(Revised 12-1-50)

PRELIMINARY
Flood Control Work Plan
DEEP CREEK WATERSHED
A Subwatershed of the Middle Colorado River
TX-SCD No. 98 - MC No. 12

DESCRIPTION OF THE WATERSHED

Deep Creek rises about two miles east of Rochelle, Texas, in McColloch County, and flows in a northeasterly direction for about 16 miles, entering the Colorado River one and one-half miles northeast of Milburn. The watershed varies in width from two and one-half to six miles, with an average width of four miles. Dry Prong and Rough Creek are the main tributaries.

Milburn is located at the extreme north end of the area and is the only town within the watershed boundaries.

The 55 miles of county roads and two miles of state farm-to-market roads within the watershed provide access to all-weather highways and to railroads. U. S. Highway 283 and the Gulf-Santa Fe Railroad parallel the watershed on the west, while U. S. Highway 190 parallels it on the south.

The watershed has an area of approximately 45,800 acres of which 45,321 acres are in farms and ranches. The remaining 479 acres are in roads, towns, and miscellaneous uses. The flood plain area includes 3,909 acres, all of which was covered by the July 1938 flood.

Soils

The Edwards Plateau soils are found at the top of the steep escarpment that rings the west, south and southeast part of the watershed. These fine textured soils cover about 25 percent of the total watershed area. Reddish Prairie soils occupy the central portion, or 70 percent, of the area in the watershed. Those soils are 88 percent fine textured and 12 percent medium textured. The remaining 5 percent of the watershed area, located in the northeast part along Rough Creek, is Cross Timbers soils. These soils are 59 percent medium and 41 percent coarse textured.

Topography and Land Use

The topography varies from gentle slopes and flats on the valley floor to a steep escarpment with maximum slopes of 50 percent along the west, south and southeast sides of the watershed. Local relief varies from 50 feet on the east divide to 150 feet on the west divide. The upland area above the escarpment has slopes of 5 percent or less.

Of the 45,321 acres of ranch and farm land 11,055 acres are cultivated and 34,266 acres used for range and pasture. The 3,909 acre flood plain is comprised of 1,740 acres of cultivated land and 2,169 acres of pasture.

Approximately 87 percent of the cultivated land is Reddish Prairie, 9 percent Cross Timbers and 4 percent Edwards Plateau soils. The principal crops are grain sorghum, oats, cotton, and corn.

Climate

The climate of the watershed is typical of McCulloch County and is warm, temperate and transitional from humid to sub-humid. It is characterized by a somewhat erratic distribution of rainfall with moderate winters and long summers. The temperature varies from an average minimum of 33.4 degrees Fahrenheit in January to an average maximum of 95.2 degrees in July. Freezing temperatures occur only a few times each winter. The minimum recorded temperature is -2 degrees and the maximum recorded is 109 degrees Fahrenheit. The average frost-free period of 233 days extends from March 26, the average date of the last killing frost, to November 14, the average date of the first killing frost.

The average annual precipitation in the Deep Creek watershed is approximately 25.07 inches, as recorded over a 19-year period by the Rochelle Station at the head of the watershed. Precipitation is normally greatest during the spring and fall seasons, the wettest months being May and September. January and February are the driest months. Approximately 70 percent of the rainfall occurs during the growing season from April to October. Thunderstorms are a source of high intensity precipitation which sometimes amounts to several inches of rain in a few hours.

Water Resources

The principal water supply for livestock is surface water caught and held in stock tanks or farm ponds. Ponds are the only source of domestic water on many farms. There is a need for more farm ponds and stock tanks in order to provide better distribution of grazing. Numerous water holes along the main stem of Deep Creek are a further source of livestock water.

The underground water supply is limited and of poor quality.

ECONOMY OF THE WATERSHED

Agricultural

Of the livestock in the watershed approximately 14 percent are cattle, 16 percent goats, 69 percent sheep, and 1 percent hogs. Ninety-three percent of the cattle are used for beef production and 7 percent for dairy purposes. Cotton is the most important crop used to supplement livestock for cash income on small farms.

Because of the frequency of flooding approximately 1,200 acres of the flood plain lands suitable for cropland have never been cultivated. Farmers and ranchers have indicated that if flooding were reduced sufficiently this area now in pasture probably would be placed in cultivation and cropped as other bottomland areas.

