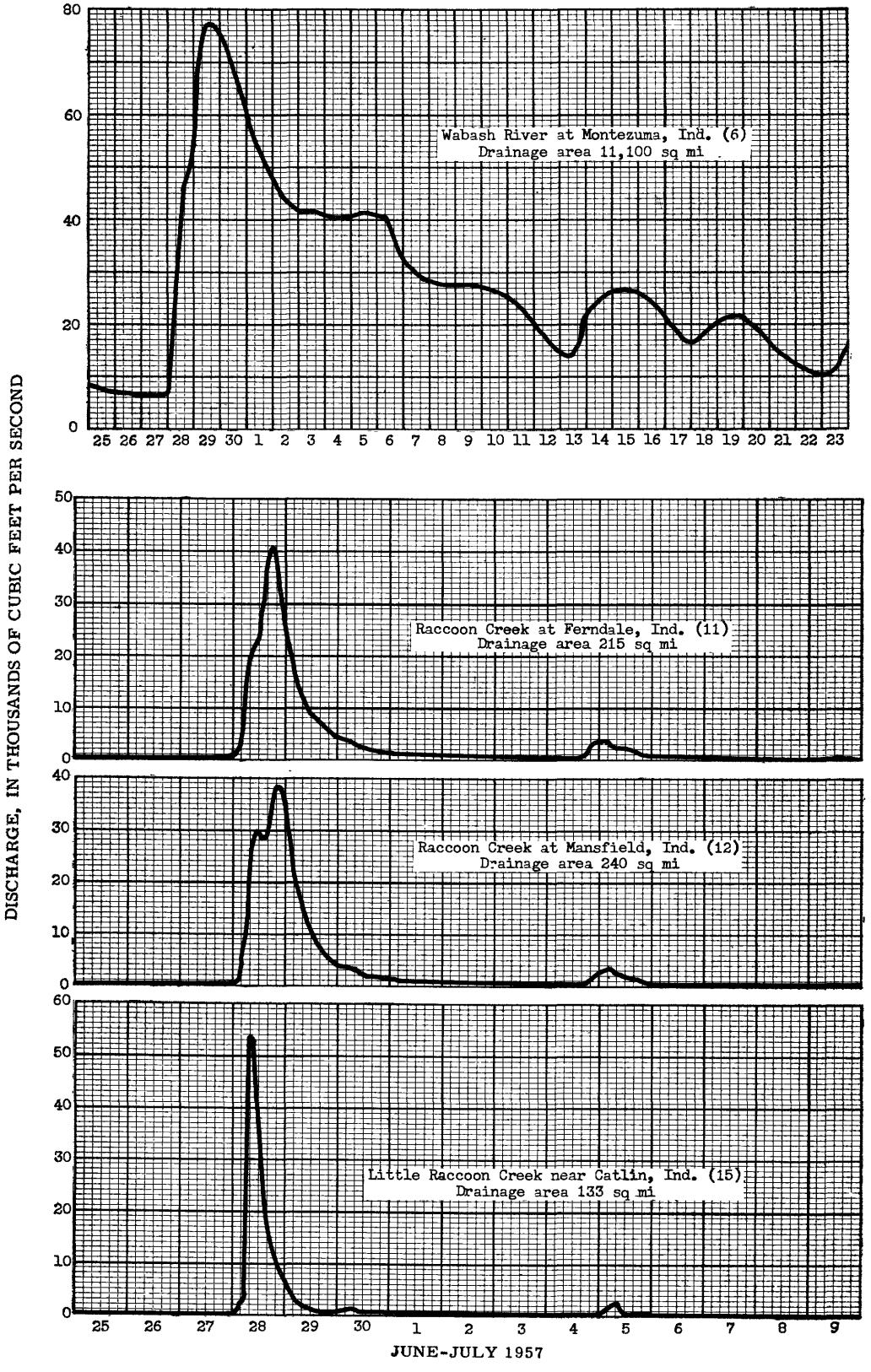

Figure 4 --Discharge hydrographs for gaging stations 6, 11, 12, 15, June-July 1957.

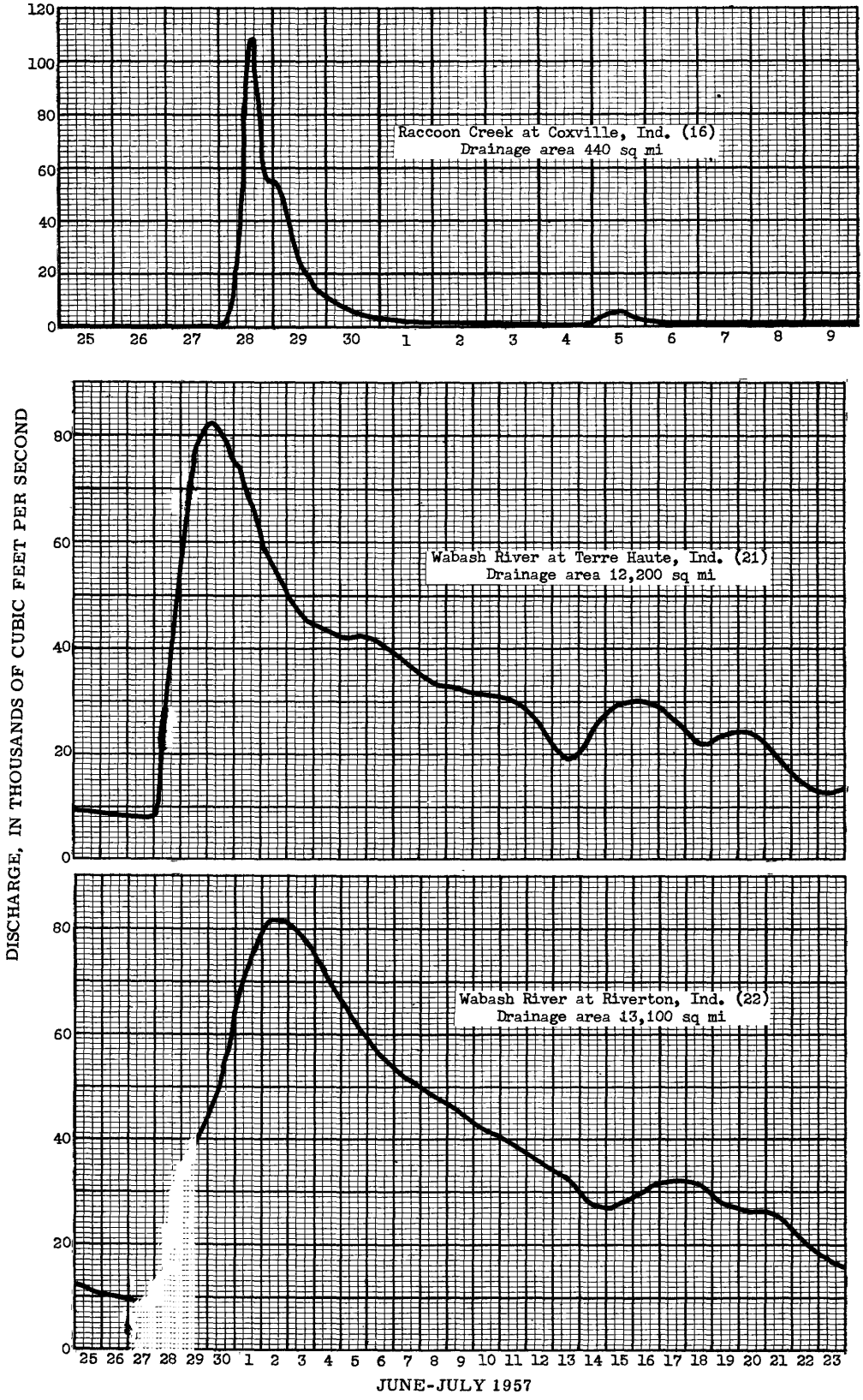

Figure 5.--Discharge hydrographs for gaging stations 16, 21, 22, June-July 1957.

