DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE CITY OF DALLAS, TEXAS

HYDROLOGIC INVESTIGATIONS
ATLAS HA-240

FLOOD OF OCTOBER 8, 1962, ON BACHMAN BRANCH AND JOES CREEK AT DALLAS, TEXAS

This report presents hydrologic data that enable the user to define areas susceptible to flooding and to evaluate the flood hazard along Bachman Branch and Joes Creek. The data provide a technical basis for making sound decisions concerning the use of flood-plain lands. The report will be useful for preparing building and zoning regulations, locating waste disposal facilities, purchasing unoccupied land, developing recreational areas, and managing surface water in relation to ground-water resources. This is one of a series of reports delineating the flood hazard on streams in the Dallas area.

The approximate areas inundated by Bachman Branch and Joes Creek, during the flood of October 8, 1962, are shown on a topographic map.

Bachman Branch and Joes Creek are in the northwest quadrant of Dallas and are directly tributary to Elm Fork Trinity River. Because the lower reaches of these streams are affected by backwater from Elm Fork Trinity River, the downstream limit of this report is at Interstate Highway 35 E, which is approximately 1 mile upstream from their mouths.

The flood of October 8, 1962, the greatest on both streams since at least 1900, was caused by a storm that lasted from about 4 a.m. to 7 a.m. and averaged about 6.7 inches of rainfall over the drainage basins. A flood of almost the same magnitude occurred on April 25, 1922. Below Bachman Lake Spillway and Denton Drive on Joes Creek, backwater from Elm Fork Trinity River on May 25, 1908, caused stages greater than those of October 8, 1962. Inundation for the flood of May 25, 1908, has been graphically represented on a topographic map (Stiles, 1913).

Floods greater than the October 8, 1962, flood are possible. Protective works already in existence make it unlikely that a flood of the magnitude of May 25, 1908, will recur on the Elm Fork Trinity River. The flood limits shown reflect channel conditions existing when the flood occurred. Changes in channel conditions, waterway openings at highways and railroads, or changes in runoff characteristics of the streams caused by increased urbanization that may have taken place after the floods occurred could affect the height of future floods of comparable magnitude. Future protective works in Bachman Branch and Joes Creek may reduce the frequency of flooding in the area, but will not necessarily eliminate flooding. Cultural changes and changes in land use may influence the inundation pattern of future floods.

Cooperation and acknowledgments.—The preparation of this report is part of an intensive hydrologic study of streams in Dallas, financed through a cooperative agreement between the city of Dallas and the U.S. Geological Survey.

The cooperative program is administered for Dallas by H. H. Stirman, Director of Public Works. The report was prepared by the U.S. Geological Survey under the administrative direction of Trigg Twichell, district chief.

Flood heights.—The height of a flood at a gaging station usually is stated in terms of gage height or stage, which is the water surface above a selected datum plane. Elevations shown on the map are in feet above mean sea level.

Prior to 1963, no systematic record of flood heights was recorded in either the Bachman Branch or Joes Creek basins. Beginning October 1, 1963, equipment was installed to record peak stages at 19 sites in Bachman Branch basin and 16 sites in Joes Creek basin. In addition, a continuous-record-streamflow station was installed on Bachman Branch at Midway Road (drainage area, 10.0 square miles).

Historical flood-height information was obtained in the two basins only for those floods occurring April 25, 1922, April 26, 1957, July 27, 1962, and October 8, 1962.

Flood discharge.—The rate of discharge of a stream is the volume of flow that passes a given site in a given period of time. Discharge rates in this report are expressed in units of cubic feet per second (cfs). Peak discharge is the maximum discharge reached during a flood.

Tabulated below are peak-discharge data for several sites in the Bachman Branch and Joes Creek basins for the flood of October 8, 1962.

