carpenter

File

LIBRARY COPY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FLOODS OF AUGUST AND SEPTEMBER 1971 IN MARYLAND AND DELAWARE

Prepared in cooperation with the
MARYLAND STATE HIGHWAY ADMINISTRATION

Open-file report
Parkville, Maryland
1974

(200)
C225f
1974

00)
225f
74

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FLOODS OF AUGUST AND SEPTEMBER 1971 IN MARYLAND AND DELAWARE

By
D. H. Carpenter

Prepared in cooperation with the
MARYLAND STATE HIGHWAY ADMINISTRATION

Open-file report
Parkville, Maryland
1974

CONTENTS

ILLUSTRATIONS

TABLES

ABSTRACT

Intense rainfall, resulting mostly from severe thunderstorms in August and September 1971 caused considerable flooding throughout much of Maryland and Delaware. Precipitation totals of 5.47 inches in 3 hours and 12.6 inches in 12 hours were reported for the most severe storm of the period which occurred on Aug. 1-2, and was centered in southeast Baltimore County, Md.

Total storm damage for the 2 months was estimated to exceed 10 million dollars. Fourteen lives were lost and extensive damage was done to homes, businesses, crops, bridges, culverts, and roadways.

Flood discharge data are presented for 75 gaging stations and for 6 miscellaneous sites. New peaks of record occurred at 32 of the gaging stations. The maximum unit peak discharge rate recorded was 2,400 cubic feet per second per square mile.

August and September 1971 in Maryland and Delaware were marked by 3 periods of heavy rainfall; Aug. 1-5, Aug. 26-28, and Sept. 11-14. Within these periods several individual storms caused significant flooding. Particularly severe storms occurred in Baltimore City and southeastern Baltimore County on Aug. 1-2 and in central Maryland and northern Delaware on Sept. 11-13. Less severe storms occurred on Aug. 3-4, Aug. 26-28, and Sept. 13-14.

National Weather Service records indicate that the total rainfall for the 2-month period ranged from 4.37 inches at Crisfield, Md., to 28.47 inches at Towson, Md. The rainfall at Towson during August was 19.99 inches. The greatest monthly total recorded at any National Weather Service station in Maryland or Delaware was 20.35 inches at Leonardtown, Md., in August 1945.

All the storms were characterized by intense and persistent thunderstorms. In addition, the Aug. 26-28 storm period included tropical storm Doria which moved up the coast of Maryland and Delaware on the evening of Aug. 27.

The highest reported rainfall intensities of the 2-month period occurred during the storm of Aug. 1-2, which was centered in southeast Baltimore County, Md. A total of 12.6 inches of rain was reported to have fallen at one site in less than 12 hours (probably less than 10 hours).

The resulting flood damage was fairly localized, but extremely heavy. Fourteen lives were lost and property damage was estimated at 6.5 million dollars (U. S. Environmental Data Service, 1971). This storm accounted for all the loss of life and more than half the property damage sustained during the 2-month period.

The second most severe flooding resulted from the storm of Sept. 11-13. A total of over 13 inches of rain was reported in Newcastle County, Del., and over 9 inches in Montgomery County, Md. Very heavy damage occurred in Montgomery County, Md., primarily in the Seneca Creek basin. Storm damage was estimated to be about 4 million dollars (U. S. Environmental Data Service, 1971).

Included in this report are descriptions of the storms and the resulting flooding. Significant peak stages and discharges in August and September and the previous peaks of record are listed for selected gaging stations. Peaks

at some miscellaneous sites are also included. Figure 1 shows the location of sites for which peak-flow data are given. Detailed descriptions of each site giving the location, drainage area, and type of gage are presented. Isohyetal maps are included to provide a generalized picture of the rainfall associated with the larger storms. Peak unit discharges plotted against drainage areas with superimposed Myers extreme-event curves (National Resources Committee, 1938) are presented.

Factors for converting data from English Units to International System (SI) Units are provided on page 13.

Data from gaging stations which did not experience significant peaks are not included in this report. Information regarding those stations and more detailed runoff data from the stations which are included in the report may be obtained from the U. S. Geological Survey office in Parkville, Md.

This report has been prepared to provide information for government agencies and private organizations that are concerned with water management. Documentation of flood data is a prerequisite to effective drainage-structure design and land-development planning.

The streamflow data in this report were collected by the U. S. Geological Survey in conjunction with its cooperative programs with the Delaware State Highway Department, the Maryland State Highway Administration, the Delaware Geological Survey, the Maryland Geological Survey, and various other Federal, State and private organizations. The cooperation of the National Weather Service in providing precipitation data is gratefully acknowledged.

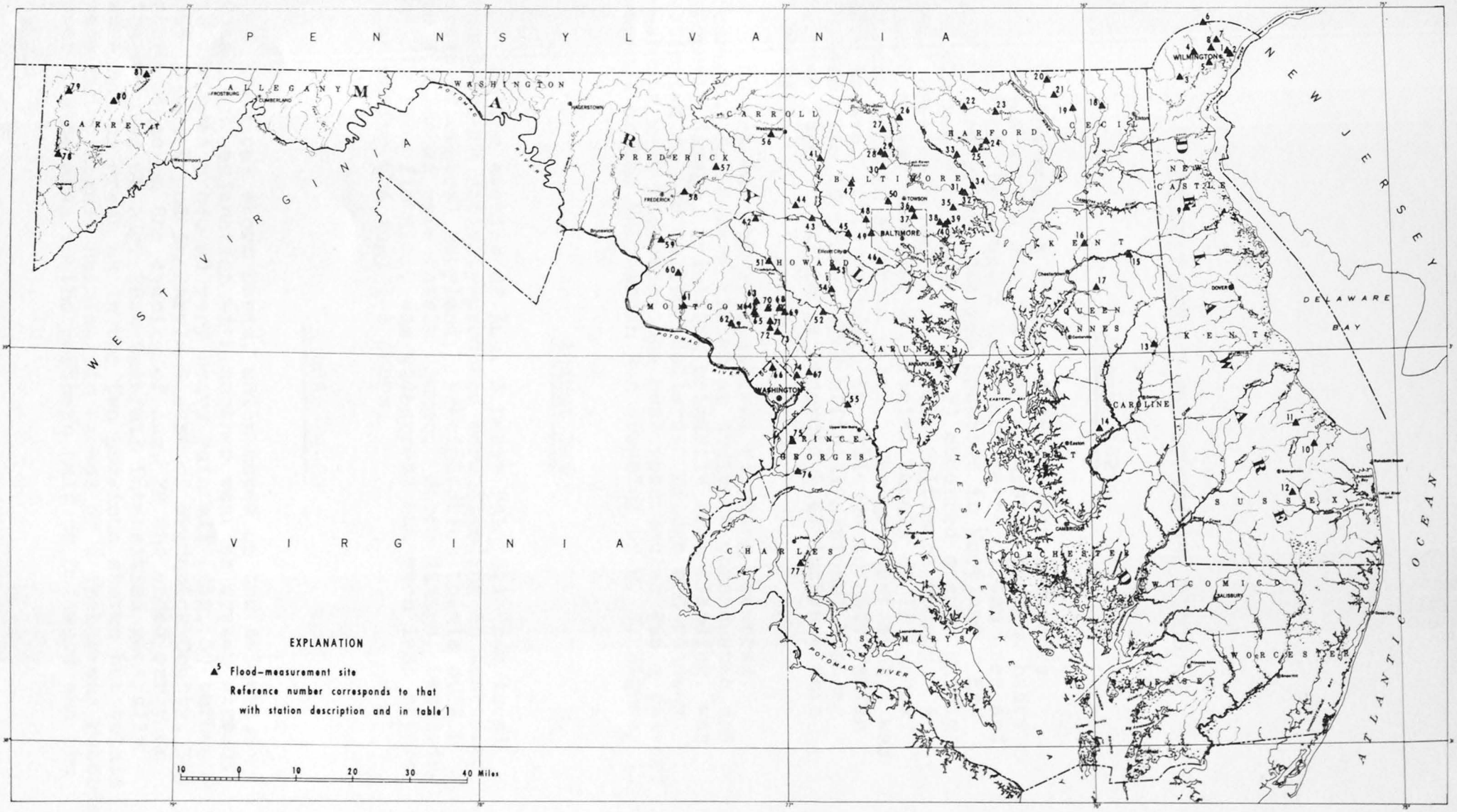

Figure 1. Location of Flood-Measurement Sites

August 1-2

On the evening of Aug. 1 severe thunderstorms associated with a stalled frontal system brought heavy rainfall to the greater Baltimore metropolitan area and Harford and Prince Georges Counties in Maryland. Extremely heavy rainfall (fig. 2) occurred over a fairly small area centered in southeast Baltimore County. A bucket survey revealed unofficial totals of 11 inches or more of rain at three sites. The greatest amount was 12.6 inches. This rainfall is believed to have fallen in less than 10 hours. The official National Weather Service gage in Baltimore recorded 5.47 inches within 3 hours.

Severe but fairly localized flooding occurred. Fourteen people were killed as a direct consequence and property damage, resulting primarily from flooding, was estimated at 6.5 million dollars. Bridge and roadway washouts were reported; the most spectacular was a culvert washout at the Whitemarsh Run crossing of U. S. Highway 1.

August 3-4

On the evening of Aug. 3 heavy rainfall from local thunderstorm activity produced more flooding in scattered areas of central Maryland. Precipitation totals of 2.5 to 3.5 inches were fairly common. Storm damage, resulting mainly from flooding, was widespread but much less severe than during the Aug. 1-2 storm.

