Floods of August-October 1955 New England to North Carolina

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1420

Prepared in cooperation with the States of Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Virginia, and West Virginia, and agencies of the Federal Government

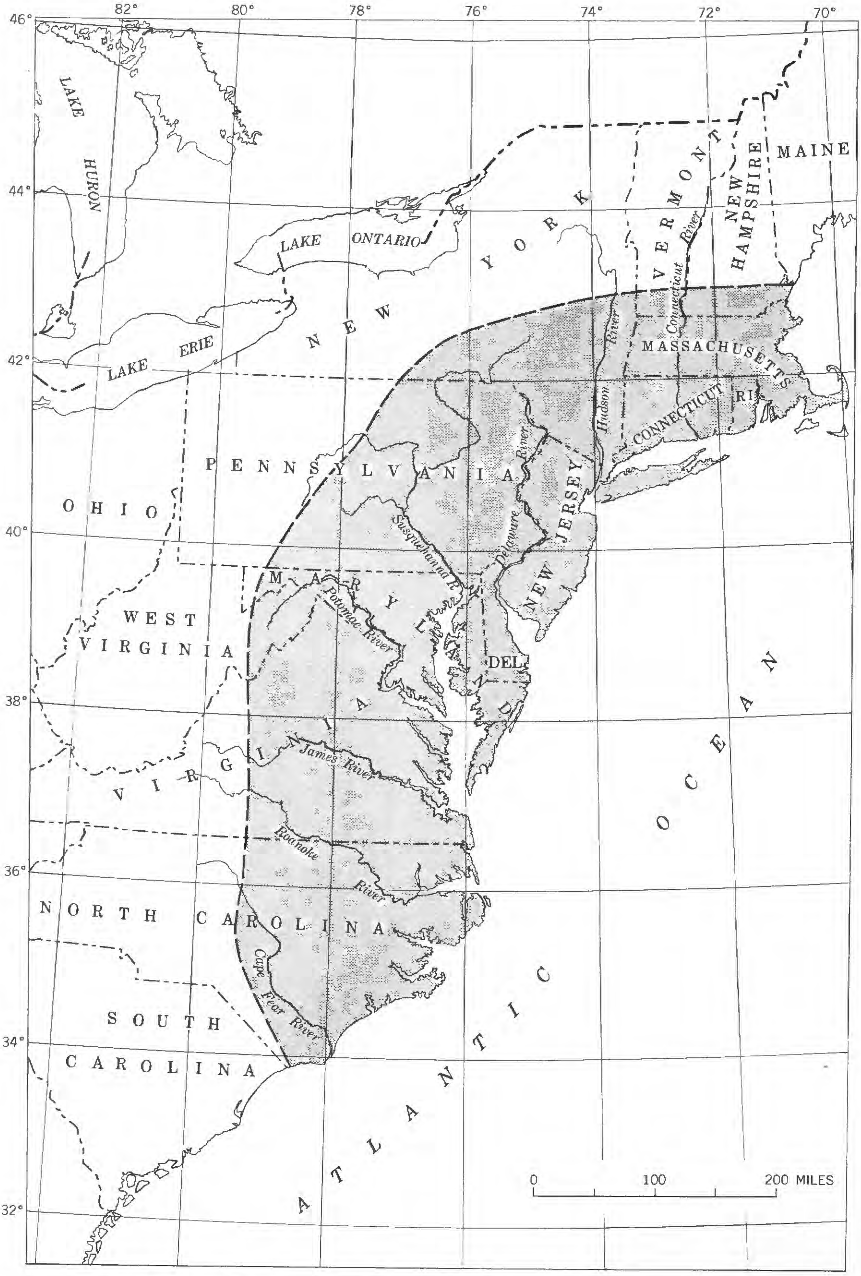

FIGURE 1.—Map of Eastern United States showing area of major flooding during 1955.

FIGURE 2.—Naugatuck, Conn., the morning of August 19, 1955. Photograph by Don A. Coviello.

FIGURE 3.—Main shopping street of Winsted, Conn., after flood had subsided. Photograph by Hank Murphy, Hartford Times.

