

PRELIMINARY
Flood Control Work Plan
TEN MILE CREEK WATERSHED
A Subwatershed of the Trinity River
TX-SCD-29 Tr. No. 29
July 21, 1950

DESCRIPTION OF THE WATERSHED

Ten Mile Creek rises 4 miles north of Cedar Hill, Texas, and flows in a southeasterly direction for 25 miles, entering the Trinity River 3 miles upstream from the southeast corner of Dallas County. The watershed varies from 1.5 to 6 miles in width, averaging 4 miles. Cottonwood Creek is the major tributary. Ten Mile Creek was a tributary of Red Oak Creek before it was diverted directly into the Trinity River and confined by levees, as was Weatherford Branch.

The incorporated towns of Duncanville, Cedar Hill, De Soto, Lancaster and Wilmer are located within the watershed boundaries. There are 207 miles of roads, of which 124 miles are hard-surfaced. Of the 90 bridges, 24 are major bridges spanning Ten Mile and Cottonwood Creeks.

The watershed has an area of 81,040 acres, of which 74,314 acres are in farms. The remaining 6,726 acres, about 8.3 percent, are in urban areas, roads, and miscellaneous uses. The bottomland area includes 3,571 acres of flood plain and 417 acres of stream channels.

Soils

The watershed lies wholly within the Blackland Prairies Problem Area in Soil Conservation with the exception of approximately 855 acres of Forested Coastal Plain soils along the central portion of Cottonwood Creek and in the drainage area of Weatherford Branch.

The principal rock formations are limestones of the Austin formation and marls of the Taylor groups. Some unconsolidated beds of sands and clays which outcrop in the eastern portion of the watershed are a part of the Woodbine sand formation. An area of soil from Ferris to the east along the upland breaks has been derived from Eagleford shale. All the formations are of Upper Cretaceous age.

Topography and Land Use

The bottomlands are intensively utilized, approximately 77 percent being in cultivation. Approximately 54 percent of the upland is cultivated.

The topography ranges from level to rolling, with the rougher slopes bordering the valleys. Moderate to gentle slopes comprise approximately 82 percent of the watershed and are utilized mainly as cropland.

The drainage pattern of Ten Mile Creek is dendritic, with many small branches joining the main stem.

Climate

Temperatures for this area range from 3 degrees below zero to 110 degrees above zero, with an average annual low in January of 45.4 degrees, and an average high in July of 84.2 degrees Fahrenheit. The extreme high and low temperatures are approached on an average of once in 5 years. The average dates of the first and last killing frost are March 18 and November 17, respectively, giving an average growing season of 244 days. The average annual rainfall is 36.16 inches. Thirty-three percent of the yearly rainfall occurs during the period of April, May and June. Sixty-six percent of the annual rainfall occurs during the growing season from March to November.

Water Resources

No large bodies of surface water are found within the watershed; however, there are numerous small farm ponds. The permeable soil in parts of the watershed has prevented the construction of farm ponds in those areas. The towns in the watershed are supplied from deep wells. Farmstead water is supplied by wells, farm ponds, springs and creeks. Information from the Lancaster Water Department indicates that the water table is lowering at the rate of 7 feet per year in that area. Information is not available from the water departments of other towns in the watershed since their wells have been drilled during the last 2 or 3 years. A recent survey of the Lancaster water supply and sewerage disposal problems shows that an additional supply of water is necessary to meet present and future residential and industrial needs.

ECONOMY OF THE WATERSHED

Agricultural Economy

Cotton and small grains are the principal crops grown in the watershed. Other crops include corn, clovers, onions, grain sorghum, and hay. The average yields per acre are: lint cotton, 137 pounds; wheat, 9 bushels; corn, 23 bushels; and oats, 25 bushels. After land treatment practices have been applied and maintained for 2 or 3 years yields have increased 25 to 30 percent.

There are several small dairies and one large dairy in the watershed. Only 10 percent of the livestock are dairy cattle. In recent years poultry, including commercial production of broilers, has become a specialized farm enterprise.

The frequency of flooding has caused 28 percent of the flood plain to become infested with Johnsongrass which, due to the high net income realized from livestock, is used for grazing and hay production.

The watershed is served by three Soil Conservation Service work units, two assisting the Dalworth Soil Conservation District and one assisting the Ellis-Prairie Soil Conservation District. These work units have assisted farmers in preparing 219 conservation plans on 30,543 acres within the watershed boundaries.

Urban and Other Influences

The proximity of the watershed to Dallas has encouraged the sub-division of farms into small acreages, which are used as residences by people who commute to and from their work. Numerous farms are owned, improved and operated by people having substantial incomes. Some of these farms contribute to agricultural production, while others serve only as country homes.

The 207 miles of roads provide access to all parts of the watershed, as well as to markets in Dallas. The frequent flooding of many of the roads causes little loss of time or extra travel because of the efficient network of roads.

Three railroads traverse the upper, central and lower parts of the watershed, providing ample shipping facilities.

FLOOD PROBLEMS AND DAMAGES

High annual damage is caused by frequent flooding of Ten Mile Creek. Devastating floods have occurred at intervals of 18 to 20 years, the last three being in 1904, 1922 and 1946. The June, 1946 flood covered the entire 3,571 acres of flood plain. During the 20-year period 1923 to 1942, inclusive, there were 29 floods which covered more than one-half the flood plain and 75 smaller floods. Fifty percent of the larger floods occurred during the spring months and caused great damage to growing crops.