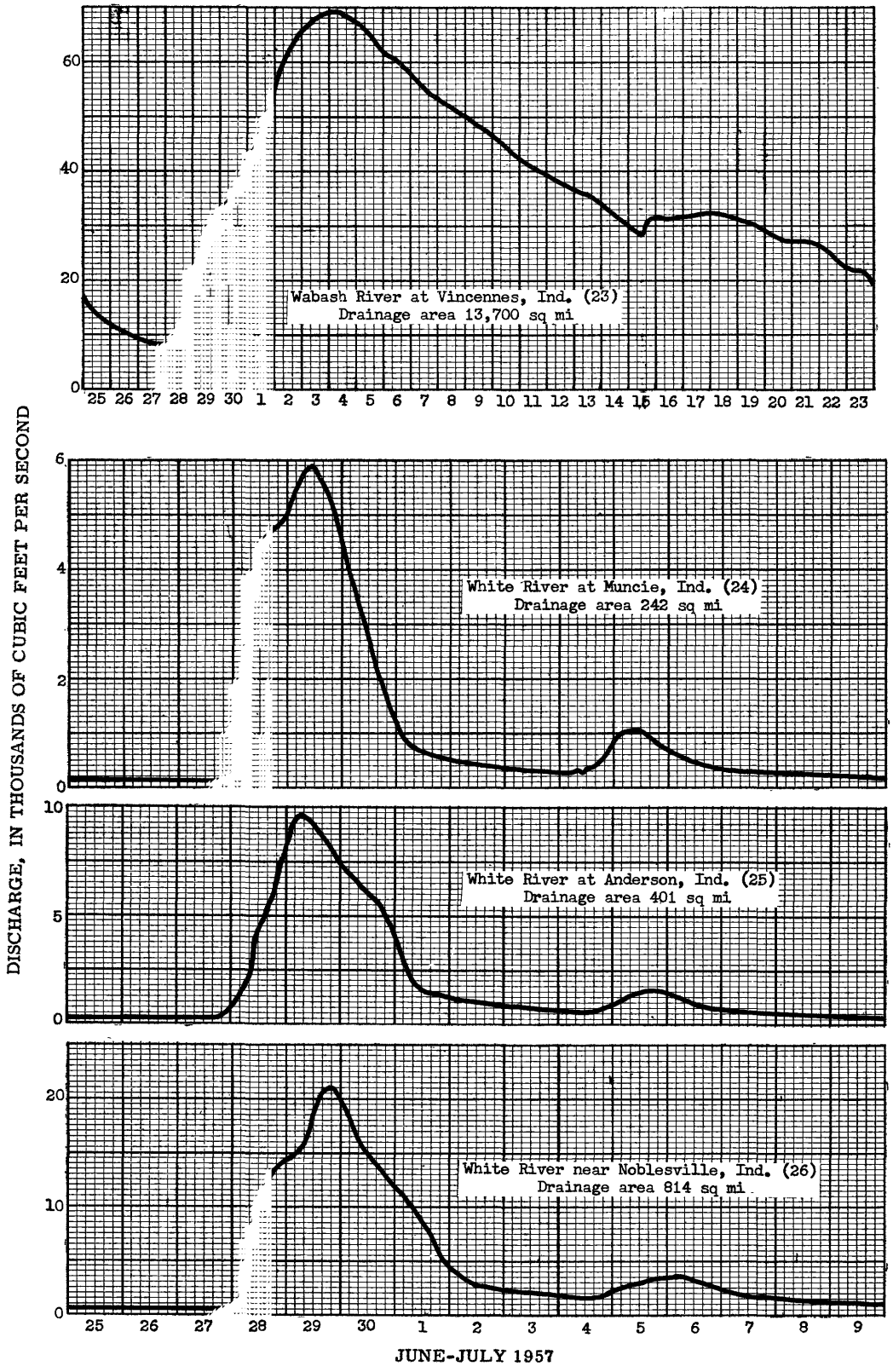

Figure 6.--Discharge hydrographs for gaging stations 23, 24, 25, 26, June-July 1957

