Hydrologic Data for Little Elm Creek, Trinity River Basin Texas, 1973

U. S. GEOLOGICAL SURVEY
Open-File Report

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

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

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

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U.S. Geological Survey
Federal Building
300 East 8th Street
Austin, TX 78701

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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, 1973, 1,587 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, 1973, is shown in table 1.

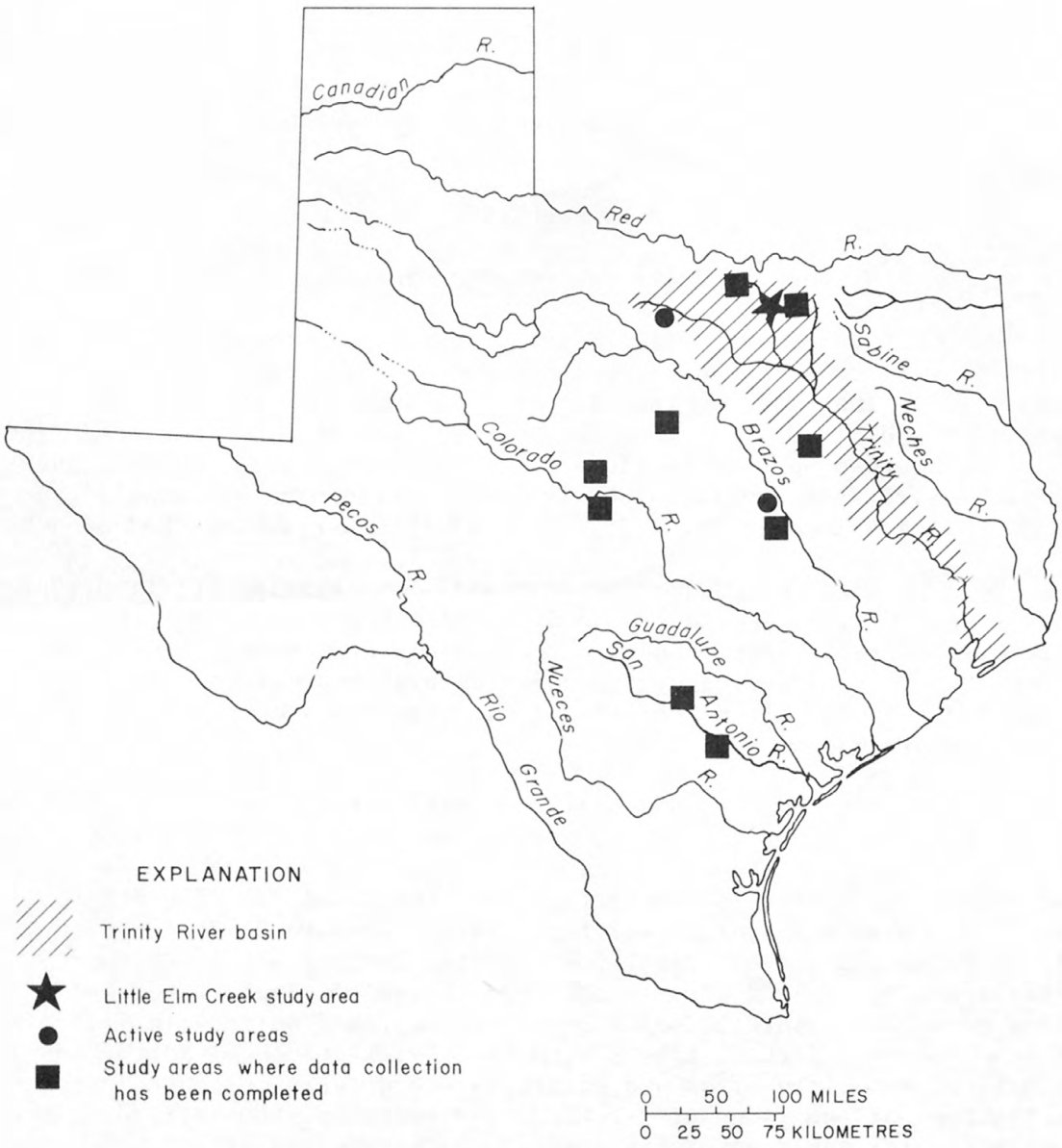

FIGURE 1.— Location of the Little Elm Creek study area and other study areas

Table 1.--Small watershed study areas in Texas as of September 30, 1973

Watershed	Drainage area above stream-gaging station (mi^2)	Data collection period	Floodwater-retarding structures above stream-gaging station	Period the structures were built
Trinity River basin:				
North Creek near Jacksboro	21.6	Aug. 1956 to	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
Brazos River basin:				
Green Creek near Alexander	46.1	Oct. 1954 to Sept. 1971	8	1954-56
Cow Bayou at Mooreville	85.0	Sept. 1954 to	26	1955-58, 64-65
1/Little Pond Creek at Burlington	22.2	Oct. 1962 to Sept. 1972	None	-
1/North Elm Creek near Cameron	48.6	Oct. 1962 to Sept. 1972	None	-
Colorado River basin:				
Mukewater Creek at Trickham	70.0	Aug. 1951 to Sept. 1973	6	1961-62, 65
Deep Creek near Mercury	43.9	June 1951 to Sept. 1971	5	1951-53
San Antonio River basin:				
Calaveras Creek near Elmendorf	77.2	Aug. 1954 to Sept. 1971	7	1954-58
Escondido Creek at Kenedy	a/72.4	July 1954 to Sept. 1971	11	1954-58, 73

1/ Adjacent watersheds; considered as one study area.
a/ 8.43 mi^2 above Escondido Creek subwatershed No. 11 (Dry Escondido Creek) near Kenedy not included in this total.

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	Abbreviation		Unit	Abbreviation
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	acre-ft	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 ojbectives:

1. To determine the net effect of floodwater-retarding structures on the regimen of streamflow at downstream points.

2. To determine the effectiveness of the structures as groundwater recharge facilities.

3. To determine the effect of the structures on the sediment yield at downstream points.

4. To develop relationships between maximum rates or volumes of runoff with rainfall in small natural watersheds.

5. To develop a stream-system model for basins with floodwater-retarding structures.

6. To determine the minimum instrumentation necessary for estimating the flood hydrographs below a system of structures, as needed for downstream water-management operation.

Purpose and Scope of this Basic-Data Report

This report, which is the fourteenth 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 1973 water year for the 75.5-mi^2 (195.5-km^2) 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.

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

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 mi^2 (195.5 km^2). Above the Celina stream-gaging station, the total area is 46.7 mi^2 (121.0 km^2).

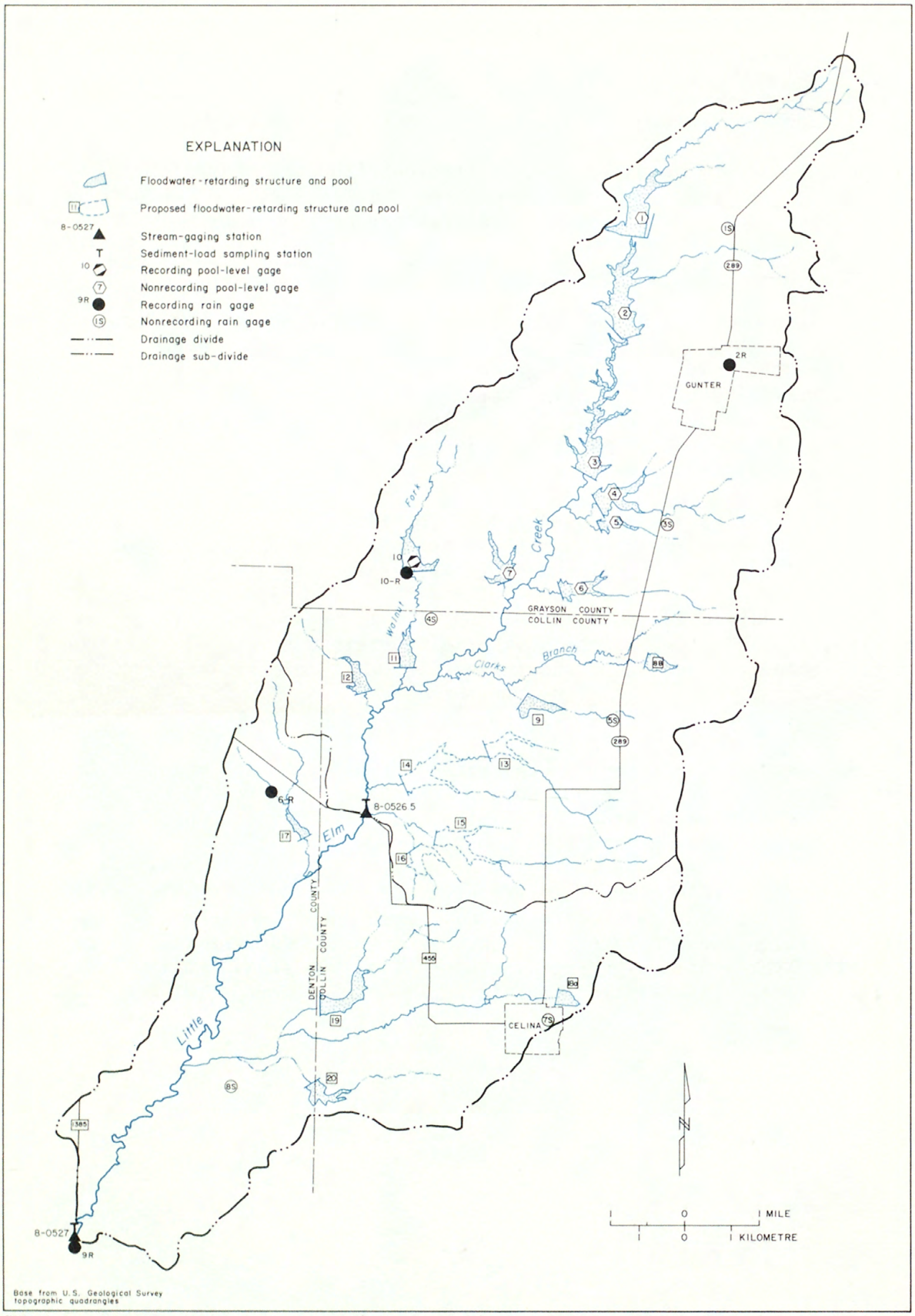

FIGURE 2.—Locations of floodwater-retarding structures (built and proposed) and hydrologic-instrument installations in the Little Elm Creek study area

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 9,490 acre-feet (11.7 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 12,340 acre-feet (15.2 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.

SUMMARY OF DATA FOR THE 1973 WATER YEAR

The average rainfall above the stream-gaging station Little Elm Creek near Aubrey (study area) during the 1973 water year was 49.66 inches (1,261 mm), or 133 percent of the 17-year (1957-73) average of 37.25 inches (946 mm) for the area. Monthly rainfall totals ranged from 0.68 inch (17 mm) in December to 8.20 inches (208 mm) in September. The weighted-mean rainfall above the stream-gaging station Little Elm Creek near Celina was 50.09 inches (1,272 mm). The weighted-mean rainfall above Little Elm Creek subwatershed No. 10 during the 1973 water year was 36.51 inches (927 mm).

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 constriction 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	(4) 12x18	15.47	251	None	--	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	None	a/ b/	12.00 14.00	118 203	None	--	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	None	--	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	--	--	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	None	--	--	None	--	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	None	--	--	None	--	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	--	None	--	--	12x36		12	7.77	15	18	9.63	6.8-32.7
9	.58	2-17-71	6- 8-71	638.25	60	23.2	220	2x4	16.25	55	--	None	--	--	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	--	--	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	--	None	--	--	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	--	None	--	--	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	--	None	--	--	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	--	None	--	--	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	--	None	--	--	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

Runoff above site 10 was 1,770 acre-feet (2.18 hm^3), which represents an equivalent depth of 15.80 inches (701 mm). The yearly mean discharge was 57.1 ft^3/s (1.62 m^3/s) at the stream-gaging station near Celina and 81.4 ft^3/s (2.31 m^3/s) at the stream-gaging station near Aubrey. At the Celina station, the annual runoff was 41,370 acre-feet (51.0 hm^3) or 16.61 inches (422 mm). The runoff for the year at the Aubrey station was 58,940 acre-feet (72.7 hm^3) or 14.64 inches (372 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 occurred January 2-3, July 30, and September 26-27, 1973. A summary of rainfall-runoff data for the three storms is shown in table 3.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1973 water year

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (ft^3/s)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
Little Elm Creek subwatershed No. 10 near Gunter, Tex. (Drainage area 2.10 mi^2)								
January 2-3, 1973	5.5	0.87	0.23	0.28	0.34	0.37	0.43	99.9
July 30, 1973	6.3	1.73	.44	.64	.92	.66	.38	327
September 26-27, 1973	8.5	2.80	.39	.56	1.11	1.78	.64	631
Little Elm Creek near Celina, Tex. (Drainage area, 46.7 mi^2 of which 28.4 mi^2 is above floodwater-retarding structures)								
January 2-3, 1973	7.5	1.16	.30	.36	.45	.26	.22	424
July 30, 1973	7.3	1.89	.34	.54	.83	.16	.08	271
September 26-27, 1973	8.5	4.49	.75	1.25	1.80	1.69	.38	3,420

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1973 water year--Continued

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (ft^3/s)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
Little Elm Creek near Aubrey, Tex. (Drainage area, 75.5 mi^2 of which 35.7 mi^2 is above floodwater-retarding structures)								
January 2-3, 1973	7.5	1.14	0.28	0.35	0.43	0.25	0.22	509
July 30, 1973	7.3	1.89	.41	.60	.84	.19	.10	416
September 26-27, 1973	8.8	4.34	.62	1.09	1.60	1.66	.38	3,650

C O M P I L A T I O N O F D A T A

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 (187.61 m) above mean sea level (Soil Conservation Service bench mark).

AVERAGE INFLOW.--7 years, 986 acre-ft/yr (1.22 hm³/yr).

AVERAGE OUTFLOW.--7 years, 883 acre-ft/yr (1.09 hm³/yr).

EXTREMES.--Current year: Maximum outflow, 24.5 ft³/s (0.694 m³/s) Sept. 27, gage height, 23.52 ft (7.17 m); no outflow most of time. Maximum inflow, 675 ft³/s (19.1 m³/s), average for 5-minute interval, May 6, computed and adjusted as below; no inflow at times.

Period of record: Maximum outflow, 31.9 ft³/s (0.903 m³/s) Apr. 30, 1966, gage height, 27.09 ft (8.26 m); no outflow most of time 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 (40-meter) wide emergency spillway at left end of dam, with crest at gage height 29.2 ft (8.9 m). Outlet structure is a 2.0- by 4.0-foot (0.6- by 1.2-meter) uncontrolled concrete drop-inlet structure with crest at gage height 20.00 ft (6.10 m) and connected to a 24-inch (610-millimeter) concrete pipe with invert at gage height 13.0 ft (4.0 m). There is also a 12-inch (305-millimeter) controlled slide gate used as a water-supply outlet that is connected to the drop inlet at gage height 13.5 ft (4.1 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 (49,320 m³) 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. 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 1972 TO SEPTEMBER 1973

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Inflow 1/	202	92.3	4.2	112	83.0	306	139	122	261	91.6	17.4	340
Outflow	82.8	96.7	.2	98.2	87.3	298	127	112	253	46.4	34.2	266
(†)	115	-9.8	-4.4	14.2	-9.8	4.3	2.0	-9.1	-.4	33.7	-41.1	57.9
(††)	5.60	2.64	.33	2.48	1.28	4.25	2.25	2.81	5.16	4.80	.58	4.33

CAL YR 1972: Inflow 352 Outflow 277 † -5.5 †† 24.14
WTR YR 1973: Inflow 1,770 Outflow 1,500 † 152 †† 36.51

PEAK INFLOW (BASE, 100 FT³/S)

DATE	TIME	DISCHARGE	DATE	TIME	DISCHARGE
10-22	about 0100	about *600	5- 6	2240	*675
3- 3	2340	*166	6- 3	0510	*211
3- 6	0945	*181	6- 5	0445	*204
3-10	0810	*472	7-30	0855	*327
3-24	2010	*304	9- 5	2125	*292
4-24	0400	*501	9-26	2055	*631

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

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets
8-0526.30

Monthly and ~~annual discharge~~ yearly weighted-mean rainfall, in inches, of Little Elm Creek Subwatershed No. 10 River at near Gunter, Tex.
[Drainage area, 2.10 square miles]

16—26489-5 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
				Station established April 1, 1966									
1966	-	-	-	-	-	-	11.14	0.71	1.92	4.44	6.89	3.29	-
1967	0.35	0.82	1.13	0.03	0.84	2.97	4.86	7.46	.84	.99	.29	4.64	25.22
1968	2.15	.44	1.82	2.73	1.31	5.09	3.94	4.99	3.41	2.03	1.90	7.24	37.05
1969	1.41	4.24	1.95	1.67	2.57	2.99	2.35	8.32	3.35	0	2.10	1.00	31.95
1970	4.10	.29	3.83	.81	4.50	2.11	7.42	2.80	.36	.20	3.20	6.73	36.35
1971	1.44	.26	.45	.59	.98	.10	1.60	3.55	.43	3.60	4.87	3.15	21.02
1972	4.90	3.74	5.09	0	.24	1.44	2.89	1.92	1.41	.30	3.25	4.12	29.30
1973	5.60	2.64	.33	2.48	1.28	4.25	2.25	2.81	5.16	4.80	.58	4.33	36.51

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0526.30

Monthly and ~~annual discharge~~ yearly net inflow, in acre-feet, of Subwatershed No. 10 Little Elm Creek River at near Gunter, Tex.

[Drainage area, 2.10 square miles] (revised)

16—26489-5 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL	
			Station established April 1, 1966											
1966	-	-	-	-	-	-	741.6	74.9	4.2	4.4	45.9	149.7	-	
1967	6.2	0.6	4.8	2.2	2.4	10.1	136.1	382.1	50.9	6.8	2.9	6.8	611.9	
1968	5.0	2.8	8.1	45.0	8.6	418	148	246	14.6	4.0	3.6	19.0	923	
1969	4.8	119	19.3	49.5	197	104	32.5	573	24.7	.7	1.2	4.9	1,130	
1970	12.8	1.9	129	1.4	262	230	571	105	14.9	0	0	128	1,460	
1971	7.9	4.6	2.1	3.8	2.5	4.3	1.6	39.8	3.4	8.8	42.2	37.3	158	
1972	210	214	372	0	2.8	2.6	9.1	3.4	0	.1	1.7	33.4	849	
1973	202	92.3	4.2	112	83.0	306	139	122	261	91.6	17.4	340	1,770	

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0526.30

Monthly and ~~annual discharge~~ yearly outflow, in acre-feet, of Little Elm Creek Subwatershed No. 10 River at near Gunter, Tex.

