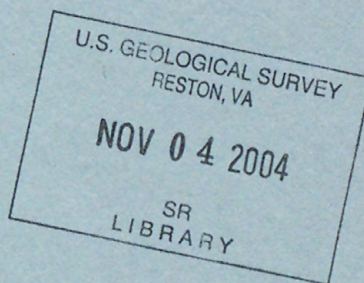


(200)
WR3chl
1974
C.2

LIBRARY COPY

Hydrologic Data for Little Elm Creek, Trinity River Basin Texas, 1974

U. S. GEOLOGICAL SURVEY
Open-File Report



*Prepared in cooperation with the city of Dallas
and the Texas Water Development Board*

*also WR3chl
6/76*

Hydrologic Data for Little Elm Creek, Trinity River Basin Texas, 1974

By R. M. Slade, Jr. and J. M. Taylor

U. S. GEOLOGICAL SURVEY

Open-File Report



*Prepared in cooperation with the city of Dallas
and the Texas Water Development Board*

May 1976

Reproduced by the Texas Water Development
Board as a part of the continuing program
of cooperation in water resources investi-
gations between the Board and the U.S.
Geological Survey.

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

CONTENTS

	Page
Introduction-----	5
History of small watershed projects in Texas-----	5
Objectives of the Texas small watershed projects-----	8
Purpose and scope of this basic-data report-----	9
Description of the watershed-----	9
Floodwater-retarding structures-----	12
Hydrologic instruments-----	12
Summary of data for the 1974 water year-----	14
Compilation of data-----	17
Little Elm Creek subwatershed No. 10 near Gunter, Tex.-----	18
Monthly and yearly weighted-mean rainfall-----	19
Monthly and yearly net inflow-----	20
Monthly and yearly outflow-----	21
Water budget of pool, annual summary-----	22
Little Elm Creek near Celina, Tex.-----	23
Monthly and yearly weighted-mean rainfall-----	24
Monthly and yearly mean discharge-----	25
Little Elm Creek near Aubrey, Tex.-----	26
Monthly and yearly average rainfall-----	27
Monthly and yearly mean discharge-----	28
Water budget of pool, annual summary	
Site 1-----	29
Site 2-----	30
Site 3-----	31
Site 4-----	32
Site 5-----	33
Site 6-----	34
Site 7-----	35
Site 8-B-----	36
Site 9-----	37
Site 11-----	38
Site 12-----	39
Site 17-----	40
Site 18-A-----	41
Site 19-----	42
Site 20-----	43
Rainfall data summary, Little Elm Creek basin-----	44
Little Elm Creek subwatershed No. 10 near Gunter, Tex.	
Storm of Oct. 11, 1973	
Inflow and outflow computations-----	47
Weighted-precipitation record-----	48
Hydrograph and mass curves-----	49

CONTENTS--Continued

	Page
Compilation of data--Continued	
Little Elm Creek subwatershed No. 10 near Gunter, Tex.--Continued	
Storm of Oct. 30, 1973	
Inflow and outflow computations-----	50
Weighted-precipitation record-----	51
Hydrograph and mass curves-----	52
Storm of Sept. 24-25, 1974	
Inflow and outflow computations-----	53
Weighted-precipitation record-----	54
Hydrograph and mass curves-----	55
Little Elm Creek near Celina, Tex.	
Storm of Oct. 30, 1973	
Runoff computations-----	56
Weighted-precipitation record-----	57
Hydrograph and mass curves-----	58
Storm of April 21-22, 1974	
Runoff computations-----	59
Weighted-precipitation record-----	60
Hydrograph and mass curves-----	61
Storm of Sept. 24-25, 1974	
Runoff computations-----	62
Weighted-precipitation record-----	63
Hydrograph and mass curves-----	64
Little Elm Creek near Aubrey, Tex.	
Storm of Oct. 30, 1973	
Runoff computations-----	65
Weighted-precipitation record-----	66
Hydrograph and mass curves-----	67
Storm of April 21-22, 1974	
Runoff computations-----	68
Weighted-precipitation record-----	69
Hydrograph and mass curves-----	70
Storm of Sept. 24-25, 1974	
Runoff computations-----	71
Weighted-precipitation record-----	72
Hydrograph and mass curves-----	73

ILLUSTRATIONS

	Page
Figure 1. Map showing the location of the Little Elm Creek study area and other study areas-----	6
2. Map showing the locations of floodwater-retarding structures (built and proposed) and hydrologic-instrument installations in the Little Elm Creek study area-----	10

TABLES

Table 1. Small watershed study areas in Texas as of September 30, 1974-----	7
2. Floodwater-retarding structure data, Little Elm Creek study area-----	13
3. Storm rainfall-runoff data, 1974 water year-----	15

HYDROLOGIC DATA FOR LITTLE ELM CREEK

TRINITY RIVER BASIN, TEXAS

1974

By

R. M. Slade, Jr. and J. M. Taylor
U.S. Geological Survey

INTRODUCTION

History of Small Watershed Projects in Texas

The U.S. Soil Conservation Service is actively engaged in the implementation of flood- and soil-erosion reducing measures in Texas under the authority of "The Flood Control Act of 1936 and 1944" and "Watershed Protection and Flood Prevention Act" (Public Law 566), as amended. The Soil Conservation Service has found that approximately 3,500 floodwater-retarding structures would be physically and economically feasible in Texas. As of September 30, 1974, 1,636 of these structures had been built.

The watershed-development program will have varying but important effects on the 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.

Hydrologic investigations of these small watersheds were begun by the Geological Survey in 1951 and are now being made in three areas (fig. 1). Data collection in nine study areas has been completed. These studies are being made in cooperation with the Texas Water Development Board, the 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 on each study area as of September 30, 1974, is shown in table 1.

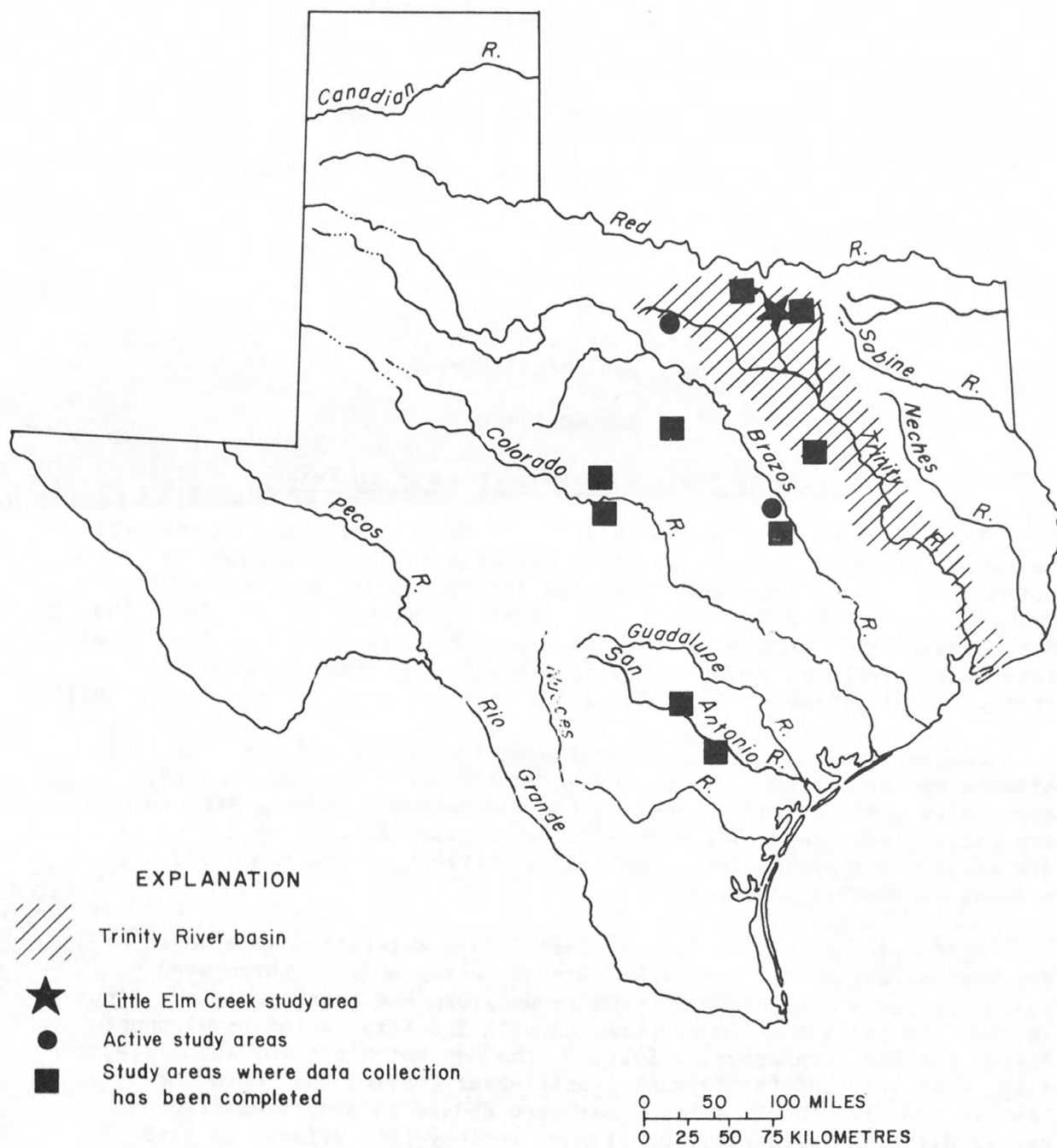


FIGURE 1.— Location of the Little Elm Creek study area and other study areas

Table 1.--Small watershed study areas in Texas as of September 30, 1974

Watershed	Drainage area above stream-gaging station (mi ²)	Data collection period	Floodwater-retarding structures above stream-gaging station	Period the structures were built
<u>Trinity River basin:</u>				
North Creek near Jacksboro	21.6	Aug. 1956 to	5	1970-72
Elm Fork Trinity River near Muenster	46.0	July 1956 to Sept. 1971	14	1954-57, 63
Little Elm Creek near Aubrey	75.5	June 1956 to	16	1966, 70-71
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	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 mi² above Escondido Creek subwatershed No. 11 (Dry Escondido Creek) near Kenedy not included in this total.

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

For those readers interested in using the metric system, metric equivalents of English units of measurements are given in parentheses. The English units 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
inches	--	25.4	millimetres	mm
feet	--	.3048	metres	m
miles	--	1.609	kilometres	km
square miles	mi ²	2.590	square kilometres	km ²
cubic feet per second	ft ³ /s	.02832	cubic metres per second	m ³ /s
feet per mile	ft/mi	.189	metres per kilometre	m/km
acre-feet	--	1233	cubic metres	m ³
		.001233	cubic hectometres	hm ³

Objectives of the Texas Small Watershed Projects

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

1. To determine the net effect of floodwater-retarding structures on the regimen of streamflow at downstream points.
2. To determine the effectiveness of the structures as ground-water recharge facilities.
3. To determine the effect of the structures on the sediment yield at downstream points.

4. To develop relationships between maximum rates or volumes of runoff with rainfall in small natural watersheds.
5. To develop a stream-system model for basins for 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, which is the fifteenth in a series of basic-data reports published annually for the Little Elm Creek study area, contains the rainfall, runoff, and storage data collected during the 1974 water year for the 75.5-mi² (195.5-km²) area above the stream-gaging station Little Elm Creek near Aubrey, Texas. The locations of floodwater-retarding structures and hydrologic-instrument installations in the area are shown on figure 2.

The investigation is scheduled to continue through a period of both above- and below-normal precipitation to define the various factors used in the analyses of rainfall-runoff relationships. Investigations in this watershed are scheduled to be discontinued on September 30, 1976.

DESCRIPTION OF THE WATERSHED

The headwaters of Little Elm Creek originate about 5 miles (8 km) northeast of Gunter in Grayson County (fig. 2). The creek flows southwest through the northwest corner of Collin County, then into Denton County, and discharges into Garza-Little Elm Reservoir about 4 miles (6 km) downstream from the stream-gaging station, Little Elm Creek near Aubrey. The length of the stream channel in the study area is about 29 miles (47 km). The principal tributaries to Little Elm Creek above the Aubrey stream-gaging station are Clarks Branch and Walnut Fork. The total drainage area above the Aubrey stream-gaging station is 75.5 mi² (195.5 km²). Above the Celina stream-gaging station, the total area is 46.7 mi² (121.0 km²).

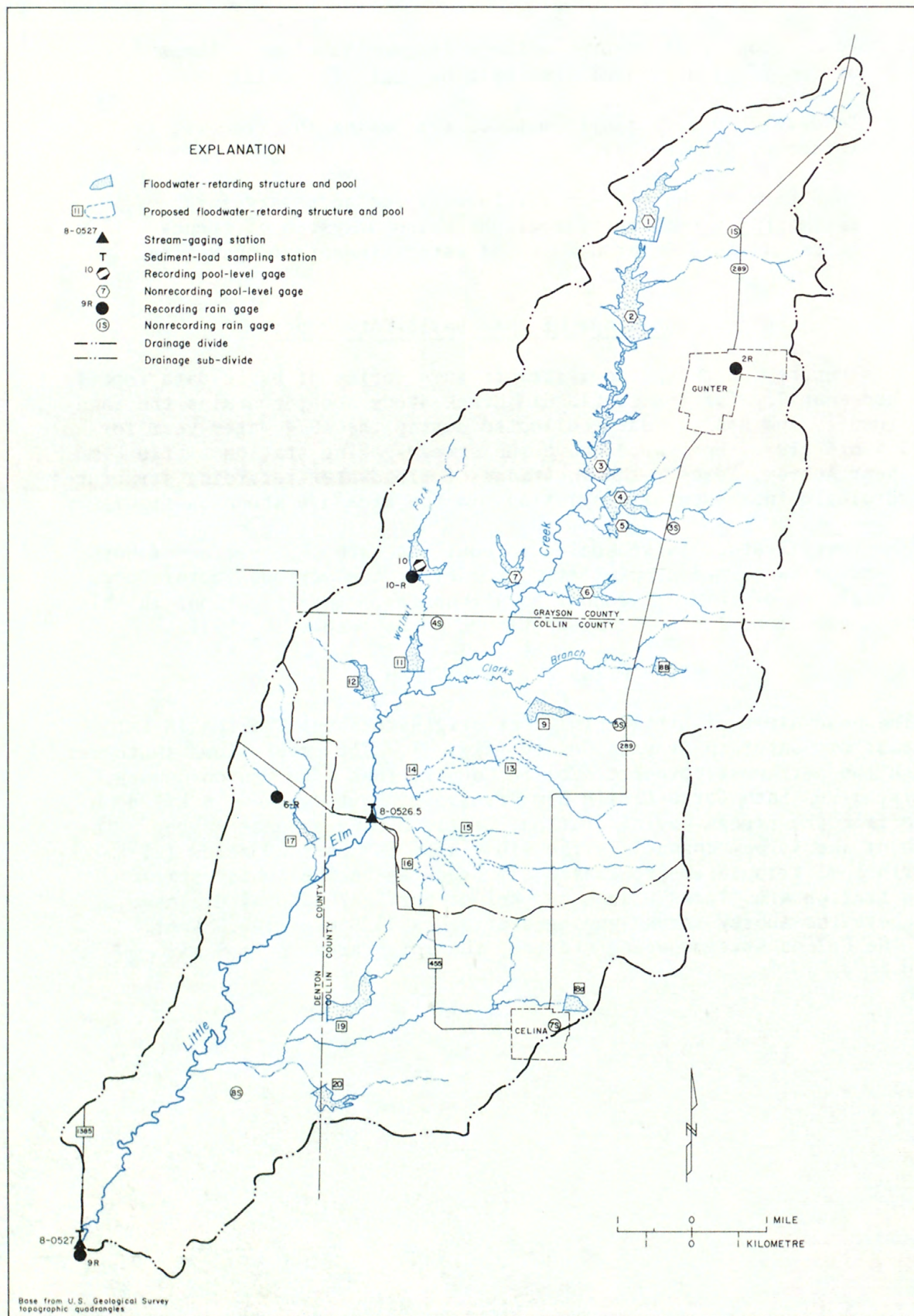


FIGURE 2.—Locations of floodwater-retarding structures (built and proposed) and hydrologic-instrument installations in the Little Elm Creek study area

The length of the watershed is about 19 miles (31 km), and the maximum width is about 7 miles (11 km). The watershed slopes from east to west; the eastern divide is 60 to 80 feet (18 to 24 m) higher than the western divide. The main channel divides the watershed into unequal areas. The smaller western area has a more gentle valley slope than the larger eastern area. The low-water channel falls from an altitude of about 840 feet (256 m) above mean sea level at the headwater divide to 540 feet (165 m) above mean sea level at the Aubrey stream-gaging station. In the 1-mile (2-km) reach immediately downstream from the divide, the elevation decreases 80 feet (24 m). The streambed has an average slope of 7 ft/mi (1.3 m/km) between river miles 21 and 27 (34 and 43 km), measured upstream from the Aubrey stream-gaging station. Between river miles 14 and 21 (23 and 34 km), the average slope of the streambed is 4 ft/mi (0.8 m/km), and between river miles 0 to 14 (0 to 23 km), the average slope is 2.5 ft/mi (0.5 m/km).

The stream has mostly a straight course, although in detail it is distinctly sinuous, with old channels, cutoff meander loops, and the remnants of several oxbow lakes present in the lower reach. The stream has a wide flood plain in the lower half of the watershed.

Approximately 81 percent of the drainage area is in the Blackland Prairie area, the remainder is in the Forested Coastal Plain area. The Blackland soils are fine to medium textured and light gray to very dark brown in color. The Forested Coastal Plain soils are medium to coarse textured and light gray in color.

The climate of the study area is temperate and subhumid. Moderate winters with sudden changes in temperature are common, as are long summers with low humidity. The most common storms are thunderstorms that occur frequently in the spring and summer. Long-duration low-intensity storms triggered by southward-moving continental polar fronts are common during the fall and winter. Some of the heaviest rainfall occurs in late summer and early fall as a result of hurricanes moving inland from the Gulf of Mexico. Individual storms causing serious flooding and sediment damage may occur during any season, but are most frequent in the spring. Records of the Environmental Data Service show that the long-term normal (1941-70) rainfall at Sherman (15 miles or 24 km northeast) is 39.83 inches (1,012 mm) per year.