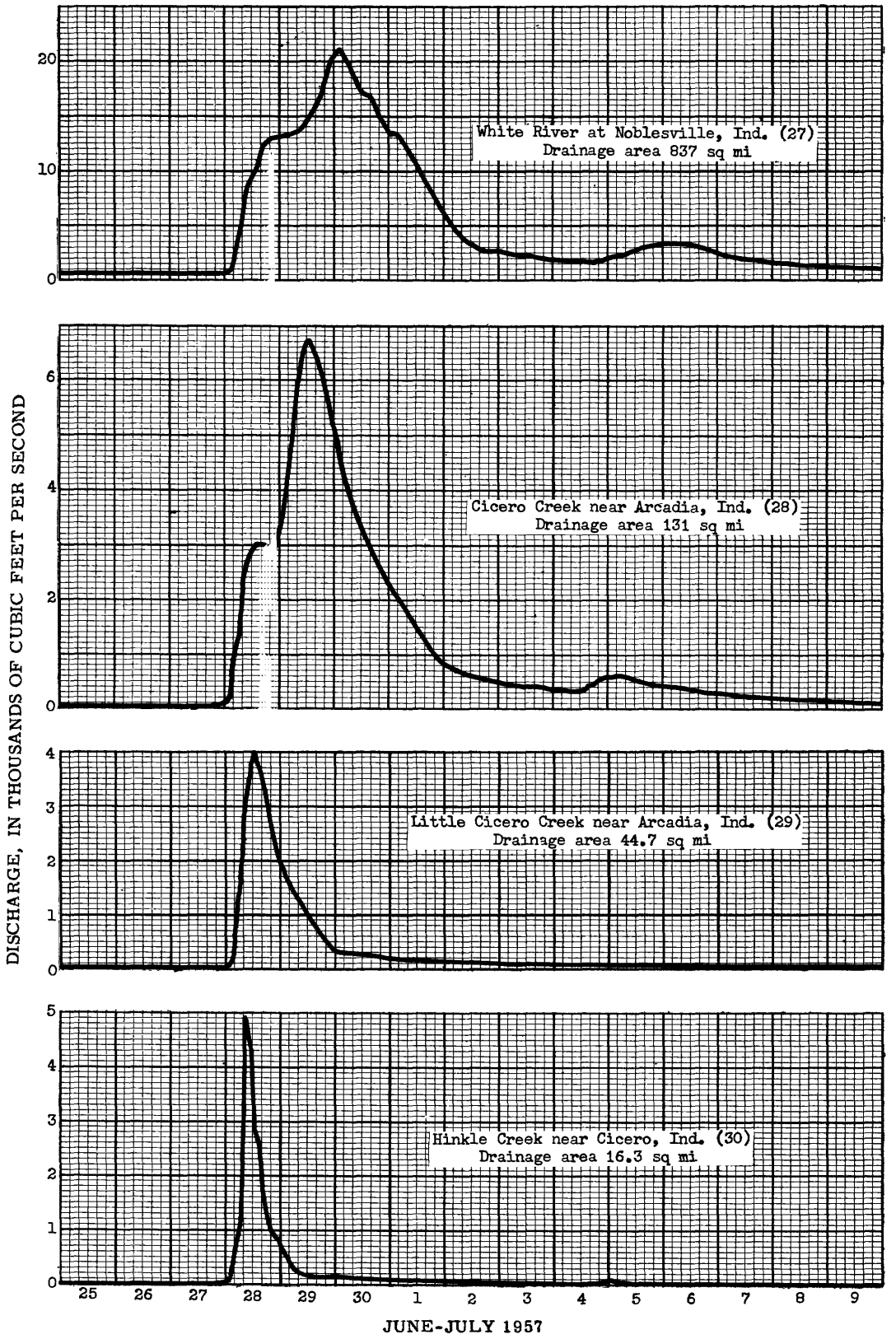

Figure 7.--Discharge hydrographs for gaging stations 27, 28, 29, 30, June-July 1957.

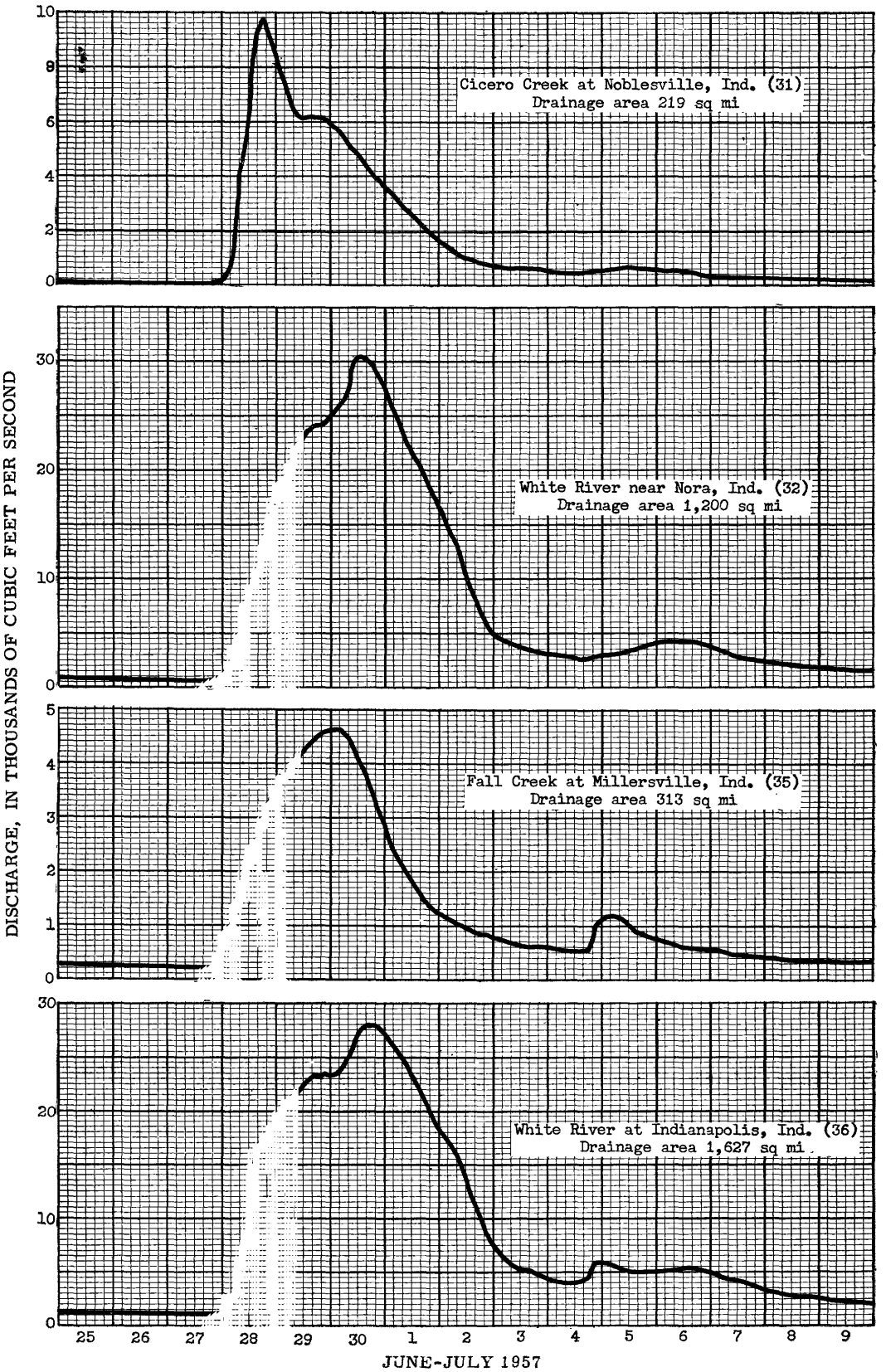

Figure 8.--Discharge hydrographs for gaging stations 31, 32, 35, 36, June-July 1957.