[Drainage area, 2.10 square miles]

16—26489-5 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
			Station established April 1, 1966										
1966	-	-	-	-	-	-	188.8	508.2	0	0	3.0	125.8	-
1967	10.6	0	0	0	0	0	101.5	74.8	396.3	0	0	0	583.2
1968	0	0	0	4.0	3.4	404	148	239	0	0	0	0	798
1969	0	90.2	23.1	31.4	202	106	9.4	579	10.1	0	0	0	1,050
1970	0	0	73.4	18.6	224	264	361	277	22.8	0	15.9	52.5	1,310
1971	1.6	0	0	0	0	0	2.7	0	0	52.8	5.5	0	62.6
1972	187	212	383	1.0	0	0	23.7	15.9	50.4	6.2	0	0	879
1973	82.8	96.7	.2	98.2	87.3	298	127	112	253	46.4	34.2	266	1,500

TX-74a
Rev. 2-74

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. Drainage Area 2.10 mi^2

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

Maxima: gage height, 23.52 ft; outflow, 24.5 ft^3/s; surface area, 65.7 acres; contents, 328 acre-feet; on Sept. 27, 1973.

Minima: gage height, 14.84 ft; surface area, 11.5 acres; contents, 52.5 acre-feet; on Oct. 20, 1972.

Maximum inflow, 675 ft^3/s (averaged for 5-min. interval and adjusted for rainfall on pool surface) on May 6, 1973.

Averages: 7 water years, (1967-73); inflow, 986 acre-feet/year; outflow, 883 acre-feet/year; rainfall, 31.05 inches/year.

Pool water budget, in acre-feet, water year October 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	202	92.3	4.2	352	112	83.0	306	139	122	261	91.6	17.4	340	1,770
Total Outflow	82.8	96.7	0.2	277	98.2	87.3	298	127	112	253	46.4	34.2	266	1,500
Total Consumption	13.5	13.2	9.3	117	6.5	9.1	17.0	17.0	26.9	24.4	24.5	25.8	28.7	216
†	+11.5	- 9.8	- 4.4	- 5.5	+14.2	- 9.8	+ 4.3	+ 2.0	- 9.1	- 0.4	+33.7	-41.1	+57.9	+152
‡	18.3	33.8	31.9	———	34.0	33.8	36.2	34.1	34.1	35.4	31.4	31.8	36.4	———
††	5.60	2.64	0.33	24.14	2.48	1.28	4.25	2.25	2.81	5.16	4.80	0.58	4.33	36.51

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 ft^3/s)

Date	Time	Discharge	Date	Time	Discharge
Oct. 22	about 0100	about 600	May 6	2240	675
Mar. 3	2340	166	June 3	0510	211
Mar. 6	0945	181	June 5	0445	204
Mar. 10	0810	472	July 30	0855	327
Mar. 24	2010	304	Sept. 5	2125	292
Apr. 24	0400	501	Sept. 26	2055	631

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 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.--7 years, 33.1 ft³/s (0.937 m³/s), 9.62 in/yr (244.3 mm/yr), 23,980 acre-ft/yr (29.6 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,420 ft³/s (96.9 m³/s) Sept. 27, gage height, 12.38 ft (3.77 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 (4.06 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 1972 TO SEPTEMBER 1973

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	517	1.6	.20	88	8.6	4.4	14	5.0	.02	40	0
2	0	234	1.3	.14	39	9.6	3.3	10	9.7	0	20	0
3	0	133	1.2	238	23	117	3.1	7.7	913	0	11	0
4	0	66	1.1	94	16	294	2.4	6.9	299	0	6.0	0
5	0	38	.74	52	12	138	1.8	6.6	971	0	3.2	0
6	0	44	.38	30	9.4	422	1.4	33	331	0	1.8	117
7	0	34	.14	33	154	228	1.3	430	243	0	1.3	173
8	0	18	.14	26	328	140	1.3	213	180	0	.96	127
9	0	13	.20	19	121	100	1.3	165	97	0	.85	65
10	0	10	.38	7.9	65	1,040	1.2	94	57	0	.74	34
11	0	6.9	.38	7.0	38	342	1.2	46	39	0	1.7	19
12	0	6.0	.96	5.5	22	270	1.1	30	25	0	1.8	11
13	0	119	4.0	5.0	17	241	2.6	16	59	0	1.3	7.3
14	0	57	3.0	6.0	12	181	2.4	11	292	0	.96	4.5
15	0	33	6.7	6.8	9.0	86	113	8.9	124	0	.85	2.9
16	0	19	2.4	7.8	6.7	46	146	6.2	63	12	.50	2.0
17	0	11	1.5	7.5	5.3	26	50	4.5	31	8.2	.28	1.4
18	0	58	2.1	6.9	4.3	16	28	3.5	18	3.1	.20	1.1
19	0	21	1.6	5.2	3.5	11	20	2.5	16	1.4	.10	.85
20	0	11	1.4	4.1	3.1	7.8	14	1.8	18	1.2	.05	.50
21	17	9.4	1.4	4.9	2.6	5.2	11	1.3	18	1.0	0	.28
22	870	9.6	1.4	5.2	2.5	3.8	81	.90	10	.62	0	.14
23	132	6.5	.62	3.5	3.8	3.4	89	.80	5.0	.38	0	.07
24	61	5.3	.28	2.5	3.3	5.4	780	5.0	3.0	.20	0	.05
25	35	6.0	.14	85	3.0	95	268	305	1.2	.14	0	.02
26	225	5.0	.07	241	8.2	56	189	74	.70	.07	0	282
27	176	4.6	.03	101	4.7	30	97	11	.20	.02	0	1,410
28	69	2.7	.02	59	3.4	18	53	8.0	.15	.01	0	430
29	273	1.8	.02	32	------	12	29	6.0	.08	.02	0	344
30	171	2.0	.74	20	------	8.8	19	4.2	.04	107	0	296
31	126	------	1.3	48	------	6.2	------	3.3	------	88	0	------
TOTAL	2,155	1,501.8	37.24	1,164.14	1,007.8	3,967.8	2,015.8	1,530.10	3,829.07	223.38	93.59	3,329.11
MEAN	69.5	50.1	1.20	37.6	36.0	128	67.2	49.4	128	7.21	3.02	111
MAX	870	517	6.7	241	328	1,040	780	430	971	107	40	1,410
MIN	0	1.8	.02	.14	2.5	3.4	1.1	.80	.04	0	0	0
CFSM	1.49	1.07	.03	.81	.77	2.74	1.44	1.06	2.74	.15	.06	2.38
IN.	1.72	1.20	.03	.93	.80	3.16	1.61	1.22	3.05	.18	.07	2.65
AC-FT	4,270	2,980	74	2,310	2,000	7,870	4,000	3,030	7,590	443	186	6,600

CAL YR 1972 TOTAL 4,004.47 MEAN 10.9 MAX 870 MIN 0 CFSM .23 IN 3.19 AC-FT 7,940
WTR YR 1973 TOTAL 20,854.83 MEAN 57.1 MAX 1,410 MIN 0 CFSM 1.22 IN 16.61 AC-FT 41,370

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

8-0526.50

Monthly and ~~annual discharge~~ yearly weighted-mean rainfall, in inches, of Little Elm Creek River at near Celina, Tex.
[Drainage area, 46.7 a/ square miles]

16—26489-5 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
			Station established February 21, 1966										
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

a/ Revised figure, prior to 1970 water year, 46.2 mi^2.

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-526.50

Monthly and ~~yearly~~ ~~peak~~ discharge, in ft^3/s, of Little Elm Creek River at near Celina, Tex.

[Drainage area, 46.7 a/ square miles]

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

WATER YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
			Station established February 21, 1966										
1966	-	-	-	-	-	2.55	250	71.8	0.50	0.30	28.2	21.8	--
1967	2.19	0	0	0	0	2.53	43.1	97.6	89.3	0	0	0	19.6
1968	0	0	1.50	18.2	7.76	140	75.0	136	2.94	2.15	0	7.70	33.0
1969	2.18	32.0	13.8	14.5	82.2	54.0	34.1	228	19.6	.055	0	0	39.9
1970	14.8	.041	52.6	13.9	103	89.6	161	52.1	3.65	0	.020	40.1	43.7
1971	.88	.024	0	0	.071	.012	0	12.0	1.39	1.68	15.5	5.36	3.12
1972	90.2	67.5	253	1.08	.060	.065	.77	4.03	0	0	0	4.18	35.5
1973	69.5	50.1	1.20	37.6	36.0	128	67.2	49.4	128	7.21	3.02	111	57.1

a/ Revised figure, prior to 1970 water year, 46.2 mi^2.

GPO 849-229

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 (196 km²).

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

GAGE.--Water-stage recorder. Datum of gage is 534.76 ft (162.99 m) above mean sea level (State Highway Department bench mark).

AVERAGE DISCHARGE.--17 years, 42.7 ft³/s (1.21 m³/s), 7.68 in/yr (195.1 mm/yr), 30,940 acre-ft/yr (38.1 hm³/yr).

EXTREMES.--Current year: Maximum discharge, 3,650 ft³/s (103 m³/s) Sept. 27, gage height, 15.84 ft (4.83 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 (5.29 m); no flow at times each year.
Maximum stage since about 1900, 18.2 ft (5.5 m) in May 1941, from information by local residents.

REMARKS.--Records good. 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 1972 TO SEPTEMBER 1973

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.45	621	3.0	1.0	145	5.7	7.9	19	3.7	0	90	0
2	.14	509	2.7	.63	58	15	6.6	14	3.9	0	51	0
3	.06	242	2.3	333	32	39	5.7	9.8	548	0	23	0
4	.02	119	2.0	186	20	435	5.2	7.3	677	0	10	0
5	.01	61	1.7	79	14	210	4.3	5.6	1,110	0	6.4	.04
6	0	63	1.4	45	11	398	3.6	9.1	726	0	4.0	74
7	0	105	.95	43	106	370	3.2	413	332	0	2.3	204
8	0	35	1.2	46	540	193	3.0	263	261	0	.95	169
9	0	21	.70	22	199	162	2.9	194	158	0	.23	98
10	0	15	.63	15	91	1,170	2.8	125	94	0	.06	51
11	0	11	.86	11	53	493	2.6	79	64	0	.04	28
12	0	9.2	1.0	8.2	33	340	2.1	141	40	0	1.2	14
13	0	160	3.6	8.0	23	303	3.9	32	33	0	2.3	9.3
14	0	99	4.4	8.5	16	257	4.5	17	457	0	1.3	6.9
15	0	53	7.1	10	12	138	49	12	270	0	.45	4.8
16	0	32	6.0	11	8.9	70	313	9.1	101	3.8	.14	3.0
17	0	20	3.3	11	7.2	40	83	7.0	52	15	.04	1.9
18	0	125	2.6	11	6.3	23	46	5.2	24	7.3	0	.63
19	0	72	2.8	9.1	5.5	15	30	4.0	14	4.0	0	.23
20	0	23	2.4	7.7	4.9	11	21	3.2	22	1.7	0	.06
21	1.1	15	2.4	7.5	4.3	8.7	15	2.6	14	.35	0	.01
22	1,480	14	2.1	8.2	4.2	7.1	51	2.0	8.1	.07	0	0
23	312	10	1.7	7.3	5.2	6.0	164	3.6	5.1	.01	.01	0
24	166	8.4	.95	5.5	6.0	6.4	1,010	2.5	3.0	.01	.01	0
25	114	8.3	.63	57	5.2	68	422	116	1.9	0	.01	0
26	285	7.6	.45	411	6.5	68	277	541	.70	0	.01	17
27	531	6.5	.30	164	9.7	40	163	82	.14	0	.01	2,150
28	176	5.3	.20	85	6.1	23	80	46	.05	0	.01	771
29	381	4.0	.30	46	------	15	46	19	.02	.03	.01	445
30	269	3.1	.95	27	------	12	27	8.8	.01	146	0	393
31	236	------	.70	24	------	9.7	------	5.3	------	242	0	------
TOTAL	3,951.78	2,477.4	61.32	1,708.63	1,433.0	4,951.6	2,855.3	2,198.1	5,023.62	420.27	193.48	4,440.87
MEAN	127	82.6	1.98	55.1	51.2	160	95.2	70.9	167	13.6	6.24	148
MAX	1,480	621	7.1	411	540	1,170	1,010	541	1,110	242	90	2,150
MIN	0	3.1	.20	.63	4.2	5.7	2.1	2.0	.01	0	0	0
CFSM	1.68	1.09	.03	.73	.68	2.12	1.26	.94	2.21	.18	.08	1.96
IN.	1.95	1.22	.03	.84	.71	2.44	1.41	1.08	2.48	.21	.10	2.19
AC-FT	7,840	4,910	122	3,390	2,840	9,820	5,660	4,360	9,960	834	384	8,810

CAL YR 1972 TOTAL 7,211.37 MEAN 19.7 MAX 1,480 MIN 0 CFSM .26 IN 3.55 AC-FT 14,300
WTR YR 1973 TOTAL 29,715.37 MEAN 81.4 MAX 2,150 MIN 0 CFSM 1.08 IN 14.64 AC-FT 58,940

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0527.00

yearly average rainfall
Monthly and ~~annual discharge~~, in inches, of Little Elm Creek ~~River~~ near Aubrey, Tex.
[Drainage area, 75.5 square miles]

16—26489-5 U. S. GOVERNMENT PRINTING OFFICE

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

9-220 c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0527.00

Monthly and ~~annual~~ yearly-mean discharge, in ft^3/s, of Little Elm Creek River at near Aubrey, Tex.

[Drainage area, 75.5 square miles]

16—26480-5 U. S. GOVERNMENT PRINTING OFFICE

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL
				Station established June 8, 1956									
1956	-	-	-	-	-	-	-	-	-	0	0	0	-
1957	0	0.16	7.89	0.51	20.1	46.6	677	701	11.0	1.03	0	8.93	123
1958	3.06	193	7.99	21.5	1.41	41.5	113	278	25.1	.93	0	0	57.3
1959	0	0	0	0	0	.52	.10	0	12.2	13.9	.01	0	2.24
1960	52.3	46.7	41.7	54.1	24.4	2.14	.37	8.78	.04	28.8	.64	0	21.7
1961	0	0	31.9	60.2	54.6	18.8	1.54	9.27	4.40	3.92	0	6.45	15.7
1962	11.7	9.47	14.6	.80	.12	9.61	93.4	.88	78.7	15.4	.50	228	38.3
1963	4.31	50.6	5.47	.85	.07	.03	65.4	91.4	2.98	.07	0	0	18.5
1964	0	0	0	0	0	21.6	85.6	30.7	.74	0	.64	258	32.7
1965	3.01	29.1	7.16	31.0	97.8	3.61	.43	93.6	78.1	.25	0	78.4	56.1
1966	.24	7.41	.06	.34	44.3	2.18	281	94.2	1.04	0	28.5	22.0	39.7
1967	2.15	.001	.05	.028	.13	3.66	51.9	154	98.6	0	0	.57	26.0
1968	.58	.18	5.64	30.5	10.9	182	110	159	5.75	3.75	0	15.0	44.0
1969	5.15	48.3	19.1	17.7	107	75.5	49.5	294	24.9	.076	0	0	53.2
1970	20.6	.29	98.0	16.7	164	126	203	73.9	6.26	0	0	75.0	64.4
1971	2.19	.10	.094	.21	.31	.19	.12	13.8	2.62	1.75	18.8	5.91	3.89
1972	118	89.9	347	1.98	.23	.94	1.62	5.21	0	0	0	13.8	48.7
1973	127	82.6	1.98	55.1	51.2	160	95.2	70.9	167	13.6	6.24	148	81.4

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 1 near Gunter, Tex. Drainage Area 3.40 mi^2

~~Continuous water-stage recorder~~ Staff-gage: ratio ____. Date of last sediment survey ____.

Maxima: gage height, 23.8 ft; outflow, 34.3 ft^3/s; surface area, 73.2 acres; contents, 440 acre-feet; on June 6, 1973.

Minima: gage height, 17.0 ft; surface area, 27.0 acres; contents, 115 acre-feet; on Oct. 21, 1972.

Maximum inflow, ____ ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	330	166	9.9	572	207	131	580	356	310	516	130	16.7	499	3250
Total Outflow	230	191	4.7	429	194	135	574	347	306	524	63.3	46.6	374	2990
Total Consumption	28.4	19.2	11.1	227	9.2	13.1	21.6	18.2	26.4	25.7	29.5	35.9	32.8	271
†	+93.1	-32.8	-3.8	-3.8	+15.7	-11.9	+3.9	+4.0	-7.9	-7.6	+53.8	-61.1	+132	+177
‡	33.0	40.1	38.3	34.6	39.8	39.6	44.9	41.3	41.9	42.2	36.9	38.6	43.2	40.0
††	7.21	3.33	0.66	28.03	3.65	1.61	5.03	3.86	4.15	7.18	5.17	1.46	10.52	53.83

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

Peak inflow - (base, ____ ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

. Little Elm Creek subwatershed No 2 near Gunter, Tex. Drainage Area 3.95 mi^2

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

Maxima: gage height, 20.2 ft; outflow, 95.3 ft^3/s; surface area, 114 acres; contents, 652 acre-feet; on April 24, 1973.

Minima: gage height, 13.2 ft; surface area, 35.4 acres; contents, 148 acre-feet; on Oct. 21, 1972.

