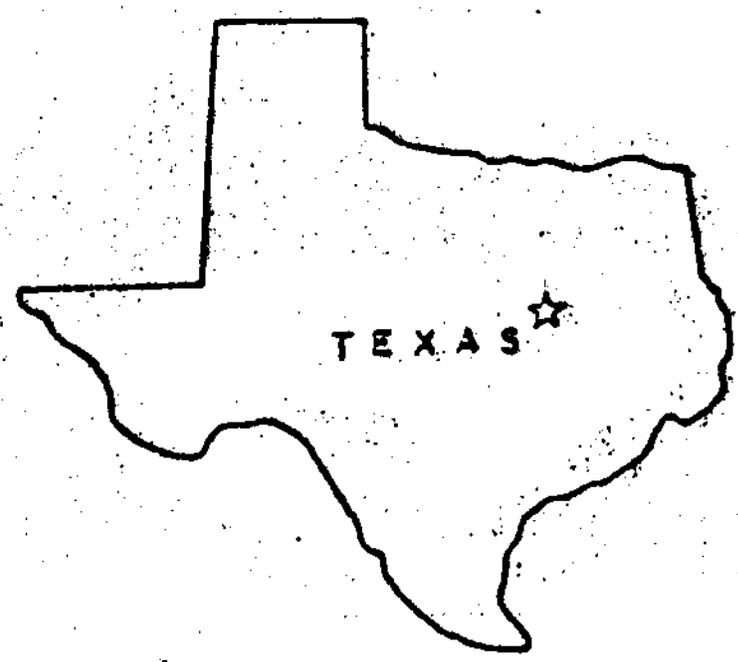


FINAL
WATERSHED PLAN
and
ENVIRONMENTAL IMPACT STATEMENT

**BIG CREEK (TRI-COUNTY)
WATERSHED**

FALLS, LIMESTONE, and McLENNAN COUNTIES, TEXAS



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

July 1984

PLAN AND ENVIRONMENTAL IMPACT STATEMENT

BIG CREEK (TRI-COUNTY) WATERSHED
Falls, Limestone, and McLennan Counties, Texas

This document describes a plan for resource protection and improvement, flood prevention, a municipal water storage facility, and a recreation development. Project measures consist of 21 floodwater retarding structures, a multiple-purpose structure for retarding floodwater and for municipal, industrial, and recreation water storage, two dikes, and recreation facilities. Economic benefits of the recommended plan exceed the cost of the project. The major environmental impacts consist of reduced erosion, reduced sedimentation, reduced flooding, an increase in prime farmland soils, and an increased acreage of open water.

Prepared under the Authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 USC 1001-1008) and in accordance with Section 102(2)(C) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq).

Prepared by: Falls County Water Control and Improvement District
Falls County Commissioners Court
Limestone-Falls Soil and Water Conservation District
McLennan County Soil and Water Conservation District
City of Marlin
U.S. Department of Agriculture, Soil Conservation Service

AGREEMENT

Between the
Following Local Organizations:

Falls County Water Control and Improvement District
Falls County Commissioners Court
Limestone-Falls Soil and Water Conservation District
McLennan County Soil and Water Conservation District
City of Marlin

(hereinafter referred to as the sponsors)

State of Texas
and the
Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the SCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsors for assistance in preparing a plan for works of improvement for the Big Creek (Tri-County) Watershed, State of Texas, under authority of the Watershed Protection and Flood Prevention Act (16 USC 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the SCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and the SCS this plan for works of improvement for the Big Creek (Tri-County) Watershed, State of Texas, hereinafter referred to as the watershed plan - environmental impact statement, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through the SCS, and the sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan and including the following:

1. The sponsors will acquire such land rights as will be needed in connection with the works of improvement. The percentages of this cost to be borne by the sponsors and SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors</u> (percent)	<u>SCS</u> (percent)	<u>Estimated Land Rights Costs</u> (dollars)
Multiple-Purpose Structure No. 19 and Recreation Facilities ^{1/}			
Payment to Landowners for about 1,246 Acres	91.28	8.72	872,200
Real Estate Appraisal Fees	91.28	8.72	20,000
Cost of Alteration or Modification of Improvements ^{1/}	99.35	0.65	81,000
Legal Fees, Survey Cost, Flowage Easements, Water Rights, and Other	100.00	0.00	118,900
All Other Structural Measures	100.00	0.00	1,326,170

^{1/} Including necessary engineering services, construction, and additional land costs.

The sponsors agree that all land acquired or improved with PL 566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the operation and maintenance agreement.

2. The sponsors assure that uniform and equitable treatment will be given to persons displaced from their homes, businesses, or farms as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as implemented by 7 CFR Part 21. The costs of relocation payments will be shared by the sponsors and SCS as follows:

	<u>Sponsors</u> (percent)	<u>SCS</u> (percent)	<u>Estimated Relocation Payment Costs</u> (dollars)
Relocation Payments	27.72	72.28	<u>1/0</u>

^{1/} Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost shared in accordance with the percentages shown.

3. The sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

4. The sponsors will obtain all necessary federal, state, and local permits as may be required for installation of the works of improvement.

5. The percentages of construction costs to be paid by the sponsors and by SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors</u> (percent)	<u>SCS</u> (percent)	<u>Estimated Construction Costs</u> (dollars)
21 floodwater Retarding Structures	0.00	100.00	5,497,090
2 Dikes	0.00	100.00	349,900
1 Multiple-Purpose Structure	39.46	60.54	1,869,300
1 Municipal Outlet Structure	100.00	0.00	72,000
Recreation Facilities	50.00	50.00	120,000

6. The percentages of the engineering costs to be borne by the sponsors and the SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors</u> (percent)	<u>SCS</u> (percent)	<u>Estimated Engineering Costs</u> (dollars)
21 Floodwater Retarding Structures	0.00	100.00	735,360
2 Dikes	0.00	100.00	57,740
1 Multiple-Purpose Structure	36.77	63.23	197,400
1 Municipal Outlet Structure	100.00	0.00	8,000
Recreation Facilities	50.00	50.00	17,000

7. The sponsors and the SCS will each bear the costs of project administration that each incurs, estimated to be \$16,000 and \$569,080, respectively.

8. The SCS will award and administer the contracts covering construction of all structural works of improvement.

9. The sponsors will obtain agreements from owners of not less than 50 percent of the land above the multipurpose structure and each floodwater retarding structure. These agreements state that the owners will carry out conservation farm or ranch plans on their land and ensure that 50 percent of the land is adequately protected before construction of any dam.
10. The sponsors will be responsible for the operation and maintenance of the works of improvement by actually performing the work or arranging for such work, in accordance with agreements to be entered into before issuing invitations to bid for construction work.
11. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.
12. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
13. A separate agreement will be entered into between SCS and the sponsors before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
14. This plan may be amended or revised only by mutual agreement of the parties hereto, except that SCS may deauthorize funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement. In this case, SCS shall promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsor or recoveries by SCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between SCS and the sponsor(s) having specific responsibilities for the measure involved.
15. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
16. The program conducted will be in compliance with all requirements respecting nondiscrimination, as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15), which provide that no person in the United States shall, on the grounds of race, color, national origin, sex, age, handicap, or religion, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity conducted or assisted by the Department of Agriculture.

Falls County Water Control
and Improvement District #1

Local Organization

c/o A. J. Novelli
Route 1, Box 265
Marlin, Texas 76661
Address Zip Code

By A. J. Novelli
A. J. Novelli

Title President

Date 4/22/85

The signing of this agreement was authorized by a resolution of the governing
body of the Falls Co. W.C.I.D. #1
adopted at a meeting held on 4/22/85

Lydia Bryan

Lydia Bryan
Secretary, Local Organization

Rt 1, Box 71
Marlin Tex 76661
Address Zip Code

Date 4/22/85

Falls County Commissioners Court
Local Organization

County Courthouse
Marlin, Texas 76661
Address Zip Code

By Burke Kirspatriek
Burke Kirspatriek

Title C. Judge

Date 4-22-85

The signing of this agreement was authorized by a resolution of the governing
body of the Falls County Commissioners Court
adopted at a meeting held on 4/22/85

Ruth H. Wood

Ruth H. Wood
Secretary, Local Organization

Box 458 Marlin Texas 76661
Address Zip Code

Date 4-22-85

Limestone-Falls Soil and Water
Conservation District
Local Organization

By E. B. Trotter
E. B. Trotter

Title Chairman

Date April 15, 1985

Box 190, Groesbeck, Texas 76642
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing
body of the Limestone-Falls Soil and Water C. D.
adopted at a meeting held on November 12, 1984

A. B. McBay
A. B. McBay
Secretary, Local Organization

Rt 3 Box 445 Medina, Tx 76667
Address Zip Code

Date Apr. 15, 1985

McLennan County Soil and Water
Conservation District
Local Organization

By B. F. Engelbrecht
B. F. Engelbrecht

Title Chairman

Date April 16, 1985

c/o B. F. Engelbrecht
P. O. Box 691, Waco, Texas 76703
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing
body of the McLennan County Soil and Water Conservation District
adopted at a meeting held on April 16, 1985

Harry F. Holland, Jr.
Harry F. Holland, Jr.
Acting Secretary, Local Organization

Route 2, Box 49, Abbott, TX 76621
Address Zip Code

Date April 16, 1985

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SUMMARY

BIG CREEK (TRI-COUNTY) WATERSHED

Falls, Limestone, and McLennan Counties, Texas

Sponsors: Falls County Water Control and Improvement District
Falls County Commissioners Court
Limestone-Falls Soil and Water Conservation District
McLennan County Soil and Water Conservation District
City of Marlin

Description of Selected Plan:

Project measures in the selected plan consist of 21 floodwater retarding structures; a multiple-purpose structure for retarding floodwater and for municipal, industrial, and recreation water storage; two dikes; and recreation facilities. Economic benefits of the recommended plan exceed the cost of the project. The major environmental impacts consist of reduced erosion, reduced sedimentation, reduced flooding, an increase in prime farmland soils, and an increased acreage of open water.

Measures Considered:

1. Land treatment
2. Channel work
3. Floodwater retarding structures
4. Dikes
5. Multiple-purpose structure
6. Recreation facilities
7. Livestock trails and walkways

Resource Information:

Size of Watershed:	236,620 acres
Land Use:	
Cropland	126,500 acres
Pastureland	28,400 acres
Rangeland	71,080 acres
Other	8,790 acres
Water	1,850 acres
Land Ownership:	
Private	98 percent
State-Local	2 percent
Federal	0 percent

Number of Farms:	1,200 farms
Range in size	10 to 2,400 acres
Average size	200 acres
Prime Farmland Soils:	95,000 acres
Wetlands:	
Type 1	150 acres
Type 2	370 acres
Type 5	600 acres
Type 6	1,080 acres
Flood Plain Land Use: ^{1/}	
Cropland	21,650 acres
Pastureland	1,620 acres
Rangeland ^{2/}	8,710 acres
Other	360 acres
Endangered Species	None
Cultural Resources:	None identified

Problem Identification

1. Flood plain erosion
2. Sediment
3. Floodwater
4. Municipal and industrial water
5. Recreation

Candidate Plans Considered:

1. No action
2. National economic development

Project Purposes:

1. Flood prevention
2. Municipal and industrial water
3. Public recreation

Principal Project Measures:

1. Floodwater retarding structures
2. Dikes
3. Multiple-purpose structure
4. Recreation facilities

^{1/} Represents the evaluated area damaged by the 100-year flood event.

^{2/} As used here, rangeland includes native pasture.

Project Costs: (Table 1)

	<u>PL 566 Funds</u> (dollars)	<u>Other Funds</u> (dollars)	<u>Total</u> (dollars)
<u>Structural Measures</u>			
Floodwater Retarding Structures	6,643,700	1,255,570	7,899,270
Multiple-Purpose Structure	1,466,050	1,819,050	3,285,100
Dikes	434,470	82,100	516,570
Recreation Facilities	77,200	69,000	146,200
Municipal Outlet Structure	0	80,000	80,000
TOTAL	8,621,420	3,305,720	11,927,140

Project Benefits (Period of Analysis):

Dollars
(Discounted Average Annual)

Agricultural Acreage	
Flood Damage Reduction	
Crop and Pasture	555,960
Sediment	10,080
Scour	6,950
More Intensive Land Use	336,070
Agricultural Improvements	
Flood Damage Reduction	
Other Agricultural	79,610
Nonagricultural Improvements	
Flood Damage Reduction	
Road and Bridge	64,750
Multiple-Purpose Use	
Municipal Water Supply	169,120
Recreation	152,960
Acres Benefitted:	32,340

Impacts:

Land Use Changes:

Land Use	Present Condition (acre)	Estimated Future (20 Years)		Effect of Project (acre)
		Without Project (acre)	With Project ^{1/} (acre)	
Cropland	126,500	127,000	125,319	-1,681
Pastureland	28,400	35,900	37,746	+1,846
Rangeland	71,080	62,720	60,378	-2,342
Water ^{2/}	1,850	2,000	3,572	+1,572
Other ^{2/}	8,790	9,000	9,605	+605
Total Area	236,620	236,620	236,620	

^{1/} Includes change of land use caused by construction of the project measures

^{2/} Includes urban and built-up land and areas devoted to use as dams, spillways, and the recreation area.

Natural Resources Changed or Lost:

Riparian hardwoods	Destruction of 495 acres
Wetlands	Slight increase in acreage
Cultural resources	None identified
Wildlife habitat	Destruction or alteration of 3,454 acres
Fisheries habitat	Addition of 1,572 acres of open water
Prime farmland soils	Creation of 3,000 acres Destruction or alteration of 665 acres

INTRODUCTION

The watershed plan and environmental impact statement for this project have been combined into a single brief document. The document will provide the basis for authorizing federal assistance for implementation, as well as identifying all known environmental impacts. Landusers have been interested in a plan to reduce floodwater damages in the Big Creek watershed since as early as 1904. Numerous attempts have been made since that time, but with very little success. In recent years, the people in the watershed have organized to sponsor a PL 566 project and have requested assistance from the Soil Conservation Service of the U.S. Department of Agriculture in the development of the plan. Numerous other federal, state, and local agencies provided input into the planning process. Responsibility for compliance with Section 102(2)(C) of Public Law 91-190 rests with the Soil Conservation Service.

The sponsors, with the assistance of SCS, prepared the plan. Specialists from the State Staff and National Office reviewed this document for technical adequacy; project effectiveness; and conformance with existing policies, rules, and legislation. Following this in-Service review, a revised document was prepared for public review and additional input from sponsors, affected agencies, and concerned individuals.

