FLOOD OF MAY 24-25, 1981, IN THE AUSTIN, TEXAS, METROPOLITAN AREA

INTRODUCTION

Hydrologic data pertaining to the magnitude and areal extent of flooding that occurred on May 24-25, 1981, along Shoal, Walnut, and Little Walnut Creeks in the Austin, Texas, metropolitan area are presented in this atlas. The flood boundary maps and other flood data provide a technical data base for land-use planning.

The approximate areas inundated by the flood of May 24-25, 1981, on Shoal Creek and in urban areas along the downstream reaches of Walnut and Little Walnut Creeks are shown to document the extent of flooding in these areas. The flood was probably the greatest to occur in the Shoal and Walnut Creek basins in at least 60 years.

The U. S. Geological Survey, in cooperation with the city of Austin, is conducting an intensive hydrologic study of streams in the Austin, Texas, metropolitan area. Hydrologic records from that program were used in the preparation of this atlas which was funded by the U. S. Geological Survey, as part of a continuing program to document information in areas inundated by catastrophic floods.

DESCRIPTION OF THE AREA

Shoal Creek flows south through a densely developed area along the western part of the city of Austin. Soils in the basin are mostly thin clay loams overlying the limestone bedrock that is exposed along the streambed from the stream's origin in the foothills of northwest Austin to its confluence with Town Lake (Colorado River) in the downtown area.

Walnut Creek originates in the northwest part of Austin and has the same geologic setting as Shoal Creek. Walnut Creek flows in a southeasterly direction around the northern and eastern perimeter of the city into the Colorado River. The basin is predominantly rural but is currently (1981) experiencing rapid urban development, especially in the headwaters. The extent of inundation by future floods in the Walnut Creek basin will depend largely upon changes in land use and the application of sound flood-plain management techniques.

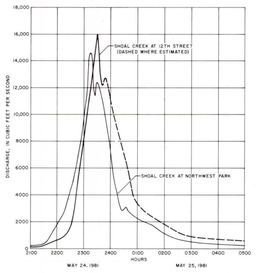

Figure 1.——Discharge hydrographs at U. S. Geological Survey gaging stations on Shoal Creek at Northwest Park and Shoal Creek at 12th Street at Austin, Texas, flood of May 24-25, 1981.

Little Walnut Creek is part of the Walnut Creek basin and originates in a densely developed residential area between the mainstem of Walnut Creek and the headwaters of Shoal Creek. The upper one-half of the Little Walnut Creek basin is the most intensely developed area in the Walnut Creek basin.

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Flood Height

The height of a flood at a gaging station usually is stated in terms of gage height or stage, which is the elevation of the water surface above a selected datum. The elevation of the water surface above NGVD (National Geodetic Vertical Datum of 1929) can be determined by adding the gage height to the NGVD of the gage. NGVD is a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level."

Flood Discharge

The rate of discharge of a stream is the volume of flow that passes a specific location in a given period of time. Discharge rates usually are given in cubic feet per second. Maximum gage height and discharge data for sites in the Shoal Creek and Walnut Creek basins for May 24-25, 1981, are given in table 1. Discharge hydrographs for selected sites in the Shoal and Little Walnut Creek basins are shown on figures 1 and 2.

Flood Frequency

The systematic collection of hydrologic data in the Shoal and Walnut Creek basins began in 1975. Sufficient data have not been obtained to date (1981) to define flood-frequency relations in these basins.

Flood Profiles

Profiles of the water surface along Shoal, Walnut, and Little Walnut Creeks, constructed from high-water marks left by the flood of May 24-25, 1981, are shown in figures 3-5. Profiles of floods corresponding to other flood heights can be plotted on these diagrams generally parallel to those shown. The abrupt changes in the profile, shown at some bridge locations and channel dam sites, indicate the difference in water-surface elevations at the upstream and downstream sides of these structures. Also shown on figures 3-5, are streambed profiles that may be used to determine depths of flooding at points of interest along the study reaches. Distances used on the profiles are marked along the streams on the flood inundation maps.

Rainfall

Rainfall amounts averaging about 0.6 inch fell over the Shoal and Walnut Creek basins on May 23. By 2130 hours on May 24, rainfall amounts ranging from 1.25 to 2.36 inches had fallen. The intense rainfall that produced the maximum stream discharge began at about 2130 hours on May 24 and ended shortly before midnight. The time distribution of the rainfall collected by the recording rain gages in the Shoal and Walnut Creek basins is given in table 2.

The areal distribution of rainfall totals for May 24-25 throughout the entire north Austin area is shown in figure 6. These totals do not include the rainfall that fell on May 23.

