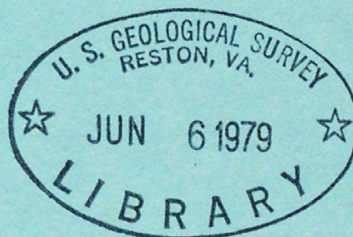


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# Hydrologic Data for North Creek Trinity River Basin Texas, 1977

U. S. GEOLOGICAL SURVEY,  
OFR/WRD 79-335

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*Prepared in cooperation with the Tarrant County Water Control  
and Improvement District No. 1, the Soil Conservation  
Service, and the Texas Department of Water Resources*





# Hydrologic Data for North Creek Trinity River Basin Texas, 1977

*By C. C. KIDWELL*

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U. S. GEOLOGICAL SURVEY  
OFR/WRD 79-335



*Prepared in cooperation with the Tarrant County Water Control  
and Improvement District No. 1, the Soil Conservation  
Service, and the Texas Department of Water Resources*

February 1979

297668



UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

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300 East 8th Street  
Austin, TX 78701



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# HYDROLOGIC DATA FOR NORTH CREEK

## TRINITY RIVER BASIN, TEXAS

1977

By

C. C. Kidwell  
U.S. Geological Survey

### INTRODUCTION

#### History of Small Watershed Projects in Texas

The U.S. Soil Conservation Service is actively engaged in the installation of flood- and soil-erosion reducing structures in Texas under the authority of "The Flood Control Act of 1936 and 1944" and "Watershed Protection and Flood Prevention Act" (Public Law 566), as amended. The Soil Conservation Service has found that approximately 3,500 floodwater-retarding structures would be physically and economically feasible in Texas. As of September 30, 1977, 1,695 (corrected figure) of these structures had been built.

This watershed-development program will have varying but important effects on surface- and ground-water resources of river basins, especially where a large number of the floodwater-retarding structures are built. Basic hydrologic data under natural and developed conditions are needed to appraise the effects of the structures on the yield and mode of occurrence of runoff.

During the period 1951-62, the U.S. Geological Survey began hydrologic investigations in 12 small watersheds (fig. 1). As of Sept. 30, 1977, data collection in eleven of these study areas has been completed and is now in progress in one area. This study is being made in cooperation with the Texas Department of Water Resources, the Soil Conservation Service, the San Antonio River Authority, the city of Dallas, and the Tarrant County Control and Improvement District No. 1. The 12 study areas were chosen to sample watersheds having different rainfall, topography, geology, and soils. In five of the study areas (North, Little Elm, Mukewater, Little Pond-North Elm, and Pin Oak Creeks), streamflow and rainfall records were collected prior to construction of the floodwater-retarding structures, thus affording the opportunity for analyses of the conditions "before and after" development. A summary of the development of the floodwater-retarding structures in each study area as of Sept. 30, 1977, is shown in table 1.

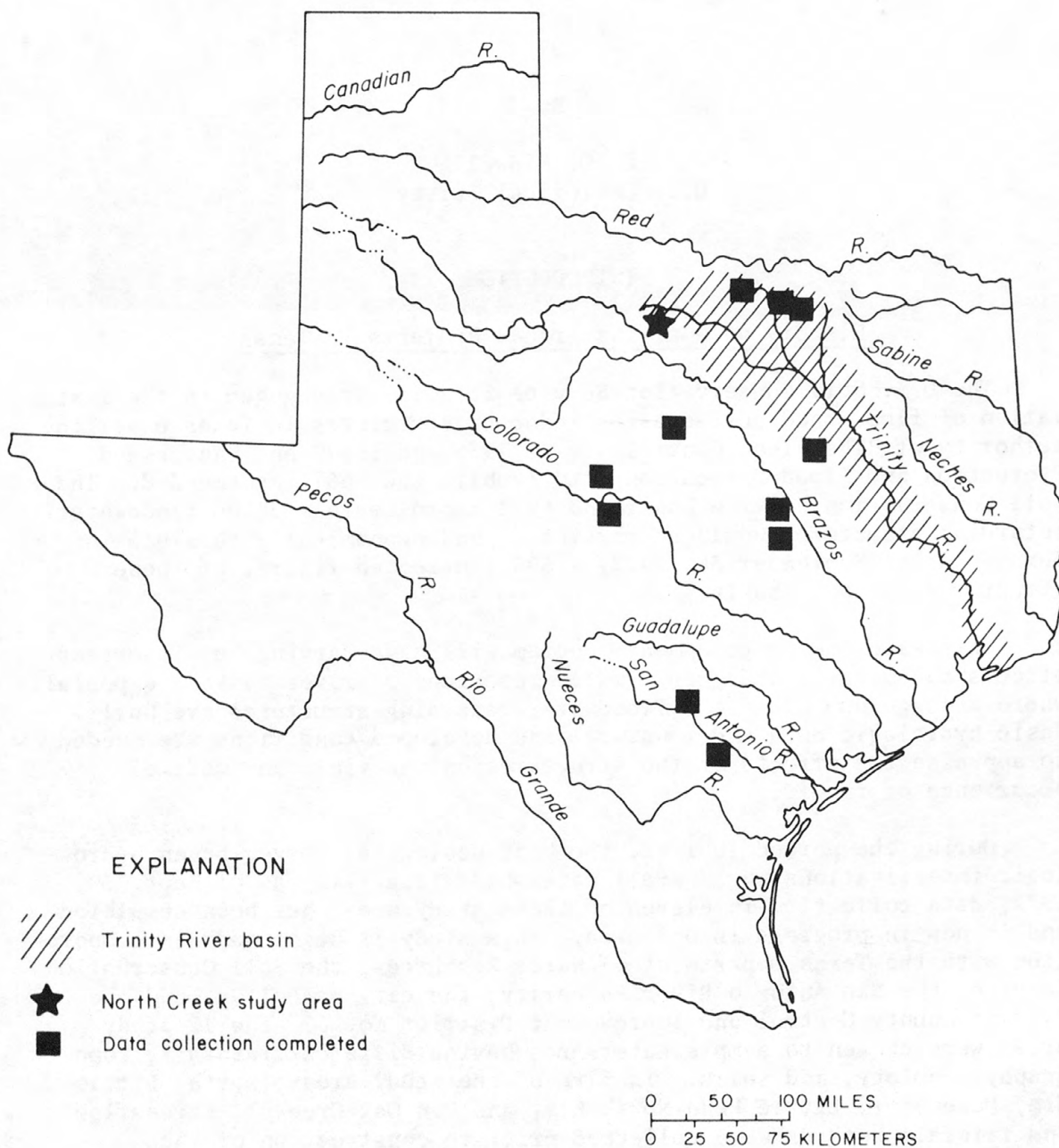


FIGURE 1. - Location of the North Creek study area and other study areas



Table 1.--Small watershed study areas in Texas as of September 30, 1977

Watershed	Drainage area above stream-gaging station (mi <sup>2</sup> )	Data collection period	Floodwater-retarding structures above stream-gaging station	Period the structures were built
<u>Trinity River basin:</u>				
North Creek near Jacksboro	21.6	Aug. 1956 to	5	1970-72
Elm Fork Trinity River near Muenster	46.0	July 1956 to Sept. 1971	14	1954-57, 63
Little Elm Creek near Aubrey	75.5	June 1956 to Sept. 1976	17	1966, 70-71, 76
Honey Creek near McKinney	39.0	July 1951 to Sept. 1971	14	1951-57, 69, 73
Pin Oak Creek near Hubbard	17.6	Sept. 1956 to Sept. 1972	6	1962-63, 65
<u>Brazos River basin:</u>				
Green Creek near Alexander	46.1	Oct. 1954 to Sept. 1971	8	1954-56
Cow Bayou at Mooreville	85.0	Sept. 1954 to Sept. 1975	26	1955-58, 64-65
1/Little Pond Creek at Burlington	22.2	Oct. 1962 to Sept. 1972	None	-
1/North Elm Creek near Cameron	48.6	Oct. 1962 to Sept. 1972	None	-
<u>Colorado River basin:</u>				
Mukewater Creek at Trickham	70.0	Aug. 1951 to Sept. 1973	6	1961-62, 65
Deep Creek near Mercury	43.9	June 1951 to Sept. 1971	5	1951-53
<u>San Antonio River basin:</u>				
Calaveras Creek near Elmendorf	77.2	Aug. 1954 to Sept. 1971	7	1954-58
Escondido Creek at Kenedy	a/72.4	July 1954 to Sept. 1971	11	1954-58, 73

1/ Adjacent watersheds; considered as one study area.

a/ 8.43 mi<sup>2</sup> above Escondido Creek subwatershed No. 11 (Dry Escondido Creek) near Kenedy not included in this total.