PROJECT SETTING^{1/}

Location and Size

The Big Creek (Tri-County) watershed is located in Central Texas in Falls, Limestone, and McLennan Counties (Appendix B-3). It consists of 236,620 acres (370 square miles). The drainage area of Big Creek originates in the northwest part of Limestone County about 20 miles southeast of the city of Waco. Following a southerly course, Big Creek flows through the southeast corner of McLennan County into the northeast corner of Falls County and enters the Brazos River about 10 miles south of the city of Marlin. Tributaries of Big Creek drain a portion of western Limestone County. The Brazos River is in the Texas Gulf Water Resource Region.

Demographic Data

The city of Marlin, population 7,099, lies on the southwestern watershed divide. Mart, population 2,324, lies in the northwestern part of the watershed. Other smaller communities in the watershed are Highbank, Reagan, McClanahan, Perry, Otto, and Ben Hur. Major population centers (MSMA) within 50 miles of the watershed are Waco, with a population of 170,755, and Killeen-Temple, with a population of 214,656 (1980 Census of Population and Housing, U.S. Department of Commerce, Bureau of the Census).

The following table shows the demographic data for the three counties and is representative of the watershed:

^{1/} All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigation by the Soil Conservation Service, U.S. Department of Agriculture.

DEMOGRAPHIC DATA^{1/}

Big Creek (Tri-County) Watershed, Texas

County	1980		1970		Percent Change		Race			Housing Units		
	Population	Change	Population	Change	White	Black	Other	Spanish Origin	1980	1970	Change	Percent
Falls	17,946	3.7	11,969	4,883	1,094	1,690	7,940	6,895	15.2			
Limestone	20,224	11.7	15,062	4,699	463	696	8,905	6,869	29.6			
McLennan	170,755	15.7	134,911	27,254	8,590	14,988	65,934	52,529	25.5			

^{1/} 1980 Census of Population and Housing, U.S. Department of Commerce, Bureau of the Census.

Climate

Climatic conditions are warm, temperate, and humid. The average date of the last killing frost in the spring is March 9, and that of the first killing frost in the fall is November 24, resulting in an average growing season of 257 days.

The average annual precipitation as recorded at the Agricultural Experiment Station at Riesel, which is near the watershed, is 33.85 inches. Rainfall is fairly evenly distributed throughout the year. Generally April and May are the wettest months and July the driest. (Soil Survey of Falls County, Texas, USDA, August 1978.)

Geology

The project area is dominantly underlain by rocks of Upper Cretaceous age while Tertiary strata are restricted to the easternmost portions of the watershed. More recent Quaternary deposits, consisting of river-deposited sediment, or alluvium, occur along stream channels and also occur as fluvial terrace deposits.

The Cretaceous strata crop out in linear belts trending north-south and decreasing in age from west to east. Regionally, the formations dip very gently toward the southeast. Faulting within the watershed trends from northeast to southwest and is associated with the Mexia Fault System.

The following table is a tabulation of geologic strata in the watershed:

CEOLOGIC DATA
Big Creek (Tri-County) Watershed, Texas

System	Series	Group	Formation	Member	Lithology of Outcrop	Approximate Thickness (ft)
Quaternary	Recent	-	Alluvium	-	Clay, silt, sand, and gravel	
Quaternary	Pleistocene	-	Alluvial terrace	-	Fluviatile clay, silt, sand, and gravel	
Tertiary	Eocene	Wilcox	Hooper Formation	-	Mudstone, lesser amounts of sandstone, lignitic, ironstone concretions, glauconitic	500
Tertiary	Eocene	Midway	Wills Point Formation	-	Clay, silty, sandy; thin limestone bed near middle; light to dark gray	250-500
Tertiary	Eocene	Midway	Kincaid Formation	Tehuacana	Limestone, hard, indurated, glauconitic, gray-white; interbedded with gray marl	30
Tertiary	Eocene	Midway	Kincaid Formation	Pisgah and Little (undivided)	Sand and clay; sand glauconitic, argillaceous, poorly sorted; clay, sandy, silty, phosphate nodules, greenish-gray, weathers to yellow-brown soil	10-120
Cretaceous	Gulf	Taylor	Kemp Clay	-	Clay, calcareous, massive, thinly laminated, dark gray	80-200
Cretaceous	Gulf	Taylor	Nacotoch Sand	-	Sand, fine to medium grain, quartz, glauconitic, friable, green-gray	180
Cretaceous	Gulf	Taylor	Neylandville Formation and Marlbrook Marl (undivided)	-	Clay, montmorillonitic, calcareous, glauconitic, pyritic, light gray	450
Cretaceous	Gulf	Taylor	Pecan Gap Chalk	-	Chalk, grades upward to chalky marl, gray-white	300
Cretaceous	Gulf	Taylor	Wolf City Formation	-	Marl, clay, sand, and sandstone phosphate and hematite nodules, gray-brown	300

Soils

The watershed is in the Texas Blackland Prairie Land Resource Area except for a small portion on the east side which is in the Texas Claypan Area. The soils are mostly deep clays and loams. Small areas of sandy soils occur near the Brazos River and in the extreme eastern part of the watershed. The major soil series occurring in the watershed are Burleson, Crockett, Heiden, Houston Black, Ships, Trinity, Weswood, and Wilson. For a detailed description of the soils in the Falls County portion of the watershed, see the Soil Survey of Falls County, Texas.

The topography of the watershed is undulating to rolling, with some broad flatlands. Generally, the steeper slopes occur on the eastern and south-eastern side of Big Creek.

Prime Farmland Soils

Prime farmland soils are lands best suited and available for producing food, feed, forage, fiber, and oilseed crops. These lands may be used as cropland, pastureland, rangeland, or other land. Prime farmland soils have the quality to produce sustained high yields of crops economically when treated and managed according to modern farming methods. Existing soil survey data and estimates indicate there are about 95,000 acres of prime farmland soils in the watershed. This represents about 40 percent of the watershed. A list of soil mapping units classified as prime farmland soils is available in local SCS offices.

Surface Water Resources

Surface water resources for livestock and domestic uses in the area are from small farm ponds, intermittent and perennial streams, shrub swamps, and reservoirs such as Marlin Lake. There are about 1,850 acres of open water in the watershed.

The major streams in the watershed are Big Creek, Brushy Creek, Cottonwood Creek, Fish Creek, Highbank Creek, and Mussel Run. Mussel Run, about 6.5 miles long, is springfed and is the only perennial stream in the watershed. About 236 miles of intermittent streams drain the watershed. Intermittent streams, as used here, are those that have continuous flow through some season of the year, but little or no flow through other seasons. Some intermittent streams have perennial potholes of water.

Economic Resources

Agriculture is the dominant economic factor in the watershed and feeder cattle production is the leading farm enterprise. Falls County is, among the top 10 counties in Texas in numbers of beef cattle during the month of January each year.

Land Use

There are 1,200 farms or ranches in the watershed, ranging from 10 to 2,400 acres and averaging about 200 acres in size. Land in the watershed is mainly (98 percent) in private ownership, with the state or county owning the other 2 percent. There is no federal land in the watershed.

The land use is shown in the following table:

Estimated Land Use in the Watershed

<u>Land Use</u>	<u>Acres</u>
Cropland	126,500
Pastureland	28,400
Rangeland	71,080
Other	8,790
Water	<u>1,850</u>
Total	236,620

PROBLEM AND OPPORTUNITY IDENTIFICATION

A broad range of problems and opportunities relating to the natural and human resources of the watershed were identified during the environmental evaluation and through public participation meetings. Major problems identified were flood plain erosion, sedimentation, floodwater, insufficient municipal and industrial water storage facilities, and a need for additional recreation facilities. Some identified problems were irrelevant to Public Law 566 assistance or could not be treated through a PL 566 project. One such problem is inadequate drainage in parts of the city of Marlin. Studies showed that this problem is caused by an inadequate storm sewer system in the developed urban area, and thus is not eligible for PL 566 assistance. There is no apparent risk of loss of life from this problem.

Each of the significant water and related land resource problems in the watershed is described in the following paragraphs.

Floodwater Problems

Floodwater damage occurs on 32,340 acres of evaluated flood plain land (exclusive of water, wetlands, and stream channels) along Big Creek and its tributaries from a 100-year frequency event (Appendix B-3). Tables showing the acres flooded and the monetary damage caused by various size storm events are in the "Effects of Recommended Plan" section of this report (page 63). At the present time, major land use in the evaluated flood plain is about 67 percent cropland (21,650 acres), 5 percent pastureland (1,620 acres), and 27 percent rangeland (8,710 acres). In addition, there is about 1 percent (360 acres) of other land in the evaluated flood plain. Flooding causes severe damages to crops, pastures, farm improvements, livestock, and public roads and bridges. The following table shows the estimated acreage of each of the major crops planted in the flood plain:

Crops Planted in the Flood Plain
(acres)

Small grain	11,210
Grain sorghum	5,810
Forage sorghum	2,410
Cotton	2,220

Flooding may occur during any season and results in reducing the effectiveness of management practices and associated monetary inputs. The estimated average annual direct monetary damage by floodwater to crops and pastures is \$1,527,390. Estimated average annual floodwater damages to farm improvements and loss of livestock is \$169,490.

Average annual floodwater damage to roads and bridges is \$137,560.

Infrequent flooding causes minor damages to a few homes and businesses in the city of Mart. There is no apparent risk of loss of life from this problem.

There is no other urban or built-up land other than roads and bridges in the flood plain. No residential, industrial, or similar developments are anticipated within the identified 100-year flood plain.

Erosion Problems

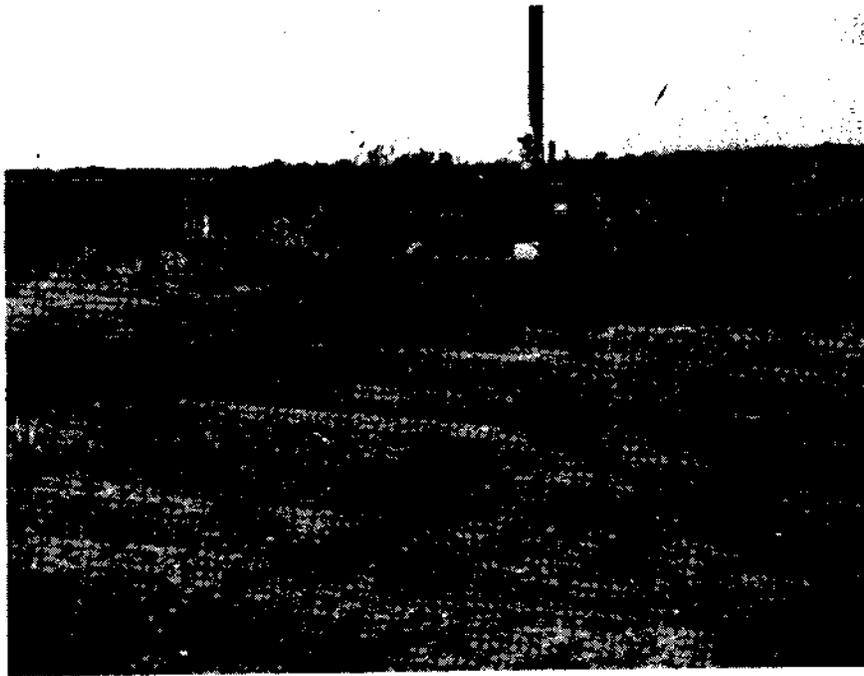
The estimated average annual gross erosion for the entire watershed is 5.52 tons per acre. The going program of the soil and water conservation districts has suppressed this problem to an acceptable level. However, erosion and the resulting sediment have aggraded stream channels and reduced flow capacities. Subsequently, this has increased flood stages and overbank deposition of sediment. More frequent and extensive flooding has also resulted in increased erosion on flood-prone bottomlands. Approximately 1,280 acres of bottomland soils are annually subjected to flood plain scour damage. In terms of reduced productive capability, this damage ranges from 10 to 40 percent. Monetarily this amounts to an average annual loss of \$23,960.

Sediment Problems

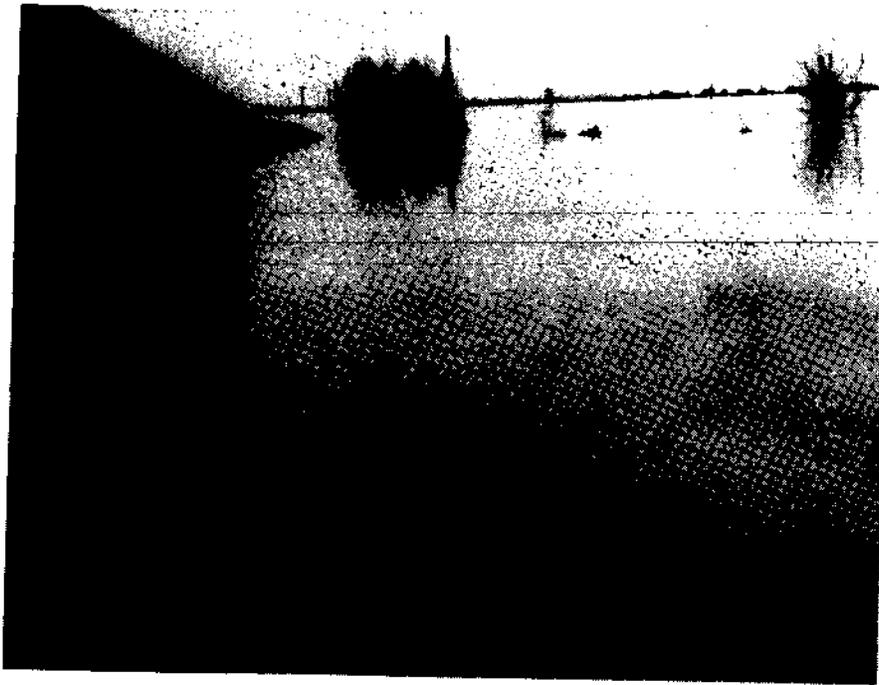
Sediment damages are occurring in the watershed in the form of channel fill deposits and overbank deposition. Sediment accumulations have reduced channel capacities materially, resulting in increased flood damages. Overbank deposition damages an average of 1,300 acres annually in the flood plain. Damage in terms of reduced productivity of the flood plain soils ranges from 10 to 50 percent.

The estimated average annual monetary damage of overbank deposition is \$28,440.