August 26-28

Tropical storm Doria, which moved up the Atlantic Coast, in conjunction with another weather system already in the area produced very heavy rainfall (fig. 3) throughout Delaware and in Maryland east of Frederick County. The storm began on the evening of Aug. 26 and ended early on the morning of Aug. 28. Rainfall intensities generally were not as great as in the two previous storms but totals were quite high. Rainfall in excess of 6 inches was recorded over a wide area in the northern half of Delaware and the

central and northern parts of Maryland's eastern shore. The greatest rainfall totals reported were 10.10 inches at La Plata, Md., 8.76 inches at Annapolis, Md., and 8.82 inches in eastern Kent County, Md.

Total storm damage (mostly wind related) was extensive but was probably considerably less than a million dollars. Flood damage was relatively minor.

September 11-13

Localized torrential rains associated with convective thunderstorm activity fell intermittently over central and northeast Maryland and northern Delaware from the early morning hours of Sept. 11 until the evening of the 13th (fig. 4). A gage in Baltimore City recorded 4.36 inches in 3 hours on Sept. 11. Three-day rainfall totals of over 6 inches were recorded at various sites in central Maryland and northern Delaware. An unofficial 13.43 inches, of which 8.43 inches fell on the 13th, was reported for the 3-day period at a site north of Wilmington, Del. Two sites in west central Montgomery County, Md., reported more than 9 inches (unofficial) on the 11th and 12th.

Severe flood damage occurred in Montgomery County where homes were destroyed in the Seneca Creek floodplain and widespread damage to bridges and roadways was reported. Baltimore City, Baltimore County, and Harford County, Md., all reported considerable damage from flooding. Substantial damage also occurred along the Patuxent River downstream from the T. Howard Duckett Reservoir. Minor flood damage occurred in the Wilmington, Del., metropolitan area. Storm damage throughout the bi-state area was estimated to be about 4 million dollars.

September 13-14

Thunderstorms hit Garrett County, Maryland on the night of Sept. 13 and deposited up to 5 inches of rain (unofficial report) in the northwest part of the county. Some minor damage was done to culverts and bridges on secondary roads in the area.

Additional information on the storms described above may be obtained from the U. S. Environmental Data Service (1971).