The Deep Creek watershed lies in the San Saba-Brady Soil Conservation District which is served by the San Saba and Brady Soil Conservation Service work units. These work units have assisted farmers and ranchers in preparing 37 conservation plans on 13,579 acres within the watershed boundaries. Where land treatment measures have been applied for several years there has been an increase in yields of 25 to 30 percent.

Urban and Other Influences

The Gulf Coast and Santa Fe Railroad which parallels the watershed on the south and west, with switches at Mercury, Placid and Rochelle, offers excellent opportunities for carload lot shipments of livestock.

The town of Milburn is small and exerts little influence on the economy of the watershed.

While the 57 miles of roads in this area are adequate in dry weather, the low water crossings commonly used on county roads do not allow crossing of streams when they are at flood stage. Therefore, considerable time is lost in detours or waiting for high water to recede.

FLOOD PROBLEMS AND DAMAGES

Floods occur on Deep Creek at a frequency of two or three small floods each year, with larger floods occurring every two to six years. The largest known flood was recorded in July 1938. This 100-year frequency storm inundated the entire flood plain of 3,909 acres. During the 20-year period of study, 1923 to 1942 inclusive, there were 10 major floods that inundated 50 percent or more of the flood plain. Even though floods occurred during the spring, summer and fall months, a majority of the larger storms fell in May and September. These storms caused greater damage since they occurred after the planting season or just before fall harvest.

Field investigations of damages caused by the July 1938 flood were made on over half of the flood plain area. The following is a summary of the flood damages found:

Crop and pasture damage	$50,504
Other agricultural damage	22,008
Roads and bridges	16,418
Sub-Total	$88,930
Indirect Damages	8,893
Total	$97,823

FLOOD CONTROL ACTIVITIES

The farmers in the watershed, working as individuals and as a group, have attempted to solve or alleviate the flood damage problem by constructing low levees or dikes on both sides of the small water courses.

These dikes are inadequate except for very low runoff, and have failed to control flooding. In one case flooding has been aggravated by these measures, according to the affected farmers.

LAND TREATMENT ACTIVITIES

Within the past three years ten neighborhood groups of landowners and operators, with membership wholly or partially within the Deep Creek watershed, have been planning and applying land treatment measures with the technical assistance of the San Saba-Brady Soil Conservation District. There are, at present, 37 farmer-district plans on 13,579 acres. Approximately 40 percent of the planned practices have been applied.

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 the Deep Creek area. The rainfall information used in these studies was obtained from the Rochelle station, with information for the missing dates interpolated from the Brady station. The Rochelle gage is located at the extreme upper end of the watershed. One rain of 13.75 inches, which fell within an eight-day period, was not considered since its expected frequency of occurrence was much greater than 20 years. The rainfall during this storm was even greater within the watershed, according to all reports of local farmers, but was not accurately gaged there.

The design storm would produce 4.9 inches of runoff from the watershed under present conditions. Runoff of this magnitude is expected to occur no more frequently than once in 25 years, and this value was used in determining detention storage requirements. From a study of the rainfall-runoff relationship for this watershed it was found that a rain of 0.70 inch, occurring within a one-day period, was the minimum which would cause flooding at the smallest channel section under present conditions. Therefore, no rains of less than this amount were considered for flood routing purposes.

The largest rain considered within the 20-year period was one of 9.29 inches which produced 5.85 inches of runoff. This storm fell within a 6-day period. Under present conditions 3,305 acres of the flood plain would be flooded by 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 3,192 acres. With land treatment measures applied and the proposed detention structures and floodways in operation 1,451 acres would be flooded as a result of such a storm.

The design storm, producing 4.90 inches of runoff, would flood 3,130 acres under present conditions. It is estimated that a storm of this magnitude would flood 3,000 acres after land treatment measures and practices had been applied. With land treatment measures applied and the proposed detention structures and floodways in operation, only 1,170 acres would be flooded as a result of such a storm.

The channel capacity of Deep Creek at Section No. 2 is 240 cubic feet per second. This section is located approximately one quarter mile above the Milburn bridge across Deep Creek and immediately above the junction with Rough Creek. This is approximately one mile above the point at which Deep Creek enters the Colorado River. Deep Creek has a gorge channel below Section No. 2 and this area was not considered in the flood routing. The peak discharge at this point for a 9.29 inch rain under present conditions was 37,500 cubic feet per second. The discharge would be reduced to 20,800 cubic feet per second by the proposed system of detention structures. The peak discharge for the design storm was 30,800 cubic feet per second under present conditions, which would be reduced to 14,700 cubic feet per second by the proposed system of detention structures.