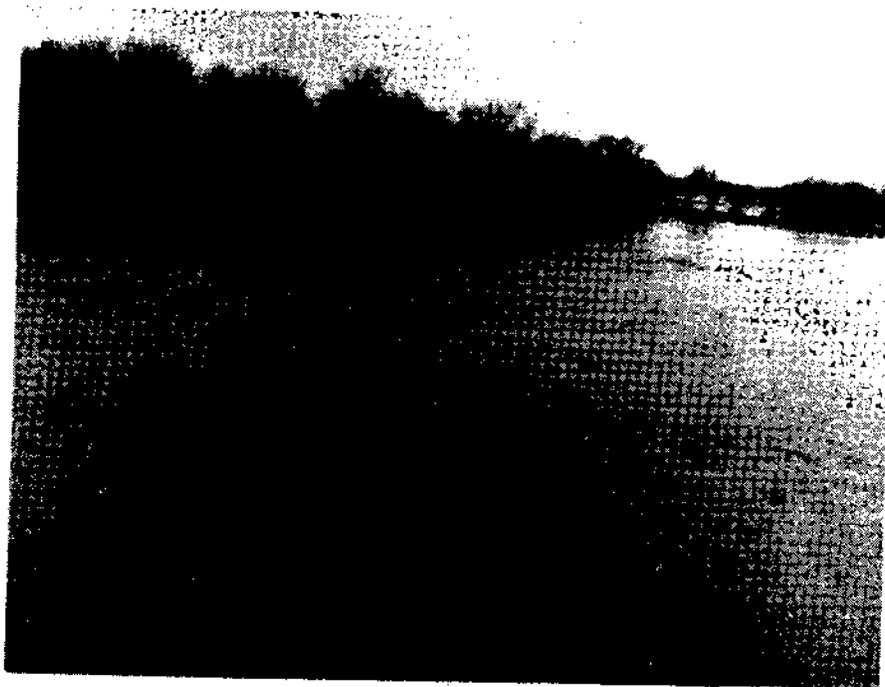
The estimated average amount of suspended sediment carried out of the watershed is 255,000 tons annually. This volume results in an average concentration of 1,780 milligrams per liter in the estimated 5.34 inches of average annual runoff at the mouth of the watershed.

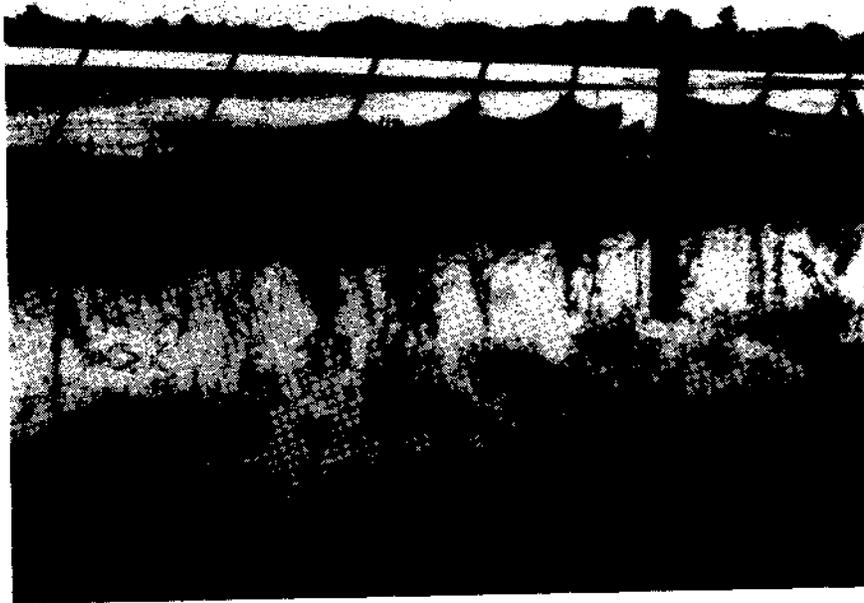


Cotton planted on this irrigated land was killed by floodwaters. The field was replanted but was flooded the second time this same year. Crops are often destroyed by floodwater, but a significant portion of the damages is related to delayed planting and harvesting, with resultant increases in the cost of producing the crop and decreases in crop yield and quality of the product.



Floodwater damage occurs on 32,340 acres of flood plain land in the Big Creek watershed. Damages to crops and pastures are extensive.





In addition to crop and pasture damages, floodwater causes other agricultural damages such as fences destroyed and livestock drowned or lost.





Road and bridge damage in the watershed is a major problem. These bridges were damaged by a flood that occurred in March 1979.



Municipal and Industrial Water Problems

The City of Marlin has indicated a need for additional water storage facilities based on a study made by Henningson, Durham, and Richardson Inc. of Texas (Engineering, Architecture, Planning, Systems, and Economics, Dallas, Texas). According to the study, the city of Marlin used, on the average, 1.6 million gallons of water per day (mgd) in 1980. Based on past trends, future water use is projected to increase to 2.7 mgd by the year 2010 and to 3.4 mgd by the year 2030. The primary water supply of the city (Marlin Lake) can dependably supply the city with only 0.75 mgd. The present quantity of water needed but not available from Marlin Lake is made up by periodically pumping water from the Brazos River. The existing supply is adequate to meet present needs but is inadequate to meet future needs. Thus, additional resources must be developed. The following table shows the present and projected water use and supply capacity:

Present and Projected Water Use and Supply in Marlin, Texas

<u>Use and Supply</u>	<u>Year</u>		
	<u>1980</u> (mgd)	<u>2010</u> (mgd)	<u>2030</u> (mgd)
Average Day Water Use	1.60	2.70	3.40
Maximum Day Water Use	<u>1/</u> 2.35	<u>2/</u> 3.97	5.00
Average Day Water Supply Capacity	<u>1/</u> 1.38	<u>2/</u> 2.46	2.46

1/ Includes Brazos River water

2/ Reflects proposed increased capacity of new Marlin Lake

The quality of water in the Brazos River is often poor (i.e., with respect to chlorides, hardness, and bacteria levels) and there is only a limited amount of dilution water available in Marlin Lake. The practice of admixing Brazos River water with Marlin Lake water often results in an unacceptable taste and hardness in the water. This problem is compounded by the fact that the Brazos River water is "heavier" than the Marlin Lake water and tends to settle in the bottom of Marlin Lake, which results in little dilution, and, consequently, poor quality. Water use from the Brazos River is limited to a mixing ratio of 1.2:1.0 due to the poor quality of water in the Brazos River.

The ground water available to Marlin is from deep wells. Water from a typical well analyzed in 1979 contained 3,680 milligrams per liter of dissolved solids, which made it unsuitable for domestic use.

Raw water is available in Lake Limestone about 35 miles east of Marlin; however, Marlin city officials stated that the cost of the water plus transportation costs make this alternative unfeasible.

The city of Mart is also deficient in municipal water supplies. Discussions and studies of the problem revealed that no suitable surface water storage sites exist within a practical radius of Mart. Based on these and other

independent studies, the City of Mart is contracting with a private engineering firm to utilize their available ground water resources.

The Tri-County Water Supply Corporation, a private corporation serving portions of the rural watershed and other areas, stated that the need for additional water for their system is critical and requested a water supply reservoir for their use. Following studies and discussions with their board of directors, the board decided to request a purchase agreement with the City of Marlin if a municipal water supply reservoir is developed.

Other municipalities in the vicinity are also experiencing water shortage problems, but none indicated a desire to participate in this project.

Recreation

Opportunities for water-based recreation are limited in the watershed area. According to the interdisciplinary studies and the Comprehensive Planning Branch of the Texas Parks and Wildlife Department, there is a need for additional recreation facilities. The demand and supply analysis within the market area indicates a deficiency of recreation facilities to provide adequate recreation opportunities to the residents. The following table shows the estimated range of needs for recreation facilities in this area:

1980 and 2000 Estimated Range of Needs for Recreation Facilities in the Rural
 Areas of Falls, Limestone, and McLennan Counties, Texas

Developed Recreation Lands and Facilities	Units of Measure	Estimated 1980 Range : of Resource Requirements : for the Three Counties	Estimated 2000 Range : of Resource Requirements : for the Three Counties
Camping	Sites	89-741	319-2,654
Picnicking	Tables	381-2,296	1,065-6,336
Boat Ramps	Ramps (2-Lane)	8-67	21-172
Boat Slips and Stalls	Slips and Stalls	1,050-1,311	2,510-3,137
Fishing Piers, Barges, and Marinas	Linear Yards	252-1,261	585-2,925
Swimming in Fresh Water Areas	Acres	25-212	120-1,000
Bicycle Trails	Miles	1-5	1-5
Horseback Riding Trails	Miles	2-4	8-14
Walking, Hiking, and Nature Study Trails	Miles	10-42	15-63

Source: Unpublished Texas Parks and Wildlife Department TORP Data Base Information.

Water quality studies indicate that surface water in this watershed is normally within the safe limits for recreation use established by state water quality standards and by the Environmental Protection Agency. (See page 21 for a more complete discussion of water quality.)

INVENTORY AND FORECASTING

Scoping of Concerns

A broad range of environmental, economic, and social factors was considered during the scoping process. The degree of significance to decision making determined the intensity that each factor was studied during project planning. Following is a list of factors considered and their degree of significance:

Evaluation of Identified Concerns

Economic, Environmental, and Social Factors	Degree of Significance to Decision Making ^{1/}
Land management	Medium
Prime farmland soils	High
Erosion	High
Sedimentation	High
Floodwater damages	High
Municipal water	High
Recreation	High
Streams and lakes	High
Surface water quality	High
Ground water	Low
Fish and wildlife habitat	High
Wetlands	Medium
Endangered species	Medium
Social and cultural	Low
Transportation	High
Archeological resources	Medium
Air quality	Low
Visual resources	Medium
Human health and safety	Low
Mineral resources	Low

- ^{1/} High - Must be considered in the analysis of alternatives
 Medium - May be affected by some alternative solutions
 Low - Consider, but not too significant

Existing and Forecasted Resources

Water Quality

The Soil Conservation Service contracted with Glen Longley and John J. Ralph, Environmental Sciences of San Marcos, to investigate the water quality of the watershed. The resulting report covers the period from September 16, 1977, to September 16, 1978.

The report stated in summary:

"Physical, chemical, and biological data indicate that the study area is quite typical of small streams in the Blackland Prairie area. It appears that erosion and the accompanying increase in sediment load are the chief problems at this time. The wide fluctuations in flow, turbidity, and total solids concentration found during this study (especially the flood event) indicate a system which does not readily buffer environmental perturbations.

"Chemical data indicates that this system is normally within the limits recommended by the Environmental Protection Agency. Although there is a paucity of existing data, it too reflects acceptable chemical limits for the area in question. Few occasions exist when this small watershed exceeded the Texas water quality standards set for the nearby Brazos River.

"Toxic nitrogen compounds ($\text{NH}_3\text{-N}$ and $\text{NO}_2\text{-N}$) were not found in concentrations which warrant concern. Other toxic substances such as arsenic and chlorinated hydrocarbons did not approach problem levels during the study. While the major plant nutrients ($\text{NO}_3\text{-N}$, O-PO_4 , and TDP) were generally within prescribed limits, the potential exists for these compounds to foster nuisance algal growth if physical conditions in the system were to change.

"This system supports a relatively healthy biological community when not disturbed by catastrophic environmental events. Indicators are that the area studied has healthy phytoplankton, zooplankton, and periphyton communities. Macroinvertebrate samples indicate many pollution intolerant individuals requiring good water quality. The general lack of macrophytes and the relatively poor macroinvertebrate species diversity lead to the conclusion that floods and droughts are operative mechanisms in retarding the succession of the biotic community."

The City of Marlin's consultant, Henningson, Durham, and Richardson, Inc. examined water quality records of streams in the general vicinity of Brushy Creek with drainage areas of comparable geologic origin. According to the consultant:

"The records indicate that the water has a low dissolved mineral content, and meets state drinking water standards. As the drainage area of Brushy Creek is similar to these watersheds with respect to geology and watershed development, we believe the proposed Brushy Creek reservoir will be suitable for not only drinking water, but also for contact recreation."

Water quality within the watershed is expected to remain the same in the future.

Fish and Wildlife Resources

Fish habitat in Big Creek watershed is limited to farm ponds, reservoirs such as Marlin Lake, a few potholes in Big Creek and its tributaries, and Mussel Run, which carries the only perennial streamflow in the watershed. There are about 1,850 acres of water in the watershed, most of which is suitable for fish habitat. The lower reach of Mussel Run serves as spawning grounds for fish from the Brazos River. During periods of high flow, fish move upstream into Big Creek and are confined to scattered potholes when the flow ceases. Flathead and channel catfish are the predominant sport fish in the stream. Most of the farm ponds and the small reservoirs also provide a good fishery resource. The principal species found in these water resources are largemouth bass, bluegill sunfish, redear sunfish, channel catfish, and bullhead catfish.

The upland areas of the watershed are open and a narrow belt of woody vegetation occurs along the major drainageways. The principal game species in the watershed are bobwhite quail and mourning dove. Several furbearers, such as beaver, raccoon, fox, skunk, and ringtail cats, are found in the area. Numerous species of songbirds and rodents inhabit the watershed. Waterfowl and various species of shorebirds also inhabit the watershed during various times. Other species which are present are fox squirrel, coyote, armadillo, bobcat, cottontail, and jackrabbit.

The following table shows the approximate acreage of wildlife habitat types in the watershed in 1981:

Habitat Types in Watershed

<u>Habitat Types</u> ^{1/}	<u>Acres in Watershed</u>
Cropland	126,500
Improved Pasture	28,400
Open Rangeland	14,000
Mesquite	25,880
Postoak	19,500
Elm Thicket	3,000
Hardwoods (mixed)	6,500
Urban and Built-up	8,790
Water (Other than Type 5)	1,850
Wetland - Type 1	150
Wetland - Type 2	370
Wetland - Type 5	600
Wetland - Type 6	1,080
Total	236,620

^{1/} Names of the habitat types are used for descriptive purposes and are not intended to imply pure stands of any vegetative types.

Endangered Species

The watershed is in the range of occurrence of two species designated as endangered by the U.S. Fish and Wildlife Service: The Arctic peregrine falcon (Falco peregrinus tundrus) and the whooping crane (Grus americana). Neither of these species is known to inhabit the watershed. Both are migrant species and may migrate through the watershed.

Economic Resources

The most common management system in the watershed is to buy stocker steers in the fall, graze them on small grain pastures during the winter and spring, and sell them in the early summer. About 65 percent of the farm marketings each year is from livestock and livestock products and 35 percent is from crops such as cotton, wheat, oats, sorghums, and corn (Texas County Statistics, Texas Department of Agriculture, Austin, Texas).

