o)
902
78-164

Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976

U.S. GEOLOGICAL SURVEY
OFR/WRD 78-164

U.S. GEOLOGICAL SURVEY
RESTON, VA.
NOV 30 1978
LIBRARY

Prepared in cooperation with the Texas Department of Water Resources

(200)
R290
no. 78-164

USGS LIBRARY-RESTON
3 1818 00069531 0

Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976

By Lynn Harmsen

U.S. GEOLOGICAL SURVEY
OFR/WRD 78-164

Reports - Open file Series.

352312

Prepared in cooperation with the Texas Department of Water Resources

June 1978

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

Reproduced by the Texas Department of Water Resources as part of the continuing program of cooperation in water-resources investigations between the Department of Water Resources and the U.S. Geological Survey.

Copies of this report may be obtained from the
U.S. Geological Survey
Federal Building
300 East 8th Street
Austin, TX 78701

CONTENTS

Page

Introduction---------- 7
Purpose and scope of this basic-data report---------- 9
Watershed features---------- 9
Climate---------- 13
Hydrologic instrumentation---------- 13
Data collection---------- 13
Precipitation---------- 13
Runoff---------- 13
Summary of data for the 1976 water year---------- 19
Annual---------- 19
Individual storms---------- 20
Elm Creek basin---------- 20
Water quality---------- 22
Selected references---------- 23
Compilation of data---------- 24
Station descriptions, discharge, and water-quality data at stations in the San Antonio area:
Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.---- 25
Olmos Creek at Dresden Drive, San Antonio, Tex.---------- 27
San Antonio River at San Antonio, Tex.---------- 29
Alazan Creek at St. Cloud Street, San Antonio, Tex.---------- 31
Panther Springs Creek at Farm Road 2696 near San Antonio, Tex.---------- 33
Salado Creek tributary at Bitters Road, San Antonio, Tex.------ 35
Salado Creek (upper station) at San Antonio, Tex.---------- 37
Salado Creek tributary at Bee Street, San Antonio, Tex.-------- 39
Salado Creek (lower station) at San Antonio, Tex.---------- 41
Leon Creek tributary at Farm Road 1604, San Antonio, Tex.------ 44
Helotes Creek at Helotes, Tex.---------- 46
Leon Creek tributary at Kelly Air Force Base, Tex.---------- 49
Daily and monthly rainfall summary---------- 52
Storm rainfall and runoff records for selected storms at continuous-record stream-gaging stations:
Olmos Creek at Dresden Drive, San Antonio, Tex.
Storm of May 6-7, 1976---------- 62
Salado Creek (lower station) at San Antonio, Tex.
Storm of May 7-8, 1976---------- 65
Helotes Creek at Helotes, Tex.
Storm of April 17-18, 1976---------- 69
Storm of May 6-7, 1976---------- 72

CONTENTS--Continued

Page

Compilation of data--Continued
Storm rainfall and runoff records for selected storms at continuous-record stream-gaging stations--Continued
Leon Creek tributary at Kelly Air Force Base, Tex.
Storm of Oct. 25, 1975---------- 75
Storm of May 20, 1976---------- 77
Storm of June 16, 1976---------- 79
Storm of Sept. 19-20, 1976---------- 81
Storm of Sept. 28, 1976---------- 84
Storm rainfall and runoff records for selected storms at crest-stage partial-record stations:
Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.
Storm of May 6-7, 1976---------- 86
Alazan Creek at St. Cloud Street, San Antonio, Tex.
Storm of April 4, 1976---------- 89
Storm of May 6-7, 1976---------- 91
Storm of Aug. 29, 1976---------- 94
West Elm Creek at San Antonio, Tex.
Storm of May 7, 1976---------- 97
Storm of May 26, 1976----------100
Storm of Sept. 28, 1976----------103
East Elm Creek at San Antonio, Tex.
Storm of May 7, 1976----------106
Storm of May 26, 1976----------109
Storm of July 6, 1976----------112
Salado Creek tributary at Bitters Road, San Antonio, Tex.
Storm of April 4, 1976----------115
Storm of May 6-7, 1976----------117
Storm of June 16, 1976----------121
Storm of Aug. 18, 1976----------123
Salado Creek tributary at Bee Street, San Antonio, Tex.
Storm of May 6-7, 1976----------125
Storm of May 26, 1976----------128
Storm of Sept. 28, 1976----------131

ILLUSTRATION

Page

Figure 1. Map showing physiography, drainage basins, and hydrologic-instrument installations in the San Antonio urban area---------- 10

TABLES

Page

Table 1. Drainage area, period of record, type of gage, and watershed characteristics at gaging stations in the San Antonio urban area---------- 11
2. Weighted-mean precipitation equations for the San Antonio metropolitan area---------- 14
3. Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed---------- 15
4. Peak elevations at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek---------- 17
5. Weighted-storm rainfall for areas above stream-gaging and crest-stage partial-record stations---------- 21
6. Maximum discharge at crest-stage partial-record stations---------- 51

HYDROLOGIC DATA FOR URBAN STUDIES IN THE SAN ANTONIO, TEXAS METROPOLITAN AREA 1976

By

Lynn Harmsen
U.S. Geological Survey

INTRODUCTION

Hydrologic investigations of urban watersheds in Texas were begun by the U.S. Geological Survey in 1954. These studies are now in progress in Austin, Dallas, Dallas County, Fort Worth, Houston, and San Antonio.

The Geological Survey, in cooperation with the Texas Department of Water Resources, expanded the existing streamflow network in the San Antonio metropolitan area in May 1968 to begin urban hydrology studies in this area. In September 1968, the program was further expanded to include the collection of water-quality data.

The operation and maintenance of stations 08178000, San Antonio River at San Antonio; 08178700, Salado Creek (upper station) at San Antonio; and 08178800, Salado Creek (lower station) at San Antonio are funded by the San Antonio River Authority in conjunction with the Texas Department of Water Resources and the U.S. Geological Survey. The operation and maintenance and the water quality of stations 08178640, West Elm Creek at San Antonio, and 08178645, East Elm Creek at San Antonio, are funded by the Edwards Underground Water District in cooperation with the Texas Department of Water Resources and the U.S. Geological Survey.

The objectives of the San Antonio urban hydrology study are:

1. To provide data showing the effects of various stages of urbanization on flood discharge and runoff.

2. To provide water-quality data on surface-water runoff from floods of various magnitudes, during all seasons of the year from areas with different types of utilization.

Annual publication of the San Antonio urban studies was initiated in 1969.

The English 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	--	.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	.02832	cubic meter per second	m^3/s
foot per mile	ft/mi	.189	meter per kilometer	m/km
acre-foot	--	1233	cubic meter	m^3
		.001233	cubic hectometer	hm^3

To convert degrees Celsius (°C) to degrees Fahrenheit (°F):

°F = 9/5 °C + 32.

Purpose and Scope of this Basic-Data Report

The purpose of this report is to present a compilation of hydrologic data collected in the San Antonio urban area for the 1976 water year.

To facilitate the publication and distribution of this report at the earliest feasible time, certain material has been included that does not conform to the formal publication standards of the U.S. Geological Survey.

Watershed Features

The natural hydrologic features of watersheds in the San Antonio urban study area are strongly affected by two physiographic regions, the Edwards Plateau and the West Gulf Coastal Plain, which are divided by the Balcones Escarpment (fig. 1).

The Edwards Plateau has been eroded by streams into relatively steep and rugged topography, while the West Gulf Coastal Plain, which is rolling or moderately hilly near the Balcones Escarpment, has a more gentle relief in the southern part of the study area.

The recharge zone of the Edwards underground reservoir, as defined in the Texas Water Quality Board order 75-0128-20 (fig. 1) is that area where surface water has the potential of entering the Edwards aquifer.

A summary of gaging stations and watershed characteristics is given in table 1.

Climate

The climate of the area is modified subtropical with a prevailing south wind. Thunderstorms occur frequently in the spring and summer. Long-duration, low-intensity storms triggered by southward-moving continental polar fronts occur during the fall and winter. Some of the heaviest rainfall occurs in late summer and early fall as a result of hurricanes moving inland from the Gulf of Mexico. Individual storms that cause serious flooding may occur during any season but are most frequent in the spring. The normal rainfall for San Antonio, based on records of the Environmental Data Service for the period 1941-70, is 27.54 inches, with the largest average monthly rainfall occurring in May and September. The average annual temperature is 69°F (20.5°C).

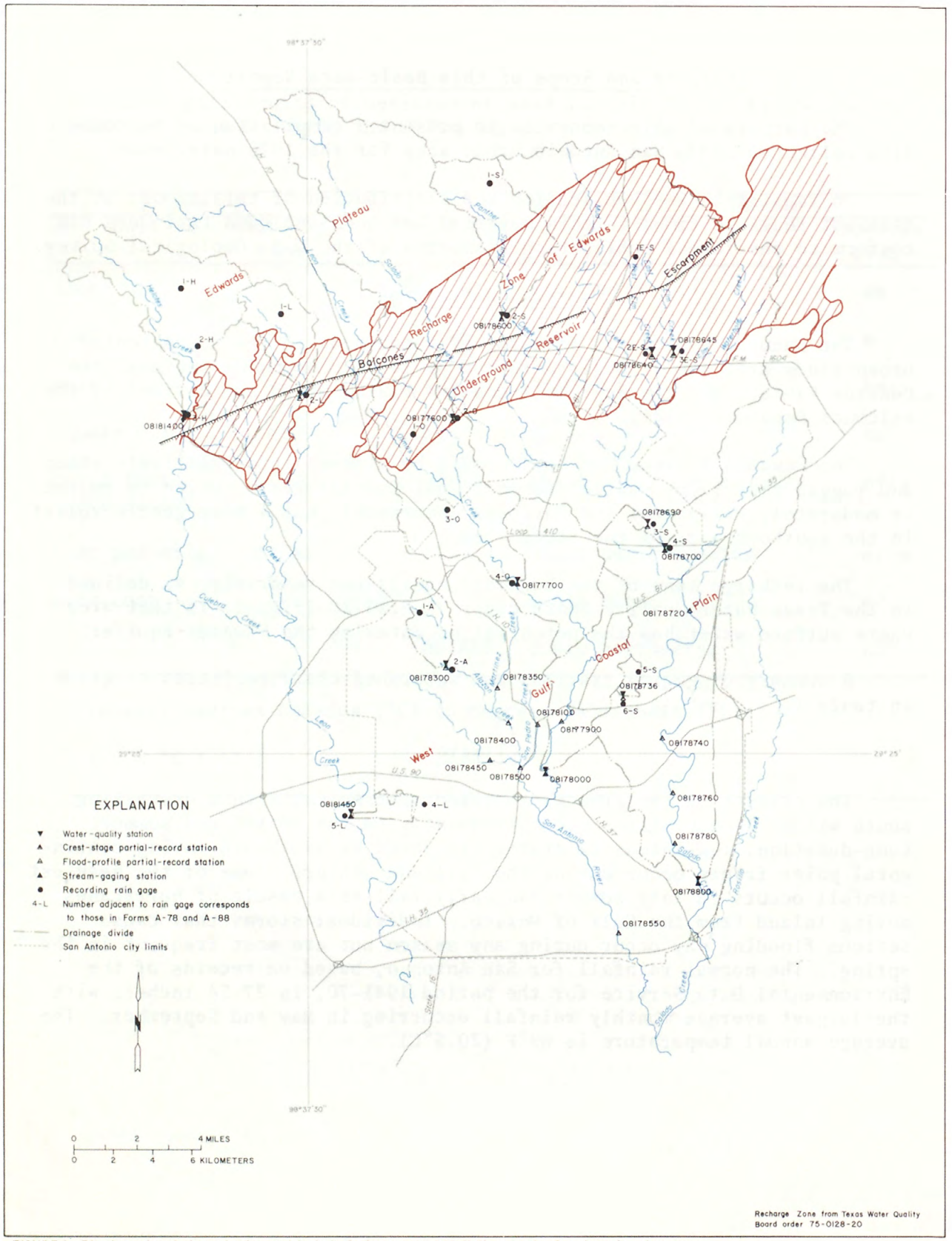


FIGURE 1.- Physiography, drainage basins, and hydrologic-instrument installations in the San Antonio urban area

Table 1.--Drainage area, period of record, type of gage, and watershed characteristics at gaging stations in the San Antonio urban area

Station number	Station name	Drainage area (mi^2)	Period of record	Type of gage	Watershed characteristics
08177600	Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.	0.33	1969-76	Crest-stage partial-record	Watershed completely within the Edwards recharge zone; completely developed residential area with 3- to 4-acre home sites; rolling terrain.
08177700	Olmos Creek at Dresden Drive, San Antonio, Tex.	21.2	1968-76	Continuous-record	Central and upper reach located within the Edwards recharge zone; residential and commercial development in lower reach, predominantly rural in upper reach; rolling terrain.
08178000	San Antonio River at San Antonio, Tex.	41.8	1915-29, 1939-76	Continuous-record	Upper reach located within the Edwards recharge zone; residential and commercial development in lower reach, predominantly rural in upper reach; rolling terrain.
08178300	Alazan Creek at St. Cloud Street, San Antonio, Tex.	3.26	1969-76	Crest-stage partial-record	Watershed completely within the West Gulf Coastal Plain; completely developed, residential and commercial; gentle to rolling terrain; considerable storm sewer development in lower reach.
08178600	Panther Springs Creek at Farm Road 2696 near San Antonio, Tex.	9.54	1969-76	Crest-stage partial-record	Lower reach is located within the Edwards recharge zone; rural area; rolling terrain.
08178640	West Elm Creek at San Antonio, Tex.	2.45	1976	Crest-stage partial-record	Watershed is completely within the recharge zone of the Edwards underground reservoir; predominantly rural; rolling to rugged terrain.
08178645	East Elm Creek at San Antonio, Tex.	2.33	1976	Crest-stage partial-record	Watershed is completely within the recharge zone of the Edwards underground reservoir; predominantly rural; rolling to rugged terrain.
08178690	Salado Creek tributary at Bitters Road, San Antonio, Tex.	.26	1969-76	Crest-stage partial-record	Drainage area almost completely within the West Gulf Coastal Plain; completely developed residential area; gentle terrain; storm sewers in lower reach.
08178700	Salado Creek (upper station) at San Antonio, Tex.	137	1960-76	Continuous-record	Central section of reach is within the Edwards recharge zone; limited amount of urban development in lower reach; predominantly rural in upper reach; rolling terrain.
08178736	Salado Creek tributary at Bee Street, San Antonio, Tex.	.45	1972-76	Crest-stage partial-record	Watershed completely within the West Gulf Coastal Plain; completely developed military and residential area; gentle to rolling terrain; some storm sewers.

Table 1.--Drainage area, period of record, type of gage, and watershed characteristics at gaging stations in the San Antonio urban area--Continued

Station number	Station name	Drainage area (mi^2)	Period of record	Type of gage	Watershed characteristics
08178800	Salado Creek (lower station) at San Antonio, Tex.	189	1960-76	Continuous-record	Upper section of watershed within the Edwards recharge zone; residential and commerical development in lower reach; predominantly rural in central and upper reach; rolling terrain.
08181000	Leon Creek tributary at Farm Road 1604, San Antonio, Tex.	5.57	1969-76	Flood-hydrograph partial-record	Lower reach of watershed is within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08181400	Helotes Creek at Helotes, Tex.	15.0	1968-76	Continuous-record	Extreme lower reach is within the Edwards recharge zone; predominantly rural; rugged terrain.
08181450	Leon Creek tributary at Kelly Air Force Base, Tex.	1.19	1969-76	Continuous-record	Watershed is completely within the West Gulf Coastal Plain; area is developed by military for runways, offices, and warehouses; gentle terrain.

HYDROLOGIC INSTRUMENTATION

A compilation of gaging stations used to obtain hydrologic data is listed in table 1. Locations of all hydrologic-instrument installations operated in connection with the San Antonio urban study are shown on figure 1.

In addition to the stations listed in table 1, four flood-profile partial-record stations are located between the stream-gaging stations Salado Creek (upper station) and Salado Creek (lower station) at San Antonio. In December 1972 and January 1973, seven crest-stage partial-record stations were installed at the request of the Corps of Engineers at sites on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek. Flood elevations are listed in table 4.

DATA COLLECTION

Precipitation

Total precipitation and rainfall intensities were determined from 22 recording rain gages distributed throughout the study area of which three are in the Elm Creek basin (fig. 1). Daily and monthly precipitation is also shown for the rain gage at the San Antonio International Airport.

Precipitation amounts in each drainage basin were compiled on a daily basis. Rainfall for each basin was weighted by the Thiessen polygon method.

In this study, a digital computer was used to process the large amounts of precipitation and runoff data. The equations used to determine weighted-mean precipitation for each drainage basin are given in table 2. Precipitation at individual gages and weighted precipitation in each drainage basin for selected storms are given in the section "Compilation of data."

Runoff

Runoff data from the San Antonio urban study area are based on discharge measurements and stage records at six continuous-record stream-gaging stations, eight crest-stage partial-record stations (flood hydrographs obtained), and water-surface elevations at eleven flood-profile partial-record stations. Daily discharge records for the six continuous-record stations and annual maximum discharge at the eight flood-hydrograph, partial-record stations for the 1976 water year are given in the section "Compilation of data." Gage heights for selected floods at four flood-profile partial-record stations, except as noted, are given in table 3 and at eight flood-profile partial-record stations, except as noted, in table 4.

Table 2.--Weighted-mean precipitation equations for the San Antonio metropolitan area

Station	Gage number	Weighted-mean precipitation equation
Stream-gaging stations		
Olmos Creek at Dresden Drive, San Antonio	08177700	(.34)(1-0)+(.18)(2-0)+(.40)(3-0)+(.08)(4-0)
Salado Creek (upper station) at San Antonio	08178700	(.32)(1-S)+(.36)(2-S)+(.22)(3-S)+(.00)(4-S) +(.08)(2-0)+(.02)(3-0)
Salado Creek (lower station) at San Antonio	08178800	(.23)(1-S)+(.27)(2-S)+(.20)(3-S)+(.10)(4-S) +(.04)(5-S)+(.09)(6-S)+(.06)(2-0)+(.01)(3-0)
Helotes Creek at Helotes	08181400	(.70)(1-H)+(.25)(2-H)+(.05)(3-H)
Leon Creek tributary at Kelly AFB	08181450	(.63)(4-L)+(.37)(5-L)
Crest-stage partial-record stations		
Olmos Creek tributary at FM 1535, Shavano Park	08177600	(1.00)(2-0)
Alazan Creek at St. Cloud Street, San Antonio	08178300	(.73)(1-A)+(.27)(2-A)
Panther Springs Creek at FM 2696 near San Antonio	08178600	(.71)(1-S)+(.29)(2-S)
West Elm Creek at San Antonio	08178640	(.58)(1E-S)+(.41)(2E-S)+(.01)(3E-S)
East Elm Creek at San Antonio	08178645	(.55)(1E-S)+(.07)(2E-S)+(.38)(3E-S)
Salado Creek tributary at Bitters Road, San Antonio	08178690	(1.00)(3-S)
Salado Creek tributary at Bee Street, San Antonio	08178736	(.59)(5-S)+(.41)(6-S)
Leon Creek tributary at FM 1604, San Antonio	08181000	(.77)(1-L)+(.23)(2-L)

Note: Where rain gage record was lost during a storm selected for analysis, that portion of the weighted-mean precipitation equation is prorated among the remaining rain gages in the equation.

Table 3.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed

Station no.	Station name	Drainage area (mi^2)	Distance above mouth of Rosillo Creek (miles)	1976 Flood elevations					
				Oct. 25	Mar. 6	Apr. 4	Apr. 16	Apr. 18	Apr. 29
a/08178700	Salado Creek (upper station) at San Antonio, Tex.	137	20.7	687.86	687.38	688.03	687.62	689.41	687.94
08178720	Salado Creek at Rittiman Road, San Antonio, Tex.	-	17.8	655.89	--	655.47	654.84	656.16	655.29
08178740	Salado Creek at East Houston Street, San Antonio, Tex.	-	11.2	597.91	596.39	--	--	598.48	--
08178760	Salado Creek at U.S. Highway 87, San Antonio, Tex.	-	7.7	578.57	577.22	577.26	--	578.85	577.64
08178780	Salado Creek at Southcross Boulevard, San Antonio, Tex.	-	5.4	--	--	--	--	--	--
a/08178800	Salado Creek (lower station) at San Antonio, Tex.	189	3.7	538.82	536.85	536.36	536.12	539.07	537.09

a/ Stream-gaging station.

Table 3.--Peak elevations for selected floods at flood-profile partial-record stations (except as noted) in the Salado Creek watershed--Continued

Station no.	Station name	Drainage area (mi^2)	Distance above mouth of Rosillo Creek (miles)	1976 Flood elevations				
				May 7	May 26	Sept. 2	Sept. 19	Sept. 28
a/08178700	Salado Creek (upper station) at San Antonio, Tex.	137	20.7	693.40	687.80	688.77	687.49	687.75
08178720	Salado Creek at Rittiman Road, San Antonio, Tex.	-	17.8	660.40	656.00	654.98	655.13	655.93
08178740	Salado Creek at East Houston Street, San Antonio, Tex.	-	11.2	605.95	602.64	--	596.77	--
08178760	Salado Creek at U.S. Highway 87, San Antonio, Tex.	-	7.7	583.02	580.36	--	577.74	--
08178780	Salado Creek at Southcross Boulevard, San Antonio, Tex.	-	5.4	557.18	--	--	--	--
a/08178800	Salado Creek (lower station) at San Antonio, Tex.	189	3.7	546.04	541.93	537.95	536.82	536.37

a/ Stream-gaging station.

Table 4.--Peak elevations at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek

Station no.	Station name	Drainage area (mi^2)	Distance above mouth	1976 Flood elevations							
				Oct. 25	Dec. 24	Feb. 20	Mar. 6-7	Apr. 4	Apr. 7	Apr. 24	Apr. 29
08177900	San Antonio River at Navarro Street, San Antonio, Tex.	--	b/14.5	639.78	--	--	--	638.58	638.82	638.80	639.79
a/08178000	San Antonio River at San Antonio, Tex.	41.8	b/12.7	614.21	615.49	611.19	613.85	615.34	615.21	614.44	614.47
08178100	San Pedro Creek at Santa Rosa Street, San Antonio, Tex.	--	3.7	641.46	640.83	638.43	640.93	642.76	642.40	640.16	--
08178350	Martinez Creek at Fredericksburg Road, San Antonio, Tex.	--	2.0	679.65	677.60	678.51	678.76	680.81	679.95	677.93	679.73
08178400	Alazan Creek at West Martin Street, San Antonio, Tex.	--	1.6	635.25	--	--	--	635.45	--	--	--
08178450	Apache Creek at South Zarzamora Street, San Antonio, Tex.	--	1.3	625.93	--	--	--	627.19	--	627.01	--
08178500	San Pedro Creek at Furnish Street, San Antonio, Tex.	--	1.7	603.33	--	--	--	601.49	601.11	601.18	--
08178550	San Antonio River at Ashley Street, San Antonio, Tex.	--	b/ 5.5	512.41	511.25	--	511.77	512.92	--	510.99	511.91

a/ Stream-gaging station.
b/ Distance above mouth of Salado Creek.

Table 4.--Peak elevations at flood-profile partial-record stations (except as noted) on rectified channels of the San Antonio River and selected tributaries above the mouth of Salado Creek --Continued

Station no.	Station name	Drainage area (mi^2)	Distance above mouth	1976 Flood elevations							
				May 7	May 20	June 16	July 4	July 14	Aug. 29	Sept. 16	Sept. 28
08177900	San Antonio River at Navarro Street, San Antonio, Tex.	--	b/14.5	640.40	643.46	--	640.06	--	--	638.72	639.98
a/08178000	San Antonio River at San Antonio, Tex.	41.8	b/12.7	616.48	616.44	614.38	615.11	611.64	--	611.17	616.01
08178100	San Pedro Creek at Santa Rosa Street, San Antonio, Tex.	--	3.7	643.77	643.12	638.46	639.72	639.66	638.53	641.71	642.65
08178350	Martinez Creek at Fredericksburg Road, San Antonio, Tex.	--	2.0	682.62	680.96	681.48	680.14	682.88	681.95	680.03	680.32
08178400	Alazan Creek at West Martin Street, San Antonio, Tex.	--	1.6	637.18	--	636.87	634.49	634.26	639.10	636.04	635.88
08178450	Apache Creek at South Zarzamora Street, San Antonio, Tex.	--	1.3	632.65	627.26	628.89	--	--	--	627.48	627.62
08178500	San Pedro Creek at Furnish Street, San Antonio, Tex.	--	1.7	605.59	602.72	603.93	--	--	604.43	602.32	603.17
08178550	San Antonio River at Ashley Street, San Antonio, Tex.	--	b/ 5.5	519.29	516.16	511.64	510.66	--	511.46	512.08	513.66

a/ Stream-gaging station.
b/ Distance above mouth of Salado Creek.

Runoff for 08181000, Leon Creek tributary at Farm Road 1604, San Antonio, occurred on April 18, May 7, 26, and Aug. 30, 1976. Runoff for 08178600, Panther Springs Creek at Farm Road 2696 near San Antonio, occurred on April 18-19, May 7, 26-28, Aug. 30, and Sept. 28, 1976. Individual storms for these stations were not analyzed this year. The annual maximum discharge is given in table 6, in the section "Compilation of data."

Runoff data from the Elm Creek study area are based on discharge measurements and stage records at two crest-stage partial-record stations (flood hydrographs obtained). Data for this basin for the 1976 water year are given in the section "Compilation of data."

SUMMARY OF DATA FOR THE 1976 WATER YEAR

Annual

Mean annual precipitation at the National Weather Service station at the San Antonio International Airport for the 30-year period 1941-70 (calendar year) is 27.54 inches. Weighted-mean rainfall, total runoff, and the rainfall-runoff ratio for five stations representing basins in the San Antonio metropolitan area for the 1976 water year are as follows:

Station	Weighted-mean rainfall (inches)	Total runoff (inches)	Ratio of runoff to rainfall
Helotes Creek at Helotes (08181400)	36.09	2.90	0.08
Leon Creek tributary at Kelly AFB (08181450)	30.43	5.64	.19
Olmos Creek at Dresden Drive, San Antonio (08177700)	34.07	2.87	.08
Salado Creek (upper station) at San Antonio (08178700)	36.95	.65	.02
Salado Creek (lower station) at San Antonio (08178800)	35.68	3.50	.10

Individual Storms

Storms producing the highest peak discharge in the San Antonio metropolitan area during the 1976 water year occurred on the following days: April 4, 17-18, May 6-8, 20, 26, June 16, July 6, Aug. 18, 29, Oct. 25, and Sept. 19-20, 28, 1976. These storms produced a variety of rainfall amounts, intensities, durations, and distributions in the drainage basins. Weighted-storm rainfall for these storm periods at sites upstream from continuous-record gaging stations and selected flood-hydrograph partial-record stations are given in table 5.

Storm rainfall and runoff records, and hydrographs and mass curves are given in the section "Compilation of data."

Storm rainfall data are not given for the 1976 water year for stations 08178600, Panther Springs Creek at Farm Road 2696 near San Antonio; 08178700, Salado Creek (upper station) at San Antonio; and 08181000, Leon Creek tributary at Farm Road 1604, San Antonio, because the unit runoff factor for the periods of flow was low and not representative of the basin. As a result of the completion of a reservoir a short distance upstream from station 08178600, the unit runoff factor for the periods of flow for the station was low and not considered representative.

Elm Creek Basin

The drainage areas and geomorphologic features of East and West Elm Creeks appear to be nearly identical. Runoff characteristics for these two streams are listed below as follows:

Station name	Date	Time of peak	Peak discharge (ft^3/s)	*Associated discharge (ft^3/s)	Accumulate Rainfall at time of peak West Elm (inches)	East Elm (inches)	Elm Cr. Basin weighted rainfall (inches)
West Elm	May 7	0730	305	0	1.86	2.81	1.74
East Elm	May 7	0930	310	25	2.15	3.10	2.41
West Elm	May 26	0230	160	14	2.25	2.38	1.88
East Elm	May 26	0310	86	43	2.25	2.38	1.82
West Elm	July 6	1805	22	65	2.74	2.72	1.60
East Elm	July 6	1820	185	3.0	2.74	2.72	1.65
West Elm	Sept. 28	0410	335	0	1.13	1.01	1.55
East Elm	Sept. 28	0710	6.7	3.3	1.27	1.17	1.69

*Associated discharge is the discharge in the basin not containing the peak which occurs at the same time as the peak occurs in the station listed under the station name. Example: West Elm is listed under station name, thus the associated discharge is that of East Elm at the time of the peak discharge in West Elm Creek.

Table 5.--Weighted-storm rainfall for areas above stream-gaging and crest-stage partial-record stations

Rainfall period	Weighted rainfall, in inches												
	Stream-gaging stations					Crest-stage partial-record stations							
	Helotes Creek at Helotes	Leon Creek tributary at Kelly AFB	Olmos Creek at Dresden Drive at San Antonio	Salado Creek (upper station) at San Antonio	Salado Creek (lower station) at San Antonio	Olmos Creek tributary at FM 1535, Shavano Park	Alazan Creek at St. Cloud Street, San Antonio	Panther Springs Creek at FM 2696 near San Antonio	Salado Creek tributary at Bitters Road, San Antonio	Salado Creek tributary at Bee Street, San Antonio	West Elm Creek at San Antonio	East Elm Creek at San Antonio	Leon Creek tributary at FM 1604, San Antonio
Apr. 4	-	-	-	-	-	-	1.21	-	1.49	-	-	-	-
Apr. 17-18	5.41	-	-	-	-	-	-	-	-	-	-	-	-
May 6-8	2.61	-	4.49	-	2.74	3.56	3.95	-	3.40	3.61	2.38	2.72	-
May 20	-	1.08	-	-	-	-	-	-	-	-	-	-	-
May 26	-	-	-	-	-	-	-	-	-	2.47	2.00	2.08	-
June 16	-	1.19	-	-	-	-	-	-	1.54	-	-	-	-
July 6	-	-	-	-	-	-	-	-	-	-	1.63	1.67	-
Aug. 18	-	-	-	-	-	-	-	-	1.25	-	-	-	-
Aug. 29	-	-	-	-	-	-	2.97	-	-	-	-	-	-
Oct. 25	-	2.34	-	-	-	-	-	-	-	-	-	-	-
Sept. 19-20	-	3.00	-	-	-	-	-	-	-	-	-	-	-
Sept. 28	-	1.63	-	-	-	-	-	-	-	1.14	1.70	1.64	-

WATER QUALITY

Water-quality data have been collected from watersheds in various stages of urban development at most of the gaging stations in the San Antonio urban area. This water-quality program provides data on the concentration of pollutants as a result of runoff from these watersheds. In addition, these data provide a relationship of water-quality parameters to discharge and seasonal conditions.

The quality of water in this area is important because of the large amounts of surface-water runoff recharged to the Edwards and associated limestones. The Edwards and associated limestones is the major aquifer supplying ground water for domestic supply, municipal supply, irrigation, and industrial use in the San Antonio area. The locations of chemical-quality sampling sites are shown on figure 1.

Water-quality data for sites in the San Antonio metropolitan area are presented in downstream order along with the streamflow records in the section "Compilation of data." A complete tabulation of data, including labaoratory analyses for the 1976 water year for the Guadalupe River basin is given in Water Resources Data for Texas, TX 76-3, 1976.

SELECTED REFERENCES

Arnow, Ted, 1959, Ground-water geology of Bexar County, Texas: Texas Board of Water Engineers Bull. 5911, 52 p.

U.S. Dept. of Commerce, Natl. Oceanic and Atmoshperic Adm. Environmental Data Service, 1972, Monthly normals of temperature, precipitation, and heating and cooling degree days, 1941-70, Texas: Climatography of the United States, no. 81 (by State).

U.S. Soil Conservation Service, 1966, Soil survey of Bexar County, Texas: U.S. Dept. of Agriculture, ser. 1962, no. 12, 125 p.

COMPILATION OF DATA

08177600 Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°34'35", long 98°32'45", Bexar County, at culvert on Farm Road 1535 at Shavano Park and 1.9 miles (3.1 km) southeast of intersection of Farm Roads 1535 and 1604.

DRAINAGE AREA.--0.33 mi² (0.85 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): October 1968 to current year.
Periodic water-quality data: Chemical, biochemical, and pesticide analyses: May 1970 (revised) to current year. Water temperatures: May 1970 (revised) to current year. Bacteria analyses: April to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Datum of gage is 907.92 ft (276.734 m) above mean sea level, through the San Antonio supplementary adjustments of 1951 and 1953.

PEAK DISCHARGE.--Current year: Maximum discharge, 233 ft³/s (6.60 m³/s) May 7 (gage height, 5.22 ft or 1.591 m).
Period of record: Maximum discharge, 303 ft³/s (8.58 m³/s) Sept. 26, 1973 (gage height, 6.26 ft or 1.908 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976."

PEAK DISCHARGE ABOVE BASE (50 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE
4-18	0310	2.64	12

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR 18...	1045	.50	181	7.8	15.5	140	15	7.9	78	5.3	50000	23000
MAY 07...	1215	20	176	7.5	18.5	160	20	8.2	87	2.9	23000	23000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR 18...	42000	76	5	28	1.5	5.8	.2	7.5	87	0	6.2	7.0
MAY 07...	24000	81	2	30	1.5	3.6	.2	5.3	97	0	5.7	3.5

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR 18...	.3	14	113	18	6	.38	.01	.03	.87	.31	22	.1
MAY 07...	.3	16	114	20	1	.33	.02	.03	.79	.22	7.1	.0

DATE	TIME	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED CHROMIUM (CR) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)
APR. 18...	1045	30	1	60	0	0	0	2
MAY 07...	1215	30	1	50	0	0	0	2

DATE	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
APR. 18...	60	0	10	0	.2	0	50	10
MAY 07...	50	0	0	10	.2	0	50	10

08177600 Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR. 18...	1045	.0	.00	.00	.0	.00	.00	.00	.02	.00	.00	.00
MAY 07...	1215	.0	.00	.00	.0	.00	.00	.00	.03	.00	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR. 18...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.19	.00
MAY 07...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.23	.00

08177700 Olmos Creek at Dresden Drive, San Antonio, Tex.

LOCATION.--Lat 29°29'56", long 98°30'36", Bexar County, on right bank 30 ft (9 m) downstream from low-water bridge on Dresden Drive at San Antonio, 0.15 mile (0.24 km) west of intersection of Blanco Road and Dresden Drive, and 4.0 miles (6.4 km) upstream from Olmos Dam.

DRAINAGE AREA.--21.2 mi² (54.9 km²).

PERIOD OF RECORD.--Discharge: June 1968 to current year.
Water quality: Chemical, biochemical, and pesticide analyses: October 1968 to current year. Sediment analyses: October 1970 to September 1973.

GAGE.--Water-stage recorder. Datum of gage is 726.10 ft (221.315 m) above mean sea level.

AVERAGE DISHCARGE.--8 years, 4.26 ft³/s (0.121 m³/s), 2.73 in/yr (69 mm/yr), 3,090 acre-ft/yr (3.81 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 5,310 ft³/s (150 m³/s) May 7 (gage height, 13.1 ft or 3.99 m, from floodmark); no flow July 31.
Period of record: Maximum discharge, 5,420 ft³/s (153 m³/s) May 7, 1972 (gage height, 13.20 ft or 4.023 m, from floodmark); no flow at times.
Maximum stage since 1935, that of May 7, 1972; floods in September and November 1947 reached a stage of 8.5 ft (2.59 m), from information by local resident.

REMARKS.--Discharge records good. Recording rain gage located at station, with three additional recording rain gages located in watershed.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.03	.04	.05	.99	.03	.02	.02	.32	1.4	.16	.01	.16
2	.03	.04	.05	.89	.03	.02	.02	.15	1.7	.10	.01	3.3
3	.03	.04	.05	.69	.03	.02	.02	.10	1.6	.14	.01	.44
4	.03	.04	.05	.69	.03	.02	37	.07	.57	7.4	.01	.16
5	.03	.04	.05	.69	.03	.02	14	16	.38	3.5	.01	.10
6	.03	.04	.05	.69	.03	.29	3.7	5.5	.38	64	.02	.10
7	.04	.04	.05	.70	.03	.03	5.4	710	.31	5.2	.04	.10
8	.04	.04	.05	.69	.03	.02	8.5	9.4	.38	4.6	.04	.09
9	.03	.04	.05	.69	.03	.02	2.3	5.1	.38	11	.04	.02
10	.03	.04	.67	1.1	.03	.02	2.1	2.2	.33	14	.02	.02
11	.03	.04	.06	1.4	.02	.02	1.0	.68	.38	7.9	.02	.02
12	.03	.04	.06	1.0	.02	.02	.69	1.1	.31	1.4	.02	.01
13	.03	.04	.06	.94	.02	.03	.10	9.8	.31	.82	.02	.38
14	.03	.04	.06	.69	.02	.03	.06	1.4	.38	4.8	.02	.15
15	.03	.05	.05	.69	.02	.02	12	.68	.47	4.6	.02	.21
16	.03	.05	.05	.69	.02	.02	26	.57	67	4.5	.02	.28
17	.03	.05	.05	.57	.02	.02	2.1	.47	1.0	1.4	.02	.31
18	.03	.05	.05	.57	.02	.02	125	.47	.57	.89	4.3	.31
19	.04	.05	.05	1.8	.02	.02	9.0	.56	.13	.50	.79	2.7
20	.03	.05	.06	14	.02	.02	15	17	.28	.24	.23	20
21	.03	.05	.06	.04	.02	.02	2.3	1.6	.17	.19	.10	2.8
22	.03	.05	.05	.04	.02	.02	.47	.53	.10	.12	.10	.24
23	.03	.05	.05	.03	.02	.02	.22	.34	.15	.01	.10	.38
24	.03	.05	31	.03	.02	.03	6.0	.35	.02	.02	.10	.02
25	64	.05	5.3	.03	.02	.02	17	.38	1.5	.01	.10	.01
26	7.4	.05	2.5	.03	.02	.02	.15	5.5	5.2	.01	.10	5.9
27	.69	.05	2.3	.03	.02	.02	.10	1.0	1.7	.01	.09	3.6
28	.22	.05	1.8	.03	.02	.02	.07	.68	.56	.01	.06	74
29	.09	.07	.99	.03	.02	.02	38	.59	.40	.01	5.1	2.5
30	.05	.05	.99	.03	---	.02	2.1	.38	.28	.01	1.6	.49
31	.05	---	.99	.03	---	.02	---	.42	---	0	.33	---
TOTAL	73.24	1.38	47.70	30.52	.68	.93	330.42	793.33	88.39	137.55	13.45	118.80
MEAN	2.36	.046	1.54	.98	.023	.030	11.0	25.6	2.95	4.44	.43	3.96
MAX	64	.07	31	14	.03	.29	125	710	67	64	5.1	74
MIN	.03	.04	.05	.03	.02	.02	.02	.07	.02	0	.01	.01
CFSM	.11	.002	.07	.05	.001	.001	.52	1.21	.14	.21	.02	.19
IN.	.13	.002	.08	.05	.001	.002	.58	1.39	.16	.24	.02	.21
AC-FT	145	2.7	95	61	1.3	1.8	655	1570	175	273	27	236
(††)	2.66	2.12	1.06	.74	.24	1.49	6.78	7.78	1.84	4.70	1.34	5.32

CAL YR 1975 TOTAL 1247.07 MEAN 3.42 MAX 319 MIN .03 CFSM .16 IN 2.19 AC-FT 2470 †† 26.66
WTR YR 1976 TOTAL 1636.39 MEAN 4.47 MAX 710 MIN 0 CFSM .21 IN 2.87 AC-FT 3250 †† 34.07

PEAK DISCHARGE BASE (400 FT³/S), OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
4-15	2345	5.54	193	6-16	0300	6.78	719
4-18	0600	6.77	585	7- 6	1930	6.72	681
5- 7	0715	a13.1	5,310	9-28	0445	6.36	477

†† Weighted-mean rainfall, in inches, based on four rain gages.
a From floodmark.

