UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Hydrologic Data for Urban Studies in the San Antonio, Texas Metropolitan Area, 1977

Open-File Report 80-743

Prepared in cooperation with the Texas Department of Water Resources

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.

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By Roberto Perez and Lynn Harmsen

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AUSTIN, TEXAS

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HYDROLOGIC DATA FOR URBAN STUDIES IN THE SAN ANTONIO, TEXAS, METROPOLITAN AREA 1977

by
Roberto Perez and Lynn Harmsen
U.S. Geological Survey

INTRODUCTION

Hydrologic investigations of urban drainage basins 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 gaging-station 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 cooperation with the Texas Department of Water Resources and the U.S. Geological Survey.

The operation and maintenance and collection of water-quality data at station 08178640, West Elm Creek at San Antonio, and station 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. These stations will provide hydrologic data on similar and adjacent drainage basins. One drainage basin is undergoing extensive urbanization while the other is undeveloped.

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 data for the San Antonio urban studies was initiated in 1969.

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

From		Multiply by	To obtain	
Unit	Abbreviation		Unit	Abbreviation
inch	in	25.4	millimeter	mm
foot	--	0.3048	meter	m
mile	--	1.609	kilometer	km
square mile	mi^2	2.590	square kilometer	km^2
cubic foot per second	ft^3/s	0.02832	cubic meter per second	m^3/s
foot per mile	ft/mi	0.189	meter per kilometer	m/km
acre-foot	--	1233	cubic meter	m^3
		0.001233	cubic hectometer	hm^3

To convert degrees Celsius (°C) to degrees Fahrenheit (°F):
°F=9/5 x °C+32.

Purpose and Scope of this Hydrologic-Data Report

The purpose of this report is to present a compilation of hydrologic data collected by the U.S. Geological Survey in the San Antonio urban area for the 1977 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.

Drainage-Basin Features

The natural hydrologic features of drainage basins in the San Antonio urban 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 aquifer, as delineated in chapter 20 of the rules of the Texas Department of Water Resources, is that area where surface water has the potential of entering the Edwards aquifer.

A summary of flood-hydrograph partial-record stations and continuous-record gaging stations and their drainage-basin 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 National Oceanic and Atmospheric Administration 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).

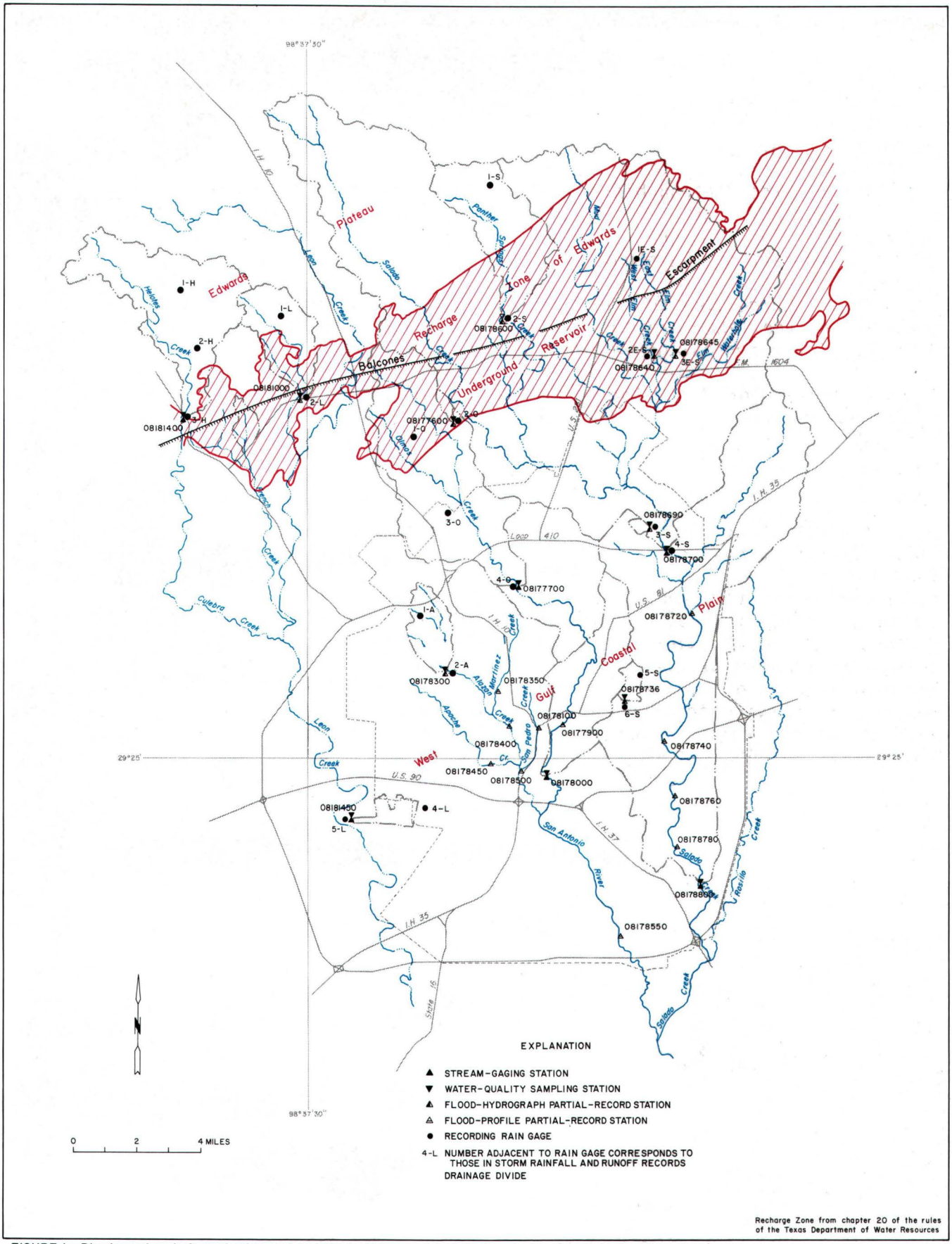

FIGURE 1.- Physiography, drainage basins, and hydrologic-instrument installations in the San Antonio urban area

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

Station number	Station name	Drainage area (mi^2)	Period of record	Type of gage	Drainage-basin characteristics
08177600	Olmos Creek tributary at Farm Road 1535, Shavano Park, Tex.	0.33	1968-77	Flood-hydrograph partial-record	Drainage basin 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	1968-77	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, 1939-77	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	1968-77	Flood-hydrograph partial-record	Drainage basin 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	1968-77	Flood-hydrograph 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	1976-77	Flood-hydrograph partial-record	Drainage basin is completely within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08178645	East Elm Creek at San Antonio, Tex.	2.33	1975-77	Flood-hydrograph partial-record	Drainage basin is completely within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08178690	Salado Creek tributary at Bitters Road, San Antonio, Tex.	0.26	1968-77	Flood-hydrograph partial-record	Drainage basin 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	1960-77	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.

Table 1.--Drainage area, period of record, type of gage, and drainage-basin 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	Drainage-basin characteristics
08178736 a/	Salado Creek tributary at Bee Street, San Antonio, Tex.	0.45	1969-77	Flood-hydrograph partial-record	Drainage basin completely within the West Gulf Coastal Plain; completely developed military and residential area; gentle to rolling terrain; some storm sewers.
08178800	Salado Creek (lower station) at San Antonio, Tex.	189	1960-77	Continuous-record	Upper section of drainage basin within the Edwards recharge zone; residential and commercial 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	1968-77	Flood-hydrograph partial-record	Lower reach of drainage basin is within the Edwards recharge zone; predominantly rural; rolling to rugged terrain.
08181400	Helotes Creek at Helotes, Tex.	15.0	1968-77	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	1969-77	Continuous-record	Drainage basin is completely within the West Gulf Coastal Plain; area is developed by military for runways, offices, and warehouses; gentle terrain.

a/ Station discontinued April 20, 1977.

HYDROLOGIC INSTRUMENTATION

A partial list of gaging stations used in this report and the watershed characteristics at each of these stations are given in table 1. The locations of all hydrologic-instrument installations for the San Antonio metropolitan area are shown on figure 1.

In addition to the stations listed in table 1, four flood-profile partial-record stations are located between the upper and lower stream-gaging stations on Salado Creek. In December 1972 and January 1973, seven flood-profile 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 for the flood-profile partial-record stations on Salado Creek and the San Antonio River are listed in tables 3 and 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 data for these rain gages are given in the section "Compilation of data."

Precipitation amounts in each drainage basin were compiled on a daily basis. In this study, a digital computer was used to process the large amounts of precipitation and runoff data. Precipitation at individual gages and weighted precipitation in each drainage basin for selected storms are given in the section "Compilation of data."

Rainfall for each basin was weighted by the Thiessen polygon method as described by Linsley, Kohler, and Paulhus (1949). The factors used to determine weighted-mean precipitation for each drainage basin are given in table 2. For example, the weighted-mean precipitation for the drainage basin upstream from the station Olmos Creek at Dresden Drive could be computed as follows: Multiply the recorded precipitation at rain-gage 1-0 by 0.34; to that value, add the recorded precipitation at rain-gage 2-0, multiplied by 0.18; to that value, add the recorded precipitation at rain-gage 3-0, multiplied by 0.40; and to that value, add the recorded precipitation at rain-gage 4-0, multiplied by 0.08.

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

Station	Station number	Rain gage 1/	Weighted-mean precipitation factor 2/
Continuous-record streamflow stations			
Olmos Creek at Dresden Drive, San Antonio	08177700	1-0	0.34
		2-0	.18
		3-0	.40
		4-0	.08
Salado Creek (upper station) at San Antonio	08178700	1-S	.32
		2-S	.36
		3-S	.22
		2-0	.08
		3-0	.02
Salado Creek (lower station) at San Antonio	08178800	1-S	.23
		2-S	.27
		3-S	.20
		4-S	.10
		5-S	.13
		2-0	.06
		3-0	.01
Helotes Creek at Helotes	08181400	1-H	.70
		2-H	.25
		3-H	.05
Leon Creek tributary at Kelly AFB	08181450	4-L	.63
		5-L	.37
Flood-hydrograph partial-record stations			
Olmos Creek tributary at FM 1535, Shavano Park	08177600	2-0	1.00

See footnotes at end of table.

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

Station	Station number	Rain gage 1/	Weighted-mean precipitation factor 2/
Flood-hydrograph partial-record stations--Continued			
Alazan Creek at St. Cloud Street, San Antonio	08178300	1-A	0.73
		2-A	.27
Panther Springs Creek at FM 2696 near San Antonio	08178600	1-S	.71
		2-S	.29
West Elm Creek at San Antonio	08178640	1E-S	.58
		2E-S	.41
		3E-S	.01
East Elm Creek at San Antonio	08178645	1E-S	.55
		2E-S	.07
		3E-S	.38
Salado Creek tributary at Bitters Road, San Antonio	08178690	3-S	1.00
Leon Creek tributary at FM 1604, San Antonio	08181000	1-L	.77
		2-L	.23

1/ Rain-gage designations are: O, Olmos Creek; S, Salado Creek; H, Helotes Creek; L, Leon Creek; A, Alazan Creek; and E-S, Elm Creek.
2/ See section on "Precipitation" for explanation of use of weighted-mean precipitation factors.
Note: Where rain-gage record was lost during a storm selected for analysis, that part of the weighted-mean precipitation factor is prorated among the remaining rain gages.

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 flood-hydrograph partial-record stations, 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 1977 water year are given in the section "Compilation of data." Gage heights for selected floods at four flood-profile partial-record stations and one stream-gaging station are given in table 3. Gage heights at seven flood-profile partial-record stations and one stream-gaging station are given in table 4.

Runoff for station 08177600, Olmos Creek tributary at Farm Road 1535, Shavano Park, Texas, occurred on October 4, 15, 19, 24, 28-29, April 20, and May 2. Runoff for station 08181000, Leon Creek tributary at Farm Road 1604, San Antonio, Texas, occurred on October 4, 15, 24, November 25, February 15, April 16, 20, May 21, and September 6. Runoff for station 08178600, Panther Springs Creek at Farm Road 2696 near San Antonio, Texas occurred on October 4, 15, 24, November 19, April 20, and May 21. Runoff for station 08178800, Salado Creek (lower station) at San Antonio, Texas, occurred on October 5, 16, 19-20, November 19, December 5, January 23, 31, February 11, April 14-17, 20-21, May 21, and September 13. Individual storms for these stations were not analyzed in this report because of missing records during the storm periods. The annual maximum discharge is given in table 6, in the section "Compilation of data."

Runoff data for the Elm Creek study area are based on discharge measurements and stage records at two flood-hydrograph partial-record stations. Data for the Elm Creek basin for the 1977 water year are given in the section "Compilation of data."

SUMMARY OF DATA FOR THE 1977 WATER YEAR

Annual

During the 1977 water year, the average rainfall at 21 rain gages in the San Antonio urban study area was 33.91 inches. Rainfall at the National Weather Service station located at the San Antonio International Airport was 32.83 inches. Mean annual precipiation at the National Weather Service station for the 30-year period 1941-70 (calendar year) is 27.54 inches.

Runoff during the 1977 water year was compared with the long-term average at two selected stations. Runoff for the current year at San Antonio River at San Antonio (08178000) was 292 percent of the 52-year average of 54.7 ft^3/s. Runoff for the current year for Salado Creek (lower station) at San Antonio (08178800) was 161 percent of the 17-year average of 40.7 ft^3/s. Additional runoff data for these stations is given in the section "Compilation of data."

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	At river mile	1977 Flood elevations								
			Oct. 4-5	Oct. 15-16	Oct. 19	Oct. 24	Oct. 29	Dec. 5-6	Apr. 19-20	June 23-24	Sept. 12-13
a/08178700	Salado Creek (upper station) at San Antonio, Tex.	24.0	688.96	688.38	688.74	687.81	691.64	687.94	692.82	687.68	687.61
08178720	Salado Creek at Rittiman Road, at San Antonio, Tex.	21.1	656.28	655.40	655.61	654.32	657.33	654.93	660.26	655.18	655.13
08178740	Salado Creek at East Houston Street, San Antonio, Tex.	14.5	597.64	597.69	597.11		600.69	601.23	603.67		597.90
08178760	Salado Creek at U.S. Highway 87, San Antonio, Tex.	11.0	578.83	578.54	578.20		580.46	577.62	582.90		577.95
08178780	Salado Creek at Southcross Boulevard, San Antonio, Tex.	8.7					553.09		557.06		
a/08178800	Salado Creek (lower station) at San Antonio, Tex.	7.0	535.50	538.33	537.80	535.83	541.44	537.21	545.97	535.53	536.68

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

Station no.	Station name	At river mile	1977 Flood elevations									
			Oct. 4	Oct. 19	Oct. 24	Oct. 29	Dec. 5	Mar. 3	Apr. 19-20	May 21	June 23	Sept. 12
08177900	San Antonio River at Navarro Street, San Antonio, Tex.	233.8	640.16	639.99		639.64	638.24		642.80	639.60		639.46
08178000 a/	San Antonio River at San Antonio, Tex.	232.0	615.76	614.82	614.21	614.57	614.07	612.97	615.54	614.71	612.91	615.30
08178100	San Pedro Creek at Santa Rosa Street, San Antonio, Tex.	3.7	643.39	640.17	639.39	640.58	639.72	639.38	646.13	641.93	639.75	643.13
08178350	Martinez Creek at Fredericksburg Road, San Antonio, Tex.	2.0	681.62	680.92	678.74	680.96	679.33	679.22	683.20	681.17	679.54	679.82
08178400	Alazan Creek at West Martin Street, San Antonio, Tex.	1.6	637.72	634.93		636.27	634.24	634.22	641.52	636.33		635.47
08178450	Apache Creek at South Zarzamora Street, San Antonio, Tex.	1.3	626.78	631.39		627.19			631.01	627.48		627.86
08178500	San Pedro Creek at Furnish Street, San Antonio, Tex.	1.7	603.12	603.36		603.27			609.86	601.97		603.59
08178550	San Antonio River at Ashley Street, San Antonio, Tex.	224.8	513.22	512.15	510.54	513.92			518.03	512.09		512.89

a/ Stream-gaging station.

Weighted-mean rainfall totals, total runoff, and rainfall-runoff ratio for five continuous-record streamflow stations representing basins in the San Antonio metropolitan area for the 1977 water year are as follows:

Station	Weighted-mean rainfall (inches)	Total runoff (inches)	Ratio of runoff to rainfall
Helotes Creek at Helotes (08181400)	40.16	8.92	0.22
Leon Creek tributary at Kelly Air Force Base (08181450)	30.65	10.44	.34
Olmos Creek at Dresden Drive, San Antonio (08177700)	34.09	3.14	.09
Salado Creek (upper station) at San Antonio (08178700)	34.92	1.21	.03
Salado Creek (lower station) at San Antonio (08178800)	33.04	4.70	.14

Individual Storms

Storms producing the highest peak discharge in the San Antonio metropolitan area during the 1977 water year occurred on the following days: October 4-5, 15, 19, 23-24, April 19-20, May 9, 21, and September 12-13. These storms produced a variety of rainfall amounts, intensities, durations, and distributions in the drainage basins. Weighted-storm rainfall for these storm periods at areas upstream from continuous-record streamflow stations and from selected flood-hydrograph partial-record stations are given in table 5. Storm rainfall and runoff records are given in the section "Compilation of data."

Table 5.--Weighted-storm rainfall for selected storms for areas upstream from continuous-record stations and flood-hydrograph partial-record stations

Rainfall period	Weighted rainfall, in inches												
	Stream-gaging stations					Flood-hydrograph partial-record stations							
	Helotes Creek at Helotes (08181400)	Leon Creek tributary at Kelly AFB (08181450)	Olmos Creek at Dresden Drive, at San Antonio (08177700)	Salado Creek (upper station) at San Antonio (08178700)	Salado Creek (lower station) at San Antonio (08178800)	Olmos Creek tributary at FM 1535, Shavano Park (08177603)	Alazan Creek at St. Cloud Street, San Antonio (08178300)	Panther Springs Creek at FM 2696 near San Antonio (08178600)	Salado Creek tributary at Bitters Road, San Antonio (08178690)	Salado Creek tributary at Bee Street, San Antonio (08178736)	West Elm Creek at San Antonio (08178640)	East Elm Creek at San Antonio (08178645)	Leon Creek tributary at FM 1604, San Antonio (08181000)
Oct. 4	-	1.24	-	-	-	-	-	-	1.69	-	-	-	-
Oct. 4-5	-	-	1.68	-	-	-	-	-	-	-	-	-	-
Oct. 15	-	-	-	-	-	-	-	-	1.81	-	-	-	-
Oct. 19	-	1.18	-	-	-	-	-	-	1.24	-	-	-	-
Oct. 23-24	2.84	-	-	-	-	-	-	-	-	-	1.91	1.82	-
Apr. 19-20	-	-	2.09	2.31	-	-	3.41	-	4.12	-	-	-	-
May 9	-	.74	-	-	-	-	-	-	-	-	-	-	-
May 21	-	-	-	-	-	-	1.22	-	-	-	-	-	-
May 31	-	-	-	-	-	-	.33	-	-	-	-	-	-
June 1	-	-	-	-	-	-	.68	-	-	-	-	-	-
June 23	-	-	-	-	-	-	-	-	.82	-	-	-	-
Sept. 12-13	-	2.75	-	-	-	-	-	-	-	-	-	-	-

Individual storm data are not given for four stations during the 1977 water year. Storm-rainfall data for station 08177600, Olmos Creek tributary at Farm Road 1535, Shavano Park, and station 08181000, Leon Creek tributary at Farm Road 1604, San Antonio, were not analyzed because the unit-runoff factor for the period of streamflow was low and not representative of basin conditions during flood runoff. As the result of the completion, in August 1976, of a reservoir located a short distance upstream from station 08178600, Panther Springs Creek at Farm Road 2696 near San Antonio, the unit-runoff factor for this station will be directly affected and will not be representative of the true runoff for this station. Because of insufficient data (missing record during storm periods) storm-rainfall data for station 08178800, Salado Creek (lower station) at San Antonio were not analyzed for the 1977 water year.

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 data provides information on the concentration of pollutants as a result of runoff from these watersheds. In addition, these data may provide a relationship of water-quality parameters to discharge and to seasonal conditions.

The quality of water in this area is important because a large amount of recharge to the Edwards aquifer is from the surface-water runoff. The Edwards aquifer is the only aquifer supplying ground water for domestic supply, municipal supply, irrigation, and industrial use in the San Antonio metropolitan area. The location of chemical-quality sampling sites are shown on figure 1.

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COMPILATION OF DATA

GUADALUPE RIVER BASIN

08177600 OLMOS CREEK TRIBUTARY AT FARM ROAD 1535, SHAVANO PARK, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°34'35", long 98°32'45", Bexar County, Hydrologic Unit 12100301, at culvert on Farm Road 1535 at Shavano Park and 1.9 mi (3.1 km) southeast of intersection of Farm Roads 1535 and 1604.