Location	Drainage area (square miles)	Elevation above mean sea level (feet).1/	Discharge (cubic feet per second)
Bachman Branch			
Forest Lane	2.14	580.3	2,700
Royal Lane	3.44	543.3	5,160
Walnut Hill Lane	4.73	512.8	6,160
Brookview Drive	7.51	488.9	7,900
Midway Road	10.0	465.6	9,200
Joes Creek			
Royal Lane	1.94	521.2	4,470
Merrell Road	3.30	498.9	5,670
Lombardy Lane	5.65	449.8	7,080
State Highway 114	7.51	425.3	7,430

1/Elevation of water surface at downstream side of bridge.

Flood frequency.—As applied to flood events, recurrence interval is the average interval of time within which a given flood will be equaled or exceeded once. Frequencies of floods may also be stated in terms of their probabilities (virtually, reciprocals of their recurrence intervals for floods with recurrence intervals greater than 10 years). For example, a flood with a 25-year recurrence interval would have a 4-percent chance of being equaled or exceeded in any one year. It should not be inferred that the "100-year" flood will occur once and only once during a 100-year period. It may occur in any year, even in successive years. The 100-year flood has one chance in one hundred of being equaled or exceeded in any given year.

Frequency of floods on Bachman Branch at Midway Road and Joes Creek at State Highway 114 (excluding Elm Fork Trinity River backwater floods) has been estimated from streamflow data obtained at each site and other hydrologic data obtained from the Dallas area. The general relation between frequency and discharge is shown in figures 1 and 2. The relation between discharge and frequency can be affected by changes in land cover and usage. It must be emphasized that the curves shown in figures 1 and 2 are only estimates and might be adjusted as more hydrologic data on small streams are gathered and analyzed.

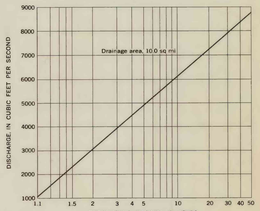

FIGURE 1.—*Frequency of floods on Bachman Branch at Midway Road at Dallas*

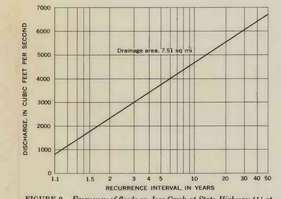

FIGURE 2.—*Frequency of floods on Joes Creek at State Highway 114 at Dallas*

The discharge of Bachman Branch at Midway Road for a flood with a recurrence interval of 50 years is about 8,800 cfs. The peak discharge for October 8, 1962, was 9,200 cfs.

The discharge of Joes Creek at State Highway 114 for a flood with a recurrence interval of 50 years is about 6,800 cfs. The peak discharge for October 8, 1962, was about 7,400 cfs.

Magnitude and frequency of floods resulting from backwater from Elm Fork Trinity River have not been determined. Because of extensive flood-control works in the upper Elm Fork trinity River basin and because inundation maps for the 1908 flood have previously been published, no extensive analysis will be reported herein concerning backwater-type floods.

Flood profiles.—Profiles of the water surface, based on elevations of marks left by the flood of October 8, 1962, are shown in figures 3 and 4. Profiles of floods corresponding to other flood heights will usually be parallel to the profile for the 1962 flood. River miles used for the profiles correspond to those marked along the streams on the flood map.

The abrupt changes in the profiles shown at some road crossings indicate the difference in water-surface elevations at the upstream and downstream sides of bridges that produce channel constrictions. These differences reflect the relative hydraulic capacities of bridge openings and those of channels and flood plains. The drop in water surface through bridge openings during future floods may be different from that shown on the profiles. An increase in channel capacity through a bridge opening could reduce the flood height on the upstream side. An accumulation of debris at a bridge would reduce channel capacity and tend to increase the upstream flood height. Channel changes through bridge openings may also change the overflow pattern of future floods.

Flood depths.—Depth of flooding at any point can be estimated by subtracting the ground elevation from the water-surface elevation indicated by the profiles in figures 3 and 4. The approximate ground elevation can be determined from contours on the map, although more accurate elevations can be obtained by leveling to nearby bench marks.

