UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

COMPILATION OF HYDROLOGIC DATA, LITTLE ELM CREEK TRINITY RIVER BASIN, TEXAS 1968

72-420

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

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COMPILATION OF HYDROLOGIC DATA, LITTLE ELM CREEK TRINITY RIVER BASIN, TEXAS 1968

INTRODUCTION

History of Small Watershed Projects in Texas

The U.S. Soil Conservation Service is actively engaged in the installation of flood and soil erosion reducing 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. In June 1968, the Soil Conservation Service estimated approximately 3,500 structures to be physically and economically feasible for installation in Texas. As of September 30, 1968, 1,271 of these structures had been built.

This 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 are needed to appraise the effects of the structures on water yield and the 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 11 areas (fig. 1). 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 11 study areas were chosen to sample watersheds having different rainfall, topography, geology, and soils. In four of the study areas (Mukewater, North, Little 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. Structures have now been built in three of these study areas. A summary of the development of the floodwater-retarding structures on each study area as of September 30, 1968, is shown in table 1.

Purpose and Scope of this Basic-Data Report

This report, which is the ninth 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 1968 water year for the 75.5-square-mile area above the stream-gaging station Little Elm Creek near Aubrey, Texas. The location of floodwater-retarding structures and hydrologic instruments in the area are shown on figure 2.

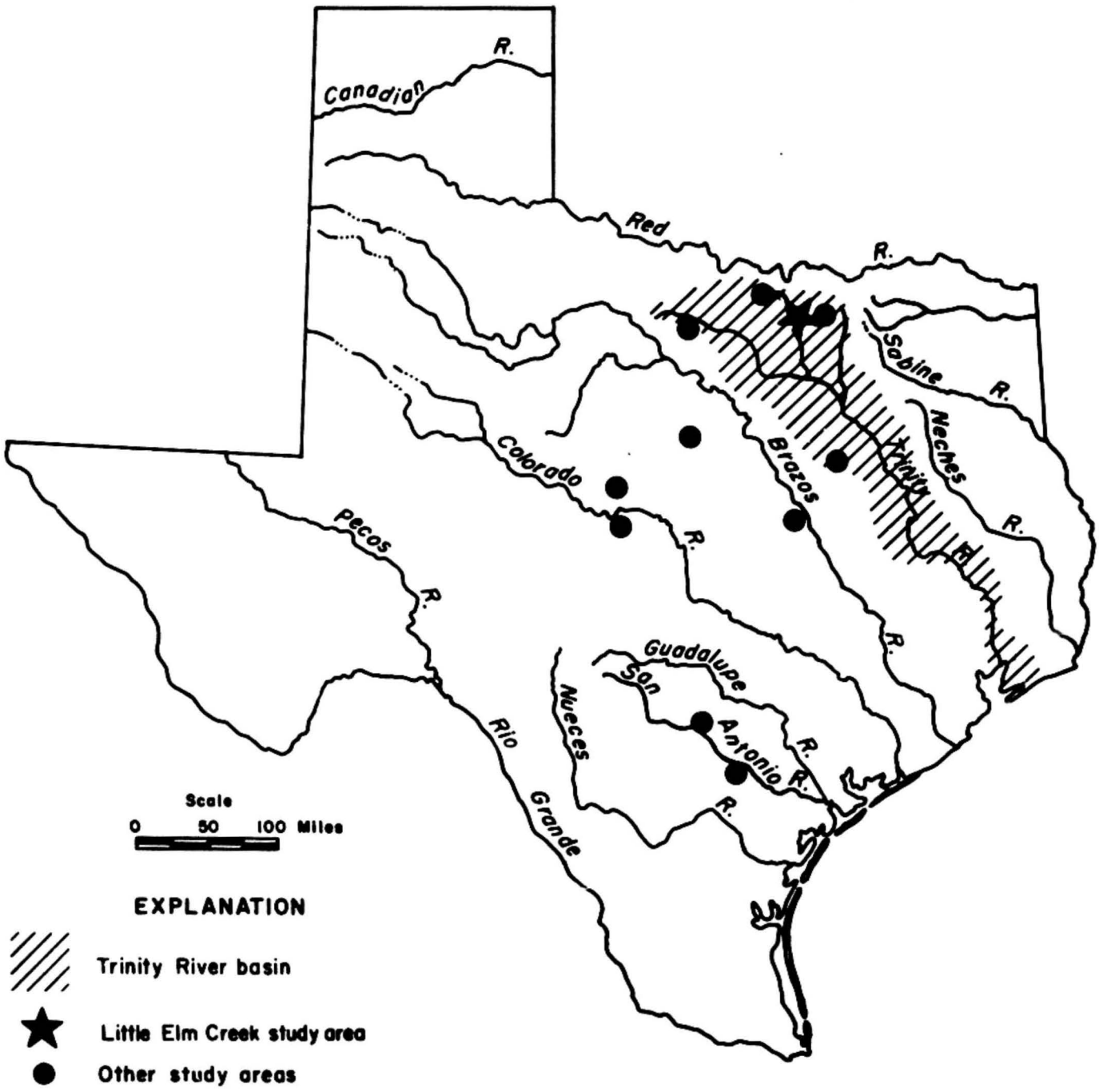


FIGURE 1.— Location of the Little Elm Creek study area

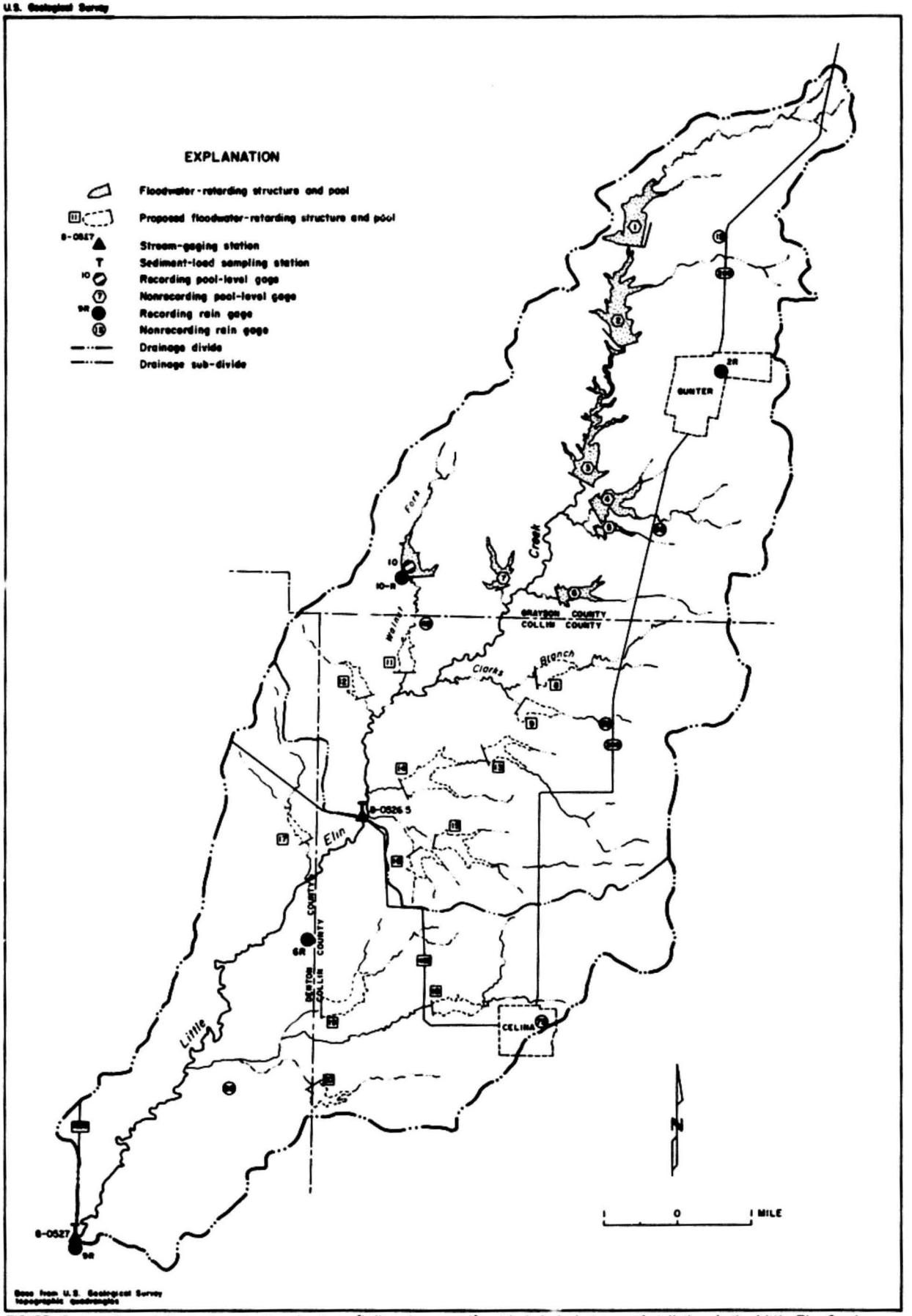


FIGURE 2.–Locations of floodwater-retarding structures (built and proposed) and hydrologic-instrument installations in the Little Elm Creek study area

Table 1.--Small watershed study areas in Texas as of Sept. 30, 1968

Watershed	Drainage area above stream-gaging station (sq mi)	Hydrologic data collection began	Floodwater-retarding structures above stream-gaging station	Period the structures were built
Trinity River basin:				
North Creek near Jacksboro	21.6	Aug. 1956	None	
Elm Fork Trinity River near Muenster	46.0	July 1956	14	1954-57, 63
Little Elm Creek near Aubrey	75.5	June 1956	8	1966
Honey Creek near McKinney	39.0	July 1951	12	1951-57
Pin Oak Creek near Hubbard	17.6	Sept. 1956	6	1962-63, 65
Brazos River basin:				
Green Creek near Alexander	46.1	Oct. 1954	8	1954-56
Cow Bayou near Mooreville	79.6	Sept. 1954	26	1955-58, 64-65
Colorado River basin:				
Deep Creek near Mercury	*43.9	June 1951	5	1951-53
Mukewater Creek at Trickham	70.0	Aug. 1951	6	1961-62, 65
San Antonio River basin:				
Calaveras Creek near Elmendorf	77.2	Aug. 1954	7 1/	1954-58
Escondido Creek at Kenedy	**72.4	July 1954	10	1954-58

* 8.31 sq mi above Dry Prong Deep Creek near Mercury not included in this total.
** 8.43 sq mi above Escondido Creek subwatershed No. 11 (Dry Escondido Creek) near Kenedy not included in this total.
1/ Two additional structures, sites 1 and 4, were destroyed during the 1968 water year due to construction of Calaveras Dam.

The investigation was 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 before and after floowater-retarding structures are built.

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 northeast of Gunter in Grayson County (fig. 2). The creek flows southwesterly through the northeast corner of Collin County, then into Denton County, and discharges into Garza-Little Elm Reservoir about 4 miles downstream from the lower stream-gaging station, Little Elm Creek near Aubrey. The length of the stream channel from the headwaters to the stream-gaging station is about 29 miles. The principal tributaries to Little Elm Creek above the Aubrey stream-gaging station are Clarks Branch, Walnut Fork, and Hearne Branch. The total drainage area above the Aubrey stream-gaging station is 75.5 square miles. Above the Celina stream-gaging station, the total area is 46.2 square miles.

The length of the watershed is about 19 miles and the maximum width is about 7 miles. The watershed slopes from east to west with the eastern divide being some 60 to 80 feet higher than the western divide. The main channel splits the watershed into unequal areas, with the smaller western area having a more gentle valley slope. The low-water channel falls from an altitude of about 840 feet above mean sea level at the headwater divide to 540 feet above mean sea level at the Aubrey stream-gaging station. In the 1-mile reach immediately downstream from the divide, there is a decrease in elevation of 80 feet. The streambed has an average slope of 7 feet per mile between river miles 21 and 27, measured upstream from the Aubrey stream-gaging station. Between river miles 14 and 21, the average slope of the streambed is is 4 feet per mile, and river mile 0 to 14, the average slope is 2-1/2 feet per mile.

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, with the remainder in the Forested Coastal Plain. The Blackland soils are medium to fine textured with a color range from light gray to very dark brown. The Forested Coastal Plain soils are medium to coarse textured and light gray.

Cropland used in the watershed is about 60 percent cultivation, about 34 percent pasture, about 3 percent woodland, and the remaining 3 percent miscellaneous.

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. The long-term normal (1931-60) rainfall recorded at the U.S. Weather Bureau station at Sherman (15 miles northeast) is 39.05 inches per year.

FLOODWATER-RETARDING STRUCTURES

There are eight floodwater-retarding structures in the Little Elm Creek watershed upstream from the stream-gaging station Little Elm Creek near Celina. These eight floodwater-retarding structures presently in operation provide capacity for the temporary storage of 7,720 acre-feet of flood runoff from 23.8 of the 46.2-square-mile study area above the stream-gaging station near Celina. These eight structures were completed during the period March to August 1966.

Table 2 contains a summary of the physical data at each of the eight 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, or water-stage recorders at each of the eight floodwater-retarding structures, and two stream-gaging stations on Little Elm Creek downstream from the eight structures. The location of instruments is 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. The original rainfall records are filed in the Geological Survey office in Fort Worth, Texas.

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

Site number	Drainage area (sq mi)	Date dam completed	Date gage established	Datum of gage above mean sea level, Datum of 1929	Emergency Spillway			Drop Inlet		Portholes or weir notches			Controlled opening		Pipe diameter through dam (in.)	Inside dimensions of drop inlet box	Inside dimensions of orifice plate (in.)	Range of Staff Gages
					Width (ft)	Gage Height (ft)	Contents (ac-ft)	Gage Height (ft)	Pool Contents	Number and Size (in.)	Gage Height at bottom (ft)	Pool Contents (ac-ft)	Gage Height at bottom (ft)	Pool Contents (ac-ft)				
1	*3.40	6-10-66	4- 8-66	674.00	90	29.0	977	19.00	179	None	-	-	9.50	17	24	2'x6'	Two 15.5	13.6-30.5
2	*3.95	6-10-66	7-13-66	657.30	205	25.3	1420	17.00	351	Four 12"x18" notches	15.47	251	7.92	38	30	2'6"x 8'4"	- -	10.2-23.7
3	*7.27	6-10-66	7-14-66	632.80	335	24.8	1840	16.00	337	Twelve 12.7" x 8"	14.00	203	7.50	32	42	3'6"x 11'	-	8.1-27.1
										Twelve 12.7 x 8"	12.00	118						
4	*3.33	8-11-66	9-13-66	639.60	350	29.9	1330	17.00	265	Two 10"x12" notches	16.12	228	7.50	35	24	2'x6'	One 16 x 14	7.0-30.5
5	*.50	3-16-66	4- 8-66	641.20	45	28.4	204	18.00	54	None	-	-	9.50	8.2	18	2'x4'	-	10.2-30.5
6	*1.99	3-16-66	4-7-66	625.50	One 145	31.2	744	19.00	158	None	-	-	10.50	18	24	2'x4'	One 17.25	10.2-37.3
7	1.28	3-16-66	4- 7-66	618.30	One 110	23.7	464	14.00	108	None	-	-	8.50	31	24	2'x4'	One 14	10.2-27.1
10	*2.10	3-16-66	4- 6-66	615.50	125	29.2	868	20.00	159	None	-	-	13.50	40	24	2'x4'	One 16.5 x 18	10.2-27.1

* Drainage areas revised.

A continuous water-stage recording gage is operated at floodwater-retarding structure site 10. Data collected at this site are used to compute the contents, surface area, inflow, and outflow. Records at this site began April 1, 1966. Weekly readings of the staff gages at each of the eight 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 total runoff from the area above each stream-flow 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 1968 WATER YEAR

Rainfall and Runoff

Average rainfall over the study area during the 1968 water year was 41.02 inches, or 111 percent of the 12-year average of 37.08 inches. Monthly rainfall totals ranged from 0.97 inch in November to 6.47 inches in September. The weighted-mean rainfall above the stream-gaging station Little Elm Creek near Celina was 41.35 inches. The mean daily discharge was 33.0 cfs (cubic feet per second) at the stream-gaging station near Celina and 44.0 cfs at the stream-gaging station near Aubrey. These figures compare closely with the 12-year average of 39.6 cfs at the stream-gaging station near Aubrey. The annual runoff during the year at the Aubrey station was 31,910 acre-feet (7.92 inches). At the Celina station, the annual runoff was 23,810 acre-feet (9.66 inches).

The weighted-mean rainfall above Little Elm Creek subwatershed No. 10 during the 1968 water year was 37.05 inches. Runoff above site 10 was 923 acre-feet, which represents an equivalent depth of 8.24 inches.

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.

Five storm periods were selected for detailed computations. These computations include a detailed time breakdown of rainfall and discharge. Hydrographs and mass curves are drawn for illustration. The

storm periods selected occurred on March 19-20, April 22, May 9, May 10-11, and May 12-13, 1968. A summary of rainfall-runoff data for these storms is shown in table 3. Computations and curves for the storms are shown in the compilation of data.

Chemical Quality

Records of sedimentation data for the 1968 water year have been withheld pending further analysis of the record.

During the year, one chemical-quality sample was collected at the stream-gaging station near Aubrey.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table .--Storm rainfall-runoff data, 1968 water year

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (cfs)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Texas (Drainage area, 2.10 sq mi)								
March 19-20, 1968	26	2.88	0.31	0.52	0.58	2.47	0.86	635
April 22, 1968	0.5	1.48	1.00	1.48	-	0.64	0.43	451
May 9, 1968	1.8	1.39	0.75	1.14	1.26	0.43	0.31	355
May 10-11, 1968	6.0	1.49	0.50	0.84	0.88	0.89	0.60	246
May 12-13, 1968	2.2	0.81	0.43	0.61	0.68	0.46	0.57	230
8-0526.5 Little Elm Creek near Celina, Texas (Drainage area, 46.2 sq mi, of which 23.8 sq mi is above floodwater-retarding structures)								
March 19-20, 1968	26.2	3.30	0.23	0.38	0.53	1.92	0.58	2,840
April 22, 1968	1.0	1.19	0.70	0.99	1.19	0.81	0.68	1,960
May 9, 1968	9.5	1.96	1.00	1.58	1.83	0.41	0.21	938
May 10-11, 1968	7.0	1.46	0.45	0.66	0.69	0.98	0.67	1,630
May 12-13, 1968	2.5	1.02	0.41	0.69	0.84	0.89	0.87	1,720

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 3.--Storm rainfall-runoff data, 1968 water year--Continued.

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (cfs)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
8-0527. Little Elm Creek near Aubrey, Texas (Drainage area, 75.5 sq mi, of which 23.8 sq mi is above floodwater-retarding structures)								
March 19-20, 1968	26.5	3.21	0.17	0.32	0.55	1.68	0.52	2,830
April 22, 1968	1.0	1.08	0.61	0.94	1.08	0.68	0.63	1,640
May 9, 1968	14.2	1.47	0.64	1.15	1.34	0.21	0.14	561
May 10-11, 1968	6.0	1.23	0.26	0.41	0.58	0.57	0.46	1,410
May 12-13, 1968	10.5	0.95	0.35	0.55	0.78	0.62	0.65	1,380

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

8-0526.3. Little Elm Creek subwatershed No. 10 near Gunter, Tex.

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

Drainage area (revised).--2.10 sq mi.

Records available.--April 1966 to September 1968.

Gage.--Water-stage recorder. Datum of gage is 615.51 ft above mean sea level, datum of 1929 (Soil Conservation Service bench mark).

Extremes.--Maximum outflow during year, 27.3 cfs Mar. 20 (gage height, 24.50 ft); no outflow most of time. Maximum inflow during year, 635 cfs (average for 5-minute interval) Mar. 20, computed from change in pool contents and adjusted for outflow and rainfall on pool surface during time of peak inflow; no inflow most of time.
1966-68: Maximum outflow, 31.9 cfs Apr. 30, 1966 (gage height, 27.09 ft); no outflow most of time each year. Maximum inflow, 3,240 cfs (average for 5-minute interval) May 30, 1967, computed and adjusted as above; no inflow at times.

Remarks.--Records good. Dam completed Mar. 16, 1966, and storage began in April 1966. Pool is formed by rolled-fill earthen dam 1,588 ft long, with a 130-foot wide emergency spillway at left end of dam, with crest at gage height 29.2 ft. Outlet structure is a 2.0- by 4.0-foot uncontrolled concrete drop inlet structure with crest at gage height 20.00 ft, and connected to a 24-inch concrete pipe with invert at gage height 13.0 ft. There is also a 12-inch controlled slide gate used as a water-supply outlet that is connected to the drop inlet at gage height 13.5 ft. Pool capacity is 868 acre-ft at spillway crest, 159 acre-ft at crest of drop inlet, and 40 acre-ft 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.

POOL WATER BUDGET, IN ACRE-FEET, WATER YEAR OCTOBER 1967 TO SEPTEMBER 1968

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Inflow 1/	5.0	2.8	8.1	45.0	8.6	420	148	246	14.6	4.0	3.6	19.0
Outflow	0	0	0	4.0	3.4	404	148	239	0	0	0	0
(††)	2.15	0.44	1.82	2.73	1.31	4.70	3.94	4.99	3.41	2.03	1.90	7.24

Calendar year 1967: Inflow 616 Outflow 583 †† 27.33

Water year 1967-68: Inflow 925 Outflow 798 †† 36.66

Peak inflow (base, 100 cfs)

Date	Time	Discharge
3-20	0655	*635
4-22	0850	*451
5- 9	1645	*355
6-11	0530	**246
6-13	0230	**230

1/ Inflow adjusted for rainfall on pool and pool losses.
†† Weighted-mean rainfall, in inches.
* 5-minute interval.
** 15-minute interval.

9-329c
(Oct. 1961)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0526.30

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

10-329-5 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	

9-329.a
(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 Gunter, Tex.
[Drainage area, 2.10 square miles] (revised)

16-29329-5 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	

D-829.e
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0526.30

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

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	

A-74a
Rev 7-65

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR

8-0526.3, Little Elm Creek subwatershed No. 10 near Gunter, Tex. Drainage Area 2.10 sq. mi.

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

Maxima: gage height, 24.50 ft; outflow, 27.3 c.f.s.; surface area, 76.0 acres; contents, 397 acre-feet; on Mar. 20, 1968.

Minima: gage height, 18.4 ft; surface area, 23.9 acres; contents, 114 acre-feet; on Oct. 28, 1967.

Maximum inflow, 635 c.f.s. (averaged for 5-min. interval and adjusted for rainfall on pool surface) on Mar. 20, 1968.

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

Pool water budget, in acre-feet, water year October 1967 to September 1968.

	Oct	Nov.	Dec.	Calendar year 1967	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1968
Total Inflow 1/	5.0	2.8	8.1	616	45.0	8.6	*418	148	246	14.6	4.0	3.6	19.0	*923
Total Outflow	0	0	0	583	4.0	3.4	404	148	239	0	0	0	0	798
Total Consumption	11.8	6.1	7.6	190	3.2	9.4	15.0	29.1	27.1	25.0	19.8	23.4	17.2	195
†	-2.4	-2.4	+4.2	- 22.7	+44.2	-0.7	+16.4	-17.8	- 4.8	-1.6	-10.6	-15.6	+18.6	+ 27.5
♦	24.6	24.4	24.5	-	26.9	32.2	38.4	34.6	35.2	31.3	30.5	27.6	27.3	-
††	2.15	0.44	1.82	27.33	2.73	1.31	*5.09	3.94	4.99	3.41	2.03	1.90	7.24	*37.05

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.
* **Revised figures.**

Peak inflow - (base, 100 cfs)

Date	Time	Discharge	Date	Time	Discharge
3-20-68	0655	635#	5-11-68	0530	246##
4-22-68	0850	451#	5-13-68	0230	230##
5- 9-68	1645	355#			

\# 5-minute interval.
\## 15-minute interval.

8-0526.5. Little Elm Creek near Celina, Tex.

Location.--Lat 33°21'55", long 96°49'25", on left bank at downstream side of bridge on Farm Road 455, 3.8 miles northwest of Celina, Collin County, and 10 miles upstream from Mustang Creek.

Drainage area.--46.2 sq mi.

Records available.--February 1966 to September 1968.

Gage.--Digital water-stage recorder. Datum of gage is 582.4 ft above mean sea level, datum of 1929 (State Highway Department bench mark). Prior to Sept. 27, 1966, graphic water-stage recorder at same site and datum.

Extremes.--Maximum discharge during year, 2,840 cfs Mar. 20 (gage height, 12.05 ft); no flow for many days.
1966-68: Maximum discharge, 5,340 cfs May 31, 1967 (gage height, 13.32 ft); no flow for many days each year.

Remarks.--Records good. No known diversion above station. Four standard and 1 recording rain gages are located in basin above station. At end of year, flow from 23.8 sq mi above this station was partly controlled by 8 floodwater-retarding structures, with a total combined capacity of 7,720 acre-ft below the flood-spillway crests, of which 6,650 acre-ft is floodwater-retarding capacity and 1,070 acre-ft is sediment-pool capacity. The capacity in these pools allocated to sediment storage will be used for conservation storage until eliminated by sedimentation. Records of suspended-sediment loads and water temperatures for the water year 1968 are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1967 TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	25	13	207	4.4	0	.39	0	0
2	0	0	0	0	17	9.6	247	2.5	0	64	0	0
3	0	0	0	0	11	7.6	143	1.5	1.2	2.0	0	0
4	0	0	0	0	7.6	5.2	71	2.6	1.4	.05	0	0
5	0	0	0	0	6.2	3.9	45	1.3	0	0	0	0
6	0	0	0	0	5.0	9.3	28	.50	0	0	0	0
7	0	0	0	0	3.7	12	16	.14	.01	0	0	0
8	0	0	0	0	2.4	7.9	10	9.9	.04	0	0	0
9	0	0	0	0	1.7	10	7.3	174	0	0	0	0
10	0	0	0	0	1.3	17	5.4	343	0	0	0	0
11	0	0	0	0	1.1	292	3.5	853	0	0	0	0
12	0	0	0	0	.81	284	2.4	322	0	0	0	0
13	0	0	0	0	.49	131	2.8	793	2.9	0	0	0
14	0	0	0	0	.78	64	2.2	323	4.3	0	0	0
15	0	0	11	0	8.3	40	1.5	343	.18	0	0	0
16	0	0	5.0	0	9.6	25	.67	264	0	0	0	0
17	0	0	27	0	6.6	15	.30	400	0	0	0	0
18	0	0	3.2	16	4.5	10	.38	170	0	0	0	0
19	0	0	.25	55	3.5	362	150	84	0	.09	0	0
20	0	0	.03	15	3.0	1310	103	49	0	.01	0	0
21	0	0	.01	10	3.1	382	38	32	0	0	0	0
22	0	0	0	29	3.0	328	672	20	0	0	0	0
23	0	0	0	14	2.4	300	210	12	0	0	0	0
24	0	0	0	7.6	2.1	221	110	7.8	.04	0	0	124
25	0	0	0	5.0	2.4	125	61	4.6	7.6	0	0	82
26	0	0	0	3.5	2.0	74	31	2.5	69	0	0	18
27	0	0	0	6.3	1.5	51	20	1.0	1.6	0	0	5.3
28	0	0	0	162	63	38	38	.36	0	0	0	1.5
29	0	0	0	139	26	26	16	.10	0	0	0	.29
30	0	0	0	62	------	17	7.1	.02	0	0	0	.02
31	0	------	0	40	------	157	------	0	------	0	0	------
TOTAL	0	0	46.49	564.4	225.08	4347.5	2249.55	4221.22	88.27	66.54	0	231.11
MEAN	0	0	1.50	18.2	7.76	140	75.0	136	2.94	2.15	0	7.70
MAX	0	0	27	162	63	1310	672	853	69	64	0	124
MIN	0	0	0	0	.49	3.9	.30	0	0	0	0	0
AC-FT	0	0	92	1120	446	8620	4460	8370	175	132	0	458
(†)	932	913	1040	1360	1350	1780	1340	1250	1230	1160	997	1220
(††)	3.28	1.01	2.14	3.07	1.70	5.97	4.08	6.29	3.22	2.77	1.17	6.38

CAL YR 1967: TOTAL 7,122.54 MEAN 19.5 MAX 1,810 MIN 0 AC-FT 14,130 †† 33.77
WTR YR 1968: TOTAL 12,040.16 MEAN 33.0 MAX 1,310 MIN 0 AC-FT 23,810 †† 41.08

† Contents, in acre-feet, at end of month, in Soil Conservation Service reservoirs upstream from station.
†† Weighted-mean rainfall, in inches.