Maximum inflow, —— ft^3/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 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	568	337	16.6	1000	399	243	1100	694	556	1020	156	59.2	992	6140
Total Outflow	400	387	16.8	813	339	297	1090	672	572	1020	98.6	56.1	848	5800
Total Consumption	32.6	26.8	14.8	315	13.2	18.2	31.2	24.2	42.1	43.5	45.2	58.3	45.9	396
†	+172	-59.0	-11.9	-1.4	+63.9	-63.9	+11.9	+18.6	-36.2	-5.7	+38.2	-49.2	+154	+233
‡	49.4	63.8	59.4	50.9	62.7	62.7	70.8	63.8	63.8	64.9	57.2	58.3	63.8	61.7
††	7.21	3.33	0.66	28.56	3.65	1.61	5.03	3.86	4.15	7.18	5.17	1.46	10.52	53.83

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

Peak inflow – (base, —— ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 3 near Gunter, Tex. Drainage Area 7.27 mi^2

~~Continuous water-stage recorder~~ Staff gage: ratio ____. Date of last sediment survey ____.

Maxima: gage height, 21.2 ft; outflow, 220 ft^3/s; surface area, 187 acres; contents, 1020 acre-feet; on Sept. 27, 1973

Minima: gage height, 10.4 ft; surface area, 21.5 acres; contents, 76.4 acre-feet; on Oct. 21, 1972.

Maximum inflow, ____ ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	907	559	26.4	1570	624	479	2210	1230	1200	1900	202	84.2	1860	11,300
Total Outflow	786	635	22.8	1450	590	507	2210	1230	1200	1900	146	99.8	1680	11,000
Total Consumption	18.7	15.0	7.8	178	7.1	10.4	20.3	17.6	25.1	28.7	24.6	33.0	33.3	242
†	+119	-81.6	-3.2	-4.0	+37.0	-33.8	+6.8	0	-13.2	-1.5	+45.9	-45.9	+177	+206
‡	25.3	36.5	32.5	28.6	35.5	36.0	41.5	40.0	39.2	44.2	31.2	33.0	43.8	36.6
††	7.11	3.15	0.58	28.05	3.24	1.52	5.86	4.13	4.21	7.24	5.59	1.04	9.85	53.52

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

Peak inflow - (base, ____ ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

. Little Elm Creek subwatershed No. 4 near Gunter, Tex. Drainage Area 3.33 mi^2

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

Maxima: gage height, 23.1 ft; outflow, 50.3 ft^3/s; surface area, 80.0 acres; contents, 648 acre-feet; on Sept. 27, 1973.

Minima: gage height, 13.8 ft; surface area, 30.0 acres; contents, 144 acre-feet; on Oct. 21, 1972.

Maximum inflow, —— ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	209	140	13.5	451	142	157	785	460	252	418	101	15.6	486	3180
Total Outflow	111	142	10.0	286	117	173	785	451	263	447	35.6	13.7	404	2950
Total Consumption	26.4	19.4	11.0	256	9.2	14.1	22.8	18.9	28.0	30.7	34.0	39.7	33.2	287
†	+92.6	-10.3	-6.3	-11.3	+28.2	-24.5	+3.9	+11.2	-23.8	-15.2	+48.4	-34.4	+83.0	+153
‡	34.8	44.0	42.2	38.3	43.8	44.0	47.6	45.1	43.0	47.4	43.6	41.8	44.8	43.5
††	6.78	3.16	0.44	26.53	3.40	1.57	6.24	4.96	4.20	7.58	5.24	1.04	9.59	54.20

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, —— ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 5 near Gunter, Tex. Drainage Area 0.50 mi^2

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

Maxima: gage height, 20.2 ft; outflow, 15.6 ft^3/s; surface area, 10.2 acres; contents, 74.5 acre-feet; on Sept. 27, 1973.

Minima: gage height, 15.1 ft; surface area, 6.3 acres; contents, 33.0 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	39.3	14.1	1.3	67.1	25.4	13.6	119	55.0	40.3	68.4	5.9	2.5	76.7	462
Total Outflow	20.9	12.9	0	34.5	24.6	12.6	120	55.3	39.4	67.9	0	0	74.1	428
Total Consumption	4.4	3.8	1.9	49.2	2.1	2.4	4.1	3.5	6.3	6.4	7.0	7.3	5.2	54.4
†	+18.1	-.4	-.4	-0.8	+1.1	-.3	0	0	-2.5	-.4	+2.1	-4.1	+3.8	+17.0
‡	7.0	8.4	8.3	7.6	8.4	8.4	8.5	8.4	8.4	8.5	7.9	8.1	8.3	8.2
††	6.56	3.17	0.36	25.56	3.50	1.60	6.39	5.38	4.16	7.72	4.99	1.04	9.33	54.20

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, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 6 near Gunter, Tex. Drainage Area 1.99 mi^2

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

Maxima: gage height, 23.3 ft; outflow, 23.8 ft^3/s; surface area, 37.2 acres; contents, 291 acre-feet; on March 10, 1973.

Minima: gage height, 17.0 ft; surface area, 22.7 acres; contents, 109 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	125	69.7	3.9	263	105	48.2	293	151	97.9	226	31.1	0.9	297	1450
Total Outflow	78	70.4	0.7	156	91.6	57.8	297	150	95.2	225	11.1	0.6	221	1300
Total Consumption	18.1	10.6	6.3	162	5.6	7.4	12.1	11.7	17.2	19.4	21.9	20.6	15.8	167
†	+42.8	-4.3	-2.3	-2.1	+16.0	-13.4	-1.3	+1.8	-5.2	-0.5	+9.2	-18.1	+83.3	+108
‡	24.5	26.4	26.1	25.0	26.5	26.4	28.2	26.7	26.4	26.9	25.5	25.8	27.3	26.4
††	6.56	3.17	0.36	25.56	3.50	1.60	6.39	5.38	4.16	7.72	4.99	1.04	9.33	54.20

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, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 7 near Gunter, Tex. Drainage Area 1.28 mi^2

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

Maxima: gage height, 16.1 ft; outflow, 10.4 ft^3/s; surface area, 26.2 acres; contents, 157 acre-feet; on Apr. 24, Sept. 27, 1973

Minima: gage height, 11.8 ft; surface area, 14.9 acres; contents, 69.7 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	70.3	72.4	3.1	183	62.4	53.2	154	77.1	96.8	146	50.0	23.3	167	976
Total Outflow	33.0	70.6	0.3	110	56.3	50.7	152	73.0	88.4	142	23.6	27.4	130	847
Total Consumption	9.4	8.3	5.4	112	4.5	7.3	9.2	8.7	14.2	14.6	17.5	16.0	15.2	130
†	+36.2	-1.9	-2.0	-2.8	+5.9	-2.6	0	-0.5	-1.0	-2.2	+16.8	-19.2	+28.5	+58.0
‡	17.2	20.8	20.2	18.4	20.6	20.8	21.4	20.8	21.0	21.8	20.1	20.5	21.4	20.6
††	5.60	2.64	0.33	24.14	2.48	1.28	4.25	2.25	2.81	5.16	4.80	0.58	4.33	36.51

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

Peak inflow – (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

. Little Elm Creek subwatershed No. 8-B near Gunter, Tex. Drainage Area 1.25 mi^2

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

Maxima: gage height, 22.9 ft; outflow, 18.2 ft^3/s; surface area, 33.6 acres; contents, 247 acre-feet; on Sept. 27, 1973.

Minima: gage height, 11.9 ft; surface area, 8.9 acres; contents, 42.4 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct	Nov	Dec	Calendar year 1972	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1973
Total Inflow 1/	59.3	65.9	13.2	154	74.5	54.2	263	115	73.2	163	9.6	4.8	250	1150
Total Outflow	34.6	64.6	13.1	119	69.2	58.5	261	108	66.9	169	8.7	6.2	176	1040
Total Consumption	6.4	4.3	2.4	63.2	2.4	3.5	6.5	5.2	8.1	8.6	10.5	8.8	9.0	75.7
†	+24.2	+0.8	-1.4	-0.6	+6.1	-6.0	-0.8	+4.7	+2.3	-8.1	-5.6	-9.3	+74.8	+81.7
‡	10.3	12.0	11.5	10.7	12.4	12.6	14.4	12.4	12.1	12.4	11.4	11.3	13.4	12.2
††	6.72	3.69	0.87	31.37	2.97	1.79	3.25	2.89	3.80	6.26	4.07	0.95	8.96	46.22

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, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 9 near Gunter, Tex. Drainage Area 0.58 mi^2

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

Maxima: gage height, 18.8 ft; outflow, 17.7 ft^3/s; surface area, 21.2 acres; contents, 100 acre-feet; on Sept. 27, 1973.

Minima: gage height, 12.9 ft; surface area, 6.8 acres; contents, 20.7 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	74.1	30.8	2.2	132	23.7	14.7	91.2	55.5	20.7	106	32.2	9.3	234	694
Total Outflow	69.6	36.3	1.3	112	19.3	18.4	90.2	53.2	18.0	109	20.9	7.4	215	659
Total Consumption	5.3	2.9	1.7	39.6	1.6	2.6	3.6	3.1	4.8	4.9	5.2	5.9	5.4	47
†	+4.8	-5.7	-0.3	-0.3	+4.8	-5.1	0	+1.1	+0.5	-2.8	+9.0	-3.5	+21.0	+23.8
‡	8.0	8.0	7.4	6.7	7.8	7.7	8.3	8.0	7.7	8.2	7.0	7.2	9.2	7.9
††	6.72	3.69	0.87	31.37	2.97	1.79	3.25	2.89	3.80	6.26	4.07	0.95	8.96	46.22

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, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 11 near Gunter, Tex. Drainage Area 1.17 mi^2

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

Maxima: gage height, 14.5 ft; outflow, 76.0 ft^3/s; surface area, 26.3 acres; contents, 111 acre-feet; on Sept. 27, 1973.

Minima: gage height, 3.8 ft; surface area, 0.8 acres; contents, 1.4 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	201	149	2.0	370	153	139	458	205	185	429	97.4	42.0	472	2530
Total Outflow	162	152	1.1	337	142	148	455	199	187	427	64.9	57.6	440	2440
Total Consumption	4.3	7.3	3.3	56.7	3.2	4.4	8.4	7.6	12.7	10.3	14.2	16.2	14.9	107
†	+42.5	-5.1	-1.6	-1.5	+13.4	-10.9	+3.0	+3.4	-9.0	0	+26.7	-30.0	+27.3	+59.7
‡	6.3	15.6	14.3	9.5	15.3	15.6	17.2	16.2	15.9	16.6	15.9	14.3	16.9	15.0
††	6.06	3.04	0.43	26.08	3.01	1.49	4.80	2.72	3.09	5.78	5.20	0.90	5.63	42.15

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

Peak inflow – (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 12 near Gunter, Tex. Drainage Area 1.62 mi^2

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

Maxima: gage height, 17.3 ft; outflow, 13.4 ft^3/s; surface area, 34.6 acres; contents, 247 acre-feet; on June 5, 1973.

Minima: gage height, 8.2 ft; surface area, 11.8 acres; contents, 48.5 acre-feet; on Oct. 2, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	185	71.0	0.8	289	64.2	63.3	204	131	95.8	223	72.1	12.6	202	1320
Total Outflow	142	84.3	0.4	244	54.8	69.5	204	122	104	221	29.3	41.8	130	1200
Total Consumption	10.9	6.4	3.5	84.9	3.6	5.9	7.5	5.8	10.2	11.0	11.6	15.8	12.0	104
†	+42.7	-14.3	-2.2	-4.5	+11.4	-9.5	+2.3	+8.2	-13.3	+1.8	+39.3	-42.9	+71.4	+94.9
‡	15.8	16.3	15.4	13.8	16.2	16.3	17.1	16.7	16.5	17.8	15.4	15.6	16.7	16.3
††	5.95	2.64	0.38	25.04	2.54	1.36	4.35	2.67	3.01	5.55	4.65	0.52	5.15	38.77

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

Peak inflow – (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 17 near Gunter, Tex. Drainage Area 2.17 mi^2

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

Maxima: gage height, 20.5 ft; outflow, 19.5 ft^3/s; surface area, 56.0 acres; contents, 377 acre-feet; on June 5, 1973.

Minima: gage height, 12.1 ft; surface area, 17.5 acres; contents, 60.5 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	294	86.0	0.8	455	92.3	99.0	310	142	71.5	340	133	11.0	340	1920
Total Outflow	181	89.2	0	270	81.9	95.1	307	138	62.9	336	75.2	42.1	207	1620
Total Consumption	20.9	13.7	9.2	63.2	9.5	9.7	18.0	14.2	24.2	27.3	25.2	29.9	29.9	232
†	+108	-9.6	-6.8	+153	+7.2	-1.1	-0.7	+2.9	-4.7	-0.7	+44.9	-60.8	+127	+206
‡	29.5	37.0	35.5	10.9	36.5	36.0	39.2	37.4	35.5	40.2	34.0	36.0	37.9	36.2
††	7.15	2.38	0.53	27.67	2.46	1.55	4.43	4.15	3.67	6.81	3.76	0.06	7.78	44.73

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

Peak inflow – (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 18-A near Gunter, Tex. Drainage Area 1.05 mi^2

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

Maxima: gage height, 20.5 ft; outflow, 20.8 ft^3/s; surface area, 22.0 acres; contents, 196 acre-feet; on March 10, 1973.

Minima: gage height, 13.7 ft; surface area, 11.0 acres; contents, 88.8 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	112	106	21.8	283	82.7	49.7	210	128	30.7	118	28.2	2.6	209	1100
Total Outflow	90.3	103	20.5	240	83.6	47.9	211	128	29.9	118	24.3	0	157	1010
Total Consumption	8.9	6.3	2.9	75.3	2.5	3.6	6.0	4.6	7.0	8.4	9.7	10.2	7.7	77.8
†	+19.7	0	-0.6	-0.6	+0.3	+0.3	-0.5	+0.4	-0.2	-0.9	-0.6	-7.5	+53.0	+63.4
‡	11.6	13.1	12.8	12.3	13.0	13.0	13.7	13.1	12.8	13.0	12.6	12.4	13.0	12.8
††	7.29	3.33	0.90	30.90	3.42	1.93	5.23	4.52	5.55	6.91	5.02	0.10	8.57	52.77

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

Peak inflow - (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 19 near Gunter, Tex. Drainage Area 2.01 mi^2

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

Maxima: gage height, 14.2 ft; outflow, 21.2 ft^3/s; surface area, 61.6 acres; contents, 338 acre-feet; on March 10, 1973

Minima: gage height, 10.5 ft; surface area, 35.5 acres; contents, 159 acre-feet; on Oct. 21, 1972

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct.	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	268	88.8	19.5	505	67.2	50.9	267	154	97.6	212	106	5.8	258	1590
Total Outflow	238	95.4	20.6	377	57.4	52.3	271	147	89.4	218	59.1	23.8	170	1440
Total Consumption	35.3	18.4	12.0	236	10.5	11.1	17.0	15.6	24.3	28.2	27.0	33.4	29.0	262
†	+19.9	-13.8	-9.7	-5.5	+11.6	-6.5	-3.0	+7.6	0	-13.0	+37.2	-51.0	+82.5	+61.8
‡	39.7	38.3	37.6	34.6	37.6	38.3	40.4	39.0	38.6	39.7	35.5	35.5	36.2	38.0
††	7.28	3.34	0.97	32.61	3.65	1.88	5.24	4.74	5.34	6.64	5.37	0.13	8.16	52.74

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

Peak inflow - (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOL

ANNUAL SUMMARY

1973 WATER YEAR

_____. Little Elm Creek subwatershed No. 20 near Gunter, Tex. Drainage Area 2.06 mi^2

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

Maxima: gage height, 21.7 ft; outflow, 21.9 ft^3/s; surface area, 58.9 acres; contents, 412 acre-feet; on Sept. 27, 1973.

Minima: gage height, 15.3 ft; surface area, 27.1 acres; contents, 142 acre-feet; on Oct. 21, 1972.

Maximum inflow, — ft^3/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 1972 to September 1973.