FLOODWATER-RETARDING STRUCTURES

There are 12 floodwater-retarding structures in the Little Elm Creek watershed upstream from the stream-gaging station Little Elm Creek near Celina. These structures have a combined capacity of 9,540 acre-feet (11.8 hm^3) below the emergency spillway and control runoff from 28.4 mi^2 (73.6 km^2), or 61 percent of the area above the Celina stream-gaging station.

Four floodwater-retarding structures are located in the area between the Celina and Aubrey stream-gaging stations. The 16 floodwater-retarding structures have a combined capacity of 12,450 acre-feet (15.4 hm^3) below the emergency spillway and control runoff from 35.7 mi^2 (92.5 km^2), or 47 percent of the area above the Aubrey stream-gaging station.

Table 2 contains a summary of the physical data at each of the 16 floodwater-retarding structures.

HYDROLOGIC INSTRUMENTS

Instruments to collect rainfall and stage data in the study area consist of a network of rain gages, staff gages at each of the 16 floodwater-retarding structures, a water-stage recorder at one of the structures, and 2 stream-gaging stations on Little Elm Creek. The locations of instruments are shown on figure 2.

Four recording and six nonrecording rain gages are located at points throughout the study area to define the total rainfall and rainfall intensities. Measurements of rainfall at nonrecording rain gages are made daily by local observers.

A continuous water-stage recording gage is operated at floodwater-retarding structure site 10. Data collected at this site since April 1, 1966, are used to compute the contents, surface area, inflow, and outflow. Weekly readings of the staff gages at each of the 15 remaining floodwater-retarding structures provide data to determine the quantity of water retained or released from the structures.

Two continuous water-stage recorders at the stream-gaging stations Little Elm Creek near Celina and Little Elm Creek near Aubrey provide records of the stage, which together with measurements of streamflow are used to compute the runoff from the area above each streamflow station. The station near Aubrey was established on June 8, 1956; and the Celina station was established on February 21, 1966.

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

Site number	Drainage area (mi ²)	Date dam completed	Date gage established	Datum of gage above mean sea level, datum of 1929	Emergency spillway			Drop inlet			Diameter or dimensions of opening in orifice plate (in)	Portholes or weir notches					Controlled opening			Discharge pipe		Range of staff gages
					Width (ft)	Gage height crest (ft)	Pool contents (ac-ft)	Inside dimensions (ft)	Gage height crest (ft)	Pool contents (ac-ft)		Number and dimensions (in)	Gage height crest (ft)	Pool contents (ac-ft)	Dimensions of dewatering notch (in)	Date dewatering notch filled	Size of valve (in)	Gage height of invert of valve (ft)	Pool contents (ac-ft)	Diameter (in)	Height of con- striction plate above invert of pipe (in)	
1	3.40	6-10-66	4- 8-66	674.00	90	29.0	977	2x6	19.00	179	(2) 15.5	None	--	--	None	--	12	9.50	17	24	--	13.6- 30.5
2	3.95	6-10-66	7-13-66	657.30	205	25.3	1,420	2.5x8.3	17.00	351	None	12x18 a/	15.47	251	"	--	12	7.92	38	30	--	10.2- 23.7
3	7.27	6-10-66	7-14-66	632.80	335	24.8	1,840	3.5x11	16.00	337	"	b/	12.00 14.00	203	"	--	12	7.50	32	42	--	8.1- 27.1
4	3.33	8-11-66	9-13-66	639.60	350	29.9	1,330	2x6	17.00	265	16x14 (2)	10x12	16.12	228	"	--	12	7.50	35	24	--	7.0- 30.5
5	.50	3-16-66	4- 8-66	641.20	45	28.4	204	2x4	18.00	54	None	None	--	--	"	--	12	9.50	8.2	18	--	10.2- 30.5
6	1.99	3-16-66	4- 7-66	625.50	145	31.2	744	2x4	19.00	158	17.25	"	--	--	"	--	12	10.50	18	24	--	10.2- 37.3
7	1.28	3-16-66	4- 7-66	618.30	110	23.7	464	2x4	14.00	108	14	"	--	--	"	--	12	8.50	31	24	--	10.2- 27.1
8-B	1.25	2-17-71	6- 7-71	676.73	100	28.3	495	2x4	17.27	109	--	"	--	--	12x36	--	12	7.77	15	18	9.63	32.7- 6.8-
9	.58	2-17-71	6- 8-71	638.25	60	23.2	220	2x4	16.25	55	--	"	--	--	12x36	--	12	7.75	2.1	18	9	3.4- 29.8
10	2.10	3-16-66	4- 6-66	615.50	125	29.2	868	2x4	20.00	159	16.5x18	"	--	--	None	--	12	13.50	40	24	--	10.2- 27.1
11	1.17	1-20-71	6- 8-71	601.10	130	20.9	400	2.5x7.5	12.20	60	--	"	--	--	12x22.75	--	12	7.70	15	30	--	6.7- 23.7
12	1.62	1-20-71	6- 8-71	595.96	140	24.7	576	2x4	12.24	110	--	"	--	--	12x24	--	12	7.74	43	18	7.75	3.4- 29.7
13																						
14																						
15																						
16																						
17	2.17	1-20-71	6-18-71	586.16	150	26.6	809	2x4	15.84	161	--	None	--	--	12x36	7-71	12	4.34	.7	18	9.38	3.4- 30.5
18-A	1.05	8-17-70	8-13-70	712.42	100	30.2	524	2x4	15.58	111	--	"	--	--	12x36	7-71	12	4.08	14	24	7.75	3.4- 37.3
19	2.01	8-17-70	8-14-70	87.34	100	19.4	769	2x4	10.76	168	--	"	--	--	12x36	7-71	12	4.26	40	24	10.38	6.8- 23.7
20	2.06	8-17-70	8-13-70	88.51	100	27.5	809	2x4	15.59	150	--	"	--	--	12x36	7-71	12	4.09	6.0	24	8.50	6.8- 30.5

a/ Twelve 7x8-inch portholes

b/ Twelve 7x8-inch portholes

SUMMARY OF DATA FOR THE 1974 WATER YEAR

The average rainfall above the stream-gaging station Little Elm Creek near Aubrey (study area) during the 1974 water year was 43.18 inches (1,097 mm), or 115 percent of the 18-year (1957-74) average of 37.58 inches (955 mm) for the area. Monthly rainfall totals ranged from 0.82 inch (21 mm) in March to 7.55 inches (192 mm) in June. The weighted-mean rainfall above the stream-gaging station Little Elm Creek near Celina was 44.21 inches (1,123 mm). The weighted-mean rainfall above Little Elm Creek subwatershed No. 10 during the 1974 water year was 31.69 inches (805 mm).

Runoff above site 10 was 1,530 acre-feet (1.89 hm^3), which represents an equivalent depth of 13.66 inches (347 mm). The yearly mean discharge was $52.5 \text{ ft}^3/\text{s}$ ($1.49 \text{ m}^3/\text{s}$) at the stream-gaging station near Celina and $74.6 \text{ ft}^3/\text{s}$ ($2.11 \text{ m}^3/\text{s}$) at the stream-gaging station near Aubrey. At the Celina station, the annual runoff was 37,970 acre-feet (46.8 hm^3) or 15.24 inches (387 mm). The runoff for the year at the Aubrey station was 53,970 acre-feet (66.5 hm^3) or 13.40 inches (340 mm).

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

Three storm periods were selected for detailed computations. These computations include a time breakdown of rainfall and discharge with hydrographs and mass curves drawn for illustrations. The storms selected for the Celina and Aubrey stations occurred October 30, 1973, April 21-22, 1974, and September 24-25, 1974. The storms selected for site 10 occurred October 11, 1973, October 30, 1973, and September 24-25, 1974. A summary of rainfall-runoff data for the selected storms is shown in table 3.

ANNUAL STORM RAINFALL--RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1974 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			
Little Elm Creek subwatershed No. 10 near Gunter, Tex. (Drainage area 2.10 mi ²)							
October 11, 1973	5.2	1.39	0.46	0.79	1.00	0.95	248
October 30, 1973	7.5	1.66	.64	.82	.89	1.02	304
September 24-25, 1974	13	1.23	.09	.18	.28	.79	170

Little Elm Creek near Celina, Tex.

Drainage area, 46.7 mi² of which 28.4 mi² is above floodwater-retarding structures

October 30, 1973	11	1.52	.27	.34	.63	1.01	.66	1,530
April 21-22, 1974	11	2.66	.54	.94	1.36	.60	.23	885
September 24-25, 1974	27	2.18	.13	.22	.41	1.06	.49	1,600

ANNUAL STORM RAINFALL--RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1974 water year--Continued

[illegible]

COMPI LATION O F D A T A

TRINITY RIVER BASIN

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex.

LOCATION.--Lat 33°24'33", long 96°48'41", Grayson County, near center of dam on Walnut Fork tributary to Little Elm Creek, 1.6 miles (2.6 km) upstream from mouth, and 4.7 miles (7.6 km) southwest of Gunter.

DRAINAGE AREA.--2.10 mi² (5.44 km²).

PERIOD OF RECORD.--April 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 615.51 ft (187.607 m) above mean sea level (Soil Conservation Service bench mark).

AVERAGE INFLOW.--8 years, 1,050 acre-ft/yr (1.29 hm³/yr).

AVERAGE OUTFLOW.--8 years, 955 acre-ft/yr (1.18 hm³/yr).

EXTREMES.--Current year: Maximum outflow, 28.4 ft³/s (0.80 m³/s) June 7 (gage height, 25.10 ft or 7.650 m); no outflow for many days. Maximum inflow, 1,610 ft³/s (45.6 m³/s), average for 5-minute interval, June 7, computed and adjusted as explained below; no inflow at times.

Period of record: Maximum outflow, 31.9 ft³/s (0.90 m³/s) Apr. 30, 1966 (gage height, 27.09 ft or 8.257 m); no outflow at times each year. Maximum inflow, 3,240 ft³/s (91.8 m³/s), average for 5-minute interval, May 30, 1967, computed from outflow and change in pool contents and adjusted for rainfall on pool surface during time of peak inflow; no inflow at times each year.

REMARKS.--Records fair. Dam completed Mar. 16, 1966, and storage began in April 1966. Pool is formed by rolled-fill earthen dam 1,588 ft (484 m) long, with a 130-foot-wide (40-metre) spillway at left end of dam, with crest at gage height 29.2 ft (8.90 m). Outlet structure is a 2.0- by 4.0-foot (0.6- by 1.2-metre) uncontrolled concrete drop-inlet structure with crest at gage height 20.00 ft (6.096 m) and connected to a 24-inch (610-millimetre) concrete pipe with invert at gage height 13.0 ft (3.96 m). There is also a 12-inch (305-millimetre) controlled slide gate used as a water-supply outlet that is connected to the drop inlet at gage height 13.5 ft (4.11 m). Pool capacity is 868 acre-ft (1.07 hm³) at spillway crest, 159 acre-ft (0.196 hm³) at crest of drop inlet, and 40 acre-ft (0.049 hm³) at controlled slide gate. Capacity table is based on Soil Conservation Service map prepared prior to construction and adjusted for borrow by the Geological Survey. Recording rain gage located at station. A total of 26.7 acre-ft (32,900 m³) was diverted from the pool for irrigation during the period Aug. 13-24. Records of precipitation and hydrologic data for selected storms are published elsewhere in basic-data report.

REVISIONS.--WRD Texas 1968: Drainage area.

POOL WATER BUDGET, IN ACRE-FEET, WATER YEAR OCTOBER 1973 TO SEPTEMBER 1974

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Inflow 1/	525	161	3.6	6.8	14.0	2.2	50.3	101	515	4.7	30.3	121
Outflow	487	225	4.5	0	1.7	.1	13.1	138	488	0	26.7	80.3
(+)	+31.1	-73.8	-9.4	0	+4.5	-9.7	+28.7	-53.6	+30.1	-19.7	-4.6	+35.1
(++)	5.76	2.01	.53	.27	.60	.31	4.28	1.45	7.26	.45	4.88	3.89
CAL YR 1973: Inflow	2,160					+ -0.4		++ 36.24				
WTR YR 1974: Inflow	1,530					+ -41.3		++ 31.69				

PEAK INFLOW (BASE, 100 FT³/S)

DATE	TIME	DISCHARGE	DATE	TIME	DISCHARGE
10- 6	0950	*241	5- 1	2030	*558
10-11	0740	*248	6- 7	0625	*1,610
10-12	2355	*246	6- 9	0225	*140
10-30	1920	*304	6-12	0735	*463
11-20	0350	*102	9-25	0225	*170

1/ Inflow adjusted for rainfall on pool and pool losses.
+ Change in contents, in acre-feet.
++ Rainfall, in inches.
* Average for 5-minute interval.

Sheet 1 of Sheets
08052600

[illegible]

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

08052630

WATER RESOURCES DIVISION
Little Elm Creek
yearly net inflow _____ of _____ acre-feet _____ of _____ Subwatershed No. 10 River ^{at} near _____ Gunter, Tex.
Monthly and ~~annual~~ discharge, in _____ [Drainage area, _____ 2.10 _____ square miles] (revised)

16-28489-5 U. S. GOVERNMENT PRINTING OFFICE

[illegible]

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

yearly outflow

yearly outflow
Monthly and ~~annual~~ discharge, in acre-feet, of Little Elm Creek ^{at} near Gunter, Tex.
[Drainage area, 2.10 square miles]

[illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. Drainage Area 2.10 mi²

Continuous water-stage recorder: ratio 1:6. Date of last sediment survey —.

Maxima: gage height, 25.10 ft; outflow, 28.4 ft³/s; surface area, 82.0 acres; contents, 445 acre-feet; on June 7, 1974.

Minima: gage height, 17.78 ft; surface area, 21.5 acres; contents, 101 acre-feet; on Aug. 25, 1974.

Maximum inflow, 1610 ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on June 7, 1974.

Averages: 8 water years, (1967-74); inflow, 1050 acre-feet/year; outflow, 955 acre-feet/year; rainfall, 31.14 inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year
Total Inflow <u>1/</u>	525	161	3.6	2160	6.8	14.0	2.2	50.3	101	515	4.7	30.3	121	1530
Total Outflow	487	225	4.5	2040	0	1.7	0.1	13.1	138	488	0	26.7	80.3	1460
Total Consumption	23.7	15.5	9.9	229	7.5	9.7	12.6	19.4	20.8	31.2	25.5	18.2	14.5	208
†	+ 31.1	-73.8	-9.4	-0.4	0	+ 4.5	- 9.7	+ 28.7	- 53.6	+ 30.1	- 19.7	- 4.6	+ 35.1	- 41.3
‡	39.2	35.2	32.0	34.5	31.4	31.4	31.4	30.8	33.6	41.0	29.6	25.7	29.0	32.5
††	5.76	2.01	0.53	36.24	0.27	0.60	0.31	4.28	1.45	7.26	0.45	4.88	3.89	31.69

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, 100 ft³/s)

Date	Time	Discharge	Date	Time	Discharge
Oct. 6	0950	241	May 1	2030	558
11	0740	248	June 7	0625	1610
12	2355	246	9	0225	140
30	1920	304	12	0735	463
Nov 20	0350	102	Sept 25	0225	170

* Averaged for 5-minute interval

TRINITY RIVER BASIN

08052650 Little Elm Creek near Celina, Tex.

LOCATION.--Lat 33°21'55", long 96°49'25", Collin County, on left bank at downstream side of bridge on Farm Road 455, 3.6 miles (5.8 km) northwest of Celina, and 10 miles (16 km) upstream from Mustang Creek.

DRAINAGE AREA.--46.7 mi² (121.0 km²).

PERIOD OF RECORD.--February 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 582.4 ft (177.5 m) above mean sea level (State Highway Department bench mark).

AVERAGE DISCHARGE.--8 years, 35.5 ft³/s (1.005 m³/s), 10.32 in/yr (262 mm/yr), 25,720 acre-ft/yr (31.7 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 4,710 ft³/s (133 m³/s) June 7 (gage height, 13.03 ft or 3.972 m); no flow for many days.

Period of record: Maximum discharge, 5,340 ft³/s (151 m³/s) May 31, 1967 (gage height, 13.32 ft or 4.060 m); no flow for many days each year.

REMARKS.--Records good. Small diversions for irrigation above station. Four standard and two recording rain gages are located in basin above station. At end of year, flow from 28.4 mi² (73.6 km²) above this station was partly controlled by 12 floodwater-retarding structures with a total combined capacity of 9,490 acre-ft (11.7 hm³) below the flood-spillway crests, of which 7,960 acre-ft (9.81 hm³) is floodwater-retarding capacity and 1,530 acre-ft (1.89 hm³) is sediment-pool capacity. The capacity in these pools allocated to sediment storage will be used for conservation storage until eliminated by sedimentation. Water-quality records for the current year are published in Part 2 of this report.