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

From		Multiply by	To obtain	
Unit	Abbrevia- tion		Unit	Abbrevia- tion
inch	--	25.4	millimeter	mm
foot	--	.3048	meter	m
mile	--	1.609	kilometer	km
square mile	mi <sup>2</sup>	2.590	square kilometer	km <sup>2</sup>
cubic foot per second	ft <sup>3</sup> /s	.02832	cubic meter per second	m <sup>3</sup> /s
foot per mile	ft/mi	.189	meter per kilometer	m/km
acre-foot	--	1233	cubic meter	m <sup>3</sup>
		.001233	cubic hectometer	hm <sup>3</sup>



## Objectives of the Texas Small Watershed Projects

The purpose of these investigations is to collect sufficient data to meet the following objectives:

1. To determine the net effect of floodwater-retarding structures on the regimen of streamflow at downstream points.
2. To determine the effectiveness of the structures as ground-water recharge facilities.
3. To determine the effect of the structures on the sediment yield at downstream points.
4. To develop relationships between maximum rates or volumes of runoff with rainfall in small natural watersheds.
5. To develop a stream-system model for basins with floodwater-retarding structures.
6. To determine the minimum instrumentation necessary for estimating the flood hydrographs below a system of structures, as needed for downstream water-management operation.

## Purpose and Scope of this Basic-Data Report

This report contains the rainfall, runoff, and storage data collected during the 1977 water year for the 21.6-square-mile area above the stream-gaging station North Creek near Jacksboro, Texas. The locations of floodwater-retarding structures and hydrologic-instrument installations in the area are shown on figure 2.

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

## DESCRIPTION OF THE WATERSHED

The headwaters of North Creek are near the town of Jermyn in the western part of Jack County. The Creek flows northeasterly for approximately 19 miles where it flows into Big Cleveland Creek, 4 miles upstream from the West Fork Trinity River. North Creek drains a 43.1-square-mile area; however, this report is concerned only with the 21.6 square miles of the watershed above the Geological Survey stream-gaging station at the U.S. Highway 281 bridge near Jacksboro. This area is referred to as the "study area" (fig. 2).

The topography of the watershed ranges from steep to gently rolling. Altitudes in the watershed range from about 1,310 feet at the headwaters to about 1,090 feet at the gaging station. The average channel gradient is about 18.4 ft/mi.






Underlying rocks in the study area are limestone, shale, and sandstone. The ridges are formed by the harder sandstones and limestones, and the deep valleys are cut into the shale. The soils are fine to medium textured and are slightly to moderately permeable.

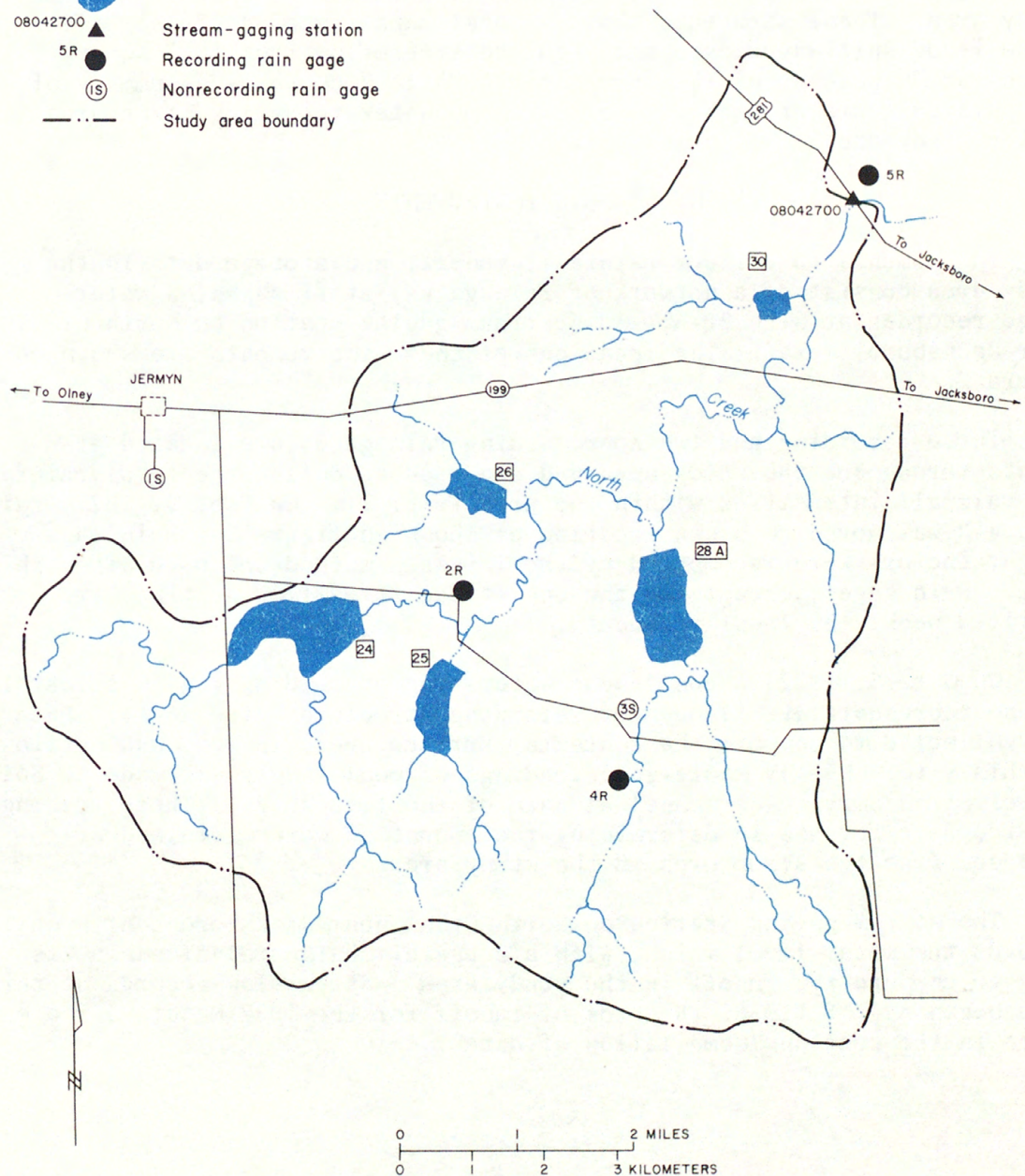
Most of the watershed area is used as range land, with oats and wheat grazed by livestock during winter months and harvested during spring and early summer. Livestock is the principal source of income for the area.

Climate of the study area is temperate and subhumid with a prevailing south wind. The most common storms are thunderstorms occurring frequently in the spring and summer. Long-duration low-intensity storms, triggered by southward-moving continental polar fronts, occur during the fall and winter. In late summer and early fall, hurricanes moving inland from the Gulf of Mexico cause some of the heaviest rainfall. Individual storms, although most frequent in the spring, may cause serious flooding and sediment damage during any season.

The records of the Environmental Data Service show that the normal annual rainfall for the 30-year base period (1941-70) at Graham (about 18 miles southwest of the study area) is 28.03 inches. During this period, the annual rainfall has ranged from 14.12 inches in 1956 to 48.99 inches in 1957. The wettest months are April, May, June, September, and October.

# EXPLANATION

-  Floodwater-retarding structure and pool
-  Stream-gaging station
-  Recording rain gage
-  Nonrecording rain gage
-  Study area boundary



Based on map from Work Plan of North Creek Watershed furnished by U.S. Soil Conservation Service (February 1960)

FIGURE 2.-- Locations of floodwater-retarding structures and hydrologic-instrument installations in the North Creek study area



## FLOODWATER-RETARDING STRUCTURES

There are five floodwater-retarding structures in the North Creek study area. These structures have a total capacity of 4,425 acre-feet below flood-spillway crests and regulate streamflow from 16.3 square miles, or 75 percent of the study area. Table 2 contains a summary of the physical data at each of the five floodwater-retarding structures in the study area.

## HYDROLOGIC INSTRUMENTS

Instruments to collect rainfall, runoff, and storage data in the study area consist of a network of rain gages, staff gages, a water-stage recorder at site 28-A, and a stream-gaging station on North Creek near Jacksboro, Texas. The locations of these instruments are shown on figure 2.

Three recording and two nonrecording rain gages are located at points throughout the study area and are used to define the total rainfall and rainfall intensities within the area (fig. 2). On Feb. 9, 1977, rain gage 4-R was moved to a new location as shown on figure 2. Rain gage weight-factors were recomputed by the Thiessen method and used after this date. Rain gages, except for the one at the streamflow station, are serviced weekly by local residents.

On Oct. 5, 1972, a continuous water-stage recording gage was installed at one representative floodwater-retarding structure (site 28-A). Data are collected to compute the contents, surface area, inflow, and outflow at this site. Weekly staff-gage readings of pool levels are made by Soil Conservation Service personnel at each of the five sites. These readings provide data for use in determining the amount of water retained or released from the structures in the study area.

The stream-gaging station on North Creek near Jacksboro continuously records the water level which, with a stage-discharge relationship, is used to compute the runoff in the study area. Streamflow records at this gage began Aug. 8, 1956. Records of runoff for the 1977 water year are given in the section "Compilation of data".

