Summary of Floods in the United States During 1950

Floods of 1950

Prepared under the direction of J. V. B. WELLS, *Chief, Surface Water Branch*

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1137-I

Prepared in cooperation with various Federal, State, and local agencies

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1954

UNITED STATES DEPARTMENT OF THE INTERIOR

Douglas McKay, *Secretary*

GEOLOGICAL SURVEY

W. E. Wrather, *Director*

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 20 cents (paper cover)

PREFACE

This report on the summary of floods in the United States during 1950 was prepared by the Geological Survey, Water Resources Division, C. G. Paulsen, chief, under the direction of J. V. B. Wells, chief, Surface Water Branch.

The continuing investigation of surface-water resources in the areas covered by this report is performed by the Geological Survey in cooperation with State agencies, the Corps of Engineers, the Bureau of Reclamation, and other Federal or local agencies.

The base data and information were collected by the district offices of the Surface Water Branch, in those districts where the floods occurred.

Acknowledgement is made to the following agencies for data or information furnished: the Corps of Engineers; the Weather Bureau; the Tennessee Valley Authority; State, county, and municipal officials; the Red Cross; and many individuals.

CONTENTS

ILLUSTRATIONS

FLOODS OF 1950

SUMMARY OF FLOODS IN THE UNITED STATES DURING 1950

INTRODUCTION

The purpose of this summary chapter to the series "Floods of 1950" is to assemble into a single volume information relating to all known severe floods in the United States, whether local or of wide areal extent. For floods that are described in previous chapters of Water-Supply Paper 1137, in other publications of the Geological Survey, or in reports prepared by other Federal and State agencies, only very brief mention including references to the reports containing detailed descriptions, will be given here. Local floods for which no individual reports have been prepared are briefly described.

The year 1950 was one of extensive floods throughout the country. In addition to those that are reported in the preceding chapters of Water-Supply Paper 1137, many severe and destructive floods occurred in small areas. According to a summary of flood losses prepared by the Weather Bureau from all available sources, these losses in the United States in 1950 amounted to $176 million; 93 lives were also lost.

Figure 130 is a map of the United States on which the areas covered by chapters in this series are delineated.

A summary of flood peaks, listed alphabetically by States, for the floods that are not reported in the individual chapters of Water-Supply Paper 1137 is given. (See table, p. 980-989.)

SUMMARY OF FLOODS

California

October-November, Northwestern California

The floods of October-November in northwestern California are described under the section on "Oregon" (p. 973).

November-December, Central Valley Basin

The floods of November-December in the Central Valley basin were the greatest since the turn of the century in most parts of the basin and probably were exceeded in the lower San Joaquin River basin only by the historic flood of 1862. Outstanding features of

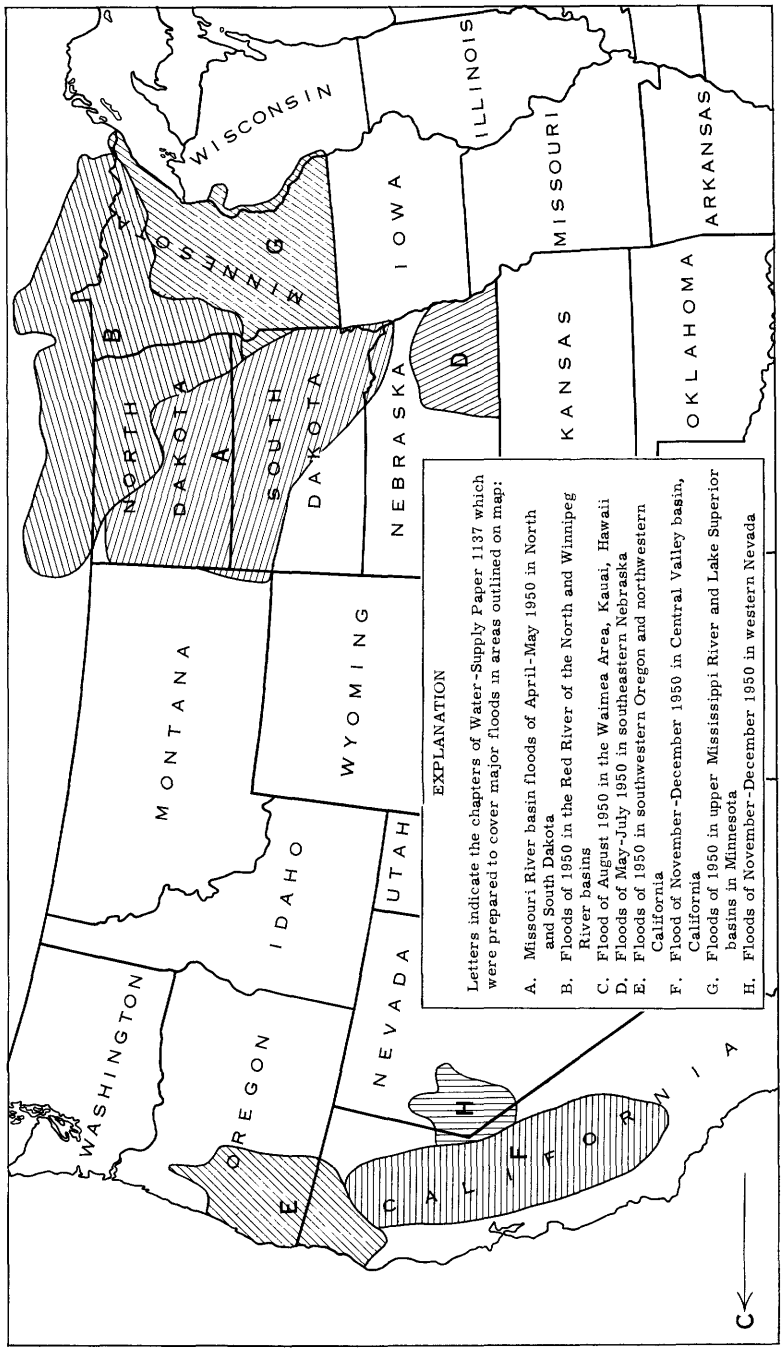

Figure 130.--Map of the United States, showing outline of areas for which reports on floods were prepared, 1950.

the floods were their unprecedented occurrence so early in the winter flood season, their magnitude in both peak and volume in most major tributaries, and the occurrence of a succession of near-peak flows within a period of 3 weeks. A comprehensive report on these floods is published in Water-Supply Paper 1137-F, Floods of November-December 1950 in Central Valley basin, California.

Connecticut

A destructive combination of wind, rain, flood, and tide struck the northeastern section of the country, including Connecticut, on the night of November 25, 1950. The storm was described by the Weather Bureau in "Climatological Data" for the month of November 1950, as "a suddenly intensified disturbance from the Southern Appalachian Highlands [that] moved north and northwestward, becoming what was defined as the most violent storm of its kind on record." The Weather Bureau stated that although the stormwinds were of hurricane force, the storm could not technically be termed a hurricane because it was not of tropical origin. Observations at New Haven, Hartford, and Putnam showed gust wind velocities as much as 77, 100, and 92 mph., respectively, and a fastest wind-mile at New Haven and Hartford of 57 and 77 mph., respectively. An unusually high average wind velocity of 38.2 mph was recorded at Hartford for the calendar day of November 25.

Damage from storm and tide was extensive along the southern Connecticut coast, and from storm and flood at many places inland. The Weather Bureau reported that as the sustained gales veered slowly from east through southeast and south, they became directly onshore at some time everywhere along the coast. Coastal highways, seawalls, cottages, small craft, and several large vessels suffered heavy damages. Inland for several miles the gales were just as violent as along the coast. Power, light, and telephone blackouts afflicted many communities; flooding streams, particularly in the northwest quarter of the State, caused considerable havoc in low-lying areas. The Weather Bureau reported an estimated damage from the storm, tide, and flood in New England alone of more than $15 million, and a death toll of 9 attributable to the weather. Part of the State was declared a "disaster area" by the Reconstruction Finance Corporation, making industries eligible for rehabilitation loans.

No flood records were broken on Connecticut streams in this storm, but major rises occurred on the Farmington and Naugatuck Rivers and most of their tributaries. Elsewhere in the State the floods were moderately high, except in the southeast quarter where they were minor only. The Connecticut River at Hartford crested on November 28 at 17 feet, a relatively low flood stage. The table shows stages and discharges at gaging stations where major rises occurred.

Hawaii

A severe flood occurred in the Waimea River basin on August 15-18 as a result of torrential rains associated with the only typhoon ever recorded in the proximity of the Hawaiian Archipelego. A report on the flood, including a description of the storm, is contained in Water-Supply Paper 1137-C, Flood of August 1950 in the Waimea Area, Kauai, Hawaii.

