

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

# Hydrologic Data for North Creek Trinity River Basin Texas, 1978

*By C. C. Kidwell*

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Open-File Report 80-573

*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*

AUSTIN, TEXAS

AUGUST 1980

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

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water-resources investigations between the Department  
and the U.S. Geological Survey

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# METRIC CONVERSIONS

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	in	25.4	millimeter	mm
foot	ft	0.3048	meter	m
mile	mi	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	0.02832	cubic meter per second	m <sup>3</sup> /s
foot per mile	ft/mi	0.189	meter per kilometer	m/km
acre-foot	acre-ft	1233	cubic meter	m <sup>3</sup>
		0.001233	cubic hectometer	hm <sup>3</sup>

# HYDROLOGIC DATA FOR NORTH CREEK

## TRINITY RIVER BASIN, TEXAS

1978

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 U.S. Soil Conservation Service has found that approximately 3,500 floodwater-retarding structures would be physically and economically feasible in Texas. As of September 30, 1978, 1,786 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 1951-62, the U.S. Geological Survey began hydrologic investigations in 12 small watersheds (fig. 1). As of Sept. 30, 1978, data collection in all of these study areas, except for North Creek, had been completed. This study is being made in cooperation with the Texas Department of Water Resources, the U.S. Soil Conservation Service, the San Antonio River Authority, the city of Dallas, and the Tarrant County Water 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, 1978, is given in table 1.

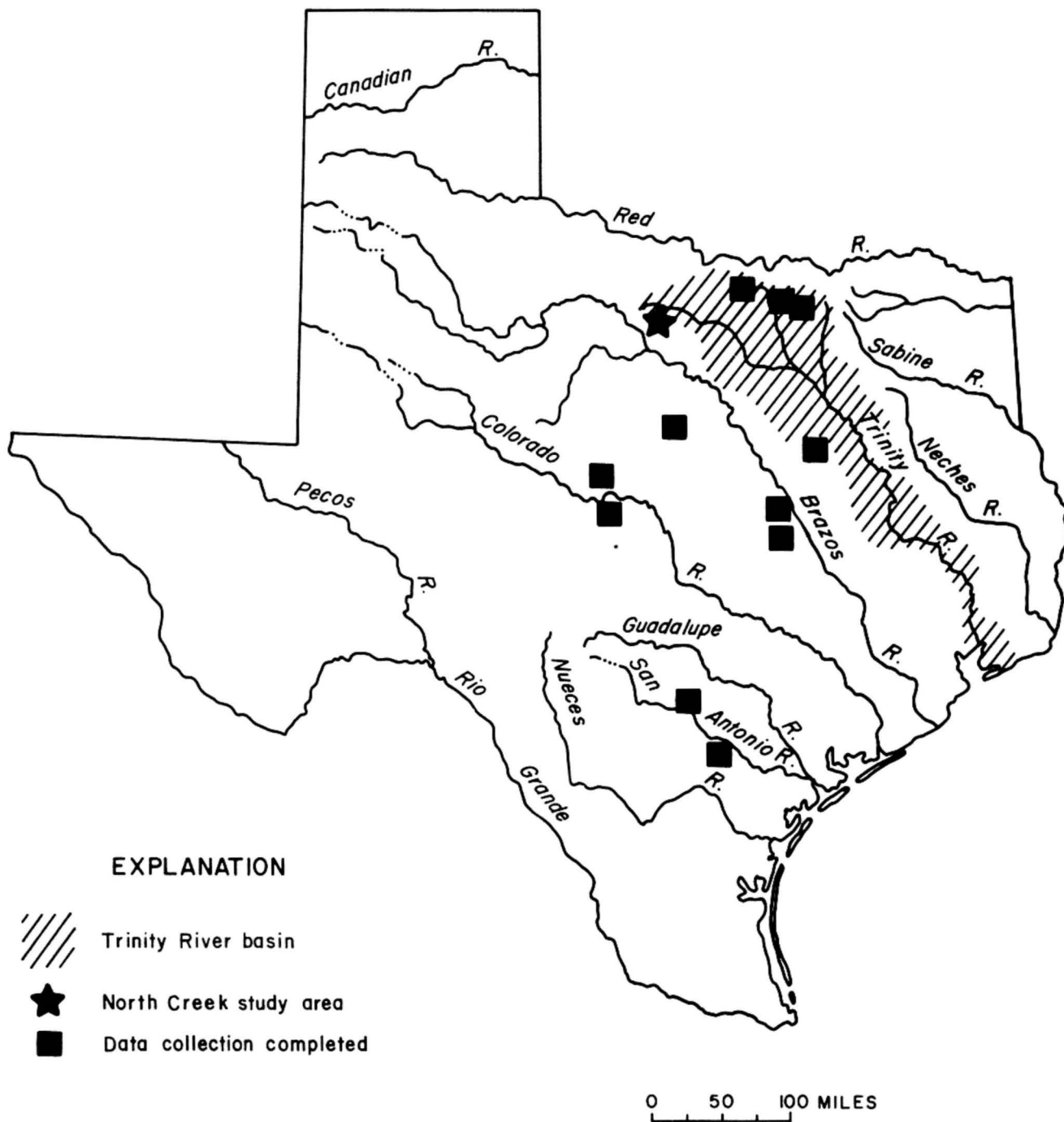


FIGURE 1. - Location of the North Creek study area and other study areas

Table 1.--Small-watershed study areas in Texas as of September 30, 1978

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 present	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.

### Objectives of the 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.

## Purpose and Scope of this Hydrologic-Data Report

This report contains the rainfall, runoff, and storage data collected during the 1978 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