Flood damages included: damage to crops and pastures; deposition of sediment on valley lands; flood plain scour; damage to roads, bridges, levees, fences, farm equipment and buildings; and loss of livestock. Other damages such as late planting of crops and planting crops of shorter growing season due to spring floods are common to the watershed.

FLOOD CONTROL ACTIVITIES

Levee districts were formed about 25 years ago. As a result 13 miles of levee was constructed along the east side of Cottonwood Creek, 6 miles along the lower end of Ten Mile Creek to divert it directly into the Trinity River, and 4 miles along the east side of Weatherford Branch. These levees protect approximately 3,840 acres of land between the Cottonwood Creek levee and the Trinity River levee in addition to 9,536 acres of bottomland south of the Ten Mile Creek levee. However, these levees have failed on an average of once in every 5 to 7 years.

LAND TREATMENT ACTIVITIES

During the past 3 years 21 neighborhood groups of landowners or operators, with membership wholly or partly within the Ten Mile Creek watershed, have been cooperating with their local soil conservation districts in the application and maintenance of land treatment practices on their lands.

HYDRAULIC AND HYDROLOGIC INVESTIGATIONS

From a graph showing cumulative departures from normal precipitation the rainfall series for the period 1923 to 1942 inclusive was selected as most representative for this watershed.

The design storm would produce 4.95 inches of runoff from the watershed under present conditions. Runoff of this magnitude is not expected to occur more frequently than once in 25 years, and this value was used in determining floodwater detention storage requirements. From a study of the rainfall-runoff relationships for this watershed, it was found that a rain of 0.8 inch, occurring within a one-day period, was the minimum which would cause flooding at the smallest channel section. Therefore, no rains of less than this amount were considered for flood routing purposes.

The largest rain considered, which occurred during the 20-year period, was one of 8.49 inches which produced 4.95 inches of runoff on Ten Mile Creek, and 4.58 inches of runoff on Weatherford Branch. Under present conditions 2,565 acres of the flood plain would be flooded by the runoff from this storm. If such a rain were to occur after land treatment practices and measures have been applied it is estimated that the area inundated would be reduced to 2,426 acres. With land treatment measures applied, and the proposed floodwater detention structures in operation only 526 acres would be flooded as the result of such a storm. Approximately 100 acres of flood plain would lie within the permanent pools of the proposed detention structures, and 442 acres within the detention pools.

The channel capacity of Ten Mile Creek at section No. 2 is 500 cubic feet per second. This section is located approximately 3.5 miles east of U. S. Highway #75, and immediately above the junction of Ten Mile Creek and Cottonwood Creek. The peak discharge at this point for an 8.49 inch rain under present conditions was 16,000 cubic feet per second. The discharge would be reduced to 1,685 cubic feet per second by the proposed system of detention structures.

SEDIMENTATION CONDITIONS

Sheet erosion and flood plain scour are the dominant sedimentation problems of the watershed. Some gully erosion is taking place on the upland breaks east of U. S. Highway 75.

The three kinds of sedimentation damage common to Ten Mile Creek watershed include: (1) overbank deposition on valley lands, (2) channel filling, and (3) swamping of valley land.

Overbank Deposition

Overbank deposition damage to the valley lands of Ten Mile Creek watershed occurs in the lower reaches of the main stem where some subsoil is being deposited on the valley lands. The sediment source area extends from a point 1.75 miles west of Ferris to the Trinity River valley. The southern

part of the area averages approximately 0.75 of a mile in width and includes the upper reaches of the Weatherford Branch drainage. The northern portion averages a little over 0.25 of a mile in width. Erosion is severe to very severe on the soils of this area which are very tight, tenacious clays lying on slopes of 8 to 10 percent.

Channel Filling

Channel filling has reduced channel capacities approximately 25 percent in the middle and lower reaches of Ten Mile Creek, approximately 25 percent in the middle reaches of Cottonwood Creek, and 20 to 40 percent in the leveed area of Weatherford Branch. Accelerated channel filling at these locations is causing increased flooding.

Swamping of Valley Land

Swamping occurs just east of the Lancaster-Ferris Road, on the north side of the Ten Mile Creek flood plain. The approximate areas and extent of damage are as follows: 29 acres, 70 percent damage; 5 acres just east of U. S. Highway 75, 10 percent damage; and 6 acres west of Parkinson Road, 90 percent damage.

Approximately 155 acres have been damaged 10 percent along the middle reaches of Cottonwood Creek. Weatherford Branch has an excessive amount of swamping along the west side of the levee. Seventy-seven acres are affected, with damage ranging from 10 to 90 percent.

Sediment Output Rates

Under present conditions it is estimated that the average annual sediment output rate above the proposed detention structures is 1.2 to 5.0 acre-feet per square mile, depending on size of drainage area, slope, land use, and vegetative cover.

FLOOD PLAIN SCOUR

Damage from sheet scour is not serious in the area west of Hampton Road. Between Hampton Road and the Trinity River sheet scour is very active and has caused 10 to 30 percent damage on approximately 497 acres. Significant scour channel damage has occurred from east of Sunny Meadow Road to the Trinity River, damaging 224 acres from 10 to 90 percent. Scour channels are numerous in the flood plain just north of Ferris.