A large percentage of the acres flooded by the various storms after installation of detention structures and land treatment practices would be between Sections 1 and 3, due to inadequate channel capacity of the stream. This flooded area is near the upper end of the gorge section of Deep Creek and all of it is in pasture.

SEDIMENTATION CONDITIONS

Soils in the Deep Creek watershed are divided into three general groups, (1) fine textured soils - 86 percent, (2) medium textured soils - 12 percent, and (3) coarse textured soils - 2 percent. These soils extend over three soil conservation problem areas; Reddish Prairie - 70 percent, Edwards Plateau - 25 percent, and Cross Timbers - 5 percent.

The two major types of sedimentation damage occurring in the valleys of Deep Creek and its tributaries are (1) overbank deposition, and (2) channel filling.

Overbank Deposition

Only minor overbank deposition has occurred in the Deep Creek valley. Thin deposits of modern sediment were measured in some areas on the pasture land adjacent to the stream banks. This pasture land extends from the mouth to the head of Deep Creek in a band 100 to 300 feet wide. Natural levees formed by overbank deposition average about 100 feet wide and have an average thickness of 1 to 2 feet. The measured overbank deposits cover an area of 248 acres and range from 0.1 to 2.0 feet in thickness. Assuming a period of 50 years for this accumulation, it was estimated that the average annual rate of damage was 5 acres. It was further estimated that the reduction in productivity of the land would be approximately 10 percent. This damage occurred mostly on pasture land.

Channel Filling

Channel filling is occurring at an accelerated rate. The entire channel has an estimated sediment deposit of four feet in thickness which consists of sand and gravel with some bars of large flat boulders. On the average the channel capacity of Deep Creek has been reduced 25 percent, but at

some of the bends it has been reduced approximately 50 percent. The deposits in the channel of Deep Creek and Dry Prong of Deep Creek have an estimated volume of 396 acre feet.

Sediment Output Rates

It is estimated that the average annual sediment output rate of the Reddish Prairie soils ranges from 0.6 to 1.0 acre foot per square mile, the Edwards Plateau soils approximately 0.4 acre foot per square mile, and the Cross Timbers soils from 0.5 to 1.0 acre foot per square mile.

FLOOD PLAIN SCOUR AND CHANNEL ENLARGEMENT

Sheet scour was found to be active on 444 acres of cropland in the Deep Creek flood plain. This acreage may be separated into 333 acres of moderate damage (15 percent) with an average soil loss of 2 to 4 inches, and 111 acres of severe damage (30 percent) with an average soil loss of over 4 inches. The average annual area affected by scour channels is estimated to be 0.2 acre of pasture land damaged 50 percent.

Stream bank erosion along Deep Creek and its tributaries occurs on about 25 percent of the banks at an average rate of approximately 0.2 foot lateral cut per year. This results in an estimated average annual land loss of 0.3 acre.

FLOOD DAMAGES

Flood damage information for approximately 57 percent of the flood plain of Deep Creek watershed was obtained from landowners and operators. Most of the information gathered on amounts and extent of damage was taken with regard to the storm of July 17-18, 1938. Other information on major crops and their yields and the general flood problems was listed at the same time. The monetary value of the percentages of damage to the flood plain lands by sediment and scour was based on present land values. Information concerning road and bridge damage was obtained from landowners and operators adjacent to the damage and from county highway officials.

Damage rates for the July 1938 flood 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 depths and seasons. The acreages flooded by depth increments by each flood in the series were multiplied by the per-acre rate at each depth adjusted to the month of the year in which the flood occurred.

The total direct floodwater and sedimentation damages are estimated to average $33,191 annually under present conditions, of which $22,915 (69 percent) is crop and pasture damage. After land treatment measures have been applied the estimated direct floodwater and sedimentation damages will be $26,089, of which $18,618 is crop and pasture damage. These figures are based on the flood plain area excluding the very minor flood plain areas above some of the proposed detention structures.

In addition to the above there were numerous indirect damages such as the interruption of travel while waiting for low water bridges to clear, detours, depreciation in property values in the flooded areas and other similar items. Ten percent of the total annual value of the direct damages, or $3,319, was taken as a conservative estimate of the annual indirect flood damages. The annual average monetary flood damages are summarized in Table 1.