08177700 Olmos Creek at Dresden Drive, San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG. C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR												
15...	2320	76	259	7.7	16.5	22	160	8.0	81	15	62000	9600
MAY												
07...	0850	1250	197	7.8	17.0	260	250	9.0	100	4.1	48000	32000
07...	1235	921	133	7.5	9.5	--	--	8.4	90	5.0	50000	20000
07...	1725	120	184	7.4	23.	--	--	7.9	91	4.6	38000	15000
07...	2310	34	252	7.3	22.	--	--	7.7	88	3.5	54000	11000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR												
15...	3400	160	0	37	2.	10	.4	3.1	124	0	16	10
MAY												
07...	7200	47	1	18	.6	4.2	.3	2.8	56	0	7.8	3.0
07...	3200	--	--	--	--	--	--	--	--	--	--	--
07...	2000	--	--	--	--	--	--	--	--	--	--	--
07...	1300	--	--	--	--	--	--	--	--	--	--	--

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR												
15...	.2	6.	146	444	136	.39	.01	.32	1.9	.69	6.6	.1
MAY												
07...	.3	5.9	71	168	292	.48	.02	.14	2.9	.45	34	.0
07...	--	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--	--

DATE	TIME	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED CHROMIUM (CR) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)
APR.								
15...	2320	0	3	80	0	0	0	2
MAY								
07...	0850	330	1	20	0	0	0	3

DATE	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
APR.								
15...	0	4	0	10	.2	0	150	20
MAY								
07...	220	0	0	0	.1	0	50	20

DATE	TIME	TOTAL PCB (UG/L)	POLYCHLORINATED NAPHTHALENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLORDANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DIAZINON (UG/L)	TOTAL DIELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
15...	2320	.0	.00	.00	.2	.00	.00	.00	.75	.04	.00	.00
MAY												
07...	0850	.0	.00	.00	.2	.00	.00	.01	.13	.02	.00	.00

DATE	TOTAL HEPTACHLOR (UG/L)	TOTAL HEPTACHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALATHION (UG/L)	TOTAL METHYL PARATHION (UG/L)	TOTAL METHYL TRITHION (UG/L)	TOTAL PARATHION (UG/L)	TOTAL TOXAPHENE (UG/L)	TOTAL TRITHION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
15...	.01	.00	.00	.03	.00	.00	.00	0	.00	.00	.00	.00
MAY												
07...	.01	.00	.00	--	.00	.00	.00	0	.00	.00	.00	.00

08178000 San Antonio River at San Antonio, Tex.

LOCATION.--Lat 29°24'34", long 98°29'41", Bexar County, on left bank 193 ft (59 m) downstream from South Alamo Street Bridge in San Antonio, 2.1 miles (3.4 km) upstream from San Pedro Creek, and at mile 230.6 (371.1 km).

DRAINAGE AREA.--41.8 mi² (108.3 km²). Flow of river comes from intermittent spring flow and from artesian wells; drainage area of stream not applicable.

PERIOD OF RECORD.--Discharge: January 1915 to November 1929, February 1939 to current year. Ground-water discharge into river is discussed by Petit and George, Texas Board of Water Engineers Bull. 5608, vol. 1 (1956, p. 45). December 1895 to June 1906, periodic discharge measurements only.
Water quality: Chemical, biochemical, and pesticide analyses: October 1968 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 605.26 ft (184.483 m) above mean sea level. Jan. 26, 1915, to Feb. 27, 1916, nonrecording gage at site 1.3 miles (2.1 km) upstream at different datum. Feb. 28, 1916, to Apr. 7, 1920, nonrecording gage at site 1.1 miles (1.8 km) upstream at different datum. Apr. 8, 1920, to Nov. 16, 1929, and Feb. 15, 1939, to Apr. 25, 1967, water-stage recorder in vicinity of South Alamo Street Bridge at 7.00 ft (2.134 m) higher datum. Apr. 25, 1967, to May 13, 1969, water-stage recorder at site 307 ft (94 m) downstream at same datum.

AVERAGE DISCHARGE.--51 years, 52.6 ft³/s (1.490 m³/s), 38,110 acre-ft/yr (47.0 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,500 ft³/s (99.1 m³/s) May 26 (gage height, 12.60 ft or 3.840 m), from rating curve extended above 1,900 ft³/s (53.8 m³/s) on basis of computed discharge of 14,400 ft³/s (408 m³/s) by Corps of Engineers; minimum, 0.04 ft³/s (0.001 m³/s) Apr. 16.
Period of record: Maximum discharge, 15,300 ft³/s (433 m³/s) Sept. 10, 1921 (gage height, 20.14 ft or 6.139 m, from floodmark, at former site and datum), from rating curve extended above 2,000 ft³/s (56.6 m³/s) on basis of slope-area measurement of peak flow; no flow at times due to regulation.
Maximum stage since 1819, that of Sept. 10, 1921; flood of July 5, 1819, equaled or exceeded that of Sept. 10, 1921.

REMARKS.--Discharge records good. Floodflow is regulated by Olmos flood-control reservoir (capacity, 15,500 acre-ft or 19.1 hm³) about 8.5 miles (13.7 km) upstream. Dam completed in 1926. Springs emerge intermittently from Edwards and associated limestones in Balcones Fault Zone.

REVISIONS (WATER YEARS).--WSP 1312: 1917. WSP 1923: Drainage area. WRD Texas 1972: 1971(m).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	52	48	47	24	16	31	55	96	18	75	60
2	30	46	48	47	27	19	7.7	53	93	17	74	170
3	30	45	45	46	47	17	10	51	93	17	61	235
4	30	44	43	44	24	14	165	50	85	206	47	65
5	30	41	42	44	14	31	34	96	81	74	45	40
6	31	12	42	42	12	107	7.8	63	79	42	43	35
7	30	41	40	40	21	30	89	1180	76	113	39	35
8	30	44	43	38	21	7.5	7.4	594	73	68	33	35
9	29	44	40	40	51	15	17	82	67	120	36	35
10	29	44	41	41	10	18	16	68	61	194	33	34
11	27	42	44	42	16	20	17	70	58	118	24	33
12	26	41	44	44	20	23	15	120	55	53	27	35
13	27	41	45	41	12	32	19	141	53	61	28	32
14	26	41	44	37	6.7	23	18	79	49	95	26	37
15	25	42	47	37	29	25	86	82	43	93	21	36
16	27	42	45	37	46	25	101	79	169	127	25	33
17	27	44	46	36	19	20	21	82	25	87	28	34
18	27	41	42	35	19	17	265	78	41	78	46	44
19	25	38	42	58	14	21	80	74	37	65	54	191
20	29	35	46	73	19	18	122	231	34	74	31	129
21	28	35	47	30	18	16	45	126	33	74	31	63
22	29	38	47	38	12	17	45	137	29	75	30	37
23	30	40	44	38	16	23	42	153	25	74	29	48
24	27	41	232	43	12	45	45	150	24	73	28	46
25	491	41	58	42	12	21	63	162	26	71	26	46
26	71	41	32	40	27	20	36	318	33	70	28	65
27	45	43	44	34	12	21	46	94	47	66	29	105
28	45	48	46	33	6.5	15	44	90	57	63	30	282
29	43	50	47	31	26	20	262	90	35	60	38	59
30	43	46	47	30	---	12	47	90	29	59	80	62
31	46	---	47	30	---	9.7	---	92	---	64	230	---
TOTAL	1462	1292	1568	1255	598.2	718.2	1843.9	4830	1703	2469	1377	2161
MEAN	47.2	43.1	50.6	40.5	20.6	23.2	61.5	156	56.8	79.6	44.4	72.0
MAX	491	91	232	73	51	107	265	1180	169	206	230	282
MIN	25	12	32	30	6.5	7.5	7.4	50	24	17	21	32
CFSM	1.13	1.03	1.21	.97	.49	.56	1.47	3.73	1.35	1.90	1.06	1.72
IN.	1.30	1.15	1.40	1.12	.53	.64	1.64	4.30	1.52	2.20	1.23	1.92
AC-FT	2900	2560	3110	2490	1190	1420	3660	9580	3380	4900	2730	4290

CAL YR 1975 TOTAL 31282.0 MEAN 85.7 MAX 930 MIN 12 CFSM 2.05 IN 27.84 AC-FT 62050
WTR YR 1976 TOTAL 21277.3 MEAN 58.1 MAX 1180 MIN 6.5 CFSM 1.39 IN 18.94 AC-FT 42200

08178000 San Antonio River at San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
MAY												
07...	1930	1040	146	7.6	21.[illegible]	110	400	8.6	96	5.0	98000	27000
2 ...	1246	818	294	7.7	21.[illegible]	35	160	7.5	83	>8.8	280000	40000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
MAY												
07...	110000	77	[illegible]	28	1.7	2.9	.1	4.0	88	0	9.5	3.5
2 ...	51000	140	[illegible]	43	[illegible]	8.6	.3	2.5	162	0	18	10

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAY												
07...	.[illegible]	6.9	100	848	168	.57	.02	.09	1.3	.52	11	.0
2 ...	1.[illegible]	7.2	178	426	78	.98	.02	.08	1.3	.38	13	.0

DATE	TIME	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED CHROMIUM (CR) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)
MAY 20...	1246	30	1	90	0	0	0	5

DATE	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
MAY 20...	40	0	0	40	.2	0	330	10

DATE	TIME	TOTAL PCB (UG/L)	POLYCHLORINATED NAPHTHALENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLORDANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DIAZINON (UG/L)	TOTAL DIELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
MAY												
07...	1930	.0	.00	.00	.1	.00	.00	.00	.19	.01	.00	.00
20...	1246	.0	.00	.00	.1	.01	.02	.04	.14	.01	.00	.00

DATE	TOTAL HEPTACHLOR (UG/L)	TOTAL HEPTACHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALATHION (UG/L)	TOTAL METHYL PARATHION (UG/L)	TOTAL METHYL TRITHION (UG/L)	TOTAL PARATHION (UG/L)	TOTAL TOXAPHENE (UG/L)	TOTAL TRITHION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
MAY												
07...	.00	.02	.00	--	.00	.00	.00	0	.00	.00	.02	.00
20...	.00	.00	.00	.66	.00	.00	.00	0	.00	.00	.07	.00

08178300 Alazan Creek at St. Cloud Street, San Antonio, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°27'29", long 98°32'59", Bexar County, at bridge on St. Cloud Street in San Antonio and 1.5 miles (2.4 km) upstream from Woodlawn Lake Dam.

DRAINAGE AREA.--3.26 mi² (8.44 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): October 1968 to current year.
Periodic water-quality data (revised): Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: September 1970 to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: December 1975 to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Gage not referenced to mean sea level.

PEAK DISCHARGE.--Current year: Maximum discharge, 2,600 ft³/s (73.6 m³/s) May 7 (elevation, 12.80 ft or 3.901 m).
Period of record: Maximum discharge, 4,380 ft³/s (124 m³/s) May 8, 1975 (elevation, 16.08 ft or 4.901 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976."

PEAK DISCHARGE ABOVE BASE (120 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	ELEV.	DISCHARGE
12-24	1320	5.20	73
4-15	2215	7.50	447
5-20	1055	7.37	420

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
DEC												
24...	1010	34	207	6.9	11.5	45	50	10.8	98	11	99000	27000
APR												
16...	0020	69	210	6.8	15.5	55	150	9.4	93	9.6	42000	10000
MAY												
20...	1100	246	121	7.6	20.5	70	240	9.2	101	>8.8	160000	40000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
DEC												
24...	168000	71	5	26	1.4	7.2	.4	3.5	80	0	15	7.0
APR												
16...	53000	59	0	21	1.6	11	.6	3.1	78	0	11	14
MAY												
20...	68000	40	0	14	1.2	8.2	.6	2.6	53	0	11	6.6

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
DEC												
24...	.2	2.4	103	9	0	.44	.02	.06	.84	.27	--	--
APR												
16...	.3	4.2	105	230	56	.49	.02	.16	.94	.43	6.0	.1
MAY												
20...	1.0	3.6	75	518	74	.41	.03	.13	1.2	.43	5.8	.0

08178300 Alazan Creek at St. Cloud Street, San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
DEC. 24...	1010	60	1	70	0	0	0	8
APR. 16...	0020	30	2	100	0	0	0	3
MAY 20...	1100	40	1	100	1	0	0	7

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
DEC. 24...	210	50	0	0	.8	0	160	40
APR. 16...	20	19	0	10	.2	0	120	10
MAY 20...	40	10	0	40	.3	0	120	20

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR. 16...	0020	.0	.00	.00	.1	.01	.01	.01	.14	.01	.00	.00
MAY 20...	1100	.0	.00	.00	.2	.00	.00	.02	.14	.01	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR. 16...	.00	.01	.01	.05	.00	.00	.00	0	.00	.00	.00	.00
MAY 20...	.00	.03	.00	--	.00	.00	.00	0	.00	.00	.11	.00

08178600 Panther Springs Creek at Farm Road 2696 near San Antonio, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'31", long 98°31'06", Bexar County, at culvert on Farm Road 2696, 1.3 miles (2.1 km) north of intersection of Farm Roads 2696 and 1604, and 5.5 miles (8.8 km) north of San Antonio.

DRAINAGE AREA.--9.54 mi² (24.71 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): October 1968 to current year.
Periodic water-quality data: Chemical, biochemical, and pesticide analyses: May 1969 (revised) to current year. Water temperatures: May 1969 (revised) to current year. Bacteria analyses: April to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Gage not referenced to mean sea level.

PEAK DISCHARGE.--Current year: Maximum discharge, 127 ft³/s (3.60 m³/s) Sept. 28 (elevation, 5.10 ft or 1.554 m).
Period of record: Maximum discharge, 8,610 ft³/s (244 m³/s) May 11, 1972 (elevation, 9.53 ft or 2.905 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metroplitan Area, 1976." After August 1976, flow from 8.86 mi² (22.95 km²) was controlled by a floodwater-retarding structure with a capacity of 3,293 acre-ft (4.06 hm³) below the flood-spillway crest, of which 198 acre-ft (0.244 hm³) is conservation-pool capacity.

PEAK DISCHARGE ABOVE BASE (200 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	ELEV.	DISCHARGE
4-18	0935	4.69	56
5- 7	1055	4.39	27

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR												
18...	0850	56	114	7.8	14.5	210	220	8.7	84	4.9	68000	38000
18...	1125	19	113	8.4	15.0	130	160	9.2	90	6.9	50000	27000
18...	1230	11	114	7.6	15.0	130	150	9.8	96	4.1	48000	24000
MAY												
07...	1100	27	111	7.7	17.5	180	35	8.2	85	3.4	3800	3700

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR												
18...	66000	52	0	19	1.1	2.5	.2	4.3	68	0	4.0	4.2
18...	58000	53	0	20	.9	2.1	.1	4.8	67	0	3.5	3.4
18...	67000	48	0	18	.7	2.4	.2	4.5	62	0	3.4	2.6
MAY												
07...	4500	53	0	20	.7	1.9	.1	2.8	67	0	3.2	1.8

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR												
18...	.2	6.8	76	448	112	.40	.02	.13	1.5	.37	35	.1
18...	.2	6.9	75	272	72	.29	.01	.19	1.9	.25	28	.1
18...	.2	3.4	66	228	48	.29	.01	.06	1.2	.22	34	.1
MAY												
07...	.3	13	77	37	0	.05	.01	.04	.8	.05	11	.0

08178600 Panther Springs Creek at Farm Road 2696 near San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
APR.								
18...	0850	30	1	60	0	0	0	2
18...	1125	240	0	70	0	8	0	2
18...	1230	100	0	60	0	8	0	6
MAY								
07...	1100	40	0	20	0	0	0	1

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR.								
18...	20	0	0	0	.2	0	50	0
18...	160	0	0	5	.0	0	30	20
18...	80	4	0	5	.1	2	20	20
MAY								
07...	40	0	0	10	.3	0	50	0

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
18...	0850	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
MAY												
07...	1100	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
18...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
MAY												
07...	.00	.00	.00	--	.00	.00	.00	0	.00	.00	.00	.00

08178690 Salado Creek tributary at Bitters Road, San Antonio, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°31'36", long 98°26'25", Bexar County, at culvert on Bitters Road immediately east of MacArthur High School in San Antonio.

DRAINAGE AREA.--0.26 mi² (0.67 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): October 1968 to current year.
Periodic water-quality data (revised): Chemical, biochemical, and pesticide analyses: November 1968 to current year. Sediment analyses: April to September 1973. Water temperatures: November 1968 to current year. Bacteria analyses: April to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Gage not referenced to mean sea level.

PEAK DISCHARGE.--Current year: Maximum discharge, 162 ft³/s (4.59 m³/s) Apr. 4 (elevation, 6.06 ft or 1.847 m).
Period of record: Maximum discharge, 253 ft³/s (7.16 m³/s) May 7, 1972 (elevation, 7.88 ft or 2.402 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976."

PEAK DISCHARGE ABOVE BASE (50 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	ELEV.	DISCHARGE
4-18	0600	4.08	62
8-30	1510	3.92	55

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR												
18...	0655	20	71	6.8	13.0	60	20	11.0	104	4.2	140000	34000
MAY												
20...	1140	2.8	--	--	22.5	--	--	--	--	--	--	--
AUG												
30...	1637	13	52	7.6	25.0	48	15	7.4	91	5.8	280000	10000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA+MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR												
18...	150000	28	1	10	.8	1.1	.1	3.5	33	0	3.7	1.3
MAY												
20...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
30...	92000	17	0	6.5	.1	.8	.1	2.0	22	0	4.7	1.1

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR												
18...	.1	3.0	40	30	5	.43	.01	.15	.63	.46	23	.1
MAY												
20...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
30...	.1	1.1	28	39	11	.51	.01	.16	.49	.20	8.2	.1

08178690 Salado Creek tributary at Bitters Road, San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
APR. 18...	0655	30	1	30	0	0	0	0
AUG. 30...	1637	30	1	20	0	0	0	6

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR. 18...	20	5	0	0	.3	0	30	10
AUG. 30...	50	46	10	10	.3	1	70	30

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR 18...	655	.0	.00	.00	.0	.00	.00	.00	.74	.02	.00	.00
AUG 30...	1637	.0	.00	.02	.3	.02	.03	.02	.27	.01	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR 18...	.00	.00	.00	.03	.05	.00	.00	0	.00	.04	.06	.00
AUG 30...	.00	.02	.00	.03	.05	.00	--	0	--	.26	.01	.27

08178700 Salado Creek (upper station) at San Antonio, Tex.

LOCATION.--Lat 29°30'57", long 98°25'51", Bexar County, on upstream side of upstream bridge of two bridges on Interstate Highway 410 in San Antonio, 1.0 mile (1.6 km) west of Northeast School, 1.1 miles (1.8 km) upstream from Perrin-Beitel Creek, and 2.7 miles (4.3 km) east of San Antonio International Airport.

DRAINAGE AREA.--137 mi² (355 km²).

PERIOD OF RECORD.--Discharge: September 1960 to current year.
Water quality: Chemical, biochemical, and pesticide analyses: October 1968 to current year. Sediment analyses: October 1972 to September 1973.

GAGE.--Water-stage recorder with concrete control. Datum of gage is 684.60 ft (208.666 m) above mean sea level.

AVERAGE DISCHARGE.--16 years, 9.20 ft³/s (0.261 m³/s), 0.91 in/yr (23 mm/yr), 6,670 acre-ft/yr (8.22 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,870 ft³/s (110 m³/s) May 7 (gage height, 8.80 ft or 2.682 m); no flow for several days.
Period of record: Maximum discharge, 24,900 ft³/s (705 m³/s) May 12, 1972 (gage height, 15.22 ft or 4.639 m), from rating curve extended above 8,000 ft³/s (227 m³/s) on basis of slope-area measurement of peak flow; no flow at times.
Maximum stage since at least 1853, 23 to 24 ft (7.0 to 7.3 m) in October 1913. Flood in September 1921 reached a stage of 18 ft (5.5 m), and flood of Sept. 27, 1946, reached a stage of 18.2 ft (5.55 m), and are the highest since 1899.

REMARKS.--Discharge records good. No known diversion above station. Recording rain gage located at station with five additional recording rain gages located in watershed. At end of year, flow from 39.5 mi² (102 km²) above this station was partly controlled by six floodwater-retarding structures with a combined detention capacity of 14,300 acre-ft (17.6 hm³).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.65	1.4	.44	.52	.95	0	0	3.3	4.9	.37	.89	5.4
2	.39	.75	.98	.44	.90	.02	0	3.4	3.0	.25	.64	45
3	2.4	.53	.53	1.0	.90	.13	0	2.9	3.9	.40	3.8	14
4	2.0	.96	.37	.25	1.3	.02	6.1	.75	2.7	1.1	3.8	4.3
5	.81	.62	.58	1.4	1.2	0	1.1	1.9	1.5	8.5	1.1	2.9
6	1.1	.18	.92	.45	.82	.61	.91	3.0	2.7	8.4	1.2	2.7
7	.53	1.4	.28	.14	.41	.71	.23	1350	3.0	6.1	3.5	2.1
8	.76	1.1	.06	.43	.11	.29	.18	48	1.3	7.5	1.4	4.3
9	.66	.41	2.0	.46	1.1	.15	.5[illegible]	12	1.5	9.1	1.4	4.0
10	.93	.73	.13	2.2	.76	.04	.18	11	2.1	9.9	1.1	1.6
11	1.1	2.4	.04	.90	.23	.01	.14	11	3.0	9.1	1.5	.64
12	.35	.39	.64	.45	.6[illegible]	0	.22	10	1.1	9.4	1.3	2.1
13	.53	.33	.39	.49	2.0	0	.40	43	.51	10	1.4	3.2
14	1.2	1.1	.07	.75	.37	0	.04	12	.32	12	1.1	3.3
15	.47	.36	1.4	.51	.11	0	.25	5.4	1.9	8.4	.61	2.7
16	.82	2.3	.16	.64	.07	0	5.9	3.0	14	21	.99	2.1
17	.44	.61	.34	.42	.05	0	2.2	3.4	1.5	13	.85	5.2
18	1.4	1.3	.36	.82	.03	0	-1	7.3	2.4	5.3	4.4	3.9
19	1.1	.94	.63	.54		.57	6.6	5.3	3.8	4.8	1.1	5.8
20	.75	.26	.47	1.2	.04	.25	17	5.6	2.1	4.0	1.1	3.3
21	1.1	1.7	.07	.91	.1[illegible]	.02	4.2	5.1	2.4	3.0	.59	3.5
22	.65	.89	.02	.75	.03	0	3.1	4.6	.51	3.2	.24	3.4
23	.71	.44	1.9	1.4	.01	0	2.7	3.4	.18	1.5	2.7	1.8
24	2.6	1.4	7.4	.62	0	.12	.84	4.6	1.1	1.3	2.6	2.0
25	12	.48	3.9	.17	0	.33	.51	3.4	3.0	1.2	2.4	1.4
26	6.4	.84	1.7	1.6	.03	.09	2.5	17	2.4	2.1	.67	1.4
27	2.1	.37	.22	1.1	.01	.02	2.5	3.3	1.5	3.7	.42	2.0
28	.46	.5[illegible]	.41	.87	0	.07	.98	.6	.62	1.5	1.1	14
29	.35	.34	.33	.18	0	.12	23	3.5	.34	2.3	1.3	3.8
30	.90	.56	2.5	.42	---	.02	4.8	4.2	.17	1.5	50	1.8
31	1.5	---	.58	1.1	---	.01	---	3.5	---	1.1	14	---
TOTAL	48.15	25.44	30.40	23.65	11.64	3.50	148.29	1404.85	69.45	172.92	109.70	153.64
MEAN	1.55	.86	.98	.76	.4	.12	4.94	51.8	2.32	5.58	3.54	5.12
MAX	12	2.4	7.4	2.2	2.	.71	61	1350	14	21	50	45
MIN	.35	.18	.02	.14	0	0	0	.75	.18	.25	.24	.64
CFSM	.01	.006	.007	.005	.002	0	.04	.38	.02	.04	.03	.04
IN.	.01	.007	.009	.006	.00[illegible]	.0010	.04	.44	.02	.05	.03	.04
AC-FT	96	51	60	47	23	7.1	294	3180	138	343	218	305
(††)	2.63	.12	1.63	.89	.40	1.35	7.67	7.26	1.78	4.45	2.74	6.03

CAL YR 1975 TOTAL 2066.62 MEAN 5.66 MAX 234 MIN .02 CFSM .04 IN .56 AC-FT 4100 †† 27.47
WTR YR 1976 TOTAL 2452.23 MEAN 6.68 MAX 1350 MIN 0 CFSM .05 IN .65 AC-FT 4760 †† 36.95

PEAK DISCHARGE ABOVE BASE (150 FT³/S), OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
4-18	0830	4.81	303	8-30	1930	4.66	285
5- 7	1315	8.80	3,870	9- 2	1630	4.17	214
5-13	0200	3.80	152				

†† Weighted-mean rainfall, in inches, based on six rain gages.

08178700 Salado Creek (upper station) at San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
MAY												
07...	1347	3570	139	8.0	20.5	140	360	8.3	91	5.2	17000	15000
20...	1210	7.9	775	7.6	23.5	15	20	8.4	98	>8.8	2600	600

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
MAY												
07...	37000	58	1	22	.4	3.9	.2	4.0	70	0	8.0	3.5
20...	1400	336	75	120	8.6	30	.7	6.4	315	0	100	33

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
MAY												
07...	.3	8.6	86	756	152	.41	.02	.08	1.6	.40	15	.0
20...	.8	15	471	32	6	.95	.05	.15	.45	.05	4.6	.0

DATE	TIME	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED CHROMIUM (CR) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)
MAY								
07...	1347	70	2	8	0	0	0	2
20...	1210	30	1	140	0	0	0	2

DATE	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
MAY								
07...	50	0	10	40	.1	0	70	30
20...	20	0	400	20	.1	0	560	10

DATE	TIME	TOTAL PCB (UG/L)	POLYCHLORINATED NAPHTHALENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLORDANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DIAZINON (UG/L)	TOTAL DIELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
MAY												
07...	1347	.0	.00	.00	.0	.00	.00	.00	.10	.00	.00	.00
20...	1210	.0	.00	.00	.0	.00	.00	.00	.03	.00	.00	.00

DATE	TOTAL HEPTACHLOR (UG/L)	TOTAL HEPTACHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALATHION (UG/L)	TOTAL METHYL PARATHION (UG/L)	TOTAL METHYL TRITHION (UG/L)	TOTAL PARATHION (UG/L)	TOTAL TOXAPHENE (UG/L)	TOTAL TRITHION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
MAY												
07...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.09	.00
20...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

08178736 Salado Creek tributary at Bee Street, San Antonio, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°26'37", long 98°27'13", Bexar County, 76 ft (23 m) downstream from culvert at intersection of Bee and Shirley Streets in San Antonio and 0.25 mile (0.40 km) north of Pershing Elementary School.

DRAINAGE AREA.--0.45 mi² (1.17 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): August 1969 to current year.
Periodic water-quality data: Chemical, biochemical, and pesticide analyses: September 1970 to current year. Sediment analyses: April (revised) to September 1973. Water temperatures: September 1970 (revised) to current year. Bacteria analyses: December 1975 to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Gage not referenced to mean sea level. Prior to Sept. 29, 1971, at site 104 ft (32 m) upstream at same datum.

PEAK DISCHARGE.--Current year: Maximum discharge, 303 ft³/s (8.58 m³/s) May 26 (gage height, 7.28 ft or 2.219 m).
Period of record: Maximum discharge, 515 ft³/s (14.6 m³/s) June 8, 1975 (gage height, 9.01 ft or 2.746 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976."

PEAK DISCHARGE ABOVE BASE (60 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE
12-24	0835	4.73	57
4-15	2200	4.68	54
5-20	1015	4.92	70

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
DEC												
24...	1046	6.4	251	7.2	13.0	130	50	10.0	94	10	28000	6100
APR												
16...	0005	11	103	7.8	15.0	50	60	9.2	90	7.3	55000	14000
MAY												
20...	1155	9.8	135	7.5	21.5	65	30	7.8	88	>8.8	176000	52000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
DEC												
24...	44000	91	17	31	3.2	15	.7	3.6	90	0	28	12
APR												
16...	27000	39	0	14	.9	3.8	.3	2.5	47	0	6.6	3.0
MAY												
20...	26000	45	0	16	1.3	6.0	.4	3.2	55	0	12	4.8

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
DEC												
24...	.3	5.0	142	85	33	--	--	--	--	--	--	--
APR												
16...	.2	3.3	58	154	26	.53	.01	.25	.74	.38	9.9	.1
MAY												
20...	.3	4.3	75	100	22	.47	.02	.13	.87	.32	12	.1

08178736 Salado Creek tributary at Bee Street, San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
APR. 16...	0005	20	1	140	0	0	0	3
MAY 20...	1155	40	1	160	0	0	0	8

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR. 16...	0	8	0	10	.3	0	50	10
MAY 20...	70	23	0	40	.1	0	100	10

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR. 16...	0005	.0	.00	.00	.0	.04	.01	.01	.10	.00	.00	.00
MAY 20...	1155	.0	.00	.00	.0	.00	.00	.01	.10	.00	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR. 16...	.01	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
MAY 20...	.00	.00	.00	--	.00	.00	.00	0	.00	.00	.01	.00

08178800 Salado Creek (lower station) at San Antonio, Tex.

LOCATION.--Lat 29°21'25", long 98°24'45", Bexar County, on right bank at upstream side of bridge on Loop 13 at San Antonio, 1.4 miles (2.3 km) east of Brooks Air Force Base, and 3.3 miles (5.3 km) upstream from Rosillo Creek.

DRAINAGE AREA.--189 mi² (490 km²).

PERIOD OF RECORD.--Discharge: September 1960 to current year.
Water quality: Chemical, biochemical, and pesticide analyses: October 1968 to current year. Sediment analyses: October 1972 to September 1973.

GAGE.--Water-stage recorder. Datum of gage is 526.95 ft (160.614 m) above mean sea level.

AVERAGE DISCHARGE.--16 years, 39.2 ft³/s (1.110 m³/s), 2.82 in/yr (72 mm/yr), 28,400 acre-ft/yr (35.0 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,600 ft³/s (102 m³/s) May 7 (gage height, 19.09 ft or 5.819 m); minimum, 16 ft³/s (0.45 m³/s) Nov. 12.
Period of record: Maximum discharge, 13,100 ft³/s (371 m³/s) Sept. 27, 1973 (gage height, 28.83 ft or 8.787 m); no flow Aug. 13, 1967.
Maximum stage since at least 1941, that of Sept. 27, 1973. Floods of Sept. 27, 1946, and Aug. 15, 1960, were about equal magnitude. Flood of Aug. 15, 1960, reached a stage of 26.8 ft (8.17 m), from floodmarks.

REMARKS.--Discharge records good. Small diversions above station. Most of low flow comes from artesian wells and springs in city of San Antonio. For statement regarding regulation by Soil Conservation Service floodwater-retarding structures, see station 08178700.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	19	21	21	21	19	29	51	46	21	25	43
2	24	20	21	20	24	19	29	44	45	22	24	123
3	24	20	22	19	21	19	29	43	37	22	24	180
4	25	20	23	20	22	19	126	41	34	168	23	43
5	24	19	23	20	22	19	76	47	32	326	25	28
6	25	19	22	20	22	94	44	51	30	100	24	26
7	27	19	21	20	22	57	38	1590	30	62	23	26
8	28	19	21	19	20	30	57	415	30	54	23	26
9	29	19	22	19	20	23	36	104	28	90	23	26
10	29	19	22	20	20	20	33	83	27	149	22	26
11	28	18	22	21	20	19	33	76	26	148	21	25
12	25	18	22	22	20	19	32	74	27	78	20	25
13	24	19	22	31	21	24	31	439	27	71	20	25
14	31	19	23	20	21	25	31	107	25	77	21	25
15	31	20	23	19	21	21	33	67	25	94	21	25
16	34	21	23	18	21	28	146	58	39	112	20	25
17	31	20	23	19	23	37	58	54	53	109	20	25
18	23	21	22	19	22	31	396	52	33	52	51	29
19	20	20	22	19	21	29	150	53	30	39	77	149
20	20	20	23	32	21	30	116	105	27	35	24	96
21	20	20	23	28	22	30	85	77	27	34	22	46
22	20	25	23	21	22	30	44	56	26	32	21	31
23	21	20	23	20	21	32	44	52	24	31	20	26
24	20	20	23	20	19	45	52	50	23	29	20	24
25	172	21	96	20	19	33	57	50	23	28	20	23
26	320	21	30	20	20	31	42	482	33	28	20	23
27	37	22	24	19	19	30	40	93	35	27	20	32
28	23	22	22	20	20	31	41	56	27	27	21	175
29	22	24	20	20	20	30	167	40	24	26	23	72
30	20	22	21	20	---	24	116	36	23	26	45	32
31	19	---	21	20	---	28	---	37	---	25	254	---
TOTAL	1220	601	839	646	607	931	2215	5183	916	2142	1017	1480
MEAN	39.4	20.0	27.1	20.8	20.9	30.0	73.8	167	30.5	69.1	32.8	49.3
MAX	320	24	96	32	24	94	396	1590	53	326	254	180
MIN	19	18	20	18	19	19	28	36	23	21	20	23
CFSM	.21	.11	.14	.11	.11	.16	.39	.88	.16	.37	.17	.26
IN.	.24	.12	.17	.13	.12	.18	.44	1.02	.18	.42	.20	.29
AC-FT	2420	1190	1660	1280	1200	1850	4390	10280	1820	4250	2020	2940
(††)	2.65	.10	1.62	.75	.32	1.39	7.21	7.11	1.62	4.82	2.60	5.49

CAL YR 1975 TOTAL 17566 MEAN 48.1 MAX 1230 MIN 18 CFSM .25 IN 3.46 AC-FT 34840 †† 27.35
WTR YR 1976 TOTAL 17797 MEAN 48.6 MAX 1590 MIN 18 CFSM .26 IN 3.50 AC-FT 35300 †† 35.68

PEAK DISCHARGE BASE (600 FT³/S), OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
10-26	0200	11.87	682	5-13	1200	12.43	817
12-24	2300	8.96	189	5-26	0900	14.98	1,640
4-16	0700	9.17	219	7- 4	2400	13.26	1,050
4-18	1900	12.13	742			about	
5- 7	2000	19.09	3,600	8-31	0800	a11.5	607

†† Weighted-mean rainfall, in inches, based on eight rain gages.
a From graph.

08178800 Salado Creek (lower station) at San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
DEC.												
24...	1235	135	567	7.8	12.5	28	150	10.0	93	4.2	28000	7000
APR.												
15...	0130	133	364	7.8	17.[illegible]	55	150	9.1	94	12	52000	24000
16...	1315	190	387	7.8	18.[illegible]	25	240	7.8	82	7.5	77000	50000
MAY												
07...	1547	1780	223	7.6	21.[illegible]	--	--	7.6	84	5.6	98000	45000
07...	2140	3720	197	7.7	20.6	120	380	7.8	85	5.2	94000	27000

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
DEC.												
24...	21000	200	51	63	11	34	1.0	4.0	186	0	49	56
APR.												
15...	83000	130	30	41	7.7	22	.8	4.6	128	0	31	32
16...	60000	160	22	47	9.4	19	.7	3.5	164	0	26	26
MAY												
07...	100000	--	--	--	--	--	--	--	--	--	--	--
07...	74000	71	4	25	2.[illegible]	9.3	.5	5.5	82	0	19	7.0

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
DEC.												
24...	.2	8.7	319	291	42	.76	.01	.07	.20	.23	--	--
APR.												
15...	.3	8.1	211	412	56	.78	.02	.16	1.7	.44	5.7	.1
16...	.4	8.8	222	432	564	.72	.02	.21	1.4	.46	31	.1
MAY												
07...	--	--	--	--	--	--	--	--	--	--	--	--
07...	.4	8.9	118	1180	256	.48	.03	.14	1.8	.52	20	.1

08178800 Salado Creek (lower station) at San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
DEC.								
24...	1235	20	1	140	0	0	0	3
APR.								
16...	0130	20	2	130	0	0	0	4
16...	1315	40	1	40	0	5	0	5
MAY								
07...	2140	70	3	80	0	0	0	0

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
DEC.								
24...	180	0	20	20	.5	0	700	20
APR.								
16...	40	3	10	10	.2	0	470	20
16...	40	0	10	5	.1	3	700	20
MAY								
07...	60	0	100	0	.1	0	150	40

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
16...	0130	.0	.00	.00	.1	.00	.00	.00	.17	.01	.00	.00
16...	1315	.0	.00	.00	.0	.00	.01	.04	.08	.01	.00	.00
MAY												
07...	2140	.0	.00	.00	.1	.00	.00	.02	.21	.02	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
16...	.00	.00	.00	.01	.00	.00	.00	0	.00	.00	.05	.00
16...	.00	.00	.10	.00	.00	.00	.00	0	.00	.00	.03	.02
MAY												
07...	.00	.00	.00	--	.00	.00	.00	0	.00	.00	.05	.04

08181000 Leon Creek tributary at Farm Road 1604, San Antonio, Tex.
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°35'14", long 98°37'40", Bexar County, 97 ft (30 m) upstream from culvert on Farm Road 1604 at San Antonio and 1.5 miles (2.4 km) west of bridge on Leon Creek.

DRAINAGE AREA.--5.57 mi² (14.43 km²).

PERIOD OF RECORD.--Discharge (storm hydrographs): July 1968 to current year.
Periodic water-quality data (revised): Chemical, biochemical, and pesticide analyses: May 1970 to current year. Sediment analyses: May 1972 to June 1973. Water temperatures: May 1970 to current year. Bacteria analyses: April to September 1976.

GAGE.--Digital recorders (water stage and rainfall). Gage not referenced to mean sea level.

PEAK DISCHARGE.--Water year 1975: Maximum discharge, 10 ft³/s estimated (stage unknown).
Water year 1976: Maximum discharge, 137 ft³/s (3.88 m³/s) Apr. 18 (gage height, 3.25 ft or 0.991 m).
Period of record: Maximum discharge, 1,790 ft³/s (50.7 m³/s) July 16, 1973 (gage height, 10.91 ft or 3.325 m).

REMARKS.--Additional storm rainfall-runoff data for this site can be obtained from the report "Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1976."

PEAK DISCHARGE ABOVE BASE (200 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE
5-7	0705	3.16	117

DISCHARGE AND WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	CHEMICAL OXYGEN DEMAND (LOW LEVEL) (MG/L)
APR										
18...	1000	2.0	240	8.0	14.0	40	15	13.2	126	41
MAY										
17...	0850	2.0	170	6.2	17.5	180	80	9.7	101	44
27...	1235	1.0	220	7.1	24.5	150	60	8.4	100	43

DATE	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO
APR										
18...	5.2	3600	1400	4300	120	27	45	1.9	2.4	.1
MAY										
17...	3.0	3700	2300	11000	87	7	33	1.2	2.3	.1
27...	3.5	2100	800	4700	110	4	42	1.5	2.4	.1

DATE	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)
APR									
18...	3.1	114	0	14	3.1	.3	7.6	139	29
MAY									
7...	2.4	98	0	5.7	2.7	.2	5.2	104	152
7...	2.8	125	0	11	3.2	.3	11	136	56

DATE	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)	OIL AND GREASE (MG/L)
APR									
18...	7	.79	.01	.04	.88	.03	21	.1	0
MAY									
17...	18	.30	.01	.01	1.1	.07	15	.0	0
27...	8	.31	.01	.02	.68	.05	11	.0	0

08181000 Leon Creek tributary at Farm Road 1604, San Antonio, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
APR.								
18...	1000	20	1	80	0	0	0	0
MAY								
07...	0850	40	0	20	0	0	0	2
07...	1235	50	0	40	0	0	0	2

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR.								
18...	20	0	0	0	.2	0	50	0
MAY								
07...	350	0	0	10	.2	0	40	10
07...	40	0	0	40	.2	0	50	0

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
18...	1000	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
MAY												
07...	0850	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
07...	1235	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
18...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
MAY												
07...	.00	.00	.00	--	.00	.00	.00	0	.00	.00	.00	.00
07...	.00	.00	.00	--	.00	.00	.00	0	.00	.00	.00	.00

08181400 Helotes Creek at Helotes, Tex.

LOCATION.--Lat 29°34'42", long 98°41'29", Bexar County, 42 ft (13 m) left of and 44 ft (13 m) downstream from centerline of bridge on State Highway 16, 0.1 mile (0.2 km) northwest of Helotes, and 8.6 miles (13.8 km) upstream from mouth.