Cottonwood Creek is affected only slightly by flood plain scour. Fifty acres have been damaged approximately 10 percent, including ten acres damaged by scour channels.

FLOOD DAMAGES

Flood damage information was obtained on approximately 75 percent of the flood plain area. Information as to amounts and extent of damage related to the June, 1946 flood, in most instances. Other information was

obtained on the present and past use of the flood plain, its future use if flooding were substantially reduced, crop yields, property damage, and general flood problems. Present prices were used to estimate the monetary damage to flood plain lands by sediment deposition and scour.

Information concerning damage to roads and bridges was obtained from the County Highway Engineer, and data on damage to railroad property since 1922 was furnished by the railroad companies. The T. & N. O. Railroad track across Ten Mile Creek north of Ferris was damaged to the extent of \$10,000 in 1922. This amount was not included in the watershed damage values because the track has been raised and it is not anticipated that floods such as occurred in the rainfall series would cause damage to the track in its present condition.

Damage to crops and lands caused by failures of the Cottonwood, Ten Mile and Weatherford Branch levees was not included in the damage calculations because large floods that cause breaks in these levees usually are followed by floods on the Trinity River within a few days. The river backs through these breaks and completely inundates the entire common flood plain. However, flood damage to the creek levees was included in the annual damage calculations.

Damages rates, as determined from damage schedules, were adjusted on the basis of relationships found from surveys of other watersheds of similar characteristics to indicate damage rates to be expected from floods of various sizes and seasons. These rates were multiplied by acreages flooded by each flood, by size and season, in the evaluation series and adjusted for recurrence of flooding. Flood plain areas lying within the pool limits of proposed detention structures were excluded from damage calculations.

The total direct floodwater and sedimentation damages are estimated to average \$122,071 annually under present conditions, of which \$76,392 (63 percent) is crop and pasture damage. These figures are based on the entire flood plain area. After excluding the areas of flood plain inundated by the proposed detention structures the average annual direct damage would be \$101,946, of which \$56,267 is crop and pasture damage. In addition, there are numerous indirect damages such as losses sustained by dealers and industries dependent upon agricultural products, depreciation in property values in the flooded areas, and similar items. Ten percent of the total annual value of the direct damages, or \$10,195, was taken as a conservative evaluation of the annual indirect flood damages. A summary of the average annual monetary flood damages is found in Table 1.

THE REMEDIAL PROGRAM AND ITS EVALUATION

Land Treatment Measures Needed

The major land treatment measures needed are the seeding or sodding of 19,231 acres of retired land to permanent vegetation, the establishment of 1,181 acres of vegetated farm waterways, and the construction of

1,783 miles of terraces. Other land treatment measures needed include 41 miles of farm diversions, 113 farm ponds, 211 miles of farm fencing to inclose newly retired and seeded areas, and 21 drop structures and 8 drop inlets to facilitate application of land treatment measures.

The estimated total cost of installing these measures is \$887,349, and the annual cost, including installation and maintenance, is \$61,465.

Flood Control Structures and Measures

The structures and measures necessary to provide flood protection for flood plain lands, roads, and levees are listed in Table 2, items 1 to 3.

Eight detention structures are needed in the Ten Mile Creek drainage area and 2 on Weatherford Branch to protect the flood plain lands along these streams. The proposed structures and their drainage areas are shown on the Work Plan Map. Descriptive information concerning the detention structures is summarized in Table 5.

The system of detention structures will detain the runoff from 75.5 percent of the drainage area of Ten Mile Creek, 59.7 percent of Cottonwood Creek, and 72.5 percent of Weatherford Branch. The runoff from approximately 72.6 percent of the entire watershed will be detained by these structures. The areas protected by levees were not included in calculating these percentages.

Effect of These Measures on Damages and Benefits

The combined program of land treatment and flood control measures described above would prevent damage from 8 of the 29 major floods and all of the 75 minor floods such as occurred in the 20-year period 1923 to 1942, inclusivs. The remaining 21 major floods would be reduced to minor floods covering an average of 237 acres annually and causing an estimated average annual damage of only \$3,601.

Most of the expected reduction in annual flood damage would be effected by the system of detention structures. The annual value of the reduction in flood damages attributable to these structures is estimated to be \$84,393 out of the total of \$108,540 from all measures, as shown in Table 1.

Owners and operators of flood plain lands say that if flood protection is provided they will intensify their use of these lands by growing high-value crops such as alfalfa, cotton, corn, and onions on areas now used for pasture or meadow because of the frequency of flooding. It is estimated that this more intensive use would increase the net income to the land, after all expenses are deducted, by \$37,857 annually.

The total flood control benefit, including both the reduction in flood damages and the benefit from more intensive use of flood plain lands, is estimated to be \$116,397 annually. In addition, it is estimated that the

benefit to landowners and operators in the upland areas of the watershed from application of land treatment measures would be \$695,023 annually. The total expected benefit from the combined program would amount to \$841,420 annually.

The expected land treatment benefit was determined by estimating the increased net income to the land which would result from the application of the needed practices and measures. It was assumed that the proportion of the cropland used for each crop would not change, although the total area used for cropland would be decreased by the retirement of steep and severely eroded areas to pasture or meadow, along with idle cropland. Likewise, it was assumed that there would be no change in the percentages of cattle used for dairying and beef production, although the total number of cattle would increase materially because of the increased acreages of meadow and pasture and the greater per-acre hay production and pasture carrying capacity to be expected from the application of land treatment measures.