Idaho

Kootenai valley drainage districts in northern Idaho suffered damage from high stages of Kootenai River during June. The stage at Bonners Ferry was above 30 feet for 11 days, June 16-26, and about 4,600 acres of cropland was submerged because of dike failures on districts 2, 9, 12, and 14, and 3 small tracts.

A maximum daily discharge of 90,100 cfs occurred at Bonners Ferry on June 22 and 23, and the maximum gage height of 33.98 feet (1,776.98 feet above mean sea level) on June 24.

The flood was caused by melting snow at high altitudes and delay of runoff that normally occurs during April and May, resulting in a concentration of runoff in June.

Louisiana

February

Extremely heavy rains occurred over the Calcasieu River basin on February 12 and 13, producing serious floods throughout the basin. Twenty-four-hour totals of 7.70 and 5.72 inches fell at DeRidder and Leesville, respectively.

Many roads were blocked for short periods. The greatest damage was in the vicinity of Oakdale where homes and sawmills were flooded, and people were marooned in their homes.

New records of maximum stage and discharge were established at four stations in the Calcasieu River basin (see table).

June

On June 2 and 3, heavy rains fell in the western and north-central parts of Louisiana. The heaviest falls were recorded in the parishes along the Texas border and in Evangeline Parish at Ville Platte.

Several Sabine Parish towns, including Many, the parish seat, were almost isolated as overflow from small streams inundated U. S. Highway 71 and other roads in the Parish. The highway was under water at many locations between Many and Leesville and northward to Mansfield. The town of Zwolle was almost surrounded by floodwaters. Many highway bridges and fills were damaged and there was considerable overflow of agricultural land.

In the area where flooding was worst, there were only two stream-gaging stations: Bayou Anacoco near Leesville and Bayou San Miguel near Zwolle, both having records beginning in September 1948. At these stations the peak discharge was much greater than that established previously during the short period of record. Information from local residents and precipitation and flood discharge data indicate that the flood was an outstanding event in the area, having a frequency of possibly once in 15 to 20 years. At other stations in the general area of the storm, no new maxima of record were approached except at Hickory Branch near Kernan, where the flood was the second highest in a period of record beginning in August 1945.

Maine

Heavy rainfall during the period November 26-29 produced very heavy runoff in all sections of Maine. Machias River at Whitneyville, a gaging station with 39 years of record, reached a peak discharge of 11,800 cfs on November 28, exceeding the maximum flood previously known by 300 cfs. Flow of Piscataquis River near Dover-Foxcroft approached the maximum previously established in April 1923. During the 4-day period, precipitation ranged from $2\frac{1}{2}$ to 6 inches over the State--a maximum of 6.59 inches being recorded at Greenville. The total rainfall for November ranged from a low of 5.14 inches at Middle Dam to a high of 12.61 inches at Woodland.

During the first 13 days of December fairly heavy general rains, falling on ground already wet from the November storm, caused additional flooding, particularly in eastern Maine. East Machias River near East Machias reached a discharge of 3,660 cfs on December 15, exceeding that established in March 1936 by 20 percent. Meduxnekeag and St. Croix Rivers attained flows somewhat less than maxima previously established. Several washouts occurred on the main lines of railroads in the eastern part of the State, halting traffic until water levels receded. At Woodland 6.26 inches of rainfall was measured during the 13-day period. Flood stages and discharges at 4 gaging stations in eastern Maine are included in the table.

Maryland

Multiple flood peaks of varying magnitude occurred at gaging stations in east-central Maryland as a result of a narrow storm belt running northwestward through Washington, D. C., and Baltimore, Md., on September 10-11, 1950.

The initial early morning peak on September 10 and also the highest unit runoff resulted from a storm concentrated over the line between Charles and St. Marys Counties in southern Maryland. A rainfall reported to be 6 inches or more produced a peak discharge of 729 cfs per square mile at 1:20 a.m. on September 10, from the 10.7 square-mile drainage area on Chaptico Creek at the Chaptico gaging station. The road between Chaptico and Mechanicsville was closed at the Chaptico gage when floodwaters inundated the road for a distance of 1,000 feet and as much as 5 feet in depth. This peak discharge undoubtedly had a recurrence interval of 50 years or more, and the rainfall was of record proportions. Peak discharge was determined by the slope-area method.

A second storm 17 hours or more later and of much lower intensity occurred in Howard and Baltimore Counties, producing peak-of-the-year discharges at most gaging stations on the evening of September 10. At many points streams overflowed their banks; at one time all major highways into Baltimore were reported under water. Peak discharge from the 52.9 square-mile drainage area on Little Falls at Blue Mount amounted to 108 cfs per square mile, based on contracted-opening studies. Noteworthy peaks at 6 gaging stations are shown in the table.

A third but smaller flood peak occurred on the morning of September 11 in the belt south and east of Washington, D. C., in a more sparsely settled region. This peak had no outstanding characteristics and caused practically no damage.

Michigan

Heavy rains during April caused flooding in the St. Joseph River basin (tributary to Lake Michigan) in the southwestern part of the southern peninsula. Previous maxima were exceeded at Mottville and Niles on the main stem of St. Joseph River and at Coldwater on East Branch Coldwater River (see table). These stations have been in operation for 26, 18, and 12 years, respectively.

On the St. Joseph River two peaks of nearly equal magnitude occurred during the month, the first one during the period April 5-7; the second, April 27-28. At the Mottville station both peaks exceeded the previous maximum experienced during 26 years of record. Another feature of the floods was the unusually high mean flow for the month. At the Niles station the mean flow for April

1950 was 26 percent greater than that previously experienced.

No information on flood damage is available.

Minnesota

April-June, Mississippi River Basin

Floods of great magnitude occurred in Minnesota on the Mississippi River and tributaries, and on streams tributary to Lake Superior during the months April to June. They were caused by an unusual combination of high soil-moisture content, very heavy snow cover, delayed snowmelt, and heavy rain during the flood period. A detailed report on these floods is presented in Water-Supply Paper 1137-G, Floods of 1950 in upper Mississippi River and Lake Superior basins in Minnesota.

April-July, Red River of the North Basin

The floods of April-July in the Red River of the North basin are described under the section on "North Dakota" (p. 970).

Mississippi

Rains totaling nearly 10 inches fell January 4 and 5 along the southeast rim of the Pearl River basin in Mississippi. The storm was centered along a northeast-southwest axis covering Tuscolameta Creek in the upper Pearl River basin and Strong River in the south-central Pearl River basin. Northwest of this axis, rainfall was quite heavy and all parts of the State in that area received at least 3 inches. To the southeast, however, the intensity of the storm decreased rapidly; Hattiesburg, about 60 miles from the storm axis, received only $1\frac{1}{2}$ inches, and Shubuta, about 100 miles away, only 1 inch.

Widespread disruption of traffic and communications resulted from the storm. Because of the intense rainfall, many families in the Jackson area were marooned in their homes by swiftly rising waters of the Pearl River. U. S. Highways 80 west of Meridian, 49 south of Jackson, and 51 near McComb were inundated on January 6. Many miles of State and county roads also were made impassable. Telephone lines in the Brookhaven area were broken when poles were uprooted by swift waters of some of the smaller streams.

New flood-stage and discharge records were established at a number of stations in the upper Chickasawhay and upper Pearl

River basins, and in southwest Mississippi. Most of the stations have records of 12 years, beginning in 1938. New maximum flows established at Chunky Creek near Chunky, Tuscolameta Creek at Walnut Grove, and Bogue Chitto near Tylertown, were especially outstanding. Maxima of record at 11 gaging stations are shown in the table.

Montana

On June 17 a cloudburst caused flooding of Antelope Creek in Wheatland County in south-central Montana. One life was lost. Damage in and near Harlowton consisted of 1 mile of railroad track destroyed and some highways and homes damaged.

Indirect determinations of the peak flow of Antelope Creek indicated that the rate of runoff was 334 cfs per square mile, from a drainage area of 73 square miles. However, some parts of this area may not have contributed to peak flow because of the apparently localized nature of the severe storm.

Nebraska

Four floods occurred in southeastern Nebraska during the period May to July as a result of severe summer thunderstorms that reached cloudburst intensities in some localities. The dates of these floods and areas of greatest flooding are as follows: May 8 and 9--Nemaha and Little Nemaha Rivers and Salt Creek (Platte River basin); June 2 and 3--Shell Creek (Platte River basin); July 8 to 10--Big Blue River (Kansas River basin) and West Fork Big Blue River; and July 18--Plum Creek (tributary to Loup River in Platte River basin). A detailed report on these floods is presented in Water-Supply Paper 1137-D, Floods of May-July 1950 in southeastern Nebraska.