	Oct	Nov.	Dec.	Calendar year 1972	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Water year 1973
Total Inflow 1/	344	158	7.1	697	120	67.7	316	264	91.0	244	83.2	10.9	350	2060
Total Outflow	299	194	0.7	604	121	64.1	320	265	85.0	246	49.0	25.7	222	1890
Total Consumption	24.4	13.1	9.0	176	6.9	7.4	12.2	10.5	18.0	19.0	20.1	24.1	18.4	183
†	+40.0	-40.6	-0.2	-3.1	+0.2	+0.6	-3.7	+3.7	0	-4.8	+27.1	-38.5	+128	+112
‡	30.9	29.7	28.2	27.7	28.6	28.6	30.5	29.3	28.6	30.1	27.1	27.4	29.7	29.1
††	7.29	3.37	1.03	32.71	3.87	1.83	5.25	4.95	5.11	6.37	5.72	0.16	7.75	52.70

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

Peak inflow - (base, — ft^3/s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA Little Elm Creek

RAIN GAGE

1973 WATER YEAR

Date of storm	1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R		Avg.
October 9		.09										
21-22	4.18	4.35	4.00	4.50	4.06	4.55	4.59	4.50	4.08	3.80		
26	1.44	1.41	1.33	1.48	1.47	1.52	2.00	1.65	1.62	1.20		
28-29	.82	.79	.68	.72	1.01	.71	.40	.75	.32			
30	.68	.72	.43	.32	.18	.37	.18	.29	.24	.60		
31	.09		.12				.12	.10	.07			
October total	7.21	7.36	6.56	7.02	6.72	7.15	7.29	7.29	6.33	5.60		6.85
November 1	1.09	1.05	1.13	1.32	1.20	.95	1.10	1.25	1.03	1.40		
6	.48	.42	.54	.50	.62		.48	.30	.34			
12	.80	.82	.68	.80	.71	.65	.67	.55	.50	.71		
18	.36	.36	.45	.60	.71	.39	.66	.83	.73	.20		
21	.25	.22	.15	.15	.20	.17	.26	.20	.34	.18		
24	.13	.10				.08			.04			
25		.18	.12	.35	.13	.14	.16		.04			
29	.22		.10	.15	.12			.24	.05	.15		
30									.06			
November total	3.33	3.15	3.17	3.87	3.69	2.38	3.33	3.37	3.13	2.64		3.21
December 6								.02	.03			
7	.06		.07						.11			
10	.04	.06	.01	.15	.05	.04	.03	.02				
11	.03	.02	.10	.10		.22	.02	.03	.11			
12	.05	.20	.18	.15			.40	.41	.16			
14	.25	.13			.34	.15		.28	.17	.16		
18								.02				
29	.23	.25		.27	.48	.12	.45	.25	.20	.17		
December total	.66	.66	.36	.67	.87	.53	.90	1.03	.78	.33		.68
1972 Calendar Year total												28.97

By JMT
r RMS

( ) denotes estimated figures

Form TX-88
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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA Little Elm Creek

1973 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		Avg.
January 2-3	1.18	1.13	1.37	1.15	1.22	.90	1.19	1.19	1.02	.87		
5	.04											
6-7	.53	.18	.20	.20		.21	.12	.63	.07			
8				.25				.05	.06			
11		.18					.04	.07	.04			
13	.04				.42				.08	.30		
17	.02			.10								
20-21	.25	.14	.12	.25	.10	.16	.37	.21	.17	.17		
25-26	1.01	.98	.83	1.12	.51	.84	1.15	1.04	1.03	.80		
31	.58	.55	.88	1.15	.72	.35	.55	.68	.28	.34		
January total	3.65	3.16	3.50	4.12	2.97	2.46	3.42	3.87	2.75	2.48		3.24
February 7	1.14	1.05	1.13	1.15	1.10	.91	1.26	1.25	1.20	.78		
22	.29	.32	.30	.45	.34	.34	.47	.50	.29	(.20)		
23	.04								.05			
26	.14	.13	.17	.35	.35	.30	.20	.08	.18	(.30)		
February total	1.61	1.50	1.60	1.95	1.79	1.55	1.93	1.83	1.72	1.28		1.68
March 1	.39	.25	.33	.40	.84	.35	.24	.82	.26	.22		
3	.93	1.10	.97	.90		.53	1.35	.54	.60	.83		
6		.89	.93	.90	1.30	.58	.85	.98	.68	.58		
8	.19	.20	.20	.25			.34		.20			
9-10	1.76	1.84	1.70	1.75	.24	1.67	1.50	2.01	1.42	1.67		
13	.41	.40	1.11	.40	.34	(.30)	.60	.25	.19	.05		
22	.28	.15		.23		(.10)		.07	.06	.08		
24	.97	.98	1.15	1.15	.47	(.80)	.35	.50	.48	.82		
27	.02							.05	.05			
30	.08	.06			.06	(.10)		.03				
March total	5.03	5.87	6.39	5.98	3.25	4.43	5.23	5.25	3.94	4.25		4.96

By JmT
V RMS

Form TX-88
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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA Little Elm Creek

1973 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		Avg.
April 2	.12	.11	.17	.20	.14	(.10)	.26	.08	.16			
8	.26	.20	.20		.20	(.10)	.25	.22	.18	.09		
13	.30	.21	.62	.33	.67	(.50)	.26	.62	.66	.19		
14	.06		.15	.05				.13	.11			
15	1.00	1.07	1.90	1.05	1.12	(1.20)	1.40	1.16	.97	.60		
17		.05	.07	.20	.22	(.10)		.03	.07	.04		
19	.16	.11	.15		.20	(.10)	.17	.19	.12	.07		
21	.13	.25				.11	.30	.05	.15			
22	.52	.41	.20	.20	.30	.47		.21	.56	.26		
23		.45	.52	.45		.40	.60	.50	.58	.20		
24	1.31	1.02	1.40	1.25		.62	1.24	1.45	.84	.80		
26					.04			.31	.06			
29							.04					
April total	3.86	3.88	5.38	3.73	2.89	3.70	4.52	4.95	4.46	2.25		3.96
May 1	.21	.08	.03		.25			.03				
5	.37	.41	.50	.45		.48	.48	.48	.43	.20		
6	2.08	2.35	1.82	1.08	.35	.73	1.36	.88	.99	1.23		
11	.03	.05	.21	.40	.30	.57	.93	1.10	1.78	.09		
22	.16	.07				.05						
23	.70	.66	.60	.58	.52	.57	.61	.75	.66	.43		
24	.41	.33	.45	.61	.56	.40	.37	.02	.11	.47		
25	.19	.36	.55	.56	1.82	.87	1.80	1.85	2.07	.39		
May total	4.15	4.31	4.16	3.68	3.80	3.67	5.55	5.11	6.04	2.81		4.33
June 1	.28	.42	.47	.39	.74	.30			.23	.32		
2	.18	.28	.32	.09	.16	.07		.22	.18	.07		
2-3	2.80	2.90	3.02	2.80	2.04	2.48	1.78	1.82	1.38	2.48		
5	1.72	1.68	1.70	1.47	.86	1.37	2.24	1.30	1.78	1.23		
11	.37	.37	.09	.10		.30			.10			
12	.33	.18	.40	.20	.81	.15	.14	.95	.04			
13	.74	.45	.57			.59		.12	.36	.37		
14	.43	.62	.78	1.40	1.65	.85	1.35	1.50	1.41	.44		
16		.07										
19-20	.33	.25	.37	.65		.70	1.26	.46	.76	.25		
29							.14					
June total	7.18	7.22	7.72	7.10	6.26	6.81	6.91	6.37	6.24	5.16		6.70

By JMT
V RMS

Form TX-88
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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA Little Elm Creek

1973 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		Avg.
July 7	.08	.11	.04	.10			.13					
9	.05	.06	.08	.10	.02	.05		.10				
10	.55	.10		.05	.42	.36						
11	.72	.88	.12					.27		.12		
14-15	.82	2.00	1.15	2.17	.05	.25	1.39	1.42	1.81	1.83		
28-29	1.20	1.20	1.59	1.43	1.58	1.25	1.41	2.20	2.55	1.12		
30	1.75	1.52	2.01	2.22	2.00	1.85	2.09	1.73	1.68	1.73		
July total	5.17	5.87	4.99	6.07	4.07	3.76	5.02	5.72	6.04	4.80		5.15
August 10	1.24	.71	.44	.50	.15					.08		
27	.22		.20			.06		.16		.50		
29		.32	.40	1.10	.80		.10					
August total	1.46	1.03	1.04	1.60	.95	.06	.10	.16	0	.58		.70
September 1	.25	.11		.57	.02	.48		.27		.56		
3	.43	.17										
5-6	3.13	3.29	4.10	3.60	2.72	2.66	3.20	3.15	2.62	.71		
6	1.48	1.10	.50	.40	.42	.45	.47	.25	.21	.18		
13	.49	.25	.33	.25		.06		.04		.04		
26-27	4.66	5.28	4.30	3.60	5.72	3.94	4.90	3.76	3.08	2.80		
27	.08	.07	.10		.08	.19		.28	.19	.04		
September total	10.52	10.27	9.33	8.42	8.96	7.78	8.57	7.75	6.10	4.33		8.20
1973 Water Year Total												49.66

By JMJ
√ RMS

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 1 of 1

INFLOW AND OUTFLOW COMPUTATIONS

Storm period January 2-3, 1973

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 mi²

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage ft³/s	Mean G. Ht. ft	Outflow ft³/s	Total inflow ft³/s	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage ft³/s	Net Inflow Rate ft³/s	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
Jan 2, 1973																
0000	19.93															
2330	19.91	156.17	23.50													
2345	19.93	156.80	.25	+ .63	+ 30.5	19.92	0		.23	31.5	.60	29.0	1.5	.0011	.0003	.0003
2400	19.94	157.12	.25	+ .32	+ 15.5	19.94	0		.05	31.6	.13	6.3	9.2	.0068	.0017	.0020
Jan 3, 1973																
0100	19.96	157.75	1.0	+ .63	+ 7.6	19.95	0	7.6	.16	31.7	.42	5.1	2.5	.0018	.0018	.0038
0200	19.98	158.39	1.0	+ .64	+ 7.7	19.97	0	7.7	.10	31.8	.26	3.1	4.6	.0034	.0034	.0072
0300	20.03	159.99	1.0	+ 1.60	+ 19.4	20.00	0	19.4	.19	32.0	.51	6.2	13.2	.0097	.0097	.0169
0400	20.11	162.59	1.0	+ 2.60	+ 31.5	20.07	.07	31.6	.08	32.5	.22	2.7	28.9	.0213	.0213	.0382
30	20.19	165.25	.50	+ 2.66	+ 64.4	20.15	.34	64.7	.05	33.1	.14	3.4	61.3	.0452	.0226	.0608
45	20.24	166.94	.25	+ 1.69	+ 81.8	20.22	.76	82.6	.01	33.8	.03	1.5	81.1	.0599	.0150	.0758
0500	20.30	168.98	.25	+ 2.04	+ 98.7	20.27	1.2	99.9					99.9	.0737	.0184	.0942
30	20.41	172.82	.50	+ 3.84	+ 92.9	20.36	2.1	95.0					95.0	.0701	.0350	.1292
0600	20.50	176.02	.50	+ 3.20	+ 77.4	20.46	3.5	80.9					80.9	.0597	.0298	.1590
30	20.57	178.57	.50	+ 2.55	+ 61.7	20.54	4.9	66.6					66.6	.0492	.0246	.1836
0730	20.66	181.89	1.0	+ 3.32	+ 40.2	20.62	6.5	46.7					46.7	.0345	.0345	.2181
0830	20.72	184.14	1.0	+ 2.25	+ 27.2	20.69	8.2	35.4					35.4	.0261	.0261	.2442
1000	20.77	186.04	1.5	+ 1.90	+ 16.3	20.74	9.4	24.7					24.7	.0182	.0273	.2715
1200	20.80	187.18	2.0	+ 1.14	+ 6.9	20.78	10.4	17.3					17.3	.0128	.0256	.2971
1400	20.81	187.57	2.0	+ .39	+ 2.4	20.80	10.8	13.2					13.2	.0097	.0194	.3165
1600	20.81	187.57	2.0	0	0	20.81	11.0	11.0					11.0	.0081	.0162	.3327
1900	20.79	186.80	3.0	- .77	- 3.1	20.80	10.8	7.7					7.7	.0057	.0171	.3498
2400	20.73	184.52	5.0	- 2.28	- 5.5	20.76	9.9	4.4					4.4	.0032	.0160	.3658

Comp. by: RMS
Checked by: TRH

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

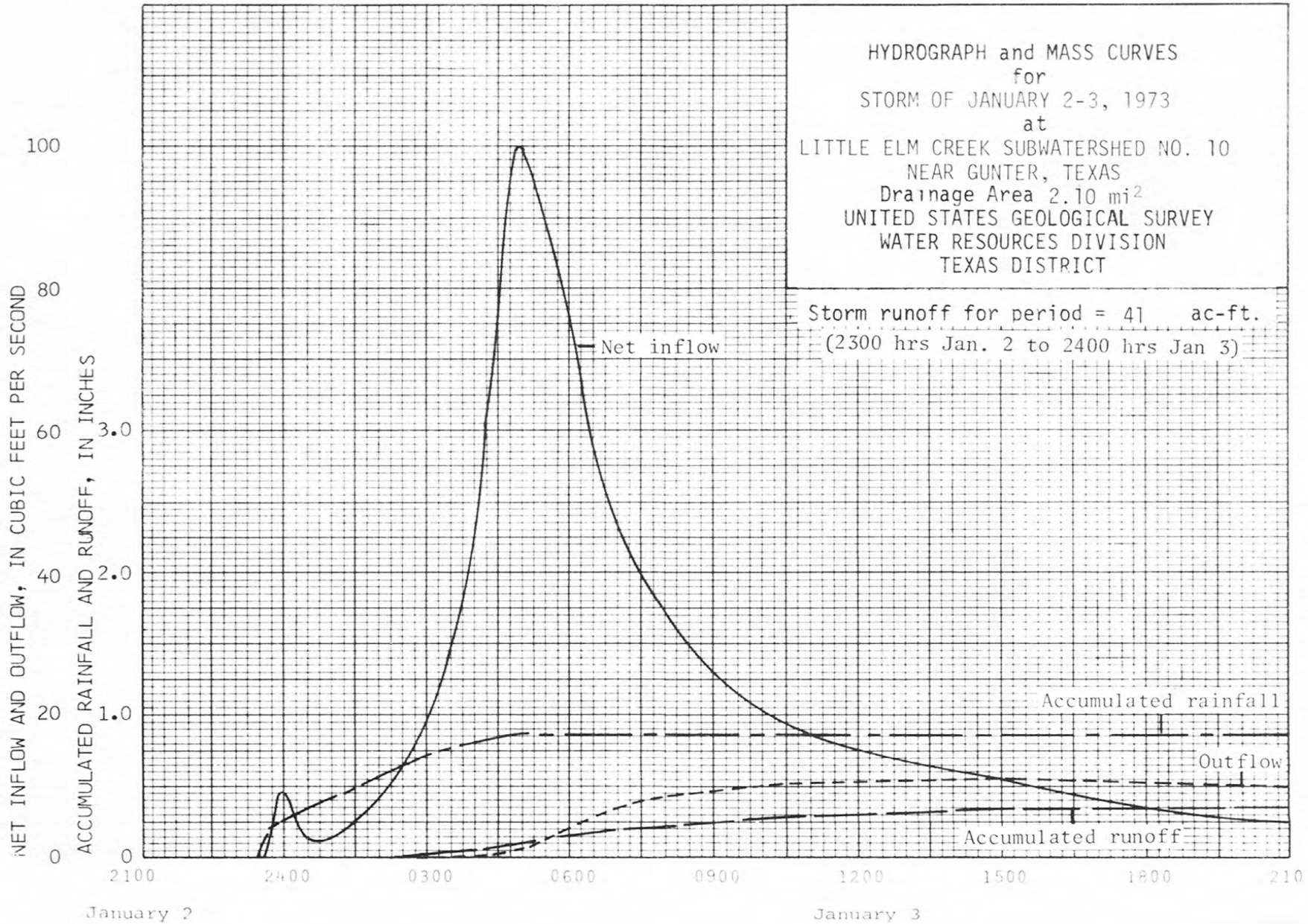
Sheet 1 of 1
Comp. by: RMS
Date 9-30-74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek subwatershed No. 10 near Gunter, Tex. Date of storm January 2-3, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	1.000												Recording Gages	(Rec. Gages x K)
Date & Time	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	All Gages	All Gages
January 2, 1973														
0000	0													0
2330	0													0.
45	.23													.23
2400	.28													.28
January 3, 1973														
0015	.32													.32
30	.34													.34
45	.38													.38
0100	.44													.44
15	.45													.45
30	.48													.48
45	.52													.52
0200	.54													.54
15	.61													.61
30	.66													.66
45	.72													.72
0300	.73													.73
30	.77													.77
0400	.81													.81
30	.86													.86
0500	.87													.87
2400	.87													.87

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
										WMR	.87

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


HYDROGRAPH and MASS CURVES
for
STORM OF JANUARY 2-3, 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 = 41 ac-ft.
(2300 hrs Jan. 2 to 2400 hrs Jan 3)
Net inflow
Accumulated rainfall
Outflow
Accumulated runoff
NET INFLOW AND OUTFLOW, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
20
40
60
80
100
1.0
2.0
3.0
2100
2400
0300
0600
0900
1200
1500
1800
210
January 2
January 3

TX.-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record January 2-4, 1973 Drainage Area 46.7 mi^2

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Inc.	In/Hr	Runoff Inches	Acc. In.
	Jan. 2, 1973						
0000	2.84	-.15	.14	95	.0000	.0000	.0000
2345	2.84	-.15	.14	96	.0000	.0000	.0000
2400	2.87	-.16	.28	1	.0000	.0000	.0000
			27.02	192			
			.14				
	Jan. 3, 1973						
0000	2.87	-.16	.28	.5	.0000	.0000	.0000
0100	2.97	-.18	1.2	1.0	.0000	.0000	.0000
0200	3.68	-.20	13	1.0	.0004	.0004	.0004
0300	5.14	-.22	85	1.0	.0028	.0028	.0032
0400	6.89	-.24	223	1.0	.0074	.0074	.0106
0500	7.81	-.24	311	1.0	.0103	.0103	.0209
0600	8.35	-.13	377	1.0	.0125	.0125	.0334
0700	8.57	-.09	412	1.0	.0137	.0137	.0471
0800	8.63	-.07	424	1.0	.0141	.0141	.0612
0900	8.56	-.09	410	1.0	.0136	.0136	.0748
1000	8.47	-.11	395	1.5	.0131	.0196	.0944
1200	8.16	-.17	353	2.0	.0117	.0234	.1178
1400	7.64	-.25	293	2.0	.0097	.0194	.1372
1600	6.97	-.24	230	1.5	.0076	.0114	.1486
1700	6.68	-.24	206	1.5	.0068	.0102	.1588
1900	6.21	-.22	170	2.0	.0056	.0112	.1700
2100	5.96	-.21	151	2.5	.0050	.0125	.1825
2400	5.70	-.20	131	1.5	.0043	.0064	.1889
			5708.84	24			
			238				

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Inc.	In/Hr.	Runoff Inches	Acc. In
	Jan. 4, 1973						
0000	5.70	-.20	131	3.0	.0043	.0129	.2018
0600	5.42	-.19	109	6.0	.0036	.0216	.2234
1200	5.16	-.18	90	6.0	.0030	.0180	.2414
1800	4.96	-.16	77	6.0	.0026	.0156	.2570
2400	4.80	-.16	66	3.0	.0022	.0066	.2636
			2247	24			
			94				