Comparison of Cost and Benefit

The ratio of the average annual benefit from detention structures, \$122,250, to their average annual cost, \$24,884, is 4.91:1.

The ratio of the average annual benefit, \$719,170, from the land treatment measures and practices to their average annual cost, \$61,465, is 11.70:1.

The ratio of total average annual benefit, \$841,420, to total average annual cost, \$86,349, is 9.74:1. See Table 4.

ANNUAL MAINTENANCE

The estimated annual maintenance costs after land treatment measures and flood control structures have been installed are shown in Table 3. The land treatment measures will be maintained by the landowners or operators of the farms on which the measures are installed. It is expected that the flood control structures will be maintained by the benefited farmers under an agreement with the soil conservation district which carries the responsibility for maintenance.

Table 1
 Summary of Average Annual Monetary Floodwater and Sediment Damage
 and Flood Control Benefit from the Recommended Program 1/
 TEN MILE CREEK WATERSHED

Damages	Average Annual Damage		Average Annual Benefit	
	(dollars)	(dollars)	(dollars)	(dollars)
	Under Treatment	With Land and Treatment	From Land	From Detention
	Present	Only	Storage	Control
	Conditions	Only	Storage	Only
	(dollars)	(dollars)	(dollars)	(dollars)
<u>Floodwater Damage</u>				
Crop and Pasture	56,267	1,913	11,289	43,065
Flood Plain Scour	2,243	81	538	1,624
Other Agricultural	13,073	33	3,120	9,920
Roads, bridges & railroads	23,160	842	5,543	16,775
Sub-Total	94,743	2,869	20,490	71,384
<u>Sediment Damage</u>				
Overbank Deposition	213	164	49	155
Ponding	6,990	5,577	1,413	5,182
Sub-Total	7,203	5,741	1,462	5,337
Indirect Damage	10,195	8,000	2,195	7,672
Total Damage	112,141	87,994	3,601	xxx
Benefit from Reduction of Damage	xxx	xxx	24,147	84,393
Benefit from More Intensive Use of Flood Plain	xxx	xxx	xxx	37,857
Total Flood Control Benefit	xxx	xxx	24,147	122,250

1/ Areas to be inundated by proposed detention structures excluded.

Table 2
Cost Estimate Table
TEN MILE CREEK WATERSHED

Structure or Measure	Unit	No.	Cost			Total
			To Farmer	To Federal Funds	To State, County or Other	
Detention Structures	Each	10	\$	\$ 618,687	\$ 63,791	\$ 682,478
Site Acquisition	Total			158,120		158,120
Relocating Roads	Mile	5.1			63,500	63,500
Seeding Retired Areas	Acre	19,231	196,156	130,771		326,927
Farm Waterways	Acre	1,181	88,575	29,525		118,100
Drop Structures	Each	21		63,063		63,063
Drop Inlets, Inc. Fill	Each	8		14,984		14,984
Terracing	Mile	1,783	222,875			222,875
Farm Diversions	Mile	41	6,150			6,150
Farm Ponds	Each	113	50,850			50,850
Farm Fencing	Mile	211	84,400			84,400
Farm and Ranch Planning and Application	Acre	74,314		111,471		111,471
Total			\$649,006	\$1,126,621	\$127,291	\$1,902,918
Estimated Amount to be Expended During 1952 Fiscal Year			\$136,291	\$ 465,824	\$ 63,500	\$ 665,615

Table 3
Annual Costs
TEN MILE CREEK WATERSHED

Structure or Measure	Unit	No.	Annual Cost		Total
			Installation	Maintenance	
Detention Structures	Each	10	\$18,344	\$ 1,000	\$19,344
Site Acquisition	Total		3,953		3,953
Relocating Roads	Mile	5.1	1,587		1,587
Seeding Retired Areas	Acre	19,231	11,115		11,115
Farm Waterways	Acre	1,181	4,281	4,724	9,005
Drop Structures	Each	21	1,577	210	1,787
Drop Inlets, Inc. Fill	Each	8	375	200	575
Terracing	Mile	1,783	8,915	17,830	26,745
Farm Diversions	Mile	41	246	328	574
Farm Ponds	Each	113	2,034	2,034	4,068
Farm Fencing	Mile	211	3,376	4,220	7,596
Total			\$55,803	\$30,546	\$86,349
Flood Control Structures and Measures					\$24,884
Land Treatment Measures					61,465
Annual Maintenance - Farmer				\$30,546	

Table 4
 Comparison of Average Annual Benefit and Cost of the Recommended Program
 TEN MILE CREEK WATERSHED

Source of Benefit	Annual Cost (dollars)	Annual Benefit (dollars)	Benefit per Dollar of Cost (dollars)
Detention Storage	24,884	122,250	4.91
Land Treatment			
Flood Control	xxx	24,147	xxx
Land Treatment	xxx	695,023	xxx
Total	61,465	719,170	11.70
All Sources	86,349	841,420	9.74

APPENDIX
Table 1

Summary of Average Annual Monetary Floodwater and Sediment Damage
and Flood Control Benefit from the Recommended Program 1/
TEN MILE CREEK WATERSHED
TEN MILE CREEK