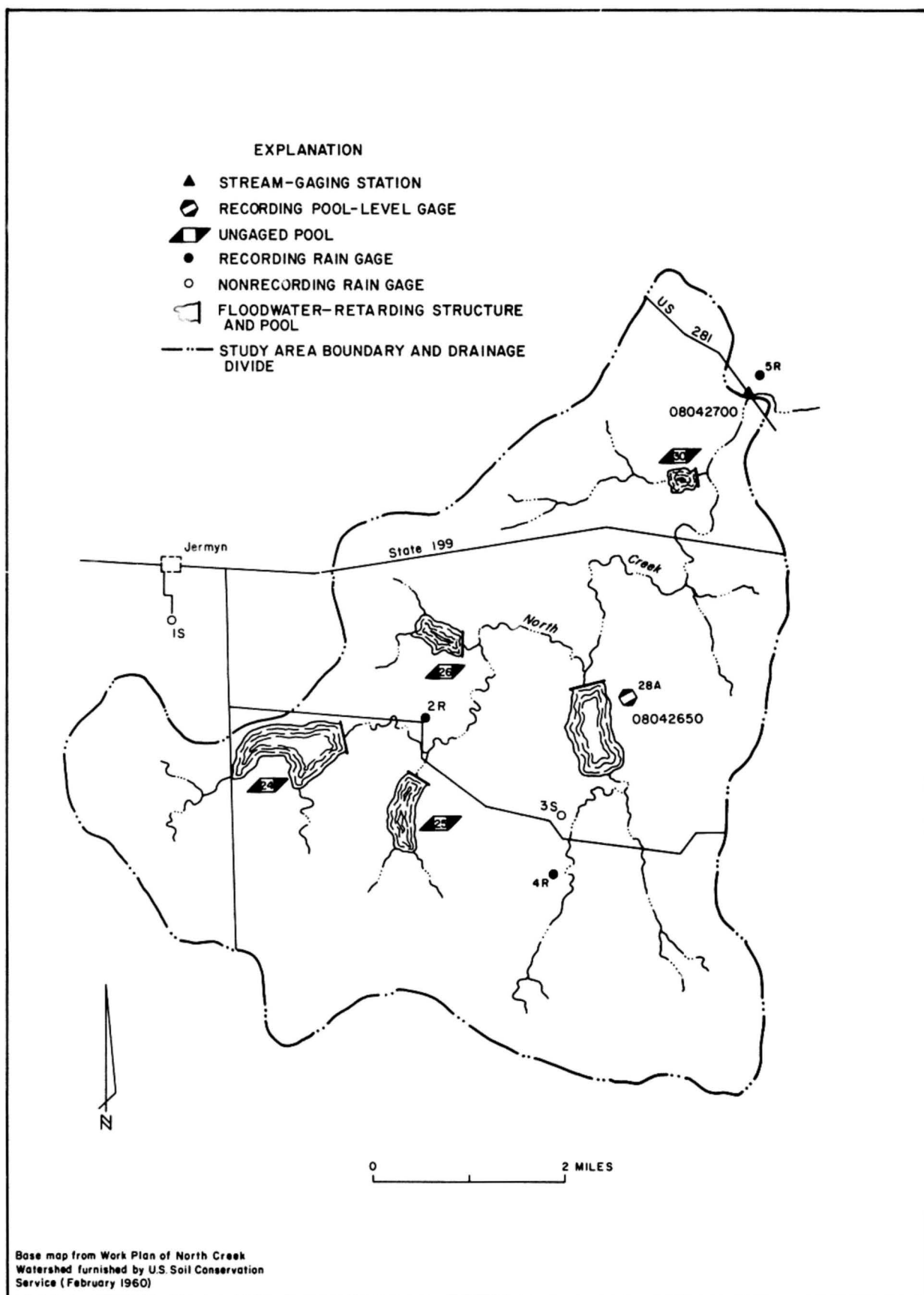
The headwaters of North Creek are near the town of Jermyn in the western part of Jack County. The Creek flows northeasterly for approximately 19 miles where it flows into Big Cleveland Creek, 4 miles upstream from the West Fork Trinity River. North Creek drains a 43.1-square-mile area; however, the study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

The topography of the watershed ranges from steep to gently rolling. Altitudes in the watershed range from about 1,310 feet above NGVD (National Geodetic Vertical Datum of 1929) at the headwaters to about 1,016 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 rangeland, 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.

The 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.



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

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 ranged from 14.12 inches in 1956 to 48.99 inches in 1957. The wettest months are April, May, June, September, and October.

#### FLOODWATER-RETARDING STRUCTURES

There are five floodwater-retarding structures in the North Creek study area. These structures which have a total capacity of 4,425 acre-feet below the flood-spillway crests, 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 (08042650) and a stream-gaging station on North Creek near Jacksboro, Texas (08042700). 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). The rain gages, except for the one at the stream-gaging station, are serviced weekly by local residents.

On Oct. 5, 1972, a continuous water-stage recorder was installed at the station North Creek Subwatershed No. 28-A near Jermyn (08042650). 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. A monthly water budget of the pools is 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 NGVD (ft)	Emergency spillway			Principal spillway		Controlled outlet		Diameter of pipe through dam (in)	Range of staff gages
					Width (ft)	Gage height (ft)	Contents <u>1/</u> (acre-ft)	Gage height (ft)	Contents <u>2/</u> (acre-ft)	Gage height of invert (ft)	Contents (acre-ft)		
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	<u>a/</u> 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	<u>b/</u> 24	6.7-35.7
28-A	6.82	3-31-72	<u>c/</u> 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	<u>d/</u> 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.

The stream-gaging station North Creek near Jacksboro (08042700), continuously records the water level, which with a stage-discharge relationship, is used to compute discharge and runoff from the study area. Streamflow records at this gage began Aug. 8, 1956. Records of runoff for the 1978 water year are given in the section "Compilation of data".

#### SUMMARY OF DATA FOR THE 1978 WATER YEAR

The average rainfall in the study area during the 1978 water year was 21.21 inches, which is much less than the 21-year average of 29.45 inches for 1958-78. Monthly rainfall totals ranged from 0.04 inch in July to 6.54 inches in August. The average runoff from the study area during the 1978 water year was 1.20 ft<sup>3</sup>/s (865 acre-feet). This value can be compared with the 14-year (1957-70) average of 5.75 ft<sup>3</sup>/s (4,170 acre-feet) for the period prior to construction of the upstream floodwater-retarding structures, or the 8-year (1971-78) average of 2.09 ft<sup>3</sup>/s (1,510 acre-feet) for the period of control by the structures.

A storm 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 the floodwater-retarding structures.

Two storms were selected for detailed hydrograph-related computations for the 1978 water year. These storms occurred April 9-10, and August 5, 1978. Patterns of storm rainfall and runoff are illustrated in this report by the use of hydrographs and mass curves. A summary of rainfall and runoff data for the year is given in table 3. The computations, hydrographs, and curves are given in the section "Compilation of data".

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UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1978 water year

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (ft <sup>3</sup> /s)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			

North Creek subwatershed No. 28-A near Jermyn, Tex.  
(Drainage area 6.82 mi<sup>2</sup>)

April 9-10, 1978	13.0	4.62	1.18	2.19	3.55	0.67	0.15	1,330
August 5, 1978	3.0	1.19	.36	.47	.69	.22	.18	456

North Creek near Jacksboro, Tex.  
(Drainage area 21.6 mi<sup>2</sup> of which 16.3 mi<sup>2</sup> is above floodwater-retarding structures)

April 9-10	13.25	4.75	1.13	2.06	3.21	.61	.13	1,610
August 5, 1978	4.0	1.18	.23	.44	.60	.03	.03	165

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) Soil Conservation Service Datum. Prior to Oct. 5, 1972, staff gage at same datum.

REMARKS.--Records pour. 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 (302,000 m<sup>3</sup>), and the capacity at the crest of the controlled outlet pipe is 24 acre-ft (29,600 m<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.--6 years (water years 1973-78), 593 acre-ft/yr (731,000 m<sup>3</sup>/yr), 1.63 in/yr (41 mm/yr).

AVERAGE OUTFLOW.--6 years (water years 1973-78), 363 acre-ft/yr (448,000 m<sup>3</sup>/yr), 1.00 in/yr (25 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)
Apr. 9	2045	*1,330 37.7	Aug. 5	0850	456 12.9

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

Minimum discharge, no inflow at times. Maximum outflow, 47.9 ft<sup>3</sup>/s (1.36 m<sup>3</sup>/s) Apr. 9, gage height, 19.14 ft, (5.834 m); no outflow October to March, May to July and September.