DRAINAGE AREA.--15.0 mi² (38.8 km²).

PERIOD OF RECORD.--Discharge: June 1968 to current year.
Water quality: Chemical, biochemical, and pesticide analyses: October 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,014.82 ft (309.317 m) above mean sea level.

AVERAGE DISCHARGE.--8 years, 4.29 ft³/s (0.121 m³/s), 3.88 in/yr (99 mm/yr), 3,110 acre-ft/yr (3.83 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 2,090 ft³/s (59.2 m³/s) Apr. 18 (gage height, 5.51 ft or 1.679 m); no flow at times.
Period of record: Maximum discharge, 7,680 ft³/s (217 m³/s) July 16, 1973 (gage height, 10.8 ft or 3.29 m, from floodmarks), from rating curve extended above 5,000 ft³/s (142 m³/s); no flow most of time.
Maximum stage since 1923, 13.7 ft (4.18 m) in 1927, from information by local resident.

REMARKS.--Discharge records good. An undetermined amount of flow is diverted for domestic use above the station, and some flow enters the Edwards and associated limestones through the Balcones Fault Zone in the vicinity of the gage. Recording rain gage located at station, with two additional recording rain gages located in watershed.

REVISIONS (WATER YEARS).--WRD Texas 1973: 1972(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0		0				0	4.5	4.2	0	0	0
2	0		0				0	7.9	3.8	0	0	.03
3	0		0				0	6.4	2.6	0	0	0
4	0		0				.44	5.1	1.5	0	0	0
5	0		0				.29	11	1.2	0	0	0
6	0		0				0	6.4	.87	0	0	0
7	0		0				0	162	.60	0	0	0
8	0		0				0	69	.11	0	0	0
9	0		0				0	43	0	.28	0	0
10	0		0				0	32	0	.17	0	0
11	0		0				0	24	0	0	0	0
12	0		0				0	19	0	0	0	0
13	0		0				0	26	0	0	0	0
14	0		0				0	22	0	.09	0	0
15	0		0				.20	19	0	.55	0	0
16	0		0				.01	15	0	.22	0	0
17	0		0				.53	13	0	0	0	0
18	0		0				332	10	0	0	0	0
19	0		0				50	9.2	0	0	0	.33
20	0		0				32	13	0	0	0	.06
21	0		0				19	10	0	0	0	0
22	0		0				13	9.0	0	0	0	0
23	0		0				10	7.0	0	0	0	0
24	0		.16				9.1	6.6	0	0	0	0
25	.44		0				7.1	6.2	.03	0	0	0
26	0		0				5.1	19	.11	0	0	.03
27	0		0				5.0	9.5	0	0	0	0
28	0		0				4.4	7.0	0	0	0	18
29	0		0				17	5.8	0	0	0	6.8
30	0		0		---		11	5.0	0	0	.08	.87
31	0	---	0		---		---	4.8	---	0	0	---
TOTAL	.44	0	.16	0	0	0	516.17	609.4	15.02	1.31	.08	26.12
MEAN	.014	0	.005	0	0	0	17.2	19.7	.50	.042	.003	.87
MAX	.44	0	.16	0	0	0	332	162	4.2	.55	.08	18
MIN	0	0	0	0	0	0	0	4.8	0	0	0	0
CFSM	0	0	0	0	0	0	1.15	1.31	.03	.002	0	.06
IN.	.001	0	.0004	0	0	0	1.28	1.51	.04	.003	.0002	.06
AC-FT	.9	0	.3	0	0	0	1020	1210	30	2.6	.2	52
(††)	2.48	.05	1.51	.38	.74	1.25	10.82	6.38	1.65	4.14	1.32	5.37

CAL YR 1975 TOTAL 354.79 MEAN .97 MAX 39 MIN 0 CFSM .06 IN .88 AC-FT 704 †† 26.01
WTR YR 1976 TOTAL 1168.70 MEAN .19 MAX 332 MIN 0 CFSM .21 IN 2.90 AC-FT 2320 †† 36.09

PEAK DISCHARGE ABOVE BASE (140 FT³/S)
OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE
4-18	0315	5.51	2,090
5- 7	0530	3.78	808
9-28	0245	2.48	171

†† Weighted-mean rainfall, in inches, based on three rain gages.

08181400 Helotes Creek at Helotes, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR												
18...	0925	154	238	7.6	13.[illegible]	50	150	12.7	120	3.8	9800	6500
18...	1135	1[illegible]9	211	7.8	14.[illegible]	50	180	11.9	114	2.4	15000	7300
18...	1510	89	279	7.8	14.5	55	85	11.3	110	2.2	6400	3200
MAY												
07...	1045	171	283	6.9	18.[illegible]	50	140	9.2	97	3.0	21000	17000
07...	1405	97	336	7.8	21.5	--	--	8.5	97	2.5	2600	2300

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA+MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR												
18...	16000	110	1	37	5.[illegible]	3.7	.2	2.5	136	0	11	8.3
18...	23000	110	6	37	4.2	4.6	.2	2.7	126	0	10	7.2
18...	9400	140	10	44	6.3	4.5	.2	2.3	154	0	13	10
MAY												
07...	20000	140	7	47	6.1	4.2	.2	1.6	165	0	10	5.8
07...	4200	--	--	--	--	--	--	--	--	--	--	--

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR												
18...	.2	5.7	141	256	72	.76	.01	.06	1.1	.10	27	.1
18...	.2	5.3	134	372	116	.74	.01	.04	1.5	.15	25	.1
18...	.2	6.5	163	134	4[illegible]	.88	.01	.02	.82	.06	30	.1
MAY												
07...	.2	7.1	163	204	44	.67	.01	.02	.98	.08	11	.0
07...	--	--	--	--	--	--	--	--	--	--	--	--

08181400 Helotes Creek at Helotes, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	DIS-SOLVED ALUM-INUM (AL) (UG/L)	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BORON (B) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COBALT (CO) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)
APR.								
18...	0925	30	0	50	0	9	0	0
18...	1135	50	1	80	0	0	0	13
18...	1510	20	0	70	0	8	0	0
MAY								
07...	1045	10	0	8	0	0	0	4

DATE	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED LITHIUM (LI) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED STRON-TIUM (SR) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR.								
18...	60	0	0	0	.1	0	50	20
18...	110	9	0	0	--	0	80	60
18...	50	0	0	0	.1	0	60	20
MAY								
07...	10	0	0	0	.0	0	80	0

DATE	TIME	TOTAL PCB (UG/L)	POLY-CHLO-RINATED NAPH-THA-LENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLOR-DANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
18...	1135	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
MAY												
07...	1045	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00

DATE	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METHYL PARA-THION (UG/L)	TOTAL METHYL TRI-THION (UG/L)	TOTAL PARA-THION (UG/L)	TOTAL TOX-APHENE (UG/L)	TOTAL TRI-THION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
18...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
MAY												
07...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

08181450 Leon Creek tributary at Kelly Air Force Base, Tex.

LOCATION.--Lat 29°23'12", long 98°36'00", Bexar County, on left bank 128 ft (39 m) downstream from centerline of bridge on Billy Mitchell Road at Kelly Air Force Base, 0.15 mile (0.24 km) upstream from mouth, and 2.0 miles (3.2 km) southeast of intersection of U.S. Highway 90 West and Loop 13.

DRAINAGE AREA.--1.19 mi² (3.08 km²).

PERIOD OF RECORD.--Discharge: March 1969 to current year.
Water quality: Chemical, biochemical, and pesticide analyses: October 1969 to current year. Sediment analyses: October 1972 to September 1973.

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 657.57 ft (220.427 m) above mean sea level.

AVERAGE DISCHARGE.--7 years, 0.49 ft³/s (0.0139 m³/s), 5.59 in/yr (142 mm/yr), 355 acre-ft/yr (438,000 m³/yr).

EXTREMES.--Current year: Maximum discharge, 326 ft³/s (9.23 m³/s) Sept. 19 (gage height, 3.37 ft or 1.027 m); no flow at times.
Period of record: Maximum discharge, 555 ft³/s (15.7 m³/s) May 14, 1970 (gage height, 4.44 ft or 1.353 m), from rating curve extended above 100 ft³/s (2.83 m³/s) on basis of formula, $Q=CLH^{3/2}$; no flow at times each year.
No historical flood information is available.

REMARKS.--Discharge records fair. Recording rain gage located at station with one additional rain gage located in watershed.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0		0	0		0	0	0	0	0	0	0
2	0		0	0		0	0	0	0	0	0	0
3	0		0	0		0	0	0	0	0	0	0
4	0		0	0		0	7.7	0	0	0	0	0
5	0		0	0		0	1.6	.79	0	0	0	0
6	0		0	0		1.1	0	0	0	0	0	0
7	0		0	0		0	0	26	0	0	0	0
8	0		0	0		0	0	.12	0	.19	0	0
9	0		0	0		0	0	.02	0	3.5	0	0
10	0		0	0		0	0	0	0	4.3	0	0
11	0		0	0		0	0	0	0	.27	0	0
12	0		0	0		0	0	1.2	0	0	0	0
13	0		0	0		0	0	18	0	.01	0	0
14	0		0	0		0	0	.01	0	2.0	0	0
15	0		0	0		0	1.9	0	0	1.5	0	0
16	0		0	0		0	5.2	0	6.3	.19	0	0
17	0		0	0		0	0	0	0	0	0	0
18	0		0	0		0	12	0	0	0	0	0
19	0		0	0		0	0	0	0	0	0	21
20	0		0	.56		0	4.1	11	0	0	0	2.5
21	0		0	0		0	0	0	0	0	0	0
22	0		0	0		0	0	0	0	0	0	0
23	0		0	0		.09	0	0	0	0	0	0
24	0		3.8	0		.45	1.9	0	0	0	0	0
25	13		0	0		0	.46	0	0	0	0	0
26	.66		0	0		0	0	3.9	0	0	0	0
27	0		0	0		0	0	0	0	0	0	0
28	0		0	0		0	0	0	0	0	0	17
29	0		0	0		0	3.0	0	0	0	3.1	.01
30	0		0	0	---	0	0	0	0	0	0	0
31	0	---	0	0	---	0	---	0	---	0	0	---
TOTAL	13.66	0	3.8	.56	0	1.64	37.86	61.04	6.3	11.96	3.1	40.51
MEAN	.44	0	.12	.018	0	.053	1.26	1.97	.21	.39	.10	1.35
MAX	13	0	3.8	.56	0	1.1	12	26	6.3	4.3	3.1	21
MIN	0	0	0	0	0	0	0	0	0	0	0	0
CFSM	.37	0	.10	.02	0	.04	1.06	1.66	.18	.33	.08	1.13
IN.	.43	0	.12	.02	0	.05	1.18	1.91	.20	.37	.10	1.27
AC-FT	27	0	7.5	1.1	0	3.3	75	121	12	24	6.1	80
(††)	2.42	.01	1.41	.65	0	1.60	5.27	7.57	1.36	3.12	1.55	5.47

CAL YR 1975 TOTAL 103.99 MEAN .28 MAX 13 MIN 0 CFSM .24 IN 3.25 AC-FT 206 †† 21.98
WTR YR 1976 TOTAL 180.43 MEAN .49 MAX 26 MIN 0 CFSM .41 IN 5.64 AC-FT 358 †† 30.43

PEAK DISCHARGE BASE (90 FT³/S), OR FOR WATER-QUALITY ANALYSIS

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
4-15	2345	2.00	70	6-16	0315	2.14	92
5- 7	0715	2.59	171	9-19	2030	3.37	326
5-12	2400	2.66	184	9-28	0400	2.67	186
5-20	1045	2.35	128				

†† Weighted-mean rainfall, in inches, based on two rain gages.

08181450 Leon Creek tributary at Kelly Air Force Base, Tex.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
APR.												
15...	2330	28	84	8.4	17.0	35	400	9.1	94	9.0	14000	2900
16...	0120	70	100	8.1	16.0	50	190	8.5	85	4.7	--	--
MAY												
20...	1143	85	58	8.5	20.5	55	170	8.6	95	8.0	22000	2200

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)
APR.												
15...	16000	30	0	11	.6	3.1	.2	2.3	40	2	6.1	3.7
16...	--	44	0	17	.3	2.4	.2	2.3	54	0	5.1	2.5
MAY												
20...	6000	30	0	11	.5	2.2	.2	1.4	39	0	1.6	1.0

DATE	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	VOL. NONFILTRABLE RESIDUE (MG/L)	TOTAL NITRATE (N) (MG/L)	TOTAL NITRITE (N) (MG/L)	TOTAL AMMONIA NITROGEN (N) (MG/L)	TOTAL ORGANIC NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	TOTAL ORGANIC CARBON (C) (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
APR.												
15...	.1	2.5	51	1010	228	.61	.01	.43	1.3	.43	9.0	.1
16...	.2	3.1	60	270	74	.55	.01	.20	.65	.25	12	.1
MAY												
20...	.1	2.6	40	328	44	.24	.02	.03	.52	.17	3.2	.0

DATE	TIME	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED CHROMIUM (CR) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)
APR.								
15...	2330	20	1	90	0	0	0	3
16...	0120	20	1	70	0	10	0	4
MAY								
20...	1143	70	1	50	0	0	0	4

DATE	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
APR.								
15...	10	0	0	0	.2	0	50	0
16...	40	1	0	10	.1	0	40	0
MAY								
20...	60	0	0	10	.3	0	50	0

DATE	TIME	TOTAL PCB (UG/L)	POLYCHLORINATED NAPHTHALENES (UG/L)	TOTAL ALDRIN (UG/L)	TOTAL CHLORDANE (UG/L)	TOTAL DDD (UG/L)	TOTAL DDE (UG/L)	TOTAL DDT (UG/L)	TOTAL DIAZINON (UG/L)	TOTAL DIELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)
APR.												
15...	2330	4.7	.00	.00	--	--	--	--	.07	--	--	.00
MAY												
20...	1143	.9	.00	.00	.0	.03	.01	.09	.02	.01	.00	.00

DATE	TOTAL HEPTACHLOR (UG/L)	TOTAL HEPTACHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALATHION (UG/L)	TOTAL METHYL PARATHION (UG/L)	TOTAL METHYL TRITHION (UG/L)	TOTAL PARATHION (UG/L)	TOTAL TOXAPHENE (UG/L)	TOTAL TRITHION (UG/L)	TOTAL 2,4-D (UG/L)	TOTAL 2,4,5-T (UG/L)	TOTAL SILVEX (UG/L)
APR.												
15...	.00	--	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
MAY												
20...	.00	.00	.01	--	.00	.00	.00	0	.00	.00	.00	.00

Table 6.--Maximum discharge at crest-stage partial-record stations

Station number	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft^3/s)
08177600	Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex. a/	Lat 29°34'35", long 98°32'45", Bexar County, at culvert on Farm Road 1535 at Shavano Park.	0.33	1969-76	5-7-76	5.35	233
08178300	Alazan Creek at St. Cloud Street, San Antonio, Tex. a/	Lat 29°27'29", long 98°32'59", Bexar County, at bridge on St. Cloud Street at San Antonio.	3.26	1969-76	5-7-76	13.50	2,600
08178600	Panther Springs Creek at Farm Road 2696 near San Antonio, Tex. a/	Lat 29°37'31", long 98°31'06", Bexar County, at culvert on Farm Road 2696 and 5.5 miles north of San Antonio.	9.54	1969-76	9-28-76	5.28	127
08178640	West Elm Creek at San Antonio, Tex. a/	Lat 29°37'23", long 98°26'29", Bexar County, at 7.0 miles north of San Antonio International Airport at San Antonio.	2.45	1976	9-28-76	4.30	335
08178645	East Elm Creek at San Antonio, Tex. a/	Lat 29°37'04", long 98°25'41", Bexar County, at 6.9 miles north of San Antonio International Airport at San Antonio.	2.33	1976	5-7-76	6.78	310
08178690	Salado Creek tributary at Bitters Road, San Antonio, Tex. a/	Lat 29°31'36", long 98°26'25", Bexar County, at culvert on Bitters Road at San Antonio.	.26	1969-76	5-7-76	5.33	116
08178736	Salado Creek tributary at Bee Street, San Antonio, Tex. a/	Lat 29°26'37", long 98°27'13", Bexar County, 76 ft downstream from culvert at intersection of Bee and Shirley Streets at San Antonio.	.45	1972-76	5-7-76	6.52	197
08181000	Leon Creek tributary at Farm Road 1604, San Antonio, Tex. a/	Lat 29°35'14", long 98°37'40", Bexar County, at culvert on Farm Road 1604 at San Antonio.	5.57	1969-76	4-18-76	3.60	139

a/ Equipped with stage-rainfall recorder.

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
OCT									
15	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
16	0.04	0.02	0.01	0.04	0.00	0.02	0.00	0.02	0.02
22	0.00	0.10	0.04	0.10	0.12	0.10	0.00	0.03	0.06
24	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
25	2.40	2.05	1.92	2.49	2.40	2.50	2.08	2.12	2.18
26	0.00	0.00	0.03	0.00	0.02	0.00	0.02	0.00	0.01
MTOT	2.61	2.20	2.03	2.63	2.54	2.62	2.10	2.17	2.28
NOV									
2	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01
17	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
18	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.04
MTOT	0.07	0.00	0.02	0.04	0.02	0.02	0.00	0.00	0.05
DEC									
3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
4	0.00	0.05	0.00	0.00	0.01	0.05	0.00	0.00	0.02
5	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
15	0.00	0.35	0.04	0.24	0.11	0.06	0.00	0.00	0.04
16	0.00	0.15	0.10	0.20	0.14	0.07	0.00	0.00	0.10
23	0.09	0.11	0.00	0.05	0.01	0.00	0.00	0.00	0.02
24	1.03	0.95	1.05	1.20	1.29	1.41	1.10	0.66	0.97
25	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	1.12	1.61	1.19	1.69	1.61	1.59	1.10	0.66	1.18
CTOT	26.47	24.59	21.08	24.95	26.43	23.48	19.15	16.97	*****

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
JAN									
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00
19	0.10	0.00	0.16	0.15	0.15	0.46	0.21	0.10	0.27
20	0.17	0.19	0.05	0.26	0.16	0.22	0.38	0.30	0.38
21	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
24	0.10	0.20	0.15	0.26	0.12	0.00	0.00	0.00	0.00
25	0.09	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	0.37	0.39	0.37	0.67	0.46	0.68	0.59	0.46	0.67
FEB									
5	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.52	0.20	0.13	0.41	0.25	0.00	0.00	0.04	0.10
21	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.05
MTOT	0.82	0.32	0.13	0.41	0.25	0.00	0.00	0.04	0.15
MAR									
4	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.00
5	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.00	0.03
6	0.60	0.65	0.45	0.58	0.45	0.85	0.47	0.25	0.57
7	0.15	0.15	0.06	0.17	0.20	0.14	0.08	0.16	0.14
8	0.10	0.08	0.14	0.11	0.11	0.05	0.00	0.06	0.05
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
12	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
13	0.15	0.10	0.15	0.19	0.23	0.19	0.05	0.00	0.17
14	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
22	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.01
23	0.06	0.07	0.00	0.03	0.06	0.55	0.30	0.00	0.23
24	0.10	0.10	0.12	0.00	0.11	0.15	0.08	0.03	0.10
25	0.09	0.09	0.00	0.00	0.02	0.03	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
29	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
MTOT	1.25	1.29	0.95	1.08	1.27	1.96	0.98	0.50	1.35

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
APR									
3	0.25	0.37	0.30	0.31	0.47	0.15	0.07	0.03	0.18
4	0.67	1.02	1.22	1.11	1.19	1.28	0.13	1.08	1.55
5	0.75	0.80	0.88	0.45	0.48	0.45	0.10	0.25	0.24
6	0.00	0.03	0.00	0.14	0.00	0.05	0.02	0.00	0.00
7	0.12	0.12	0.12	0.00	0.19	0.15	0.02	1.06	1.05
8	0.01	0.00	0.00	0.00	0.06	0.05	0.03	0.04	0.05
14	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.02
15	0.96	1.23	0.84	0.95	1.12	0.85	0.82	0.73	0.80
16	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.03
17	1.92	1.68	1.40	0.62	0.19	0.05	0.00	0.05	0.03
18	3.84	2.94	3.13	3.67	3.49	1.08	1.74	1.74	1.38
19	0.20	0.00	0.15	0.16	0.17	0.08	0.04	0.00	0.10
20	0.51	0.46	0.45	0.50	0.44	0.50	0.45	0.18	0.58
21	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
24	0.30	0.41	0.48	0.39	0.36	0.50	0.45	0.46	0.49
25	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.02
26	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
28	0.46	0.22	0.00	0.16	0.02	0.00	0.00	0.00	0.00
29	1.18	0.66	0.74	0.76	1.87	0.65	0.40	0.77	0.70
MTOT	11.17	9.94	9.71	9.27	10.16	5.84	4.29	6.39	7.22
MAY									
5	0.95	1.00	0.79	0.80	0.78	0.48	0.28	0.36	0.77
6	0.13	0.10	0.22	0.12	0.76	0.00	0.05	0.09	0.31
7	2.23	3.67	3.20	2.17	2.48	3.50	2.88	3.93	3.71
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00
9	0.00	0.15	0.00	0.15	0.19	0.13	0.02	0.03	0.13
10	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.04
12	0.10	0.55	0.52	0.60	0.72	1.45	0.08	0.63	0.99
13	0.68	0.13	0.00	0.12	0.21	0.35	1.52	0.18	0.30
20	1.00	0.77	0.94	1.45	1.61	1.10	1.05	0.62	1.08
25	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
26	1.08	1.00	0.84	1.41	1.30	1.04	0.45	0.07	0.47
30	0.00	0.07	0.00	0.08	0.00	0.25	0.00	0.02	0.00
31	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
MTOT	6.24	7.44	6.51	6.90	8.21	8.30	6.33	6.07	7.80

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
JUN									
1	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.16
2	0.00	0.24	0.18	0.17	0.31	0.00	0.00	0.04	0.04
3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
16	0.00	0.00	0.00	0.07	0.00	1.85	0.07	0.97	0.34
17	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06	0.00
18	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	1.36
19	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00
24	0.00	0.04	0.00	0.05	0.00	0.21	0.05	0.46	0.00
25	1.39	1.53	0.72	0.50	0.70	0.00	0.00	0.03	0.19
26	0.13	0.27	0.46	0.10	0.21	0.00	0.00	0.00	0.02
27	0.00	0.00	0.00	0.18	0.01	0.00	0.00	0.00	0.00
MTOT	1.52	2.08	1.36	1.07	1.64	2.09	0.12	1.56	2.12
JUL									
3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
4	0.30	0.43	0.43	0.50	1.01	0.05	0.00	0.08	0.07
5	0.40	0.06	0.23	0.20	0.09	0.50	0.22	0.12	0.11
6	0.13	0.18	0.00	0.06	0.09	0.00	0.00	0.24	0.26
7	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
8	0.14	0.24	0.22	0.26	0.28	0.47	0.33	0.31	0.34
9	1.08	1.02	0.82	0.95	1.02	0.65	0.58	0.87	0.92
10	1.58	1.37	0.80	1.14	0.93	0.83	0.55	0.96	1.03
11	0.14	0.09	0.00	0.21	0.22	0.02	0.03	0.00	0.00
12	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.02	0.00	0.00	0.69	0.00	0.04	0.20	0.59	0.63
14	0.55	0.64	0.42	0.31	0.67	0.65	0.45	0.26	0.29
15	0.07	0.20	0.12	0.00	0.32	0.24	0.20	0.00	0.00
16	0.11	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
21	0.00	0.00	0.02	0.23	0.04	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
MTOT	4.52	4.28	3.06	4.55	4.75	3.45	2.56	3.43	3.65

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
AUG									
16	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00
18	0.50	0.22	0.13	0.18	0.01	0.18	0.36	0.50	0.07
19	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.01
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
29	0.67	1.11	0.52	0.48	0.86	1.54	0.90	2.68	3.77
30	0.14	0.02	0.55	1.27	1.17	0.00	0.00	0.00	0.03
31	0.00	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.00
MTOT	1.31	1.35	1.30	1.97	2.33	1.72	1.26	3.18	4.30
SEPT									
2	0.85	0.70	0.36	1.40	1.13	0.16	0.35	0.23	0.13
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.27
13	0.00	0.00	0.00	0.03	0.01	0.35	0.40	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
19	1.32	2.15	2.05	2.25	2.21	2.94	1.96	1.50	1.37
20	0.11	0.22	0.62	0.40	0.58	0.50	0.29	0.49	0.43
26	0.68	0.75	0.49	0.52	0.45	0.22	0.05	0.44	0.28
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
28	2.07	2.30	2.84	1.87	2.10	1.78	1.38	1.15	1.13
MTOT	5.03	6.12	6.36	6.47	6.48	6.05	4.47	4.11	3.67
WTOT	36.03	37.02	32.99	36.75	39.72	34.32	23.80	28.57	34.44

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

S A N A N T O N I O U R B A N H Y D R O L O G Y S T U D Y

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER													
	1-O	2-O	3-O	4-O	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
OCT														
15	0.00	0.07	0.00	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.00	0.00
16	0.06	0.03	0.13	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.00	0.01
22	0.00	0.02	0.00	0.00	0.05	0.12	0.00	*****	*****	*****	0.03	0.08	0.04	0.05
24	0.00	0.00	0.05	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.02	0.03
25	2.29	2.57	2.82	2.08	2.55	2.51	2.53	*****	*****	*****	2.70	3.07	2.51	2.16
26	0.00	0.03	0.00	0.00	0.00	0.03	0.02	*****	*****	*****	0.02	0.00	0.02	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.01	0.00
MTOT	2.35	2.72	3.00	2.08	2.60	2.66	2.55	*****	*****	*****	2.75	3.15	2.60	2.25
NOV														
2	0.00	0.07	0.15	0.03	0.06	0.04	0.00	*****	*****	*****	0.00	0.06	0.04	0.00
3	0.00	0.06	0.00	0.00	0.00	0.01	0.00	*****	*****	*****	0.00	0.00	0.01	0.00
17	0.04	0.00	0.00	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.00	0.00
18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	*****	*****	*****	0.00	0.00	0.00	0.00
29	0.00	0.07	0.00	0.04	0.07	0.08	0.04	*****	*****	*****	0.08	0.00	0.00	0.03
MTOT	0.04	0.21	0.15	0.07	0.13	0.13	0.04	*****	*****	*****	0.08	0.06	0.05	0.03
DEC														
2	0.00	0.00	0.00	0.00	0.00	0.01	0.01	*****	*****	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.00	0.00	0.00	0.00	0.00	*****	*****	0.00	0.00	0.00	0.00	0.00
4	0.00	0.02	0.00	0.00	0.06	0.01	0.00	*****	*****	0.00	0.00	0.04	0.00	0.00
5	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	*****	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.01	0.00	0.00	0.00	0.00
15	0.03	0.02	0.10	0.07	0.40	0.09	0.05	0.16	*****	0.05	0.02	0.00	0.00	0.03
16	0.11	0.11	0.10	0.08	0.16	0.15	0.07	0.12	*****	0.13	0.08	0.03	0.00	0.05
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00	0.00	0.00	0.00	0.01
20	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	*****	0.01	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	*****	0.01	0.03	0.00	0.00	0.02
24	0.75	0.95	0.94	1.08	1.17	1.20	1.67	1.05	*****	1.11	1.45	1.49	1.46	1.37
25	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	*****	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	*****	0.00	0.00	0.00	0.01	0.00
MTOT	0.89	1.13	1.14	1.23	1.82	1.49	1.82	*****	*****	1.32	1.58	1.56	1.47	1.48
CTOT	24.97	27.31	28.05	25.16	25.72	28.61	28.17	*****	*****	*****	27.96	28.82	24.61	25.35

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER												
	1-O	2-O	3-O	4-O	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
JAN														
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00	0.00	0.00	0.01	0.00
19	0.40	0.54	0.57	0.20	0.50	0.47	0.14	0.27	*****	0.37	0.18	0.19	0.14	0.33
20	0.13	0.13	0.27	0.36	0.10	0.13	0.27	0.10	*****	0.22	0.32	0.25	0.07	0.23
21	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	*****	0.00	0.00	0.00	0.00	0.00
24	0.12	0.09	0.00	0.00	0.66	0.25	0.00	0.24	*****	0.07	0.00	0.00	0.00	0.00
25	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	*****	0.02	0.00	0.00	0.01	0.00
MTOT	0.65	0.78	0.84	0.56	1.26	0.88	0.42	0.61	*****	0.68	0.50	0.44	0.23	0.56
FEB														
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.02	0.00	0.00	0.00	0.02
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
17	0.00	*****	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
20	0.20	*****	0.18	0.10	0.64	0.31	0.10	0.27	0.00	0.00	0.15	0.00	0.00	0.08
21	0.00	*****	0.05	0.02	0.02	0.03	0.03	0.03	0.00	0.16	0.01	0.10	0.06	0.03
23	0.00	*****	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	0.20	*****	0.23	0.12	0.66	0.35	0.15	0.35	0.02	0.20	0.16	0.10	0.06	0.13
MAR														
4	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.08	0.03	0.00	0.13	0.04	0.04	0.03	0.08	0.07	0.06	0.03	0.00	0.04	0.02
6	0.50	0.55	0.48	0.65	0.40	0.48	0.60	0.52	0.29	0.35	0.80	0.77	0.94	0.56
7	0.08	0.17	0.14	0.10	0.19	0.18	0.13	0.15	0.16	0.16	0.10	0.05	0.09	0.11
8	0.03	0.08	0.05	0.08	0.06	0.08	0.04	0.07	0.08	0.07	0.07	0.00	0.04	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
13	0.85	0.61	0.35	0.18	0.20	0.56	0.14	0.73	0.51	0.29	0.16	0.25	0.20	0.14
14	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.01
22	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.00	0.00	0.03
23	0.00	0.06	0.13	0.25	0.06	0.07	0.11	0.05	0.08	0.09	0.10	0.25	0.30	0.13
24	0.07	0.10	0.07	0.10	0.09	0.08	0.10	0.05	0.11	0.11	0.10	0.11	0.12	0.15
25	0.06	0.00	0.03	0.00	0.07	0.03	0.00	0.08	0.01	0.02	0.00	0.00	0.00	0.00
26	0.00	0.05	0.00	0.00	0.00	0.02	0.02	0.00	0.02	0.04	0.04	0.03	0.01	0.02
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00
MTOT	1.67	1.69	1.25	1.49	1.14	1.56	1.18	1.73	1.40	1.31	1.42	1.46	1.76	1.20

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER													
	1-O	2-O	3-O	4-O	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
APR														
3	0.27	0.26	0.25	0.17	0.38	0.26	0.14	0.19	0.22	0.20	0.16	0.09	0.11	0.15
4	1.12	0.88	1.05	1.09	0.51	0.69	1.49	0.50	0.62	0.76	1.66	0.99	1.00	0.83
5	0.29	0.37	0.30	0.40	0.35	0.36	0.26	0.21	0.25	0.23	0.20	0.26	0.16	0.31
6	0.03	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
7	0.08	0.12	0.07	0.28	0.07	0.38	0.13	0.25	0.27	0.33	0.14	0.37	0.32	0.14
8	0.00	0.04	0.00	0.00	0.00	0.04	0.03	0.00	0.03	0.04	0.04	0.00	0.04	0.03
11	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00
14	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
15	0.98	0.97	1.05	0.80	0.86	1.06	0.77	0.95	0.84	1.04	0.92	0.92	0.97	0.80
16	0.00	0.03	0.00	0.00	0.04	0.05	0.03	0.00	0.04	0.06	0.08	0.00	0.02	0.01
17	0.05	0.01	0.05	0.00	0.46	0.04	0.00	0.12	0.82	1.03	0.00	0.00	0.00	0.06
18	2.28	2.04	1.93	1.28	3.52	2.58	2.15	1.80	1.62	2.02	1.94	1.33	0.82	1.71
19	0.13	0.17	0.13	0.12	0.18	0.20	0.06	0.13	0.10	0.13	0.09	0.05	0.00	0.05
20	0.43	0.40	0.27	0.48	0.42	0.42	0.65	0.38	0.37	0.46	0.66	0.45	0.40	0.47
21	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
24	0.34	0.38	0.42	0.32	0.72	0.47	0.12	0.18	0.11	0.14	0.10	0.20	0.25	0.17
25	0.00	0.02	0.00	0.00	0.00	0.05	0.02	0.00	0.02	0.03	0.00	0.00	0.02	0.00
26	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.17	0.00	0.00	0.00	0.22	0.01	0.00	0.56	0.00	0.00	0.06	0.00	0.00	0.00
29	1.05	1.16	1.00	0.96	0.76	1.30	1.05	1.00	1.22	1.51	0.78	1.17	0.95	0.94
MTOT	7.25	6.87	6.52	5.90	8.54	7.95	6.92	6.27	6.55	8.01	6.83	5.88	5.06	5.67
MAY														
1	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
5	1.07	1.18	0.67	0.62	0.67	0.89	0.41	0.93	0.96	0.85	0.36	0.30	0.32	0.50
6	0.36	0.36	0.10	0.72	0.00	0.11	0.69	0.00	0.05	0.11	0.14	0.22	0.10	0.72
7	4.24	3.20	4.85	3.36	1.88	2.72	2.71	2.27	2.50	3.41	3.00	3.48	3.37	2.99
8	0.00	0.00	0.00	0.28	0.21	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00
9	0.23	0.22	0.25	0.14	0.00	0.20	0.09	0.00	0.18	0.15	0.07	0.00	0.00	0.07
10	0.02	0.05	0.00	0.07	0.00	0.05	0.04	0.00	0.04	0.06	0.09	0.00	0.01	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
12	0.38	0.42	0.34	0.52	0.00	1.01	0.62	1.15	0.63	0.55	0.60	0.85	0.00	0.45
13	0.14	0.19	0.20	0.28	1.20	0.13	0.26	0.07	0.05	0.18	0.12	0.14	0.01	0.08
14	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.11	0.01	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.64	0.98	0.00	0.80	0.73	0.76	0.47	0.45	0.45	0.26	0.42	1.10	0.86	0.57
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10
26	1.34	1.46	0.49	0.28	2.21	1.62	0.56	1.74	2.36	2.51	0.50	2.32	2.69	0.10
29	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.01	0.00
30	0.17	0.00	0.11	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.16	0.00	0.00
31	0.00	0.16	0.00	0.14	0.33	0.18	0.22	0.00	0.28	0.34	0.20	0.00	0.08	0.22
MTOT	8.59	8.22	7.01	7.21	7.23	7.76	6.15	7.17	7.65	8.46	5.50	8.57	7.45	5.80

S A N A N T O N I O U R B A N H Y D R O L O G Y S T U D Y

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER												
	1-O	2-O	3-O	4-O	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
JUN														
1	0.00	0.03	0.00	0.00	0.00	0.02	*****	0.00	0.02	0.01	0.00	0.00	0.04	0.00
2	0.10	0.20	0.18	0.56	0.00	0.00	*****	0.00	0.01	0.00	0.00	0.00	0.02	0.03
3	0.00	0.01	0.00	0.00	0.00	0.01	*****	0.00	0.00	0.00	0.00	0.00	0.43	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00	0.00	0.01	0.00	0.00	0.01	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00	0.08	0.07	0.00	0.00	0.01	0.00
10	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
16	0.27	0.12	1.64	1.96	0.00	0.23	1.54	0.35	0.71	0.21	1.04	0.00	0.05	0.97
17	0.04	0.04	0.07	0.00	0.23	0.06	0.11	0.00	0.05	0.06	0.08	0.00	0.01	0.06
18	0.00	0.03	0.00	0.00	0.00	0.02	0.05	0.00	0.03	0.04	0.08	0.00	0.05	0.00
19	0.00	0.00	0.20	0.00	0.07	0.00	0.00	0.08	0.02	0.00	0.00	0.00	0.00	0.00
24	0.55	0.64	0.04	0.00	1.55	0.62	0.42	2.06	1.33	1.44	0.00	0.04	0.02	0.00
25	0.07	0.20	0.34	0.00	0.26	0.29	0.06	0.00	0.33	0.23	0.40	0.13	0.13	0.45
26	0.00	0.01	0.00	0.83	0.00	0.01	0.01	0.00	0.02	0.01	0.02	0.05	0.00	0.10
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	1.03	1.28	2.47	3.35	2.16	1.27	*****	2.74	2.51	2.49	1.62	0.27	0.78	1.61
JUL														
3	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.04	0.00	0.00	0.00	0.02
4	0.38	0.49	0.32	1.50	1.14	0.49	0.94	0.60	0.70	0.92	0.84	3.40	4.54	1.44
5	0.40	0.82	0.08	0.00	0.12	0.45	0.36	0.59	0.45	0.62	0.18	0.15	0.12	0.31
6	0.43	0.55	1.80	0.23	0.30	0.40	0.06	0.80	2.78	2.72	0.12	0.23	0.24	0.13
7	0.00	0.02	0.00	0.00	0.00	0.04	0.11	0.12	0.33	0.33	0.08	0.00	0.03	0.00
8	0.28	0.35	0.30	0.50	0.33	0.30	0.45	0.28	0.36	0.43	0.36	0.38	0.37	0.34
9	0.87	0.72	0.85	0.58	0.30	0.55	0.10	0.43	0.45	0.50	0.42	0.47	0.55	0.48
10	0.85	0.89	0.82	0.74	1.26	0.90	0.55	1.05	0.83	1.04	0.44	1.00	0.96	0.79
11	0.35	0.42	0.35	0.22	0.51	0.55	0.21	0.11	0.13	0.13	0.30	0.30	0.37	0.51
12	0.02	0.00	0.02	0.00	0.15	0.04	0.05	0.22	0.23	0.48	0.08	0.00	0.01	0.00
13	0.00	0.02	0.00	0.00	0.20	0.25	0.03	0.24	0.18	0.25	0.18	0.00	0.01	0.04
14	0.48	0.43	0.43	0.35	0.55	0.42	0.04	0.46	0.35	0.42	0.24	0.46	0.52	0.46
15	0.10	0.06	0.09	0.08	0.16	0.08	0.03	0.00	0.02	0.06	0.05	0.03	0.09	0.00
16	0.02	0.01	0.01	0.00	0.00	0.03	0.03	0.11	0.12	0.25	0.50	0.67	0.67	0.86
17	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.01	0.01	0.00	0.00	0.03	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.02	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00
20	0.00	0.23	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.01
21	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00
22	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
30	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	4.23	5.01	5.37	4.20	5.02	4.00	3.11	5.01	6.95	8.20	3.89	7.09	8.56	5.70

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1976 WATER YEAR

DATE	GAGE NUMBER												
	1-O	2-O	3-O	4-O	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
AUG														
15	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.17	0.09	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
18	0.35	0.56	0.55	0.80	0.29	0.57	1.25	0.80	2.39	2.36	1.06	0.18	0.14	0.95
19	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
29	0.62	0.50	0.44	1.08	0.55	1.48	0.29	0.65	0.57	0.66	0.44	0.75	0.92	0.07
30	0.24	0.56	0.18	0.12	0.30	2.05	1.22	1.15	1.71	0.95	1.85	0.05	0.02	0.93
31	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.00
MTOT	1.21	1.65	1.17	2.00	1.14	4.52	2.77	2.60	4.88	4.13	3.37	0.98	1.08	2.09
SEPT														
2	0.68	0.42	0.05	0.38	0.40	0.71	0.93	1.15	0.84	0.57	0.92	0.28	0.18	0.46
3	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00
12	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.85	0.00	0.00	0.21	0.00	0.60	0.00	0.00	0.06	0.06	0.00	0.00	0.08	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
16	0.05	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.01
17	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.02	0.00	0.01	0.40	0.83	0.66	0.41
19	0.81	0.75	0.90	0.85	1.00	1.14	0.65	0.42	0.49	1.06	0.56	1.57	1.76	0.43
20	1.44	2.07	1.23	0.71	1.35	1.34	0.26	0.75	0.78	0.41	0.20	0.05	0.08	0.45
21	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.01	0.01	0.00	0.00	0.01	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
26	0.65	1.04	0.70	0.80	0.70	1.08	0.49	1.34	1.29	1.05	0.32	0.39	0.20	0.91
27	0.00	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.02	0.02	0.00	0.00	0.01	0.00
28	1.93	1.40	1.40	1.10	3.58	1.67	1.12	2.00	1.28	1.18	1.15	1.05	1.26	1.12
29	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
31	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
MTOT	6.56	5.73	4.34	4.05	7.03	6.58	3.95	5.68	4.80	4.39	3.55	4.17	4.36	3.79
WTOT	34.67	*****	33.19	32.26	38.73	39.75	*****	*****	*****	*****	31.25	33.73	33.56	30.31

