UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Hydrologic Data for North Creek Trinity River Basin Texas, 1979

Open-File Report 81-823

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

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By C. C. Kidwell

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AUSTIN, TEXAS

AUGUST 1981

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

Doyle G. Frederick, Director

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

HYDROLOGIC DATA FOR NORTH CREEK

TRINITY RIVER BASIN, TEXAS

1979

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, 1979, 1,808 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. Hydrologic data collected from natural and developed areas 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 September 30, 1979, data collection in all of these study areas, except for North Creek, has 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 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 September 30, 1979, is given in table 1.

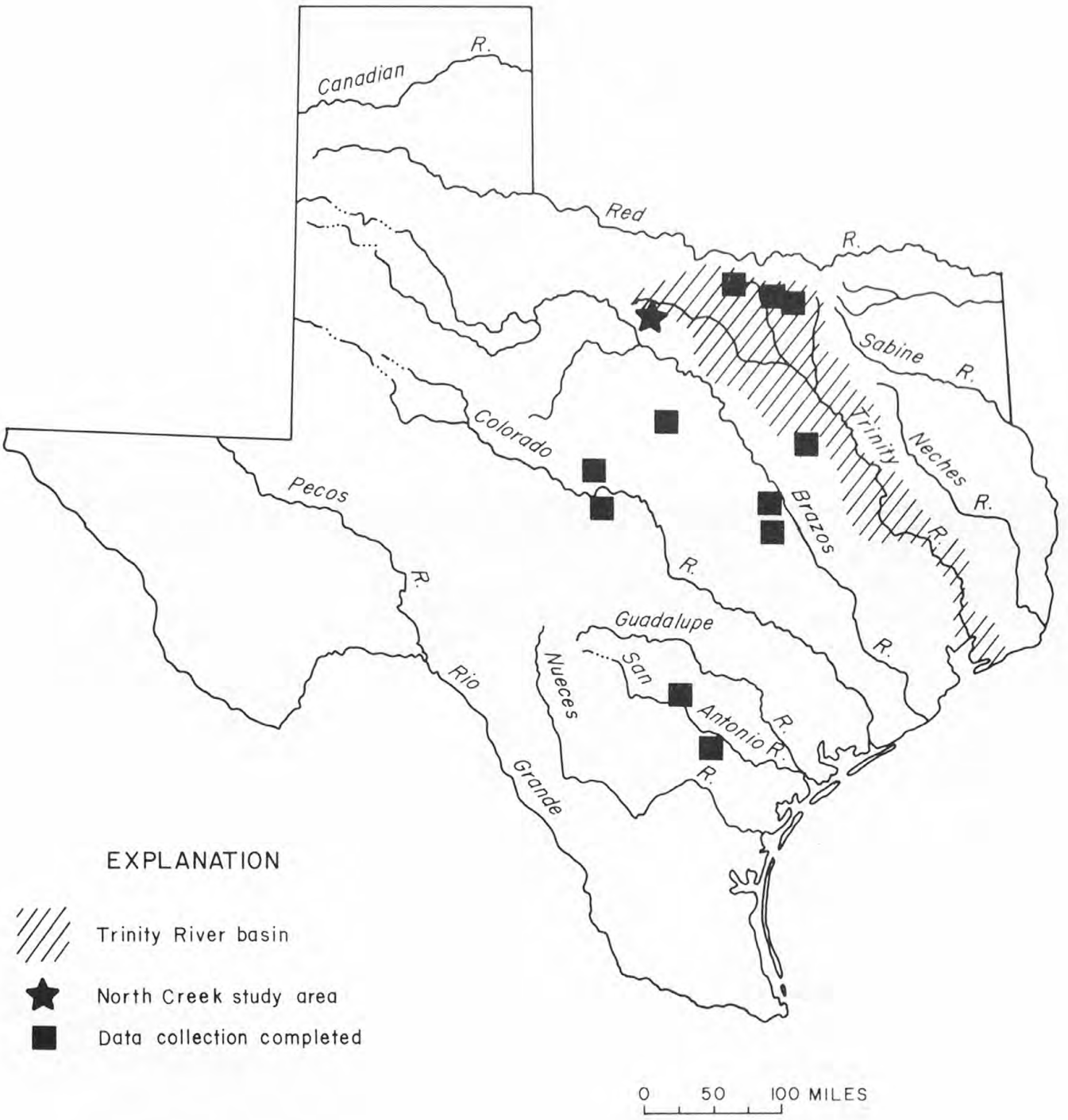


FIGURE 1. - Location of the North Creek study area and other study areas

Table 1.--Small-watershed study areas in Texas as of September 30, 1979

Watershed	Drainage area above stream-gaging station (mi^2)	Data-collection period	Floodwater-retarding structures above stream-gaging station	Period the structures were built
Trinity River basin:				
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
Brazos River basin:				
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	--
Colorado River basin:				
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
San Antonio River basin:				
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^2 above Escondido Creek subwatershed no. 11 (Dry Escondido Creek) near Kenedy not included in this total.

Objectives of the Texas Small Watershed Projects

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

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 groundwater 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 1979 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.

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).