Table 2.--Floodwater-retarding structure data, North Creek study area

Site number	Drainage area (mi <sup>2</sup> )	Date dam completed	Date station established	Datum of gage above mean sea level	Emergency spillway			Principal spillway			Controlled outlet		Diameter of pipe through dam	Range of staff gages
					Width	Gage height	Contents 1/	Gage height	Contents 2/	Gage height of invert	Contents	Contents		
					(ft)	(ft)	(acre-ft)	(ft)	(acre-ft)	(ft)	(acre-ft)	(acre-ft)	(in)	
24	5.47	1-11-71	5-20-71	1,174.38	210	49.6	1,400	29.80	133	25.36	68.9	24	17.5-54.3	
25	1.39	5-24-72	5-11-72	1,177.65	80	22.4	381	8.21	34.3	2.69	3.8	a/ 18	0-27.1	
26	1.41	10-23-71	4-19-71	1,133.56	100	28.8	360	10.18	25.0	5.65	4.9	b/ 24	6.7-35.7	
28-A	6.82	3-31-72	c/ 3-14-72	1,090.39	100	33.5	1,940	18.12	245	8.61	24.5	30	6.8-47.5	
30	1.20	10-23-70	5-19-71	1,031.24	60	47.5	344	24.80	41.0	20.20	19.8	d/ 24	10.2-54.3	

1/ Total capacity.

2/ Sediment-pool capacity; to be used for flood retardation until filled with sediment. The floodwater-retarding pool capacity is the capacity between the principal spillway and the emergency spillway.

a/ A 9-inch constriction plate in the pipe reduces the cross-sectional area by 50 percent.

b/ A 17-1/2-inch constriction plate in the pipe reduces the cross-sectional area by 78 percent.

c/ Continuous water-stage recorder installed Oct. 5, 1972.

d/ A 17-3/4-inch constriction plate in the pipe reduces the cross-sectional area by 79 percent.

## SUMMARY OF DATA FOR THE 1977 WATER YEAR

The weighted-mean rainfall in the study area during the 1977 water year was 27.82 inches, which is less than the 20-year average of 29.87 inches for the period 1958-77. Monthly rainfall totals ranged from 0.25 inch in Sept. to 5.41 inches in May. The mean discharge for 1977 at the stream-gaging station was 3.95 ft<sup>3</sup>/s, compared with the 14-year (1957-70) average of 5.75 ft<sup>3</sup>/s. The annual runoff from the basin above the stream-gaging station was 2,860 acre-feet or 2.48 inches.

A storm event is defined as a period of rainfall separated by at least 6 hours from other rainfall. Storms are generally selected for detailed rainfall-runoff computations on the basis of rainfall totals and distribution, the peak discharge produced from the rainfall, and the assurance of good rainfall and runoff records for the storm periods selected. Data for these storms will be used later in calibrating a watershed-response model to show the effects of floodwater-retarding structures.

Two storms were selected for detailed computations for the 1977 water year. The storms selected occurred on March 26-27, 1977 and May 23, 1977. Rainfall and discharge were computed on the basis of a refined time breakdown. Patterns of the storms are illustrated by the hydrographs and mass curves included. A summary of rainfall-runoff data is shown in table 3. Computations and graphs are given in the section "Compilation of data".



## ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1977 water year

[illegible]

COMPI LATION   OF   DATA

# TRINITY RIVER BASIN

08042650 NORTH CREEK SUBWATERSHED NO. 28-A NEAR JERMYN, TX

LOCATION.--Lat 33°14'52", long 98°19'19", Jack County, Hydrologic Unit 12030101, near center of earthfill dam on unnamed tributary of North Creek, 0.2 mi (0.3 km) upstream from North Creek, and 4.0 mi (6.4 km) southeast of Jermyn.

DRAINAGE AREA.--6.82 mi<sup>2</sup> (17.66 km<sup>2</sup>).

PERIOD OF RECORD.--March 1972 to current year.

GAGE.--Water-stage recorder and flat-crested weir on concrete drop inlet. Datum of gage is 1,090.39 ft (332.351 m) above mean sea level (Soil Conservation Service bench mark). Prior to Oct. 5, 1972, staff gage at same datum.

REMARKS.--Records fair. The pool is formed by a rolled earthfill dam 1,800 ft (549 m) long with a 100-foot-wide (30 m) earthen spillway at the left end of dam. The crest of emergency spillway is at gage height 33.5 ft (10.21 m). The dam was completed in March 1972, and storage began May 12, 1972. The outlet structure consists of a 2.5- by 7.5-foot (0.8 by 2.3 m) uncontrolled concrete drop-inlet structure that is connected to a 30-inch (762 mm) concrete outlet pipe. The drop-inlet structure is also equipped with a 12-inch-diameter (305 mm) slide gate near the bottom of the tower with invert at a gage height of 8.61 ft (2.62 m). The crest of the drop inlet is at gage height 18.12 ft (5.52 m). The capacity of pool at crest of emergency spillway is 1,940 acre-ft (2.39 hm<sup>3</sup>), the capacity at crest of the drop inlet is 245 acre-ft (0.302 hm<sup>3</sup>), and the capacity at the crest of the controlled outlet pipe is 24 acre-ft (0.030 hm<sup>3</sup>). The capacity table below 18.12 ft (5.52 m) was computed using the average-end-area method from a surface area table based on a survey of Mar. 14, 1972. The capacity table above 18.12 ft (5.52 m) was computed using the average-end-area method and based on an area table furnished by the Soil Conservation Service.

AVERAGE INFLOW.--5 years (water years 1973-77), 635 acre-ft/yr (0.783 hm<sup>3</sup>/yr), 1.75 in/yr (44 mm/yr).

AVERAGE OUTFLOW.--5 years (water years 1973-77), 419 acre-ft/yr (0.517 hm<sup>3</sup>/yr), 1.15 in/yr (29 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum inflow, 1,430 ft<sup>3</sup>/s (40.5 m<sup>3</sup>/s), average for 5-minute interval, Oct. 30, 1974, computed from change in pool contents and adjusted for rainfall on pool surface during time of peak inflow; no inflow at times each year. Maximum outflow, 96.2 ft<sup>3</sup>/s (2.72 m<sup>3</sup>/s) Oct. 30, 1974, gage height, 22.80 ft (6.949 m); no outflow most of time each year.

EXTREMES FOR CURRENT YEAR.--Peak inflow above base of 200 ft<sup>3</sup>/s (5.66 m<sup>3</sup>/s) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)	Date	Time	Discharge (ft <sup>3</sup> /s) (m <sup>3</sup> /s)
Mar. 27	0310	*1,020 28.9	May 23	0300	488 13.8

NOTE.--Average for 5-minute interval. Inflow computed and adjusted as explained above.

Minimum discharge, no inflow at times. Maximum outflow, 92.9 ft<sup>3</sup>/s (2.63 m<sup>3</sup>/s) Mar. 27, gage height, 21.17 ft (6.453 m); no outflow December to February and July to September.

## POOL WATER BUDGET, IN ACRE-FEET, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Inflow 1/	140	25.5	0.6	21.7	17.8	307	150	240	1.2	1.3	17.1	0.1
Outflow	118	25.0	0	0	0	278	137	222	.3	0	0	0
(+)	+13.7	-20.7	-12.3	+13.9	-2.0	+18.0	-7.7	+2.1	-30.3	-36.6	-11.3	-28.2
(++)	6.04	.40	.90	2.29	.96	4.02	2.75	5.19	1.66	1.68	3.26	0
CAL YR 1976: Inflow	524											
WTR YR 1977: Inflow	922											
Outflow			268		+63.3		31.38					
			780		-101		29.15					

1/ Inflow adjusted for rainfall on pool and pool losses.

+ Change in contents, in acre-feet.

++ Weighted-mean rainfall, in inches.



North Creek  
of Subwatershed No. 28-A near Jermyn, Tex.  
[Drainage area, 6.82 square miles]

[illegible]

Monthly and yearly net inflow, in acre-feet, of Subwatershed No. 28-A near Jermyn, Tex.

[Drainage area,  $\frac{6.82}{\text{square miles}}$ ]

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Monthly and yearly net outflow, in acre-feet of Subwatershed No. 28-A <sup>near</sup> Jermyn, Tex.  
[Drainage area, 6.82 square miles]

[illegible]



UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

08042650 North Creek subwatershed No. 28-A near Jermyn, Tex. Drainage Area 6.82 mi<sup>2</sup> 1977 WATER YEAR

Continuous water-stage recorder: ratio 1:6. Date of last sediment survey Mar. 14, 1972.

Maxima: gage height, 21.17 ft; outflow, 92.9 ft<sup>3</sup>/s; surface area, 72.7 acres; contents, 420 acre-feet; on Mar. 27

Minima: gage height, 15.00 ft; surface area, 27.0 acres; contents, 141 acre-feet; on Sept. 30

Maximum inflow, 1,020 ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on Mar. 27

Averages: 5 water years, (1973-77); inflow, 635 acre-feet/year; outflow, 419 acre-feet/year; rainfall, 31.10 inches/year.