## POOL WATER BUDGET, IN ACRE-Feet, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Total 1/	2.9	0.9	0.9	0.4	2.7	0.8	243	1.2	3.7	0.1	127	0.8
Outflow	0	0	0	0	0	0	76.4	0	0	0	5.2	0
(t)	-19.3	-13.4	-13.5	-8.3	-2.8	-10.1	+150	-25.7	-28.3	-39.1	+97.7	-29.9
(tt)	.74	.93	.24	.70	1.79	1.42	4.86	1.89	1.58	0	7.34	.80

CAL YR 1977	INFLOW	761	OUTFLOW	637	t	-128	tt	23.72
WTH YR 1978	INFLOW	384	OUTFLOW	81.6	t	+57.3	tt	22.29

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

t Change in contents, in acre-feet.

tt Weighted-mean rainfall, in inches.

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY-TEXAS DISTRICT

08042650

Monthly and yearly rainfall, in inches \_\_\_\_\_ of North Creek  
Subwatershed No. 28-A near Jermyn, Tex.  
 [Drainage area, 6.82 square miles]

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[illegible]

08042650

## North Creek

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

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[illegible]

[Drainage area, 6.82 square miles]

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UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

080426 50 North Creek subwatershed No 28-A near Jermyn, Tex. Drainage Area 6.82 mi<sup>2</sup>

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

Maximum gage height, 19.14 ft; outflow, 47.9 ft<sup>3</sup>/s; surface area, 52.4 acres; contents, 293 acre-feet; on April 9

Minimum gage height, 11.86 ft; surface area, 18.6 acres; contents, 70.9 acre-feet; on April 19, 1978

Maximum inflow, 1,330 ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on April 9

Averages 6 water years, (1973-78); inflow, 593 acre-feet/year; outflow, 363 acre-feet/year; rainfall, 29.63 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978.

	Oct	Nov	Dec	Calendar year 1977	Jan	Feb	Mar	Apr.	May	June	July	Aug	Sept	Water year 1978
Total Inflow $\downarrow$	2.9	0.9	0.9	761	0.4	2.7	0.8	243	1.2	3.7	0.1	127	0.8	384
Total Outflow	0	0	0	637	0	0	0	76.4	0	0	0	5.2	0	81.6
Total Consumption	23.8	16.2	14.8	327	9.9	8.5	13.2	25.4	32.6	36.5	39.2	42.9	33.2	296
†	-19.3	-13.4	-13.5	-128	-8.3	-2.8	-10.1	+150	-25.7	-28.3	-39.1	+97.7	-29.9	+57.3
††	25.6	23.5	21.8	34.2	20.7	20.3	19.7	31.7	36.2	33.2	28.0	37.6	36.5	27.9
†††	.74	.93	.24	23.72	.70	1.79	1.42	4.86	1.89	1.58	0	7.34	.80	22.29

$\downarrow$  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, 200 ft<sup>3</sup>/s)

Date	Time	Discharge	Date	Time	Discharge
*Apr. 9	2045	1,330	(37.7 m <sup>3</sup> /s)		
Aug. 5	0850	456	(12.9 m <sup>3</sup> /s)		

Note.--Average for 5-minute interval.

Inflow computed and adjusted as explained above.

# 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) Texas Department of Highways and Public Transportation datum.

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 1971-78) regulated, 2.09 ft<sup>3</sup>/s (0.0592 m<sup>3</sup>/s), 1.31 in/yr (33 mm/yr), 1,510 acre-ft/yr (1.86 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. 18, 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, 1,610 ft<sup>3</sup>/s (45.6 m<sup>3</sup>/s) Apr. 9, gage height, 13.75 ft (4.191 m); no flow for many days.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.17	.08	.11	.35	.00	.00	.00	.00
2	.00	.00	.00	.00	.10	.09	.09	.62	.00	.00	.00	.00
3	.00	.00	.00	.00	.06	.07	.09	.23	.01	.00	23	.00
4	.00	.00	.00	.00	.07	.05	.09	.43	.01	.00	.94	.00
5	.00	.00	.00	.00	.08	.03	.08	.38	.00	.00	19	.00
6	.00	.00	.00	.00	.08	.09	.21	.36	1.5	.00	1.0	.00
7	.00	.00	.00	.00	.07	.28	.07	.34	.43	.00	.21	.00
8	.00	.00	.00	.00	.06	.16	.06	.27	.25	.00	.01	.00
9	.00	.00	.00	.00	.06	.11	176	.23	.06	.00	.00	.06
10	.00	.00	.00	.00	.06	.11	125	.21	.01	.00	.00	.00
11	.00	.00	.00	.00	.09	.12	53	.22	.00	.00	.00	.00
12	.00	.00	.00	.00	.24	.10	6.4	.22	.00	.00	.00	.00
13	.00	.00	.00	.00	.19	.11	2.0	.13	.00	.00	.00	.00
14	.00	.00	.00	.00	.09	.10	1.3	.12	.00	.00	.00	.00
15	.00	.00	.00	.00	.13	.09	1.1	.13	.00	.00	.00	.00
16	.00	.00	.00	.06	.13	.07	.96	.07	.00	.00	.00	.00
17	.00	.00	.00	.06	.11	.08	.86	.06	.00	.00	.00	.00
18	.00	.00	.00	.04	.09	.10	.79	.05	.00	.00	.00	.00
19	.00	.00	.00	.02	.09	.10	.71	.01	.00	.00	1.4	.00
20	.00	.00	.00	.02	.13	.12	.69	.00	.00	.00	.18	.00
21	.00	.00	.00	.03	.11	.12	.65	.02	.00	.00	.00	.00
22	.00	.00	.00	.04	.10	.11	.66	.03	.00	.00	.00	.00
23	.00	.00	.00	.06	.11	.15	.65	.01	.00	.00	.00	.00
24	.00	.00	.00	.08	.11	.19	.60	.00	.00	.00	.00	.00
25	.00	.00	.00	.12	.09	.11	.52	.00	.00	.00	.00	.00
26	.00	.00	.00	.09	.07	.11	.43	.00	.00	.00	.00	.00
27	.00	.00	.00	.04	.08	.12	.42	.00	.00	.00	.00	.00
28	.00	.00	.00	.02	.10	.13	.42	1.0	.00	.00	.00	.00
29	.00	.00	.00	.03	---	.12	.38	.06	.00	.00	.00	.00
30	.00	.00	.00	.06	---	.11	.38	.01	.00	.11	.00	.00
31	.00	---	.00	.12	---	.11	---	.00	---	.00	.00	---
TOTAL	.00	.00	.00	.89	2.89	3.44	374.72	6.22	2.27	.11	45.74	.06
MEAN	.000	.000	.000	.029	.10	.11	12.5	.20	.076	.004	1.48	.002
MAX	.00	.00	.00	.12	.24	.28	176	1.0	1.5	.11	23	.06
MIN	.00	.00	.00	.00	.00	.03	.06	.00	.00	.00	.00	.00
CFSM	.000	.000	.000	.001	.005	.005	.58	.009	.004	.000	.07	.000
IN.	.00	.00	.00	.00	.00	.01	.65	.01	.00	.00	.08	.00
AC-FT	.00	.00	.00	1.8	5.7	6.8	743	12	4.5	.2	91	.1

CAL YR 1977 TOTAL 1267.25 MEAN 3.47 MAX 446 MIN .00 CFSM .16 IN 2.18 AC-FT 2510  
WTR YR 1978 TOTAL 436.34 MEAN 1.20 MAX 176 MIN .00 CFSM .06 IN .75 AC-FT 865

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WATER RESOURCES DIVISION

Sheet \_\_\_\_\_ of \_\_\_\_\_ Sheets

08042700

Monthly and yearly average basin rainfall  
in inches

upstream from North Creek near Jacksboro, Texas

[Drainage area, 21.6 square miles]

16-70490-6 U.S. GOVERNMENT PRINTING OFFICE

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	23.13
1978	.72	.89	.22	.58	1.54	1.28	4.90	1.80	1.75	.04	6.54	.95	21.21	

UNITED STATES  
 DEPARTMENT OF THE INTERIOR  
 GEOLOGICAL SURVEY  
 WATER RESOURCES DIVISION

Sheet \_\_\_\_\_ of \_\_\_\_\_ Sheets

08-0427.00

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

16-70400-5 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	
1978	0	0	0	.029	.10	.11	12.5	.20	.076	.004	1.48	.002	1.20	

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

North Creek subwatershed No 24 near Jermyn, Tex. Drainage Area 5.47 mi<sup>2</sup>

Continuous ~~water-gage record~~ staff-gage ratio -- Date of last sediment survey May 21, 1971.