DRAINAGE AREA.--0.33 mi^2 (0.85 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Digital recorders (water stage and rainfall). Datum of gage is 907.92 ft (276.734 m) National Geodetic Vertical Datum of 1929, San Antonio supplementary adjustments of 1951 and 1953.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 303 ft^3/s (8.58 m^3/s) Sept. 26, 1973, gage height, 6.26 ft (1.908 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft^3/s (1.42 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 15	1955	63	1.78	3.18	0.969	Oct. 29	0715	*64	1.81	3.19	0.972
Oct. 24	0345	a21	.59	2.74	.835	Apr. 20	1050	a23	.65	2.76	.841

a Water-quality samples were obtained during this flood event.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: May 1970 to current year. Water temperatures: May 1970 to current year. Bacteria analyses: April 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT 24...	1110	3.0	195	7.0	18.0	140	25	8.1	88	1.2	57000	33000
APR 20...	1340	.50	184	7.4	22.5	140	15	6.8	80	3.7	100000	77000

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT 24...	83000	89	0	33	1.6	3.8	.2	4.8	111	0	5.1	5.7
APR 20...	170000	86	0	32	1.5	3.2	.2	5.3	105	0	5.2	3.6

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)
OCT 24...	.2	16	125	24	6	.05	.01	.02	.59	.16	5.8	.10
APR 20...	.0	16	119	20	8	.17	.01	.01	.79	.30	7.9	.00

08177600 OLMOS CREEK TRIBUTARY AT FARM ROAD 1535, SHAVANO PARK, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT 24...	1110	1	100	0	0	0	50
APR 20...	1340	2	100	0	14	2	80

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT 24...	2	0	.0	0	0	0
APR 20...	2	0	.0	0	0	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)
OCT 24...	1110	.0	.00	.00	.0	.00	.00	.00	.01	.00	.00	.00
APR 20...	1340	.0	.00	.00	.0	.00	.00	.00	.01	.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)
OCT 24...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.03	.00
APR 20...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.01	.00

GUADALUPE RIVER BASIN

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX

LOCATION.--Lat 29°29'56", long 98°30'36", Bexar County, Hydrologic Unit 12100301, on right bank 30 ft (9 m) downstream from low-water bridge on Dresden Drive at San Antonio, 0.15 mi (0.24 km) west of intersection of Blanco Road and Dresden Drive, and 4.0 mi (6.4 km) upstream from Olmos Dam.

DRAINAGE AREA.--21.2 mi² (54.9 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

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

REMARKS.--Water-discharge records good. Recording rain gage located at station, with three additional recording rain gages located in watershed. City of San Antonio rain gage and gage-height telemeters at station.

AVERAGE DISHCARGE.--9 years, 4.33 ft³/s (0.123 m³/s), 2.77 in/yr (70 mm/yr), 3,140 acre-ft/yr (3.87 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,420 ft³/s (153 m³/s) May 7, 1972, gage height, 13.20 ft (4.023 m), from floodmark; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--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.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft³/s (11.3 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Oct. 4	2245	*1,040	29.5	7.38	2.249	Apr. 19	2100	998	28.3	7.30	2.225
Oct. 15	2400	800	22.7	6.90	2.103	May 21	0830	420	11.9	6.25	1.905
Oct. 29	0730	535	15.2	6.47	1.972	Sept. 6	0500	415	11.8	b6.92	2.109
aApr. 15	1345	73	2.07	4.87	1.484						

a Water-quality sample obtained on this flood event.
b From floodmark.

Minimum discharge, no flow Aug. 13-15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.21	1.6	.57	.89	2.7	.80	.74	.68	4.5	.06	.01	.15
2	.06	.93	1.2	3.0	3.4	.80	.59	.18	5.3	.06	.01	.14
3	.04	.80	.51	1.0	4.6	5.4	1.1	.22	2.0	.06	.01	.10
4	110	.57	.47	.58	1.3	3.7	6.6	.26	.93	.06	.01	.06
5	41	.57	20	.56	.85	1.4	.28	.29	.80	.06	.01	.06
6	17	.57	7.5	1.6	.80	1.2	.14	.29	.57	.06	.01	2.9
7	.80	.48	2.1	.99	.80	1.1	.13	.24	.47	.06	.02	1.0
8	.68	.38	.89	.74	6.4	.87	.21	.26	.47	.06	.02	1.9
9	.38	.38	.68	2.2	1.1	.38	.18	29	.38	.06	.02	1.0
10	.38	.46	.68	.57	6.1	.38	.21	1.6	.30	.04	.02	.50
11	.31	.53	2.6	.47	12	.63	.21	21	.25	.04	.01	.40
12	.31	6.6	10	10	2.2	.74	.16	1.3	2.9	.04	.01	1.1
13	.31	7.9	5.5	19	1.5	.61	.21	.45	1.0	.04	.00	.90
14	.38	.51	6.6	3.2	1.4	.93	.33	.17	.80	.06	.00	.40
15	102	.43	1.6	1.5	1.4	1.1	18	.14	.90	.06	.00	.20
16	102	1.8	1.2	.78	1.5	.96	49	.14	.70	.06	.01	.15
17	2.2	11	.97	.51	1.4	.98	1.5	.14	.30	.06	.01	.13
18	.93	6.0	.93	.47	1.4	1.1	.04	.13	.20	.06	.01	.12
19	61	35	2.2	.47	1.1	1.0	66	.09	.15	.04	.02	.11
20	5.7	3.6	1.6	.51	.79	.93	234	.05	.11	.06	.01	.10
21	1.2	1.8	1.6	.57	.80	.89	22	65	.10	.02	.01	.09
22	.80	1.4	1.3	24	.80	.87	3.3	2.7	.59	.02	.01	.20
23	4.7	.64	.68	23	.83	.93	1.3	.31	27	.02	.01	.15
24	35	.47	.68	3.1	.93	1.3	.84	.18	3.1	.02	.01	.12
25	6.3	16	.77	1.2	.93	1.2	.58	.10	1.8	.01	.01	.10
26	.80	7.6	.96	.87	.81	5.3	.38	.06	.39	.01	.01	.10
27	1.2	1.4	.80	.57	.80	11	.36	.04	.10	.01	.02	.10
28	25	1.5	.70	.47	.80	3.0	.31	.04	.06	.01	.12	.09
29	202	.76	.68	.48	---	.50	.31	.06	.06	.01	.06	.09
30	16	.57	.68	23	---	.35	6.4	.02	.06	.01	.07	.09
31	3.9	---	.70	7.3	---	.33	---	.04	---	.01	.06	---
TOTAL	742.59	112.25	77.35	133.60	59.44	50.68	415.41	125.18	56.29	1.25	.61	12.55
MEAN	24.0	3.74	2.50	4.31	2.12	1.63	13.8	4.04	1.88	.040	.020	.42
MAX	202	35	20	24	12	11	234	65	27	.06	.12	2.9
MIN	.04	.38	.47	.47	.79	.33	.04	.02	.06	.01	.00	.06
CFSM	1.13	.18	.12	.20	.10	.08	.65	.19	.09	.002	.001	.02
IN.	1.30	.20	.14	.23	.10	.09	.73	.22	.10	.00	.00	.02
AC-FT	1470	223	153	265	118	101	824	248	112	2.5	1.2	25
(††)	9.05	2.66	1.86	3.78	.84	1.31	5.40	3.20	2.47	.05	.65	2.82

CAL YR 1976 TOTAL 2446.26 MEAN 6.68 MAX 710 MIN .00 CFSM .32 IN 4.29 AC-FT 4850 †† 43.80
WTR YR 1977 TOTAL 1787.20 MEAN 4.90 MAX 234 MIN .00 CFSM .23 IN 3.14 AC-FT 3540 †† 34.09

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

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT												
19...	1805	80	152	7.2	14.0	110	130	--	--	2.9	51000	18000
APR												
15...	1515	55	345	7.2	16.5	20	130	5.1	54	14	140000	20000
JUN												
22...	1240	1.0	952	7.5	29.5	0	25	11.2	147	1.7	2500	360

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT												
19...	52000	59	0	22	.9	5.0	.3	2.6	84	0	6.8	3.9
APR												
15...	160000	130	5	48	3.5	19	.7	3.9	158	0	21	19
JUN												
22...	1100	370	130	130	11	66	1.5	2.1	290	0	130	90

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)
OCT												
19...	.2	6.0	89	182	53	.26	.02	.03	.65	.27	9.0	.00
APR												
15...	.2	8.1	201	408	156	.47	.21	.22	2.9	.38	2.3	.20
JUN												
22...	.5	12	585	52	16	4.0	.09	.06	1.1	.02	4.0	.10

08177700 OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT 19...	1805	--	300	0	0	0	40
APR 15...	1515	4	100	0	0	4	40
JUN 22...	1240	1	200	0	10	3	10

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT 19...	2	0	--	--	0	20
APR 15...	12	70	.0	0	0	10
JUN 22...	1	8	.0	1	0	8

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)
OCT 19...	1805	.0	.00	.01	.2	.00	.00	.00	.20	.01	.00	.00
APR 15...	1515	.0	.00	.06	.3	.00	.01	.00	.36	.06	.00	.00
JUN 22...	1240	.0	.00	.00	.0	.00	.00	.00	.02	.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)
OCT 19...	.00	.01	.00	.00	.00	.00	.00	0	.00	.00	.01	.00
APR 15...	.00	.00	.01	.09	.00	.00	.00	0	.00	.57	.30	.03
JUN 22...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178000 SAN ANTONIO RIVER AT SAN ANTONIO, TX

LOCATION.--Lat 29°24'34", long 98°29'41", Bexar County, Hydrologic Unit 12100301, on left bank 193 ft (59 m), downstream from South Alamo Street Bridge in San Antonio, 2.1 mi (3.4 km) upstream from San Pedro Creek, and 230.6 mi (371.1 km) upstream from mouth.

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.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--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.

REVISED RECORDS.--WSP 1312: 1917. WSP 1923: Drainage area. WDR TX-72-1: 1971(m).

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 mi (2.1 km) upstream at different datum. Feb. 28, 1916, to Apr. 7, 1920, nonrecording gage at site 1.1 mi (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.

REMARKS.--Water-discharge records good. Floodflow is regulated by Olmos flood-control reservoir, capacity 15,500 acre-ft (19.1 hm³) about 8.5 mi (13.7 km) upstream. Dam completed in 1926. Springs emerge intermittently from the Edwards and associated limestones along the Balcones Fault Zone. City of San Antonio rain-gage and gage-height telemeters at station.

AVERAGE DISCHARGE.--52 years, 54.7 ft³/s (1.549 m³/s), 17.77 in/yr (451 mm/yr), 39,630 acre-ft/yr (48.9 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft³/s (433 m³/s) Sept. 10, 1921, gage height, 20.14 ft (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.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1819, that of Sept. 10, 1921; flood of July 5, 1819, equaled or exceeded that of Sept. 10, 1921.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,940 ft³/s (54.9 m³/s) Oct. 10, gage height, 10.50 ft (3.200 m); no flow at times, due to regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	59	186	174	183	232	183	173	220	198	122	62	49
2	64	188	174	195	231	189	193	220	173	120	53	51
3	66	189	180	188	227	231	183	200	125	120	57	50
4	211	178	184	185	235	196	183	209	125	122	56	47
5	328	172	321	183	229	194	168	204	122	122	49	48
6	66	171	233	186	223	193	167	201	120	117	47	161
7	75	171	184	183	223	179	164	202	117	117	47	53
8	89	175	180	184	237	193	163	201	111	108	45	66
9	66	168	178	189	229	184	163	309	117	102	54	67
10	74	168	181	183	241	202	160	149	108	97	46	66
11	77	167	189	181	254	194	160	238	108	100	38	63
12	74	182	230	241	225	174	159	149	100	97	35	101
13	74	197	208	284	198	181	183	170	97	124	34	167
14	74	175	205	177	200	181	174	184	86	81	38	79
15	325	172	193	187	200	180	266	173	86	92	43	77
16	302	192	190	184	214	179	458	173	89	86	43	85
17	102	232	187	187	218	179	186	151	84	84	42	82
18	92	182	189	183	218	178	181	167	77	89	41	81
19	321	339	199	181	220	191	384	167	72	84	40	98
20	120	176	194	181	214	180	1170	170	74	86	41	82
21	108	174	187	182	199	175	500	362	70	89	47	68
22	111	172	187	319	223	158	221	176	127	82	51	85
23	117	171	187	363	212	164	217	187	192	79	49	86
24	268	171	187	195	216	173	217	170	122	74	46	85
25	142	219	200	201	195	175	208	144	120	77	43	80
26	141	176	189	199	202	184	214	157	125	68	37	78
27	146	178	189	202	201	193	215	154	111	62	40	74
28	244	178	186	202	201	186	226	154	122	64	43	70
29	742	176	184	199	---	176	223	151	122	62	52	68
30	308	172	185	354	---	173	243	149	125	66	49	68
31	188	---	183	232	---	172	---	146	---	64	49	---
TOTAL	5174	5567	6037	6493	6117	5690	7522	5807	3425	2857	1417	2335
MEAN	167	186	195	209	218	184	251	187	114	92.2	45.7	77.8
MAX	742	339	321	363	254	231	1170	362	198	124	62	167
MIN	59	167	174	177	195	158	159	144	70	62	34	47
CFSM	4.00	4.45	4.67	5.00	5.22	4.40	6.01	4.47	2.73	2.21	1.09	1.86
IN.	4.60	4.95	5.37	5.78	5.44	5.06	6.69	5.17	3.05	2.54	1.26	2.08
AC-FT	10260	11040	11970	12880	12130	11290	14920	11520	6790	5670	2810	4630

CAL YR 1976 TOTAL 33733.3 MEAN 92.2 MAX 1180 MIN 6.5 CFSM 2.21 IN 30.02 AC-FT 66910
WTR YR 1977 TOTAL 58441.0 MEAN 160 MAX 1170 MIN 34 CFSM 3.83 IN 52.01 AC-FT 115900

WATER-QUALITY RECORDS

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

REMARKS.--Peak discharges for storm events during which water-quality samples were obtained are given in the following table:

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Apr. 20	0845	1,800	60.0	10.28	3.133	June 22	1545	678	19.2	8.30	2.530

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./ 100 ML)
APR												
20...	1330	1250	238	--	20.0	55	240	8.8	100	4.0	120000	96000
JUN												
22...	1100	100	472	7.6	28.0	0	4	7.8	101	1.4	68000	8800

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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												
20...	130000	110	13	36	4.8	5.4	.2	3.8	118	0	14	6.7
JUN												
22...	3200	240	28	70	16	11	.3	1.5	260	0	22	17

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												
20...	.1	8.8	138	438	72	.86	.02	.11	1.1	.38	8.8	.00
JUN												
22...	.2	12	278	10	3	1.4	.01	.01	.24	.05	2.2	.00

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
APR 20...	1330	3	0	0	12	0	20
JUN 22...	1100	1	200	0	0	1	10

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR 20...	0	0	.0	0	0	10
JUN 22...	1	8	.0	0	0	4

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 20...	1330	.0	.00	.00	.8	.00	.02	.03	.40	.04	.00	.00
JUN 22...	1100	.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 20...	.00	.02	.01	.02	.00	.00	.00	0	.00	.02	.13	.10
JUN 22...	.00	.00	.00	.00	.00	.00	.00	0	.00	.05	.02	.02

GUADALUPE RIVER BASIN

08178300 ALAZAN CREEK AT ST. CLOUD STREET, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°27'29", long 98°32'59", Bexar County, Hydrologic Unit 12100301, at bridge on St. Cloud Street in San Antonio and 1.5 mi (2.4 km) upstream from Woodlawn Lake Dam.

DRAINAGE AREA.--3.26 mi^2 (8.44 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,380 ft^3/s (124 m^3/s) May 8, 1975, elevation, 16.08 ft (4.901 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft^3/s (11.3 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 4	2125	*1,200	34.0	10.08	3.072	May 21	0625	810	22.9	8.98	2.737
Apr. 19	2050	1,100	31.2	9.81	2.990	June 23	1615	a100	2.83	5.44	1.658
Apr. 20	0635	895	25.3	9.24	2.816	Sept. 6	1005	a77	2.18	5.24	1.597

a Water-quality samples were obtained during this flood event.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--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 current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./ 100 ML)
APR 19...	2217	144	138	7.7	20.0	100	220	8.1	92	5.4	160000	71000
JUN 23...	1610	66	150	7.4	23.5	70	150	7.4	89	3.9	150000	79000
SEP 06...	1250	6.4	373	7.1	23.5	80	140	7.5	90	5.8	510000	250000

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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 19...	210000	51	3	18	1.4	5.6	.3	4.1	58	0	13	4.4
JUN 23...	140000	58	9	21	1.3	6.2	.4	2.4	60	0	11	6.0
SEP 06...	67000	150	17	47	7.5	16	.6	2.9	160	0	38	18

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 19...	.1	6.7	82	480	108	.51	.02	.16	1.7	.40	11	.00
JUN 23...	.1	3.8	81	214	60	.20	.01	.06	.43	.24	12	.00
SEP 06...	.3	9.2	218	198	48	1.1	.05	.01	.67	.24	11	.20

08178300 ALAZAN CREEK AT ST. CLOUD STREET, SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CADMIUM (CD) (UG/L)	DIS-SOLVED CHROMIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
APR 19...	2217	2	100	0	12	3	100
JUN 23...	1610	1	0	0	0	2	50
SEP 06...	1250	2	100	0	0	3	30

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MANGANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELENIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR 19...	19	10	.0	0	0	10
JUN 23...	24	0	.0	0	0	10
SEP 06...	9	10	.0	0	0	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)
APR 19...	2217	.0	.00	.00	.2	.00	.01	.05
JUN 23...	1610	.0	.00	.00	.0	.00	.00	.00
SEP 06...	1250	.0	.00	.00	.0	.00	.00	.01

DATE	TOTAL DI-AZINON (UG/L)	TOTAL DI-ELDRIN (UG/L)	TOTAL ENDRIN (UG/L)	TOTAL ETHION (UG/L)	TOTAL HEPTA-CHLOR (UG/L)	TOTAL HEPTA-CHLOR EPOXIDE (UG/L)	TOTAL LINDANE (UG/L)	TOTAL MALA-THION (UG/L)	TOTAL METH-OXY-CHLOR (UG/L)
APR 19...	.27	.03	.00	.00	.01	.02	.01	.00	--
JUN 23...	.00	.00	.00	.00	.00	.00	.00	.00	--
SEP 06...	.05	.01	.00	.00	.00	.00	.00	.00	.00

DATE	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 19...	.00	.00	.00	0	.00	.02	.16	.00
JUN 23...	.00	.00	.00	0	.00	.00	.26	.00
SEP 06...	.00	.00	.00	0	.00	.00	.30	.00

GUADALUPE RIVER BASIN

08178600 PANTHER SPRINGS CREEK AT FARM ROAD 2696 NEAR SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'31", long 98°31'06", Bexar County, Hydrologic Unit 12100301, at culvert on Farm Road 2696, 1.3 mi (2.1 km) north of intersection of Farm Roads 2696 and 1604, and 5.5 mi (8.8 km) north of San Antonio.

DRAINAGE AREA.--9.54 mi^2 (24.71 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to September 1977 (discontinued).

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

REMARKS.--After August 1976, flow from 8.86 mi^2 (22.95 km^2) was controlled by a floodwater-retarding structure with a capacity of 3,293 acre-ft (4.06 hm^3) below the flood-spillway crest, of which 198 acre-ft (0.244 hm^3) is conservation-pool capacity.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,610 ft^3/s (244 m^3/s) May 11, 1972, elevation, 9.53 ft (2.905 m).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 152 ft^3/s (4.30 m^3/s) Oct. 24, elevation, 5.20 ft (1.585 m), no peak above base of 200 ft^3/s (5.66 m^3/s).

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: May 1969 to September 1977 (discontinued). Water temperatures: May 1969 to September 1977 (discontinued). Bacteria analyses: April 1976 to September 1977 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT 24...	1035	125	114	7.5	18.0	220	120	8.6	93	2.0	75000	30000

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT 24...	66000	51	0	19	.9	1.5	.1	2.7	70	0	4.4	2.9

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)
OCT 24...	.2	7.7	74	200	36	.08	.01	.02	.94	.13	6.2	.00

08178600 PANTHER SPRINGS CREEK AT FARM ROAD 2696 NEAR SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT 24...	1035	0	100	0	0	0	40

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT 24...	0	0	.0	0	0	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)
OCT 24...	1035	.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)
OCT 24...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178640 WEST ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'23", long 98°26'29", Bexar County, Hydrologic Unit 12100301, at mid-channel, 1.8 mi (2.9 km) upstream from East Elm Creek, 2.1 mi (3.4 km) upstream from Farm Road 1604, and 7.0 mi (11.3 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.45 mi^2 (6.35 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1976 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 335 ft^3/s (9.49 m^3/s) Sept. 28 1976, gage height, 4.30 ft (1.311 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft^3/s (2.83 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 24	0505	*215	6.09	4.00	1.219
Oct. 29	0750	138	3.91	3.73	1.137

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide and bacteria analyses: May 1976 to current year. Water temperatures: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 19...	2315	13	106	7.7	19.5	120	25	7.4	83	50

DATE	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM .7UM-MF (COL./ 100 ML)	FECAL STREPTOCOCCI KF AGAR (COL. 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 19...	3.5	77000	52000	130000	52	1	20	.5	1.4	.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 19...	3.5	62	0	3.7	2.0	.0	13	75	40

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 19...	17	.07	.01	.06	.83	.17	7.9	.00	1

08178640 WEST ELM CREEK AT SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)
APR 19...	2315	2	100	0	13	2	50	2

DATE	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED VANA-DIUM (V) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR 19...	0	.0	0	0	0	10	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 19...	2315	.0	.00	.00	.0	.01	.01	.02	.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 19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178645 EAST ELM CREEK AT SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°37'04", long 98°25'41", Bexar County, Hydrologic Unit 12100301, at mid-channel, 2.1 mi (3.4 km) upstream from West Elm Creek, 2.4 mi (3.9 km) upstream from Farm Road 1604, and 6.9 mi (11.1 km) north of San Antonio International Airport.

DRAINAGE AREA.--2.33 mi^2 (6.03 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1975 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 310 ft^3/s (8.78 m^3/s) May 7, 1976, elevation, 6.78 ft (2.067 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft^3/s (2.83 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 29	0815	117	3.31	5.04	1.536	Apr. 19	2200	*190	5.38	5.73	1.747
Apr. 16	0850	102	2.89	4.89	1.490						

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, pesticide and bacteria analyses: May 1976 to current year. Water temperatures: May 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 20...	1010	52	99	7.9	19.0	140	20	5.6	62	34

DATE	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM .7UM-MF (COL./100 ML)	FECAL STREPTOCOCCI KF AGAR (COL. 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 20...	2.7	16000	4400	16000	57	9	21	1.1	1.0	.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 20...	3.3	58	0	3.5	1.4	.0	18	78	31

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 20...	16	.02	.01	.01	1.2	.04	7.8	.00	1

08178645 EAST ELM CREEK AT SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED LEAD (PB) (UG/L)
APR 20...	1010	0	0	0	13	0	40	4

DATE	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED NICKEL (NI) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED VANA-DIUM (V) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR 20...	0	.0	0	0	0	3.0	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 20...	1010	.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 20...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178690 SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°31'36", long 98°26'25", Bexar County, Hydrologic Unit 12100301, at culvert on Bitters Road immediately east of MacArthur High School in San Antonio.