Pool water budget, in acre-feet, water year October 1976 to September 1977.

	Oct.	Nov.	Dec.	Calendar year	1976	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1977
Total Inflow 1/	140	25.5	.6	524		21.7	17.8	307	150	240	1.2	1.3	17.1	.1	922
Total Outflow	118	25.0	0	268		0	0	278	137	222	.3	0	0	0	780
Total Consumption	28.5	22.6	15.9	270		15.1	23.0	24.6	30.4	35.0	36.4	42.9	36.6	28.3	339
†	+13.7	-20.7	-12.3	63.3		+13.9	-2.0	+18.0	-7.7	+2.1	-30.3	-36.6	-11.3	-28.2	-101
†	40.2	41.8	38.8	30.5		38.8	41.0	39.6	43.5	43.8	38.7	34.6	31.0	28.9	38.4
††	6.04	.40	.90	31.38		2.29	.96	4.02	2.75	5.19	1.66	1.68	3.26	0	29.15

1/ Inflow adjusted for rainfall on pool and pool losses.

† Change in contents, in acre-feet.

† Mean surface area, in acres.

†† Weighted mean rainfall, in inches.

\* Average for 5-min. interval.

Peak inflow - (base, 200 ft<sup>3</sup>/s)

Date	Time	Discharge	Date	Time	Discharge
*Mar. 27	0310	1,020			
*May 23	0300	488			

TRINITY RIVER BASIN

08042700 NORTH CREEK NEAR JACKSBORO, TX

LOCATION.--Lat 33°16'57", long 98°17'53", Jack County, Hydrologic Unit 12030101, near left bank on downstream side of bridge on U.S. Highway 281, 1.7 mi (2.7 km) upstream from Henderson Creek, 8.4 mi (13.5 km) upstream from mouth, and 9.5 mi (15.3 km) northwest of Jacksboro.

DRAINAGE AREA.--21.6 mi<sup>2</sup> (55.9 km<sup>2</sup>).

PERIOD OF RECORD.--August 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,016.33 ft (309.78 m) above mean sea level (State Highway Department bench mark), unadjusted.

REMARKS.--Records good. No diversions above station. Five rain gages (two nonrecording and three recording) are operated in the basin. At end of year, flow from 16.3 mi<sup>2</sup> (42.2 km<sup>2</sup>) above this station was partly controlled by five floodwater-retarding structures with a total detention capacity of 3,940 acre-ft (4.86 hm<sup>3</sup>). Several observations of water temperature were made during the year.

AVERAGE DISCHARGE.--14 years (water years 1957-70) prior to completion of floodwater-retarding structures, 5.75 ft<sup>3</sup>/s (0.163 m<sup>3</sup>/s), 3.62 in/yr (92 mm/yr), 4,170 acre-ft/yr (5.14 hm<sup>3</sup>/yr); 7 years (water years 1971-77) regulated, 2.22 ft<sup>3</sup>/s (0.0629 m<sup>3</sup>/s), 1.40 in/yr (36 mm/yr), 1,610 acre-ft/yr (1.99 hm<sup>3</sup>/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,990 ft<sup>3</sup>/s (198 m<sup>3</sup>/s) Apr. 28, 1957, gage height, 24.45 ft (7.452 m); no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1900, that of Apr. 28, 1957. Significant floods occurred in April 1915, from information by local resident, and on May 3, 1956, which reached a stage of 21.58 ft (6.578 m), from floodmark, discharge 5,700 ft<sup>3</sup>/s (161 m<sup>3</sup>/s), from rating curve.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,340 ft<sup>3</sup>/s (66.3 m<sup>3</sup>/s) May 23, gage height, 15.56 ft (4.743 m); no flow for many days.

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	1.4	.18	.14	.32	.32	1.4	.44	.72	.05	.00	.00
2	.00	.74	.17	.17	.31	.36	1.2	21	.68	.09	.00	.00
3	.00	.41	.19	.24	.43	.37	1.1	1.3	.63	.03	.00	.00
4	.00	.28	.20	.20	.33	.32	.90	.77	.58	.01	.00	.00
5	.24	.20	.24	.17	.30	.30	.83	.66	.52	.01	.00	.00
6	.01	.22	.40	.19	.28	.31	.81	.66	.49	.00	.00	.00
7	.18	.18	.21	.20	.29	.32	.79	.49	.46	.00	.00	.00
8	.16	.13	.19	.21	.30	.34	.74	.43	.44	.46	.00	.00
9	.01	.20	.19	.16	.32	.35	.73	5.5	.43	.86	.00	.00
10	.01	.20	.21	.16	.33	.39	.72	1.5	.40	.20	.00	.00
11	.00	.19	.20	.16	.91	.46	.75	.82	.38	.03	.00	.00
12	.00	.14	.20	.31	.60	.35	.74	.64	.37	.00	.00	.00
13	.00	.18	.19	1.9	.38	.37	.73	.58	.35	.00	.00	.00
14	.00	.24	.20	1.3	.34	.39	.89	.56	.33	.00	.00	.00
15	1.0	.22	.20	.52	.30	.38	4.8	.55	.34	.00	.00	.00
16	.41	.19	.20	.30	.31	.36	33	.50	.34	.00	.00	.00
17	.08	.17	.19	.30	.35	.46	65	.52	.30	.00	.00	.00
18	.02	.20	.21	.27	.35	.45	5.8	.48	.24	.00	.00	.00
19	.07	.22	.21	.27	.32	.41	2.7	.49	.21	.00	.00	.00
20	.08	.21	.17	.27	.33	.40	1.8	.62	.17	.00	22	.00
21	.05	.17	.15	.26	.35	.41	1.3	46	.13	.00	.29	.00
22	.07	.15	.19	.26	.38	.38	.95	3.5	.10	.00	.14	.00
23	.10	.17	.19	.29	.41	.40	.79	446	.17	.00	.04	.00
24	.13	.19	.19	.26	.32	.41	.70	45	.86	.00	.00	.00
25	.12	.21	.21	.25	.35	.44	.64	13	.47	.00	.00	.00
26	.10	.23	.17	.26	.31	3.0	.61	8.8	.29	.00	.00	.00
27	.35	.16	.21	.28	.29	352	.59	7.4	.23	.00	.00	.00
28	.70	.13	.21	.25	.31	87	.55	4.6	.19	.00	.00	.00
29	99	.16	.20	.23	---	6.9	.47	1.5	.14	.00	.00	.00
30	53	.18	.21	.29	---	2.8	.47	.91	.10	.00	.00	.00
31	3.5	---	.15	.32	---	1.8	---	.80	---	.00	.00	---
TOTAL	159.39	7.67	6.23	10.39	10.12	462.95	132.50	616.02	11.06	1.74	22.47	.00
MEAN	5.14	.26	.20	.34	.36	14.9	4.42	19.9	.37	.056	.72	.000
MAX	99	1.4	.40	1.9	.91	352	65	446	.86	.86	22	.00
MIN	.00	.13	.15	.14	.28	.30	.47	.43	.10	.00	.00	.00
CFSM	.24	.01	.009	.02	.02	.69	.21	.92	.02	.003	.03	.000
IN.	.27	.01	.01	.02	.02	.80	.23	1.06	.02	.00	.04	.00
AC-FT	316	15	12	21	20	918	263	1220	22	3.5	45	.00
CAL YR 1976	TOTAL	620.50	MEAN 1.70	MAX 279	MIN .00	6FSM .08	IN 1.07	AC-FT 1230				
WTR YR 1977	TOTAL	1440.54	MEAN 3.95	MAX 446	MIN .00	CFSM .18	IN 2.48	AC-FT 2860				

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISIONSheet \_\_\_\_\_ of \_\_\_\_\_ Sheets  
08042700

yearly average rainfall

Monthly and ~~annual~~ discharge, in \_\_\_\_\_ inches, of \_\_\_\_\_ River at \_\_\_\_\_, Texas  
{Drainage area, 21.6 \_\_\_\_\_ square miles}