ADDITIONAL INFORMATION

Additional information pertaining to floods and streamflow characteristics of the Shoal and Walnut Creek basins may be obtained at the office of the U. S. Geological Survey, 300 East 8th Street, Austin, Texas. Previous studies include the city of Austin's Comprehensive drainage studies of the Shoal Creek and Little Walnut Creek basins (URS/Forest and Cotton, Inc., and Espey, Huston and Associates, Inc., 1974 and 1976). Hydrologic data collected at U. S. Geological Survey streamflow stations in the study area are published annually in the publication, "Hydrologic data for urban studies in the Austin, Texas, metropolitan area".

REFERENCES CITED

URS/Forest and Cotton, Inc., and Espey, Huston and Associates, Inc., 1974, City of Austin, Comprehensive drainage study, Shoal Creek drainage basin: CIP No. 7029-0, city of Austin, 12 sheets.

_____1976, City of Austin, Comprehensive drainage study, Little Walnut Creek drainage basin: CIP No. 7029-0, city of Austin, 13 sheets.

National Weather Service, 1981, National disaster survey report, flash floods at Austin, May 24-25, 1981: Southern Region, Fort Worth, Texas, 21 p.

METRIC CONVERSIONS

The inch-pound units of measurement used in this report may be converted to metric units by using the following conversion factors:

From		Multiply by	To obtain	
Unit	Abbreviation		Unit	Abbreviation
Inch	——	25.4	Millimeter	mm
Foot	——	0.3048	Meter	m
Mile	——	1.609	Kilometer	km
Square mile	mi^2	2.590	Square kilometer	km^2
Cubic foot per second	ft^3/s	0.02832	Cubic meter per second	m^3/s

Table 1.——Maximum gage height and discharge data for the flood of May 24-25, 1981

Location	Drainage area (square miles)	Datum of gage above NGVD of 1929 1/ (feet)	Time of maximum discharge		Maximum	
			Date	Hour	Gage height (feet)	Discharge (cubic feet per second)
Shoal Creek						
Steck Avenue	3.19	703.00	May 24	2255	10.63	5,100
Northwest Park	7.03	661.34	May 24	2315	18.00	14,600
White Rock Drive	7.56	642.60	May 24	2320	18.69	15,700
West 12th Street	12.8	455.33	2/ May 24	2330	23.22	16,000
Walnut Creek						
FM 1325	12.6	670.62	2/ May 24	2400	19.46	15,000
Dessau Road	26.2	553.44	2/ May 25	0030	26.20	21,600
Little Walnut Creek						
IH 35	5.57	628.75	May 24	2325	12.00	7,900
Manor Road	12.1	473.82	May 25	0015	19.60	14,500

1/ National Geodetic Vertical Datum of 1929.
2/ Gaging station inundated by flood. Peak time estimated.

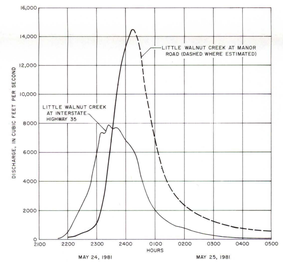


Figure 2.——Discharge hydrographs at U. S. Geological Survey gaging stations on Little Walnut Creek at Interstate Highway 35 and Little Walnut Creek at Manor Road at Austin, Texas, flood of May 24-25, 1981.