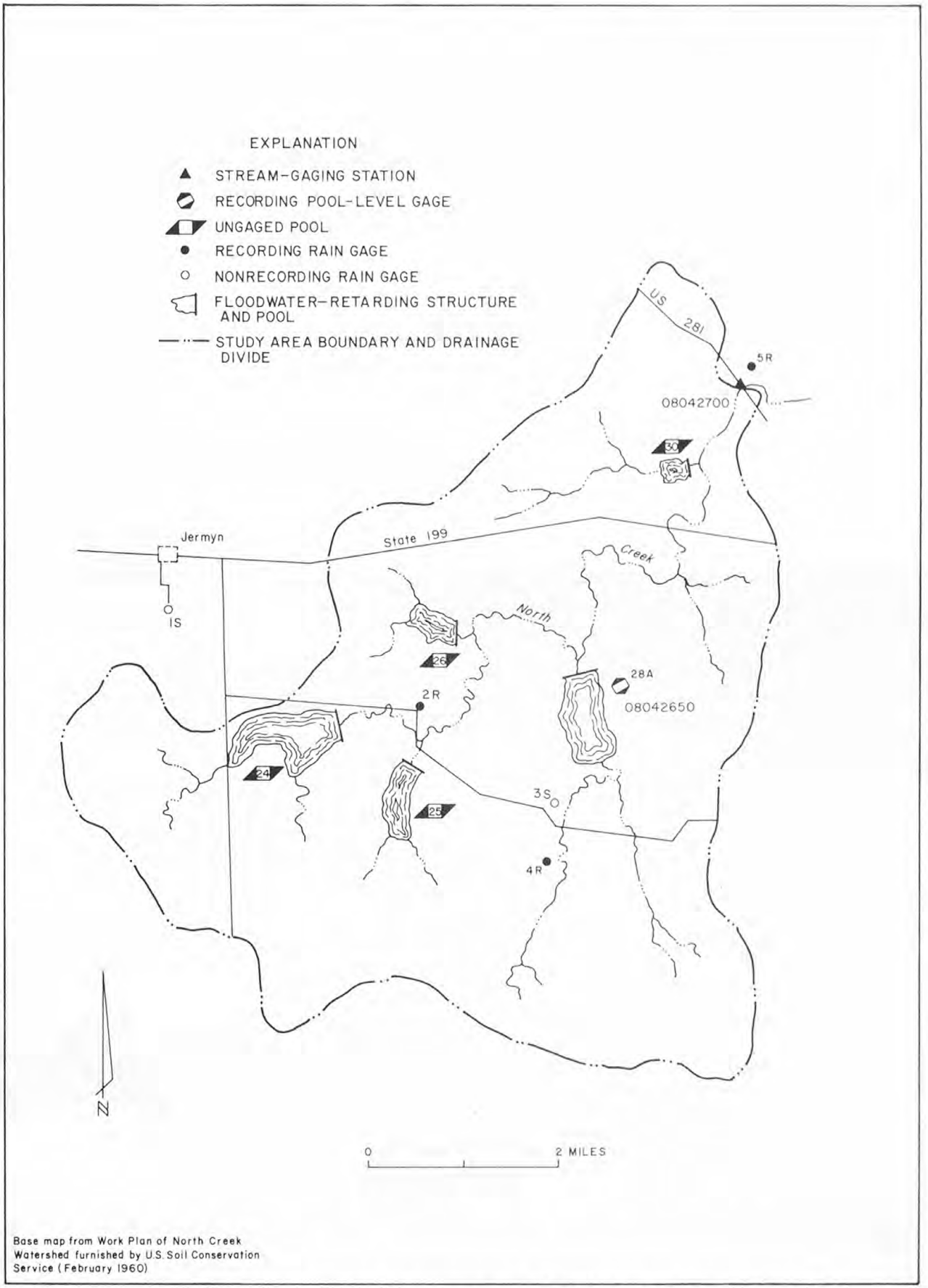
The topography of the watershed ranges from steep to gently rolling. Altitudes in the watershed range from about 1,310 feet above NGVD of 1929 (National Geodetic Vertical Datum of 1929) at the headwaters to about 1,016 feet at the gaging station. The average channel gradient is about 18.4 ft/mi.

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.

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.



Base 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 SRTUCTURES

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). Rain gages, except for the one at the streamflow station, are serviced weekly by local residents.

On Oct. 5, 1972, a continous water-stage recording gage was installed at North Creek Subwatershed No. 28-A near Jermyn (080442650). 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 pool is given in the section "Compilation of data."

The stream-gaging station 08042700, North Creek near Jacksboro, 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 1979 water year are given in the section "Compilation of data".

SUMMARY OF DATA FOR THE 1979 WATER YEAR

The average rainfall in the study area during the 1979 water year was 27.30 inches, which is less than the 22-year average of 29.36 inches for the period 1958-79. Monthly rainfall totals ranged from 0.12 inch in September to 3.99 inches in March. The average runoff from the study area during the 1979 water year was 0.49 ft^3/s (353 acre-feet). This value can be compared with the 14-year (1957-70) average of 5.75 ft^3/s (4,170 acre-feet) for the period prior to construction of the upstream floodwater-retarding structures, or the 9-year (1971-79) average of 1.91 ft^3/s (1,380 acre-feet) for the period of control by the structures.

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

Site number	Drainage area (mi^2)	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 1/ (acre-ft)	Gage height (ft)	Contents (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	69.9	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	1.14	10-23-71	4-19-71	1,133.56	100	28.8	360	10.18	25.0	5.65	4.9	a/ 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.

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 distributaion, 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.

One storm was selected for detailed hydrograph-related computations for the 1979 water year. This storm occurred April 17-18, 1979. 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 shown in table 3. Computations, hydrographs, and curves are given in the section "Compilation of data".

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1979 water year

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (ft^3/s)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
North Creek subwatershed No. 28-A near Jermyn, Texas (drainage area 6.82 mi^2)								
April 17, 1979	13.5	2.05	1445-1500 0.44	1445-1515 0.52	1430-1530 0.64	0.19	0.09	163
North Creek near Jacksboro, Texas (Drainage area 21.6 mi^2 of which 16.3 mi^2 is above floodwater-retarding structures)								
April 17, 1979	13.5	2.11	1445-1500 0.41	1445-1515 0.50	1430-1530 0.62	1/ 0.07	0.03	152

1/ Unadjusted for storage in upstream reservoirs.

COMPILATION OF DATA

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^2 (17.66 km^2).

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 poor. 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^3), the capacity at crest of the drop inlet is 245 acre-ft (302,000 m^3), and the capacity at the crest of the controlled outlet pipe is 24 acre-ft (29,600 m^3). 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.--7 years (water years 1973-79), 542 acre-ft/yr (668,000 m^3/yr), 1.49 in/yr (38 mm/yr).

AVERAGE OUTFLOW.--7 years (water years 1973-79), 311 acre-ft/yr (383,000 m^3/yr), 0.86 in/yr (22 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum inflow, 1,430 ft^3/s (40.5 m^3/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^3/s (2.72 m^3/s) Oct. 30, 1974, gage height, 22.80 ft (6.949 m); no outflow most of time each year.

EXTREMES FOR CURRENT YEAR.--Maximum inflow, 163 ft^3/s (4.62 m^3/s) average for 5-minute interval, Apr. 17, computed as explained above, no peak above base of 200 ft^3/s (5.66 m^3/s); no inflow at times. No outflow during water year.