9-329e
(Oct. 1961)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0526.50

yearly weighted-mean rainfall
Monthly and ~~annual discharge~~, in inches, of Little Elm Creek River at Celina, Tex.
[Drainage area, 46.2 square miles]

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	

9-329c
(Oct. 1951)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

8-526.50

yearly mean
Monthly and ~~annual~~ discharge, in cfs, of Little Elm Creek River at Dear. Celina, Tex.
[Drainage area, 46.2 square miles]

10—20459-6 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	

GPO 849 - 229

8-0527. Little Elm Creek near Aubrey, Tex.

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

Drainage area.--75.5 sq mi.

Records available.--June 1956 to September 1968.

Gage.--Digital water-stage recorder. Datum of gage is 534.76 ft above mean sea level (State Highway Department bench mark). Prior to Sept. 26, 1966, graphic water-stage recorder at same site and datum.

Average discharge.--12 years, 39.6 cfs (28,670 acre-ft per year).

Extremes.--Maximum discharge during year, 2,830 cfs Mar. 20 (gage height, 15.52 ft); no flow for many days.
1956-68: Maximum discharge, 7,680 cfs May 31, 1967 (gage height, 16.98 ft); no flow at times each year.
Maximum stage known since about 1900, 18.2 ft in May 1941, from information by local residents.

Remarks.--Records good. No known diversion above station. For statement regarding regulation by Soil Conservation Service floodwater-retarding structures, see Little Elm Creek near Celina (station 8-0526.5). Nine rain gages, 6 standard and 3 recording, are operated in basin above station. Records of suspended-sediment loads and water temperatures for the water year 1968 are published in Part 2 of this report.

DISCHARGE, IN CFS, WATER YEAR OCTOBER 1967 TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	2.5	.07	0	32	20	191	7.7	1.9	.31		0
2	.44	1.0	.31	0	20	13	350	5.4	1.8	98		0
3	.59	.37	.02	0	13	9.9	185	5.0	1.6	10		0
4	.01	.10	0	0	9.9	7.5	111	8.6	16	4.3		0
5	0	.03	.03	0	8.2	5.6	57	4.6	2.2	1.3		0
6	0	0	.02	0	6.8	13	37	3.0	1.2	.55		0
7	0	0	.01	0	4.9	26	23	2.0	.73	.25		0
8	0	0	0	0	3.6	14	15	6.0	.51	.14		0
9	0	.02	.04	0	2.4	11	12	21	.30	.58		0
10	0	.09	.08	0	1.7	18	9.8	382	.45	.37		0
11	0	.55	.06	0	1.1	353	8.3	841	.25	.10		0
12	0	.45	.08	0	.72	460	6.5	359	.11	.06		0
13	0	.20	.14	0	.42	170	6.4	907	.06	.04		0
14	0	.11	.36	0	1.2	93	6.0	329	1.6	.08		0
15	0	.03	19	0	12	55	4.9	307	2.3	.07		0
16	0	.02	30	0	13	35	4.3	387	.90	.03		0
17	0	.01	77	0	9.3	22	3.4	800	.27	.02		0
18	0	0	36	25	6.6	15	2.8	269	.05	.01		0
19	0	0	5.4	108	5.0	351	214	113	.03	0		0
20	0	0	2.2	32	4.4	1,870	370	60	.02	0		0
21	0	0	1.7	19	4.1	602	63	38	0	0		0
22	0	0	1.3	109	4.2	303	716	23	0	0		0
23	0	0	.69	31	3.3	280	416	14	0	.03		0
24	0	0	.39	12	3.0	240	150	9.2	15	.02		143
25	0	0	.06	6.7	2.8	157	89	6.9	2.9	.01		241
26	0	0	0	4.2	3.0	99	44	5.3	110	0		41
27	0	0	0	5.2	2.3	64	22	4.3	8.7	0		12
28	0	0	0	162	84	44	77	3.5	2.2	0		6.2
29	0	0	0	285	52	32	96	2.9	.92	0		4.3
30	12	.01	0	94	-------	23	13	2.5	.42	0		2.9
31	4.9	-------	0	53	-------	250	-------	2.0	-------	0		-------
TOTAL	17.94	5.48	174.76	946.1	314.94	5,686.0	3,303.4	4,928.9	172.42	116.27	0	480.4
MEAN	.58	.18	5.64	30.5	10.9	182	110	159	5.75	3.75	0	15.0
MAX	12	2.5	77	285	84	1,870	716	907	110	98	0	241
MIN	0	0	0	0	.42	5.6	2.8	2.0	0	0	0	0
CFSM	.0077	.0024	.075	.404	144	2.41	1.46	2.11	.076	.050	0	.199
IN	.009	.003	.09	.47	.16	2.79	1.63	2.43	.08	.06	0	.22
AC-FT	36	11	347	1,880	625	11,220	6,660	9,780	342	231	0	883
(††)	3.29	.97	2.16	3.13	1.64	5.84	4.48	5.72	3.39	2.91	.98	6.53

CAL YR 1967 : TOTAL 9,631.80 MEAN 26.4 MAX 3,800 MIN 0 CFSM 0.35 IN 4.74 AC-FT 19,100 †† 32.13
WTR YR 1968 : TOTAL 16,086.62 MEAN 44.0 MAX 1,870 MIN 0 CFSM 0.58 IN 7.92 AC-FT 31,910 †† 41.04

†† Weighted-mean rainfall, in inches.

PEAK DISCHARGE (BASE, 1,000 CFS)

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
3-20	1530	15.52	2,830	5-11	1700	14.46	1,410
4-22	2030	14.74	1,640	5-13	1500	14.44	1,380

9-220 c
(Oct. 1961)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0527.00

Monthly and annual ~~discharge~~ average rainfall, in inches, of Little Elm Creek ~~River~~ near Aubrey, Tex.

[Drainage area, 75.5 square miles]

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	ANNUAL.	
1957	2.16	2.78	2.87	2.47	2.34	5.96	13.16	16.28	0.68	1.86	0.20	5.99	56.75	
1958	2.55	7.83	1.60	2.06	.73	3.60	7.22	3.85	4.37	2.23	1.81	1.96	39.81	
1959	1.37	2.29	.69	.38	1.05	2.07	.55	2.16	6.76	4.71	2.10	1.34	25.47	
1960	6.84	1.88	4.00	2.18	2.03	1.21	2.22	3.21	3.40	6.55	2.32	2.40	38.24	
1961	1.70	.71	5.80	2.09	2.78	2.93	1.41	2.42	4.38	3.29	1.06	4.29	32.86	
1962	2.65	2.79	2.37	1.01	1.00	2.54	4.70	1.50	7.10	3.10	3.34	9.63	41.73	
1963	2.32	3.40	.75	.44	.44	.39	5.37	5.64	1.55	2.42	.32	.52	23.56	
1964	.20	.93	1.11	1.80	1.60	4.66	5.37	4.48	1.49	1.06	4.03	10.64	37.37	
1965	1.46	7.20	1.07	2.36	3.74	1.49	1.20	6.67	4.53	1.61	3.44	6.39	41.16	
1966	1.45	2.07	1.36	1.00	2.12	1.47	12.01	1.30	2.30	2.57	6.63	4.18	38.46	
1967	.56	.82	1.43	.17	1.14	3.19	4.82	8.12	1.14	1.42	.99	4.72	28.52	
1968	3.29	.97	2.16	3.13	1.64	5.89	4.48	5.71	3.39	2.91	.98	6.53	41.02	

9-220 c
(Oct. 1961)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Sheet 1 of _____ Sheets

8-0527.00

Monthly and annual discharge, in yearly-mean cfs, of Little Elm Creek River at near Aubrey, Tex.
[Drainage area, 75.5 square miles]

16—63620-3 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

A-74a
Rev 7-65

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (revised)

_____. LITTLE ELM _____ Creek subwatershed No. 1 near GUNTER, Tex. Drainage Area 3.40 sq mi

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

Maxima: gage height, 26.8; outflow, 43.2 c.f.s.; surface area, 106 acres; contents, 705 acre-feet; on MARCH 20

Minima: gage height, 16.9; surface area, 26.5 acres; contents, 112 acre-feet; on OCTOBER 28.

Maximum inflow, — — c.f.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 1967 to September 1968.

	Oct	Nov	Dec.	Calendar year 1967	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Water year 1968
Total Inflow 1/	1.2	3.7	16.3	1,790	130	39.2	864	580	685	39.8	.1	0	28.3	2,380
Total Outflow	0.	0.	0.	1,720	75.2	21.4	800	662.	693	13.9	.5	0.	0.	2,270
Total Consumption	17.1	10.6	9.0	242	6.3	12.4	17.9	23.4	27.3	25.1	26.6	27.6	18.6	222
†	-8.3	-4.7	+11.3	- 35.3	+57.6	+11.1	+77.0	-89.7	- 6.1	+ 9.6	-20.6	-26.8	+ 22.9	+ 33.3
‡	28.5	28.0	28.0	32.4	31.5	38.6	47.0	44.9	47.0	38.0	37.4	33.2	32.0	36.2
††	3.23	.97	1.75	35.12	3.24	1.75	6.59	3.80	5.47	2.76	2.00	.28	6.05	37.89

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, _____ c.f.s)

Date	Time	Discharge	Date	Time	Discharge

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Rev 7-65

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (revised)

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

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

Maxima: gage height, 21.1; outflow, 97.6 c.f.s.; surface area, 126 acres; contents, 760 acre-feet; on March 20

Minima: gage height, 14.1; surface area, 43.0 acres; contents, 183 acre-feet; on December 15.

Maximum inflow, ____ c.f.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 ____ to September ____.

	Oct	Nov	Dec	Calendar year 1967	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1968
Total Inflow 1/	16.6	2.0	40.0	3,530	139	67.5	1,730	1,010	1,370	90.4	37.9	3.6	58.0	4,560
Total Outflow	0	0	0	3,340	95.3	47.9	1,650	1,120	1,380	47.9	45.6	0	6.4	4,390
Total Consumption	22.4	13.4	12.2	362	8.1	16.3	27.4	32.4	41.0	40.0	39.6	38.1	26.4	317
†	+5.9	-8.0	+35.3	+9.0	+50.0	+12.3	+99.2	-116.	-13.4	+17.6	-34.3	-32.9	+51.3	+67.0
‡	44.8	44.8	46.8	52.5	59.9	58.3	72.0	64.9	68.4	57.2	55.0	50.8	48.8	55.5
††	3.31	.96	1.80	35.21	3.19	1.76	6.51	3.85	5.68	2.84	2.18	.26	6.10	38.34

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

Peak inflow - (base, ____ cfs)

Date	Time	Discharge	Date	Time	Discharge

A-74a
Rev 7-65

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (revised)

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

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

Maxima: gage height, 21.9; outflow, 229 c.f.s.; surface area, 203 acres; contents, 1,150 acre-feet; on March 20

Minima: gage height, 10.1; surface area, 20.0 acres; contents, 70.2 acre-feet; on September 3.

Maximum inflow, _____ c.f.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 1967 to September 1968

	Oct	Nov.	Dec.	Calendar year 1967	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Water year 1968
Total Inflow 1/	4.6	7.1	21.0	6,330	478	136	3,370	1,480	4,190	16.6	32.2	2.3	108	9,790
Total Outflow	0	0	0	6,230	459	147	3,280	1,560	4,240	94.5	0	23.9	60.6	9,780
Total Consumption	12.1	7.4	7.3	218	5.4	8.8	19.4	22.0	33.0	16.9	20.2	18.6	13.0	184
†	-.5	+2.2	+18.7	+ 2.0	+43.5	-15.6	+128	-137	- 8.0	-28.2	+20.5	-37.5	+46.5	+ 32.6
‡	24.2	24.8	26.0	32.2	34.0	34.0	54.0	44.0	59.0	26.0	28.8	24.2	23.6	33.6
††	3.03	.96	2.22	35.68	2.88	1.75	5.83	4.39	7.29	3.43	3.56	.75	6.39	42.48

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, ____ c.f.s)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (Revised)

_____ Little Elm _____ Creek subwatershed No 4 near Gunter, Tex Drainage Area 3.33 sq mi

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

Maxima: gage height, 23.8; outflow, 52.4 cfs; surface area, 84.2 acres; contents, 705 acre-feet; on March 20

Minima: gage height, 14.6; surface area, 34.0 acres; contents, 169 acre-feet; on December 5.

Maximum inflow, — cfs (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 1967 to September 1968

	Oct	Nov	Dec	Calendar year 1967	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1968
Total Inflow 1/	10.6	1.6	27.9	1,540	12.5	68.1	602	719	880	4.7	4.5	2.2	29.8	2,480
Total Outflow	0	0	0	1,200	70.5	56.7	579	757	902	.9	0	0	0	2,370
Total Consumption	17.5	10.4	9.9	239	7.9	12.9	17.9	22.6	28.7	27.1	30.0	29.2	18.5	233
†	+3.4	-5.2	+25.1	+21.9	+57.4	+4.5	+27.9	-39.0	-12.9	-12.5	-13.9	-22.6	+30.8	+43.0
‡	35.0	34.5	35.5	32.3	39.5	43.0	47.0	47.0	50.3	41.0	40.0	37.5	37.0	40.6
††	3.40	1.15	2.38	36.38	3.14	1.68	5.83	4.82	7.49	3.28	3.57	1.19	6.01	43.94

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, _____ cfs)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (revised)

_____. LITTLE ELM Creek subwatershed No. 5 near GUNTER, Tex. Drainage Area 0.50 sq mi

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

Maxima: gage height, 20.2; outflow, 15.6 c.f.s; surface area, 10.2 acres; contents, 74.5 acre-feet; on March 20

Minima: gage height, 16.1; surface area, 7.0 acres; contents, 39.6 acre-feet; on Dec. 5

Maximum inflow, ____ c.f.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 1967 to September 1968.

	Oct	Nov	Dec.	Calendar year 1967	Jan.	Feb	Mar.	Apr.	May	June	July	Aug.	Sept	Water year 1968
Total Inflow 1/	.5	.2	6.4	244	11.4	10.3	141	46.2	81.0	0.3	0.9	0	9.4	308
Total Outflow	0	0	0	219	2.8	8.3	142	47.4	82.7	0	0	0	0	283
Total Consumption	3.6	2.4	2.0	53.4	2.0	2.3	3.4	4.2	4.7	5.3	5.5	5.4	3.8	44.6
†	-1.0	-1.5	+5.8	-3.8	+8.8	+.8	+.4	-1.9	-1.1	-2.8	-2.4	-4.5	+9.3	+ 9.9
‡	7.1	7.1	7.2	7.7	7.8	8.4	8.5	8.4	8.4	8.1	7.9	7.5	7.5	7.8
††	3.55	1.25	2.44	36.56	3.30	1.65	5.84	5.04	7.47	3.17	3.46	1.46	5.88	44.49

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, ____ cfs)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR (revised)

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

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

Maxima: gage height, 26.0; outflow, 30.0 c.f.s.; surface area, 49.0 acres; contents, 407 acre-feet; on Mar. 20

Minima: gage height, 17.5; surface area, 23.5 acres; contents, 120 acre-feet; on Dec. 15.

Maximum inflow, _____ c.f.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 1967 to September 1968.

	Oct	Nov.	Dec.	Calendar year 1967	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Water year 1968
Total Inflow 1/	3.8	3.3	29.6	783	172	32.0	407	205	222	4.8	6.5	.6	23.3	1,110
Total Outflow	0.	0.	0	696	156	33.1	378	243	235	0	0	0.	0	1,050
Total Consumption	10.6	6.0	6.1	157	3.9	6.6	9.0	12.4	14.3	14.0	16.6	16.1	11.2	127
†	+ .20	- .20	+28.4	+ 8.4	+19.7	- 4.1	+35.1	-38.9	- 9.3	- 2.5	- 2.6	-12.5	+24.1	+ 37.4
♦	23.6	23.8	24.5	25.1	24.2	24.4	28.2	27.0	27.0	25.5	25.9	24.8	25.0	25.7
††	3.55	1.25	2.44	36.56	3.30	1.63	5.84	5.04	7.47	3.17	3.46	1.46	5.88	44.49

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, _____ cfs)

Date	Time	Discharge	Date	Time	Discharge

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

WATER BUDGET OF POOLS

ANNUAL SUMMARY

1968 WATER YEAR

_____ . LITTLE ELM Creek subwatershed No 7 near GUNTER, Tex Drainage Area 1.28 sq mi

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

Maxima: gage height, 19.4; outflow, 19.5 c.f.s.; surface area, 37.2 acres; contents, 261 acre-feet; on March 20

Minima: gage height, 11.8; surface area, 14.9 acres; contents, 69.7 acre-feet; on November 9.

Maximum inflow, — c.f.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 1967 to September 1968.

	Oct	Nov	Dec	Calendar year 1967	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Water year 1968
Total Inflow 1/	2.8	.8	6.2	471	42.5	6.9	264	102	120	5.2	7.4	.1	17.3	575
Total Outflow	0.	0.	0.	422	9.4	3.1	234	135	122	0.	0	0	4.4	508
Total Consumption	6.4	3.8	3.8	116	2.7	5.1	6.7	9.6	11.4	11.7	12.6	10.4	8.3	94.5
†	-.9	-2.4	+4.6	-18.7	+34.5	+1.0	+32.7	-35.0	-3.8	-1.0	-1.9	-9.5	+16.4	+34.7
♦	15.3	15.3	15.3	18.1	16.8	20.2	22.3	21.2	20.8	19.5	19.0	18.5	18.6	18.6
††	2.15	.44	1.82	27.30	2.73	1.31	5.09	3.94	4.99	3.41	2.03	1.90	7.86	37.67

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

Peak inflow - (base, _____ cfs)

Date	Time	Discharge	Date	Time	Discharge

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 (above Celina) 1968 WATER YEAR

	RAIN GAGES								
Date of storm	1-S	2-R	3-S	4-S	5-S	6-R	7-S	10-R	MMR
Weight Factor	0.16	0.13	0.20	0.14	0.19	0.04	0.02	0.12	
1967									
Oct. 7, 1967	0.60	0.55	0.56	0.68	0.70	0.58	0.83	0.42	0.60
15	.94	.96	1.22	.92	1.54	1.08	1.15	.63	1.08
29-30	1.52	1.32	1.55	1.69	1.48	1.49	1.45	1.04	1.46
30-31	.17	.20	.22	.10	.12	.10	.15	.06	.15
Oct. Total	3.23	3.03	3.55	3.39	3.84	3.25	3.58	2.15	
Oct. MMR = 3.29	0.5168	0.3939	0.7100	0.4746	0.7296	0.1300	0.0716	0.2580	3.29
Nov. 1, 1967	0.14	0.06	0.12	0.15	0	0.06	0.10	0	0.08
2	.02	.09	.17	.24	.34	.17	.10	.15	.17
9-10	.41	.40	.47	.43	.51	.42	.60	.15	.42
28	.23	.25	.24	.20	.22	.30	.25	.14	.22
29	.17	.10	.25	0	.12	.07	.30	0	.12
Nov. Total	0.97	0.90	1.25	1.02	1.19	1.02	1.35	0.44	
Nov. MMR = 1.01	0.1552	0.1170	0.2500	0.1428	0.2261	0.0408	0.0270	0.0528	1.01
Dec. 5, 1967	0.06	0.04	0.03	0.04	0.30	0.04	0.20	0	0.09
10	.12	.11	.17	.22	.18	.13	.12	.19	.16
13-14	.50	.68	.72	.56	.40	.40	.49	(.4)	.54
14-15	.54	.75	.79	.77	.55	.75	.93	.65	.68
16-17	.28	.38	.41	.35	.25	.33	.40	.32	.33
21	.05	.10	.11	.28	.14	.13	.30	.10	.13
27	.12	.10	.10	.13	.15	.08	.05	.08	.11
31	.08	.07	.11	.13	.13	.08	.25	.08	.10
Dec. Total	1.75	2.23	2.44	2.48	2.10	1.94	2.74	1.82	
Dec. MMR = 2.14	0.2800	0.2899	0.4880	0.3472	0.3990	0.0776	0.0548	0.2184	2.14
Calendar Year 1967									33.78

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Celina) 1968 WATER YEAR

	RAIN GAGES								
Date of storm	1-S	2-R	3-S	4-S	5-S	6-R	7-S	10-R	WMR
Weight Factor	0.16	0.13	0.20	0.14	0.19	0.04	0.02	0.12	
1968									
Jan. 1, 1968	0.05	0.02	0.08	0.04	0	0.05	0.05	0	0.04
3	.23	.25	.26	.24	.25	.20	.40	.17	.24
5	.07	.05	.10	.05	.10	.05	.10	.04	.07
8	.23	.05	.02	.08	0	.10	.20	.05	.07
10	0	.20	.11	.19	.21	.15	.10	.20	.15
18	1.15	.97	1.01	.32	1.14	1.06	.60	.95	.94
20	.13	.10	.14	.27	.05	.10	.10	.09	.13
21	.29	.23	.42	.85	.17	.40	.28	.23	.36
27	.47	.45	.68	.68	.44	.41	.40	.33	.51
28	.62	.40	.45	.58	.54	.64	.90	.67	.55
31	0	0	.03	0	0	0	.04	0	.01
Jan. Total	3.24	2.72	3.30	3.30	2.90	3.16	3.17	2.73	
Jan. WMR = 3.07	0.5184	0.3536	0.6600	0.4620	0.5510	0.1264	0.0634	0.3276	3.07
Feb. 1, 1968	0.10	0.10	0.13	0.28	0.14	0.10	0.16	0.14	0.14
4-5	0	.08	0	.10	.12	.03	.18	.10	.06
14	.47	.43	.42	.29	.38	.30	.24	.19	.37
15	.33	.30	.30	.23	.32	.30	.25	.39	.31
19	.06	.06	.09	.06	.07	.10	.08	.05	.07
21	.15	.23	.06	.22	0	.33	.12	0	.11
23	.04	.05	.01	.05	.11	.07	.03	0	.05
27-28	.60	.56	.62	.47	.68	.57	.62	.44	.58
Feb. Total	1.75	1.81	1.63	1.70	1.82	1.80	1.68	1.31	
Feb. WMR = 1.69	0.2800	0.2353	0.3260	0.2380	0.3458	0.0520	0.0336	0.1572	1.69
Mar. 6, 1968	0.41	0.45	0.49	0.60	0.48	0.55	0.63	0.46	0.49
8-9	.58	.26	.19	.22	.20	.18	.08		.27
11	1.12	1.00	1.15	1.05	1.14	.84	1.20	.65	1.04
19	1.40	1.26	1.21	1.31	1.55	1.35	1.78	1.26	1.35
20	2.18	1.94	1.90	1.81	2.15	1.65	2.18	1.62	1.95
22	0	0	.10	0	0	0	0	0	.02
30-31	.90	.90	.80	1.20	.87	.55	1.00	.89	.90
Mar. Total	6.59	5.81	5.84	6.19	6.39	5.12	6.87	5.09	
Mar. WMR = 6.02	1.0544	0.7553	1.1680	0.8666	1.2141	0.2048	0.1374	0.6108	6.02

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STURY AREA LITTLE ELM CREEK (above Celina) 1968 WATER YEAR

Date of storm	RAIN GAGES 1-S	2-R	3-S	4-S	5-S	6-R	7-S	10-R	WMR
Weight Factor	0.16	0.13	0.20	0.14	0.19	0.04	0.02	0.12	
1968									
Apr. 1, 1968	1.08	0.67	0.82	0.84	0.55	0.93	0.38	0.84	0.79
3	.15	.07	.12	.08	.10	.08	.18	.04	.10
12	.20	.18	.25	.12	.25	.28	.31	.15	.21
18-19	.32	.40	.46	.47	.23	.64	1.28	.33	.40
19	.97	1.22	1.38	.99	.50	.95	1.92	.75	.99
22	.67	1.23	1.64	1.62	.70	1.06	.72	1.48	1.19
27	.14	.25	.20	.18	.36	1.02	.35	.21	.26
28	.27	.25	.17	.17	.35	.23	.45	.14	.24
Apr. Total	3.80	4.27	5.04	4.47	3.04	5.19	5.59	3.94	
Apr. WMR = 4.18	0.6080	0.5551	1.0080	0.6258	0.5776	0.2076	0.1118	0.4728	4.18
May 3, 1968	0.33	0.22	0.50	0.25	0.47	0.15	0.18	0.21	0.34
7	0	.08	.12	.58	.60	.45	.03	.15	.27
8	0	.18	.02	0	0	.05	.48	0	.04
9-10	2.20	2.97	3.18	2.36	1.71	.74	.78	1.39	2.24
10-11	.71	1.46	1.02	1.15	.84	1.07	.66	1.49	1.06
12-13	1.01	1.37	1.48	1.30	.94	.90	.56	.81	1.14
15	.20	.47	.30	0	.68	.46	.65	.27	.35
16-17	.22	.20	.22	.33	.35	.32	.87	.16	.27
17	.43	.38	.43	.39	.41	.22	.61	.39	.40
21	.18	.12	.15	0	.12	.10	.10	.12	.12
25	.17	.10	0	0	0	.23	.05	0	.05
27	.02	0	.05	0	.20	0	.04	0	.05
May Total	5.47	7.55	4.47	6.36	6.32	4.69	5.01	4.99	
May WMR = 6.33	0.8752	0.9815	1.4940	0.8904	1.2008	0.1876	0.1002	0.5988	6.33
June 1, 1968	0.14	0.07	0.20	0.12	0.08	0	0.15	0.12	0.12
3	.03	.06	.17	0	0	1.48	0	.30	.14
5	.03	0	0	0	0	.10	.25	0	.01
7	.88	.60	.25	0	.26	.15	.12	.52	.39
15-16	.09	.47	.19	.12	.18	.22	.65	.05	.19
16	.03	.13	.05	.04	.05	.07	.20	0	.05
24	1.17	1.68	1.73	1.97	1.97	1.43	1.95	1.39	1.66
25	.39	.57	.58	.73	.73	.58	.80	1.03	.66
June Total	2.76	3.58	3.37	2.98	3.27	4.03	4.12	3.41	
June WMR = 3.22	0.4416	0.4940	0.6340	0.4172	0.6213	0.1612	0.0824	0.4092	3.22

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Celina) 1968 WATER YEAR

Date of storm	RAIN GAGES 1-S	2-R	3-S	4-S	5-S	6-R	7-S	10-R	WMR
Weight Factor	0.16	0.13	0.20	0.14	0.19	0.04	0.02	0.12	
1968									
July 1-2, 1968	0.72	0.86	0.97	(0.70)	1.57	1.55	1.45	0.72	0.99
8	.09	.08	.10	.12	.12	.14	.20	.02	.10
13	.14	.40	.45	.18	.16	0	0	0	.22
14	.24	.70	.80	.52	.49	.50	1.01	.34	.54
19	0	.75	.38	.90	.35	.73	.40	.75	.49
23	.08	.10	0	0	0	0	.05	0	.03
29	.73	.95	.76	.32	.34	.40	.97	.20	.56
July Total	2.00	3.84	3.46	2.74	3.03	3.32	4.08	2.03	
July WMR = 2.93	0.3200	0.4992	0.6920	0.3836	0.5757	0.1328	0.0816	0.2436	2.93
Aug. 13, 1968	0	0	0.03	0.04	0.04	0.06	0.16	0.02	0.03
13-14	0	.40	.34	.38	.41	.14	.37	.10	.28
17	0	0	0	0	0	.08	0	0	0
26	.28	.05	.74	1.20	.57	.15	.15	1.37	.65
30	0	.06	.35	0	.40	.22	.15	.41	.21
Aug. Total	0.28	0.51	1.46	1.62	1.42	0.65	0.83	1.90	
Aug. WMR = 1.17	0.0448	0.0663	0.2920	0.2268	0.2698	0.0260	0.0166	0.2280	1.17
Sept. 2, 1968	0.27	0.06	0.12	0.35	0.16	0.02	0	0.07	0.16
3	0	0	.05	0	0	.05	0	.11	.03
4	1.56	.96	1.20	1.71	1.40	1.27	1.12	1.58	1.38
5	.23	.14	.18	.25	.21	.20	.18	.75	.27
15	.83	1.00	1.02	.88	1.36	.65	1.52	.79	1.00
17	.08	.12	.25	.31	.46	.19	.60	.10	.24
21	.28	.25	.23	.49	.17	.23	.15	.23	.26
24	2.80	3.96	2.83	2.35	2.70	2.00	4.02	3.61	2.96
Sept. Total	6.05	6.49	5.88	6.34	6.46	4.61	7.59	7.24	
Sept. WMR = 6.30	0.9680	0.8437	1.1760	0.8876	1.2274	0.1844	0.1518	0.8688	6.30
Water Year Totals (1968)									41.35