Maxima: gage height, 35.25 ft; outflow, 59.6 ft<sup>3</sup>/s; surface area, 46.9 acres; contents, 326 acre-feet; on Apr. 9, 1978.

Minima: gage height, 24.92 ft; surface area, 8.5 acres; contents, 65.0 acre-feet; on Apr. 9, 1978.

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

Averages: 6 water years, (1973-78); inflow, 262 acre-feet/year; outflow, 185 acre-feet/year; rainfall, 29.14 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978.

	Oct	Nov	Dec	Calendar year 1977	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year 1978
Total Inflow 1/	.9	1.4	.8	234	.9	3.6	2.3	226	5.9	1.6	0	15.5	1.7	261
Total Outflow	0	0	0	185	0	0	0	163	0	0	0	0	0	163
Total Consumption	9.0	6.2	4.8	143	4.1	3.6	5.3	13.1	17.8	17.5	17.7	15.7	11.2	126
†	-7.4	-4.0	-3.8	-54.7	-2.8	+1.1	-2.0	+56.5	-9.0	-13.0	-17.7	+7.2	-8.3	- 3.2
‡	11.0	10.3	9.5	17.2	9.0	9.0	9.0	16.4	19.8	17.0	12.9	13.1	12.4	12.4
††	.71	.90	.25	24.04	.59	1.51	1.28	5.22	1.80	1.90	.05	6.97	1.16	22.34

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)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

North Creek subwatershed No 25 near Jermyn, Tex. Drainage Area 1.39 mi<sup>2</sup>  
staff-gage  
Continuous ~~water stage correlation~~ ratio -. Date of last sediment survey June 8, 1972.  
Maxima: gage height, 12.40 ft; outflow, 14.8 ft<sup>3</sup>/s; surface area, 15.0 acres; contents, 80.1 acre-feet; on Apr. 9, 1978.  
Minima: gage height, 2.74 ft; surface area, 2.8 acres; contents, 3.9 acre-feet; on Apr. 9, 1978.  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -.  
Averages: 6 water years, (1973-78); inflow, 98.4 acre-feet/year; outflow, 60.2 acre-feet/year; rainfall, 29.14 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978.

	Oct	Nov	Dec	Calendar year <u>1977</u>	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year <u>1978</u>
Total Inflow 1/	1.4	.6	.3	106	0	0	.9	78.9	.3	1.7	0	12.4	.7	97.2
Total Outflow	0	0	0	85.8	0	0	0	49.2	0	0	0	0	0	49.2
Total Consumption	5.3	3.3	2.2	56.7	1.3	1.1	2.2	5.2	6.7	7.4	6.7	7.4	5.6	54.4
†	-3.6	-2.3	-1.8	-21.6	-1.1	-.7	-1.0	+26.6	-5.3	-4.6	-6.7	+8.5	-4.3	+3.7
‡	5.1	4.7	4.2	6.7	3.7	3.5	3.1	6.5	7.4	6.7	5.7	6.7	6.2	5.3
††	.71	.90	.25	24.04	.59	1.51	1.28	5.22	1.80	1.90	.05	6.97	1.16	22.34

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)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

North Creek subwatershed No 26 near Jermyn, Tex. Drainage Area 1.41 mi<sup>2</sup>  
Continuous ~~water~~ <sup>staff-gage</sup> ~~ratio~~ ratio -. Date of last sediment survey May 19, 1971.  
Maxima: gage height, 13.00 ft; outflow, 10.1 ft<sup>3</sup>/s; surface area, 8.8 acres; contents, 46.5 acre-feet; on Apr. 9, 1978.  
Minima: gage height, 5.59 ft; surface area, 2.6 acres; contents, 4.7 acre-feet; on Apr. 9, 1978.  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -.  
Averages: 6 water years, (1973-78); inflow, 117 acre-feet/year; outflow, 90.9 acre-feet/year; rainfall, 29.14 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978.

	Oct	Nov	Dec	Calendar year <u>1977</u>	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year <u>1978</u>
Total Inflow <u>1/</u>	.3	1.1	.2	235	0	.4	1.0	45.8	1.4	.9	0	8.4	1.2	60.7
Total Outflow	0	0	0	218	0	0	0	26.4	0	0	0	0	0	26.4
Total Consumption	3.4	2.8	2.3	47.5	1.0	.8	1.8	4.0	5.0	5.8	5.7	5.9	4.1	42.6
†	-2.9	-1.4	-2.0	-17.6	-.8	-.1	-.5	+17.3	-2.7	-4.0	-5.7	+5.1	-2.4	-.1
‡	4.1	3.7	3.3	5.5	2.9	2.7	2.7	5.3	6.0	5.4	4.4	4.9	4.7	4.2
††	.71	.90	.25	24.04	.59	1.51	1.28	5.22	1.80	1.90	.05	6.97	1.16	22.34

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)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

North Creek subwatershed No 26 near Jermyn, Tex. Drainage Area 1.41 mi<sup>2</sup>  
Continuous ~~water~~ <sup>staff-gage</sup> ~~ratio~~ ratio -. Date of last sediment survey May 19, 1971.  
Maxima: gage height, 13.00 ft; outflow, 10.1 ft<sup>3</sup>/s; surface area, 8.8 acres; contents, 46.5 acre-feet; on Apr. 9, 1978.  
Minima: gage height, 5.59 ft; surface area, 2.6 acres; contents, 4.7 acre-feet; on Apr. 9, 1978.  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -.  
Averages: 6 water years, (1973-78); inflow, 117 acre-feet/year; outflow, 90.9 acre-feet/year; rainfall, 29.14 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978.