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

STA. NO. 08177700 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

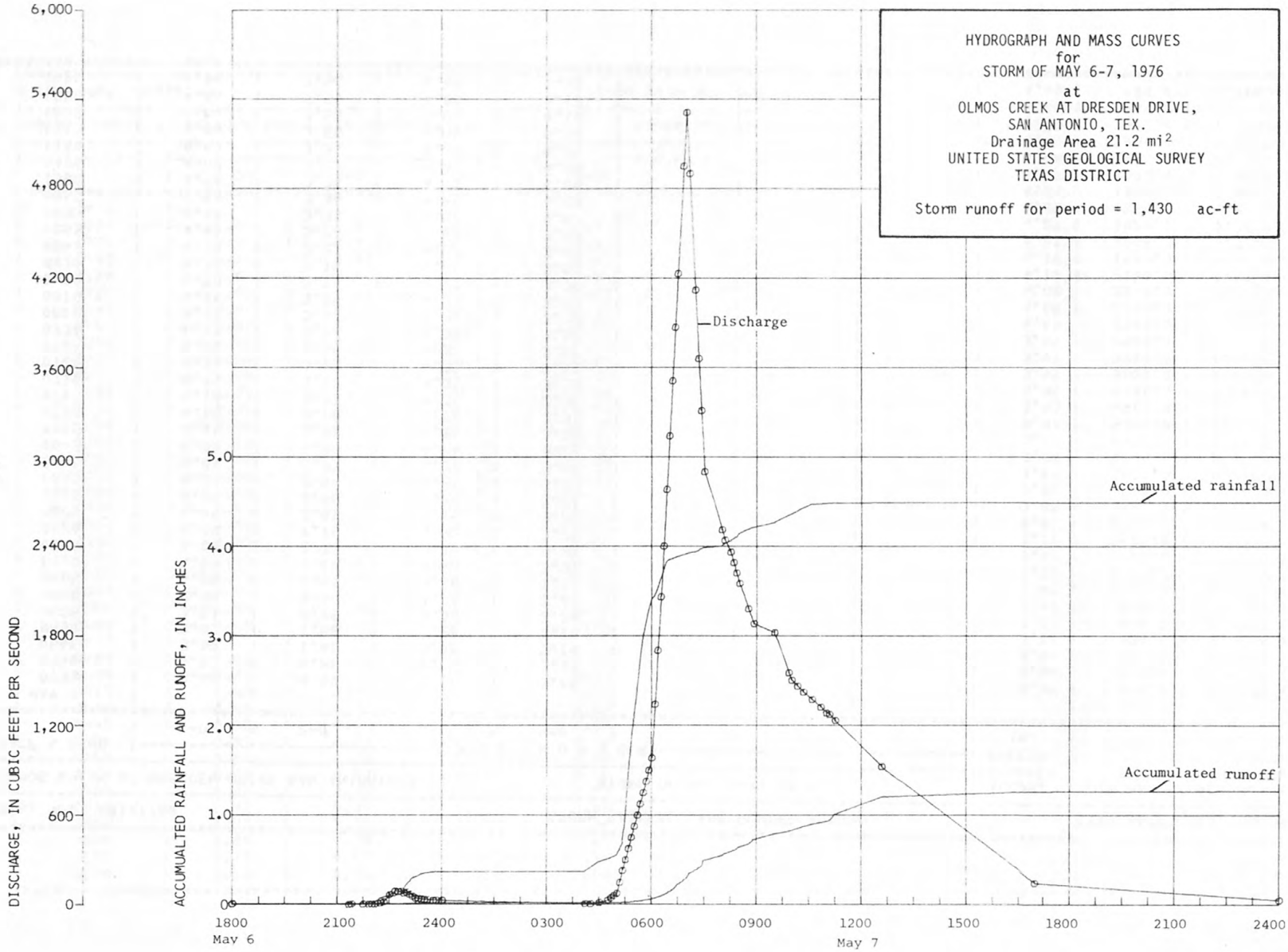
OLMOS CREEK AT DRESDEN DRIVE SAN ANTONIO,TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 1-0	2-0	3-0	4-0				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 6										
0000	0.0	0.0	0.0	0.0				0.0	4.9	0.0028
1525	0.0	0.0	0.0	0.0				0.0	1.4	0.0036
1530	0.0	0.01	0.0	0.0				0.00	1.4	0.0039
2120	0.0	0.01	0.0	0.0				0.00	0.7	0.0040
2125	0.0	0.01	0.0	0.01				0.00	1.0	0.0040
2145	0.0	0.01	0.0	0.01				0.00	1.4	0.0040
2155	0.0	0.01	0.0	0.02				0.00	1.4	0.0041
2200	0.02	0.01	0.0	0.03				0.01	1.4	0.0041
2205	0.04	0.01	0.0	0.04				0.02	1.4	0.0041
2215	0.04	0.01	0.0	0.66				0.07	8.5	0.0042
2220	0.07	0.01	0.0	0.68				0.08	16.0	0.0043
2230	0.09	0.01	0.01	0.71				0.09	63.0	0.0051
2240	0.09	0.02	0.01	0.71				0.09	90.0	0.0059
2245	0.11	0.03	0.02	0.71				0.11	83.0	0.0064
2250	0.12	0.04	0.02	0.71				0.11	89.0	0.0069
2255	0.26	0.05	0.03	0.71				0.17	75.0	0.0074
2300	0.40	0.05	0.05	0.71				0.22	82.0	0.0079
2305	0.49	0.06	0.06	0.71				0.26	69.0	0.0083
2310	0.58	0.09	0.07	0.71				0.30	55.0	0.0087
2315	0.59	0.12	0.07	0.71				0.31	42.0	0.0089
2320	0.59	0.19	0.08	0.71				0.32	39.0	0.0091
2325	0.59	0.29	0.08	0.71				0.34	36.0	0.0094
2330	0.59	0.32	0.09	0.71				0.35	33.0	0.0098
2345	0.60	0.35	0.10	0.71				0.36	29.0	0.0103
2400	0.60	0.36	0.10	0.71				0.37	27.0	0.0126
MAY 7										
0000	0.60	0.36	0.10	0.71				0.37	27.0	0.0126
0405	0.61	0.36	0.10	0.71				0.37	5.4	0.0154
0415	0.62	0.36	0.10	1.21				0.41	5.4	0.0155
0430	0.62	0.36	0.10	2.01				0.48	13.0	0.0157
0445	0.62	0.36	0.12	2.31				0.51	28.0	0.0161
0450	0.63	0.36	0.13	2.36				0.52	43.0	0.0163
0455	0.64	0.37	0.14	2.41				0.53	58.0	0.0167
0500	0.67	0.37	0.14	2.46				0.55	73.0	0.0171
0505	0.82	0.38	0.14	2.56				0.61	147.0	0.0180
0510	0.97	0.39	0.14	2.66				0.67	227.0	0.0194
0515	1.37	0.39	0.40	2.76				0.92	299.0	0.0212
0520	2.29	0.39	0.82	2.84				1.40	374.0	0.0235
0525	2.71	0.43	1.24	2.92				1.73	449.0	0.0262
0530	3.12	0.51	1.65	2.99				2.05	524.0	0.0294

STA. NO. 08177700 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE SAN ANTONIO, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 1-0	2-0	3-0	4-0				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7										
0535	3.42	0.59	2.10	3.05				2.35	599.0	0.0331
0540	3.57	0.86	2.55	3.11				2.64	673.0	0.0372
0545	3.62	1.40	3.00	3.16				2.94	749.0	0.0417
0550	3.67	1.88	3.20	3.18				3.12	824.0	0.0468
0555	3.81	2.25	3.30	3.20				3.28	899.0	0.0522
0600	3.96	2.54	3.35	3.21				3.40	980.0	0.0582
0605	4.00	2.61	3.40	3.21				3.45	1340.0	0.0664
0610	4.04	2.69	3.50	3.21				3.51	1700.0	0.0767
0615	4.09	2.73	3.70	3.21				3.62	2060.0	0.0893
0620	4.09	2.76	3.92	3.21				3.71	2400.0	0.1039
0625	4.09	2.81	4.15	3.21				3.81	2780.0	0.1208
0630	4.09	2.90	4.20	3.21				3.85	3140.0	0.1400
0635	4.09	2.94	4.21	3.23				3.86	3510.0	0.1613
0640	4.09	2.97	4.22	3.24				3.87	3870.0	0.1849
0645	4.09	2.99	4.24	3.26				3.89	4230.0	0.2236
0655	4.11	3.00	4.26	3.29				3.90	4950.0	0.2688
0700	4.12	3.00	4.28	3.31				3.92	5310.0	0.3011
0705	4.12	3.01	4.30	3.32				3.93	4900.0	0.3459
0715	4.13	3.02	4.31	3.33				3.94	4120.0	0.3835
0720	4.14	3.03	4.31	3.42				3.95	3660.0	0.4058
0725	4.16	3.05	4.32	3.51				3.97	3310.0	0.4260
0730	4.17	3.06	4.32	3.61				3.99	2900.0	0.4878
0800	4.17	3.06	4.34	3.72				4.00	2510.0	0.5566
0815	4.26	3.09	4.39	3.77				4.06	2360.0	0.5854
0820	4.29	3.10	4.41	3.79				4.08	2290.0	0.6063
0830	4.34	3.16	4.48	3.83				4.14	2150.0	0.6390
0845	4.38	3.22	4.52	3.89				4.19	1980.0	0.6692
0855	4.40	3.24	4.55	3.93				4.21	1880.0	0.7207
0930	4.48	3.30	4.56	4.07				4.27	1820.0	0.7872
0955	4.54	3.34	4.69	4.08				4.35	1550.0	0.8156
1000	4.56	3.36	4.70	4.08				4.36	1500.0	0.8521
1035	4.62	3.52	4.85	4.09				4.47	1370.0	0.9022
1100	4.63	3.54	4.85	4.10				4.48	1280.0	0.9334
1115	4.64	3.55	4.85	4.12				4.49	1230.0	1.0045
1235	4.64	3.56	4.85	4.12				4.49	921.0	1.1981
1700	4.64	3.56	4.85	4.12				4.49	141.0	1.2569
2400	4.64	3.56	4.85	4.12				4.49	29.0	1.2643


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
OLMOS CREEK AT DRESDEN DRIVE,
SAN ANTONIO, TEX.
Drainage Area 21.2 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 1,430 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
6,000
5,400
4,800
4,200
3,600
3,000
2,400
1,800
1,200
600
0
5.0
4.0
3.0
2.0
1.0
0
1800
May 6
2100
2400
0300
0600
0900
1200
May 7
1500
1800
2100
2400

STA. NO. 08178800 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK LOWER STA.AT SAN ANTONIO, TEX. — STORM OF MAY 7-8, 1976

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	4-S	5-S	6-S	2-O	3-O							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7																	
0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	46.0	0.0002
0100	0.0	0.0	0.01	0.0	0.0	0.0	0.0	0.0							0.00	45.0	0.0006
0200	0.01	0.01	0.01	0.0	0.0	0.0	0.0	0.0							0.01	45.0	0.0009
0300	0.01	0.01	0.01	0.0	0.0	0.0	0.0	0.0							0.01	45.0	0.0013
0400	0.01	0.01	0.01	0.0	0.0	0.0	0.0	0.0							0.01	46.0	0.0015
0415	0.01	0.01	0.01	0.0	0.01	0.0	0.0	0.0							0.01	47.0	0.0016
0430	0.02	0.01	0.01	0.0	0.02	0.0	0.0	0.0							0.01	47.0	0.0017
0445	0.02	0.01	0.02	0.02	0.04	0.01	0.0	0.02							0.02	47.0	0.0018
0500	0.02	0.01	0.03	0.04	0.05	0.02	0.01	0.05							0.02	48.0	0.0019
0510	0.04	0.01	0.06	0.20	0.08	0.03	0.03	0.05							0.05	48.0	0.0020
0515	0.08	0.02	0.09	0.40	0.38	0.03	0.03	0.30							0.10	48.0	0.0020
0525	0.25	0.06	0.09	0.90	1.13	0.47	0.07	1.20							0.29	50.0	0.0021
0530	0.40	0.15	0.10	0.95	1.25	0.91	0.15	1.55							0.40	50.0	0.0021
0535	0.55	0.31	0.33	1.00	1.34	1.17	0.23	1.80							0.57	50.0	0.0021
0545	0.85	0.68	0.84	1.22	1.63	1.44	1.04	2.90							0.96	51.0	0.0022
0555	1.12	1.34	0.98	1.30	1.72	1.73	1.89	3.10							1.31	51.0	0.0023
0600	1.18	1.56	1.03	1.37	1.73	1.77	2.18	3.25							1.43	52.0	0.0023
0605	1.20	1.61	1.07	1.39	1.79	1.79	2.26	3.30							1.46	56.0	0.0024
0615	1.28	1.68	1.22	1.50	1.91	1.86	2.37	3.67							1.56	66.0	0.0024
0625	1.32	1.72	1.28	1.60	2.01	1.95	2.45	4.10							1.63	75.0	0.0025
0630	1.33	1.77	1.33	1.80	2.11	2.02	2.54	4.15							1.69	80.0	0.0026
0645	1.35	1.98	1.74	2.20	2.63	2.43	2.60	4.22							1.94	101.0	0.0028
0700	1.37	2.02	1.98	2.27	2.64	2.66	2.65	4.24							2.03	122.0	0.0031
0715	1.38	2.04	2.09	2.34	2.80	2.72	2.66	4.27							2.08	180.0	0.0035
0730	1.39	2.06	2.17	2.38	2.83	2.80	2.69	4.27							2.12	242.0	0.0040
0745	1.39	2.07	2.19	2.40	2.84	2.81	2.70	4.29							2.13	307.0	0.0046
0800	1.40	2.08	2.20	2.44	2.84	2.82	2.70	4.30							2.14	371.0	0.0053
0815	1.41	2.10	2.23	2.46	2.87	2.83	2.73	4.35							2.16	408.0	0.0062
0830	1.45	2.13	2.26	2.48	2.90	2.86	2.80	4.42							2.19	448.0	0.0071
0845	1.52	2.24	2.29	2.50	2.92	2.88	2.86	4.47							2.25	487.0	0.0081
0900	1.56	2.34	2.32	2.60	3.03	2.96	2.88	4.50							2.32	529.0	0.0092
0915	1.63	2.37	2.36	2.65	3.10	3.06	2.90	4.52							2.37	556.0	0.0103
0930	1.68	2.41	2.39	2.70	3.13	3.08	2.92	4.55							2.41	585.0	0.0115
0945	1.73	2.46	2.45	2.78	3.18	3.12	2.96	4.60							2.46	615.0	0.0128
1000	1.77	2.51	2.48	2.86	3.24	3.19	3.04	4.66							2.51	643.0	0.0141
1015	1.82	2.57	2.53	2.90	3.33	3.27	3.06	4.73							2.57	706.0	0.0155
1030	1.87	2.65	2.64	2.97	3.36	3.32	3.14	4.79							2.64	779.0	0.0171
1045	1.88	2.69	2.67	2.97	3.40	3.35	3.17	4.80							2.67	856.0	0.0189
1100	1.88	2.71	2.69	2.97	3.43	3.36	3.18	4.80							2.68	937.0	0.0208

STA. NO. 08178800 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

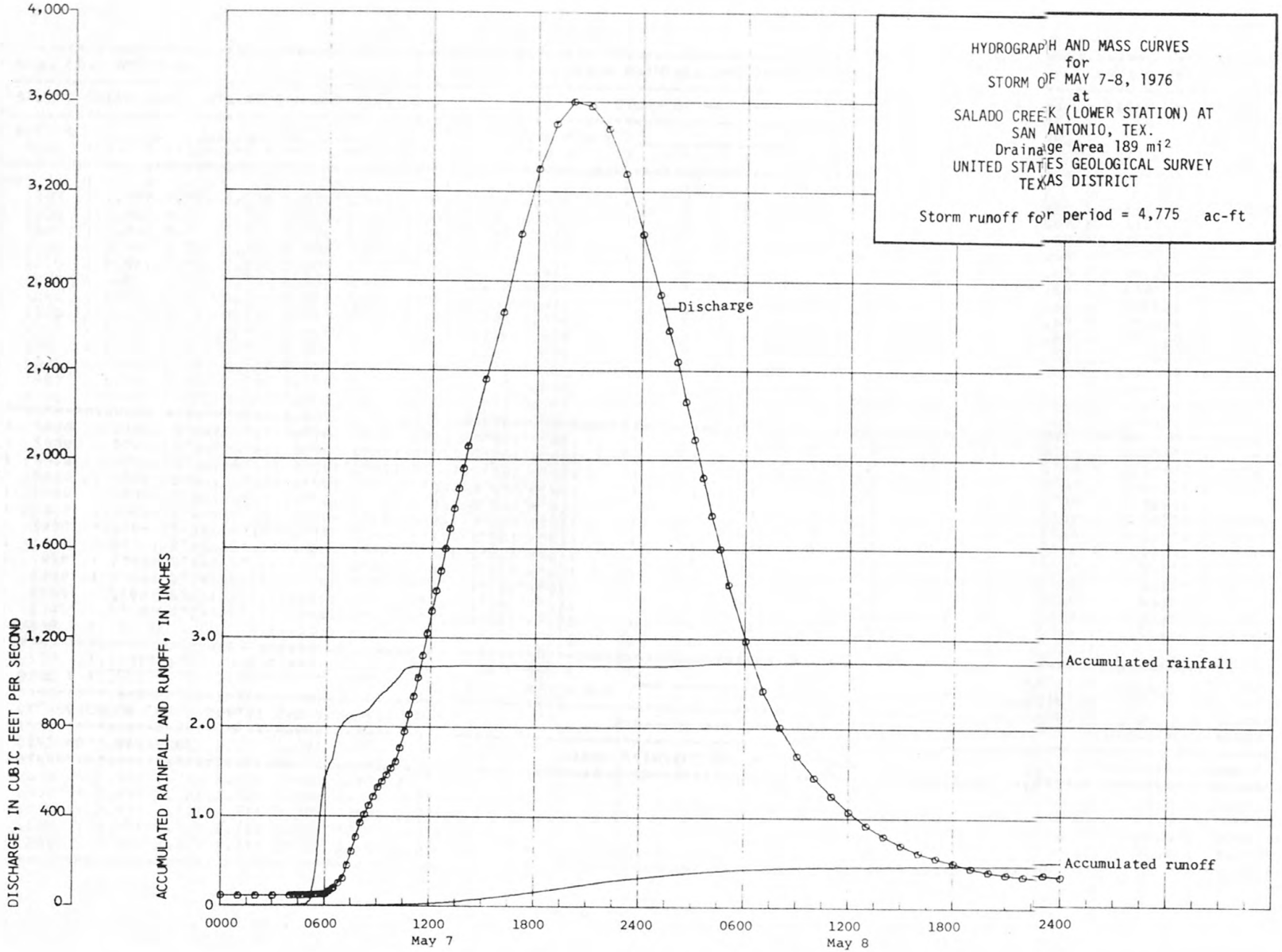
SALADO CREEK LOWER STA.AT SAN ANTONIO, TEX. — STORM OF MAY 7-8, 1976

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	4-S	5-S	6-S	2-0	3-0							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 7																	
1115	1.88	2.71	2.69	2.97	3.44	3.36	3.19	4.81							2.68	1020.0	0.0229
1130	1.88	2.71	2.70	2.97	3.45	3.36	3.19	4.81							2.68	1120.0	0.0252
1145	1.88	2.71	2.70	2.97	3.45	3.36	3.19	4.81							2.68	1220.0	0.0277
1200	1.88	2.71	2.70	2.97	3.45	3.36	3.19	4.81							2.68	1320.0	0.0304
1215	1.88	2.71	2.70	2.97	3.46	3.36	3.19	4.81							2.68	1410.0	0.0333
1230	1.88	2.71	2.71	2.97	3.46	3.36	3.20	4.81							2.68	1500.0	0.0364
1245	1.88	2.71	2.71	2.97	3.47	3.37	3.20	4.81							2.69	1600.0	0.0397
1300	1.88	2.71	2.71	2.97	3.47	3.37	3.20	4.81							2.69	1690.0	0.0431
1315	1.88	2.71	2.71	2.98	3.48	3.37	3.20	4.81							2.69	1780.0	0.0468
1330	1.88	2.71	2.71	2.99	3.48	3.37	3.20	4.81							2.69	1870.0	0.0506
1345	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	1960.0	0.0546
1400	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	2060.0	0.0652
1500	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	2360.0	0.0845
1600	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	2660.0	0.1063
1700	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3010.0	0.1310
1800	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3300.0	0.1581
1900	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3500.0	0.1868
2000	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3600.0	0.2163
2100	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3580.0	0.2456
2200	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3480.0	0.2742
2300	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3280.0	0.3011
2400	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3010.0	0.3196
MAY 8																	
0000	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	3010.0	0.3196
0100	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	2740.0	0.3426
0130	1.88	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.69	2580.0	0.3532
0200	1.91	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.70	2440.0	0.3632
0230	1.93	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.70	2260.0	0.3724
0300	1.94	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.71	2090.0	0.3810
0330	1.96	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.71	1920.0	0.3889
0400	2.01	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.72	1750.0	0.3960
0430	2.03	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.73	1600.0	0.4026
0500	2.04	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.73	1440.0	0.4114
0600	2.04	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.73	1190.0	0.4212
0700	2.04	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.73	967.0	0.4291
0800	2.06	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.73	804.0	0.4357
0900	2.07	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	676.0	0.4413
1000	2.07	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	579.0	0.4460
1100	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	498.0	0.4501
1200	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	428.0	0.4536

STA. NO. 08178800 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK LOWER STA.AT SAN ANTONIO, TEX. — STORM OF MAY 7-8, 1976

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	4-S	5-S	6-S	2-0	3-0							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 8																	
1300	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	367.0	0.4566
1400	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	319.0	0.4592
1500	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	279.0	0.4615
1600	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	245.0	0.4635
1700	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	221.0	0.4653
1800	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	201.0	0.4670
1900	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	178.0	0.4684
2000	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	162.0	0.4698
2100	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	150.0	0.4710
2200	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	142.0	0.4722
2300	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	134.0	0.4733
2400	2.09	2.72	2.71	3.00	3.48	3.37	3.20	4.81							2.74	127.0	0.4738


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 7-8, 1976
at
SALADO CREEK (LOWER STATION) AT
SAN ANTONIO, TEX.
Drainage Area 189 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 4,775 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
4,000
3,600
3,200
2,800
2,400
2,000
1,600
1,200
800
400
0
3.0
2.0
1.0
0
0000
0600
1200
1800
2400
0600
1200
1800
2400
May 7
May 8

STA. NO. 08181400 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

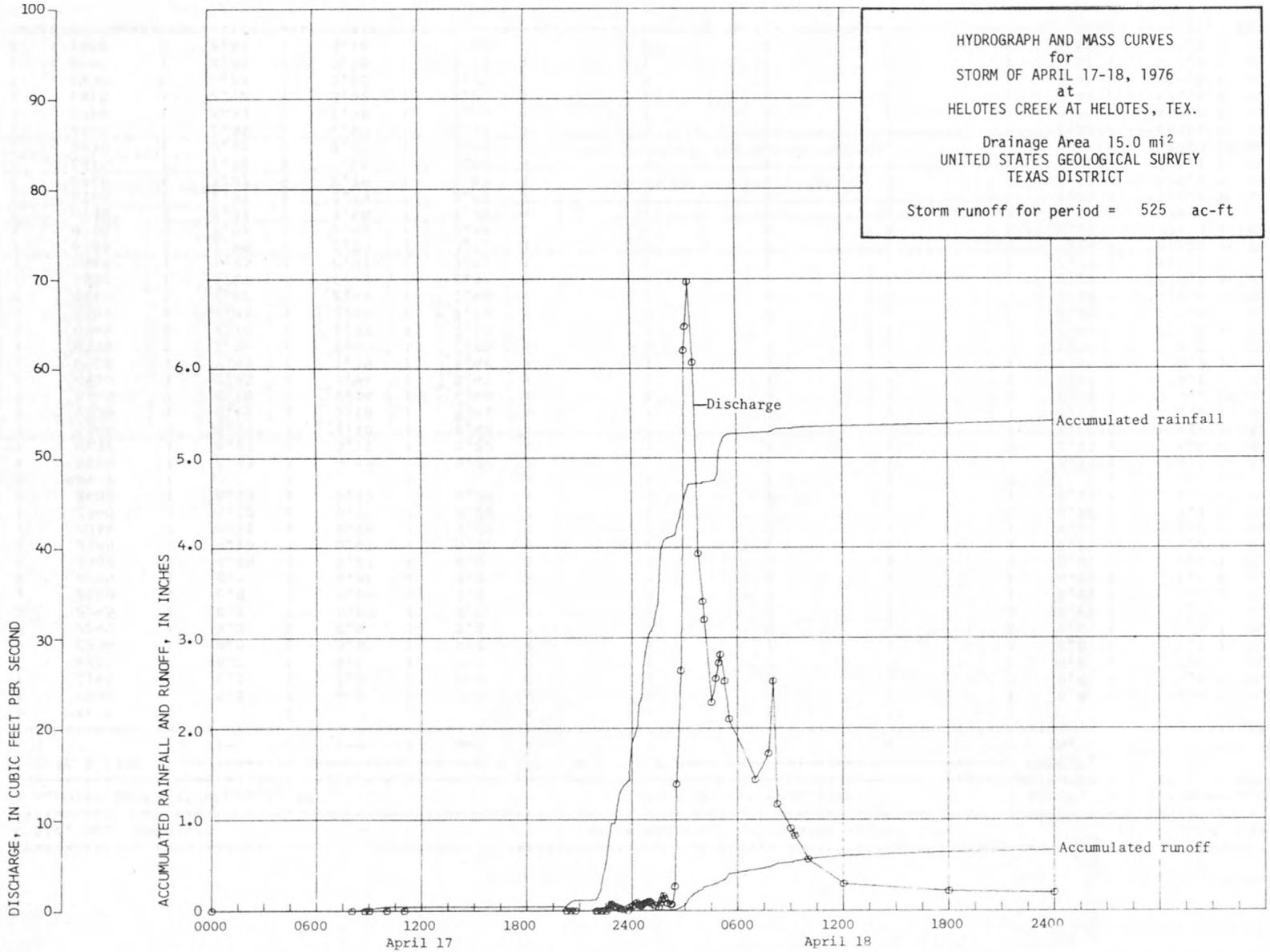
HELOTES CREEK AT HELOTES, TEX. — STORM OF APRIL 17-18, 1976

DATE & TIME	GAGE NUMBER 1-H	2-H	3-H				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 17									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0800	0.0	0.0	0.0				0.0	0.0	0.0
0845	0.02	0.0	0.0				0.01	0.0	0.0
0900	0.03	0.02	0.0				0.03	0.0	0.0
1000	0.03	0.10	0.0				0.05	0.0	0.0
1100	0.03	0.11	0.0				0.05	0.0	0.0
2015	0.03	0.11	0.0				0.05	0.0	0.0
2030	0.10	0.11	0.0				0.10	0.0	0.0
2045	0.13	0.11	0.0				0.12	0.0	0.0
2155	0.13	0.13	0.0				0.12	0.0	0.0
2200	0.16	0.13	0.0				0.14	0.0	0.0
2210	0.21	0.22	0.04				0.20	0.0	0.0
2215	0.28	0.26	0.12				0.27	0.0	0.0
2230	0.48	0.56	0.60				0.51	0.0	0.0
2235	0.55	0.72	0.66				0.60	7.0	0.0001
2245	0.82	1.03	0.78				0.87	22.0	0.0004
2250	0.95	1.03	0.79				0.96	20.0	0.0006
2300	0.95	1.03	0.80				0.96	14.0	0.0008
2305	1.05	1.03	0.81				1.03	12.0	0.0010
2315	1.25	1.26	0.82				1.23	8.5	0.0011
2320	1.35	1.27	0.82				1.30	6.7	0.0012
2330	1.43	1.29	0.82				1.36	4.1	0.0013
2345	1.46	1.33	1.18				1.41	1.8	0.0013
2350	1.47	1.34	1.25				1.43	12.0	0.0014
2400	1.92	1.68	1.40				1.83	16.0	0.0017
APR 18									
0000	1.92	1.68	1.40				1.83	16.0	0.0017
0015	2.06	1.80	1.60				1.97	27.0	0.0022
0020	2.10	1.90	1.73				2.03	21.0	0.0024
0025	2.40	2.00	1.86				2.27	18.0	0.0026
0030	2.42	2.05	1.98				2.31	16.0	0.0027
0035	2.45	2.25	2.05				2.38	20.0	0.0029
0040	2.88	2.34	2.13				2.71	24.0	0.0031
0045	2.97	2.43	2.20				2.80	27.0	0.0034
0055	3.16	2.63	2.28				2.98	31.0	0.0038
0100	3.25	2.64	2.32				3.05	28.0	0.0041
0105	3.28	2.66	2.35				3.08	23.0	0.0044
0115	3.35	2.70	2.40				3.14	18.0	0.0048
0130	3.63	2.81	3.00				3.39	12.0	0.0050
0135	4.00	3.05	3.03				3.71	24.0	0.0052

STA. NO. 08181400 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

HELOTES CREEK AT HELOTES, TEX. — STORM OF APRIL 17-18, 1976

DATE & TIME	GAGE NUMBER 1-H	2-H	3-H				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
APR 18									
0140	4.37	3.08	3.06				3.98	36.0	0.0055
0145	4.42	3.11	3.08				4.03	48.0	0.0059
0150	4.48	3.14	3.15				4.08	40.0	0.0064
0200	4.49	3.20	3.30				4.11	24.0	0.0068
0210	4.50	3.23	3.30				4.12	21.0	0.0071
0215	4.50	3.23	3.30				4.12	20.0	0.0074
0225	4.51	3.23	3.47				4.14	80.0	0.0084
0230	4.52	3.30	3.55				4.17	416.0	0.0156
0245	4.71	3.50	3.60				4.35	790.0	0.0360
0300	4.91	3.70	3.83				4.55	1860.0	0.0680
0305	4.97	3.77	3.84				4.61	1940.0	0.0930
0315	5.10	3.78	3.85				4.71	2090.0	0.1380
0330	5.10	3.79	3.88				4.71	1820.0	0.1850
0345	5.10	3.81	3.90				4.72	1180.0	0.2155
0400	5.10	3.81	3.91				4.72	1020.0	0.2331
0405	5.12	3.82	3.91				4.73	960.0	0.2579
0430	5.12	3.84	3.92				4.74	685.0	0.2814
0445	5.12	3.85	4.11				4.75	764.0	0.2979
0455	5.12	4.08	4.24				4.82	817.0	0.3084
0500	5.47	4.20	4.30				5.09	843.0	0.3230
0515	5.60	4.35	4.40				5.23	756.0	0.3425
0530	5.65	4.38	4.40				5.27	630.0	0.3994
0700	5.66	4.42	4.40				5.29	430.0	0.4494
0745	5.66	4.43	4.40				5.29	516.0	0.4761
0800	5.66	4.45	4.45				5.30	756.0	0.4956
0815	5.67	4.53	4.50				5.33	349.0	0.5136
0900	5.67	4.54	4.51				5.33	271.0	0.5264
0910	5.67	4.54	4.52				5.33	254.0	0.5297
0915	5.67	4.58	4.52				5.34	246.0	0.5403
1000	5.68	4.58	4.53				5.35	168.0	0.5642
1200	5.69	4.59	4.53				5.36	88.0	0.6005
1800	5.72	4.60	4.53				5.38	64.0	0.6402
2400	5.76	4.62	4.53				5.41	58.0	0.6582


HYDROGRAPH AND MASS CURVES
for
STORM OF APRIL 17-18, 1976
at
HELOTES CREEK AT HELOTES, TEX.
Drainage Area 15.0 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 525 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
100
90
80
70
60
50
40
30
20
10
0
6.0
5.0
4.0
3.0
2.0
1.0
0
0000
0600
1200
1800
2400
0600
1200
1800
2400
April 17
April 18

STA. NO. 08181400 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

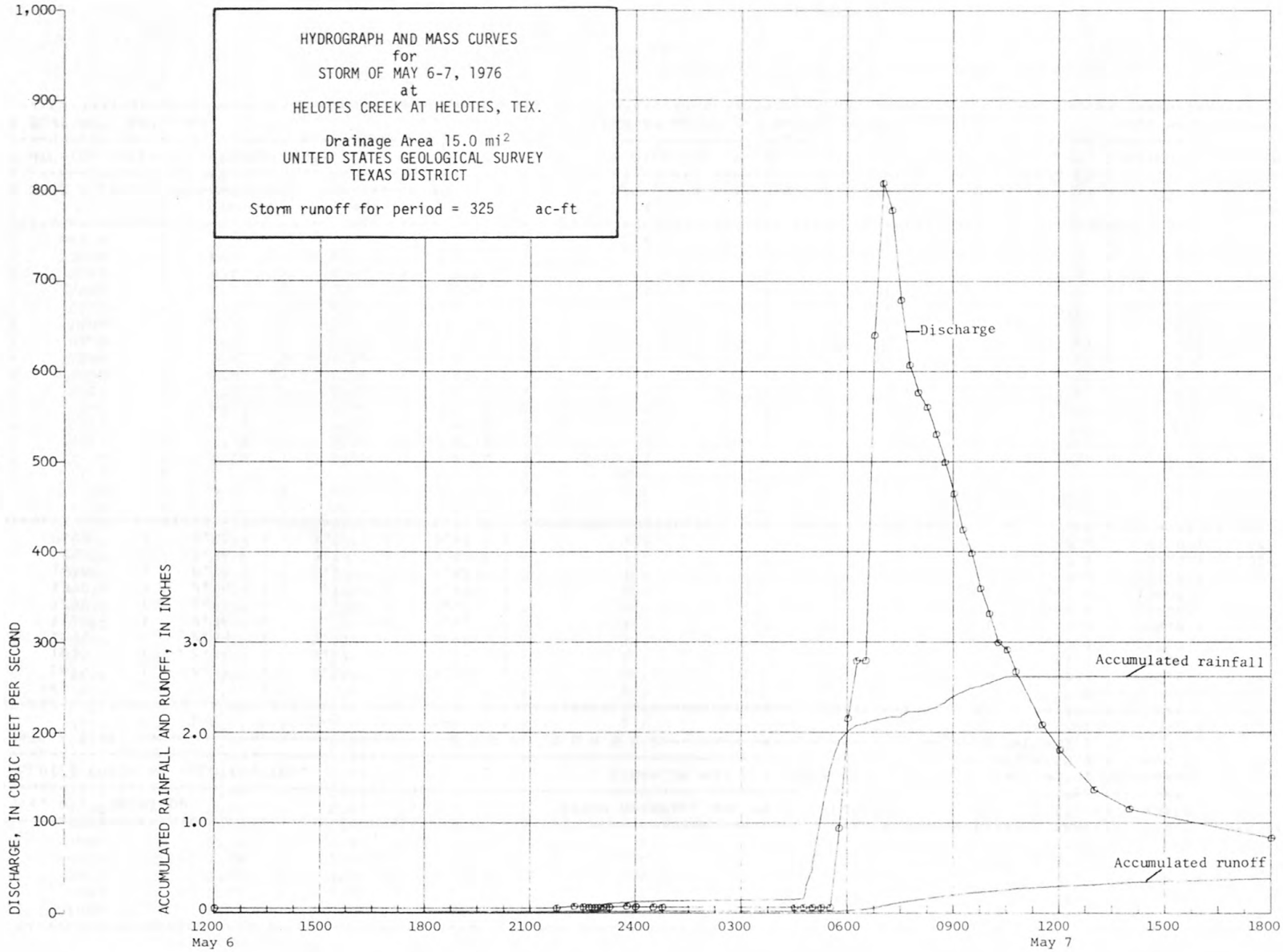
HELOTES CREEK AT HELOTES, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 1-H	2-H	3-H					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 6										
0000	0.0	0.0	0.0					0.0	5.4	0.0061
2145	0.0	0.0	0.0					0.0	5.4	0.0123
2215	0.0	0.0	0.0					0.0	7.1	0.0125
2230	0.0	0.0	0.0					0.0	6.6	0.0127
2240	0.0	0.0	0.0					0.0	6.4	0.0128
2245	0.0	0.03	0.0					0.01	6.2	0.0128
2250	0.0	0.06	0.0					0.01	6.2	0.0129
2255	0.0	0.06	0.0					0.01	6.2	0.0129
2300	0.05	0.07	0.0					0.05	6.2	0.0130
2305	0.10	0.07	0.07					0.09	6.2	0.0131
2315	0.11	0.08	0.22					0.11	6.2	0.0133
2345	0.12	0.09	0.22					0.12	7.1	0.0136
2400	0.13	0.10	0.22					0.13	6.6	0.0137
MAY 7										
0000	0.13	0.10	0.22					0.13	6.6	0.0137
0030	0.13	0.10	0.22					0.13	6.4	0.0141
0045	0.13	0.10	0.40					0.14	6.2	0.0153
0430	0.15	0.10	0.40					0.15	6.2	0.0166
0445	0.15	0.14	0.40					0.16	6.2	0.0168
0500	0.33	0.94	0.40					0.49	6.2	0.0169
0515	0.83	1.79	0.40					1.05	6.2	0.0171
0530	1.38	2.24	0.75					1.56	6.2	0.0173
0545	1.70	2.37	2.15					1.89	94.0	0.0197
0600	1.80	2.44	2.70					2.00	215.0	0.0252
0615	1.87	2.46	2.95					2.07	279.0	0.0324
0630	1.89	2.49	2.98					2.09	279.0	0.0397
0645	1.93	2.51	3.01					2.13	640.0	0.0562
0700	1.95	2.53	3.03					2.15	808.0	0.0770
0715	1.97	2.55	3.05					2.17	778.0	0.0971
0730	1.97	2.55	3.05					2.17	679.0	0.1147
0745	1.97	2.79	3.05					2.23	607.0	0.1304
0800	1.97	2.79	3.05					2.23	576.0	0.1452
0815	1.98	2.81	3.06					2.24	560.0	0.1597
0830	2.00	2.87	3.08					2.27	530.0	0.1734
0845	2.05	2.93	3.14					2.32	499.0	0.1863
0900	2.13	2.98	3.16					2.39	464.0	0.1983
0915	2.18	3.02	3.20					2.44	424.0	0.2092
0930	2.23	3.05	3.25					2.49	398.0	0.2195
0945	2.25	3.08	3.27					2.51	359.0	0.2288
1000	2.28	3.12	3.30					2.54	331.0	0.2373