DRAINAGE AREA.--0.26 mi^2 (0.67 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 253 ft^3/s (7.16 m^3/s) May 7, 1972, elevation, 7.88 ft (2.402 m).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft^3/s (1.42 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 4	2135	105	2.97	4.95	1.509	Apr. 19	2005	*167	4.73	6.15	1.875
Oct. 15	1535	50	1.42	3.82	1.164	Apr. 20	0850	125	3.54	5.36	1.634
Oct. 19	1140	a40	1.13	3.60	1.097	May 21	0610	70	1.98	4.24	1.292
Apr. 13	1735	62	1.76	4.08	1.244	June 23	1415	a45	1.27	3.71	1.131
Apr. 15	1445	50	1.42	3.83	1.167						

a Water-quality samples were obtained during this flood event.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--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 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT												
19...	1330	21	64	6.2	13.0	55	10	10.1	99	2.7	84000	22000
APR												
15...	1355	17	127	7.6	18.0	25	20	6.6	72	5.7	130000	14000
20...	0025	28	173	7.1	19.5	30	15	7.6	85	3.4	250000	38000
JUN												
23...	1437	29	60	7.3	24.0	30	20	6.8	83	3.4	220000	110000

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT												
19...	110000	26	0	9.9	.2	1.0	.1	2.7	32	0	5.6	2.4
APR												
15...	170000	52	5	19	1.[illegible]	4.3	.3	2.6	57	0	4.4	6.6
20...	290000	75	10	27	1.9	3.7	.2	4.6	79	0	13	4.1
JUN												
23...	150000	25	0	9.6	.3	1.2	.1	2.1	33	0	3.6	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)
OCT												
19...	.4	2.5	40	10	3	.18	.01	.09	.27	.30	5.2	.00
APR												
15...	.0	2.0	68	40	21	2.0	.02	.18	3.3	.21	6.0	.10
20...	.0	6.4	100	30	10	1.3	.04	.20	.80	.60	8.1	.10
JUN												
23...	.0	1.1	36	49	17	.14	.01	.07	.56	.24	7.5	.10

08178690 SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
APR							
15...	1355	1	100	0	1	6	40
20...	0025	1	0	0	12	2	30
JUN							
23...	1437	0	0	0	10	2	50

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR						
15...	48	10	.0	0	0	20
20...	16	10	.0	0	0	10
JUN						
23...	84	4	.0	1	0	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)
OCT												
19...	1330	.0	.00	.00	.1	.00	.00	.00	.06	.01	.00	.00
APR												
15...	1355	.0	.00	.00	.1	.00	.00	.01	.46	.01	.00	.00
20...	0025	.0	.00	.00	.2	.00	.01	.02	.30	.04	.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)
OCT												
19...	.00	.03	.00	.00	.00	.00	.00	0	.00	.00	.08	.00
APR												
15...	.00	.00	.01	.00	.00	.00	.00	0	.00	.00	.07	.00
20...	.00	.04	.01	.03	.00	.00	.00	0	.00	.13	.15	.00

GUADALUPE RIVER BASIN

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°30'57", long 98°25'51", Bexar County, Hydrologic Unit 12100301, on upstream side of upstream bridge of two bridges on Interstate Highway 410 in San Antonio, 1.0 mi (1.6 km) west of Northeast School, 1.1 mi (1.8 km) upstream from Perrin-Beitel Creek, and 2.7 mi (4.3 km) east of San Antonio International Airport.

DRAINAGE AREA.--137 mi² (355 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1960 to current year.

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

REMARKS.--Water-discharge records good. No known diversion above station. Recording rain gage located at station with five additional recording rain gages located in watershed. Flow is affected at times by discharge from flood-detention pools of seven floodwater-retarding structures with combined detention capacity of 17,390 acre-ft (21.4 hm³). These structures control runoff from 48.4 mi² (125.4 km²) above this station.

AVERAGE DISCHARGE.--17 years, 9.38 ft³/s (0.266 m³/s), 0.93 in/yr (24 mm/yr), 6,800 acre-ft/yr (8.38 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,900 ft³/s (705 m³/s) May 12, 1972, gage height, 15.22 ft (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.

EXTREMES OUTSIDE PERIOD OF RECORD.--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.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 150 ft³/s (4.25 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Oct. 4	2400	242	6.85	4.36	1.329	Apr. 16	1100	297	8.41	4.76	1.451
Oct. 19	1445	210	5.95	4.14	1.262	Apr. 20	1030	*2,720	77.0	a8.22	2.505
Oct. 29	1230	1,050	29.7	7.04	2.146						

a From high-water mark.

Minimum discharge, 0.02 ft³/s (0.001 m³/s) July 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	14	7.0	5.8	11	5.3	4.4	11	3.4	8.0	2.6	.32
2	2.1	13	8.6	7.2	11	5.3	4.1	9.3	4.1	7.7	3.8	2.7
3	2.2	14	6.6	6.7	13	6.3	4.0	10	5.4	5.8	6.6	4.9
4	20	12	6.6	6.0	7.9	7.5	5.0	9.5	6.0	2.1	5.7	4.6
5	39	8.2	22	5.5	7.1	5.4	4.2	11	5.2	2.6	4.8	.74
6	5.4	4.5	29	6.3	6.7	5.3	5.7	11	4.7	5.7	1.2	.44
7	4.0	12	10	5.8	7.1	5.1	5.0	10	4.0	5.9	.40	.26
8	3.8	11	7.9	5.2	11	4.8	4.9	8.9	4.2	5.0	.23	5.1
9	2.9	7.5	7.3	5.4	8.7	4.6	4.9	7.2	4.6	2.4	5.2	1.7
10	2.4	7.5	7.0	4.8	11	4.7	4.9	6.9	5.5	2.4	5.3	3.0
11	2.4	7.0	8.6	5.3	26	4.6	4.8	9.5	5.1	3.5	5.3	2.5
12	2.2	7.0	15	9.1	14	4.2	4.9	7.9	2.4	5.6	5.0	2.3
13	2.4	9.8	11	21	10	4.2	11	7.4	4.1	6.6	1.5	8.1
14	1.7	6.6	11	12	9.0	4.5	14	6.6	2.3	2.0	.47	3.9
15	41	6.6	8.1	7.5	6.9	4.6	15	6.6	4.1	1.7	.15	1.1
16	34	6.6	7.2	6.7	7.1	4.3	94	6.6	2.8	6.1	4.6	2.1
17	9.0	12	7.1	6.4	6.6	4.3	13	6.6	2.6	6.6	2.1	4.2
18	4.5	8.0	7.4	6.1	6.3	4.4	6.8	6.6	2.4	5.7	5.9	.45
19	42	28	9.0	6.1	5.7	4.6	64	6.4	2.3	5.7	5.7	1.0
20	14	12	8.3	6.1	5.4	5.0	1140	6.1	4.5	1.6	5.7	5.5
21	7.1	9.2	6.7	6.2	7.1	4.6	64	19	3.8	1.2	1.2	1.7
22	6.6	6.6	7.0	15	8.0	5.0	18	6.7	6.1	5.6	.83	5.9
23	5.9	7.0	6.9	32	7.0	4.7	12	5.3	13	5.3	4.3	5.9
24	27	7.5	6.6	12	5.8	1.0	10	6.0	7.8	5.3	1.2	1.3
25	13	8.6	6.7	8.8	5.4	5.3	9.7	5.7	4.5	5.3	4.3	.62
26	8.3	11	6.2	8.8	5.7	5.5	9.7	5.7	4.0	5.3	.55	.62
27	9.1	7.0	5.8	7.7	5.7	6.7	9.0	5.7	4.8	3.6	.20	.61
28	19	6.6	6.0	8.0	5.6	6.3	8.9	5.6	5.4	.76	1.9	1.4
29	510	4.9	5.7	6.1	---	5.3	10	5.2	9.1	.24	1.9	2.8
30	77	3.4	5.9	20	---	5.3	13	4.2	5.1	.08	1.2	3.4
31	23	---	5.9	19	---	4.8	---	3.7	---	.05	3.2	---
TOTAL	943.7	279.1	274.1	288.6	241.8	153.5	1578.9	237.9	143.3	125.43	93.03	79.16
MEAN	30.4	9.30	8.84	9.31	8.64	4.95	52.6	7.67	4.78	4.05	3.00	2.64
MAX	510	28	29	32	26	7.5	1140	19	13	8.0	6.6	8.1
MIN	1.7	3.4	5.7	4.8	5.4	1.0	4.0	3.7	2.3	.05	.15	.26
CFSM	.22	.07	.07	.07	.06	.04	.38	.06	.04	.03	.02	.02
IN.	.26	.08	.07	.08	.07	.04	.43	.06	.04	.03	.03	.02
AC-FT	1870	554	544	572	480	304	3130	472	284	249	185	157
(††)	10.33	2.57	2.10	3.49	1.01	1.26	6.46	2.24	2.31	.16	.68	2.31

CAL YR 1976 TOTAL 3794.64 MEAN 10.4 MAX 1350 MIN .00 CFSM .08 IN 1.03 AC-FT 7530 †† 47.57
WTR YR 1977 TOTAL 4438.52 MEAN 12.2 MAX 1140 MIN .05 CFSM .09 IN 1.21 AC-FT 8800 †† 34.92

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

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT												
19...	1425	32	669	7.8	17.5	20	50	8.3	89	2.6	4800	1300
19...	1615	172	348	7.8	15.5	70	500	9.1	94	4.4	77000	30000
24...	1430	32	475	7.5	18.5	50	190	7.3	80	2.8	60000	23000
APR												
20...	0105	845	242	8.0	19.0	110	360	6.5	72	6.4	160000	60000
JUN												
22...	0907	2.5	825	7.3	25.5	0	8	6.1	76	1.3	3200	60

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT												
19...	2800	240	33	87	6.5	26	.7	60	258	0	120	27
19...	110000	--	--	--	--	--	--	--	--	--	--	--
24...	110000	--	--	--	--	--	--	--	--	--	--	--
APR												
20...	190000	76	0	28	1.4	11	.6	8.5	94	0	21	12
JUN												
22...	860	250	36	84	9.6	38	1.0	75	260	0	150	39

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)
OCT												
19...	.2	15	469	58	8	.85	.05	.15	.64	.15	5.0	.10
19...	--	--	--	724	172	--	--	--	--	--	--	--
24...	--	--	--	240	52	--	--	--	--	--	--	--
APR												
20...	.2	9.8	138	1980	264	.32	.02	.08	3.2	1.2	13	.00
JUN												
22...	.1	14	539	17	7	.03	.00	.07	.23	.04	3.2	.10

08178700 SALADO CREEK (UPPER STATION) AT SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT							
19...	1425	3	200	0	0	0	100
APR							
20...	0105	2	100	0	17	2	40
JUN							
22...	0907	1	100	0	10	1	20

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT						
19...	2	10	.2	1	0	10
APR						
20...	2	0	.4	0	0	10
JUN						
22...	0	0	.0	2	0	4

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)
OCT												
19...	1425	.0	.00	.00	.0	.00	.00	.00	.01	.00	.00	.00
APR												
20...	0105	.0	.00	.00	.0	.00	.00	.00	.69	.00	.00	.00
JUN												
22...	0907	.0	.00	.00	.0	.00	.00	.00	.01	.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)
OCT												
19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.01	.00
APR												
20...	.00	.00	.00	.00	.00	.00	.00	0	.00	.08	1.0	.03
JUN												
22...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08178736 SALADO CREEK TRIBUTARY AT REE STREET, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°26'37", long 98°27'13", Bexar County, Hydrologic Unit 12100301, 76 ft (23 m) downstream from culvert at intersection of Ree and Shirley Streets in San Antonio and 0.25 mi (0.40 km) north of Pershing Elementary School.

DRAINAGE AREA.--0.45 mi^2 (1.17 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1969 to April 1977 (discontinued).

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 515 ft^3/s (14.6 m^3/s) June 8, 1975, gage height 9.01 ft (2.746 m).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 60 ft^3/s (1.70 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 4	2135	146	4.13	5.84	1.780
Apr. 19	2150	*185	5.24	6.24	1.902

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical, biochemical, and pesticide analyses: September 1970 to April 1977 (discontinued). Sediment analyses: April to September 1973. Water temperatures: September 1970 to April 1977. Racteria analyses: December 1975 to April 1977 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
APR 19...	2155	289	120	8.1	19.0	110	230	9.1	101	4.4	72000	34000

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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 19...	93000	29	4	10	1.0	5.3	.4	1.9	30	0	14	2.8

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 19...	.1	3.0	53	848	228	.31	.03	.18	1.7	.38	12	.00

08178736 SALADO CREEK TRIBUTARY AT BEE STREET, SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
APR 19...	2155	2	0	0	13	2	60

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR 19...	3	0	.0	0	0	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 19...	2155	.0	.00	.00	.1	.00	.03	.08	.05	.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 19...	.00	.01	.00	.00	.00	.00	.00	0	.00	.00	.04	.00

GUADALUPE RIVER BASIN

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX

LOCATION.--Lat 29°21'25", long 98°24'45", Bexar County, Hydrologic Unit 12100301, on right bank at upstream side of bridge on Loop 13 at San Antonio, 1.4 mi (2.3 km) east of Brooks Air Force Base, and 3.3 mi (5.3 km) upstream from Rosillo Creek.

DRAINAGE AREA.--189 mi² (490 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1960 to current year.

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

REMARKS.--Water-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.

AVERAGE DISCHARGE.--17 years, 40.7 ft³/s (1.153 m³/s), 2.92 in/yr (74 mm/yr), 29,490 acre-ft/yr (36.4 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s (371 m³/s) Sept. 27, 1973, gage height, 28.83 ft (8.787 m); no flow Aug. 13, 1967.

EXTREMES OUTSIDE PERIOD OF RECORD.--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.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 600 ft³/s (17.0 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Oct. 29	1800	1,460	41.3	14.49	4.417	Apr. 20	1900	*3,560	101	19.02	5.797
Apr. 16	2100	1,060	30.0	13.31	4.057						

Minimum discharge, 15 ft³/s (0.42 m³/s) Aug. 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	68	46	46	77	46	40	69	40	33	19	19
2	26	58	48	55	66	47	41	59	41	34	18	19
3	26	56	48	56	77	48	39	58	39	33	19	18
4	33	55	48	50	66	65	49	57	39	32	20	20
5	279	52	102	48	57	49	41	57	38	30	21	21
6	62	48	255	48	55	46	34	58	38	28	19	23
7	34	46	84	48	54	45	35	57	35	28	19	27
8	30	51	59	46	59	44	33	55	34	29	19	22
9	30	49	54	48	60	44	33	97	34	29	18	20
10	28	47	52	47	64	44	33	61	33	28	17	22
11	27	47	56	45	154	44	32	79	34	27	20	21
12	25	46	86	59	126	43	31	66	34	26	19	23
13	26	73	89	127	64	42	34	55	31	26	18	174
14	26	58	83	109	57	42	109	53	32	29	20	49
15	82	50	64	62	54	43	92	51	30	25	20	28
16	346	48	56	52	52	41	672	50	33	24	18	23
17	65	110	53	50	52	40	233	48	32	25	18	22
18	40	72	52	48	51	40	63	49	30	27	20	23
19	195	218	55	47	50	40	96	48	29	27	23	23
20	200	114	61	48	49	38	2580	47	29	25	21	20
21	51	63	54	47	49	38	687	173	29	23	23	21
22	40	54	51	84	51	37	111	92	38	22	20	22
23	38	50	50	354	50	37	80	52	78	22	18	22
24	134	50	50	100	48	38	71	48	102	23	18	23
25	112	57	64	65	47	39	66	47	44	23	18	22
26	52	80	53	58	47	40	62	45	37	21	17	20
27	44	61	50	55	46	49	60	43	35	22	18	19
28	72	53	48	53	46	50	59	43	33	21	21	19
29	1040	52	47	51	---	43	57	43	34	20	21	19
30	384	48	47	114	---	40	71	42	36	20	18	19
31	102	---	46	199	---	38	---	40	---	18	19	---
TOTAL	3676	1934	2011	2319	1728	1340	5644	1842	1151	800	597	823
MEAN	119	64.5	64.9	74.8	61.7	43.2	188	59.4	38.4	25.8	19.3	27.4
MAX	1040	218	255	354	154	65	2580	173	102	34	23	174
MIN	25	46	46	45	46	37	31	40	29	18	17	18
CFSM	.63	.34	.34	.40	.33	.23	1.00	.31	.20	.14	.10	.15
IN.	.72	.38	.40	.46	.34	.26	1.11	.36	.23	.16	.12	.16
AC-FT	7290	3840	3990	4600	3430	2660	11190	3650	2280	1590	1180	1630
(††)	9.43	2.32	2.04	3.34	.98	1.13	6.62	2.10	2.18	.14	.51	2.25

CAL YR 1976 TOTAL 22758 MEAN 62.2 MAX 1590 MIN 18 CFSM .33 IN 4.48 AC-FT 45140 †† 45.10
WTR YR 1977 TOTAL 23865 MEAN 65.4 MAX 2580 MIN 17 CFSM .35 IN 4.70 AC-FT 47340 †† 33.04

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

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
APR												
21...	1610	240	394	7.2	22.0	60	150	7.2	85	3.7	650000	470000
JUN												
22...	1000	35	897	7.7	24.5	0	20	6.5	79	.7	4200	340

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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												
21...	660000	170	35	57	5.5	18	.6	5.7	158	0	38	23
JUN												
22...	1000	340	82	110	17	63	1.5	9.1	320	0	77	92

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												
21...	.2	15	241	294	7[illegible]	.49	.02	.07	1.1	.33	9.2	.00
JUN												
22...	.4	15	541	37	10	2.0	.01	.09	.53	.05	2.8	.00

08178800 SALADO CREEK (LOWER STATION) AT SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
APR							
21...	1610	3	100	0	11	2	90
JUN							
22...	1000	1	200	0	10	1	10

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
APR						
21...	0	10	.0	0	0	10
JUN						
22...	0	4	.0	1	0	2

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												
21...	1610	.0	.00	.00	.0	.00	.00	.00	.17	.01	.00	.00
JUN												
22...	1000	.0	.00	.00	.0	.00	.00	.01	.23	.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												
21...	.00	.00	.00	.00	.00	.00	.00	0	.00	.02	.35	.02
JUN												
22...	.00	.00	.00	.00	.00	.00	.00	0	.00	.01	.02	.01

GUADALUPE RIVER BASIN

08181000 LEON CREEK TRIBUTARY AT FARM ROAD 1604, SAN ANTONIO, TX
(Flood-hydrograph partial-record station)

LOCATION.--Lat 29°35'14", long 98°37'40", Bexar County, Hydrologic Unit 12100301, 97 ft (30 m) upstream from culvert on Farm Road 1604 at San Antonio and 1.5 mi (2.4 km) west of bridge on Leon Creek.

DRAINAGE AREA.--5.57 mi^2 (14.43 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1968 to current year.

GAGE.--Digital recorders (stage and rainfall). Gage is not referenced to National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,790 ft^3/s (50.7 m^3/s) July 16, 1973, gage height, 10.91 ft (3.325 m).

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 200 ft^3/s (5.66 m^3/s) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Oct. 19	unknown	a10	0.28	unknown	--	Sept. 6	0305	a95	2.69	3.06	0.933
Oct. 24	0455	*280	7.93	3.90	1.189						

a Water-quality sample obtained for this flood event.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--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 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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)
OCT 19...	1345	1.0	126	8.2	13.0	130	80	11.8	116	14
SEP 06...	1120	.10	112	7.0	25.0	140	45	8.0	99	50

DATE	BIOCHEMICAL OXYGEN DEMAND 5 DAY (MG/L)	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM .7UM-MF (COL./ 100 ML)	FECAL STREPTOCOCCI KF AGAR (COL. 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
OCT 19...	2.3	15000	4600	12000	50	0	19	.7	2.5	.2
SEP 06...	7.8	190000	140000	13000	54	4	20	1.1	1.7	.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)
OCT 19...	1.7	62	0	7.1	1.5	.2	9.4	73	110
SEP 06...	1.8	62	0	4.5	1.1	.0	4.4	65	58

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)
OCT 19...	32	.24	.01	.02	.48	.05	7.8	.00	1
SEP 06...	11	.60	.04	.03	.27	.03	9.0	.10	0

08181000 LEON CREEK TRIBUTARY AT FARM ROAD 1604, SAN ANTONIO, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT 19...	1345	--	100	0	0	2	10
SEP 06...	1120	1	0	0	0	2	30

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT 19...	0	0	--	--	0	40
SEP 06...	2	10	.0	0	0	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)
OCT 19...	1345	.0	.00	.00	.0	.00	.00	.00	.07	.00	.00	.00
SEP 06...	1120	.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)
OCT 19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
SEP 06...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.01	.00

GUADALUPE RIVER BASIN

08181400 HELOTES CREEK AT HELOTES, TX

LOCATION.--Lat 29°34'42", long 98°41'29", Bexar County, Hydrologic Unit 12100302, 42 ft (13 m) left of and 44 ft (13 m) downstream from centerline of bridge on State Highway 16, 0.1 mi (0.2 km) northwest of Helotes, and 8.6 mi (13.8 km) upstream from mouth.

DRAINAGE AREA.--15.0 mi² (38.8 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

REVISED RECORDS.--WDR TX-73-1: 1972(M).

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

REMARKS.--Water-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.

AVERAGE DISCHARGE.--9 years, 4.90 ft³/s (0.139 m³/s), 4.44 in/yr (113 mm/yr), 3,550 acre-ft/yr (4.38 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,680 ft³/s (217 m³/s) July 16, 1973, gage height, 10.8 ft (3.29 m), from floodmarks, from rating curve extended above 5,000 ft³/s (142 m³/s); no flow most of time.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1923, 13.7 ft (4.18 m) in 1927, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 140 ft³/s (3.96 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Oct. 15	1600	190	5.38	2.53	0.771	Oct. 29	0815	308	8.72	2.83	0.863
aOct. 19	1345	32	.91	1.96	.597	aApr. 20	0015	86	2.44	2.32	.707
Oct. 24	0345	*1,840	52.1	5.21	1.588						

a Water-quality samples obtained on this flood event.