FIGURE 4.—Railroad washout near Carpentersville, N.J., with Delaware River in background. Photograph by James G. Taylor, Jr.

FIGURE 5.—Petersburg section of Scranton, Pa., after recession of flood of August 18–19, 1955. Photograph by Pennsylvania Department of Highways.

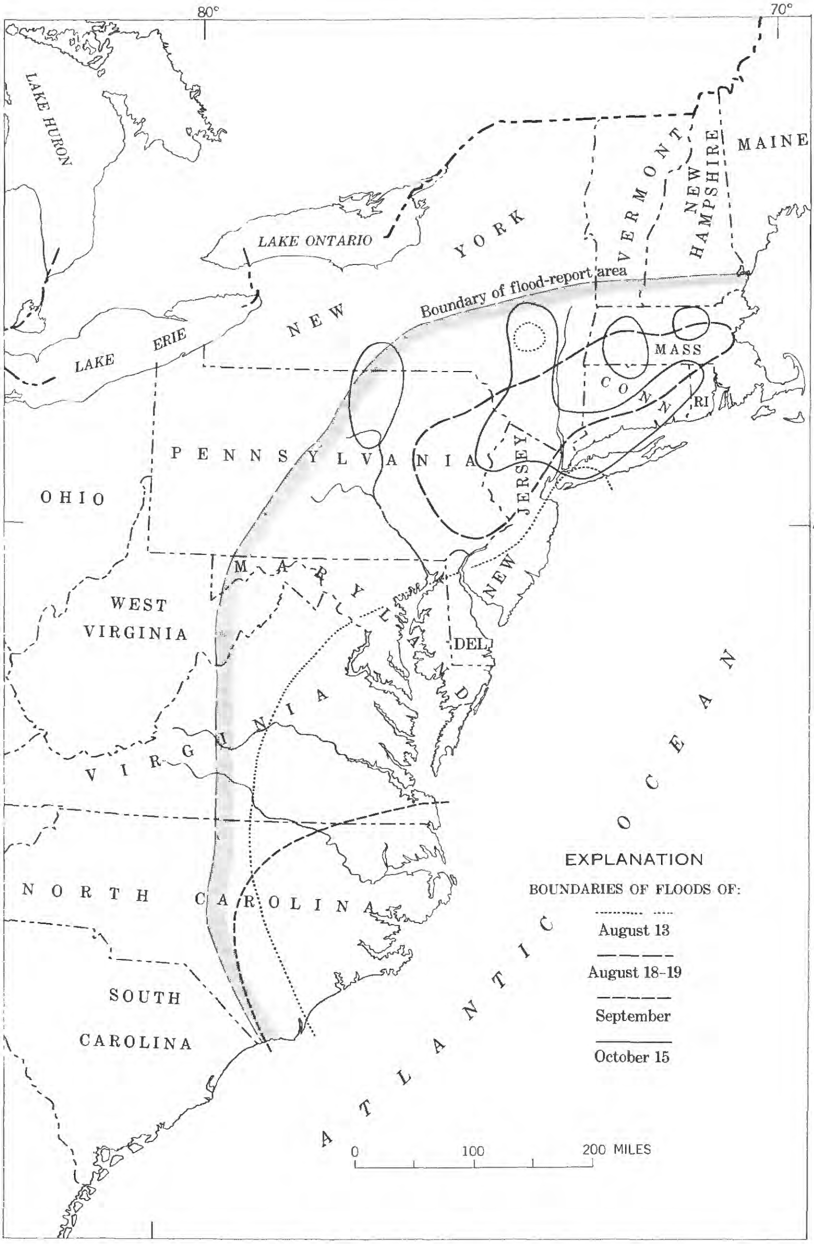

FIGURE 6.—Map of the States affected by the floods, showing areal extent of the floods.

FIGURE 7.—Street bridge in Putnam, Conn., at the height of the August 19 flood. Photograph by John Callahan, Providence Journal Bulletin.