REVISIONS.--WRD Texas 1970: 1968-69, drainage area.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1973 TO SEPTEMBER 1974

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	196	246	12	.96	2.7	3.9	.01	155	0	0	0	9.6
2	108	156	8.9	.50	2.2	3.2	0	288	.99	0	0	7.5
3	57	83	8.3	.38	1.8	2.6	0	247	.90	0	0	4.6
4	32	327	9.2	.38	1.3	2.0	0	196	.82	0	0	2.1
5	21	122	6.5	.38	.85	1.7	0	102	1.5	0	0	.96
6	299	60	4.9	.38	.74	1.7	0	61	3.2	0	0	.14
7	143	34	4.0	.38	.74	1.5	0	39	1,400	0	0	.01
8	69	23	3.4	.62	.38	1.2	0	27	514	0	0	0
9	37	17	2.8	.62	.14	.85	0	17	751	0	0	0
10	20	12	2.4	.74	.14	.74	0	9.6	426	0	0	0
11	833	9.0	2.0	.62	.10	6.4	0	5.6	383	0	0	0
12	532	6.8	1.8	.38	.07	2.9	0	3.4	538	0	0	37
13	1,090	5.9	1.6	.38	.05	1.8	.07	2.2	379	0	0	97
14	334	5.3	1.5	.50	.05	1.4	.03	14	308	0	0	27
15	309	4.6	1.4	.50	.05	.96	.01	64	206	0	0	13
16	249	3.5	1.1	.50	.05	.62	0	23	140	0	0	65
17	152	2.5	.96	.50	.05	.50	0	17	97	0	0	131
18	81	2.0	.85	.62	.07	.28	0	11	53	0	0	66
19	48	2.0	32	6.9	.05	.20	0	6.6	31	0	0	33
20	28	252	9.9	4.7	.07	.14	0	3.9	18	0	0	35
21	19	105	5.7	3.6	131	.28	204	2.7	10	0	0	82
22	13	62	4.6	2.9	88	.38	405	1.9	6.4	0	0	19
23	8.7	40	3.8	2.3	41	.14	142	1.3	3.6	0	0	9.8
24	5.8	346	3.5	1.8	22	.05	73	.72	2.0	0	0	33
25	4.4	321	2.9	1.5	14	.02	38	.30	1.0	0	0	860
26	3.4	149	2.4	1.8	9.5	.01	20	.09	.28	0	0	270
27	89	80	2.0	7.1	6.5	.01	11	.03	.05	27	0	173
28	84	45	1.7	20	5.0	.01	6.8	.01	.01	0	6.9	94
29	48	25	1.5	7.6	-----	.01	4.5	0	0	20	0	50
30	229	17	1.5	5.1	-----	.01	427	0	0	84	0	27
31	638	-----	1.2	3.6	-----	.01	-----	0	-----	22	-----	-----
TOTAL	5,780.3	2,563.6	146.31	78.24	328.60	35.52	1,331.42	1,299.35	5,274.75	0	159.9	2,146.71
MEAN	186	85.5	4.72	2.52	11.7	1.15	44.4	41.9	176	0	5.16	71.6
MAX	1,090	346	32	20	131	6.4	427	288	1,400	0	84	860
MIN	3.4	2.0	.85	.38	.05	.01	0	0	0	0	0	0
CFSM	3.98	1.83	.10	.05	.25	.02	.95	.90	3.77	0	.11	1.53
IN.	4.60	2.04	.12	.06	.26	.03	1.06	1.04	4.20	0	.13	1.71
AC-FT	11,470	5,080	290	155	652	70	2,640	2,580	10,460	0	317	4,260

CAL YR 1973 TOTAL 25,651.00 MEAN 70.3 MAX 1,410 MIN 0 CFSM 1.51 IN 20.43 AC-FT 50,880
WTR YR 1974 TOTAL 19,144.70 MEAN 52.5 MAX 1,400 MIN 0 CFSM 1.12 IN 15.25 AC-FT 37,970

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of Sheets

08052650

yearly weighted-mean rainfall
Monthly and ~~annual~~ discharge, in inches

of Little Elm Creek River ^{at} near Celina, Tex.
[Drainage area, 46.7 a/ square miles]

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
1966	-	-	-	-	-	-	11.68	1.59	2.35	3.12	7.39	4.46	-
1967	0.50	0.80	1.44	0.09	1.26	3.44	5.15	8.81	1.05	1.91	1.00	4.63	30.08
1968	3.29	1.01	2.14	3.07	1.69	6.02	4.18	6.33	3.22	2.93	1.17	6.30	41.35
1969	1.68	4.25	1.84	1.90	3.07	2.67	2.85	8.52	4.46	.02	2.17	1.71	35.12
1970	5.91	.52	4.19	.60	5.54	3.24	8.53	3.01	.85	.49	3.84	7.51	44.23
1971	1.47	.47	.73	.82	1.45	.54	1.99	5.08	1.28	3.52	5.13	3.68	26.16
1972	6.23	3.83	6.90	.36	.29	1.49	2.86	2.01	1.19	1.41	3.61	4.28	34.46
1973	6.79	3.30	.60	3.30	1.64	5.09	3.78	3.89	6.84	5.04	1.05	8.77	50.09
1974	7.14	2.96	.80	1.09	1.32	.97	5.52	3.21	7.81	1.15	5.65	6.59	44.21
a/ Revised figure, prior to 1970 water year, 46.2 mi ² .													

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Monthly and ~~annual~~ ^{yearly mean} discharge, in ft³/s, of Little Elm Creek River ^{at} near Celina, Tex.
[Drainage area, 46.7 a/square miles]

[illegible]

TRINITY RIVER BASIN

08052700 Little Elm Creek near Aubrey, Tex.

LOCATION.--Lat 33°17'00", long 96°53'33", Denton County, on left bank at downstream side of bridge on Farm Road 1385, 1.5 miles (2.4 km) upstream from Mustang Creek, 5.5 miles (8.8 km) east of Aubrey, and 18 miles (29 km) upstream from Lewisville Dam.

DRAINAGE AREA.--75.5 mi² (195.5 km²).

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

GAGE.--Water-stage recorder. Datum of gage is 534.76 ft (162.995 m) above mean sea level (State Highway Department bench mark).

AVERAGE DISCHARGE.--18 years, 44.5 ft³/s (1.260 m³/s), 8.00 in/yr (203 mm/yr), 32,240 acre-ft/yr (39.8 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,980 ft³/s (113 m³/s) June 7 (gage height, 15.95 ft or 4.862 m); no flow for many days.

Period of record: Maximum discharge, 7,830 ft³/s (222 m³/s) Apr. 26, 1957 (gage height, 17.34 ft or 5.285 m); no flow at times each year.

Maximum stage since about 1900, 18.2 ft (5.55 m) in May 1941, from information by local residents.

REMARKS.--Records good through April 1974. Beginning May 1974, records good above 100 ft³/s (2.83 m³/s) and fair below. Small diversions for irrigation above station. Ten rain gages, six standard and four recording gages, are operated in basin above station. At end of year, flow from 35.7 mi² (92.5 km²) above this station was partly controlled by 16 floodwater-retarding structures with a total combined capacity of 12,340 acre-ft (15.2 hm³) below the flood-spillway crests, of which 10,260 acre-ft (12.7 hm³) is floodwater-retarding capacity and 2,080 acre-ft (2.56 hm³) is sediment-pool capacity. The capacity in these pools allocated to sediment storage will be used for conservation storage until eliminated by sedimentation. Water-quality records for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WRD Texas 1970: 1969.

DISCHARGE IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1973 TO SEPTEMBER 1974

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	314	368	14	1.9	4.9	6.6	.35	503	0	0	0	11
2	202	213	11	2.0	4.2	5.7	.22	315	0	0	0	7.2
3	102	107	10	.80	3.6	5.0	.22	249	0	0	0	7.3
4	55	502	12	.70	3.0	4.3	.09	243	.03	0	0	4.1
5	33	279	10	1.0	2.3	3.6	.02	140	.36	0	0	2.3
6	175	124	8.4	1.2	2.2	3.2	.01	78	2.9	0	0	.95
7	308	67	7.3	1.2	1.6	3.1	0	50	1,280	0	0	.30
8	102	34	6.4	1.3	1.3	3.0	0	35	1,160	0	0	.10
9	54	21	5.8	1.4	1.0	2.5	0	24	977	0	0	.03
10	28	14	5.2	1.4	.70	2.2	0	15	571	0	0	.03
11	720	11	4.7	1.3	.56	4.2	.26	9.5	461	0	0	.05
12	1,100	8.7	4.4	1.0	.40	6.6	1.4	6.1	959	0	0	.02
13	1,860	7.4	4.1	.78	.35	4.1	.28	3.3	616	0	0	103
14	624	6.9	4.0	.86	.35	3.2	.13	6.4	372	0	0	30
15	398	6.3	3.6	.95	.35	2.8	.07	77	267	0	0	13
16	379	5.3	3.8	.86	.35	2.5	.05	32	178	0	0	32
17	243	4.4	4.0	.95	.35	1.9	.03	22	118	0	0	224
18	148	4.4	3.7	1.0	.35	1.7	.01	16	63	0	0	105
19	46	4.7	52	15	.35	1.3	.01	11	35	0	0	55
20	40	267	15	10	.26	1.3	.01	7.5	23	0	0	25
21	23	154	8.7	6.4	129	1.6	134	4.5	14	0	0	130
22	15	76	7.1	4.9	162	1.2	978	2.6	9.0	0	0	29
23	11	48	6.1	3.9	62	1.3	270	1.4	5.7	0	0	12
24	9.1	149	5.3	3.4	31	.95	141	.75	3.0	0	0	7.9
25	7.6	671	4.7	2.5	17	.70	88	.42	2.0	0	0	1,010
26	6.6	229	4.1	2.7	11	.63	52	.43	.63	0	0	605
27	61	116	3.7	5.7	4.3	.50	27	.13	.17	0	0	258
28	123	64	3.3	45	7.7	.56	18	.06	.06	13	0	135
29	60	34	3.0	12	-----	.50	13	.02	.01	6.9	0	69
30	102	20	2.7	8.1	-----	.35	525	0	0	67	0	32
31	969	-----	2.7	6.3	-----	.30	-----	0	-----	32	-----	-----
TOTAL	8,368.3	3,616.1	241.0	146.50	457.47	77.39	2,249.16	1,903.11	7,117.86	0	125.7	2,908.28
MEAN	270	121	7.77	4.73	16.3	2.50	75.0	61.4	237	0	4.05	96.9
MAX	1,860	671	52	45	162	6.6	978	503	1,280	0	67	1,010
MIN	6.6	4.4	2.7	.70	.26	.30	0	0	0	0	0	.02
CFSM	3.58	1.60	.10	.06	.22	.03	.99	.81	3.14	0	.05	1.28
IN.	4.12	1.78	.12	.07	.23	.04	1.11	.94	3.51	0	.06	1.43
AC-FT	16,600	7,170	478	291	907	154	4,460	3,770	14,120	0	249	5,770

CAL YR 1973 TOTAL 35,450.27 MEAN 97.1 MAX 2,150 MIN 0 CFSM 1.29 IN 17.47 AC-FT 70,320
WTR YR 1974 TOTAL 27,210.87 MEAN 74.6 MAX 1,860 MIN 0 CFSM .99 IN 13.41 AC-FT 53,970

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISIONSheet 1 of Sheets
08052700

yearly average rainfall

Monthly and ~~annual~~ discharge, in inches, of Little Elm Creek ^{near} Dinner Aubrey, Tex.
[Drainage area, 75.5 square miles]

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
1957	2.16	2.78	2.87	2.47	2.34	5.96	13.16	16.28	0.68	1.86	0.20	5.99	56.75
1958	2.55	7.83	1.60	2.06	.73	3.60	7.22	3.85	4.37	2.23	1.81	1.96	39.81
1959	1.37	2.29	.69	.38	1.05	2.07	.55	2.16	6.76	4.71	2.10	1.34	25.47
1960	6.84	1.88	4.00	2.18	2.03	1.21	2.22	3.21	3.40	6.55	2.32	2.40	38.24
1961	1.70	.71	5.80	2.09	2.78	2.93	1.41	2.42	4.38	3.29	1.06	4.29	32.86
1962	2.65	2.79	2.37	1.01	1.00	2.54	4.70	1.50	7.10	3.10	3.34	9.63	41.73
1963	2.32	3.40	.75	.44	.44	.39	5.37	5.64	1.55	2.42	.32	.52	23.56
1964	.20	.93	1.11	1.80	1.60	4.66	5.37	4.48	1.49	1.06	4.03	10.64	37.37
1965	1.46	7.20	1.07	2.36	3.74	1.49	1.20	6.67	4.53	1.61	3.44	6.39	41.16
1966	1.45	2.07	1.36	1.00	2.12	1.47	12.01	1.30	2.30	2.57	6.63	4.18	38.46
1967	.56	.82	1.43	.17	1.14	3.19	4.82	8.12	1.14	1.42	.99	4.72	28.52
1968	3.29	.97	2.16	3.13	1.64	5.89	4.48	5.71	3.39	2.91	.98	6.53	41.02
1969	1.68	4.19	1.71	1.76	3.03	3.77	3.01	8.25	4.24	.03	2.07	1.89	35.57
1970	5.65	.50	4.36	.64	5.47	3.11	8.20	2.67	1.13	.44	3.90	7.11	43.18
1971	1.63	.47	.76	.75	1.47	.52	1.97	4.62	1.21	3.34	4.13	3.65	24.52
1972	6.35	3.96	6.84	.36	.26	1.64	2.88	2.09	1.52	1.20	3.34	4.94	35.38
1973	6.85	3.21	.68	3.24	1.68	4.96	3.96	4.33	6.70	5.15	.70	8.20	49.66
1974	7.27	3.09	.84	1.12	1.23	.82	5.77	2.76	7.55	1.19	5.08	6.46	43.18

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

yearly-mean
Monthly and annual discharge, in ft^3/s , of Little Elm Creek River ^{at} Aubrey, Tex.
[Drainage area, 75.5 square miles]

16-26489-K
U. S. GOVERNMENT PRINTING OFFICE[illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 1 near Gunter, Tex. Drainage Area 3.40 mi²

Continuous staff gage ratio — Date of last sediment survey —

Maxima: gage height, 22.9 ft; outflow, 31.1 ft³/s; surface area, 65.4 acres; contents, 378 acre-feet; on June 7, 1974.

Minima: gage height, 18.0 ft; surface area, 32.0 acres; contents, 144 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1974
Total Inflow \downarrow	858	204	7.1	3,820	4.4	19.4	3.0	102	296	593	1.3	10.9	254	2,350
Total Outflow	874	301	5.3	3,740	.9	9.3	.6	44.9	344	593	0	0	225	2,400
Total Consumption	19.0	15.0	10.0	256	8.0	11.8	17.2	20.0	24.2	30.8	27.0	23.2	12.6	219
†	-8.2	-103	-5.8	+3.9	+7	+3.1	-11.1	+53.8	-51.1	-2.7	-21.0	+1.0	+35.5	-109
†	44.9	40.4	38.9	41.0	38.6	38.6	38.3	57.7	41.7	42.8	35.6	33.2	37.0	39.0
††	7.34	2.54	.76	53.27	1.61	1.49	1.18	5.04	5.89	6.92	1.54	4.02	6.54	45.67

\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, — ft³/s)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

Little Elm Creek subwatershed No. 2 near Gunter, Tex. Drainage Area 3.95 mi²
1974 WATER YEAR

~~Continuous~~ Staff gage ratio — Date of last sediment survey —

Maxima: gage height, 20.0 ft; outflow, 94.7 ft³/s; surface area, 112 acres; contents, 629 acre-feet; on June 7, 1974.

Minima: gage height, 14.3 ft; surface area, 44.8 acres; contents, 192 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow 1/	1290	430	40.4	6,980	17.5	55.6	23.1	331	770	1890	6.2	27.4	239	5,120
Total Outflow	1320	480	45.2	6,840	16.0	33.8	10.9	252	824	1890	0	0	173	5,040
Total Consumption	46.7	33.5	16.7	419	12.0	19.9	33.0	35.2	48.5	54.8	47.0	37.9	27.2	412
†	-38.7	-68.5	-17.9	+6.5	-2.8	+8.7	-15.1	+69.0	-72.9	+1.1	-35.2	+9.5	+67.6	-95.2
‡	71.7	63.8	58.5	762	57.6	57.2	57.6	59.4	66.0	71.7	52.2	46.8	56.6	59.9
††	7.29	2.54	.76	53.22	1.61	1.49	1.18	5.04	5.89	6.92	1.54	4.82	6.54	45.62

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

Little Elm Creek subwatershed No. 3 near Gunter, Tex. Drainage Area 7.27 mi²
1974 WATER YEAR
~~Continuous~~ ^{Staff gage} ~~water stage recorder~~ ratio — Date of last sediment survey —
Maxima: gage height, 23.8 ft; outflow, 241 ft³/s; surface area, 249 acres; contents, 1580 acre-feet; on June 7, 1974
Minima: gage height, 11.0 ft; surface area, 24.8 acres; contents, 90.2 acre-feet; on Aug. 25, 1974
Maximum inflow, — ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —
Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct.	Nov.	Dec.	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow <u>1/</u>	2120	653	99.8	12,700	19.3	116	85.6	547	1640	3290	4.1	71.0	655	9,300
Total Outflow	2160	757	105	12,600	13.5	102	48.1	448	1720	3280	0	29.1	651	9,310
Total Consumption	46.7	22.8	9.0	279	6.7	11.0	18.2	20.0	44.6	64.5	26.3	20.5	28.0	318
†	-43.8	-115	-12.0	+1.5	+1.6	+7.9	+21.7	+99.2	-117	-17.0	-20.4	+35.9	+3.6	-155
‡	50.9	40.5	34.0	39.2	32.8	33.5	33.0	34.5	44.6	64.5	28.6	27.2	38.4	38.5
††	7.51	2.92	.77	53.88	1.13	1.43	1.07	5.51	4.66	8.94	.97	5.39	6.13	46.43

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 4 near Gunter, Tex. Drainage Area 3.33 mi²
Staff gage ratio — Date of last sediment survey —

Maxima: gage height, 26.2 ft; outflow, 57.7 ft³/s; surface area, 98.6 acres; contents, 92.5 acre-feet; on June 7, 1974.