Nevada

Record-breaking floods in the Walker, Carson, and Truckee River basins during November and December 1950 resulted from a rapid sequence of storms and unseasonably high temperatures that melted most of the early snow cover. Precipitation during the period November 13 to December 8 ranged from about 5 inches at the foot of the Sierra Nevada in Nevada to about 30 inches at the crest of the Sierra Nevada in California, near the California-Nevada State line; about half of it fell during the period November 16-21. The most concentrated and destructive effects of the flood occurred in Reno, where damages approached $2 million, according to estimates compiled by the Corps of Engineers. A detailed report

on these floods is presented in Water-Supply Paper 1137-H, Floods of November-December 1950 in western Nevada.

New Jersey

Heavy rainfall on November 25, 1950, accompanying a storm with winds that approached hurricane force produced high water in many streams in New Jersey, but the major part of the extensive property damage resulting from the storm was evidently due to the long continuance of strong-gale and whole-gale winds. However, the wind-driven tides, combined with heavy rains, caused flooding to homes in southwest Jersey. Several hundred families were evacuated in that area and 10 persons lost their lives by drowning.

A peak discharge at Flat Brook near Flatbrookville of 2,370 cfs (previous maxima, 3,470 cfs in 1924 and 1925) was on the fringe area of a record flood in southern New York (see p. 968). A peak discharge of more than 200 cfs per square mile from 15 square miles occurred on Salem Creek in southwest New Jersey from rains of 5 to 6 inches. The table includes stages and discharges at 2 gaging stations in the area.

New York

August 1

On August 1, at about 6 p. m., an intense rainstorm of small areal extent caused excessive runoff in the vicinity of Cuba. The storm was described by observers as being a "pin-point" cloudburst. Small tributaries to Oil and Dodge Creeks in Allegheny River basin, and to South Branch Van Campen River in Genesee River basin, were particularly affected. According to county officials, the flood in that area was the worst "since the Cuba flood of 1916." Overflow of these small streams caused damage amounting to tens of thousands of dollars. Many highway culverts and one sizable bridge were washed out. The road between Nile and West Clarksville, in Allegany County, was inundated at many places and damage to it was considerable. A 40-foot concrete bridge on the road was undermined. Maturing grain crops were damaged and some soil erosion was reported.

Indirect determinations of peak flow were made at points on 3 unnamed creeks, with drainage areas ranging from 1.41 to 5.19 square miles. Discharges ranged from 453 to 787 cfs per square mile--rates of runoff considered noteworthy. Results are shown in the table.

August 31 to September 1

A meteorologic disturbance of several days' duration culminated in heavy rainstorms over east-central New York and a few other localities of the State on August 31 to September 1. The storms were caused by the passage of the diminishing remnant of a hurricane. The most significant flood flows caused by the heavy rains occurred in Unadilla and upper Chenango River basins, where new maximum discharges were recorded at 3 stream-gaging stations. On August 28 and 29, before the main storm, rains of about 1 inch had fallen over the area. This storm had wet the ground and caused some increase of runoff. These antecedent conditions probably contributed to the intense runoff during the main storm period, August 31 to September 1, when precipitation averaged $2\frac{1}{2}$ to more than 5 inches in the area.

The floods caused a variety of property damage in Otsego, Madison, and Chenango Counties. Soil erosion was heavy in the hills, fences and farm buildings were damaged, and crops were destroyed. Parts of farm fields in low overbank areas were covered with sand and gravel. Damage to rural roads were considerable and a number of bridges were destroyed. Small losses of livestock were reported. Damage was probably greatest in villages. An area of particular interest centered about Leonardsville, situated on the Unadilla River, which, at that point, is the boundary between Madison and Otsego Counties. Much of the village was inundated and normal activities ceased, for most of the population battled rising waters of the Unadilla River. Floodwaters of Crumb and Wells Brooks and Button Falls Creek caused considerable farm damage. One farm resident stated that the flood on Crumb Brook was "the worst in 50 years."

Farther to the south near New Berlin, Unadilla River reached a stage of 9.95 feet, or 0.15 foot higher than the previous maximum for 26 years of record. A local tributary, Papermill Brook, undermined a hardware warehouse, resulting in an estimated loss of $5,000. Small streams in the vicinity of West Exeter and as far east as Cooperstown and Milford caused some damage. A 100-year-old bridge on the road between Milford and Laurens was reported to have been washed out. At Morris the grounds of the Otsego County Fair were inundated by Butternut Creek, which rose to its highest level in at least 12 years. Both Wharton and Butternut Creeks contributed heavily to floodwaters of the Unadilla River.

Features of the flood were similar in those parts of Madison and Chenango Counties in the Chenango River basin. Bridges were washed out by small tributaries at North Brookfield, and near East Hamilton. A new peak stage was established at the gaging station on Chenango River at Sherburne, a station which has been operated for 12 years. Floodwaters of Newton Creek caused extensive

damage in Bainbridge, in the southern part of Chenango County, when a bridge became choked with debris. Damage in Bainbridge was estimated to be in excess of $50,000.

The village of Fort Plain suffered a small amount of damage when Otsquago Creek overflowed its west bank. Traffic was halted on the Barge Canal in the vicinity of Fort Plain because of swift currents produced in the canal by flood flows from Otsquago Creek and other streams.

Flood stages and discharges at 4 stream-gaging stations and 2 indirect determinations of peak discharge are shown in the table.

In Rensselaer County, N. Y., adjacent to Bennington County, Vt., a moderately high but not damaging flood occurred on the Hoosic River. Some small tributaries of the river experienced fairly high stages, however. One tributary, Woods Brook, caused damage in Hoosic Falls, N. Y. A long culvert, which ordinarily carries the flow of Woods Brook beneath the business section of Hoosic Falls, was filled and the floodwaters overflowed an extensive area. Cellars of business establishments, homes, armory, and hospital were flooded. Two determinations of peak flow at points on Woods Brook are included in the table.

September 10

At about 6 p.m. on September 10, heavy rains caused small streams in the vicinity of Frankfort and Herkimer to overflow their banks. According to newspaper reports, the flood in that area was the "worst in 40 years." Although statewide, the storm was generally moderate. No other area of the State was greatly affected. The greatest 24-hour rainfall intensity was recorded at 8 a.m. at Frankfort, where 3.42 inches fell during the preceding 24 hours.

A bridge was washed out in East Frankfort and several other bridges were made impassable. Route 5-S between Ilion and East Frankfort was closed temporarily because of washed-out shoulders, undermined pavement, and debris left by the overflowing streams. State officials placed damage to State-owned roads and bridges at $50,000. Damage to farm and village property probably exceeded this figure.

In Herkimer, flow from Bellinger Creek caused considerable damage when it cut a new channel across the athletic field and deposited trees and stones on streets in the western section of the village.

Swift currents halted traffic on the Barge Canal in the vicinity of Saint Johnsville, 16 miles east of Herkimer.

Three stream-gaging stations were in operation in the vicinity of Herkimer: West Canada Creek at Kast Bridge, East Canada Creek at East Creek, and Mohawk River near Little Falls. Of these, the only appreciable rise occurred on Mohawk River, which rose nearly 7 feet. Previous peaks were not approached, however. Indirect determinations of peak flow of Moyer Creek at Frankfort and McGowan Creek near Ilion indicated peak flow rates of 121 and 469 cfs per square mile, respectively. Results of indirect determinations of flow are included in the table.

September 12

A local cloudburst occurred in Gowanda on September 12, at about 6 p. m. The areal extent of the storm was very small; only Grannis Brook, with a drainage area of 3 square miles, was affected significantly. Grannis Brook, which flows through Gowanda, reached a stage that was the highest in 47 years, according to local residents. Buffalo Street became a stream as floodwaters from the brook flowed overland to Cattaraugus Creek. Damage to property in the village was estimated at several thousand dollars by village officials.

An indirect determination of the peak flow of Grannis Brook, drainage area 2.10 square miles, gave an extreme runoff intensity of 752 cfs per square mile.

The nearest stream-gaging station to the storm center was Cattaraugus Creek at Gowanda, within the village limits. This creek and other local streams experienced only minor rises, however, indicating the small areal extent of the storm.