Minimum discharge, no flow at times.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	76	12	6.7	13	5.6	.37	7.8	5.8	.40	.00	.00
2	.00	52	12	7.1	12	5.3	.50	7.0	5.0	.20	.00	.00
3	.00	39	12	6.6	12	5.3	.31	6.3	4.4	.10	.00	.00
4	.70	31	11	6.4	10	5.0	1.3	5.7	3.7	.02	.00	.00
5	6.3	24	12	5.5	10	4.1	.39	5.3	3.3	.00	.00	.00
6	1.7	21	18	5.1	11	3.8	.12	5.1	2.8	.00	.00	.00
7	.00	17	16	4.6	11	3.6	.03	4.2	3.2	.00	.00	.00
8	.00	15	15	4.6	12	3.4	.00	3.7	2.5	.00	.00	.00
9	.00	12	15	4.5	11	3.2	.00	4.9	2.4	.00	.00	.00
10	.00	11	15	4.2	10	3.2	.00	3.8	2.3	.00	.00	.00
11	.00	9.8	16	4.2	11	3.1	.00	6.4	1.9	.00	.00	.00
12	.00	8.5	16	4.6	10	2.8	.00	4.5	2.1	.00	.00	.12
13	.00	10	17	7.1	10	2.3	.00	4.0	2.9	.00	.00	.00
14	.00	8.0	18	7.5	9.7	2.1	.00	3.3	2.5	.00	.00	.00
15	33	7.4	18	7.5	9.0	1.8	3.8	3.5	2.2	.00	.00	.00
16	42	7.1	18	7.1	8.5	1.7	24	3.5	2.0	.01	.00	.00
17	27	7.1	17	7.1	8.5	1.6	27	3.3	1.4	.00	.00	.00
18	17	6.8	17	7.4	8.5	1.4	18	3.2	.91	.00	.00	.00
19	21	9.7	17	6.6	8.4	.93	15	2.9	.76	.00	.00	.00
20	21	8.6	16	7.2	8.0	.75	44	2.8	.56	.00	.00	.00
21	16	7.3	14	7.5	7.7	.82	52	10	1.0	.00	.00	.00
22	13	6.9	13	10	7.5	1.1	39	6.5	2.0	.00	.00	.00
23	11	6.2	11	20	6.5	.97	31	5.2	3.7	.00	.00	.00
24	359	6.2	11	20	6.0	1.0	25	5.0	3.0	.00	.00	.00
25	170	13	11	18	5.9	1.1	20	4.9	1.9	.00	.00	.00
26	100	17	9.1	17	5.9	1.8	16	4.6	1.1	.00	.00	.00
27	56	15	9.1	16	5.8	2.5	13	4.6	.99	.00	.00	.00
28	48	13	8.5	15	5.8	1.7	12	4.7	.70	.00	.00	.00
29	220	13	8.0	14	---	1.0	10	4.6	.61	.00	.00	.00
30	202	13	7.8	16	---	.71	9.3	4.2	.49	.00	.00	.00
31	123	---	6.7	14	---	.36	---	4.2	---	.00	.00	---
TOTAL	1487.70	491.6	417.2	289.1	254.7	74.04	362.12	149.7	68.12	.73	.00	.12
MEAN	48.0	16.4	13.5	9.33	9.10	2.39	12.1	4.83	2.27	.024	.000	.004
MAX	359	76	18	20	13	5.6	52	10	5.8	.40	.00	.12
MIN	.00	6.2	6.7	4.2	5.8	.36	.00	2.8	.49	.00	.00	.00
CFSM	3.20	1.09	.90	.62	.61	.16	.81	.32	.15	.002	.000	.000
IN.	3.69	1.22	1.03	.72	.63	.18	.90	.37	.17	.00	.00	.00
AC-FT	2950	975	828	573	505	147	718	297	135	1.4	.00	.2
(††)	11.09	2.54	2.34	3.33	.97	1.79	6.13	2.48	3.70	.68	1.42	3.69

CAL YR 1976 TOTAL 3564.60 MEAN 9.74 MAX 359 MIN .00 CFSM .65 IN 8.84 AC-FT 7070 †† 48.02
WTR YR 1977 TOTAL 3595.13 MEAN 9.85 MAX 359 MIN .00 CFSM .66 IN 8.92 AC-FT 7130 †† 40.16

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

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT												
19...	1500	32	400	6.8	15.5	8	4	10.4	107	1.2	1600	640
24...	1200	234	346	7.8	18.5	50	25	7.9	87	.8	11000	6800
APR												
19...	2334	60	415	7.9	20.0	0	5	7.9	90	2.1	2200	1100

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT												
19...	1200	230	7	71	12	6.5	.2	1.1	268	0	11	9.6
24...	21000	180	7	59	8.3	4.5	.1	1.9	212	0	8.8	6.3
APR												
19...	3800	240	32	73	13	7.7	.2	.8	249	0	16	12

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)
OCT												
19...	.5	8.8	253	2		.74	.01	.00	.16	.01	1.6	.10
24...	.2	8.3	252	35	6	.53	.01	.01	.43	.03	9.0	.00
APR												
19...	.1	8.1	253	13	4	.57	.00	.01	.11	.01	9.1	.00

08181400 HELOTES CREEK AT HELOTES, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMRER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT							
19...	1500	--	100	0	0	3	0
24...	1200	1	200	0	0	0	30
APR							
19...	2334	0	0	0	11	0	10

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT						
19...	0	0	--	--	0	0
24...	0	0	.0	0	0	10
APR						
19...	0	0	.0	0	0	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)
OCT												
19...	1500	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
24...	1200	.0	.00	.00	.0	.00	.00	.00	.00	.00	.00	.00
APR												
19...	2334	.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)
OCT												
19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
24...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
APR												
19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00

GUADALUPE RIVER BASIN

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TX

LOCATION.--Lat 29°23'12", long 98°36'00", Bexar County, Hydrologic Unit 12100302, on left bank 128 ft (39 m) downstream from centerline of bridge on Billy Mitchell Road at Kelly Air Force Base, 0.15 mi (0.24 km) upstream from mouth, and 2.0 mi (3.2 km) southeast of intersection of U.S. Highway 90 West and Loop 13.

DRAINAGE AREA.--1.19 mi² (3.08 km²).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1969 to current year.

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

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

AVERAGE DISCHARGE.--8 years, 0.55 ft³/s (0.0156 m³/s), 6.28 in/yr (160 mm/yr), 398 acre-ft/yr (491,000 m³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 555 ft³/s (15.7 m³/s) May 14, 1970, gage height 4.44 ft (1.353 m), from rating curve extended above 100 ft³/s (2.83 m³/s) on basis of formula, Q=CLH³/²; no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--No historical flood information is available.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 90 ft³/s (2.55 m³/s) and maximum (*):

Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft³/s)	Discharge (m³/s)	Gage height (ft)	Gage height (m)
Oct. 4	2145	124	3.51	2.33	0.710	May 9	164	4.64	2.55	0.777	
aOct. 19	1330	68	1.93	1.99	0.607	Sept. 12	2345	336	9.52	b3.42	1.042
Apr. 19	2100	*550	15.6	4.40	1.341						

a Water-quality samples obtained on this flood event.
b From floodmark.

Minimum discharge, no flow at times.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.02	.00	.00	.08	.33	.74	.06	.36	.00	.00
2	.00	.02	.03	.08	.00	.08	.38	.74	.05	.14	.00	.00
3	.00	.02	.01	.02	.00	.19	.40	.91	.01	.23	.00	.00
4	9.3	.00	.04	.02	.00	.02	.80	1.1	.01	1.1	.00	.00
5	2.8	.00	2.1	.01	.00	.02	.25	1.1	.04	.95	.00	.00
6	.00	.00	.27	.01	.00	.02	.27	1.2	.06	1.2	.00	.00
7	.00	.00	.09	.02	.00	.08	.28	1.2	.04	.60	.00	.00
8	.00	.00	.02	.02	.02	.08	.40	.84	.02	.16	.00	.00
9	.00	.00	.02	.02	.02	.08	.51	12	.02	.08	.00	.00
10	.00	.00	.03	.00	.02	.08	.83	.14	.05	.07	.00	.00
11	.00	.00	.03	.00	.52	.08	.43	3.6	.02	.04	.00	.00
12	.00	.09	1.3	1.0	.00	.09	.51	.08	.02	.02	.00	5.0
13	.00	.22	.81	2.9	.00	.39	.54	.08	.07	.00	.00	17
14	.00	.00	.66	.10	.00	.39	.50	.08	.08	.00	.00	.00
15	14	.00	.03	.03	.00	.14	3.8	.08	.08	.00	.00	.00
16	1.4	.00	.02	.02	.00	.08	19	.08	.06	.00	.00	.00
17	.00	2.0	.02	.02	.00	.08	1.2	.08	.02	.00	.00	.00
18	.00	.02	.02	.02	.02	.08	.74	.08	.03	.00	.00	.00
19	12	7.7	.08	.02	.02	.08	45	.07	.00	.00	.00	.00
20	.02	.37	.04	.03	.02	.08	63	.04	.00	.00	.00	.00
21	.00	.20	.02	.02	.02	.09	.24	9.4	.00	.00	.00	.00
22	.00	.09	.02	6.1	.02	.27	.22	.08	.01	.00	.00	.00
23	.00	.08	.02	4.9	.08	.25	.19	.08	4.7	.00	.00	.00
24	1.6	.08	.02	.08	.08	.24	.19	.08	.58	.00	.00	.00
25	.02	2.6	1.5	.04	.19	.33	.19	.08	.60	.00	.00	.00
26	.00	.38	.02	.08	.08	.85	.25	.05	.74	.00	.00	.00
27	.00	.02	.02	.14	.19	.23	.33	.02	.91	.00	.00	.00
28	3.9	.02	.02	.11	.19	.31	.48	.02	1.2	.00	.00	.00
29	23	.02	.01	.08	---	.43	.61	.02	.86	.00	.00	.00
30	.08	.02	.02	6.0	---	.40	1.5	.03	.37	.00	.00	.00
31	.02	---	.00	.18	---	.44	---	.03	---	.00	.00	---
TOTAL	68.14	13.95	7.31	22.07	1.49	6.06	143.37	34.13	10.71	4.95	.00	22.00
MEAN	2.20	.47	.24	.71	.053	.20	4.78	1.10	.36	.16	.000	.73
MAX	23	7.7	2.1	6.1	.52	.85	63	12	4.7	1.2	.00	17
MIN	.00	.00	.00	.00	.00	.02	.19	.02	.00	.00	.00	.00
CFSM	1.85	.40	.20	.60	.05	.17	4.02	.92	.30	.13	.000	.61
IN.	2.13	.44	.23	.69	.05	.19	4.48	1.07	.33	.15	.00	.69
AC-FT	135	28	14	44	3.0	12	284	68	21	9.8	.00	44

CAL YR 1976 TOTAL 252.37 MEAN .69 MAX 26 MIN .00 CFSM .58 IN 7.88 AC-FT 501
WTR YR 1977 TOTAL 334.18 MEAN .92 MAX 63 MIN .00 CFSM .77 IN 10.44 AC-FT 663

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TX--Continued

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

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 .7UM-MF (COL./100 ML)
OCT												
19...	1600	20	72	7.4	14.0	33	10	10.7	107	1.7	3700	580
20...	1200	.02	133	7.1	13.0	40	20	8.4	82	1.5	10000	400
APR												
20...	1130	19	108	--	22.0	80	45	8.0	94	2.5	63000	13000
21...	2122	360	50	8.4	19.0	90	160	8.8	98	2.4	7500	4800

DATE	FECAL STREPTOCOCCI KF AGAR (COL. 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)
OCT												
19...	5400	30	0	11	.5	.6	.0	1.7	37	0	2.2	.7
20...	2500	--	--	--	--	--	--	--	--	--	--	--
APR												
20...	24000	48	2	18	.6	1.0	.1	1.7	56	0	2.6	1.6
21...	26000	20	0	7.2	.4	1.0	.1	1.4	22	2	1.3	.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)
OCT												
19...	.5	3.4	39	12	4	.18	.01	.00	.25	.09	2.4	.10
20...	--	--	--	43	10	--	--	--	--	--	--	--
APR												
20...	.0	5.1	58	80	23	.38	.01	.06	.39	.16	8.2	.10
21...	.0	1.7	26	452	116	.15	.01	.10	.48	.63	14	.00

08181450 LEON CREEK TRIBUTARY AT KELLY AIR FORCE BASE, TX.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	DIS-SOLVED ARSENIC (AS) (UG/L)	DIS-SOLVED BARIUM (BA) (UG/L)	DIS-SOLVED CAD-MIUM (CD) (UG/L)	DIS-SOLVED CHRO-MIUM (CR) (UG/L)	DIS-SOLVED COPPER (CU) (UG/L)	DIS-SOLVED IRON (FE) (UG/L)
OCT							
19...	1600	1	100	0	0	0	0
APR							
20...	1130	5	100	0	13	2	10
21...	2122	2	0	0	14	2	30

DATE	DIS-SOLVED LEAD (PB) (UG/L)	DIS-SOLVED MAN-GANESE (MN) (UG/L)	DIS-SOLVED MERCURY (HG) (UG/L)	DIS-SOLVED SELE-NIUM (SE) (UG/L)	DIS-SOLVED SILVER (AG) (UG/L)	DIS-SOLVED ZINC (ZN) (UG/L)
OCT						
19...	2	0	--	--	0	10
APR						
20...	2	0	.0	0	0	10
21...	3	0	.0	0	0	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)
OCT												
19...	1600	.2	.00	.00	.0	.00	.00	.00	.01	.00	.00	.00
APR												
20...	1130	.1	.00	.00	.0	.04	.02	.13	.03	.00	.00	.00
21...	2122	1.0	.00	.00	.1	.42	.17	2.8	.01	.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)
OCT												
19...	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
APR												
20...	.00	.00	.00	.00	.00	.00	.00	0	.00	.03	.00	.00
21...	.00	.00	.00	.00	.00	.00	.00	0	.00	.03	.00	.00

Table 6.--Maximum discharge at flood-hydrograph 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.	Lat 29°34'35", long 98°32'45", Bexar County, at culvert on Farm Road 1535 at Shavano Park.	0.33	1968-77	10-29-76	3.19	64
08178300	Alazan Creek at St. Cloud Street, San Antonio, Tex.	Lat 29°27'29", long 98°32'59", Bexar County, at bridge on St. Cloud Street at San Antonio.	3.26	1968-77	10-04-76	10.08	1,200
08178600	Panther Springs Creek at Farm Road 2696 near San Antonio, Tex.	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	1968-77	10-24-76	5.20	152
08178640	West Elm Creek at San Antonio, Tex.	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	1976-77	10-24-76	4.00	215
08178645	East Elm Creek at San Antonio, Tex.	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	1975-77	04-19-77	5.73	190
08178690	Salado Creek tributary at Bitters Road, San Antonio, Tex.	Lat 29°31'36", long 98°26'25", Bexar County, at culvert on Bitters Road at San Antonio.	.26	1968-77	04-19-77	6.15	167
08178736	Salado Creek tributary at Bee Street, San Antonio, Tex.	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	1969-77	04-19-77	6.24	185
08181000	Leon Creek tributary at Farm Road 1604, San Antonio, Tex.	Lat 29°35'14", long 98°37'40", Bexar County, at culvert on Farm Road 1604 at San Antonio.	5.57	1968-77	10-24-76	3.90	280

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
OCT									
4	1.85	1.52	1.32	1.20	1.24	1.15	1.40	1.55	1.38
5	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.01
7	0.12	0.10	0.08	0.12	0.05	0.00	0.00	0.00	0.08
8	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.03
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
15	3.00	2.70	2.73	2.81	3.71	1.90	1.01	1.50	1.65
16	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
19	0.92	0.96	1.03	0.95	1.17	1.26	1.07	1.14	1.22
20	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
23	0.53	0.62	0.13	0.50	0.40	0.12	0.05	0.05	0.04
24	2.23	2.63	1.88	2.83	1.94	0.58	0.44	0.52	0.58
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00
27	0.12	0.14	0.09	0.00	0.14	0.12	0.06	0.21	0.23
28	1.34	1.04	0.95	1.10	1.04	1.04	0.80	0.94	1.12
29	1.22	1.10	1.04	1.20	1.23	1.45	0.00	1.23	1.27
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	11.33	10.81	9.27	10.89	11.00	7.62	4.83	7.14	7.65
NOV									
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
12	0.64	0.55	0.14	0.75	0.79	0.45	0.40	0.57	0.48
13	0.03	0.20	0.08	0.00	0.03	0.02	0.00	0.00	0.00
16	0.23	0.20	0.32	0.23	0.24	0.47	0.32	0.33	0.46
17	0.07	0.15	0.00	0.05	0.08	0.08	0.13	0.10	0.10
18	0.47	0.48	0.42	0.54	0.60	0.60	0.40	0.45	0.60
19	0.11	0.18	0.20	0.17	0.19	0.35	0.55	0.41	0.35
20	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
25	0.93	1.06	0.85	1.30	1.26	0.60	0.40	0.47	0.34
26	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.10	0.10	0.04	0.05	0.04
MTOT	2.48	2.82	2.05	3.04	3.31	2.67	2.24	2.38	2.38

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
DEC									
5	1.05	1.07	0.60	1.04	0.90	0.70	0.40	0.63	0.46
6	0.00	0.00	0.10	0.00	0.02	0.00	0.00	0.02	0.01
8	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
10	0.09	0.08	0.02	0.08	0.13	0.02	0.00	0.00	0.00
11	0.46	0.41	0.33	0.21	0.29	0.20	0.18	0.09	0.07
12	0.21	0.19	0.10	0.23	0.12	0.32	0.35	0.27	0.20
13	0.22	0.20	0.08	0.27	0.16	0.30	0.25	0.20	0.14
14	0.09	0.05	0.03	0.06	0.01	0.13	0.04	0.05	0.04
18	0.12	0.23	0.30	0.13	0.12	0.00	0.02	0.04	0.03
19	0.09	0.08	0.14	0.10	0.07	0.10	0.05	0.05	0.15
24	0.00	0.12	0.00	0.04	0.04	0.35	0.00	0.04	0.02
25	0.00	0.00	0.06	0.00	0.12	0.00	0.30	0.02	0.09
31	0.00	0.07	0.00	0.05	0.00	0.00	0.00	0.00	0.00
MTOT	2.33	2.50	1.76	2.21	1.99	2.12	1.59	1.41	1.21
CTOT	48.37	49.34	42.83	48.53	51.85	42.50	29.26	36.67	42.17
JAN									
1	0.15	0.18	0.00	0.26	0.00	0.06	0.00	0.04	0.00
2	0.00	0.00	0.14	0.00	0.18	0.15	0.00	0.16	0.00
5	0.10	0.13	0.08	0.13	0.11	0.02	0.00	0.00	0.06
6	0.09	0.10	0.07	0.08	0.09	0.03	0.00	0.06	0.03
7	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.02	0.07
9	0.08	0.10	0.05	0.06	0.01	0.00	0.00	0.07	0.01
10	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
11	0.06	0.06	0.00	0.06	0.05	0.07	0.00	0.03	0.07
12	0.55	0.51	0.35	0.50	0.46	0.42	0.20	0.40	0.38
13	0.40	0.33	0.35	0.28	0.24	0.24	0.20	0.28	0.26
14	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
21	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
22	1.15	1.33	0.92	1.07	1.13	1.23	0.95	1.05	0.96
23	0.02	0.03	0.10	0.00	0.03	0.06	0.05	0.03	0.03
30	0.70	0.73	0.65	0.71	0.73	0.95	0.74	0.84	0.88
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	3.30	3.50	2.71	3.42	3.15	3.28	2.14	3.00	2.77

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
FEB									
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2	0.24	0.21	0.18	0.25	0.25	0.13	0.00	0.10	0.19
3	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.02
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00
7	0.18	0.17	0.02	0.16	0.06	0.00	0.00	0.17	0.00
8	0.20	0.18	0.12	0.18	0.25	0.06	0.03	0.05	0.19
9	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.06	0.02
10	0.26	0.27	0.18	0.29	0.29	0.22	0.13	0.21	0.24
11	0.10	0.13	0.18	0.18	0.11	0.13	0.15	0.14	0.17
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	0.98	0.96	0.70	1.06	0.99	0.56	0.31	0.79	0.85
MAR									
3	0.40	0.31	0.22	0.30	0.25	0.20	0.04	0.20	0.30
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
24	0.00	0.05	0.00	0.05	0.03	0.08	0.00	0.08	0.08
26	0.77	0.65	0.53	0.62	0.63	0.45	0.25	0.34	0.30
27	0.75	0.56	0.37	0.49	0.44	0.21	0.08	0.28	0.28
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01
MTOT	1.92	1.57	1.12	1.46	1.37	0.94	0.37	0.90	1.00