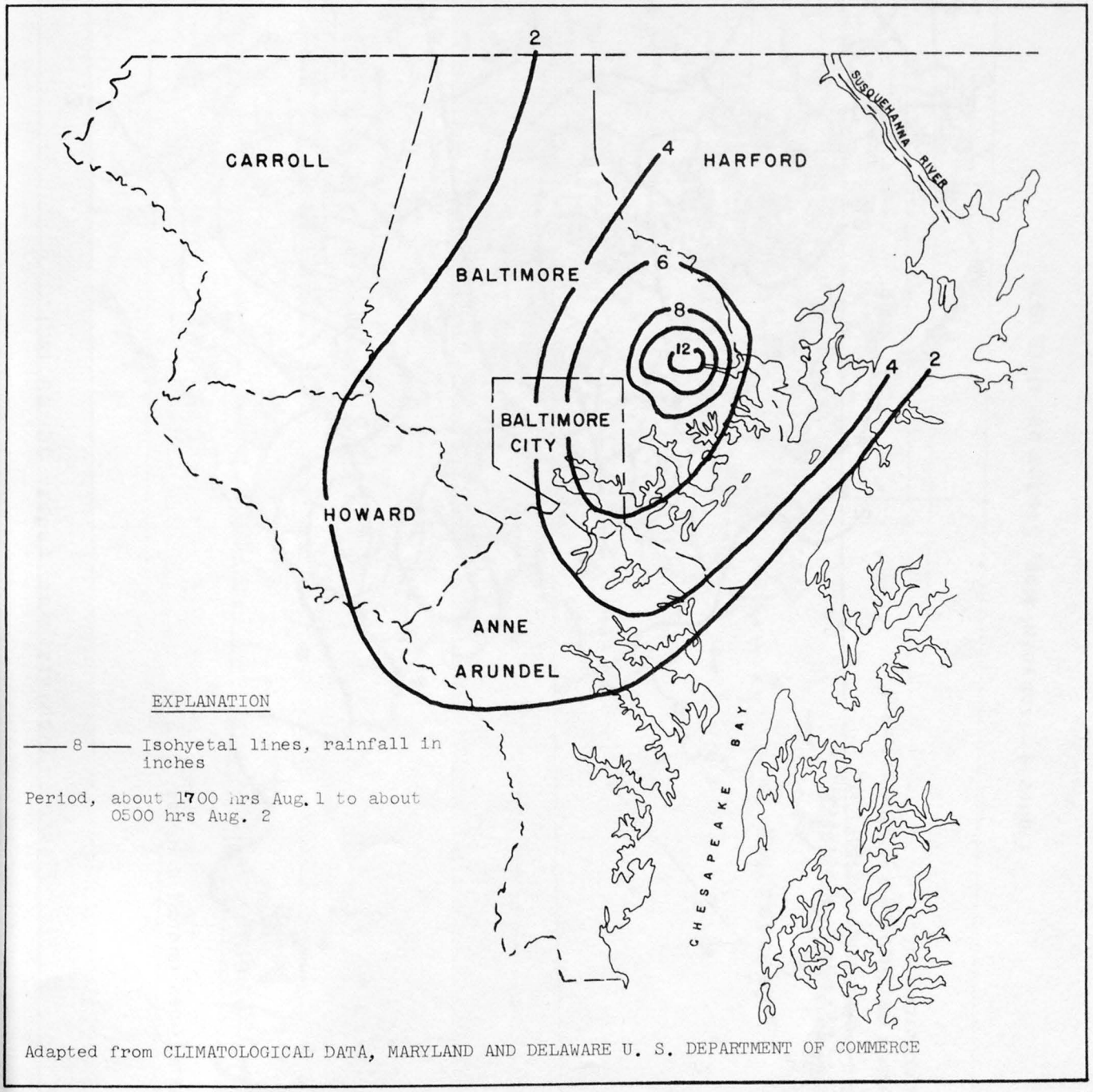

Figure 2 – Isohyetal Map, August 1-2, 1971

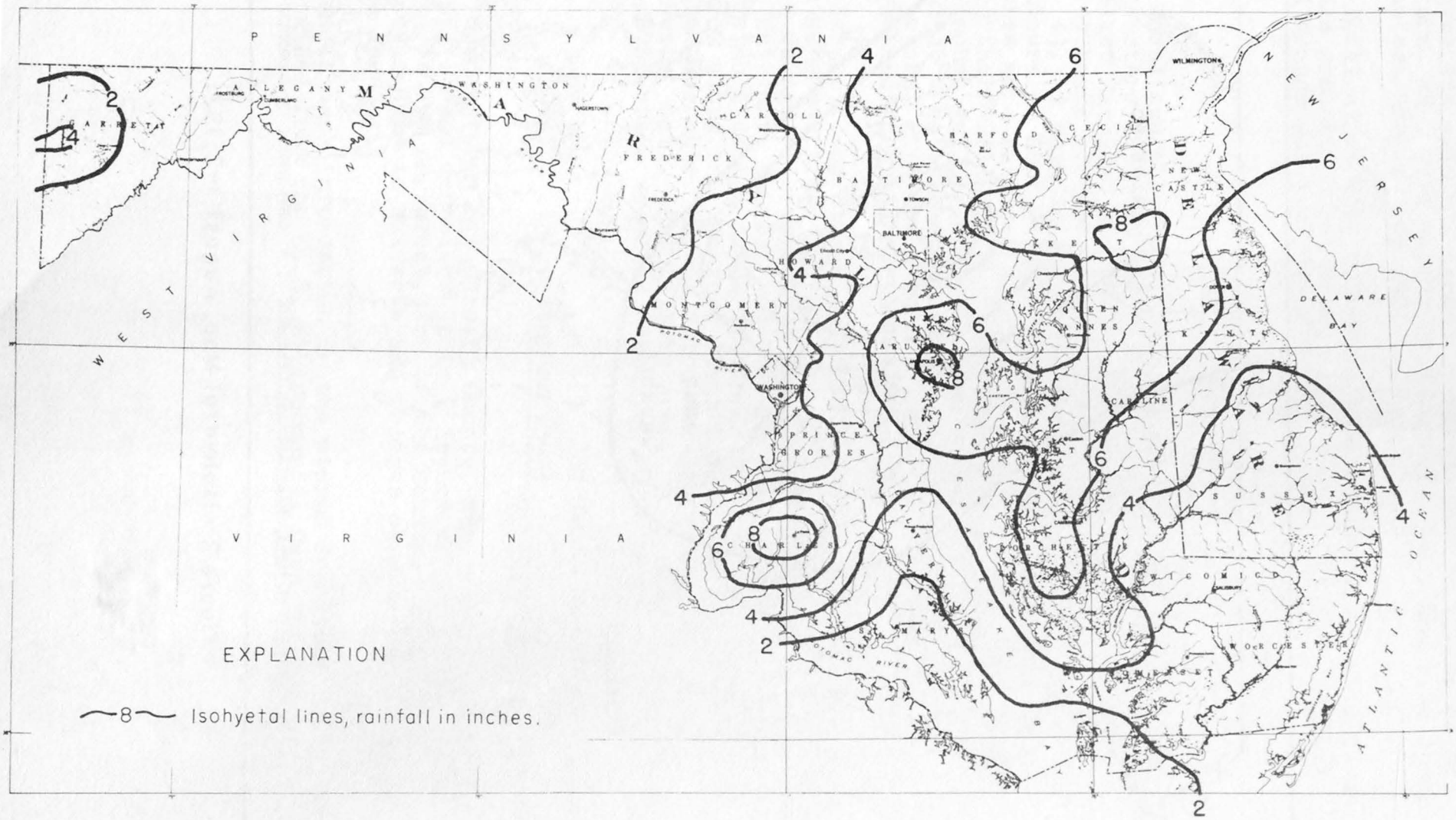

Figure 3– Isohyetal Map, August 26–28, 1971

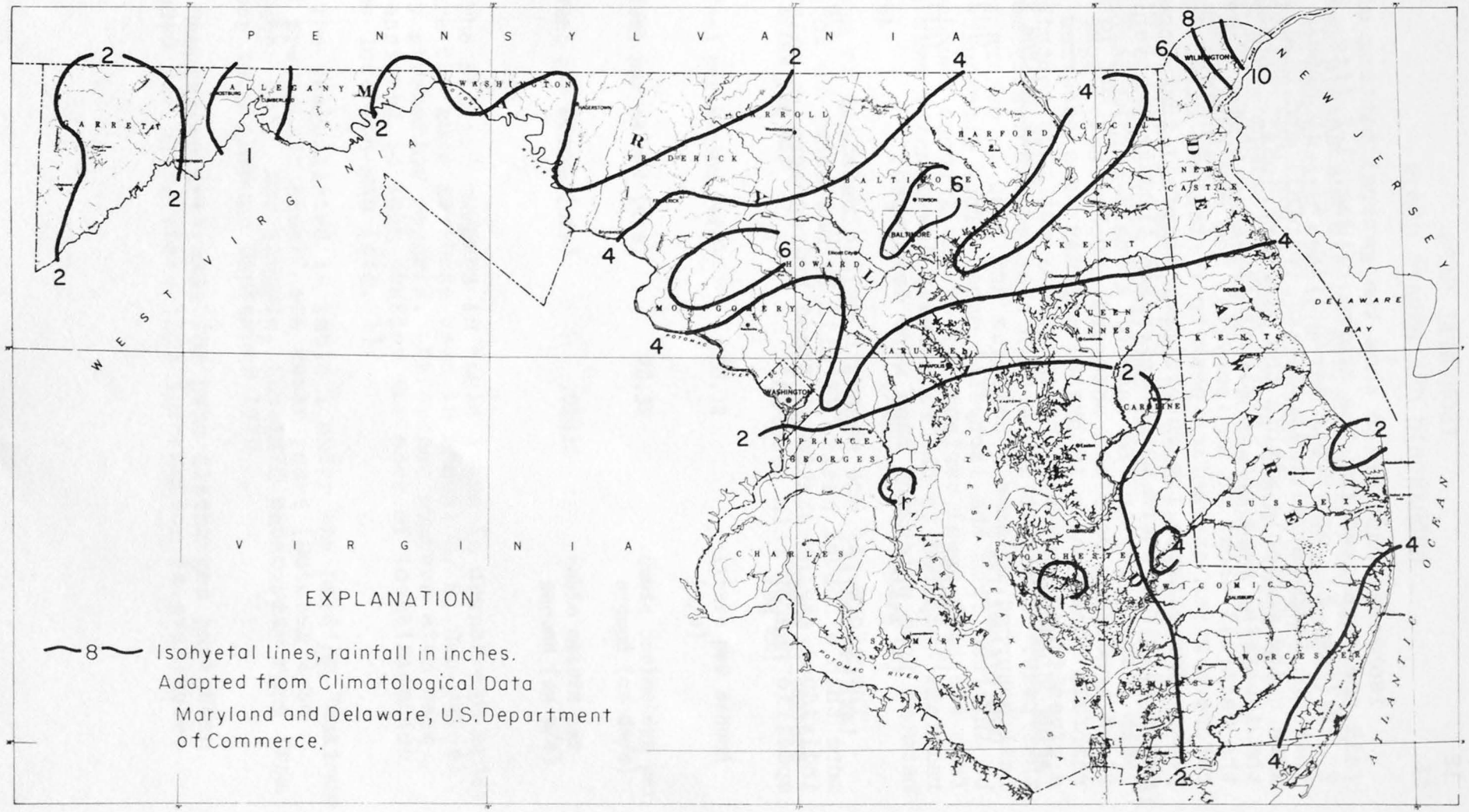

Figure 4 – Isohyetal Map, September 11-13, 1971

ISOHYETAL MAPS

Isohyetal maps which show the general pattern of rainfall are presented for the storms of Aug. 1-2 (fig. 2), Aug. 26-28 (fig. 3), and Sept. 11-13 (fig. 4). It should be noted that the temporal distribution of rainfall and timing of peaks were quite variable within the storm periods. Consequently the isohyetal maps can be misleading. In other words, much of the rainfall shown on an isohyetal map may have come too far before a given streamflow peak to contribute directly to that peak. For example the runoff from rainfall that occurred early within a storm may have passed through a given drainage basin (especially in the case of a small basin) before the flood producing rainfall occurred. Conversely, some of the rainfall shown on an isohyetal map may have occurred after a given flood peak and therefore may not have contributed to that peak. Also, it is certain that substantially more rainfall occurred in some localities and less in others than can be inferred from the isohyetal maps. This difficulty results from the high areal variability of the intense thunderstorm rainfall compared to the relatively low density rain gage network from which the maps were developed.

Therefore, if one wants to relate rainfall to runoff on more than a casual basis, it will be necessary to interpret individual gaging-stations' flood hydrographs in relation to specific nearby rain records.

Peak stages and discharges are presented in table 1 for 75 stream-gaging stations (53 continuous-record, 5 flood-hydrograph, and 17 crest-stage). Recurrence intervals and comparative data for previous floods are included. Peak discharges at 6 miscellaneous sites are also presented.

The following factors may be used to convert data from the English Units published herein to the International System of Units (SI).

Multiply English units	By	To obtain SI units
inches (in)	25.4	millimeters (mm)
inches (in)	.0254	meters (m)
feet (ft)	.3048	meters (m)
miles (mi)	1.609	kilometers (km)
square miles (sq mi)	2.590	square kilometers (sq km)
cubic feet per second (cfs)	28.32	liters per second (l/s)
cubic feet per second (cfs)	28.32	cubic decimeters per second (cu dm/s)
cubic feet per second (cfs)	.02832	cubic meters per second (cu m/s)

The station numbers in table 1 are in downstream order and are the same as those used in annual U. S. Geological Survey streamflow reports. Reference numbers also have been assigned to each station for ease of identification on the location map (fig. 1).

The years listed in table 1 under the heading "Maximum flood previously known" are water years (October 1 to September 30). For example, the 1970 water year runs from October 1969 through September 1970

Recurrence intervals for peak discharges have been included for sites where this information is available.

A recurrence interval, as applied to flood events, is the average interval of years during which a given peak discharge can be expected to be equaled or exceeded once. It is inversely related to the chance of the peak being equaled or exceeded in any one year. Thus, a 20-year flood would have 1 chance in 20 (5-percent chance) of being equaled or exceeded in any one year.

The flood recurrence intervals included in table 1 were determined by straight-line interpolation from flood-frequency tables listing 2-, 5-, 10-, 25-, and 50-year instantaneous peaks. The base flood-frequency data in these tables were developed by "log-Pearson Type III" analyses. Most of these base data were presented by Walker (1971) or by Cushing, Kantrowitz, and Taylor (1973). For some sites which had short records of peak flows, the base flood-frequency data were estimated for high recurrence intervals. Recurrence interval data included in this report derived from estimated base data are qualified in the footnotes. In general, peaks believed to have recurrence intervals of less than 3 years are not included in this report. The recurrence intervals listed may be too high for urban or urbanizing areas.

Figure 5 shows the flood discharges in cubic feet per second per square mile for the peaks plotted against the corresponding drainage areas. Discharges of less than 10 cfs per sq mi were not plotted. Curves depicting Myers ratings of 30 and 100 are superimposed on figure 5. These curves represent a form of the Myers extreme-flood formula which is:

$$q = \frac{C_m}{\sqrt{M}}$$

where q is the peak discharge in cfs per sq mi, C_m is a coefficient which equals the Myers rating number times 100 and varies with locality, and M is the area of the drainage basin in square miles. Myers ratings are sometimes used as a frame of reference to judge relative magnitudes of floods.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Delaware River basin									
1	01477790	Matson Run at Wilmington, Del.	0.94	-	1967	-	1,120	9-13	-	1,580	
2	01477800	Shellpot Creek at Wilmington, Del.	7.46	1946-71	1967	9.10	4,650	8-28 9-13	6.29 11.91	2,020 6,850	5 al.1
3	01479000	White Clay Creek near Newark, Del.	87.8	1933-37 1944-57, 1960-71	1937 1967	b,c23 16.41	d 6,640	8-28	13.70	4,190	3
4	01480000	Red Clay Creek at Wooddale, Del.	47.0	1944-71	1960	9.93	e4,780	9-13	8.10	3,520	15
5	01480100	Little Mill Creek at Elsmere, Del.	6.70	1964-71	1967	8.58	3,960	8-28 9-13	5.34 7.79	926 2,650	
6	01481200	Brandywine Creek tributary near Centerville, Del.	.97	1966-71	1969	f8.38	333	9-13	f9.35	405	
7	01481450	Willow Run at Rockland, Del.	.37	1966-71	1970	10.55	375	9-13	f12.70	620	
8	01481500	Brandywine Creek at Wilmington, Del.	314	1948-71	1955	13.89	17,800	8-28 9-13	9.85 13.83	8,700 21,300	3 al.1
9	01483200	Blackbird Creek at Blackbird, Del.	3.85	1952-53, 1955-71	1960	4.10	510	8-28	3.13	194	5
		Broadkill River basin									
10	01484270	Beaverdam Creek near Milton, Del.	6.10	1966-71	1969	g4.88	25	8-28	4.28	34	
11	01484300	Sowbridge Branch near Milton, Del.	7.08	1957-71	1967	6.33	134	8-28 9-13	5.61 5.40	58 41	5 3
		Indian River basin									
12	01484500	Stockley Branch at Stockley, Del.	5.24	1944-71	1948	h5.0	132	8-28	3.35	75	4
		Choptank River basin									
13	01490800	Oldtown Branch at Goldsboro, Md.	3.9	1967-71	1967	9.79	690	8-28	5.98	235	
14	01492000	Beaverdam Branch at Matthews, Md.	5.85	1951-71	1960	110.24	2,200	8- 4 8-27	4.75 5.55	387 562	3 5
		Chester River basin									
15	01493000	Unicorn Branch near Millington, Md.	22.3	1949-71	1960	7.17	1,060	8-28 9-12	5.18 4.86	524 430	5 4
16	01493500	Morgan Creek near Kennedyville, Md.	10.5	1952-71	1960	8.88	1,530	8-27 9-11	6.28 6.90	565 760	4 7

See footnotes at end of table.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Chester River basin.-Con't.									
17	01494020	Brown's Branch tributary near Church Hill, Md.	1.7	1971	1971	7.38	145	8-28 9-11	8.87 f12.3	260 890	
		Northeast River basin									
18	01496000	Northeast Creek at Leslie, Md.	24.3	1949-71	1967	7.74	4,060	8-28	5.68	2,040	4
		Principio Creek basin									
19	01496200	Principio Creek near Principio Furnace, Md.	9.03	1968-71	1969	9.26	7,060	8-28	7.35	1,260	
		Susquehanna River basin									
20	01578500	Octoraro Creek near Rising Sun, Md.	193	1884 1933-58, 1963, 1965-71	1884 1942	f24.3 17.57	d 35,000	8-28 9-12	9.52 9.46	j6,730 j6,600	
21	01579000	Basin Run at Liberty Grove, Md.	5.31	1949-58, 1965-71	1967	k7.66	3,500	8-28	m4.98	1,200	9
22	01580000	Deer Creek at Rocks, Md.	94.4	1927-71	1933	f,n17.7	13,600	8- 2 8- 4	10.05 9.48	4,520 4,130	4 3
23	01580200	Deer Creek near Kalmia, Md.	125	1967-71	1967	10.45	6,130	8- 2 8- 4	9.32 8.83	4,850 4,310	
		Bush River basin									
24	01581500	Bynum Run at Bel Air, Md.	8.52	1945-50, 1956-71	1945	6.25	3,620	8- 1	5.72	1,650	5
25	01581700	Winters Run near Benson, Md.	34.8	1968-71	1968	f,p8.9	p4,300	8- 1 9-11	7.35 8.96	3,500 5,350	
		Gunpowder River basin									
26	01582000	Little Falls at Blue Mount, Md.	52.9	1945-71	1950	q11.93	5,730	8- 3	8.50	3,450	6
27	01582510	Piney Creek near Hereford, Md.	1.5	1966-71	1968	12.62	690	9-11	13.27	790	
28	01583495	Western Run tributary at Western Run, Md.	.26	1966-71	1967	8.11	236	8- 1 8-27 9-11	7.15 6.10 6.21	175 130 140	
29	01583500	Western Run at Western Run, Md.	59.8	1945-71	1956	10.84	5,590	8- 4 8-27 9-12	7.64 7.48 r7.41	2,690 2,580 2,530	3 3 3

See footnotes at end of table.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Gunpowder River basin.-Con't.									
30	01583580	Baisman Run at Broadmoor, Md.	1.47	1965-71	1968	5.43	490	8- 1 8-27	s3.8 s3.5	245 200	
31	01584045	Bean Creek at Loreley, Md.	p1.0	-	-	-	-	8- 1	-	1,940	
32	01584050	Gunpowder Falls at Loreley, Md.	347	-	-	-	-	8- 1	-	t19,700	
33	01584500	Little Gunpowder Falls at Laurel Brook, Md.	36.1	1927-71	1933	10.3	9,200	8- 1	6.90	3,900	5
34	01585045	Little Gunpowder Falls at Gunpowder, Md.	55.3	-	-	-	-	8- 1	-	11,800	
35	01585100	Whitemarsh Run at White Marsh, Md.	7.61	1960-71	1960	6.60	1,580	8- 1 8- 4 8-27 9-11	14.05 7.73 7.64 11.46	8,000 1,610 1,580 3,760	
		Back River basin									
36	01585200	West Branch Herring Run at Idlewylde, Md.	2.13	1958-71	1967	6.46	1,540	8- 1 9-11	6.51 6.80	1,570 1,740	
37	01585220	Herring Run at Montebello Park, Md.	p8.0	-	-	-	-	8- 1	-	7,300	
38	01585300	Stemmers Run at Rossville, Md.	4.94	1959-71	1965	7.86	1,720	8- 1 8- 4 8-27 9-11	111.34 6.95 7.35 9.85	5,950 1,200 1,410 3,650	
39	01585390	Brien Run near Middle River, Md.	.72	-	-	-	-	8- 1	-	1,750	
40	01585400	Brien Run at Stemmers Run, Md.	1.97	1959-71	1960	5.03	506	8- 1 8-27 9-11	110.75 4.59 5.65	u3,500 430 630	
		Patapsco River basin									
41	01586000	North Branch Patapsco River at Cedarhurst, Md.	56.6	1946-71	1955	10.38	4,130	8- 4	9.35	3,340	10
42	01587050	Hay Meadow Branch tributary at Poplar Springs, Md.	.54	1966-71	1967	5.92	190	8- 3 9-11	6.70 10.55	250 630	
43	01587500	South Branch Patapsco River at Henryton, Md.	64.4	1949-71	1956	19.40	12,100	8- 4 9-12	10.94 16.85	4,410 9,250	8 a1.1
44	01588000	Piney Run near Sykesville, Md.	11.4	1932-71	1956	f12.0	7,380	9-11	f7.68	2,000	10

See footnotes at end of table.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Patapsco River basin.-Con't.									
45	01589000	Patapsco River at Hollofield, Md.	285	1933 1945-71	1933 1956	b19.5 15.88	(d) v19,000	8- 4 9-12	7.34 11.01	v7,040 v12,700	
46	01589100	East Branch Herbert Run at Arbutus, Md.	2.47	1956, 1958-71	1956	f5.7	1,090	8- 1 8-27 9-11	4.87 4.17 5.94	836 626 1,180	10 4 w40
47	01589200	Gwynns Falls near Owings Mills, Md.	4.90	1959-71	1967	5.06	1,330	8- 3 8- 5 8-27	5.13 3.44 2.88	1,360 536 338	
48	01589300	Gwynns Falls at Villa Nova, Md.	32.5	1956, 1958-71	1956	f12.6	5,270	8- 2 8- 4 8- 5 8-27 9-11	7.04 7.23 6.56 9.71 7.09	1,300 1,360 1,160 2,370 1,320	6 6 4 25 6
49	01589330	Dead Run at Franklintown, Md.	5.52	1960-71	1968	i10.22	2,750	8- 2 8- 3 8-27 9-11	6.39 8.15 8.13 8.68	1,260 1,920 1,910 2,130	
50	01589440	Jones Falls at Sorrento, Md.	25.2	1958-71	1968	11.30	2,160	8- 2 8- 5 8-27 9-11	7.61 6.48 8.43 6.97	1,070 790 1,290 912	
		Patuxent River basin									
51	01591000	Patuxent River near Unity, Md.	34.8	1945-71	1956	14.35	10,700	8- 4 9-11	13.61 18.60	9,300 21,800	40 a2.1
52	01592500	Patuxent River near Laurel, Md.	132	1945-71	1956	f17.7	x11,800	8- 4 9-12	14.87 p,f18.5	x7,060 p,x12,000	
53	01593350	Little Patuxent River tributary at Guilford Downs, Md.	.95	1966-71	1968	8.53	c < 450	8- 2 8-27 9-11	7.16 6.62 6.23	265 210 170	
54	01593500	Little Patuxent River at Guilford, Md.	38.0	1933-71	1952	13.26	5,300	8- 4 8-27 9-11	11.45 10.22 10.75	3,070 1,990 2,420	10 5 7
55	01594500	Western Branch near Largo, Md.	30.2	1950-71	1955	18.51	1,580	8- 2 8- 4 8-27 9-12	7.53 7.77 8.97 6.73	1,220 1,460 1,760 834	6 10 25 2