POOL WATER BUDGET, IN ACRE-FEET, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
TOTAL INFLOW 1/	17.4	14.8	0.9	4.9	2.1	42.5	78.6	22.0	26.2	5.5	13.8	2.9
TOTAL OUTFLOW	0	0	0	0	0	0	0	0	0	0	0	0
(†)	-20.3	-7.8	-15.7	-6.2	-8.6	+27.8	+58.4	-9.8	-12.6	-33.0	-18.3	-24.9
(††)	2.75	3.21	.36	1.99	.70	4.30	3.35	3.41	2.87	1.93	4.08	1.17

CAL YR 1978	INFLOW 413	OUTFLOW 81.6	† +59.7	†† 26.70
WTR YR 1979	INFLOW 232	OUTFLOW 0	† -71.0	†† 29.12

1/ Inflow adjusted for rainfall on pool and pool losses.
† Change in contents, in acre-feet.
†† Weighted-mean rainfall, in inches.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

08042650

Monthly and yearly rainfall, in inches

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

16—25489-6 U.S. GOVERNMENT PRINTING OFFICE

Water Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
	Station established March 14, 1972 (continuous recorder installed Oct. 5, 1972)												
1972	--	--	--	--	--	0.59	3.21	5.36	1.75	1.81	0.79	1.84	--
1973	3.96	1.13	.43	3.79	1.51	2.34	2.83	1.62	2.56	5.46	0	5.55	31.18
1974	4.14	1.39	0	.33	1.61	.54	3.72	1.60	2.12	.89	7.09	5.45	28.88
1975	7.32	.93	1.40	1.49	2.41	1.45	1.81	8.12	4.20	4.25	4.72	1.31	39.41
1976	.32	.89	1.63	0	0	1.00	4.98	2.92	2.39	2.65	3.35	6.75	26.88
1977	6.04	.40	.90	2.29	.96	4.02	2.75	5.19	1.66	1.68	3.26	0	29.15
1978	.74	.93	.24	.70	1.79	1.42	4.86	1.89	1.58	0	7.34	.80	22.29
1979	2.75	3.21	.36	1.99	.70	4.30	3.35	3.41	2.87	1.93	4.08	.17	29.12

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

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]

16—26489-6 U.S. GOVERNMENT PRINTING OFFICE

Water Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
	Station established March 14, 1972 (continuous recorder installed Oct. 5, 1972)												
1972	--	--	--	--	--	0	0	190	2.4	1.2	0.7	0.9	--
1973	8.1	.6	.1	2.6	1.8	3.2	2.0	1.5	4.6	152	.7	4.1	181
1974	146	4.0	1.4	.2	.2	.7	35.6	12.3	10.3	.2	64.5	109	384
1975	501	67.1	3.2	14.5	124	7.7	29.8	355	101	29.6	67.7	6.9	1,310
1976	2.7	5.8	12.3	0	0	0	73.2	2.2	4.9	12.6	21.9	243	379
1977	140	25.5	.6	21.7	17.8	307	150	240	1.2	1.3	17.1	.1	922
1978	2.9	.9	.9	.4	2.7	.8	243	1.2	3.7	.1	127	.8	384
1979	17.4	14.8	.9	4.9	2.1	42.5	78.6	22.0	26.2	5.5	13.8	2.9	232

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

08042650

North Creek

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

[Drainage area, 6.82 square miles]

16—26489-6 U.S. GOVERNMENT PRINTING OFFICE

Water Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
	Station established March 14, 1972 (continuous recorder installed Oct. 5, 1972)												
1972	--	--	--	--	--	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	23.8	0	0	0	0	0	0	0	0	0	0	15.9	39.7
1975	342	219	0	0	92.8	0	15.6	332	93.4	9.8	46.6	0	1,150
1976	0	0	0	0	0	0	0	0	0	0	0	125	125
1977	118	25.0	0	0	0	278	137	222	0.3	0	0	0	780
1978	0	0	0	0	0	0	76.4	0	0	0	5.2	0	81.6
1979	0	0	0	0	0	0	0	0	0	0	0	0	0

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1979 WATER YEAR

08042650 North Creek subwatershed No. 28-A near Jermyn, Tex. Drainage Area 6.82 mi^2

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

Maxima: gage height, 17.85 ft; outflow, 0 ft^3/s; surface area, 39.6 acres; contents, 234 acre-feet; on April 19.

Minima: gage height, 14.47 ft; surface area, 25.2 acres; contents, 127 acre-feet; on Sept. 30.

Maximum inflow, 163 ft^3/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on April 17.

Averages: 7 water years, (1973-79); inflow, 542 acre-feet/year; outflow, 311 acre-feet/year; rainfall, 29.56 inches/year.

Pool water budget, in acre-feet, water year October 1978 to September 1979.

	Oct	Nov	Dec	Calendar year 1978	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1979
Total Inflow 1/	17.4	14.8	.9	413	4.9	2.1	42.5	78.6	22.0	26.2	5.5	13.8	2.9	232
Total Outflow	0	0	0	81.6	0	0	0	0	0	0	0	0	0	0
Total Consumption	37.7	22.6	16.6	318	11.1	10.7	14.7	20.2	31.8	38.8	38.5	32.1	27.8	303
†	-20.3	-7.8	-15.7	+59.7	-6.2	-8.6	+27.8	+58.4	-9.8	-12.6	-33.0	-18.3	-24.9	-71.0
‡	32.8	31.0	29.7	29.8	28.4	27.5	27.3	33.6	37.4	37.3	32.6	29.2	26.7	31.1
††	2.75	3.21	.36	26.70	1.99	.70	4.30	3.35	3.41	2.87	1.93	4.08	.17	29.12

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, 200 ft^3/s)

Date	Time	Discharge	Date	Time	Discharge
No peak above base					

Note: Average for 5-minute interval
Inflow computed and adjusted as exlained 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 mi² (55.9 km²).