November

Floods of November 25 and 26, in the Catskill Mountain region of New York State, rank among the highest known in the area. Damage was great as mountain creeks became destructive torrents and overflowed their banks. The valley bottoms were filled with floodwaters and alluvial plains were inundated extensively. Large areas of farmland were made unfit for agricultural use. Homes, farm buildings, commercial buildings, and bridges were destroyed. A detailed report of these floods is presented in Water-Supply Paper 1227-C, Floods of 1950 and 1951 in the Catskill Mountain region, New York.

North Carolina

March

On March 12 and 13 a storm over Tennessee River Valley areas in North Carolina produced floods on most streams in the Hiwassee River basin. It is estimated that floods of this size have a frequency of about once in 3 years on the average; however, on the upper Nottely River the peak stage near Blairsville, Ga., was the highest since the July 1938 flood.

A description of this storm is contained in Tennessee Valley Authority Bulletin, Precipitation in Tennessee River basin--March 1950.

July

Heavy rainfall accompanied storms in July along the coast of North Carolina between Wilmington and Elizabeth City. Belhaven recorded 20.10 inches during the month, and 12 to 19 inches were reported at other points. Generally, the storms occurred during three periods: July 6-9, 11-16, and 24-28.

Precipitation during the first storm, which was the most intense, coupled with that of the second storm period, caused major floods on most coastal streams in the area. Thousands of acres of flat farmland were flooded. Heavy damages to agriculture resulted.

Only three recently established gaging stations were in operation in the area most affected: Herring Run near Washington, Swift Creek near Vanceboro, and New River near Gum Branch (see table).

September

Floods occurred on September 1 in the French Broad and Nolichucky River basins in the western part of the State. Peak stages at all stations were less than previous maxima, although the crest stage of 11.17 feet of the French Broad at Rosman approached the previous maximum of 11.86 feet established in August 1940.

Floods of September 8-10 on French Broad River above Asheville and on Mud Creek inundated farmlands, resulting in moderate damage to late truck crops. Heavy rain during this storm caused several slides along the Blue Ridge Parkway in North Carolina.

December

Heavy rain along the Blue Ridge Mountains on December 7, together with melting snow, caused flooding of most streams in Kanawha River basin in that area. North Fork New River at Crumpler reached a flow of 15,100 cfs, or 54.5 cfs per square mile, as determined by slope-area method. The corresponding peak stage of 10.72 feet was the highest since the flood of August 1940.

As a result of the same storm, there was also flooding in Watauga, French Broad, and Tuckasegee Rivers in the Tennessee River basin. Wide overflow occurred along French Broad River above Asheville, causing damage to roads, bridges, and 4,000 acres of cover crops. Floodwaters of the Tuckasegee River destroyed a timber bridge near Cullowhee. Watauga River at Sugar Grove reached a stage of 16.40 feet, highest since the record flood of August 1940. Detailed report of this flood is included in Tennessee Valley Authority Bulletin, Precipitation in Tennessee River basin--December 1950.

North Dakota

April-May, Missouri River Basin

The floods of April-May in the Missouri River basin are described under the section on "South Dakota" (p. 974).

April-July, Red River of the North Basin

The floods of April-July in the Red River of the North and Winnipeg River basins were the largest that have occurred in several decades. A notable feature of the floods in the Red River of the North basin was the dual peaks--one in April and the other in May--of nearly the same size; a notable feature of the floods in Winnipeg River basin was the lateness of the flood crest in the Lake of the Woods, near the end of July. These floods are reported in Water-Supply Paper 1137-B, Floods of 1950 in the Red River of the North and Winnipeg River basins. The report was prepared in cooperation with the Water Resources Division, Department of Resources and Development, Canada, who furnished the information relating to Canada.

Ohio

January

A flash flood on the night of January 15 occurred in the town of Shelby. The Black Fork rose rapidly, causing damage estimated at about $150,000, largely to merchandise in stores. The peak

discharge, from a contracted-opening determination, was 5,270 cfs from 32.6 square miles, not an outstanding rate of discharge. The same storm caused the highest stage (but not the highest discharge) in 21 years of record on the Sandusky River near Bucyrus.

February

Rains of February 12-14, together with snowmelt and heavy antecedent precipitation in December and January, produced floods of record proportions in the Maumee, Portage, and Sandusky River basins. Previous maxima for the period of record were exceeded at more than half of the gaging stations in these basins. Stages did not approach those of the flood of March 1913. More than 250 houses were flooded in and around Findlay, Defiance, Grand Rapids, Ottawa, and Fremont. Business and industrial establishments also suffered severe damage. The high-water period continued into May, making 1950 the highest runoff year of record throughout most of northwestern Ohio.

April

Williams and Fulton Counties in the extreme northwest corner of the State were lashed by two storms that occurred on Saturday night, April 22, and on Sunday night, April 23. Highest recorded precipitation was 3.24 inches (both storms) caught by the U. S. Weather Bureau gage at Montpelier. Supplemental rainfall catches obtained from local residents indicated a maximum precipitation of about 5 inches at the storm center, about 10 miles northeast of Montpelier. Damage was light. A peak discharge of 6,640 cfs on April 25 was recorded at the station on Tiffin River at Stryker, the maximum of record (17 years). Peak discharge of 3,860 cfs (second highest of 10 years of record) was recorded at the gaging station on Bean Creek at Powers. Three peak-flow determinations were made on drainage areas ranging from 11.0 to 176 square miles, the highest unit discharge being 252 cfs per square mile from 11.0 square miles (see table).

The same general storm settled over the Swan Creek basin. Precipitation of 3.28 inches was recorded at Toledo, and other catches indicated at least 4 inches at the storm center about 10 miles west of Toledo. Damage was relatively severe in suburban Toledo because of flooding of homes along Swan Creek. No active streamflow stations were in the area, but high-water marks higher than those for the short period of record (3 years) at abandoned stations on Swan and Ten Mile Creeks were obtained.

June

A flash flood on the night of June 16, 1950, caused extensive damage in Crooksville, Roseville, and nearby communities. Estimates of peak discharges were as high as 946 cfs per square

mile from areas of less than 10 square miles. The total flood area was about 25 square miles. One life was lost, about half the houses in the area were inundated, and many highway bridges were destroyed. The damage was estimated at $10 million. Flood stages and discharges for this flood are included in the table.

A report entitled "The Crooksville area flood of June 16-17, 1950," with a section on meteorology furnished by the Weather Bureau, was prepared cooperatively by the Geological Survey and published as a bulletin by the Ohio Division of Water.

Oklahoma

As a result of torrential rains on May 9-11, 1950, floods of unusual magnitude occurred in the lower Washita and Canadian Rivers and on the Illinois River. Flash floods on small streams throughout south central and northeastern Oklahoma were especially severe. On the basis of both official and unofficial rainfall records, there were 2 unusually high storm centers at which the 2-day rainfall was approximately 16 inches. One center was in the vicinity of Purcell in the Canadian River basin in central Oklahoma, and the other in the northeastern part of the State along the divide between the Illinois and Neosho Rivers.

The crest gage height on the Washita River at the gaging station near Pauls Valley was 0.9 foot higher than any previously known during at least the past 40 years, and peak discharge was much higher than the rating curve for previous years would indicate, owing to a progressive enlargement of channel in recent years. Stages along the Illinois River were the highest ever known, exceeding previous maxima by 2 to almost 5 feet (see table). Tributaries of the lower Neosho (Grand River) were unusually high. Retention of flood flows by Pensacola Dam and the partly completed Fort Gibson Dam effectively reduced the flow of the Neosho near its mouth. The Arkansas River experienced a major flood below the mouth of the Illinois River, but stages were well below previous maxima.

Four persons lost their lives in the floodwaters and more than 1,000 persons were forced from their homes. Cities particularly affected by floodwaters included Duncan, Comanche, Maysville, Pauls Valley, and Waurika in south-central Oklahoma, and Tahlequah, Gore, and Okmulgee in the east-central section. Many highways were closed and damages to roads, bridges, crops, homes and other property were very great.

Oregon

June

On June 17 at about 6 p. m., a cloudburst caused flash floods in an area of Morrow County east of Hardman and south of Heppner, in north-central Oregon. Considerable damage was done to hay and grain when Rhea Creek overtopped its banks and covered crops with mud and debris. Fences, bridges, and roads were also damaged, and one barn was reported as a total loss.

Much of the runoff in Rhea Creek was contributed by Balm Canyon, which is practically dry most of the time. A slope-area determination of the peak flow of Balm Canyon was made at a point three-quarters of a mile above its mouth. Results indicated a yield of 96.4 cfs per square mile from a drainage area of 28 square miles. This is an extremely high rate of runoff for this semiarid part of the State, where average annual precipitation is about 15 inches.