THE REMEDIAL PROGRAM AND ITS EVALUATION

Land Treatment Measures Needed

One of the major land treatment measures needed is the seeding of 960 acres of retired upland areas to perennial grasses. This land has been removed from cultivation and now has a cover of annual vegetation. The entire area in range and pasture land, except those areas on which a range and pasture improvement program has been applied through the assistance of the Soil Conservation District, is overgrazed and needs improvement.

Approximately 326 miles of terraces need to be constructed to assist in the control of erosion on 7,825 acres of cultivated land. About 180 acres of vegetated waterways will be needed to carry the runoff from these terrace systems.

Other land treatment measures needed include 24 miles of diversion terraces, 30 farm ponds, 35 miles of farm fencing to enclose newly seeded and retired areas, improved crop rotation on 11,000 acres of cropland, and 34,225 acres of improved range and pasture management.

The estimated total cost of installing these measures is $106,170 and the annual cost, including maintenance and installation, is $9,494.

Flood Control Structures and Measures

The flood control structures and measures needed to provide flood protection for flood plain lands and highways are listed in Table 3, items 1 to 6 inclusive.

A system of 8 detention structures is needed to protect the flood plain land along Deep Creek and its major tributaries. The proposed structures and their drainage areas are shown on the Work Plan Map. Descriptive information concerning the structures is summarized in Table 6.

The system of detention structures will detain the runoff from 53.1 percent of that portion of the Deep Creek watershed lying above the town of Milburn, exclusive of Rough Creek which flows into the gorge section east of Milburn.

The other flood control measures listed in Table 3 are needed to reduce flooding on bottomlands and highways. A large floodwater diversion is needed to divert Cedar Branch into detention structure Site 8 on Dry

Prong. A large gully plug and diversion which will outlet into detention structure Site 5 will be a more economical means of runoff control than to construct a detention structure immediately below the proposed gully plug location. Other needed diversions add drainage area to proposed detention structures. Two proposed culverts or low water crossings are needed because of floodwater diversions which will cross county roads. Although a detention structure is planned on Dry Prong of Deep Creek, it will also be necessary to construct three floodways to further reduce flooding. Detention structure Site 8 and the floodways are integral parts of the plan, one without the other will be incapable of reducing floods sufficiently on adjacent farm lands in the flood plain.

Effect of these Measures on Damages and Benefits

The combined program of land treatment and flood control structures and measures described above would have prevented damage from 83 of the 111 floods which occurred during the 20-year period 1923 to 1942 inclusive. The remaining 28 floods would have been reduced so as to flood only 452 acres annually, causing an estimated average annual damage of $4,312. The detention structure system is expected to reduce annual flooding to a greater extent than the other planned measures. The annual value of the reduction of flood damage due to detention storage and floodways is estimated to be $24,386 out of a total of $32,198 from all measures as shown in Table 1.

Farmers and ranchers who have land in the flood plain have indicated that if flooding were reduced materially, about 55 percent of the bottomland now in pasture would be farmed in feed and cash crops. As shown in Table 2, it is estimated that this intensification of bottomland farming would increase the net income from the land, after all expenses are deducted, by about $18,689 annually.

The total flood control benefits, including both the reductions in flood damages and the benefits from more intensive use of the flood plain lands, are estimated to be $50,887 annually. In addition it is estimated that the benefits to landowners and operators in upland areas of the watershed from the application of land treatment measures would be $63,032 annually. The expected benefit from the combined program would amount to $113,919 annually.

The benefits from land treatment were determined by estimating the increased net income of the land which would result from the application of the needed measures. It was assumed that the percentage of cultivated land planted to various crops would remain the same even though cultivated and pasture acreages would be changed in accordance with proper use of the land. Also the percentage of various types of livestock such as beef and dairy cattle, goats, and sheep would remain the same even though the overall number might increase because of the increased acreage in pasture and the greater carrying capacity to be expected from the application of land treatment measures.

The estimated increase in annual net income is $51,092 from cropland and $12,140 from pasture, or a total of $63,032 annually.

Comparison of Cost and Benefits

The ratio of the annual benefit from detention storage and floodways, $43,075, to the average annual cost of the floodways and detention structures, and the appurtenant structures for their protection, $14,007, is 3.08:1.