Computed by RMS Date 9-23-74 Checked by JMT Date 10-23-74

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

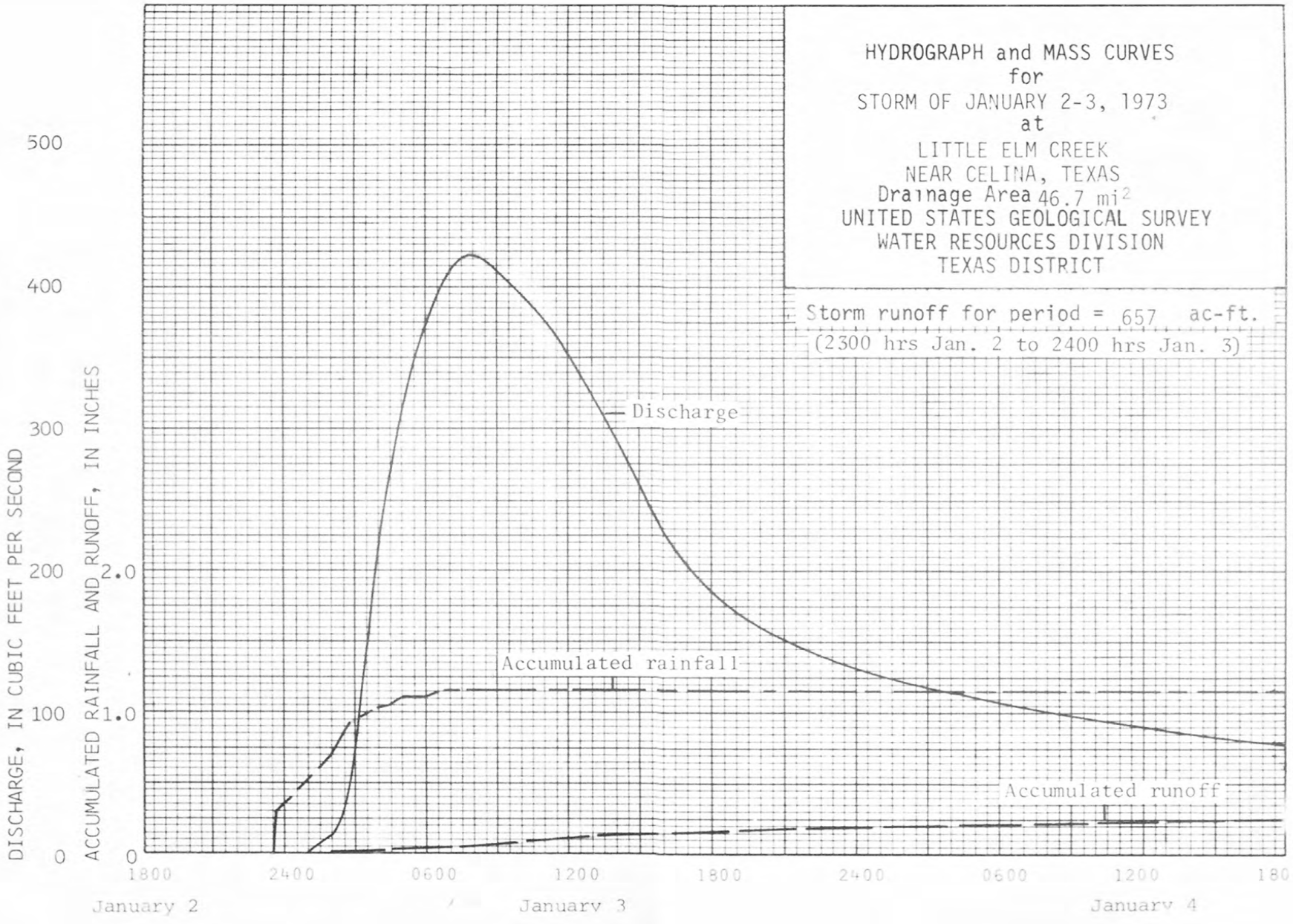
Sheet 1 of 1
Comp. by RMS
Date 10-11-74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek near Celina, Tex. Date of storm January 2-3, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	.45		.13		.42									
	Gage 2-R		Gage 6-R		Gage 10-R		Gage		Gage		Gage		Recording Gages	(Rec. Gages x K)
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages	All Gages
January 2, 1973														
0000	0	0	0	0	0	0							0	0
2330	0	0	0	0	0	0							0	0
45	.28	.13	.24	.03	.23	.10							.26	.30
2400	.34	.15	.28	.04	.28	.12							.31	.36
January 3, 1973														
0015	.38	.17	.32	.04	.32	.13							.34	.39
30	.45	.20	.36	.05	.34	.14							.39	.45
45	.47	.21	.40	.05	.38	.16							.42	.49
0100	.53	.24	.45	.06	.44	.18							.48	.56
15	.56	.25	.46	.06	.45	.19							.50	.58
30	.61	.27	.50	.06	.48	.20							.53	.61
45	.65	.29	.54	.07	.52	.22							.58	.67
0200	.70	.32	.57	.07	.54	.23							.62	.72
15	.75	.34	.61	.08	.61	.26							.68	.79
30	.82	.37	.68	.09	.66	.28							.74	.86
45	.87	.39	.71	.09	.72	.30							.78	.90
0300	.90	.40	.73	.09	.73	.31							.80	.93
30	.94	.42	.76	.10	.77	.32							.84	.97
0400	1.01	.45	.80	.10	.81	.34							.89	1.03
0500	1.06	.48	.86	.11	.87	.37							.96	1.11
0600	1.07	.48	.87	.11	.87	.37							.96	1.11
0700	1.13	.51	.90	.12	.87	.37							1.00	1.16
2400	1.13	.51	.90	.12	.87	.37							1.00	1.16

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.16	1.18	.19	7-S	.02	1.19	.02				
2-R	.13	1.13	.15	10-R	.12	.89	.10				
3-S	.20	1.37	.27								
4-S	.14	1.15	.16								
5-S	.19	1.22	.23								
6-R	.04	.90	.04							WMR	1.16

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 1.16 / 1.00 = 1.160


HYDROGRAPH and MASS CURVES
for
STORM OF JANUARY 2-3, 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 = 657 ac-ft.
(2300 hrs Jan. 2 to 2400 hrs Jan. 3)
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
500
400
300
200
100
0
2.0
1.0
0
1800
2400
0600
1200
1800
2400
0600
1200
180
January 2
January 3
January 4

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record January 2-4, 1973 Drainage Area 75.5 mi^2

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Inc.	In/Hr.	Runoff Inches	Acc. In.
	Jan. 2, 1973						
0000	4.48	-.05	.86	93	.0000	.0000	.0000
2315	4.41	-.05	.40	96	.0000	.0000	.0000
2400	4.48	-.05	.86	3	.0000	.0000	.0000
			120.96	192			
			.63				
	Jan. 3, 1973						
0000	4.48	-.05	.86	.5	.0000	.0000	.0000
0100	4.62	-.05	2.3	1.5	.0000	.0000	.0000
0300	5.31	-.03	10	1.5	.0002	.0003	.0003
0400	6.13	-.01	30	1.0	.0006	.0006	.0009
0500	8.32	0	126	1.0	.0026	.0026	.0035
0600	9.66		210	1.0	.0043	.0043	.0078
0700	10.41		265	1.0	.0054	.0054	.0132
0800	10.86		306	1.0	.0063	.0063	.0195
0900	11.27		347	1.0	.0071	.0071	.0266
1000	11.65		388	1.0	.0080	.0080	.0346
1100	11.96		434	1.0	.0089	.0089	.0435
1200	12.18		467	1.0	.0096	.0096	.0531
1300	12.32		488	1.5	.0100	.0150	.0681
1500	12.45		508	1.5	.0104	.0156	.0837
1600	12.46		509	1.0	.0104	.0104	.0941
1700	12.45		508	1.0	.0104	.0104	.1045
1800	12.39		499	1.5	.0102	.0153	.1198
2000	12.19		469	2.0	.0096	.0192	.1390
2200	11.86	0	419	2.0	.0086	.0172	.1562
2400	11.44	0	364	1.0	.0075	.0075	.1637
			7991.38	24			
			333				
	Jan. 4, 1973						
0000	11.44	0	364	1.0	.0075	.0075	.1712
0200	10.92		312	2.0	.0064	.0128	.1840
0400	10.38		262	2.0	.0054	.0108	.1948
0600	9.89		226	2.5	.0046	.0115	.2063
0900	9.36		189	3.0	.0039	.0117	.2180
1200	8.96		163	3.0	.0033	.0099	.2279
1500	8.63		143	3.0	.0029	.0087	.2366
1800	8.35		128	3.0	.0026	.0078	.2444
2100	8.13		116	3.0	.0024	.0072	.2516
2400	7.91	0	106	1.5	.0022	.0033	.2549
			4453	24			
			186				

Computed by RMS Date 9-24-74 Checked by JMT Date 10-23-74

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

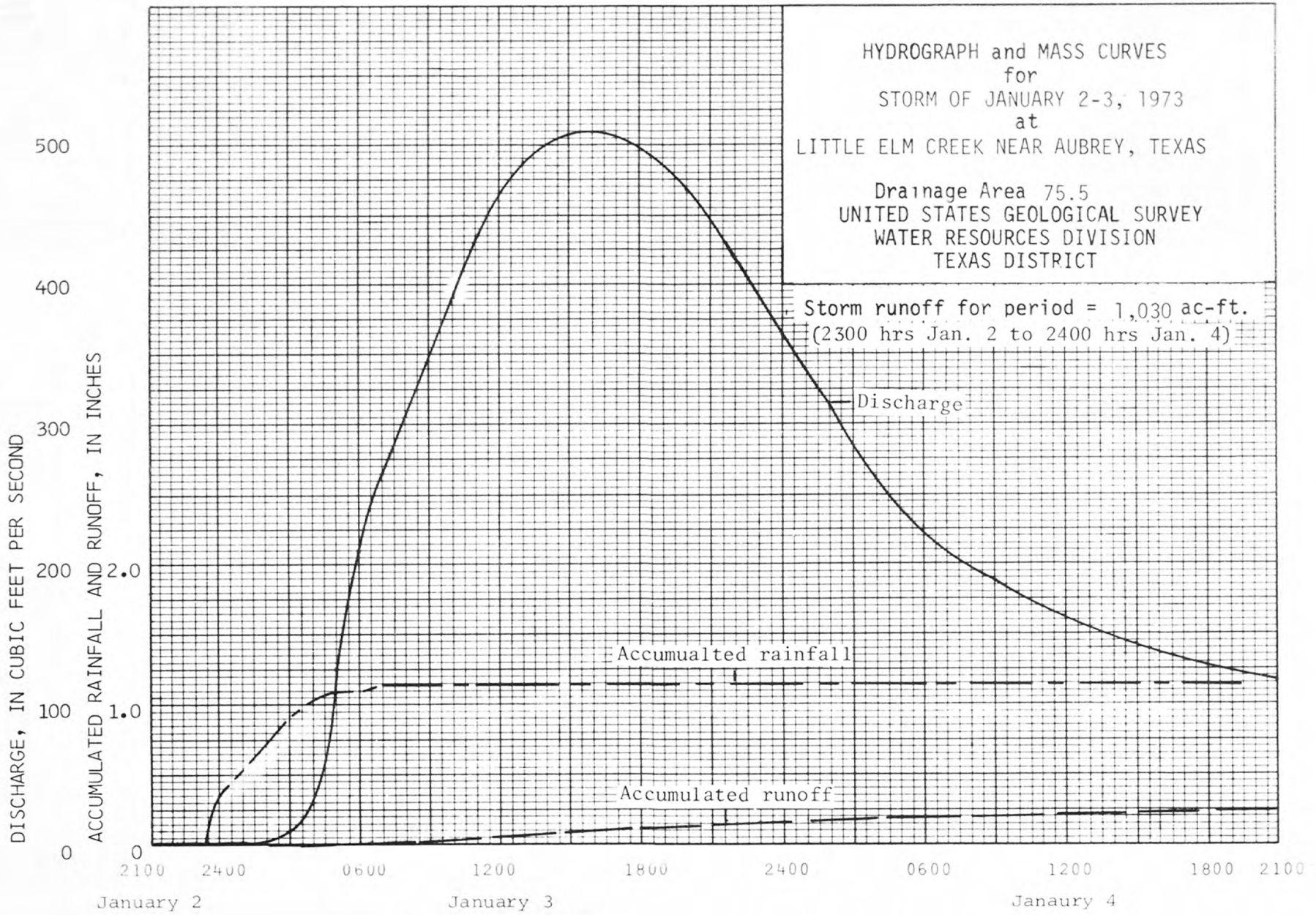
Sheet 1 of 1
Comp. by: RMS
Date 10-11-74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek near Aubrey, Tex. Date of storm January 2-3, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	.294		.345		.088		.273							
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	Gage Recorded	x Factor	Recording Gages All Gages	(Rec. Gages x K) All Gages
January 2, 1973														
0000	0	0	0	0	0	0	0	0					0	0
2330	0	0	0	0	0	0	0	0					0	0
45	.28	.08	.24	.08	.21	.02	.23	.06					.24	.28
2400	.34	.10	.28	.10	.27	.02	.28	.08					.30	.35
January 3, 1973														
0015	.38	.11	.32	.11	.31	.03	.32	.09					.34	.40
30	.45	.13	.36	.12	.37	.03	.34	.09					.37	.43
45	.47	.14	.40	.14	.41	.04	.38	.10					.42	.49
0100	.53	.16	.45	.16	.47	.04	.44	.12					.48	.56
15	.56	.16	.46	.16	.49	.04	.45	.12					.48	.56
30	.61	.18	.50	.17	.55	.05	.48	.13					.53	.62
45	.65	.19	.54	.19	.57	.05	.52	.14					.57	.67
0200	.70	.21	.57	.20	.62	.05	.54	.15					.61	.72
15	.75	.22	.61	.21	.66	.06	.61	.17					.66	.78
30	.82	.24	.68	.23	.74	.07	.66	.18					.72	.85
45	.87	.26	.71	.24	.79	.07	.72	.20					.77	.90
0300	.90	.26	.73	.25	.81	.07	.73	.20					.78	.92
30	.94	.28	.76	.26	.85	.07	.77	.21					.82	.96
0400	1.01	.30	.80	.28	.89	.08	.81	.22					.88	1.03
0500	1.06	.31	.86	.30	.95	.08	.87	.24					.93	1.09
0600	1.07	.31	.87	.30	.99	.09	.87	.24					.94	1.10
0700	1.13	.33	.90	.31	1.02	.09	.87	.24					.97	1.14
2400	1.13	.33	.90	.31	1.02	.09	.87	.24					.97	1.14

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.10	1.18	.12	7-S	.11	1.19	.13				
2-R	.09	1.13	.10	8-S	.12	1.19	.14				
3-S	.13	1.37	.18	9-R	.03	1.02	.03				
4-S	.09	1.15	.10	10-R	.08	.87	.07				
5-S	.13	1.22	.16								
6-R	.12	.90	.11							WMR	1.14

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 1.14 / .97 = 1.175


HYDROGRAPH and MASS CURVES
for
STORM OF JANUARY 2-3, 1973
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 1,030 ac-ft.
(2300 hrs Jan. 2 to 2400 hrs Jan. 4)
Discharge
Accumualted rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
500
400
300
200
100
0
2.0
1.0
0
2100
2400
0600
1200
1800
2400
0600
1200
1800
2100
January 2
January 3
Janaury 4

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 1 of 1

INFLOW AND OUTFLOW COMPUTATIONS

Storm period July 30, 1973

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 mi²

Date and time	Gage height	Storage	Time int.	Change in storage		Mean G. Ht.	Outflow	Total inflow	Rainfall on Pool				Net Inflow			
										area	Storage		Rate			Acc
	ft	ac-ft	hrs	ac-ft	ft³/s	ft	ft³/s	ft³/s	in	ac	ac-ft	ft³/s	ft³/s	in/hr	in	in
July 30,	1973															
0000	19.79															
0645	19.79	152.44	6.75													
0715	19.81	153.05	.50	+ .61	+ 14.8	19.80	0	14.8	.17	30.8	.44	10.6	4 2	.0031	.0016	.0016
45	19.83	153.67	.50	+ .62	+ 15.0	19.82	0	15.0	.14	30.9	.36	8.7	6 3	.0046	.0023	.0039
0830	19.92	156.48	.75	+ 2.81	+ 45.3	19.88	0	45.3	.82	31.3	2.14	34.5	10 8	.0080	.0060	.0099
0915	19.96	157.75	.75	+ 1.27	+ 20.5	19.94	0	20.5	.11	31.6	.29	4.7	158	.0117	.0088	.0187
30	19.99	158.70	.25	+ .95	+ 46.0	19.98	0	46.0	.08	31.9	.21	10.2	35 8	.0264	.0066	.0253
45	20.09	161.94	.25	+ 3.24	+ 157	20.04	.02	157	.05	32.3	.13	6.3	151	.1114	.0278	.0531
50	20.14	163.59	.083	+ 1.65	+ 241	20.12	.22	241	.				241	.1779	.0148	.0679
55	20.20	165.58	.083	+ 1.99	+ 290	20.17	.44	290	.01	33.4	.03	4.4	286	.2111	.0175	.0854
1000	20.27	167.96	.083	+ 2.38	+ 346	20.24	.90	347	.05	33.9	.14	20.4	327	.2413	.0200	.1054
15	20.44	173.88	.25	+ 5.92	+ 287	20.36	2.1	289	.04	34.9	.12	5.8	283	.2089	.0522	.1576
30	20.58	178.93	.25	+ 5.05	+ 244	20.51	4.3	248	.03	36.1	.09	4.4	244	.1801	.0450	.2026
45	20.69	183.01	.25	+ 4.08	+ 197	20.64	6.9	204	.02	37.1	.06	2.9	201	.1483	.0371	.2397
1100	20.78	186.42	.25	+ 3.41	+ 165	20.74	9.4	174	.03	37.9	.09	4.4	170	.1255	.0314	.2711
30	20.93	192.25	.50	+ 5.83	+ 141	20.86	11.8	153	.04	38.9	.13	3.1	150	.1107	.0554	.3265
1200	21.06	197.45	.50	+ 5.20	+ 126	21.00	12.8	139	.07	40.0	.23	5.6	133	.0982	.0491	.3756
1300	21.24	204.92	1.0	+ 7.47	+ 90.4	21.15	13.8	104	.07	41.5	.24	2.9	101	.0745	.0745	.4501
1400	21.35	209.64	1.0	+ 4.72	+ 57.1	21.30	14.7	71.8					71.8	.0530	.0530	.5031
1500	21.42	212.71	1.0	+ 3.07	+ 37.1	21.38	15.1	52.2					52.2	.0385	.0385	.5416
1700	21.48	215.38	2.0	+ 2.67	+ 16.2	21.45	15.4	31.6					31.6	.0233	.0466	.5882
2000	21.50	216.27	3.0	+ .89	+ 3.6	21.49	15.6	19.2					19.2	.0142	.0426	.6308
2200	21.49	215.82	2.0	- .45	- 2.7	21.50	15.7	13.0					13.0	.0096	.0192	.6500
2400	21.46	214.49	2.0	- 1.33	- 8.0	21.48	15.6	7.6					7.6	.0056	.0112	.6612