WATER YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL	CAL YR
1957	-	-	2.32	0.94	3.80	1.89	14.42	10.69	3.98	2.09	0.05	2.52	-	
1958	4.53	6.79	.94	1.99	.73	2.83	5.95	3.06	1.81	3.17	1.36	3.54	36.70	38.55
1959	2.20	1.35	.70	.27	.48	.84	1.21	3.88	7.47	2.72	1.26	1.61	23.99	32.84
1960	9.84	.52	2.74	2.82	1.74	1.03	2.10	3.52	2.08	4.22	1.87	5.18	37.66	29.94
1961	2.72	.01	2.65	3.85	1.53	3.91	.06	2.53	3.30	4.75	2.17	4.51	31.99	34.07
1962	2.97	3.74	1.00	.14	.40	2.60	2.34	2.85	7.99	5.75	2.04	9.54	41.37	40.21
1963	2.25	2.82	1.48	.07	.42	.14	4.74	3.04	1.84	1.13	2.27	1.40	21.60	20.78
1964	1.38	3.31	1.04	2.49	1.10	1.65	2.16	6.43	1.14	.41	3.84	3.20	28.16	29.78
1965	.03	6.57	.76	2.42	1.50	.36	2.84	5.71	1.56	.12	2.95	6.52	31.34	27.87
1966	2.40	.38	1.11	1.87	1.18	1.99	10.76	.34	2.65	.55	4.43	5.77	33.43	30.81
1967	.65	.46	.16	0	.32	.61	1.73	6.00	1.53	3.22	.20	7.30	22.18	25.44
1968	2.52	.76	1.25	4.27	1.97	4.65	1.51	2.41	3.04	5.07	1.46	1.97	30.88	31.33
1969	.94	3.21	.83	.67	2.20	4.83	3.14	5.51	3.51	.75	1.89	5.46	32.94	36.34
1970	3.38	.81	4.19	.01	2.53	2.47	5.49	1.24	.42	.32	.70	3.25	24.81	19.42
1971	2.35	.32	.32	.19	1.05	.20	.92	2.86	1.35	5.36	4.05	5.77	24.74	29.07
1972	3.84	.71	2.77	.23	.79	.83	3.00	5.69	1.86	1.32	1.01	1.98	24.03	21.98
1973	3.89	1.04	.34	3.69	1.40	2.26	2.28	2.09	2.28	5.24	.04	5.58	30.13	30.55
1974	3.99	1.70	0	.30	1.45	.51	3.30	1.73	2.39	.91	7.07	5.41	28.76	32.60
1975	7.05	1.04	1.44	1.40	2.42	1.37	1.81	7.94	4.03	4.59	4.55	1.37	39.01	32.26
1976	.39	.88	1.51	0	.14	.88	4.57	2.73	2.19	2.77	3.25	6.56	25.87	29.61
1977	5.33	.47	.72	2.23	.78	3.74	2.73	5.41	1.93	1.47	2.76	.25	27.82	

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION

Sheet \_\_\_\_\_ of \_\_\_\_\_ Sheets  
08-0427.00

Monthly and ~~annual~~ yearly mean discharge, in  $\text{ft}^3/\text{s}$ , of North Creek River <sup>near</sup> Jacksboro, Tex.  
[Drainage area, 21.6 square miles]

10-70489-8 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
			Station established	Aug. 8, 1956									
1956	-	-	-	-	-	-	-	-	-	-	0.10	0	-
1957	16.0	9.32	1.65	0	13.3	1.62	162	98.6	13.9	0.74	0	0.003	26.3
1958	1.43	21.6	.12	.39	.10	1.85	29.3	23.5	.31	2.77	0	1.01	6.85
1959	.08	0	0	0	0	0	0	.17	21.3	14.4	0	.17	3.00
1960	48.2	0	.006	3.48	3.44	.08	1.57	.67	.41	.30	.32	9.25	5.69
1961	1.51	0	0	13.9	.65	19.8	.02	2.54	.04	17.4	.07	1.10	4.84
1962	3.69	2.13	.01	0	0	.57	.92	.01	45.5	15.2	.57	19.0	7.09
1963	.96	7.49	2.86	.03	.08	.06	14.7	2.09	2.13	0	.05	0	2.52
1964	0	2.38	0	.54	.30	0	.26	15.1	.26	0	.65	.54	1.69
1965	0	16.4	0	.33	.01	.003	1.10	16.7	.003	0	0	18.7	4.42
1966	1.10	0	0	.315	.421	5.40	66.8	3.23	2.59	0	1.17	2.67	6.90
1967	.060	.003	.012	.001	.002	.013	.055	12.5	.706	1.75	0	5.45	1.73
1968	.006	0	0	2.90	.30	13.1	.89	.49	3.25	3.10	0	.18	2.04
1969	0	.098	.005	.016	.51	12.5	3.12	33.6	3.25	0	0	2.64	4.71
1970	.012	.0003	5.50	.085	.55	1.80	23.8	1.39	.003	0	0	0	2.75
			Runoff affected by floodwater-retarding structures										
1971	.005	0	0	0	0	0	0	.40	0	4.52	.62	3.86	.79
1972	1.40	0	1.16	.13	.050	.18	.80	18.9	0	0	0	0	1.91
1973	.23	.001	0	.17	.008	.12	.29	.27	.016	3.97	.003	.77	.49
1974	3.91	.10	0	0	.30	0	1.74	.67	.95	0	3.45	2.43	1.13
1975	22.0	9.46	.22	.52	3.61	.46	.68	16.5	9.85	3.61	4.16	.31	5.98
1976	.039	.14	.27	.22	.19	.15	1.45	.18	.27	.089	.81	11.5	1.26
1977	5.14	.26	.20	.34	.36	14.9	4.42	19.9	.37	.056	.72	0	3.95



UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

North Creek subwatershed No. 24 near Jermyn, Tex. Drainage Area 5.47 mi<sup>2</sup>  
Staff-gage Continuous ~~water stage recorder~~ ratio - Date of last sediment survey May 21, 1971  
Maxima: gage height, 32.46 ft; outflow, 39.8 ft<sup>3</sup>/s; surface area, 35.7 acres; contents, 211 acre-feet; on Mar. 27  
Minima: gage height, 26.85 ft; surface area, 11.8 acres; contents, 84.4 acre-feet; on Sept. 30  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -  
Averages: 5 water years, (1973-77); inflow, 262 acre-feet/year; outflow, 190 acre-feet/year; rainfall, 30.50 inches/year.

1977 WATER YEAR

Pool water budget, in acre-feet, water year October 1976 to September 1977.

	Oct	Nov	Dec	Calendar year 1976	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Water year 1977
Total Inflow $\downarrow$	9.3	1.7	5.9	170	5.9	7.2	148	47.2	12.2	3.9	1.0	2.5	2.8	248
Total Outflow	3.2	0.6	0	72.8	0	0.3	138	41.7	4.8	0	0	0	0	189
Total Consumption	11.3	10.1	9.4	102	6.5	7.6	11.0	14.5	17.1	20.0	19.8	16.8	9.7	154
†	+4.6	-7.9	-2.1	+29.2	+3.6	+0.7	+5.7	-3.9	-0.2	-12.7	-15.7	-10.6	-6.4	-44.9
‡	21.8	22.4	21.9	14.0	21.7	22.4	22.0	23.0	22.8	20.8	17.2	13.9	12.4	20.2
††	5.48	.59	.79	29.68	2.39	.75	3.35	2.70	5.02	2.10	2.15	3.23	.49	29.04

$\downarrow$  Inflow adjusted for rainfall on pool and pool losses.

† Change in contents, in acre-feet.

‡ Mean surface area, in acres.

†† Weighted mean rainfall, in inches.

Peak inflow - (base, - ft<sup>3</sup>/s)

Date	Time	Discharge	Date	Time	Discharge

# UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY - TEXAS DISTRICT

## WATER BUDGET OF POOL

### ANNUAL SUMMARY

1977 WATER YEAR

North Creek subwatershed No. 25 near Jermyn, Tex. Drainage Area 1.39 mi<sup>2</sup>

Staff-gage

~~Continuous water stage recorder~~ ratio —. Date of last sediment survey June 8, 1972.

Maxima: gage height, 11.36 ft; outflow, 14.0 ft<sup>3</sup>/s; surface area, 12.9 acres; contents, 65.6 acre-feet; on Mar. 27.

Minima: gage height, 5.29 ft; surface area, 5.4 acres; contents, 14.8 acre-feet; on Sept. 30.

Maximum inflow, — ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —.

Averages: 5 water years, (1973-77); inflow, 98.6 acre-feet/year; outflow, 62.3 acre-feet/year; rainfall, 30.50 inches/year.

Pool water budget, in acre-feet, water year October 1976 to September 1977.

	Oct	Nov	Dec	Calendar year 1976	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1977
Total Inflow $\downarrow$	4.1	0	0	40.8	1.8	5.2	53.4	30.3	8.6	0.8	2.3	1.2	0.1	108
Total Outflow	1.2	0	0	2.8	0	.4	50.0	28.6	6.8	0	0	0	0	87
Total Consumption	4.7	3.6	2.8	41.3	2.1	2.6	4.1	5.0	5.3	6.7	8.2	7.3	4.6	57
†	+1.8	+3.2	+2.3	+10.4	+1.2	+2.7	+1.7	-1.4	-0.1	-4.6	-4.6	-4.5	-4.3	-17.6
*	7.9	8.1	7.7	5.7	7.6	8.0	8.1	8.3	8.2	7.7	7.1	6.2	5.6	7.5
††	5.48	.59	.79	29.68	2.39	.75	3.35	2.70	5.02	2.10	2.15	3.23	.49	29.04

$\downarrow$  Inflow adjusted for rainfall on pool and pool losses.

† Change in contents, in acre-feet.

\* Mean surface area, in acres.

†† Weighted mean rainfall, in inches.