Form TX-88
Rev. 10-69

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Aubrey) 1968 WATER YEAR

Date of storm	RAIN GAGES 1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R
1967										
Oct. 7, 1967	0.60	0.55	0.56	0.68	0.70	0.58	0.83	0.70	0.62	0.42
15	.94	.96	1.22	.92	1.54	1.08	1.15	1.10	.85	.63
29-30	1.52	1.32	1.55	1.69	1.48	1.49	1.45	1.70	1.52	1.04
30-31	.17	.20	.22	.10	.12	.10	.15	.18	.17	.06
Oct. Total	3.23	3.03	3.55	3.39	3.84	3.25	3.58	3.68	3.16	2.15
Oct. Average = 3.29										
Nov. 1, 1967	0.14	0.06	0.12	0.15	0	0.06	0.10	0.09	0.08	0
2	.02	.09	.17	.24	.34	.17	.10	0	0	.15
9-10	.41	.40	.47	.43	.51	.42	.60	.35	.31	.15
28	.23	.25	.24	.20	.22	.30	.25	.22	.18	.14
29	.17	.10	.25	0	.12	.07	.30	.16	.13	0
Nov. Total	.97	.90	1.25	1.02	1.19	1.02	1.35	.82	.70	.44
Nov. Average = 0.97										
Dec. 5, 1967	0.06	0.04	0.03	0.04	0.30	0.04	0.20	0.01	0.02	0
10	.12	.11	.17	.22	.18	.13	.12	.23	.20	.19
13-14	.50	.68	.72	.56	.40	.40	.49	.42	.34	(.4)
14-15	.54	.75	.79	.77	.55	.75	.93	.79	.65	.65
16-17	.28	.38	.41	.35	.25	.33	.40	.34	.29	.32
21	.05	.10	.11	.28	.14	.13	.30	.01	.10	.10
27	.12	.10	.10	.13	.15	.08	.05	.20	.10	.08
31	.08	.07	.11	.13	.13	.08	.25	.37	.04	.08
Dec. Total	1.75	2.23	2.44	2.48	2.10	1.94	2.74	2.37	1.74	1.82
Dec. Average = 2.16										
Calendar Year 1967 = Average = 32.13										

Form TX-85
Rev. 10-69

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Aubrey) 1968 WATER YEAR

Date of storm	RAIN GAGES 1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R
1968										
Jan. 1, 1968	0.05	0.02	0.08	0.04	0	0.05	0.05	0.03	0.02	0
3	.23	.25	.26	.24	.25	.20	.40	.33	.19	.17
5	.07	.05	.10	.05	.10	.05	.10	.02	.05	.04
8	.23	.05	.02	.08	0	.10	.20	.06	.07	.05
10	0	.20	.11	.19	.21	.15	.10	.13	.10	.20
18	1.15	.97	1.01	.32	1.14	1.06	.60	.94	1.00	.95
20	.13	.10	.14	.27	.05	.10	.10	.22	.24	.09
21	.29	.23	.42	.85	.17	.40	.28	.54	.69	.23
27	.47	.45	.68	.68	.44	.41	.40	.59	.31	.33
28	.62	.40	.45	.58	.54	.64	.90	.45	.73	.67
31	0	0	.03	0	0	0	.04	.02	.02	0
Jan. Total	3.24	2.72	3.30	3.30	2.90	3.16	3.17	3.33	3.42	2.73
Jan. Average = 3.13										
Feb. 1, 1968	0.10	0.10	0.13	0.28	0.14	0.10	0.16	0.10	0.10	0.14
4-5	0	.08	0	.10	.12	.03	.18	.12	.04	.10
14	.47	.43	.42	.29	.38	.30	.24	.32	0	.19
15	.33	.30	.30	.23	.32	.30	.25	.33	.48	.39
19	.06	.06	.09	.06	.07	.10	.08	.06	0	.05
21	.15	.23	.06	.22	0	.33	.12	.09	.02	0
23	.04	.05	.01	.05	.11	.07	.03	.06	0	0
27-28	.60	.56	.62	.47	.68	.57	.62	.64	.51	.44
Feb. Total	1.75	1.81	1.63	1.70	1.82	1.80	1.68	1.72	1.15	1.31
Feb. Average = 1.64										
Mar. 6, 1968	0.41	0.45	0.49	0.60	0.48	0.55	0.63	0.68	0.40	0.46
8-9	.58	.26	.19	.22	.20	.18	.08	.11	.05	.21
11	1.12	1.00	1.15	1.05	1.14	.84	1.20	1.17	.65	.65
19	1.40	1.26	1.21	1.31	1.55	1.35	1.78	1.20	1.37	1.26
20	2.18	1.94	1.90	1.81	2.15	1.65	2.18	1.46	1.34	1.62
22	0	0	.10	0	0	0	0	.06	0	0
30-31	.90	.90	.80	1.20	.87	.55	1.00	1.12	1.27	.89
Mar. Total	6.59	5.81	5.84	6.19	6.39	5.12	6.87	5.80	5.08	5.09
Mar. Average = 5.89										

Form TX-88
Rev. 10-69

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Aubrey) 1968 WATER YEAR

Date of storm	RAIN GAGES 1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R
Apr. 1, 1968	1.08	0.67	0.82	0.84	0.55	0.93	0.38	0.60	0.55	0.84
3	.15	.07	.12	.08	.10	.08	.18	.11	.04	.04
12	.20	.18	.25	.12	.25	.28	.31	.17	.19	.15
18-19	.32	.40	.46	.47	.23	.64	1.28	.80	.80	.33
19	.97	1.22	1.38	.99	.50	.95	1.92	1.21	1.22	.75
22	.67	1.23	1.64	1.62	.70	1.06	.72	.88	.78	1.48
27	.14	.25	.20	.18	.36	1.02	.35	.20	.43	.21
28	.27	.25	.17	.17	.35	.23	.45	.73	.76	.14
Apr. Total	3.80	4.27	5.04	4.47	3.04	5.19	5.59	4.70	4.77	3.94
Apr. Average = 4.48										
May 3, 1968	0.33	0.22	0.50	0.25	0.47	0.15	0.18	0.17	1.09	0.21
7	0	.08	.12	.58	.60	.45	.03	.02	0	.15
8	0	.18	.02	0	0	.05	.48	.30	0	0
9-10	2.20	2.97	3.18	2.36	1.71	.74	.78	.70	.43	1.39
10-11	.71	1.46	1.02	1.15	.84	1.07	.66	.59	.54	1.49
12-13	1.01	1.37	1.48	1.30	.94	.90	.56	.50	.86	.81
15	.20	.47	.30	0	.68	.46	.65	.60	.50	.27
16-17	.22	.20	.22	.33	.35	.32	.87	.87	1.10	.16
17	.43	.38	.43	.39	.41	.22	.61	.60	.27	.39
21	.18	.12	.15	0	.12	.10	.10	0	.13	.12
25	.17	.10	0	0	0	.23	.05	.02	0	0
27	.02	0	.05	0	.20	0	.04	0	0	0
May Total	5.47	7.55	7.47	6.36	6.32	4.69	5.01	4.37	4.92	4.99
May Average = 5.71										
June 1, 1968	0.14	0.07	0.20	0.12	0.08	0	0.15	0.37	0.26	0.12
3	.03	.06	.17	0	0	1.48	0	.15	.02	.30
5	.03	0	0	0	0	.10	.25	.22	.15	0
7	.88	.60	.25	0	.26	.15	.12	.05	.04	.52
15-16	.09	.47	.19	.12	.18	.22	.65	.37	.34	.05
16	.03	.13	.05	.04	.05	.07	.20	.12	.42	0
24	1.17	1.68	1.73	1.97	1.97	1.43	1.95	1.46	1.20	1.39
25	.39	.57	.58	.73	.73	.58	.80	.60	.77	1.03
June Total	2.76	3.58	3.17	2.98	3.27	4.03	4.12	3.34	3.20	3.41
June Average = 3.39										

Form TX-88
Rev. 10-69

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RAINFALL DATA SUMMARY

STUDY AREA LITTLE ELM CREEK (above Aubrey) 1968 WATER YEAR

	RAIN GAGES									
Date of storm	1-S	2-R	3-S	4-S	5-S	6-R	7-S	8-S	9-R	10-R
July 1-2, 1968	0.72	0.86	0.97	(0.70)	1.57	1.55	1.45	0.80	1.32	0.72
8	.09	.08	.10	.12	.12	.14	.20	.19	.18	.02
13	.14	.40	.45	.18	.16	0	0	0	0	0
14	.24	.70	.80	.52	.49	.50	1.01	.62	.56	.34
19	0	.75	.38	.90	.35	.73	.40	.28	0	.75
23	.08	.10	0	0	0	0	.05	.02	0	0
29	.73	.95	.76	.32	.34	.40	.97	.45	.20	.20
July Total	2.00	3.84	3.46	2.74	3.03	3.32	4.08	2.36	2.26	2.03
July Average = 2.91										
August 13, 1968	0	0	0.03	0.04	0.04	0.06	0.16	0	0	0.02
13-14	0	.40	.34	.38	.41	.14	.37	0	.66	.10
17	0	0	0	0	0	.08	0	.17	.28	0
26	.28	.05	.74	1.20	.57	.15	.15	0	0	1.37
30	0	.06	.35	0	.40	.22	.15	0	0	.41
Aug. Total	0.28	0.51	1.46	1.62	1.42	0.65	0.83	0.17	0.94	1.90
Aug. Average = 0.98										
Sept. 2, 1968	0.27	0.06	0.12	0.35	0.16	0.02	0	0.10	0	0.07
3	0	0	.05	0	0	.05	0	0	0	.11
4	1.56	.96	1.20	1.71	1.40	1.27	1.12	1.58	.93	1.58
5	.23	.14	.18	.25	.21	.20	.18	.26	.18	.75
15	.83	1.00	1.02	.88	1.36	.65	1.52	.62	.72	.79
17	.08	.12	.25	.31	.46	.19	.60	.48	.61	.10
21	.28	.25	.23	.49	.17	.23	.15	.22	.53	.23
24	2.80	3.96	2.83	2.35	2.70	2.00	4.02	3.77	3.97	3.61
Sept. Total	6.05	6.49	5.88	6.34	6.46	4.61	7.59	7.03	6.94	7.24
Sept. Average = 6.47										
Water Year Totals	37.89	42.74	44.49	42.59	41.78	38.78	46.61	39.82	38.38	37.05

Water Year 1968 = Average = 41.02

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

INFLOW AND OUTFLOW COMPUTATIONS

Storm period March 19-20, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
	March	19														
0000	20.16	164.25														
0800	20.15	163.92	8	- .33	- 0.5	20.16	0.39	0	0				0	0	0	0
30	20.15	163.92	.5	0	0	20.15	.34	.34	0				.3	.0002	.0001	.0001
0900	20.21	165.92	.5	+2.00	48.4	20.18	.50	48.9	.52	33.4	1.45	35.1	13.8	.0102	.0051	.0052
1000	20.24	166.94	1	1.02	12.3	20.22	.76	13.1	.12	33.8	.34	4.1	9.0	.0066	.0066	.0118
1100	20.29	168.64	1	1.70	20.6	20.26	1.07	21.7	0		0	0	21.7	.0160	.0160	.0278
30	20.32	169.68	.5	1.04	25.2	20.30	1.43	26.6	.04	34.4	.11	2.7	23.9	.0176	.0088	.0366
45	20.34	170.37	.25	.69	33.4	20.33	1.76	35.2	0		0	0	35.2	.0260	.0065	.0431
1200	20.38	171.76	.25	1.39	67.5	20.36	2.12	69.4	0		0	0	69.4	.0512	.0128	.0559
30	20.47	174.95	.5	3.19	77.2	20.42	2.93	80.1	0		0	0	80.1	.0591	.0296	.0855
1300	20.56	178.20	.5	3.25	78.6	20.52	4.52	83.1	.19	36.2	.57	13.8	69.3	.0511	.0256	.1111
30	20.66	181.89	.5	3.69	89.3	20.61	6.30	95.6	.12	36.9	.37	9.0	86.6	.0639	.0320	.1431
1400	20.76	185.66	.5	3.77	91.2	20.71	8.65	100	.09	37.7	.28	6.8	93.2	.0688	.0344	.1775
05	20.78	186.42	.083	.76	110	20.77	10.1	120	.03	38.2	.10	14.5	106	.0782	.0065	.1840
10	20.80	187.18	.083	.76	110	20.79	10.6	121	.01	38.3	.03	4.4	117	.0863	.0052	.1892
15	20.91	188.73	.083	1.55	225	20.82	11.2	236	0				236	.1742	.0145	.2037
20	20.90	191.06	.083	2.33	338	20.87	11.8	350	0				350	.2583	.0214	.2251
25	20.97	193.83	.083	2.77	402	20.94	12.4	414	0				414	.3055	.0254	.2505
30	21.03	196.24	.083	2.41	350	21.00	12.8	363	0				363	.2679	.0224	.2729
45	21.15	201.14	.25	4.90	237	21.09	13.4	250	0				250	.1845	.0461	.3190
1500	21.26	205.77	.25	4.63	224	21.20	14.1	238	0				238	.1756	.0439	.3629
15	21.35	209.64	.25	3.87	187	21.30	14.7	202	0				202	.1491	.0373	.4002
30	21.42	212.71	.25	3.07	149	21.38	15.1	164	0				164	.1210	.0302	.4304
45	21.48	215.38	.25	2.67	129	21.45	15.4	144	0				144	.1063	.0266	.4570
1600	21.53	217.64	.25	2.26	109	21.50	15.7	125	.02	45.0	.07	3.4	122	.0900	.0225	.4795
30	21.61	221.28	.50	3.64	88.1	21.57	16.1	104	.04	45.7	.15	3.6	100	.0738	.0369	.5164
1700	21.66	223.61	.50	2.33	56.4	21.64	16.4	72.8	.02	46.4	.08	1.9	70.9	.0523	.0262	.5426
1800	21.72	226.42	1.0	2.81	34.0	21.69	16.6	50.6	.04	46.9	.16	1.9	48.7	.0359	.0359	.5785
1900	21.76	228.32	1	1.90	23.0	21.74	16.9	39.9	.02	47.4	.08	1.0	38.9	.0287	.0287	.6072
2000	21.80	230.22	1	+1.90	23.0	21.78	17.1	40.1	0	47.8			40.1	.0296	.0296	.6368

Computed by BBH
checked by EEL, FAD

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 2 of 3

INFLOW AND OUTFLOW COMPUTATIONS

Storm period March 19-20, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Acc in
	March 19, cont.															
2100	21.82	231.19	1	+ .97	11.7	21.81	17.2	28.9					28.9	.0213	.0213	.6581
2300	21.83	231.68	2	+ .49	3.0	21.82	17.3	20.3					20.3	.0150	.0300	.6881
2400	21.83	231.68	1	0	0	21.83	17.4	17.4					17.4	.0128	.0128	.7009
	March 20															
0000	21.83	231.68														
0230	21.80	230.22	2.5	- 1.46	- 7.0	21.82	17.3	10.3	0				10.3	.0076	.0190	.7199
0430	21.80	230.22	2	0	0	21.80	17.2	17.2	.11	48.0	.44	2.7	14.5	.0107	.0214	.7413
0500	21.82	231.19	.5	+ .97	23.5	21.81	17.2	40.7	.02	48.1	.08	.6	40.1	.0296	.0148	.7561
30	21.85	232.64	.5	1.45	35.1	21.84	17.4	52.5	.17	48.4	.69	16.7	35.8	.0264	.0132	.7693
0600	21.88	234.06	.5	3.42	82.8	21.88	17.6	100	.26	49.8	1.06	25.7	74.3	.0548	.0274	.7967
15	22.00	240.08	.25	3.96	192	21.96	18.0	210	*.12	49.6	.50	24.3	186	.1373	.0343	.8310
30	22.10	245.07	.25	5.05	244	22.05	18.4	262	.08	50.5	.34	16.5	246	.1815	.0454	.8764
35	22.14	247.13	.083	2.06	299	22.12	18.8	318	.03	51.2	.13	189	299	.2207	.0183	.8947
40	22.19	249.70	.083	2.57	373	22.16	19.0	392	.03	51.6	.13	189	373	.2753	.0229	.9175
45	2225	252.84	.083	3.14	456	22.22	19.3	475	.03	52.2	.13	18.9	466	.3365	.0279	.9454
50	22.32	256.54	.083	3.70	537	22.28	19.6	557	.05	52.8	.22	31.9	525	.3874	.0322	.9776
55	22.40	260.82	.083	4.28	621	22.36	20.0	641	.01	53.6	.04	5.8	635	.4686	.0389	1.0165
0700	22.47	264.64	.083	3.82	555	22.44	20.4	575	.03	54.4	.14	20.3	55	.4096	.0340	1.0505
15	22.62	272.95	.25	8.31	402	22.54	20.8	423	.05	55.4	.23	11.1	412	.3041	.0760	1.1265
30	22.76	280.92	.25	7.97	386	22.69	21.4	402	.06	56.9	.28	13.6	393	.2900	.0725	1.1990
45	22.89	288.48	.25	7.56	366	22.82	21.9	388	.05	58.2	.24	11.6	376	.2775	.0694	1.2684
0800	23.01	295.63	.25	7.15	346	22.96	22.4	368	.04	59.5	.20	9.7	358	.2642	.0660	1.3344
15	23.11	301.70	.25	6.07	294	23.06	22.8	317	.04	60.7	.20	9.7	307	.2266	.0566	1.3910
30	23.20	307.24	.25	5.54	268	23.16	23.2	291	.04	61.8	.21	10.2	281	.2074	.0518	1.4428
45	23.28	312.26	.25	5.02	243	23.24	23.6	267	.04	62.6	.21	10.2	257	.1897	.0474	1.4902
0900	23.35	316.21	.25	4.45	215	23.32	23.9	239	.04	63.5	.21	10.2	229	.1690	.0422	1.5324
15	23.42	321.20	.25	4.49	217	23.38	24.0	241	*.05	64.2	.27	13.1	228	.1683	.0421	1.5745

* Rain gage 10-R malfunctioned, increments based on average between 2-R and 6-R.

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 3 of 3

INFLOW AND OUTFLOW COMPUTATIONS

Storm period March 19-20, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
	March 20, cont.															
0920	23.45	323.15	.083	+ 1.95	+283	23.44	24.2	307	.04	648	.22	31.9	275	.2030	.0169	1.5913
25	23.48	325.10	.083	1.95	283	23.46	24.3	307	.04	65.1	.22	31.9	275	.2030	.0169	1.6081
30	23.52	327.72	.083	2.62	380	23.50	24.4	404	.03	65.5	.16	23.2	381	.2812	.0233	1.6314
35	23.57	331.02	.083	3.30	479	23.52	24.5	504	.03	65.9	.16	23.2	481	.3550	.0296	1.6609
40	23.63	335.02	.083	4.00	581	23.60	24.7	606	.03	66.4	.17	24.7	581	.4288	.0356	1.6965
45	23.68	338.38	.083	3.36	488	23.66	24.9	513	.03	67.3	.17	24.7	488	.3601	.0299	1.7264
50	23.72	341.08	.083	2.70	392	23.70	25.0	417	.01	67.7	.06	8.7	408	.3011	.0250	1.7514
55	23.75	343.13	.083	2.05	298	23.74	25.1	323	.01	68.1	.06	8.7	314	.2317	.0192	1.7706
1000	23.78	345.18	.083	2.05	298	23.76	25.2	323	.01	68.4	.06	8.7	314	.2317	.0192	1.7898
15	23.87	351.40	.25	6.22	301	23.82	25.4	326	.02	69.0	.11	5.3	321	.2369	.0592	1.8490
30	23.96	357.70	.25	6.30	305	23.92	25.7	331	.02	69.9	.12	5.8	325	.2398	.0600	1.9090
45	24.05	364.10	.25	6.40	310	24.00	25.9	336					336	.2480	.0620	1.9710
1100	24.13	369.84	.25	5.74	278	24.09	26.2	304					304	.2244	.0561	2.0271
30	24.26	379.33	.5	9.49	230	24.20	26.5	256					256	.1889	.0946	2.1215
1200	24.35	386.00	.5	6.67	161	24.30	26.8	188					188	.1387	.0694	2.1909
30	24.40	389.72	.5	3.72	90.0	24.38	27.0	117					117	.0863	.0432	2.2341
1300	24.43	391.98	.5	2.26	54.7	24.42	27.2	81.9					81.9	.0604	.0302	2.2643
30	24.45	393.50	.5	1.52	36.8	24.44	27.2	64.0					64.0	.0472	.0236	2.2879
1400	24.47	395.00	.5	1.50	36.3	24.46	27.2	63.5					63.5	.0469	.0234	2.3113
1500	24.49	396.52	1	1.52	18.4	24.48	27.3	45.7					45.7	.0337	.0337	2.3450
1600	24.50	397.27	1	+ .75	9.1	24.50	27.3	36.4					36.4	.0269	.0269	2.3719
1700	24.50	397.27	1	0	0	24.50	27.3	27.3					27.3	.0201	.0201	2.3920
1800	24.48	396.76	2	- 1.51	- 9.1	24.49	27.3	18.2					18.2	.0134	.0268	2.4188
2100	24.45	395.50	2	-2.26	-13.7	24.46	27.2	13.5					13.5	.0100	.0200	2.4388
2400	24.41	394.48	3	-3.02	-12.2	24.43	27.2	15.0					15.0	.0111	.0333	2.4721

A-78 (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-20-69
Check by: BBN
Date. 9-26-69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK SUBWATERSHED No. 10 NEAR GUNTER, TX Date of storm MARCH 19-20 1968

Weight Factor		1.000												Accumulated Weighted Precipitation	
	Accumulated Precipitation in Inches for Recording Gages														
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	(Rec. Gages x K) All Gages
MARCH	19,	1968													
00 00	0														0
08 30	0														0
45	.31														.31
09 00	.52														.52
10 00	.64														.64
15	.66														.66
12 00	.68														.68
45	.69														.69
13 00	.87														.87
15	.97														.97
30	.99														.99
45	1.08														1.08
14 00	1.08														1.08
15 00	1.14														1.14
18 00	1.24														1.24
19 00	1.26														1.26
24 00	1.26														1.26
MARCH	20,	1968													
02 00	1.30														1.30
30	1.30														1.30
45	1.35														1.35
03 00	1.37														1.37
04 00	1.37														1.37
30	1.37														1.37
05 00	1.39														1.39
15	1.44														1.44
30	1.56														1.56
45	1.66														1.66
06 00	1.82														1.82

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
										SUM:	

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

TX-78 (Revised July 1969)

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

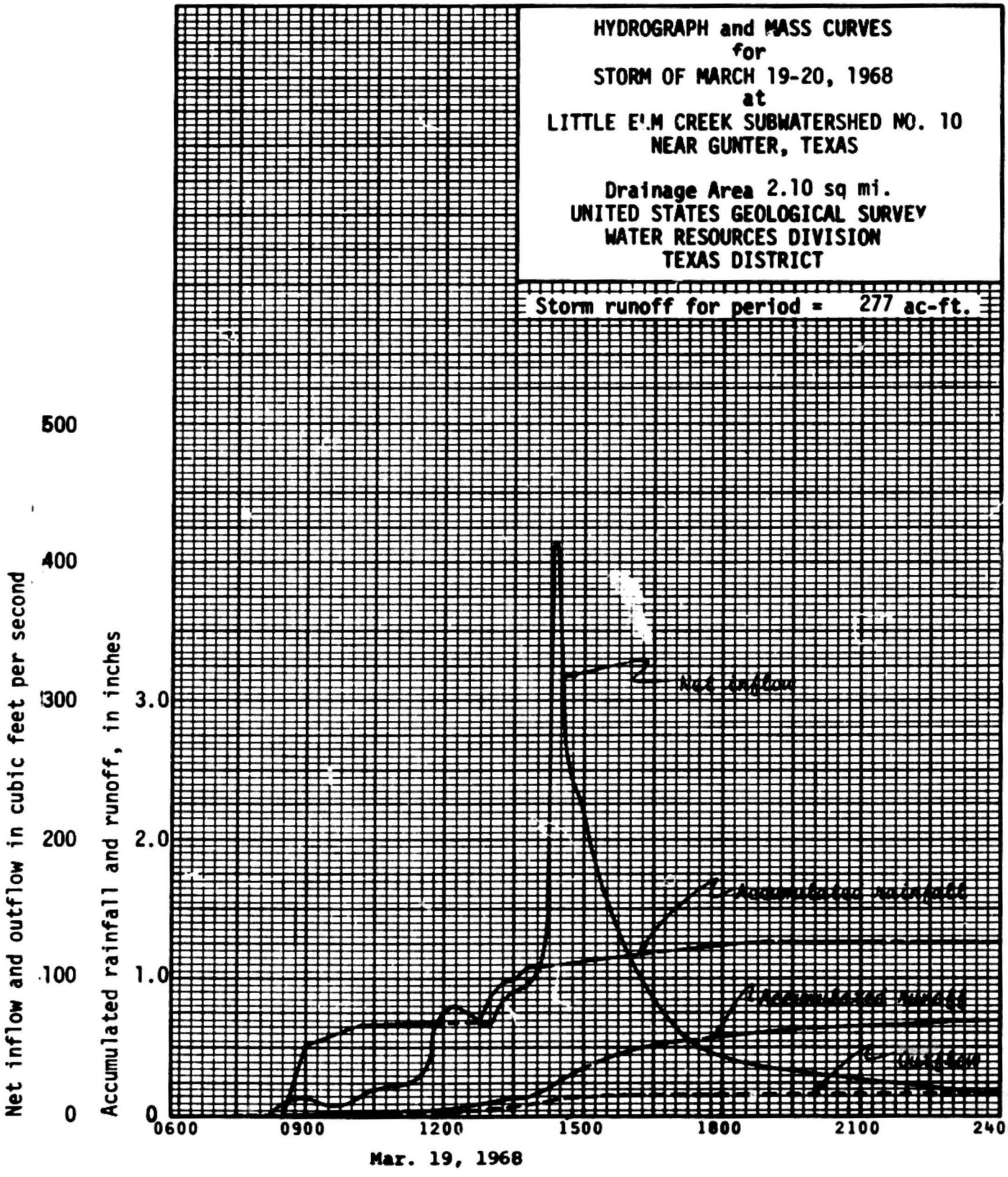
WEIGHTED PRECIPITATION RECORD

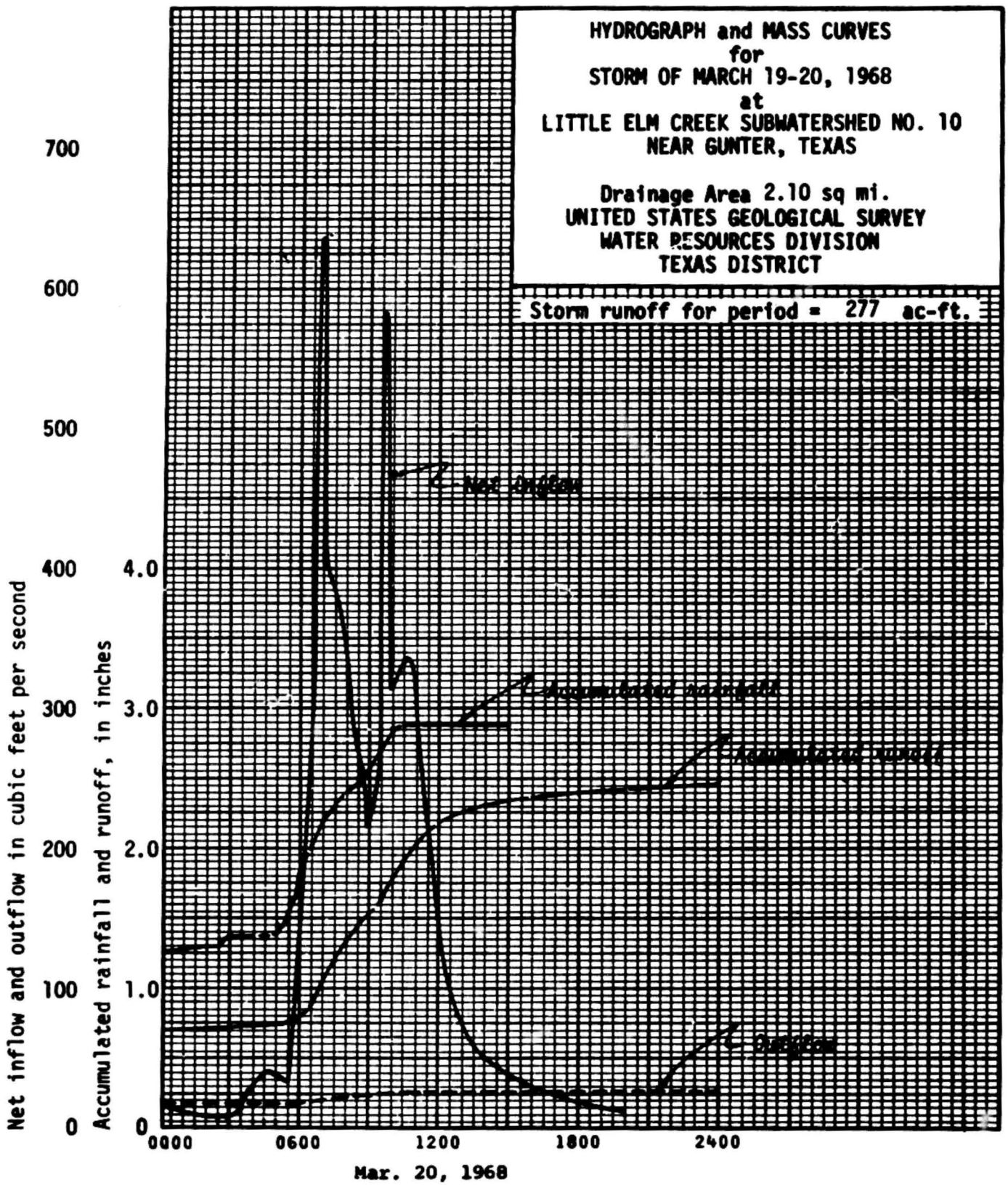
Sheet 2 of 2
Comp. by: BRH
Date 9-25-69
Check by GRD
Date 10-1-69