	Average Annual Damage		Average Annual Benefit			
	Under	With Land	From Land	Total		
Damages	Present	Treatment	Detention	Flood		
	Conditions	Only	Storage	Only		
	(dollars) (dollars) (dollars) (dollars) (dollars) (dollars)					
<u>Floodwater Damage</u>						
Crop and Pasture	51,412	40,790	1,484	10,622	39,306	49,928
Flood Plain Scour	2,243	1,705	81	538	1,624	2,162
Other Agricultural	12,893	9,799	17	3,094	9,782	12,876
Roads, bridges & railroads	23,000	17,480	828	5,520	16,652	22,172
Sub-Total	89,548	69,774	2,410	19,774	67,364	87,138
<u>Sediment Damage</u>						
Overbank Deposition	193	147	7	46	140	186
Ponding	4,170	3,169	150	1,001	3,019	4,020
Sub-Total	4,363	3,316	157	1,047	3,159	4,206
Indirect Damage	9,391	7,309	257	2,082	7,052	9,134
Total Damage	103,302	80,399	2,824	xxx	xxx	xxx
Benefit from Reduction of Damage	xxx	xxx	xxx	22,903	77,575	100,478
Benefit from more Intensive Use of Flood Plain	xxx	xxx	xxx	xxx	36,539	36,539
Total Flood Control Benefit	xxx	xxx	xxx	22,903	114,114	137,017

1/ areas to be inundated by proposed detention structures excluded.

APPENDIX
Table 1A

Summary of Average Annual Monetary Floodwater and Sediment Damage
and Flood Control Benefit from the Recommended Program 1/
TEN MILE CREEK WATERSHED
WEATHERFORD BRANCH

	Average Annual Damage	With Land:	Treatment:	and	From Land:	Detention:	From	Total
Damages	Under	Present	Conditions:	Only	Storage:	Only	Only	Benefits
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
<u>Floodwater Damage</u>								
Crop and Pasture	4,855	4,188	429	667	3,759	4,426		
Other Agricultural	180	154	16	26	138	164		
Roads, bridges & railroads	160	137	14	23	123	146		
Sub--Total	5,195	4,479	459	716	4,020	4,736		
<u>Sediment Damage</u>								
Overbank Deposition	20	17	2	3	15	18		
Ponding	2,820	2,408	245	412	2,163	2,575		
Sub--Total	2,840	2,425	247	415	2,178	2,593		
Indirect Damage	804	691	71	113	620	733		
Total Damage	8,839	7,595	777	xxx	xxx	xxx		
Benefit from Reduction of Damage	xxx	xxx	xxx	1,244	6,818	8,062		
Benefit from more Intensive Use of Flood Plain	xxx	xxx	xxx	xxx	1,318	1,318		
Total Flood Control Benefit	xxx	xxx	xxx	1,244	8,136	9,380		

1/ Areas to be inundated by proposed detention structures excluded.

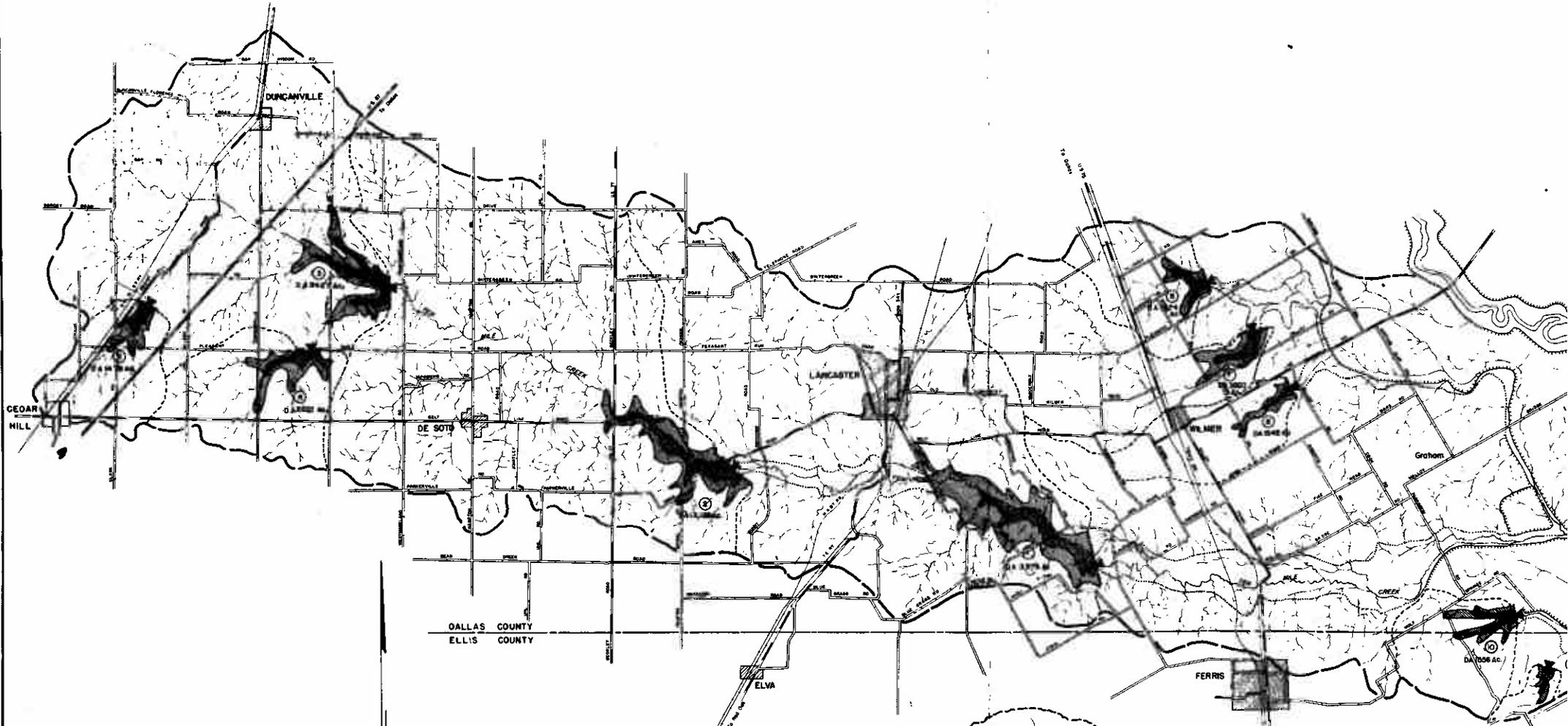
APPENDIX
Table 2
Increase in Income through more Intensive Use of Flood Plain Lands
TEN MILE CREEK WATERSHED
TEN MILE CREEK