Field procedures for these measurements include a topographic survey of a stream channel or a structure, cross sections, and a survey of high-water marks. Discharges may be computed from field data by using methods of computation which have been standardized within the Geological Survey. Indirect measurements supplement measurements made by current meter and in some places these are the only means for determining peak discharge.

The use of indirect measurements is not limited to gaging stations—they apply to any suitable place. It was possible during the 1955 floods also to obtain peak discharge at many of the 57 crest-stage stations and at 167 miscellaneous sites. In all, more than 300 indirect measurements were made.

A crest-stage station is generally one at which only base-flow and peak-flow measurements are made. Peak stages are recorded on crest-stage gages and measurements are referenced to those stages. The records thus provided define the extremes of flow.

A miscellaneous site, known also as a correlative site, is selected to provide data on an ungaged drainage area or part of a gaged area, that can be correlated with data from nearby stations. Typically, one, or at most only a few measurements are made at such a place, depending upon the need for information.

FLOODS OF AUGUST 13 AND AUGUST 18-19

The two major floods in August 1955 properly must be considered as one hydrologic event. It is true that the first floods, those of August 13, were an independent event on which prior floods had negligible effect. These floods, however, set the stage for the August 18–19 floods by raising the flood potential of the land. Occurring so closely together, their hydrologic relationship must be considered in reporting and evaluating them.

AREAS FLOODED AND THE CAUSES

The first half of the summer of 1955 was hot and dry and drought conditions were developing in the coastal States of the Northeast. The flow of streams generally was very low, groundwater levels declined steadily, and concern was felt for the total water supply.

In August the drought conditions abruptly ceased with the advent of the first of a series of hurricanes which afflicted the Northeast. Hurricane Connie came out of the Atlantic east of the Caribbean area and followed an erratic course as it approached the mainland. It moved inland in a northerly direction over the east edge of North Carolina on the morning of August 12 (fig. 8). The track of hurricane Connie skirted coastal Virginia, curved to the north-northwest across