Study Area Little Elm Creek subwatershed No.10 near Gunter, Tex. Date of storm March 19-20, 1968

Weight Factor	Accumulated Precipitation in Inches for Recording Rain Gages												Accumulated Weighted Precipitation	
	Gage 10-R		Gage		Gage		Gage		Gage		Gage		Recording Gages All Gages	(Rec. Gages x K) All Gages
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor		
March 20 (Continued)														
0630	* 2.02													2.02
0700	2.20													2.20
30	2.31													2.31
0800	2.40													2.40
30	2.48													2.48
0900	2.56													2.56
30	2.72													2.72
1000	2.84													2.84
30	2.88													2.88
1200	* 2.88													2.88

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


HYDROGRAPH and MASS CURVES
for
STORM OF MARCH 19-20, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 277 ac-ft.
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
500
400
300
200
100
0
3.0
2.0
1.0
0
0600
0900
1200
1500
1800
2100
2400
Mar. 19, 1968


HYDROGRAPH and MASS CURVES
for
STORM OF MARCH 19-20, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 277 ac-ft.
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
700
600
500
400
300
200
100
0
4.0
3.0
2.0
1.0
0
0000
0600
1200
1800
2400
Mar. 20, 1968

TX.-65 (Rev. 7-69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record March 19-22, 1968 Drainage Area 46.2

Time	G. Ht. Feet	Sh. Adj.	Discharge C. f. s.	Inc.	In/Hr.	Runoff Inches	Acc. In.
			March 19				
0000	3.65	+.12	89	4	0.0003	.0012	0.0012
0600	3.62		8.4	4.5	.0003	.0014	.0026
0900	3.65		8.9	1.5	.0003	.0004	.0030
1100	3.77		11	1.25	.0004	.0005	.0035
1130	3.92	+.12	15	.5	.0005	.0002	.0037
1200	4.28	+.08	25	.5	.0008	.0004	.0041
1230	5.18	+.01	67	.5	.0022	.0011	.0052
1300	5.80	+.06	111	.75	.0037	.0028	.0080
1400	7.32	+.13	251	.75	.0084	.0063	.0143
1430	8.62	+.28	382	.5	.0128	.0064	.0207
1500	9.52	+.40	509	1.25	.0171	.0214	.0421
1700	10.25	+.22	815	2.0	.0273	.0546	.0967
1900	10.58	+.12	1,100	1.25	.0369	.0461	.1428
1930	10.62	+.11	1,130	.75	.0379	.0284	.1712
2030	10.57	+.12	1,090	1.5	.0366	.0549	.2261
2230	10.28	+.21	835	1.75	.0280	.0490	.2751
2400	10.00	+.29	664	.75	.0223	.0167	.2918
			8699.5	24			
			362				
			March 20				
0000	10.00	+.29	664	2.5	.0223	.0558	.3476
0500	9.25	+.38	457	2.75	.0153	.0421	.3897
0530	9.27	+.40	459	.5	.0154	.0077	.3974
0600	9.47	+.45	489	.75	.0164	.0123	.4097
0700	10.37	+.19	698	1	.0301	.0301	.4398
0800	11.22	0	1,760	1.5	.0590	.0885	.5283

Time	G. Ht. Feet	Sh. Adj.	Discharge C. f. s.	Inc.	In/Hr.	Runoff Inches	Acc. In
1000	11.95	0	2,680	1.75	.0899	.1573	.6857
1130	12.05		2,840	1	.0953	.0953	.7809
1200	12.03		2,810	.75	.0942	.0706	.8515
1300	11.93		2,650	1.5	.0889	.1334	.9849
1500	11.52	0	2,080	2	.0698	.1396	1.1245
1700	10.89	+.03	1,420	2	.0476	.0952	1.2197
1900	10.22	+.24	790	2	.0265	.0530	1.2727
2100	9.77	+.35	575	2.5	.0193	.0482	1.3209
2400	9.30	+.41	463	1.5	.0155	.0232	1.3441
			31375.5	24			
			1,310				
			March 21				
0000	9.30	+.41	463	3	.0155	.0465	1.3906
0600	8.77	+.29	400	6	.0134	.0804	1.4710
1200	8.55	+.28	373	9	.0125	.1125	1.5835
2400	8.24	+.25	339	6	.0114	.0684	1.6519
			9180	24			
			382				
			March 22				
0000	8.24	+.25	339	6	.0114	.0684	1.7203
1200	8.13	+.24	328	12	.0110	.1320	1.8523
2400	8.04	+.23	319	6	.0107	.0642	1.9165
			7884	24			
			328				

Computed by BBH Date 10/1/70 Checked by FAP Date 10/7/70
& Revised

A-78 (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-22-69
Check by: BBN
Date. 9-25-69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR CELINA, TEX. Date of storm MARCH 19-20, 1968

Weight Factor		.45		.13		.42								Accumulated Weighted Precipitation	
		Accumulated Precipitation in Inches for Recording Gages													
Date & Time	Gage 3-E Recorded	x Factor	Gage 6-E Recorded	x Factor	Gage 10-E Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages x K) All Gages
MARCH 19, 1968														
0800	0	0	0	0	0	0.							0.	0.
15	0	0.	.02	.003	0	0.							.003	0.
30	0	0.	.15	.020	0.	0.							.020	.02
45	0	0.	.20	.026	.31	.130							.156	.17
09 00	.26	.117	.24	.031	.52	.218							.366	.40
30	.35	.158	.34	.044	.58	.244							.446	.48
10 00	.41	.184	.39	.051	.64	.269							.504	.55
15	.47	.212	.40	.052	.66	.277							.541	.59
30	.49	.220	.41	.053	.66	.277							.550	.60
11 00	.50	.225	.52	.068	.66	.277							.570	.62
30	.54	.243	.61	.079	.67	.281							.603	.65
12 00	.55	.248	.66	.086	.68	.286							.620	.67
15	.56	.252	.70	.091	.69	.290							.633	.69
30	.57	.256	.77	.100	.69	.290							.646	.70
45	.67	.256	.79	.103	.69	.290							.649	.70
18 00	.72	.324	.90	.117	.87	.365							.806	.87
15	.80	.360	1.04	.135	.97	.407							.902	.98
30	.87	.392	1.15	.150	.99	.416							.958	1.04
45	.92	.414	1.20	.156	1.08	.454							1.024	1.11
14 00	.99	.446	1.20	.156	1.08	.454							1.056	1.15
15 00	1.07	.482	1.20	.156	1.12	.470							1.108	1.20
16 00	1.10	.495	1.20	.156	1.14	.479							1.130	1.22
30	1.17	.526	1.30	.169	1.19	.500							1.195	1.30
17 00	1.21	.544	1.31	.170	1.22	.512							1.226	1.33
18 00	1.26	.567	1.34	.174	1.24	.521							1.262	1.37
19 00	1.26	.567	1.35	.176	1.26	.529							1.272	1.38
24 00	1.26	.567	1.35	.176	1.26	.529							1.272	1.38
(Continued)														

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
										WNR.	

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

A-78 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date: 8-21-69
Check by: OBH
Date: 9-24-69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR CELINA, TEX. Date of storm MARCH 19-20, 1968

Weight Factor		.45		.13		.42								Accumulated Weighted Precipitation	
		Accumulated Precipitation in Inches for Recording Gages													
Date & Time	Gage 1-R Recorded	x Factor	Gage 2-R Recorded	x Factor	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages x K) All Gages
MARCH 20, 1968														
02 00	1.30	.585	1.36	.177	1.30	.546							1.308	1.48
30	1.31	.590	1.41	.183	1.30	.546							1.319	1.49
45	1.32	.594	1.47	.191	1.35	.567							1.352	1.47
03 00	1.32	.594	1.47	.191	1.37	.575							1.360	1.47
04 00	1.34	.603	1.47	.191	1.37	.575							1.369	1.48
15	1.34	.603	1.48	.192	1.37	.575							1.370	1.48
30	1.38	.621	1.55	.202	1.37	.575							1.398	1.52
45	1.42	.639	1.56	.203	1.39	.584							1.426	1.55
05 00	1.49	.670	1.60	.208	1.39	.584							1.462	1.59
15	1.56	.702	1.71	.222	1.44	.605							1.529	1.66
30	1.65	.743	1.80	.234	1.56	.655							1.631	1.77
45	1.77	.796	2.05	.266	1.66	.697							1.759	1.91
06 00	1.92	.864	2.15	.280	1.82	.764							1.908	2.07
15	2.06	.927	2.25	.293	1.94	.815							2.035	2.20
30	2.15	.968	2.32	.302	*2.02	.848							2.118	2.30
45	2.25	1.012	2.40	.312	2.11	.886							2.210	2.40
07 00	2.36	1.062	2.46	.320	2.20	.924							2.306	2.50
30	2.50	1.125	2.55	.332	2.31	.970							2.427	2.63
08 00	2.60	1.170	2.63	.342	2.40	1.008							2.520	2.73
30	2.70	1.215	2.70	.351	2.48	1.042							2.608	2.83
09 00	2.80	1.260	2.76	.359	2.56	1.075							2.694	2.92
15	2.85	1.282	2.80	.364	2.61	1.096							2.742	2.97
30	2.90	1.305	2.96	.385	2.72	1.142							2.832	3.07
45	3.05	1.372	3.00	.390	2.81	1.180							2.942	3.19
10 00	3.12	1.404	3.00	.390	2.84	1.193							2.987	3.24
30	3.20	1.440	3.00	.390	2.88	1.210							3.040	3.30
12 00	3.20	1.440	3.00	.390	*2.88	1.210							3.040	3.30
18 00	3.20	1.440	3.00	.390	*2.88	1.210							3.040	3.30

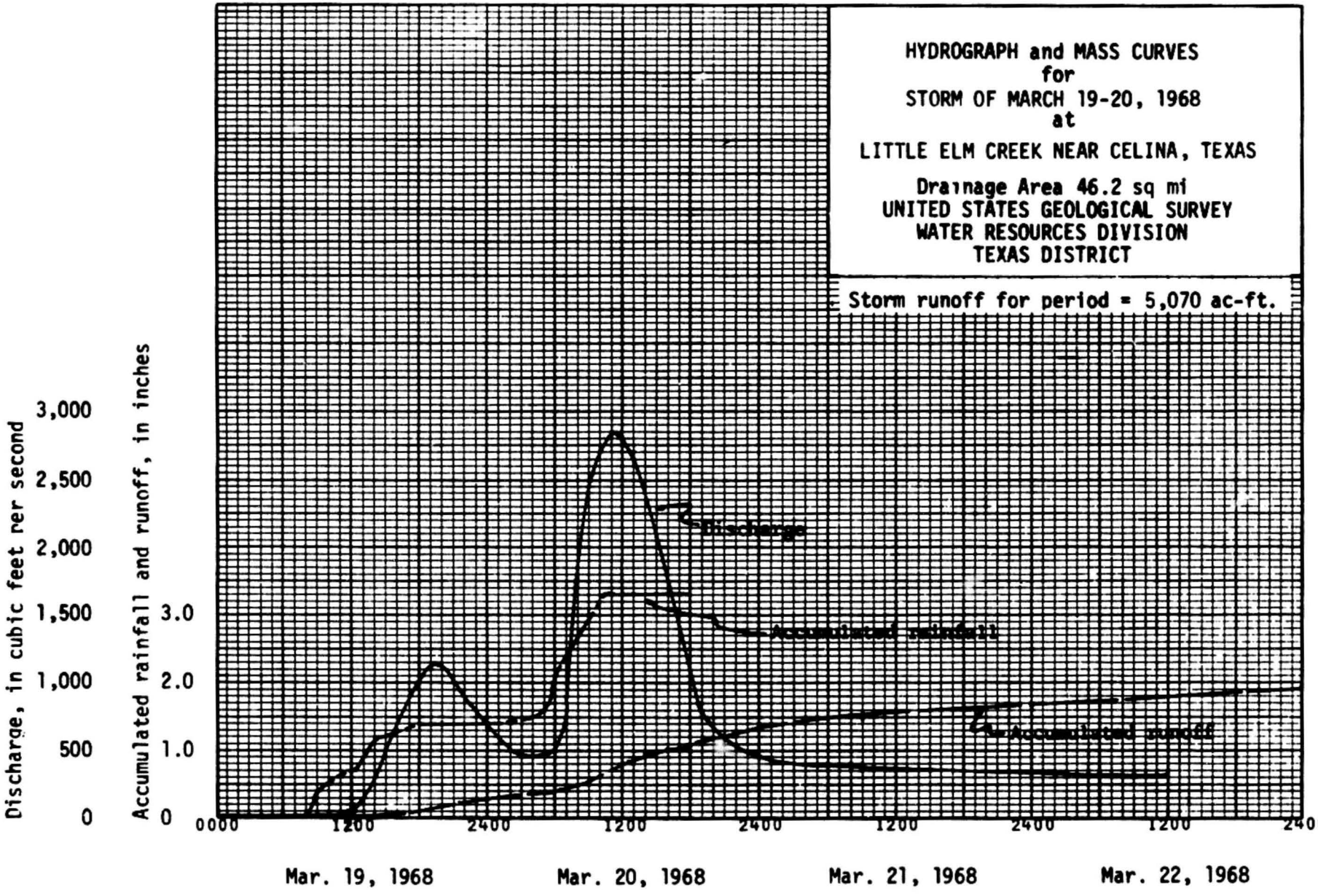
Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
1-R	.16	3.58	.573
2-R	.13	3.20	.416
3-R	.20	3.11	.622
4-R	.14	3.18	.437
5-R	.9	3.70	.703
6-R	.04	3.00	.120

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
7-R	.02	3.96	.079
10-R	.12	2.88	.346
		TOTAL	2.896

Rain Gage	Weight Factor	Precipitation	Precipitation x Weight Factor
		sum:	3.896

WWR = Sum of Precipitation x Weight Factor K = WWR / Total Recording Gages Weighted Precipitation = 3.896 / 3.040 = 1.004

* Rain gage 10-R malfunctioned, increments based on average of 2-R and 6-R.


HYDROGRAPH and MASS CURVES
for
STORM OF MARCH 19-20, 1968
at
LITTLE ELM CREEK NEAR CELINA, TEXAS
Drainage Area 46.2 sq mi
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 5,070 ac-ft.
Discharge, in cubic feet per second
3,000
2,500
2,000
1,500
1,000
500
0
Accumulated rainfall and runoff, in inches
3.0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0000
1200
2400
1200
2400
1200
2400
1200
2400
Mar. 19, 1968
Mar. 20, 1968
Mar. 21, 1968
Mar. 22, 1968

A-65
(Rev. 6-63)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY-AUSTIN DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record March 19 - 22, 1968 Drainage Area 75.5

Rating Table No. 7

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Runoff In/hr.	Runoff Inches	Runoff Acc. In.
		March 19					
0000	4.95	0	13	4	.0003	.0012	.0012
0800	4.89		12	4.5	.0002	.0009	.0021
0900	4.98		14	2	.0003	.0006	.0027
1200	5.23		18	2	.0004	.0008	.0035
1300	5.60		27	.75	.0006	.0004	.0039
1330	6.34		50	.5	.0010	.0005	.0044
1400	7.60		105	.5	.0022	.0011	.0055
1430	9.15		194	.5	.0040	.0020	.0075
1500	10.27		280	.5	.0057	.0028	.0103
1530	11.17		372	.5	.0076	.0038	.0141
1600	11.80		461	.75	.0095	.0071	.0212
1700	12.51		598	1.5	.0123	.0184	.0396
1900	13.32		822	2.5	.0169	.0422	.0818
2200	14.23		1,230	2.5	.0253	.0632	.1450
2400	14.43	0	1,370	1.0	.0281	.0281	.1731
			24336	24			
			351				
		March 20					
0000	14.43	0	1,370	.5	.0281	.0140	.1871
0100	14.45		1,390	1.5	.0286	.0428	.2299
0300	14.37		1,330	2.25	.0273	.0614	.2913
0530	14.20		1,210	2	.0248	.0496	.3409
0700	14.35		1,320	2.25	.0271	.0610	.4019
1000	14.77		1,670	2.5	.0343	.0858	.4877
1200	15.12		2,090	2	.0429	.0858	.5735
1400	15.43		2,630	1.75	.0540	.0945	.6680
1530	15.52		2,830	1	.0581	.0581	.7261
1600	15.47	0	2,720	2.25	.0558	.1256	.8517
BBN OBU	BBN OBU	BBN OBU	BBN OBU	BBN OBU	HHW BBN	HHW BBN	HHW BBN

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Runoff In/hr.	Runoff Inches	Runoff Acc. In.
			March 20 cont.				
2000	15.17	0	2,160	4	.0443	.1772	1.0289
2400	14.68	0	1,580	2	.0324	.0648	1.0937
			44860	24			
			1,870				
			March 21				
0000	14.68	0	1,580	2	.0324	.0648	1.1585
0400	13.70		960	3.5	.0197	.0690	1.2275
0700	12.72		650	3	.0133	.0399	1.2674
1000	11.89		476	2.5	.0098	.0245	1.2919
1200	11.54		422	4	.0087	.0348	1.3267
1800	11.02		354	6	.0073	.0438	1.3705
2400	10.76	0	326	3	.0067	.0201	1.3906
			14160	24			
			602				
			March 22				
0000	10.76	0	326	6	.0067	.0402	1.4308
1200	10.48		299	12	.0061	.0732	1.5040
2400	10.37	0	289	6	.0059	.0354	1.5394
			7278	24			
			303				
			March 23				
0000	10.37	0	289	6	.0059	.0354	1.5748
1200	10.27		280	12	.0057	.0684	1.6432
2400	10.17	0	272	6	.0056	.0336	1.6768
			6726	24			
			280				
BBN OBU	BBN OBU	BBN OBU	BBN OBU	BBN OBU	HHW BBN	HHW BBN	HHW BBN

Computed by _____ Date _____ Computed _____ Date _____

A-78 (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date: 9-24-69
Check by: RBH
Date: 9-24-69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NR. AUBREY, TEXAS Date of storm MARCH 19-20, 1968

Accumulated Precipitation in Inches for Recording Gages

Weight Factor	.294		.345		.088		.273						Accumulated Weighted Precipitation
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	(Rec. Gages x E) All Gages
MARCH 19, 1968														
08 00	0.	0.	0.	0.	0.	0.	0.	0.					0.	0.
15	0.	0.	.02	.007	0.	0.	0.	0.					.007	.01
30	0.	0.	.15	.052	0.	0.	0.	0.					.052	.06
45	0.	0.	.20	.069	0.	0.	.31	.085					.154	.16
09 00	.26	.076	.24	.083	.11	.010	.52	.142					.311	.33
15	.32	.094	.29	.100	.20	.018	.55	.150					.362	.39
30	.35	.103	.34	.117	.32	.028	.58	.158					.406	.44
10 00	.41	.121	.39	.135	.33	.029	.64	.175					.460	.50
15	.47	.138	.40	.138	.38	.033	.66	.180					.489	.53
30	.49	.144	.41	.141	.43	.038	.66	.180					.503	.54
11 00	.50	.147	.52	.179	.46	.040	.66	.180					.546	.59
30	.54	.159	.61	.210	.47	.041	.67	.183					.593	.64
12 00	.55	.162	.66	.228	.51	.045	.68	.186					.621	.67
15	.56	.165	.70	.242	.51	.045	.69	.188					.640	.69
30	.57	.168	.77	.266	.51	.045	.69	.188					.667	.72
45	.57	.168	.79	.273	.51	.045	.69	.188					.674	.73
13 00	.72	.212	.90	.310	.51	.045	.87	.238					.805	.87
15	.80	.235	1.04	.359	.76	.066	.97	.265					.925	1.00
30	.87	.256	1.15	.397	.92	.081	.99	.270					1.004	1.08
45	.92	.270	1.20	.414	1.03	.091	1.08	.295					1.070	1.15
14 00	.99	.291	1.20	.414	1.05	.092	1.08	.295					1.092	1.18
30	1.04	.306	1.20	.414	1.16	.102	1.12	.306					1.128	1.22
15 00	1.07	.315	1.20	.414	1.17	.103	1.12	.306					1.138	1.23
16 00	1.10	.323	1.20	.414	1.18	.104	1.14	.311					1.152	1.24
30	1.17	.344	1.30	.448	1.25	.110	1.19	.325					1.227	1.32
17 00	1.21	.356	1.31	.452	1.32	.116	1.22	.333					1.257	1.36
18 00	1.26	.370	1.34	.462	1.35	.119	1.24	.339					1.290	1.39
19 00	1.26	.370	1.35	.466	1.36	.120	1.26	.344					1.300	1.40
2400	1.26	.370	1.35	.466	1.37	.121	1.26	.344					1.301	1.40

(Continued)

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

WWR = Sum of Precipitation x Weight Factor E = WWR / Total Recording Gages Weighted Precipitation = WWR:

A-78 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HMW
Date: 8-24-69
Check by: ARH
Date: 9-24-69

WEIGHTED PRECIPITATION RECORD

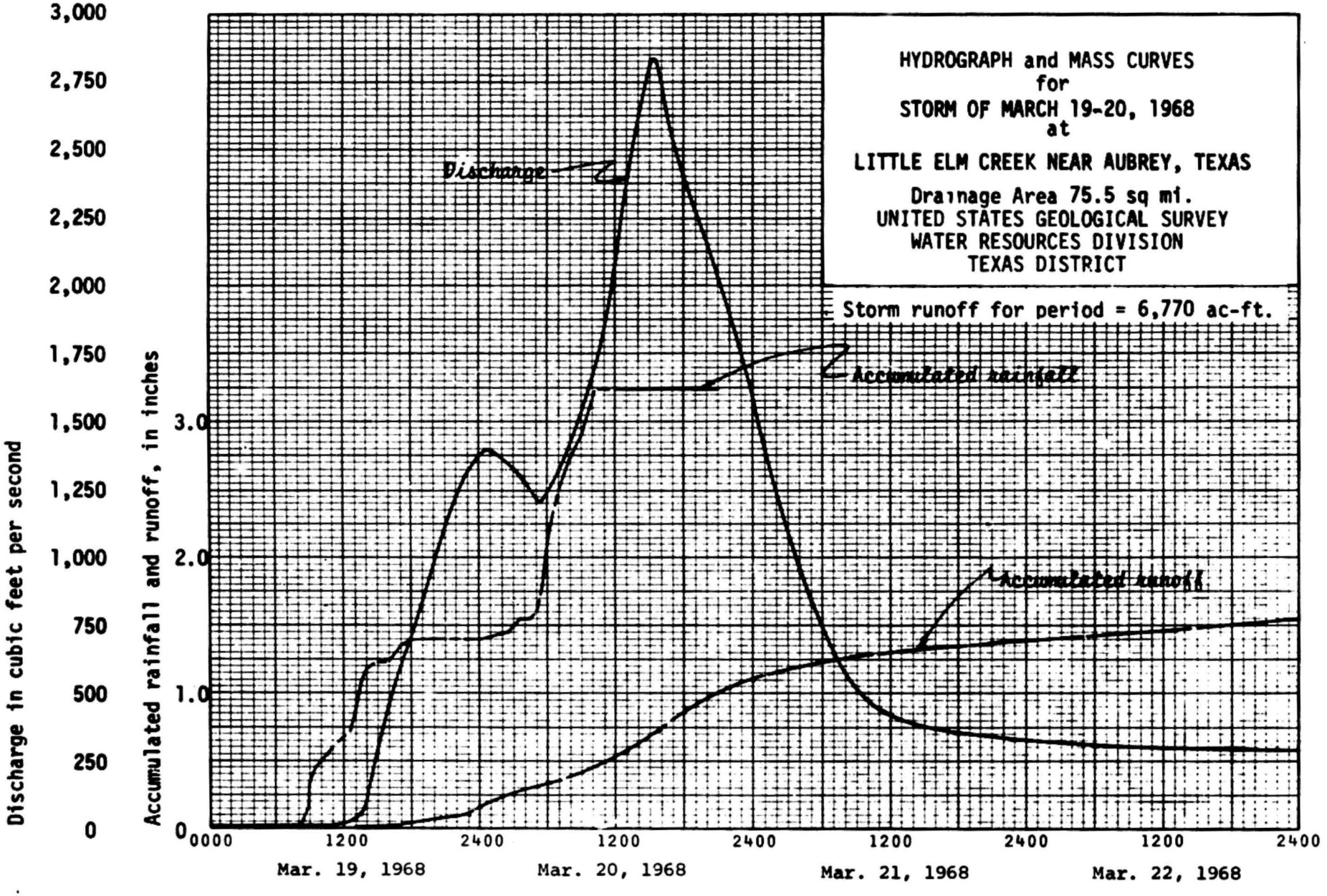
Area: LITTLE ELM CREEK NEAR AUBREY, TEXAS Date of storm MARCH 19-20, 1968

Weight Factor		.294		.246		.088		.273						Accumulated Weighted Precipitation	
	Accumulated Precipitation in Inches for Recording Gages														
	Gage 2-R		Gage 4-R		Gage 9-R		Gage 10-R		Gage		Gage				
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor		Recording Gages	(Rec. Gages x K) All Gages
March 20, 1968															
02 00	1.30	.382	1.36	.469	1.37	.121	1.30	.355						1.327	1.43
30	1.31	.385	1.41	.486	1.37	.121	1.30	.355						1.347	1.45
45	1.32	.388	1.47	.507	1.37	.121	1.35	.369						1.386	1.49
03 00	1.38	.388	1.47	.507	1.37	.121	1.37	.374						1.390	1.50
04 00	1.34	.394	1.47	.507	1.38	.121	1.37	.374						1.396	1.51
15	1.34	.394	1.48	.511	1.39	.121	1.37	.374						1.400	1.51
30	1.38	.406	1.55	.535	1.38	.121	1.37	.374						1.436	1.55
45	1.42	.417	1.56	.538	1.40	.123	1.39	.379						1.457	1.57
05 00	1.49	.438	1.60	.552	1.43	.126	1.39	.379						1.495	1.61
15	1.56	.459	1.71	.590	1.45	.128	1.44	.393						1.570	1.69
30	1.66	.488	1.80	.621	1.50	.132	1.56	.426						1.664	1.80
45	1.77	.520	2.05	.707	1.64	.144	1.66	.453						1.824	1.96
06 00	1.92	.564	2.15	.742	1.79	.158	1.82	.497						1.961	2.12
15	2.06	.606	2.25	.776	1.90	.167	1.94	.530						2.079	2.24
30	2.15	.632	2.32	.800	1.93	.170	*2.02	.551						2.153	2.32
45	2.25	.662	2.40	.828	2.04	.180	2.11	.576						2.246	2.42
07 00	2.36	.694	2.46	.849	2.11	.186	2.20	.601						2.330	2.51
30	2.50	.735	2.55	.880	2.29	.202	2.31	.631						2.448	2.64
08 00	2.60	.764	2.63	.907	2.34	.206	2.40	.655						2.532	2.73
30	2.70	.794	2.70	.932	2.40	.211	2.48	.677						2.614	2.82
09 00	2.80	.823	2.76	.952	2.42	.213	2.56	.699						2.687	2.90
15	2.85	.838	2.80	.966	2.44	.215	2.61	.713						2.732	2.95
30	2.90	.853	2.96	1.021	2.48	.218	2.72	.743						2.835	3.05
45	2.95	.897	3.00	1.035	2.56	.225	2.81	.767						2.924	3.16
10 00	3.12	.917	3.00	1.035	2.62	.231	2.84	.775						2.958	3.19
30	3.20	.941	3.00	1.035	2.69	.237	2.88	.786						2.999	3.24
11 00	3.20	.941	3.00	1.035	2.71	.238	2.88	.786						3.000	3.24
12 00	3.20	.941	3.00	1.035	2.71	.238	*2.88	.786						3.000	3.24
21 00	3.20	.941	3.00	1.035	2.71	.238	*2.88	.786						3.000	3.24

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	3.68	.368	7-S	.11	3.96	.436				
2-R	.09	3.20	.288	8-S	.12	2.66	.319				
3-S	.13	3.11	.404	9-R	.03	2.71	.081				
4-S	.09	3.12	.281	10-R	.08	2.88	.230				
5-S	.13	3.70	.481								
6-R	.12	3.00	.360		Totals		3.238				sum: 3.238

WWR = Sum of Precipitation x Weight Factor K = WWR / Total Recording Gages Weighted Precipitation = 3.238 / 3.000 = 1.0793

* Rain gage 10-R malfunctioned; increments based on average of 8R and 6-R.