Minima: gage height, 15.0 ft; surface area, 36.0 acres; contents, 183 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow <u>1</u>	471	215	60.8	3,560	37.5	66.9	24.5	124	141	932	3.2	16.9	270	2,360
Total Outflow	474	258	70.6	3,490	30.5	54.9	21.3	96.3	137	935	.2	0	240	2,320
Total Consumption	27.4	21.1	13.0	292	10.2	15.0	22.2	22.6	30.4	40.3	33.5	27.4	25.3	288
†	+2.0	-50.6	-19.8	+8.4	0	+2.6	-16.0	+25.6	-14.3	-8.4	-27.9	+9.4	+39.4	-58.0
‡	45.0	44.6	43.2	44.5	42.2	42.8	42.0	42.0	43.3	51.8	39.4	37.4	42.4	43.0
††	8.20	3.22	.81	56.05	.99	1.54	.94	5.59	3.73	8.78	.86	5.95	8.06	48.67

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 5 near Gunter, Tex. Drainage Area 0.50 mi²
~~Continuous~~ staff gage ratio —. Date of last sediment survey —.
 Maxima: gage height, 19.1 ft; outflow, 14.8 ft³/s; surface area, 9.2 acres; contents, 63.8 acre-feet; on Sept. 25, 1974.
 Minima: gage height, 16.5 ft; surface area, 7.2 acres; contents, 42.4 acre-feet; on Aug. 25, 1974.
 Maximum inflow, — ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —.
 Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow \downarrow	46.9	7.4	1.1	46.2	1.9	3.7	1.3	36.4	12.3	78.9	0.9	8.2	97.1	296
Total Outflow	45.9	7.0	0	44.7	0	2.3	0.1	27.9	15.0	81.4	2.8	0	96.3	279
Total Consumption	5.1	3.8	2.2	55.4	1.7	3.2	4.1	4.3	6.0	6.4	5.8	5.1	5.1	52.8
†	+1.9	-1.1	-0.5	0	+0.8	-0.7	-2.3	+8.2	-6.4	-1.1	-7.2	+7.0	+2.2	+0.8
‡	8.4	8.3	8.3	8.3	8.3	8.3	8.2	8.1	8.3	8.4	7.8	7.5	8.3	8.2
††	8.55	3.35	.82	56.83	.91	1.58	.85	5.72	3.34	8.55	.80	6.23	9.15	49.85

\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, — ft³/s)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 6 near Gunter, Tex. Drainage Area 1.99 mi²

Continuous staff gage records ratio — Date of last sediment survey —

Maxima: gage height, 27.7 ft; outflow, 33.4 ft³/s; surface area, 58.2 acres; contents, 498 acre-feet; on June 7, 1974.

Minima: gage height, 17.9 ft; surface area, 24.2 acres; contents, 130 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow <u>1/</u>	239	153	10.0	1,650	8.6	19.8	0.5	210	66.6	495	0.4	48.3	194	1,450
Total Outflow	286	174	8.5	1,620	5.6	14.7	1.8	137	98.3	530	0	13.7	201	1,470
Total Consumption	15.9	11.8	5.9	165	4.0	7.8	8.6	14.2	18.4	19.8	20.9	18.3	16.0	162
†	-43.1	-24.5	-2.6	+1.6	+1.6	+0.8	-8.1	+71.8	-42.6	-27.1	-18.9	+29.2	-1.9	-66.0
‡	27.2	26.8	26.1	26.6	26.1	26.1	26.0	24.3	26.7	29.4	25.2	24.7	27.0	26.5
††	8.55	3.35	.82	56.83	.91	1.58	.85	5.72	3.34	8.55	.80	6.23	9.15	49.85

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 7 near Gunter, Tex. Drainage Area 1.28 mi²
Staff gage ratio — Date of last sediment survey —

Maxima: gage height, 21.0 ft; outflow, 23.0 ft³/s; surface area, 44.5 acres; contents, 32.6 acre-feet; on June 7, 1974.

Minima: gage height, 13.0 ft; surface area, 17.8 acres; contents, 89.2 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Water year 1974
Total Inflow 1/	206	259	1.2	1,060	7.5	9.2	1.8	90.1	16.8	315	.2	23.7	106	803
Total Outflow	188	61.4	1.4	994	.6	3.1	0	78.7	17.3	319	0	5.0	95.6	770
Total Consumption	12.7	9.5	6.0	135	5.3	7.3	8.8	10.1	13.3	16.8	13.9	13.3	12.0	129
†	+16.3	-39.0	-5.0	-2.0	+3.2	+4	-5.5	+11.7	-10.6	+2	-11.4	+15.8	+7.7	-16.2
‡	22.0	20.8	20.1	20.9	20.0	20.2	20.0	20.2	20.4	23.8	19.0	18.8	21.0	22.3
††	6.00	3.50	.75	38.19	.98	.95	.93	5.82	1.89	9.11	1.46	6.32	5.51	43.22

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 8-B near Gunter, Tex. Drainage Area 1.25 mi²

Continuous ~~water stage~~ ^{staff-gage} recorder: ratio — Date of last sediment survey —

Maxima: gage height, 22.2 ft; outflow, 19.3 ft³/s; surface area, 31.0 acres; contents, 224 acre-feet; on June 7, 1974.

Minima: gage height, 13.3 ft; surface area, 10.4 acres; contents, 56.0 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct.	Nov.	Dec.	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow 1/	12.3	12.1	8.8	12.60	11.1	25.1	15.2	16.8	31.3	29.1	0.9	70.8	204	1,070
Total Outflow	16.4	14.3	11.7	1,240	6.8	22.5	14.8	13.0	64.9	29.2	0	50.0	207	1,100
Total Consumption	7.9	6.2	2.9	79.6	2.7	3.7	6.0	6.3	8.5	10.7	7.9	6.9	8.7	78.4
†	-41.1	-24.6	-4.8	-	1.2	+ 2.9	+ 5	- 4.3	+ 38.2	- 34.7	- 2.1	- 5.6	+ 19.7	- 3.1
†	12.9	12.9	11.7	12.5	11.6	11.7	11.7	11.9	12.0	13.6	11.0	11.1	13.4	12.1
††	6.90	3.12	1.06	46.02	1.35	1.59	1.32	6.28	2.39	6.53	1.54	6.28	7.43	45.79

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 9 near Celina, Tex. Drainage Area 0.58 mi²
~~Continuous~~ Staff gage ratio — Date of last sediment survey —
 Maxima: gage height, 18.7 ft; outflow, 17.6 ft³/s; surface area, 20.9 acres; contents, 98.0 acre-feet; on June 7, 1974.
 Minima: gage height, 12.1 ft; surface area, 5.6 acres; contents, 15.8 acre-feet; on Aug. 25, 1974.
 Maximum inflow, — ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —.
 Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow <u>1</u>	78.1	25.6	2.6	694	3.1	5.6	1.3	96.9	48.8	152	2	11.2	134	559
Total Outflow	94.8	30.6	2.8	680	1.2	3.9	.6	79.9	59.6	155	0	2.7	134	565
Total Consumption	5.2	3.8	2.3	48.4	1.8	2.4	3.8	4.2	6.1	6.7	4.9	4.1	5.6	51.1
†	-16.7	-6.7	-1.9	-.3	+.9	+.1	-2.2	+17.6	-15.2	-2.6	-3.9	+7.7	+3	-22.6
†	8.5	8.0	7.5	7.9	7.3	7.4	7.3	7.8	8.6	9.0	6.5	6.0	9.0	7.7
††	6.90	3.12	1.06	46.02	1.35	1.59	1.32	6.28	2.39	6.53	1.54	6.28	7.43	45.79

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

Little Elm Creek subwatershed No. 11 near Gunter, Tex. Drainage Area 1.17 mi²
1974 WATER YEAR

Continuous Staff gage ratio — Date of last sediment survey —

Maxima: gage height, 17.2 ft; outflow, 97.5 ft³/s; surface area, 39.7 acres; contents, 198 acre-feet; on June 7, 1974.

Minima: gage height, 9.8 ft; surface area, 10.6 acres; contents, 24.5 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow <u>1</u>	682	256	6.8	3,130	2.7	8.7	2.1	31.0	190	910	.4	47.8	181	2,320
Total Outflow	664	282	9.9	3,080	.1	3.4	.4	24.8	182	909	0	33.0	174	2,280
Total Consumption	12.4	8.9	4.5	118	3.5	5.0	7.8	7.6	12.2	14.6	11.6	9.9	10.5	108
†	+14.1	-31.3	-6.7	0	+2	+1.4	-5.0	+5.6	-2.3	+3	-9.6	+12.6	+4.1	-16.6
‡	17.7	16.6	14.4	16.0	14.0	14.0	13.9	13.6	15.7	17.4	13.0	12.6	15.8	14.9
††	6.00	3.50	.75	42.87	.98	.95	.93	5.82	1.87	9.11	1.46	6.32	5.51	43.20

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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

Little Elm Creek subwatershed No. 12 near Celina, Tex. Drainage Area 1.62 mi²
1974 WATER YEAR

Staff gage ratio — Date of last sediment survey —

Maxima: gage height, 19.2 ft; outflow, 14.7 ft³/s; surface area, 38.4 acres; contents, 316 acre-feet; on June 7, 1974.

Minima: gage height, 9.4 ft; surface area, 13.9 acres; contents, 64.0 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec.	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow \downarrow	262	64.4	2.3	1,400	6.5	16.7	1.8	30.2	9.0	359	0.9	38.4	116	907
Total Outflow	321	61.1	7.0	1,370	.9	9.4	2.2	14.7	15.5	354	.3	19.6	108	914
Total Consumption	11.4	7.8	5.3	108	4.5	6.0	8.0	8.0	10.2	15.0	12.7	10.4	9.5	109
†	-60.2	+ .3	-9.1	- .30	+2.3	+2.5	-7.2	+15.1	-14.2	+4.9	-10.3	+16.8	+5.7	-53.4
‡	18.9	16.2	15.5	16.6	15.2	15.5	15.3	15.2	15.6	21.0	14.9	14.6	16.3	16.2
††	6.7	3.32	.76	40.05	1.01	1.01	.89	5.72	1.72	8.63	1.40	6.03	5.35	42.01

\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, — ft³/s)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 17 near Celina, Tex. Drainage Area 2.17 mi²

Continuous water-stage recorder: ratio —. Date of last sediment survey —.

Maxima: gage height, 21.2 ft; outflow, 19.8 ft³/s; surface area, 58.9 acres; contents, 417 acre-feet; on June 7, 1974.

Minima: gage height, 14.7 ft; surface area, 30.5 acres; contents, 123 acre-feet; on Aug. 25, 1974.

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

Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct.	Nov.	Dec.	Calendar year <u>1973</u>	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year <u>1974</u>
Total Inflow <u>✓</u>	<u>155</u>	<u>170</u>	<u>1.5</u>	<u>1,870</u>	<u>37.7</u>	<u>17.0</u>	<u>4.3</u>	<u>132</u>	<u>12.9</u>	<u>392</u>	<u>0.7</u>	<u>35.4</u>	<u>138</u>	<u>1,100</u>
Total Outflow	<u>263</u>	<u>162</u>	<u>0</u>	<u>1,770</u>	<u>25.2</u>	<u>3.7</u>	<u>0</u>	<u>104</u>	<u>20.7</u>	<u>380</u>	<u>0</u>	<u>0</u>	<u>128</u>	<u>1,090</u>
Total Consumption	<u>21.9</u>	<u>16.9</u>	<u>10.6</u>	<u>237</u>	<u>8.8</u>	<u>17.8</u>	<u>18.1</u>	<u>18.5</u>	<u>23.7</u>	<u>29.2</u>	<u>24.0</u>	<u>20.2</u>	<u>21.4</u>	<u>231</u>
†	<u>108</u>	<u>0</u>	<u>-6.8</u>	<u>-2.8</u>	<u>+7.2</u>	<u>-.7</u>	<u>-11.7</u>	<u>+26.1</u>	<u>-28.5</u>	<u>+5.9</u>	<u>-20.1</u>	<u>+27.9</u>	<u>+2.9</u>	<u>-106</u>
‡	<u>37.7</u>	<u>37.0</u>	<u>35.8</u>	<u>36.9</u>	<u>35.5</u>	<u>35.7</u>	<u>35.5</u>	<u>35.5</u>	<u>35.8</u>	<u>40.6</u>	<u>33.4</u>	<u>32.5</u>	<u>37.0</u>	<u>36.0</u>
††	<u>6.88</u>	<u>2.54</u>	<u>.77</u>	<u>44.86</u>	<u>1.17</u>	<u>1.27</u>	<u>.72</u>	<u>5.33</u>	<u>1.02</u>	<u>6.59</u>	<u>1.17</u>	<u>4.77</u>	<u>4.68</u>	<u>36.91</u>

✓ 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

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1974 WATER YEAR

Little Elm Creek subwatershed No. 18-A near Celina, Tex. Drainage Area 1.05 mi²
~~Continuous~~ Staff gage ratio — Date of last sediment survey —
Maxima: gage height, 17.6 ft; outflow, 18.2 ft³/s; surface area, 16.2 acres; contents, 140 acre-feet; on June 7, 1974
Minima: gage height, 14.4 ft; surface area, 11.5 acres; contents, 96.6 acre-feet; on Sept. 12, 1974
Maximum inflow, — ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —
Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct.	Nov.	Dec.	Calendar year 1973	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1974
Total Inflow 1/	190	148	16.4	1,210	15.5	17.6	11.2	140	46.7	147	0.3	2.1	152	887
Total Outflow	232	150	14.6	1,200	12.4	13.4	6.2	123	60.9	146	0	0	141	900
Total Consumption	8.0	6.4	4.6	78.7	4.0	5.1	7.0	7.3	8.6	9.0	9.6	8.5	7.3	85.4
†	-39.0	-4.3	-1.9	-.9	+3.3	+1.1	-1.3	+18.8	-20.0	-.7	-8.3	-1.7	+13.2	-44.8
‡	13.3	13.1	12.9	13.0	12.9	12.9	12.8	13.0	12.9	13.0	12.2	11.7	12.1	12.7
††	9.58	4.17	.81	55.81	1.11	.96	.66	7.88	2.63	6.24	.98	4.85	9.28	49.15

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, — ft³/s)

Date	Time	Discharge	Date	Time	Discharge

ANNUAL SUMMARY

Continuous Little Elm Creek subwatershed No. 19 near Celina
Staff-gage
water-sound recorder ratio — Date of last sediment survey —

Minima : gage height, 8.3 ft; surface area, 22.3 acres; contents, 95.0 acre-feet; on Jan. 26, 1974 and Apr. 20, 1974

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

Averages: _____ water years, (_____): inflow, _____ acre-feet/year; outflow, _____ inches/year; rainfall, _____ inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct.	Nov.	Dec.	Calendar year 1973			Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1974
Total Inflow J/	281	175	4.4	1,680	25.8	33.7	2.0	153	4.0	126	2.4	1.6	276	1,080		
Total Outflow	342	174	46.1	1,650	26.4	5.0	20.3	56.5	27.1	127	0	0	236	1,060		
Total Consumption	24.8	19.0	11.5	251	7.8	10.5	14.3	14.9	24.3	25.3	29.2	18.6	20.0	22.0		
†	-58.0	-4.9	-50.0	-47.5	-5.4	+21.3	-30.8	+96.3	-41.4	+7	-21.7	-5.8	+42.1	-57.6		
†	42.5	39.0	32.2	37.9	25.0	26.8	27.6	28.3	37.2	37.6	33.2	30.5	34.7	32.9		
††	8.58	4.10	1.00	54.83	1.31	1.18	.71	6.96	2.28	7.16	1.43	4.69	7.95	47.35		

- ✓ 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.

[illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

Little Elm Creek subwatershed No. 20 near Celina, Tex. Drainage Area 2.06 mi²
Staff gage ratio — Date of last sediment survey —
Maxima: gage height, 20.4 ft; outflow, 21.4 ft³/s; surface area, 52.6 acres; contents, 339 acre-feet; on Oct. 13, 1973 and Apr. 22, 1974.
Minima: gage height, 14.3 ft; surface area, 23.5 acres; contents, 117 acre-feet; on Aug. 25, 1974.
Maximum inflow, — ft³/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on —.
Averages: — water years, (—); inflow, — acre-feet/year; outflow, — acre-feet/year; rainfall, — inches/year.

Pool water budget, in acre-feet, water year October 1973 to September 1974.

	Oct	Nov	Dec	Calendar year 1973	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Water year 1974
Total Inflow <u>1</u>	413	143	7.5	2,110	12.9	7.0	4.3	214	15.5	236	0.3	8.5	366	1,430
Total Outflow	522	141	1.5	2,060	4.1	1.2	0	206	7.4	234	0	0	336	1,450
Total Consumption	22.0	15.0	10.5	184	9.3	11.8	14.0	18.0	20.1	22.6	24.6	18.5	17.4	204
†	-109	-3.4	-1.7	-1.5	+3.1	-2.8	-8.0	+9.4	-7.5	+6	-20.2	-7	+30.9	-109
‡	33.4	28.9	28.2	29.2	28.2	28.0	27.4	30.1	27.8	29.7	26.0	24.0	27.4	28.3
††	8.58	4.10	1.00	54.69	1.31	1.17	.71	6.96	2.28	7.16	1.43	4.69	7.95	47.34

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, — ft³/s)

Date	Time	Discharge	Date	Time	Discharge

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA Little Elm Creek

1974 WATER YEAR

RAIN GAGE

Date of storm	1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R	Aug.								
October 5	.10	.05	.10			.10		.10	.19	.28									
6	1.14	1.05	1.40	.60	.84	1.40	.40	.80	.64	1.01									
10								.08	.13										
11	1.57	1.80	1.88	1.50	1.76	1.88	2.86	1.32	1.78	1.39									
12-13	1.61	1.60	2.07	1.90	2.15	1.25	2.70	2.50	1.54	.99									
15	.37	.37	.32			.21	1.50	.43	.40	.10									
27	1.11	1.00	1.30		.75	.60	.56	.70	.82	.67									
30	1.44	1.44	1.48	2.00	1.40	1.44	1.56	1.65	1.32	1.32									
October total	7.34	7.31	8.55	6.00	6.90	6.88	9.58	7.58	6.82	5.76	7.27								
November 4	.56	.70	.75	.75	1.00	.90	1.80	2.00	1.22	.60									
20	.94	.98	.90	1.25	.90	.80	1.03	.90	.81	.69									
22	.04	.05	.10																
24	.88	.97	1.28	1.50	1.22	.80	1.34	1.08	.62	.65									
25-26	.12	.18	.32		.04			.05	.06	.07									
November total	2.54	2.88	3.35	3.50	3.12	2.54	4.17	4.03	2.76	2.01	3.09								
December 3	.31	.21	.10	.25	.38	.30	.34	.30	.37	.17									
19	.45	.56	.72	.50	.48	.47	.47	.87	.60	.26									
20										.08									
21					.20			.03		.02									
December total	.76	.77	.82	.75	1.06	.77	.81	1.20	.97	.53	.84								
1973 Calendar Year total											50.12								
January 10	.18	(.1)	.03	.11				.05											
15	.40	(.2)			.05			.05											
19	.52	(.4)	.36	.60	.57	.82	.57	.67	.56	.13									
26	.31	(.3)	.27	.27	.34	.22	.34	.33	.21	.08									
27	.20	(.2)	.25		.39	.13	.20	.42	.27	.06									
29									.04										
January total	1.61	(1.2)	.91	.98	1.35	1.17	1.11	1.57	1.08	.27	1.12								
February 18	.22	.17	.15	.15	.18	.07	.03	.02											
21	1.27	1.25	1.43	.80	1.41	1.20	.93	1.37	1.08	.60									
February total	1.49	1.42	1.58	.95	1.57	1.27	.96	1.39	1.08	.60	1.23								

() 1/6 to 2/3 no rainfall record from gage 2-R, estimated by averaging gages 1-S and 3-S.