STA. NO. 08181400 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

HELOTES CREEK AT HELOTES, TEX. — STORM OF MAY 6-7, 1976

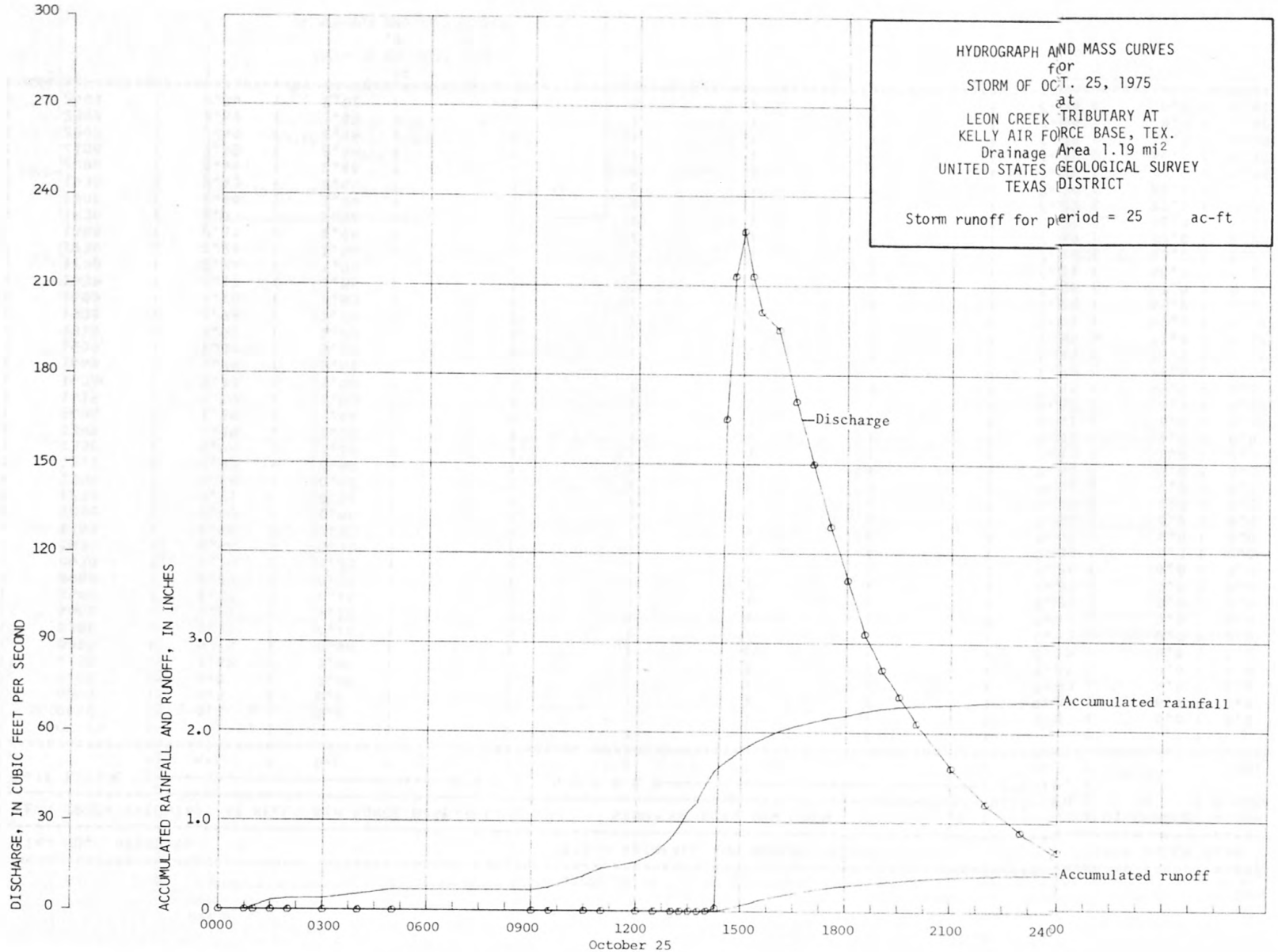
DATE & TIME	GAGE NUMBER 1-H	2-H	3-H				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
1015	2.32	3.14	3.35				2.58	299.0	0.2450
1030	2.36	3.17	3.37				2.61	291.0	0.2525
1045	2.36	3.17	3.42				2.62	267.0	0.2663
1130	2.36	3.17	3.42				2.62	208.0	0.2798
1200	2.36	3.17	3.42				2.62	180.0	0.2937
1300	2.36	3.17	3.42				2.62	136.0	0.3078
1400	2.36	3.17	3.42				2.62	115.0	0.3375
1800	2.36	3.17	3.42				2.62	83.0	0.3803
2400	2.36	3.17	3.42				2.62	81.0	0.4054


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
HELOTES CREEK AT HELOTES, TEX.
Drainage Area 15.0 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 325 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
1,000
900
800
700
600
500
400
300
200
100
0
3.0
2.0
1.0
0
1200
May 6
1500
1800
2100
2400
0300
0600
0900
1200
May 7
1500
1800

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE,TEX. — STORM OF OCT. 25, 1975

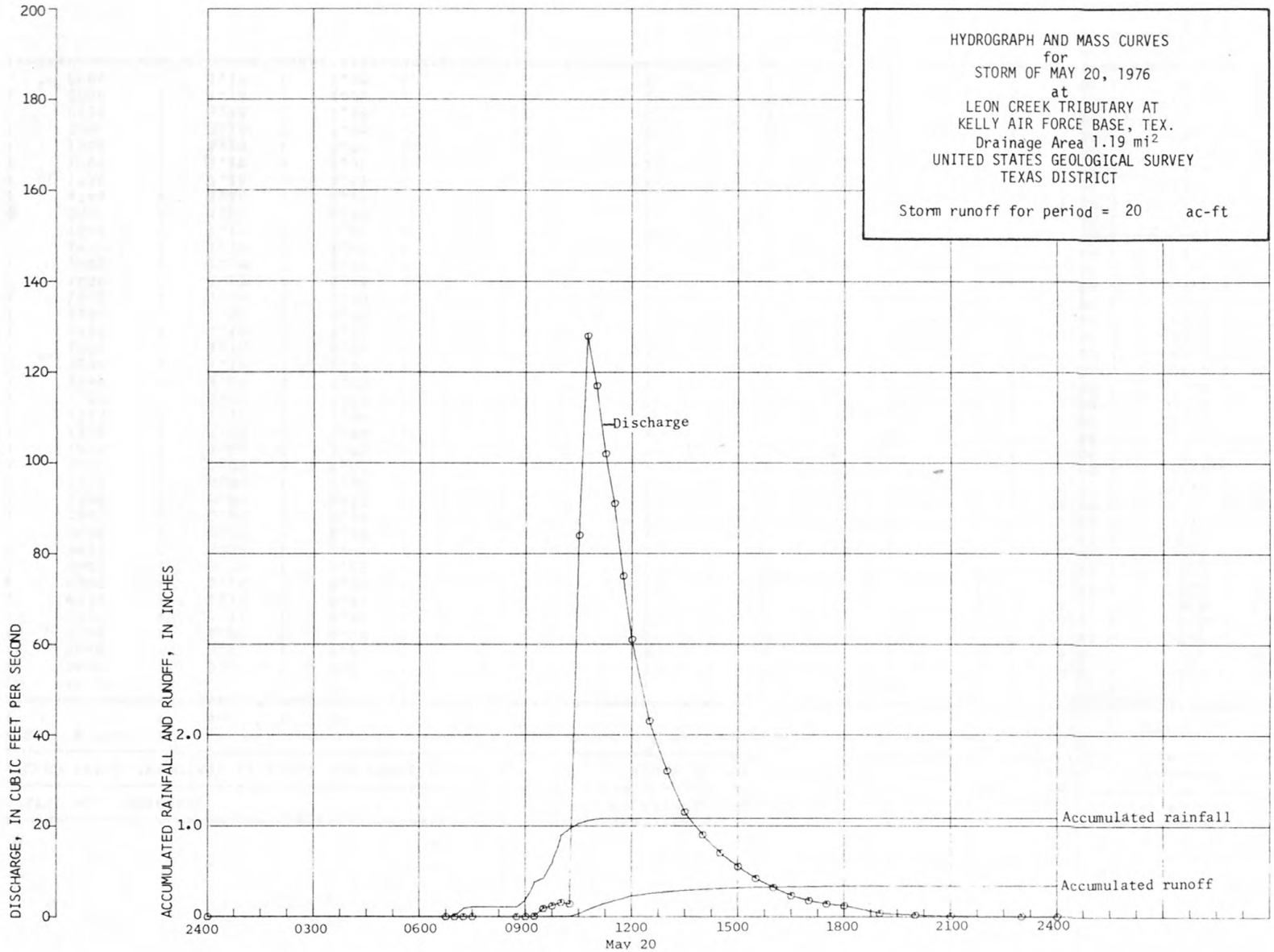
DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 25									
0000	0.0	0.0					0.0	0.0	0.0
0045	0.0	0.0					0.0	0.0	0.0
0100	0.0	0.08					0.03	0.0	0.0
0130	0.12	0.08					0.11	0.0	0.0
0200	0.15	0.08					0.12	0.0	0.0
0300	0.15	0.10					0.13	0.0	0.0
0400	0.21	0.12					0.18	0.0	0.0
0500	0.27	0.16					0.23	0.0	0.0
0900	0.27	0.16					0.23	0.0	0.0
0930	0.29	0.21					0.26	0.0	0.0
1030	0.44	0.30					0.39	0.0	0.0
1100	0.56	0.33					0.47	0.0	0.0
1200	0.63	0.40					0.54	0.0	0.0
1230	0.71	0.50					0.63	0.0	0.0
1300	0.88	0.68					0.81	0.0	0.0
1315	0.97	0.88					0.94	0.0	0.0
1330	1.06	1.18					1.10	0.0	0.0
1345	1.15	1.30					1.21	0.0	0.0
1400	1.39	1.44					1.41	0.0	0.0000
1415	1.59	1.53					1.57	0.3	0.0001
1430	1.70	1.56					1.65	55.0	0.0180
1445	1.78	1.61					1.72	71.0	0.0411
1500	1.85	1.69					1.79	76.0	0.0659
1515	1.92	1.73					1.85	71.0	0.0890
1530	1.98	1.78					1.91	67.0	0.1217
1600	2.10	1.83					2.00	65.0	0.1640
1630	2.17	1.88					2.06	57.0	0.2011
1700	2.24	1.90					2.11	50.0	0.2337
1730	2.29	1.94					2.16	43.0	0.2617
1800	2.31	1.98					2.19	37.0	0.2858
1830	2.37	2.00					2.23	31.0	0.3060
1900	2.40	2.04					2.27	27.0	0.3235
1930	2.43	2.05					2.29	24.0	0.3392
2000	2.44	2.06					2.30	21.0	0.3597
2100	2.45	2.08					2.31	16.0	0.3805
2200	2.49	2.08					2.34	12.0	0.3961
2300	2.50	2.08					2.34	8.9	0.4077
2400	2.50	2.08					2.34	6.4	0.4119


HYDROGRAPH AND MASS CURVES
for
STORM OF OCT. 25, 1975
at
LEON CREEK TRIBUTARY AT
KELLY AIR FORCE BASE, TEX.
Drainage Area 1.19 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 25 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
300
270
240
210
180
150
120
90
60
30
0
3.0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
October 25

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TEX. — STORM OF MAY 20, 1976

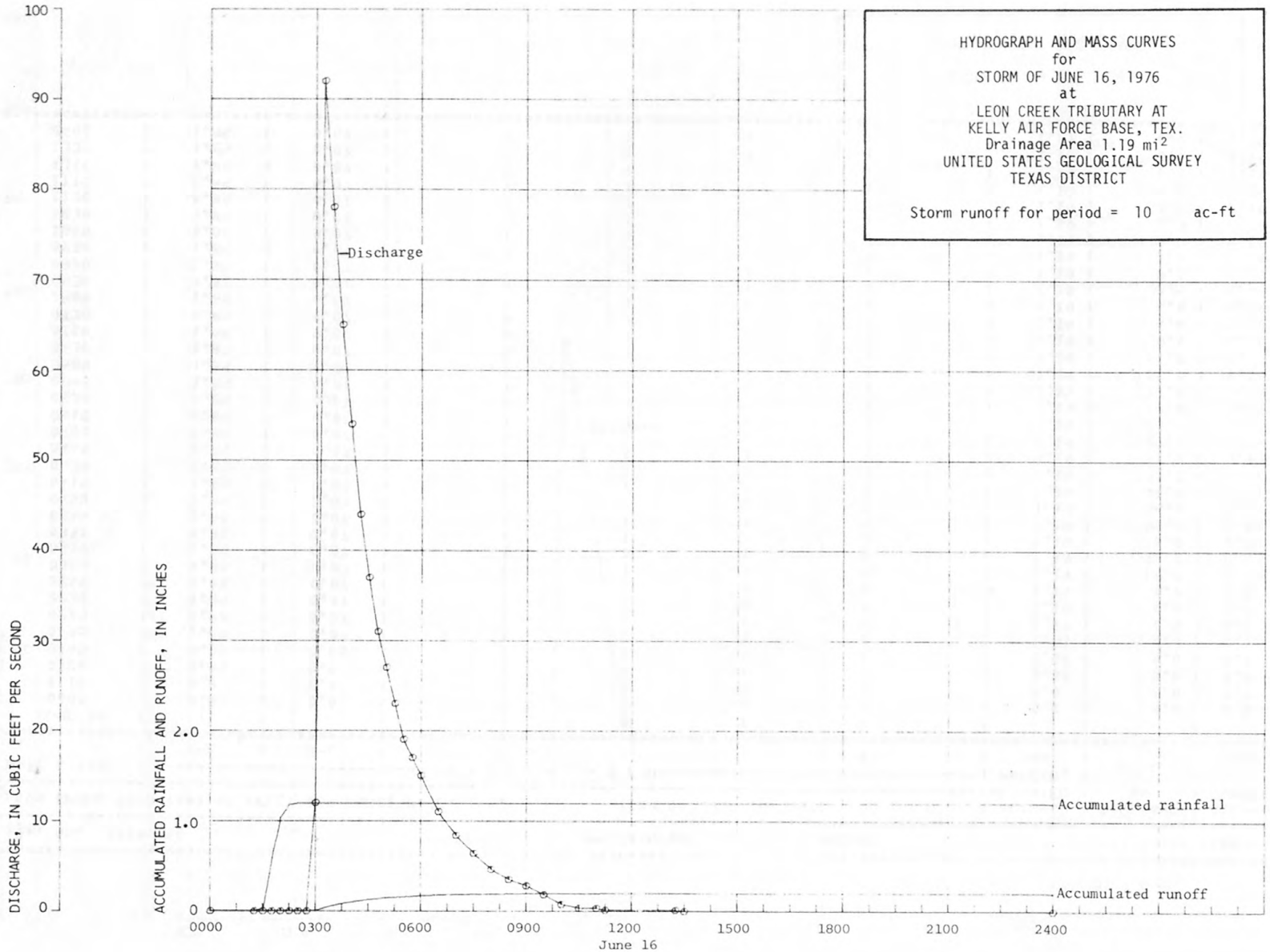
DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 20									
0000	0.0	0.0					0.0	0.0	0.0
0645	0.0	0.0					0.0	0.0	0.0
0700	0.01	0.02					0.01	0.0	0.0
0715	0.12	0.04					0.09	0.0	0.0
0730	0.14	0.05					0.11	0.0	0.0
0845	0.14	0.05					0.11	0.0	0.0
0900	0.15	0.25					0.19	0.0	0.0
0915	0.32	0.48					0.38	0.1	0.0000
0930	0.32	0.60					0.42	1.8	0.0006
0945	0.48	0.80					0.60	2.4	0.0014
1000	0.85	0.97					0.89	3.1	0.0024
1015	0.95	1.00					0.97	2.8	0.0033
1030	1.03	1.02					1.03	84.0	0.0307
1045	1.06	1.05					1.06	128.0	0.0723
1100	1.09	1.05					1.08	117.0	0.1104
1115	1.10	1.05					1.08	102.0	0.1436
1130	1.10	1.05					1.08	91.0	0.1733
1145	1.10	1.05					1.08	75.0	0.1977
1200	1.10	1.05					1.08	61.0	0.2275
1230	1.10	1.05					1.08	43.0	0.2555
1300	1.10	1.05					1.08	32.0	0.2763
1330	1.10	1.05					1.08	23.0	0.2913
1400	1.10	1.05					1.08	18.0	0.3030
1430	1.10	1.05					1.08	14.0	0.3121
1500	1.10	1.05					1.08	11.0	0.3193
1530	1.10	1.05					1.08	8.4	0.3247
1600	1.10	1.05					1.08	6.4	0.3289
1630	1.10	1.05					1.08	4.6	0.3319
1700	1.10	1.05					1.08	3.5	0.3342
1730	1.10	1.05					1.08	2.8	0.3360
1800	1.10	1.05					1.08	2.4	0.3383
1900	1.10	1.05					1.08	0.7	0.3393
2000	1.10	1.05					1.08	0.3	0.3397
2100	1.10	1.05					1.08	0.1	0.3399
2300	1.10	1.05					1.08	0.0	0.3399
2400	1.10	1.05					1.08	0.0	0.3399


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 20, 1976
at
LEON CREEK TRIBUTARY AT
KELLY AIR FORCE BASE, TEX.
Drainage Area 1.19 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 20 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
Discharge
Accumulated rainfall
Accumulated runoff
May 20

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TEX. — STORM OF JUNE 16, 1976

DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JUNE 16									
0000	0.0	0.0					0.0	0.0	0.0
0115	0.0	0.0					0.0	0.0	0.0
0130	0.05	0.0					0.03	0.0	0.0
0145	0.90	0.05					0.59	0.0	0.0
0200	1.60	0.07					1.03	0.0	0.0
0215	1.82	0.07					1.17	0.0	0.0
0230	1.85	0.07					1.19	0.0	0.0
0245	1.85	0.07					1.19	0.0	0.0
0300	1.85	0.07					1.19	12.0	0.0039
0315	1.85	0.07					1.19	92.0	0.0339
0330	1.85	0.07					1.19	78.0	0.0592
0345	1.85	0.07					1.19	65.0	0.0804
0400	1.85	0.07					1.19	54.0	0.0980
0415	1.85	0.07					1.19	44.0	0.1123
0430	1.85	0.07					1.19	37.0	0.1244
0445	1.85	0.07					1.19	31.0	0.1344
0500	1.85	0.07					1.19	27.0	0.1432
0515	1.85	0.07					1.19	23.0	0.1507
0530	1.85	0.07					1.19	19.0	0.1569
0545	1.85	0.07					1.19	17.0	0.1624
0600	1.85	0.07					1.19	15.0	0.1698
0630	1.85	0.07					1.19	11.0	0.1769
0700	1.85	0.07					1.19	8.4	0.1824
0730	1.85	0.07					1.19	6.4	0.1866
0800	1.85	0.07					1.19	4.6	0.1896
0830	1.85	0.07					1.19	3.5	0.1918
0900	1.85	0.07					1.19	2.8	0.1937
0930	1.85	0.07					1.19	1.8	0.1948
1000	1.85	0.07					1.19	0.7	0.1953
1030	1.85	0.07					1.19	0.3	0.1955
1100	1.85	0.07					1.19	0.3	0.1957
1115	1.85	0.07					1.19	0.1	0.1958
1315	1.85	0.07					1.19	0.1	0.1960
1330	1.85	0.07					1.19	0.0	0.1960
2400	1.85	0.07					1.19	0.0	0.1960


HYDROGRAPH AND MASS CURVES
for
STORM OF JUNE 16, 1976
at
LEON CREEK TRIBUTARY AT
KELLY AIR FORCE BASE, TEX.
Drainage Area 1.19 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 10 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
100
90
80
70
60
50
40
30
20
10
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
June 16

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

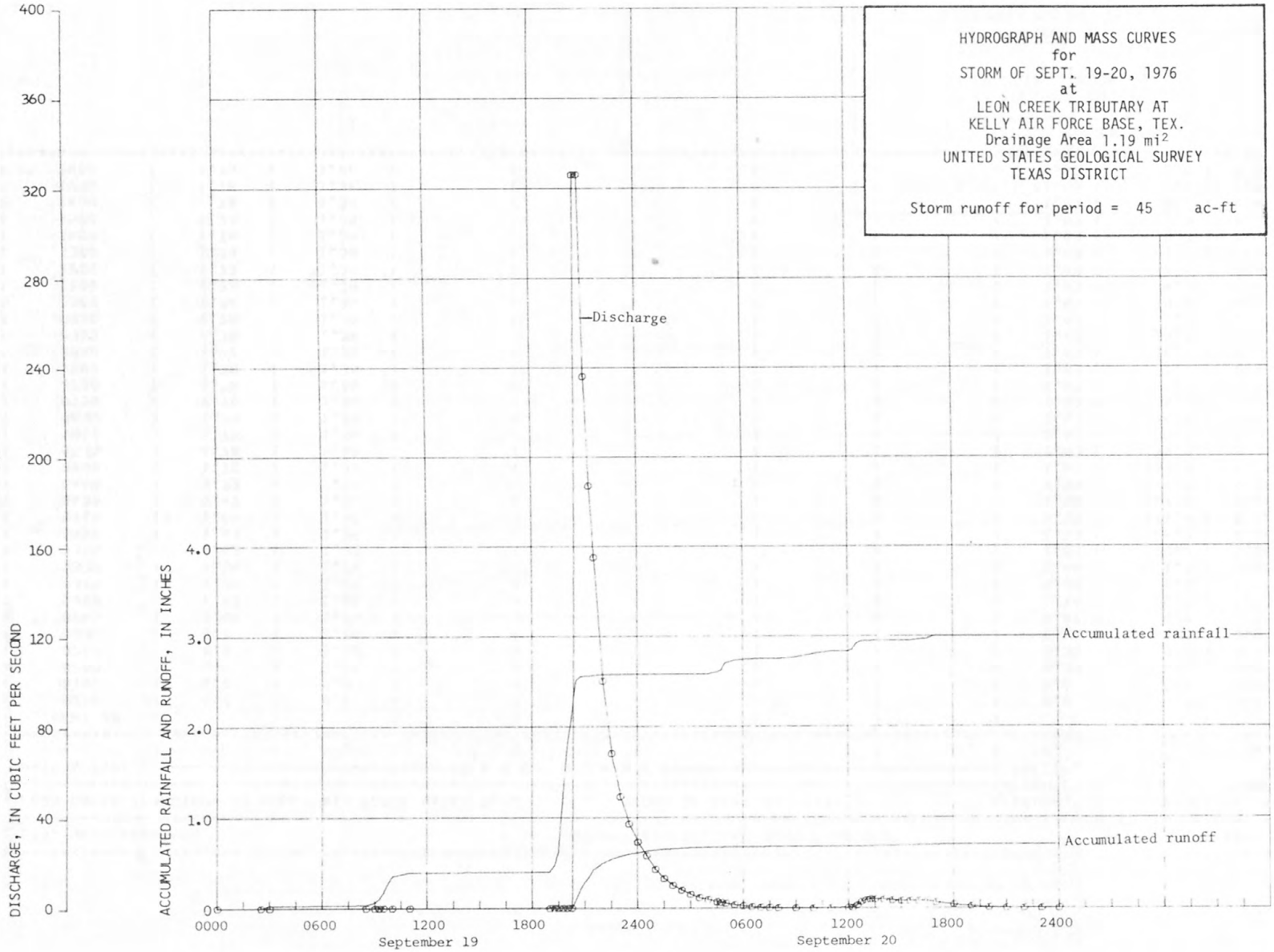
LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TEX. — STORM OF SEPT 19-20, 1976

DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 19									
0000	0.0	0.0					0.0	0.0	0.0
0230	0.0	0.0					0.0	0.0	0.0
0300	0.0	0.08					0.03	0.0	0.0
0830	0.0	0.10					0.04	0.0	0.0
0900	0.0	0.17					0.06	0.0	0.0
0915	0.0	0.28					0.10	0.0	0.0
0930	0.07	0.35					0.17	0.0	0.0
1000	0.33	0.40					0.36	0.0	0.0
1100	0.39	0.40					0.39	0.0	0.0
1900	0.39	0.42					0.40	0.0	0.0
1915	0.39	0.60					0.47	0.0	0.0
1930	0.39	1.00					0.62	0.0	0.0
1945	0.94	1.57					1.17	0.0	0.0
2000	1.68	1.93					1.77	0.0	0.0
2015	2.18	1.93					2.09	0.0	0.0
2030	2.84	1.94					2.51	326.0	0.1061
2045	2.91	1.94					2.55	326.0	0.2123
2100	2.92	1.94					2.56	236.0	0.2891
2115	2.92	1.94					2.56	187.0	0.3500
2130	2.93	1.94					2.56	155.0	0.4256
2200	2.94	1.95					2.57	100.0	0.4908
2230	2.94	1.95					2.57	68.0	0.5350
2300	2.94	1.95					2.57	49.0	0.5669
2330	2.94	1.96					2.58	37.0	0.5910
2400	2.94	1.96					2.58	29.0	0.6052
SEPT 20									
0000	2.94	1.96					2.58	29.0	0.6052
0030	2.94	1.96					2.58	23.0	0.6249
0100	2.94	1.96					2.58	17.0	0.6359
0130	2.94	1.96					2.58	13.0	0.6444
0200	2.94	1.96					2.58	10.0	0.6509
0230	2.94	1.96					2.58	7.9	0.6561
0300	2.94	1.96					2.58	6.0	0.6600
0330	2.94	1.96					2.58	4.6	0.6630
0400	2.94	1.96					2.58	3.8	0.6654
0430	2.95	2.00					2.60	2.8	0.6668
0445	2.95	2.05					2.62	2.4	0.6676
0500	3.07	2.07					2.70	2.1	0.6686
0530	3.11	2.08					2.73	1.5	0.6696
0600	3.12	2.09					2.74	1.0	0.6702

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TEX. — STORM OF SEPT 19-20, 1976

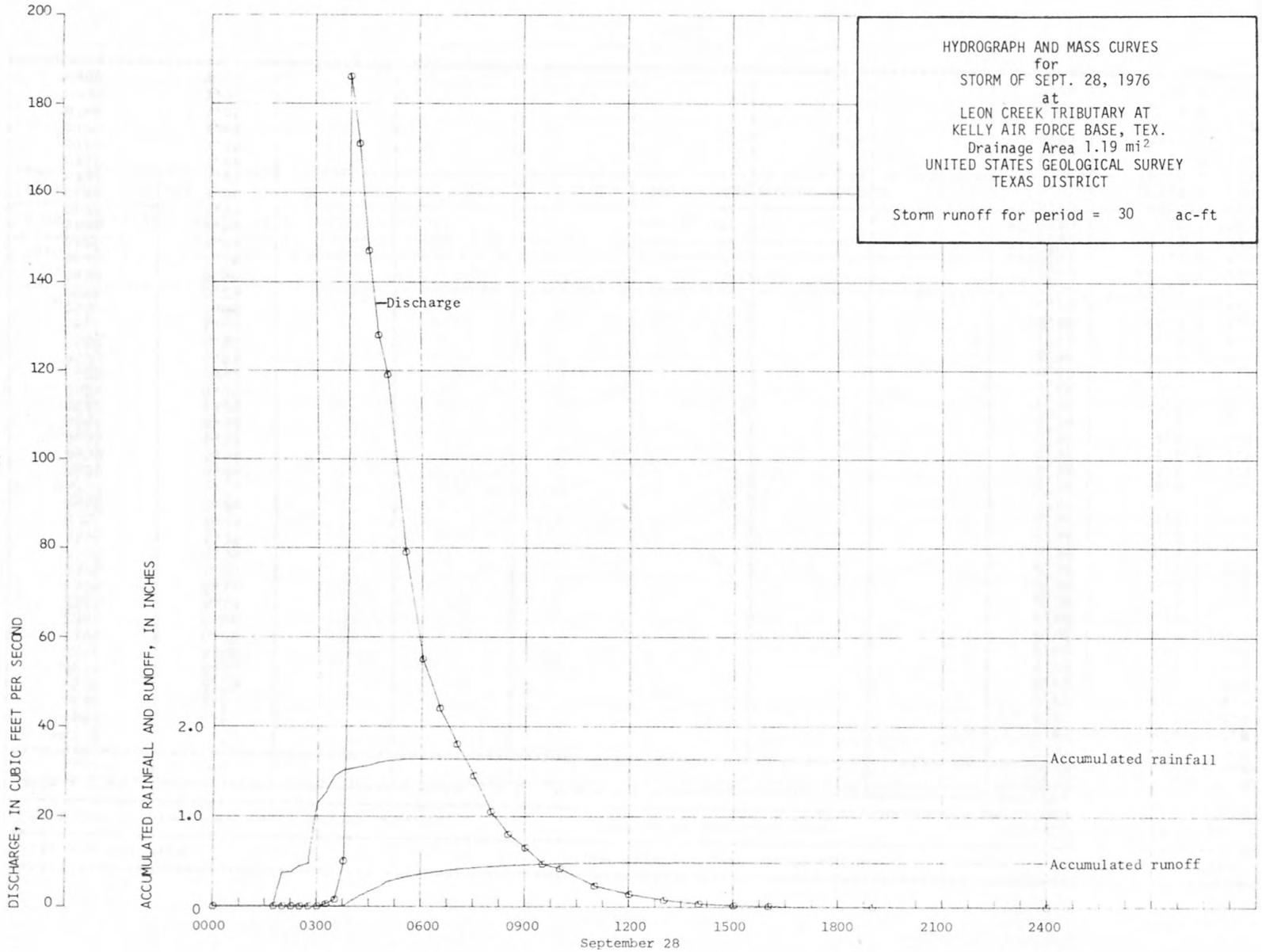
DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 20									
0630	3.13	2.09					2.75	0.5	0.6706
0700	3.13	2.10					2.75	0.3	0.6708
0730	3.13	2.10					2.75	0.2	0.6709
0800	3.13	2.10					2.75	0.1	0.6710
0900	3.15	2.11					2.77	0.0	0.6711
1000	3.21	2.11					2.80	0.0	0.6711
1100	3.25	2.12					2.83	0.0	0.6711
1200	3.25	2.12					2.83	0.2	0.6713
1215	3.27	2.12					2.84	0.2	0.6713
1230	3.35	2.18					2.92	1.2	0.6717
1245	3.38	2.18					2.94	2.8	0.6726
1300	3.39	2.18					2.94	3.5	0.6738
1315	3.39	2.18					2.94	3.8	0.6750
1330	3.40	2.18					2.95	3.8	0.6769
1400	3.40	2.18					2.95	3.8	0.6793
1430	3.40	2.18					2.95	3.5	0.6816
1500	3.40	2.18					2.95	3.1	0.6836
1530	3.40	2.18					2.95	3.1	0.6857
1600	3.40	2.21					2.96	3.1	0.6877
1630	3.40	2.23					2.97	3.1	0.6897
1700	3.44	2.25					3.00	2.4	0.6920
1800	3.44	2.25					3.00	1.5	0.6940
1900	3.44	2.25					3.00	0.7	0.6950
2000	3.44	2.25					3.00	0.2	0.6952
2100	3.44	2.25					3.00	0.1	0.6953
2200	3.44	2.25					3.00	0.0	0.6954
2300	3.44	2.25					3.00	0.0	0.6954
2400	3.44	2.25					3.00	0.0	0.6954


HYDROGRAPH AND MASS CURVES
for
STORM OF SEPT. 19-20, 1976
at
LEON CREEK TRIBUTARY AT
KELLY AIR FORCE BASE, TEX.
Drainage Area 1.19 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 45 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
40
80
120
160
200
240
280
320
360
400
0
1.0
2.0
3.0
4.0
0000
0600
1200
1800
2400
0600
1200
1800
2400
September 19
September 20

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TEX. — STORM OF SEPT 28, 1976

DATE & TIME	GAGE NUMBER 4-L	5-L					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 28									
0000	0.0	0.0					0.0	0.0	0.0
0145	0.0	0.0					0.0	0.0	0.0
0200	0.0	1.01					0.37	0.0	0.0
0215	0.0	1.02					0.38	0.0	0.0
0230	0.0	1.20					0.44	0.0	0.0
0245	0.02	1.24					0.47	0.0	0.0
0300	1.07	1.25					1.14	0.0	0.0
0315	1.26	1.26					1.26	0.5	0.0002
0330	1.54	1.28					1.44	1.5	0.0007
0345	1.62	1.32					1.51	10.0	0.0039
0400	1.63	1.35					1.53	186.0	0.0645
0415	1.65	1.37					1.55	171.0	0.1201
0430	1.67	1.38					1.56	147.0	0.1680
0445	1.72	1.38					1.59	128.0	0.2096
0500	1.75	1.38					1.61	119.0	0.2678
0530	1.78	1.38					1.63	79.0	0.3192
0600	1.78	1.38					1.63	55.0	0.3550
0630	1.78	1.38					1.63	44.0	0.3837
0700	1.78	1.38					1.63	36.0	0.4071
0730	1.78	1.38					1.63	29.0	0.4260
0800	1.78	1.38					1.63	21.0	0.4396
0830	1.78	1.38					1.63	16.0	0.4501
0900	1.78	1.38					1.63	13.0	0.4585
0930	1.78	1.38					1.63	9.4	0.4646
1000	1.78	1.38					1.63	8.4	0.4729
1100	1.78	1.38					1.63	4.6	0.4788
1200	1.78	1.38					1.63	2.8	0.4825
1300	1.78	1.38					1.63	1.5	0.4844
1400	1.78	1.38					1.63	0.7	0.4854
1500	1.78	1.38					1.63	0.3	0.4858
1600	1.78	1.38					1.63	0.2	0.4864
1900	1.78	1.38					1.63	0.1	0.4869
2400	1.78	1.38					1.63	0.0	0.4869


HYDROGRAPH AND MASS CURVES
for
STORM OF SEPT. 28, 1976
at
LEON CREEK TRIBUTARY AT
KELLY AIR FORCE BASE, TEX.
Drainage Area 1.19 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 30 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
200
180
160
140
120
100
80
60
40
20
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
September 28

STA. NO. 08177600 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

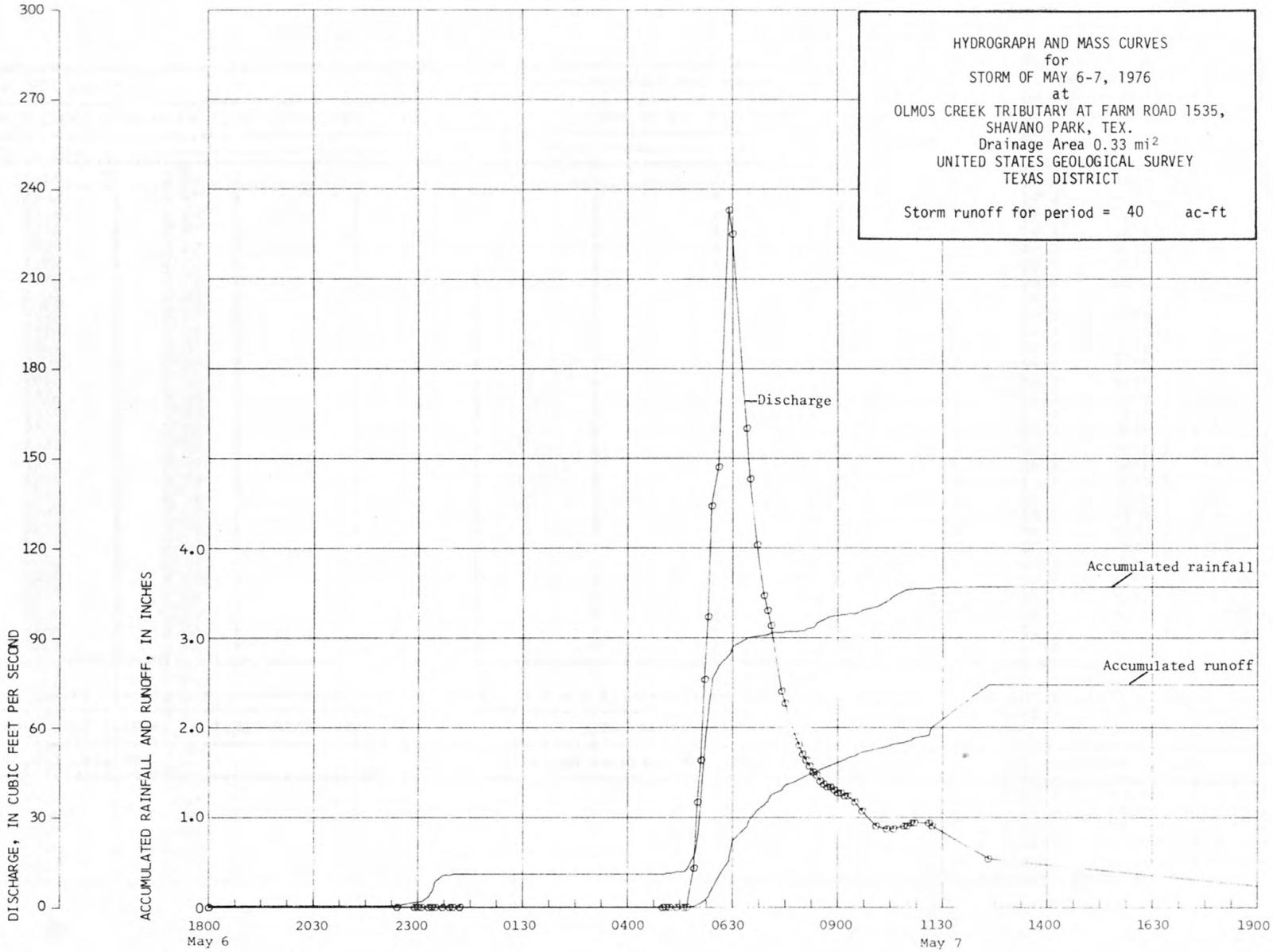
OLMOS CREEK TRIB AT FM 1535, SHAVANO PARK, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 2-0						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 6									
0000	0.0						0.0	0.0	0.0
1525	0.0						0.0	0.0	0.0
1530	0.01						0.01	0.0	0.0
2230	0.01						0.01	0.0	0.0
2255	0.05						0.05	0.0	0.0
2300	0.05						0.05	0.0	0.0
2305	0.06						0.06	0.0	0.0
2315	0.12						0.12	0.0	0.0
2320	0.19						0.19	0.0	0.0
2325	0.29						0.29	0.0	0.0
2335	0.35						0.35	0.0	0.0
2345	0.35						0.35	0.0	0.0
2350	0.36						0.36	0.0	0.0
2400	0.36						0.36	0.0	0.0
MAY 7									
0000	0.36						0.36	0.0	0.0
0450	0.36						0.36	0.0	0.0
0455	0.37						0.37	0.0	0.0
0500	0.37						0.37	0.0	0.0
0510	0.39						0.39	0.0	0.0
0520	0.39						0.39	0.0	0.0
0525	0.43						0.43	0.0	0.0
0535	0.59						0.59	13.0	0.0076
0540	0.86						0.86	35.0	0.0213
0545	1.40						1.40	49.0	0.0405
0550	1.88						1.88	76.0	0.0702
0555	2.25						2.25	97.0	0.1082
0600	2.54						2.54	134.0	0.1869
0610	2.69						2.69	147.0	0.3307
0625	2.81						2.81	233.0	0.5130
0630	2.90						2.90	225.0	0.7331
0650	2.99						2.99	160.0	0.8896
0655	3.00						3.00	143.0	0.9736
0705	3.01						3.01	121.0	1.0683
0715	3.02						3.02	104.0	1.1293
0720	3.03						3.03	99.0	1.1681
0725	3.05						3.05	94.0	1.2416
0740	3.05						3.05	72.0	1.2980
0745	3.06						3.06	68.0	1.3512
0800	3.06						3.06	57.0	1.3958