See footnotes at end of table.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Potomac River basin									
56	01640000	Little Pipe Creek at Avondale, Md.	8.1	1948-56, 1959-64, 1967-71	1956	8.47	1,880	8- 1	5.08	554	3
57	01642400	Dollyhyde Creek at Libertytown, Md.	2.7	1967-71	1969	8.88	760	8- 3	6.94	450	
58	01642500	Linganore Creek near Frederick, Md.	82.3	1935-71	1955	11.39	4,130	8- 4	9.69	3,200	5
59	01643500	Bennett Creek at Park Mills, Md.	62.8	1949-58, 1960-71	1953	y10.34	3,230	8- 4 9-12	11.15 14.33	7,180 13,000	a2.0 a3.5
60	01644420	Bucklodge Branch tributary near Barnesville, Md.	.27	1967-71	1969	f11.60	153	8- 3 9-11	9.51 9.58	126 127	
61	01645000	Seneca Creek at Dawsonville, Md.	101	1931-71	1956	12.17	15,000	8- 4 9-12	9.62 f16.32	6,810 25,900	20 z2.4
62	01645200	Watts Branch at Rockville, Md.	3.7	1958-71	1970	6.55	1,220	8- 1 8-27 9-11 9-11	6.05 5.58 5.62 5.74	600 314 328 380	
63	01647685	Williamsburg Run near Olney, Md.	2.25	1967-71	1969	4.99	606	8- 3	5.90	1,140	
64	01647720	North Branch Rock Creek near Norbeck, Md.	9.73	1967-71	1971	5.86	1,030	8- 4	5.77	998	
65	01647725	Manor Run near Norbeck, Md.	1.01	1967-71	1970	4.56	333	8- 3 8-27	4.67 3.99	536 313	
66	01648000	Rock Creek at Sherrill Drive, Washington, D. C.	62.2	1930-71	1956	113.19	7,220	8-27	7.71	*1,950	
67	01649500	Northeast Branch Anacostia River at Riverdale, Md.	72.8	1933, 1939-71	1933	f,p15.5	10,500	8- 4 8-27 9-11	5.45 6.47 6.60	2,860 4,160 4,340	3 8 9
68	01650050	Northwest Branch Anacostia River at Norwood, Md.	2.45	1967-71	1969	4.14	496	8- 3	5.43	1,500	
69	01650085	Nursery Run at Cloverly, Md.	.35	1967-71	1967	3.46	216	8- 3	3.56	260	
70	01650190	Batchellor's Run at Oakdale, Md.	.47	1967-71	1969	s2.83	240	8- 3	3.50	p370	
71	01650450	Bel Pre Creek at Layhill, Md.	1.69	1967-71	1967	6.18	338	8- 3	8.49	1,030	
72	01650470	Lutes Run at Lutes, Md.	.47	1967-69	1967	†4.60	570	8- 1 8- 3 8-27	4.17 4.12 3.63	220 210 150	

See footnotes at end of table.

Table 1. Flood Stages and Discharges in Maryland and Delaware

No.	Station number	Stream and place of measurement	Drainage area (sq mi)	Period of known floods (water years)	Maximum previously known			Floods during Aug.-Sept. 1971			
					Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (cfs)	Discharge (cfs)	Recurrence interval (years)
		Potomac River basin.-Con't.									
73	01650500	Northwest Branch Anacostia River River near Colesville, Md.	21.1	1924-71	1953	10.99	4,910	8- 4 8-27	9.87 8.47	2,420 1,340	8 3
74	01651000	Northwest Branch Anacostia River near Hyattsville, Md.	49.4	1933, 1939-71	1933 1966	p13.5 13.50	(d) 7,000	8-27	9.12	2,510	3
75	01653500	Henson Creek at Oxon Hill, Md.	16.7	1949-71	1955	7.33	3,000	8- 4 8-27	7.63 6.20	3,440 1,840	30 6
76	01653600	Piscataway Creek at Piscataway, Md.	39.5	1965-71	1968	6.76	938	8-28	7.19	1,180	
77	01660930	Clark Run near Bel Alton, Md.	10.4	1966-71	1970	6.67	260	8-27	6.79	285	
		Monongahela River basin									
78	03075600	Toliver Run tributary near Hoyes Run, Md.	.53	1965-71	1968	5.33	43	8-26	5.89	60	
79	03076600	Bear Creek at Friendsville, Md.	48.9	1965-71	1967	6.61	1,980	9-14	f9.6	4,650	
80	03077700	North Branch Casselman River tributary at Foxtown, Md.	1.0	1965-71	1967	f5.42	64	9-14	6.31	84	
81	03078000	Casselman River at Grantsville, Md.	62.5	1948-71	1955	10.70	8,400	9-14	5.87	3,010	4

a Ratio of peak discharge to estimated 50-year flood.
b From outside source of information.
c Probably affected by backwater.
d Discharge unknown.
e Revised.
f From floodmarks.
g From high-water mark on crest-stage gage.
h From graph based on gage readings.
i From high-water mark in gage shelter.
j Flow regulated since 1951 by Pine Grove Reservoir.
k 7.66 ft in gage well, 7.88 ft from floodmarks.
m 4.98 ft from recorder, 5.55 ft from floodmarks.
n Maximum stage known since at least 1888.
p About.
q 11.93 ft in gage well, 13.32 ft from floodmark.
4 From maximum stage indicator in gage shelter.
s From graph based on digital recorder recording at 15-minute intervals.
t Flow fom 303 of the 347 sq mi above this site regulated by Loch Raven Reservoir. It is reasonably certain that Loch Raven contributed less than 2,000 of the 19,700 cfs measured at this site.
u Based on drainage area relation with Brien Run near Middle River, Md.
v Flow regulated since 1954 by Liberty Reservoir.
w Estimated.
x Flow regulated by T. Howard Ducket Reservoir and Triadelphia Reservoir.
y 10.34 ft in gage well, 10.77 ft from outside gage.
z Ratio of peak discharge to 50-year flood.
* Flow regulated by Needwood Lake and Bernard Frank Lake.
† Different datum from 1971 peaks.

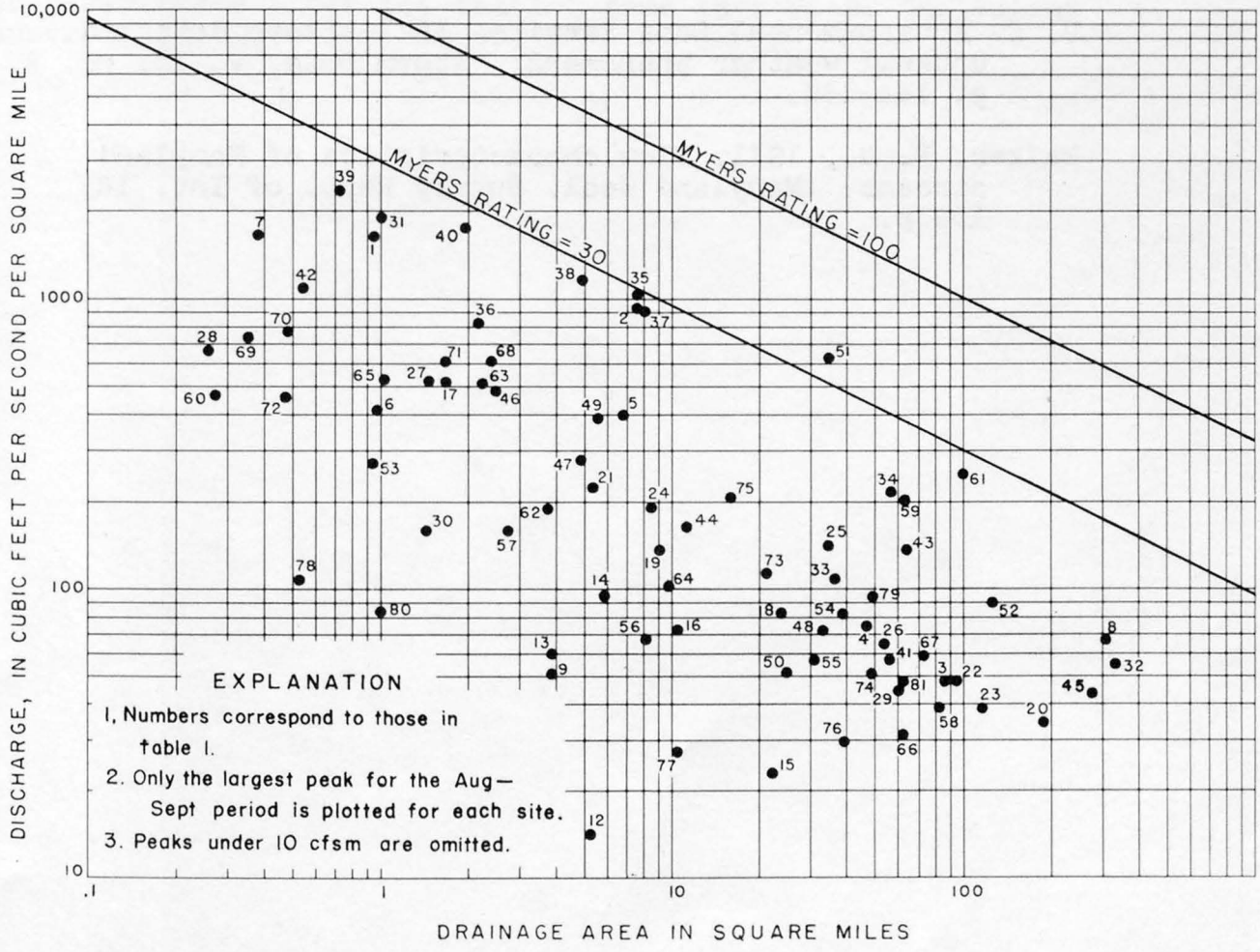

Figure 5— Relation of peak unit discharge to drainage area, floods of August and September, 1971

REFERENCES CITED

Cushing, E. M., Kantrowitz, I. H., and Taylor, K. R., 1973, Water resources of the Delmarva Peninsula: U. S. Geol. Survey Prof. Paper 822, 58 p., 12 pl., 27 figs.