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
APR									
1	0.00	0.07	0.00	0.04	0.02	0.00	0.00	0.05	0.05
2	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.05	0.05
3	0.65	0.50	0.15	0.04	0.52	0.20	0.00	0.32	0.26
4	0.07	0.03	0.10	0.50	0.04	0.12	0.22	0.02	0.06
13	0.25	0.36	0.14	0.51	0.23	0.00	0.27	0.09	0.14
14	0.25	0.21	0.22	0.22	0.08	0.21	0.00	0.07	0.02
15	1.93	1.67	1.98	1.74	1.11	0.55	0.68	0.54	0.48
16	1.14	1.06	1.15	1.25	1.26	1.42	0.98	1.00	1.09
17	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
19	1.14	0.79	0.50	0.80	0.65	3.28	2.15	1.56	2.56
20	0.45	0.38	0.60	0.38	0.63	0.66	0.85	1.74	1.16
21	0.30	0.50	0.20	0.15	0.08	0.00	0.07	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.35
30	0.18	0.25	0.23	0.23	0.18	0.46	0.15	0.27	0.01
MTOT	6.36	5.82	4.37	5.86	4.85	6.90	5.37	5.78	6.29
MAY									
1	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
9	0.23	0.70	0.15	0.20	0.11	1.06	0.20	2.05	1.15
10	0.00	0.00	0.00	0.00	0.01	0.00	1.05	0.00	0.00
11	0.95	0.70	0.65	0.55	0.67	0.52	0.60	0.55	0.79
12	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
16	0.00	0.18	0.00	0.12	0.01	0.00	0.00	0.00	0.02
17	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.01
20	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
21	1.25	1.17	0.98	1.00	0.98	1.03	0.85	1.23	1.19
22	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
23	0.00	0.00	0.00	0.00	0.00	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
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
31	0.00	0.00	0.00	0.16	0.22	0.03	0.00	0.25	0.55
MTOT	2.43	2.75	1.78	2.03	2.06	2.72	2.70	4.08	3.76

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 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	0.52	0.51	0.40	0.31	0.06	0.20	0.00	0.80	0.35
2	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
5	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
6	0.31	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.28	0.34	0.15	0.00	0.03	0.00	0.00	0.05	0.00
12	0.06	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00
13	0.21	0.34	0.02	0.16	0.08	0.00	0.00	0.00	0.01
15	0.21	0.20	0.25	0.39	0.04	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
21	0.48	0.32	0.50	0.20	0.08	0.10	0.15	0.02	0.07
22	0.67	0.63	0.52	0.30	0.31	0.18	0.30	0.04	0.65
23	1.01	0.90	0.84	0.84	0.70	0.74	0.63	0.85	0.55
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.01
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MTOT	3.75	3.59	2.73	2.25	1.32	1.22	1.08	1.90	1.66
JUL									
16	0.46	0.57	0.48	0.15	0.12	0.00	0.10	0.00	0.00
17	0.00	0.00	0.00	0.05	0.01	0.00	0.05	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
19	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.08	0.03
20	0.20	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
29	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.02
MTOT	0.66	0.78	0.48	0.20	0.13	0.10	0.15	0.13	0.05

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER								
	1-H	2-H	3-H	1-L	2-L	4-L	5-L	1-A	2-A
AUG									
2	0.06	0.18	0.00	0.07	0.04	0.11	0.05	0.00	0.00
3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.06
12	0.22	0.65	0.22	0.26	0.03	0.00	0.07	0.00	0.00
18	0.77	1.70	0.20	1.78	1.39	0.15	0.80	0.27	0.20
19	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
21	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
28	0.00	0.10	0.00	0.08	0.01	0.30	0.00	0.05	0.03
MTOT	1.05	2.63	0.42	2.19	1.51	0.56	0.92	0.40	0.35
SEPT									
1	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
6	1.83	1.43	0.38	2.73	2.45	1.55	1.62	0.54	0.66
7	0.18	0.18	0.00	0.04	0.03	0.05	0.03	0.04	0.02
8	0.05	0.30	0.00	0.00	0.70	0.00	0.00	0.00	0.00
9	0.04	0.50	0.26	0.15	0.13	0.00	0.10	0.00	0.00
10	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01
12	0.98	0.96	0.85	0.95	0.37	2.93	2.10	0.90	1.38
13	0.49	0.72	0.18	0.26	0.43	0.10	0.16	0.05	0.10
19	0.07	0.13	0.00	0.15	0.26	0.05	0.17	0.12	0.14
20	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	0.00	0.00	0.00	0.00	0.01
MTOT	3.64	4.22	1.67	4.28	4.40	4.73	4.18	1.65	2.35
WTOT	40.23	41.95	29.06	38.89	36.08	33.42	25.88	29.56	30.32

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER												
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
OCT														
1	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
4	1.42	1.57	1.88	1.93	1.40	0.99	1.69	1.28	1.64	1.56	1.63	1.02	1.51	1.96
5	0.00	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.02	0.03	0.03	0.00	0.01	0.00
7	0.00	0.10	0.05	0.10	0.15	0.13	0.07	0.15	0.11	0.13	0.10	0.00	0.06	0.08
8	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
9	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	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	0.01	0.00	0.00	0.00	0.00
15	3.05	3.13	2.05	1.70	3.24	2.90	1.81	2.85	2.77	2.68	1.50	1.30	1.76	1.94
16	0.03	0.02	0.00	0.00	0.00	0.02	0.02	0.00	0.05	0.07	0.00	0.00	0.01	0.00
17	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
19	1.04	0.97	1.23	1.18	1.13	0.95	1.24	0.10	0.73	0.80	1.24	1.15	1.27	1.38
20	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.01	0.00
22	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.02	0.02	0.00	0.00	0.03	0.08
23	0.00	0.49	0.42	0.10	0.58	0.86	0.06	0.60	0.57	0.48	0.02	0.00	0.03	0.10
24	0.54	0.97	0.67	0.70	3.00	1.53	0.64	1.53	1.04	0.92	0.72	0.42	0.89	0.69
25	0.84	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.02	0.00	0.00	0.01	0.00
27	0.17	0.25	0.22	0.24	0.05	0.08	0.15	0.05	0.08	0.10	0.12	0.00	0.13	0.16
28	1.06	0.97	1.05	1.10	1.06	1.07	0.99	1.08	0.97	0.98	0.95	0.65	1.05	0.91
29	1.46	1.30	1.33	1.50	1.21	1.26	1.46	1.26	1.35	1.52	1.30	1.60	1.74	1.28
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
MTOT	9.61	9.86	8.90	8.55	11.82	9.86	8.23	8.95	9.40	9.39	7.61	6.14	8.52	8.48
NOV														
1	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
2	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
12	0.62	0.55	0.45	0.46	0.52	0.63	0.38	0.68	0.68	0.69	0.33	0.00	0.37	0.55
13	0.03	0.07	0.00	0.00	0.05	0.05	0.06	0.07	0.03	0.08	0.07	0.00	0.02	0.05
14	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
15	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
16	0.25	0.25	0.37	0.37	0.26	0.26	0.44	0.22	0.28	0.40	0.47	0.48	0.55	0.38
17	0.12	0.10	0.17	0.17	0.09	0.09	0.11	0.07	0.09	0.10	0.13	0.09	0.10	0.10
18	0.47	0.46	0.57	0.58	0.50	0.49	0.40	0.50	0.55	0.50	0.42	0.20	0.51	0.39
19	0.41	0.38	0.36	0.36	0.40	0.39	0.45	0.43	0.52	0.51	0.33	0.12	0.26	0.50
20	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.00	0.01	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00
24	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
25	0.80	0.67	0.70	0.60	0.90	0.64	0.37	0.59	0.67	0.68	0.33	0.00	0.32	0.43
26	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
28	0.00	0.00	0.07	0.02	0.00	0.09	0.00	0.11	0.06	0.08	0.10	0.00	0.03	0.06
29	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	0.00
MTOT	2.70	2.54	2.69	2.56	2.72	2.66	2.23	2.67	2.92	3.10	2.18	0.89	2.23	2.46

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER												
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
DEC														
2	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.90	0.85	0.80	0.86	0.89	0.95	1.42	0.90	1.12	1.30	1.18	0.78	1.44	0.96
6	0.00	0.08	0.04	0.04	0.02	0.02	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00
7	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
10	0.00	0.05	0.00	0.00	0.06	0.04	0.00	0.06	0.12	0.03	0.00	0.00	0.00	0.01
11	0.22	0.18	0.19	0.17	0.19	0.22	0.20	0.22	0.31	0.29	0.22	0.00	0.19	0.22
12	0.11	0.28	0.37	0.40	0.19	0.25	0.33	0.27	0.15	0.32	0.30	0.00	0.27	0.32
13	0.05	0.26	0.24	0.26	0.14	0.26	0.12	0.22	0.13	0.14	0.12	0.10	0.20	0.09
14	0.01	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.05	0.06	0.04	0.20	0.09	0.05
16	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
18	0.07	0.05	0.04	0.00	0.11	0.09	0.04	0.10	0.08	0.08	0.04	0.03	0.01	0.05
19	0.13	0.09	0.20	0.15	0.09	0.09	0.16	0.08	0.09	0.10	0.16	0.12	0.11	0.13
23	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
24	0.00	0.04	0.03	0.00	0.10	0.03	0.01	0.10	0.02	0.04	0.00	0.16	0.00	0.03
25	0.00	0.09	0.08	0.05	0.00	0.11	0.09	0.00	0.07	0.08	0.10	0.00	0.23	0.09
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
29	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
MTOT	1.49	2.03	2.04	1.98	1.85	2.13	2.44	2.02	2.17	2.49	2.16	1.39	2.55	1.95
CTOT	45.19	46.04	42.53	41.97	50.57	50.12	39.74	45.80	*****	53.05	38.79	37.38	42.74	39.44

MTOT=MONTHLY TOTALS
CTOT=CALENDAR YEAR TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER												
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
JAN														
1	0.20	0.16	0.17	0.06	0.00	0.13	0.04	0.27	0.28	0.05	0.00	0.00	0.01	0.04
2	0.27	0.28	0.24	0.15	0.23	0.33	0.16	0.25	0.32	0.33	0.15	0.00	0.21	0.04
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00
4	0.00	0.01	0.00	0.02	0.00	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.01
5	0.09	0.08	0.95	0.04	0.07	0.10	0.08	0.10	0.10	0.10	0.05	0.06	0.03	0.08
6	0.10	0.08	0.06	0.06	0.20	0.13	0.03	0.03	0.05	0.04	0.03	0.00	0.02	0.02
7	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
8	0.13	0.11	0.09	0.10	0.06	0.14	0.09	0.12	0.10	0.13	0.00	0.00	0.03	0.12
9	0.00	0.03	0.03	0.06	0.05	0.02	0.02	0.00	0.01	0.01	0.10	0.00	0.02	0.02
10	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
11	0.05	0.06	0.05	0.06	0.07	0.05	0.05	0.06	0.06	0.07	0.03	0.07	0.02	0.06
12	0.45	0.52	0.44	0.56	0.45	0.65	0.44	0.54	0.52	0.56	0.30	0.32	0.41	0.43
13	0.36	0.42	0.36	0.40	0.34	0.47	0.33	0.41	0.45	0.36	0.30	0.25	0.32	0.35
14	0.02	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.01	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
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00
22	1.10	1.03	0.90	1.00	1.05	1.02	1.12	1.05	0.81	1.02	0.95	1.12	1.27	1.10
23	0.00	0.05	0.03	0.12	0.00	0.05	0.06	0.00	0.01	0.04	0.05	0.02	0.04	0.04
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
27	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
30	0.73	0.71	0.85	0.85	0.60	0.71	0.84	0.65	0.66	0.70	0.84	0.80	0.89	0.79
31	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.01	0.00
MTOT	3.50	3.55	4.17	3.48	3.12	3.90	3.33	3.48	3.64	3.51	2.80	2.82	3.31	3.10
FEB														
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.08	0.00	0.00	0.00
2	0.18	0.22	0.00	0.28	0.20	0.22	0.18	0.26	0.25	0.26	0.00	0.15	0.14	0.17
3	0.00	0.02	0.00	0.00	0.05	0.04	0.02	0.00	0.02	0.02	0.02	0.00	0.03	0.00
7	0.10	0.05	0.03	0.00	0.00	0.05	0.00	0.12	0.01	0.03	0.00	0.00	0.00	0.00
8	0.20	0.26	0.24	0.18	0.33	0.29	0.21	0.23	0.31	0.30	0.16	0.11	0.10	0.20
9	0.02	0.04	0.05	0.02	0.00	0.03	0.04	0.05	0.05	0.04	0.00	0.03	0.00	0.02
10	0.26	0.33	0.27	0.30	0.26	0.28	0.37	0.41	0.40	0.40	0.40	0.30	0.30	0.34
11	0.12	0.13	0.12	0.15	0.13	0.14	0.23	0.12	0.22	0.25	0.28	0.24	0.26	0.18
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	0.00
24	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	0.00
MTOT	0.88	1.05	0.71	0.93	0.97	1.05	1.05	1.19	1.28	1.30	0.94	0.83	0.84	0.91

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER												
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
MAR														
2	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.05	0.00	0.00	0.00	0.00
3	0.31	0.29	0.55	0.25	0.36	0.19	0.24	0.30	0.21	0.28	0.25	0.36	0.17	0.27
4	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.01	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
6	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	0.00
11	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	0.01
15	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
24	0.07	0.05	0.15	0.03	0.06	0.05	0.08	0.13	0.12	0.10	0.12	0.10	0.07	0.10
25	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.05	0.00	0.00	0.00
26	0.39	0.35	0.25	0.28	0.53	0.35	0.19	0.25	0.28	0.35	0.18	0.15	0.16	0.29
27	0.37	0.48	0.36	0.27	0.73	0.54	0.19	0.42	0.51	0.41	0.15	0.22	0.16	0.21
28	0.04	0.02	0.04	0.00	0.00	0.02	0.01	0.00	0.02	0.02	0.00	0.00	0.03	0.00
29	0.17	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTOT	1.35	1.20	1.40	0.83	1.68	1.20	0.75	1.12	1.18	1.26	0.75	0.83	0.61	0.88
APR														
1	0.00	0.04	0.00	0.12	0.00	0.03	0.06	0.05	0.07	0.08	0.00	0.00	0.00	0.07
2	0.00	0.06	0.00	0.00	0.00	0.06	0.06	0.07	0.07	0.07	0.02	0.00	0.00	0.07
3	0.29	0.29	0.32	0.24	0.31	0.51	0.20	0.06	0.06	0.16	0.27	0.21	0.18	0.27
4	0.03	0.06	0.10	0.08	0.08	0.06	0.08	0.13	0.14	0.06	0.00	0.00	0.00	0.04
6	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
12	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
13	0.12	0.30	0.12	0.03	0.65	1.09	0.73	1.31	1.49	1.37	0.80	0.28	0.38	0.80
14	0.23	0.35	0.07	0.07	0.50	0.42	0.24	0.42	0.32	0.44	0.18	0.16	0.13	0.29
15	1.18	1.28	0.81	0.75	1.23	0.79	0.88	1.18	1.16	1.04	0.60	0.63	0.47	0.83
16	1.14	1.13	1.11	1.15	1.18	1.23	1.28	1.34	1.50	1.46	1.38	1.10	*****	1.07
17	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.00	0.00	*****	0.00
19	0.85	0.42	1.05	2.50	0.48	0.44	2.13	1.25	1.61	1.82	2.37	2.22	*****	2.80
20	0.70	1.08	1.33	1.80	1.12	1.56	1.99	1.17	1.51	1.72	2.27	1.47	*****	2.08
21	0.00	0.10	0.00	0.10	0.14	0.10	0.04	0.00	0.01	0.01	0.00	0.04	*****	0.04
22	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	*****	0.00
29	0.25	0.25	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	*****	0.00
30	0.20	0.26	0.30	0.40	0.05	0.11	0.18	0.15	0.15	0.20	0.18	0.29	*****	0.44
MTOT	4.99	5.63	5.26	7.24	5.74	6.44	7.90	7.16	8.11	8.46	8.07	6.40	*****	8.80

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER													
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
MAY														
1	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.00	*****	0.00
2	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
7	0.00	0.04	0.00	0.00	0.00	0.01	0.04	0.00	0.02	0.03	0.00	0.00	*****	0.00
9	0.48	0.10	1.13	0.54	0.38	0.01	0.03	0.00	0.03	0.02	0.00	0.75	*****	0.03
11	0.60	0.59	0.55	0.50	0.00	0.48	0.45	0.25	0.32	0.33	0.38	0.35	*****	0.38
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
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	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	*****	0.01
16	0.00	0.01	0.00	0.00	0.13	0.09	0.07	0.00	0.08	0.22	0.08	0.04	*****	0.06
17	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.04	0.00	0.00	*****	0.00
18	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.02	0.02	0.00	0.00	*****	0.00
19	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00
20	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	*****	0.00
21	0.85	0.96	1.07	1.10	1.08	1.08	1.01	1.00	1.24	1.44	0.98	0.92	*****	1.01
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.00	*****	0.00
23	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	*****	0.00
24	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	*****	0.05
31	1.51	0.89	0.70	0.08	0.47	0.80	0.03	0.00	0.10	0.14	0.00	0.00	*****	0.08
MTOT	3.44	2.66	3.45	2.22	2.06	2.57	1.69	1.25	1.89	2.33	1.44	2.06	*****	1.62
JUN														
1	0.75	0.04	1.13	0.38	0.05	0.01	0.03	0.13	0.01	0.01	1.52	0.00	*****	0.10
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	*****	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	*****	0.00
6	0.00	0.00	0.00	0.00	0.78	0.02	0.00	0.19	0.00	0.00	0.00	0.00	*****	0.00
7	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
11	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.06	0.00	0.03	0.00	0.00	*****	0.11
12	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
13	0.00	0.10	0.00	0.00	0.00	0.07	0.02	0.15	0.21	0.08	0.00	0.00	*****	0.01
14	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.10	0.00	0.00	*****	0.03
15	0.55	0.93	0.24	0.00	0.00	0.06	0.12	0.10	3.67	1.84	0.27	0.00	*****	0.27
16	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.07	*****	0.00
17	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.18	0.00	0.01	0.00	0.00	*****	0.00
18	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
21	0.00	0.09	0.00	0.00	0.05	0.03	0.14	0.45	0.46	0.45	0.07	0.00	*****	0.35
22	0.09	0.26	0.07	0.20	0.55	0.25	0.38	0.75	0.66	0.75	0.33	0.43	*****	0.30
23	0.37	0.89	0.29	0.85	1.75	1.21	0.82	0.77	0.83	0.82	0.78	0.64	*****	1.19
24	0.98	0.05	0.76	0.00	0.00	0.05	0.03	0.00	0.01	0.01	0.00	0.00	*****	0.00
26	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
27	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
MTOT	2.74	2.39	2.49	1.43	3.38	1.74	1.62	2.78	5.94	4.13	2.97	1.14	*****	2.36

MTOT=MONTHLY TOTALS

SAN ANTONIO URBAN HYDROLOGY STUDY

DAILY AND MONTHLY RAINFALL SUMMARY — PERIOD : 1977 WATER YEAR

DATE	GAGE NUMBER												
	1-0	2-0	3-0	4-0	1-S	2-S	3-S	1E-S	2E-S	3E-S	4-S	5-S	6-S	NOAA
JUL														
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.09	0.16	0.00	0.00	*****	0.00
17	0.00	0.00	0.00	0.00	0.00	0.12	0.04	0.00	0.07	0.04	0.00	0.00	*****	0.00
18	0.00	0.01	0.00	0.00	0.00	0.01	0.08	0.00	0.01	0.01	0.00	0.00	*****	0.06
19	0.00	0.00	0.00	0.00	0.07	0.00	0.12	0.00	0.00	0.00	0.04	0.00	*****	0.00
20	0.00	0.00	0.00	0.20	0.00	0.06	0.01	0.00	0.01	0.00	0.00	0.00	*****	0.01
29	0.05	0.05	0.00	0.00	0.00	0.04	0.03	0.07	0.03	0.02	0.00	0.00	*****	0.03
MTOT	0.05	0.06	0.00	0.20	0.07	0.23	0.28	0.19	0.21	0.23	0.04	0.00	*****	0.10
AUG														
2	0.46	0.29	0.00	0.00	0.11	0.03	0.03	0.45	0.28	0.18	0.00	0.00	*****	0.03
3	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.00	*****	0.00
12	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00
16	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
18	0.15	0.05	0.34	0.00	0.56	0.56	0.01	0.62	0.08	0.26	0.00	0.05	*****	0.02
19	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.03	0.02	0.02	0.00	0.00	*****	0.00
20	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*****	0.00
27	0.00	0.00	0.00	0.10	0.00	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	0.00	0.00	0.00	0.28	0.01	0.05	0.00	0.00	*****	0.01
29	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
MTOT	0.61	0.37	0.89	0.10	1.25	0.62	0.05	1.38	0.42	0.55	0.00	0.05	*****	0.06
SEPT														
1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	*****	0.07
5	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	*****	0.00
6	1.74	1.40	2.87	0.58	1.30	1.49	0.51	1.28	0.99	0.94	0.20	0.43	*****	0.80
7	0.00	0.00	0.00	0.00	0.15	0.00	0.08	0.00	0.00	0.01	0.00	0.03	*****	0.06
8	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
9	0.02	0.01	0.00	0.00	0.00	0.02	0.01	0.05	0.00	0.06	0.00	0.00	*****	0.00
10	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.02	0.00	0.00	*****	0.00
12	0.20	0.17	0.37	0.24	0.57	0.36	0.71	0.90	0.51	0.29	0.76	1.87	*****	0.90
13	0.40	0.64	0.13	0.38	0.08	0.33	0.65	0.65	0.69	0.64	0.60	0.13	*****	0.28
14	0.00	0.00	0.00	0.00	0.13	0.01	0.02	0.00	0.02	0.01	0.00	0.00	*****	0.00
19	0.05	0.03	0.20	0.09	0.22	0.02	0.41	0.04	0.00	0.06	0.00	0.00	*****	0.00
20	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.02	0.00	0.00	*****	0.00
MTOT	2.41	2.27	3.72	1.29	2.45	2.27	2.41	3.07	2.25	2.05	1.56	2.46	*****	2.11
WTOT	33.77	33.61	35.72	30.81	37.11	34.67	31.98	35.26	39.41	38.80	30.52	25.01	*****	32.83