Land Use	Acres	Yield	Production	Gross Income	Cost	N In
<u>Present Conditions</u>						
Cotton	77	375 lb.	28,875	\$ 9,962	\$ 4,466	\$ 5,
Corn	85	46 bu.	3,910	5,670	923	4,
Oats	45	57 bu.	2,565	2,283	430	1,
Clover	16	450 lb.	7,200	1,440	235	1,
Johnsongrass	452	2.5 ton	1,130	19,775	7,910	11,
Alfalfa	16	3 ton	48	1,752	381	1,
Onions	5	\$400 Ac.		2,000	500	1,
Sudan	477	\$44.55 Ac.		21,250	3,458	17,
Pasture	354	6 AUM	2,124	5,055		5,
Pecans (trees)	3,220	20 lb./tr.	64,400	6,440	3,220	3,
Miscellaneous	80					
Woods	1					
Idle	2					
Total	1,610			\$ 75,627	\$21,523	\$54,:
<u>After Land Treatment and Detention Storage</u>						
Cotton	225		84,375	\$ 29,109	\$13,050	\$16,0
Corn	169	Same	7,774	11,272	1,835	9,4
Oats	45		2,565	2,283	430	1,4
Clover	163	as	73,350	14,670	2,396	12,3
Johnsongrass	16		40	700	280	4
Alfalfa	316	Above	948	34,602	7,521	27,0
Onions	16			6,400	1,600	4,8
Sudan	398			17,732	2,886	14,8
Pasture	180		1,080	2,570		2,5
Pecans (trees)	3,220		64,400	6,440	3,220	3,2
Miscellaneous	80					
Idle	2					
Total	1,610			\$125,778	\$33,218	\$92,5
Flooded too often In pools	240 550			Gross Increase \$ 50,151	Net Increase \$36	
Total Flood Plain	2,400			Less Added Damage		
				Less Cost of Clearing		
				Less increased overhead 611 ac. x \$2.95	1	
				Net Benefit	\$36	

APPENDIX
Table 2A

Increase in Income through more Intensive Use of Flood Plain Lands
TEN MILE CREEK WATERSHED
WEATHERFORD BRANCH

Land Use	Acres	Yield	Production	Gross Income	Cost	Ne Inc
<u>Present Conditions</u>						
Cotton	40	375 lb.	15,000	\$5,175	\$2,320	\$2,
Corn	8	45 bu.	360	536	83	
Oats	8	57 bu.	456	406	76	
Alfalfa	4	3 ton	12	438	95	
Idle	7					
Woods	13					
Pasture	14	6 AUM	84	200		
Miscellaneous	3					
Total	97			\$6,755	\$2,574	\$4,
<u>After Land Treatment and Detention Storage</u>						
Cotton	40	Same	15,000	\$5,175	\$2,320	\$2,
Corn	8		360	536	83	
Oats	8	as	456	406	76	
Alfalfa	21		63	2,300	500	1,
Woods	8					
Pasture	9	Above	54	129		
Miscellaneous	3					
Total	97			\$8,546	\$2,979	\$5,!
Flooded too often In Pools	68 0			Gross Increase \$1,791	Net Increase	\$1,:
Total Flood Plain	165			Less Cost of Clearing 5 ac. @ \$50.00 x 4%	Less Added Damage	
				Less increased overhead 17 ac. @ \$2.95		
					Net Benefit	\$1,:



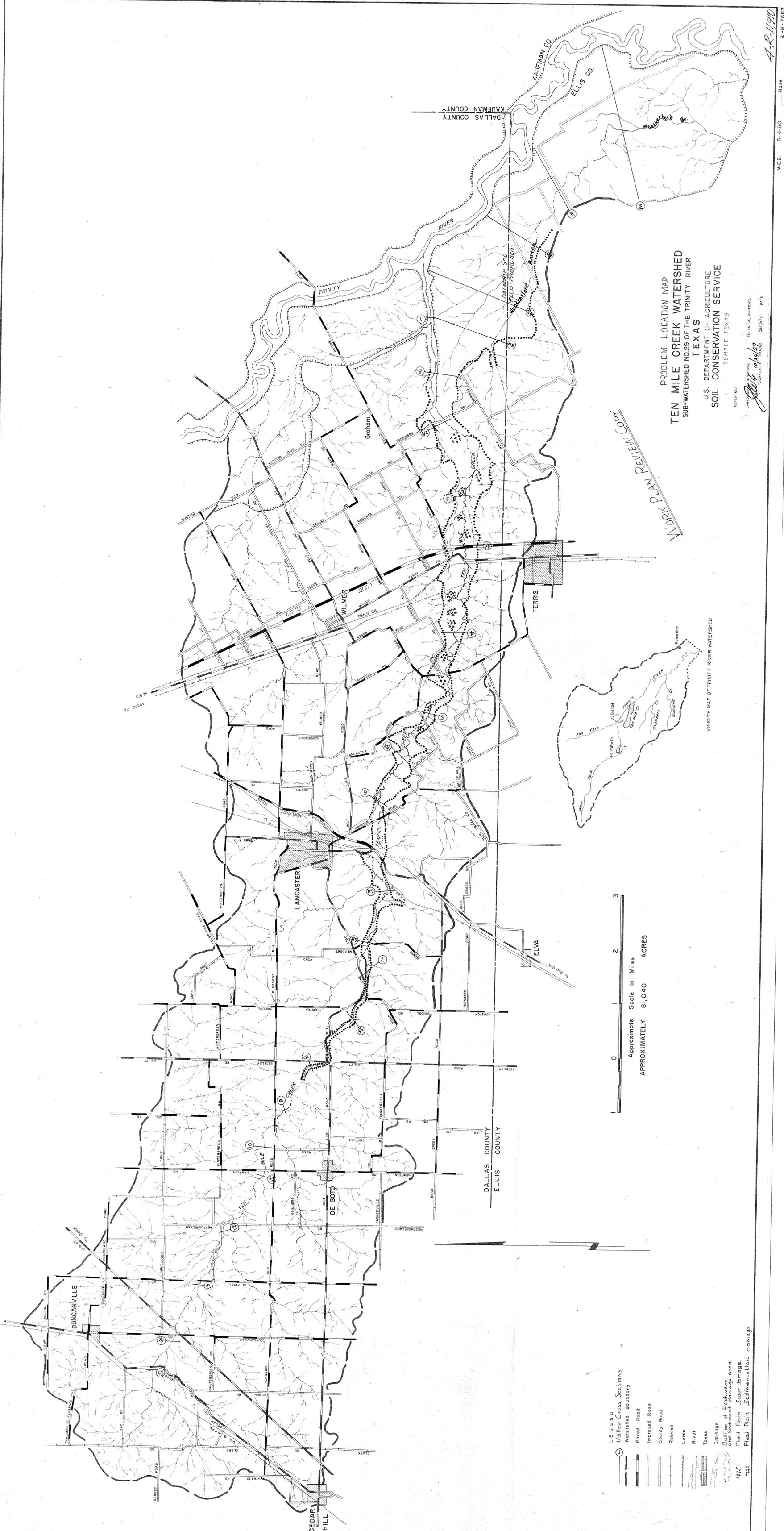
- LEGEND**
- Detention Structure
 - Outline of Flood and Seepage damage area
 - Contour
 - Active Drainage Area
 - Drainage Area Boundary
 - Watershed Boundary
 - Paved Road
 - Impass Road
 - County Road
 - Railroad
 - Levee
 - River
 - Town
 - Drainage

0 1 2 3
 Approximate Scale in Miles
 APPROXIMATELY 81,040 ACRES



PRELIMINARY
FLOOD CONTROL
TEN MILE CREEK
 SUB-WATERSHED NO. 29 OF 1
TEXAS
 U. S. DEPARTMENT OF
 SOIL CONSERVATION
 H. H. BENNETT
 REGIONAL DIRECTOR

ORTHOPHOGRAPHIC APPROVAL: _____ TECH: _____
 COMPILED: _____ DRAWN: _____
 DATE: _____



LEGEND

- ⊕ Valley Cross Sections
- Watershed Boundary
- == Paved Road
- == Improved Road
- == County Road
- == Railroad
- == Levee
- == River
- == Towns
- == Drainage
- Outline of Floodwater and Sediment damage Area
- Flood Plain
- Sour damage
- Flood Plain Sedimentation damage