National Resources Committee, 1938, Low dams: Washington, D. C., U. S. Government Printing Office, p. 32-33.

U. S. Environmental Data Service, 1971, Storm data and unusual weather phenomena: Storm Data, v. 13, no. 8, p. 144-165.

Walker, P. N., 1971, Flow characteristics of Maryland streams: Maryland Geol. Survey Rept. of Inv. 16, 160 p.

Station Descriptions

Descriptions of the stream-gaging stations and miscellaneous sites for which peak flow data appear in this report are given on the following pages. The descriptions include location, drainage area, and type of gage at each site. The number preceding the station name is a reference number that can be used to facilitate locating a station on figure 1 or in table 1. The number in parentheses after the station name is a U. S. Geological Survey identification number.

1 MATSON RUN AT WILMINGTON, DEL. (01477790).

LOCATION.--Lat 39°45'58", long 75°31'36", New Castle County, at Lea Boulevard, in Wilmington.

DRAINAGE AREA.--0.94 sq mi.

GAGE.--No gage, miscellaneous site.

2 SHELLPOT CREEK AT WILMINGTON, DEL. (01477800).

LOCATION.--Lat 39°45'39", long 75°31'10", New Castle County, 100 ft east of intersection of Forty-fourth and Pine Streets, in Clifton Park in Wilmington.

DRAINAGE AREA.--7.46 sq mi.

GAGE.--Continuous record.

3 WHITE CLAY CREEK NEAR NEWARK, DEL. (01479000).

LOCATION.--Lat 39°42'01", long 75°41'00", New Castle County, 300 ft upstream from Baltimore and Ohio Railroad bridge, 3.5 miles east of Newark.

DRAINAGE AREA.--87.8 sq mi.

GAGE.--Continuous record.

4 RED CLAY CREEK AT WOODDALE, DEL. (01480000).

LOCATION.--Lat 39°45'52", long 75°38'08", New Castle County, at State Highway 48, 0.3 mile south of Wooddale.

DRAINAGE AREA.--47.0 sq mi.

GAGE.--Continuous record.

5 LITTLE MILL CREEK AT ELSMERE, DEL. (01480100).

LOCATION.--Lat 39°44'05", long 75°35'14", New Castle County, at North duPont Road in Elsmere.

DRAINAGE AREA.--6.70 sq mi.

GAGE.--Continuous record.

6 BRANDYWINE CREEK TRIBUTARY NEAR CENTERVILLE, DEL. (01481200).

LOCATION.--Lat 39°50'08", long 75°35'57", New Castle County, at State Highway 100, 1.4 miles northeast of Centerville.

DRAINAGE AREA.--0.97 sq mi.

GAGE.--Crest stage.

7 WILLOW RUN AT ROCKLAND, DEL. (01481450).

LOCATION.--Lat 39°47'32", long 75°33'16", New Castle County, at Country Club Drive, 1.0 mile east of Rockland.

DRAINAGE AREA.--0.37 sq mi.

GAGE.--Crest stage.

8 BRANDYWINE CREEK AT WILMINGTON, DEL. (01481500).

LOCATION.--Lat 39°46'09", long 75°34'25", New Castle County, in Rockford Park, 0.2 mile downstream from Henry Clay Bridge in Wilmington.

DRAINAGE AREA.--314 sq mi.

GAGE.--Continuous record.

9 BLACKBIRD CREEK AT BLACKBIRD, DEL. (01483200).

LOCATION.--Lat 39°21'58", Long 75°40'10", New Castle County, at highway bridge, 0.6 mile southwest of Blackbird, and 5.6 miles northwest of Smyrna.

DRAINAGE AREA.--3.85 sq mi.

GAGE.--Continuous record.

10 BEAVERDAM CREEK NEAR MILTON, DEL. (01484270).

LOCATION.--Lat 38°45'41", long 75°16'03", Sussex County, at Road No. 88, 2.5 miles east of Milton.

DRAINAGE AREA.--6.10 sq mi.

GAGE.--Flood hydrograph.

11 SOWBRIDGE BRANCH NEAR MILTON, DEL. (01484300).

LOCATION.--Lat 38°48'51", long 75°19'39", Sussex County, at highway bridge, 1 mile downstream from Reynolds Pond, and 2.5 miles north of Milton.

DRAINAGE AREA.--7.08 sq mi.

GAGE.--Continuous record.

12 STOCKLEY BRANCH AT STOCKLEY, DEL. (01484500).

LOCATION.--Lat 38°38'19", long 75°20'31", Sussex County, at highway bridge in Stockley, 4.4 miles southeast of Georgetown.

DRAINAGE AREA.--5.24 sq mi.

GAGE.--Continuous record.

13 OLDTOWN BRANCH AT GOLDSBORO, MD. (01490800).

LOCATION.--Lat 39°01'23", long 75°47'16", Caroline County, at State Highway 313, 0.7 mile south of Goldsboro.

DRAINAGE AREA.--3.9 sq mi.

GAGE.--Crest stage.

14 BEAVERDAM BRANCH AT MATTHEWS, MD. (01492000).

LOCATION.--Lat 38°48'41", long 75°58'15", Talbot County, at State Highway 328, 1 mile west of Matthews.

DRAINAGE AREA.--5.85 sq mi.

GAGE.--Continuous record.

15 UNICORN BRANCH NEAR MILLINGTON, MD. (01493000).

LOCATION.--Lat 39°14'59", long 75°51'40", Kent County, at State Highway 313, 1.4 miles southwest of Millington.

DRAINAGE AREA.--22.3 sq mi.

GAGE.--Continuous record.

16 MORGAN CREEK NEAR KENNEDYVILLE, MD. (01493500).

LOCATION.--Lat 39°16'48", long 76°00'54", Kent County, 200 ft upstream from highway bridge, 2 miles southwest of Kennedyville, and 4.5 miles upstream from mouth.

DRAINAGE AREA.--10.5 sq mi.

GAGE.--Continuous record.

17 BROWN'S BRANCH TRIBUTARY NEAR CHURCH HILL, MD. (01494020).

LOCATION.--Lat 39°10'05", long 75°58'41", Queen Annes County, at John Powell Road, 1.8 miles north of Church Hill.

DRAINAGE AREA.--1.7 sq mi.

GAGE.--Crest stage.

18 NORTHEAST CREEK AT LESLIE, MD. (01496000).

LOCATION.--Lat 39° 37'38", long 75°56'40", Cecil County, at highway bridge, 0.7 mile northeast of Leslie, and 1.5 miles southeast of Bay View.

DRAINAGE AREA.--24.3 sq mi.

GAGE.--Continuous record.

19 PRINCIPIO CREEK NEAR PRINCIPIO FURNACE, MD. (01496200).

LOCATION.--Lat 39°37'34", long 76°02'27", Cecil County, 55 ft downstream from highway bridge on Belvedere Road, 3.5 miles north of Principio Furnace.

DRAINAGE AREA.--9.03 sq mi.

GAGE.--Continuous record.

20 OCTORARO CREEK NEAR RISING SUN, MD. (01578500).

LOCATION.--Lat 39°41'24", long 76°07'43", Cecil County, at Porter Bridge, 300 ft downstream from Love Run, and 3.5 miles west of Rising Sun.

DRAINAGE AREA.--193 sq mi.

GAGE.--Continuous record.

21 BASIN RUN AT LIBERTY GROVE, MD. (01579000).

LOCATION.--Lat 39°39'30", long 76°06'10", Cecil County, 100 ft upstream from highway bridge, 0.9 mile east of Liberty Grove, and 1.0 mile southwest of Colora.

DRAINAGE AREA.--5.31 sq mi.

GAGE.--Flood hydrograph.

22 DEER CREEK AT ROCKS, MD. (01580000).

LOCATION.--Lat 39°37'49", long 76°24'13", Harford County, 0.3 mile upstream from highway bridge on Cherry Hill Road, 0.8 mile southeast of Rocks.

DRAINAGE AREA.--94.4 sq mi.

GAGE.--Continuous record.

23 DEER CREEK NEAR KALMIA, MD. (01580200).

LOCATION.--Lat 39°37'16", long 76°17'57", Harford County, at U. S. Highway 1, 1 mile north of Kalmia.

DRAINAGE AREA.--125 sq mi.

GAGE.--Continuous record.

24 BYNUM RUN AT BEL AIR, MD. (01581500).

LOCATION.--Lat 39°32'30", long 76°19'50", Harford County, at State Highway 22, 1.0 mile east of Bel Air.

DRAINAGE AREA.--8.52 sq mi.

GAGE.--Crest stage.

25 WINTERS RUN NEAR BENSON, MD. (01581700).

LOCATION.--Lat 39°31'12", long 76°22'24", Harford County, at U. S. Highway 1, 1.2 miles northeast of Benson.

DRAINAGE AREA.--34.8 sq mi.

GAGE.--Continuous record.

26 LITTLE FALLS AT BLUE MOUNT, MD. (01582000).

LOCATION.--Lat 39°36'16", long 76°37'16", Baltimore County, at Pennsylvania Railroad bridge, 0.2 mile north of Blue Mount, and 1.2 miles south of White Hall.