MTOT=MONTHLY TOTALS
WTOT=WATER YEAR TOTAL

STA. NO. 08177700 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TEX. — STORM OF OCT 4-5, 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.
OCT 4							
0000	0.0	0.0	0.0	0.0	0.0	1.1	0.0008
2005	0.0	0.0	0.0	0.0	0.0	1.2	0.0017
2010	0.0	0.0	0.0	0.03	0.00	1.2	0.0017
2015	0.0	0.0	0.01	0.06	0.01	1.2	0.0017
2020	0.01	0.01	0.02	0.18	0.03	5.5	0.0017
2025	0.06	0.02	0.04	0.40	0.07	9.7	0.0018
2030	0.07	0.07	0.06	0.90	0.13	14.0	0.0019
2035	0.26	0.14	0.25	1.00	0.29	43.0	0.0021
2040	0.45	0.32	0.60	1.20	0.55	71.0	0.0026
2045	0.65	0.56	0.77	1.58	0.76	100.0	0.0032
2050	0.85	0.90	0.97	1.70	0.97	229.0	0.0046
2055	1.00	1.05	1.14	1.75	1.12	358.0	0.0068
2100	1.10	1.22	1.30	1.85	1.26	487.0	0.0097
2105	1.11	1.27	1.46	1.88	1.34	550.0	0.0131
2110	1.20	1.34	1.60	1.89	1.44	612.0	0.0168
2115	1.22	1.39	1.78	1.90	1.53	675.0	0.0209
2120	1.32	1.48	1.80	1.90	1.59	660.0	0.0249
2125	1.35	1.52	1.83	1.90	1.62	645.0	0.0289
2130	1.37	1.54	1.85	1.91	1.64	631.0	0.0366
2145	1.39	1.55	1.86	1.91	1.65	662.0	0.0487
2200	1.40	1.55	1.88	1.93	1.66	786.0	0.0630
2215	1.41	1.56	1.88	1.93	1.67	951.0	0.0804
2230	1.42	1.56	1.88	1.93	1.67	998.0	0.0986
2245	1.42	1.56	1.88	1.93	1.67	1040.0	0.1176
2300	1.42	1.56	1.88	1.93	1.67	998.0	0.1359
2315	1.42	1.56	1.88	1.93	1.67	967.0	0.1535
2330	1.42	1.56	1.88	1.93	1.67	901.0	0.1700
2345	1.42	1.56	1.88	1.93	1.67	838.0	0.1853
2400	1.42	1.57	1.88	1.93	1.67	700.0	0.1949
OCT 5							
0000	1.42	1.57	1.88	1.93	1.67	700.0	0.1949
0015	1.42	1.57	1.88	1.93	1.67	508.0	0.2074
0030	1.42	1.57	1.88	1.93	1.67	354.0	0.2139
0045	1.42	1.57	1.88	1.93	1.67	253.0	0.2185
0100	1.42	1.57	1.88	1.93	1.67	202.0	0.2222
0115	1.42	1.57	1.88	1.93	1.67	173.0	0.2253
0130	1.42	1.57	1.88	1.93	1.67	145.0	0.2280
0145	1.42	1.57	1.88	1.93	1.67	128.0	0.2303
0200	1.42	1.57	1.88	1.93	1.67	112.0	0.2334
0230	1.42	1.57	1.88	1.93	1.67	89.0	0.2366

STA. NO. 08177700 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TEX. — STORM OF OCT 4-5, 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.
OCT 5							
0300	1.42	1.57	1.88	1.93	1.67	74.0	0.2394
0330	1.42	1.57	1.88	1.93	1.67	62.0	0.2416
0400	1.42	1.57	1.88	1.93	1.67	52.0	0.2445
0500	1.42	1.57	1.88	1.93	1.67	42.0	0.2491
0700	1.42	1.57	1.88	1.93	1.67	30.0	0.2535
0900	1.42	1.57	1.88	1.93	1.67	20.0	0.2564
1100	1.42	1.57	1.88	1.93	1.67	14.0	0.2579
1200	1.42	1.57	1.88	1.93	1.67	11.0	0.2587
1300	1.42	1.58	1.88	1.93	1.67	8.9	0.2603
1700	1.42	1.58	1.88	1.93	1.67	5.5	0.2620
2100	1.42	1.59	1.88	1.93	1.68	3.1	0.2628
2400	1.42	1.59	1.88	1.93	1.68	2.4	0.2630

STA. NO. 08177700 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TEX. STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-0	2-0	3-0	4-0	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19							
0000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1815	0.0	0.0	0.0	0.07	0.01	0.0	0.0
1830	0.0	0.0	0.0	0.07	0.01	0.0	0.0
1850	0.0	0.0	0.0	0.14	0.02	0.0	0.0
1855	0.0	0.01	0.0	0.24	0.02	0.0	0.0
1900	0.02	0.02	0.0	0.30	0.03	0.0	0.0
1905	0.04	0.03	0.0	0.60	0.07	0.0	0.0
1910	0.05	0.03	0.0	0.90	0.09	0.0	0.0
1915	0.07	0.03	0.0	1.20	0.13	0.0	0.0
1920	0.09	0.03	0.01	1.37	0.15	0.0	0.0
1925	0.10	0.04	0.02	1.53	0.17	0.0	0.0
1930	0.11	0.05	0.03	1.70	0.19	0.0	0.0
1935	0.12	0.06	0.04	1.88	0.22	0.0	0.0
1940	0.12	0.07	0.05	2.05	0.24	0.0	0.0
1945	0.13	0.08	0.06	2.23	0.26	0.1	0.0000
2000	0.22	0.10	0.10	2.23	0.31	0.1	0.0000
2005	0.23	0.13	0.14	2.23	0.34	38.0	0.0002
2010	0.23	0.15	0.18	2.23	0.36	76.0	0.0007
2015	0.24	0.17	0.22	2.23	0.38	114.0	0.0014
2020	0.24	0.19	0.22	2.23	0.38	152.0	0.0023
2025	0.24	0.20	0.22	2.23	0.39	190.0	0.0035
2030	0.27	0.21	0.25	2.23	0.41	228.0	0.0049
2035	0.28	0.22	0.29	2.23	0.43	356.0	0.0070
2040	0.29	0.23	0.34	2.23	0.45	485.0	0.0100
2045	0.30	0.24	0.38	2.23	0.48	613.0	0.0137
2050	0.30	0.25	0.40	2.23	0.49	741.0	0.0182
2055	0.31	0.25	0.41	2.23	0.49	870.0	0.0235
2100	0.32	0.26	0.43	2.23	0.51	998.0	0.0296
2105	0.38	0.27	0.43	2.30	0.53	945.0	0.0354
2110	0.38	0.28	0.44	2.36	0.54	892.0	0.0408
2115	0.38	0.29	0.44	2.42	0.55	840.0	0.0510
2130	0.39	0.30	0.46	2.42	0.56	681.0	0.0635
2145	0.39	0.30	0.47	2.42	0.57	543.0	0.0734
2200	0.39	0.30	0.49	2.42	0.58	406.0	0.0808
2215	0.39	0.30	0.51	2.42	0.58	362.0	0.0874
2230	0.39	0.31	0.64	2.46	0.64	319.0	0.0962
2300	0.43	0.31	0.66	2.50	0.67	246.0	0.1029
2315	0.50	0.32	0.67	2.50	0.70	200.0	0.1066
2330	0.52	0.39	0.86	2.50	0.79	167.0	0.1096

STA. NO. 08177700	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-0	2-0	3-0	4-0	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19							
2345	0.55	0.41	0.98	2.50	0.85	136.0	0.1113
2350	0.65	0.42	0.98	2.50	0.89	126.0	0.1121
2355	0.75	0.42	0.98	2.50	0.92	116.0	0.1128
2400	0.85	0.42	1.05	2.50	0.98	106.0	0.1134
APR 20							
0000	0.85	0.42	1.05	2.50	0.98	106.0	0.1134
0010	0.85	0.43	1.25	2.50	1.07	101.0	0.1150
0020	0.85	0.55	1.46	2.50	1.17	97.0	0.1161
0030	0.85	0.58	1.46	2.50	1.18	92.0	0.1184
0100	0.86	0.58	1.46	2.60	1.19	133.0	0.1220
0115	0.86	0.58	1.46	2.62	1.19	190.0	0.1255
0130	0.87	0.58	1.46	2.67	1.20	246.0	0.1300
0145	0.87	0.58	1.46	2.67	1.20	328.0	0.1360
0200	0.87	0.58	1.46	2.73	1.20	410.0	0.1435
0215	0.87	0.58	1.46	2.76	1.20	464.0	0.1520
0230	0.87	0.58	1.46	2.78	1.21	518.0	0.1614
0245	0.87	0.58	1.46	2.79	1.21	502.0	0.1706
0300	0.88	0.58	1.47	2.80	1.22	487.0	0.1839
0330	0.88	0.58	1.48	2.82	1.22	350.0	0.1967
0400	0.88	0.58	1.49	2.82	1.23	218.0	0.2027
0415	0.88	0.59	1.49	2.83	1.23	175.0	0.2059
0430	0.89	0.59	1.50	2.83	1.24	133.0	0.2083
0445	0.89	0.59	1.51	2.90	1.24	112.0	0.2104
0500	0.89	0.59	1.51	3.02	1.25	92.0	0.2121
0515	0.89	0.59	1.51	3.30	1.28	84.0	0.2136
0530	0.89	0.59	1.51	3.40	1.28	76.0	0.2157
0600	0.90	0.59	1.52	3.42	1.29	67.0	0.2175
0615	0.96	0.60	1.53	3.48	1.32	142.0	0.2201
0630	0.96	0.65	1.68	3.48	1.39	218.0	0.2241
0645	0.98	0.66	1.68	3.51	1.40	502.0	0.2333
0700	1.00	0.68	1.70	3.63	1.43	786.0	0.2476
0715	1.02	0.70	1.71	3.70	1.45	734.0	0.2610
0730	1.05	0.72	1.72	4.30	1.52	683.0	0.2735
0745	1.12	0.76	1.74	4.30	1.56	612.0	0.2847
0800	1.16	0.83	1.75	4.30	1.59	540.0	0.2946
0815	1.22	0.88	1.77	4.30	1.63	424.0	0.2997
0820	1.28	0.89	1.79	4.30	1.66	385.0	0.3021
0825	1.35	0.91	1.81	4.30	1.69	346.0	0.3042
0830	1.41	0.96	1.83	4.30	1.73	307.0	0.3061
0835	1.42	1.16	1.95	4.30	1.82	394.0	0.3085

STA. NO. 08177700	STORM RAINFALL AND RUNOFF RECORD							1977 WATER YEAR
OLMOS CREEK AT DRESDEN DRIVE, SAN ANTONIO, TEX.	STORM OF APRIL 19-20, 1977						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
DATE & TIME	GAGE NUMBER								
	1-0	2-0	3-0	4-0					
APR 20									
0840	1.42	1.33	2.08	4.30			1.90	481.0	0.3114
0845	1.43	1.40	2.20	4.30			1.96	567.0	0.3183
0900	1.44	1.42	2.25	4.30			1.99	828.0	0.3309
0910	1.44	1.44	2.26	4.30			2.00	783.0	0.3452
0930	1.45	1.44	2.28	4.30			2.01	694.0	0.3664
1000	1.46	1.44	2.30	4.30			2.02	551.0	0.3865
1030	1.47	1.44	2.33	4.30			2.03	580.0	0.4024
1045	1.50	1.44	2.34	4.30			2.05	594.0	0.4132
1100	1.55	1.44	2.35	4.30			2.07	608.0	0.4410
1200	1.55	1.44	2.38	4.30			2.08	396.0	0.4700
1300	1.55	1.44	2.38	4.30			2.08	145.0	0.4766
1315	1.55	1.50	2.38	4.30			2.09	136.0	0.4791
1330	1.55	1.50	2.38	4.30			2.09	126.0	0.4848
1430	1.55	1.50	2.38	4.30			2.09	90.0	0.4898
1500	1.55	1.50	2.38	4.30			2.09	86.0	0.4929
1530	1.55	1.50	2.38	4.30			2.09	78.0	0.4958
1600	1.55	1.50	2.38	4.30			2.09	73.0	0.5184
2400	1.55	1.50	2.38	4.30			2.09	73.0	0.5398

STA. NO. 08178700 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

SALADO CREEK UPPER STA. AT SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	2-O	3-O	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19								
0000	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0006
1445	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0011
1450	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0011
1455	0.0	0.0	0.02	0.0	0.0	0.00	6.6	0.0013
1855	0.0	0.0	0.04	0.01	0.0	0.01	6.6	0.0014
1930	0.0	0.02	0.06	0.05	0.03	0.02	6.6	0.0015
2000	0.01	0.11	0.11	0.10	0.10	0.08	6.6	0.0015
2015	0.03	0.17	0.14	0.17	0.22	0.12	7.5	0.0015
2020	0.05	0.22	0.19	0.19	0.23	0.16	7.5	0.0015
2025	0.07	0.25	0.39	0.20	0.24	0.22	7.5	0.0015
2030	0.09	0.28	0.50	0.21	0.25	0.26	7.5	0.0015
2035	0.11	0.30	0.53	0.22	0.29	0.28	7.9	0.0015
2045	0.15	0.32	0.74	0.24	0.33	0.35	8.6	0.0016
2050	0.16	0.33	1.06	0.25	0.39	0.43	11.0	0.0016
2055	0.17	0.33	1.41	0.25	0.41	0.51	14.0	0.0016
2100	0.18	0.34	1.73	0.26	0.43	0.59	16.0	0.0016
2115	0.33	0.34	1.79	0.29	0.44	0.65	314.0	0.0025
2130	0.38	0.38	1.82	0.30	0.46	0.69	382.0	0.0036
2145	0.44	0.38	1.84	0.30	0.47	0.72	331.0	0.0045
2200	0.47	0.38	1.94	0.30	0.49	0.75	277.0	0.0053
2215	0.48	0.38	1.96	0.30	0.51	0.76	292.0	0.0061
2230	0.48	0.38	1.96	0.31	0.64	0.76	353.0	0.0071
2245	0.48	0.38	1.97	0.31	0.64	0.76	574.0	0.0087
2300	0.48	0.38	1.97	0.32	0.64	0.76	674.0	0.0107
2315	0.48	0.39	1.97	0.32	0.64	0.77	690.0	0.0126
2330	0.48	0.42	1.97	0.39	0.77	0.78	701.0	0.0146
2345	0.48	0.43	2.00	0.41	0.98	0.80	716.0	0.0166
2400	0.48	0.43	2.13	0.42	1.05	0.83	728.0	0.0182
APR 20								
0000	0.48	0.43	2.13	0.42	1.05	0.83	728.0	0.0182
0015	0.48	0.51	2.13	0.48	1.30	0.87	724.0	0.0207
0030	0.48	0.55	2.14	0.57	1.46	0.90	720.0	0.0228
0045	0.48	0.56	2.14	0.58	1.46	0.90	728.0	0.0248
0100	0.49	0.57	2.14	0.58	1.46	0.91	772.0	0.0270
0115	0.49	0.57	2.14	0.58	1.46	0.91	798.0	0.0293
0130	0.50	0.57	2.14	0.58	1.46	0.91	923.0	0.0319
0145	0.51	0.57	2.14	0.58	1.46	0.91	1000.0	0.0347
0200	0.52	0.58	2.15	0.58	1.46	0.92	1020.0	0.0376
0215	0.52	0.58	2.15	0.58	1.46	0.92	1040.0	0.0405
0230	0.52	0.58	2.19	0.58	1.46	0.93	1040.0	0.0435

STA. NO. 08178700 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

SALADO CREEK UPPER STA. AT SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	2-O	3-O			ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 20										
0245	0.52	0.58	2.19	0.58	1.46			0.93	1020.0	0.0463
0300	0.52	0.58	2.22	0.58	1.47			0.94	990.0	0.0491
0315	0.52	0.58	2.26	0.58	1.47			0.95	952.0	0.0518
0330	0.52	0.58	2.31	0.58	1.48			0.96	901.0	0.0544
0345	0.52	0.58	2.40	0.58	1.49			0.98	872.0	0.0568
0400	0.52	0.58	2.44	0.58	1.49			0.99	901.0	0.0594
0415	0.52	0.58	2.46	0.59	1.50			0.99	894.0	0.0619
0430	0.52	0.58	2.48	0.59	1.51			1.00	804.0	0.0653
0500	0.52	0.58	2.48	0.59	1.51			1.00	824.0	0.0688
0515	0.52	0.58	2.48	0.59	1.51			1.00	845.0	0.0712
0530	0.52	0.58	2.49	0.59	1.51			1.00	873.0	0.0737
0545	0.52	0.58	2.64	0.59	1.52			1.03	894.0	0.0762
0600	0.52	0.58	2.79	0.59	1.52			1.07	923.0	0.0801
0630	0.52	0.59	2.90	0.65	1.68			1.10	937.0	0.0854
0700	0.52	0.71	2.95	0.68	1.70			1.16	945.0	0.0894
0715	0.69	0.73	2.99	0.70	1.71			1.23	930.0	0.0921
0730	1.01	0.75	3.12	0.72	1.72			1.37	945.0	0.0961
0800	1.01	0.81	3.18	0.83	1.75			1.42	923.0	0.1013
0830	1.10	0.92	3.44	0.96	1.83			1.55	967.0	0.1054
0845	1.13	1.26	3.99	1.40	2.20			1.85	1080.0	0.1084
0900	1.15	1.91	4.09	1.42	2.25			2.11	1250.0	0.1120
0915	1.18	1.95	4.10	1.44	2.26			2.14	1470.0	0.1161
0930	1.22	1.99	4.10	1.44	2.28			2.17	1730.0	0.1210
0945	1.26	1.99	4.10	1.44	2.29			2.18	2010.0	0.1267
1000	1.50	2.00	4.10	1.44	2.30			2.26	2490.0	0.1373
1030	1.58	2.00	4.10	1.44	2.33			2.29	2720.0	0.1488
1045	1.60	2.00	4.10	1.44	2.33			2.30	2540.0	0.1560
1100	1.60	2.00	4.11	1.44	2.35			2.30	2640.0	0.1672
1130	1.60	2.00	4.11	1.44	2.36			2.30	2140.0	0.1823
1215	1.60	2.00	4.11	1.44	2.38			2.30	2000.0	0.2021
1315	1.60	2.00	4.12	1.50	2.38			2.31	2090.0	0.2258
1415	1.60	2.00	4.12	1.50	2.38			2.31	2010.0	0.2428
1445	1.60	2.00	4.12	1.50	2.38			2.31	1870.0	0.2534
1515	1.60	2.00	4.12	1.50	2.38			2.31	1610.0	0.2625
1545	1.60	2.00	4.12	1.50	2.38			2.31	1360.0	0.2721
1630	1.60	2.00	4.12	1.50	2.38			2.31	1120.0	0.2800
1700	1.60	2.00	4.12	1.50	2.38			2.31	1020.0	0.2858
1730	1.60	2.00	4.12	1.50	2.38			2.31	937.0	0.2911
1800	1.60	2.00	4.12	1.50	2.38			2.31	845.0	0.2959

STA. NO. 08178700 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

SALADO CREEK UPPER STA. AT SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-S	2-S	3-S	2-O	3-O			ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 20										
1830	1.60	2.00	4.12	1.50	2.38			2.31	772.0	0.3013
1915	1.60	2.00	4.12	1.50	2.38			2.31	690.0	0.3072
2000	1.60	2.00	4.12	1.50	2.38			2.31	619.0	0.3133
2100	1.60	2.00	4.12	1.50	2.38			2.31	507.0	0.3190
2200	1.60	2.00	4.12	1.50	2.38			2.31	365.0	0.3232
2300	1.60	2.00	4.12	1.50	2.38			2.31	289.0	0.3264
2400	1.60	2.00	4.12	1.50	2.38			2.31	232.0	0.3277

STA. NO. 08181400 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

HELOTES CREEK AT HELOTES, TEX — STORM OF OCT 23-24, 1976

DATE & TIME	GAGE NUMBER 1-H	2-H	3-H	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 23						
0000	0.0	0.0	0.0	0.0	10.0	0.0073
1410	0.0	0.0	0.0	0.0	10.0	0.0147
1415	0.03	0.03	0.0	0.03	10.0	0.0150
1445	0.05	0.06	0.0	0.05	10.0	0.0155
1515	0.05	0.06	0.0	0.05	10.0	0.0164
1630	0.08	0.09	0.0	0.08	10.0	0.0183
1900	0.09	0.09	0.0	0.09	10.0	0.0200
1945	0.15	0.18	0.0	0.15	10.0	0.0205
2000	0.17	0.20	0.0	0.17	10.0	0.0208
2015	0.17	0.20	0.02	0.17	10.0	0.0212
2045	0.17	0.20	0.05	0.17	10.0	0.0218
2130	0.19	0.22	0.05	0.19	10.0	0.0229
2245	0.19	0.22	0.05	0.19	13.0	0.0239
2300	0.21	0.25	0.05	0.21	13.0	0.0242
2315	0.30	0.35	0.05	0.30	13.0	0.0245
2330	0.38	0.45	0.05	0.38	13.0	0.0249
2345	0.47	0.55	0.13	0.47	13.0	0.0252
2400	0.53	0.62	0.13	0.53	13.0	0.0255
OCT 24						
0000	0.53	0.62	0.13	0.53	13.0	0.0255
0015	0.57	0.67	0.15	0.57	13.0	0.0259
0030	0.60	0.70	0.18	0.60	14.0	0.0262
0045	0.72	0.85	0.21	0.73	14.0	0.0266
0100	0.82	0.97	0.24	0.83	15.0	0.0270
0115	0.98	1.15	0.27	0.99	27.0	0.0277
0130	1.00	1.17	0.30	1.01	39.0	0.0287
0145	1.15	1.35	0.33	1.16	51.0	0.0300
0200	1.28	1.50	0.51	1.30	64.0	0.0317
0215	1.47	1.73	0.53	1.49	136.0	0.0352
0230	1.81	2.13	0.65	1.83	159.0	0.0393
0245	2.19	2.57	0.86	2.22	167.0	0.0436
0300	2.32	2.73	1.13	2.36	349.0	0.0526
0315	2.37	2.79	1.51	2.43	1150.0	0.0823
0330	2.40	2.83	1.59	2.47	1560.0	0.1226
0345	2.42	2.84	1.63	2.49	1840.0	0.1701
0400	2.43	2.86	1.68	2.50	1790.0	0.2163
0415	2.44	2.87	1.69	2.51	1570.0	0.2569
0430	2.45	2.89	1.71	2.52	1370.0	0.2923
0445	2.45	2.89	1.71	2.52	1340.0	0.3269
0500	2.46	2.90	1.71	2.53	985.0	0.3905

