FLOOD OF MARCH 1968 ON THE IPSWICH RIVER, MASSACHUSETTS

INTRODUCTION

This report presents photomosaics which show areas inundated along the Ipswich River during the flood of March 1968, and flood data for the gaging stations in the Ipswich River basin. The report illustrates the magnitude of the March 1968 flood and provides a technical basis for making decisions pertaining to flood-plain use and to flood containment and prevention. It is one of a series covering the March 1968 floods on major rivers in eastern Massachusetts and northern Rhode Island.

The flood of March 1968 on the Ipswich River was caused by intense rainfall, which began on March 17. In northeastern Massachusetts, from 4 to 5 inches of rain fell on ground already saturated by snowmelt and heavy rain which had fallen on March 12–13. The resulting flood was the highest for the period of record at the three gaging stations in the Ipswich River basin. At the gaging station near Ipswich, historical data indicate that the flood of March 1968 was the greatest since the flood of 1886.

The Ipswich River is a coastal stream which meanders through swamps and meadows along much of its course. Flood damage is caused by inundation rather than by high velocity. Because most of the flood plain along the river is undeveloped, flood damage in March 1968 was not great—confined mostly to the basements of homes.

FLOODED AREAS

The extent of flooding along the Ipswich River and Maple Meadow Brook, a gaged tributary, is shown on the photomosaics. The areas covered by the photomosaics are outlined in figure 1.

The photomosaics have not been corrected for possible distortion caused by camera tilt or minor changes of altitude during flight. Although such distortions might cause slight error in the linear scale of the photomosaics, they have no effect on the boundaries of the flooding. Flooded areas masked by dense vegetation are outlined by a dashed line to indicate that the limit of flooding is only approximate. The photographs from which the photomosaics were compiled were taken after the river had reached its peak. Although the extent of flooding was clearly visible for the most part, flooding may have extended beyond the outlined areas in some reaches.

FLOOD DATA

Flood-crest elevations for the 1968 flood, in feet above mean sea level, are shown on the photomosaics. The flood-crest marks were those identified during field surveys.

Very few historical data are available on floods in the Ipswich River basin—probably because past floods have caused only minor damage. According to old newspaper accounts, even the flood of 1886, the greatest known in the basin, damaged only cellars and the boiler room of a mill.

The rate of discharge of a stream is the volume of water that passes a given point in a given period of time. Discharge rates usually are expressed in units of cubic feet per second (cfs). Peak discharge, the maximum discharge reached during a flood, generally occurs at the time of maximum height of a flood.

Peak-discharge data for major floods during the period of record (shown in parentheses after the name) at each gaging station in the Ipswich River basin are compared in the following table:

Date	Elevation (feet above mean sea level)	Discharge (cubic feet per second)
01101300. Maple Meadow Brook at Wilmington (1962–68)		
Oct. 7, 1962	81.04	103
Mar. 19, 1968	81.34	119
01101500. Ipswich River at South Middleton (1938–68)		
Oct. 7, 1962	51.96	808
Mar. 19, 1968	52.06	833
01102000. Ipswich River near Ipswich (1930–68)		
Mar. 15, 1936	28.33	2,610
Oct. 9, 1962	28.03	2,070
Mar. 20, 21, 1968	29.04	2,680

Discharge hydrographs for the March 1968 flood for the two gaging stations on the Ipswich River and for Maple Meadow Brook are shown in figures 2 and 3, respectively.

FLOOD FREQUENCY

The frequency of a flood may be expressed in terms of recurrence interval or of probability. The recurrence interval is the average interval of time within which a flood of a given magnitude will be exceeded once.

The frequency with which a flood of given magnitude can be expected on the Ipswich River near Ipswich can be determined from figure 4. The graph was derived from streamflow records for the period 1930–68 and from historical data. The elevation-discharge relation shown is based on channel conditions existing in 1968.

Figure 4 shows that at the station near Ipswich, a flood exceeding that of March 1968 can be expected, on the average, only once in about 50 years. It is emphasized that floods do not occur at regular intervals. For example, the graph shows a flood equal to at least 2,000 cfs has a recurrence interval of about 13 years. Yet, only one flood of that magnitude occurred in the first 31 years of record; then two occurred in the next 7 years.

Probability is virtually the reciprocal of the recurrence interval for floods greater than the 10-year flood. When stated in terms of probability, a flood exceeding that of March 1968 has 1 chance in 50 or a 2-percent chance of occurring in any given year.

COOPERATION AND ACKNOWLEDGMENTS

This report was prepared by the U.S. Geological Survey under the administrative direction of C.E. Knox, district chief, Water Resources Division, in cooperation with the Commonwealth of Massachusetts, Water Resources Commission. The aerial photographs used for the photomosaics were taken by Lockwood, Kessler, and Bartlett, Inc., Syosset, New York. Extent of flooding was delineated by W.J. Schneider and Antonio Jurado of the U.S. Geological Survey. The flood-crest elevations shown on the photomosaics were furnished by the U.S. Army Corps of Engineers.