RAINFALL DATA SUMMARY

RAIN GAGE

-45-

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

STUDY AREA Little Elm Creek RAINFALL DATA SUMMARY RAIN GAGE 1974 WATER YEAR

Date of storm	1-5	2-8	3-5	4-5	5-5	6-8	7-5	8-5	9-8	10-8	Aug.
August 1		.06		.13	.30	.21				.11	
2	.08	.10	.50						.07		
6	.10	.09	.15	.05	.05	.04					
8	.03						.75				
10	1.46	1.15	.48	1.30	1.47	1.55	1.62	2.29	1.63	1.17	
22	1.03	.75			.10	.30	.40				
25			.45	.99	.35			.10		1.59	
26	1.33	1.67	2.00	3.27	2.46	2.29	2.35	2.14	1.19	1.81	
29	.79	1.40	2.65	.60	1.55	.38	.23			.70	
August total	4.82	5.22	6.23	6.32	6.28	4.77	4.85	4.53	2.89	4.88	5.08
September 2	.26	.24	.80	.68	.30	.15	.22	.03		.40	
9-10	.23	.28	.50	.44	.65		.48	.37	.23	.20	
12-13	1.99	1.31	1.65	.61	1.71	.40	1.60	1.02	.33	.56	
16	.91	.82	.20	.26	.05	.40	.80	.38	2.38	1.02	
17	.74	.29	2.25	.90	1.56	1.14	2.24	1.85	.17	.18	
20-21	.49	.36	.60	.71	.89	.65	1.68	.72	.96	.30	
24	.21	.20	.15	.08	.10	.13	.10	.08			
24-25	1.71	1.78	3.00	1.83	2.17	1.81	2.16	2.17	2.11	1.23	
September total	6.54	5.28	9.15	5.51	7.43	4.68	9.28	6.62	6.18	3.89	6.46
1974 Water Year Total											43.18

Storm period October 11, 1973

Creek subwatershed No.

10 near

Gunter

, Tex. D.A.

.2.10 sq mi

[illegible]

comp.	RMS
check	JMT

Sheet 1 of 1
Comp. by: RMS
Date Nov. 17, 1975
Check by JMT
Date 11/21/75

WEIGHTED PRECIPITATION RECORD

[illegible]

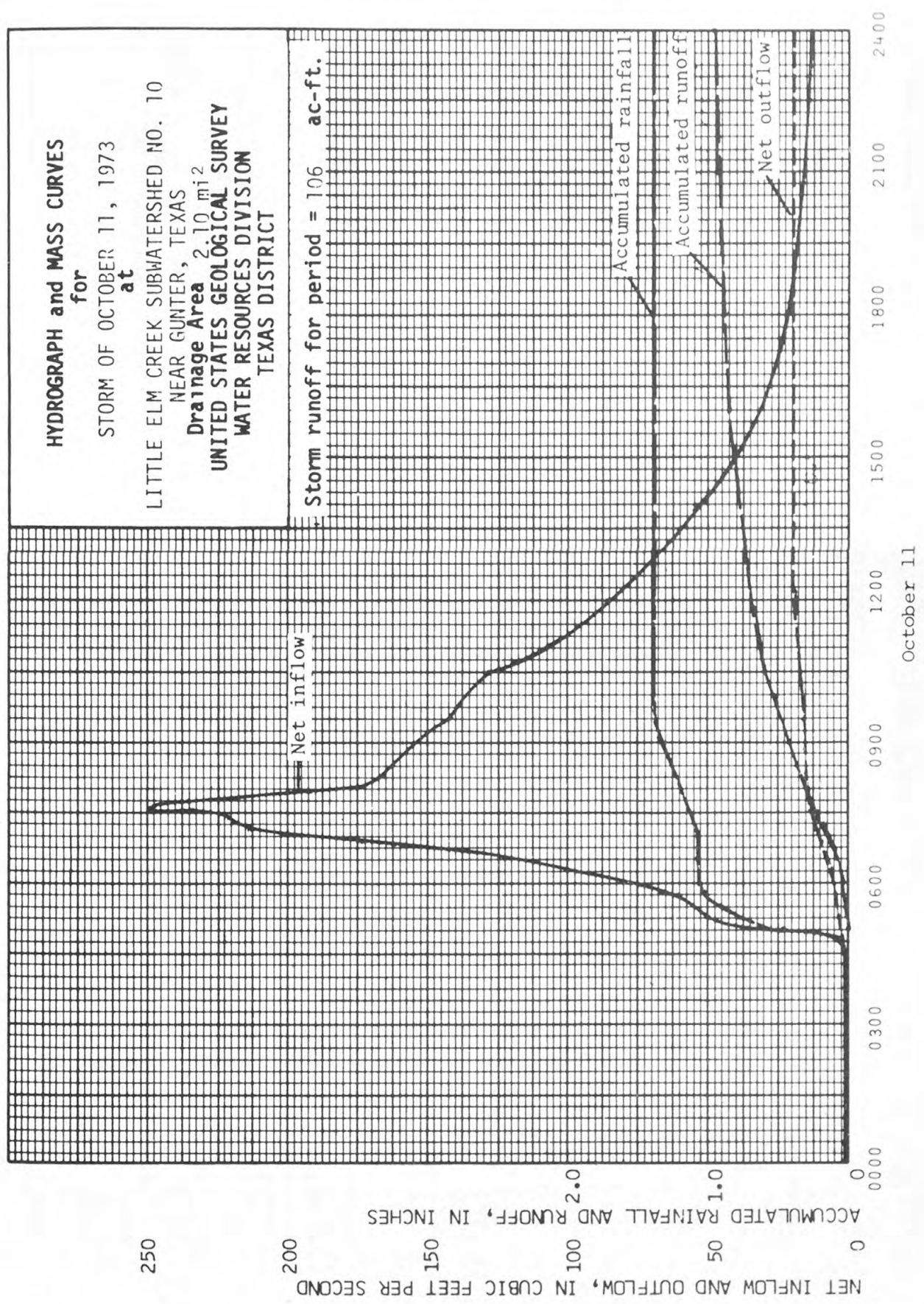
HYDROGRAPH and MASS CURVES for

STORM OF OCTOBER 11, 1973
at

LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS

Drainage Area 2.10 mi²
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 106 ac-ft.



INFLOW AND OUTFLOW COMPUTATIONS

Storm period Oct. 30, 197308052630 Little Elm Creek subwatershed No. 10 near Bunter, Tex. D.A. 2.10 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 cfs	Rate cfs	in/hr	in	Acc in
October 30															
0000	20.33	170.02													
1230	20.29	168.64	12.5	- 1.38	- 1.3	20.30	1.4	+ 0.1					0.1	.0001	.0012
1300	20.30	168.98	.50	+ .34	+ 8.2	20.30	1.4	9.6	.10	34.4	.29	7.0	2.6	.0019	.0022
1400	20.31	169.33	1.0	.35	4.2	20.30	1.4	5.6	.06	34.4	.17	2.1	3.5	.0026	.0048
1645	20.31	169.33	2.75	0	0	20.31	1.5	1.5					1.5	.0011	.0030
1700	20.36	171.07	.25	1.74	84.2	20.34	1.9	86.1	.51	34.7	1.47	71.1	15.0	.0111	.0028
30	20.42	173.17	.50	2.10	50.8	20.39	2.5	53.3	.17	35.1	.50	12.1	41.2	.0304	.0152
1800	20.51	176.38	.50	3.21	77.7	20.46	3.5	81.2	.07	35.7	.21	5.1	76.1	.0562	.0281
30	20.65	181.52	.50	5.14	124.	20.58	5.7	130.	.10	36.6	.30	7.3	123.	.0908	.0454
45	20.76	185.66	.25	4.14	200.	20.70	8.4	208.	.02	37.6	.06	2.9	205.	.1513	.0378
1900	20.89	190.67	.25	5.01	242.	20.82	11.2	253.	.04	38.6	.13	6.3	247.	.1823	.0456
10	21.00	195.02	.167	4.35	316.	20.94	12.4	328.	.17	39.5	.56	40.7	287.	.2118	.0354
15	21.05	197.04	.083	2.02	293.	21.02	12.9	306.	.03	40.2	.10	14.5	292.	.2155	.0179
20	21.10	199.07	.083	2.03	295.	21.08	13.4	308.	.01	40.8	.03	4.4	304.	.2244	.0106
30	21.19	202.80	.167	3.73	271.	21.14	13.7	285.					285.	.2103	.0351
45	21.31	207.90	.25	5.10	247.	21.25	14.4	261.	.03	42.5	.11	5.3	256.	.1889	.0472
2015	21.53	217.64	.50	9.74	236.	21.42	15.3	251.	.01	44.2	.04	1.0	250.	.1845	.0922
45	21.72	226.42	.50	8.78	212.	21.62	16.3	228.					228.	.1683	.0842
2130	21.95	237.54	.75	11.12	179.	21.84	17.4	196.					196.	.1446	.1084
2200	22.06	243.05	.50	5.51	133.	22.00	18.2	151.					151.	.1114	.0557
30	22.13	246.62	.50	3.57	86.4	22.10	18.7	105.					105.	.0775	.0388
2300	22.18	249.19	.50	2.57	62.2	22.16	19.0	81.2					81.2	.0599	.0300
2400	22.25	252.84	1.0	3.65	44.2	22.22	19.3	63.5					63.5	.0469	.0469
October 31															
0200	22.32	256.54	2.0	3.70	22.4	22.28	19.6	42.0					42.0	.0310	.0620
0400	22.35	258.14	2.0	+ 1.60	+ 9.7	22.34	19.9	29.6					29.6	.0218	.0436
0800	22.32	256.54	4.0	- 1.60	- 4.8	22.34	19.9	15.1					15.1	.0111	.0444
1200	22.26	253.37	4.0	- 3.17	- 9.6	22.29	19.6	10.0					10.0	.0074	.0296
1800	22.13	246.62	6.0	- 6.75	- 13.6	22.20	19.2	5.6					5.6	.0041	.0246
2400	21.99	239.52	6.0	- 7.10	- 14.3	22.06	18.5	4.2					4.2	.0031	.0186

comp RWS
check JMT

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

WEIGHTED-PRECIPITATION RECORD

[illegible]

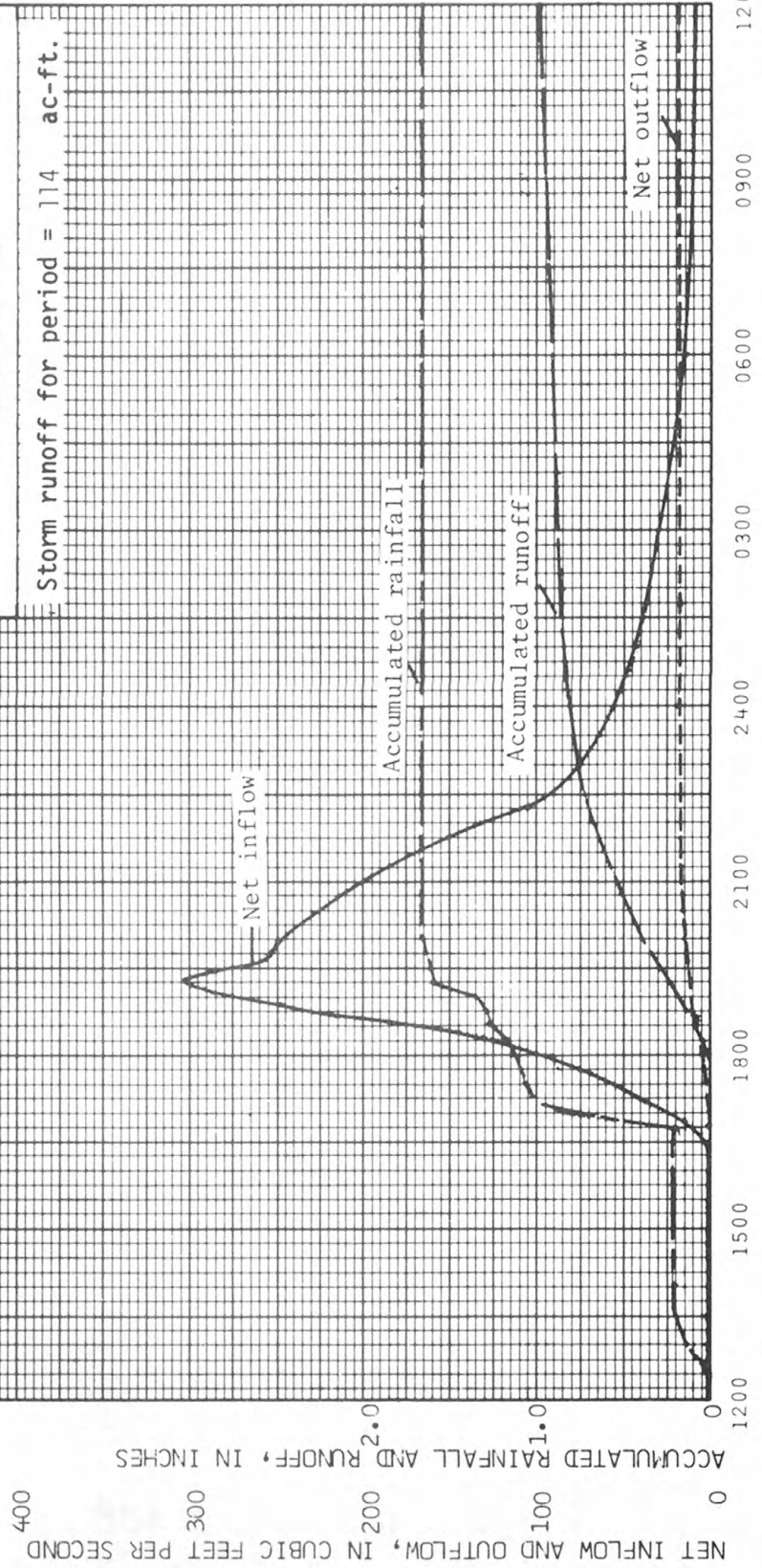
HYDROGRAPH and MASS CURVES

for
STORM OF OCTOBER 30, 1973

at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS

Drainage Area 2.10 mi²
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 114 ac-ft.



WEIGHTED-PRECIPITATION RECORD

[illegible]

HYDROGRAPH and MASS CURVES

for

STORM OF SEPTEMBER 24-25, 1974

at

LITTLE ELM CREEK SUBWATERSHED NO. 10

NEAR GUNTER, TEXAS

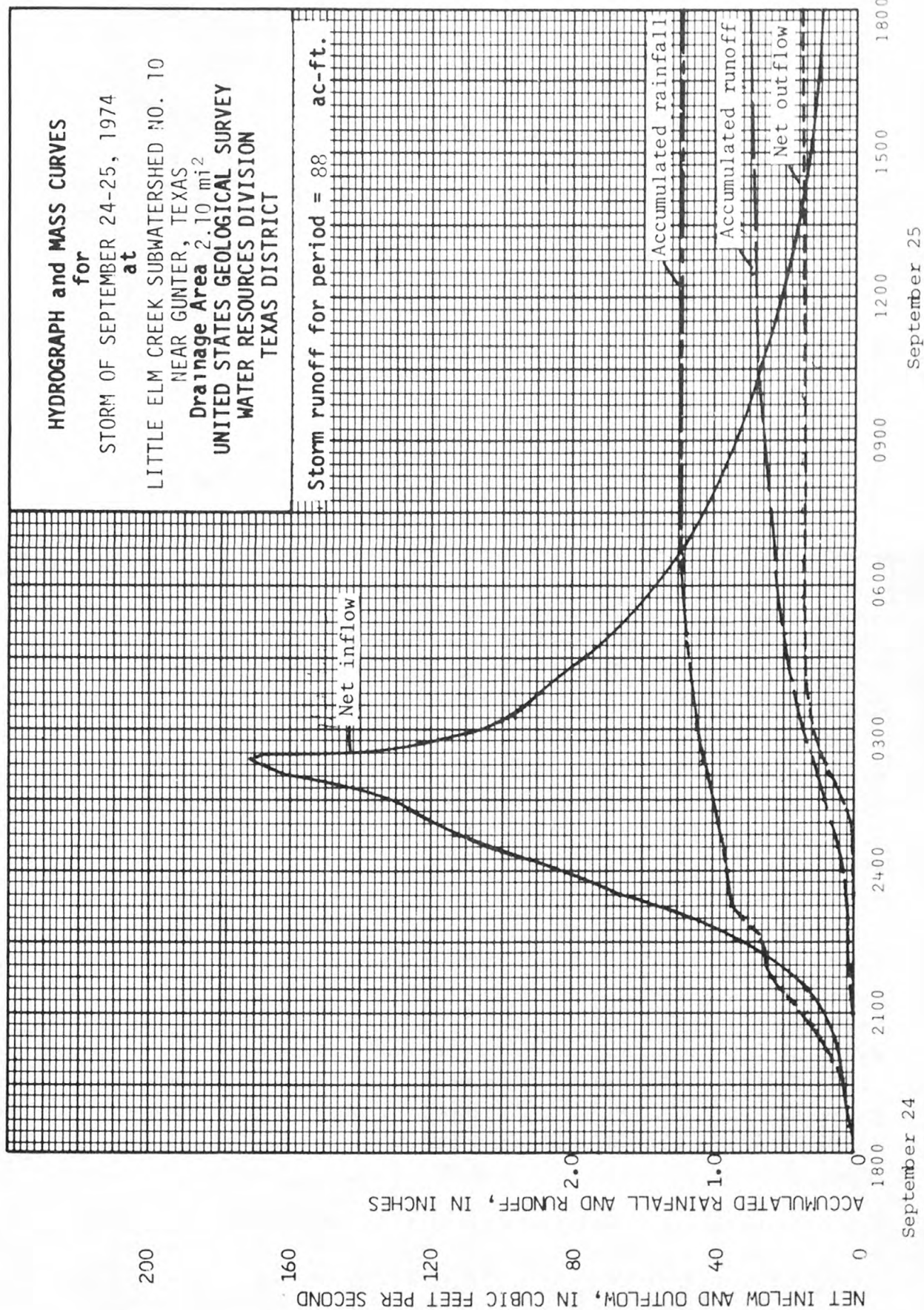
Drainage Area 2.10 mi²

UNITED STATES GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

TEXAS DISTRICT

Storm runoff for period = 88 ac-ft.