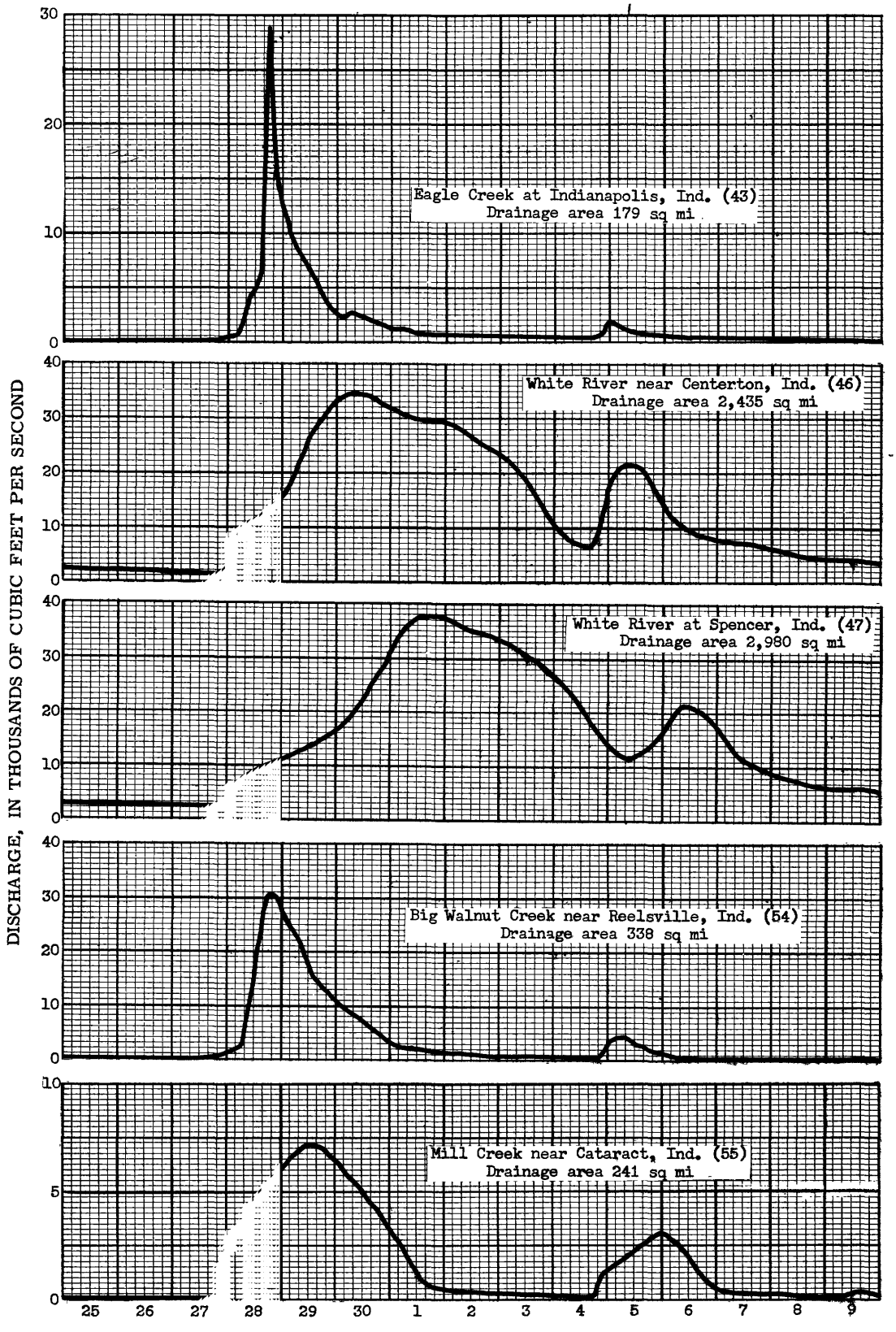

Figure 9.--Discharge hydrographs for gaging stations 43, 46, 47, 54, 55, June-July 1957.

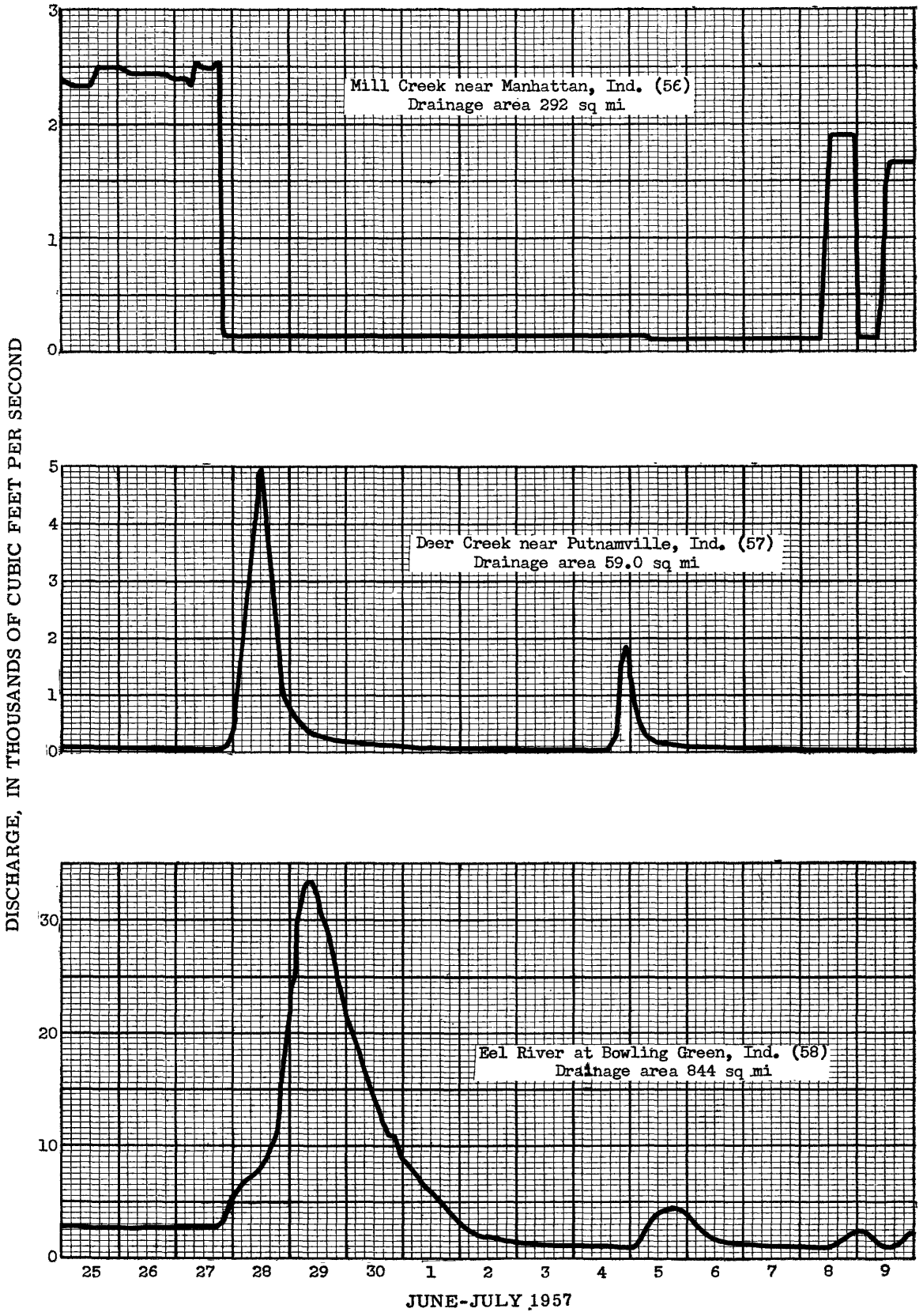

Figure 10. --Discharge hydrographs for gaging stations 56, 57, 58, June-July 1957.