STA. NO. 08177600 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

OLMOS CREEK TRIB AT FM 1535, SHAVANO PARK, TEX. — STORM OF MAY 6-7, 1976

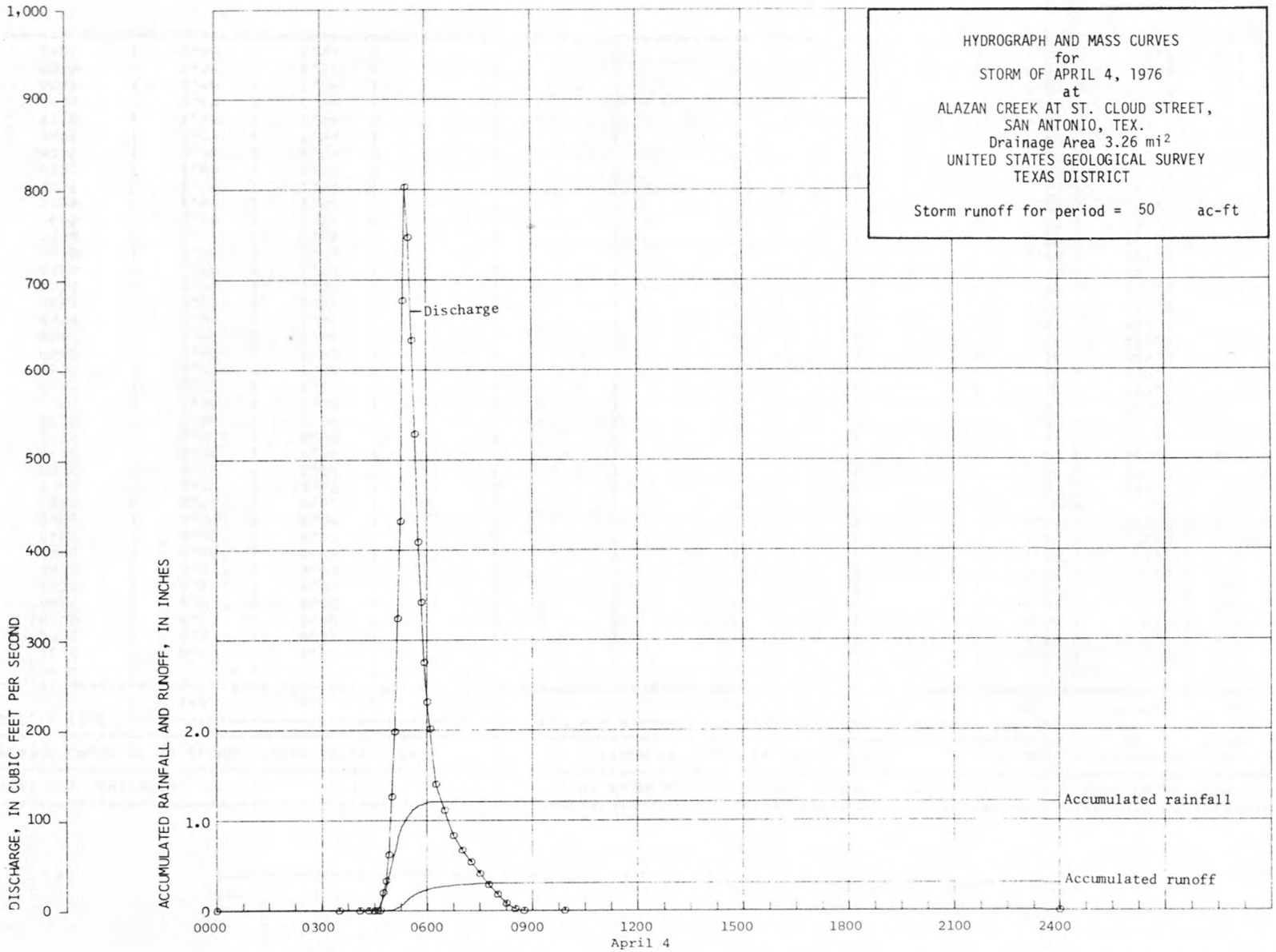
DATE & TIME	GAGE NUMBER 2-0						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0805	3.07						3.07	54.0	1.4169
0810	3.07						3.07	51.0	1.4369
0815	3.09						3.09	49.0	1.4561
0820	3.10						3.10	47.0	1.4745
0825	3.11						3.11	45.0	1.4921
0830	3.16						3.16	44.0	1.5093
0835	3.18						3.18	42.0	1.5257
0840	3.20						3.20	41.0	1.5418
0845	3.22						3.22	40.0	1.5574
0850	3.23						3.23	40.0	1.5731
0855	3.24						3.24	39.0	1.5883
0900	3.24						3.24	38.0	1.6032
0905	3.25						3.25	38.0	1.6181
0910	3.25						3.25	37.0	1.6325
0915	3.26						3.26	37.0	1.6543
0925	3.26						3.26	35.0	1.6816
0935	3.30						3.30	32.0	1.7192
0955	3.34						3.34	27.0	1.7562
1010	3.40						3.40	26.0	1.7816
1020	3.46						3.46	26.0	1.8071
1035	3.52						3.52	27.0	1.8282
1040	3.53						3.53	27.0	1.8388
1045	3.53						3.53	28.0	1.8497
1050	3.54						3.54	28.0	1.8771
1110	3.54						3.54	28.0	1.9045
1115	3.55						3.55	27.0	1.9943
1235	3.56						3.56	16.0	2.4733
2400	3.56						3.56	0.0	2.4733


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
OLMOS CREEK TRIBUTARY AT FARM ROAD 1535,
SHAVANO PARK, TEX.
Drainage Area 0.33 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 40 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
300
270
240
210
180
150
120
90
60
30
0
4.0
3.0
2.0
1.0
0
1800
May 6
2030
2300
0130
0400
0630
0900
1130
May 7
1400
1630
1900

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

ALAZAN CREEK AT ST CLOUD ST, SAN ANTONIO, TEX. — STORM OF APRIL 4, 1976

DATE & TIME	GAGE NUMBER 1-A	2-A					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 4									
0000	0.0	0.0					0.0	0.0	0.0
0330	0.0	0.01					0.00	0.0	0.0
0405	0.0	0.02					0.01	0.0	0.0
0420	0.0	0.03					0.01	0.0	0.0
0430	0.0	0.04					0.01	0.0	0.0
0435	0.0	0.05					0.01	0.0	0.0
0440	0.10	0.06					0.09	0.0	0.0
0445	0.20	0.07					0.16	20.0	0.0008
0450	0.37	0.08					0.29	33.0	0.0021
0455	0.54	0.11					0.42	62.0	0.0046
0500	0.72	0.17					0.57	126.0	0.0095
0505	0.79	0.37					0.68	198.0	0.0174
0510	0.86	0.74					0.83	324.0	0.0302
0515	0.94	0.88					0.92	432.0	0.0473
0520	0.96	1.04					0.98	677.0	0.0742
0525	0.98	1.18					1.03	803.0	0.1060
0530	1.00	1.29					1.08	747.0	0.1355
0535	1.02	1.38					1.12	633.0	0.1606
0540	1.04	1.42					1.14	529.0	0.1816
0545	1.06	1.44					1.16	409.0	0.1978
0550	1.06	1.47					1.17	342.0	0.2113
0555	1.07	1.50					1.19	275.0	0.2222
0600	1.08	1.51					1.20	231.0	0.2314
0605	1.08	1.53					1.20	201.0	0.2433
0615	1.08	1.54					1.20	140.0	0.2572
0630	1.08	1.54					1.20	111.0	0.2704
0645	1.08	1.54					1.20	83.0	0.2802
0700	1.08	1.54					1.20	67.0	0.2882
0715	1.08	1.54					1.20	54.0	0.2946
0730	1.08	1.54					1.20	41.0	0.2995
0745	1.08	1.54					1.20	29.0	0.3029
0800	1.08	1.54					1.20	18.0	0.3051
0815	1.08	1.54					1.20	8.0	0.3060
0830	1.08	1.54					1.20	2.0	0.3063
0845	1.08	1.54					1.20	0.0	0.3063
0955	1.08	1.55					1.21	0.0	0.3063
2400	1.08	1.55					1.21	0.0	0.3063


HYDROGRAPH AND MASS CURVES
for
STORM OF APRIL 4, 1976
at
ALAZAN CREEK AT ST. CLOUD STREET,
SAN ANTONIO, TEX.
Drainage Area 3.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 50 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
1,000
900
800
700
600
500
400
300
200
100
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
April 4

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

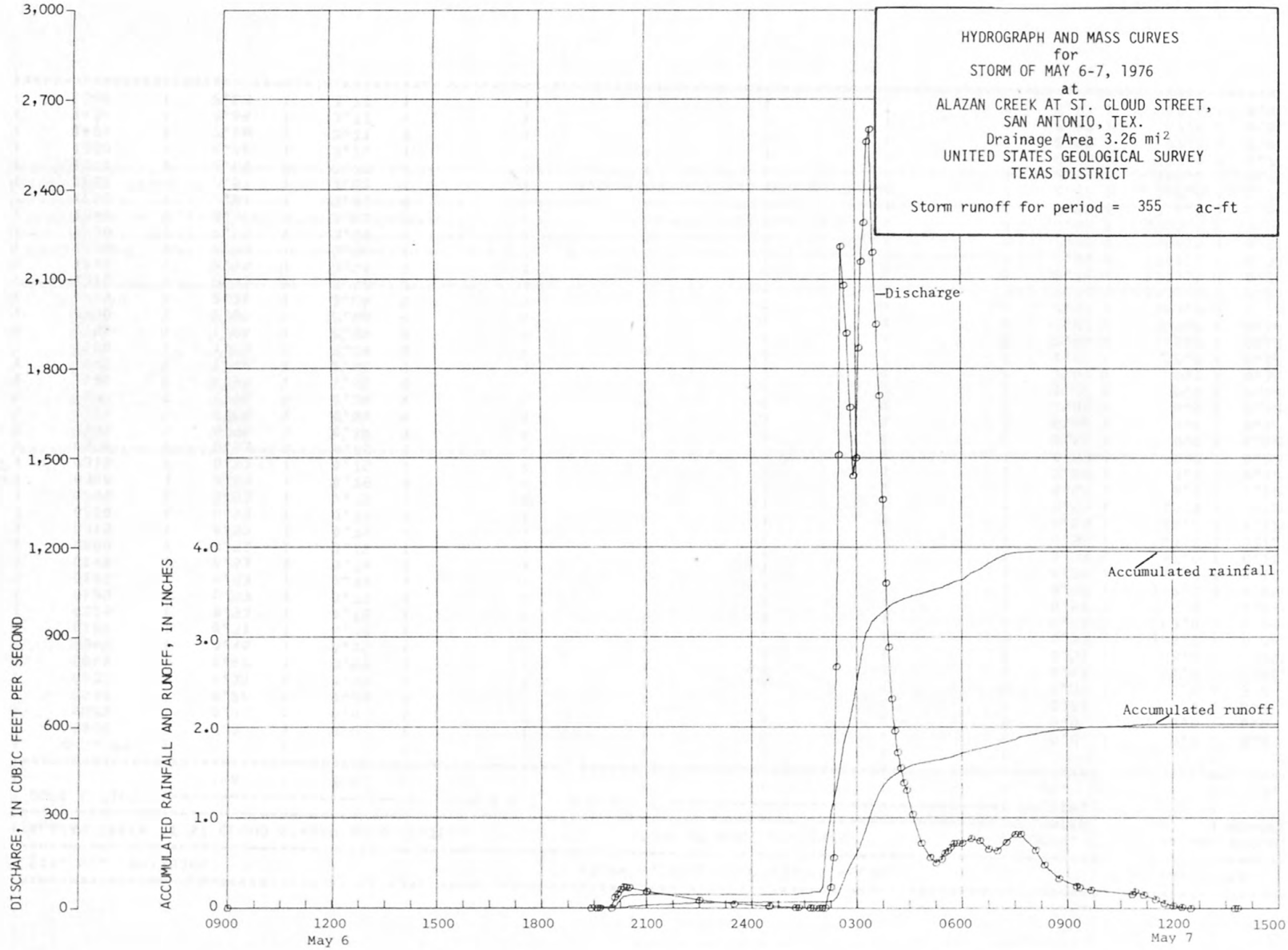
ALAZAN CREEK AT ST CLOUD ST, SAN ANTONIO, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 1-A	2-A					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 6									
0000	0.0	0.0					0.0	0.0	0.0
2225	0.0	0.0					0.0	0.0	0.0
2235	0.0	0.03					0.01	0.0	0.0
2240	0.0	0.04					0.01	0.0	0.0
2300	0.0	0.04					0.01	0.0	0.0
2305	0.0	0.05					0.01	36.0	0.0014
2310	0.03	0.14					0.06	46.0	0.0032
2315	0.06	0.21					0.10	62.0	0.0057
2320	0.07	0.28					0.13	70.0	0.0085
2325	0.07	0.30					0.13	68.0	0.0112
2330	0.08	0.31					0.14	67.0	0.0205
2400	0.09	0.31					0.15	54.0	0.0365
MAY 7									
0000	0.09	0.31					0.15	54.0	0.0365
0130	0.09	0.31					0.15	25.0	0.0610
0230	0.09	0.31					0.15	13.0	0.0672
0330	0.09	0.31					0.15	6.0	0.0697
0415	0.09	0.31					0.15	2.0	0.0701
0420	0.10	0.32					0.16	2.0	0.0703
0440	0.11	0.32					0.17	1.0	0.0703
0445	0.12	0.33					0.18	0.0	0.0703
0455	0.12	0.33					0.18	0.0	0.0703
0500	0.19	0.34					0.23	0.0	0.0703
0505	0.79	0.35					0.67	0.0	0.0703
0515	1.34	0.38					1.08	69.0	0.0744
0520	1.52	0.41					1.22	167.0	0.0811
0525	1.60	0.70					1.36	800.0	0.1128
0530	1.70	1.18					1.56	1510.0	0.1726
0535	1.87	1.54					1.78	2210.0	0.2601
0540	1.98	1.71					1.91	2080.0	0.3425
0545	2.10	1.77					2.01	1920.0	0.4186
0550	2.29	1.89					2.18	1670.0	0.4847
0555	2.50	1.99					2.36	1440.0	0.5417
0600	2.74	2.10					2.57	1500.0	0.6012
0605	2.93	2.24					2.74	1870.0	0.6752
0610	3.09	2.49					2.93	2160.0	0.7608
0615	3.20	2.63					3.05	2290.0	0.8515
0620	3.24	2.72					3.10	2560.0	0.9529
0625	3.29	2.84					3.17	2600.0	1.0559
0630	3.30	2.93					3.20	2190.0	1.1426

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

ALAZAN CREEK AT ST CLOUD ST, SAN ANTONIO, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 1-A	2-A					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0635	3.32	2.99					3.23	1950.0	1.2199
0640	3.33	3.06					3.26	1710.0	1.2876
0645	3.35	3.11					3.29	1360.0	1.3415
0650	3.36	3.18					3.31	1080.0	1.3843
0655	3.37	3.26					3.34	865.0	1.4185
0700	3.39	3.30					3.37	693.0	1.4460
0705	3.40	3.32					3.38	587.0	1.4692
0710	3.42	3.33					3.40	515.0	1.4896
0715	3.43	3.35					3.41	464.0	1.5080
0720	3.44	3.38					3.42	415.0	1.5244
0725	3.45	3.39					3.43	391.0	1.5477
0735	3.48	3.40					3.46	311.0	1.5785
0750	3.51	3.41					3.48	215.0	1.6040
0805	3.55	3.42					3.51	168.0	1.6207
0815	3.57	3.43					3.53	150.0	1.6325
0825	3.59	3.44					3.55	162.0	1.6422
0830	3.59	3.51					3.57	183.0	1.6494
0835	3.60	3.53					3.58	189.0	1.6569
0840	3.61	3.55					3.59	201.0	1.6649
0845	3.62	3.59					3.61	214.0	1.6733
0850	3.63	3.60					3.62	215.0	1.6861
0900	3.64	3.63					3.64	215.0	1.7074
0915	3.72	3.69					3.71	231.0	1.7349
0930	3.76	3.73					3.75	223.0	1.7614
0945	3.84	3.76					3.82	196.0	1.7846
1000	3.90	3.81					3.88	190.0	1.8072
1015	3.93	3.89					3.92	218.0	1.8331
1030	3.93	3.95					3.94	245.0	1.8574
1040	3.93	3.97					3.94	245.0	1.8914
1105	3.93	4.00					3.95	192.0	1.9218
1120	3.93	4.00					3.95	143.0	1.9614
1215	3.93	4.00					3.95	73.0	1.9846
1240	3.93	4.01					3.95	60.0	2.0083
1355	3.93	4.01					3.95	56.0	2.0327
1430	3.93	4.01					3.95	29.0	2.0402
1500	3.93	4.01					3.95	8.0	2.0421
1530	3.93	4.01					3.95	0.0	2.0421
2400	3.93	4.02					3.95	0.0	2.0421


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
ALAZAN CREEK AT ST. CLOUD STREET,
SAN ANTONIO, TEX.
Drainage Area 3.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 355 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
3,000
2,700
2,400
2,100
1,800
1,500
1,200
900
600
300
0
4.0
3.0
2.0
1.0
0
0900
1200
1500
1800
2100
2400
0300
0600
0900
1200
1500
May 6
May 7

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

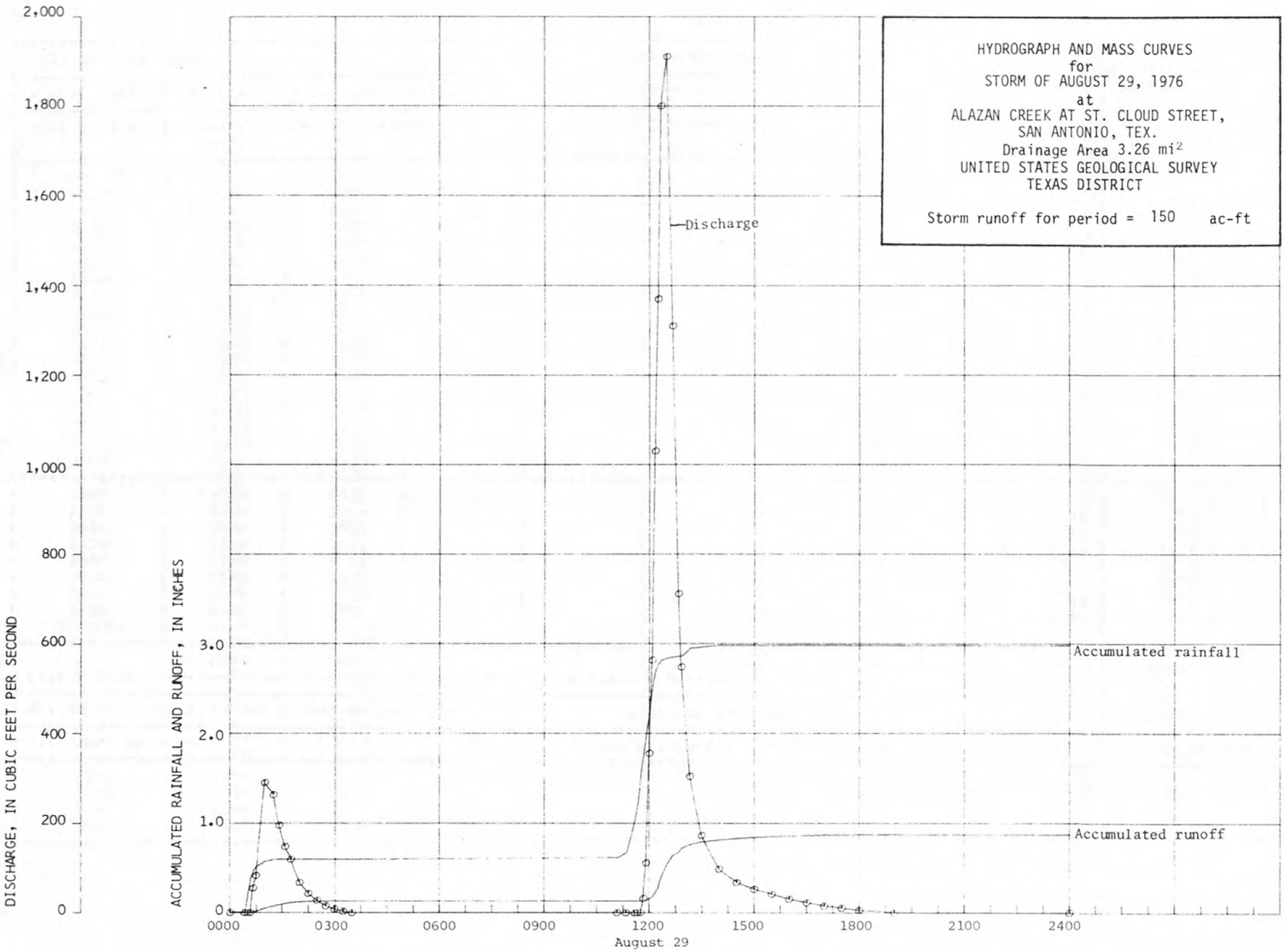
ALAZAN CREEK AT ST CLOUD ST.SAN ANTONIO.TEX. — STORM OF AUG. 29, 1976

DATE & TIME	GAGE NUMBER 1-A	2-A					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
AUG. 29									
0000	0.0	0.0					0.0	0.0	0.0
0025	0.0	0.0					0.0	0.0	0.0
0030	0.20	0.28					0.22	0.0	0.0
0035	0.35	0.49					0.39	0.0	0.0
0040	0.42	0.59					0.47	55.0	0.0022
0045	0.46	0.65					0.51	83.0	0.0088
0100	0.51	0.72					0.57	290.0	0.0432
0115	0.53	0.75					0.59	263.0	0.0693
0125	0.53	0.75					0.59	195.0	0.0847
0135	0.53	0.75					0.59	147.0	0.0964
0145	0.53	0.75					0.59	119.0	0.1081
0200	0.53	0.75					0.59	67.0	0.1161
0215	0.53	0.75					0.59	43.0	0.1212
0230	0.53	0.75					0.59	28.0	0.1245
0245	0.53	0.75					0.59	15.0	0.1263
0300	0.53	0.75					0.59	8.0	0.1273
0315	0.53	0.75					0.59	3.0	0.1276
0330	0.53	0.75					0.59	0.0	0.1276
1105	0.55	0.77					0.61	0.0	0.1276
1120	0.60	0.84					0.66	0.0	0.1276
1135	0.95	1.34					1.06	0.0	0.1276
1140	1.10	1.55					1.22	0.0	0.1276
1145	1.42	2.00					1.58	0.0	0.1276
1150	1.63	2.29					1.81	32.0	0.1289
1155	1.84	2.59					2.04	111.0	0.1333
1200	2.05	2.88					2.27	355.0	0.1474
1205	2.30	3.24					2.55	563.0	0.1697
1210	2.43	3.42					2.70	1030.0	0.2105
1215	2.49	3.50					2.76	1370.0	0.2647
1220	2.53	3.56					2.81	1800.0	0.3717
1230	2.55	3.59					2.83	1910.0	0.5230
1240	2.56	3.60					2.84	1310.0	0.6268
1250	2.57	3.61					2.85	711.0	0.6690
1255	2.57	3.62					2.85	547.0	0.7123
1310	2.65	3.73					2.94	304.0	0.7545
1330	2.66	3.75					2.95	172.0	0.7886
1400	2.68	3.77					2.97	97.0	0.8116
1430	2.68	3.77					2.97	67.0	0.8275
1500	2.68	3.77					2.97	52.0	0.8399

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

ALAZAN CREEK AT ST CLOUD ST,SAN ANTONIO,TEX. — STORM OF AUG. 29, 1976

DATE & TIME	GAGE NUMBER 1-A	2-A					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
AUG. 29									
1530	2.68	3.77					2.97	41.0	0.8496
1600	2.68	3.77					2.97	30.0	0.8568
1630	2.68	3.77					2.97	22.0	0.8620
1700	2.68	3.77					2.97	15.0	0.8656
1730	2.68	3.77					2.97	10.0	0.8679
1800	2.68	3.77					2.97	5.0	0.8697
1900	2.68	3.77					2.97	0.0	0.8697
2400	2.68	3.77					2.97	0.0	0.8697


HYDROGRAPH AND MASS CURVES
for
STORM OF AUGUST 29, 1976
at
ALAZAN CREEK AT ST. CLOUD STREET,
SAN ANTONIO, TEX.
Drainage Area 3.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 150 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
3.0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
August 29

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

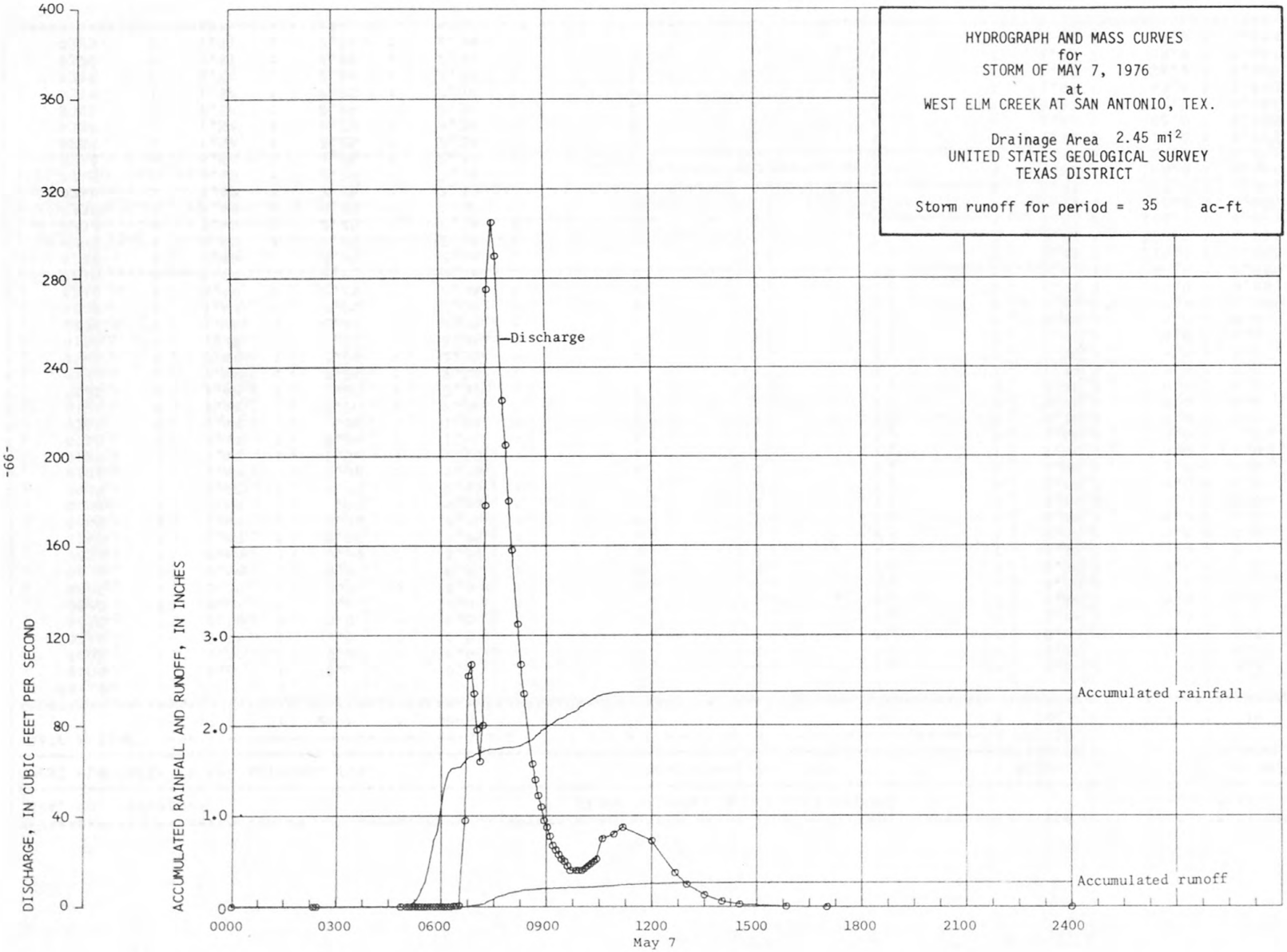
WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 7, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0220	0.0	0.0	0.0				0.0	0.0	0.0
0225	0.0	0.0	0.01				0.00	0.0	0.0
0450	0.0	0.0	0.02				0.00	0.0	0.0
0500	0.0	0.0	0.07				0.00	0.0	0.0
0505	0.04	0.0	0.09				0.02	0.0	0.0
0510	0.05	0.05	0.13				0.05	0.0	0.0
0515	0.08	0.06	0.15				0.07	0.0	0.0
0520	0.18	0.07	0.22				0.14	0.0	0.0
0525	0.28	0.09	0.29				0.20	0.0	0.0
0530	0.38	0.12	0.35				0.27	0.0	0.0
0535	0.59	0.15	1.00				0.41	0.0	0.0
0540	0.81	0.19	1.73				0.56	0.0	0.0
0545	1.02	0.29	2.20				0.73	0.0	0.0
0550	1.11	0.36	2.39				0.82	0.0	0.0
0555	1.21	0.74	2.47				1.03	0.0	0.0
0600	1.30	1.12	2.51				1.24	0.0	0.0
0605	1.35	1.42	2.54				1.39	0.0	0.0
0610	1.40	1.57	2.55				1.48	0.0	0.0
0615	1.45	1.60	2.56				1.52	0.0	0.0
0620	1.45	1.61	2.59				1.53	0.3	0.0000
0625	1.45	1.63	2.65				1.54	0.3	0.0000
0630	1.45	1.64	2.67				1.54	0.4	0.0001
0640	1.57	1.67	2.69				1.62	38.0	0.0031
0645	1.58	1.72	2.71				1.65	102.0	0.0084
0650	1.59	1.73	2.75				1.66	107.0	0.0141
0655	1.60	1.77	2.77				1.68	94.0	0.0190
0700	1.60	1.79	2.78				1.69	78.0	0.0232
0705	1.61	1.81	2.78				1.70	64.0	0.0265
0710	1.62	1.83	2.79				1.72	80.0	0.0307
0715	1.62	1.85	2.80				1.73	178.0	0.0401
0720	1.63	1.86	2.81				1.74	275.0	0.0619
0730	1.63	1.86	2.81				1.74	305.0	0.0860
0735	1.63	1.87	2.82				1.74	290.0	0.1089
0745	1.64	1.89	2.83				1.75	225.0	0.1267
0750	1.64	1.89	2.84				1.75	205.0	0.1375
0755	1.64	1.90	2.84				1.76	180.0	0.1470
0800	1.64	1.90	2.85				1.76	158.0	0.1595
0810	1.65	1.91	2.86				1.77	125.0	0.1694

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 7, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0815	1.67	1.92	2.87				1.78	107.0	0.1750
0820	1.69	1.93	2.89				1.80	94.0	0.1849
0835	1.74	1.98	2.95				1.85	63.0	0.1916
0840	1.80	1.99	2.98				1.89	56.0	0.1945
0845	1.83	2.00	3.00				1.91	49.0	0.1971
0850	1.87	2.03	3.01				1.95	44.0	0.1994
0855	1.89	2.05	3.03				1.97	38.0	0.2014
0900	1.92	2.07	3.05				1.99	35.0	0.2033
0905	1.94	2.08	3.06				2.01	31.0	0.2049
0910	1.95	2.11	3.08				2.03	27.0	0.2063
0915	1.97	2.15	3.10				2.06	25.0	0.2076
0920	1.99	2.16	3.11				2.07	23.0	0.2088
0925	2.00	2.17	3.14				2.08	21.0	0.2099
0930	2.02	2.19	3.16				2.10	20.0	0.2110
0935	2.04	2.21	3.17				2.12	18.0	0.2119
0940	2.05	2.23	3.18				2.14	16.0	0.2132
0950	2.07	2.27	3.20				2.16	16.0	0.2145
0955	2.10	2.32	3.22				2.20	16.0	0.2153
1000	2.12	2.33	3.23				2.22	16.0	0.2162
1005	2.15	2.34	3.27				2.24	17.0	0.2171
1010	2.17	2.36	3.29				2.26	18.0	0.2180
1015	2.20	2.37	3.32				2.28	19.0	0.2190
1020	2.22	2.38	3.34				2.30	20.0	0.2201
1025	2.25	2.39	3.36				2.32	21.0	0.2217
1035	2.26	2.43	3.38				2.34	30.0	0.2265
1055	2.27	2.47	3.39				2.36	32.0	0.2324
1110	2.27	2.48	3.40				2.37	35.0	0.2444
1200	2.27	2.48	3.40				2.37	29.0	0.2581
1240	2.27	2.49	3.40				2.37	15.0	0.2629
1300	2.27	2.49	3.40				2.37	9.9	0.2655
1330	2.27	2.49	3.40				2.37	5.2	0.2671
1400	2.27	2.49	3.40				2.37	2.5	0.2679
1430	2.27	2.49	3.40				2.37	1.1	0.2685
1550	2.27	2.49	3.41				2.37	0.2	0.2687
1700	2.27	2.50	3.41				2.38	0.0	0.2687
2400	2.27	2.50	3.41				2.38	0.0	0.2687


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 7, 1976
at
WEST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 35 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
400
360
320
280
240
200
160
120
80
40
0
3.0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
May 7

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

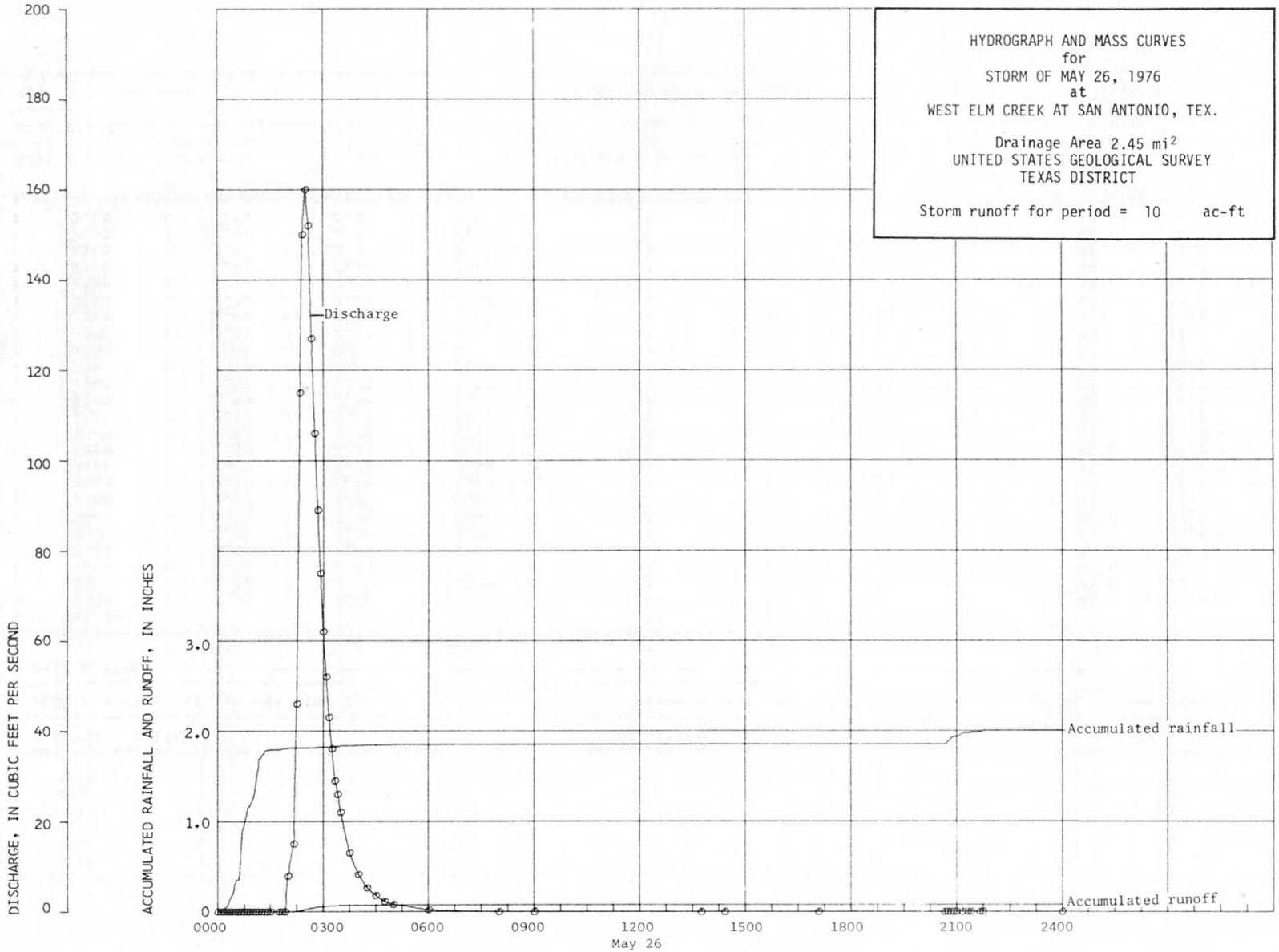
WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 26									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0005	0.03	0.0	0.0				0.02	0.0	0.0
0010	0.06	0.0	0.0				0.03	0.0	0.0
0015	0.10	0.0	0.0				0.06	0.0	0.0
0020	0.25	0.0	0.0				0.14	0.0	0.0
0025	0.35	0.0	0.0				0.20	0.0	0.0
0030	0.60	0.0	0.0				0.35	0.0	0.0
0035	0.60	0.01	0.01				0.35	0.0	0.0
0040	1.47	0.05	0.05				0.87	0.0	0.0
0045	1.47	0.34	0.20				0.99	0.0	0.0
0050	1.47	0.69	0.48				1.14	0.0	0.0
0055	1.47	0.80	0.62				1.19	0.0	0.0
0100	1.47	1.00	0.78				1.27	0.0	0.0
0105	1.47	1.54	1.15				1.50	0.0	0.0
0110	1.47	2.00	1.66				1.69	0.0	0.0
0115	1.47	2.08	1.92				1.72	0.0	0.0
0120	1.47	2.20	2.26				1.78	0.0	0.0
0125	1.48	2.20	2.32				1.78	0.0	0.0
0130	1.48	2.21	2.32				1.79	0.0	0.0
0145	1.48	2.21	2.33				1.79	0.0	0.0
0150	1.48	2.23	2.36				1.80	0.0	0.0
0155	1.48	2.24	2.37				1.80	0.0	0.0
0200	1.49	2.25	2.38				1.81	7.9	0.0006
0210	1.49	2.25	2.38				1.81	15.0	0.0018
0215	1.49	2.25	2.38				1.81	46.0	0.0042
0220	1.49	2.25	2.38				1.81	115.0	0.0103
0225	1.49	2.25	2.38				1.81	150.0	0.0182
0230	1.49	2.25	2.38				1.81	160.0	0.0266
0235	1.49	2.25	2.38				1.81	152.0	0.0346
0240	1.49	2.25	2.38				1.81	127.0	0.0413
0245	1.49	2.25	2.38				1.81	106.0	0.0469
0250	1.50	2.25	2.38				1.82	89.0	0.0516
0255	1.50	2.25	2.38				1.82	75.0	0.0556
0300	1.50	2.25	2.38				1.82	62.0	0.0588
0305	1.50	2.25	2.38				1.82	52.0	0.0616
0310	1.50	2.25	2.38				1.82	43.0	0.0638
0315	1.50	2.25	2.38				1.82	36.0	0.0657
0320	1.51	2.26	2.39				1.83	29.0	0.0673
0325	1.51	2.26	2.39				1.83	26.0	0.0686

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 26									
0330	1.52	2.26	2.39				1.83	22.0	0.0710
0345	1.52	2.26	2.39				1.83	13.0	0.0730
0400	1.52	2.27	2.40				1.84	8.2	0.0743
0415	1.52	2.28	2.40				1.84	5.3	0.0752
0430	1.52	2.28	2.40				1.84	3.6	0.0757
0445	1.52	2.28	2.40				1.84	2.3	0.0761
0500	1.53	2.28	2.40				1.85	1.6	0.0767
0600	1.53	2.28	2.40				1.85	0.4	0.0771
0800	1.53	2.28	2.40				1.85	0.0	0.0771
0900	1.53	2.28	2.40				1.85	0.0	0.0771
1345	1.53	2.28	2.41				1.85	0.0	0.0771
1425	1.53	2.29	2.41				1.85	0.0	0.0771
1705	1.53	2.29	2.42				1.85	0.0	0.0771
2040	1.53	2.29	2.42				1.85	0.0	0.0771
2045	1.58	2.29	2.42				1.88	0.0	0.0771
2050	1.65	2.29	2.42				1.92	0.0	0.0771
2055	1.67	2.29	2.42				1.93	0.0	0.0771
2100	1.67	2.29	2.42				1.93	0.0	0.0771
2110	1.74	2.29	2.42				1.97	0.0	0.0771
2120	1.74	2.29	2.43				1.97	0.0	0.0771
2125	1.74	2.30	2.45				1.98	0.0	0.0771
2140	1.74	2.31	2.46				1.98	0.0	0.0771
2145	1.74	2.36	2.51				2.00	0.0	0.0771
2400	1.74	2.36	2.51				2.00	0.0	0.0771


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 26, 1976
at
WEST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 10 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
200
180
160
140
120
100
80
60
40
20
0
3.0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
May 26