The ratio of the average annual benefit, $70,844, from the land treatment measures to their average annual cost, $9,494, is 7.46:1.

The ratio of total annual benefits, $113,919, to total average annual cost, $23,501, is 4.84:1.

ANNUAL MAINTENANCE

Estimated annual maintenance cost after the land treatment measures and flood control structures have been installed is shown in Table 4.

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. Group orgainzations of farmers and ranchers will be developed for this purpose. The land treatment measures will be maintained by the landowners or operators of the farms on which the measures are installed.

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

Damages	Average Annual Damage			Average Annual Benefit		
	Under Present Conditions (dollars)	With Land Treatment Only (dollars)	With Land Treatment, Detention Storage and Floodways (dollars)	From Land Treatment Only (dollars)	From Detention Storage and Floodways (dollars)	Total Flood Control Benefits (dollars)
Floodwater						
Crop and Pasture	22,915	18,618	3,497	4,297	15,121	19,418
Flood Plain Scour	709	567	85	142	482	624
Other Agricultural	6,844	4,963	312	1,881	4,651	6,532
Roads, Bridges, Railroads	2,702	1,924	24	778	1,900	2,678
Sub-Total	33,170	26,072	3,918	7,098	22,154	29,252
Sediment						
Overbank Deposition Reservoirs	21	17	2	4	15	19
Sub-Total	33,191	26,089	3,920	7,102	22,169	29,271
Indirect Damages	3,319	2,609	392	710	2,217	2,927
Total Damages	36,510	28,698	4,312	xxx	xxx	xxx
Benefits from Reduction of Damage	xxx	xxx	xxx	7,812	24,386	32,198
Benefits from More Intensive Use of Flood Plain	xxx	xxx	xxx	xxx	18,689	18,689
Total Flood Control Benefits	xxx	xxx	xxx	7,812	43,075	50,887

Table 2
Increase in Income Through More Intensive Use of Flood Plain Lands
DEEP CREEK WATERSHED

Land Use	Acres	Yield	Production	Gross Income	Cost	Net Income
Present Conditions						
Cotton	556	234 lb.	130,104	$42,154	$22,896	
Grain Sorghum	720	1700 lb.	1,224,000	20,441	7,056	
Oats	142	40 bu.	5,680	3,976	1,358	
Wheat	133	17.5 bu.	2,328	4,400	1,357	
Corn	189	30.5 bu.	5,765	5,938	2,630	
Pasture	2,169	1 AUM	2,169	12,970	4,958	
Total	3,909			$89,879	$40,255	$49,624
After Land Treatment, Detention Storage & Floodways						
Cotton	556	234 lb.	130,104	$42,154	$22,896	
Grain Sorghum	1,217	1700 lb.	2,068,900	34,551	11,927	
Oats	441	40 bu.	17,640	12,348	4,216	
Wheat	407	17.5 bu.	7,125	13,462	4,151	
Corn	319	30.5 bu.	9,730	10,022	4,439	
Pasture	969	1.5 AUM	1,454	8,671	3,314	
Total	3,909			$121,208	$50,943	$70,265
				Gross Increase		$20,641
				Clearing		768
						19,873
				Less Added Damage		1,184
				Net Increase		$18,689

Table 3
Cost Estimate Table
DEEP CREEK WATERSHED

Structure or Measure	Unit	No.	Cost		
			To Farmer	To Federal Funds	To State, County or Other	Total
Detention Structures	Each	8		$326,826		$326,826
Site Acquisition	Total			34,995		34,995
Earth Gully Plugs	Each	4		8,760		8,760
Culverts	Each	3		6,204		6,204
Floodwater Diversions	Mile	3.1		16,075		16,075
Floodways	Mile	5.2	6,238	18,712		24,950
Seeding Retired Areas	Acre	960	9,792	6,528		16,320
Farm Waterways	Acre	180	13,500	4,500		18,000
Terracing	Mile	326	40,750			40,750
Farm Diversion	Mile	24	3,600			3,600
Farm Ponds	Each	30	13,500			13,500
Farm Fencing	Mile	35	14,000			14,000
Farm & Ranch Planning and Application	Acre	45,800		68,700		68,700
Total			$101,380	$491,300		$592,680
Estimated Amount to be Expended during 1951 Fiscal Year			$ 28,000	$151,450		$179,450