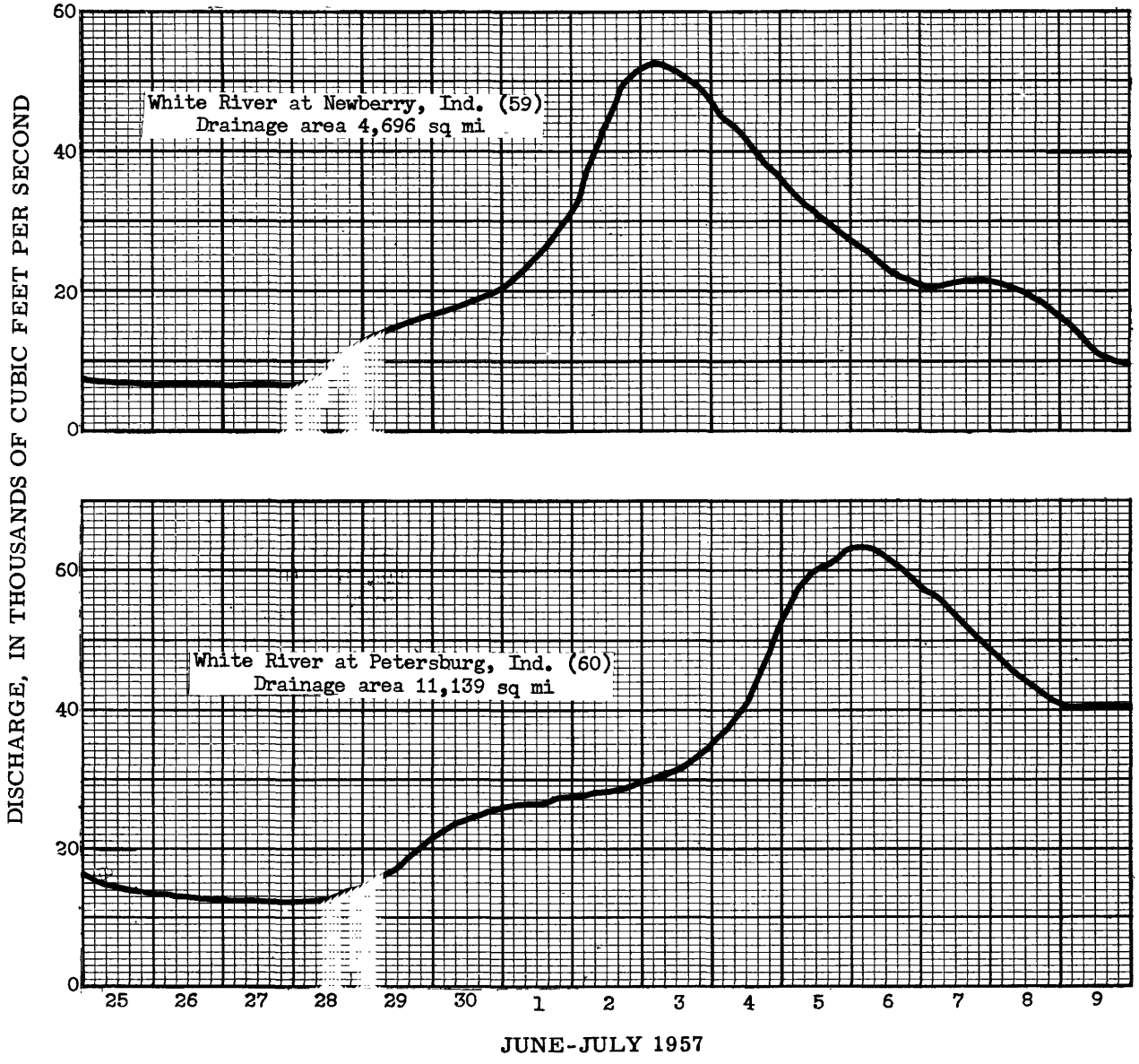

Figure 11.--Discharge hydrographs for gaging stations 59, 60, June-July 1957

SUMMARY OF FLOOD STAGES AND DISCHARGES

The results of the determinations of peak stages and discharges at 32 established stream-gaging stations and at 28 miscellaneous ungaged points in the area are summarized in table 3.

The discharges listed in table 3 were determined by the method described in the gaging-station and miscellaneous site descriptions. The peak-discharge values are given as actually determined; that is, no attempt has been made to adjust them for artificial storage, regulation or diversions.

For two stations the peak discharge did not occur simultaneously with peak stage because of the effects of slope, backwater, or storage. In these instances, the maxima are given separately—first, the peak discharge and its date and time, and second, the peak stage and its date and time. A second line, also, is used to present data on floods prior to the period of gaging-station operation, where such historical information is available. A period of record is shown for all regular gaging stations, whereas a leader indicates a miscellaneous point where no record of discharge has been systematically collected.

Table 3.--Summary of flood stages and discharges

No.	Stream and place of determination	Drainage area (sq mi)	Period of record	Maximum flood previously known				Maximum during present flood				
				Date	Gage height (feet)	Discharge		Date and hour	Gage height (feet)	Discharge		
						Cfs	Cfs per sq mi			Cfs	Cfs per sq mi	Ratio to $Q_{2.33}$
1	Wabash River at Covington----------	8,208	1939-57	May 20, 1943 March 1913	32.44 [a]35.1	147,000 200,000	17.9 24.4	July 3, 8-9 a.m------	21.46	36,200	4.41	0.59
2	Prairie Creek near Thorntown--------	35.9	-------	----------	-----	-------	----	June 28----------	-----	3,250	90.5	-----
3	Walnut Fork near Mace----------	32.4	-------	----------	-----	-------	----	June 28----------	-----	5,710	176	-----
4	Sugar Creek at Crawfordsville-------	509	1938-57	May 18, 1943 March 1913	14.02 [a]17.3	24,000 36,000	47.2 70.7	June 28, 1 p.m------	14.48	26,300	51.7	2.46
5	Sugar Creek near Byron----------	668	1940-57	May 18, 1943	20.68	28,700	43.0	June 28, 2 p.m------	22.93	32,200	48.2	2.12
6	Wabash River at Montezuma----------	11,100	1927-57	May 20, 1943 Mar. 27, 1913	32.83 [a]34.0	184,000 230,000	16.6 20.7	June 29, 1-2 p.m-----	26.11	77,100	6.95	1.15
7	Little Raccoon Creek near Ladoga----	4.62	-------	----------	-----	-------	----	June 28----------	-----	3,230	699	-----
8	Raccoon Creek at Ladoga----------	54.4	-------	----------	-----	-------	----	June 28----------	-----	9,820	181	3.40
9	Raccoon Creek near Fincastle--------	122	-------	----------	-----	-------	----	June 28----------	-----	38,400	315	8.00
10	Ramp Creek at Fincastle----------	25.2	-------	----------	-----	-------	----	June 28----------	-----	12,900	512	-----
11	Raccoon Creek at Ferndale----------	215	1956-57	May 11, 1957	12.09	5,690	26.5	June 28, 6-7 p.m-----	19.87	40,500	188	5.87
12	Raccoon Creek at Mansfield----------	240	1939-57	May 18, 1943 1875	19.5 [b]21.2	20,000 -------	83.3 ----	June 28, 9 p.m------	21.54	38,400	160	4.76
13	Little Raccoon Creek at Guion-------	30.7	-------	----------	-----	-------	----	June 28----------	-----	23,700	772	-----
14	South Fork Little Raccoon Creek at Guion	28.6	-------	----------	-----	-------	----	June 28----------	-----	21,600	755	-----
15	Little Raccoon Creek near Catlin----	133	1956-57	Apr. 4, 1957	13.24	4,180	31.4	June 28, 8 a.m------	18.27	53,400	402	10.57
16	Raccoon Creek at Coxville----------	440	1956-57	Apr. 4, 1957	13.86	10,100	23.0	June 28, 2:30 p.m----	21.23	108,000	245	10.00
17	Rock Run near Mecca----------	9.38	-------	----------	-----	-------	----	June 28----------	-----	6,450	688	-----
18	Leatherwood Creek at Bloomingdale---	5.67	-------	----------	-----	-------	----	June 28----------	-----	2,430	429	-----
19	Brouilletts Creek near Blanford-----	263	-------	----------	-----	-------	----	June 28----------	-----	35,200	134	4.51
20	Otter Creek at North Terre Haute----	118	-------	----------	-----	-------	----	June 28----------	-----	13,800	117	2.94
21	Wabash River at Terre Haute----------	12,200	1927-57	May 20, 1943 Mar. 27, 1913	30.50 [a]31.1	189,000 245,000	15.5 20.1	June 29, 12 p.m. to June 30, 4 a.m	25.04	82,000	6.72	1.13