Comp. by RMS
Ckd. by JMT

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

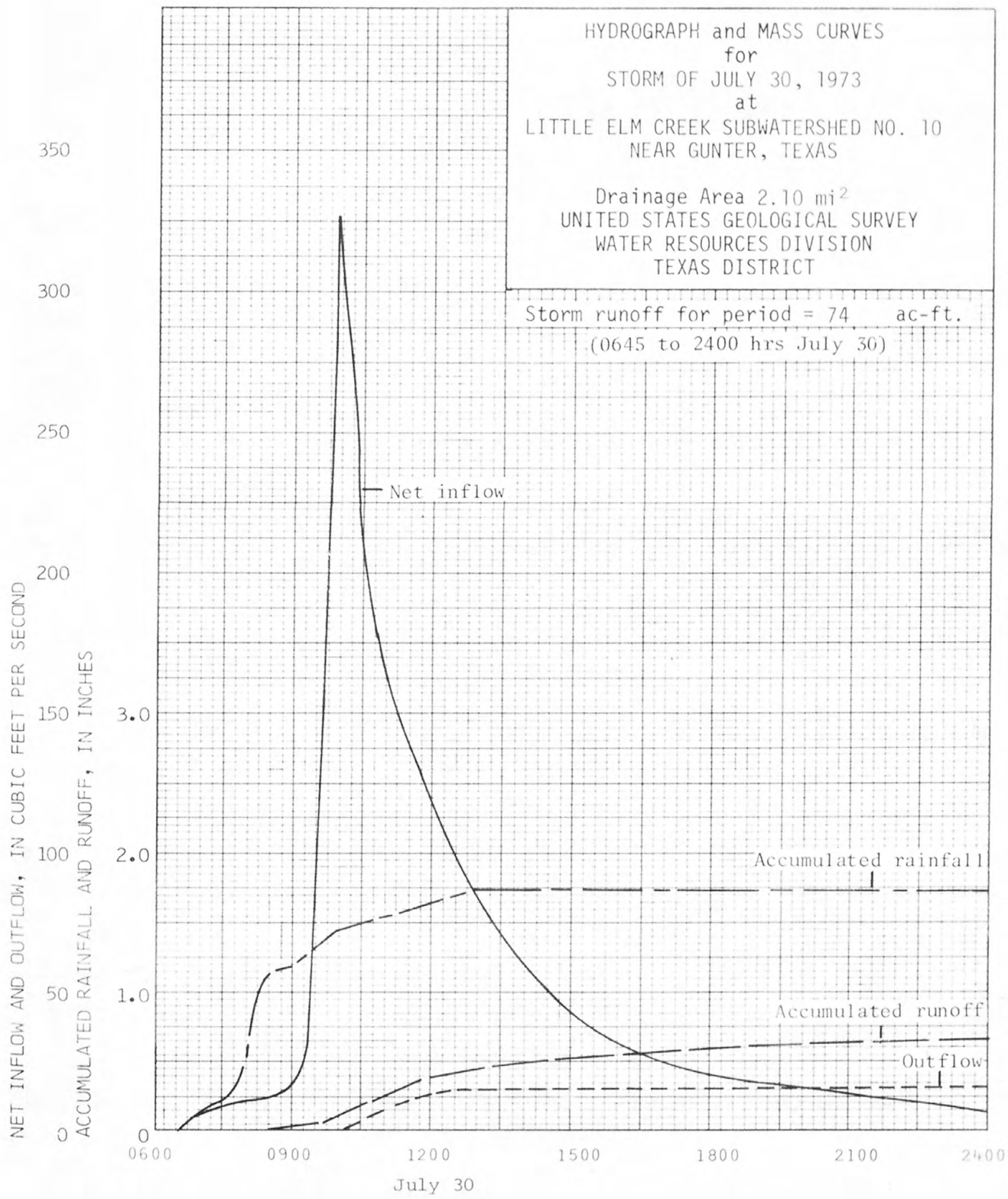
Sheet 1 of 1
Comp. by: RMS
Date 10-15-74
Check by JmT
Date 10-24-74

Study Area Little Elm Creek subwatershed No. 10 near Gunter, Tex. Date of storm July 30, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	1.000													
Date & Time	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages All Gages	(Rec. Gages x K) All Gages
July 30,	1973													
0000	0													0
0645	0													0
0700	.03													.03
15	.17													.17
30	.21													.21
45	.31													.31
0800	.49													.49
15	.93													.93
30	1.13													1.13
45	1.15													1.15
0900	1.17													1.17
15	1.24													1.24
30	1.32													1.32
45	1.37													1.37
1000	1.43													1.43
30	1.50													1.50
1100	1.55													1.55
30	1.59													1.59
1200	1.66													1.66
30	1.70													1.70
1300	1.73													1.73
2400	1.73													1.73

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
										WMR:	1.73

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


HYDROGRAPH and MASS CURVES
for
STORM OF JULY 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 = 74 ac-ft.
(0645 to 2400 hrs July 30)
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
NET INFLOW AND OUTFLOW, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
350
300
250
200
150
100
50
0
3.0
2.0
1.0
0
0600
0900
1200
1500
1800
2100
2400
July 30

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record July 30-31, 1973 Drainage Area 46.7 mi^2

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Inc.	In/Hr	Runoff Inches	Acc. In.
	July	30,	1973				
0000	2.42	+.26	.10	3.5	.0000	.0000	.0000
0700	2.42	+.26	.10	4	.0000	.0000	.0000
0800	2.47	+.24	.28	1	.0000	.0000	.0000
0900	2.82	0	1.5	1	.0000	.0000	.0000
1000	3.72	-.08	18	1	.0006	.0006	.0006
1100	4.58	-.15	54	1	.0018	.0018	.0024
1200	5.40	-.19	108	1	.0036	.0036	.0060
1300	6.23	-.22	172	1	.0057	.0057	.0117
1400	6.99	-.24	231	1	.0077	.0077	.0194
1500	7.37	-.25	266	1	.0088	.0088	.0282
1600	7.42	-.25	271	1	.0090	.0090	.0372
1700	7.30	-.25	259	1	.0086	.0086	.0458
1800	7.03	-.24	235	1	.0078	.0078	.0536
1900	6.73	-.24	210	1	.0070	.0070	.0606
2000	6.47	-.23	190	1.5	.0063	.0094	.0700
2200	6.07	-.22	159	2	.0053	.0106	.0806
2400	5.87	-.21	144	1	.0048	.0048	.0854
			2573.5				
			107				

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Inc.	In/Hr.	Runoff Inches	Acc. In.
	July	31,	1973				
0000	5.87	-.21	144	1.5	.0048	.0072	.0926
0300	5.62	-.20	125	3	.0042	.0126	.1052
0600	5.40	-.19	108	3	.0036	.0108	.1160
0900	5.18	-.18	91	3	.0030	.0090	.1250
1200	5.02	-.17	80	3	.0027	.0081	.1331
1500	4.90	-.16	73	3	.0024	.0072	.1403
1800	4.81	-.16	67	3	.0022	.0066	.1469
2100	4.72	-.15	62	3	.0021	.0063	.1532
2400	4.63	-.15	57	1.5	.0019	.0028	.1560
			2119.5				
			88				

Computed by RMS Date 10-9-74 Checked by JMT Date 10-23-74

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

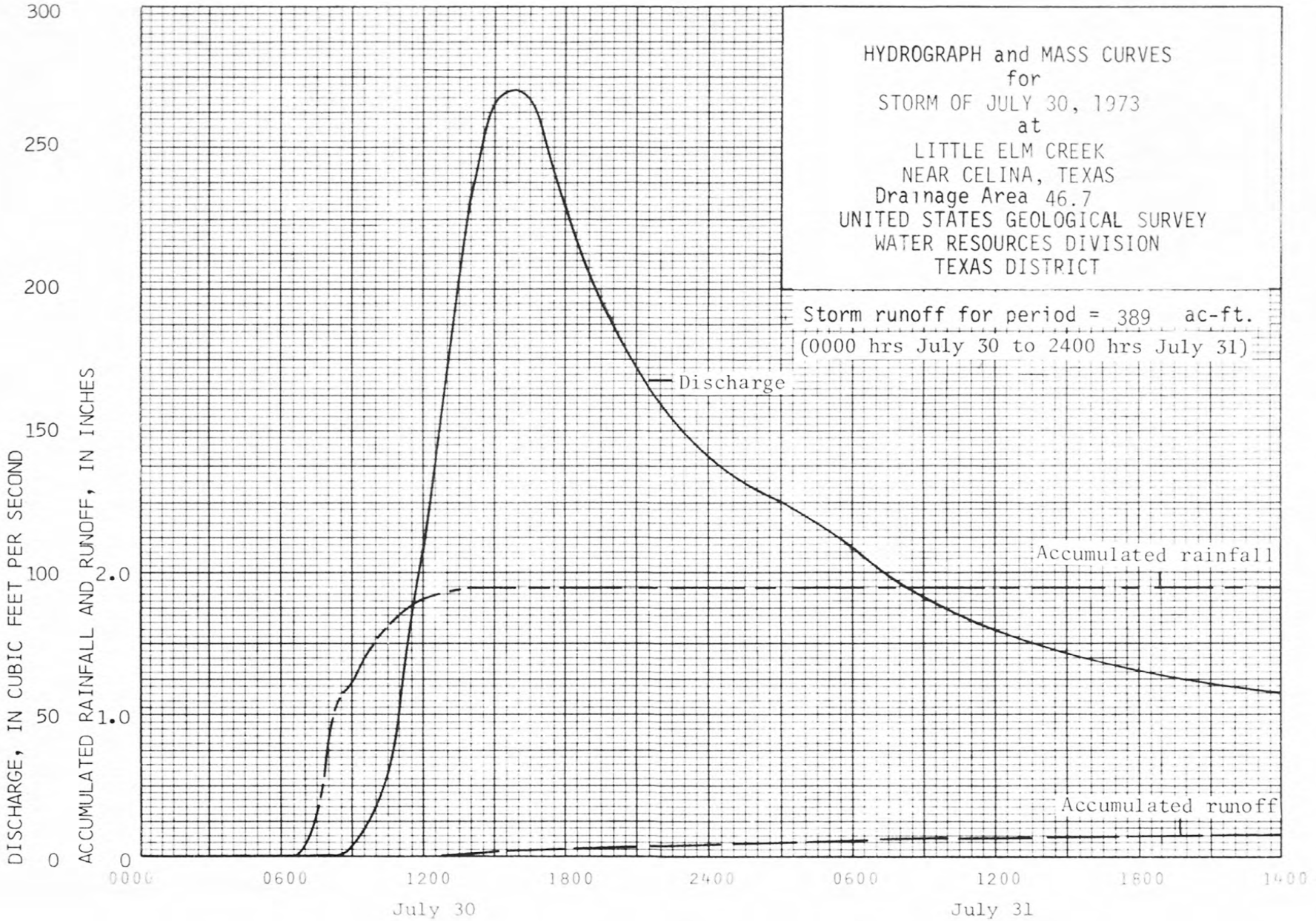
Sheet 1 of 1
Comp. by: RMS
Date 10-9 74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek near Celina, Tex. Date of storm July 30, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	.45		.13		.42								Recording Gages	(Rec. Gages x K)
	Gage 2-R		Gage 6-R		Gage 10-R		Gage		Gage		Gage		All Gages	All Gages
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor		
July 30, 1973														
0000	0	0	0	0	0	0							0	0
0645	0	0	0	0	0	0							0	0
0700	.06	.03	.12	.02	.03	.01							.06	.07
15	.14	.06	.16	.02	.17	.07							.15	.17
30	.38	.17	.21	.03	.21	.09							.29	.33
45	.45	.20	.35	.05	.31	.13							.38	.44
0800	.56	.25	.60	.08	.49	.21							.54	.62
15	.64	.29	1.21	.16	.93	.39							.84	.96
30	.84	.38	1.23	.16	1.13	.47							1.01	1.16
45	.91	.41	1.26	.16	1.15	.48							1.05	1.20
0900	.93	.42	1.33	.17	1.17	.49							1.08	1.24
15	.98	.44	1.40	.18	1.24	.52							1.14	1.31
30	1.06	.48	1.45	.19	1.32	.55							1.22	1.40
45	1.12	.50	1.52	.20	1.37	.58							1.28	1.47
1000	1.19	.54	1.58	.21	1.43	.60							1.35	1.55
30	1.26	.57	1.63	.21	1.50	.63							1.41	1.61
1100	1.30	.58	1.69	.22	1.55	.65							1.45	1.66
30	1.36	.61	1.75	.23	1.59	.67							1.51	1.73
1200	1.43	.64	1.82	.24	1.66	.70							1.58	1.81
1400	1.52	.68	1.85	.24	1.73	.73							1.65	1.89
2400	1.52	.68	1.85	.24	1.73	.73							1.65	1.89

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.16	1.75	.28	7-S	.02	2.09	.04				
2-R	.13	1.52	.20	10-R	.12	1.73	.21				
3-S	.20	2.01	.40								
4-S	.14	2.22	.31								
5-S	.19	2.00	.38								
6-R	.04	1.85	.07								
										WMB	1.89

WMB = Sum of Precipitation x Weight Factor K = WMB / Total Recording Gages Weighted Precipitation = 1.89 / 1.65 = 1.145


HYDROGRAPH and MASS CURVES
for
STORM OF JULY 30, 1973
at
LITTLE ELM CREEK
NEAR CELINA, TEXAS
Drainage Area 46.7
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 389 ac-ft.
(0000 hrs July 30 to 2400 hrs July 31)
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
300
250
200
150
100
50
0
2.0
1.0
0
0000
0600
1200
1800
2400
0600
1200
1800
2400
July 30
July 31

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record July 30-31, 1973 Drainage Area 75.5 mi^2

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Discharge Inc.	Discharge In/Hr	Runoff Inches	Runoff Acc. In.
	July 30, 1973						
0000	4.36	-.23	0	1.5	.0000	.0000	.0000
0300	4.40	-.23	.01	3.75	.0000	.0000	.0000
0730	4.40	-.23	.01	2.5	.0000	.0000	.0000
0800	4.50	-.23	.10	.75	.0000	.0000	.0000
0900	4.98	-.23	4.0	1.0	.0001	.0001	.0001
1000	4.98	-.23	4.0	1.0	.0001	.0001	.0002
1100	5.60	-.21	12	1.0	.0002	.0002	.0004
1200	6.85	-.03	55	1.0	.0011	.0011	.0015
1300	8.00	0	110	1.0	.0022	.0022	.0037
1400	8.81		154	1.0	.0032	.0032	.0069
1500	9.57		204	1.0	.0042	.0042	.0111
1600	10.21		249	1.0	.0051	.0051	.0162
1700	10.65		286	1.0	.0059	.0059	.0221
1800	10.98		318	1.5	.0065	.0098	.0319
2000	11.44		364	2.0	.0075	.0150	.0469
2200	11.72		398	2.0	.0082	.0164	.0633
2400	11.83	0	415	1.0	.0085	.0085	.0718
			3494,14	24			
			146				

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft^3/s	Discharge Inc.	Discharge In/Hr.	Runoff Inches	Runoff Acc. In
	July 31, 1973						
0000	11.83	0	415	.5	.0085	.0042	.0760
0100	11.84		416	1.0	.0085	.0085	.0845
0200	11.79		409	1.5	.0084	.0126	.0971
0400	11.55		375	2.0	.0077	.0154	.1125
0600	11.16		336	2.0	.0069	.0138	.1263
0800	10.68		288	2.0	.0059	.0118	.1381
1000	10.20		248	2.0	.0051	.0102	.1483
1200	9.78		219	2.0	.0045	.0090	.1573
1400	9.39		191	2.0	.0039	.0078	.1651
1600	9.03		167	2.0	.0034	.0068	.1719
1800	8.72		148	2.0	.0030	.0060	.1779
2000	8.48		134	2.0	.0027	.0054	.1833
2200	8.31		126	2.0	.0026	.0052	.1885
2400	8.18	0	119	1.0	.0024	.0024	.1909
			5820	24			
			242				

Computed by RMS Date 10-7-74 Checked by JMT Date 10-23-74

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

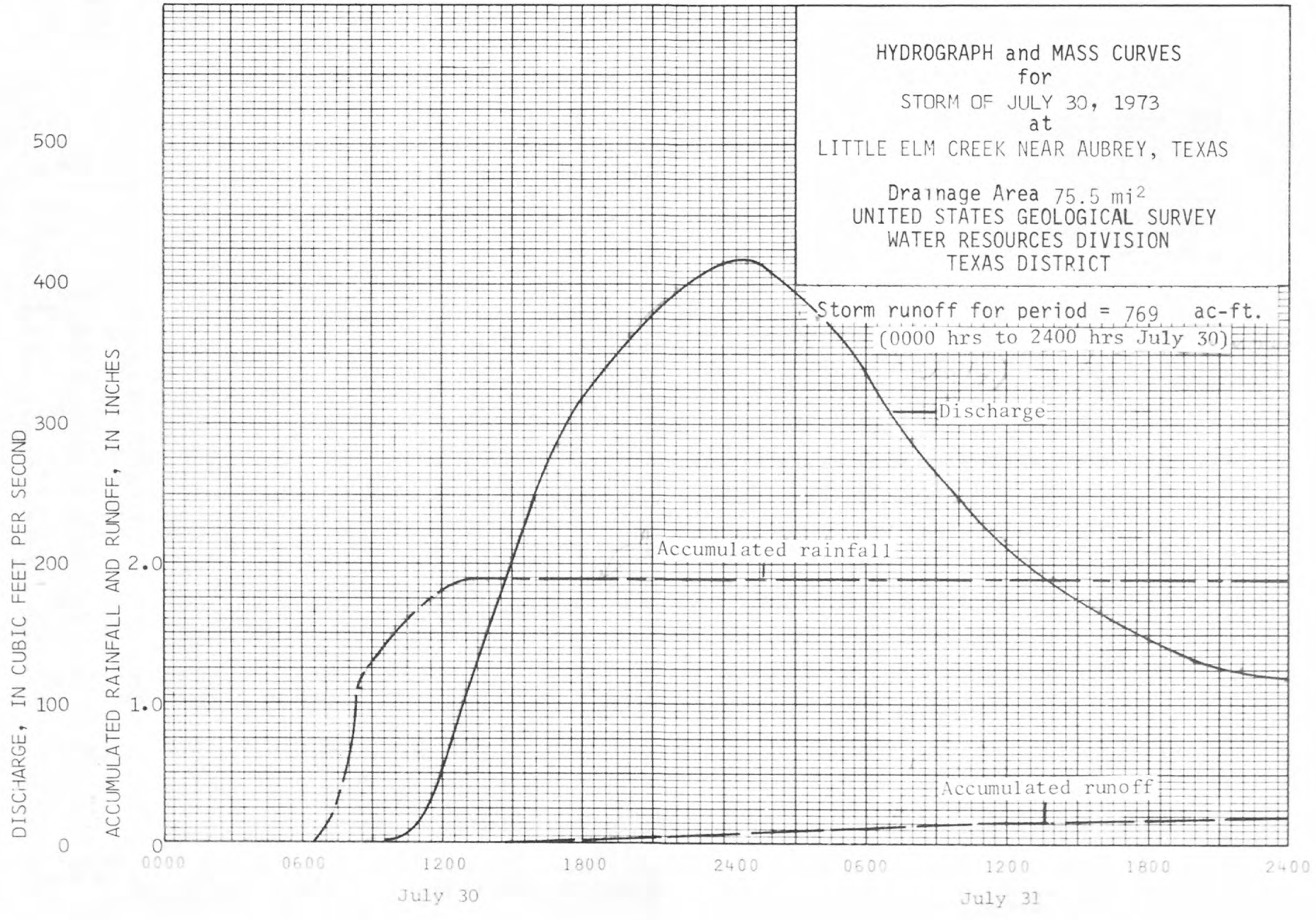
Sheet 1 of 1
Comp. by: RMS
Date 10-10-74
Check by JMT
Date 10-23-74