HYDROGRAPH and MASS CURVES
for
STORM OF MARCH 19-20, 1968
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 6,770 ac-ft.
Discharge
Accumulated rainfall
Accumulated runoff
Discharge in cubic feet per second
Accumulated rainfall and runoff, in inches
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
3.0
2.0
1.0
0
0000
1200
2400
1200
2400
1200
2400
1200
2400
Mar. 19, 1968
Mar. 20, 1968
Mar. 21, 1968
Mar. 22, 1968

Form A-64
(Rev. 6-62)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - AUSTIN DISTRICT

Sheet 1 of 1

INFLOW AND OUTFLOW COMPUTATIONS

Storm period April 22, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Guyer, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Acc in
	April 22															
0000	20.12	162.92														
0700	20.12	162.92	7.	0	0	20.12	0.22	.22	0				.2	.0001	.0007	.0007
15	20.15	163.92	.25	1.00	48.4	20.14	.30	48.7	.48	38.1	1.32	629	0	.0000	.0000	.0007
30	20.28	168.30	.25	4.38	212	20.22	.76	213	1.00	33.8	2.82	136	77.0	.0568	.0142	.0149
45	20.35	170.72	.25	2.42	117	20.32	1.65	119	0.				119	.0878	.0220	.0369
0800	20.41	172.82	.25	2.10	102	20.38	2.38	104	0.				104	.0768	.0192	.0561
15	20.48	175.31	.26	2.49	121	20.44	3.21	124	0.				124	.0915	.0229	.0790
30	20.57	178.57	.25	3.26	158	20.52	4.52	163	0.				163	.1203	.0300	.1090
35	20.60	179.66	.083	1.09	158	20.58	5.70	164	0.				164	.1210	.0100	.1190
40	20.65	181.52	.083	1.86	270	20.62	6.51	277	0.				277	.2044	.0170	.1360
45	20.72	184.14	.083	2.62	380	20.68	7.90	388	0.				388	.2863	.0238	.1598
50	20.80	187.18	.083	3.04	441	20.76	9.90	451	0.				451	.3328	.0276	.1874
55	20.87	189.90	.083	2.72	395	20.84	11.5	406	0.				406	.2996	.0249	.2123
0900	20.93	192.25	.083	2.35	341	20.90	12.1	353	0.				353	.2605	.0216	.2339
15	21.07	197.86	.25	5.61	272	21.00	12.8	285	0.				285	.2103	.0526	.2865
30	21.18	202.39	.25	4.53	219	21.12	13.6	233	0.				233	.1720	.0430	.3295
45	21.28	206.62	.25	4.23	205	21.23	14.3	219	0.				219	.1616	.0404	.3699
1000	21.35	209.64	.25	3.02	146	21.32	14.8	161	0.				161	.1188	.0297	.3996
15	21.40	211.82	.25	2.18	106	21.38	15.1	121	0.				121	.0893	.0223	.4219
30	21.44	213.60	.25	1.78	86.2	21.42	15.3	102	0.				102	.0753	.0188	.4407
45	21.47	214.94	.25	1.34	64.9	21.46	15.5	80.4	0.				80.4	.0593	.0148	.4555
1100	21.49	215.82	.25	.88	42.6	21.48	15.6	58.2	0.				58.2	.0430	.0108	.4663
30	21.52	217.18	.5	1.36	32.9	21.50	15.7	48.6	0.				48.6	.0359	.0180	.4843
1200	21.54	218.09	.5	.91	22.0	21.53	15.8	37.8	0.				37.8	.0279	.0140	.4983
1300	21.56	219.00	1	.91	11.0	21.55	16.0	27.0	0.				27.0	.0199	.0199	.5182
1400	21.55	218.54	1	- .46	- 5.6	21.56	16.0	21.6	0.				21.6	.0159	.0159	.5341
1800	21.50	216.27	4	-2.27	- 2.3	21.51	15.9	13.6	0.				13.6	.0100	.0400	.5741
2400	21.38	210.95	6	-5.32	- 1.1	21.49	15.6	14.5	0.				14.5	.0107	.0642	.6383
			24				243.39									

Computed by BBH
checked by FAD

A-78 (Revised Feb. 1960)

Sheet 1 of 1

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-21-69
Check by: BBH
Date. 9-24-69

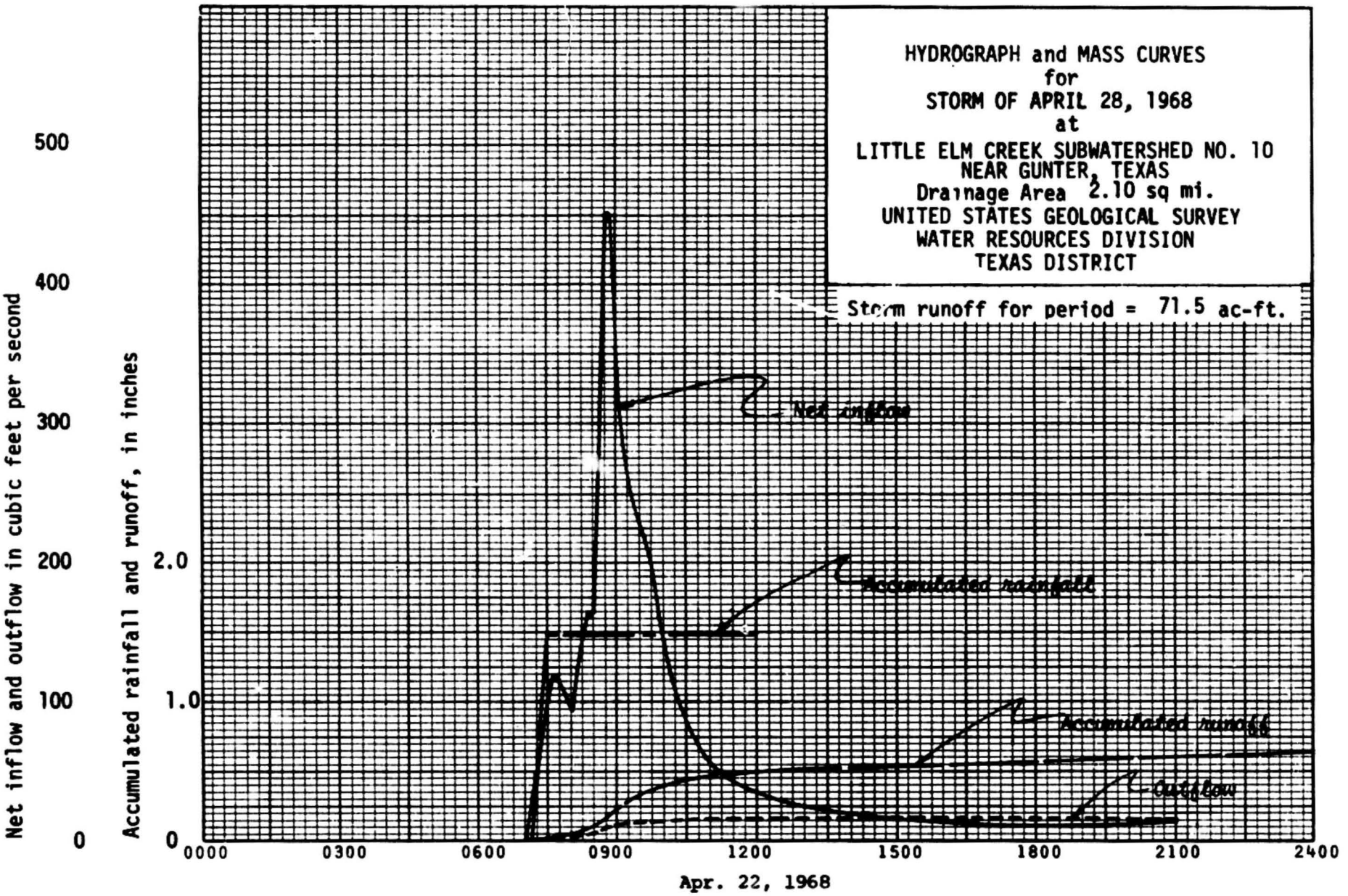
WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK SUBWATERSHED No. 10 NEAR GUNTER, TX Date of storm APRIL 22, 1968

Weight Factor		1.000												Accumulated Weighted Precipitation	
		Accumulated Precipitation in Inches for Recording Gages													
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	(Rec. Gages x E) All Gages
April	22, 1968													
0000	0													0
0700	0.													0
15	.48													.48
30	1.48													1.48
0800	1.48													1.48
1200	1.48													1.48

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

WWR = Sum of Precipitation x Weight Factor E = WWR / Total Recording Gages Weighted Precipitation =


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 28, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 71.5 ac-ft.
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
500
400
300
200
100
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
Apr. 22, 1968

TX-65 (Rev. 7-69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record April 22-23, 1968 Drainage Area 46.2

Time	G. Ht. Feet	Sh. Adj.	Discharge C. f. s.	Inc.	In/Hr.	Runoff Inches	Acc. In.
			April	22			
0000	4.25	+.12	25	3.25	.0008	.0026	0.0026
0630	4.13	+12	21	3.5	.0007	.0024	.0050
0700	4.62	+12	42	.375	.0014	.0005	.0055
0715	5.75	-.06	106	.25	.0036	.0009	.0064
0730	7.00	-.15	215	.25	.0072	.0018	.0082
0745	8.05	-.24	319	.25	.0107	.0027	.0109
0800	9.10	-.34	439	.375	.0147	.0055	.0164
0830	10.00	-.29	664	.5	.0223	.0112	.0276
0900	10.52	-.15	1,030	.75	.0345	.0259	.0535
1000	10.93	-.03	1,460	1	.0490	.0490	.1025
1100	11.32	0	1,870	1	.0627	.0627	.1652
1200	11.41		1,960	1	.0657	.0657	.2309
1300	11.31	0	1,860	1.5	.0624	.0936	.3245
1500	10.73	-.08	1,240	2.5	.0416	.1040	.4285
1800	9.77	-.36	572	3	.0192	.0576	.4861
2100	8.75	-.29	398	2.5	.0133	.0332	.5193
2300	8.09	-.24	324	1.5	.0109	.0164	.5357
2400	7.85	-.22	299	.5	.0100	.0050	.5407
			16/26,125	24			
			672				

Time	G. Ht. Feet	Sh. Adj.	Discharge C.f.s.	Inc.	In/Hr.	Runoff Inches	Acc. In
			April	23			
0000	7.85	-.22	299	2	.0100	.0200	.5607
0400	7.36	-.18	250	4.5	.0084	.0378	.5985
0900	7.07	-.16	221	4	.0074	.0296	.6281
1200	6.83	-.14	199	4.5	.0067	.0302	.6583
1800	6.60	-.12	178	6	.0060	.0360	.6943
2400	6.31	-.10	153	3	.0051	.0153	.7096
			5029.5	24			
			210				
			April	24			
0000	6.31	-.10	153	3	.0051	.0153	.7402
0600	5.98	-.08	125	6	.0042	.0252	.7654
1200	5.74	-.05	106	6	.0036	.0216	.7870
1800	5.57	-.04	93	6	.0031	.0186	.8056
2400	5.36	-.02	79	3	.0026	.0078	.8134
			2640	24			
			110				

Computed by B.B.H. Date 10/1/70 Checked by F.A.P. Date 10/7/70

*Revised

A-78 (Revised Feb. 1960)

Sheet 1 of 1

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-25-69
Check by: AAV
Date. 9/22/69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR CELINA, TEX. Date of storm APRIL 22-23, 1969

Weight Factor		0.45		0.18		0.42								Accumulated Weighted Precipitation
Date & Time	Gage 1-S Recorded	x Factor	Gage A-R Recorded	x Factor	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages + E) All Gages
April 22, 1969														
0000	0.	0	0	0.	0.	0.							0.	0.
0700	0.	0.	0	0.	0.	0							0.	0.
15	.10	.045	.60	.078	.48	.202							.325	.29
30	.75	.338	1.06	.138	1.48	.622							1.098	.99
45	1.17	.526	1.06	.138	1.48	.622							1.286	1.16
0800	1.23	.554	1.06	.138	1.48	.622							1.314	1.19
1200	1.23	.554	1.06	.138	1.48	.622							1.314	1.19
1800	1.23	.554	1.06	.138	1.48	.622							1.314	1.19

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	.67	.107	7-S	.02	.72	.014				
A-R	.13	1.23	.160	10-R	.12	1.48	.178				
2-S	.20	1.64	.328								
4-S	.14	1.62	.227		Total		1.189				
5-S	.19	.70	.133								
6-R	.06	1.06	.042								sum 1.189

WWP = Sum of Precipitation x Weight Factor E = WWP / Total Recording Gages Weighted Precipitation = 1.189 / 1.314 = .9049

A-78 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HMW
Date: 8-26-69
Check by: ARH
Date: 9-24-69

WEIGHTED PRECIPITATION RECORD

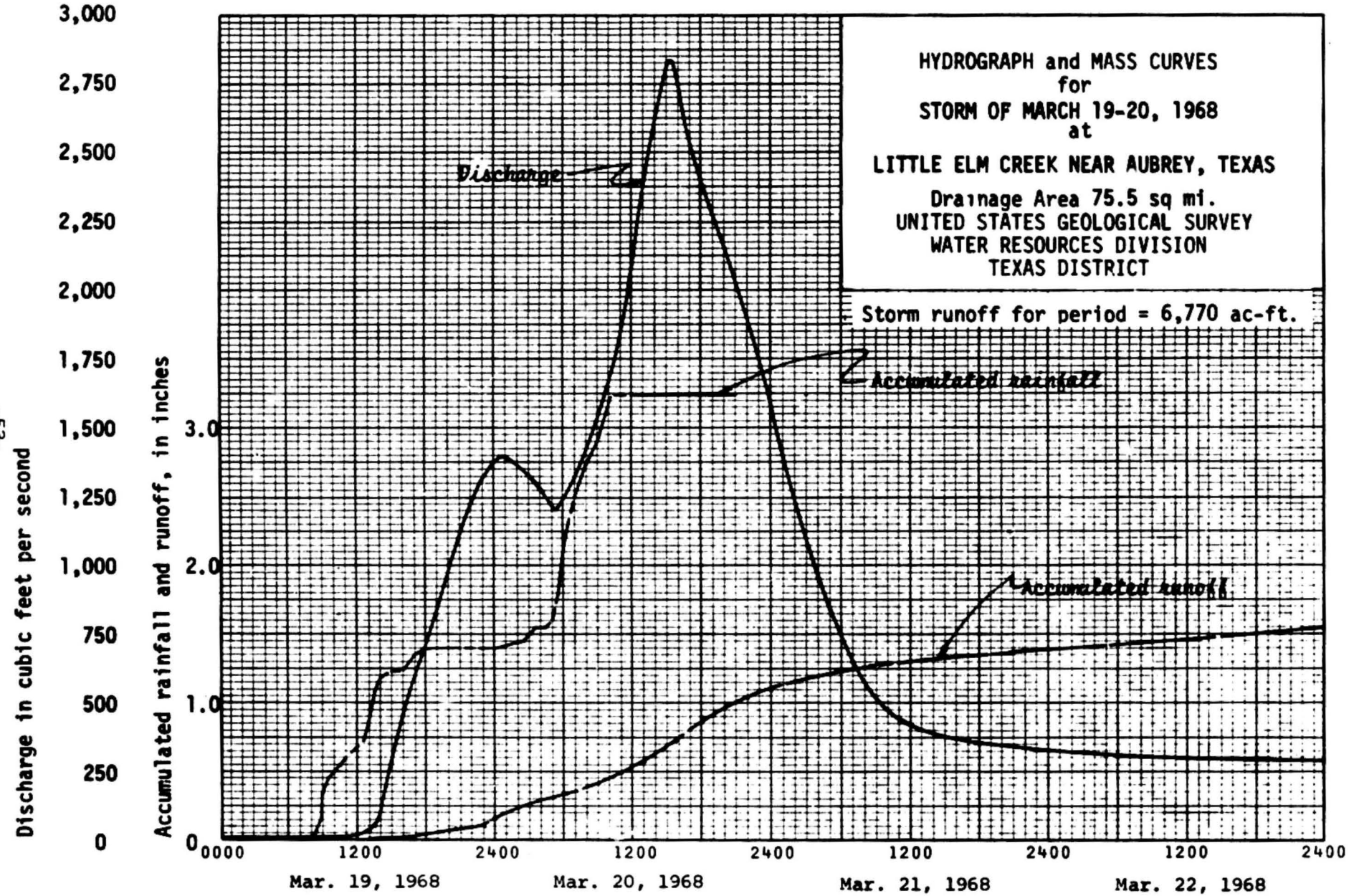
Area: LITTLE ELM CREEK NEAR AUBREY, TEXAS Date of storm MARCH 19-20, 1968

	Accumulated Precipitation in Inches for Recording Gages												Accumulated Weighted Precipitation	
Weight Factor	.294		.346		.088		.272							
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	(Rec. Gages x K) All Gages
March 20, 1968														
02 00	1.30	.382	1.36	.469	1.37	.121	1.30	.355					1.327	1.43
30	1.31	.385	1.41	.486	1.37	.121	1.30	.355					1.347	1.45
45	1.32	.388	1.47	.507	1.37	.121	1.35	.369					1.386	1.49
03 00	1.32	.388	1.47	.507	1.37	.121	1.37	.374					1.390	1.50
04 00	1.34	.394	1.47	.507	1.38	.121	1.37	.374					1.396	1.51
15	1.34	.394	1.48	.511	1.38	.121	1.37	.374					1.400	1.51
30	1.38	.406	1.55	.536	1.38	.121	1.37	.374					1.436	1.55
45	1.42	.417	1.56	.538	1.40	.123	1.39	.379					1.457	1.57
05 00	1.49	.438	1.60	.552	1.43	.126	1.39	.379					1.495	1.61
15	1.56	.459	1.71	.590	1.45	.128	1.44	.393					1.570	1.69
30	1.65	.485	1.80	.621	1.50	.132	1.66	.454					1.692	1.80
45	1.77	.520	2.05	.707	1.64	.144	1.66	.453					1.824	1.96
06 00	1.92	.564	2.15	.742	1.79	.158	1.82	.497					1.961	2.12
15	2.06	.606	2.25	.776	1.90	.167	1.94	.530					2.079	2.24
30	2.15	.632	2.32	.800	1.93	.170	*2.02	.551					2.153	2.32
45	2.25	.662	2.40	.828	2.04	.180	2.11	.576					2.246	2.42
07 00	2.36	.694	2.46	.849	2.11	.186	2.20	.601					2.330	2.51
30	2.50	.735	2.56	.883	2.29	.202	2.31	.631					2.448	2.64
08 00	2.60	.764	2.63	.907	2.34	.206	2.40	.655					2.532	2.73
30	2.70	.794	2.70	.932	2.40	.211	2.48	.677					2.614	2.82
09 00	2.80	.823	2.76	.952	2.42	.213	2.56	.699					2.687	2.90
15	2.85	.838	2.80	.966	2.44	.215	2.61	.713					2.732	2.95
30	2.90	.853	2.96	1.021	2.48	.218	2.72	.743					2.835	3.05
45	2.95	.897	3.00	1.035	2.56	.225	2.81	.767					2.924	3.16
10 00	3.12	.917	3.00	1.035	2.62	.231	2.84	.775					2.958	3.19
30	3.20	.941	3.00	1.035	2.69	.237	2.88	.786					2.999	3.24
11 00	3.20	.941	3.00	1.035	2.71	.238	2.88	.786					3.000	3.24
12 00	3.20	.941	3.00	1.035	2.71	.238	*2.88	.786					3.000	3.24
21 00	3.20	.941	3.00	1.035	2.71	.238	*2.88	.786					3.000	3.24

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	3.68	.368	7-S	.11	3.96	.436				
2-R	.09	3.20	.288	8-S	.12	2.64	.319				
3-S	.13	3.11	.404	9-R	.03	2.71	.081				
4-S	.09	3.12	.281	10-R	.08	2.88	.230				
5-S	.13	3.70	.481								
6-R	.12	3.00	.360		Totals		3.238				sum: 3.238

WMP = Sum of Precipitation x Weight Factor K = WMP / Total Recording Gages Weighted Precipitation = 3.238 / 3.000 = 1.0793

* Rain gage 10-R malfunctioned; increments based on average of 8R and 6-R.


HYDROGRAPH and MASS CURVES
for
STORM OF MARCH 19-20, 1968
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 6,770 ac-ft.
Discharge
Accumulated rainfall
Accumulated runoff
Discharge in cubic feet per second
Accumulated rainfall and runoff, in inches
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
3.0
2.0
1.0
0
0000
1200
2400
1200
2400
1200
2400
1200
2400
Mar. 19, 1968
Mar. 20, 1968
Mar. 21, 1968
Mar. 22, 1968

Form A-64
(Rev. 6-62)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - AUSTIN DISTRICT

Sheet 1 of 1

INFLOW AND OUTFLOW COMPUTATIONS

Storm period April 22, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Guyer, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
	April 22															
0000	20.12	162.92														
0700	20.12	162.92	7	0	0	20.12	0.22	.22	0				.2	.0001	.0007	.0007
15	20.15	163.92	.25	1.00	48.4	20.14	.30	48.7	.48	38.1	1.32	629	0	.0000	.0000	.0007
30	20.28	168.30	.25	4.38	212	20.22	.76	213	1.00	33.8	2.82	136	77.0	.0568	.0142	.0149
45	20.35	170.72	.25	2.42	117	20.32	1.65	119	0.				119	.0878	.0220	.0369
0800	20.41	172.82	.25	2.10	102	20.38	2.38	104	0.				104	.0768	.0192	.0561
15	20.48	175.31	.25	2.49	121	20.44	3.21	124	0.				124	.0915	.0229	.0790
30	20.57	178.57	.25	3.26	158	20.52	4.52	163	0.				163	.1203	.0300	.1090
35	20.60	179.66	.083	1.09	158	20.58	5.70	164	0.				164	.1210	.0100	.1190
40	20.65	181.52	.083	1.86	270	20.62	6.51	277	0.				277	.2044	.0170	.1360
45	20.72	184.14	.083	2.62	380	20.68	7.90	388	0.				388	.2863	.0238	.1598
50	20.80	187.18	.083	3.04	441	20.76	9.90	451	0.				451	.3328	.0276	.1874
55	20.87	189.90	.083	2.72	395	20.84	11.5	406	0.				406	.2996	.0249	.2123
0900	20.93	192.25	.083	2.35	341	20.90	12.1	353	0.				353	.2605	.0216	.2339
15	21.07	197.86	.25	5.61	272	21.00	12.8	285	0.				285	.2103	.0526	.2865
30	21.18	202.39	.25	4.53	219	21.12	13.6	233	0.				233	.1720	.0430	.3295
45	21.28	206.62	.25	4.23	205	21.23	14.3	219	0.				219	.1616	.0404	.3699
1000	21.35	209.64	.25	3.02	146	21.32	14.8	161	0.				161	.1188	.0297	.3996
15	21.40	211.82	.25	2.18	106	21.38	15.1	121	0.				121	.0893	.0223	.4219
30	21.44	213.60	.25	1.78	86.2	21.42	15.3	102	0.				102	.0753	.0188	.4407
45	21.47	214.94	.25	1.34	64.9	21.46	15.5	80.4	0.				80.4	.0593	.0148	.4555
1100	21.49	215.82	.25	.88	42.6	21.48	15.6	58.2	0.				58.2	.0430	.0108	.4663
30	21.52	217.18	.5	1.36	32.9	21.50	15.7	48.6	0.				48.6	.0359	.0180	.4843
1200	21.54	218.09	.5	.91	22.0	21.53	15.8	37.8	0.				37.8	.0279	.0140	.4983
1300	21.56	219.00	1	.91	11.0	21.55	16.0	27.0	0.				27.0	.0199	.0199	.5182
1400	21.55	218.54	1	- .46	- 5.6	21.56	16.0	21.6	0.				21.6	.0159	.0159	.5341
1800	21.50	216.27	4	-2.27	- 2.3	21.51	15.9	13.6	0.				13.6	.0100	.0400	.5741
2400	21.38	210.95	6	-5.32	-1.1	21.49	15.6	14.5	0.				14.5	.0107	.0642	.6383
			24				243.39									

Computed by GBH
Checked by FAD

A-78 (Revised Feb. 1960)

Sheet 1 of 1

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date: 8-21-69
Check by: BBH
Date: 9-24-69