	Oct	Nov	Dec	Calendar year <u>1977</u>	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year <u>1978</u>
Total Inflow <u>1/</u>	.3	1.1	.2	235	0	.4	1.0	45.8	1.4	.9	0	8.4	1.2	60.7
Total Outflow	0	0	0	218	0	0	0	26.4	0	0	0	0	0	26.4
Total Consumption	3.4	2.8	2.3	47.5	1.0	.8	1.8	4.0	5.0	5.8	5.7	5.9	4.1	42.6
†	-2.9	-1.4	-2.0	-17.6	-.8	-.1	-.5	+17.3	-2.7	-4.0	-5.7	+5.1	-2.4	-.1
‡	4.1	3.7	3.3	5.5	2.9	2.7	2.7	5.3	6.0	5.4	4.4	4.9	4.7	4.2
††	.71	.90	.25	24.04	.59	1.51	1.28	5.22	1.80	1.90	.05	6.97	1.16	22.34

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)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1978 WATER YEAR

North Creek subwatershed No 30 near Jermyn, Tex. Drainage Area 1.20 mi<sup>2</sup>  
Continuous ~~water stage recorder~~ <sup>staff-gage</sup> ratio - Date of last sediment survey May 20, 1971  
Maxima: gage height, 21.94 ft; outflow, 0 ft<sup>3</sup>/s; surface area, 4.2 acres; contents, 26.5 acre-feet; on Apr. 9, 1978  
Minima: gage height, 11.33 ft; surface area, .8 acres; contents, 2.0 acre-feet; on Aug. 3, 1978  
Maximum inflow, - ft<sup>3</sup>/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on -  
Averages: 6 water years, (1973-78 ); inflow, 90.2 acre-feet/year; outflow, 47.0 acre-feet/year; rainfall, 27.11 inches/year.

Pool water budget, in acre-feet, water year October 1977 to September 1978

	Oct	Nov	Dec	Calendar year <u>1977</u>	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Water year <u>1978</u>
Total Inflow <u>1/</u>	0	.3	0	207	0	.2	.2	22.6	0	0	0	4.6	0	27.9
Total Outflow	0	0	0	154	0	0	0	0	0	0	0	0	0	0
Total Consumption	3.9	2.5	1.9	70.0	1.4	1.2	1.2	4.0	6.2	5.4	4.6	3.4	2.3	38.0
†	-3.7	-2.1	-1.9	-10.1	-1.3	-.8	-.9	19.1	-5.7	-5.0	-4.6	+2.0	+2.2	-7.1
††	2.3	1.9	1.6	3.7	1.4	1.3	1.1	2.7	3.2	2.6	1.9	2.0	1.7	2.0
†††	.75	.85	.18	23.66	.49	1.68	1.25	3.30	1.86	1.80	0	5.13	.67	17.96

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)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY-AUSTIN DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA North Creek

1978 WATER YEAR

RAIN GAGES

Date of storm	1-5	2-R	3-5	4-R	5-R	Aug.												By
Oct. 5	.40	.35	.40	.30	.50													✓
10	.05	.05	0	.03	0													ck
22	.29	.25	.29	.20	.20													
30	.08	.06	.05	.05	.05													
October Totals	.82	.71	.74	.58	.75	.72												
Nov. 7	.02	.06	.07	.07	0													
8	.89	.84	.86	.78	.85													
November Totals	.91	.90	.93	.85	.85	.89												
Dec. 28	.04	.05	.04	.03	0													
29	.20	.20	.20	.17	.18													
December Totals	.24	.25	.24	.20	.18	.22												
1977 Calendar Year Total						23.13												
Jan 11	.25	.25	.33	.20	.22													
16	.12	.12	.14	.08	.10													
18-19	.05	0	.01	0	0													
25	.10	.07	.05	.03	.03													
30-31	.12	.15	.17	.15	.14													
January Totals	.64	.59	.70	.46	.49	.58												
Feb 1	.07	.12	.13	.10	.08													
6-9	.55	.14	.54	.15	.10													
12	.57	.51	.53	.50	.70													
14-15	.34	.32	.32	.22	.40													
17	.10	.42	.27	.13	.40													
February Totals	1.63	1.51	1.79	1.10	1.68	1.54												
Mar 7	.65	.88	1.07	.92	.80													
23	.60	.40	.35	.26	.45													
March Totals	1.25	1.28	1.42	1.18	1.25	1.28												
Apr. 5	.25	0	.24	.05	.40													
9	5.29	4.80	4.25	4.64	2.45													
10	.46	.42	.37	.43	.45													
April Totals	6.00	5.22	4.86	5.12	3.30	4.90												

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY-AUSTIN DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA North Creek

1978 WATER YEAR

RAIN GAGES

Date of storm	1-5	2-R	3-5	4-R	5-R	Aug.													By
May 2	.72	.74	.89	.80	.91														✓
26	.08	.12	0	.02	.03														ccx
28	.99	.94	1.00	.85	.92														
May Totals	1.79	1.80	1.89	1.67	1.86	1.80													
June 1	.52	.36	.25	.25	.33														
6	1.08	1.19	1.20	.98	.92														
7	.53	.20	.13	.05	.55														
15	0	.15	0	.05	0														
June Totals	2.12	1.90	1.58	1.33	1.80	1.75													
July 16	.07	.02	0	0	0														
24	.06	.03	0	.04	0														
July Totals	.13	.05	0	.04	0	.04													
Aug 2	.07	.08	.10	.05	.04														
3	2.48	2.95	3.62	3.72	2.47														
4	.42	.50	.61	.32	.78														
5	1.10	1.32	1.19	1.22	.88														
11	.21	.05	0	.02	0														
16	.29	.42	.25	.15	.06														
19	1.65	1.65	1.57	1.55	.90														
August Totals	6.22	6.97	7.34	7.03	5.13	6.54													
Sept 1	.12	.55	.38	.50	.15														
8-9	.83	.32	.14	.10	.40														
11	.02	.04	0	0	0														
26-28	.34	.25	.28	.25	.12														
September Totals	1.29	1.16	.80	.85	.67	.95													
1978 Water Year Total						21.21													