Following is an estimate of the labor force in the watershed area (Labor Force Estimates, Texas Employment Commission, June 1982):

Labor Force Estimates

<u>County</u>	<u>Labor Force</u>	<u>Unemployed</u>	<u>Rate</u>	<u>Total Employed</u>
Falls	7,816	331	4.2	7,485
Limestone	9,024	321	3.6	8,703
McLennan	83,554	4,844	5.8	78,710

Land Use and Management

Technical assistance in applying land treatment practices is being provided by the Soil Conservation Service in cooperation with the local soil and water conservation districts serving the watershed area. The on-going program of technical assistance is adequate to meet the land treatment needs of the watershed.

The 1981 land use is shown in the following table:

	<u>Flood Plain</u> (acres)	<u>Total Watershed</u> (acres)
Cropland	21,650	126,500
Pastureland	1,620	28,400
Rangeland ^{1/}	8,710	71,080
Other	360	8,790
Water	-	1,850
Total	32,340	236,620

^{1/} As used here, rangeland includes native pasture and types 1, 2, 5, and 6 Wetlands.

About 126,500 acres are used for the production of cultivated crops. The following list shows an estimate of the acreage of each of the major crops produced in the watershed:

<u>Crop</u>	<u>Watershed</u> (acres)	<u>Flood Plain</u> (acres)
Small grain	62,200	11,210
Grain sorghum	36,700	5,810
Forage sorghum	13,000	2,410
Cotton	6,400	2,220
Corn	2,000	-
Idle cropland	6,200	-
Total	126,500	21,650

The expected future land use is shown on the table on page 60.

Visual Resources

The visual resources in the watershed are characterized by the gently sloping lines of the horizon and low vertical lines of geologic formations and manmade structures such as buildings, grain storage bins, and windmills. The horizon is seldom broken by a dominant geologic feature or by vegetation. The woody vegetation tends to be of uniform height that provides a short vertical accent.

Most of the watershed is a mature landscape characterized by smooth, flowing landforms shaped by years of wind and water erosion. In some isolated cases, areas where bedrock has been exposed contrast sharply and are most sensitive to change at their edges.

Archeological and Historical Resources

The Texas Archeological Research Laboratory has records of 298 archeological sites in Falls, Limestone, and McLennan Counties. The majority of these are in the immediate vicinity of the Navasota and Brazos Rivers. Only 10 are within the 236,620-acre Big Creek watershed area.

A cultural resource survey was carried out in 1977-78 in areas of the watershed that might be affected by key structural measures that were being planned. The survey was performed by Parker Nunley; the results were published in the report, Archeological Survey of Portions of Big Creek Watershed, Nunley Multimedia Productions, Dallas, Texas, 1978. The field work focused on 12 separate locations comprising 5,811 acres. The report identified 31 archeological sites and recommended further testing of 4 sites to determine significance.

The Historical Commission chairpersons for the three counties were contacted to ascertain if locally important historic sites might be affected by the proposed project. None of the chairpersons identified any known historical sites which might be affected by the project. The National Register of Historic Places does not list any sites in the affected areas.

FORMULATION OF ALTERNATIVES

Formulation Process

The most practical measures which could be installed in this watershed under PL 566 which would achieve one or more of the project objectives are shown in the planning consideration table:

Planning Considerations

Project Purposes	Effects of Structural Measures Considered			
	Floodwater : Retarding : Structures	Multiple- Purpose : Structure	Recreation : Facilities	Dikes
Flood prevention	Positive	Positive	None	Positive
Provide additional municipal and industrial water storage	None	Positive	None	None
Provide additional public recreation facilities	None	Positive	Positive	None

Inspection of the planning consideration table reveals that each of the elements will satisfy one or more of the project purposes.

Land treatment was considered as a plan element to reduce floodwater damages. Measures that could be used proved to have insignificant impact on reducing flooding. A system of livestock trails and walkways within the flood plain was considered but the cost of installing this system was greater than the benefits.

In 1980, the City of Marlin became a sponsor based on their need for additional municipal and industrial water and recreation water. They engaged Henningson, Durham, & Richardson, Inc., an engineering consulting firm, to study their need for additional water. The consultants determined that existing water storage resources (Marlin Lake) can dependably supply the city with 0.75 million gallons of water per day (mgd). Based on past trends and estimates of the consulting firm, future water use is projected to increase to 2.46 mgd by the year 2010 and 3.4 mgd by the year 2030.

The consulting firm recommended several nonstructural measures to conserve the available water supply. Based on this recommendation, the city implemented a plan which consists of the following measures:

1. Modification of their water service pricing policy
2. Continuing efforts to revitalize their water treatment plant
3. Continuing efforts to improve the efficiency of their water distribution system
4. Establishing a drought contingency plan to minimize water use and allocate water supplies during emergency shortages

Other nonstructural measures, such as recycling water supplies, water system pressure reduction, increasing upstream watershed management, and conjunctive use of ground and surface water, were considered for use by the city. These measures, which provide efficient water use in large-scale water developments, were determined to be inappropriate for this small-scale water development project.

The city studied the following alternatives to meet their remaining water supply need:

1. Ground Water

Ground water in sufficient quantity for municipal use could be obtained from deep wells (>3,000 feet) in the Hosston Member of the Travis Peak Formation. However, the poor quality of this water, which does not meet federal and state drinking water standards, precludes its use for municipal and domestic purposes. Ground water chemical quality is lower than that of the Brazos River from which Marlin obtains its present supplemental supply.

2. Pipeline to Major Reservoirs

Discussions with the Brazos River Authority, which operates all major reservoirs within 30 miles of Marlin, revealed that the present supply of water from each is totally committed.

3. Dredging Lake Marlin

Based on a recent sediment survey of Marlin Lake, the quantity of material which would need to be removed in order for Marlin Lake to meet the city's present needs is 4,000 acre-feet. In addition to high capital cost of this alternative, high turbidity would cause treatment plant operational costs to increase and a disposal site would be required for the material removed.

4. Reverse Osmosis Treatment of Brazos River Water

A reverse osmosis water treatment facility could be constructed which would treat Brazos River water by removing a large percentage of the chlorides and other chemical constituents found in the water. However, in addition to the high capital cost, the operational costs for electricity and chemicals in such a process would result in a high finished water cost. A brine discharge permit would also be required for the reverse osmosis plant.

5. A New Storage Reservoir

A new reservoir could be constructed on Brushy Creek about 6 miles east of Marlin Lake. If this reservoir were constructed, it would be capable of supplementing the City of Marlin's present supply for about the next 16 years.

6. Enlargement of Marlin Lake

This will be accomplished by raising both the concrete spillway and the top of the dam by 10 feet. This will increase the lake's capacity from 2,328 acre-feet to 6,056 acre-feet and will increase the dependable water supply of Marlin Lake from 0.75 mgd to 1.41 mgd. This amount of water alone will not be sufficient to meet the city's demand and make-up water will still be required from the Brazos River.

After studying all the alternatives, Marlin city officials decided to implement alternative 6 (Enlargement of Marlin Lake) immediately and to continue planning on alternative 5 (A New Storage Reservoir).

Channel modification was studied as a possible measure to reduce floodwater damage. The cost of channel work proved greater than the benefits received. Unstable soil conditions dictate that this measure would require rock rip-rap in most areas to prevent stream channel erosion. Major petroleum transmission lines, roads and bridges, and utilities would require modification. In addition, channel work would have adverse effects on several hundred acres of type 6 wetland. Because of these unacceptable economic and environmental costs, channel work is not included in a candidate plan.

Various systems of floodwater retarding structures and dikes were analyzed to determine how flood damages could be reduced. Preliminary studies revealed 40 probable sites for floodwater retarding structures (Appendix B-4). Several of these sites were in series on the same drainage area. More detailed studies of the geologic resources, the potential land rights problems, and the environmental impacts reduced the number of acceptable sites to 25. The 25 sites were evaluated to identify those which would produce net benefits. This eliminated 3 sites from further consideration because of cost-benefit deficiencies. The lowest structure on Brushy Creek was designed to include municipal and recreation water storage with associated recreation facilities. This resulted in a system of 21 floodwater retarding structures, 1 multiple-purpose structure, and recreation facilities.

The protection provided by this system left major floodwater damage in reach 1 (Appendix B-3). Further studies were made to identify dikes which would reduce this problem and produce net benefits.

A flood problem in the city of Mart was studied. Structural measures to treat this problem would involve intensive alteration of a major highway. Also, there is not a suitable site for a floodwater retarding structure that would alleviate this problem. In addition, nonstructural measures proved unfeasible.

Incremental Analysis

Incremental analysis was made to determine the National Economic Development (NED) plan. The NED plan maximizes net benefits resulting from implementation of the project. The following baselines were used in making the incremental analysis:

1. The combination of measures was selected, using the following criteria:
 - A. Site location
 - B. Drainage area controlled
 - C. Structure cost
 - D. Dictated construction sequence (i.e., floodwater retarding structures Nos. 16, 17, and 18 must be in place before multiple-purpose structure No. 19 is constructed; all proposed floodwater retarding structures must be in place before dikes are constructed).
2. Damages were determined under without-project conditions.
3. Combinations of structures were added as increments.

Benefits exceeded costs for the first 21 floodwater retarding structures, a multiple-purpose structure, and recreation facilities when installed in increments. Three additional floodwater retarding structures were added and the costs far exceeded the benefits for this increment. Dikes were added as a last increment and produced net benefits. Therefore, the 21 floodwater retarding structures, a multiple-purpose structure, recreation facilities, and two dikes were identified as being the NED plan.

A summary of the incremental analysis is shown on the following table:

Incremental Analysis of NED Plan
Big Creek (Tri-County) Watershed, Texas

Evaluation Unit	Annual Cost		Annual Benefits		Net Benefits	
	Incremental	Total	Incremental	Total	Incremental	Total
Floodwater Retarding Structures Nos. 1, 2, 9	142,520	142,520	302,400	302,400	159,880	159,880
Floodwater Retarding Structures Nos. 10 thru 13	112,070	254,590	214,530	516,930	102,460	262,340
Floodwater Retarding Structures Nos. 16 thru 18	122,560	377,150	193,810	710,740	71,250	333,590
Multiple-Purpose Structure No. 19 and Recreation Facility	307,460	684,610	624,130	1,334,870	316,670	650,260
Floodwater Retarding Structures Nos. 3 thru 5	53,990	738,600	133,450	1,468,320	79,460	729,720
Floodwater Retarding Structures Nos. 6 thru 8	50,090	788,690	107,380	1,575,700	57,290	787,010
Floodwater Retarding Structures Nos. 14 and 15	65,280	853,970	100,330	1,676,030	35,050	822,060
Floodwater Retarding Structures Noa. 20 thru 22	105,410	959,380	202,680	1,878,710	97,270	919,330
Dikes Nos. 1 and 2	43,260	1,002,640	133,210	2,011,920	89,950	1,009,280

Evaluation of Alternative Plans

Following is a description of the alternative plans:

Alternative 1 - No Project

Components: This alternative consists of foregoing implementation of the project.

Costs: None

Impacts: Foregoing the project would eliminate the opportunity to realize \$672,840 net benefits annually. Average annual acres flooded would continue to be 47,637. Flood plain erosion and sediment damages would continue. Average annual monetary flood damage would be \$1,886,840.

The opportunity to provide a storage reservoir for municipal, industrial, and recreation water would be foregone.

The opportunity to provide additional recreation facilities for public use would be foregone.

The need to use 409 acres to construct the structural measures would be eliminated.

The creation of 1,572 acres of surface water would be foregone.

The net increase of 2,335 acres of prime farmland soils would be foregone.

(For additional effects see the "Summary and Comparison of Candidate Plans," pages 33 and 34.)

Alternative 2 - National Economic Development Plan

(See Project Map - Appendix C)

Components: This alternative consists of a system of 21 floodwater retarding structures, 1 multiple-purpose structure, 2 dikes, and recreation facilities. The multiple-purpose structure will be designed for retarding floodwater and for storage of municipal, industrial, and recreation water.

Impacts: Total installation cost is \$11,927,140. Public Law 566 cost share is \$8,621,420. Other cost is \$3,305,720. Average annual cost discounted is \$702,660. Measures included in this alternative will provide discounted annualized benefits of \$1,375,500 and net discounted annualized benefits of \$672,840. Average annual acres flooded will be reduced from 47,637 to 22,058, which is a 54 percent reduction. There will be a net increase of 2,335 acres of prime farmland soils. There will be an adequate water storage facility for the present and the projected needs for the city of Marlin. The recreation facilities will provide recreation opportunities for area residents. The average annual monetary floodwater, erosion, and sediment damages will be

reduced by 56, 40, and 49 percent, respectively. The average annual monetary flood damages will be reduced from \$1,886,840 to \$834,690, a 56 percent reduction. There will be an addition of 1,572 acres of open water and a loss of 26 miles of intermittent streams. The wildlife habitat will be destroyed or altered on 3,454 acres. This loss will be minimized by planting and managing specific areas for the benefit of wildlife habitat.

(For additional benefits and effects, see the "Summary and Comparison of Candidate Plans," pages 33 and 34.)

Comparison of Candidate Plans

Candidate plans considered during formulation included a national economic development plan and no project.

The national economic development plan is directed toward increasing the value of the Nation's output of goods and services and increasing national economic efficiency. Project contributions are measured in dollars.

The alternatives considered as candidate plans are described in the "Summary and Comparison of Candidate Plans" (pages 33 and 34). Economic, environmental, and social impacts believed to be of greatest significance to decision making are also presented.

Summary and Comparison of Candidate Plans
Big Creek (Tri-County) Watershed, Texas

Measures	Effects	Expected Future Conditions Without Project	Alternative 1 (No Project)	Alternative 2 (NED)
Project Investment		0	0	\$11,927,140
<u>National Economic Development Account</u>				
Beneficial (Annualized)		0	0	1/ \$ 1,375,500
Adverse (Annualized)		0	0	1/ \$ 702,660
Net Beneficial		0	0	\$ 672,840
Flood Damages		Average annual acres flooded - 47,637 Average annual monetary flood damages \$1,886,840	No effect	Average annual acres flooded 22,058 - a 54% reduction Average annual monetary flood damages \$834,690 - a 56% reduction
<u>Other</u>				
Beneficial Prime Farmland Soils		95,000 acres of prime farmland soils	No effect	Create 3,000 acres of prime farmland soils
Erosion (Flood Plain)		Erosion damages 1,280 acres	No effect	Reduced by 41%
Sedimentation		Sediment damages 1,300 acres	No effect	Reduced by 50%
Streams and Lakes		1,850 acres of open water and 236 miles of intermittent streams	No effect	Addition of 1,572 acres of open water
Surface Water Quality		Sediment pollution of 1,780 mg/l	No effect	Sediment pollution reduced to 1,150 mg/l

1/ Discounted at 8.125 for 109 years (period of analysis).