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

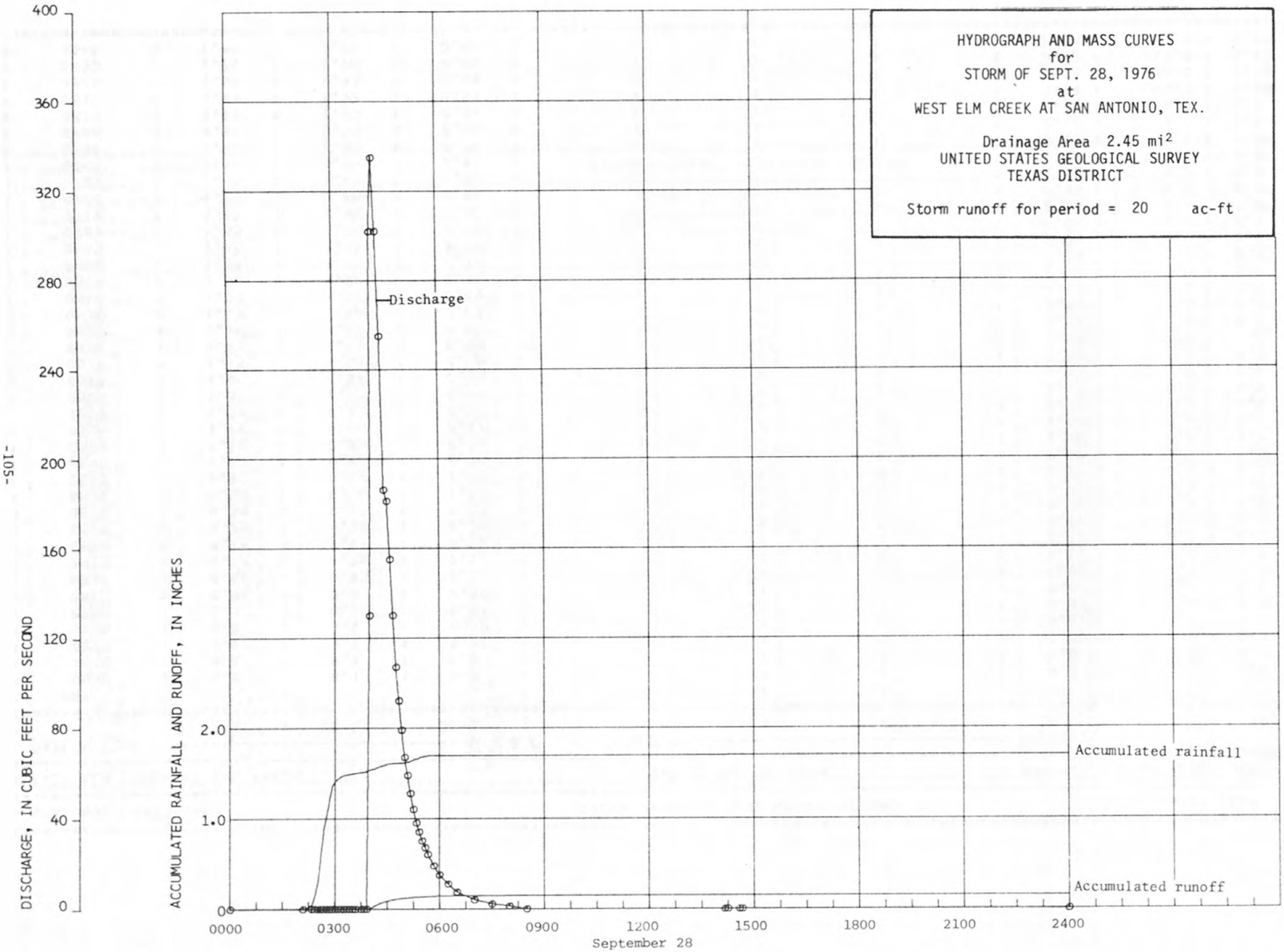
WEST ELM CREEK AT SAN ANTONIO, TEx. — STORM OF SEPT 28, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
SEPT 28									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0205	0.0	0.0	0.0				0.0	0.0	0.0
0220	0.08	0.0	0.0				0.05	0.0	0.0
0225	0.25	0.0	0.0				0.14	0.0	0.0
0230	0.50	0.01	0.0				0.29	0.0	0.0
0235	0.95	0.13	0.0				0.60	0.0	0.0
0240	1.30	0.28	0.04				0.87	0.0	0.0
0245	1.47	0.43	0.17				1.03	0.0	0.0
0250	1.55	0.76	0.41				1.21	0.0	0.0
0255	1.68	0.92	0.70				1.36	0.0	0.0
0300	1.72	0.99	0.80				1.41	0.0	0.0
0305	1.74	1.03	0.86				1.44	0.0	0.0
0310	1.76	1.05	0.89				1.46	0.0	0.0
0315	1.78	1.06	0.92				1.48	0.0	0.0
0320	1.78	1.07	0.95				1.48	0.0	0.0
0325	1.79	1.07	0.96				1.49	0.0	0.0
0330	1.79	1.08	0.96				1.49	0.0	0.0
0335	1.80	1.08	0.97				1.50	0.0	0.0
0345	1.81	1.09	0.97				1.51	0.0	0.0
0350	1.82	1.09	0.98				1.51	0.0	0.0
0355	1.83	1.10	0.98				1.52	0.0	0.0
0400	1.84	1.11	0.99				1.53	130.0	0.0069
0405	1.85	1.12	1.00				1.54	302.0	0.0228
0410	1.86	1.13	1.01				1.55	335.0	0.0404
0415	1.87	1.15	1.02				1.57	302.0	0.0563
0420	1.88	1.16	1.04				1.58	255.0	0.0698
0425	1.89	1.17	1.05				1.59	186.0	0.0796
0430	1.90	1.19	1.07				1.60	181.0	0.0891
0435	1.90	1.19	1.08				1.60	155.0	0.0973
0440	1.90	1.20	1.09				1.60	130.0	0.1041
0445	1.90	1.20	1.10				1.60	107.0	0.1098
0450	1.90	1.21	1.10				1.61	92.0	0.1146
0455	1.90	1.21	1.10				1.61	79.0	0.1188
0500	1.91	1.21	1.11				1.61	67.0	0.1223
0505	1.92	1.21	1.11				1.62	59.0	0.1254
0510	1.93	1.22	1.12				1.63	51.0	0.1281
0515	1.95	1.23	1.13				1.65	44.0	0.1304
0520	1.96	1.23	1.14				1.65	38.0	0.1325
0525	1.98	1.24	1.14				1.67	34.0	0.1342

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF SEPT 28, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 28									
0530	1.99	1.25	1.15				1.68	30.0	0.1358
0535	1.99	1.26	1.16				1.68	27.0	0.1372
0540	2.00	1.27	1.17				1.69	24.0	0.1391
0550	2.00	1.27	1.17				1.69	19.0	0.1411
0600	2.00	1.27	1.17				1.69	15.0	0.1431
0615	2.00	1.27	1.17				1.69	11.0	0.1449
0630	2.00	1.27	1.17				1.69	7.5	0.1466
0700	2.00	1.27	1.17				1.69	4.0	0.1479
0730	2.00	1.27	1.17				1.69	2.2	0.1486
0800	2.00	1.27	1.17				1.69	1.2	0.1490
0830	2.00	1.27	1.17				1.69	0.0	0.1490
1410	2.00	1.27	1.17				1.69	0.0	0.1490
1415	2.00	1.28	1.17				1.70	0.0	0.1490
1435	2.00	1.28	1.17				1.70	0.0	0.1490
1440	2.00	1.28	1.18				1.70	0.0	0.1490
2400	2.00	1.28	1.18				1.70	0.0	0.1490


HYDROGRAPH AND MASS CURVES
for
STORM OF SEPT. 28, 1976
at
WEST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 20 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
400
360
320
280
240
200
160
120
80
40
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
September 28

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

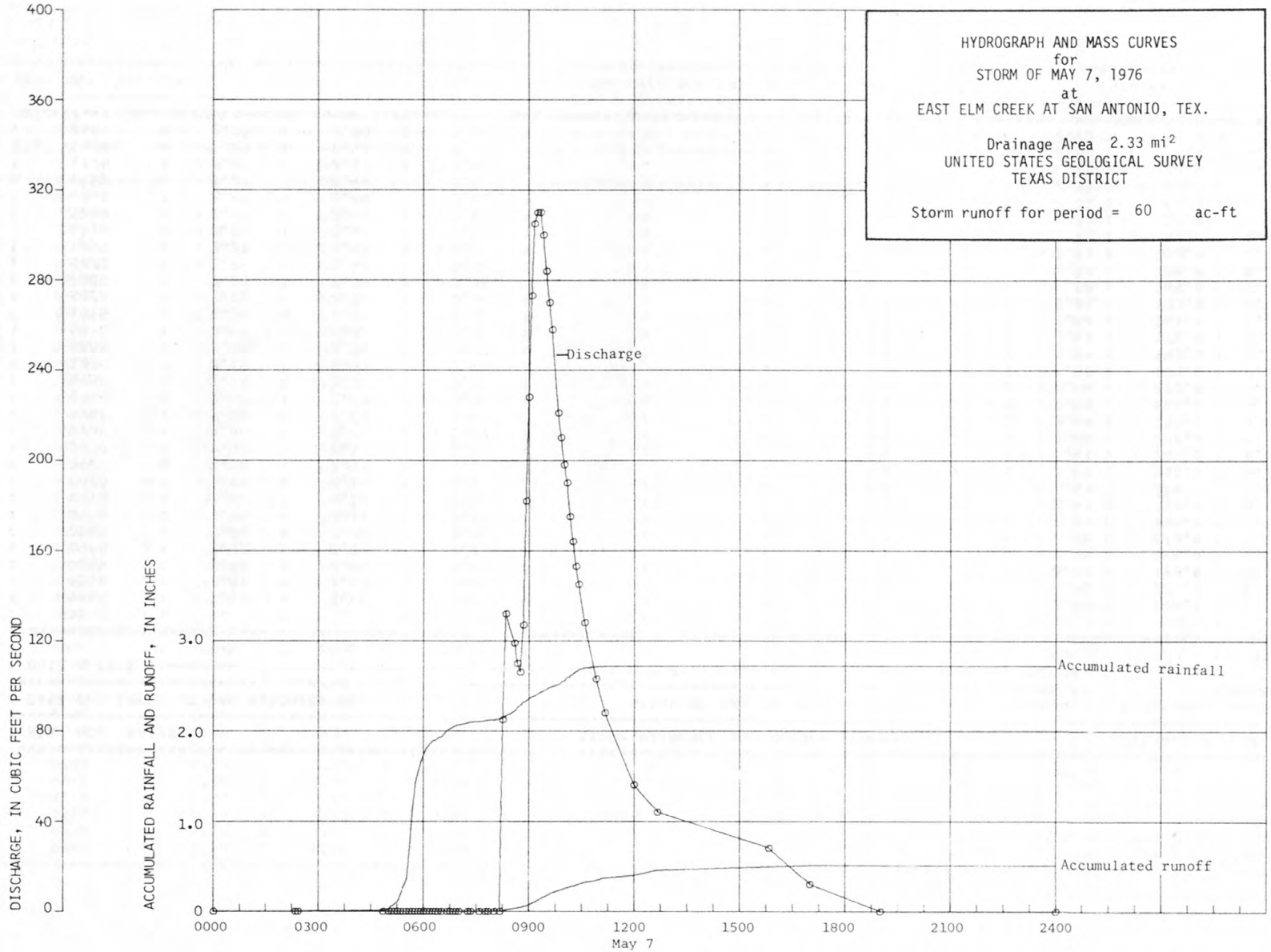
EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 7, 1976

DATE & TIME	GAGE NUMBER 1F-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 7									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0220	0.0	0.0	0.0				0.0	0.0	0.0
0225	0.0	0.0	0.01				0.00	0.0	0.0
0450	0.0	0.0	0.02				0.01	0.0	0.0
0500	0.0	0.0	0.07				0.03	0.0	0.0
0505	0.04	0.0	0.09				0.06	0.0	0.0
0510	0.05	0.05	0.13				0.08	0.0	0.0
0515	0.08	0.06	0.15				0.11	0.0	0.0
0520	0.18	0.07	0.22				0.19	0.0	0.0
0525	0.28	0.09	0.29				0.27	0.0	0.0
0530	0.38	0.12	0.35				0.35	0.0	0.0
0535	0.59	0.15	1.00				0.71	0.0	0.0
0540	0.81	0.19	1.73				1.12	0.0	0.0
0545	1.02	0.29	2.20				1.42	0.0	0.0
0550	1.11	0.36	2.39				1.54	0.0	0.0
0555	1.21	0.74	2.47				1.66	0.0	0.0
0600	1.30	1.12	2.51				1.75	0.0	0.0
0605	1.35	1.42	2.54				1.81	0.0	0.0
0610	1.40	1.57	2.55				1.85	0.0	0.0
0615	1.45	1.60	2.56				1.88	0.0	0.0
0620	1.45	1.61	2.59				1.89	0.0	0.0
0625	1.45	1.63	2.65				1.92	0.0	0.0
0630	1.45	1.64	2.67				1.93	0.0	0.0
0640	1.57	1.67	2.69				2.00	0.0	0.0
0645	1.58	1.72	2.71				2.02	0.0	0.0
0650	1.59	1.73	2.75				2.04	0.0	0.0
0655	1.60	1.77	2.77				2.06	0.0	0.0
0700	1.60	1.79	2.78				2.06	0.0	0.0
0715	1.62	1.85	2.80				2.08	0.0	0.0
0720	1.63	1.86	2.81				2.09	0.0	0.0
0735	1.63	1.87	2.82				2.10	0.0	0.0
0745	1.64	1.89	2.83				2.11	0.0	0.0
0750	1.64	1.89	2.84				2.11	0.0	0.0
0800	1.64	1.90	2.85				2.12	0.0	0.0
0810	1.65	1.91	2.86				2.13	0.0	0.0
0815	1.67	1.92	2.87				2.14	85.0	0.0047
0820	1.69	1.93	2.89				2.16	132.0	0.0193
0835	1.74	1.98	2.95				2.22	119.0	0.0325
0840	1.80	1.99	2.98				2.26	110.0	0.0386

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TEx. — STORM OF MAY 7, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0845	1.83	2.00	3.00				2.29	106.0	0.0445
0850	1.87	2.03	3.01				2.31	127.0	0.0515
0855	1.89	2.05	3.03				2.33	182.0	0.0616
0900	1.92	2.07	3.05				2.36	228.0	0.0743
0905	1.94	2.08	3.06				2.38	273.0	0.0894
0910	1.95	2.11	3.08				2.39	305.0	0.1063
0915	1.97	2.15	3.10				2.41	310.0	0.1235
0920	1.99	2.16	3.11				2.43	310.0	0.1407
0925	2.00	2.17	3.14				2.45	300.0	0.1573
0930	2.02	2.19	3.16				2.47	284.0	0.1730
0935	2.04	2.21	3.17				2.48	270.0	0.1880
0940	2.05	2.23	3.18				2.49	258.0	0.2094
0950	2.07	2.27	3.20				2.51	221.0	0.2278
0955	2.10	2.32	3.22				2.54	210.0	0.2394
1000	2.12	2.33	3.23				2.56	198.0	0.2504
1005	2.15	2.34	3.27				2.59	190.0	0.2610
1010	2.17	2.36	3.29				2.61	175.0	0.2707
1015	2.20	2.37	3.32				2.64	164.0	0.2797
1020	2.22	2.38	3.34				2.66	153.0	0.2882
1025	2.25	2.39	3.36				2.68	145.0	0.3003
1035	2.26	2.43	3.38				2.70	128.0	0.3216
1055	2.27	2.47	3.39				2.71	103.0	0.3415
1110	2.27	2.48	3.40				2.71	88.0	0.3732
1200	2.27	2.48	3.40				2.71	56.0	0.4012
1240	2.27	2.49	3.40				2.71	44.0	0.4573
1550	2.27	2.49	3.41				2.72	28.0	0.4976
1700	2.27	2.50	3.41				2.72	12.0	0.5102
1900	2.27	2.50	3.41				2.72	0.0	0.5102
2400	2.27	2.50	3.41				2.72	0.0	0.5102


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 7, 1976
at
EAST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.33 mi2
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 60 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
40
80
120
160
200
240
280
320
360
400
1.0
2.0
3.0
0000
0300
0600
0900
1200
1500
1800
2100
2400
May 7

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

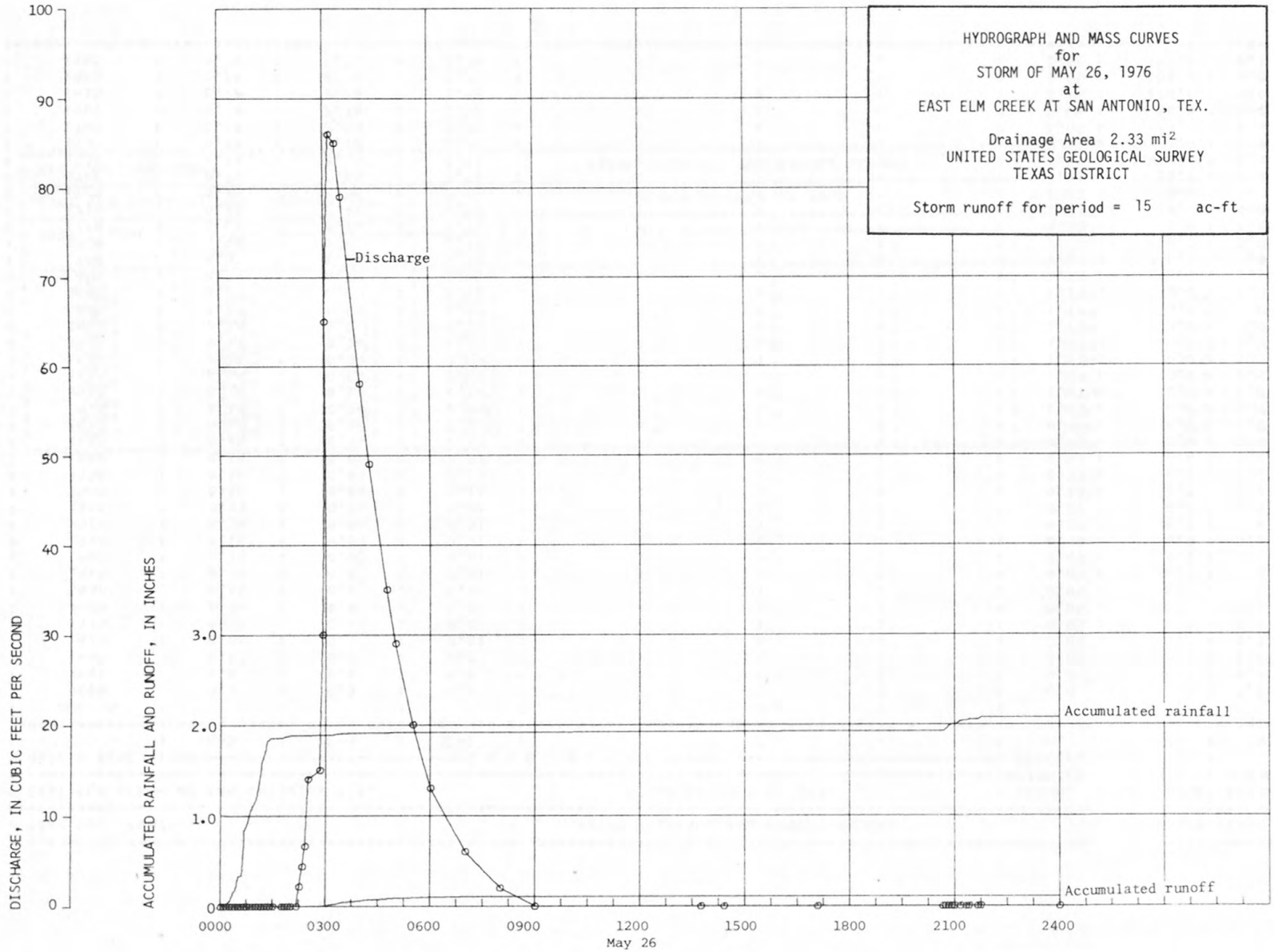
EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 26									
0000	0.0	0.0	0.0				0.0	0.0	0.0
0005	0.03	0.0	0.0				0.02	0.0	0.0
0010	0.06	0.0	0.0				0.03	0.0	0.0
0015	0.10	0.0	0.0				0.05	0.0	0.0
0020	0.25	0.0	0.0				0.14	0.0	0.0
0025	0.35	0.0	0.0				0.19	0.0	0.0
0030	0.60	0.0	0.0				0.33	0.0	0.0
0035	0.60	0.01	0.01				0.33	0.0	0.0
0040	1.47	0.05	0.05				0.83	0.0	0.0
0045	1.47	0.34	0.20				0.91	0.0	0.0
0050	1.47	0.69	0.48				1.04	0.0	0.0
0055	1.47	0.80	0.62				1.10	0.0	0.0
0100	1.47	1.00	0.78				1.17	0.0	0.0
0105	1.47	1.54	1.15				1.35	0.0	0.0
0110	1.47	2.00	1.66				1.58	0.0	0.0
0115	1.47	2.08	1.92				1.68	0.0	0.0
0120	1.47	2.20	2.26				1.82	0.0	0.0
0125	1.48	2.20	2.32				1.85	0.0	0.0
0130	1.48	2.21	2.32				1.85	0.0	0.0
0145	1.48	2.21	2.33				1.85	0.0	0.0
0150	1.48	2.23	2.36				1.87	0.0	0.0
0155	1.48	2.24	2.37				1.87	0.0	0.0
0200	1.49	2.25	2.38				1.88	0.0	0.0
0210	1.49	2.25	2.38				1.88	0.0	0.0
0215	1.49	2.25	2.38				1.88	2.2	0.0001
0220	1.49	2.25	2.38				1.88	4.4	0.0004
0225	1.49	2.25	2.38				1.88	6.6	0.0007
0230	1.49	2.25	2.38				1.88	14.0	0.0027
0250	1.50	2.25	2.38				1.89	15.0	0.0047
0255	1.50	2.25	2.38				1.89	30.0	0.0064
0300	1.50	2.25	2.38				1.89	65.0	0.0118
0310	1.50	2.25	2.38				1.89	86.0	0.0213
0320	1.51	2.26	2.39				1.90	85.0	0.0308
0330	1.52	2.26	2.39				1.90	79.0	0.0483
0400	1.52	2.27	2.40				1.91	58.0	0.0627
0415	1.52	2.28	2.40				1.91	49.0	0.0750
0445	1.52	2.28	2.40				1.91	35.0	0.0837
0500	1.53	2.28	2.40				1.91	29.0	0.0909
0530	1.53	2.28	2.40				1.91	20.0	0.0976

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT³/S	ACCUM. RUNOFF IN.
MAY 26									
0600	1.53	2.28	2.40				1.91	13.0	0.1041
0700	1.53	2.28	2.40				1.91	6.0	0.1081
0800	1.53	2.28	2.40				1.91	2.0	0.1094
0900	1.53	2.28	2.40				1.91	0.0	0.1094
1345	1.53	2.28	2.41				1.92	0.0	0.1094
1425	1.53	2.29	2.41				1.92	0.0	0.1094
1705	1.53	2.29	2.42				1.92	0.0	0.1094
2040	1.53	2.29	2.42				1.92	0.0	0.1094
2045	1.58	2.29	2.42				1.95	0.0	0.1094
2050	1.65	2.29	2.42				1.99	0.0	0.1094
2055	1.67	2.29	2.42				2.00	0.0	0.1094
2100	1.67	2.29	2.42				2.00	0.0	0.1094
2110	1.74	2.29	2.42				2.04	0.0	0.1094
2120	1.74	2.29	2.43				2.04	0.0	0.1094
2125	1.74	2.30	2.45				2.05	0.0	0.1094
2140	1.74	2.31	2.46				2.05	0.0	0.1094
2145	1.74	2.36	2.51				2.08	0.0	0.1094
2400	1.74	2.36	2.51				2.08	0.0	0.1094


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 26, 1976
at
EAST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.33 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 15 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
100
90
80
70
60
50
40
30
20
10
0
3.0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
May 26

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

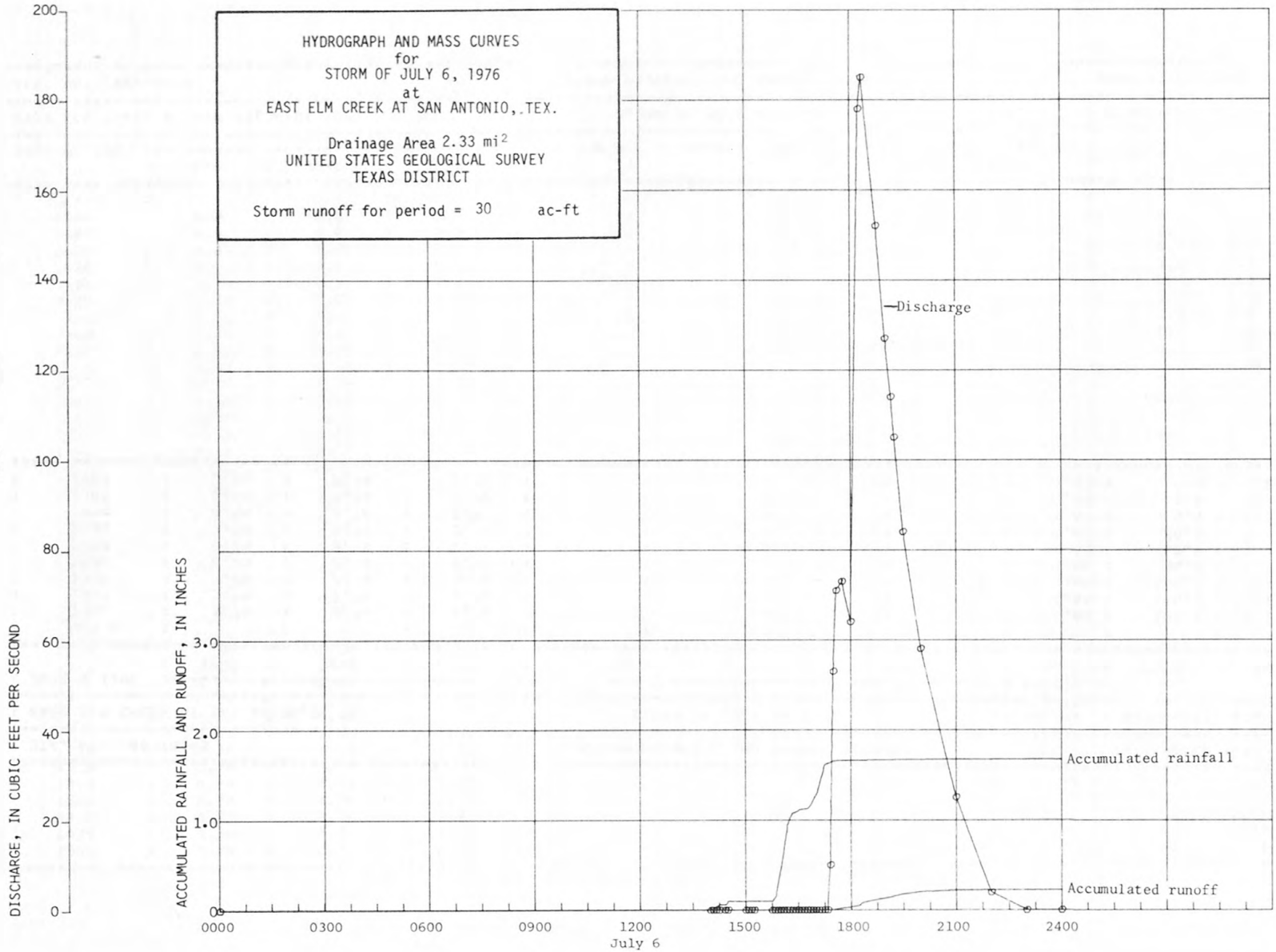
EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF JULY 6, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JULY 6									
0000	0.0	0.0	0.0				0.0	0.0	0.0
1400	0.0	0.0	0.0				0.0	0.0	0.0
1405	0.03	0.0	0.0				0.02	0.0	0.0
1410	0.06	0.0	0.01				0.04	0.0	0.0
1415	0.09	0.0	0.01				0.05	0.0	0.0
1425	0.09	0.0	0.01				0.05	0.0	0.0
1430	0.16	0.0	0.01				0.09	0.0	0.0
1500	0.16	0.0	0.01				0.09	0.0	0.0
1505	0.16	0.02	0.01				0.09	0.0	0.0
1510	0.16	0.03	0.01				0.09	0.0	0.0
1515	0.16	0.04	0.01				0.09	0.0	0.0
1545	0.16	0.04	0.01				0.09	0.0	0.0
1550	0.16	0.04	0.16				0.15	0.0	0.0
1555	0.16	0.04	0.62				0.33	0.0	0.0
1600	0.16	0.04	1.07				0.50	0.0	0.0
1605	0.16	0.04	1.69				0.73	0.0	0.0
1610	0.16	0.04	2.24				0.94	0.0	0.0
1615	0.16	0.04	2.46				1.03	0.0	0.0
1620	0.16	0.04	2.58				1.07	0.0	0.0
1625	0.16	0.04	2.62				1.09	0.0	0.0
1630	0.16	0.04	2.67				1.11	0.0	0.0
1635	0.16	0.04	2.69				1.11	0.0	0.0
1640	0.16	0.04	2.70				1.12	0.0	0.0
1645	0.17	0.05	2.70				1.12	0.0	0.0
1650	0.22	0.23	2.71				1.17	0.0	0.0
1655	0.27	0.73	2.71				1.23	0.0	0.0
1700	0.32	1.14	2.71				1.29	0.0	0.0
1705	0.46	1.80	2.71				1.41	0.0	0.0
1710	0.61	2.18	2.71				1.52	0.0	0.0
1715	0.75	2.41	2.71				1.61	0.0	0.0
1720	0.76	2.55	2.71				1.63	0.0	0.0
1725	0.77	2.66	2.71				1.64	10.0	0.0006
1730	0.78	2.69	2.71				1.65	53.0	0.0035
1735	0.78	2.72	2.72				1.65	71.0	0.0094
1745	0.78	2.73	2.72				1.65	73.0	0.0195
1800	0.78	2.74	2.72				1.65	64.0	0.0301
1815	0.78	2.74	2.72				1.65	178.0	0.0499
1820	0.78	2.74	2.72				1.65	185.0	0.0806
1845	0.79	2.74	2.72				1.66	152.0	0.1143

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF JULY 6, 1976

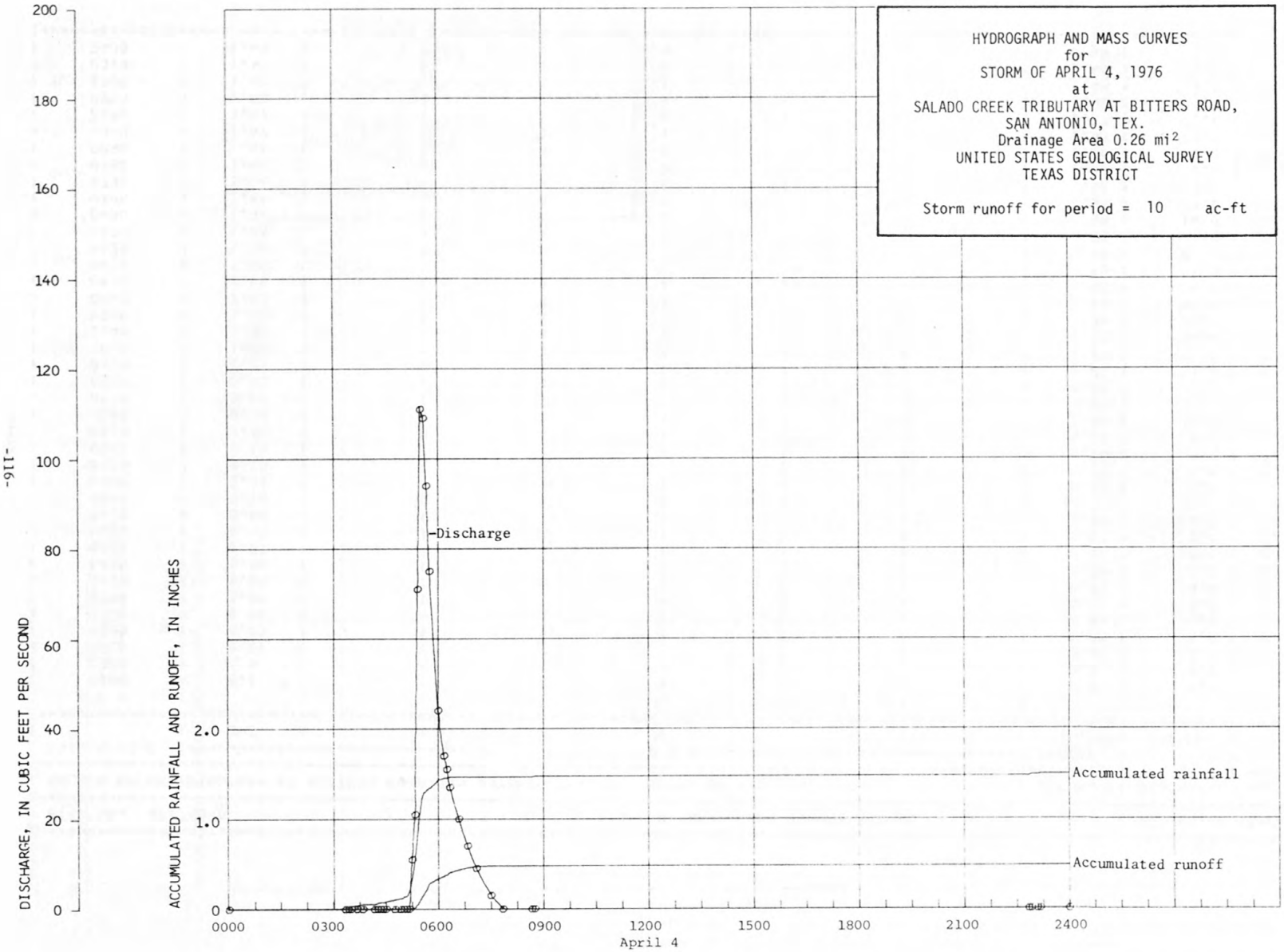
DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S				ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JULY 6									
1900	0.79	2.74	2.72				1.66	127.0	0.1319
1910	0.79	2.75	2.72				1.66	114.0	0.1414
1915	0.79	2.78	2.72				1.66	105.0	0.1530
1930	0.79	2.78	2.72				1.66	84.0	0.1740
2000	0.79	2.78	2.72				1.66	58.0	0.2029
2100	0.80	2.78	2.72				1.67	25.0	0.2196
2200	0.80	2.78	2.72				1.67	3.9	0.2221
2300	0.80	2.78	2.72				1.67	0.0	0.2221
2400	0.80	2.78	2.72				1.67	0.0	0.2221


HYDROGRAPH AND MASS CURVES
for
STORM OF JULY 6, 1976
at
EAST ELM CREEK AT SAN ANTONIO, TEX.
Drainage Area 2.33 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 30 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
20
40
60
80
100
120
140
160
180
200
0
1.0
2.0
3.0
0000
0300
0600
0900
1200
1500
1800
2100
2400
July 6

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF APRIL 4, 1976

DATE & TIME	GAGE NUMBER 3-S						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 4									
0000	0.0						0.0	0.0	0.0
0320	0.0						0.0	0.0	0.0
0325	0.01						0.01	0.0	0.0
0330	0.03						0.03	0.0	0.0
0340	0.04						0.04	0.0	0.0
0350	0.05						0.05	0.0	0.0
0410	0.05						0.05	0.0	0.0
0415	0.06						0.06	0.0	0.0
0420	0.07						0.07	0.0	0.0
0425	0.07						0.07	0.0	0.0
0430	0.08						0.08	0.0	0.0
0445	0.10						0.10	0.0	0.0
0455	0.11						0.11	0.0	0.0
0500	0.13						0.13	0.0	0.0
0505	0.14						0.14	0.0	0.0
0510	0.21						0.21	0.0	0.0
0515	0.38						0.38	11.0	0.0055
0520	0.65						0.65	21.0	0.0159
0525	0.97						0.97	71.0	0.0512
0530	1.21						1.21	111.0	0.1063
0535	1.29						1.29	109.0	0.1604
0540	1.32						1.32	94.0	0.2071
0545	1.34						1.34	75.0	0.2816
0600	1.43						1.43	44.0	0.3362
0610	1.45						1.45	34.0	0.3616
0615	1.45						1.45	31.0	0.3770
0620	1.46						1.46	27.0	0.4038
0635	1.46						1.46	20.0	0.4336
0650	1.46						1.46	14.0	0.4544
0705	1.46						1.46	9.0	0.4723
0730	1.46						1.46	3.0	0.4790
0750	1.46						1.46	0.0	0.4790
0840	1.46						1.46	0.0	0.4790
0845	1.47						1.47	0.0	0.4790
2250	1.47						1.47	0.0	0.4790
2255	1.48						1.48	0.0	0.4790
2305	1.48						1.48	0.0	0.4790
2310	1.49						1.49	0.0	0.4790
2400	1.49						1.49	0.0	0.4790


HYDROGRAPH AND MASS CURVES
for
STORM OF APRIL 4, 1976
at
SALADO CREEK TRIBUTARY AT BITTERS ROAD,
SAN ANTONIO, TEX.
Drainage Area 0.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 10 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
200
180
160
140
120
100
80
60
40
20
0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0000
0300
0600
0900
1200
1500
1800
2100
2400
April 4

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 3-S							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 6										
0000	0.0							0.0	0.0	0.0
1435	0.0							0.0	0.0	0.0
1440	0.01							0.01	0.0	0.0
2150	0.01							0.01	0.0	0.0
2155	0.02							0.02	0.0	0.0
2200	0.03							0.03	0.0	0.0
2210	0.04							0.04	0.0	0.0
2215	0.05							0.05	0.0	0.0
2300	0.05							0.05	0.0	0.0
2305	0.06							0.06	0.0	0.0
2310	0.08							0.08	0.0	0.0
2315	0.17							0.17	0.0	0.0
2320	0.26							0.26	0.0	0.0
2325	0.29							0.29	0.0	0.0
2330	0.30							0.30	6.5	0.0032
2335	0.43							0.43	13.0	0.0097
2340	0.66							0.66	25.0	0.0221
2345	0.69							0.69	42.0	0.0430
2350	0.69							0.69	79.0	0.0822
2355	0.69							0.69	80.0	0.1219
2400	0.69							0.69	68.0	0.1557
MAY 7										
0000	0.69							0.69	68.0	0.1557
0010	0.69							0.69	47.0	0.2193
0020	0.70							0.70	34.0	0.2531
0030	0.70							0.70	26.0	0.2789
0040	0.70							0.70	18.0	0.2968
0050	0.70							0.70	12.0	0.3087
0100	0.70							0.70	7.0	0.3156
0110	0.70							0.70	3.0	0.3186
0120	0.70							0.70	1.0	0.3194
0125	0.70							0.70	0.0	0.3194
0435	0.70							0.70	0.0	0.3194
0440	0.71							0.71	0.0	0.3194
0455	0.71							0.71	0.0	0.3194
0500	0.72							0.72	0.0	0.3194
0505	0.73							0.73	0.0	0.3194
0510	0.75							0.75	0.0	0.3194
0515	0.78							0.78	0.0	0.3194
0525	0.78							0.78	0.0	0.3194