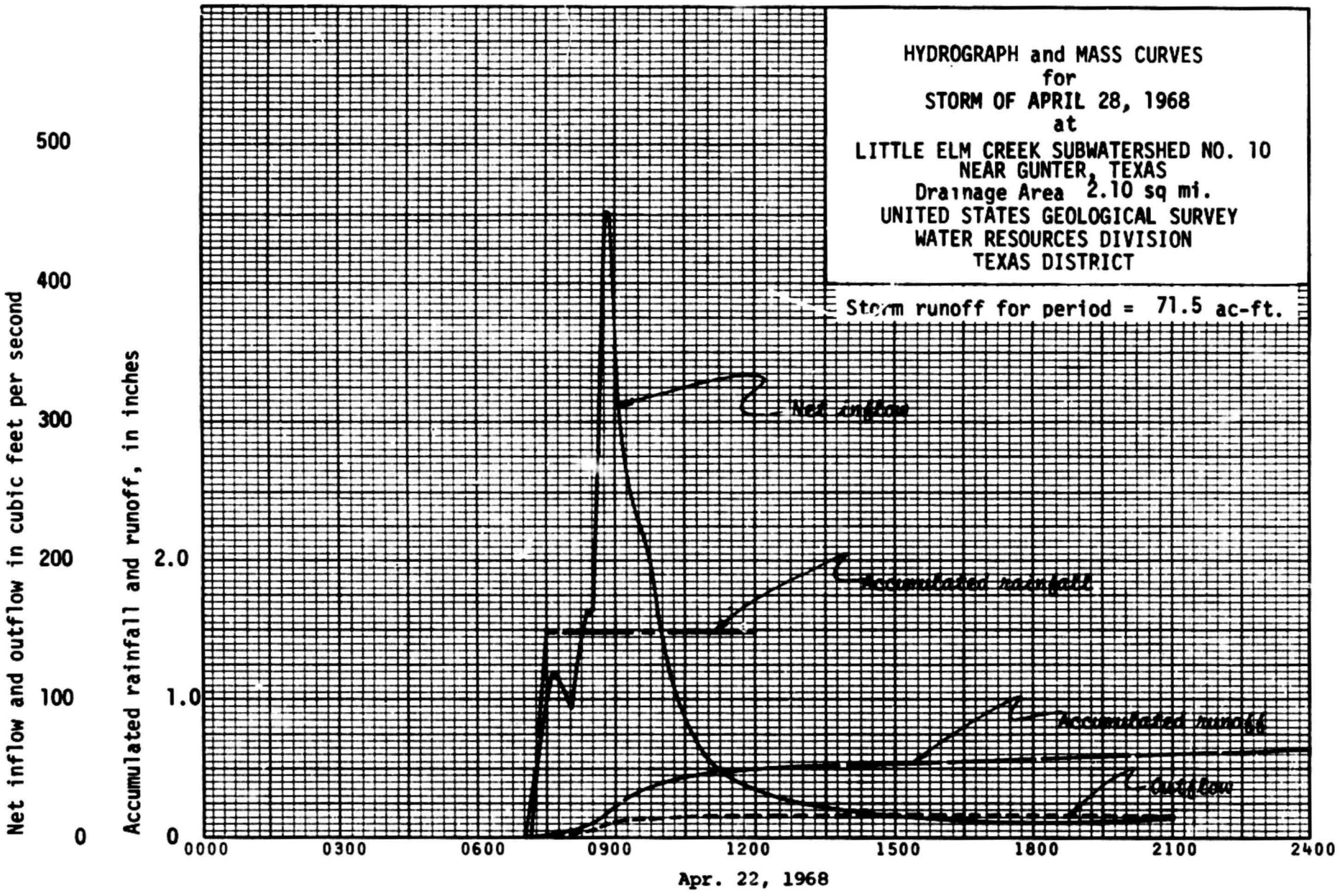
WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK SUBWATERSHED No. 10 NEAR GUNTER, TX Date of storm APRIL 22, 1968

Weight Factor		1.000												Accumulated Weighted Precipitation	
	Gage 10-B		Gage		Gage		Gage		Gage		Gage			
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recording Gages	(Rec. Gages x K) All Gages
April	22, 1968													
0000	0													0
0700	0.													0
15	.48													.48
30	1.48													1.48
0800	1.48													1.48
1200	1.48													1.48

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

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


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 28, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 71.5 ac-ft.
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
500
400
300
200
100
0
2.0
1.0
0
0000
0300
0600
0900
1200
1500
1800
2100
2400
Apr. 22, 1968

TX.-65 (Rev.7-69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record April 22-23, 1968 Drainage Area 46.2

Time	G. Ht. Feet	Sh. Adj.	Discharge C. f. s.	Inc.	In/Hr.	Runoff Inches	Acc. In.
			April 22				
0000	4.25	+.12	25	3.25	.0008	.0026	.0026
0630	4.13	+12	21	3.5	.0007	.0024	.0050
0700	4.62	+12	42	.375	.0014	.0005	.0055
0715	5.75	-06	106	.25	.0036	.0009	.0064
0730	7.00	-15	215	25	.0072	.0018	.0082
0745	8.05	-24	319	.25	.0107	.0027	.0109
0800	9.10	-34	439	.38	.0147	.0055	.0164
0830	10.00	-29	664	.5	.0223	.0112	.0276
0900	10.52	-15	1,030	.75	.0345	.0259	.0535
1000	10.93	-03	1,460	1	.0490	.0490	.1025
1100	11.32	0	1,870	1	.0627	.0627	.1652
1200	11.41	|	1,960	1	.0657	.0657	.2309
1300	11.31	0	1,860	1.5	.0624	.0936	.3245
1500	10.73	-08	1,240	2.5	.0416	.1040	.4285
1800	9.77	-36	572	3	.0192	.0576	.4861
2100	8.75	-29	398	2.5	.0133	.0832	.5193
2300	8.09	-24	324	1.5	.0109	.0164	.5357
2400	7.85	-22	299	.5	.0100	.0050	.5407
			16,126.125	24			
			672				

Time	G. Ht. Feet	Sh. Adj.	Discharge C.f.s.	Inc.	In/Hr.	Runoff Inches	Acc. In
			April 23				
0000	7.85	-22	299	2	.0100	.0200	.5607
0400	7.36	-18	250	4.5	.0084	.0378	.5985
0900	7.07	-16	221	4	.0074	.0296	.6281
1200	6.83	-14	199	4.5	.0067	.0302	.6583
1800	6.60	-12	178	6	.0060	.0360	.6943
2400	6.31	-10	153	3	.0051	.0153	.7096
			5029.5	24			
			210				
			April 24				
0000	6.31	-10	153	3	.0051	.0153	.7402
0600	5.98	-08	125	6	.0042	.0252	.7654
1200	5.74	-05	106	6	.0036	.0216	.7870
1800	5.57	-04	93	6	.0031	.0186	.8056
2400	5.36	-02	79	3	.0026	.0078	.8134
			2640	24			
			110				

Computed by B.B.H. Date 10/1/70 Checked by F.A.P. Date 10/7/70

*Revised

A-78 (Revised Feb. 1960)

Sheet 1 of 1

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date: 8-25-69
Check by: AGW
Date: 9/22/69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR CELINA, TEX. Date of storm APRIL 22 & 23, 1968

Accumulated Precipitation in Inches for Recording Gages

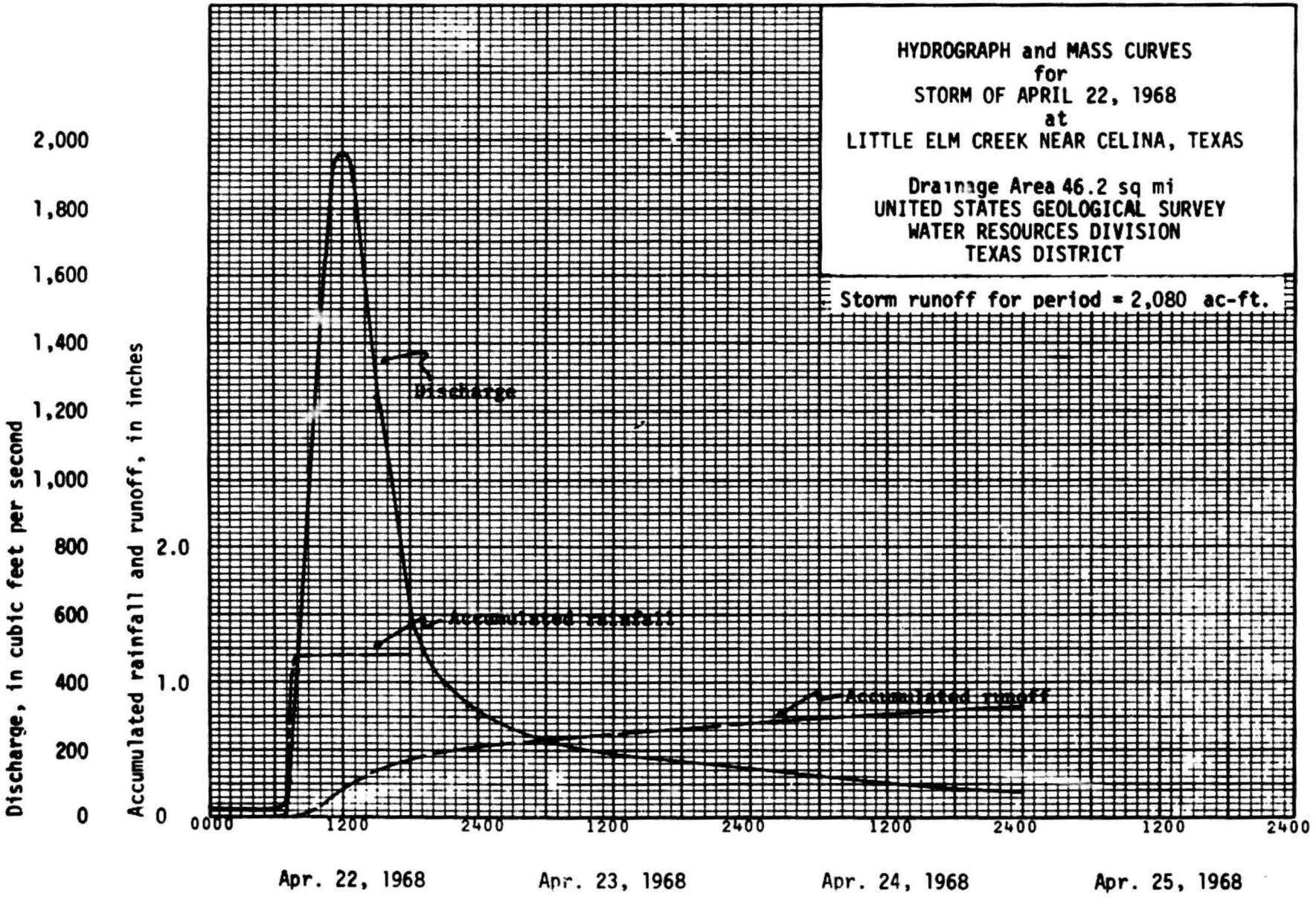
Weight Factor		0.45		0.0		2.42								Accumulated Weighted Precipitation
Date & Time	Gage 1-S Recorded	x Factor	Gage A-R Recorded	x Factor	Gage 10-R Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages x E) All Gages
APRIL 22, 1968														
0000	0.	0	0	0.	0.	0.							0.	0.
0700	0.	0.	0	0.	0.	0							0.	0.
15	.10	.045	.60	.078	.68	.802							.325	.29
30	.75	.338	1.06	.138	1.68	.802							1.078	.99
45	1.17	.526	1.06	.138	1.68	.632							1.296	1.16
0800	1.23	.554	1.06	.138	1.68	.632							1.314	1.19
1200	1.23	.554	1.06	.138	1.68	.632							1.314	1.19
1900	1.23	.554	1.06	.138	1.68	.632							1.314	1.19

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	.67	.107	7-R	.02	.72	.014				
2-R	.13	1.23	.160	10-R	.12	1.68	.178				
3-S	.20	1.64	.328								
4-S	.14	1.62	.227		TOTAL		1.189				
5-S	.19	.70	.133								
6-R	.04	1.06	.042								

Sum 1.189

Σ(P x F) = Sum of Precipitation x Weight Factor

E = Σ(P x F) / Total Recording Gages Weighted Precipitation = 1.189 / 1.314 = .9049


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 22, 1968
at
LITTLE ELM CREEK NEAR CELINA, TEXAS
Drainage Area 46.2 sq mi
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 2,080 ac-ft.
Discharge, in cubic feet per second
Accumulated rainfall and runoff, in inches
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0000
1200
2400
1200
2400
1200
2400
1200
2400
Apr. 22, 1968
Apr. 23, 1968
Apr. 24, 1968
Apr. 25, 1968

A-65
(Rev. 6-63)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY-AUSTIN DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record April 22-25, 1968 Drainage Area 75.5

Rating Table No. 7

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.
			April 22				
0000	6.05	0	41	3.5	.0008	.0028	.0028
0700	5.88	|	35	3.75	.0007	.0026	.0054
0730	6.53	|	58	.5	.0012	.0006	.0060
0800	7.00	|	77	.5	.0016	.0008	.0068
0830	8.25	|	138	.5	.0028	.0014	.0082
0900	9.70	|	234	.5	.0048	.0024	.0106
0930	10.72	|	322	.5	.0066	.0033	.0139
1000	11.52	|	419	.5	.0086	.0043	.0182
1030	12.00	|	496	.5	.0102	.0051	.0233
1100	12.29	|	553	1.25	.0114	.0142	.0375
1300	13.12	|	761	2	.0156	.0312	.0687
1500	13.79	|	996	2	.0204	.0408	.1095
1700	14.33	|	1,300	2	.0267	.0534	.1629
1900	14.66	|	1,560	1.75	.0320	.0560	.2189
2030	14.74	|	1,640	1.5	.0337	.0506	.2695
2200	14.66	|	1,560	1.75	.0320	.0560	.3255
2400	14.35	0	1,320	1.	.0271	.0271	.3526
			17192	24			
			716				
			April 23				
0000	14.35	0	1,320	1.5	.0271	.0406	.3932
0300	13.32	|	822	2.5	.0169	.0422	.4354
0500	12.33	|	561	2	.0115	.0230	.4584
0700	11.45	|	409	2.5	.0084	.0210	.4794
1000	10.56	|	306	4.5	.0063	.0284	.5078
1600	9.72	|	236	7	.0048	.0336	.5414
2400	9.14	0	193	4	.0040	.0160	.5574
			9980	24			
BRH DBH	BRH DBH	BRH DBH	416	BRH DBH	HHW BSH	HHW BSH	HHW BSH

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.
			April 24				
0000	9.14	0	193	6	.0040	.0240	.5814
1200	8.39	|	145	12	.0030	.0360	.6174
2400	7.82	0	116	6	.0024	.0144	.6318
			3594	24			
			150				
			April 25				
0000	7.82	0	116	6	.0024	.0144	.6462
1200	7.24	|	88	12	.0018	.0216	.6678
2400	6.71	0	65	6	.0013	.0078	.6756
			2,142	24			
			89				
BRH DBH	BRH DBH	BRH DBH	BRH DBH	BRH DBH	HHW BSH	HHW BSH	HHW BSH

Computed by _____ Date _____ Computed _____ Date _____

A-78 (Revised Feb. 1960)

Sheet 1 of 1

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-26-69
Check by: BBH
Date. 9/28/69

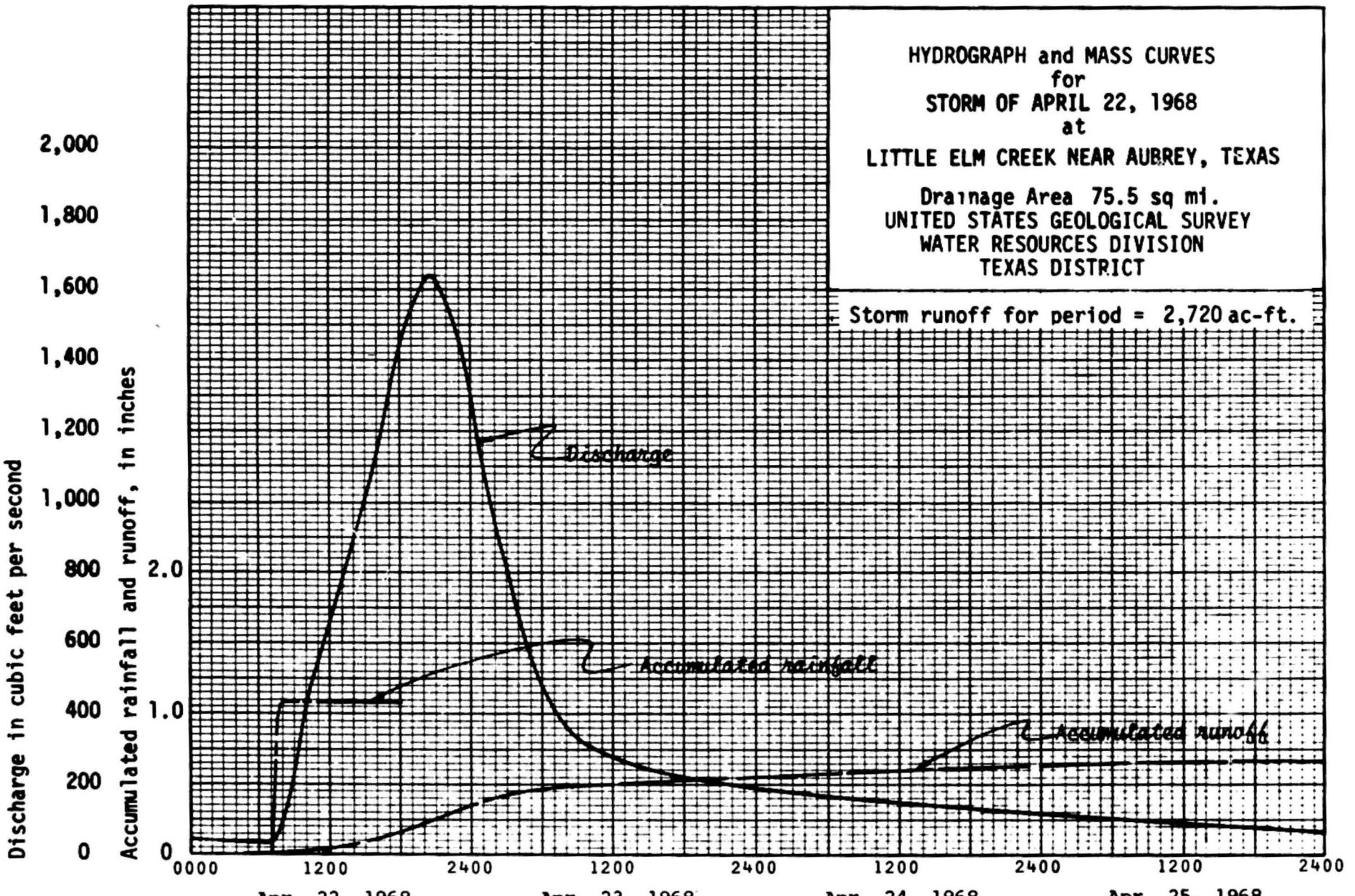
WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR AUBREY, TEXAS Date of storm APRIL 22, 1969

Weight Factor	.294		.346		.088		.273						Accumulated Weighted Precipitation	
	Accumulated Precipitation in Inches for Recording Gages													
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	(Rec. Gages x E) All Gages
APRIL 22, 1969														
0000	0.	0.	0.	0.	0.	0.	0.	0.					0.	0.
0700	0.	0.	0.	0.	0.	0.	0.	0.					0.	0.
15	.1[illegible]	.089	.60	.207	0.	0.	.48	.131					.347	.33
30	.[illegible]	.320	1.06	.366	.66	.058	1.48	.404					1.049	.94
45	1.[illegible]	.344	1.06	.366	.76	.067	1.48	.404					1.181	1.06
0800	1.[illegible]	.362	1.06	.366	.78	.069	1.48	.404					1.201	1.08
1200	1.23	.362	1.06	.366	.78	.069	1.48	.404					1.201	1.08
1800	1.23	.362	1.06	.366	.78	.069	1.48	.404					1.201	1.08

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	.67	.067	7-S	.11	.72	.079				
2-R	.09	1.23	.111	8-S	.12	.88	.106				
3-S	.13	1.64	.213	9-R	.08	.78	.062				
4-S	.09	1.62	.146	10-R	.08	1.48	.118				
5-S	.13	.70	.091								
6-R	.12	1.06	.127			Total	1.081				sum 1.081

WPR = Sum of Precipitation x Weight Factor E = WPR / Total Recording Gages Weighted Precipitation = 1.081 / 1.201 = .9001


HYDROGRAPH and MASS CURVES
for
STORM OF APRIL 22, 1968
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 2,720 ac-ft.
Discharge in cubic feet per second
Accumulated rainfall and runoff, in inches
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0000
1200
2400
1200
2400
1200
2400
1200
2400
Apr. 22, 1968
Apr. 23, 1968
Apr. 24, 1968
Apr. 25, 1968

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 1 of 4

INFLOW AND OUTFLOW COMPUTATIONS

Storm period May 9-13, 1968

S-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

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	cfs	ft	cfs	cfs	in	ac	ac-ft	cfs	cfs	in/hr	in	in
	May 9															
0000	19.97	158.07														
1400	19.97	158.07	14	0	0	19.97	0.	0	0				0	0	0.	0
30	19.97	158.07	.5	0	0	19.97	0.	0	0				0	0	0.	0
45	20.05	160.64	.25	2.57	124	20.01	0.	124	.39	82.1	1.04	50.3	73.7	.0544	.0136	.0136
1500	20.12	162.92	.25	2.28	110	20.08	.09	110	.75	82.6	2.04	98.7	11.3	.0088	.0021	.0157
1600	20.17	164.58	1	1.66	20.1	20.14	.30	20.4	.20	83.1	.55	6.7	13.7	.0101	.0101	.0258
15	20.18	164.92	.25	.34	16.5	20.18	.50	17.0	.08	83.4	.14	6.8	10.2	.0075	.0019	.0277
30	20.20	165.58	.25	.66	31.9	20.19	.56	32.5	0				32.5	.0240	.0060	.0337
35	20.25	167.28	.083	1.70	247	20.22	.76	248					248	.1830	.0152	.0489
40	20.31	169.33	.083	2.05	298	20.28	1.25	299					298	.2207	.0183	.0672
45	20.38	171.76	.083	2.43	353	20.34	1.88	355					355	.2620	.0217	.0889
50	20.44	173.88	.083	2.12	308	20.41	2.79	311					311	.2295	.0190	.1079
55	20.49	175.66	.083	1.78	258	20.46	3.50	262					262	.1934	.0161	.1240
1700	20.53	177.11	.083	1.45	211	20.51	4.34	215					215	.1587	.0132	.1372
15	20.64	181.15	.25	4.04	196	20.58	5.70	202					202	.1491	.0373	.1745
30	20.73	184.52	.25	3.37	163	20.68	7.90	171					171	.1262	.0316	.2061
45	20.80	187.18	.25	2.66	129	20.76	9.90	139					139	.1026	.0256	.2317
1800	20.86	189.51	.25	2.33	113	20.83	11.4	124					124	.0915	.0229	.2546
30	20.92	191.85	.5	2.34	56.6	20.89	12.0	68.6					68.6	.0506	.0253	.2799
1900	20.97	193.83	.5	1.98	47.9	20.94	12.4	60.3					60.3	.0446	.0223	.3021
2000	21.00	195.02	1	1.19	14.4	20.98	12.7	27.1					27.1	.0200	.0100	.3121
2100	21.02	195.83	1	.81	9.8	21.01	12.9	22.7					22.7	.0168	.0168	.3289
2400	20.99	194.62	3	-1.21	-4.9	21.00	12.8	7.9	0				7.9	.0058	.0174	.3463
			24													
											3.77					
	May 10															
0000	20.99	194.62														
2300	20.66	181.89	23	-12.73	-6.7	20.82	11.2	4.5	0				4.5	.0033	.0759	.4222
15	20.67	182.26	.25	.37	17.9	20.66	7.41	25.3	.34	27.3	1.06	51.3	0.	.0000	.0000	.4222
30	20.75	185.28	.25	3.02	146	20.71	8.65	155	.50	37.7	1.57	76.0	78.0	.0583	.0146	.4468
2400	20.80	187.18	.5	1.90	46.0	20.78	10.4	56.4	.04	28.2	.13	3.1	53.3	.0393	.0196	.4664
			24													

computed by BBH
checked by FAD

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

INFLOW AND OUTFLOW COMPUTATIONS

Storm period May 9-13, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
	May 11															
0000	20.80	187.18														
30	20.85	189.12	.5	1.94	46.9	20.82	11.2	58.1	0				58.1	.0439	.0214	.4678
45	20.91	191.46	.25	2.34	113	20.88	11.9	125	0				125	.0922	.0330	.5108
0100	20.98	194.23	.25	2.77	134	20.94	12.4	146	0				146	.1077	.0269	.5377
15	.08	198.26	.25	4.03	195	21.03	13.0	208	0				208	.1536	.0384	.5761
30	21.16	201.56	.25	3.30	160	21.12	13.6	174	0				174	.1284	.0321	.6082
45	21.22	204.07	.25	2.51	121	21.19	14.0	135	0				135	.0996	.0249	.6331
0200	21.27	206.20	.25	2.13	103	21.24	14.3	117	0				117	.0863	.0216	.6547
15	21.32	208.34	.25	2.14	104	21.30	14.7	119	0				119	.0878	.0220	.6767
30	21.34	209.21	.25	.87	42.1	21.33	14.8	56.9	0				56.9	.0420	.0105	.6872
45	21.36	210.08	.25	.87	42.1	21.35	15.0	57.1	0				57.1	.0421	.0105	.6977
0300	21.38	210.95	.25	.87	42.1	21.37	15.0	57.1	0				57.1	.0421	.0105	.7082
15	21.41	212.26	.25	1.31	63.4	21.40	15.2	78.6	.12	44.0	.44	21.3	57.3	.0423	.0106	.7188
30	21.43	213.16	.25	.90	43.6	21.42	15.3	58.9	.08	44.2	.33	16.0	42.9	.0317	.0079	.7267
45	21.45	214.04	.25	.88	42.6	21.44	15.4	58.0	.12	44.4	.44	21.3	36.7	.0271	.0068	.7335
0400	21.47	214.94	.25	.90	43.6	21.46	15.5	59.1	.07	44.6	.26	12.6	46.5	.0343	.0086	.7421
30	21.53	217.64	.5	2.70	65.3	21.50	15.7	81.0	.13	45.0	.49	11.9	69.1	.0510	.0255	.7676
0500	21.63	222.22	.5	4.58	111	21.58	16.1	127	.08	45.8	.31	7.5	120	.0886	.0443	.8119
15	21.68	224.54	.25	2.32	112	21.66	16.5	128	0				128	.0945	.0236	.8355
30	21.78	229.27	.25	4.73	229	21.73	16.8	246	0				246	.1815	.0454	.8809
45	21.87	233.62	.25	4.35	211	21.82	17.3	228	0				228	.1683	.0421	.9230
0600	21.95	237.54	.25	3.92	190	21.91	17.8	208	0				208	.1535	.0384	.9614
15	22.02	241.03	.25	3.49	169	21.98	18.1	187	0				187	.1380	.0345	.9959
30	22.08	244.06	.25	3.03	147	22.05	18.4	165	0				165	.0122	.0030	.9989