Table 3.--Summary of flood stages and discharges--Continued

No.	Stream and place of determination	Drainage area (sq mi)	Period of record	Maximum flood previously known				Maximum during present flood				
				Date	Gage height (feet)	Discharge		Date and hour	Gage height (feet)	Discharge		
						Cfs	Cfs per sq mi			Cfs	Cfs per sq mi	Ratio to $Q_{2.33}$
22	Wabash River at Riverton----------	13,100	1938-57	May 21, 1943 Mar. 28, 1913	29.36 26.4	201,000 250,000	15.3 19.1	July 2, 3 p.m--------	22.00	81,800	6.24	1.27
23	Wabash River at Vincennes----------	13,700	1929-57	May 22,23,1943 Mar. 29, 1913	29.33 26.3	189,000 255,000	13.8 18.6	July 4, 3 a.m-------- July 4, 7-10 a.m-----	----- 23.70	69,400 ------	5.07 ------	1.14
24	White River at Muncie----------	242	1930-57	Jan. 15, 1937 March 1913	18.07 [a]19.6	11,500 20,000	47.5 82.6	June 29, 9-11 a.m----	8.35	5,880	24.3	.96
25	White River at Anderson----------	401	1925-26, 1931-57	Jan. 15, 1937 Mar. 25, 1913	18.63 [a]23.6	17,100 28,000	42.6 69.8	June 29, 6 a.m-------	17.66	9,590	23.9	1.18
26	White River near Noblesville--------	814	1915-57	Mar. 21, 1927	16.3	27,200	33.4	June 29, 6-7 p.m-----	15.93	20,800	25.6	1.87
27	White River at Noblesville----------	837	1946-57	Jan. 5, 1950 Mar. 25, 1913	18.97 [a]23.8	19,500 -------	23.3 ----	June 30, 2 a.m-------	19.94	21,100	25.2	1.88
28	Cicero Creek near Arcadia----------	131	1955-57	July 21, 1956 (c)	8.98 [a]15.6	1,540 -------	11.8 ----	June 29, 1 p.m-------	11.86	6,720	51.3	2.69
29	Little Cicero Creek near Arcadia----	44.7	1955-57	Apr. 4, 1957	5.98	1,100	24.6	June 28, 12 m--------	8.69	3,980	89.0	-----
30	Hinkle Creek near Cicero----------	16.3	1955-57	Apr. 3, 1957	5.13	714	43.8	June 28, 8:30 a.m----	8.45	4,920	302	-----
31	Cicero Creek at Noblesville---------	219	1950-57	Apr. 4, 1957	12.37	3,660	16.7	June 28, 6-7 p.m-----	15.26	9,800	44.7	2.82
32	White River near Nora----------	1,200	1925-26, 1929-57	May 19, 1943 Mar. 26, 1913	18.19 22.4	32,400 58,500	27.0 48.8	June 30, 11 a.m. to 2 p.m	18.04	30,400	25.3	2.14
33	Williams Creek near Augusta---------	17.4	-------	----------	-----	-------	-----	June 28----------	-----	4,170	240	-----
34	Crooked Creek at Augusta----------	7.22	-------	----------	-----	-------	-----	June 28----------	-----	2,160	299	-----
35	Fall Creek at Millersville----------	313	1925-26, 1929-57	May 28, 1956 Mar. 26, 1913	13.53 [a]16.3	12,900 22,000	41.2 70.3	June 30, 2-3 a.m-----	9.91	4,590	14.7	.97
36	White River at Indianapolis---------	1,627	1904-06, 1930-57	Jan. 16, 1937 May 18, 1943 Mar. 26, 1913	681.57 ----- 690.0	------- 37,200 70,000	----- 22.9 43.0	June 30, 5-6 p.m-----	679.03	28,000	17.2	1.40
37	Eagle Creek at Rosston----------	26.4	-------	----------	-----	-------	-----	June 28----------	-----	8,040	305	-----
38	Fenley Creek at Northfield----------	9.37	-------	----------	-----	-------	-----	June 28----------	-----	2,650	283	-----
39	Jackson Run near Zionsville---------	6.53	-------	----------	-----	-------	-----	June 28----------	-----	2,880	441	-----
40	Fishback Creek near Traders Point---	18.0	-------	----------	-----	-------	-----	June 28----------	-----	6,020	334	-----

41	Eagle Creek near Clermont----------	155	-------	----------	-----	-------	-----	June 28----------	-----	42,400	274	7.57
42	Eagle Creek at Speedway----------	176	-------	----------	-----	-------	-----	June 28----------	-----	25,200	143	4.20
43	Eagle Creek at Indianapolis----------	179	1938-57	May 28, 1956 March 1913	13.62 [b]16.0	9,920 -------	55.4 -----	June 28, 6 p.m-------	16.38	28,800	161	4.90
44	White Lick Creek at Brownsburg------	33.2	-------	----------	-----	-------	-----	June 28----------	-----	6,020	181	-----
45	West Fork White Lick Creek at Danville	28.7	-------	----------	-----	-------	-----	June 28----------	-----	6,660	232	-----
46	White River near Centerton----------	2,435	1930-32, 1946-57	Jan. 6 or 7, 1950 March 1913	[d]17.2 [e]22.8	43,000 90,000	17.7 37.0	June 30, 8 a.m-------	16.06	34,700	14.3	1.42
47	White River at Spencer----------	2,980	1925-57	Jan. 16, 1937, May 15, 1933 Mar. 26, 1913	23.2 [a]28.5	59,400 100,000	19.9 33.6	July 1, 5-6 p.m------	21.50	37,700	12.7	1.22
48	Big Walnut Creek at Jamestown-------	37.5	-------	----------	-----	------	-----	June 28----------	-----	4,370	117	-----
49	Middle Fork Big Walnut Creek at North Salem	11.6	-------	----------	-----	------	-----	June 28----------	-----	6,860	591	-----
50	Big Walnut Creek near Barnard-------	120	-------	----------	-----	------	-----	June 28----------	-----	23,800	198	5.01
51	Owl Creek near Morton----------	6.99	-------	----------	-----	------	-----	June 28----------	-----	5,550	794	-----
52	Owl Creek Tributary at Morton-------	2.64	-------	----------	-----	------	-----	June 28----------	-----	2,870	1,090	-----
53	Jones Creek at Brick Chapel---------	2.06	-------	----------	-----	------	-----	June 28----------	-----	1,460	709	-----
54	Big Walnut Creek near Reelsville----	338	1949-57	June 22, 1952	17.96	15,700	46.4	June 28, 7 p.m-------	18.63	30,700	90.8	3.13
55	Mill Creek near Cataract----------	241	1949-57	Jan. 5, 1950	21.35	9,480	39.3	June 29, 3 p.m-------	19.64	7,180	29.8	1.06
56	Mill Creek near Manhattan----------	292	1938-57	Jan. 5, 1950	18.38	8,960	30.7	June 27, 6 p.m------ June 28, 7-8 p.m-----	----- [f]15.18	2,540 ------	8.70 -----	-----
57	Deer Creek near Putnamville---------	59.0	1954-57	Sept. 29, 1955 Spring 1951	12.05 14.05	4,200 ------	71.2 -----	June 28, 12 m--------	13.34	4,930	83.6	1.49
58	Eel River at Bowling Green----------	844	1931-57	Jan. 4, 1950 1875	23.53 [a]30.0	34,000 ------	40.3 -----	June 29, 8 a.m-------	23.39	33,400	39.6	2.26
59	White River at Newberry----------	4,696	1928-57	May 21, 1943 Mar. 27, 1913	24.19 [g]27.5	76,900 ------	16.4 -----	July 3, 6 a.m--------	22.09	52,700	11.2	1.24
60	White River at Petersburg----------	11,139	1927-57	Jan. 22, 1937 March 1913	[h]31.58 [a]29.5	183,000 235,000	16.4 21.1	July 6, 2-4 a.m------	22.16	63,200	5.67	.84