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

GAGE.--Water-stage recorder. Datum of gage is 1,016.33 ft (309.78 m) State 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 mi² (42.2 km²) above this station was partly controlled by five floodwater-retarding structures with a total detention capacity of 3,940 acre-ft (4.86 hm³). 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 ft³/s (0.163 m³/s), 3.62 in/yr (92 mm/yr), 4,170 acre-ft/yr (5.14 hm³/yr); 9 years (water years 1971-79) regulated, 1.91 ft³/s (0.0541 m³/s), 1.20 in/yr (30 mm/yr), 1,380 acre-ft/yr (1.70 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,990 ft³/s (198 m³/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 ft³/s (161 m³/s), from rating curve.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 311 ft³/s (8.81 m³/s) Mar. 29, gage height, 8.53 ft (2.600 m); no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.05	.12	.13	.16	.70	.38	.00	.00	.00
2	.00	.00	.00	.04	.16	.18	.11	.46	.40	.00	.00	.00
3	.00	.00	.00	.04	.16	.23	.09	.37	.25	.00	.00	.00
4	.00	.00	.00	.05	.13	.11	.09	.35	.18	.00	.00	.00
5	.00	.00	.00	.07	.20	.10	.08	.31	7.2	.00	.00	.00
6	.00	.00	.00	.07	.22	.11	.07	.32	25	.00	.00	.00
7	.00	.00	.00	.07	.19	.12	.07	.29	12	.00	.00	.00
8	.00	.00	.00	.07	.17	.13	.08	.28	1.5	.00	.00	.00
9	.00	.00	.00	.08	.12	.12	.07	.24	.73	.00	.00	.00
10	.00	.00	.00	.11	.15	.11	.18	.25	.53	.00	.00	.00
11	.00	.00	.01	.17	.15	.12	.91	.20	.32	.00	.00	.00
12	.00	.00	.02	.19	.15	.13	.15	.22	.26	.00	.00	.00
13	.00	.00	.02	.20	.15	.14	.10	.21	.23	.00	.00	.00
14	.00	.00	.02	.17	.19	.11	.09	.17	.19	.00	.00	.00
15	.00	2.1	.03	.17	.15	.16	.08	.14	.13	.00	.00	.00
16	.00	1.4	.04	.19	.09	.24	.07	.11	.10	.00	.00	.00
17	.00	.10	.02	.21	.10	.22	35	.12	.08	.00	.00	.00
18	.00	.01	.03	.22	.13	.21	7.0	.11	.06	.00	.00	.00
19	.00	.00	.07	.26	.15	1.3	1.2	.10	.03	.00	.04	.00
20	.00	.00	.06	.15	.16	.31	.75	.06	.02	.00	.00	.00
21	.00	.00	.03	.08	.17	.17	.64	2.3	.01	.00	.00	.00
22	.00	.00	.02	.07	.18	1.7	.60	8.9	.01	.00	.00	.00
23	.00	.00	.04	.08	.16	.32	.49	2.5	.00	.00	.38	.00
24	.00	.00	.05	.06	.17	.14	.47	.55	.00	.00	.00	.00
25	.00	.00	.05	.11	.18	.11	.42	.33	.00	.00	.00	.00
26	.00	.71	.05	.16	.14	.10	.32	.33	.00	.00	.00	.00
27	.00	.04	.04	.11	.17	.08	.33	.30	.00	.00	.00	.00
28	.00	.00	.06	.08	.16	.09	.39	.25	.00	.00	.00	.00
29	.00	.00	.07	.11	---	33	.62	.24	.00	.00	.00	.00
30	.00	.00	.05	.12	---	2.1	.34	.26	.00	.00	.00	.00
31	.00	---	.09	.09	---	.28	---	.22	---	.00	.00	---
TOTAL	.00	4.36	.87	3.65	4.37	42.37	50.97	21.19	49.61	.00	.42	.00
MEAN	.000	.15	.028	.12	.16	1.37	1.70	.68	1.65	.000	.014	.000
MAX	.00	2.1	.09	.26	.22	33	35	8.9	25	.00	.38	.00
MIN	.00	.00	.00	.04	.09	.08	.07	.06	.00	.00	.00	.00
CFSM	.000	.007	.001	.006	.007	.06	.08	.03	.08	.000	.001	.000
IN.	.00	.01	.00	.01	.01	.07	.09	.04	.09	.00	.00	.00
AC-FT	.00	8.6	1.7	7.2	8.7	84	101	42	98	.00	.8	.00

CAL YR 1978	TOTAL	441.57	MEAN	1.21	MAX	176	MIN	.00	CFSM	.06	IN	.76	AC-FT	876
WTR YR 1979	TOTAL	177.81	MEAN	.49	MAX	35	MIN	.00	CFSM	.02	IN	.31	AC-FT	353

9-220c
(Oct. 1951)

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—26489-6 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	25.45
1979	2.60	3.19	.28	1.87	.57	3.99	3.14	3.55	3.08	1.34	3.57	.12	27.30	

GPO 849-229

9-220c
(Oct. 1961)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

08042700

Monthly and ~~annual~~ yearly mean discharge, in ft^3/s, of North Creek River near Jacksboro, Tex.
[Drainage area, 21.6 square miles]

16—70459-5 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

TX-67

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

08042700

Monthly and ~~annual~~ yearly mean discharge, in ft^3/s, of North Creek River at or near Jacksboro, Texas

[Drainage area, 21.6 square miles]

16—26489-6 U.S. GOVERNMENT PRINTING OFFICE

WATER YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL	
1979	0	0.15	0.028	0.12	0.16	1.37	1.70	0.68	1.65	0	0.014	0	0.49	

TX-74a
Rev. 2-74

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1979 WATER YEAR

_____ North Creek subwatershed No. 24 near Jermyn, Tex. Drainage Area 5.47 mi^2

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

Maxima: gage height, 28.95 ft; outflow, 0 ft^3/s; surface area, 18.8 acres; contents, 115 acre-feet; on June 6.

Minima: gage height, 26.03 ft; surface area, 10.3 acres; contents, 75.3 acre-feet; on Sept. 30.

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

Averages: 7 water years, (1973-79); inflow, 236 acre-feet/year; outflow, 159 acre-feet/year; rainfall, 29.35 inches/year.

Pool water budget, in acre-feet, water year October 1978 to September 1979.

	Oct	Nov.	Dec.	Calendar year 1978	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1979
Total Inflow 1/	7.7	6.9	3.7	276	1.4	1.8	20.9	5.9	6.4	25.4	5.2	4.4	0	89.7
Total Outflow	0	0	0	163	0	0	0	0	0	0	0	0	0	0
Total Consumption	11.6	7.8	6.3	132	3.5	3.4	6.2	8.5	11.0	16.6	16.7	16.1	10.4	118
†	-1.5	+2.5	-2.3	+10.7	-.5	-1.1	+18.8	+.7	-.2	+12.6	-9.4	-6.9	-10.3	+2.4
‡	11.4	11.5	11.5	12.8	11.3	11.2	11.5	12.5	12.6	15.8	13.8	12.6	11.0	12.2
††	2.58	3.65	.32	27.03	1.72	.50	4.33	3.21	4.29	3.53	1.93	4.40	.15	30.61

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^3/s)

Date	Time	Discharge	Date	Time	Discharge

TX-74a
Rev. 2-74

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1979 WATER YEAR

_____ North Creek subwatershed No. 25 near Jermyn, Tex. Drainage Area 1.39 mi^2

staff-gage recorder: ratio –. Date of last sediment survey June 8, 1972.

Maxima: gage height, 8.80 ft; outflow, 10.7 ft^3/s; surface area, 8.8 acres; contents, 39.3 acre-feet; on Apr. 17.

Minima: gage height, 5.0 ft; surface area, 5.2 acres; contents, 13 2 acre-feet; on Mar. 16.

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

Averages: 7 water years, (1973-79); inflow, 94.7 acre-feet/year; outflow, 56.0 acre-feet/year; rainfall, 29.35 inches/year.

Pool water budget, in acre-feet, water year October 1978 to September 1979.