Summary and Comparison of Candidate Plans (cont'd)
Big Creek (Tri-County) Watershed, Texas

Effects	Expected Future Conditions Without Project	Alternative 1 (No Project)	Alternative 2 (NED)
Beneficial (cont'd)			
Wildlife Habitat	Wildlife habitat quality has decreased in past years. This trend is expected to continue	No effect	Improve habitat on 624 acres adjacent to the multiple-purpose structure and on disturbed areas of other structures
Fish Habitat	Total of 1,850 acres	No effect	Create 1,572 acres of open water
Municipal Water	Water supply inadequate to meet present needs of city of Marlin	No effect	Provide adequate water storage for the present and the projected needs
Recreation	Region has insufficient opportunities for water-based recreation	No effect	Produces about 55,000 recreation visitor days annually
Archeological	31 archeological sites	No effect	No known effect
Adverse Prime Farmland Soils	95,000 acres of prime farmland soils in the watershed	No effect	Convert 665 acres of prime farmland soils to structural measures
Streams and Lakes	-	No effect	Reduction of 26 miles of intermittent stream
Wildlife Habitat	-	No effect	Destroy or alter habitat on 3,454 acres affected by structural measures

Project Interaction

There are no known existing or expected federal or non-federal projects that would have significant economic, environmental, or physical interaction with any of the candidate plans.

Risk and Uncertainty

All data used in evaluating and establishing future conditions in the watershed are based on recent history and rainfall and streamflow gage records. Flood-free agricultural production estimates are based on local records of farm and ranch units under an average level of management. The net benefits of the recommended plan exceed the cost of the planned measures without consideration of any projections. Therefore, the uncertainty aspects of projections for project justification are not applicable.

Rationale for Plan Selection

After analyzing the candidate plans, it was determined that Alternative 2, the national economic development plan, was both acceptable to the sponsors and implementable under the authority of the SCS. Alternative 1 does not satisfy project goals of national economic development. The "Summary and Comparison of Candidate Plans," pages 33 and 34, clearly indicates the rationale for selecting Alternative 2.

RECOMMENDED PLAN

Purpose and Summary

The recommended plan is Alternative 2, the national economic development plan, and consists of 21 floodwater retarding structures, a multiple-purpose structure, two dikes, and recreation facilities. The plan purposes include flood prevention, municipal and industrial water, and public recreation. The project will be installed during a 9-year period. (See Appendix C for the location of the proposed measures, Tables 1 through 3A for information on costs and structural data, and page 45 for the installation schedule.)

Plan Elements

Each floodwater retarding structure and the multiple-purpose structure will consist of an earthen dam with an emergency spillway, a principal spillway, a floodwater retarding pool, and a sediment pool (Appendix B-2). The multiple-purpose structure will store municipal, industrial, and recreation water in a conservation pool. The water in each of the retarding pools will be released through the principal spillway during an approximate period of 10 days after inflow ceases. Each emergency spillway will be designed to convey runoff that exceeds the planned capacity of the retarding pool past the embankment and back to the downstream channel. The sediment pool will be the capacity below the principal spillway crest elevation allocated for the storage of submerged sediment.

The structures will control runoff from 84,200 acres, or 36 percent of the delineated watershed (see Appendix C for the locations of the structural measures).

The total capacity allocated for the anticipated 100-year accumulation of submerged sediment is 12,017 acre-feet (Table 3). The principal spillway crest of each floodwater retarding structure will be set at the capacity of the 100-year sediment volume predicted to be deposited as submerged sediment. Principal spillways of floodwater retarding structures which have over 200 acre-feet of submerged sediment will be ported at the 200-acre-foot capacity, including borrow volume, except floodwater retarding structure No. 15, which will be ported at a lower capacity to reduce the area of valuable streamside hardwoods, wildlife habitat, and other land that will be inundated. The principal spillways of all structures will be the drop inlet type with cantilever outlets. The inlets will be ungated to operate automatically, and will have features to release impounded water in order to perform maintenance and, if it becomes necessary, to avoid encroachment upon prior downstream water rights. The total floodwater retarding capacity of the structures is 35,807 acre-feet, provided for in the space between the sediment pools or conservation pool and the emergency spillway crests.

Preliminary investigations indicate the required volumes of suitable embankment fill materials are available from borrow areas below the elevations of the lowest ungated outlets. Lithologically, embankment foundations range from massive claystone with thin lenses of sandstone to chalky marl. Overburden on these strata are gravelly, sandy, and silty clay soils. Foundations for the steel-reinforced concrete principal spillways will be on compressible soil and rock. The emergency spillways are expected to be in erosion resistant soils. The following tabulation indicates geologic strata cropping out at the planned floodwater retarding structure and multiple-purpose structure sites:

Geologic Data at the Proposed Site Locations
Big Creek (Tri-County) Watershed, Texas

Site No.	Geologic Data										
	Wolf City Formation	Pecan Gap Chalk	Neylandville Formation and Marlbrook Marl	Nacotoch Sand	Kemp Clay	Pisgah and Littig members Kincaid Formation	Tehuacana Member Kincaid Formation	Wills Point Formation	Hooper Formation	Pleistocene Alluvial Terrace	Recent Alluvium
1	X	-	-	-	-	-	-	-	-	-	-
2	-	-	X	X	-	-	-	-	-	-	-
3	-	X	-	-	-	-	-	-	-	-	-
4	-	X	-	-	-	-	-	-	-	-	-
5	-	X	X	-	-	-	-	-	-	-	-
6	-	-	X	-	-	-	-	-	-	-	-
7	-	-	X	-	-	-	-	-	-	-	-
8	-	-	X	-	-	-	-	-	-	-	-
9	-	-	-	-	X	-	-	-	-	-	X
10	-	-	-	-	X	-	-	-	-	-	X
11	-	-	-	-	X	-	-	-	-	-	-
12	-	-	-	-	X	-	-	-	-	-	X
13	-	-	-	-	X	X	-	-	-	-	-
14	-	-	-	-	-	X	-	-	-	-	-
15	-	-	-	-	X	X	-	-	-	-	-
16	-	X	-	-	-	-	-	-	-	-	-
17	-	X	-	-	-	-	-	-	-	-	-
18	-	-	X	-	-	-	-	-	-	-	-
19	-	-	-	-	X	-	-	-	-	-	-
20	-	-	-	X	-	-	-	-	X	-	X
21	-	-	-	-	X	-	-	-	X	-	-
22	-	-	-	-	X	X	-	-	-	-	X

X indicates strata crops out on the site

Preliminary investigations indicate there are no unusual geologic conditions relating to structural design that will adversely affect construction. However, routine design considerations will be the presence of high shrink-swell embankment fill materials on all sites and the need for embankment foundation drainage for structures Nos. 20, 11, and 22.

Embankment fill material will be excavated from as small an area as practical to minimize impacts to the area. Restricting the area of the borrow pits will effect smaller and deeper sediment pools. This will also minimize shallow water areas with exposed shorelines. Should additional embankment fill materials be needed, supplementary borrow area selections will be made based on interdisciplinary assessments of impacts.

Clearing and vegetation of the affected areas are described under mitigation features on pages 40 and 41.

The structural measures are classified according to the SCS hazard classification system. The basic concept of the classification system is the potential hazard to life and property in the event of sudden structural failure. The following classes of dams are used: Class (a) where failure may damage farm buildings, agricultural land, or township and country roads; class (b) where failure may damage isolated homes, main highways, or minor railroads, or cause interruption of use or service of relatively important utilities; and class (c) where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads. All of the floodwater retarding structures and the multiple-purpose structure are class (a).

The following classes of dikes are used: Class I where failure may cause loss of life or loss of high value land and improvements; class III are dikes less than 6 feet high; and all other dikes are class II. Both of the planned dikes in this project are class II.

The potential hazard determination of all structural measures was based on present and projected uses of the area downstream. Breach hazard information is shown in Appendix B-5. Adequate precautions should be taken before any future development of the designated area.

Dike No. D-1, in combination with the floodwater retarding structures, will reduce floodwater damage in reaches 1A, 1B, and 1C (Appendix B-3). Dike D-2 will provide additional floodwater damage reduction in reach 1C. The dikes will consist of earthen embankments with an average height of 7 feet and side slopes of three to one.

The area needed for installation and operation of the multiple-purpose structure, including the recreation development, will require 1,402 acres, which consist of 73 acres needed for the dam and spillway; 695 acres for the conservation pool; 445 acres for floodwater detention; 56 acres for the recreation facilities; 95 acres for the buffer zone; and a 38-acre flood zone below the dam. The areas needed for installation and operation

of the dikes and floodwater retarding structures, excluding the multiple-purpose structure, will require 6,070 acres, which consist of 130 acres needed for the dikes, 338 acres for the dams and spillways, 2,162 acres for the conservation pools, and 3,438 acres for the floodwater detention pools.

The sponsors will acquire land rights by easement or purchase as necessary to install the planned measures and for subsequent operation and management of the measures. The sponsors will also provide for the change in locations or modifications of utility lines, road, structures, etc., and all permits necessary for the installation of the measures. (See page 41 for a list of applicable permits and page 46 for a list of modifications required.)

Facilities for recreation use will be installed adjacent to multiple-purpose structure No. 19. They will consist of access roads, parking areas, boat launching facilities, beach developments, sanitary facilities, water and electric utilities, picnic grounds, and game areas. The recreation facilities will be designed and constructed to ensure accessibility and usability by physically handicapped people in accordance with Public Law 90-480. The sanitary facilities will include a restroom with a septic tank and filter field. All sewage disposal will adhere to the standards of the Texas Department of Health. It is estimated that 1,246 acres of the total area affected by the multiple-purpose structure will be purchased. An additional 156 acres will require flood easements.

See Table 3 for structural data and storage capacity of each structure.

The sediment pools of the 21 floodwater retarding structures are expected to hold water and have potential for water-based recreation. The problems, expenses, and liability associated with the landowners' opening their property to public use limit the acceptance of this activity. The cost of additional land rights acquisition for recreation use exceeds the financial ability of the sponsors. Therefore, the sponsors do not plan to assure public access to any of the structures except multiple-purpose site No. 19 (Appendix C). Public recreation use will be prohibited at all other sites. If public access is ever provided at any of the other sites, the sponsors will assure that adequate sanitary facilities in compliance with public health laws are installed prior to making the areas available for public use.

Under present conditions, there will be no apparent displacements or relocations of persons, businesses, or farm operations as a result of installation of the project. If relocations or displacements become necessary, they will be carried out under the provisions of Public Law 91-646, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and will be cost-shared as follows: SCS, 72.28 percent; sponsors, 27.72 percent.

The environment will be protected from soil erosion and water and air pollution during construction by requiring contractors to adhere to strict guidelines set forth in each construction contract. Excavation and construction operations will be scheduled and controlled to prevent exposure of extraneous amounts of unprotected soil to erosion and the

resulting translocation of sediment. Measures to control erosion will be uniquely specified at each work site and will include, as applicable, use of temporary vegetation or mulches, diversions, mechanical retardation of runoff, and traps. Harmful dust and other pollutants inherent to the construction process will be held to minimum practical limits. Haul roads and excavation areas and other work sites will be sprinkled with water as needed to keep dust within tolerable limits. Contract specifications will require that fuel, lubricants, and chemicals be adequately labeled and stored safely in protected areas, and disposal at work sites will be by approved methods and procedures. All equipment used in construction will conform to SCS Construction Safety Standards and Interpretations. Clearing and disposal of brush and vegetation will be carried out in accordance with applicable laws, ordinances, and regulations. Disposal of brush and vegetation will be by burying, hauling to approved off-site locations, adequately anchoring in sediment pools, or controlled burning, as applicable. Each contract will set forth specific stipulations to prevent uncontrolled grass or brush fires.

Necessary sanitary facilities, including garbage disposal facilities, will be located to prohibit such facilities being injuriously adjacent to live streams, wells, or springs in conformance with the federal, state, and local water pollution control regulations. Conformance to all environmental control requirements will be monitored by a construction inspector who will be on-site during all periods of construction operation. During construction periods, the structure sites will be open and available for monitoring by federal, state, and local regulatory agencies to allow adequate monitoring of water and air pollution.

Efforts will be made to avoid creating conditions which will increase populations of vectors which affect public health conditions. Prevention and control measures will be implemented, if needed, in cooperation with appropriate federal, state, and local health agencies to suppress proliferation of vectors such as aquatic insects, terrestrial arthropods, rodents, etc., that could occur during installation of the structures.

Mitigation Features

The following measures are included in the recommended plan in order to mitigate the loss of terrestrial habitat:

1. The easement area for construction of the dam and spillway of each floodwater retarding structure and the multiple-purpose structure (411 acres) will be fenced and managed for the benefit of wildlife. The dams and spillways (223 acres) will be vegetated with multi-use plants for erosion control and wildlife use. The remaining area within the easement lines (188 acres) will be vegetated with forbs and grasses that have a recognized value for wildlife use.
2. The purchase area of the multiple-purpose structure above the permanent water elevation is 422 acres, excluding the dam and

spillway and the recreation area. Within this area are 173 acres of woody vegetation and 2 acres of farm ponds which will not be disturbed during project action. The remaining 247 acres will be vegetated, where practical, with forbs and grasses beneficial to wildlife. The entire purchase area will be fenced and managed for wildlife use.

3. Vegetation will be cleared for a distance of 400 feet upstream from the principal spillways. Other woody vegetation which has value for wildlife habitat will be left undisturbed at all construction sites unless it will create a hazard to proper functioning of the floodwater retarding structures or unless it must be removed for construction purposes. Specifically, woody vegetation will be left undisturbed in the upper reaches of the resulting water areas of selected floodwater retarding structures.
4. The dikes will be vegetated with multipurpose plants for erosion control and wildlife use. In addition, an area that averages 50 feet in width adjacent to Dike D-2 will be included within the fenced dike. The 50-foot strip will comprise 16 acres and will be vegetated with plants having a recognized value for wildlife.
5. SCS technical specifications will be followed in the selection, planting, and management of these mitigation areas.

Landscape plantings will be made where the visual resource is adversely affected and the adverse impact is apparent to the public.

The SCS will follow all applicable rules and regulations relative to archeological resources (7CFR 656). If previously unidentified evidence of significant cultural values is discovered prior to or during construction, the procedures in Public Law 93-291 will be followed. There will be no change in the existing responsibilities of the SCS under Executive Order 11593. Mitigation will be accomplished as set forth in Title 7, Code of Federal Regulations, Part 656, "Procedures for the Protection of Archeological and Historical Properties Encountered in SCS-assisted Programs."