STA. NO. 08181400	STORM RAINFALL AND RUNOFF RECORD							1977 WATER YEAR		
HELOTES CREEK AT HELOTES, TEX	STORM OF OCT 23-24, 1976							ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
DATE & TIME	GAGE NUMBER									
	1-H	2-H	3-H							
OCT 24										
0600	2.47	2.91	1.71					2.54	850.0	0.4783
0700	2.49	2.93	1.71					2.55	645.0	0.5283
0730	2.54	2.99	1.71					2.61	494.0	0.5538
0800	2.56	3.03	1.79					2.64	393.0	0.5842
0900	2.59	3.05	1.81					2.67	299.0	0.6151
1000	2.62	3.09	1.88					2.70	259.0	0.6419
1100	2.64	3.11	1.89					2.72	234.0	0.6661
1200	2.64	3.11	1.91					2.72	234.0	0.7023
1400	2.66	3.14	1.92					2.74	234.0	0.7386
1500	2.71	3.20	1.93					2.79	234.0	0.7627
1600	2.76	3.25	1.99					2.84	238.0	0.7812
1630	2.76	3.25	2.01					2.84	234.0	0.8054
1800	2.76	3.25	2.01					2.84	234.0	0.8477
2000	2.76	3.25	2.01					2.84	223.0	0.9168
2400	2.76	3.25	2.01					2.84	211.0	0.9931
OCT 25										
0000	2.76	3.25	2.01					2.84	211.0	0.9931
0600	2.76	3.25	2.01					2.84	197.0	1.1479
1200	2.76	3.25	2.01					2.84	171.0	1.2539
1800	2.76	3.25	2.01					2.84	147.0	1.3450
2400	2.76	3.25	2.01					2.84	132.0	1.3859

STA. NO. 08181450	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB, TEX. — STORM OF OCT 4, 1976

DATE & TIME	GAGE NUMBER 4-L	GAGE NUMBER 5-L	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 4					
0000	0.0	0.0	0.0	0.0	0.0
1950	0.07	0.0	0.04	0.0	0.0
2000	0.13	0.02	0.11	0.0	0.0
2015	0.70	0.70	0.70	0.0	0.0
2030	1.00	1.25	1.09	5.5	0.0018
2045	1.11	1.33	1.19	5.1	0.0035
2100	1.13	1.35	1.21	1.5	0.0039
2115	1.15	1.40	1.24	2.1	0.0046
2130	1.15	1.40	1.24	92.0	0.0346
2145	1.15	1.40	1.24	123.0	0.0746
2200	1.15	1.40	1.24	124.0	0.1150
2215	1.15	1.40	1.24	97.0	0.1466
2230	1.15	1.40	1.24	86.0	0.1746
2245	1.15	1.40	1.24	78.0	0.1999
2300	1.15	1.40	1.24	62.0	0.2201
2315	1.15	1.40	1.24	55.0	0.2380
2330	1.15	1.40	1.24	47.0	0.2533
2345	1.15	1.40	1.24	43.0	0.2673
2400	1.15	1.40	1.24	36.0	0.2849
OCT 5					
0000	1.15	1.40	1.24	36.0	0.2849
0100	1.15	1.40	1.24	20.0	0.3227
0200	1.15	1.40	1.24	12.0	0.3383
0300	1.15	1.40	1.24	6.9	0.3473
0400	1.15	1.40	1.24	4.2	0.3528
0500	1.15	1.40	1.24	2.1	0.3555
0600	1.15	1.40	1.24	1.3	0.3580
0800	1.15	1.40	1.24	0.2	0.3604
2400	1.15	1.40	1.24	0.1	0.3614

STA. NO. 08181450 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB, TEX. — STORM OF OCT 19, 1976

DATE & TIME	GAGE NUMBER 4-L	GAGE NUMBER 5-L	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 19					
0000	0.0	0.0	0.0	0.0	0.0
0845	0.0	0.0	0.0	0.0	0.0
0900	0.14	0.05	0.11	0.0	0.0
0915	0.27	0.30	0.28	0.3	0.0001
0930	0.40	0.35	0.38	0.7	0.0003
0945	0.47	0.45	0.46	0.7	0.0006
1000	0.59	0.50	0.55	0.7	0.0008
1015	0.65	0.60	0.63	1.0	0.0011
1030	0.73	0.66	0.71	0.3	0.0012
1045	0.79	0.70	0.76	0.3	0.0013
1100	0.81	0.75	0.79	32.0	0.0117
1115	0.84	0.75	0.81	49.0	0.0277
1130	0.85	0.76	0.82	54.0	0.0453
1145	0.90	0.80	0.86	54.0	0.0628
1200	0.97	0.85	0.93	51.0	0.0794
1215	1.01	0.95	0.99	50.0	0.0957
1230	1.25	1.05	1.18	49.0	0.1117
1245	1.26	1.05	1.18	55.0	0.1296
1300	1.26	1.05	1.18	62.0	0.1497
1315	1.26	1.05	1.18	67.0	0.1716
1330	1.26	1.05	1.18	68.0	0.1937
1345	1.26	1.05	1.18	60.0	0.2132
1400	1.26	1.05	1.18	54.0	0.2396
1430	1.26	1.05	1.18	43.0	0.2676
1500	1.26	1.05	1.18	32.0	0.2884
1530	1.26	1.05	1.18	26.0	0.3054
1600	1.26	1.05	1.18	20.0	0.3151
1615	1.26	1.05	1.18	19.0	0.3275
1700	1.26	1.05	1.18	12.0	0.3373
1730	1.26	1.05	1.18	9.4	0.3434
1800	1.26	1.05	1.18	6.9	0.3501
1900	1.26	1.05	1.18	4.6	0.3561
2000	1.26	1.05	1.18	2.4	0.3592
2100	1.26	1.05	1.18	1.5	0.3612
2200	1.26	1.05	1.18	0.7	0.3621
2300	1.26	1.05	1.18	0.3	0.3625
2400	1.26	1.05	1.18	0.2	0.3626

STA. NO. 08181450	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB, TEX. — STORM OF MAY 9, 1977

DATE & TIME	GAGE NUMBER 4-L	5-L	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 9					
0000	0.0	0.0	0.0	1.0	0.0038
0550	0.0	0.0	0.0	1.0	0.0077
0600	0.04	0.10	0.06	1.0	0.0080
0615	0.22	0.13	0.19	1.0	0.0084
0640	0.25	0.15	0.21	1.0	0.0087
0645	0.75	0.17	0.54	40.0	0.0174
0700	1.01	0.19	0.71	147.0	0.0653
0715	1.03	0.19	0.72	143.0	0.1118
0730	1.05	0.20	0.74	119.0	0.1506
0745	1.06	0.20	0.74	97.0	0.1821
0800	1.06	0.20	0.74	71.0	0.2168
0830	1.06	0.20	0.74	58.0	0.2451
0845	1.06	0.20	0.74	41.0	0.2585
0900	1.06	0.20	0.74	36.0	0.2761
0930	1.06	0.20	0.74	25.0	0.2923
1000	1.06	0.20	0.74	19.0	0.3109
1100	1.06	0.20	0.74	11.0	0.3252
1200	1.06	0.20	0.74	6.4	0.3336
1300	1.06	0.20	0.74	3.1	0.3376
1400	1.06	0.20	0.74	1.8	0.3399
1500	1.06	0.20	0.74	0.7	0.3409
1600	1.06	0.20	0.74	0.3	0.3415
1800	1.06	0.20	0.74	0.2	0.3425
2400	1.06	0.20	0.74	0.1	0.3428

STA. NO. 08181450 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

LEON CREEK TRIBUTARY AT KELLY AFB, TEX. STORM OF SEPT 12-13, 1977

DATE & TIME	GAGE NUMBER 4-L	GAGE NUMBER 5-L	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
SEPT 12					
0000	0.0	0.0	0.0	0.0	0.0
1730	0.0	0.0	0.0	0.0	0.0
1745	0.05	0.0	0.03	0.0	0.0
2200	0.05	0.0	0.03	0.0	0.0
2215	0.13	0.0	0.08	0.0	0.0
2230	0.25	0.60	0.38	0.0	0.0
2245	0.80	1.20	0.95	0.0	0.0
2300	1.65	1.80	1.71	5.1	0.0017
2315	2.55	2.00	2.35	6.0	0.0036
2330	2.80	2.05	2.52	6.0	0.0056
2345	2.85	2.10	2.57	144.0	0.0524
2400	2.93	2.10	2.62	336.0	0.1345
SEPT 13					
0000	2.93	2.10	2.62	336.0	0.1345
0015	2.94	2.15	2.65	220.0	0.2334
0030	2.95	2.15	2.65	164.0	0.2868
0045	2.95	2.20	2.67	137.0	0.3314
0100	2.95	2.20	2.67	114.0	0.3685
0115	2.95	2.20	2.67	94.0	0.3991
0130	2.95	2.20	2.67	81.0	0.4255
0145	2.96	2.20	2.68	68.0	0.4477
0200	2.96	2.20	2.68	58.0	0.4665
0215	2.96	2.23	2.69	49.0	0.4905
0245	2.97	2.23	2.70	37.0	0.5085
0300	2.97	2.25	2.70	36.0	0.5203
0315	2.99	2.26	2.72	32.0	0.5307
0330	3.01	2.26	2.73	26.0	0.5391
0345	3.03	2.26	2.75	24.0	0.5469
0400	3.03	2.26	2.75	24.0	0.5665
0500	3.03	2.26	2.75	16.0	0.5873
0600	3.03	2.26	2.75	10.0	0.6003
0700	3.03	2.26	2.75	6.0	0.6081
0800	3.03	2.26	2.75	3.5	0.6127
0900	3.03	2.26	2.75	2.1	0.6154
1000	3.03	2.26	2.75	0.7	0.6164
1100	3.03	2.26	2.75	0.1	0.6165
1200	3.03	2.26	2.75	0.0	0.6165
2400	3.03	2.26	2.75	0.0	0.6165

STA. NO. 08178300	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19					
0000	0.0	0.0	0.0	0.0	0.0
1445	0.0	0.0	0.0	0.0	0.0
1450	0.0	0.01	0.00	0.0	0.0
1500	0.0	0.04	0.01	0.0	0.0
1850	0.01	0.05	0.02	0.0	0.0
1915	0.04	0.07	0.05	0.0	0.0
1935	0.08	0.10	0.09	0.0	0.0
1945	0.20	0.16	0.19	0.0	0.0
1950	0.25	0.23	0.24	0.0	0.0
1955	0.28	0.33	0.29	52.0	0.0021
2000	0.33	0.46	0.37	80.0	0.0052
2005	0.41	0.59	0.46	126.0	0.0102
2010	0.48	0.67	0.53	175.0	0.0172
2015	0.50	0.84	0.59	212.0	0.0255
2020	0.55	0.95	0.66	251.0	0.0355
2025	0.68	1.15	0.81	325.0	0.0484
2030	0.78	1.36	0.94	415.0	0.0648
2035	0.84	1.58	1.04	517.0	0.0853
2040	0.85	2.16	1.20	742.0	0.1147
2045	0.87	2.33	1.26	957.0	0.1526
2050	0.87	2.34	1.27	1100.0	0.1962
2055	0.88	2.34	1.27	916.0	0.2324
2100	0.88	2.34	1.27	784.0	0.2635
2105	0.88	2.35	1.28	678.0	0.2903
2110	0.88	2.35	1.28	570.0	0.3129
2115	0.88	2.35	1.28	482.0	0.3320
2120	0.88	2.35	1.28	395.0	0.3477
2125	0.89	2.35	1.28	324.0	0.3605
2130	0.89	2.35	1.28	277.0	0.3824
2145	0.89	2.35	1.28	231.0	0.4007
2150	0.93	2.35	1.31	157.0	0.4070
2155	0.98	2.35	1.35	143.0	0.4126
2200	1.03	2.36	1.39	130.0	0.4178
2205	1.05	2.38	1.41	116.0	0.4247
2215	1.05	2.44	1.43	144.0	0.4389
2230	1.05	2.45	1.43	200.0	0.4587
2240	1.06	2.45	1.44	212.0	0.4713
2245	1.06	2.46	1.44	196.0	0.4869
2300	1.07	2.46	1.45	155.0	0.4991

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19					
2305	1.08	2.46	1.45	133.0	0.5044
2310	1.10	2.46	1.47	124.0	0.5093
2315	1.35	2.46	1.65	116.0	0.5139
2320	1.42	2.46	1.70	109.0	0.5182
2325	1.54	2.48	1.79	112.0	0.5227
2330	1.55	2.49	1.80	107.0	0.5290
2340	1.55	2.54	1.82	103.0	0.5351
2345	1.55	2.55	1.82	110.0	0.5395
2350	1.55	2.56	1.82	133.0	0.5448
2355	1.56	2.56	1.83	162.0	0.5512
2400	1.56	2.56	1.83	221.0	0.5599
APR 20					
0000	1.56	2.56	1.83	221.0	0.5599
0010	1.56	2.56	1.83	279.0	0.5809
0015	1.56	2.56	1.83	243.0	0.5905
0020	1.56	2.56	1.83	214.0	0.6032
0030	1.56	2.56	1.83	165.0	0.6130
0035	1.56	2.56	1.83	140.0	0.6214
0045	1.56	2.56	1.83	121.0	0.6405
0115	1.56	2.56	1.83	102.0	0.6587
0130	1.57	2.56	1.84	82.0	0.6668
0140	1.59	2.56	1.85	75.0	0.6728
0150	1.61	2.56	1.87	68.0	0.6782
0200	1.61	2.56	1.87	63.0	0.6844
0215	1.61	2.56	1.87	56.0	0.6888
0220	1.64	2.58	1.89	55.0	0.6921
0230	1.64	2.58	1.89	61.0	0.6981
0245	1.64	2.62	1.90	64.0	0.7032
0250	1.64	2.63	1.91	66.0	0.7071
0300	1.64	2.64	1.91	70.0	0.7113
0305	1.66	2.65	1.93	76.0	0.7143
0310	1.68	2.65	1.94	78.0	0.7174
0315	1.69	2.70	1.96	82.0	0.7206
0320	1.69	2.75	1.98	86.0	0.7241
0325	1.70	2.79	1.99	91.0	0.7277
0330	1.71	2.83	2.01	101.0	0.7317
0335	1.71	2.85	2.02	112.0	0.7361
0340	1.72	2.88	2.03	128.0	0.7412
0345	1.74	2.94	2.06	136.0	0.7465
0350	1.75	2.97	2.08	152.0	0.7526

STA. NO. 08178300	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 20					
0355	1.77	2.98	2.10	165.0	0.7624
0405	1.77	2.98	2.10	165.0	0.7722
0410	1.77	2.99	2.10	154.0	0.7813
0420	1.77	2.99	2.10	134.0	0.7893
0425	1.77	2.99	2.10	125.0	0.7942
0430	1.78	2.99	2.11	120.0	0.8014
0440	1.78	2.99	2.11	105.0	0.8118
0455	1.78	2.99	2.11	96.0	0.8232
0510	1.78	2.99	2.11	85.0	0.8299
0515	1.79	2.99	2.11	83.0	0.8365
0530	1.80	3.00	2.12	78.0	0.8458
0545	1.92	3.00	2.21	72.0	0.8515
0550	2.08	3.05	2.34	73.0	0.8544
0555	2.50	3.05	2.65	72.0	0.8572
0600	2.60	3.08	2.73	72.0	0.8601
0605	2.63	3.14	2.77	80.0	0.8632
0610	2.64	3.30	2.82	115.0	0.8678
0615	2.64	3.36	2.83	155.0	0.8739
0620	2.65	3.37	2.84	409.0	0.8901
0625	2.65	3.37	2.84	535.0	0.9113
0630	2.65	3.39	2.85	726.0	0.9401
0635	2.65	3.39	2.85	895.0	0.9755
0640	2.65	3.39	2.85	806.0	1.0074
0645	2.65	3.39	2.85	690.0	1.0348
0650	2.66	3.39	2.86	544.0	1.0563
0655	2.66	3.39	2.86	451.0	1.0742
0700	2.67	3.39	2.86	359.0	1.0884
0705	2.67	3.39	2.86	308.0	1.1006
0710	2.68	3.39	2.87	272.0	1.1114
0715	2.69	3.39	2.88	240.0	1.1209
0720	2.70	3.39	2.89	215.0	1.1294
0725	2.71	3.40	2.90	190.0	1.1369
0730	2.72	3.40	2.90	180.0	1.1441
0735	2.73	3.40	2.91	165.0	1.1506
0740	2.75	3.40	2.93	160.0	1.1569
0745	2.76	3.41	2.94	157.0	1.1632
0750	2.77	3.42	2.95	162.0	1.1696
0755	2.78	3.44	2.96	155.0	1.1757
0800	2.79	3.45	2.97	165.0	1.1822

STA. NO. 08178300	STORM RAINFALL AND RUNOFF RECORD							1977 WATER YEAR
ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX.	STORM OF APRIL 19-20, 1977						ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
DATE & TIME	GAGE NUMBER								
	1-A	2-A							
APR 20									
0805	2.84	3.47					3.01	162.0	1.1887
0810	2.89	3.49					3.05	165.0	1.1952
0815	2.90	3.53					3.07	174.0	1.2021
0820	3.12	3.63					3.26	203.0	1.2101
0825	3.19	3.64					3.31	240.0	1.2196
0830	3.20	3.64					3.32	279.0	1.2307
0835	3.20	3.69					3.33	342.0	1.2442
0840	3.20	3.69					3.33	460.0	1.2625
0845	3.21	3.69					3.34	538.0	1.2838
0850	3.21	3.69					3.34	718.0	1.3122
0855	3.21	3.69					3.34	729.0	1.3411
0900	3.22	3.71					3.35	658.0	1.3671
0905	3.22	3.71					3.35	566.0	1.3896
0910	3.22	3.71					3.35	492.0	1.4091
0915	3.23	3.71					3.36	417.0	1.4256
0920	3.23	3.71					3.36	357.0	1.4397
0925	3.23	3.71					3.36	311.0	1.4520
0930	3.23	3.71					3.36	270.0	1.4627
0935	3.24	3.71					3.37	236.0	1.4767
0945	3.24	3.71					3.37	203.0	1.4928
0955	3.25	3.71					3.37	168.0	1.5028
1000	3.26	3.71					3.38	155.0	1.5120
1010	3.26	3.71					3.38	136.0	1.5309
1035	3.27	3.71					3.39	101.0	1.5509
1100	3.29	3.71					3.40	86.0	1.5645
1115	3.30	3.71					3.41	77.0	1.5752
1135	3.30	3.71					3.41	66.0	1.5909
1215	3.30	3.71					3.41	54.0	1.6026
1230	3.30	3.72					3.41	50.0	1.6145
1315	3.30	3.72					3.41	43.0	1.6298
1400	3.30	3.72					3.41	37.0	1.6452
1500	3.30	3.72					3.41	32.0	1.7213
2400	3.30	3.72					3.41	6.0	1.7341

STA. NO. 08178300 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF MAY 21, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
MAY 21					
0000	0.0	0.0	0.0	0.0	0.0
0515	0.0	0.0	0.0	0.0	0.0
0520	0.14	0.0	0.10	0.0	0.0
0525	0.27	0.0	0.20	0.0	0.0
0530	0.40	0.01	0.29	0.0	0.0
0535	0.55	0.08	0.42	0.0	0.0
0540	0.67	0.14	0.53	42.0	0.0017
0545	0.81	0.20	0.65	60.0	0.0040
0550	0.95	0.50	0.83	122.0	0.0089
0555	1.06	0.70	0.96	258.0	0.0191
0600	1.11	0.90	1.05	385.0	0.0343
0605	1.15	0.99	1.11	611.0	0.0585
0610	1.19	1.03	1.15	797.0	0.0901
0615	1.23	1.08	1.19	810.0	0.1222
0620	1.23	1.12	1.20	752.0	0.1520
0625	1.23	1.14	1.21	660.0	0.1781
0630	1.23	1.14	1.21	552.0	0.2000
0635	1.23	1.14	1.21	482.0	0.2191
0640	1.23	1.14	1.21	405.0	0.2351
0645	1.23	1.14	1.21	342.0	0.2487
0650	1.23	1.14	1.21	299.0	0.2605
0655	1.23	1.14	1.21	258.0	0.2707
0700	1.23	1.14	1.21	215.0	0.2793
0705	1.23	1.14	1.21	198.0	0.2871
0710	1.23	1.14	1.21	174.0	0.2940
0715	1.23	1.14	1.21	154.0	0.3001
0720	1.23	1.14	1.21	145.0	0.3058
0725	1.23	1.16	1.21	136.0	0.3193
0745	1.23	1.16	1.21	121.0	0.3313
0750	1.23	1.17	1.21	98.0	0.3352
0755	1.23	1.17	1.21	94.0	0.3389
0800	1.23	1.17	1.21	87.0	0.3441
0810	1.23	1.17	1.21	77.0	0.3532
0830	1.23	1.17	1.21	65.0	0.3635
0850	1.23	1.18	1.22	56.0	0.3746
0920	1.23	1.18	1.22	48.0	0.3955
1040	1.23	1.18	1.22	39.0	0.4110
1100	1.23	1.18	1.22	32.0	0.5124
2400	1.23	1.19	1.22	0.0	0.5124