DRAINAGE AREA.--52.9 sq mi.

GAGE.--Continuous record.

27 PINEY CREEK NEAR HEREFORD, MD. (01582510).

LOCATION.--Lat 39°34'38", long 76°40'39", Baltimore County, at Interstate Highway 83, 1.1 miles southwest of Hereford.

DRAINAGE AREA.--1.5 sq mi.

GAGE.--Crest stage.

28 WESTERN RUN TRIBUTARY AT WESTERN RUN, MD. (01583495).

LOCATION.--Lat 39°31'01", long 76°41'04", Baltimore County, at Western Run Road, 0.3 mile northwest of Western Run, and 3.0 miles northwest of Cockeysville.

DRAINAGE AREA.--0.26 sq mi.

GAGE.--Crest stage.

29 WESTERN RUN AT WESTERN RUN, MD. (01583500).

LOCATION.--Lat 39°30'38", long 76°40'37", Baltimore County, 100 ft downstream from bridge on Western Run Road, 0.3 mile southeast of Western Run.

DRAINAGE AREA.--59.8 sq mi.

GAGE.--Continuous record.

30 BAISMAN RUN AT BROADMOOR, MD. (01583580).

LOCATION.--Lat 39°28'45", long 76°40'42", Baltimore County, at Ivy Hill Road, 0.6 mile southwest of Broadmoor.

DRAINAGE AREA.--1.47 sq mi.

GAGE.--Flood hydrograph.

31 BEAN CREEK AT LOVELEY, MD. (01584045).

LOCATION.--Lat 39°24'37", long 76°24'50", Baltimore County, at Interstate Highway 95, 0.7 mile northwest of Loveley.

DRAINAGE AREA.--1.0 sq mi.

GAGE.--No gage, miscellaneous site.

32 GUNPOWDER FALLS AT LOVELEY, MD. (01584050).

LOCATION.--Lat 39°24'48", long 76°24'12", Baltimore County, 900 ft downstream from bridge on State Highway 7, 0.5 mile north of Loveley.

DRAINAGE AREA.--347 sq mi.

GAGE.--No gage, miscellaneous site.

33 LITTLE GUNPOWDER FALLS AT LAUREL BROOK, MD. (01584500).

LOCATION.--Lat 39°30'18", long 76°25'56", Baltimore County, 750 ft upstream from bridge on Bottom Road, 0.4 mile southwest of Laurel Brook railroad station.

DRAINAGE AREA.--36.1 sq mi.

GAGE.--Crest stage.

34 LITTLE GUNPOWDER FALLS AT GUNPOWDER, MD. (01585045).

LOCATION.--Lat 39°25'28", long 76°22'41", Baltimore County, at State Highway 7, 0.9 mile northeast of Gunpowder.

DRAINAGE AREA.--55.3 sq mi.

GAGE.--No gage, miscellaneous site.

35 WHITEMARSH RUN AT WHITE MARSH, MD. (01585100).

LOCATION.--Lat 39°22'15", long 76°26'46", Baltimore County, at State Highway 7, 1 mile southwest of White Marsh.

DRAINAGE AREA.--7.61 sq mi.

GAGE.--Continuous record.

36 WEST BRANCH HERRING RUN AT IDLEWYLDE, MD. (01585200)

LOCATION.--Lat 39°22'25", long 76°35'05", Baltimore County, at Regester Avenue, in Idlewylde.

DRAINAGE AREA.--2.13 sq mi.

GAGE.--Continuous record.

37 HERRING RUN AT MONTABELLO PARK, MD. (01585220).

LOCATION.--Lat 39°21'14", long 76°34'25", Baltimore City, at Echodale Avenue, 0.7 mile north of Montebello Park.

DRAINAGE AREA.--8.0 sq mi.

GAGE.--No gage, miscellaneous site.

38 STEMMERS RUN AT ROSSVILLE, MD. (01585300).

LOCATION.--Lat 39°20'20", long 76°29'15", Baltimore County, at State Highway 7, in Rossville.

DRAINAGE AREA.--4.94 sq mi.

GAGE.--Continuous record.

39 BRIEN RUN NEAR MIDDLE RIVER, MD. (01585390).

LOCATION.--Lat 39°20'20", long 76°27'44", Baltimore County, at State Highway 700, 1.1 miles northwest of Middle River.

DRAINAGE AREA.--0.72 sq mi.

GAGE.--No gage, miscellaneous site.

40 BRIEN RUN AT STEMMERS RUN, MD. (01585400).

LOCATION.--Lat 39°20'01", long 76°28'23", Baltimore County, 0.2 mile upstream from mouth, and 0.3 mile north of Stemmers Run.

DRAINAGE AREA.--1.97 sq mi.

GAGE.--Continuous record.

41 NORTH BRANCH PATAPSCO RIVER AT CEDARHURST, MD. (01586000).

LOCATION.--Lat 39°30'00", long 76°53'00", Carroll County, in Cedarhurst, 0.8 mile downstream from Roaring Run.

DRAINAGE AREA.--56.6 sq mi.

GAGE.--Continuous record.

42 HAY MEADOW BRANCH TRIBUTARY AT POPLAR SPRINGS, MD. (01587050).

LOCATION.--Lat 39°20'55", long 77°06'02", Howard County, at U. S. Highway 40, 0.4 mile northwest of Poplar Springs, and 2.2 miles southwest of Woodbine.

DRAINAGE AREA.--0.54 sq mi.

GAGE.--Crest stage.

43 SOUTH BRANCH PATAPSCO RIVER AT HENRYTON, MD. (01587500).

LOCATION.--Lat 39°21'05", long 76°54'50", Howard County, at Henryton Road, in Henryton.

DRAINAGE AREA.--64.4 sq mi.

GAGE.--Continuous record.

44 PINEY RUN NEAR SYKESVILLE, MD. (01588000).

LOCATION.--Lat 39°22'55", long 76°58'00", Carroll County, 75 ft below bridge at State Highway 32, $1\frac{1}{4}$ miles north of Sykesville.

DRAINAGE AREA.--11.4 sq mi.

GAGE.--Crest stage.

45 PATAPSCO RIVER AT HOLLOFIELD, MD. (01589000).

LOCATION.--Lat 39°18'36", long 76°47'39", Howard County, at highway bridge, in Hollofield, 3.0 miles north of Ellicott City.

DRAINAGE AREA.--285 sq mi.

GAGE.--Continuous record.

46 EAST BRANCH HERBERT RUN AT ARBUTUS, MD. (01589100).

LOCATION.--Lat 39°14'24", long 76°41'33", Baltimore County, at Tom Day Boulevard in Arbutus.

DRAINAGE AREA.--2.47 sq mi.

GAGE.--Continuous record.

47 GWYNNS FALLS NEAR OWINGS MILLS, MD. (01589200).

LOCATION.--Lat 39°26'16", long 76°46'57", Baltimore County, at bridge on railroad siding, 1.2 miles north of Owings Mills.

DRAINAGE AREA.--4.90 sq mi.

GAGE.--Continuous record.

48 GWYNNS FALLS AT VILLA NOVA, MD. (01589300).

LOCATION.--Lat 39°20'45", long 76°44'01", Baltimore County, 300 ft downstream from bridge on Essex Road, in Villa Nova.

DRAINAGE AREA.--32.5 sq mi.

GAGE.--Continuous record.

49 DEAD RUN AT FRANKLINTOWN, MD. (01589330).

LOCATION.--Lat 39°18'40", long 76°43'02", Baltimore County, at Colonial Road, in Franklintown.

DRAINAGE AREA.--5.52 sq mi.

GAGE.--Continuous record.

50 JONES FALLS AT SORRENTO, MD. (01589440).

LOCATION.--Lat 39°23'30", long 76°39'42", Baltimore County, 0.3 mile downstream from bridge on State Highway 25, 0.4 mile downstream from Slaughterhouse Branch and Sorrento.

DRAINAGE AREA.--25.2 sq mi.

GAGE.--Continuous record.

51 PATUXENT RIVER NEAR UNITY, MD. (01591000).

LOCATION.--Lat 39°14'18", long 77°03'23", Montgomery County, at State Highway 97, 1.1 miles northeast of Unity.

DRAINAGE AREA.--34.8 sq mi.

GAGE.--Continuous record.

52 PATUXENT RIVER NEAR LAUREL, MD. (01592500).

LOCATION.--Lat 39°06'56", long 76°52'27", Prince Georges County, 600 ft downstream from Rocky Gorge Dam, 1.3 miles northwest of Laurel.

DRAINAGE AREA.--132 sq mi.

GAGE.--Continuous record.

53 LITTLE PATUXENT RIVER TRIBUTARY AT GUILFORD DOWNS, MD. (01593350).

LOCATION.--Lat 39°13'39", long 76°50'41", Howard County, at U. S. Highway 29, in Guilford Downs, and 4.1 miles north of Guilford.

DRAINAGE AREA.--0.95 sq mi.

GAGE.--Crest stage.

54 LITTLE PATUXENT RIVER AT GUILFORD, MD. (01593500).

LOCATION.--Lat 39°10'04", long 76°51'07", Howard County, 75 ft upstream from bridge on State Highway 32, 1 mile west of Guilford.

DRAINAGE AREA.--38.0 sq mi.

GAGE.--Continuous record.

55 WESTERN BRANCH NEAR LARGO, MD. (01594500).

LOCATION.--Lat 38°52'34", long 76°47'54", Prince Georges County, 200 ft upstream from culvert on State Highway 202, 2.3 miles southeast of Largo.