Permits and Compliance

Information supplied by the Corps of Engineers indicates that installation of the planned structures is covered by a nationwide permit and a special permit issued under the authority of Section 404 of the Federal Water Pollution Control Act Amendment of 1972 will not be required. No other federal permits are required. State permits will be required for the installation and operation of the multiple-purpose structure. Compliance with the Water Resources Council's designated environmental statutes is shown in the following table:

Compliance of the Selected Plan with
WRC - Designated Environmental Statutes

Federal Policies

Compliance^{1/}

Archeological and Historic Preservation Act, 16 U.S.C. 469 et seq.	a
Clean Air Act, as amended, 42 U.S.C. 1857h-7 et seq.	d
Clean Water Act (Federal Water Pollution Control Act) 33 U.S.C. 1251 et seq.	a
Coastal Zone Management Act, 16 U.S.C. 1451, et seq.	d
Endangered Species Act, 16 U.S.C. 1531 et seq.	a
Estuary Protection Act, 16 U.S.C. 1221, et seq.	d
Federal Water Project Recreation Act, 16 U.S.C. 460-1(12), et seq.	d
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq.	a
Land and Water Conservation Fund Act, 16 U.S.C. 460/-460/-11, et seq.	a
Marine Protection, Research and Sanctuary Act, 33 U.S.C. 1401, et seq.	d
National Environmental Policy Act, 42 U.S.C. 4321, et. seq.	a
National Historic Preservation Act, 16 U.S.C. 470a, et seq.	a
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	d
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	a
Wild and Scenic Rivers Act, 16 U.S.C. 1271, et seq.	d
Executive Order 11988, Flood Plain Management	a

1/

- a. Full compliance - having met all requirements of the statute for the current stage of planning (either preauthorization or postauthorization).
- b. Partial compliance - not having met some of the requirements that normally are met in the current stage of planning.
- c. Noncompliance.
- d. Not applicable.

Costs

Project costs, which include all PL 566 and other costs that will be incurred for installing the works of improvement after the project is authorized for installation, are shown on Table 1.

The estimated cost distribution for the project is shown on Table 2. Each item's cost is distributed between PL 566 cost and other funds or local cost. Costs are further distributed into construction, engineering, land rights, and project administration.

Construction costs include the engineer's estimate and contingencies. The engineer's estimate is based on current unit cost of structural measures in similar areas modified by special conditions inherent to the site location. Ten percent of the engineer's estimate was added as a contingency to provide funds for unpredictable construction costs. Cost estimates and preliminary designs for the multiple-purpose structure were made jointly by the consulting engineering firm employed by the City of Marlin and the SCS. No unusual construction problems are anticipated.

Engineering services and project administration costs are based on an analysis of previous work in similar areas. Engineering services costs consist of, but are not limited to, detailed surveys, geologic investigations and laboratory analyses, reports, designs, cartographic services, and construction inspection. The City of Marlin and the SCS will enter into agreements for the negotiation of separate architectural and engineering contracts with private engineering firms to prepare construction plans and specifications for multiple-purpose structure No. 19 and the recreation facilities. The City of Marlin will be responsible for all construction and engineering costs of the municipal outlet structure.

Public Law 566 project administration costs consist of contract administration and maintenance of SCS records and accounts.

Local costs for project administration include the sponsors' costs related to contract administration, overhead and organization administrative costs, and whatever construction inspection they desire to make at their own expense.

Local costs for land rights include costs to obtain all necessary land rights or subordination agreements to make possible legal and orderly construction of the works of improvement as planned. The sponsoring local organizations will determine that all land rights are adequate from a legal standpoint. The adequacy of land rights is the responsibility of the local organization.

The cost of landscape planting, a mitigation for adverse impacts to the visual resource, is included in the construction costs. The total cost of wildlife habitat mitigation is also included in the construction costs.

All costs were allocated to flood prevention, recreation, and municipal and industrial water supply in accordance with current SCS policy (Table 2A).

Installation and Financing

The project installation period will be 9 years. The general sequence of installation is shown in the following "Schedule of Obligations":

Schedule of Obligations

Fiscal Year :	Construction Unit :	PL 566 Funds (dollars) :	Other Funds (dollars) :	Total (dollars) :
1st	FRS 1, 2, and 9			
	Engineering	76,910	-	76,910
	Land Rights	-	348,930	348,930
	Subtotal	76,910	348,930	425,840
2nd	FRS 1, 2, and 9			
	Construction	1,156,490	-	1,156,490
	Project Administration	85,910	1,500	87,410
	Engineering	59,300	-	59,300
	FRS 10, 11, 12, and 13			
	Engineering	75,240	-	75,240
	Land Rights	-	200,000	200,000
	Subtotal	1,376,940	201,500	1,578,440
3rd	FRS 10, 11, 12, and 13			
	Construction	954,040	-	954,040
	Project Administration	70,660	2,000	72,660
	Engineering	56,050	-	56,050
	FRS 16, 17, and 18			
	Engineering	72,120	-	72,120
	Land Rights	-	222,980	222,980
	Subtotal	1,152,870	224,980	1,377,850
4th	FRS 16, 17, and 18			
	Construction	1,056,360	-	1,056,360
	Project Administration	77,580	1,500	79,080
	Engineering	55,060	-	55,060
	MP 19 and Recreation Facilities			
	Engineering	78,650	61,350	140,000
	Land Rights and Water Rights	87,330	1,004,770	1,092,100
	Subtotal	1,354,980	1,067,620	2,422,600
5th	MP 19, Recreation Facilities, and Municipal Outlet Structure			
	Construction	1,191,600	869,700	2,061,300
	Project Administration	131,000	4,500	135,500
	Engineering	54,670	27,730	82,400
	FRS 3, 4, 5, 6, 7, and 8			
	Engineering	87,300	-	87,300
	Land Rights	-	163,400	163,400
	Subtotal	1,464,570	1,065,330	2,529,900
6th	FRS 3, 4, 5, 6, 7, and 8			
	Construction	873,200	-	873,200
	Project Administration	65,820	3,000	68,820
	Engineering	63,570	-	63,570
	FRS 14 and 15			
	Engineering	42,610	-	42,610
	Land Rights	-	122,200	122,200
	Subtotal	1,045,200	125,200	1,170,400
7th	FRS 14 and 15			
	Construction	551,790	-	551,790
	Project Administration	42,160	1,000	43,160
	Engineering	32,410	-	32,410
	FRS 20, 21, and 22			
	Engineering	66,250	-	66,250
	Land Rights	-	187,560	187,560
	Subtotal	692,610	188,560	881,170
8th	FRS 20, 21, and 22			
	Construction	905,210	-	905,210
	Project Administration	69,120	1,500	70,620
	Engineering	48,540	-	48,540
	Oikes D-1 and D-2			
	Engineering	33,240	-	33,240
	Land Rights	-	81,100	81,100
	Subtotal	1,056,110	82,600	1,138,710
9th	Dikee D-1 and D-2			
	Construction	349,900	-	349,900
	Project Administration	26,830	1,000	27,830
	Engineering	24,500	-	24,500
	Subtotal	401,230	1,000	402,230
GRAND TOTAL		8,621,420	3,305,720	11,927,140

This schedule may be changed from year to year to conform with appropriations, accomplishments, and any mutually agreed-to changes.

Construction will not be started in any construction unit, as identified in the "Schedule of Obligations," until the sponsors have obtained all necessary land rights for that unit. The multiple-purpose structure will not be built until floodwater retarding structures Nos. 16, 17, and 18 have been built. The dikes will not be built until all floodwater retarding structures and the multiple-purpose structure have been built.

The sponsors will have the following responsibilities pertaining to the project:

1. The soil and water conservation districts will, within their respective districts, obtain agreements from land users of not less than 50 percent of the land above each structure that they will carry out conservation farm or ranch plans on their land. A minimum of 50 percent of the land upstream from each structure will be adequately protected from erosion prior to construction of the dam.
2. The Falls County WCID will acquire necessary land rights for all floodwater retarding structures and the dikes consistent with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and USDA Rules and Regulations (Title 7, Part 21).
3. The Falls County WCID will acquire or provide assurance that land users or water users have acquired water rights pursuant to state law as may be needed in the installation and operation of the structural measures.
4. The Falls County WCID will provide for the change in location or modification of utility lines, roads, structures, etc., and all permits necessary for the installation of the structural measures. These modification include, but are not limited to, the following:

Structure No.	Improvement	Estimated Modification Cost (dollars)
2	Modify powerline	1,500
9	Modify powerline	900
13	Modify powerline	30,000
15	Modify powerline	20,000
16	Modify powerline	15,000
17	Modify powerline	30,000
Total		97,400

All costs for modifications as listed are land rights costs and will be borne by the sponsors.

5. Falls County WCID will execute an operation and maintenance agreement with SCS for each measure within McLennan and Limestone Counties.
6. Falls County Commissioners Court will execute an operation and maintenance agreement with the SCS for each measure within Falls County.
7. The City of Marlin will acquire necessary land rights for multiple-purpose structure No. 19 and the adjoining recreation area consistent with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and USDA Rules and Regulations (Title 7, Part 21).
8. The City of Marlin will acquire water rights pursuant to state law as may be needed in the installation and operation of the multiple-purpose structure.
9. The City of Marlin will provide for the change in location of utility lines, roads, structures, etc., and all permits necessary for the installation of the multiple-purpose structure and the adjoining recreation area. Modifications will consist of elevating Texas Highway 147 and relocating 10,560 feet of powerline at an estimated cost of \$81,000.
10. The City of Marlin will execute an operation and maintenance agreement with the SCS for the multiple-purpose structure and the recreation facilities.

The sponsors have the right of eminent domain under applicable state law and have the financial resources to fulfill their responsibilities. Participation of the City of Marlin is contingent on passage of a special bond election which will be held by the city prior to any financial commitment of the city.

Technical assistance will be provided by the SCS in preparation of plans and specifications, construction inspection, preparation of contract payments, estimates, final inspection, execution of certificate of completion, and related tasks necessary to install the planned structural measures.

The sponsors have requested the SCS to issue invitations for bids and to award and administer the contracts for installation of the works of improvement.

If significant affected archeological sites are identified prior to or during construction of the structural measures, the State Historical Preservation Officer and the Interagency Archeological Service will be requested to concur in a mitigation plan. The National Park Service will be responsible for funding the cost of mitigation which exceeds one percent of Public Law 566 construction cost of each measure that affects archeological resources.

Operation and Maintenance

The 21 proposed floodwater retarding structures and the 2 dikes will be operated and maintained by the Falls County Commissioners Court, the soil and water conservation districts, and the Falls County Water Control and Improvement District. The Falls County Commissioners Court and the Falls County Water Control and Improvement District will provide the personnel, facilities, equipment, and supplies needed for operation and maintenance. The soil and water conservation districts will perform the required inspections. The Falls County Water Control and Improvement District will cooperate with the other entities.

Operation and Maintenance Responsibilities

Structure Numbers	Responsible Local Sponsor	Soil and Water Conservation Districts
1	Falls County WCID	McLennan County
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13	Falls County WCID	Limestone-Falls
14, 15, 16, 17, 18, 20, 21, 22, D-1, and D-2	Falls County Commissioners Court	Limestone-Falls

The estimated average annual operation and maintenance cost for the floodwater retarding structures and the dikes is \$7,560. Funds for this purpose will be provided by the Falls County WCID and the Falls County Commissioners Court for the structures for which each is responsible.

The City of Marlin will be responsible for the operation and maintenance of multiple-purpose structure No. 19 and the adjoining recreation facilities. Funds for this purpose will be available from the general operating funds of the city. Additional funds may include income from the recreation development.

With consideration of allocation by purpose, the lower operating unit of the municipal water supply is elevation 372.3 feet mean sea level. The city will notify the SCS, through the state conservationist, whenever the reservoir is operated below this elevation. The city will participate with the state conservationist in determining whether there is a continuing need to so operate the reservoir. If it is found that there is a continuing need for the use of recreation storage for municipal or industrial purposes, the city agrees to reimburse the federal government for all federal funds used for public recreation associated with the reservoir (construction, engineering services, land, and basic facilities).

The estimated average annual cost of operation and maintenance for the multiple-purpose structure and the recreation facilities is \$14,920. This consists of \$1,390 for the structure and \$13,530 for recreation facilities. Admission may be charged at the option of the City of Marlin and will be limited to that necessary to repay the initial investment and provide funds for adequate operation and maintenance.

As the floodwater retarding structures, the multiple-purpose structure, the recreation facilities, and the dikes are completed, the sponsors will assume responsibility for maintenance of the structures and areas fenced for mitigation of wildlife habitat. They will perform promptly, or have performed promptly, all maintenance as determined to be needed by either the sponsors or the SCS, including that required to prevent soil erosion and water pollution. Weed control will be carried out to maintain a good vegetative cover. Fences around the dams, emergency spillways, and selected areas adjacent to the sediment pools will be maintained.

A specific operation and maintenance agreement will be prepared for each measure and will be executed prior to SCS furnishing financial assistance for real property acquisition, relocation assistance, or installation of the measure. The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance. The agreement will set forth specific details on procedure in line with recognized assignments of responsibility and will be in accordance with the SCS National Operation and Maintenance Manual.

The sponsors will inspect the structures as specified in the O&M plans. The SCS may inspect the measures at any reasonable time during the period covered by the agreements. At the discretion of the state conservationist, SCS personnel may assist the sponsors in inspections. A written report will be made of each inspection and provided to others as outlined in the O&M plan.

Provisions will be made for unrestricted access by representatives of the sponsors and the SCS to inspect the structural measures and their appurtenances and areas fenced and designated as wildlife mitigation areas at any time and for the sponsors to perform operation and maintenance. Easements ensuring this unrestricted ingress and egress will be furnished by the sponsors.

The sponsors should discourage development in the potential impact area, Appendix B-5. Development in this area could change the hazard classification of the structure or structures and require modifications. The hazard classification of all class (a) structures will be reviewed annually as a part of the annual inspection.

The sponsors will also control the handling, use, and application of any pesticides that may be needed for operation and maintenance of the structural measures. If the use of chemicals should be required, only approved and authorized reagents and compounds will be used. Their applications will be compatible with current laws regulating their use. In addition to prudent judgment, ordinances and standards concerned with the disposal or storage of unused chemicals, empty containers, contaminated equipment, etc., will be observed and applied.

The SCS will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspections and technical guidance and information necessary for the operation and maintenance program.