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

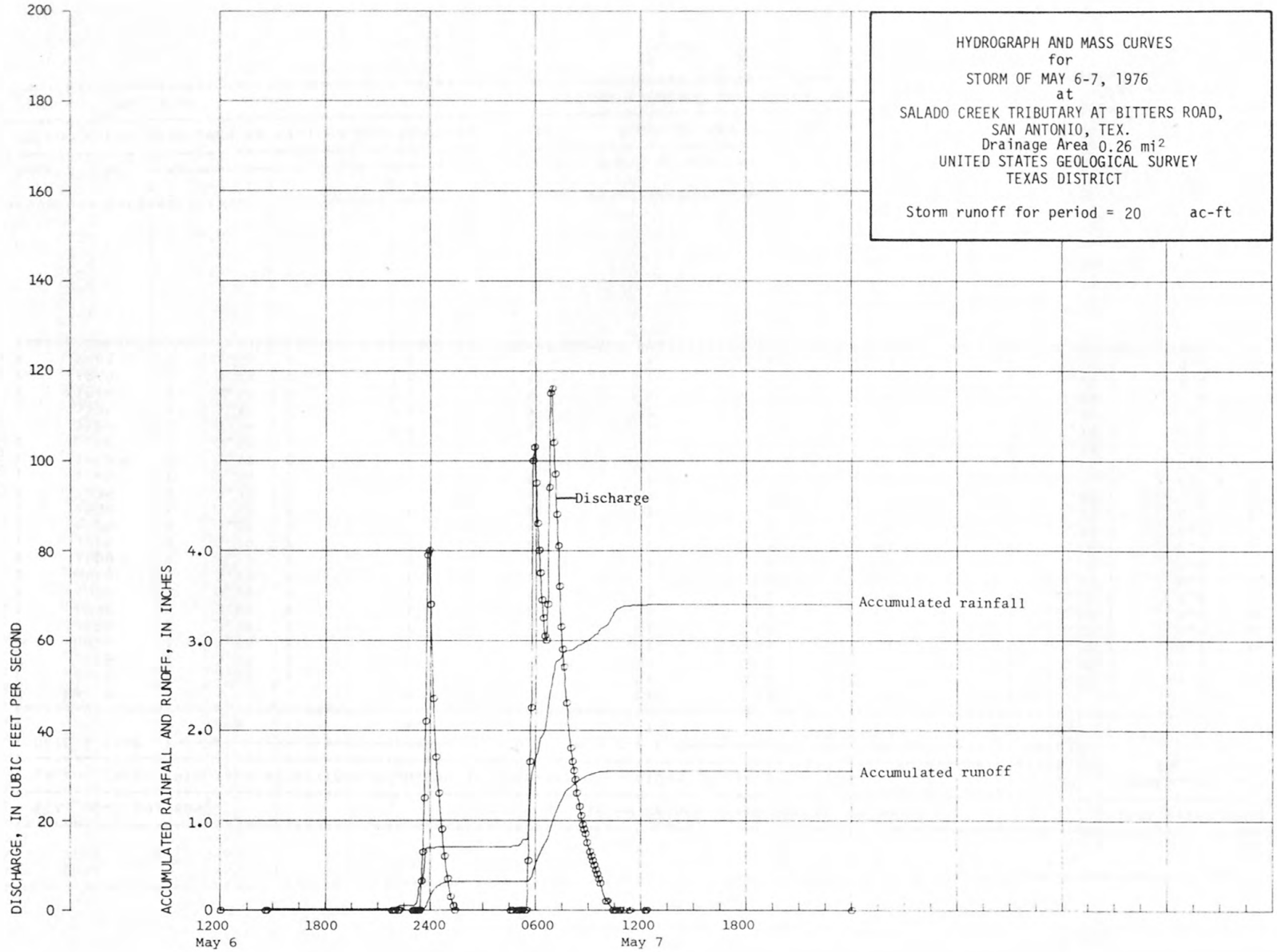
SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 3-S						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0530	0.79						0.79	0.0	0.3194
0535	1.02						1.02	11.0	0.3248
0540	1.43						1.43	33.0	0.3412
0545	1.53						1.53	45.0	0.3636
0550	1.59						1.59	100.0	0.4132
0555	1.67						1.67	103.0	0.4644
0600	1.72						1.72	95.0	0.5116
0605	1.76						1.76	86.0	0.5543
0610	1.87						1.87	80.0	0.5940
0615	1.91						1.91	75.0	0.6313
0620	1.94						1.94	69.0	0.6655
0625	1.97						1.97	65.0	0.6978
0630	2.02						2.02	61.0	0.7281
0635	2.16						2.16	60.0	0.7579
0640	2.31						2.31	68.0	0.7917
0645	2.43						2.43	94.0	0.8384
0650	2.48						2.48	115.0	0.8955
0655	2.60						2.60	116.0	0.9531
0700	2.67						2.67	104.0	1.0047
0705	2.76						2.76	97.0	1.0529
0710	2.77						2.77	88.0	1.0966
0715	2.78						2.78	81.0	1.1369
0720	2.79						2.79	72.0	1.1726
0725	2.81						2.81	63.0	1.2039
0730	2.86						2.86	58.0	1.2327
0735	2.87						2.87	54.0	1.2729
0745	2.88						2.88	46.0	1.3301
0800	2.89						2.89	36.0	1.3658
0805	2.90						2.90	33.0	1.3822
0810	2.91						2.91	31.0	1.3976
0815	2.92						2.92	29.0	1.4120
0820	2.94						2.94	26.0	1.4314
0830	2.95						2.95	23.0	1.4485
0835	2.96						2.96	21.0	1.4589
0840	2.97						2.97	19.0	1.4684
0845	2.98						2.98	18.0	1.4773
0850	2.99						2.99	17.0	1.4858
0855	3.00						3.00	15.0	1.4969
0905	3.02						3.02	13.0	1.5066

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF MAY 6-7, 1976

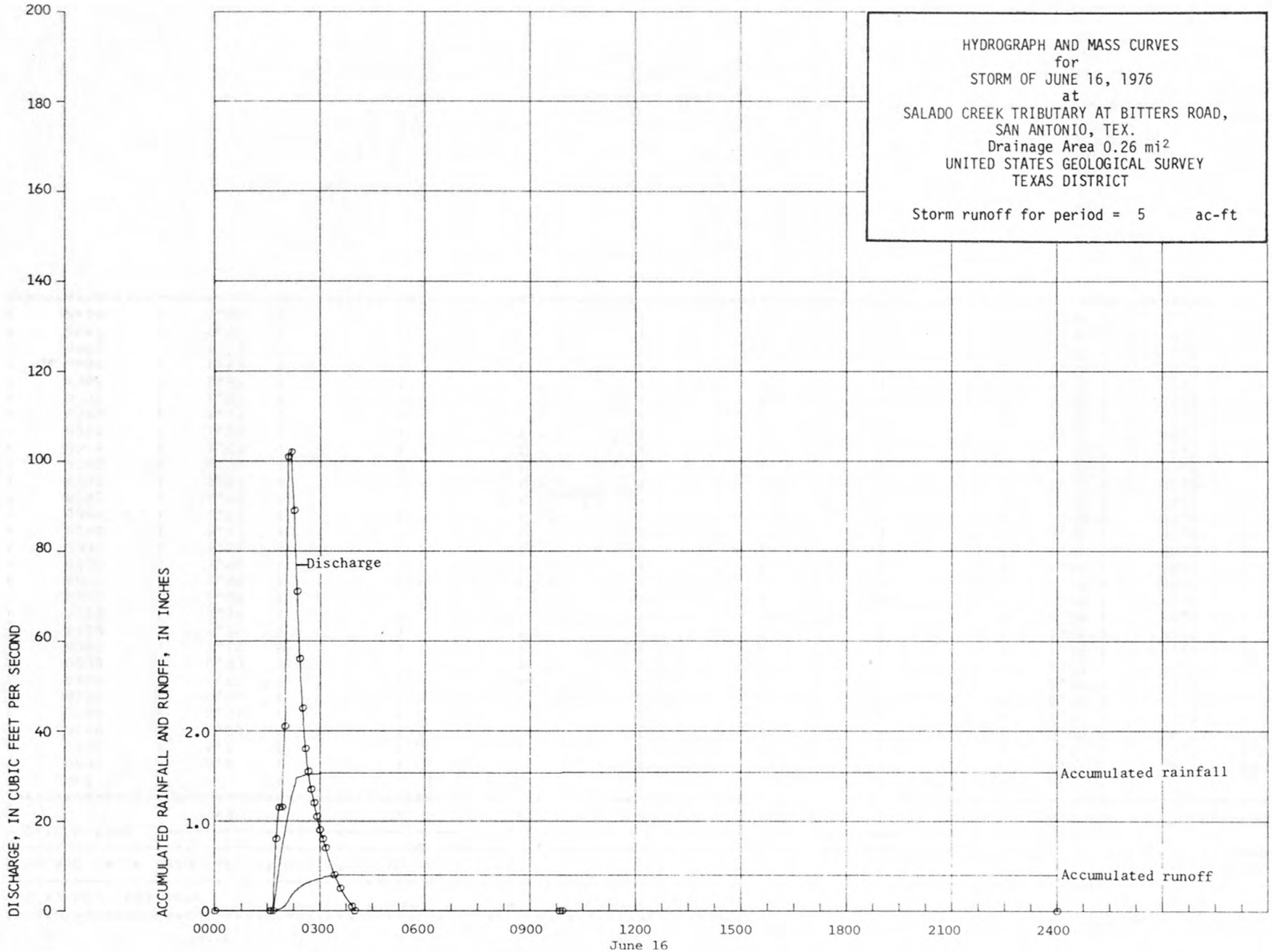
DATE & TIME	GAGE NUMBER 3-S						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0910	3.03						3.03	12.0	1.5126
0915	3.05						3.05	11.0	1.5180
0920	3.06						3.06	10.0	1.5230
0925	3.07						3.07	9.0	1.5275
0930	3.08						3.08	8.0	1.5314
0935	3.11						3.11	7.0	1.5349
0940	3.13						3.13	6.0	1.5424
1000	3.17						3.17	2.0	1.5449
1005	3.19						3.19	2.0	1.5473
1025	3.31						3.31	0.0	1.5473
1030	3.33						3.33	0.0	1.5473
1035	3.35						3.35	0.0	1.5473
1045	3.36						3.36	0.0	1.5473
1050	3.37						3.37	0.0	1.5473
1100	3.38						3.38	0.0	1.5473
1120	3.38						3.38	0.0	1.5473
1125	3.39						3.39	0.0	1.5473
1215	3.39						3.39	0.0	1.5473
1220	3.40						3.40	0.0	1.5473
2400	3.40						3.40	0.0	1.5473


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
SALADO CREEK TRIBUTARY AT BITTERS ROAD,
SAN ANTONIO, TEX.
Drainage Area 0.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 20 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
Discharge
Accumulated rainfall
Accumulated runoff
200
180
160
140
120
100
80
60
40
20
0
4.0
3.0
2.0
1.0
0
1200
1800
2400
0600
1200
1800
May 6
May 7

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF JUNE 16, 1976

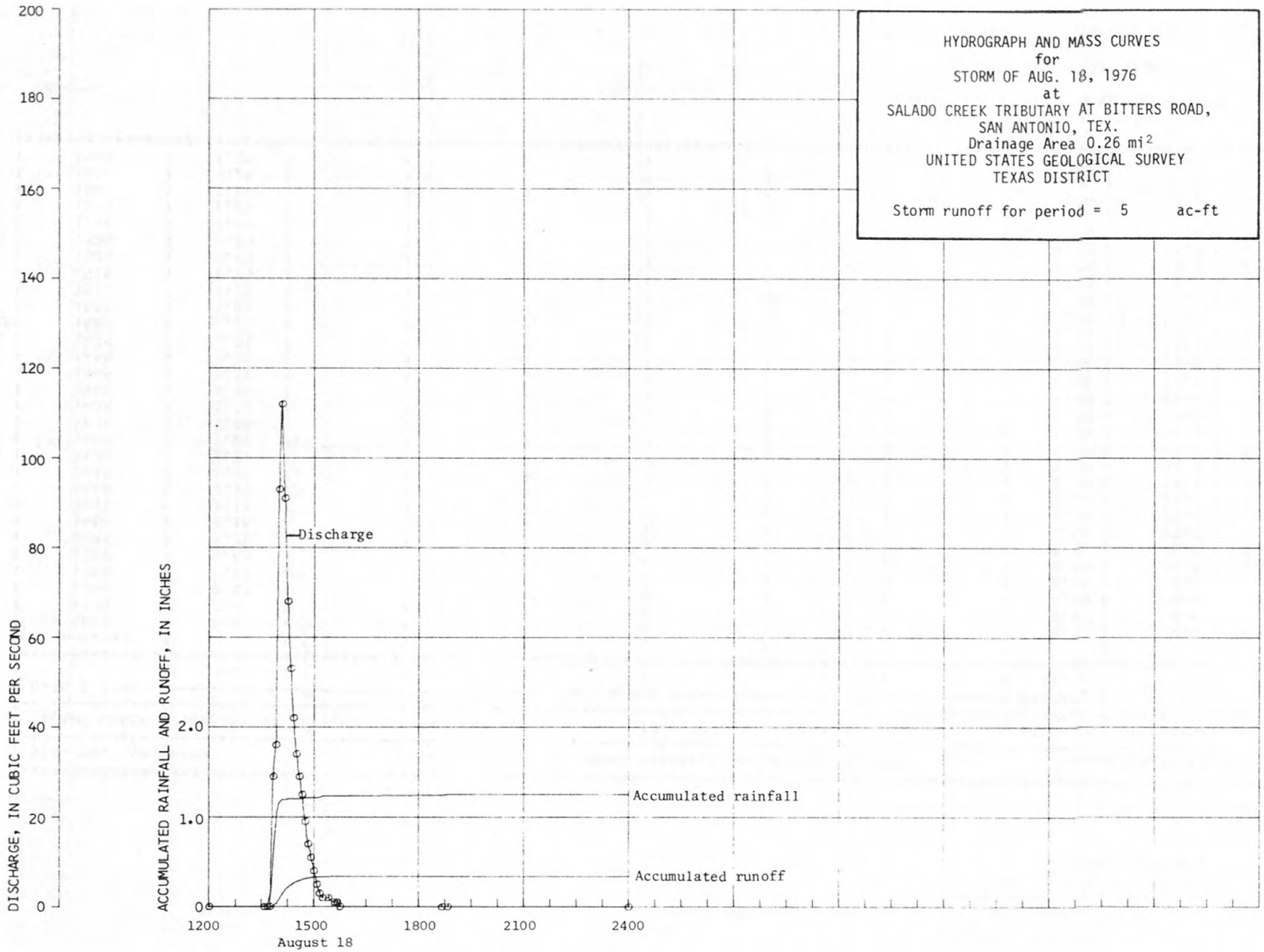
DATE & TIME	GAGE NUMBER 3-S						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JUNE 16									
0000	0.0						0.0	0.0	0.0
0135	0.0						0.0	0.0	0.0
0140	0.05						0.05	0.0	0.0
0145	0.31						0.31	16.0	0.0079
0150	0.56						0.56	23.0	0.0194
0155	0.75						0.75	23.0	0.0308
0200	0.93						0.93	41.0	0.0512
0205	1.10						1.10	101.0	0.1013
0210	1.26						1.26	102.0	0.1520
0215	1.38						1.38	89.0	0.1962
0220	1.48						1.48	71.0	0.2314
0225	1.49						1.49	56.0	0.2593
0230	1.50						1.50	45.0	0.2816
0235	1.51						1.51	36.0	0.2995
0240	1.51						1.51	31.0	0.3149
0245	1.52						1.52	27.0	0.3283
0250	1.52						1.52	24.0	0.3402
0255	1.52						1.52	21.0	0.3506
0300	1.53						1.53	18.0	0.3596
0305	1.53						1.53	16.0	0.3675
0310	1.53						1.53	14.0	0.3814
0325	1.53						1.53	8.0	0.3914
0335	1.53						1.53	5.0	0.3988
0355	1.53						1.53	1.0	0.4001
0400	1.53						1.53	0.0	0.4001
0950	1.53						1.53	0.0	0.4001
0955	1.54						1.54	0.0	0.4001
2400	1.54						1.54	0.0	0.4001


HYDROGRAPH AND MASS CURVES
for
STORM OF JUNE 16, 1976
at
SALADO CREEK TRIBUTARY AT BITTERS ROAD,
SAN ANTONIO, TEX.
Drainage Area 0.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 5 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
Discharge
Accumulated rainfall
Accumulated runoff
0
20
40
60
80
100
120
140
160
180
200
0
1.0
2.0
0000
0300
0600
0900
1200
1500
1800
2100
2400
June 16

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF AUG 18, 1976

DATE & TIME	GAGE NUMBER 3-S							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
AUG. 18										
0000	0.0							0.0	0.0	0.0
1335	0.0							0.0	0.0	0.0
1340	0.03							0.03	0.0	0.0
1345	0.17							0.17	0.0	0.0
1350	0.69							0.69	29.0	0.0144
1355	1.05							1.05	36.0	0.0323
1400	1.16							1.16	93.0	0.0785
1405	1.19							1.19	112.0	0.1341
1410	1.19							1.19	91.0	0.1793
1415	1.20							1.20	68.0	0.2131
1420	1.20							1.20	53.0	0.2394
1425	1.20							1.20	42.0	0.2603
1430	1.20							1.20	34.0	0.2771
1435	1.20							1.20	29.0	0.2915
1440	1.20							1.20	25.0	0.3040
1445	1.21							1.21	19.0	0.3134
1450	1.21							1.21	14.0	0.3203
1455	1.21							1.21	11.0	0.3258
1500	1.21							1.21	8.0	0.3298
1505	1.21							1.21	5.0	0.3323
1510	1.22							1.22	3.0	0.3338
1515	1.23							1.23	2.0	0.3352
1525	1.23							1.23	2.0	0.3372
1535	1.23							1.23	1.0	0.3380
1540	1.23							1.23	1.0	0.3385
1545	1.23							1.23	0.0	0.3385
1840	1.24							1.24	0.0	0.3385
1850	1.25							1.25	0.0	0.3385
2400	1.25							1.25	0.0	0.3385


HYDROGRAPH AND MASS CURVES
for
STORM OF AUG. 18, 1976
at
SALADO CREEK TRIBUTARY AT BITTERS ROAD,
SAN ANTONIO, TEX.
Drainage Area 0.26 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 5 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
Discharge
Accumulated rainfall
Accumulated runoff
August 18

STA. NO. 08178736 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

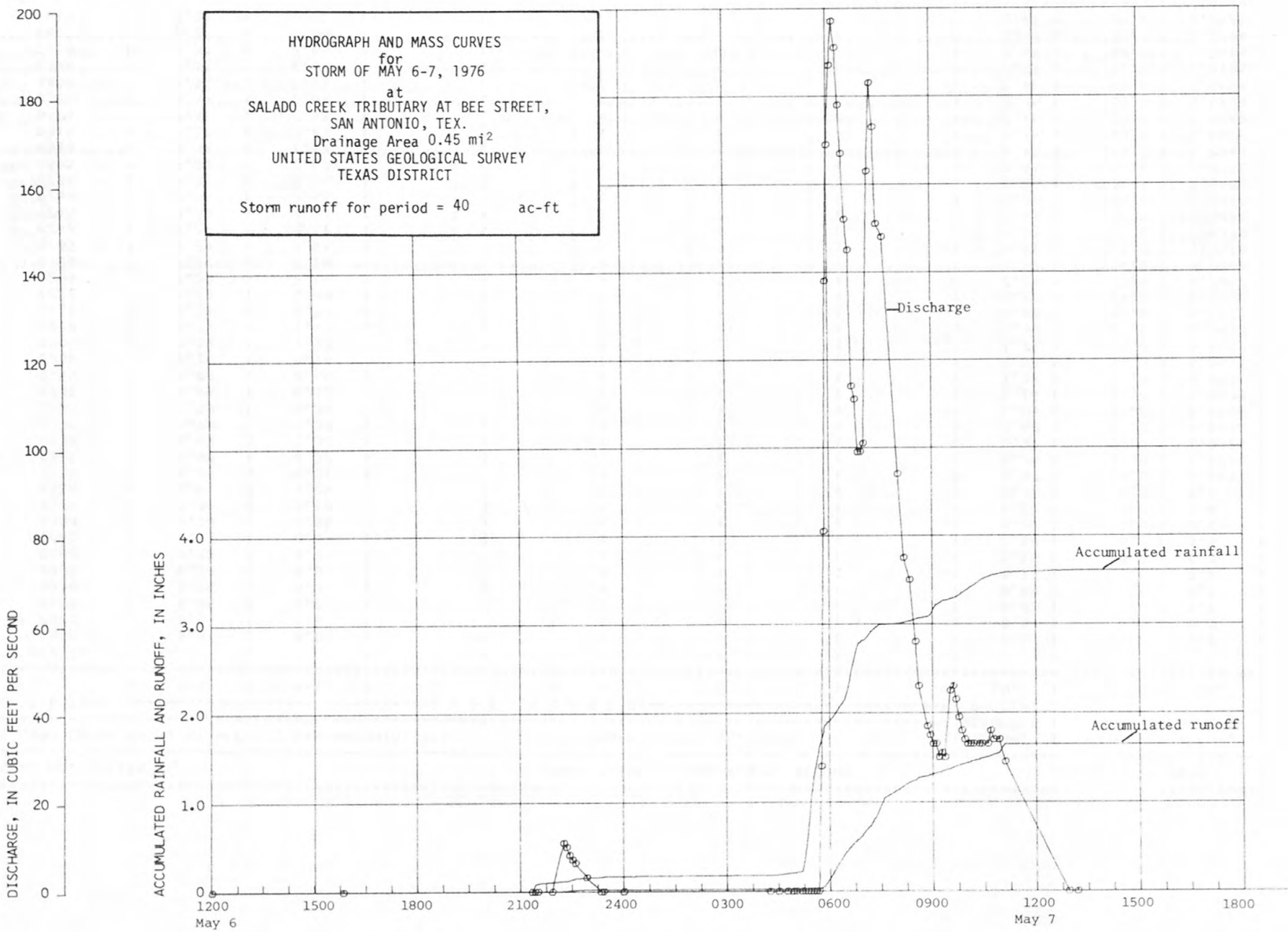
SALADO CREEK TRIBUTARY AT REE ST.,SAN ANTONIO,TEX. — STORM OF MAY 6-7, 1976

DATE & TIME	GAGE NUMBER 5-S	6-S					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 6									
0000	0.0	0.0					0.0	0.0	0.0
1550	0.0	0.01					0.00	0.0	0.0
2120	0.0	0.01					0.00	0.0	0.0
2125	0.13	0.01					0.08	0.0	0.0
2130	0.14	0.02					0.09	0.0	0.0
2155	0.16	0.03					0.11	0.0	0.0
2215	0.17	0.04					0.12	11.0	0.0079
2220	0.17	0.04					0.12	10.0	0.0108
2225	0.18	0.05					0.13	8.3	0.0131
2230	0.19	0.06					0.14	7.2	0.0152
2235	0.19	0.08					0.14	6.4	0.0198
2255	0.20	0.09					0.15	3.2	0.0239
2320	0.21	0.09					0.16	0.0	0.0239
2325	0.22	0.10					0.17	0.0	0.0239
2400	0.22	0.10					0.17	0.0	0.0239
MAY 7									
0000	0.22	0.10					0.17	0.0	0.0239
0415	0.23	0.10					0.18	0.0	0.0239
0430	0.24	0.10					0.18	0.0	0.0239
0455	0.26	0.12					0.20	0.0	0.0239
0500	0.27	0.12					0.21	0.0	0.0239
0510	0.28	0.13					0.22	0.0	0.0239
0515	0.60	0.13					0.41	0.0	0.0239
0520	1.00	0.23					0.68	0.0	0.0239
0525	1.35	0.57					1.03	0.0	0.0239
0530	1.47	1.01					1.28	0.0	0.0239
0535	1.56	1.27					1.44	0.0	0.0239
0540	1.78	1.36					1.61	0.0	0.0239
0545	1.85	1.54					1.72	28.0	0.0320
0550	1.91	1.78					1.86	81.0	0.0552
0555	1.94	1.83					1.89	138.0	0.0948
0600	1.95	1.87					1.92	169.0	0.1433
0605	2.01	1.89					1.96	187.0	0.1970
0610	2.05	1.94					2.00	197.0	0.2535
0615	2.13	1.96					2.06	191.0	0.3083
0620	2.18	1.99					2.10	178.0	0.3594
0625	2.23	2.05					2.16	167.0	0.4073
0630	2.38	2.12					2.27	152.0	0.4509
0635	2.65	2.17					2.45	145.0	0.4925
0640	2.78	2.27					2.57	114.0	0.5253

STA. NO. 08178736 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIBUTARY AT BEE ST.,SAN ANTONIO,TEX. — STORM OF MAY 6-7, 1975

DATE & TIME	GAGE NUMBER 5-S	6-S					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 7									
0645	2.85	2.53					2.72	111.0	0.5571
0650	2.85	2.69					2.78	99.0	0.5855
0655	2.85	2.75					2.81	99.0	0.6139
0700	2.86	2.76					2.82	101.0	0.6574
0710	3.00	2.77					2.91	163.0	0.7276
0715	3.02	2.82					2.94	183.0	0.7801
0720	3.03	2.87					2.96	173.0	0.8297
0725	3.05	2.90					2.99	151.0	0.8947
0735	3.05	2.91					2.99	148.0	1.0434
0800	3.06	2.92					3.00	94.0	1.1378
0810	3.08	2.93					3.02	75.0	1.1808
0820	3.10	2.94					3.03	70.0	1.2210
0830	3.12	2.96					3.05	56.0	1.2451
0835	3.13	2.97					3.06	46.0	1.2715
0850	3.15	2.98					3.08	37.0	1.2927
0855	3.17	3.01					3.10	35.0	1.3028
0900	3.25	3.06					3.17	33.0	1.3122
0905	3.28	3.12					3.21	33.0	1.3217
0910	3.30	3.14					3.23	30.0	1.3303
0915	3.32	3.16					3.25	31.0	1.3392
0920	3.33	3.17					3.26	30.0	1.3521
0930	3.35	3.18					3.28	45.0	1.3715
0935	3.36	3.19					3.29	46.0	1.3847
0940	3.38	3.20					3.31	43.0	1.3970
0945	3.40	3.22					3.33	39.0	1.4082
0950	3.42	3.25					3.35	36.0	1.4186
0955	3.44	3.27					3.37	34.0	1.4283
1000	3.46	3.29					3.39	33.0	1.4378
1005	3.48	3.32					3.41	33.0	1.4472
1010	3.50	3.34					3.43	33.0	1.4614
1020	3.54	3.40					3.48	33.0	1.4851
1035	3.60	3.43					3.53	33.0	1.5041
1040	3.61	3.44					3.54	36.0	1.5144
1045	3.62	3.45					3.55	34.0	1.5388
1105	3.66	3.46					3.58	29.0	1.6470
1255	3.69	3.47					3.60	0.0	1.6470
1310	3.70	3.47					3.61	0.0	1.6470
2400	3.70	3.47					3.61	0.0	1.6470


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 6-7, 1976
at
SALADO CREEK TRIBUTARY AT BEE STREET,
SAN ANTONIO, TEX.
Drainage Area 0.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 40 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
200
180
160
140
120
100
80
60
40
20
0
4.0
3.0
2.0
1.0
0
1200
1500
1800
2100
2400
0300
0600
0900
1200
1500
1800
May 6
May 7

STA. NO. 08178736 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

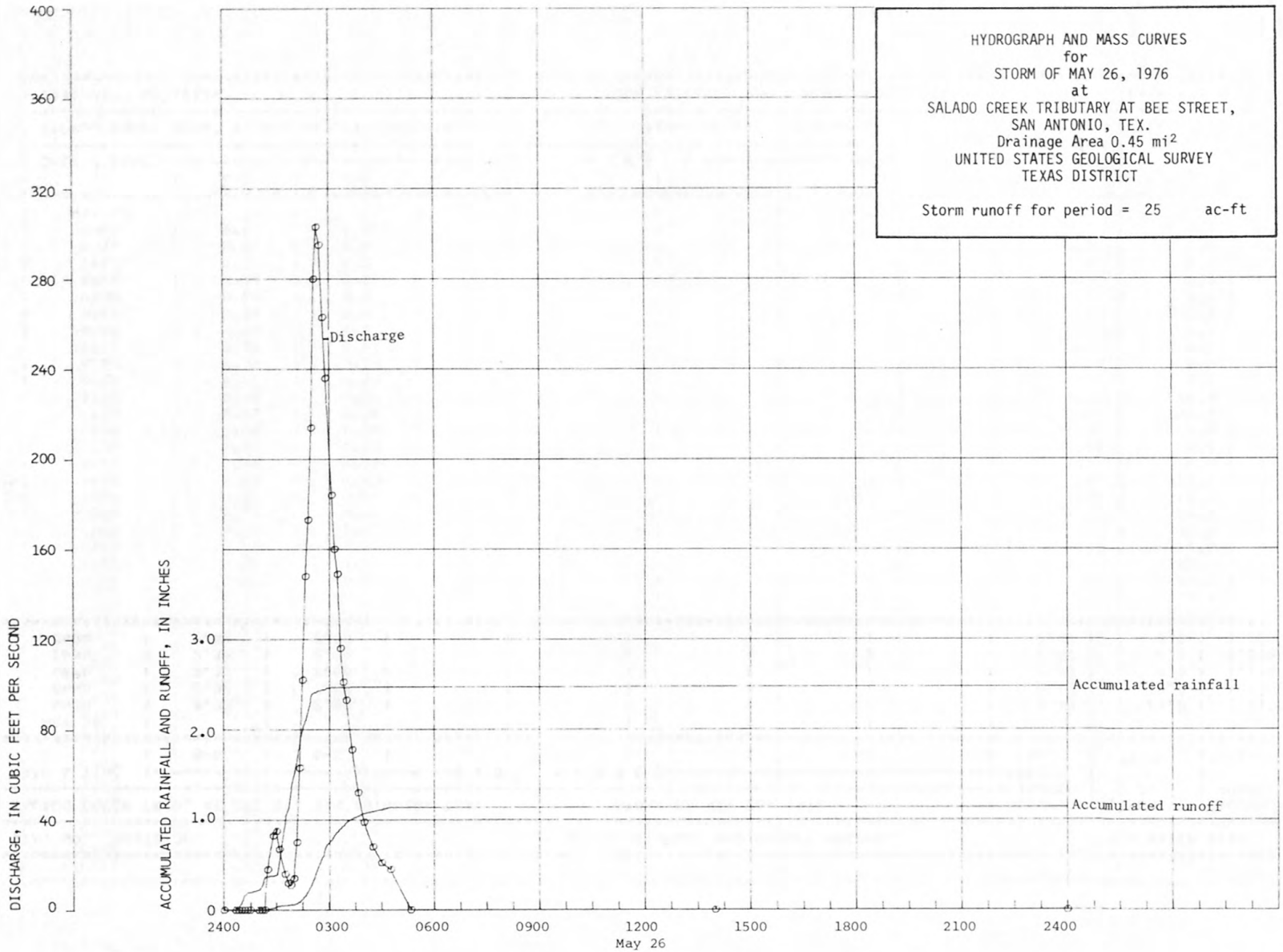
SALADO CREEK TRIB. AT BEE ST. SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

DATE & TIME	GAGE NUMBER 5-S	6-S						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 26										
0000	0.0	0.0						0.0	0.0	0.0
0020	0.0	0.0						0.0	0.0	0.0
0025	0.05	0.0						0.03	0.0	0.0
0030	0.15	0.0						0.09	0.0	0.0
0035	0.28	0.0						0.17	0.0	0.0
0040	0.32	0.0						0.19	0.0	0.0
0045	0.33	0.0						0.19	0.0	0.0
0100	0.34	0.05						0.22	0.0	0.0
0105	0.34	0.18						0.27	0.0	0.0
0110	0.41	0.29						0.36	0.0	0.0
0115	0.41	0.31						0.37	18.0	0.0077
0125	0.42	0.32						0.38	33.0	0.0220
0130	0.43	0.32						0.38	35.0	0.0320
0135	0.79	0.33						0.60	27.0	0.0436
0145	1.50	0.38						1.04	16.0	0.0505
0150	1.63	0.43						1.14	12.0	0.0539
0155	2.00	0.50						1.38	11.0	0.0571
0200	2.10	0.70						1.53	14.0	0.0611
0205	2.15	1.07						1.71	30.0	0.0697
0210	2.23	1.43						1.90	63.0	0.0878
0215	2.26	1.70						2.03	102.0	0.1171
0220	2.29	1.89						2.13	148.0	0.1595
0225	2.29	2.18						2.24	173.0	0.2092
0230	2.29	2.54						2.39	214.0	0.2706
0235	2.29	2.58						2.41	280.0	0.3510
0240	2.29	2.61						2.42	303.0	0.4379
0245	2.29	2.63						2.43	295.0	0.5226
0250	2.30	2.64						2.44	263.0	0.5980
0255	2.31	2.66						2.45	236.0	0.6996
0305	2.32	2.67						2.46	184.0	0.7788
0310	2.32	2.67						2.46	160.0	0.8247
0315	2.32	2.67						2.46	149.0	0.8675
0320	2.32	2.67						2.46	116.0	0.9008
0325	2.32	2.67						2.46	101.0	0.9298
0330	2.32	2.67						2.46	93.0	0.9698
0340	2.32	2.68						2.47	71.0	1.0105
0350	2.32	2.68						2.47	52.0	1.0404
0400	2.32	2.68						2.47	39.0	1.0684
0415	2.32	2.68						2.47	28.0	1.0925

STA. NO. 08178736 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIB. AT BEE ST. SAN ANTONIO, TEX. — STORM OF MAY 26, 1976

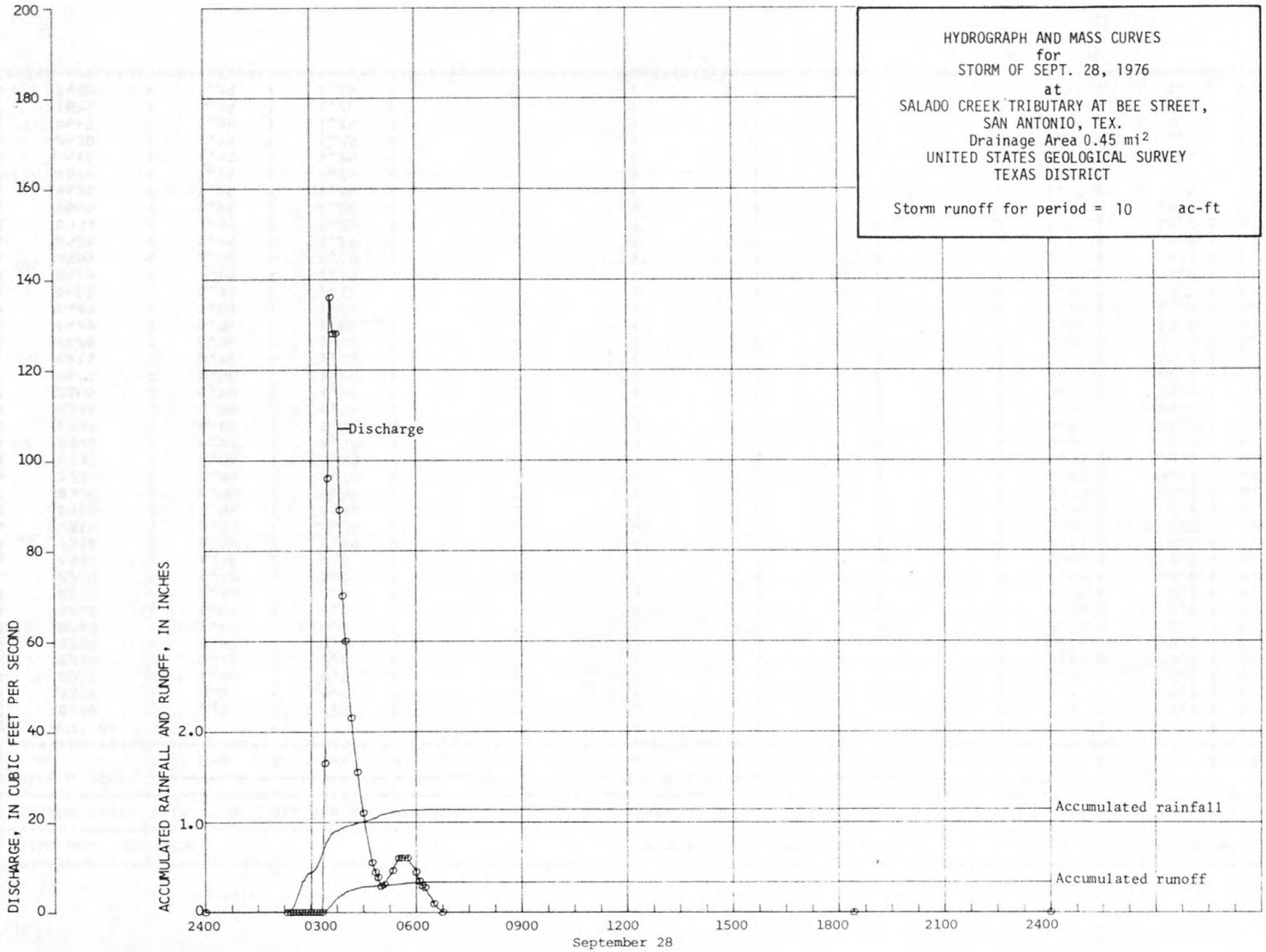
DATE & TIME	GAGE NUMBER 5-S	6-S					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 26									
0430	2.32	2.68					2.47	21.0	1.1105
0445	2.32	2.68					2.47	18.0	1.1364
0520	2.32	2.68					2.47	0.0	1.1364
1400	2.32	2.69					2.47	0.0	1.1364
2400	2.32	2.69					2.47	0.0	1.1364


HYDROGRAPH AND MASS CURVES
for
STORM OF MAY 26, 1976
at
SALADO CREEK TRIBUTARY AT BEE STREET,
SAN ANTONIO, TEX.
Drainage Area 0.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 25 ac-ft
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
400
360
320
280
240
200
160
120
80
40
0
3.0
2.0
1.0
0
2400
0300
0600
0900
1200
1500
1800
2100
2400
May 26

STA. NO. 08178736 — STORM RAINFALL AND RUNOFF RECORD — 1976 WATER YEAR

SALADO CREEK TRIB AT BEE ST. SAN ANTONIO, TEX. — STORM OF SEPT. 28, 1976

DATE & TIME	GAGE NUMBER 5-S	6-S					ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 28									
0000	0.0	0.0					0.0	0.0	0.0
0220	0.0	0.0					0.0	0.0	0.0
0225	0.04	0.0					0.02	0.0	0.0
0230	0.12	0.0					0.07	0.0	0.0
0235	0.27	0.0					0.16	0.0	0.0
0240	0.42	0.0					0.25	0.0	0.0
0245	0.57	0.0					0.34	0.0	0.0
0250	0.64	0.0					0.38	0.0	0.0
0255	0.72	0.0					0.42	0.0	0.0
0305	0.78	0.0					0.46	0.0	0.0
0310	0.80	0.09					0.51	0.0	0.0
0315	0.83	0.24					0.59	0.0	0.0
0320	0.84	0.46					0.68	0.0	0.0
0325	0.85	0.65					0.77	33.0	0.0095
0330	0.86	0.76					0.82	96.0	0.0370
0335	0.86	0.88					0.87	136.0	0.0760
0340	0.87	0.92					0.89	128.0	0.1128
0345	0.87	0.95					0.90	128.0	0.1495
0350	0.88	0.98					0.92	89.0	0.1750
0355	0.89	1.00					0.94	70.0	0.1951
0400	0.90	1.02					0.95	60.0	0.2210
0410	0.92	1.03					0.97	43.0	0.2456
0420	0.94	1.05					0.99	31.0	0.2634
0430	0.96	1.06					1.00	22.0	0.2792
0445	1.00	1.08					1.03	11.0	0.2871
0455	1.03	1.11					1.06	7.7	0.2904
0500	1.05	1.12					1.08	5.8	0.2921
0505	1.05	1.13					1.08	6.1	0.2956
0520	1.05	1.19					1.11	9.2	0.3022
0530	1.05	1.21					1.12	12.0	0.3108
0545	1.05	1.24					1.13	12.0	0.3211
0600	1.05	1.24					1.13	8.9	0.3275
0610	1.05	1.24					1.13	5.9	0.3300
0615	1.05	1.25					1.13	5.4	0.3331
0630	1.05	1.25					1.13	1.9	0.3348
0645	1.05	1.25					1.13	0.0	0.3348
1825	1.05	1.26					1.14	0.0	0.3348
2400	1.05	1.26					1.14	0.0	0.3348


HYDROGRAPH AND MASS CURVES
for
STORM OF SEPT. 28, 1976
at
SALADO CREEK TRIBUTARY AT BEE STREET,
SAN ANTONIO, TEX.
Drainage Area 0.45 mi²
UNITED STATES GEOLOGICAL SURVEY
TEXAS DISTRICT
Storm runoff for period = 10 ac-ft
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
Discharge
Accumulated rainfall
Accumulated runoff
September 28

USGS LIBRARY-RESTON
3 1818 00069531 0