	Oct.	Nov.	Dec.	Calendar year 1978	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1979
Total Inflow 1/	2.1	3.0	.1	100	1.1	1.1	17.4	17.5	13.7	9.5	3.8	3.5	0	72.8
Total Outflow	0	0	0	49.2	0	0	0	12.3	10.1	8.5	0	0	0	30.9
Total Consumption	4.6	3.4	3.5	55.1	1.9	2.3	3.1	4.5	6.6	8 2	8.8	7.4	5.1	59.4
†	-1.3	+1.3	-3.3	+8.1	0	-1.0	+16.2	+2.4	-.2	-4.8	-3.9	-1.6	-5.0	-1.2
‡	5.7	5.7	5.6	5.5	5.4	5.4	5.4	7.1	8.0	8.0	7.1	6.1	6.0	6.3
††	2.58	3.65	.32	27.03	1.72	.50	4.33	3.21	4.29	3.53	1.93	4.40	.15	30.61

1/ Inflow adjusted for rainfall on pool and pool losses.
† Change in contents, in acre-feet.
‡ Mean surface area, in acres.
†† [illegible] rainfall, in inches.

Peak inflow – (base, _____ ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

TX-74a
Rev. 2-74

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1979 WATER YEAR

_____ North Creek subwatershed No. 26 near Jermyn, Tex. Drainage Area 1.41 mi²

~~Continuous water-stage records~~ staff-gage ratio –. Date of last sediment survey May 19, 1971.

Maxima: gage height, 10.80 ft; outflow, 8.6 ft³/s; surface area, 7.0 acres; contents, 29.2 acre-feet; on May 22.

Minima: gage height, 7.10 ft; surface area, 3.7 acres; contents, 9.4 acre-feet; on Mar. 16.

Maximum inflow, – ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on –.

Averages: 7 water years, (1973-79); inflow, 112 acre-feet/year; outflow, 83.7 acre-feet/year; rainfall, 29.35 inches/year.

Pool water budget, in acre-feet, water year October 1978 to September 1979

	Oct	Nov.	Dec.	Calendar year 1978	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1979
Total Inflow 1/	1.0	2.9	0	63.0	1.5	.8	16.0	8.6	19.2	24.2	4.2	1.2	.1	79.7
Total Outflow	0	0	0	26.4	0	0	0	7.1	14.1	19.5	0	0	0	40.7
Total Consumption	3.4	2.9	2.4	42.8	2.0	1.5	2.7	4.1	7.8	8.4	8.5	5.7	4.0	53.4
†	-1.5	+1.2	-2.3	+3.6	+.1	-.5	+14.7	-1.1	-.5	-1.8	-3.4	-2.7	-3.8	-1.6
‡	4.3	4.2	3.8	4.3	3.9	3.8	3.9	5.8	6.3	6.2	5.7	5.1	4.5	4.8
††	2.58	3.65	.32	27.03	1.72	.50	4.33	3.21	4.29	3.53	1.93	4.40	.15	30.61

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, _____ ft³/s)

Date	Time	Discharge	Date	Time	Discharge

TX-74a
Rev. 2-74

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1979 WATER YEAR

_____ North Creek subwatershed No. 30 near Jermyn, Tex. Drainage Area 1.20 mi^2

Control: staff-gage ratio –. Date of last sediment survey May 20, 1971.

Maxima: gage height, 21.35 ft; outflow, 0 ft^3/s; surface area, 4.0 acres; contents, 24.0 acre-feet; on June 5

Minima: gage height, 12.10 ft; surface area, 1.1 acres; contents, 2.8 acre-feet; on Mar. 28.

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

Averages: 7 water years, (1973-79); inflow, 81.6 acre-feet/year; outflow, 40.3 acre-feet/year; rainfall, 26.68 inches/year.

Pool water budget, in acre-feet, water year October 1978 to September 1979.

	Oct	Nov	Dec	Calendar year 1978	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1979
Total Inflow 1/	.4	.3	0	28.3	.5	.4	5.2	14.4	4.3	4.5	.1	0	0	30.1
Total Outflow	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Consumption	1.9	1.3	.8	33.7	.7	.6	1.0	2.5	5.4	6.5	6.2	4.6	3.3	34.8
†	-1.3	-.6	-.8	-2.1	0	-.2	+4.6	+12.4	0	-1.2	-5 8	-4.2	-3.3	-.4
‡	1.5	1.4	1.3	1.8	1.2	1.2	1.3	2.5	3.6	3.6	2.8	2.3	1.8	2.0
††	1.96	2.97	.05	21.16	1.56	.42	4.07	3.16	3.41	2.84	1.32	2.29	.10	24.15

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.

Peak inflow – (base, _____ ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

Form A-88
Rev. 1-63

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-AUSTIN DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA North Creek — 1979 WATER YEAR

RAIN GAGES

Date of storm	1-S	2-R	3-S	4-R	5-R		Avg.													By V
Oct. 5	1.32	1.10	1.13	1.12	.45															WK/MP
22	.97	.77	.84	.60	.65															
23	.82	.65	.71	.78	.81															
24	.07	.06	.07	.02	.05															
October Totals	3.18	2.58	2.75	2.52	1.96		2.60													
Nov. 5	.12	.10	.09	.12	0															
6	.71	.50	.51	.40	.40															
14	.68	.70	.51	1.18	0															
15	1.32	1.59	1.09	.22	1.87															
16	.28	.11	.12	0	.11															
25	.19	0	.15	0	0															
26	.80	.65	.74	.68	.59															
November Totals	4.10	3.65	3.21	2.60	2.97		3.19													
Dec 30	T	0	0	0	0															
31	.45	.32	.36	.20	.05															
December Totals	.45	.32	.36	.20	.05		.28													
1978 Calendar Year Total							25.45													
Jan 4-5	0	.05	.05	.12	0															
10-11	.65	.70	.65	.42	.77															
17-18	.50	.07	.08	.40	.18															
19	.35	.30	.37	.17	.14															
20	.28	.20	.28	.18	.07															
25-26	.27	.30	.35	.38	.25															
30	.25	.10	.21	.10	.15															
January Totals	2.30	1.72	1.99	1.77	1.56		1.87													
Feb 4-6	.41	.32	.43	.33	.32															
24	.27	.18	.27	.20	.10															
February Totals	.68	.50	.70	.53	.42		.57													
Mar 2	.37	.47	.45	.40	.48															
15-17	.56	.50	.62	.50	.57															
19	1.11	1.00	1.20	1.03	.80															
22	.69	.74	.68	.67	.62															
29-30	.50	1.62	1.35	1.34	1.60															
March Totals	3.29	4.33	4.30	3.94	4.07		3.99													

Form A-88
Rev. 1-63

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-AUSTIN DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA North Creek — 1979 WATER YEAR