Not enough range for 5-minute interval

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 3 of 4

INFLOW AND OUTFLOW COMPUTATIONS

Storm period May 9-13, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height	Storage	Time int.	Change in storage		Mean G. Ht.	Outflow	Total inflow	Rainfall on Pool				Net Inflow			
									in	area	Storage		Rate		in	Acc in
	ft	ac-ft	hrs	ac-ft	cfs	ft	cfs	cfs		ac	ac-ft	cfs	cfs	in/hr		
	May 11 cont.															
0645	22.18	249.19	.25	5.13	348	22.18	19.1	267	a.				267	.1970	.0492	1.0481
0700	22.22	251.27	.25	2.08	101	22.20	19.2	130	a.				120	.0886	.0222	1.0703
0730	22.25	252.84	.5	1.57	40.0	22.24	19.4	59.4	a.				59.4	.0438	.0219	1.0922
0800	22.29	254.94	.5	2.10	53.6	22.27	19.6	70.4	a.				70.4	.0520	.0260	1.1182
30	22.32	256.54	.5	1.60	38.7	22.30	19.7	58.4	a.				58.4	.0431	.0216	1.1398
0900	22.34	257.61	.5	1.07	25.9	22.33	19.8	45.7	a.				45.7	.0337	.0168	1.1566
1000	22.37	259.22	1	1.61	19.5	22.36	20.0	39.5	a.				39.5	.0292	.0292	1.1858
1100	22.38	259.75	1	.53	6.4	22.38	20.1	26.5	a.				26.5	.0196	.0196	1.2054
1200	22.37	259.22	1	-.53	-6.4	22.38	20.1	13.7	a.				13.7	.0101	.0101	1.2155
2400	22.13	246.62	12	-12.60	-12.7	22.25	19.4	6.7	a.				6.7	.0049	.0588	1.2743
			24													
	May 12															
0000	22.13	246.62														
1200	21.83	231.68	12	-14.94	-15.1	21.98	18.1	3.0	a.				3.0	.0022	.0264	1.3007
2400	21.53	217.64	12	-14.04	-14.2	21.68	16.6	2.4	.01	46.8	.33	.2	2.4	.0018	.0216	1.3223
			24													
											.23					
	May 13															
0000	21.53	217.64														
0015	21.57	219.46	.25	1.82	88.1	21.55	16.0	104	.08	45.5	1.63	70.9	25.1	.0185	.0046	1.3269
0030	21.60	220.82	.25	1.36	65.8	21.58	16.1	81.9	.10	45.8	.69	33.4	48.5	.0358	.0090	1.3359
0100	21.65	222.27	.5	1.40	33.9	21.61	16.2	50.1	.07	46.1	.27	6.5	43.6	.0321	.0160	1.3519
30	21.65	223.14	.5	.92	22.3	21.64	16.4	38.7	.04	46.4	.15	3.6	35.1	.0259	.0180	1.3699
45	21.70	225.47	.25	2.33	113	21.68	16.6	130.	.03	46.8	.12	5.8	124.	.0915	.0229	1.3928
0200	21.76	228.32	.25	2.85	138	21.73	16.8	155	a.				155	.1144	.0286	1.4214
15	21.83	231.68	.25	3.36	163	21.80	17.2	180	a.				180.	.1328	.0332	1.4546
30	21.92	236.06	.25	4.38	212	21.88	17.6	230	a.				230	.1697	.0424	1.4970
45	21.98	239.03	.25	2.97	144	21.95	18.0	162	a.				162	.1196	.0299	1.5269
0300	22.03	241.54	.25	2.51	121	22.00	18.2	139	a.				139	.1026	.0256	1.5525

Not enough range in stage for 5-minute interval

Form A-64
(Rev. 5-65)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

Sheet 4 of 4

INFLOW AND OUTFLOW COMPUTATIONS

Storm period May 9-13, 1968

8-0526.3 Little Elm Creek subwatershed No. 10 near Gunter, Tex. D.A. 2.10 sq mi

Date and time	Gage height ft	Storage ac-ft	Time int. hrs	Change in storage ac-ft	Change in storage cfs	Mean G. Ht. ft	Outflow cfs	Total inflow cfs	Rainfall on Pool in	Rainfall on Pool area ac	Rainfall on Pool Storage ac-ft	Rainfall on Pool Storage cfs	Net Inflow Rate cfs	Net Inflow Rate in/hr	Net Inflow in	Net Inflow Acc in
	May 13 Cont															
0315	22.08	244.06	.25	2.52	122	22.06	18.5	140					140	.1033	.0258	1.5717
30	22.12	246.10	.25	2.04	98.7	22.10	18.7	117					117	.0863	.0216	1.5933
45	22.15	247.64	.25	1.54	74.5	22.14	18.9	93.4					93.4	.0689	.0172	1.6105
0400	22.18	249.19	.25	1.55	75.0	22.16	19.0	94.0					94.0	.0694	.0174	1.6279
30	22.22	251.27	.5	2.08	50.3	22.20	18.2	69.5					69.5	.0513	.0256	1.6535
0500	22.24	252.32	.5	1.05	25.4	22.23	19.4	44.8					44.8	.0331	.0166	1.6701
30	22.25	252.84	.5	.52	12.6	22.24	19.4	32.0					32.0	.0236	.0118	1.6819
0600	22.26	253.37	.5	.53	12.8	22.26	19.5	32.3					32.3	.0238	.0119	1.6938
0700	22.26	253.37	1	0.	0.	22.26	19.5	19.5					19.5	.0144	.0144	1.7082
1200	22.19	249.70	5	-3.67	-8.9	22.22	19.3	10.4					10.4	.0077	.0385	1.7467
2400	21.91	236.56	12	-16.14	-14.3	22.05	18.4	4.1					4.1	.0030	.0360	1.7827
			24													

A-78 (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date: 8-25-69
Check by: BBH
Date: 9-26-69

WEIGHTED PRECIPITATION RECORD

Area: Little Elm Creek Subwatershed No. 10 near Gunter, Tex. Date of storm May 9-11, 1969

Weight Factor		1.000												Accumulated Weighted Precipitation	
		Accumulated Precipitation in Inches for Recording Gages													
Date & Time	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gage	(Rec. Gages x E) All Gages
May 9, 1968													May 9 (Storm)	(Storm)
1430	0												0	0
45	.39												.39	.39
1500	1.14												1.14	1.14
30	1.26												1.26	1.26
1600	1.34												1.34	1.34
15	1.39												1.39	1.39
2400	1.39												1.39	1.39
May 10, 1968													May 10-11	
2400	0												0	1.39
15	.34												.34	1.73
30	.84												.84	2.23
2440	.88												.88	2.27
May 11, 1968														
0300	.88												.88	2.27
15	1.00												1.00	2.39
30	1.09												1.09	2.48
45	1.21												1.21	2.60
0400	1.28												1.28	2.67
30	1.41												1.41	2.80
0500	1.49												1.49	2.88
0600	1.49												1.49	2.88
May 12, 1968													May 12-13	
2300	0												0	2.88
45	0												0	2.88
2400	.06												.06	2.94
(continued)														

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

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

A-78 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-25-69
Check by: BBH
Date. 9-26-69

WEIGHTED PRECIPITATION RECORD

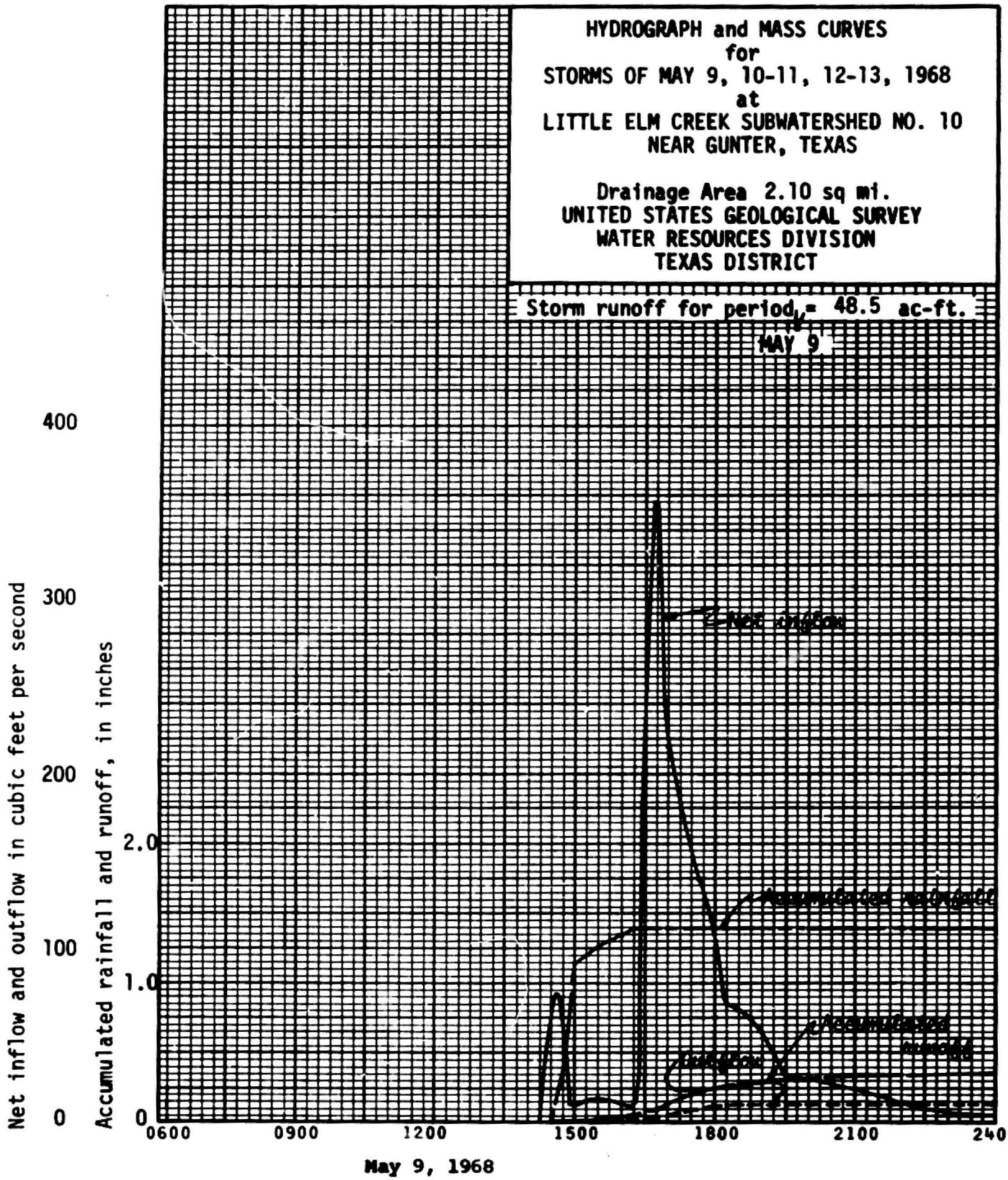
Area: LITTLE ELM CREEK SUBWATERSHED No. 10 NEAR GUNTER, TEX. Date of storm MAY 9, 10-11, 12-13, 1968

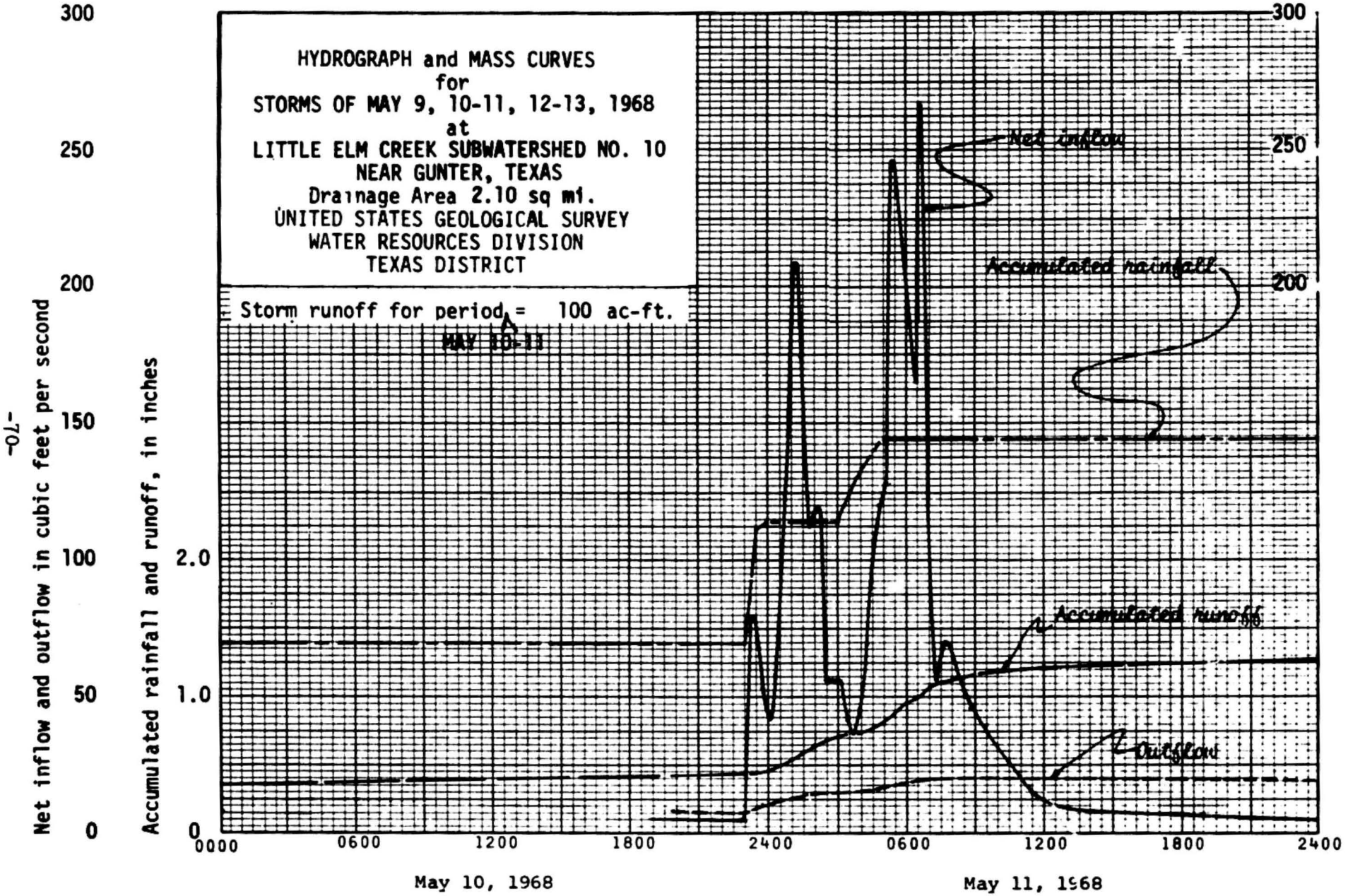
Accumulated Precipitation in Inches for Recording Gages

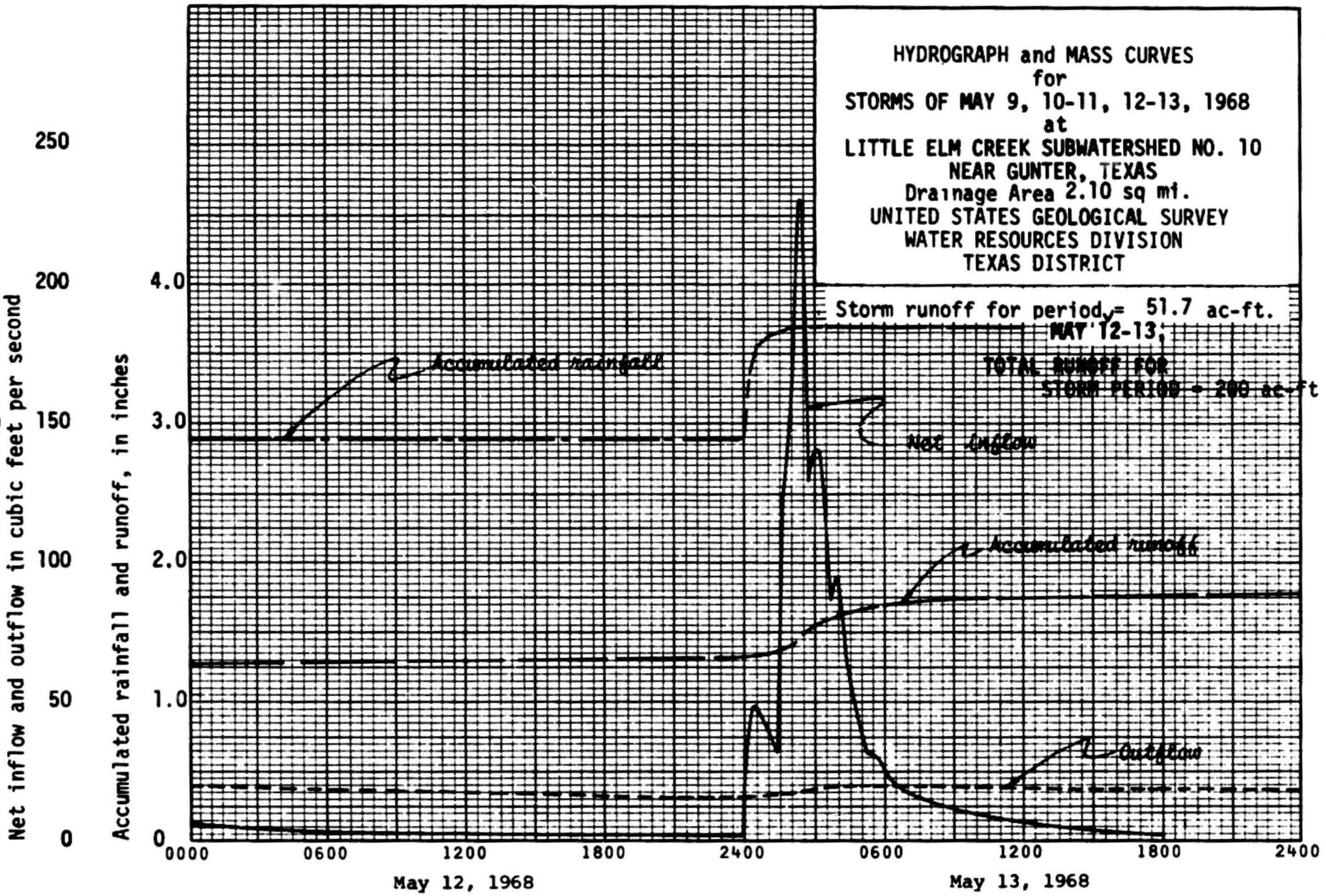
Weight Factor	1.000												Accumulated Weighted Precipitation	
Date & Time	Gage A0-8 Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages x E) All Gages (Storm)	(Runoff)
May 13, 1968											continue		May 12-13		
0000	.06													.06	2.94
15	.49													.49	3.37
30	.67													.67	3.55
0100	.74													.74	3.62
0200	.81													.81	3.69
1200	.81													.81	3.69

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
										SWR:	

SWR = Sum of Precipitation x Weight Factor E = SWR / Total Recording Gages Weighted Precipitation =


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 48.5 ac-ft.
MAY 9
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
400
300
200
100
0
2.0
1.0
0
0600
0900
1200
1500
1800
2100
May 9, 1968


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 100 ac-ft.
MAY 10-11
Net inflow
Accumulated rainfall
Accumulated runoff
Outflow
Net inflow and outflow 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
May 10, 1968
May 11, 1968


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK SUBWATERSHED NO. 10
NEAR GUNTER, TEXAS
Drainage Area 2.10 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 51.7 ac-ft.
MAY 12-13;
TOTAL RUNOFF FOR
STORM PERIOD = 200 ac-ft
Accumulated rainfall
Net inflow
Accumulated runoff
Outflow
Net inflow and outflow in cubic feet per second
Accumulated rainfall and runoff, in inches
250
200
150
100
50
0
4.0
3.0
2.0
1.0
0
0000
0600
1200
1800
2400
0600
1200
1800
2400
May 12, 1968
May 13, 1968

TX-65 (Rev. 7-69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record May 9-12, 1968 Drainage Area 46.2

Time	G. Ht. Feet	Sh. Adj.	Discharge C. f. s.	Inc.	In/Hr.	Runoff Inches	Acc. In.
			May 9				
0000	3.26	+.09	2.6	3	.0009	.0003	.0003
0600	3.15		1.9	6	.0005	.0003	.0006
1200	3.08		.80	4.25	.0003	.0001	.0007
1430	3.07		.72	1.5	.0002	.0000	.0007
1500	3.10		.97	.5	.0003	.0000	.0007
1530	3.22		2.1	.5	.0007	.0004	.0011
1600	3.63		8.0	.5	.0003	.0002	.0013
1630	4.18	+.09	22	.375	.0007	.0003	.0016
1645	4.95	0	54	.25	.0018	.0004	.0020
1700	5.88	+.07	117	.375	.0039	.0015	.0035
1730	7.00	+.15	215	.5	.0072	.0036	.0071
1800	7.87	+.22	302	.75	.0101	.0076	.0147
1900	8.70	+.23	391	1	.0131	.0131	.0278
2000	9.39	+.45	473	1	.0159	.0159	.0437
2100	10.00	+.29	664	1	.0223	.0223	.0660
2200	10.33	+.20	868	.75	.0291	.0218	.0878
2230	10.40	+.16	938	.75	.0315	.0236	.1114
2330	10.32	+.20	862	.75	.0289	.0217	.1331
2400	10.23	+.23	800	.25	.0268	.0067	.1398
			4,164.89	24			
			174				

Time	G. Ht. Feet	Sh. Adj.	Discharge C.f.s.	Inc.	In/Hr.	Runoff Inches	Acc. In
			May 10				
0000	10.23	+.23	800	1.5	.0268	.0402	.1806
0300	9.52	+.45	499	3	.0167	.0501	.2301
0600	8.60	+.29	378	3	.0127	.0381	.2682
0900	7.90	+.22	305	3	.0102	.0306	.2988
1200	7.62	+.20	276	7	.0093	.0651	.3639
2300	7.23	+.17	237	5.25	.0079	.0454	.4093
2330	7.32	+.18	245	.5	.0082	.0041	.4134
2400	7.73	+.21	287	.25	.0096	.0024	.4158
			8235	24			
			343				
			May 11				
0000	7.73	+.21	287	.25	.0096	.0024	.4182
0030	8.77	+.29	400	.5	.0134	.0067	.4249
0100	9.62	+.40	529	.75	.0177	.0133	.4382
0200	10.09	+.26	715	1.5	.0240	.0360	.4742
0400	10.32	+.21	856	2	.0287	.0574	.5316
0600	10.90	+.03	1,430	1.5	.0480	.0720	.6036
0700	11.06	0	1,610	1	.0540	.0540	.6576
0800	11.08	0	1,630	1	.0547	.0547	.7123
0900	11.05	0	1,600	1.5	.0537	.0806	.7929
1100	10.77	+.06	1,290	3	.0433	.1299	.9228
1500	9.92	+.32	625	3.5	.0210	.0735	.9963
1800	9.29	+.40	463	4.5	.0155	.0698	1.0661
2400	8.44	+.27	360	3	.0121	.0363	1.1024
			20,459	24			
			853				

cont.

Computed by BBH Date 10/1/70 Checked by FAP Date 10/7/70

*Revised

TX-65 (Rev. 7-69)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Celina, Tex.

Period of Record May 9-12, 1968 Drainage Area 46.2

Time	G. Ht. Feet	Sh. Adj.	Discharge C.f.s.	Inc.	In/Hr.	Runoff Inches	Acc. In.
			May 12				
0000	8.44	-.27	360	6	.0121	.0726	1.1750
1200	8.00	-.23	315	12	.0106	.1272	1.3022
2400	7.86	-.22	300	6	.0101	.0606	1.3628
			7740	24			
			322				
			May 13				
0000	7.86	-.22	300	.25	.0101	.0252	1.3880
0030	8.04	-.23	319	.5	.0107	.0054	1.3934
0100	8.55	-.27	374	.5	.0125	.0062	1.3996
0130	9.48	-.45	491	.5	.0165	.0082	1.4078
0200	10.12	-.26	730	.75	.0245	.0184	1.4262
0300	10.62	-.12	1,120	1.5	.0376	.0564	1.4826
0500	11.03	0	1,580	1.25	.0530	.0662	1.5488
0530	11.14		1,680	.5	.0563	.0282	1.5770
0600	11.18		1,720	.75	.0577	.0433	1.6203
0700	11.14	0	1,680	1	.0563	.0563	1.6766
0800	10.98	-.01	1,520	1.5	.0510	.0765	1.7531
1000	10.51	-.15	1,020	2	.0342	.0684	1.8215
1200	10.02	-.30	668	2.5	.0224	.0560	1.8775
1500	9.38	-.45	471	3	.0158	.0474	1.9249
1800	8.90	-.30	416	4.5	.0140	.0630	1.9879
2400	8.41	-.27	357	3	.0120	.0360	2.0239
			1902.5	24			
			793				

Time	G. Ht. Feet	Sh. Adj.	Discharge C.f.s.	Inc.	In/Hr.	Runoff Inches	Acc. In
			May 14				
0000	8.41	-.27	357	3	.0120	.0360	2.0599
0600	8.16	-.25	330	6	.0111	.0666	2.1265
1200	8.07	-.24	321	9	.0108	.0972	2.2237
2400	7.88	-.22	303	6	.0102	.0612	2.2849
			7758	24			
			323				

Computed by BBH Date 10/1/70 Checked by EAP Date 10/7/70

Revised

A-7b (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: MHW
Date. 8-27-69
Check by: RAH
Date. 9-22-69

WEIGHTED PRECIPITATION RECORD

Area: Little Elm Creek near Celina, Tex. Date of storm May 9-11, 1968

Weight Factor													Accumulated Weighted Precipitation	
	Accumulated Precipitation in Inches for Recording Gages													
Date & Time	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages + 8) All Gages
May 9,	1968												May 9 (8am)	(same)
1615	0	0	0	0	0	0							0	0
30	0	0	0	0	0	0							0	0
45	.79	.364	.58	.070	.59	.164							.590	.58
1800	2.34	1.053	.67	.076	1.12	.379							1.606	1.58
15	2.72	1.224	.58	.075	1.24	.429							1.828	1.80
30	2.76	1.242	.67	.087	1.24	.429							1.858	1.83
45	2.84	1.278	.70	.091	1.25	.432							1.932	1.90
1900	2.84	1.278	.71	.092	1.29	.586							1.956	1.92
2400	2.92	1.314	.76	.096	1.39	.586							1996	1.96
May 10												Storm of May 10-11		
2400	2.92	1.314	.76	.096	1.39	.586							1996	0
2300	2.97	1.336	.76	.096	1.39	.586							2016	.02
15	3.00	1.350	1.20	.154	1.73	.727							2231	.24
30	3.03	1.363	1.24	.161	2.23	.937							2461	.47
2400	3.57	1.606	1.26	.161	2.27	.953							2720	.73
May 11														
0245	3.60	1.620	1.24	.146	2.27	.953							2719	.72
0300	3.61	1.624	1.28	.173	2.27	.953							2750	.75
15	3.69	1.660	1.45	.188	2.39	1.004							2852	.85
30	4.11	1.850	1.54	.201	2.48	1.042							3093	1.09
45	4.18	1.881	1.63	.212	2.60	1.092							3185	1.18
0400	4.32	1.944	1.68	.220	2.67	1.121							3285	1.28
30	4.43	1.994	1.80	.234	2.80	1.176							3404	1.40
0500	4.50	2.025	1.81	.235	2.88	1.210							3470	1.46

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
1-5	.14	4.92	.689	2-5	.02	2.00	.040				
2-8	.13	5.80	.754	8-R	.12	3.69	.443				
3-5	.20	5.68	1.136								
4-5	.14	4.81	.673		Total		4.645				
5-8	.19	3.49	.663								
6-8	.06	2.71	.163								

WWR = Sum of Precipitation x Weight Factor

K = WWR / Total Recording Gages Weighted Precipitation = 4.645 / 4.812 = .9649

A-70 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-27-69
Check by: BBH
Date. 9-22-69