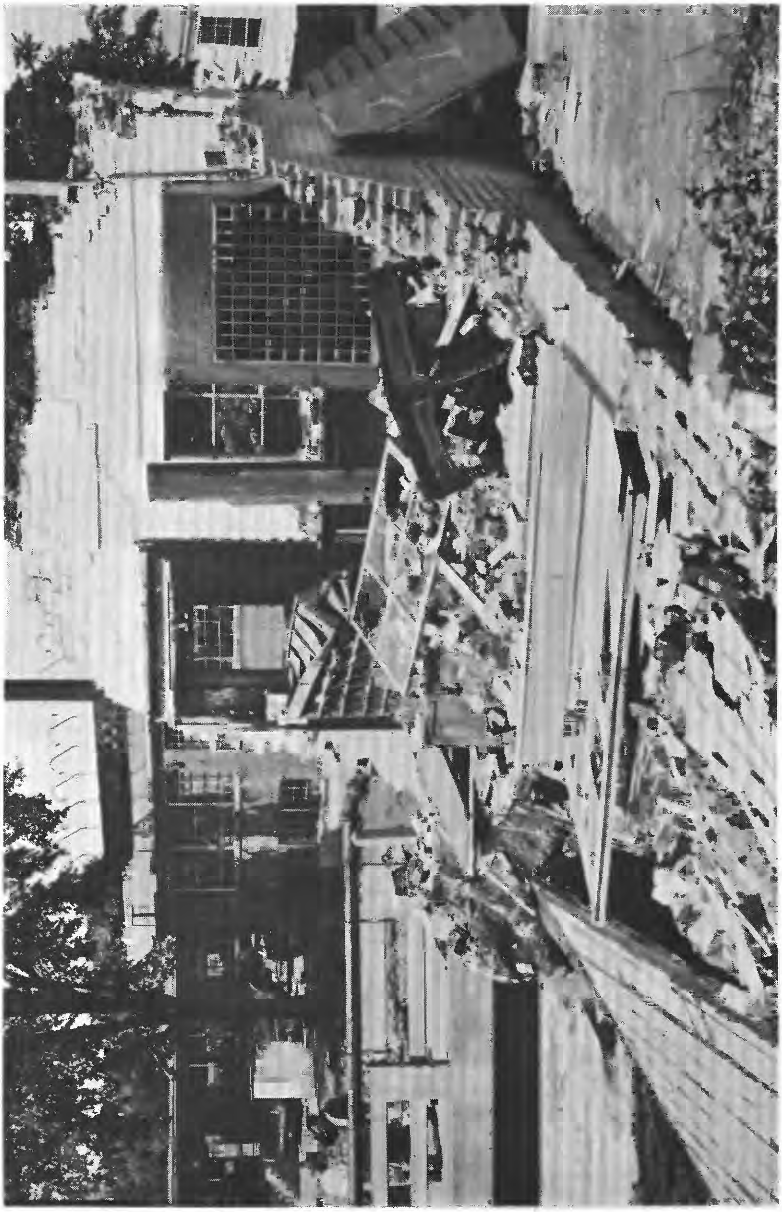

FIGURE 9.—The post office at Rochdale, Mass., in the upper reaches of French River. Photograph by Boston Record American.

downstream in the main channels all the way to tidewater at Long Island Sound.

The list of flooded streams and valleys includes all the major streams of Connecticut: Quinebaug-Thames, Willamantic, Connecticut, Farmington, Naugatuck, and Housatonic Rivers. It also includes hundreds of lesser streams and tributaries.

The city of Putnam, on Quinebaug River, had both a disastrous flood and a major fire during the flood. Much of Winsted's commercial district was destroyed as Mad River roared down the main street (fig. 3).

The destruction was not all urban. Villages like Suffield were devastated by small streams that became raging torrents (fig. 10). Irreplaceable losses occurred when the waters destroyed historic sites and buildings.

The entire mainstem of Naugatuck River experienced the greatest known flood. All bridges across the river were damaged (fig. 11) and many were destroyed. Great damage also occurred at Waterbury (fig. 12), where Naugatuck River piled a tremendous mass of buildings, railroad-bridge girders, rolling stock, and other debris against a bridge near the center of the city. For a while, Naugatuck River divided Connecticut into two parts, virtually out of communication with each other.

NEW YORK

The band of severe flooding became more narrow in New York than in the adjoining States. East of Hudson River, the area extended from Hudson southward to Peekskill, with great damage in the Wappinger Creek basin and in the vicinity of Copake Falls.

On the west side of Hudson River, the principal floods occurred in the triangle formed by Kingston, Narrowsburg (25 miles northwest of Port Jervis), and Warwick. Heavy damage of the velocity type was caused by most streams in the Rondout Creek basin, except Wallkill River. Damage was severe also in Wallkill River basin but it was the inundation type, with notable exceptions.

The flash floods of small mountain streams in the vicinity Ellenville caused much damage in New York, and Port Jervis was severely flooded when Delaware River overflowed. The area immediately tributary to Delaware River from Narrowsburg to Port Jervis, including the lower reaches of Neversink River, experienced severe flooding and much damage.

NEW JERSEY

Most of the flooding in New Jersey was north and west of a line between Trenton and Perth Amboy. The three major river systems of the area—Passaic, Raritan, and Delaware—had severe floods. Damage was extensive, but it was widely distributed and not con-

FIGURE 10.—Stony Brook, a small tributary of Connecticut River, at Suffield, Conn., the morning of August 19, 1955. Photograph by Roger C. Loomis.

FIGURE 11.—Site of bridge submerged by Naugatuck River. Photograph by Don A. Coviello.