ADDITIONAL INFORMATION

Additional information pertaining to floods in the Ipswich River basin can be obtained at the offices of the U.S. Geological Survey in Boston and from the following reports:

Green, A.R., 1964, Magnitude and frequency of floods in the United States, pt. 1-A, North Atlantic slope basins, Maine to Connecticut: U.S. Geol. Survey Water-Supply Paper 1671, 260 p.

Grover, N.C., 1937, The floods of March 1936, pt. 1, New England rivers: U.S. Geol. Survey Water-Supply Paper 798, 466 p.

Thomson, M.T., and others, 1964, Historical floods in New England: U.S. Geol. Survey Water-Supply Paper 1779-M, 105 p.

Wood, G.K., and others, 1970, Flood of March 1968 in eastern Massachusetts and Rhode Island: U.S. Geol. Survey open-file report, 81 p.

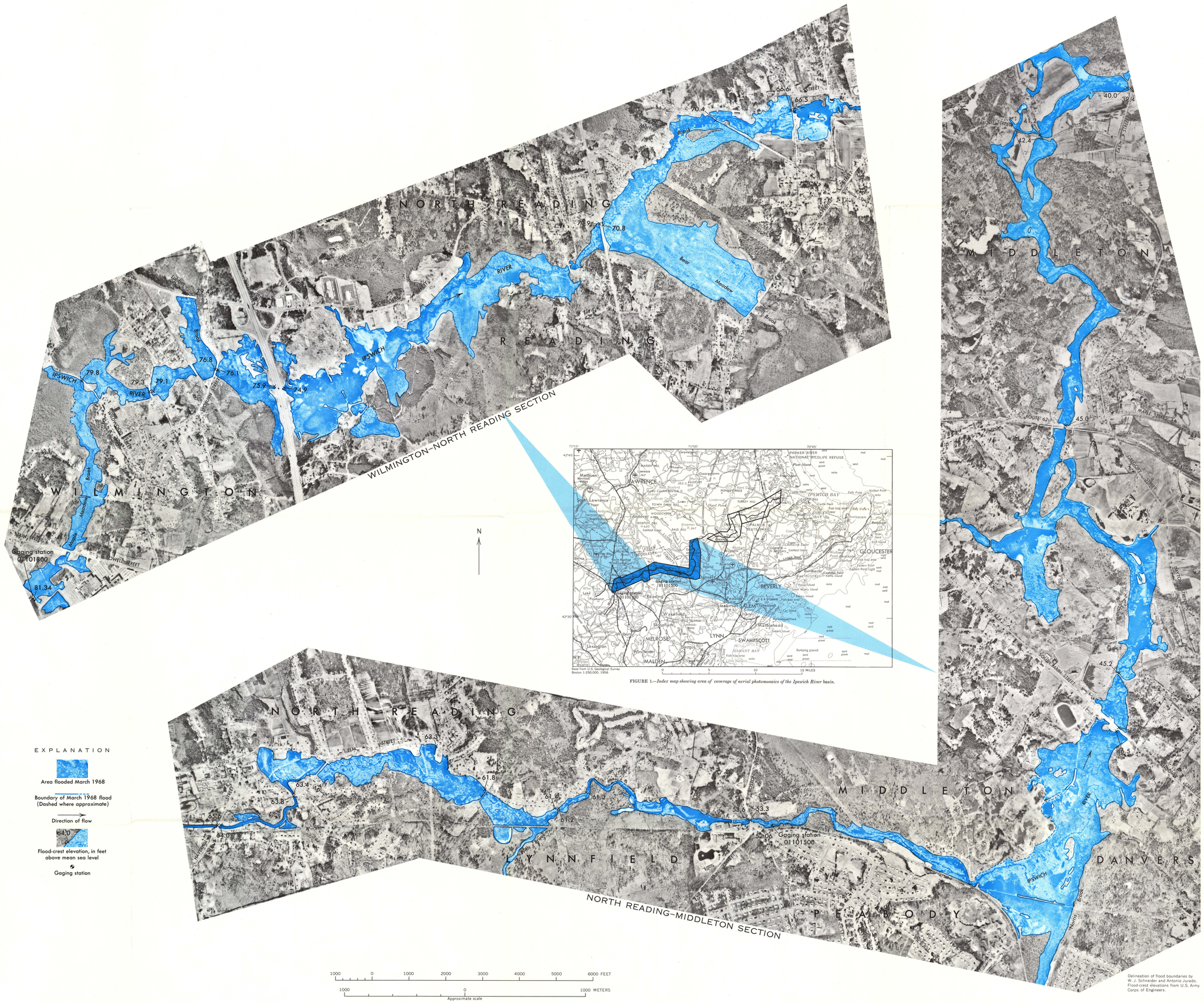

FIGURE 1.—*Index map showing area of coverage of aerial photomosaics of the Ipswich River basin.*

EXPLANATION

- Area flooded March 1968
- Boundary of March 1968 flood (Dashed where approximate)
- Direction of flow
- 64.0 — Flood-crest elevation, in feet above mean sea level
- Gaging station

1000 0 1000 2000 3000 4000 5000 6000 FEET
1000 0 1000 METERS
Approximate scale

Delineation of flood boundaries by W. J. Schneider and Antonio Jurado. Flood-crest elevations from U.S. Army Corps. of Engineers.

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