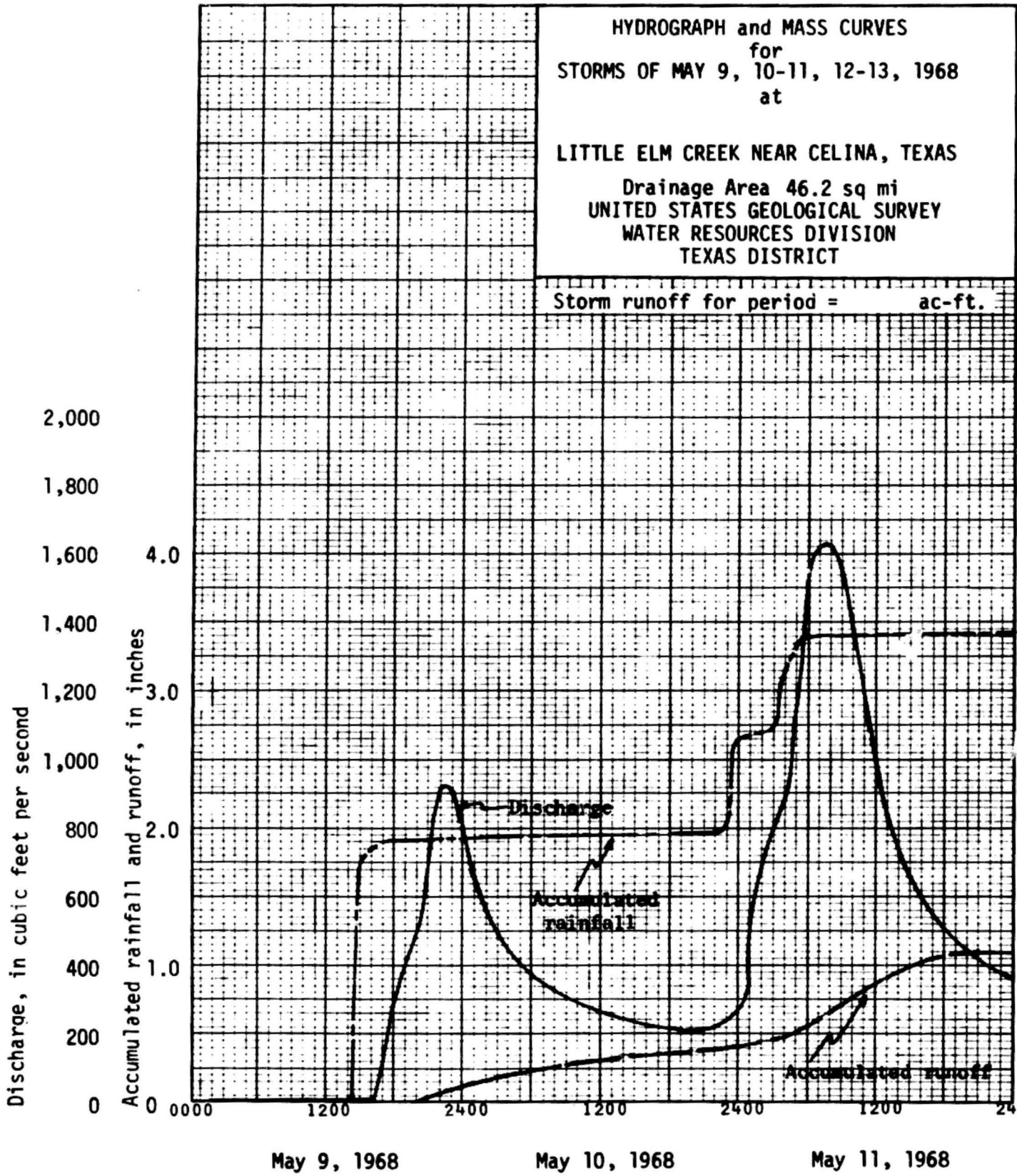
WEIGHTED PRECIPITATION RECORD

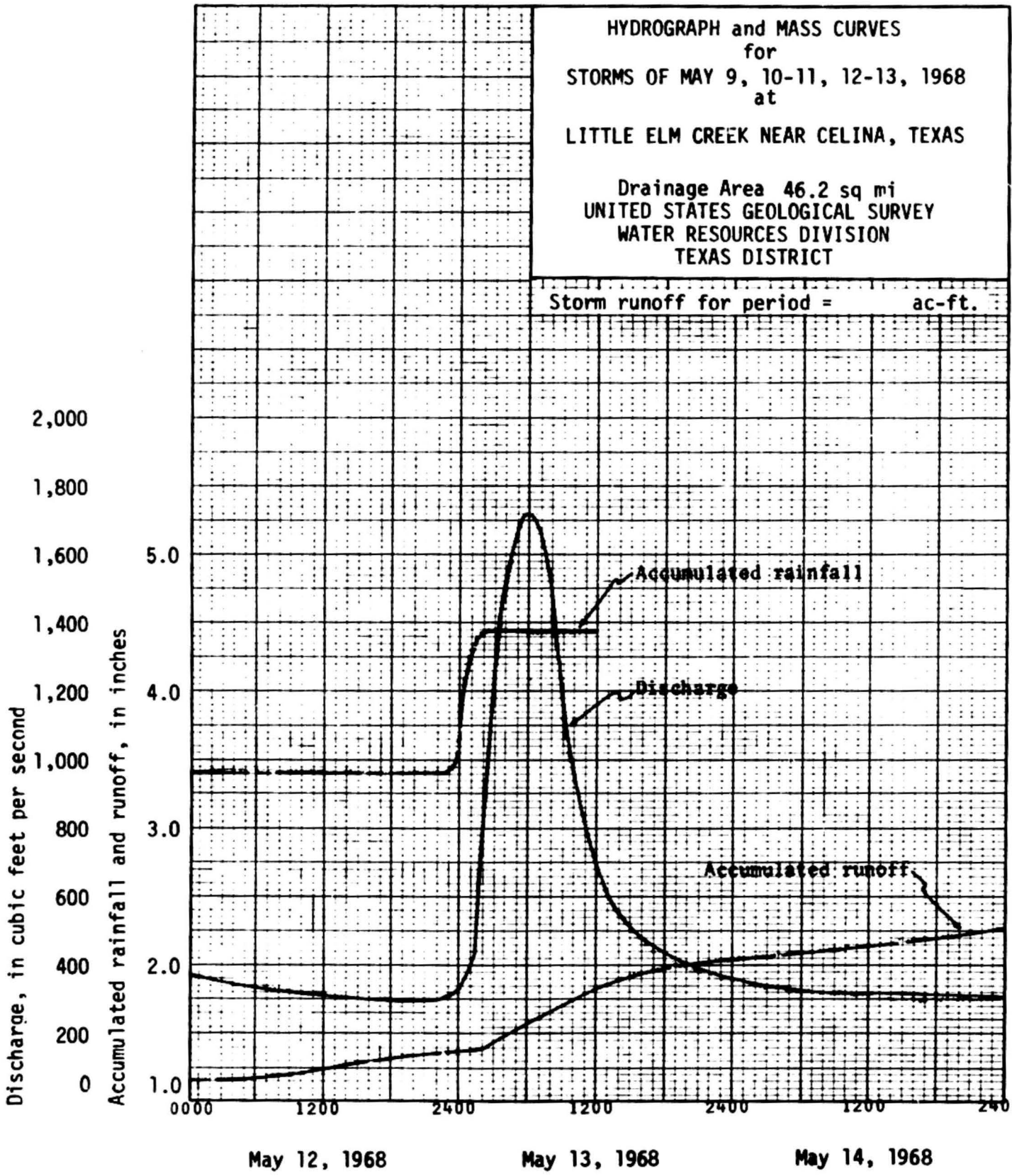
Area: LITTLE ELM CREEK NEAR CELINA, TEX. Date of storm MAY 9-10-11/12-13, 1968

	Accumulated Precipitation in Inches for Recording Gages												Accumulated Weighted Precipitation		
Weight Factor	Gage 7-B .45		Gage 6-B .13		Gage 10-B .42		Gage		Gage		Gage				
Date & Time	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Gage Recorded	x Factor	Recording Gages	(Rec. Gages x K) All Gages Storm	Accum
MAY 12, 1968											Storm of May 11-12				
23 30	4.60	2.025	1.85	.240	2.88	1.210							3.475	0	341
45	4.51	2.030	1.92	.250	2.88	1.210							3.490	.02	344
24 00	4.53	2.038	2.36	.307	2.94	1.235							3.580	.11	353
MAY 13, 1968															
00 15	5.19	2.508	2.64	.330	3.37	1.235							3.973	.39	381
30	5.65	2.542	2.55	.332	3.55	1.415							4.289	.80	422
01 00	5.73	2.578	2.62	.341	3.62	1.520							4.439	.95	437
02 00	5.80	2.610	2.68	.348	3.69	1.550							4.508	1.02	444
05 00	5.80	2.610	2.71	.352	3.69	1.550							4.512	1.02	444
12 00	5.80	2.610	2.71	.352	3.69	1.550							4.512	1.02	444

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

ΣWP = Sum of Precipitation x Weight Factor K = ΣWP / Total Recording Gages Weighted Precipitation = [illegible]


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK NEAR CELINA, TEXAS
Drainage Area 46.2 sq mi
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = ac-ft.
Discharge, in cubic feet per second
Accumulated rainfall and runoff, in inches
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
4.0
3.0
2.0
1.0
0
Discharge
Accumulated rainfall
Accumulated runoff
0000
1200
2400
1200
2400
1200
240
May 9, 1968
May 10, 1968
May 11, 1968


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK NEAR CELINA, TEXAS
Drainage Area 46.2 sq mi
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = ac-ft.
Discharge, in cubic feet per second
Accumulated rainfall and runoff, in inches
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
5.0
4.0
3.0
2.0
1.0
Accumulated rainfall
Discharge
Accumulated runoff
0000
1200
2400
1200
2400
1200
2400
May 12, 1968
May 13, 1968
May 14, 1968

A-65
(Rev. 6-63)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY-AUSTIN DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record May 9-14, 1968 Drainage Area 75.5

Rating Table No. B

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.
			May 9				
0000	4.96	+.18	11	6	.0002	.0012	0.0012
1200	4.58		5.5	10.5	.0001	.0010	.0022
2100	4.49		4.5	4.75	.0001	.0005	.0027
2130	4.68	+.18	6.7	.5	.0001	.0000	.0027
2200	6.35	+.05	48	.5	.0010	.0005	.0032
2230	8.38	0	145	.5	.0030	.0015	.0047
2300	9.00		183	.75	.0038	.0028	.0075
2400	9.92	0	252	.5	.0052	.0026	.0101
			508.225	24			
			21				
			May 10				
0000	9.92	0	252	.5	.0052	.0026	.0127
0100	10.60		310	1.5	.0064	.0096	.0223
0300	11.57		426	2.5	.0087	.0218	.0441
0600	12.23		541	2.25	.0111	.0250	.0691
0730	12.33		561	1.5	.0115	.0172	.0863
0900	12.23		541	2.25	.0111	.0250	.1113
1200	11.52		419	3.5	.0086	.0301	.1414
1600	10.55		306	4	.0063	.0252	.1666
2000	10.05		262	4	.0054	.0216	.1882
2400	9.86	0	247	2	.0051	.0102	.1984
			916.50	24			
			38.2				
			May 11				
0000	9.86	0	247	.5	.0051	.0026	.2010
0100	9.84		245	1	.0050	.0050	.2060
0200	10.00	0	258	1.5	.0053	.0080	.2140
BBH DBH	BBH DBH	BBH DBH	BBH DBH	BBH DBH	HHW BBH	HHW BBH	HHW BBH

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.
			May 11 cont.				
0400	10.87	0	338	2	.0069	.0138	.2278
0600	11.88		475	2.5	.0098	.0245	.2523
0900	12.98		719	3	.0148	.0444	.2967
1200	13.93		1,060	2.5	.0218	.0545	.3512
1400	14.37		1,330	1.75	.0273	.0478	.3990
1530	14.48		1,410	1.5	.0289	.0434	.4424
1700	14.45		1,390	3.25	.0285	.0926	.5350
2200	13.52		892	3.5	.0183	.0640	.5990
2400	12.83	0	678	1	.0139	.0139	.6129
			20186	24			
			841				
			May 12				
0000	12.83	0	678	1	.0139	.0139	.6268
0200	12.13		521	3	.0107	.0321	.6589
0600	11.17		372	5	.0076	.0380	.6969
1200	10.58		308	8	.0063	.0504	.7473
2200	10.31		284	5.5	.0058	.0319	.7792
2300	10.60		310	1	.0064	.0064	.7856
2400	11.10	0	364	.5	.0075	.0038	.7894
			8619	24			
			359				
			May 13				
0000	11.10	0	364	1	.0075	.0075	.7969
0200	12.07		509	3	.0104	.0312	.8281
0600	13.12		761	3.5	.0156	.0546	.8827
0900	13.85		1,020	3	.0209	.0627	.9454
1200	14.37	0	1,330	2.5	.0273	.0682	1.0136
BBH DBH	BBH DBH	BBH DBH	BBH DBH	BBH DBH	HHW BBH	HHW BBH	HHW BBH

Computed by _____ Date _____ Computed _____ Date _____

A-65
(Rev. 6-63)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY-AUSTIN DISTRICT

RUNOFF COMPUTATIONS

Station Little Elm Creek near Aubrey, Tex.

Period of Record May 9-14, 1968 Drainage Area 75.5

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.
			May 13 cont.				
1400	14.44	0	1,380	2	.0283	.0566	1.0702
1600	14.32		1,290	3	.0265	.0795	1.1497
2000	13.35		832	3	.0171	.0513	1.2010
2200	12.58		615	2	.0126	.0252	1.2262
2400	11.90	0	478	1	.0098	.0098	1.2360
			21735	24			
			907				
			May 14				
0000	11.90	0	478	3	.0098	.0294	1.2654
0600	10.92		343	6	.0070	.0420	1.3074
1200	10.54		305	9	.0063	.0567	1.3641
2400	10.23	0	277	6	.0057	.0342	1.3983
			7899	24			
			329				
			May 15				

BBH DBU | BBH DBU | BBH DBU | BBH DBU | BBH DBU | WWW BBH | WWW BBH

Time	G. Ht. Feet	Sh. Adj.	Discharge c.f.s.	Discharge Inc.	Discharge In/hr.	Runoff Inches	Runoff Acc. In.

Computed by _____ Date _____ Computed _____ Date _____

A-78 (Revised Feb. 1960)

Sheet 1 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHN
Date. 8-27-69
Check by: RBH
Date. 9-22-69

WEIGHTED PRECIPITATION RECORD

Area: LITTLE ELM CREEK NEAR AUBREY, TEXAS Date of storm MAY 9, 10-11, 12-13, 1968

	Accumulated Precipitation in Inches for Recording Gages												Accumulated Weighted Precipitation		
Weight Factor	.294		.346		.084		.273								
	Gage 2-R		Gage 4-R		Gage 9-R		Gage 10-R		Gage		Gage				
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recording Gages	(Rec. Gages x E) All Gages (Storm)	(Reservoir)
MAY 9, 1968															
09 00	0.	0.	0.	0.	0.	0.	0.	0.					0	0	0
45	0.	0.	0.	0.	0.	0.	0.	0.					0	0	0
10 00	0.	0.	0.	0.	.07	.006	0.	0.					.006	.01	.01
30	0.	0.	0.	0.	.24	.021	0.	0.					.021	.02	.02
14 00	0.	0.	0.	0.	.27	.024	0.	0.					.024	.02	.02
15	0.	0.	0.	0.	.27	.024	0.	0.					.024	.02	.02
30	0.	0.	0.	0.	.29	.026	0.	0.					.026	.02	.02
45	.79	.232	.54	.186	.32	.028	.39	.106					.552	.53	.53
15 00	2.34	.688	.57	.197	.32	.028	1.14	.311					1.224	1.17	1.17
15	2.72	.800	.58	.200	.42	.037	1.26	.344					1.381	1.32	1.32
30	2.76	.811	.67	.231	.42	.037	1.26	.344					1.423	1.36	1.36
16 00	2.84	.835	.70	.242	.42	.037	1.34	.366					1.480	1.42	1.42
17 00	2.84	.835	.71	.245	.43	.038	1.39	.379					1.497	1.43	1.43
24 00	2.92	.858	.74	.255	.43	.038	1.39	.379					1.530	1.47	1.47
MAY 10, 1968															
23 00	2.97	.858	.74	.255	.43	.038	1.39	.379					1.530	0	1.47
15	3.00	.873	1.20	.414	.49	.043	1.73	.472					1.802	.26	1.73
30	3.53	.882	1.24	.428	.54	.048	2.23	.609					1.967	.41	1.88
24 00	3.57	1.038	1.24	.428	.56	.049	2.27	.620					2.135	.58	2.05
MAY 11, 1968															
02 45	3.60	1.058	1.26	.435	.59	.052	2.27	.620					2.165	.60	2.07
03 00	3.61	1.061	1.33	.459	.59	.052	2.27	.620					2.192	.63	2.10
15	3.69	1.085	1.45	.500	.59	.052	2.39	.652					2.289	.72	2.19
30	4.11	1.208	1.56	.538	.63	.055	2.48	.677					2.478	.90	2.37
45	4.18	1.229	1.63	.562	.68	.060	2.60	.710					2.561	.98	2.45
04 00	4.38	1.270	1.69	.583	.79	.070	2.67	.729					2.652	1.07	2.54
30	4.43	1.302	1.80	.621	.91	.080	2.80	.764					2.767	1.18	2.65
05 00	4.50	1.323	1.81	.624	.96	.084	2.88	.786					2.817	1.23	2.70

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	3.92	.392	7-S	.11	2.00	.220				
2-R	.09	5.80	.522	8-S	.12	1.79	.215				
3-S	.13	5.68	.738	9-R	.03	1.83	.055				
4-S	.09	4.81	.433	10-R	.08	3.69	.295				
5-S	.13	3.49	.454								
6-R	.12	2.71	.325			TOTAL	3.649			sum: 3.649	

WWR = Sum of Precipitation x Weight Factor K = WWR / Total Recording Gages Weighted Precipitation = 3.649 / 3.808 = .9582

A-78 (Revised Feb. 1960)

Sheet 2 of 2

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY, SURFACE WATER BRANCH
AUSTIN DISTRICT

Comp. by: HHW
Date. 8-27-69
Check by: BRH
Date. 9-22-69

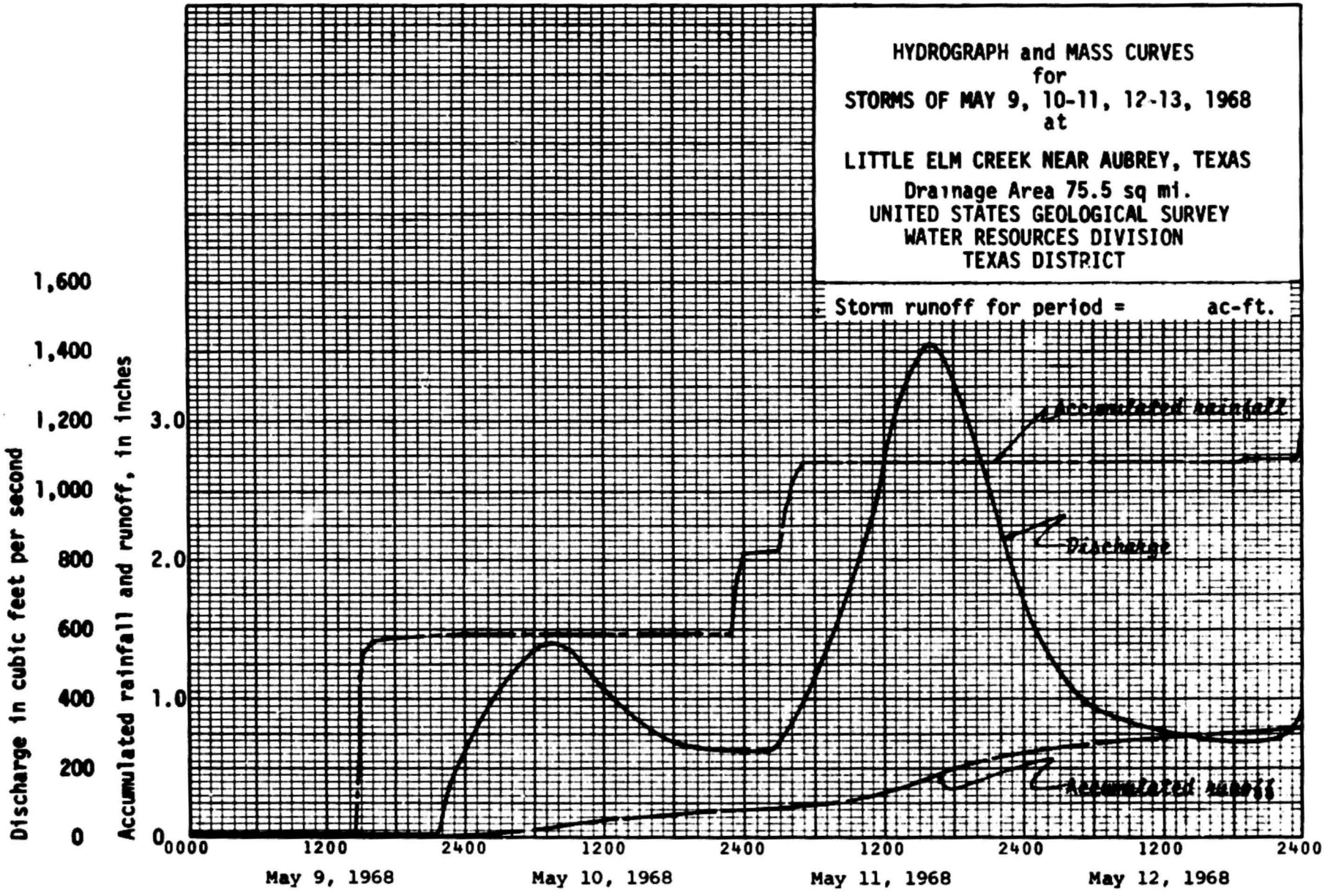
WEIGHTED PRECIPITATION RECORD

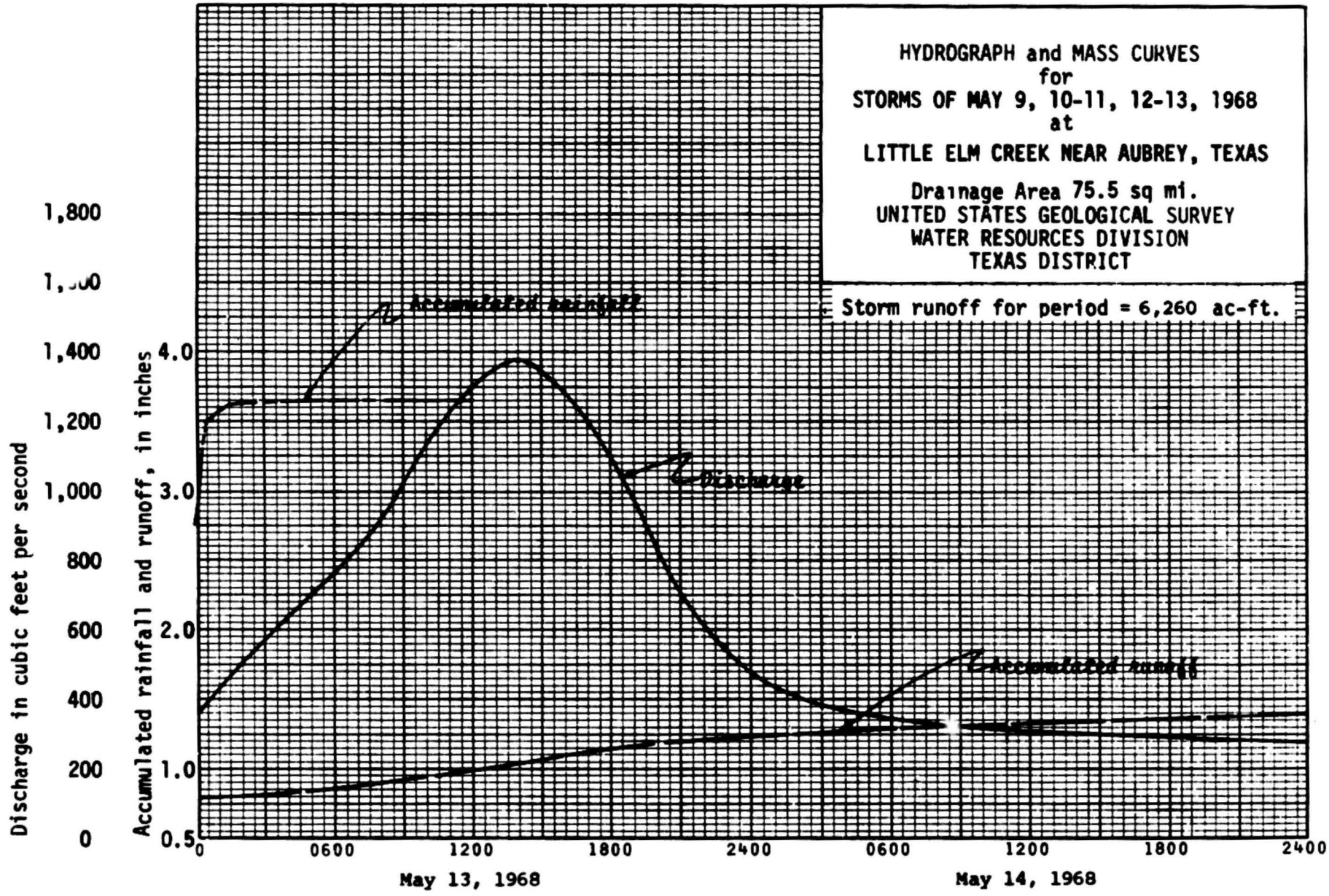
Area: LITTLE ELM NEAR AUBREY, TEXAS Date of storm MAY 9, 10, 11, 12-13, 1968

Weight Factor	.394		.345		.088		.273						Accumulated Weighted Precipitation		
	Gage 2-B		Gage 4-B		Gage 9-B		Gage 10-B		Gage		Gage			(Rec. Gages x K) All Gages	
Date & Time	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recorded	x Factor	Recording Gages	(Storm)	(Season)
MAY 12,	1968														
1830	4.50	1.323	1.82	.628	.96	.084	2.88	.786					2.821	0	2.70
1900	4.50	1.323	1.84	.635	1.02	.090	2.88	.786					2.834	.02	2.72
2330	4.50	1.323	1.85	.638	1.04	.092	2.88	.786					2.839	.03	2.72
45	4.51	1.326	1.92	.662	1.07	.094	2.88	.786					2.868	.05	2.75
2400	4.53	1.332	2.36	.814	1.51	.133	2.94	.803					3.082	.25	2.95
MAY 13,	1968														
0015	5.13	1.508	2.54	.876	1.57	.138	3.37	.920					3.442	.60	3.30
30	5.65	1.661	2.55	.880	1.57	.138	3.55	.969					3.648	.80	3.50
45	5.68	1.670	2.59	.894	1.62	.143	3.56	.972					3.679	.83	3.53
0100	5.73	1.685	2.62	.904	1.69	.149	3.62	.988					3.726	.87	3.57
30	5.78	1.699	2.67	.921	1.77	.156	3.66	.999					3.775	.92	3.62
0200	5.80	1.705	2.68	.925	1.77	.156	3.69	1.007					3.793	.93	3.63
0500	5.80	1.705	2.71	.935	1.80	.158	3.69	1.007					3.805	.95	3.65
1200	5.80	1.705	2.71	.935	1.83	.161	3.69	1.007					3.808	.96	3.65

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
										SWR:	

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


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = ac-ft.
Discharge in cubic feet per second
Accumulated rainfall and runoff, in inches
1,600
1,400
1,200
1,000
800
600
400
200
0
3.0
2.0
1.0
0
Accumulated rainfall
Discharge
Accumulated runoff
0000
1200
2400
1200
2400
1200
2400
1200
2400
May 9, 1968
May 10, 1968
May 11, 1968
May 12, 1968


HYDROGRAPH and MASS CURVES
for
STORMS OF MAY 9, 10-11, 12-13, 1968
at
LITTLE ELM CREEK NEAR AUBREY, TEXAS
Drainage Area 75.5 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT
Storm runoff for period = 6,260 ac-ft.
Accumulated rainfall
Discharge
Accumulated runoff
Discharge in cubic feet per second
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Accumulated rainfall and runoff, in inches
4.0
3.0
2.0
1.0
0.5
0
0600
1200
1800
2400
0600
1200
1800
2400
May 13, 1968
May 14, 1968