Peak inflow - (base, — ft<sup>3</sup>/s)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1977 WATER YEAR

Staff-gage North Creek subwatershed No. 26 near Jermyn, Tex. Drainage Area 1.41 mi<sup>2</sup>  
~~Continuous-water-stage-recorder~~ ratio —. Date of last sediment survey May 19, 1971.  
 Maxima: gage height, 16.10 ft; outflow, 12.0 ft<sup>3</sup>/s; surface area, 12.4 acres; contents, 78.8 acre-feet; on May 23.  
 Minima: gage height, 7.97 ft; surface area, 4.5 acres; contents, 12.9 acre-feet; on Sept. 30.  
 Maximum inflow, — ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —.  
 Averages: 5 water years, ( 1973-77); inflow, 128 acre-feet/year; outflow, 104 acre-feet/year; rainfall, 30.50 inches/year.

Pool water budget, in acre-feet, water year October 1976 to September 1977.

	Oct	Nov	Dec	Calendar year 1976	Jan.	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year 1977
Total Inflow <u>1/</u>	6.0	7.2	5.2	56.1	9.5	7.4	42.4	19.4	147	3.5	0.8	3.5	0	252
Total Outflow	4.4	6.3	4.0	29.6	8.5	6.1	40.7	17.1	145	.4	0	0	0	232
Total Consumption	3.2	2.5	1.7	33.5	1.6	2.0	3.2	3.9	4.9	5.7	7.3	6.6	3.8	46.4
†	+1.3	-1.3	-0.1	+6.5	+0.7	-0.3	+0.4	-0.2	+0.3	-1.5	-5.4	-1.7	-3.6	-11.4
†	6.3	6.5	6.4	5.6	6.4	6.5	6.4	6.5	7.0	6.3	5.9	5.3	4.8	6.2
††	5.48	.59	.79	29.68	2.39	.75	3.35	2.70	5.02	2.10	2.15	3.23	.49	29.04

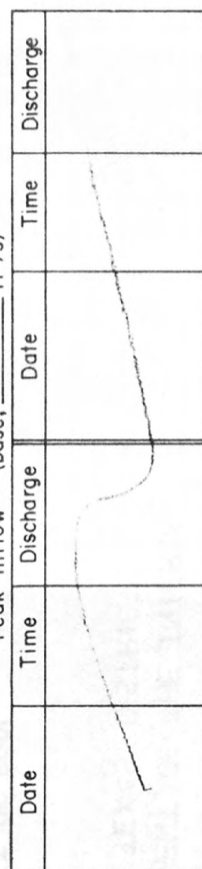
1/ Inflow adjusted for rainfall on pool and pool losses.

† Change in contents, in acre-feet.

† Mean surface area, in acres.

†† Weighted mean rainfall, in inches.

Peak inflow - (base, — ft<sup>3</sup>/s)



UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1977 WATER YEAR

Staff-gage North Creek subwatershed No. 30 near Jermyn, Tex. Drainage Area 1.20 mi<sup>2</sup>  
~~Continuous water-stage recorder~~ ratio -. Date of last sediment survey May 20, 1971.  
Maxima: gage height, 36.50 ft; outflow, 14.2 ft<sup>3</sup>/s; surface area, 13.2 acres; contents, 163 acre-feet; on May 23.  
Minima: gage height, 17.34 ft; surface area, 2.4 acres; contents, 11.7 acre-feet; on Mar. 25.  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -.  
Averages: 5 water years, (1973-77); inflow, 103 acre-feet/year; outflow, 56.4 acre-feet/year; rainfall, 28.94 inches/year.

Pool water budget, in acre-feet, water year October 1976 to September 1977

	Oct.	Nov.	Dec.	Calendar year 1976	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1977
Total Inflow <u>J</u>	6.3	0	0.1	31.9	2.0	0.6	31.0	5.7	162	0.2	2.7	2.2	0	213
Total Outflow	0	0	0	0	0	0	2.6	.9	151	0	0	0	0	154
Total Consumption	4.8	5.0	2.9	38.4	2.5	2.5	2.8	8.6	10.4	9.7	11.0	9.0	5.2	74.4
†	+2.7	-4.9	-2.7	-1.9	+0.2	-1.7	+26.5	-2.6	+3.2	-8.8	-7.9	-6.1	-5.2	-7.3
‡	3.1	3.5	2.9	2.3	2.9	2.8	2.8	6.2	7.2	5.4	4.5	3.6	2.8	4.0
††	4.90	.34	.46	27.61	2.76	.80	3.96	2.40	6.51	1.78	1.10	2.37	.20	27.58

J Inflow adjusted for rainfall on pool and pool losses.

† Change in contents, in acre-feet.

‡ Mean surface area, in acres.

†† Weighted mean rainfall, in inches.

Peak inflow - (base, - ft<sup>3</sup>/s)

Date	Time	Discharge	Date	Time	Discharge



## RAINFALL DATA SUMMARY

RAIN GAGE

Date of storm	1-5	2-R	3-5	4-R	5-R	Avg.
Oct. 4	.43	.60	.73	.60	.49	
6-8	.75	.68	.78	.53	.62	
15	.86	.90	1.21	.60	1.08	
16	0	.20	0	.10	.12	
19	.18	.20	.30	.25	.20	
24	.06	0	.06	0	.05	
27	.55	.90	.96	.89	.80	
28	.25	.22	.22	.21	.18	
29	1.81	1.78	1.78	1.72	1.78	
October Totals	4.89	5.48	6.04	4.90	5.32	5.33
Nov. 11-13	.41	.55	.40	.32	.30	
25	.25	.04	0	.02	.04	
November Totals	.66	.59	.40	.34	.34	.47
Dec 5	.53	.53	.58	.31	.50	
6	0	.20	.25	.12	.30	
11-12	.05	.06	.07	.03	.05	
December Totals	.58	.79	.90	.46	.85	.72
1976 Calendar Year Totals						29.61
Jan 2	0	.03	.04	0	0	
8	0	.28	.22	(.20)	.04	
9	.40	.50	.50	(.50)	.93	
10	0	.08	0	(.05)	.07	
12	.20	.62	.64	(.60)	.85	
13	.25	.26	.28	(.25)	.27	
22-23	.31	.25	.26	(.25)	(.25)	
30	.35	.37	.35	(.35)	(.35)	
January Totals	1.51	2.39	2.29	2.20	2.76	2.23
Feb 2-3	.18	.25	.31	(.25)	(.25)	
10-11	.35	.50	.65	*.60	(.55)	
February Totals	.53	.75	.96	.85	.80	.78
Mar. 10-11	.23	.08	.42	.35	(.30)	
26	1.89	1.84	1.89	1.80	2.12	
27	1.47	1.43	1.71	1.63	1.54	
March Totals	3.59	3.35	4.02	3.78	3.96	3.74

\* Rain gage moved to new location 2/9/77  
( ) No record rainfall estimated

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY-AUSTIN DISTRICT

## RAINFALL DATA SUMMARY--Continued

STUDY AREA North Creek 1977 WATER YEAR

## RAIN GAGES

Date of storm	1-5	2-2	3-5	4-2	5-2	Aug.														By
Apr. 14-15	1.77	1.40	1.37	1.20	1.15															
16-17	1.40	1.20	1.28	1.07	1.20															
19	.23	.10	.10	.07	.05															
30	.05	0	0	0	0															
April Totals	3.45	2.70	2.75	2.34	2.40	2.73														
May 2	.50	.67	.76	.67	1.15															
5	.38	.35	.37	.35	.30															
9-10	.41	.55	.78	.73	.46															
19	.08	.05	.35	.27	.25															
20	1.28	.95	1.02	1.08	.90															
21	.29	.20	.26	.23	.55															
23	3.21	2.25	1.65	.85	2.90															
May Totals	6.15	5.02	5.19	4.18	6.51	5.41														
June 22	.08	.30	.10	.08	.05															
23	.72	.28	.24	.38	.40															
24	1.78	1.52	1.32	1.07	1.33															
June Totals	2.58	2.10	1.66	1.53	1.78	1.93														
July 8	.25	1.95	1.68	1.80	1.10															
10	.28	.10	0	0	0															
17	.02	.10	0	.08	0															
July Totals	.55	2.15	1.68	1.88	1.10	1.47														
Aug 1	.60	.60	.60	.55	.37															
11	.27	.05	.16	.37	0															
20	1.23	2.55	2.50	1.75	1.57															
23	.13	.03	0	.05	.43															
August Totals	2.23	3.23	3.26	2.72	2.37	2.76														
Sept 6	.10	.35	0	.09	.12															
7	0	.07	0	.06	0															
12	.28	.07	0	0	.08															
19	.04	0	0	0	0															
September Totals	.42	.49	0	.15	.20	.25														
1977 Water Year Total						27.82														