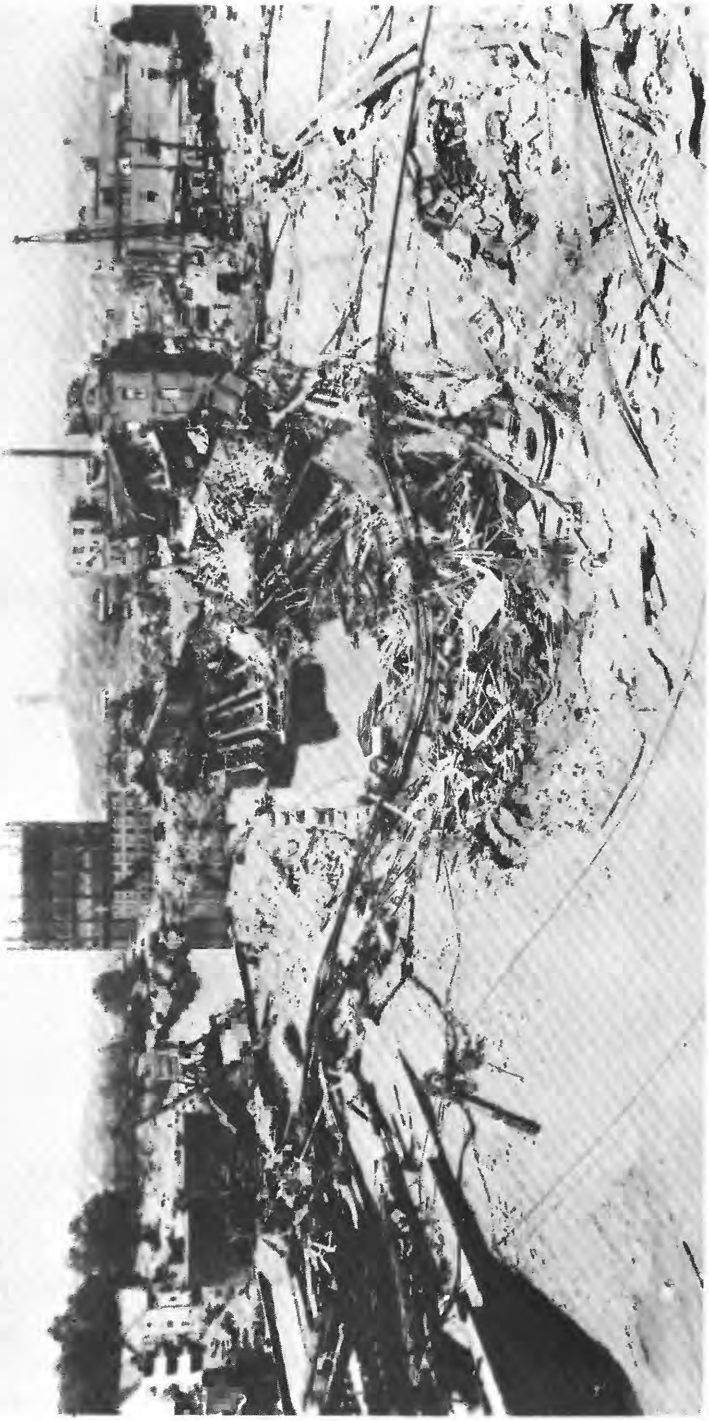

FIGURE 12.—Debris left by Naugatuck River at a bridge in Waterbury, Conn. Photographed by Howard Birch, Waterbury Republican-American.

centrated in any particular area, except along the mainstem of the Delaware.

Delaware River was the scene of the most severe damage along the west side of the State from Port Jervis to below Trenton. The low-lying parts of all communities along the mainstem were inundated. Only the recently built highway bridges at Montague and Trenton were open during the floods—all others were inaccessible or were damaged and four were destroyed. The bridges that were destroyed connected the following communities:

Columbia, N.J	Portland, Pa.
Phillipsburg, N.J	Easton, Pa.
Bryam, N.J	Point Pleasant, Pa.
Trenton, N.J. (near)	Yardley, Pa.

The old covered bridge between Columbia, N.J., and Portland, Pa., which was started in 1831 and completed in 1869, withstood all floods until the one in August 1955. The bridge collapsed when it was about three-quarters submerged.

Very little of the Bryam-Point Pleasant bridge remained after the flood (fig. 13). The Phillipsburg-Easton bridge, which is an eyebar-suspension type, presented an unusual picture when the center of the main span collapsed, leaving shorter suspended sections cantilevered out from the towers.