October-November

The floods of October-November in southwestern Oregon and northwestern California were caused by heavy rains October 27-30, following a month of nearly continuous rainfall. Most streams in the flood area reached their peaks on October 29. Rains in mid-November caused secondary peaks, which were substantially lower than the October peaks. These floods are the subject of a separate report in this series, Water-Supply Paper 1137-E, Floods of 1950 in southwestern Oregon and northwestern California.

Pennsylvania

November

Following heavy rains, which averaged about 4 inches on November 25 and 26, the highest flood since that of March 1936 was produced in the Juniata River basin. On some tributaries, in both Juniata and lower West Branch Susquehanna River basins, peak stages approached or exceeded those of March 1936. Property damage in the Susquehanna River basin, as a direct result of the flood, was estimated at more than $3 million. One person was reported killed as a result of the flood.

These rains, which amounted to more than 7 inches in some locations, caused severe flooding of the Delaware River in southeastern Pennsylvania.

December

Heavy rains on December 4, following closely those of November 25 and 26 (see preceding page), again produced flood stages in the same localities affected by the November flood. In some sections, notably the Schuylkill River basin, stages were only slightly less or equal to the flood peaks attained in November.

Peak stages and discharges for the floods of November and December at 10 stream-gaging stations are included in the table. At 9 of these stations, and 4 others (not listed), peak discharges equaled or exceeded the maxima for period of record established during previous floods.

South Dakota

The floods of April-May occurred on tributaries of the Missouri River between Bismarck, N. Dak., and Pierre, S. Dak. The primary cause of the floods was the rapid melting of the season's great accumulation of snow, one of the deepest on record. The floods on tributaries of the Missouri River between Bismarck and Pierre exceeded any previously known on many of these streams. West of the Missouri River the floods were notable for their rapid rise, and magnitude of peak discharge; east of the Missouri River they were notable for their long duration. These floods are the subject of a separate report in this series, Water-Supply Paper 1137-A, Missouri River basin floods of April-May 1950 in North and South Dakota.

Texas

Floods occurred on the Wichita River in Texas on August 1-6 following rains of 4 to 10 inches that fell southwest of the city of Wichita Falls on August 1. Direct and indirect damages in Wichita Falls was estimated at $1 million. Five hundred families in low areas were evacuated, but no loss of life was reported.

Peak discharge of Wichita River at Wichita Falls was 9,000 cfs, as compared with the previous maximum of 17,800 cfs, which occurred in 1941.

Complete information in this flood is given in the report entitled "Flood of August 1-6, 1950, at Wichita Falls, Tex.," by Ivan D. Yost, prepared in cooperation with the Texas Board of Water Engineers and issued as Geological Survey Circular 99.

Vermont

August 18

Cloudburst rainfall on the east side of Bald Mountain, northeast of Bennington, caused an intense local flood along Walloomsac Brook during the night of August 18. There was considerable damage in the vicinity of Bennington. In the area of heavy rainfall, rural roads were badly eroded by the large volume of overland flow. Steeply pitched ravines were also severely eroded. The Molly Stark Trail, Vermont State Route 9, was inundated and damaged east of Bennington and traffic was halted. The stream bed of Walloomsac Brook, composed mainly of cobbles and boulders, underwent considerable adjustment and change in some reaches. Channel improvements instituted after the flood of December 31, 1948, had not become stabilized and large amounts of loosely piled material along the banks were moved.

Damage was centered principally in Bennington. One end of the Rutland Railroad bridge was undermined and about 75 feet of adjoining fill was washed away. Water entered the ground floors of a number of houses in Bennington and its environs. Vermont State Route 67-A was flooded at Furnace Creek at Papermill Village. Some of the floodwaters in Furnace Creek probably come overland from Walloomsac Brook in the vicinity of Rutland Railroad bridge. Two men were injured when struck by lightning, but no other personal injuries were reported. Property damage was sizable but no estimate of the total was available.

Although the rainfall area on the night of August 18 was fairly extensive, flood conditions developed only in the Walloomsac River basin. Across the State line in New York, Hoosic River, which receives the flow of the Walloomsac, showed only a moderate rise.

August 31 to September 1

The events described in the preceding section were repeated during the night of August 31, when the upper Walloomsac River basin experienced a second, and more serious, flood. The storm was described locally as one of the worst in 75 years. Molly Stark Trail was destroyed for a distance of several hundred feet, and the fill of Rutland Railroad was again washed away. Crop damage was severe in the valleys and some livestock was lost.

This flood was the result of heavy rainfall during the passage northward of the diminishing remnant of a hurricane. A noteworthy feature was the occurrence of two peaks of similar magnitude on streams in the area: the first during the night of August 31; the second, about noon on September 1. Determinations of flow shown in the table are based on data obtained during the second

peak. At the gaging station on Walloomsac River near North Bennington, drainage area 111 square miles, the peak discharge of 7,800 cfs was the third highest in 19 years of record. The maximum recorded flow of 8,450 cfs occurred during the 1938 flood.

Virginia

Intense floods occurred on September 10, 1950, at scattered points in Virginia. The main flood occurred on Kerrs, Buffalo, and Whistle Creeks in Rockbridge County, where two lives were lost and damage was estimated at $1,200,000. An open-file report entitled "Peak discharges for the Rockbridge County flood of September 10, 1950," was prepared by the Geological Survey in cooperation with the Virginia Department of Highways. Copies of this report may be examined at the Surface Water Branch, U. S. Geological Survey, in Washington, D. C., or at the district office of the Surface Water Branch in Cabell Hall, University of Virginia, Charlottesville, Va.

Discharge at 6 points on streams having outstanding flows are included in the table. Unit discharges range from 48.7 cfs per square mile for Maury River near Lexington, drainage area 487 square miles, to 1,800 cfs per square mile for Whistle Creek near Lexington, drainage area 6.4 square miles. Discharges at 8 additional locations and a brief flood frequency study are included in the open-file report referred to above.

Washington

During the period June 11-18, thunderstorms accompanied by torrential rains swept over parts of eastern Washington. These storms caused several flash floods in small areas. Considerable damage resulted and three persons were drowned. Exceedingly high runoff was observed at several points, most noteworthy of which was 1,710 cfs per square mile from 5.7 square miles in the creek in Linfield Gulch near Pomeroy. A brief report on these floods appears in an open-file report entitled "Peak discharge determinations for floods in Washington, November 1949 to June 1950," prepared in cooperation with the Washington State Highway Department. Copies of this report may be examined at the Surface Water Branch, U. S. Geological Survey, in Washington, D. C., or at the district office of the Surface Water Branch in Room 207 Federal Building, Tacoma, Wash.

West Virginia

A flash flood during the night of June 24-25 in Middle Island Creek, West Fork, Hughes, and Little Kanawha River basins caused excessive damage.

A "bucket survey" of precipitation made shortly after the flood, showed amounts higher than 14 inches in some local areas.

The flood peaks occurred at night within a few hours after the intense rain. Thirty-one persons lost their lives, 123 homes were destroyed, and 1,292 homes were damaged, according to available information. Damage to farm crops, buildings, highway bridges, railroad and business property, and public utilities was estimated by the U. S. Weather Bureau to be in excess of $10 million.

At several points peak stages or discharges exceeded the previous maxima of record (see table). Peak stage at Weston, on West Fork River, was 25.85 feet as compared with 22.5 feet in July 1888, the highest previously known.

SUMMARY OF FLOOD STAGES AND DISCHARGES

The table that follows is a summary of flood stages and discharges, listed alphabetically by States (chronologically within States), for local floods that are not reported in the individual chapters of Water-Supply Paper 1137. The table includes results of determinations of maximum flood flows at existing stream-gaging stations and other places on streams in the areas affected by the floods.

During major floods, the maximum stage at a gaging station may be so high above the stage of the highest measurement previously obtained that an extension of the stage-discharge relation curve is not feasible. Furthermore, during floods it is often impossible to obtain current-meter measurements for several reasons: the road to the gaging station may be impassable; many streams rise and fall so rapidly that there is not enough time to make a current-meter measurement near the crest stage; floating debris may make it impossible to suspend a current meter in the water; bridge or cableway from which the measurement would be made may have been destroyed or inundated. At gaging stations where the flood greatly exceeded the stage defined by current-meter measurement and at miscellaneous points where measurement of the flood discharge was desired, the maximum discharge usually was computed by indirect methods: computation of flow through contracted opening, computation of flow over dams, computation of flow by critical-depth method, and computation of flow from slope-area observation. In the table those peak discharge

figures for the floods of 1950 that were computed by these indirect methods are followed by a symbol that is explained in a headnote.