INFLOW AND OUTFLOW COMPUTATIONSStorm period April 9-10, 197808042650 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		
				ac-ft	cfs				in	area ac	Storage		Rate	in	Acc in
											ac-ft	cfs	cfs	in/hr	
<u>April 9, 1978</u>															
0000	11.86	70.86													
1730	11.86	70.86	17.5	0	0	11.86	0	0	.09	18.6	.14	.1	0	.0000	.0000
1830	11.91	71.79	1.0	+1.93	11.3	11.88	0	11.3	.68	18.7	1.06	12.8	0	.0000	.0000
1900	12.18	76.92	.50	+5.13	124	12.04	0	124	2.19	19.0	3.47	84.0	40	.0092	.0046
30	12.76	88.49	.50	+11.57	280	12.47	0	280	.93	19.9	1.54	37.3	243	.0559	.0280
45	13.23	98.36	.25	+9.87	478	13.00	0	478	.18	21.0	.32	15.5	462	.1063	.0266
2000	14.16	119.44	.25	+21.08	1020	13.70	0	1020	0				1020	.2346	.0586
10	14.81	135.84	.167	+16.40	1190	14.48	0	1190	0				1190	.2737	.0457
20	15.36	150.89	.167	+15.05	1090	15.08	0	1090	.02	27.3	.05	3.6	1090	.2507	.0419
30	15.86	165.48	.167	+14.59	1060	15.61	0	1060	.01	29.2	.02	1.4	1060	.2438	.0407
40	16.36	181.02	.167	+15.54	1130	16.11	0	1130	.02	31.1	.05	3.6	1130	.2599	.0434
45	16.64	190.20	.083	+9.18	1330	16.50	0	1330	.01	32.8	.03	4.4	1330	.3059	.0254
50	16.90	199.05	.083	+8.85	1290	16.77	0	1290	0				1290	.2967	.0246
55	17.12	206.80	.083	+7.75	1130	17.01	0	1130	.01	35.2	.03	4.4	1130	.2599	.0216
2100	17.32	214.03	.083	+7.23	1050	17.22	0	1050	.01	36.2	.03	4.4	1050	.2415	.0200
05	17.50	220.69	.083	+6.66	967	17.41	0	967	0				967	.2224	.0185
10	17.65	226.38	.083	+5.69	826	17.58	0	826	0				826	.1900	.0158
20	17.91	236.54	.167	+10.16	738	17.78	0	738	0				738	.1697	.0283
30	18.12	245.18	.167	+8.64	627	18.02	0	627	0				627	.1442	.0241
40	18.30	252.93	.167	+7.75	563	18.21	1.3	564	0				564	.1297	.0217
50	18.46	260.11	.167	+7.18	521	18.38	6.2	527	0				527	.1212	.0202
2200	18.60	266.58	.167	+6.47	470	18.53	12.3	482	0				482	.1109	.0185
15	18.78	275.21	.25	+8.63	418	18.69	20.2	438	0				438	.1007	.0252
30	18.93	282.64	.25	+7.43	360	18.86	29.7	390	.03	49.6	.12	5.8	384	.0883	.0221
2300	19.10	291.33	.50	+8.69	210	19.02	39.7	250	.01	51.2	.04	1.0	249	.0573	.0286
30	19.13	292.90	.50	+1.57	38.0	19.12	46.5	84.5	.02	52.2	.09	2.2	82.3	.0189	.0094
2400	19.14	293.43	.50	+0.53	12.8	19.14	47.9	60.7	.02	52.4	.09	2.2	58.5	.0135	.0068
<u>April 10, 1978</u>															
0030	19.14	293.43	.50	0	0	19.14	47.9	47.9	0				47.9	.0110	.0055
0100	19.13	292.90	.50	-0.53	-12.8	19.14	47.9	35.1	.03	52.4	.13	3.1	32.0	.0074	.0037
0200	19.10	291.33	1.0	-1.57	-19.0	19.12	46.5	27.5	.05	52.2	.22	2.7	24.8	.0057	.0057
0300	19.06	289.27	1.0	-2.06	-24.9	19.08	43.8	18.9	.10	51.8	.43	5.2	13.7	.0032	.0032

Storm period April 9-10, 1978

Creek subwatershed No. 28-A near Jeromon, Tex. D.A. 6.82 sq mi

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

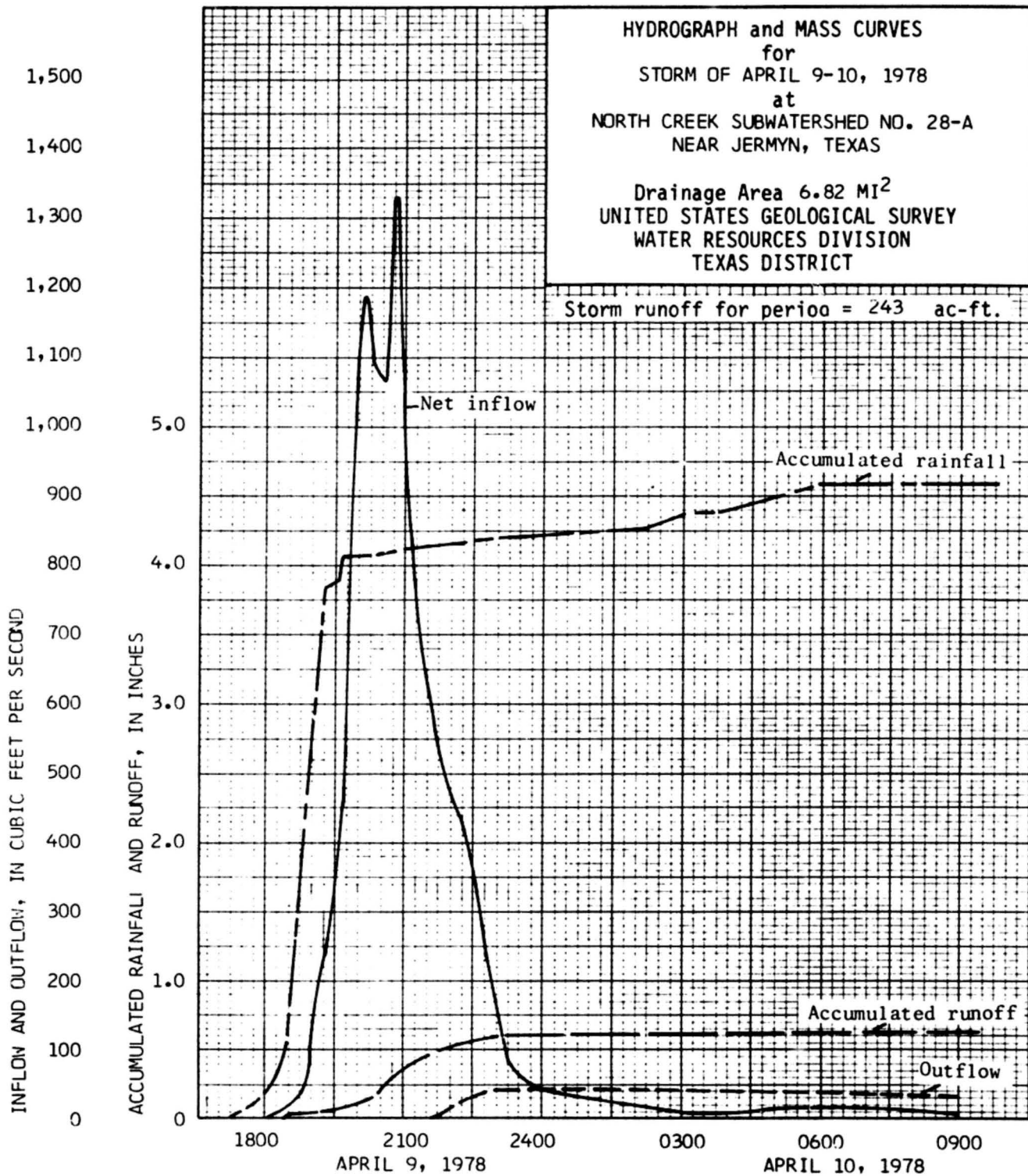
Sheet 1 of 2

Comp. by CCK  
Date 3/16/79  
Check by WFH  
Date 3/20/79

Study Area 08042650 North Creek SWS #28-A near Lerman, Tex Date of Study April 9-10, 1978

Studs Area 5012255 North Creek SW 25 - 0.4 New - 4/11/78 Date of Study April 11, 1978													Accumulated			
Weight Factor	0												Weighted Precipitation		Recording Gages (Rec. Gages x K)	
Date & Time	Gage	4R	Gage		Gage		Gage		Gage		Gage		Gage		All Gages	All Gages
April 9, 1978																
1700	0													0	0	
30	.10													.10	.09	
1815	.35													.35	.32	
30	.85													.85	.77	
45	1.95													1.95	1.78	
1900	3.25													3.25	2.96	
15	4.25													4.25	3.87	
30	4.27													4.27	3.89	
45	4.47													4.47	4.07	
2000	4.47													4.47	4.07	
10	4.47													4.47	4.07	
20	4.49													4.49	4.09	
30	4.50													4.50	4.10	
40	4.52													4.52	4.12	
45	4.53													4.53	4.13	
50	4.53													4.53	4.13	
55	4.54													4.54	4.14	
2100	4.55													4.55	4.15	
2215	4.55													4.55	4.15	
30	4.59													4.59	4.18	
2300	4.60													4.60	4.19	
30	4.62													4.62	4.21	
2400	4.64													4.64	4.23	
April 10, 1978																
30	4.64													4.64	4.23	
0100	4.67													4.67	4.26	
0200	4.73													4.73	4.31	
Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	
3-5	1.00	4.62														
4R	0	5.07														
WMH = Sum of Precipitation x Weight Factor																
WMH / Total Recording Gages = Weighted Precipitation																
$\frac{4.62}{2} = 9/12$																