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, TexPeriod of Record October 30 - November 2, 1973 Drainage Area 46.7 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In.
October 30, 1973							
0000	4.09	0	369.5	.0012	.0057	.0057	
0930	3.96		291.3	.0010	.0065	.0122	
1300	3.95		294.5	.0010	.0022	.0144	
1400	3.97		303	.0010	.0015	.0159	
1600	4.36		504	.0017	.0034	.0193	
1800	4.82		782.25	.0026	.0029	.0222	
15	5.02		93.5	.0031	.0008	.0230	
30	5.29		114.5	.0038	.0010	.0240	
45	5.62		141.5	.0047	.0012	.0252	
1900	6.05		175.75	.0058	.0022	.0274	
30	7.35		289.1	.0096	.0048	.0322	
2000	8.85		470.1	.0156	.0078	.0400	
30	9.74		694.1	.0230	.0115	.0515	
2100	10.20		900.5	.0299	.0224	.0739	
2200	10.60		1,190.2	.0395	.0395	.1134	
2300	10.77		1,340.2	.0445	.0445	.1579	
2400	10.91	0	1,470.1	.0488	.0244	.1823	
October 31, 1973							
0000	10.91	0	1,470.1	.0488	.0244	.2067	
0100	10.98		1,530.2	.0508	.0508	.2575	
0200	10.89		1,450.2	.0481	.0481	.3056	
0300	10.70		1,280.2	.0425	.0425	.3481	
0400	10.48		1,090.3	.0362	.0543	.4024	
0600	10.02		810.4	.0269	.0538	.4562	
0800	9.58		639.4	.0212	.0424	.4986	
1000	9.17	0	534.6	.0177	.0531	.5517	
November 1, 1973							
0000	7.39	0	293.3	.0097	.0291	.7195	
0600	7.18		272.6	.0090	.0540	.7735	
1200	6.86		241.6	.0080	.0480	.8215	
1800	6.66		224.6	.0074	.0444	.8659	
2400	6.43	0	205.3	.0068	.0204	.8863	
November 2, 1973							
0000	6.43	0	205.3	.0068	.0204	.9067	
0600	6.16		184.6	.0061	.0366	.9433	
1200	5.79		154.6	.0051	.0306	.9739	
1800	5.45		127.6	.0042	.0252	.9991	
2400	5.23	0	109.3	.0036	.0108	1.0099	

Computed by JMT Date 12-17-74 Checked by RMS Date _____

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

WEIGHTED PRECIPITATION RECORD

[illegible]

HYDROGRAPH and MASS CURVES for

STORM OF OCTOBER 30, 1973
at

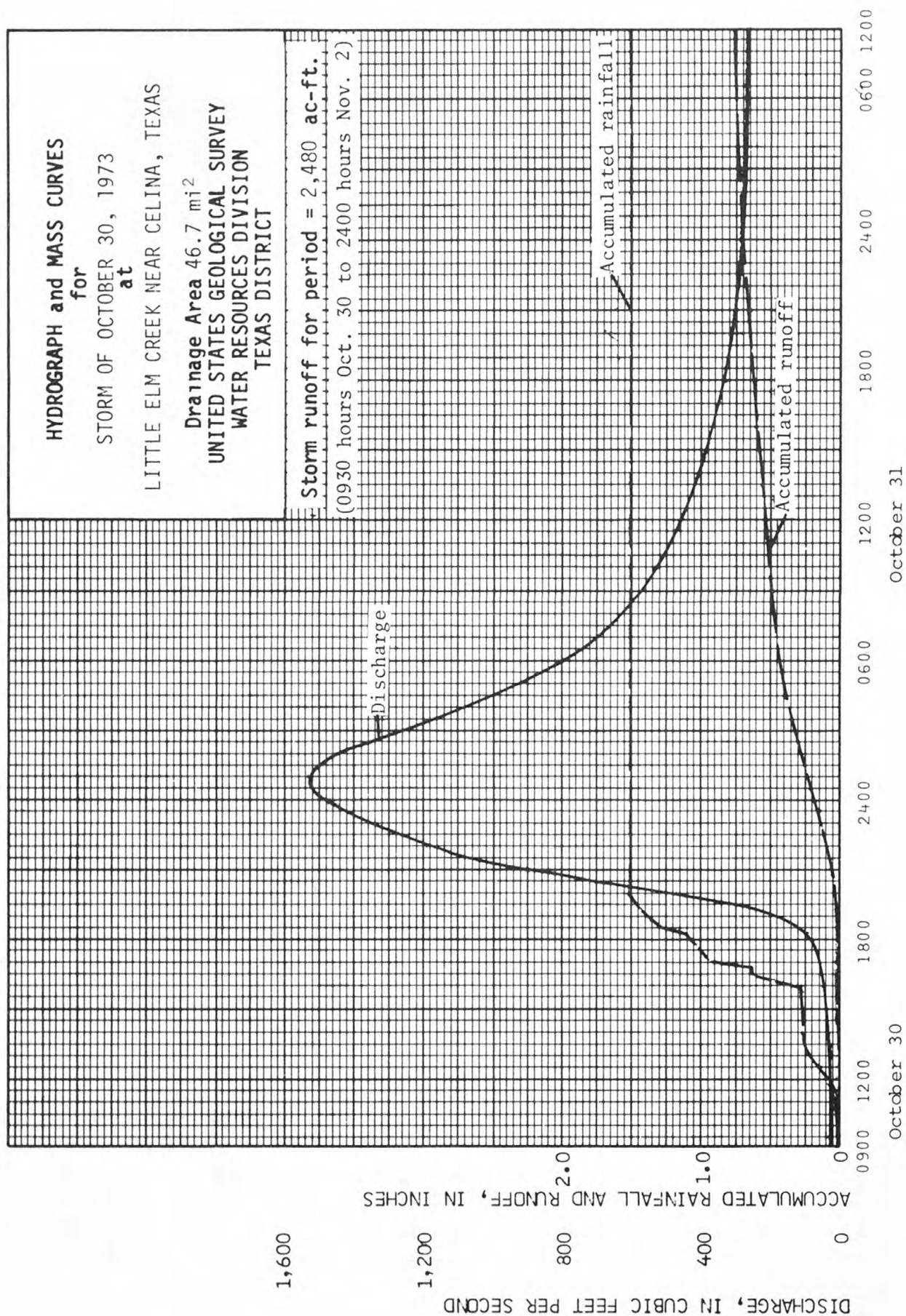
LITTLE ELM CREEK NEAR CELINA, TEXAS

Drainage Area 46.7 mi²

UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 2,480 ac-ft.

(0930 hours Oct. 30 to 2400 hours Nov. 2)



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.Period of Record April 21-23, 1974 Drainage Area 46.7 mi.²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In.
April 21, 1974							
0000	2.53	04	0.625	0	0	0	0
0615	2.53		0.14	0	0	0	0
1400	2.53		0.875	0	0	0	0
1500	2.55		0.2	0	0	0	0
1600	2.58	04	0.125	0	0	0	0
15	2.74	03	0.96	5	0	0	0
30	3.11	01	3.8	5	0.001	0.000	0.000
45	3.27	01	8.3	5	0.003	0.001	0.001
1700	3.77	01	22	5	0.007	0.002	0.003
15	5.51	09	125	5	0.041	0.010	0.013
30	6.75	15	219	5	0.073	0.018	0.031
45	7.79	19	314	5	0.104	0.026	0.057
1800	8.68	23	408	5	0.135	0.034	0.091
15	9.39	26	526	5	0.175	0.044	0.135
30	9.75	28	608	75	0.202	0.076	0.211
1900	10.03	29	694	1.5	0.230	0.172	0.383
2000	10.18	30	747	1.5	0.248	0.186	0.569
30	10.34	31	815	1	0.270	0.135	0.704
2100	10.47	32	875	1	0.290	0.145	0.849
30	10.49	33	880	1	0.292	0.146	0.995
2200	10.46	32	870	1.5	0.289	0.217	1.212
2300	10.37	31	830	1.5	0.275	0.206	1.418
30	10.35		820	1	0.272	0.136	1.554
2400	10.38	31	835	1.5	0.277	0.069	1.623
April 22, 1974							
0000	10.38	31	835	1.5	0.277	0.069	1.692
April 23, 1974							
0030	10.43	31	860	1	0.285	0.142	1.834
0100	10.50	33	885	1	0.294	0.147	1.981
30	10.48	34	870	1	0.289	0.144	2.125
0200	10.41	34	835	1	0.277	0.138	2.263
30	10.32	35	786	1	0.261	0.130	2.393
0300	10.19		731	1.5	0.243	0.182	2.575
0400	10.04	35	676	3	0.224	0.336	2.911
0600	9.63	33	565	4	0.188	0.376	3.287
0800	9.17	31	472	4	0.157	0.314	3.601
1000	8.61	28	391	5	0.130	0.325	3.926
1300	7.57	24	287	6	0.095	0.285	4.211
1600	6.88	21	225	7	0.075	0.262	4.473
2000	6.49	19	195	8	0.065	0.260	4.733
2400	6.27	18	178	4	0.059	0.118	4.851
April 23, 1974							
0000	6.27	18	178	1	0.059	0.177	5.028
0600	6.04	17	161	2	0.053	0.318	5.346
1200	5.83	16	145	2	0.048	0.288	5.634
1800	5.54	15	122	2	0.040	0.240	5.874
2400	5.29	14	103	1	0.034	0.102	5.976

Computed by JMTDate 12-17-74Checked by RMS & THH

Date _____

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

 Sheet 1 of 1
 Comp. by: JmT
 Date: 11/14/75
 Check by: CTS + RMS
 Date: 11/24/75

WEIGHTED PRECIPITATION RECORD

Study Area <u>Little Elm Creek near Celina, Tex.</u>		Date of storm <u>April 21-22, 1974</u>										Accumulated	
Date & Time	Weight Factor	Precipitation in Inches for Recording Rain Gages										Accumulated	
		Gage 1-5 Recorded	Gage 2-8 Recorded	Gage 1-3 Recorded	Gage 4-8 Recorded	Gage 10-12 Recorded	Gage 13-15 Recorded	Gage 16-18 Recorded	Gage 19-21 Recorded	Gage 22-24 Recorded	Gage 25-27 Recorded	Weighted Precipitation Recording Gages (Rec. Gages x K)	Weighted Precipitation All Gages
<u>April 21</u>													
0000	0	0	0	0	0	0	0	0	0	0	0	0	0
1445	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	.03	.01	.34	.04	.17	.07						.12	.14
15	.40	.18	.35	.05	.18	.08						.29	.34
30	.46	.21	.35	.05	.19	.08						.34	.39
45	.47	.21	.35	.05	.19	.08						.34	.39
1600	.48	.22	.58	.08	.48	.20						.50	.58
15	.73	.33	1.35	.18	1.09	.46						.97	1.12
30	1.21	.54	1.70	.22	1.31	.55						1.31	1.52
45	1.51	.68	1.82	.24	1.40	.59						1.51	1.75
1700	1.59	.72	1.89	.25	1.42	.60						1.57	1.82
15	1.61	.72	1.94	.25	1.43	.60						1.57	1.82
30	1.65	.74	1.98	.26	1.44	.60						1.60	1.85
1800	1.73	.78	2.04	.27	1.47	.62						1.67	1.93
30	1.80	.81	2.14	.28	1.60	.67						1.76	2.04
1900	1.89	.85	2.16	.28	1.61	.68						1.81	2.09
2000	1.95	.88	2.20	.29	1.63	.68						1.85	2.14
2245	1.95	.88	2.20	.29	1.63	.68						1.85	2.14
2300	1.95	.88	2.48	.32	1.96	.82						2.02	2.34
15	2.23	1.00	2.50	.32	1.96	.82						2.14	2.48
2400	2.24	1.01	2.51	.33	1.96	.82						2.16	2.50
<u>April 22</u>													
0100	2.24	1.01	2.52	.33	2.02	.85						2.19	2.53
30	2.47	1.11	2.52	.33	2.03	.85						2.29	2.65
45	2.50	1.12	2.52	.33	2.03	.85						2.30	2.66
2400	2.50	1.12	2.52	.33	2.03	.85						2.30	2.66
Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation	Precipitation x Weight Factor	Precipitation	Precipitation x Weight Factor
1-5	.16	2.60	.42	7-5	.02	4.60	.09						
2-8	.13	2.50	.32	10-12	.12	2.03	.24						
3-5	.20	2.92	.58										
4-5	.14	2.53	.35										
5-5	.19	2.93	.56										
6-8	.04	2.52	.10										
WMR : Sum of Precipitation x Weight Factor													
K : WMR Total Recording Gages Weighted Precipitation :													
													WMR. 2.66
													2.66/2.30 = 1.157

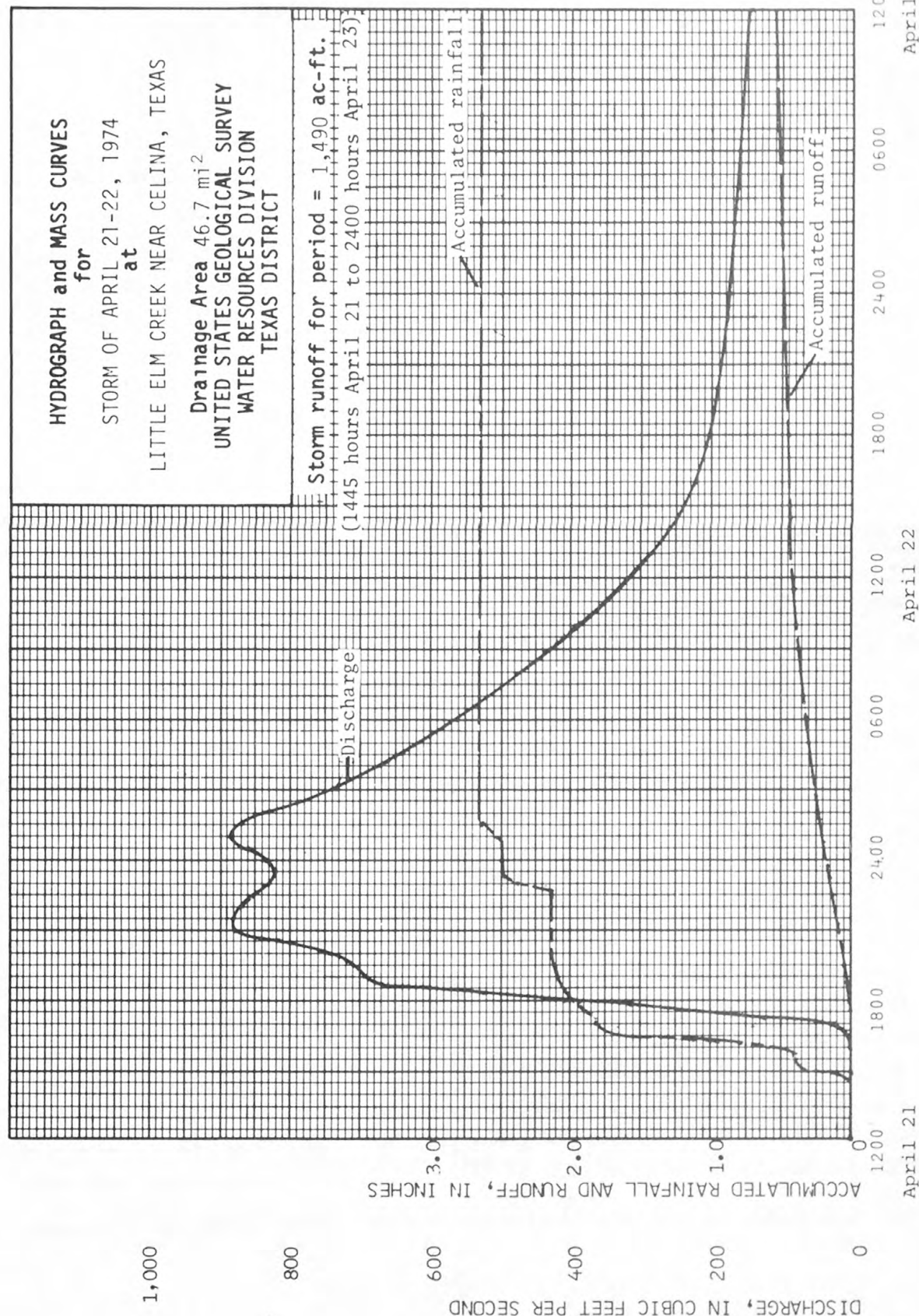
HYDROGRAPH and MASS CURVES for

STORM OF APRIL 21-22, 1974
at

LITTLE ELM CREEK NEAR CELINA, TEXAS

Drainage Area 46.7 mi²
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 1,490 ac-ft.
(1445 hours April 21 to 2400 hours April 23)