The peak discharges at most of the stream-gaging stations in the table were determined from an established curve of relation (rating curve) or from a reasonable extension of the curve. Short extensions of the rating curve are usually based on logarithmic plotting or velocity-area studies.

Gaging stations and additional points can be identified in the table by the entry in the column "Period of record": a period of record is shown for all gaging stations; leaders indicate that no record of discharge has been collected systematically at that point.

Pertinent information regarding stages antedating the period of record is available at many stations and is included in the table except in a few places where it is incorporated in footnotes. Explanatory footnotes on other features of the table are also included.

Figure 131 shows the flood discharges, in cubic feet per second per square mile, which are listed in the table, plotted against the corresponding drainage areas. It should be understood that except for a small number of items as indicated in the table, the discharges are given as observed and some may be affected by artificial storage, release of water at dams, or other similar factors. The figure provides a convenient method for comparing flood discharges from drainage basins that differ widely in size; it does not bring out the comparative influence of topographic or other basin characteristics that may influence flood discharge. Discharge for some stations was less than 1.0 cfs per square mile and could not be plotted.

The basic data and computations for the determinations of discharge are filed in the Geological Survey district offices in the districts where the floods occurred and may be examined in those offices.

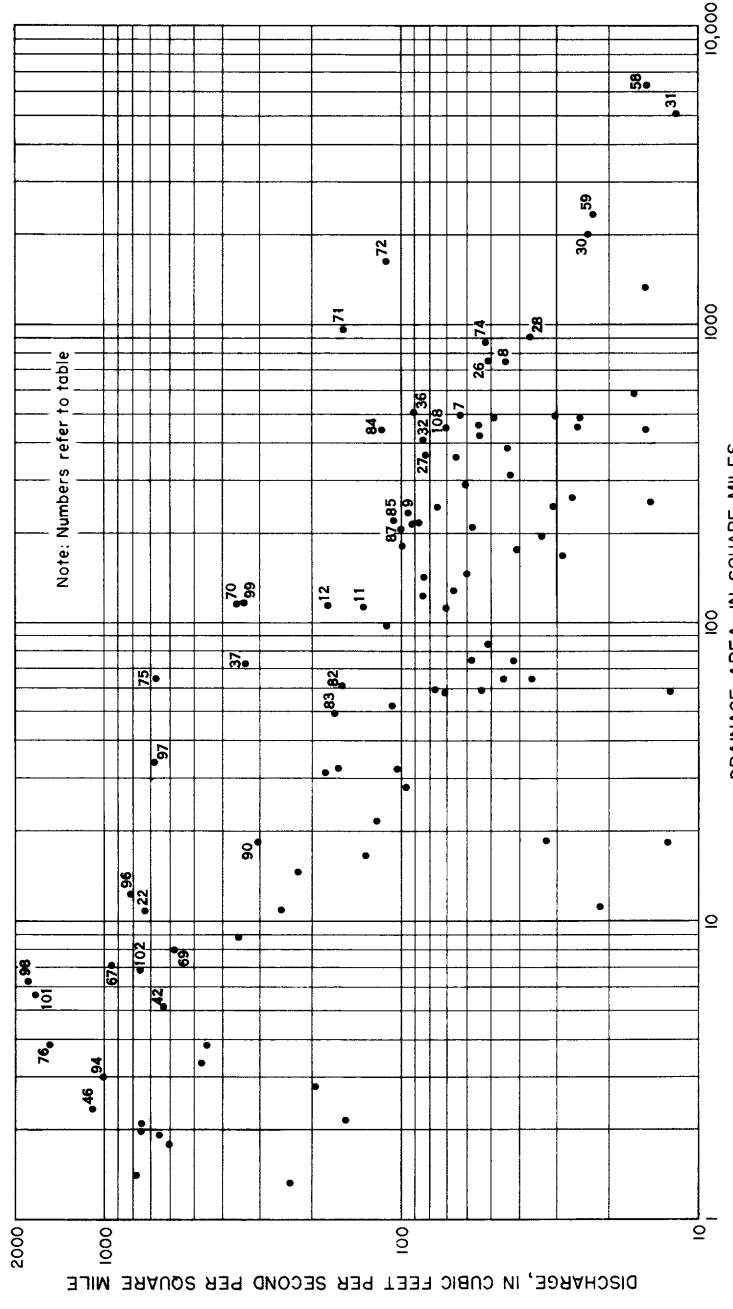

Figure 131.--Relation of unit discharge to size of drainage basin.

Summary of flood stages and discharges for local floods in the United States during 1950

[Maximum discharges for the floods of 1950 were obtained from gaging-station records, except as otherwise indicated by the following symbols: C, contracted-opening determination; D, computed flow over dam; R, critical-depth determination; S, slope-area determination]

No. on fig. 131	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	CONNECTICUT										
	Connecticut River basin										
1	West Branch Farmington River at Riverton	a 216	1929-50	Sept. 21, 1938	17.95	37,100	186	Nov. 26	12.37	17,400	87.4
2	Farmington River at Rainbow	b 584	1928-50	Sept. 22, 1938 Jan. 1, 1949	c 13.7 13.83	(d) 26,500	-- 55.1	Nov. 27	6.60	7,960	16.5
3	Still River at Robertsville	84.4	1948-50	Dec. 31, 1948	10.12	9,550	113	Nov. 25	7.17	4,250	50.4
	Housatonic River basin										
4	Naugatuck River near Naugatuck	246	1918-24, 1928-50	November 1927 Dec. 31, 1948	14 12.40	e 26,000 28,500	-- 116	Nov. 26	6.74	7,590	30.9
	GEORGIA										
	Tennessee River basin										
5	Nottely River near Blairsville	74.8	1942-50	September 1898 July 1938 Feb. 10, 1946	f 14.5 f 12 11.18	f 6,540 f 4,700 4,160	-- -- 55.7	Mar. 13	11.43	4,320	57.8
	IDAHO										
	Kootenai River basin										
6	Kootenai River at Bonners Ferry	13,000	1927-50	May 27, 1948	(g)	h 128,000	--	June 22,23	(i)	j 90,100	--
	LOUISIANA										
	Calcasieu River basin										
7	Calcasieu River near Glenmora	499	1943-50	Apr. 4, 1945	18.0	27,400	54.9	Feb. 14	18.82	31,900	63.8
8	Calcasieu River near Oberlin	753	1922-25, 1938-50	Apr. 7, 1923	e 21	30,300	40.3	Feb. 16	21.54	33,200	44.1

9	Bundick Creek near Dry Creek	238	1939-50	Apr. 10,	1940	19.12	22,000	92.4	Feb. 14	19.23	22,500	94.5
10	Beckwith Creek near De Quincy	148	1945-50	June 1,	1946	20.8	5,650	38.2	Feb. 14	22.40	8,930	60.3
	Sabine River basin											
11	Bayou San Miguel near Zwolle	113	1948-50	---		--	--	--	June 3	15.75	15,000	133
12	Bayou Anacoco near Leesville	114	1948-50	---		--	--	--	June 3	18.13	20,000	175
	MAINE											
	St. Croix River basin											
13	St. Croix River near Baileyville	1,320	1919-50	May 1,	1923	13.90	23,300	17.6	Dec. 13	10.94	19,900	15.1
	Machias River basin											
14	Machias River at Whitneyville	457	1903-21, 1929-50	Sept. 30,	1909	14.78	11,500	25.1	Nov. 28	c 14.70	11,800	25.8
15	East Machias River near East Machias	251	1926-50	Mar. 20,	1936	k 8.29	3,010	12.0	Dec. 15	9.05	3,660	14.6
	Penobscot River basin											
16	Piscataquis River near Dover-Foxcroft	286	1902-50	Apr. 29,	1923	17.67	m 21,500	75.2	Nov. 27	15.16	17,400	60.8
	MARYLAND											
	Bush River basin											
17	Bynam Run at Bel Air	8.8	1944-50	July 19,	1945	6.25	3,620	411	Sept. 10	6.18	3,080C	350
	Gunpowder River basin											
18	Little Falls at Blue Mount	52.9	1944-50	August	1933	e 14	--	--	Sept. 10	11.93	5,730C	108
				July 13,	1949	11.10	5,170	97.7				
19	Western Run at Western Run	59.8	1944-50	Aug. 18,	1946	10.62	(n)	--	Sept. 10	9.88	4,600S	76.9
	Patapsco River basin											
20	South Branch Patapsco River at Henryton	64.4	1948-50	May 15,	1949	7.10	2,400	37.3	Sept. 10	7.88	2,920S	45.3
	Potomac River basin											
21	Henson Creek at Oxon Hill	16.7	1948-50	Dec. 4,	1948	4.26	659	39.5	Sept. 11	6.63	2,200S	132
22	Chaptico Creek at Chaptico	10.7	1947-50	May 3,	1949	5.03	295	27.6	Sept. 10	8.56	7,800S	729

See footnotes at end of table.