INFLOW AND OUTFLOW COMPUTATIONSStorm period March 26-27, 197708042650NorthCreek subwatershed No. 28-A near Jerman, Tex. D.A. 6.82 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage		Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool			Net Inflow			
				ac-ft	cfs				in	ac	ac-ft	cfs	cfs	Rate	
														in/hr	in
March 26, 1977															
0000	17.42														
1400	17.42	217.71	14			17.42			.02	37.1	.06	0	0	0.0000.0000	
1800	17.46	219.20	4.0	+1.49	4.5	17.44		4.5	.72	37.2	2.23	6.7	0	0.0020.0000	
2000	17.52	221.45	2.0	+2.25	13.6	17.49		13.6	.62	37.5	1.94	11.7	1.9	0.0004.0008	
2200	17.57	223.34	2.0	+1.89	11.4	17.54		11.4	.09	37.7	.28	1.7	9.7	0.0022.0044	
2400	17.67	227.14	2.0	+3.80	23.0	17.62		23.0	.44	38.1	1.40	8.5	14.5	0.0033.0066	
March 27															
0100	17.77	231.01	1.0	+3.87	44.8	17.72		44.8	.42	38.6	1.35	16.3	30.5	0.0070.0070	
30	17.86	234.55	.50	+3.54	85.7	17.82		85.7	.58	39.3	1.90	46.0	39.7	0.0091.0096	
0200	18.02	241.01	.50	+6.46	156	17.94		156	.24	40.4	.81	19.6	136	0.0313.0156	
15	18.14	246.03	.25	+5.02	243	18.08		243	.08	41.8	.28	13.6	229	0.0527.0132	
30	18.32	253.82	.25	+7.79	377	18.23		379	.05	43.3	.18	8.7	370	0.0851.0213	
40	18.47	260.56	.167	+6.74	489	18.40		496	.01	45.0	.04	2.9	493	0.1134.0189	
50	18.65	268.96	.167	+8.40	610	18.56		624	0	46.6	0	0	624	0.1435.0240	
55	18.76	274.24	.083	+5.28	767	18.70		789	0	48.0	0	0	789	0.1812.0150	
0300	18.88	280.14	.083	+5.90	857	18.82		884	0	49.2	0	0	884	0.2033.0169	
05	19.01	286.70	.083	+6.56	953	18.94		988	0	50.4	0	0	988	0.2272.0189	
10	19.14	293.43	.083	+6.73	977	19.08		1020	0	51.8	0	0	1020	0.2346.0195	
15	19.26	299.79	.083	+6.36	923	19.20		975	0	53.0	0	0	975	0.2242.0186	
25	19.47	311.26	.167	+11.47	833	19.36		897	0	54.6	0	0	897	0.2063.0345	
35	19.66	322.03	.167	+10.77	782	19.56		861	0	56.6	0	0	861	0.1980.0331	
45	19.82	331.37	.167	+9.34	678	19.74		876	0	58.4	0	0	876	0.1762.0294	
0400	20.08	347.10	.25	+15.73	761	19.95		895	0	60.5	0	0	895	0.1955.0489	
15	20.35	364.16	.25	+17.06	826	20.22		910	0	63.2	0	0	917	0.2109.0527	
30	20.60	380.58	.25	+16.42	795	20.48		916	0	65.8	0	0	887	0.2040.0510	
0500	20.90	401.13	.50	+20.55	497	20.75		921	0	68.5	0	0	589	0.1355.0678	
0600	21.14	418.23	1.0	+17.10	207	21.02		926	.06	71.2	.36	4.4	296	0.0481.0681	
0800	21.17	420.40	2.0	+2.17	13.1	21.16		929	.27	72.6	1.63	9.4	96.1	0.0221.0442	
1200	20.96	405.36	4.0	-15.04	-45.5	21.06		92.7	0	71.6	0	0	42.2	0.0109.0436	
1800	20.39	366.74	6.0	-38.62	-77.9	20.68		92.0	0	67.8	0	0	14.1	0.0032.0192	

## Storm period March 26-27/1977

Jerome, Tex. D.A. 6.82sq mi

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UNITED STATES DEPARTMENT OF INTERIOR  
GEOLOGICAL SURVEY - WATER RESOURCES DIVISION  
TEXAS DISTRICT

## WEIGHTED-PRECIPITATION RECORD

Sheet 1 of 1  
Comp. by: CCK  
Date: 1/24/78  
Check by: EOL  
Date: 1/30/78

Study Area <u>08042650 North Creek SWS #28-A near Jermyn, Tex</u> Date of storm <u>March 26-27, 1977</u>									
Accumulated Precipitation in Inches for Recording Rain Gages									
Weight Factor	Gage Recorded	Gage x Factor	Gage Recorded	Gage x Factor	Gage Recorded	Gage x Factor	Gage Recorded	Gage x Factor	Weighted Precipitation (Rec. Gages x K)
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages
<u>March 26, 1977</u>									
1330	.00								.00
1400	.02								.02
1600	.28								.28
1730	.51								.51
1800	.70								.70
1900	.90								.90
2000	1.30								1.30
2200	1.38								1.38
2315	1.45								1.45
30	1.75								1.75
2400	1.80								1.80
<u>March 27</u>									
0030	1.88								1.88
0100	2.20								2.20
30	2.75								2.75
0200	2.98								2.98
15	3.06								3.06
30	3.10								3.10
40	3.11								3.11
0500	3.11								3.11
0600	3.17								3.17
0800	3.43								3.43
1000	3.43								3.43
WMR = Sum of Precipitation x Weight Factor									
Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation x Weight Factor	Precipitation x Weight Factor
4R	0	3.43	0						
3-5	1.00	3.60	3.60						
WMR = 3.60									
K = WMR / Total Recording Gages Weighted Precipitation = $\frac{3.60}{3.43} = 1.050$									

UNITED STATES DEPARTMENT OF THE INTERIOR  
 GEOLOGICAL SURVEY - TEXAS DISTRICT

## RUNOFF COMPUTATIONS

Station 08042700 North Creek near Jacksboro, TexPeriod of Record March 26-28, 1978Drainage Area 21.6 mi<sup>2</sup> of which 16.3 mi<sup>2</sup>  
is above flood detection structures

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft <sup>3</sup> /s	Inc.	In/Hr	Inches	Acc. In.
March 26, 1977							
0000	4.66	±0.3	.44	56	.0000	.0000	.0000
1400	4.66		.44	72	.0000	.0000	.0000
1800	4.74		.83	20	.0001	.0002	.0002
1900	4.77		.98	8	.0001	.0001	.0003
2000	4.93		2.1	6	.0002	.0002	.0005
30	5.12	±0.3	4.4	4	.0003	.0002	.0007
2100	5.46	±0.2	12	4	.0009	.0004	.0011
30	5.28	±0.3	7.0	3	.0005	.0002	.0013
45	5.35	±0.2	8.3	3	.0006	.0002	.0015
2215	5.89	±0.1	34	5	.0024	.0015	.0030
2300	5.67	±0.1	21	6	.0015	.0011	.0041
45	5.49	±0.2	13	4	.0009	.0004	.0045
2400	5.66	±0.1	20	1	.0014	.0002	.0047
			572.86	192			
			3.0				
March 27							
0000	5.66	±0.1	20	2	.0014	.0004	.0051
30	6.35	0	70	4	.0050	.0025	.0076
0100	6.32		67	4	.0048	.0024	.0100
30	7.52		195	4	.0140	.0070	.0170
0200	9.63		526	4	.0378	.0189	.0359
30	10.81		789	4	.0566	.0283	.0642
0300	11.21		891	4	.0640	.0320	.0962
30	11.52		973	5	.0699	.0437	.1399
0415	11.58		990	6	.0711	.0533	.1932
0500	11.34		925	5	.0664	.0415	.2347
30	10.77	0	780	4	.0560	.0280	.2627
March 27 (continued)							
0600	9.87	0	575	4	.0413	.0206	.2833
30	9.33		470	4	.0337	.0168	.3001
0700	8.93		399	6	.0286	.0214	.3215
0800	8.45		322	12	.0231	.0346	.3561
1000	8.13		275	16	.0197	.0394	.3955
1200	8.04		262	20	.0188	.0470	.4425
1500	7.86		238	24	.0171	.0513	.4938
1800	7.76		225	36	.0162	.0729	.5667
2400	7.63	0	209	24	.0150	.0450	.6117
			67648	192			
			352				
March 28							
0000	7.63	0	209	1	.0150	.0225	.6342
0300	7.33		172	2	.0123	.0369	.6711
0600	6.99		134	2	.0096	.0288	.6999
0900	6.70		103	2	.0074	.0222	.7221
1200	6.33		68	2	.0049	.0147	.7368
1500	6.07		46	2	.0033	.0066	.7434
1800	5.90	0	34	3	.0024	.0108	.7542
2400	5.59	±0.3	18	2	.0013	.0039	.7581
			1393	16			
			87				