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

Weight Factor		.294		.345		.088		.273						Accumulated Weighted Precipitation	
		Gage 2-R		Gage 6-R		Gage 9-R		Gage 10-R		Gage		Gage		Recording Gages	(Rec. Gages x K)
Date & Time		Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages	All Gages
July 30, 1973															
	0000	0	0	0	0	0	0	0	0					0	0
	0645	0	0	0	0	0	0	0	0					0	0
	0700	.06	.02	.12	.04	.20	.02	.03	.01					.09	.10
	15	.14	.04	.16	.06	.82	.07	.17	.05					.22	.24
	30	.38	.11	.21	.07	.87	.08	.21	.06					.32	.35
	45	.45	.13	.35	.12	.92	.08	.31	.08					.41	.45
	0800	.56	.16	.60	.21	.96	.08	.49	.13					.58	.64
	15	.64	.19	1.21	.42	1.02	.09	.93	.25					.95	1.05
	30	.84	.25	1.23	.42	1.08	.10	1.13	.31					1.08	1.19
	45	.91	.29	1.26	.43	1.15	.10	1.15	.31					1.11	1.23
	0900	.93	.27	1.33	.46	1.20	.11	1.17	.32					1.16	1.28
	15	.98	.29	1.40	.48	1.28	.11	1.24	.34					1.22	1.35
	30	1.06	.31	1.45	.50	1.32	.12	1.32	.36					1.29	1.43
	45	1.12	.33	1.52	.52	1.35	.12	1.37	.37					1.34	1.48
	1000	1.19	.35	1.58	.54	1.38	.12	1.43	.39					1.40	1.55
	30	1.26	.37	1.63	.56	1.46	.13	1.50	.41					1.47	1.62
	1100	1.30	.38	1.69	.58	1.55	.14	1.55	.42					1.52	1.68
	30	1.36	.40	1.75	.60	1.61	.14	1.59	.43					1.57	1.73
	1200	1.43	.42	1.82	.63	1.64	.14	1.66	.45					1.64	1.81
	1400	1.52	.45	1.85	.64	1.68	.15	1.73	.47					1.71	1.89
	2400	1.52	.45	1.85	.64	1.68	.15	1.73	.47					1.71	1.89

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.10	1.75	.18	7-S	.11	2.09	.23				
2-R	.09	1.52	.14	8-S	.12	1.73	.21				
3-S	.13	2.01	.26	9-R	.03	1.68	.05				
4-S	.09	2.22	.20	10-R	.08	1.73	.14				
5-S	.13	2.00	.26								
6-R	.12	1.85	.22							WMR:	1.89

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 1.89 / 1.71 = 1.105


HYDROGRAPH and MASS CURVES
for
STORM OF JULY 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 = 769 ac-ft.
(0000 hrs to 2400 hrs July 30)
Discharge
Accumulated rainfall
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
500
400
300
200
100
0
2.0
1.0
0
0000
0600
1200
1800
2400
0600
1200
1800
2400
July 30
July 31

Form A-64
(Rev. 2-68)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

INFLOW AND OUTFLOW COMPUTATIONS

Storm period Sept 26-27, 1973

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 mi²

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage ft³/s	Mean G. Ht. ft	Outflow ft³/s	Total inflow ft³/s	Rainfall on Pool in	Rainfall on Pool area ac	Storage ac-ft	Storage ft³/s	Net Inflow Rate ft³/s	Net Inflow Rate in/hr	Net Inflow in	Acc in
Sept 26																
0000	19.96															
1700	19.96	157.75	17													
30	19.96	157.75	.5	0	0	19.96	0	0	0				0	.0000	.0000	.0000
45	19.97	158.07	.25	+ .32	15.5	19.96	0	15.5	.04	31.8	.11	5.3	10.2	.0075	.0019	.0019
1800	19.99	158.70	.25	+ .63	30.5	19.98	0	30.5	.10	31.9	.27	13.1	17.4	.0128	.0032	.0051
15	20.03	159.99	.25	+ 1.29	62.4	20.01	0	62.4	.39	32.1	1.04	50.3	12.1	.0089	.0022	.0073
30	20.05	160.64	.25	+ .65	31.5	20.04	.02	31.5	.16	32.3	.43	20.8	10.7	.0079	.0020	.0093
45	20.08	161.61	.25	+ .97	46.9	20.06	.05	46.9	.22	32.5	.60	29.0	17.9	.0132	.0033	.0126
1900	20.12	162.92	.25	+ 1.31	63.4	20.10	.15	63.5	.34	32.8	.93	45.0	18.5	.0137	.0034	.0160
15	20.16	164.25	.25	+ 1.33	64.4	20.14	.30	64.7	.11	33.1	.30	14.5	50.2	.0370	.0092	.0252
30	20.22	166.26	.25	+ 2.01	97.3	20.19	.56	97.9	.27	33.5	.75	36.3	61.6	.0455	.0114	.0366
45	20.28	168.30	.25	+ 2.04	98.7	20.25	.98	99.7	.14	34.0	.40	19.4	80.3	.0593	.0148	.0514
2000	20.35	170.72	.25	+ 2.42	117.	20.32	1.6	119.	.18	34.6	.52	25.2	93.8	.0692	.0173	.0687
15	20.42	173.17	.25	+ 2.45	119.	20.38	2.4	121.	.09	35.0	.26	12.6	108	.0797	.0199	.0886
30	20.55	177.84	.25	+ 4.67	226.	20.48	3.8	230.	.14	35.8	.42	20.3	210	.1550	.0388	.1274
45	20.72	184.14	.25	+ 6.30	305.	20.64	6.9	312.					312	.2303	.0576	.1850
50	20.79	186.80	.083	+ 2.66	386.	20.76	9.9	396.					396	.2922	.0243	.2093
55	20.90	191.06	.083	+ 4.26	619	20.84	11.5	631.					631	.4657	.0387	.2480
2100	21.00	195.02	.083	+ 3.96	575	20.95	12.4	587.					587	.4332	.0360	.2840
05	21.09	198.66	.083	+ 3.64	529	21.04	13.1	542.	.01	40.4	.03	4.4	538	.3970	.0330	.3170
10	21.17	201.98	.083	+ 3.32	482.	21.13	13.7	496.	.01	41.3	.03	4.4	492	.3631	.0301	.3471
15	21.24	204.92	.083	+ 2.94	427.	21.20	14.1	441.	.02	42.0	.07	10.2	431	.3181	.0264	.3735
20	21.31	207.90	.083	+ 2.98	433.	21.28	14.6	448.	.01	42.8	.04	5.8	442	.3262	.0271	.4006
25	21.38	210.95	.083	+ 3.05	443.	21.34	14.9	458.	.01	43.4	.04	5.8	452	.3336	.0277	.4283
30	21.44	213.60	.083	+ 2.65	385.	21.41	15.2	400.	.01	44.1	.04	5.8	394	.2908	.0241	.4524
45	21.61	221.28	.25	+ 7.68	372	21.52	15.8	388.	.05	45.2	.19	9.2	379	.2797	.0699	.5223
2200	21.74	227.37	.25	+ 6.09	295.	21.68	16.6	312.	.05	46.8	.20	9.7	302	.2229	.0557	.5780
15	21.86	233.13	.25	+ 5.76	279	21.80	17.2	296.	.02	48.0	.08	3.9	292	.2155	.0539	.6319
30	21.97	238.54	.25	+ 5.41	262.	21.92	17.8	289	.04	49.2	.16	7.7	272	.2007	.0502	.6821

Comp. by: JMT
Checked by: RMS

Form A-64
(Rev. 9-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

INFLOW AND OUTFLOW COMPUTATIONS

Storm period Sept 26-27, 1974

08052630 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 mi²

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage ft³/s	Mean G. Ht. ft	Outflow ft³/s	Total inflow ft³/s	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage ft³/s	Net Inflow Rate ft³/s	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
2300	22.14	247.13	.5	+ 8.59	208.	22.06	18.5	226.	.08	50.6	.34	8.2	218.	.1609	.0804	.7625
30	22.31	256.00	.5	+ 8.87	215.	22.22	19.3	234.	.10	52.2	.44	10.6	223.	.1646	.0823	.8448
2400	22.46	264.09	.5	+ 8.09	196.	22.38	20.1	216.	.08	53.8	.36	8.7	207.	.1528	.0764	.9212
Sept 27																
0200	23.12	302.31	2.0	+38.22	231	22.79	21.8	253.	.13	57.9	.63	3.8	249.	.1838	.3676	1.2888
0300	23.29	312.89	1.0	+10.58	128.	23.20	23.4	151.					151.	.1114	.1114	1.4002
0400	23.39	319.26	1.0	+ 6.37	77.1	23.34	23.9	101.					101.	.0745	.0745	1.4747
0600	23.49	325.75	2.0	+ 6.49	39.3	23.44	24.2	63.5					63.5	.0469	.0938	1.5685
0900	23.52	327.72	3.0	+ 1.97	7.9	23.52	24.5	32.4					32.4	.0239	.0717	1.6402
1200	23.50	326.40	3.0	- 1.32	- 5.3	23.50	24.4	19.1					19.1	.0141	.0423	1.6825
1800	23.41	320.55	6.0	- 5.85	- 11.8	23.44	24.2	12.4					12.4	.0092	.0552	1.7377
2400	23.30	313.52	6.0	- 7.03	- 19.2	23.33	23.9	9.7	.04	63.6	.21	.4	9.3	.0069	.0414	1.7791

Comp. by: JMT
Checked by: RMS

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

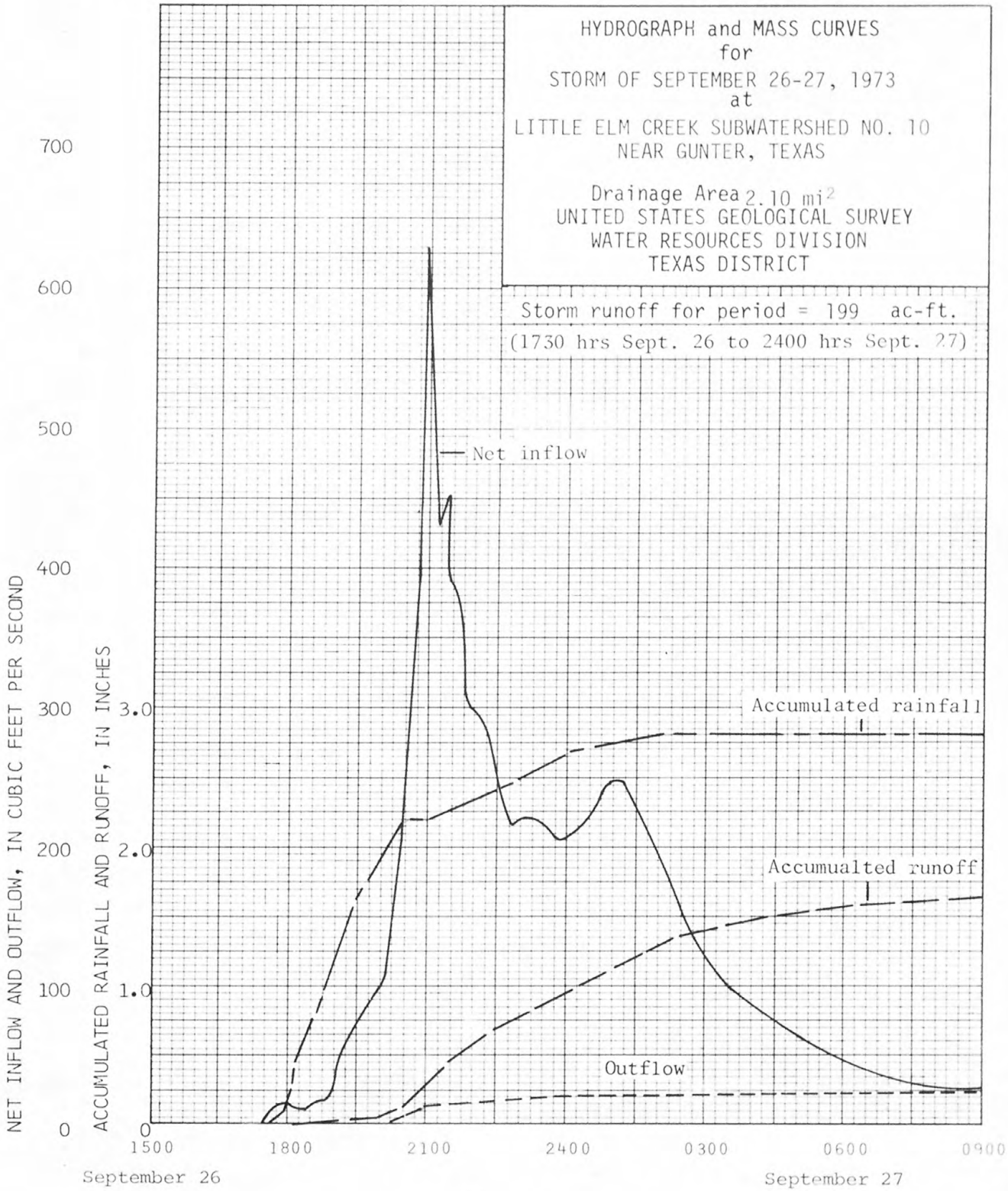
Sheet 1 of 1
Comp. by: RMS
Date 9-23-74
Check by JMT
Date 10-24-74

Study Area Little Elm Creek subwatershed No. 10 near Gunter, Tex. Date of storm September 26-27, 1973

Accumulated Precipitation in Inches for Recording Rain Gages													Accumulated Weighted Precipitation	
Weight Factor		1.000												
	Gage	10-R	Gage		Gage		Gage		Gage		Gage		Recording Gages	(Rec. Gages x K)
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages	All Gages
Sept 26, 1973														
0000	0													
1730	0													
45	.04													.04
1800	.14													.14
15	.53													.53
30	.69													.69
45	.91													.91
1900	1.25													1.25
15	1.36													1.36
30	1.63													1.63
45	1.77													1.77
2000	1.95													1.95
15	2.04													2.64
30	2.18													2.18
2100	2.18													2.18
30	2.25													2.25
45	2.30													2.30
2200	2.35													2.35
2300	2.49													2.49
2400	2.67													2.67
Sept 27, 1973														
0200	2.80													2.80

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
										WMR:	2.80

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


HYDROGRAPH and MASS CURVES
for
STORM OF SEPTEMBER 26-27, 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 = 199 ac-ft.
(1730 hrs Sept. 26 to 2400 hrs Sept. 27)
Net inflow
Accumulated rainfall
Accumualted runoff
Outflow
NET INFLOW AND OUTFLOW, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
100
200
300
400
500
600
700
1.0
2.0
3.0
1500
1800
2100
2400
0300
0600
0900
September 26
September 27

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record September 26-28, 1973 Drainage Area 46.7 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Discharge Inc.	Discharge In. Hr.	Runoff Inches	Runoff Acc. In.
	Sept. 26, 1973						
0000	2.37	+.26	.01	8.5	.0000	.0000	.0000
1700	2.35	+.27	.01	8.75			
30	2.35	+.27	.01	.5			
1800	2.44	+.22	.05	.375			
15	2.46	+.21	.07	.25			
30	2.49	+.19	.10	.25			
45	2.56	+.16	.38	.25			
1900	2.69	+.08	.96	.25	.0000		
15	2.85	0	1.8	.25	.0001	.0000	.0000
30	3.37	-.02	9.8	.25	.0003	.0001	.0001
45	4.53	-.14	51	.25	.0017	.0004	.0005
2000	5.75	-.20	135	.25	.0045	.0011	.0016
15	7.08	-.24	240	.25	.0080	.0020	.0036
30	8.18	-.16	356	.25	.0118	.0030	.0066
45	9.16	0	532	.25	.0177	.0044	.0110
2100	9.88		747	.375	.0248	.0093	.0203
30	10.67		1,250	.5	.0415	.0208	.0411
2200	11.09		1,640	.75	.0544	.0408	.0819
2300	11.96		2,700	1	.0896	.0896	.1715
2400	12.25	0	3,190	.5	.1059	.0530	.2245
			6,762.10				
			282				
	Sept. 27, 1973						
0000	12.25	0	3,190	.25	.1059	.0265	.2510
0030	12.31	0	3,300	.375	.1096	.0411	.2921
0045	12.34	0	3,350	.25	.1112	.0278	.3199
0100	12.37		3,410	.25	.1132	.0283	.3482
15	12.38		3,420	.25	.1135	.0284	.3766
30	12.37		3,410	.25	.1132	.0283	.4049
45	12.35		3,370	.25	.1119	.0280	.4329
0200	12.33		3,330	.625	.1106	.0691	.5020
0300	12.24		3,170	1.5	.1052	.1578	.6598
0500	11.90		2,600	2	.0863	.1726	.8324
0700	11.35		1,900	2	.0631	.1262	.9586
0900	10.75		1,320	2	.0438	.0876	1.0462
1100	10.23		918	3	.0305	.0915	1.1377
1500	9.53		624	4	.0207	.0828	1.2205
1900	9.25		552	4.5	.0183	.0824	1.3029
2400	9.06	0	512	2.5	.0170	.0425	1.3454
			33,765.25	24			
			1,410				
	Sept. 28, 1973						
0000	9.06	0	512	6	.0170	.1020	1.4474
1200	8.60	-.08	418	12	.0139	.1668	1.6142
2400	8.32	-.14	373	6	.0124	.0744	1.6886
			10,326	24			
			430				