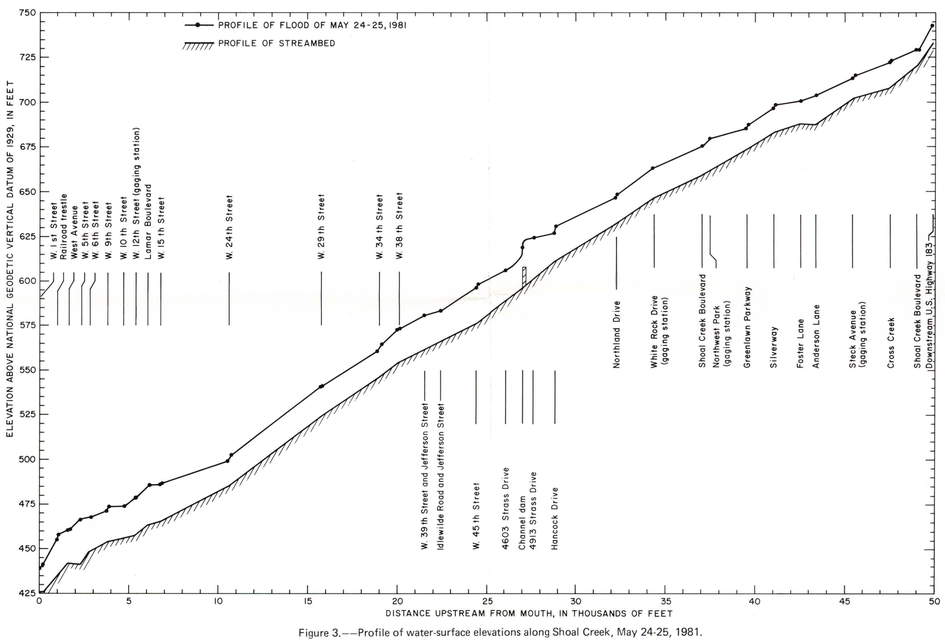
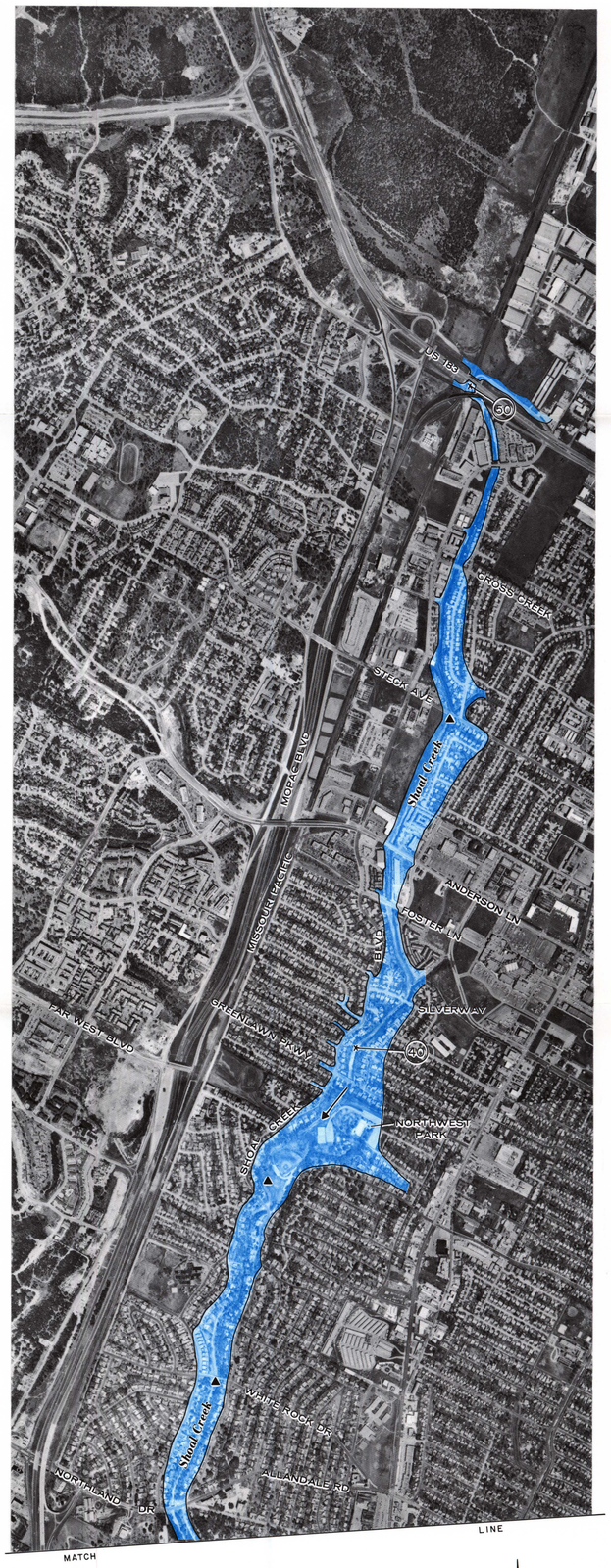


Figure 3.——Profile of water-surface elevations along Shoal Creek, May 24-25, 1981.



EXPLANATION

- AREA FLOODED MAY 24-25, 1981
- BOUNDARY OF MAY 24-25, 1981 FLOOD
- DIRECTION OF FLOW
- (40) DISTANCE UPSTREAM FROM MOUTH OF SHOAL CREEK, IN THOUSANDS OF FEET
- ▲ GAGING STATION

N

Maps showing areas flooded along Shoal Creek.

1000 0 1000 2000 3000 4000 5000 6000 FEET

1000 0 1000 METERS

Uncontrolled photomosaic base by U. S. Geological Survey from aerial photograph taken by the Miller Blue Print Company, Austin, Texas, in March 1981.

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