STA. NO. 08178300	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF MAY 31, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT3/S	ACCUM. RUNOFF IN.
MAY 31					
0000	0.0	0.0	0.0	0.0	0.0
1850	0.0	0.0	0.0	0.0	0.0
1855	0.0	0.05	0.01	0.0	0.0
1900	0.0	0.15	0.04	0.0	0.0
1905	0.08	0.34	0.15	65.0	0.0026
1910	0.16	0.45	0.24	100.0	0.0065
1915	0.19	0.47	0.26	186.0	0.0139
1920	0.20	0.51	0.28	233.0	0.0231
1925	0.24	0.52	0.32	262.0	0.0335
1930	0.25	0.53	0.33	233.0	0.0427
1935	0.25	0.53	0.33	189.0	0.0502
1940	0.25	0.53	0.33	157.0	0.0564
1945	0.25	0.53	0.33	136.0	0.0618
1950	0.25	0.53	0.33	117.0	0.0665
1955	0.25	0.53	0.33	100.0	0.0704
2000	0.25	0.53	0.33	96.0	0.0761
2010	0.25	0.54	0.33	92.0	0.0852
2025	0.25	0.55	0.33	98.0	0.0949
2035	0.25	0.55	0.33	92.0	0.1004
2040	0.25	0.55	0.33	82.0	0.1037
2045	0.25	0.55	0.33	76.0	0.1067
2050	0.25	0.55	0.33	70.0	0.1094
2055	0.25	0.55	0.33	66.0	0.1121
2100	0.25	0.55	0.33	62.0	0.1157
2110	0.25	0.55	0.33	56.0	0.1202
2120	0.25	0.55	0.33	51.0	0.1232
2125	0.25	0.55	0.33	49.0	0.1271
2140	0.25	0.55	0.33	45.0	0.1351
2210	0.25	0.55	0.33	41.0	0.1578
2400	0.25	0.55	0.33	28.0	0.1701

STA. NO. 08178300	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

ALAZAN CREEK AT ST. CLOUD ST. SAN ANTONIO, TEX. — STORM OF JUNE 1, 1977

DATE & TIME	GAGE NUMBER 1-A	GAGE NUMBER 2-A	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JUNE 1					
0000	0.0	0.0	0.0	0.0	0.0
0825	0.0	0.0	0.0	0.0	0.0
0830	0.0	0.01	0.00	0.0	0.0
0920	0.0	0.01	0.00	0.0	0.0
0925	0.0	0.02	0.01	0.0	0.0
1120	0.0	0.02	0.01	0.0	0.0
1125	0.0	0.03	0.01	0.0	0.0
1445	0.0	0.03	0.01	0.0	0.0
1450	0.17	0.03	0.13	0.0	0.0
1455	0.34	0.03	0.26	0.0	0.0
1500	0.52	0.03	0.39	0.0	0.0
1505	0.72	0.03	0.53	0.0	0.0
1510	0.76	0.07	0.57	0.0	0.0
1515	0.77	0.18	0.61	0.0	0.0
1520	0.77	0.27	0.63	66.0	0.0026
1525	0.77	0.31	0.65	355.0	0.0167
1530	0.77	0.32	0.65	347.0	0.0304
1535	0.77	0.32	0.65	365.0	0.0449
1540	0.77	0.32	0.65	319.0	0.0575
1545	0.77	0.32	0.65	268.0	0.0681
1550	0.77	0.32	0.65	215.0	0.0766
1555	0.77	0.33	0.65	189.0	0.0841
1600	0.77	0.33	0.65	164.0	0.0906
1605	0.77	0.33	0.65	134.0	0.0986
1615	0.77	0.33	0.65	110.0	0.1073
1625	0.77	0.33	0.65	96.0	0.1130
1630	0.78	0.33	0.66	87.0	0.1165
1635	0.78	0.33	0.66	82.0	0.1197
1640	0.79	0.34	0.67	77.0	0.1243
1650	0.79	0.34	0.67	68.0	0.1297
1700	0.80	0.34	0.68	61.0	0.1345
1710	0.80	0.35	0.68	56.0	0.1412
1730	0.80	0.35	0.68	49.0	0.1509
1800	0.80	0.35	0.68	41.0	0.1655
1900	0.80	0.35	0.68	25.0	0.1774
2000	0.80	0.35	0.68	15.0	0.1845
2100	0.80	0.35	0.68	8.0	0.1883
2200	0.80	0.35	0.68	4.0	0.1911
2400	0.80	0.35	0.68	0.0	0.1911

STA. NO. 08178690	STORM RAINFALL AND RUNOFF RECORD	1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX STORM OF OCT 4, 1976

DATE & TIME	GAGE NUMBER 3-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 4				
0000	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0
2040	0.01	0.01	0.0	0.0
2045	0.02	0.02	0.0	0.0
2050	0.03	0.03	0.0	0.0
2055	0.12	0.12	9.0	0.0045
2100	0.46	0.46	17.0	0.0129
2105	0.60	0.60	21.0	0.0233
2110	0.68	0.68	29.0	0.0377
2115	0.85	0.85	30.0	0.0526
2120	1.09	1.09	38.0	0.0964
2125	1.29	1.29	94.0	0.1430
2130	1.48	1.48	104.0	0.1947
2135	1.60	1.60	105.0	0.2468
2140	1.63	1.63	100.0	0.2965
2145	1.65	1.65	85.0	0.3387
2150	1.65	1.65	69.0	0.3730
2155	1.66	1.66	57.0	0.4013
2200	1.66	1.66	48.0	0.4251
2205	1.67	1.67	39.0	0.4445
2210	1.68	1.68	34.0	0.4614
2215	1.68	1.68	30.0	0.4763
2220	1.68	1.68	27.0	0.4964
2230	1.69	1.69	23.0	0.5193
2240	1.69	1.69	20.0	0.5391
2250	1.69	1.69	17.0	0.5560
2300	1.69	1.69	14.0	0.5838
2330	1.69	1.69	11.0	0.6166
2400	1.69	1.69	9.0	0.6300

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX STORM OF OCT 15, 1976

DATE & TIME	GAGE NUMBER 3-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 15				
0000	0.0	0.0	0.0	0.0
0225	0.01	0.01	0.0	0.0
0440	0.03	0.03	0.0	0.0
0710	0.05	0.05	0.0	0.0
1030	0.12	0.12	0.0	0.0
1155	0.13	0.13	0.0	0.0
1200	0.20	0.20	0.0	0.0
1205	0.25	0.25	0.0	0.0
1210	0.27	0.27	0.0	0.0
1215	0.39	0.39	0.0	0.0
1220	0.46	0.46	10.0	0.0050
1225	0.47	0.47	10.0	0.0099
1230	0.51	0.51	25.0	0.0223
1235	0.54	0.54	40.0	0.0422
1240	0.54	0.54	40.0	0.0621
1245	0.58	0.58	36.0	0.0800
1250	0.63	0.63	33.0	0.1045
1300	0.71	0.71	30.0	0.1567
1325	0.77	0.77	30.0	0.2088
1335	0.78	0.78	25.0	0.2337
1345	0.78	0.78	21.0	0.2545
1355	0.78	0.78	19.0	0.2734
1405	0.81	0.81	17.0	0.2903
1415	0.90	0.90	16.0	0.3102
1430	0.91	0.91	15.0	0.3362
1450	0.95	0.95	14.0	0.3571
1500	1.04	1.04	16.0	0.3770
1515	1.08	1.08	23.0	0.3998
1520	1.23	1.23	33.0	0.4162
1525	1.28	1.28	40.0	0.4460
1535	1.29	1.29	50.0	0.4833
1540	1.29	1.29	48.0	0.5190
1550	1.29	1.29	37.0	0.5650
1605	1.29	1.29	26.0	0.5972
1615	1.29	1.29	20.0	0.6221
1630	1.29	1.29	16.0	0.6777
1725	1.29	1.29	10.0	0.7075
1730	1.30	1.30	9.0	0.7231
1800	1.30	1.30	8.0	0.7410

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX STORM OF OCT 15, 1976

DATE & TIME	GAGE NUMBER 3-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 15				
1815	1.31	1.31	7.0	0.7532
1835	1.40	1.40	7.0	0.7619
1840	1.44	1.44	9.0	0.7663
1845	1.44	1.44	16.0	0.7743
1850	1.44	1.44	20.0	0.7892
1900	1.46	1.46	20.0	0.8091
1910	1.48	1.48	19.0	0.8279
1920	1.50	1.50	17.0	0.8448
1930	1.52	1.52	16.0	0.8687
1950	1.53	1.53	14.0	0.8895
2000	1.57	1.57	13.0	0.9024
2010	1.60	1.60	13.0	0.9250
2035	1.67	1.67	13.0	0.9509
2050	1.72	1.72	16.0	0.9707
2100	1.76	1.76	17.0	0.9876
2110	1.80	1.80	18.0	1.0055
2120	1.81	1.81	18.0	1.0413
2150	1.81	1.81	18.0	1.0904
2215	1.81	1.81	14.0	1.1252
2240	1.81	1.81	11.0	1.1498
2300	1.81	1.81	9.0	1.1855
2400	1.81	1.81	7.0	1.2064

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX STORM OF OCT.19.1976

DATE & TIME	GAGE NUMBER R-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 19				
0000	0.0	0.0	0.0	0.0
0755	0.0	0.0	0.0	0.0
0800	0.02	0.02	0.0	0.0
0805	0.11	0.11	0.0	0.0
0810	0.19	0.19	0.0	0.0
0820	0.25	0.25	0.0	0.0
0830	0.29	0.29	0.0	0.0
0840	0.35	0.35	9.0	0.0134
0900	0.39	0.39	25.0	0.0755
0930	0.44	0.44	10.0	0.1463
1015	0.56	0.56	15.0	0.1872
1025	0.62	0.62	15.0	0.2059
1040	0.71	0.71	19.0	0.2295
1050	0.81	0.81	27.0	0.2563
1100	0.90	0.90	32.0	0.2881
1110	0.98	0.98	36.0	0.3596
1140	1.17	1.17	40.0	0.4589
1200	1.22	1.22	32.0	0.5304
1225	1.23	1.23	23.0	0.5647
1230	1.24	1.24	21.0	0.5856
1245	1.24	1.24	17.0	0.6278
1320	1.24	1.24	12.0	0.6576
1335	1.24	1.24	10.0	0.6923
1430	1.24	1.24	5.0	0.7135
1500	1.24	1.24	3.0	0.7269
1600	1.24	1.24	0.0	0.7269
2400	1.24	1.24	0.0	0.7269

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER B-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 19				
0000	0.0	0.0	0.0	0.0
1445	0.0	0.0	0.0	0.0
1450	0.01	0.01	0.0	0.0
1500	0.03	0.03	0.0	0.0
1525	0.04	0.04	0.0	0.0
1920	0.04	0.04	0.0	0.0
2000	0.11	0.11	0.0	0.0
2010	0.12	0.12	0.0	0.0
2015	0.14	0.14	0.0	0.0
2020	0.19	0.19	9.0	0.0045
2025	0.39	0.39	11.0	0.0099
2030	0.50	0.50	16.0	0.0179
2035	0.53	0.53	51.0	0.0432
2040	0.60	0.60	76.0	0.0810
2045	0.74	0.74	76.0	0.1187
2050	1.06	1.06	83.0	0.1599
2055	1.41	1.41	103.0	0.2111
2100	1.73	1.73	144.0	0.2826
2105	1.75	1.75	167.0	0.3655
2110	1.78	1.78	135.0	0.4326
2115	1.79	1.79	109.0	0.4867
2120	1.82	1.82	89.0	0.5309
2125	1.82	1.82	72.0	0.5667
2130	1.82	1.82	62.0	0.5975
2135	1.82	1.82	54.0	0.6243
2140	1.83	1.83	48.0	0.6601
2150	1.88	1.88	39.0	0.6891
2155	1.93	1.93	37.0	0.7075
2200	1.94	1.94	36.0	0.7343
2210	1.95	1.95	33.0	0.7589
2215	1.96	1.96	33.0	0.7999
2235	1.96	1.96	33.0	0.8408
2240	1.97	1.97	31.0	0.8716
2255	1.97	1.97	24.0	0.9134
2315	1.97	1.97	20.0	0.9630
2345	2.00	2.00	16.0	0.9908
2350	2.08	2.08	16.0	0.9988
2355	2.13	2.13	16.0	1.0067
2400	2.13	2.13	16.0	1.0127
APR 20				

STA. NO. 08178690 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. — STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER R-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 20				
0000	2.13	2.13	16.0	1.0127
0005	2.13	2.13	16.0	1.0306
0020	2.13	2.13	27.0	1.0641
0030	2.14	2.14	28.0	1.0989
0045	2.14	2.14	23.0	1.1331
0100	2.14	2.14	18.0	1.1644
0120	2.14	2.14	15.0	1.1868
0130	2.14	2.14	14.0	1.2146
0200	2.15	2.15	11.0	1.2419
0220	2.17	2.17	10.0	1.2568
0230	2.19	2.19	10.0	1.2692
0245	2.19	2.19	10.0	1.2841
0300	2.22	2.22	10.0	1.3065
0330	2.31	2.31	13.0	1.3452
0400	2.44	2.44	19.0	1.3924
0420	2.47	2.47	22.0	1.4361
0440	2.48	2.48	22.0	1.4907
0510	2.48	2.48	17.0	1.5456
0545	2.64	2.64	14.0	1.5769
0555	2.78	2.78	21.0	1.6082
0615	2.88	2.88	53.0	1.6872
0625	2.89	2.89	52.0	1.7517
0640	2.92	2.92	45.0	1.8188
0655	2.94	2.94	36.0	1.8724
0710	2.98	2.98	30.0	1.9246
0730	3.12	3.12	27.0	1.9916
0800	3.18	3.18	31.0	2.0455
0805	3.22	3.22	31.0	2.0609
0810	3.26	3.26	31.0	2.0840
0820	3.28	3.28	31.0	2.1071
0825	3.30	3.30	35.0	2.1245
0830	3.44	3.44	39.0	2.1438
0835	3.60	3.60	50.0	2.1687
0840	3.83	3.83	64.0	2.2004
0845	3.99	3.99	101.0	2.2506
0850	4.05	4.05	125.0	2.3127
0855	4.08	4.08	123.0	2.3738
0900	4.09	4.09	110.0	2.4284
0905	4.09	4.09	95.0	2.4756

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY AT BITTERS ROAD, SAN ANTONIO, TEX. STORM OF APRIL 19-20, 1977

DATE & TIME	GAGE NUMBER 3-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
APR 20				
0910	4.10	4.10	81.0	2.5158
0915	4.10	4.10	71.0	2.5511
0920	4.10	4.10	63.0	2.5824
0925	4.10	4.10	56.0	2.6241
0935	4.10	4.10	48.0	2.6718
0945	4.10	4.10	41.0	2.7227
1000	4.10	4.10	34.0	2.7987
1030	4.10	4.10	28.0	2.8821
1100	4.11	4.11	21.0	2.9447
1130	4.11	4.11	18.0	2.9983
1200	4.11	4.11	17.0	3.0490
1230	4.11	4.11	14.0	3.0942
1305	4.11	4.11	13.0	3.1523
1400	4.12	4.12	10.0	3.1945
1430	4.12	4.12	9.0	3.2481
1600	4.12	4.12	5.0	3.3003
1800	4.12	4.12	0.0	3.3003
2400	4.12	4.12	0.0	3.3003

STA. NO. 08178690 STORM RAINFALL AND RUNOFF RECORD 1977 WATER YEAR

SALADO CREEK TRIBUTARY BITTERS ROAD, SAN ANTONIO, TEX. STORM OF JUNE 23, 1977

DATE & TIME	GAGE NUMBER B-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
JUNE 23				
0000	0.0	0.0	0.0	0.0
0605	0.0	0.0	0.0	0.0
0610	0.05	0.05	0.0	0.0
0710	0.11	0.11	0.0	0.0
0930	0.17	0.17	0.0	0.0
1040	0.21	0.21	0.0	0.0
1110	0.28	0.28	0.0	0.0
1200	0.28	0.28	10.0	0.0372
1225	0.28	0.28	10.0	0.0546
1235	0.29	0.29	9.0	0.0636
1245	0.30	0.30	9.0	0.0703
1250	0.31	0.31	9.0	0.0792
1305	0.31	0.31	9.0	0.0882
1310	0.32	0.32	9.0	0.0993
1330	0.32	0.32	9.0	0.1150
1345	0.35	0.35	9.0	0.1239
1350	0.50	0.50	9.0	0.1284
1355	0.58	0.58	12.0	0.1343
1400	0.63	0.63	16.0	0.1423
1405	0.66	0.66	19.0	0.1517
1410	0.68	0.68	39.0	0.1808
1420	0.70	0.70	45.0	0.2255
1430	0.72	0.72	35.0	0.2689
1445	0.77	0.77	27.0	0.3159
1505	0.80	0.80	23.0	0.3559
1520	0.80	0.80	21.0	0.3767
1525	0.81	0.81	20.0	0.4165
1600	0.81	0.81	14.0	0.4547
1620	0.81	0.81	11.0	0.4711
1630	0.81	0.81	10.0	0.4810
1640	0.81	0.81	9.0	0.4944
1700	0.81	0.81	0.0	0.4944
2400	0.82	0.82	0.0	0.4944

STA. NO. 08178640 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

WEST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF OCT 23-24, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 23						
0000	0.0	0.0	0.0	0.0	0.0	0.0
0630	0.0	0.0	0.0	0.0	0.0	0.0
1500	0.0	0.01	0.01	0.00	0.0	0.0
1600	0.04	0.02	0.03	0.03	0.0	0.0
2200	0.17	0.18	0.21	0.17	0.0	0.0
2400	0.60	0.57	0.48	0.59	0.0	0.0
OCT 24						
0000	0.60	0.57	0.48	0.59	0.0	0.0
0100	0.69	0.62	0.52	0.66	0.0	0.0
0130	0.71	0.63	0.53	0.68	0.0	0.0
0205	0.81	0.64	0.53	0.74	0.0	0.0
0235	0.84	0.65	0.53	0.76	0.0	0.0
0300	1.25	0.65	0.53	1.00	0.0	0.0
0310	1.46	0.67	0.56	1.13	0.0	0.0
0320	1.65	0.78	0.59	1.28	0.0	0.0
0330	1.77	0.94	0.66	1.42	0.0	0.0
0340	1.79	1.08	0.79	1.49	0.0	0.0
0350	1.80	1.20	0.95	1.55	0.0	0.0
0400	1.81	1.21	1.01	1.56	0.0	0.0
0445	1.85	1.27	1.06	1.60	0.0	0.0
0455	1.86	1.27	1.06	1.61	80.0	0.0063
0500	1.86	1.27	1.07	1.61	185.0	0.0161
0505	1.86	1.28	1.07	1.61	215.0	0.0274
0510	1.86	1.28	1.07	1.61	202.0	0.0381
0515	1.86	1.28	1.07	1.61	183.0	0.0477
0520	1.87	1.28	1.07	1.62	160.0	0.0561
0525	1.87	1.28	1.07	1.62	142.0	0.0636
0530	1.87	1.28	1.07	1.62	126.0	0.0769
0545	1.88	1.28	1.07	1.63	88.0	0.0908
0600	1.90	1.28	1.07	1.64	60.0	0.1050
0630	1.90	1.30	1.09	1.65	29.0	0.1150
0705	1.90	1.30	1.10	1.65	13.0	0.1211
0800	1.90	1.32	1.11	1.65	4.0	0.1236
0900	1.90	1.38	1.15	1.68	1.0	0.1248
1200	1.97	1.42	1.24	1.74	0.0	0.1248
1400	2.03	1.47	1.27	1.79	0.0	0.1248
1530	2.13	1.56	1.35	1.89	0.0	0.1248
1850	2.13	1.61	1.40	1.91	0.0	0.1248
2400	2.13	1.61	1.40	1.91	0.0	0.1248

STA. NO. 08178645 — STORM RAINFALL AND RUNOFF RECORD — 1977 WATER YEAR

EAST ELM CREEK AT SAN ANTONIO, TEX. — STORM OF OCT 23-24, 1976

DATE & TIME	GAGE NUMBER 1E-S	2E-S	3E-S	ACCUM. WEIGHTED PRECIP. IN.	DISCHARGE IN FT^3/S	ACCUM. RUNOFF IN.
OCT 23						
0000	0.0	0.0	0.0	0.0	0.0	0.0
0630	0.0	0.0	0.0	0.0	0.0	0.0
1500	0.0	0.01	0.01	0.00	0.0	0.0
1600	0.04	0.02	0.03	0.03	0.0	0.0
2005	0.06	0.03	0.03	0.05	0.0	0.0
2200	0.17	0.18	0.21	0.19	0.0	0.0
2400	0.60	0.57	0.48	0.55	0.0	0.0
OCT 24						
0000	0.60	0.57	0.48	0.55	0.0	0.0
0100	0.69	0.62	0.52	0.62	0.0	0.0
0130	0.71	0.63	0.53	0.64	0.0	0.0
0205	0.81	0.64	0.53	0.69	0.0	0.0
0235	0.84	0.65	0.53	0.71	0.0	0.0
0300	1.25	0.65	0.53	0.93	0.0	0.0
0310	1.46	0.67	0.56	1.06	0.0	0.0
0320	1.65	0.78	0.59	1.19	0.0	0.0
0330	1.77	0.94	0.66	1.29	0.0	0.0
0340	1.79	1.08	0.79	1.36	0.0	0.0
0350	1.80	1.20	0.95	1.43	0.0	0.0
0400	1.81	1.21	1.01	1.46	0.0	0.0
0445	1.85	1.27	1.06	1.51	0.0	0.0
0455	1.86	1.27	1.06	1.51	0.0	0.0
0500	1.86	1.28	1.07	1.52	0.0	0.0
0520	1.87	1.28	1.07	1.52	0.0	0.0
0540	1.87	1.28	1.07	1.52	0.0	0.0
0600	1.90	1.28	1.07	1.54	0.0	0.0
0610	1.90	1.28	1.08	1.54	10.0	0.0008
0615	1.90	1.28	1.08	1.54	59.0	0.0041
0620	1.90	1.28	1.08	1.54	73.0	0.0081
0625	1.90	1.29	1.08	1.55	75.0	0.0123
0630	1.90	1.30	1.09	1.55	73.0	0.0163
0635	1.90	1.30	1.09	1.55	71.0	0.0203
0640	1.90	1.30	1.10	1.55	69.0	0.0260
0650	1.90	1.30	1.10	1.55	62.0	0.0346
0705	1.90	1.30	1.10	1.55	55.0	0.0453
0725	1.90	1.30	1.10	1.55	45.0	0.0565
0750	1.90	1.30	1.10	1.55	33.0	0.0620
0755	1.90	1.31	1.10	1.55	31.0	0.0637
0800	1.90	1.32	1.11	1.56	29.0	0.0693
0830	1.90	1.33	1.13	1.57	17.0	0.0736