Table 4
Annual Cost
DEEP CREEK WATERSHED

Structure or Measure	Unit	No.	Annual Cost		
			Installation	Maintenance	Total
Detention Structures	Each	8	$ 9,690	$ 800	$10,490
Site Acquisition	Total		875		875
Earth Gully Plugs	Each	4	219	60	279
Culverts	Each	3	155	30	185
Floodwater Diversions	Mile	3.1	402	124	526
Floodways	Mile	5.2	717	935	1,652
Seeding Retired Areas	Acre	960	555		555
Farm Waterways	Acre	180	653	720	1,373
Terracing	Mile	326	1,630	3,260	4,890
Farm Diversions	Mile	24	144	192	336
Farm Ponds	Each	30	540	540	1,080
Farm Fencing	Mile	35	560	700	1,260
Total			$16,140	$7,361	$23,501

Flood Control Structures and Measures		$14,007
Land Treatment Measures		9,494
Annual Maintenance - Farmer	$7,331	
Annual Maintenance - State, County and Other	30	

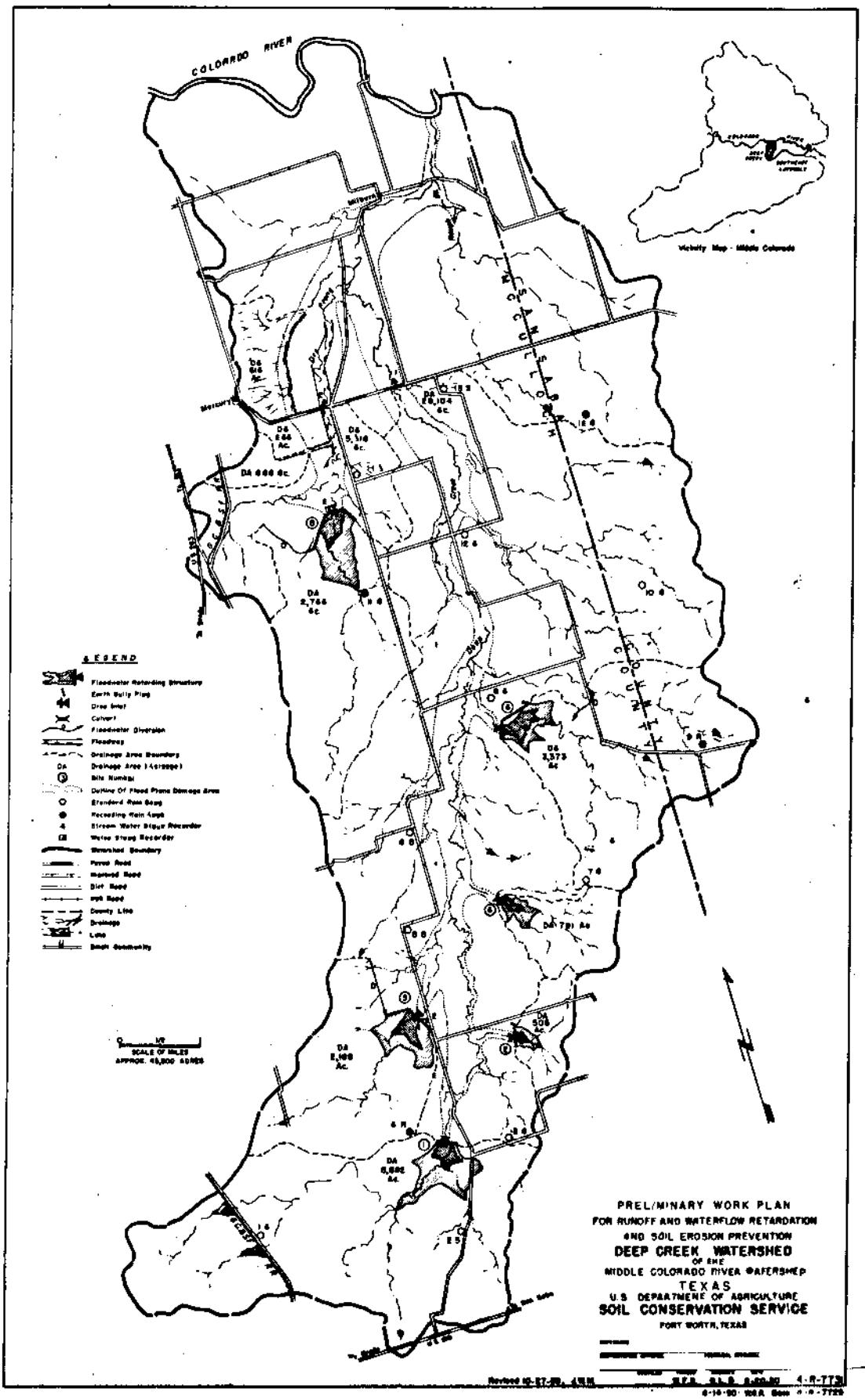
Table 5
Comparison of Average Annual Benefit and Cost of the Recommended Program
DEEP CREEK WATERSHED