Additional information.—Other information pertaining to floods on Bachman Branch and Joes Creek and on other streams in Dallas can be obtained at the offices of the U.S. Geological Survey in Austin and Fort Worth, and from the following reports:

Benson, M. A., 1964, Factors affecting the occurrence of floods in the Southwest: U.S. Geol. Survey Water-Supply Paper 1580-D, 72 p.

Gilbert, C. R., 1963, Floods on White Rock Creek above White Rock Lake at Dallas, Texas: U.S. Geol. Survey open-file report (Texas no. 66), 15 p.

Patterson, J. L., 1963, Floods in Texas, magnitude and frequency of peak flows: Texas Water Commission Bull. 6311, 207 p.

_____ 1965, Magnitude and frequency of floods in the United States, Part 8, Floods in Western Gulf of Mexico basins: U.S. Geol. Survey Water-Supply Paper 1682, 506 p.

Ruggles, F. H., Jr., 1964, Frequency and extent of flooding on Lower White Rock Creek at Dallas, Texas: U.S. Geol. Survey open-file report (Texas no. 69), 23 p.

_____ 1964, Floods on Bachman Branch and Joes Creek at Dallas, Texas: U.S. Geol. Survey open-file report (Texas no. 83), 26 p.

_____ 1966, Floods on small streams in Texas: U.S. Geol. Survey open-file report (Texas no. 89), 105 p.

Stiles, A. A., 1913, Elm Fork Trinity River, Dallas County, Owen Crossing Sheet, Texas Reclamation Map.

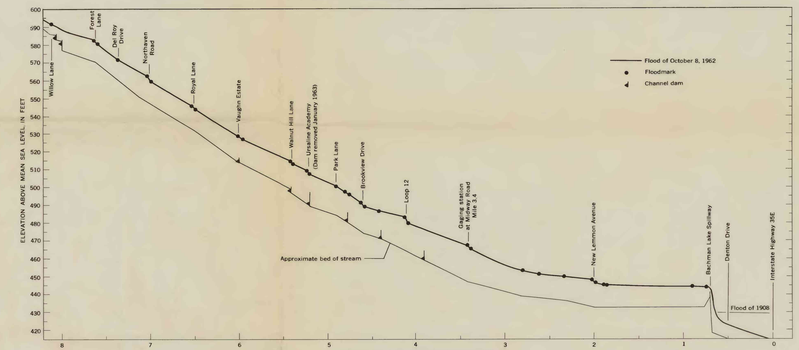

FIGURE 3.—*Profile of October 8, 1962, flood on Bachman Branch*

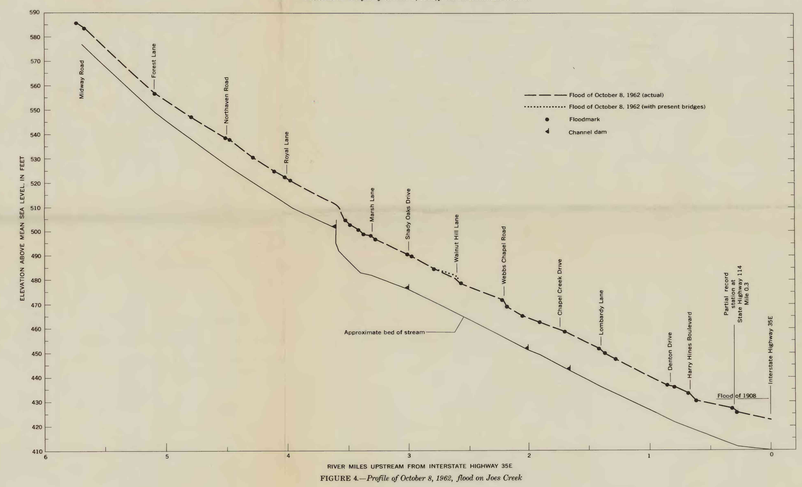

FIGURE 4.—*Profile of October 8, 1962, flood on Joes Creek*

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