RAIN GAGES

Date of storm	1-R	2-R	3-R	4-R	5-R		Avg.													By / ck/wrk
Apr. 9-11	.73	.68	.90	.87	.93															
17	1.62	2.18	2.05	2.25	2.13															
28	.29	.35	.40	.23	.10															
April Totals	2.64	3.21	3.35	3.35	3.16		3.14													
May 1	.59	.50	.55	.56	.55															
3	.11	.15	.10	.07	.07															
21	1.66	2.53	1.92	1.73	1.87															
22	.90	1.11	.84	1.00	.92															
May Totals	3.26	4.29	3.41	3.36	3.41		3.55													
June 1-2	.97	.75	.75	.43	.57															
4-5	.61	1.28	.24	1.12	1.34															
6	2.01	1.25	1.68	.41	.75															
9	.25	.25	.20	.17	.18															
24	.20	0	0	0	0															
June Totals	4.04	3.53	2.87	2.13	2.84		3.08													
July 6	0	No Record	.17	No Record	0															
9	0		.11		0															
17	.57		1.30		1.00															
18	.21		.35		.27															
31	0		0		.05															
July Totals	.78		1.93		1.32		1.34													
Aug. 10	.05	0	0	0	.18															
19	1.28	2.00	1.44	1.35	.85															
20	.50	.45	.64	.45	.18															
21	.52	.48	.56	.55	.58															
22-23	.76	1.42	1.33	1.40	.50															
31	.07	.05	.11	.15	0															
August Totals	3.18	4.40	4.08	3.90	2.29		3.57													
Sept. 20	.17	.15	.17	0	.10															
September Totals	.17	.15	.17	0	.10		.12													
1979 Water Year Total							27.30													

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 1 of 2

INFLOW AND OUTFLOW COMPUTATIONS

Storm period April 17-18, 1979

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 ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
April 17																
0000	15.70	160.71														
1000	15.69	160.42	10	-.29												
1100	15.72	161.30	1.0	+.88	10.6	15.70		10.6	.18	29.5	.44	5.3	5.3	.0012	.0012	.0012
1300	15.75	162.20	2.0	+.90	5.4	15.74		5.4	.24	29.6	.59	3.6	1.8	.0004	.0008	.0020
1500	15.85	165.18	2.0	+2.98	18.0	15.80		18.0	.79	29.8	1.96	11.8	6.2	.0014	.0028	.0048
1600	15.96	168.50	1.0	+3.32	40.2	15.90		40.2	.34	30.2	.86	10.4	29.8	.0069	.0069	.0117
30	16.05	171.26	.50	+2.76	66.8	16.00		66.8	.02	30.6	.05	1.2	65.6	.0151	.0076	.0193
1700	16.17	174.98	.50	+3.72	90.0	16.11		90.0	.02	31.1	.05	1.2	88.8	.0204	.0102	.0295
15	16.24	177.19	.25	+2.21	107	16.20		107	.01	31.5	.03	1.5	105	.0242	.0060	.0355
30	16.32	179.73	.25	+2.54	123	16.28		123	.02	31.8	.05	2.4	121	.0278	.0070	.0425
45	16.41	182.63	.25	+2.90	140	16.36		140	.04	32.2	.11	5.3	135	.0310	.0078	.0503
55	16.475	184.74	.167	+2.11	153	16.44		153	.03	32.6	.08	5.8	147	.0338	.0056	.0559
1800	16.51	185.89	.083	+1.15	167	16.49		167	.01	32.8	.03	4.4	163	.0375	.0031	.0590
05	16.543	186.98	.083	+1.09	158	16.53		158	.02	33.0	.06	8.7	149	.0343	.0028	.0618
10	16.57	187.97	.083	+.89	129	16.56		129	.01	33.1	.03	4.4	125	.0288	.0024	.0642
20	16.61	189.20	.167	+1.33	96.6	16.59		96.6	.03	33.2	.08	5.8	90.8	.0209	.0035	.0677
30	16.67	191.20	.167	+2.00	145	16.64		145	.02	33.5	.06	4.4	141	.0324	.0054	.0731
45	16.74	193.57	.25	+2.37	115	16.70		115	.05	33.7	.14	6.8	108	.0248	.0062	.0793
1900	16.80	195.61	.25	+2.04	98.7	16.77		98.7	.04	34.1	.11	5.3	93.4	.0215	.0054	.0847
30	16.90	199.05	.50	+3.44	83.2	16.85		83.2	.07	34.4	.20	4.8	78.4	.0180	.0090	.0937
2000	16.99	202.19	.50	+3.14	76.0	16.94		76.0	.02	34.8	.06	1.5	74.5	.0171	.0086	.1023
2100	17.15	207.87	1.0	+5.68	68.7	17.07		68.7	.03	35.4	.09	1.1	67.6	.0155	.0155	.1178
2200	17.29	212.93	1.0	+5.06	61.2	17.22		61.2	.03	36.2	.09	1.1	60.1	.0138	.0138	.1316
2300	17.41	217.34	1.0	+4.41	53.4	17.35		53.4	.03	36.8	.09	1.1	52.3	.0120	.0120	.1436
2400	17.51	221.07	1.0	+3.73	45.1	1746		45.1	0				45.1	.0104	.0104	.1540
April 18																
0200	17.63	225.62	2.0	+4.55	27.5	17.57		27.5					27.5	.0063	.0126	.1666
0400	17.69	227.91	2.0	+2.29	13.9	17.66		13.9					13.9	.0032	.0064	.1730
0600	17.73	229.45	2.0	+1.54	9.3	17.71		9.3					9.3	.0021	.0042	.1772
0900	17.76	230.62	3.0	+1.17	4.7	17.74		4.7					4.7	.0011	.0033	.1805

No Outflow

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

INFLOW AND OUTFLOW COMPUTATIONS

Storm period April 17-18, 1979

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 ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
April 18 (continued)																
1200	17.78	231.39	3.0	+.77	3.1	17.77	0	3.1					3.1	.0007	.0021	.1826
1800	17.81	232.57	6.0	+1.18	2.4	17.80	0	2.4					2.4	.0006	.0036	.1862
2400	17.83	233.36	6.0	+.79	1.6	17.82	0	1.6					1.6	.0004	.0024	.1886

TX-78 (Revised July 1969)