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.Period of Record September 24-27, 1974 Drainage Area 46.7 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In.				Ft ³ /s	Inc.	In/Hr.	Inches	Acc. In	
September 24, 1974																
0000	3.23	05	8.34	25	.0003	.0006	.0006	0600	11.05	0	1,600	2	.0531	.0531	.2723	
0415	3.20		7.71	19	.0003	.0028	.0034	0700	11.02		1,570	3	.0521	.0782	.3505	
1900	3.15		6.71	58	.0002	.0016	.0050	0900	10.74		1,320	4	.0438	.0876	.4381	
2000	3.19		7.51	15	.0002	.0002	.0052	1100	10.34		988	4	.0328	.0656	.5031	
30	3.27		9.27	15	.0003	.0001	.0053	1300	9.90		755	4	.0251	.0502	.5539	
45	3.36		11	.5	.0004	.0001	.0054	1500	9.52		621	4	.0206	.0412	.5951	
2100	3.51	05	16	.5	.0005	.0001	.0055	1700	9.14		528	5	.0175	.0438	.6389	
15	3.83	04	26	.5	.0009	.0002	.0057	2000	8.59		428	7	.0142	.0497	.6886	
30	4.18		42	.5	.0014	.0004	.0061	2400	7.94	0	348	4	.0116	.0232	.7118	
45	4.55	04	63	.5	.0021	.0005	.0066	September 26, 1974								
2200	5.11	03	102	.5	.0034	.0008	.0074	0000	7.94	0	348	3	.0116	.0348	.7466	
15	5.68	02	147	.5	.0049	.0012	.0086	0600	7.38		292	6	.0097	.0582	.8048	
30	6.24	01	191	.5	.0063	.0016	.0102	1200	7.08		262	6	.0087	.0522	.8570	
45	6.81	0	237	.5	.0079	.0020	.0122	1800	6.84	0	240	6	.0080	.0480	.9050	
2300	7.40		294	.5	.0098	.0024	.0146	2400	6.61	01	221	3	.0073	.0219	.9269	
15	7.97		351	.5	.0116	.0029	.0175	September 27, 1974								
30	8.34		392	.5	.0130	.0032	.0207	0000	6.61	01	221	3	.0073	.0219	.9488	
45	8.72		448	.5	.0149	.0037	.0244	0600	6.36		201	6	.0067	.0402	.9890	
2400	9.05	0	510	.25	.0169	.0021	.0265	1200	6.01		173	6	.0057	.0342	1.0232	
September 25, 1974								1800	5.67		145	6	.0048	.0288	1.0520	
0000	9.05	0	510	1	.0169	.0084	.0349	2400	5.43	01	126	3	.0042	.0126	1.0646	
0100	9.55		630	2	.0209	.0209	.0558									
0200	10.01		805	1.75	.0267	.0234	.0792									
45	10.41	0	1,040	2	.0345	.0345	.1137									
0400	10.87		1,430	2.25	.0475	.0534	.1671									
0500	11.02	0	1,570	2	.0521	.0521	.2192									

Computed by JMT Date 12-17-74 Checked by RMS + THH Date _____

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

 Sheet 1 of 1
 Comp. by: JMT
 Date: 11/14/75
 Check by: QTS g RMS
 Date: 11/25/75

WEIGHTED PRECIPITATION RECORD

Study Area		Accumulated Precipitation in Inches for Recording Rain Gages										Date of storm		September 24-25, 1974		Accumulated	
Weight Factor	Date & Time	Gage 45		Gage 13		Gage 10-R		Gage 10-R		Gage 10-R		Gage 10-R		Gage 10-R		Gage 10-R	
		Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor
September 24																	
	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0415	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0800	.07	.03	.04	.01	0	0	0	0	0	0	0	0	.04	.05	.04	.05
	1100	.19	.09	.09	.01	0	0	0	0	0	0	0	0	.10	.13	.10	.13
	1700	.20	.09	.10	.01	0	0	0	0	0	0	0	0	.10	.13	.10	.13
	1800	.22	.10	.17	.02	0	0	0	0	0	0	0	0	.12	.16	.12	.16
	1900	.30	.14	.27	.04	.04	.02	.04	.02	.04	.02	.04	.02	.20	.26	.20	.26
	30	.36	.16	.37	.05	.07	.03	.07	.03	.07	.03	.07	.03	.24	.32	.24	.32
	2000	.43	.19	.46	.06	.16	.07	.16	.07	.16	.07	.16	.07	.32	.42	.32	.42
	15	.49	.22	.56	.07	.20	.08	.20	.08	.20	.08	.20	.08	.37	.49	.37	.49
	30	.55	.25	.65	.08	.25	.10	.25	.10	.25	.10	.25	.10	.43	.56	.43	.56
	45	.62	.28	.75	.10	.30	.13	.30	.13	.30	.13	.30	.13	.51	.67	.51	.67
	2100	.72	.32	.84	.11	.34	.14	.34	.14	.34	.14	.34	.14	.57	.75	.57	.75
	15	.82	.37	.90	.12	.43	.18	.43	.18	.43	.18	.43	.18	.67	.88	.67	.88
	30	.90	.40	.92	.12	.52	.22	.52	.22	.52	.22	.52	.22	.74	.97	.74	.97
	45	.99	.45	.95	.12	.58	.24	.58	.24	.58	.24	.58	.24	.81	1.06	.81	1.06
	2200	1.02	.46	1.05	.14	.61	.26	.61	.26	.61	.26	.61	.26	.86	1.13	.86	1.13
	30	1.10	.50	1.16	.15	.66	.28	.66	.28	.66	.28	.66	.28	.93	1.22	.93	1.22
	2300	1.22	.55	1.18	.15	.78	.33	.78	.33	.78	.33	.78	.33	1.03	1.35	1.03	1.35
	2400	1.40	.63	1.31	.17	.82	.37	.82	.37	.82	.37	.82	.37	1.17	1.54	1.17	1.54
September 25																	
	0100	1.55	.70	1.53	.20	.96	.40	.96	.40	.96	.40	.96	.40	1.30	1.71	1.30	1.71
	0200	1.71	.77	1.71	.22	1.04	.44	1.04	.44	1.04	.44	1.04	.44	1.43	1.88	1.43	1.88
	0300	1.76	.79	1.76	.23	1.11	.47	1.11	.47	1.11	.47	1.11	.47	1.49	1.96	1.49	1.96
	0500	1.89	.85	1.87	.24	1.18	.50	1.18	.50	1.18	.50	1.18	.50	1.59	2.09	1.59	2.09
	0700	1.98	.89	1.94	.25	1.23	.52	1.23	.52	1.23	.52	1.23	.52	1.66	2.18	1.66	2.18
	2400	1.98	.89	1.94	.25	1.23	.52	1.23	.52	1.23	.52	1.23	.52	1.66	2.18	1.66	2.18
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	Rain Gage	Weight Factor
1-5	.16	1.92	.31	7-5	.07	2.26	.05	2.26	.05	2.26	.05	2.26	.05	2.26	.05	2.26	.05
2-R	.13	1.98	.26	10-R	.12	1.23	.15	1.23	.15	1.23	.15	1.23	.15	1.23	.15	1.23	.15
3-5	.20	3.15	.63														
4-5	.14	1.91	.27														
5-5	.19	2.27	.43														
6-R	.04	1.94	.08														
WMR : Sum of Precipitation x Weight Factor																	
K : WMR / Total Recording Gages Weighted Precipitation : 2.18 / 1.66 = 1.313																	

HYDROGRAPH AND MASS CURVES

for

STORM OF SEPTEMBER 24-25, 1974

at

LITTLE ELM CREEK NEAR CELINA, TEXAS

Drainage Area 46.7 mi²

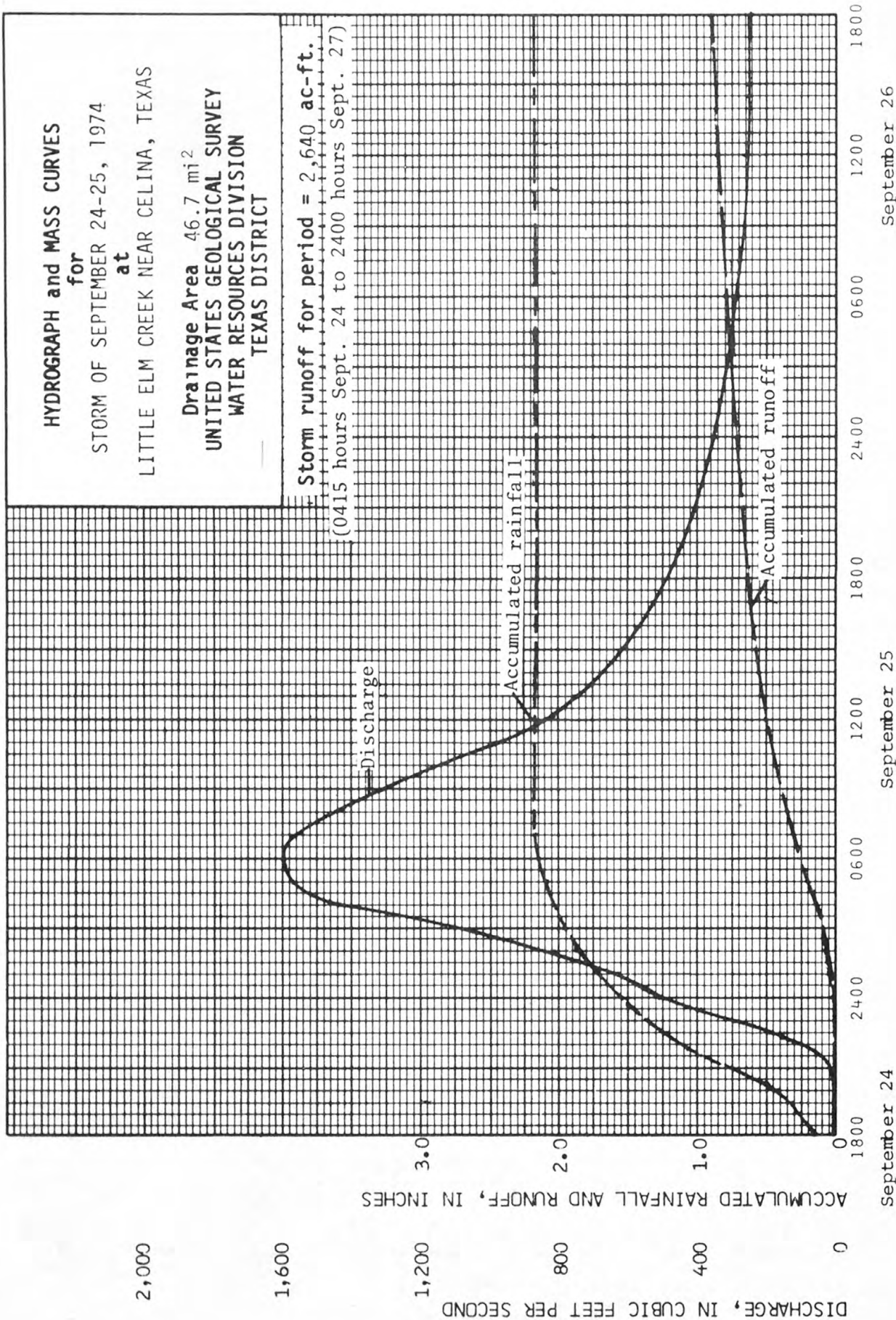
UNITED STATES GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

TEXAS DISTRICT

Storm runoff for period = 2,640 ac-ft.

(0415 hours Sept. 24 to 2400 hours Sept. 27)



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.Period of Record October 30 - November 2, 1973 Drainage Area 25.5 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In.				Ft ³ /s	Inc.	In/Hr.	Inches	Acc. In.	
October 30, 1973																
0000	6.59	06	43.4	0.0009	0.0018	0.0018		1600	14.08	24	1,250	3	0.0257	0.0386	0.4055	
0400	6.50	08	399.5	0.0008	0.0038	0.0056		1800	13.84	26	1,100	4	0.0226	0.0432	0.4507	
0930	6.38	11	35.8	0.0007	0.0028	0.0084		2000	13.45	26	890	4	0.0183	0.0366	0.4873	
1200	6.37	11	344.5	0.0007	0.0016	0.0100		2200	12.99	26	712	4	0.0146	0.0292	0.5165	
1400	6.42	11	35.4	0.0007	0.0014	0.0114		2400	12.57	26	588	2	0.0121	0.0121	0.5286	
1600	6.50	08	39.3	0.0008	0.0012	0.0126		November 1, 1973								
1700	6.71	04	49.2	0.0010	0.0010	0.0136		0000	12.57	26	588	1	0.0121	0.0121	0.5407	
1800	7.38	0	79.2	0.0016	0.0016	0.0152		0200	12.20	26	509	3	0.0104	0.0312	0.5719	
1900	8.12	0	116.2	0.0024	0.0024	0.0176		0600	11.62	16	407	5	0.0084	0.0420	0.6139	
2000	9.46	0	196.2	0.0040	0.0040	0.0216		1200	11.16	04	340	6	0.0070	0.0420	0.6559	
2100	10.64	0	285.2	0.0059	0.0059	0.0275		1800	10.84	0	304	6	0.0062	0.0372	0.6931	
2200	11.46	12	378.3	0.0078	0.0117	0.0392		2400	10.48	0	270	3	0.0055	0.0165	0.7096	
2400	12.41	26	549.2	0.0113	0.0113	0.0505		November 2, 1973								
October 31, 1973								0000	10.48	0	270	3	0.0055	0.0165	0.7261	
0000	12.41	26	549.2	0.0113	0.0113	0.0618		0600	10.15		246	6	0.0051	0.0306	0.7567	
0200	12.81	26	656.4	0.0135	0.0270	0.0888		1200	9.76		217	6	0.0045	0.0270	0.7837	
0400	13.10	26	751.4	0.0154	0.0308	0.1196		1800	9.25		182	6	0.0037	0.0222	0.8059	
0600	13.42		876.4	0.0180	0.0360	0.1556		2400	8.66	0	144	3	0.0030	0.0090	0.8149	
0800	13.75		1,040.3	0.0214	0.0321	0.1877										
0900	13.89	26	1,130.3	0.0232	0.0348	0.2225										
1100	14.11	22	1,250.3	0.0257	0.0386	0.2611										
1200	14.16	20	1,280.2	0.0263	0.0263	0.2874										
1300	14.19	19	1,290.15	0.0265	0.0199	0.3073										
30	14.20	19	1,300.1	0.0267	0.0134	0.3207										
1400	14.19	19	1,290.15	0.0265	0.0199	0.3406										
1500	14.15	21	1,280.2	0.0263	0.0263	0.3669										

Computed by JMT Date 12/11/74 Checked by RMS Date _____

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

WEIGHTED PRECIPITATION RECORD

Study Area Little Elm Creek near Aubrey, Tex.Date of storm October 30, 1973

Sheet 1 of 1
Comp. by: JMT
Date: 11/13/75
Check by: CTS & RMS
Date: 11/24/75

Date & Time	Accumulated Precipitation in Inches for Recording Rain Gages				Accumulated			
	Weight Factor	Gage Recorded x Factor	Gage Recorded x Factor	Gage Recorded x Factor	Weighted Precipitation	Recording Gages (Rec. Gages x K)	All Gages	All Gages
<u>October 30</u>	<u>.294</u>	<u>Gage 2-R</u>	<u>.345</u>	<u>Gage 9-R</u>	<u>.273</u>	<u>Gage Recorded x Factor</u>	<u>Gage Recorded x Factor</u>	<u>Gage Recorded x Factor</u>
0000	0	0	0	0	0	0	0	0
0930	0	0	0	0	0	0	0	0
1000	.05	.01	.05	.02	.05	.02	.03	.03
1100	.07	.02	.10	.03	.13	.01	.06	.06
1200	.11	.03	.10	.03	.31	.03	.09	.10
30	.23	.07	.24	.08	.37	.03	.18	.19
1300	.27	.08	.29	.10	.41	.04	.25	.27
1400	.28	.08	.31	.11	.41	.04	.27	.29
1500	.28	.08	.32	.11	.42	.04	.27	.29
45	.29	.09	.32	.11	.45	.04	.28	.30
1600	.30	.09	.33	.11	.46	.04	.28	.30
15	.68	.20	.47	.16	.62	.05	.45	.49
30	.91	.27	.58	.20	.84	.07	.58	.63
45	.96	.28	.63	.22	.91	.08	.62	.67
1700	.99	.29	.66	.23	.96	.08	.78	.84
15	1.03	.30	.71	.24	.96	.08	.81	.91
30	1.05	.31	.73	.25	.96	.08	.84	.94
45	1.07	.31	.80	.28	.98	.09	.87	.99
1800	1.09	.32	.80	.28	1.02	.09	.91	.99
15	1.10	.32	.90	.31	1.21	.11	.93	.99
30	1.33	.39	1.31	.45	1.23	.11	1.01	1.07
45	1.37	.40	1.35	.47	1.25	.11	1.03	1.33
1900	1.42	.42	1.37	.47	1.26	.11	1.07	1.36
2000	1.44	.42	1.44	.50	1.28	.11	1.32	1.39
2300	1.44	.42	1.44	.50	1.32	.12	1.32	1.50
2400	1.44	.42	1.44	.50	1.32	.12	1.32	1.51
WMR : Sum of Precipitation x Weight Factor								
WMR : Total Recording Gages Weighted Precipitation								
K : WMR								
WMR : 1.51								
WMR : 1.40								
WMR : 1.079								