TABLE 1 - ESTIMATED INSTALLATION COST
Big Creek (Fris-Country) Watershed, Texas

Installing Unit Item	Unit	Number	Estimated Cost (Dollars)			Total
			Federal Funds	Other Funds	Local	
Floodwater Retarding Structures	No.	21	6,643,700	1,255,570	7,899,270	
Multiple-Purpose Structure	No.	1	1,466,050	1,819,050	3,285,100	
Recreation Facilities			77,200	69,000	146,200	
Municipal Outlet Structure	No.	1	-	80,000	80,000	
Dikes	No.	2	434,470	82,100	516,570	
TOTAL PROJECT			9,623,420	3,305,720	12,927,140	

1/ Frisch base: 1963
2/ Federal Agency responsible for assisting in installation of works of improvement.

Table 1 - Estimated 2007 Budgetary Requirements
 Big Cable (Cablevision) - Connecticut
 (Dollars)

Item	Capital Expenditures			Operating Expenses			Intelligence Cost - Other Funds			Total	Funding Source
	Construction	Equipment	Other	Personnel	Materials	Other	Personnel	Materials	Other		
1	310,000	29,000	-	173,150	21,900	-	21,900	21,900	-	255,050	255,050
2	331,000	48,400	-	196,150	23,700	-	23,700	23,700	-	271,550	271,550
3	170,000	22,000	-	231,400	27,400	-	27,400	27,400	-	285,800	285,800
4	99,000	13,500	-	138,400	16,400	-	16,400	16,400	-	170,800	170,800
5	152,000	24,000	-	235,200	28,200	-	28,200	28,200	-	291,400	291,400
6	167,000	22,500	-	259,150	34,000	-	34,000	34,000	-	327,150	327,150
7	173,000	23,000	-	256,200	33,200	-	33,200	33,200	-	322,400	322,400
8	119,700	22,150	-	151,650	17,650	-	17,650	17,650	-	186,950	186,950
9	264,200	36,000	-	609,200	73,200	-	73,200	73,200	-	762,600	762,600
10	309,150	49,110	-	671,700	81,000	-	81,000	81,000	-	831,810	831,810
11	137,000	13,000	-	171,200	21,400	-	21,400	21,400	-	195,600	195,600
12	130,000	22,500	-	169,700	21,500	-	21,500	21,500	-	193,200	193,200
13	302,000	39,000	-	732,200	88,000	-	88,000	88,000	-	859,200	859,200
14	138,750	25,000	-	179,200	21,800	-	21,800	21,800	-	226,000	226,000
15	112,000	19,000	-	493,100	59,000	-	59,000	59,000	-	661,100	661,100
16	375,300	53,110	-	1,509,950	183,900	-	183,900	183,900	-	1,847,260	1,847,260
17	207,000	31,000	-	339,300	40,800	-	40,800	40,800	-	420,900	420,900
18	302,000	43,000	-	426,310	51,310	-	51,310	51,310	-	528,620	528,620
19	134,000	22,000	-	187,000	22,800	-	22,800	22,800	-	232,600	232,600
20	179,750	29,000	-	243,810	29,500	-	29,500	29,500	-	292,810	292,810
21	373,000	51,500	-	609,210	73,200	-	73,200	73,200	-	755,910	755,910
22	3,000,000	370,000	-	6,643,700	803,000	-	803,000	803,000	-	7,619,700	7,619,700
Subtotal - Cablevision	1,131,000	156,000	27,350	1,666,350	193,100	79,500	193,100	193,100	6,000	2,185,050	2,185,050
Intelligence Cost - Other Funds	60,000	3,500	-	77,500	60,000	6,500	-	-	-	147,000	147,000
Subtotal - Other Funds	60,000	3,500	-	77,500	60,000	6,500	-	-	-	147,000	147,000
Subtotal - Cablevision	1,191,000	159,500	27,350	1,743,850	253,100	86,000	193,100	193,100	6,000	2,332,050	2,332,050
Subtotal - Other Funds	60,000	3,500	-	77,500	60,000	6,500	-	-	-	147,000	147,000
Total	1,251,000	163,000	27,350	1,821,350	313,100	92,500	193,100	193,100	6,000	2,479,050	2,479,050

Estimated 2007 Budgetary Requirements
 Big Cable (Cablevision) - Connecticut
 (Dollars)

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY - STRUCTURAL MEASURES
 Big Creek (Tri-County) Watershed, Texas
 (Dollars)

Item	COST ALLOCATION				COST SHARING				Total		
	Flood	Prevention	Recreation	Supply	Flood	Prevention	Recreation	Supply			
MULTIPLE-PURPOSE STRUCTURE NO. 19											
Construction	980,940	301,320	587,040	1,869,300	980,940	150,660	-	1,131,600	150,660	587,040	737,700
Engineering	100,740	32,120	56,510	187,400	100,740	16,000	-	128,820	16,000	56,510	72,500
Project Administration	69,300	20,660	36,140	126,300	67,300	20,000	35,000	122,300	2,200	660	4,000
Land Rights	552,850	170,130	257,120	975,100	-	85,060	-	85,060	552,850	252,120	899,040
Appraisal Fees	11,320	3,480	5,200	20,000	-	1,740	-	1,740	11,320	5,200	18,260
Legal Fees	5,660	1,740	2,000	10,000	-	-	-	-	5,660	2,600	10,000
Road and Utility Modifications	4,450	1,060	75,690	81,000	-	530	-	530	4,450	75,490	80,470
Water Rights	-	2,200	3,700	6,000	-	-	-	-	-	2,200	6,000
Subtotal	1,753,460	532,740	1,038,800	3,285,100	1,156,980	274,070	35,000	1,466,050	576,480	933,900	1,819,050
MUNICIPAL OUTLET STRUCTURE											
Construction	-	-	72,000	72,000	-	-	-	-	-	-	72,000
Engineering	-	-	8,000	8,000	-	-	-	-	-	-	8,000
Subtotal	-	-	80,000	80,000	-	-	-	-	-	-	80,000
RECREATION FACILITIES											
Construction	-	120,000	-	120,000	-	60,000	-	60,000	-	-	60,000
Engineering	-	17,000	-	17,000	-	8,500	-	8,500	-	-	8,500
Project Administration	-	9,200	-	9,200	-	8,700	-	8,700	-	500	500
Subtotal	-	146,200	-	146,200	-	77,200	-	77,200	-	-	69,000

(See footnotes at end of table.)

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY - STRUCTURAL MEASURES (cont'd)
 Big Creek (Till-County) Watershed, Texas
 (Dollars) ^{1/}

Item	COST ALLOCATION				COST SHARING			
	Flood Prevention	Recreation	Water Supply	Total	Flood Prevention	Recreation	Water Supply	Total
FLOOD/WATER RETARDING STRUCTURES								
Construction	5,497,090	-	-	5,497,090	5,497,090	-	-	5,497,090
Engineering	735,360	-	-	735,360	735,360	-	-	735,360
Project Administration	621,750	-	-	621,750	621,750	-	-	621,750
Land Rights	1,245,070	-	-	1,245,070	-	-	-	1,245,070
Subtotal	7,099,270	-	-	7,099,270	6,843,700	-	-	6,843,700
DIKES								
Construction	349,900	-	-	349,900	349,900	-	-	349,900
Engineering	57,740	-	-	57,740	57,740	-	-	57,740
Project Administration	27,830	-	-	27,830	26,830	-	-	26,830
Land Rights	81,100	-	-	81,100	-	-	-	81,100
Subtotal	516,570	-	-	516,570	434,470	-	-	434,470
TOTAL	10,149,300	678,940	1,078,900	11,927,140	8,235,150	35,900	331,270	8,621,420
								1,914,150
								3,305,720

^{1/} Price base: 1983

July 1984

TABLE 3 - STRUCTURAL DATA - DAMS WITH PLANNED STORAGE CAPACITY
Big Creek (Tri-County) Watershed, Texas

Item	Unit	STATION NUMBER								
		1	2	3	4	5	6	7	8	9
Class of Structure		a	a	a	a	a	a	a	a	a
Uncontrolled Drainage Area	Sq. Mi.	6.40	6.49	2.83	0.86	2.84	2.19	1.88	1.3	1.3
Controlled Drainage Area	Sq. Mi.	0	0	0	0	0	0	0	0	0
Total Drainage Area	Sq. Mi.	6.40	6.49	2.83	0.86	2.84	2.19	1.88	1.3	1.3
Runoff Curve No. (1-Day)		77	77	78	77	78	78	78	78	78
Time of Concentration (To)	Hr.	2.3	2.7	2.1	0.8	1.3	1.0	0.8	0.8	0.8
Elevation Top of Dam	Ft.	539.7	483.0	561.8	572.9	531.8	519.9	505.1	499.1	499.1
Elevation Crest Emergency Spillway	Ft.	532.7	480.0	556.8	549.9	528.8	507.9	502.1	496.1	496.1
Elevation Crest High Stage Inlet	Ft.	526.5	473.2	553.1	545.4	523.8	503.2	487.5	492.0	492.0
Elevation Crest Low Stage Inlet	Ft.	-	-	581.5	563.9	522.5	501.5	485.8	490.1	490.1
Elevation Lowest Degated Outlet	Ft.	521.0	466.5	548.0	542.0	500.0	500.2	485.0	490.1	490.1
Emergency Spillway Type	Vec.	200	200	100	30	100	80	80	60	60
Emergency Spillway Section Width	Ft.	200	200	100	30	100	80	80	60	60
Emergency Spillway Exit Channel										
Slope	1	3.5	3.0	6.2	1.2	2.0	2.8	3.4	4.0	4.0
Maximum Width of Dam	Ft.	28	28	28	23	27	20	20	15	15
Volume of Fill	Cu. Yd.	132,800	146,100	78,800	45,700	93,600	76,900	54,800	54,700	54,700
Total Capacity	Ac. Ft.	2,992	2,992	2,992	892	1,284	847	768	551	551
Sediment Submerged (Lowest Degated Outlet)	Ac. Ft.	112	128	143	63	148	131	128	121	121
Sediment Submerged	Ac. Ft.	714	748	318	188	331	186	172	121	121
Sediment Acreage	Ac. Ft.	45	78	33	13	57	23	20	12	12
Reservoir Use	Ac. Ft.	-	-	-	-	-	-	-	-	-
Water Supply Use	Ac. Ft.	-	-	-	-	-	-	-	-	-
Flashboard Seeding	Ac. Ft.	1,733	1,728	797	208	796	629	548	411	411
Between High and Low Stage	Ac. Ft.	-	-	121	66	181	117	100	67	67
Surfaced Area										
Lowest Degated Outlet	Ac.	50	40	38	18	31	44	46	43	43
Sediment Pool	Ac.	182	155	67	28	88	58	33	43	43
Recognition Pool	Ac.	-	-	-	-	-	-	-	-	-
Water Supply Pool	Ac.	-	-	-	-	-	-	-	-	-
Floodwater Retarding Pool	Ac.	390	384	160	61	188	160	160	102	102
Principal Spillway Design										
Rainfall Volume (1-Day)	In.	8.30	8.30	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Rainfall Volume (10-Day)	In.	14.25	14.25	13.50	13.30	13.30	13.30	13.30	13.30	13.30
Runoff Volume (10-Day)	In.	7.97	7.94	7.78	8.02	7.78	7.88	7.94	8.06	8.06
Capacity of Low Stage (Maximum)	CFS	-	-	10.1	4.0	15.3	12.1	9.5	6.8	6.8
Capacity of High Stage (Maximum)	CFS	149	144	61	38	61	53	51	26	26
Minimums of Leadoff	Ft.	3.0	3.0	2.0	1.5	2.0	2.0	2.0	1.5	1.5
Type of Conduit	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe
Emergency Operation - Emergency Spillway	1 Chance	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Emergency Spillway Hydrograph										
Rainfall Volume	In.	6.60	6.60	7.40	7.40	7.40	7.40	7.40	7.40	7.40
Runoff Volume	In.	6.01	6.01	4.84	4.73	4.84	4.84	4.84	4.84	4.84
Storm Duration	Hr.	6	6	6	6	6	6	6	6	6
Velocity of Flow (V ₀)	Ft./Sec.	1.0	3.0	0	0	0	0	0	0	0
Maximum Reservoir Water Surface Elevation	Ft.	533.2	466.5	558.5	568.5	538.3	507.7	501.8	496.4	496.4
Freeboard Hydrograph										
Rainfall Volume	In.	15.48	15.48	10.30	10.20	10.20	10.30	10.30	10.20	10.20
Runoff Volume	In.	10.48	10.48	7.43	7.32	7.43	7.43	7.43	7.43	7.43
Storm Duration	Hr.	6	6	6	6	6	6	6	6	6
Maximum Reservoir Water Surface Elevation	Ft.	535.7	481.0	566.5	571.1	530.3	508.2	503.1	496.9	496.9
Discharge per Foot of Width (C ₀ /S)	Ac. Ft.	7.0	7.3	2.6	3.2	2.4	2.0	2.1	2.0	2.0
Walk Length	Ft.	460	330	170	130	330	440	430	270	270
Capacity Equivalents										
Sediment Volume	In.	2.21	2.38	2.31	2.30	2.36	1.87	1.89	1.91	1.91
Floodwater Retarding Volume	In.	5.08	4.98	2.28	4.20	5.23	5.38	3.43	3.63	3.63
Reservoir Volume	In.	-	-	-	-	-	-	-	-	-
Water Supply Volume	In.	-	-	-	-	-	-	-	-	-

(See footnotes at end of table.)