Sheet 1 of 1

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

Comp. by: CCK
Date 11/15/80
Check by WFH
Date 11/20/80

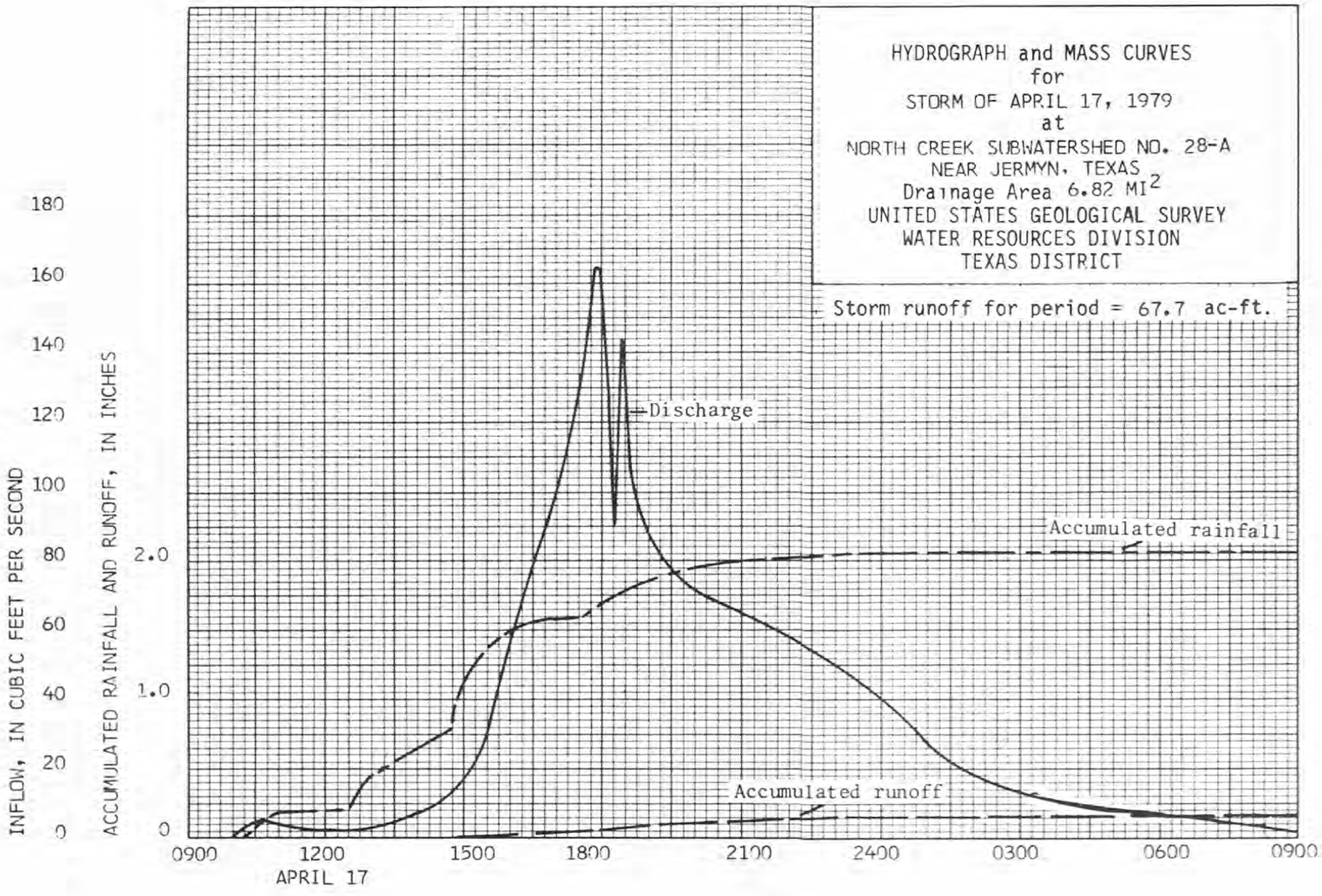
WEIGHTED-PRECIPITATION RECORD

Study Area 08042650 North Creek SWS #28-A near Jermyn, Tex Date of storm Apr. 17, 1979

Weight Factor	Accumulated Precipitation in Inches for Recording Rain Gages										Accumulated Weighted Precipitation	
	Gage 0 4R		Gage		Gage		Gage		Gage		Recording Gages	(Rec. Gages x K)
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages	All Gages
April 17, 1979												
1030	.00										.00	.00
1100	.20										.20	.18
1230	.23										.23	.21
45	.41										.41	.37
1300	.46										.46	.42
1430	.80										.80	.73
45	.84										.84	.77
1500	1.33										1.33	1.21
30	1.50										1.50	1.37
1600	1.70										1.70	1.55
1730	1.78										1.78	1.62
1815	1.91										1.91	1.74
1930	2.13										2.13	1.94
2300	2.25										2.25	2.05
2400	2.25										2.25	2.05

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
4R	0	2.25									
35	1.00	2.05									
										WMR	

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = $\frac{2.05}{2.25} = .911$


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 17, 1979
at
NORTH CREEK SUBWATERSHED NO. 28-A
NEAR JERMYN, TEXAS
Drainage Area 6.82 MI2
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 67.7 ac-ft.
Discharge
Accumulated rainfall
Accumulated runoff
INFLOW, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
180
160
140
120
100
80
60
40
20
0
2.0
1.0
0
0900
1200
1500
1800
2100
2400
0300
0600
0900
APRIL 17

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station 08042700 North Creek near Jacksboro, Tex

Period of Record April 17-18, 1979 Drainage Area 21.6 mi² of which 16.3 mi² is above flood detention structures

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Inc.	In/Hr	Runoff // Inches	Acc. In.
	April 17, 1979						
0000	4.54	0	.08	40	.0000	.0000	.0000
1000	4.54		.08	44	.0000	.0000	.0000
1100	4.59		.17	6	.0000	.0000	.0000
30	4.72		.60	4	.0000	.0000	.0000
1200	5.33		7.4	4	.0005	.0002	.0002
30	5.54		14.2	4	.0010	.0005	.0007
1300	5.36		8.1	5	.0006	.0004	.0011
45	5.67		20.4	7	.0015	.0013	.0024
1445	5.49		12.2	5	.0009	.0006	.0030
1500	5.51	0	13.0	5	.0009	.0006	.0036
1600	6.13	-.01	49.8	6	.0036	.0027	.0063
30	6.56	-.08	82.6	4	.0059	.0030	.0093
1700	7.06	-.15	125	5	.0090	.0056	.0149
45	7.31		152	4	.0109	.0054	.0203
1800	7.25	-.15	146	3	.0105	.0039	.0242
30	6.92	-.13	112	4	.0080	.0040	.0282
1900	6.66	-.09	90.7	4	.0065	.0032	.0314
30	6.82	-.12	103	5	.0074	.0046	.0360
2015	7.09	-.15	128	6	.0092	.0069	.0429
2100	6.93	-.14	112	7	.0080	.0070	.0499
2200	6.49	-.07	76.9	8	.0055	.0055	.0554
2300	6.06	0	45.2	8	.0032	.0032	.0586
2400	5.82	+.05	31.9	4	.0023	.0012	.0598
			6688.24192				
			35				
	April 18						
0000	5.82	+.05	31.9	2	.0023	.0023	.0621

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Inc.	In/Hr	Runoff Inches	Acc. In
	April 18 (continued)						
0200	5.47	+.14	17.3	4	.0012	.0024	.0645
0400	5.23	+.20	10.0	4	.0007	.0014	.0659
0600	5.09	+.25	7.6	5	.0005	.0012	.0671
0900	4.98	+.27	5.9	6	.0004	.0012	.0683
1200	4.89	+.30	4.9	9	.0004	.0018	.0701
1800	4.78	+.25	2.8	12	.0002	.0012	.0713
2400	4.72	+.21	1.9	6	.0001	.0003	.0716
			335.5	48			
			7.0				