UNITED STATES DEPARTMENT OF THE INTERIOR  
 GEOLOGICAL SURVEY - TEXAS DISTRICT

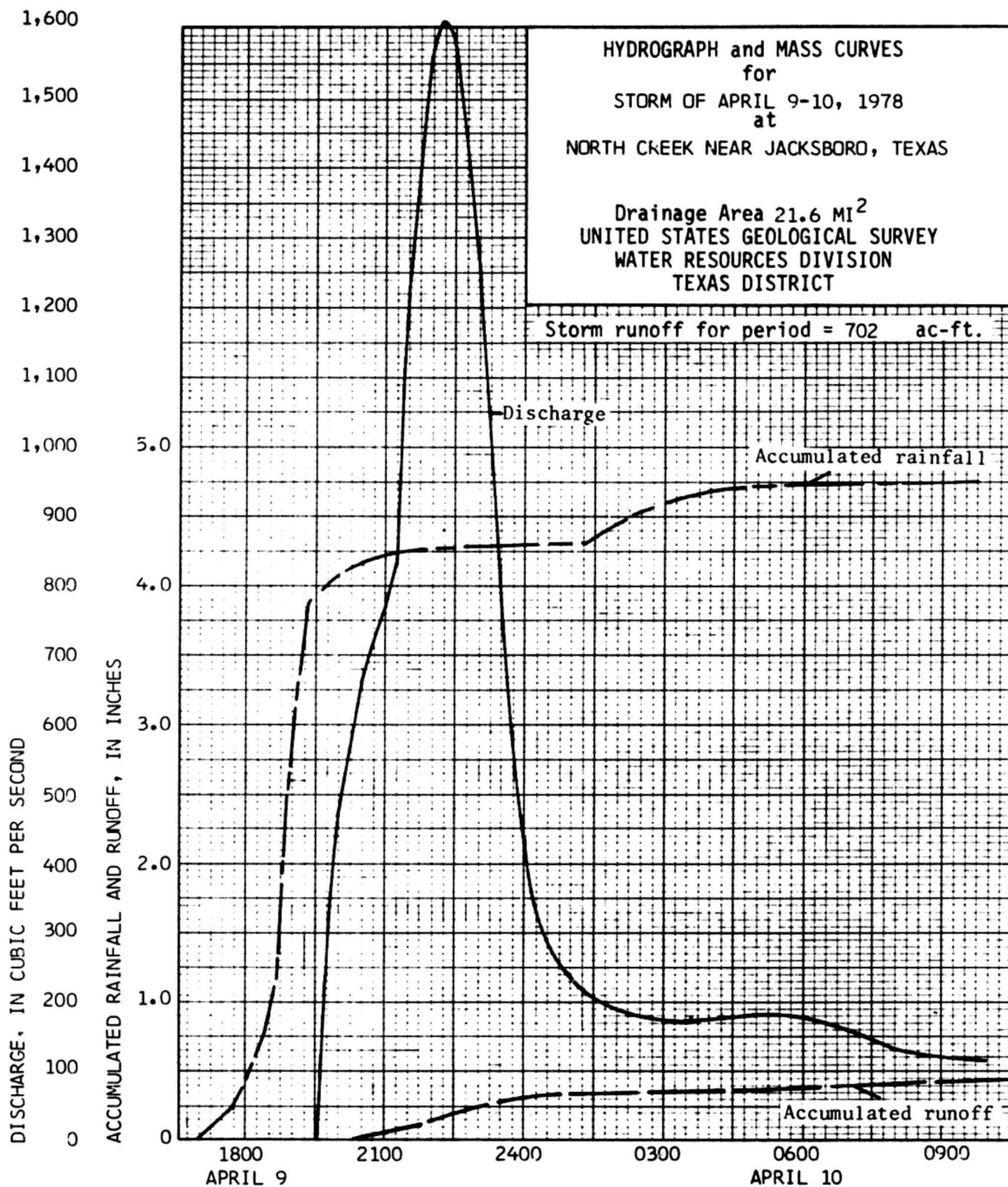
## RUNOFF COMPUTATIONS

Station 08042700 North Creek near Jacksboro, TexPeriod of Record April 9-11, 1978Drainage 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.		
April 9, 1978															
0000	4.55	0	.09	68	.0000	.0000	.0000	0700	7.40	.15	162	12	.0116	.0174	4087
1700	4.55		.09	76	.0000	.0000	.0000	0800	7.11		131	12	.0094	.0141	4228
1900	4.65		.32	10	.0000	.0000	.0000	1000	6.95		113	16	.0081	.0162	4390
30	5.47	0	11	4	.0008	.0004	.0004	1200	6.84	.15	102	20	.0073	.0182	4572
2000	9.51	.15	475	4	.0341	.0170	.0174	1500	6.71	.14	91	24	.0065	.0195	4767
30	10.41		660	4	.0474	.0237	.0411	1800	6.60	.12	83	24	.0060	.0180	4947
2100	10.85		763	3	.0548	.0206	.0617	2100	6.49	.10	74	24	.0053	.0159	5106
15	11.15		837	2	.0601	.0150	.0767	2400	6.41	.05	71	12	.0051	.0076	5182
30	12.52		1,220	3	.0876	.0328	.1095				24,084	192			
2200	13.58		1,560	3	.1120	.0420	.1515				125				
15	13.75		1,610	2	.1156	.0289	.1804	April 11							
30	13.64		1,580	3	.1134	.0425	.2229	0000	6.41	.05	71	2	.0051	.0153	5335
2300	12.61		1,240	4	.0890	.0445	.2674	0600	6.31		62	4	.0045	.0270	5605
30	10.83		758	4	.0544	.0272	.2946	1200	6.22		56	3	.0040	.0180	5785
2400	9.22	.15	423	2	.0304	.0076	.3022	1500	6.16		52	2	.0037	.0111	5896
			3370	192				1800	6.08		47	2	.0034	.0102	5998
			176					2100	5.89		35	2	.0025	.0075	6073
April 10															
0000	9.22	.15	423	1	.0304	.0038	.3060	2400	5.53		17	1	.0012	.0018	6091
15	8.68		334	2	.0240	.0060	.3120				843	16			
30	8.35		285	3	.0205	.0077	.3197				53				
0100	8.01		238	4	.0171	.0086	.3283								
30	7.76		206	4	.0148	.0074	.3357								
0200	7.60		186	6	.0134	.0100	.3457								
0300	7.55		180	6	.0129	.0097	.3554								
30	7.52		176	8	.0126	.0126	.3680								
0500	7.59	.15	185	14	.0133	.0233	.3913								