a Maximum stage known.
b Maximum stage previously known.
c Probably the flood of January 1937.
d At site three-eighths of a mile upstream.
e At site 8½ miles downstream at different datum.
f Backwater from Deer Creek and Big Walnut Creek.
g Maximum stage known since at least 1875.
h At site 29 miles downstream at datum 16.77 ft lower.

FREQUENCY OF PEAK DISCHARGES

Peak discharges, in cubic feet per second per square mile, are plotted against the corresponging drainage area from which they occurred and are shown as figures 12 and 13. These data have been divided into several hydrologic areas (fig. 14) based on a state-wide flood frequency study in order that a comparison might be made between the present floods and a corresponding flood of 50-year recurrence interval. These graphs provide a rough means of judging the possible frequencies of the present flood. Although the 50-year recurrence interval curve may be used with a fair degree of confidence, no attempt should be made to estimate the recurrence intervals of points which are plotted an appreciable distance from the curve. The reference numbers used throughout the report are shown alongside the unit discharge points for identity.

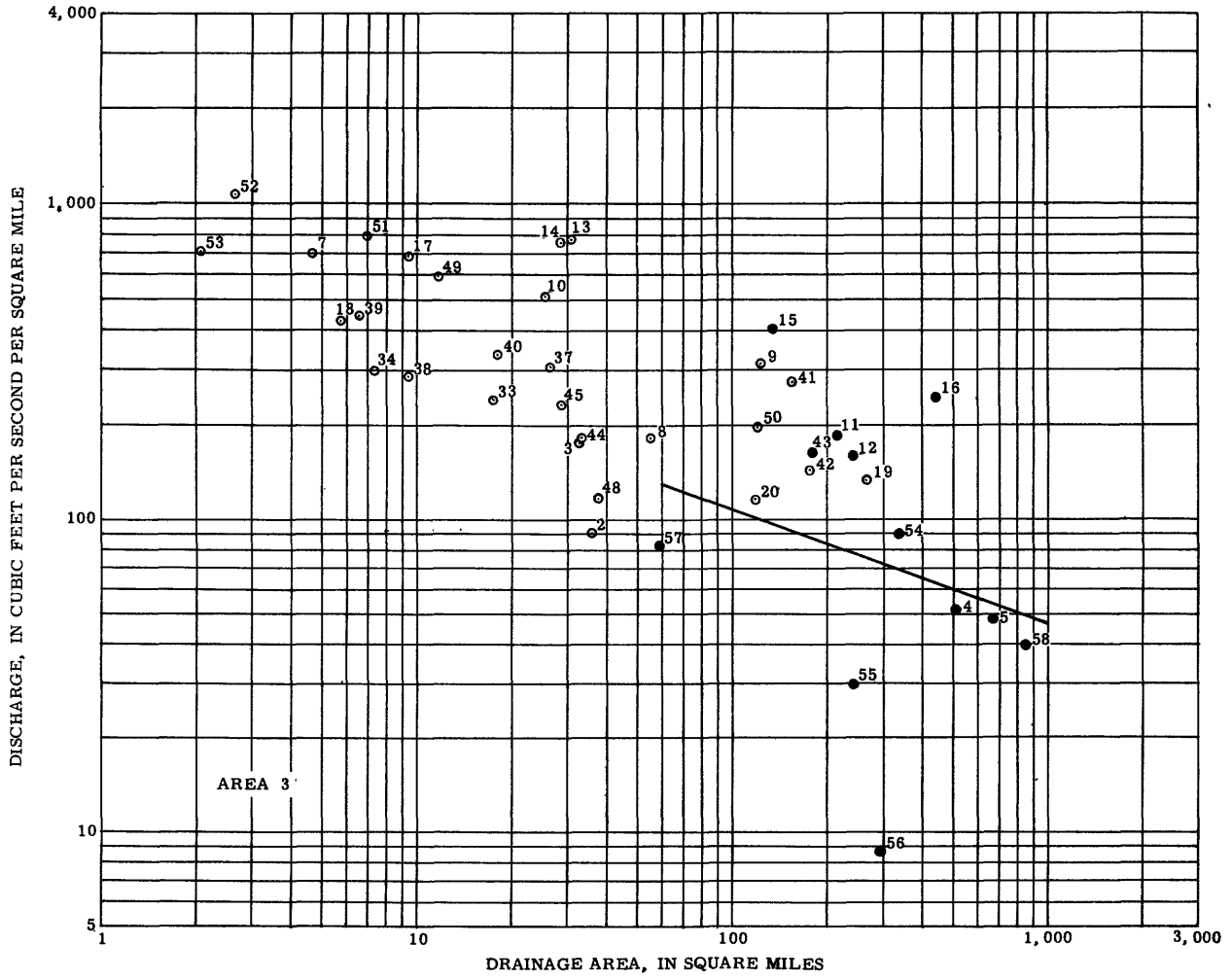

Figure 12.--Relation of unit peak discharge to 50-year flood in hydrologic area 3.