Summary of flood stages and discharges for local floods in the United States during 1950--Continued

No. on fig 131	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	MICHIGAN Streams tributary to Lake Michigan										
23	St. Joseph River at Mottville	1,860	1924-50	Apr. 8, 9, 1947	5.34	8,480	4.56	Apr. 7 Apr. 27	6.50 6.56	10,500 10,700	5.65 5.75
24	St. Joseph River at Niles	3,620	1930-50	May 26, 1943	11.78	17,300	4.78	Apr. 5 Apr. 27	13.10 11.22	20,200 16,000	5.58 4.42
25	East Branch Coldwater River at Coldwater	59	1937-50	Apr. 5, 1947	6.20	680	11.5	Apr. 24	6.60	735	12.5
	MISSISSIPPI Pascagoula River basin										
26	Leaf River near Collins	752	1938-50	May 2, 1940 Apr. 1, 1949	26.36 26.39	22,800	30.3	Jan. 8	31.14	38,100	50.7
27	Chunky Creek near Chunky	368	1938-50	Nov. 29, 1948	23.73	19,800	53.8	Jan. 7	25.08	30,700	83.4
28	Chickasawhay River at Enterprise	913	1938-50	April 1900 Nov. 30, 1948	p 37.2 32.46	-- 32,100	- 35.2	Jan. 8	33.10	33,500	36.7
29	Okatibbee Creek near Meridian	239	1938-50	April 1938 Nov. 29, 1948	e 29.5 24.63	-- m 15,700	- 65.7	Jan. 7	24.85	18,000	75.3
	Pearl River basin										
30	Pearl River near Lena	1,995	1936-50	Mar. 31, 1944	28.28	43,700	21.9	Jan. 8	28.56	46,500	23.3
31	Pearl River near Monticello	5,040	1938-50	April 1902 Feb. 21, 1946 Jan. 21, 1947	q 33 27.66 27.7	-- r 51,200	- 10.2	Jan. 7	29.44	59,300	11.8
32	Tuscolameta Creek at Walnut Grove	411	1939-50	Nov. 29, 1948	19.74	18,000	43.8	Jan. 7	23.00	34,600	84.2
33	Yockanookany River near Kosciusko	314	1938-50	Feb. 11, 1946 Jan. 5, 1949	16.21 16.64	11,600	36.9	Jan. 8	17.08	13,600	43.3

34	Yockanookany River near Ofahoma	484	1943-50	Feb. 28, 1944 Mar. 29, 31, 1944	s 18.2	10,700	22.1	Jan. 10	19.19	12,100	25.0
35	Strong River at Dlo	429	1928-50	Mar. 7, 1935	t 28.0	22,900	53.4	Jan. 7	33.0	23,300	54.3
36	Bogue Chitto near Tylertown	502	1944-50	Mar. 4, 1948	23.05	21,400	42.6	Jan. 7	33.50	45.700	91.0
	MONTANA Musselshell River basin										
37	Antelope Creek at Harlowton	73	---	---	--	--	--	June 17	--	24,400RS	334
	NEW JERSEY Delaware River basin										
38	Flat Brook near Flatbrookville	65.1	1923-50	Apr. 7, 1924 Feb. 11, 1925	7.1	3,470	53.3	Nov. 26	6.11	2,370	36.4
39	Salem Creek near Woodstown	14.6	1941-50	Sept. 1, 1940	7.98	22,000	1,510	Nov. 25	4.23	3,240	222
	NEW YORK Allegheny River basin										
40	Unnamed creek near West Clarksville, tributary to Dodge Creek.	1.41	---	---	--	--	--	Aug. 1	--	1,110S	787
41	Unnamed creek near Cuba, tributary to Oil Creek.	3.82	---	---	--	--	--	Aug. 1	--	1,730S	453
	Streams tributary to Lake Ontario Genessee River basin										
42	Unnamed creek near Nile, tributary to South Branch Van Campen River.	5.19	---	---	--	--	--	Aug. 1	--	3,280S	632
	Hudson River basin										
43	Woods Brook near Hoosic Falls	1.32	---	---	--	--	--	Sept. 1	--	312C	236
44	Woods Brook at Hoosic Falls	2.15	---	---	--	--	--	Sept. 1	--	331S	154

See footnotes at end of table.

Summary of flood stages and discharges for local floods in the United States during 1950--Continued

No. on fig. 131	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	NEW YORK--Continued Susquehanna River basin										
45	Unadilla River near New Berlin	196	1924-50	Mar. 18, 1936	9.80	6,320	32.2	Sept. 1	9.95	6,600	33.7
46	Crumb Brook near Leonardsville	2.36	---	---	--	--	--	Sept. 1	--	2,580S	1,090
47	Butternut Creek at Morris	59.6	1938-50	Dec. 30, 1942	7.75	3,180	53.4	Sept. 1	7.76	3,200	53.7
48	Chenango River at Sherburne	264	1938-50	Mar. 20, 1948	u 9.66	6,450	24.4	Sept. 1	9.88	7,000	26.5
49	Mill Brook at North Brookfield	2.79		---	--	--	--	Sept. 1	--	543S	195
50	Canasawacta Creek near South Plymouth	58.3	1945-50	Sept. 18, 1945	5.33	5,910	101	Sept. 1	5.17	4,120	71.7
51	Moyer Creek at Frankfort	21.8	---	---	--	--	--	Sept. 10	--	2,640C	121
52	McGowan Creek near Ilion	3.37	---	---	--	--	--	Sept. 10	--	1,580C	469
	Streams tributary to Lake Erie Cattaraugus Creek basin										
53	Grannis Brook at Gowanda	2.10	---	---	--	--	--	Sept. 12	--	1,580RS	752
	NORTH CAROLINA Pamlico River basin										
54	Herring Run near Washington	v 4.4	1950	--- 1946	w 17	--	--	July 9,11, 14	x 10.0	186	42.3
	Neuse River basin										
55	Swift Creek near Vanceboro	182	1950	--- 1909 --- 1928	w 16 w 11.7	-- --	-- --	July 10	y 9.54	2,330	12.8
	New River basin										
56	New River near Gum Branch	74.5	1949-50	--- 1908	(z)	--	--	July 9	16.16	3,120	41.9

	OHIO Muskingum River basin											
57	Black Fork near Shelby	32.6	---	---	--	--	--	Jan. 15	--	5,270C	162
	Streams tributary to Lake Erie											
58	Maumee River at Waterville	6,314	1898-1901, 1921-35, 1939-50	May 20, 1943	13.9	78,000	12.4	Feb. 16	14.52	94,000	14.9
59	Auglaize River near Defiance	2,329	1915-35, 1940-50	March 1913 May 19, 1943	38.8 25.5	aa 120,000 48,000	51.5 20.6	Feb. 16	26.4	52,500	22.5
60	Ottawa River at Allentown	168	1923-35, 1943-50	Mar. 15, 1939 Apr. 11, 1944	10.1 9.00	-- 4,490	-- 26.7	Feb. 14	9.17	4,760	28.3
61	Tiffin River at Stryker	444	1921-28, 1940-50	March 1913 Mar. 18, 1945	16.0 14.80	7,600 5,690	17.1 12.8	Apr. 25	15.45	6,640	15.0
62	Bates Creek near West Unity	11.0	---	---	--	--	--	Apr.23-24	--	2,770C	252
63	Beaver Creek at Pulaski	32.5	---	---	--	--	--	Apr.23-24	--	3,340C	103
64	Swan Creek at Johnston Corners	176	---	---	--	--	--	Apr. 25	--	7,140C	40.5
	Muskingum River basin										
65	Moxahala Creek at Roberts	98.0	---	---	--	--	--	June 16-17	--	10,900C	111
66	Unnamed creek at Sayre	1.92	---	---	--	--	--	June 16-17	--	1,250R	651
67	Unnamed creek at Misco Dam, near Deavertown.	7.19	---	---	--	--	--	June 16-17	--	6,800D	946
68	Burley Run at Crooksville	1.81	---	---	--	--	--	June 16-17	--	1,100C	608
69	Buckeye Fork at Saltillo	8.02	---	---	--	--	--	June 16-17	--	4,650S	580
	OKLAHOMA Arkansas River basin										
70	Spring Creek near Locust Grove	116	---	May 17, 1943	--	26,000	224	May 10	--	41,200C	355

See footnotes at end of table.