PENNSYLVANIA

The area in Pennsylvania which is bounded by Scranton, Pottsville, Philadelphia, and the Delaware River was swept by the most severe floods in its history. The entire Pocono Mountains region was swept by floods. All tributaries of the Delaware from Honesdale to Philadelphia including Lehigh River and the upper part of Schuylkill River and tributaries of Susquehanna River from Scranton to Berwick, experienced maximum or near-maximum floods.

Although the mainstem flood of Delaware River was the greatest hydrologic event of the floods in Pennsylvania, the floods of many lesser streams were spectacular and caused more concentrated destruction. Noteworthy were streams radiating from the highland just north of Pocono Summit: Wallenpaupack Creek, Bush Kill, Brodhead Creek, Tobyhanna Creek, and upper Lehigh River. Some stream channels and flood plains were ravaged from headwaters to mouth and entire small communities were flooded.

In Pennsylvania 101 lives were lost, about half the total casualties in all States combined. The greatest single tragedy occurred just north of Stroudsburg where Brodhead Creek destroyed a summer camp and caused the death of 37 persons, mostly children. Brodhead Creek destroyed the bridge on U.S. Highway 209 between Strouds-

FIGURE 13.—Washout of the bridge across Delaware River between Bryam, N.J., and Point Pleasant, Pa. Photograph by James G. Taylor, Jr.

burg and East Stroudsburg (fig. 14) and inundated large areas of both cities (fig. 15).

Lake Wallenpaupack and other lakes helped to reduce flood peaks in stream channels. It stored a large quantity of flood runoff and no water was released until the peak of the flood had passed at places below the reservoir—see the study of Lake Wallenpaupack in the section "Selected studies."

Transportation was at a standstill. The principal carrier of northeastern Pennsylvania, the Delaware, Lackawanna, and Western Rail-

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FIGURE 14.—Brodhead Creek at the U.S. Highway 209 bridge between Stroudsburg and East Stroudsburg, Pa., after the peak of the flood had passed. A school bus lies partly buried under the left end of the left bridge span. Photograph by Corps of Engineers.