DRAINAGE AREA.--30.2 sq mi.

GAGE.--Continuous record.

56 LITTLE PIPE CREEK AT AVONDALE, MD. (01640000).

LOCATION.--Lat 39°33'40", long 77°02'38", Carroll County, at private bridge, 0.1 mile downstream from Copps Branch, and $\frac{1}{2}$ mile northwest of Avondale.

DRAINAGE AREA.--8.10 sq mi.

GAGE.--Crest stage.

57 DOLLYHYDE CREEK AT LIBERTYTOWN, MD. (01642400).

LOCATION.--Lat 39°28'55", long 77°13'38", Frederick County, at State Highway 26, 0.9 mile east of Libertytown.

DRAINAGE AREA.--2.7 sq mi.

GAGE.--Crest stage.

58 LINGANORE CREEK NEAR FREDERICK, MD. (01642500).

LOCATION.--Lat 39°24'55", long 77°20'00", Frederick County, 2.4 miles upstream from mouth, and 4 miles east of Frederick.

DRAINAGE AREA.--82.3 sq mi.

GAGE.--Continuous record.

59 BENNETT CREEK AT PARK MILLS, MD. (01643500).

LOCATION.--Lat 39°17'40", long 77°24'30", Frederick County, 75 ft downstream from highway bridge, 0.2 mile south of Park Mills, and 3.7 miles southwest of Urbana.

DRAINAGE AREA.--62.8 sq mi.

GAGE.--Continuous record.

60 BUCKLODGE BRANCH TRIBUTARY NEAR BARNESVILLE, MD. (01644420).

LOCATION.--Lat 39°12'42", long 77°21'02", Montgomery County, at Barnesville Road, 0.6 mile upstream from mouth, and 1.6 miles southeast of Barnesville.

DRAINAGE AREA.--0.27 sq mi.

GAGE.--Crest stage.

61 SENECA CREEK AT DAWSONVILLE, MD. (01645000).

LOCATION.--Lat 39°07'41", long 77°20'13", Montgomery County, 60 ft downstream from bridge on State Highway 28, half a mile east of Dawsonville.

DRAINAGE AREA.--101 sq mi.

GAGE.--Continuous record.

62 WATTS BRANCH AT ROCKVILLE, MD. (01645200).

LOCATION.--Lat 39°05'03", long 77°10'38", Montgomery County, 0.2 mile south of State Highway 28, 1.3 miles west of post office in Rockville, and 9.4 miles upstream from mouth.

DRAINAGE AREA.--3.70 sq mi.

GAGE.--Continuous record.

63 WILLIAMSBURG RUN NEAR OLNEY, MD. (01647685).

LOCATION.--Lat 39°08'32", long 77°05'48", Montgomery County, 200 ft downstream from private bridge, 0.2 mile downstream from Cashell Road, and 1.8 miles southwest of Olney.

DRAINAGE AREA.--2.25 sq mi.

GAGE.--Continuous record.

64 NORTH BRANCH ROCK CREEK NEAR NORBECK, MD. (01647720).

LOCATION.--Lat 39°06'59", long 77°06'09", Montgomery County, 550 ft downstream from bridge on State Highway 115, 1.5 miles northwest of Norbeck.

DRAINAGE AREA.--9.73 sq mi.

GAGE.--Continuous record.

65 MANOR RUN NEAR NORBECK, MD. (01647725).

LOCATION.--Lat 36°06'36", long 77° 06'00" Montgomery County, 100 ft downstream from ford on farm lane, 0.5 mile upstream from mouth, and 1.2 miles west of Norbeck.

DRAINAGE AREA.--1.01 sq mi.

GAGE.--Continuous record.

66 ROCK CREEK AT SHERRILL DRIVE, WASHINGTON, D. C. (01648000).

LOCATION.--Lat 38°58'21", long 77°02'25", District of Columbia, 125 ft downstream from new Sherrill Drive Bridge, in Rock Creek Park in Washington.

DRAINAGE AREA.--62.2 sq mi.

GAGE.--Continuous record.

67 NORTHEAST BRANCH ANACOSTIA RIVER AT RIVERDALE, MD. (01649500)

LOCATION.--Lat 38°57'37", long 76°55'34", Prince Georges County, 200 ft downstream from bridge on Riverdale Road, in Riverdale.

DRAINAGE AREA.--72.8 sq mi.

GAGE.--Continuous record.

68 NORTHWEST BRANCH ANACOSTIA RIVER AT NORWOOD, MD. (01650050).

LOCATION.--Lat 39°07'36", long 77°01'15", Montgomery County, at Ednor Road, 0.4 mile east of Norwood.

DRAINAGE AREA.--2.45 sq mi.

GAGE.--Continuous Record.

69 NURSERY RUN AT CLOVERLY, MD. (01650085).

LOCATION.--Lat 39°07'05", long 77°00'24", Montgomery County, 300 ft upstream from culvert on Bryants Nursery Road, 0.8 mile northwest of Cloverly, and 2.4 miles southeast of Sandy Spring.

DRAINAGE AREA.--0.35 sq mi.

GAGE.--Continuous record.

70 BATCHELLORS RUN AT OAKDALE, MD. (01650190).

LOCATION.--Lat 39°07'21", long 77°03'37", Montgomery County, at Batchellors Forest Road, 0.8 mile southeast of Oakdale, and 1.2 miles northeast of Norbeck.

DRAINAGE AREA.--0.47 sq mi.

GAGE.--Flood hydrograph.

71 BEL PRE CREEK AT LAYHILL, MD. (01650450).

LOCATION.--Lat 39°05'27", long 77°03'11", Montgomery County, 130 ft upstream from bridge on Bel Pre Road, 0.5 mile west of Layhill, and 1.8 miles southeast of Norbeck.

DRAINAGE AREA.--1.69 sq mi.

GAGE.--Continuous record.

72 LUTES RUN AT LUTES, MD. (01650470).

LOCATION.--Lat 39°04'24", long 77°03'08", Montgomery County, at outlet of stream enclosure, 70 ft downstream from Lutes Lane, in Lutes, 0.2 mile upstream from mouth, and 2.7 miles west of Colesville.

DRAINAGE AREA.--0.47 sq mi.

GAGE.--Flood hydrograph.

73 NORTHWEST BRANCH ANACOSTIA RIVER NEAR COLESVILLE, MD. (01650500).

LOCATION.--Lat 39°03'55", long 77°01'48", Montgomery County, 400 ft upstream from bridge on State Highway 183, 1.5 miles southwest of Colesville.

DRAINAGE AREA.--21.1 sq mi.

GAGE.--Continuous record.

74 NORTHWEST BRANCH ANACOSTIA RIVER NEAR HYATTSVILLE, MD. (01651000).

LOCATION.--Lat 38°57'09", long 76°58'00", Prince Georges County, at Queens Chapel Road, 1 mi west of Hyattsville.

DRAINAGE AREA.--49.4 sq mi.

GAGE.--Continuous record.

75 HENSON CREEK AT OXON HILL, MD. (01653500).

LOCATION.--Lat 38°47'16", long 76°58'42", Prince Georges County, 100 ft downstream from bridg on Tucker Road, 1.0 mile south of Oxon Hill.

DRAINAGE AREA.--16.7 sq mi.

GAGE.--Continuous record.

76 PISCATAWAY CREEK AT PISCATAWAY, MD. (01653600).

LOCATION.--Lat 38°42'20", long 76°58'00", Prince Georges County, 70 ft upstream from bridge on State Highway 223, in Piscataway.

DRAINAGE AREA.--39.5 sq mi.

GAGE.--Continuous record.

77 CLARK RUN NEAR BEL ALTON, MD. (01660930).

LOCATION.--38°28'21", long 76°57'22", Charles County, at Newtown Road, 1.5 miles northeast of Bel Alton.

DRAINAGE AREA.--10.4 sq mi.

GAGE.--Crest stage.

78 TOLIVER RUN TRIBUTARY NEAR HOYES RUN, MD. (03075600).

LOCATION.--Lat 39°29'39", long 79°25'14", Garrett County, at Swallow Falls Road, 100 ft upstream from mouth, and 2.4 miles south of Hoyes Run.

DRAINAGE AREA.--0.53 sq mi.

GAGE.--Crest stage.

79 BEAR CREEK AT FRIENDSVILLE, MD. (03076600).

LOCATION.--Lat 39°39'22", long 79°23'41", Garrett County, 0.2 mile downstream from bridge on Accident - Friendsville Road, 0.8 mile southeast of Friendsville.

DRAINAGE AREA.--48.9 sq mi.

GAGE.--Continuous record.

80 NORTH BRANCH CASSELMAN TRIBUTARY AT FOXTOWN, MD. (03077700).

LOCATION.--Lat 39°37'58", long 79°14'36", Garrett County, at Dunghill Road, at Foxtown, and 3.7 miles east of Accident.

DRAINAGE AREA.--1.0 sq mi.

GAGE.--Crest stage.

81 CASSELMAN RIVER AT GRANTSVILLE, MD. (03078000).

LOCATION.--Lat 39°42'08", long 79°08'12", Garrett County, at highway bridge, 0.7 mile downstream from U. S. Highway 40, and 1 mile northeast of Grantsville.

DRAINAGE AREA.--62.5 sq mi.

GAGE.--Continuous record.

USGS LIBRARY - RESTON
3 1818 00241389 4