Computed by CLK Date 1/21/80 Checked by WFH Date 1-22-80





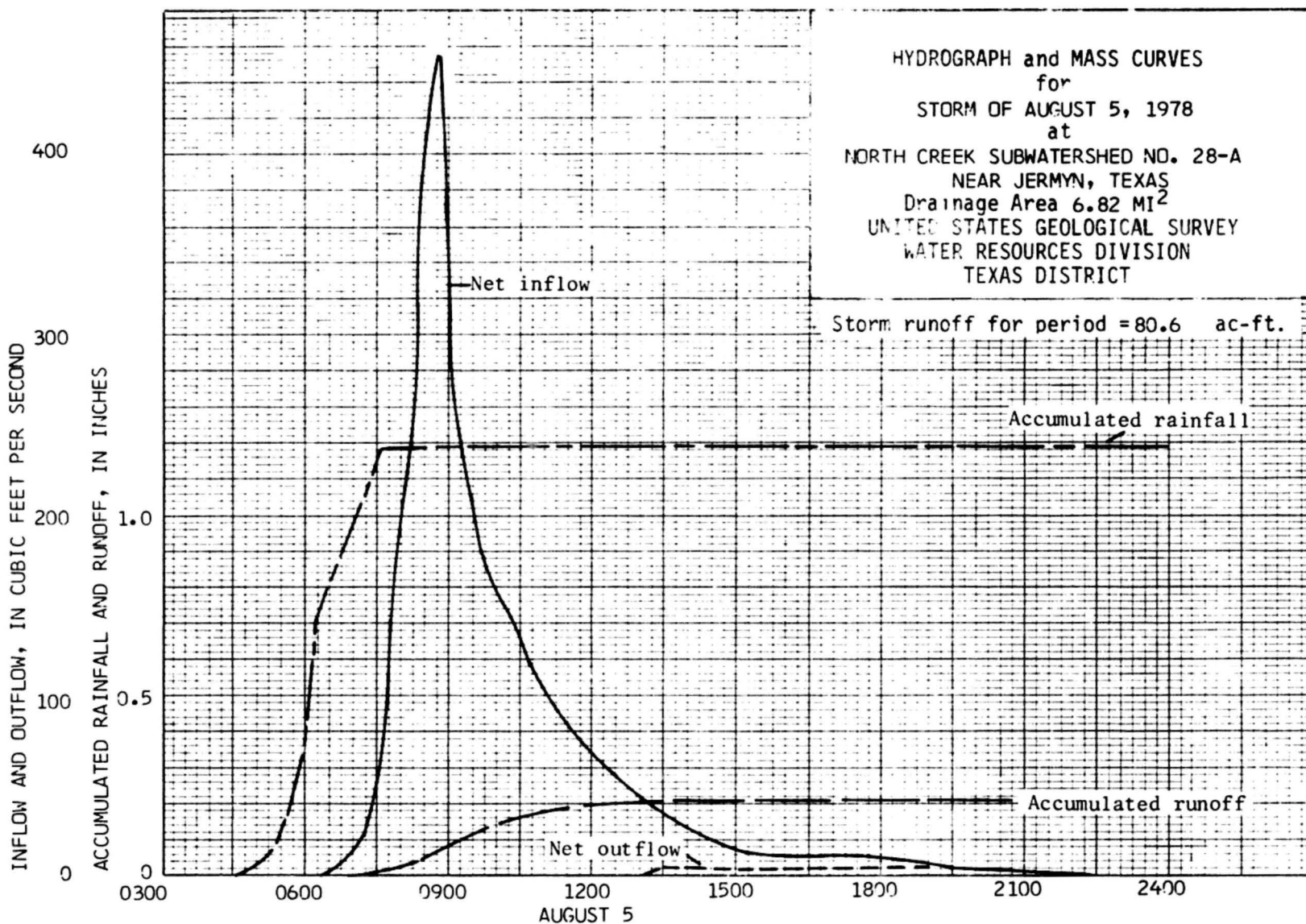
## INFLOW AND OUTFLOW COMPUTATIONS

Storm period August 5, 1978

08042650 North Creek subwatershed No. 28-A near Jecmun, Tex. D.A. 6.82 sq mi

[illegible]





UNITED STATES DEPARTMENT OF THE INTERIOR  
 GEOLOGICAL SURVEY - TEXAS DISTRICT

## RUNOFF COMPUTATIONS

Station 08042700 North Creek near Jacksboro, Tex.
 Period of Record Aug 5, 1978 Drainage Area 216 mi<sup>2</sup> of which 163 mi<sup>2</sup>  
is above flood detention structures

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft <sup>3</sup> /s	Inc.	In/Hr	Inches	Acc. In.
Aug 5, 1978							
0000	4.58	0	.15	10	.0000	.0000	.0000
0500	4.54		.08	12	.0000	.0000	.0000
0600	5.00		2.5	4	.0002	.0002	.0002
0700	4.89		1.6	4	.0001	.0001	.0003
0800	5.27	0	6.2	3	.0004	.0003	.0006
30	6.40	.09	6.6	2	.0047	.0024	.0030
0900	7.42	.15	16.5	3	.0118	.0088	.0118
1000	6.67	.10	9.1	3	.0065	.0049	.0167
30	6.49	.07	7.7	2	.0055	.0028	.0195
1100	6.80	.12	10.1	3	.0073	.0055	.0250
1200	6.15	.01	5.1	4	.0037	.0037	.0287
1300	5.67	0	2.0	6	.0014	.0021	.0308
1500	5.28		6.4	10	.0005	.0012	.0320
1800	5.07		3.3	12	.0002	.0006	.0326
2100	4.98		2.3	12	.0002	.0006	.0332
2400	4.93	0	1.9	6	.0001	.0002	.0334
			1861.0096				
			19				

 Computed by CCK Date 12/14/79 Checked by WEH Date 1-23-80

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

## WEIGHTED-PRECIPITATION RECORD

Sheet 1 of 1

Comp. by: CLK

Date 11/22/00

Check by WFM

Date 1/22/80

Study Area 08042700 North Creek near Jackboro, Tex Date August 5, 1978

Accumulated Precipitation in Inches at Recording Station							Accumulated	
Gage Factor	.45 2R	.37 4R		.18 5R			Weighted Precipitation	
			Gages		Gages		Recording Gages	(Rec. Gages x K)
							All Gages	All Gages
<b>Aug. 5, 1978</b>								
0000	0	0	0	0	0		0	0
0400	0	0	0	0	0		0	0
30	.05	.02	.02	.01	0		.03	.03
0500	.19	.09	.02	.01	.10	.02	.12	.12
15	.20	.09	.07	.03	.34	.06	.18	.18
30	.27	.12	.10	.04	.39	.07	.23	.23
45	.30	.14	.20	.07	.39	.07	.28	.28
0600	.42	.19	.33	.12	.44	.08	.39	.38
15	.55	.25	.70	.26	.44	.08	.60	.59
30	1.00	.45	.82	.30	.44	.08	.83	.82
0700	1.15	.52	.95	.35	.47	.08	.95	.93
0800	1.32	.59	1.22	.45	.88	.16	1.20	1.18

Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.16	1.10	.11				
2-R	.31	1.32	.41				
3-S	.16	1.19	.19				
4-R	.26	1.22	.32				
5-R	.17	.88	.15				

WMR =  $\frac{1.78}{1.82} = .983$