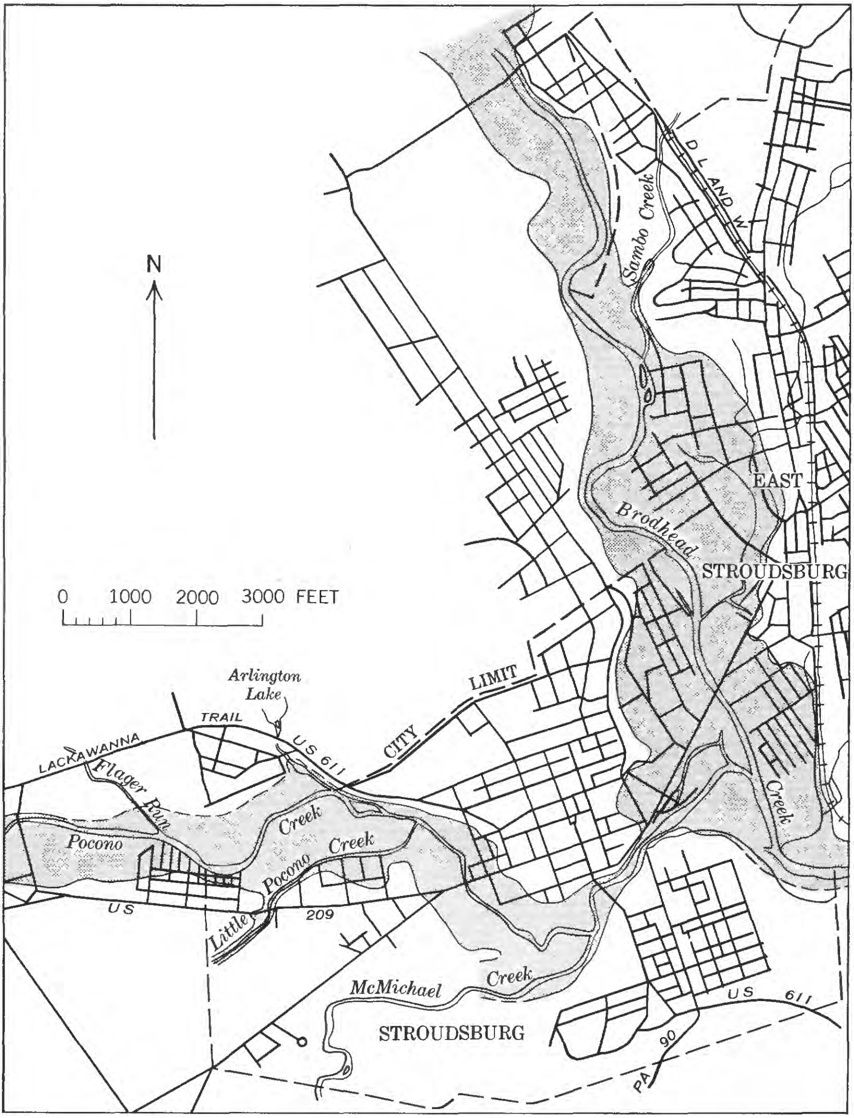

FIGURE 15.—Map of inundation at Stroudsburg and East Stroudsburg, Pa., by Brodhead Creek and Pocono Creek on August 18, 1955.

road, crosses the flood area from Delaware Water Gap to Scranton. Owing to the destruction of 17 bridges and 55 miles of track the railroad was out of service for many weeks. Highway travel ceased in many areas (fig. 16) and hundreds of automobiles were damaged.

MARYLAND TO NORTH CAROLINA

The floods extended south of Pennsylvania in a broadening zone which encompassed most of Delaware, Maryland east of the Blue

FIGURE 16.—One of the hundreds of automobiles caught in the floods, at Scranton, Pa. Photograph by Corps of Engineers.

rupted normal living. Streams in most of Fairfield County were flooded to such an extent that the region was virtually isolated.

Owing to power failures many communities were in darkness. One of the most notable features was the disruption of highway and railroad traffic which had almost been restored to normal from the August floods. In the densely populated section west of Bridgeport, tens of thousands of commuters who travel daily to and from New York experienced severely disrupted travel by bridge washouts, some of which were not repaired for several weeks.

Severe floods again occurred in the Naugatuck River valley and in other parts of the Housatonic River basin but damage was less than it might have been because less remained to be damaged. At Waterbury, the New York, New Haven & Hartford railroad bridge, newly restored to service, was again destroyed by the waters. In hundreds of factories and homes mud and debris had to be removed again.

NEW YORK

Parts of Long Island experienced flooding but most of this was the urban pond-type of inundation. Streams caused a minor amount of damage. Most of the damage occurred along the south shore where winds above 60 miles per hour, coupled with high tides, caused seawater to overflow the lower areas. Traffic was interrupted on major highways and power failures blacked out sizable areas.

In Westchester County, just north of New York City, streams flooded and caused a moderate amount of damage. The major cost to the area was the disruption of rail and highway traffic and the resultant inconvenience (fig. 26). The motor parkways were inundated in several places.

The maximum overflow ever experienced cascaded over New Croton Dam and caused damage in lower Croton River, including damage to the gaging station of the Geological Survey just below the dam. Because Croton Reservoir contained turbid water, New York City cut it out of the water-supply system and used only its Catskill supply.

Farther up the east side of Hudson River, damage from the floods was light. Temporary bridges at Copake, placed after the August floods, were destroyed by Bashbish Brook. Many highways were closed and waterfront property along the Hudson was inundated in many sections.

The principal flood areas in New York were centered about the Catskill Mountains (except on the west side of the mountains).

Catskill Creek had its greatest flood and flooded areas along most of its main stem, notably at Leeds and at Catskill. Homes were evacuated but damage was light, being widespread rather than intensive.

FIGURE 26.—State Route 22 at Stone Hill River near Bedford, N.Y. Photograph by Litchfield, Patent Press.