FLOOD ON BIG FOSSIL CREEK AT HALTOM CITY NEAR FORT WORTH, TEXAS, IN 1962

The approximate area inundated near Fort Worth, Texas, by Big Fossil Creek, during the flood of September 7, 1962, is shown on a topographic map to record the flood hazard in graphic form. Big Fossil Creek, which drains an area of 74.7 square miles, flows generally southeastward along the northeast edge of Fort Worth through Richland Hills and Haltom City, into West Fork Trinity River. The flood of September 7, 1962, the greatest in Richland Hills since at least 1900 was the result of a high rate of discharge from the area upstream from the confluence of Big Fossil Creek and Whites Branch. Greater floods are possible, but no attempt has been made to show their probable overflow limits. Future protective works may reduce the frequency of flooding in the area but will not necessarily eliminate flooding. Changes in culture such as new highways and bridges and changes in land use may influence the inundation pattern of future floods. Mapping of the West Fork Trinity River flood was beyond the scope of the Big Fossil Creek study, and is not shown.

Cooperation and acknowledgment.—Supplementary flood-mark elevations were furnished by the Corps of Engineers, U.S. Army, and by the Soil Conservation Service, U.S. Department of Agriculture.

The report was prepared under the administrative direction of Trigg Twichell, district engineer. The explanatory text was written by John H. Montgomery, the flood map was prepared by Frederick H. Ruggles, Jr., and the flood-frequency relation was developed by James L. Patterson, U.S. Geological Survey.

Flood height.—The height of a flood at a gaging station usually is stated in terms of the gage height or stage, which is the elevation of the water surface above a selected datum plane. Gage heights or stages at the gaging station on Big Fossil Creek at Haltom City, Texas, located at State Highways 121 and 183 about 3 miles east of the Fort Worth city boundary and 3.5 miles upstream from the mouth, can be converted to elevations above mean sea level by adding 491.48 feet. Water-surface elevations shown on the map are in feet above mean sea level datum.

Elevation and year of occurrence of each annual flood (highest peak discharge in each year) above 512-foot elevation known to have occurred at the gaging station on Big Fossil Creek at Haltom City during the period 1900–62, are shown in figure 1. It is evident that floods on Big Fossil Creek occur at irregular intervals.

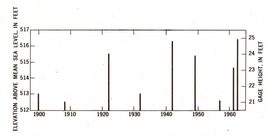

FIGURE 1.—ANNUAL FLOODS OF RECORD ABOVE 512-FOOT ELEVATION, 1900–62, ON BIG FOSSIL CREEK AT HALTOM CITY (STATE HIGHWAYS 121 AND 183)

Flood discharge.—The rate of discharge is the volume of flow that passes a particular location in a given period of time. Discharge rates usually are expressed in units of cubic feet per second (cfs). Peak discharge is the maximum discharge reached during a flood. Peak discharge and maximum height of a flood generally occur simultaneously but if a stream is affected by variable backwater, the peak discharge may not coincide with maximum stage.

Flood frequency.—Frequency of flooding on Big Fossil Creek at Haltom City (fig. 2) has been derived from streamflow records at the U.S. Geological Survey gaging station supplemented by the historical records of floods compiled by the Corps of Engineers, U.S. Army. The flood-frequency curve should not be extrapolated beyond the limits shown because of the possibility of large errors.

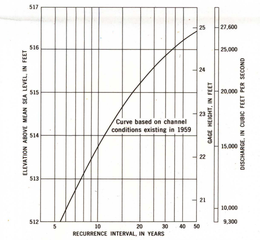

FIGURE 2.—FREQUENCY OF FLOODS ABOVE 512-FOOT ELEVATION ON BIG FOSSIL CREEK AT HALTOM CITY (STATE HIGHWAYS 121 AND 183)

Recurrence intervals.—As applied to flood events, recurrence interval is the number of years, on the average, within which a given flood height will be equaled or exceeded once. It is inversely related to the chance of a specific flood being equaled or exceeded in any one year. Thus a 20-year flood would have one chance in 20 of being equaled or exceeded in any one year, or a 25-year flood would have one chance in 25 of being equaled or exceeded in any one year.

The general relation between recurrence interval and flood height at the Haltom City gaging station at the downstream side of State Highways 121 and 183 (fig. 2) is tabulated below.

Recurrence interval (years)	Gage height (feet)	Elevation above mean sea level (feet)	Discharge (cubic feet per second)
50	24.9	516.4	27,000
30	24.3	515.8	23,900
20	23.7	515.2	20,900
10	22.2	513.7	14,600
6	20.8	512.3	10,000

It is emphasized that recurrence intervals are average figures—the average number of years that will elapse between occurrences of floods that equal or exceed a certain flood height. Thus, a flood that reaches 515.2-foot elevation at the gaging station is said to have a 20-year recurrence interval. However, because of the erratic nature of flood occurrence, the 515.2-foot elevation may not be reached in any one 20-year period, or it may be reached more than once.

The stage-discharge relation is based on channel conditions existing in 1962 but proposed channel improvements may change this relation in the future. If the stage-discharge relation is altered, the stage-frequency relation will also be changed.

Flood profiles.—The profile of the water surface along Big Fossil Creek, constructed from marks left by the flood of September 7, 1962, is shown in figure 3. Profiles of floods corresponding to other flood-heights usually can be plotted on this diagram generally parallel to the profile of the 1962 flood.

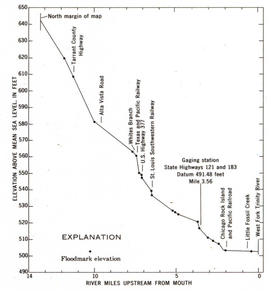

FIGURE 3.—PROFILE OF SEPTEMBER 7, 1962, FLOOD ON BIG FOSSIL CREEK

The abrupt changes in profile, shown at some street and railroad locations, indicate the difference in water surface elevations at the upstream and downstream sides of bridges. Base line for the profile is located along the main channel. River miles measured upstream from the mouth of Big Fossil Creek, used for the profile in figure 3, are also marked along the channel on the flood map.

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

Additional data.—Other information pertaining to floods near Fort Worth, Texas, may be obtained at the offices of the U.S. Geological Survey, Austin, Texas, and Fort Worth, Texas.

BIG FOSSIL CREEK FLOOD DATA

Tabulated below are flood data pertaining to Big Fossil Creek at Haltom City, Texas. Indicated water-surface elevations refer to gaging station location on downstream side of downstream bridge on State Highways 121 and 183.

Date	Gage height (feet)	Elevation above mean sea level (feet)	Discharge (cubic feet per second)
Sept.—, 1900	21.5	513.0	[1]12,000
May 25, 1908	[2]21.0	512.5	[1]10,500
April 22, 1922	[2]24.0	515.5	[1]22,400
Sept.—, 1932	21.5	513.0	[1]12,000
April 29, 1942	24.8	516.3	[1]26,400
May 16, 1949	[2]23.8	515.3	[1]21,400
May 25, 1957	21.04	512.52	[1]10,600
June 25, 1961	23.06	514.54	18,000
Sept. 7, 1962	24.90	516.38	27,000

[1] Approximate.
[2] May be affected by backwater from West Fork Trinity River.

HYDROLOGIC INVESTIGATIONS
ATLAS HA-190

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1965

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1965—W64374

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