Source of Benefit	Annual Cost (dollars)	Annual Benefit (dollars)	Benefit per Dollar of Cost (dollars)
Detention Storage and Floodways	14,007	43,075	3.08
Land Treatment Program			
Flood Control	xxx	7,812	xxx
Land Treatment	xxx	63,032	xxx
Total	9,494	70,844	7.46
All Sources	23,501	113,919	4.84

Table 6
Detention Structure Data
DEEP CREEK WATERSHED

Site No.	Drainage Area Sq. Mi.	Storage Capacity Acre Feet Perm. Pool	Det. Pool	Total	Inches of Runoff Perm. Pool	Det. Pool	Total	Surface Area Acres Top of Perm. Pool	Top of Det. Pool	Max. Ht. of Dam Ft.	Volume of Fill Cu.Yds.	Draw down Rate cfs	Type of Spillway	Estimated Total Cost	Flood Plain Area Acres Under Perm. Pool	Under Det. Pool	Total
1	8.28	481	1925	2406	1.09	4.37	5.46	75	211	34	51,360	40	Veg.	$ 23,112	4	0	4
2	0.91	109	138	247	2.25	2.86	5.11	26	45	22	34,660	15	"	15,597	1	0	1
3	3.28	209	736	945	1.20	4.20	5.40	59	155	27	45,470	16	"	20,462	8	0	8
4	1.94	107	369	476	1.03	3.57	4.60	32	65	29	55,700	17	"	25,065	0	0	0
5	5.10	225	1141	1366	0.83	4.20	5.03	43	116	37	153,100	42	"	68,895	9	0	9
~~6~~	~~4.37~~	~~215~~	~~954~~	~~1169~~	~~0.92~~	~~4.09~~	~~5.01~~	~~54~~	~~132~~	~~31~~	~~166,900~~	~~38~~	"	~~75,105~~	~~10~~	~~0~~	~~10~~
~~7~~	~~2.34~~	~~85~~	~~556~~	~~641~~	~~0.68~~	~~4.44~~	~~5.12~~	~~25~~	~~108~~	~~30~~	~~62,450~~	~~17~~	"	~~28,102~~	~~4~~	~~0~~	~~4~~
8	5.41	97	1300	1397	0.35	4.50	4.85	31	151	33	156,640	41	"	70,488	14	0	14
Total		1528	7119 1510 - 1810	8647				345 - 79	983 - 240		726,280			~~$326,826~~ [1] 123,6[illegible]	50	0	50
		1528	5609	6837				266	743								

1/ Construction Cost - $284,197
Technical Services - 42,629


COLORADO RIVER
Vicinity Map - Middle Colorado
LEGEND
Floodwater Retarding Structure
Earth Gully Plug
Drop Inlet
Culvert
Floodwater Diversion
Floodway
Drainage Area Boundary
DA
Drainage Area (Acreage)
Site Number
Outline Of Flood Plains Damage Area
Standard Rain Gage
Recording Rain Gage
Stream Water Stage Recorder
Water Stage Recorder
Watershed Boundary
Paved Road
Improved Road
Dirt Road
R.R.
County Line
Drainage
Lake
Small Community
SCALE OF MILES
APPROX. 45,800 ACRES
DA 666 Ac.
DA 2,766 Ac.
DA 3,373 Ac.
DA 781 Ac.
DA 2,188 Ac.
DA 6,682 Ac.
PRELIMINARY WORK PLAN
FOR RUNOFF AND WATERFLOW RETARDATION
AND SOIL EROSION PREVENTION
DEEP CREEK WATERSHED
OF THE
MIDDLE COLORADO RIVER WATERSHED
TEXAS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FORT WORTH, TEXAS