Summary of flood stages and discharges for local floods in the United States during 1950--Continued

No. on fig. 131	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	OKLAHOMA--Continued Arkansas River basin--Continued										
71	Illinois River near Tahlequah	959	1935-50	January 1916 May 11, 1943	26 25.37	-- 76,200	-- 79.5	May 10	27.94	150,000	156
72	Illinois River near Gore	1,622	1924-26, 1939-50	Apr. 15, 1945	25.38	118,000	72.7	May 11	30.2	180,000	111
73	Canadian River at Calvin	27,794	1938-42, 1944-50	May 5, 1941	17.0	150,000	5.40	May 11	17.35	174,000	6.27
74	Little River near Sasakwa	865	1942-50	Apr. 15, 1945	32.50	39,000	45.1	May 11	33.48	44,600	51.6
	Red River basin										
75	Cow Creek near Comanche	65	---	---	--	--	--	May 10	--	43,200S	665
76	Willow Creek near Duncan	3.87	---	---	--	--	--	May 10	--	5,900S	1,520
77	Washita River near Pauls Valley	5,329	1938-50	June 10, 1941	ab 29.0	22,000	4.13	May 11	29.88	30,000	5.63
	OREGON Willow Creek basin										
78	Balm Canyon at mouth, near Heppner	28	---	---	--	--	--	June 17	--	2,700S	96.4
	PENNSYLVANIA Delaware River basin										
79	Schuylkill River at Berne	355	1947-50	May 1942 Dec. 30, 1948	14.98 10.28	-- 10,400	-- 29.3	Nov. 26	14.52	23,300	65.6
80	Little Schuylkill River at Drehersville	122	1947-50	May 1942 Dec. 30, 1948	10.2 7.21	-- 3,630	-- 29.8	Nov. 25	10.96	10,300	84.4
81	Ridley Creek at Moylan	31.9	1931-50	July 23, 1938	8.16	3,320	104	Nov. 25	10.84	5,720C	179

82	Chester Creek near Chester	61.1	1931-50	Aug.	23, 1933	11.48	4,270	69.9	Nov. 25	16.21	9,720	159
	Susquehanna River basin											
83	North Branch Mehoopany Creek near Lovelton.	49.9	1940-50	May	27, 1946	8.28	7,640	153	Nov. 25	8.54	8,290	166
84	Loyalsock Creek at Loyalsock	443	1925-50	Nov.	16, 1926	12.3	51,200	116	Nov. 26	12.32	51,200	116
85	Little Juniata River at Spruce Creek	220	1938-50	Mar.	18, 1936	19.1	39,800	181	Nov. 25	ac 15.82	23,100S	105
				Mar.	31, 1940	10.82	7,760	35.3				
86	Standing Stone Creek near Huntingdon	128	1929-50	June	1, 1889	9.38	6,770	52.9	Nov. 25	10.96	8,500	66.4
87	Aughwich Creek near Three Springs	205	1938-50	June	1, 1889	e 19.3	--	--	Nov. 25	18.04	20,600C	100
				June	2, 1946	12.47	8,770	42.8				
88	Tuscarora Creek near Port Royal	214	1911-50	Mar.	18, 1936	ad 21.6	ae 14,400	67.3	Nov. 25	c 19.78	19,400	90.7
	TEXAS Red River basin											
89	Little Wichita River near Archer City	496	1932-50	Oct.	31, 1941	26.18	17,900	36.1	Aug. 2	25.91	15,100	30.4
	VERMONT Hudson River basin											
90	Walloomsac Brook below confluence of Bolles Brook and Bickford Hollow Brook, near Bennington.	18.4	---		---	--	--	--	Aug. 18	--	5,600S	304
91	Walloomsac River near North Bennington	111	1931-50	Sept.	21, 1938	12 04	8,450	76.1	Sept. 1	11.50	7,800S	70.2
92	Walloomsac Brook near Bennington	18.4	---		---	--	--	--	Sept. 1	--	6,000S	32.6
93	Stamford Stream near mouth, near Bennington	11.2	---		---	--	--	--	Sept. 1	--	2,400S	21.4
	VIRGINIA Rappahannock River basin											
94	Tributary to Massaponax Creek, near Massapona	3.0	---		---	--	--	--	Sept. 10	--	3,020C	1,010

See footnotes at end of table.

Summary of flood stages and discharges for local floods in the United States during 1950--Continued

No. on fig. 131	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile
	VIRGINIA--Continued James River basin										
95	Maury River near Lexington	487	1925-50	Mar. 18, 1936	23.58	40,000	82.2	Sept. 10	18.0	23,700	48.7
96	Kerrs Creek at Denmark	12.3	---	---	--	--	--	Sept. 10	--	10,000S	813
97	Kerrs Creek near Lexington	34	1930-50	Mar. 17, 1936	c 10.8	7,600	224	Sept. 10	13.8	23,000SC	677
98	Whistle Creek near Lexington	6.4	---	---	--	--	--	---	--	11,500S	1,800
99	Buffalo Creek near Lexington	117	---	---	--	--	--	Sept. 10	--	39,700S	339
	WASHINGTON Spokane River basin										
100	Bigelow Creek at Spokane	2.0	---	---	--	--	--	June 11	--	1,510S	755
	Tucannon River basin										
101	Creek in Linfield Gulch near Pomeroy	5.7	---	---	--	--	--	June 17	--	9,750S	1,710
102	Skyhawk Gulch Creek near Pomeroy	af 6.9	---	---	--	--	--	June 17	--	5,200S	754
	WEST VIRGINIA Monogahela River basin										
103	West Fork River at Butcherville	181	1915-50	--- 1888 Mar. 13, 1918 Jan. 2, 1919	ag 17 ag 14.00	12,600 9,800	69.6 54.1	June 25	16.81	18,000	99.5
104	West Fork River at Clarksburg	384	1923-50	Feb. 14, 1948	10.13	15,800	41.2	June 25	ah 11.15	16,900	44.0
	Middle Island Creek basin										
105	Middle Island Creek at Little	458	1915-22, 1928-50	August 1875 Apr. 13, 1948	e 33.5 24.68	-- 22,800	-- 49.8	June 26	c 28.0	25,000	54.6

106	Leading Creek near Glenville	144	1938-50	Apr. 17, 1939	ai 27.5	(n)	--	June 25	ai 28.63	12,100	84.0
107	South Fork Hughes River at Macfarlan	210	1915-22, 1938-50	(aj) Aug 5, 1943	e 29 27.91	e 13,000 11,200	61.9 55.5	June 25	29.3	12,100	57.6
108	Hughes River at Cisco	452	1915-22, 1929-31, 1939-50	Apr. 13, 1948	30.91	27,500	60.9	June 26	32.69	31,700	70.2

a Effective drainage area, 199 sq mi.
b Effective drainage area, 481 sq mi.
c From floodmarks.
d Discharge, 29,900 cfs at Tariffville Dam 4 miles upstream, by computation of flow over dam.
e About.
f Estimated on basis of profile study.
g Maximum elevation, 1,778.32 ft May 28, 1948.
h Daily mean discharge; instantaneous, 139,000 cfs affected by dike breakage downstream.
i Maximum elevation, 1,776.98 ft June 24, 1950.
j Daily mean discharge.
k Present datum.
m Revised.
n Not determined.
p From floodmark; from reports of U. S. Weather Bureau.
q About; from reports of U. S. Weather Bureau.
r A discharge of 66,900 cfs was measured by Corps of Engineers, Apr. 8, 1938, gage height, 30.15 ft, from floodmark.
s Maximum gage height observed, 18.8 ft Jan. 7, 1949, discharge, 10,600 cfs.
t Site and datum then in use.
u Maximum stage known, 10.6 ft Mar. 18, 1936, from records of U. S. Weather Bureau.
v Estimated; drains a large portion of Great Swamp.
w From information by local residents.
x Occurred July 9; from graph based on gage readings.
y Observed.
z Reached a stage 2 ft higher than flood of July 9, 1950, from information by local resident.
aa From rating curve extended above 51,000 cfs.
ab Approximate gage height, present site and datum; 30.6 ft site and datum then in use.
ac Affected by backwater.
ad Occurred Mar. 19, 1936, backwater from Juniata River.
ae Estimated.
af According to local residents most of the rainfall occurred in an area of about 2 sq mi.
ag Former site, present datum.
ah Gage height referred to outside gage, 11.8 ft, from floodmark.
ai Affected by backwater from Little Kanawha River.
aj Date unknown, but before 1915.

INDEX

☆U. S. GOVERNMENT PRINTING OFFICE: 1954 O - 295167