HYDROGRAPH and MASS CURVES

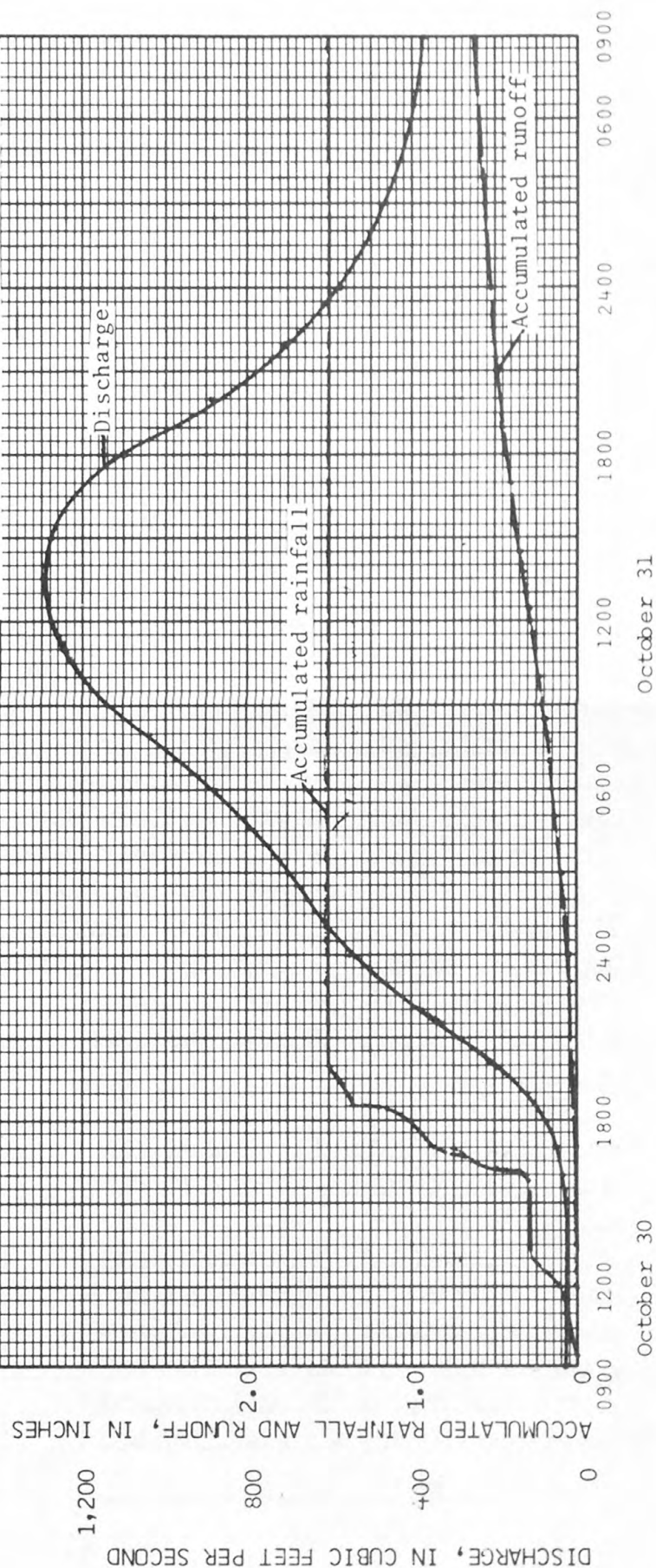
for
STORM OF OCTOBER 30, 1973
at

LITTLE ELM CREEK NEAR AUBREY, TEXAS

Drainage Area 75.5 mi²

UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 3,250 ac-ft.
(0930 hours Oct. 30 to 2400 hours Nov. 2)



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.Period of Record April 21-23, 1974 Drainage Area 75.5 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In
April 21, 1974							
0000	4.40	24	.01625	.0000	.0000	.0000	
0615	4.40	24	.0116				
1600	4.41	24	.0110				
15	4.59	27	.235	.0000			
30	4.97		3.5	.5	.0001		
45	5.47	27	9.0	.5	.0002	.0000	.0000
1700	6.06	19	22	.5	.0005	.0001	.0001
15	6.58	07	42	.5	.0009	.0002	.0003
30	7.10	0	66	.75	.0014	.0005	.0008
1800	7.84		102	.75	.0021	.0008	.0016
15	8.28		124	.5	.0025	.0006	.0022
30	9.20		178	.75	.0037	.0014	.0036
1900	10.79	0	299	1.5	.0061	.0046	.0082
2000	12.04	26	485	3	.0100	.0150	.0232
2200	12.78	1	647	4	.0133	.0266	.0498
2400	13.21	26	790	2	.0162	.0162	.0660
April 22, 1974							
0000	13.21	26	790	1	.0162	.0081	.0741
0100	13.47		898	2	.0184	.0184	.0925
0200	13.70		1,010	3	.0207	.0310	.1235
0400	13.92	26	1,150	3	.0236	.0354	.1589
0500	14.02	25	1,210	2	.0248	.0248	.1837
0600	14.10	23	1,250	2	.0257	.0257	.2094
0700	14.16	21	1,290	2.5	.0265	.0331	.2425
0830	14.22	18	1,310	3	.0269	.0404	.2829
1000	14.21	18	1,300	3.5	.0267	.0467	.3296
April 23, 1974							
0000	11.78	20	437	1	.0090	.0135	.5615
0300	11.28	07	355	2	.0073	.0219	.5834
0600	10.81	0	301	3	.0062	.0279	.6113
1200	10.24		251	4	.0052	.0312	.6425
1800	9.80		220	4	.0045	.0270	.6695
2400	9.37	0	190	2	.0039	.0117	.6812

Computed by JMT Date 12/11/74 Checked by RMS & THH Date _____

Date & Time	Gage 2-R Recorded	x Factor	Gage 6-R Recorded	x Factor	Gage 9-R Recorded	x Factor	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Recording Gages (Rec. Gages x K) All Gages
April 21											
0000	0	0	0	0	0	0	0	0			0
1445	0	0	0	0	0	0	0	0			0
1500	.03	.01	.34	.12	.09	.01	.17	.05			.19
15	.40	.12	.35	.12	.10	.01	.18	.05			.30
30	.46	.14	.35	.12	.12	.01	.19	.05			.32
45	.47	.14	.35	.12	.13	.01	.19	.05			.32
1600	.48	.14	.58	.20	.14	.01	.48	.13			.48
15	.73	.21	1.35	.47	.91	.08	1.09	.30			1.05
30	1.21	.36	1.70	.59	1.80	.16	1.31	.36			1.47
45	1.51	.44	1.82	.63	2.06	.18	1.40	.38			1.63
1700	1.59	.47	1.89	.65	2.18	.19	1.42	.39			1.70
15	1.61	.47	1.94	.67	2.28	.20	1.43	.39			1.73
30	1.65	.48	1.98	.68	2.32	.20	1.44	.39			1.75
1800	1.73	.51	2.04	.70	2.40	.21	1.47	.40			1.82
30	1.80	.53	2.14	.74	2.56	.23	1.60	.44			1.94
1900	1.89	.56	2.16	.75	2.58	.23	1.61	.44			1.98
2000	1.95	.57	2.20	.76	2.62	.23	1.63	.44			2.00
2245	1.95	.57	2.20	.76	2.63	.23	1.63	.44			2.00
2300	1.95	.57	2.48	.86	3.18	.28	1.96	.53			2.24
15	2.23	.66	2.50	.86	3.19	.28	1.96	.53			2.33
2400	2.24	.66	2.51	.87	3.22	.28	1.96	.53			2.34
April 22											
0100	2.24	.66	2.52	.87	3.25	.29	2.02	.55			2.37
30	2.47	.73	2.52	.87	3.32	.29	2.03	.55			2.44
45	2.50	.74	2.52	.87	3.38	.30	2.03	.55			2.46
2400	2.50	.74	2.52	.87	3.38	.30	2.03	.55			2.91
Rain Gage	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor
1-S	.10	2.60	.26	7-5	.11	4.60	.51				
2-R	.09	2.50	.22	8-5	.12	3.05	.37				
3-S	.13	2.92	.38	9-R	.03	3.38	.10				
4-S	.09	2.53	.23	10-R	.08	2.03	.16				
5-S	.13	2.93	.38								
6-R	.12	2.52	.30								
WMR = Sum of Precipitation x Weight Factor											
K = WMR / Total Recording Gages Weighted Precipitation = 2.91 / 2.46 = 1.183											
WMR = 2.91											

HYDROGRAPH and MASS CURVES

for

STORM OF APRIL 21-22, 1974

at

LITTLE ELM CREEK NEAR AUBREY, TEXAS

Drainage Area 75.5 mi²

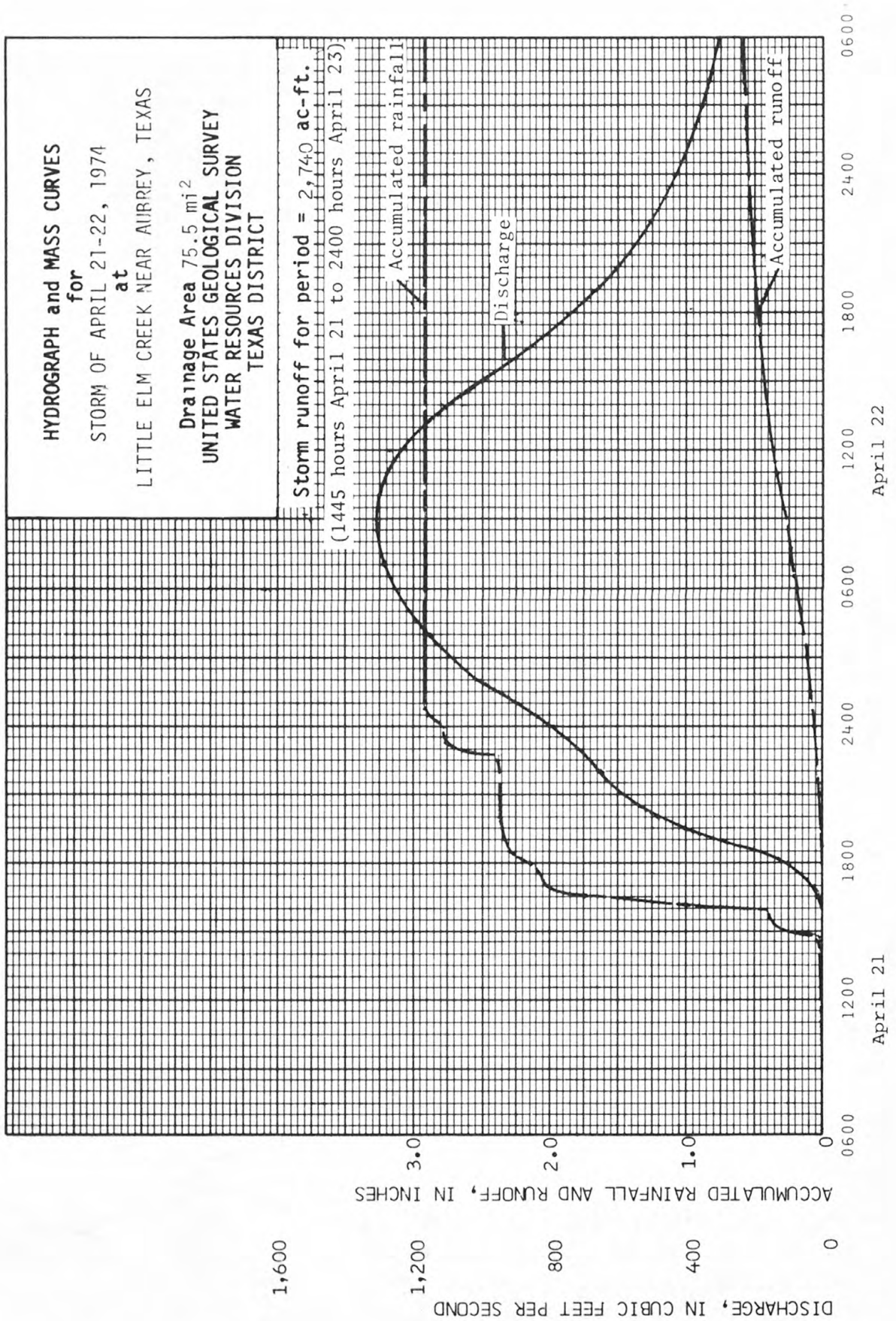
UNITED STATES GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

TEXAS DISTRICT

Storm runoff for period = 2,740 ac-ft.

(1445 hours April 21 to 2400 hours April 23)



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.Period of Record September 24-27, 1974 Drainage Area 25.5 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft ³ /s	Inc.	In/Hr	Inches	Acc. In.
September 24, 1974							
0000	6.35	1.18	8.62	1.25	.0002	.0004	.0004
0415	6.31	1.20	7.9	6	.0002	.0012	.0016
1200	6.27	1.22	7.17	3.25	.0001	.0007	.0023
1900	6.24	1.23	6.6	4	.0001	.0004	.0027
2000	6.26	1.22	7.0	1	.0001	.0001	.0028
2100	6.35	1.18	8.6	1	.0002	.0002	.0030
2200	6.42	1.14	10	1	.0002	.0002	.0032
2300	6.48	1.11	11	.75	.0002	.0002	.0034
30	6.53	1.09	13	.5	.0003	.0002	.0036
2400	6.71	1.00	18	.25	.0004	.0001	.0037
September 25, 1974							
0000	6.71	1.00	18	.5	.0004	.0002	.0039
0100	7.44	.64	54	.75	.0011	.0008	.0047
30	8.17	.33	102	.5	.0021	.0010	.0057
0200	8.95	.21	149	.75	.0031	.0023	.0080
0300	10.48	0	270	1	.0055	.0055	.0135
0400	11.53	†.14	390	1.5	.0080	.0120	.0255
0600	12.67	†.26	614	2	.0126	.0252	.0507
0800	13.11	†.26	759	3	.0156	.0468	.0975
1200	13.75	†.26	1,040	3	.0214	.0642	.1617
1400	14.24	†.18	1,330	2	.0273	.0546	.2163
1600	14.56	†.06	1,520	2	.0312	.0624	.2787
1800	14.71	†.02	1,630	1.25	.0335	.0419	.3206
30	14.72	†.02	1,640	.5	.0337	.0168	.3374
1900	14.71	†.02	1,630	.75	.0335	.0251	.3625
2000	14.69	†.02	1,610	1.5	.0331	.0496	.4121

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			Ft ³ /s	Inc.	In/Hr.	Inches	Acc. In.
2200	14.54	†.06	1,500	2	.0308	.0616	.4737
2400	14.30	†.15	1,360	1	.0279	.0279	.5016
September 26, 1974							
0000	14.30	†.15	1,360	1.5	.0279	.0418	.5434
0300	13.77	†.26	1,050	3	.0216	.0648	.6082
0600	13.07		740	3	.0152	.0456	.6538
0900	12.49		568	3	.0117	.0351	.6889
1200	12.04	†.26	485	4.5	.0100	.0450	.7339
1800	11.45	†.11	376	6	.0077	.0462	.7801
2400	11.03	†.01	324	3	.0067	.0201	.8002
September 27, 1974							
0000	11.03	†.01	324	3	.0067	.0201	.8203
0600	10.66	0	286	6	.0059	.0354	.8557
1200	10.32	0	259	6	.0053	.0318	.8875
1800	9.93	.03	227	6	.0047	.0282	.9157
2400	9.48	.07	192	3	.0039	.0117	.9274

Computed by JMT Date 12-11-74 Checked by RMS + THH Date _____

Date & Time	Gage 2-R		Gage 4-R		Gage 9-R		Gage 10-R		Gage Recorded		Gage Recorded		Recording Gages (Rec. Gages x K)	
	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	All Gages	All Gages
September 24														
0000	0	0	0	0	0	0	0	0					0	0
0415	0	0	0	0	0	0	0	0					0	0
0800	.07	.02	.04	.01	.04	.01	.04	.01					.03	.04
1100	.19	.06	.09	.03	.08	.03	.01	.01					.10	.12
1700	.20	.06	.10	.03	.11	.03	.01	.01					.10	.12
1800	.22	.06	.17	.06	.11	.06	.01	.01					.13	.16
1900	.30	.09	.28	.09	.13	.09	.01	.01					.20	.24
30	.36	.11	.37	.13	.20	.13	.02	.02					.28	.34
2000	.43	.13	.46	.16	.29	.16	.03	.03					.36	.44
15	.49	.14	.56	.19	.33	.22	.03	.03					.41	.50
30	.55	.16	.65	.22	.39	.26	.04	.04					.48	.58
45	.62	.18	.75	.26	.49	.29	.06	.06					.56	.68
2100	.72	.21	.84	.29	.63	.34	.07	.07					.65	.79
15	.82	.24	.90	.31	.70	.36	.08	.08					.73	.89
30	.90	.26	.92	.32	.77	.33	.07	.07					.79	.96
45	.99	.29	.95	.33	.82	.33	.07	.07					.85	1.03
2200	1.02	.30	1.05	.36	.89	.36	.08	.08					.91	1.10
30	1.10	.32	1.16	.40	.94	.40	.08	.08					.98	1.19
2300	1.22	.36	1.18	.41	1.03	.41	.09	.09					1.07	1.30
2400	1.40	.41	1.31	.45	1.33	.45	.12	.12					1.22	1.49
September 25														
0100	1.55	.46	1.53	.53	1.49	.53	.13	.13					1.38	1.67
0200	1.71	.50	1.71	.59	1.67	.59	.15	.15					1.52	1.84
0300	1.76	.52	1.76	.61	1.86	.61	.16	.16					1.59	1.93
0500	1.89	.56	1.87	.64	1.95	.64	.17	.17					1.69	2.05
0700	1.98	.58	1.94	.67	2.11	.67	.19	.19					1.78	2.16
2400	1.98	.58	1.94	.67	2.11	.67	.19	.19					1.78	2.16
Rain Gage	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation	Weight Factor	Precipitation
1-5	.10	1.92	.19		.11		.11		.25					
2-R	.09	1.98	.18		.12		.12		.27					
3-5	.13	3.15	.41		.03		.03		.06					
4-5	.09	1.91	.17		.08		.08		.10					
5-5	.13	2.27	.30											
6-R	.12	1.94	.23											
WMR : Sum of Precipitation x Weight Factor														
K = WMR / Total Recording Gages Weighted Precipitation :														
WMR : 2.16 / 1.78 = 1.213														2.16

HYDROGRAPH and MASS CURVES

for
STORM OF SEPTEMBER 24-25, 1974
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS

Drainage Area 75.5 mi²

UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 3,730 ac-ft.
(0415 hours Sept. 24 to 2400 hours Sept. 27)

DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES

Discharge

Accumulated rainfall

Accumulated runoff

September 24

September 25

September 26

2,000

1,600

1,200

800

400

0

1800

2400

0600

1200

1800

2400

0600

1200

1800

USGS LIBRARY - RESTON



3 1818 00484783 4