Approximate Scale in Miles
 0 1 2 3
 APPROXIMATELY 81,040 ACRES

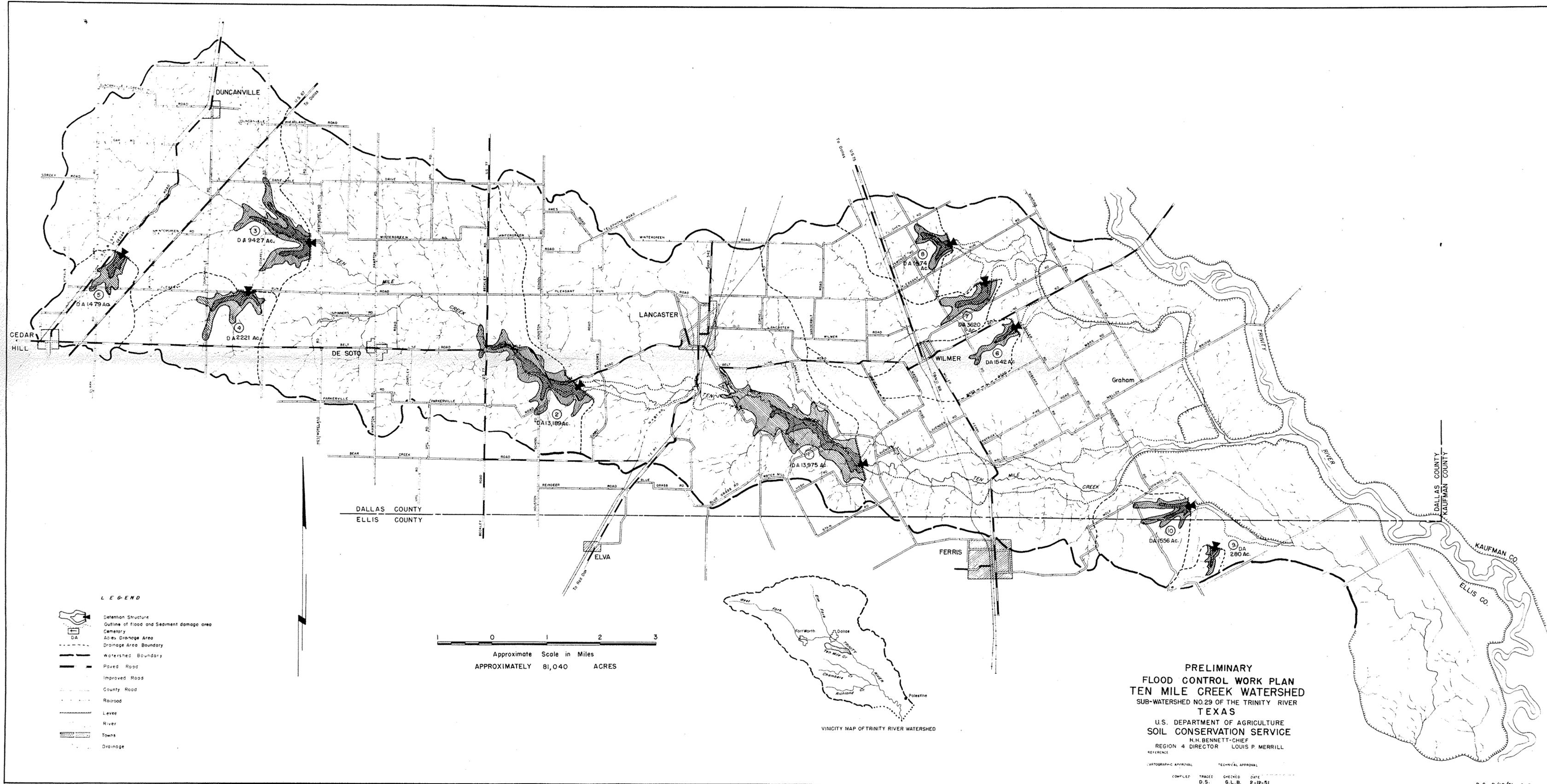
TEN MILE CREEK WATERSHED
 SUB-WATERSHED NO. 29 OF THE TRINITY RIVER
 TEXAS

PROBLEM LOCATION MAP
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 TEMPLE, TEXAS

WORK PLAN REVIEW COPY

REFERENCE
 CARTOGRAPHIC APPROVAL
 DATE
 CHECKED
 TECHNICAL APPROVAL
 DATE

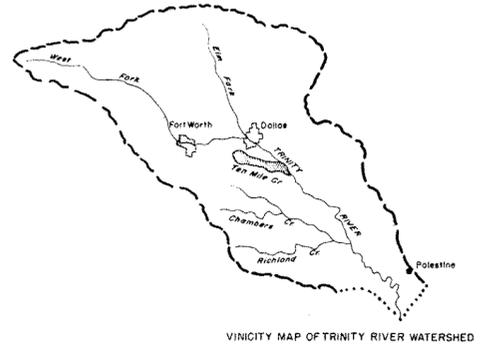
VINICITY MAP OF TRINITY RIVER WATERSHED



LEGEND

- Detention Structure
- Outline of flood and Sediment damage area
- Cemetery
- Acres Drainage Area
- Drainage Area Boundary
- Watershed Boundary
- Paved Road
- Improved Road
- County Road
- Railroad
- Levee
- River
- Towns
- Drainage

0 1 2 3
 Approximate Scale in Miles
 APPROXIMATELY 81,040 ACRES



**PRELIMINARY
 FLOOD CONTROL WORK PLAN
 TEN MILE CREEK WATERSHED
 SUB-WATERSHED NO.29 OF THE TRINITY RIVER
 TEXAS**
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 H.H. BENNETT-CHIEF
 REGION 4 DIRECTOR LOUIS P. MERRILL

CARTOGRAPHIC APPROVAL: _____
 TECHNICAL APPROVAL: _____
 COMPILED: _____ TRACED: _____ DATE: _____
 D.S. G.L.B. 2-12-51