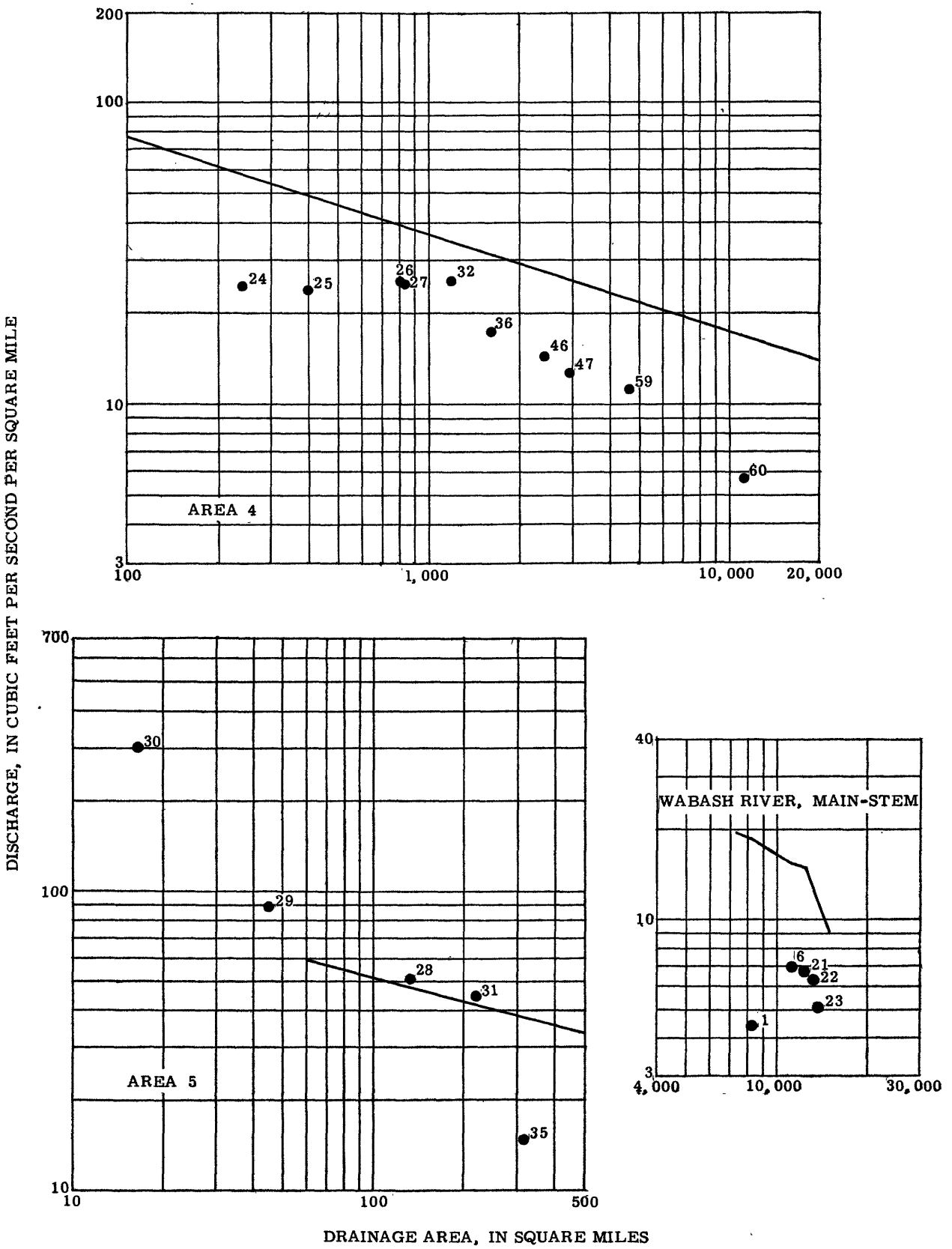

Figure 13. --Relation of unit peak discharge to 50-year flood in hydrologic areas 4, 5, and main-stem Wabash River.

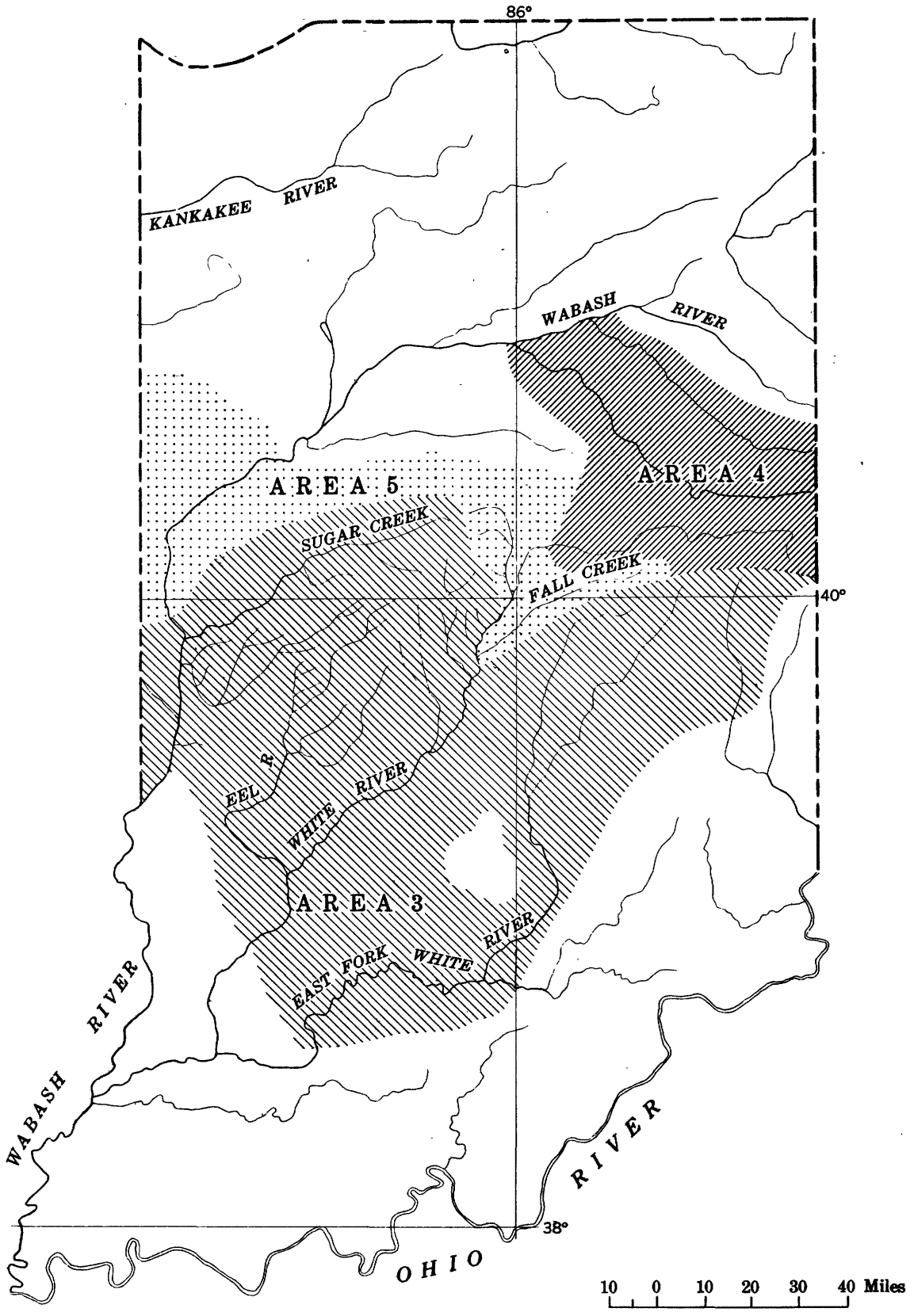

Figure 14.--Map showing location of hydrologic areas 3, 4, 5.

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