// Unadjusted for storage in upstream reservoirs

Computed by CCK Date 1/23/80 Checked by WFH Date 1/23/80

TX-78 (Revised July 1969)

Sheet 1 of 1

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

Comp. by: CCK
Date 1/23/80
Check by WFH
Date 1-24-80

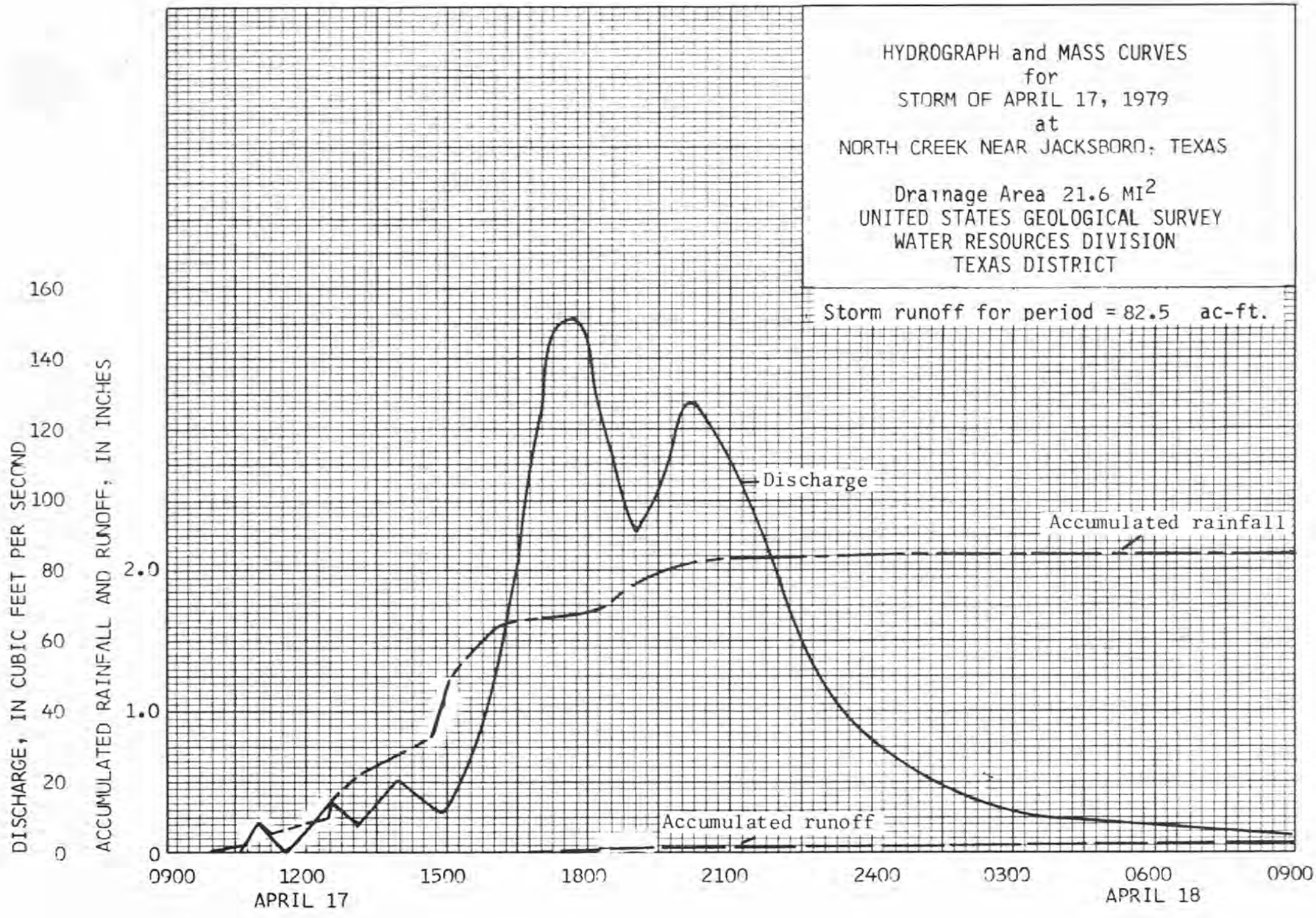
WEIGHTED-PRECIPITATION RECORD

Study Area 08042700 North Creek near Jacksboro, Tex Date of storm April 17, 1979

Weight Factor	Gage 2R .45		Gage 4R .37		Gage 5R .18								Accumulated Weighted Precipitation	
Date & Time	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages All Gages	(Rec. Gages x K) All Gages
April 17, 1979														
0000	.00	.00	.00	.00	.00	.00							.00	.00
1030	.00	.00	.00	.00	.00	.00							.00	.00
45	.05	.02	.15	.06	.06	.01							.09	.09
1100	.15	.07	.22	.08	.46	.08							.23	.22
1230	.18	.08	.25	.09	.66	.12							.29	.28
45	.47	.21	.43	.16	.66	.12							.49	.47
1330	.63	.28	.59	.22	.86	.15							.65	.63
1400	.65	.29	.66	.24	.91	.16							.69	.66
30	.74	.33	.82	.30	1.06	.19							.82	.79
45	.75	.34	.86	.32	1.13	.20							.86	.83
1500	1.28	.58	1.35	.50	1.18	.21							1.29	1.24
30	1.45	.65	1.52	.56	1.38	.25							1.46	1.41
1600	1.65	.74	1.72	.64	1.51	.27							1.65	1.59
1700	1.73	.78	1.80	.67	1.64	.30							1.75	1.69
1800	1.78	.80	1.85	.68	1.66	.30							1.78	1.71
30	1.87	.84	1.94	.72	1.86	.33							1.89	1.82
1900	1.97	.89	2.04	.75	1.93	.35							1.99	1.92
30	2.08	.94	2.15	.80	2.00	.36							2.10	2.02
2000	2.11	.95	2.18	.81	2.02	.36							2.12	2.04
2400	2.18	.98	2.25	.83	2.13	.38							2.19	2.11

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
1-S	.10	1.62	.16								
2-R	.31	2.18	.68								
3-S	.16	2.05	.33								
4R	.26	2.25	.58								
5R	.17	2.13	.36								
										WMR	

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 2.11 / 2.19 = 0.963


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 17, 1979
at
NORTH CREEK NEAR JACKSBORO, TEXAS
Drainage Area 21.6 MI2
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 82.5 ac-ft.
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
160
140
120
100
80
60
40
20
0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0900
1200
APRIL 17
1500
1800
2100
2400
0300
0600
APRIL 18
0900