Computed by BBH Date 11/20/73 Checked by JMT Date 11/20/73

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

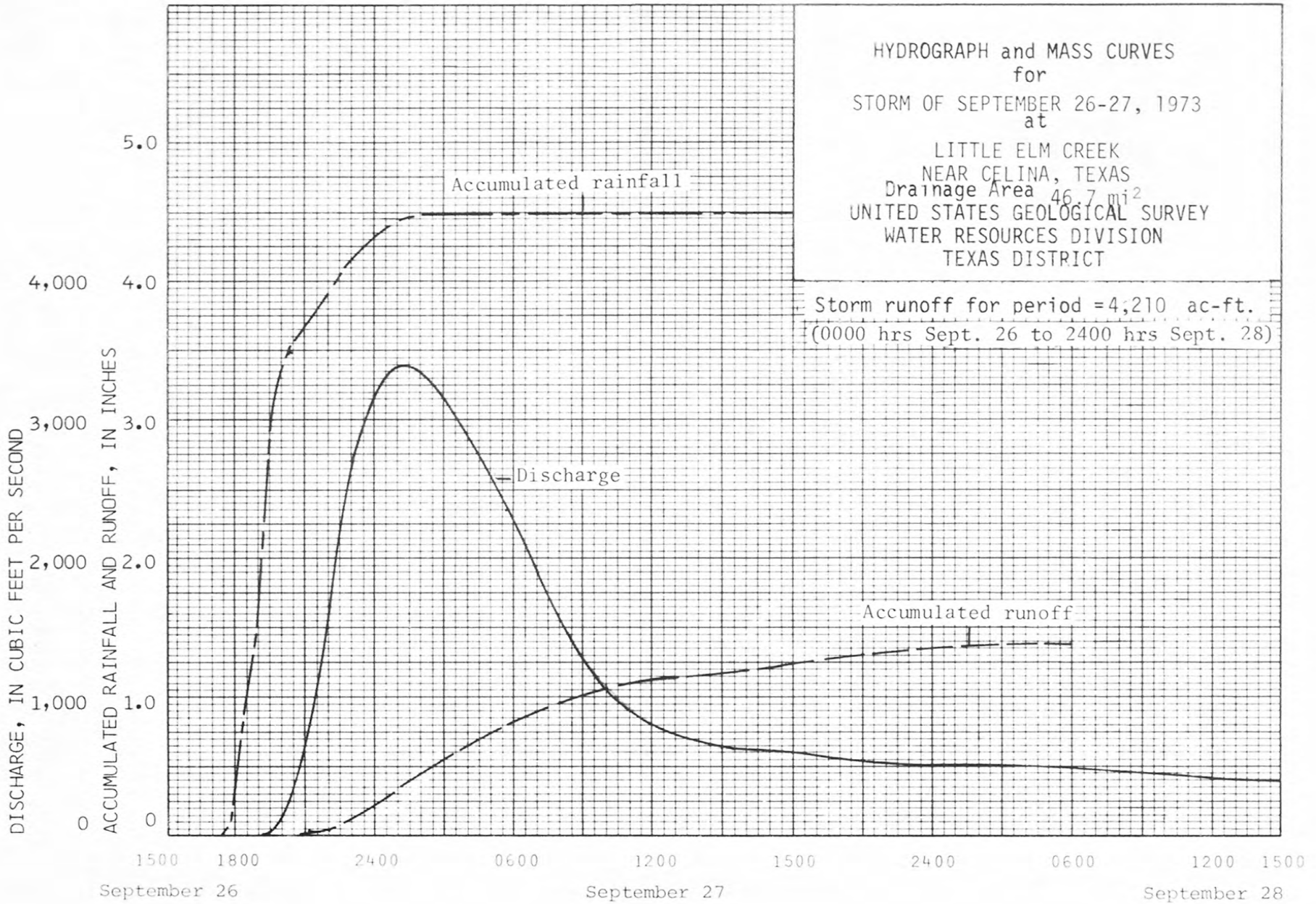
Sheet 1 of 1
Comp. by: RMS
Date 9-23-74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek near Celina, Tex. Date of storm September 26-27, 1973

Date & Time	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	.45		.13		.42								Recording Gages	(Rec. Gages x K)
	Gage 2-R		Gage 6-R		Gage 10-R		Gage		Gage		Gage		All Gages	All Gages
	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor		
Sept. 26, 1973														
0000	0													
1715	0	0	0	0	0	0								
30	0	0	.02	0	0	0							0	0
45	.12	.05	.15	.02	.04	.02							.09	.10
1800	.36	.16	.72	.09	.14	.06							.31	.34
15	.81	.36	.85	.11	.53	.22							.69	.76
30	1.35	.61	1.35	.18	.69	.29							1.08	1.19
45	1.56	.70	1.60	.21	.91	.38							1.29	1.42
1900	1.68	.76	1.78	.23	1.25	.52							1.51	1.67
15	2.48	1.12	2.15	.28	1.36	.57							1.97	2.17
30	3.65	1.64	2.55	.33	1.63	.68							2.65	2.92
45	4.05	1.82	2.75	.36	1.77	.74							2.92	3.22
2000	4.19	1.89	3.00	.39	1.95	.82							3.10	3.42
30	4.30	1.94	3.04	.40	2.18	.92							3.26	3.60
2100	4.37	1.97	3.12	.41	2.18	.92							3.30	3.64
2200	4.66	2.10	3.33	.43	2.35	.99							3.52	3.88
2300	4.98	2.24	3.58	.47	2.49	1.05							3.76	4.15
2400	5.17	2.33	3.79	.49	2.67	1.12							3.94	4.35
Sept. 27, 1973														
0100	5.25	2.36	3.87	.50	2.76	1.16							4.02	4.43
0200	5.28	2.38	3.94	.51	2.80	1.18							4.07	4.49
1800	5.28	2.38	3.94	.51	2.80	1.18							4.07	4.49

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.16	4.66	.75	7-S	.02	4.90	.10				
2-R	.13	5.28	.69	10-R	.12	2.80	.34				
3-S	.20	4.30	.86								
4-S	.14	3.60	.50								
5-S	.19	5.72	1.09								
6-R	.04	3.94	.16							WMR:	4.49

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 4.49 / 4.07 = 1.103


HYDROGRAPH and MASS CURVES
for
STORM OF SEPTEMBER 26-27, 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 =4,210 ac-ft.
(0000 hrs Sept. 26 to 2400 hrs Sept. 28)
Accumulated rainfall
Discharge
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
0
1,000
2,000
3,000
4,000
0
1.0
2.0
3.0
4.0
5.0
1500
1800
2400
0600
1200
1500
2400
0600
1200
1500
September 26
September 27
September 28

TX-65 (Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex

Period of Record September 26-29, 1973 Drainage Area 75.5 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Discharge Inc.	Discharge In/Hr.	Runoff Inches	Runoff Acc. In.
	Sept. 26, 1973						
0000	4.20	-.24	0	48	.0000	.0000	.0000
1200	4.19		0	70			
1730	4.19		0	23			
45	4.25		0	2			
1800	4.26		0	3			
30	4.29		0	4			
1900	4.42		.01	4			
30	4.66	-.24	.78	4	.0000		
2000	4.99	-.21	4.2	4	.0001		
30	5.08	-.20	5.2	4	.0001		
2100	5.04	-.20	4.8	4	.0001		
30	5.00	-.21	4.3	3	.0001		
45	5.02	-.21	4.5	2	.0001		
2200	5.31	-.17	8.2	2	.0002	.0000	.0000
15	6.85	0	56	2	.0011	.0003	.0003
30	8.02		111	3	.0023	.0009	.0012
2300	9.67		211	6	.0043	.0032	.0044
2400	11.33	0	353	4	.0072	.0036	.0080
			3221.26	192			
			17				
	Sept. 27, 1973						
0000	11.33	0	353	8	.0072	.0072	.0152
0200	12.88	0	600	16	.0123	.0246	.0398
0400	13.56	+.21	916	16	.0188	.0376	.0774
0600	14.16	+.20	1,280	16	.0262	.0524	.1298
0800	14.95	+.01	1,890	14	.0387	.0677	.1975
0930	15.43	0	2,630	12	.0539	.0808	.2783
1100	15.72		3,310	10	.0679	.0849	.3632
1200	15.81		3,560	6	.0730	.0548	.4180
30	15.84		3,650	5	.0748	.0468	.4648
1315	15.84		3,650	4	.0748	.0374	.5022
30	15.83		3,620	2	.0742	.0186	.5208
45	15.82		3,590	2	.0736	.0184	.5392
1400	15.82		3,590	9	.0736	.0828	.6220
1600	15.67		3,180	16	.0652	.1304	.7524
1800	15.46		2,700	20	.0554	.1385	.8909
2100	15.08	0	2,030	24	.0416	.1248	1.0157
2400	14.63	+.05	1,580	12	.0324	.0486	1.0643
			41180	192			
			2,150				
	Sept. 28, 1973						
0000	14.63	+.05	1,580	1	.0324	.0486	1.1129
0300	14.12	+.22	1,260	2	.0258	.0774	1.1903
0600	13.62	+.21	945	2	.0194	.0582	1.2485
0900	13.21	+.09	730	2	.0149	.0447	1.2932
1200	12.92	0	611	3	.0126	.0567	1.3499
1800	12.54	0	523	4	.0107	.0642	1.4141
2400	12.29	0	484	2	.0099	.0297	1.4438
			12335	16			
			771				

Computed by JMT Date 11/15/73 Checked by TRH Date 2/13/74

TX-65(Rev. 2-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex

Period of Record September 26-29, 1973 Drainage Area 75.5 mi²

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Discharge Inc.	Discharge In/Hr	Runoff Inches	Runoff Acc. In.
	Sept. 29,		1973				
0000	12.29	0	484	1	.0099	.0297	1.4735
0600	12.14		461	2	.0095	.0570	1.5305
1200	12.02		443	2	.0091	.0546	1.5851
1800	11.91		427	2	.0087	.0522	1.6373
2400	11.83	0	415	1	.0085	.0255	1.6628
			3558	8			
			445				

Time	G. Ht. Feet	Sh. Adj.	Discharge Ft³/s	Discharge Inc.	Discharge In/Hr.	Runoff Inches	Runoff Acc. In

Computed by JMT Date 11/15/74 Checked by TRH Date 9/13/74

TX-78 (Revised July 1969)

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

WEIGHTED PRECIPITATION RECORD

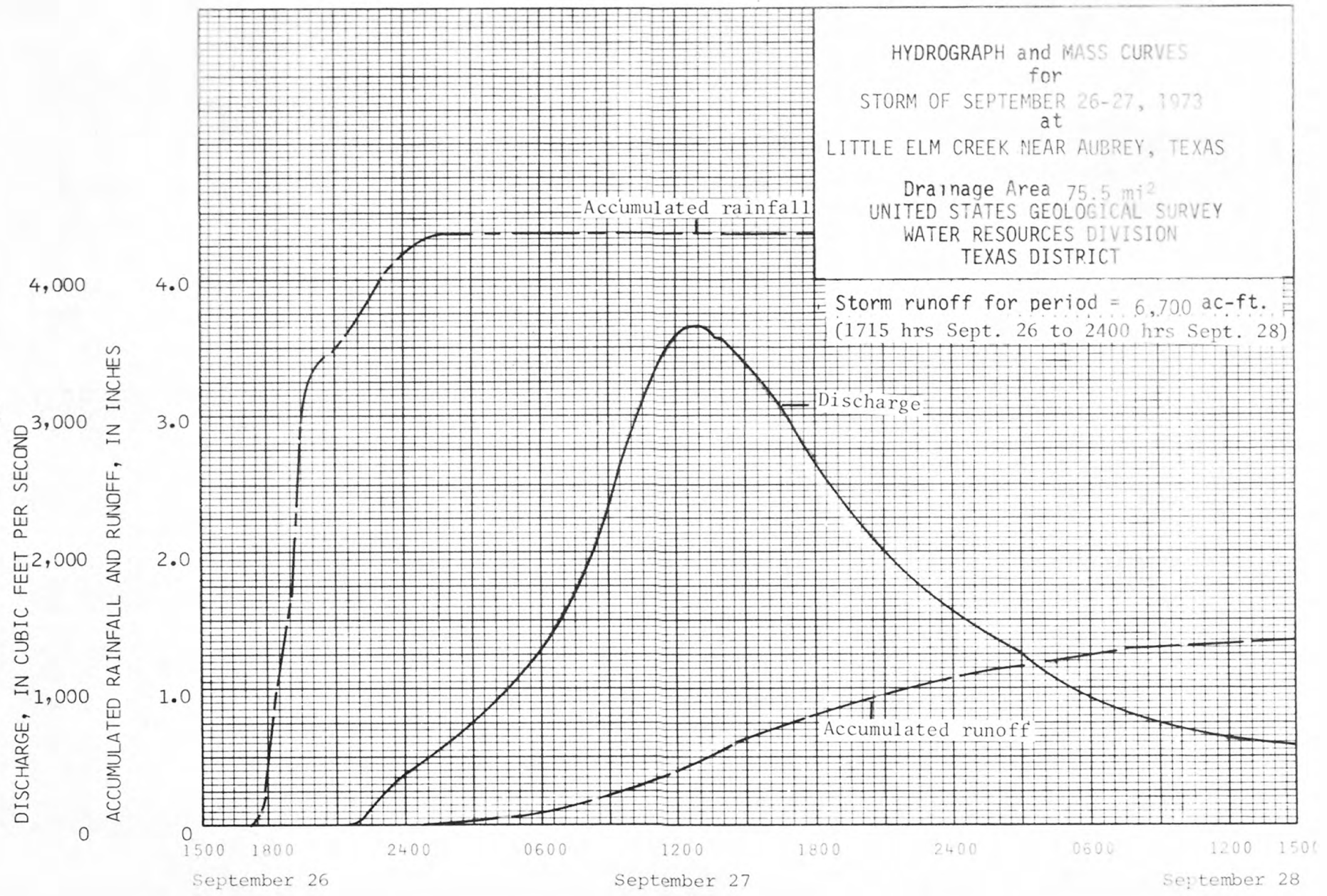
Sheet 1 of 1
Comp. by: RMS
Date 9-20-74
Check by JMT
Date 10-23-74

Study Area Little Elm Creek near Aubrey, Tex. Date of storm September 26-27, 1973

	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
Weight Factor	.294		.345		.088		.273							
	Gage 2-R		Gage 6-R		Gage 9-R		Gage 10-R		Gage		Gage		Recording Gages	(Rec. Gages x K)
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	All Gages	All Gages
Sept. 26, 1973														
0000	0	0	0	0	0	0	0	0					0	0
1715	0	0	0	0	0	0	0	0					0	0
30	0	0	.02	.01	.04	0	0	0					.01	.01
45	.12	.04	.15	.05	.12	.01	.04	.01					.11	.12
1800	.36	.11	.72	.25	.54	.05	.14	.04					.45	.50
15	.81	.24	.85	.29	.57	.05	.53	.14					.72	.79
30	1.35	.40	1.35	.47	.70	.06	.69	.19					1.12	1.23
45	1.56	.46	1.60	.55	.75	.07	.91	.25					1.33	1.47
1900	1.68	.49	1.78	.61	1.00	.09	1.25	.34					1.53	1.69
15	2.48	.73	2.15	.74	1.40	.12	1.36	.37					1.96	2.16
30	3.65	1.07	2.55	.88	1.52	.13	1.63	.44					2.52	2.78
45	4.05	1.19	2.75	.95	1.73	.15	1.77	.48					2.77	3.05
2000	4.19	1.23	3.00	1.04	2.13	.19	1.95	.53					2.99	3.29
30	4.30	1.26	3.04	1.05	2.22	.20	2.18	.60					3.11	3.43
2100	4.37	1.28	3.12	1.08	2.30	.20	2.18	.60					3.16	3.48
2200	4.66	1.37	3.33	1.15	2.48	.22	2.35	.64					3.38	3.72
2300	4.98	1.46	3.58	1.24	2.72	.24	2.49	.68					3.62	3.99
2400	5.17	1.52	3.79	1.31	2.94	.26	2.67	.73					3.82	4.21
Sept. 27, 1973														
0100	5.25	1.54	3.87	1.34	3.00	.26	2.76	.75					3.89	4.29
0200	5.28	1.55	3.94	1.36	3.08	.27	2.80	.76					3.94	4.34
1800	5.28	1.55	3.94	1.36	3.08	.27	2.80	.76					3.94	4.34

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor	Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-S	.10	4.66	.47	7-S	.11	4.90	.54				
2-R	.09	5.28	.48	8-S	.12	3.76	.45				
3-S	.13	4.30	.56	9-R	.03	3.08	.09				
4-S	.09	3.60	.32	10-R	.08	2.80	.22				
5-S	.13	5.72	.74								
6-R	.12	3.94	.47							WMR:	4.34

WMR = Sum of Precipitation x Weight Factor K = WMR / Total Recording Gages Weighted Precipitation = 4.34 / 3.94 = 1.102


HYDROGRAPH and MASS CURVES
for
STORM OF SEPTEMBER 26-27, 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 = 6,700 ac-ft.
(1715 hrs Sept. 26 to 2400 hrs Sept. 28)
Accumulated rainfall
Discharge
Accumulated runoff
DISCHARGE, IN CUBIC FEET PER SECOND
ACCUMULATED RAINFALL AND RUNOFF, IN INCHES
4,000
3,000
2,000
1,000
0
4.0
3.0
2.0
1.0
0
1500
1800
2400
0600
1200
1800
2400
0600
1200
1500
September 26
September 27
September 28