Computed by CCKDate 1/30/78Checked by EDLDate 1/31/78

UNITED STATES DEPARTMENT OF INTERIOR  
GEOLOGICAL SURVEY - WATER RESOURCES DIVISION  
TEXAS DISTRICT

Sheet 1 of 1  
Comp. by: CCK  
Date: 2/6/78  
Check by: EDL  
Date: 2/2/78

WEIGHTED-PRECIPITATION RECORD

Study Area <u>08042700 North Creek near Jacksboro, Tex.</u> Date of storm <u>March 26-27, 1977</u>									
Accumulated Precipitation in Inches for Recording Rain Gages									
Weight Factor	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Accumulated
Date & Time	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Precipitation
									(Rec. Gages x K)
									All Gages
									All Gages
<u>March 26, 1977</u>									
0000	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0
1600	.15	.07	.29	.11	.38	.07	.13	.70	.91
1730	.47	.21	.50	.18	.72	.13	.15	.90	1.38
1800	.65	.29	.70	.26	.83	.15	.20	1.39	1.41
1900	.82	.37	.89	.33	1.10	.20	.27	1.43	1.64
2000	1.35	.61	1.31	.48	1.48	.27	.36	1.82	1.84
30	1.37	.62	1.36	.50	1.50	.27	.38	2.00	2.02
2200	1.41	.63	1.39	.51	1.62	.29	.36	2.78	2.81
2315	1.60	.72	1.45	.54	2.00	.36	.65	3.13	3.17
30	1.82	.82	1.74	.64	2.02	.36	.66	3.22	3.26
2400	1.84	.83	1.80	.67	2.12	.38	.66	3.39	3.43
<u>March 27</u>									
0030	2.00	.90	1.88	.70	2.22	.40	.66	3.40	3.44
0100	2.33	1.05	2.19	.81	2.58	.46	.66	3.40	3.44
30	2.65	1.19	2.75	1.02	3.18	.57	.66	3.40	3.44
0200	2.87	1.29	2.98	1.10	3.35	.60	.66	3.40	3.44
30	3.02	1.36	3.11	1.15	3.43	.62	.66	3.40	3.44
0500	3.06	1.38	3.12	1.15	3.44	.62	.66	3.40	3.44
0700	3.11	1.40	3.21	1.19	3.52	.63	.66	3.40	3.44
0800	3.27	1.47	3.43	1.27	3.60	.65	.66	3.40	3.44
0900	3.27	1.47	3.43	1.27	3.62	.65	.66	3.40	3.44
1200	3.27	1.47	3.43	1.27	3.66	.66	.66	3.40	3.44
WMR : Sum of Precipitation x Weight Factor									
K : WMR / Total Recording Gages Weighted Precipitation = $\frac{3.44}{3.40} = 1.012$									

## INFLOW AND OUTFLOW COMPUTATIONS

Storm period May 23, 1977

08042650

North

Creek subwatershed No. 28-A near

Jermyn, Tex. D.A. 6.82 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage		Mean G. Ht. ft	Outflow cfs		Total inflow cfs	Rainfall on Pool		Net Inflow		Acc in
				ac-ft	cfs		cfs			area ac	Storage ac-ft	Rate cfs	in/hr	
	<u>May 23, 1977</u>													
0000	18.37	256.04					5.9							
0130	18.36	255.60	1.5	-44	-3.5	18.36	5.6	2.0		.04	44.6	.8	.0002	.0003
0200	18.50	261.93	50	+6.33	153	18.43	8.1	16.1	138	493	5.21	35	.0080	.0040
15	18.60	266.58	25	+4.65	225	18.55	13.2	238	17	46.5	.66	206	.0474	.0118
30	18.73	272.78	25	+6.20	300	18.66	18.7	319	.06	47.6	.24	307	.0706	.0176
40	18.83	277.66	167	+4.88	354	18.78	25.1	379				379	.0872	.0146
50	18.95	283.66	167	+6.00	436	18.89	31.5	448				448	.1076	.0180
55	19.01	286.70	.083	+3.04	441	18.98	32.1	478				478	.1099	.0091
0300	19.07	289.78	.083	+3.08	447	19.04	41.1	488				488	.1122	.0093
05	19.125	292.64	.083	+3.86	415	19.10	45.1	440				460	.1058	.0088
10	19.175	295.27	.083	+2.63	382	19.15	48.6	431				431	.0991	.0082
15	19.22	297.65	.083	+2.38	346	19.20	52.2	398				398	.0915	.0076
25	19.30	301.93	167	+4.28	311	19.26	56.7	368				368	.0846	.0141
35	19.37	305.74	167	+3.81	277	19.34	62.8	340				340	.0782	.0131
45	19.425	308.77	167	+3.03	220	19.40	67.5	288				288	.0662	.0111
0400	19.49	312.38	25	+3.61	175	19.46	72.4	247				247	.0568	.0142
15	19.53	314.62	25	+2.24	108	19.51	76.2	184				184	.0423	.0106
30	19.55	315.76	25	+1.14	55.2	19.54	78.2	133				133	.0306	.0076
0500	19.57	316.88	50	+1.12	27.1	19.56	79.4	106				106	.0244	.0122
0600	19.55	315.76	1.0	-1.12	-13.6	19.56	79.4	658				658	.0151	.0151
0800	19.40	307.38	2.0	-8.38	-50.7	19.48	74.0	23.3				23.3	.0034	.0108
1000	19.16	299.79	2.0	-7.59	-45.9	19.33	62.0	16.1				16.1	.0037	.0074
1200	19.13	298.90	2.0	-6.89	-41.7	19.20	52.2	10.5				10.5	.0024	.0048
1500	18.97	284.66	3.0	-8.24	-33.2	19.08	41.8	8.6				8.6	.0020	.0040
1800	18.85	278.66	3.0	-6.00	-24.2	18.91	32.7	8.5				8.5	.0020	.0040
2400	18.68	270.38	6.0	-8.28	-16.7	18.76	24.0	7.3				7.3	.0017	.0102
	<u>May 24</u>													
0600	18.57	265.18	6.0	-5.20	-10.5	18.62	16.6	6.1				6.1	.0014	.0084
1200	18.49	261.48	6.0	-3.70	-7.5	18.53	12.3	4.8				4.8	.0011	.0066
1800	18.44	259.20	6.0	-2.28	-4.6	18.46	9.2	4.6				4.6	.0011	.0066
2400	18.40	257.38	6.0	-1.82	-3.7	18.42	7.7	4.0				4.0	.0009	.0054



UNITED STATES DEPARTMENT OF INTERIOR  
GEOLOGICAL SURVEY - WATER RESOURCES DIVISION  
TEXAS DISTRICT

## WEIGHTED-PRECIPITATION RECORD

Study Area 08042650 North Creek Sws 28-A near German Tsk Date of storm May 23, 1977

[illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR  
 GEOLOGICAL SURVEY - TEXAS DISTRICT

## RUNOFF COMPUTATIONS

Station 08042700 North Creek near Jacksboro, Tex.Period of Record May 23-24, 1977Drainage Area 21.6 mi<sup>2</sup> of which 16.3 mi<sup>2</sup>  
is above flood detention structures

Time	G. Ht. Feet	Sh. Adj.	Discharge		Runoff		Time	G. Ht. Feet	Sh. Adj.	Discharge		Runoff		
			Ft <sup>3</sup> /s	Inc. In./Hr	Inches	Acc. In.				Ft <sup>3</sup> /s	Inc. In./Hr	Inches	Acc. In.	
May 23, 1977							May 24 (continued)							
0000	4.92	±05	2.2	6	.0002	.0002	0900	6.10	0	48	2	.0034	.0102	.8219
0130	4.91	±05	2.1	8	.0002	.0002	1200	5.91	0	34	2	.0024	.0072	.8291
0200	5.64	±02	20	3	.0014	.0005	1500	5.79	±01	28	2	.0020	.0060	.8351
15	9.80	0	560	2	.0402	.0100	1800	5.71	±01	23	2	.0017	.0051	.8402
30	13.23		1,490	2	.1070	.0268	2100	5.63	±02	19	2	.0014	.0042	.8444
45	15.20		2,200	2	.1580	.0395	2400	5.58	±02	17	1	.0012	.0018	.8462
0300	15.56		2,340	4	.1680	.0840				715	16			
45	15.25		2,220	4	.1594	.0797				45				
0400	14.91		2,090	3	.1501	.0563								
30	14.33		1,870	4	.1343	.0672								
0500	13.79		1,680	6	.1206	.0904								
0600	11.64		1,010	6	.0725	.0544								
30	10.63		746	4	.0536	.0268								
0700	9.99		600	6	.0431	.0323								
0800	9.00		411	8	.0295	.0295								
0900	8.45		322	12	.0231	.0346								
1100	7.71		219	16	.0157	.0314								
1300	7.28		166	16	.0119	.0238								
1500	7.05		140	20	.0101	.0252								
1800	6.81		114	36	.0082	.0369								
2400	6.56	0	90	24	.0065	.0195								
			85680	192										
			446											
May 24														
0000	6.56	0	90	1	.0065	.0098								
0300	6.45	1	80	2	.0057	.0171								
0600	6.37	0	72	2	.0052	.0156								

Computed by CCK Date 11/31/78 Checked by EDL Date 2/1/78

May 23, 1977

$$\frac{1.99}{1.84} = 1.082$$