TABLE 3 - STRUCTURAL DATA - DAMS WITH PLANNED STORAGE CAPACITY (Cont'd)
Big Creek (Tri-County) Watershed, Texas

Item	Unit	Storage Volume								
		1	2	3	4	5	6	7	8	9
Class of Structure		A	B	A	B	A	B	A	B	A
Seismic Zone		0	0	0	0	0	0	0	0	0
Uncontrolled Drainage Area	Sq. Mi.	15.38	7.40	1.37	1.18	6.58	2.10	10.15	7.38	
Controlled Drainage Area	Sq. Mi.	0	0	0	0	0	0	0	0	
Total Drainage Area	Sq. Mi.	15.38	7.40	1.37	1.18	6.58	2.10	10.15	7.38	
Runoff Curve No. (1-Day)		78	70	70	77	77	74	78	76	
Time of Concentration (To)	Mr.	3.0	2.0	5.7	6.8	1.8	1.2	3.8	2.5	
Elevation Top of Dam	Ft.	480.5	477.4	448.8	444.3	431.1	408.4	420.7	402.8	
Elevation Crest Emergency Spillway	Ft.	477.0	473.2	465.6	463.3	438.7	403.4	403.4	408.1	
Elevation Crest High Stage Inlet	Ft.	469.8	467.4	441.2	446.5	424.8	397.7	394.7	409.2	
Elevation Crest Low Stage Inlet	Ft.	-	468.4	439.8	438.7	423.3	-	-	-	
Elevation Lowest Ungated Outlet	Ft.	462.0	459.8	438.9	438.7	420.5	395.5	398.5	481.5	
Emergency Spillway Type	Var.	Var.	Var.	Var.	Var.	Var.	Var.	Var.	Var.	
Emergency Spillway Bottom Width	Ft.	200	200	50	60	200	60	200	200	
Emergency Spillway Exit Channel										
Slope	%	3.5	3.8	4.5	3.7	3.8	6.6	3.3	3.0	
Maximum Height of Dam	Ft.	31	28	21	21	29	31	28	35	
Volume of Fill	Cu. Yd.	208,800	200,400	48,400	31,800	140,800	70,000	203,800	144,400	
Total Capacity	Sq. Ft.	5,508	4,832	368	231	3,378	779	5,587	8,005	
Sediment Submerged (Lowest Ungated Outlet)	Ac. Ft.	78	118	130	95	108	262	115	133	
Sediment Submerged	Ac. Ft.	1,398	802	158	93	382	253	798	776	
Sediment Accreted	Ac. Ft.	140	92	18	15	26	28	77	85	
Recreation Use	Ac. Ft.	-	-	-	-	-	-	-	-	
Water Supply Use	Ac. Ft.	-	-	-	-	-	-	-	-	
Floodwater Retarding	Ac. Ft.	3,978	2,168	412	348	1,898	498	2,888	2,144	
Between High and Low Stages	Ac. Ft.	-	197	79	84	173	-	-	-	
Surface Area										
Lowest Ungated Outlet	Ac.	53	50	34	28	36	38	58	39	
Sediment Pool	Ac.	110	187	44	28	123	44	184	148	
Recreation Pool	Ac.	-	-	-	-	-	-	-	-	
Water Supply Pool	Ac.	-	-	-	-	-	-	-	-	
Floodwater Retarding Pool	Ac.	698	394	104	83	344	91	314	368	
Principal Spillway Design										
Rainfall Volume (1-Day)	In.	8.31	8.50	8.00	8.00	8.50	8.00	8.50	8.50	
Rainfall Volume (10-Day)	In.	14.11	14.25	12.90	13.80	14.28	13.90	14.28	14.25	
Runoff Volume (10-Day)	In.	7.35	7.68	8.06	7.96	7.34	7.10	7.63	8.52	
Capacity of Low Stage (Max.)	CFS	-	9.8	7.8	5.8	26.2	-	-	-	
Capacity of High Stage (Max.)	CFS	190	148	28	26	344	31	189	165	
Dimensions of Conduit	Ft.	4.0	3.0	1.5	1.5	3.8	1.5	3.0	3.0	
Type of Conduit		Box	Box	Box	Box	Box	Box	Pipe	Pipe	
Frequency Operation - Emergency Spillway	# Channel	3.8	3.0	4.0	4.0	3.0	4.0	3.0	3.0	
Emergency Spillway Hydrograph										
Rainfall Volume	In.	8.54	8.80	7.40	7.40	8.80	7.10	8.80	9.31	
Runoff Volume	In.	5.65	5.89	4.84	4.73	6.01	4.99	5.89	6.36	
Storm Duration	Mr.	6	6	6	6	6	6	6	6	
Velocity of Flow (V ₀)	Ft./Sec.	3.3	3.3	0	0	3.2	0.8	4.3	3.1	
Maximum Reservoir Water Surface Elevation	Ft.	477.7	474.5	448.7	445.0	436.4	403.4	404.8	408.8	
Freshwater Hydrograph										
Rainfall Volume	In.	13.03	13.48	10.20	10.80	13.98	10.20	13.48	13.53	
Runoff Volume	In.	9.94	10.31	7.28	7.32	10.46	6.93	10.31	12.29	
Storm Duration	Mr.	6	6	6	6	6	6	6	6	
Maximum Reservoir Water Surface Elevation	Ft.	480.3	477.4	448.8	444.5	437.1	407.7	410.3	402.8	
Discharge per Foot of Width (C ₀ /ft)	Ac. Ft.	13.4	8.4	2.3	4.7	7.8	3.8	13.7	11.7	
Bulk Length	Ft.	610	250	250	398	310	230	600	420	
Capacity Equivalents										
Sediment Volume	In.	1.85	2.28	2.41	1.64	1.59	2.31	1.48	2.13	
Floodwater Retarding Volume	In.	4.81	4.98	3.84	3.45	3.19	4.43	4.81	5.30	
Recreation Volume	In.	-	-	-	-	-	-	-	-	
Water Supply Volume	In.	-	-	-	-	-	-	-	-	

(See footnotes at end of table.)

TABLE 3 - STRUCTURAL DATA - DAM WITH PLANNED STORAGE CAPACITY (Cont'd)
Big Creek (Tri-County) Watershed, Texas

Item	Units	Principal Spillway						Total
		17	18	19	20	21	22	
Class of Structure		#	#	#	#	#	#	
Seismic Zone		0	0	0	0	0	0	
Uncontrolled Drainage Area	Sq. MI.	5.39	4.51	26.86	3.68	4.46	9.95	131.60
Controlled Drainage Area	Sq. MI.	0	0	17.48	0	0	0	17.48
Total Drainage Area	Sq. MI.	5.39	4.51	44.34	3.68	4.46	9.95	
Runoff Curve No. (1-Day)		79	76	75	77	79	75	
Time of Concentration (Tc)	Hr.	3.3	2.2	1.5	1.5	2.1	3.2	
Elevation Top of Dam	Ft.	384.4	462.9	384.4	349.1	347.0	383.2	
Elevation Great Emergency Spillway	Ft.	380.1	458.2	380.2	348.1	341.0	378.3	
Elevation Great High Stage Inlet	Ft.	481.3	443.9	388.3	336.8	336.3	370.7	
Elevation Great Low Stage Inlet	Ft.	-	-	-	-	-	-	
Elevation Lowest Ungated Outlet	Ft.	486.0	441.0	380.5	334.0	333.2	364.8	
Emergency Spillway Type	Fig.	Fig.	Fig.	Fig.	Fig.	Fig.	Fig.	
Emergency Spillway Bottom Width	Ft.	160	160	400	100	200	300	
Emergency Spillway Exit Channel								
Slope	1	1.4	1.4	3.3	3.8	2.2	0.8	
Maximum Height of Dam	Ft.	28	25	48	26	28	31	
Volume of Fill	Cu. Yd.	128,300	178,300	332,800	54,000	62,000	232,400	2,849,120
Total Capacity	Ac. Ft.	2,137	1,716	14,487	1,342	1,431	3,184	28,498
Sediment Submerged (Lowest Ungated Outlet)	Ac. Ft.	152	132	-	143	132	308	1,573
Sediment Submerged	Ac. Ft.	388	437	21,088	871	388	798	23,017
Sediment Separated	Ac. Ft.	34	48	218	44	86	81	1,281
Recreation Use	Ac. Ft.	-	-	1,827	-	-	-	1,827
Water Supply Use	Ac. Ft.	-	-	2,399	-	-	-	2,399
Floodwater Retarding	Ac. Ft.	1,581	1,221	7,712	988	1,038	2,438	25,907
Between High and Low Stage	Ac. Ft.	-	-	-	-	-	-	1,576
Surface Area								
Lowest Ungated Outlet	Ac.	45	31	-	17	42	43	881
Sediment Pool	Ac.	119	67	225	38	78	273	2,497
Recreation Pool	Ac.	-	-	328	-	-	-	505
Water Supply Pool	Ac.	-	-	883	-	-	-	695
Floodwater Retarding Pool	Ac.	280	194	1,140	182	246	332	6,741
Principal Spillway Design								
Rainfall Volume (1-Day)	In.	8.30	8.30	8.49	8.38	8.30	8.30	
Rainfall Volume (10-Day)	In.	14.25	14.25	14.43	13.80	14.27	14.25	
Runoff Volume (10-Day)	In.	8.32	8.32	8.53	7.53	7.61	7.32	
Capacity of Low Stage (Max.)	CFS	-	-	-	-	-	-	
Capacity of High Stage (Max.)	CFS	85	112	1,433	34	147	224	
Dimensions of Conduit	Ft.	2.5	2.8	7.7	1.0	1.9	2.8	
Type of Conduit		Pipe	Pipe	Box	Pipe	Pipe	Pipe	
Frequency Operation - Emergency Spillway	1 Channel	1.0	3.0	1.0	4.0	3.0	1.0	
Emergency Spillway Hydrograph								
Rainfall Volume	In.	9.31	9.31	9.31	7.40	8.30	8.30	
Runoff Volume	In.	6.30	6.30	6.34	4.73	3.77	5.77	
Storm Duration	Hr.	6	6	7.8	6	6	6	
Velocity of Flow (V ₀)	Ft./Sec.	3.3	3.2	3.2	2.7	3.1	2.1	
Maximum Reservoir Water Surface Elevation	Ft.	501.0	459.2	380.0	348.4	344.7	379.0	
Forebay Hydrograph								
Rainfall Volume	In.	13.33	13.33	13.33	18.20	13.48	13.48	
Runoff Volume	In.	12.29	12.29	12.14	7.32	10.17	10.17	
Storm Duration	Hr.	6	6	7.8	6	6	6	
Maximum Reservoir Water Surface Elevation	Ft.	504.4	462.4	380.4	348.5	344.9	381.5	
Discharge Per Foot of Width (Cu/Ft)	Ac. Ft.	4.1	9.3	28.8	4.5	5.4	7.7	
Bulk Length	Ft.	400	788	415	318	870	788	
Capacity Equivalents								
Sediment Volume	In.	2.06	2.09	1.45	1.83	1.83	1.67	
Floodwater Retarding Volume	In.	3.50	3.85	5.38	4.72	4.37	4.38	
Recreation Volume	In.	-	-	1.38	-	-	-	
Water Supply Volume	In.	-	-	1.38	-	-	-	

1/ Crest of emergency spillway
2/ Volume included is submerged sediment. Does not include estimated borrow volume.

TABLE 3A - STRUCTURAL DATA - DIKES 1/
Big Creek (Tri-County) Watershed, Texas

Dike	Stationing	Top Width (ft.)	Average Side Slope	Average Height of Dike (ft.)	100-Year Frequency Velocity (ft./sec.)	Dike Protection	Volume of Earth Fill (cu. yds.)
D-1	0+00 80+00	10	3:1	8	1	Vegetated	88,000
D-2	0+00 139+00	10	3:1	6	5	Vegetated	103,700

1/ Dikes are Class II (Ref. SCS Eng. Standard No. 356).

TABLE 4 - ANNUALIZED ADVERSE NED EFFECTS
Big Creek (Tri-County) Watershed, Texas

(Dollars)^{1/}

Evaluation Unit	Project Outlays		Total
	Installation Cost	Operation and Maintenance Cost	
21 Floodwater Retarding Structures, 1 Multiple-Purpose Structure and Recreation Facilities, and 2 Dams	650,180	37,480	702,660

^{1/} Price base: 1983. Discounted at 8.125 percent for 109 years (period of analysis).

^{2/} Includes \$13,530 for operation and maintenance of recreation facilities.

July 1984

TABLE 3 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS
 Big Creek (Tri-County) Watershed, Texas
 (Dollars)

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Floodwater			
Crop and Pasture	1,527,390	702,370	825,020
Other Agricultural	169,490	60,440	109,050
Nonagricultural			
Road and Bridge	137,560	43,020	94,540
Subtotal	1,834,440	805,830	1,028,610
Sediment			
Overbank Deposition	28,440	14,470	13,970
Erosion			
Flood Plain Scour	23,960	14,390	9,570
TOTAL	1,886,840	834,690	1,052,150

- 1/ Price base: Current normalized prices (1983) for crop and pasture; 1983 prices for all other.
- 2/ Not adjusted for period of analysis.

July 1984

TABLE 6 - COMPARISON OF NED BENEFITS AND COSTS
 Big Creek (Tri-County) Watershed, Texas
 (Dollars)^{1/}

Evaluation Unit	Intensive		Municipal		Recreation		Total	Average	
	Damage	Land Use	Land	Water	Supply	Recreation		Annual Cost	Benefit-Cost Ratio
21 Floodwater Retarding Structures, 1 Multiple-Purpose Structure and Recreation Facilities, and 2 Dikes	717,350	336,070	169,120	152,960	1,375,500	702,660	2.0:1.0		

^{1/} Price base: 1983. Discounted at 8.125 for 109 years (period of analysis).

July 1984

EFFECTS OF RECOMMENDED PLAN

The total annual cost of the project is shown on Table 4. The average annual benefits of the project measures and the ratio of average annual project benefits to the annual cost is shown on Table 6.

A description of the project impacts is presented below. Appropriate baseline data have been included to establish needed perspective. Areas of impact believed to be of key importance to decision making are summarized for the alternatives in the "Summary and Comparison of Candidate Plans."

Land Use and Management

The impact of the project on land management within the total watershed is insignificant. The impact is significant mainly on the localized areas affected by construction of the planned measures and the related impoundment areas.

The following table shows the impact of the installation of the project on the land use in the watershed. The estimated future land use is based on studies made during the interdisciplinary team assessment of the watershed:

Impact of Installation of Project Measures on Land Use

<u>Land Use</u>	<u>Present Condition</u> (acre)	<u>Estimated Future (20 Years)</u>		
		<u>Without Project</u> (acre)	<u>With Project</u> ^{1/} (acre)	<u>Effect of Project</u> (acre)
Cropland	126,500	127,000	125,319	-1,681
Pastureland	28,400	35,900	37,746	+1,846
Rangeland	71,080	62,720	60,378	-2,342
Water ^{2/}	1,850	2,000	3,572	+1,572
Other ^{2/}	8,790	9,000	9,605	+605
Total Area	236,620	236,620	236,620	

^{1/} Includes changes of land use caused by construction of the project measures and the expected land use changes resulting from intensification of flood plain land.

^{2/} Includes urban and built-up land and areas devoted to use as dams, spillways, and the recreation area.

The total area affected by installation of the structural measures (including the recreation area) is 7,472 acres. The following tabulation shows the present land use of the area which will be affected:

Present Land Use of the Area To Be Affected by Installation of
Project Measures
(Acres)

Item	Cropland	Pastureland	Rangeland	Other	Water	Total
Dams and Spillways ^{1/}	239	22	148	1	1	411
Sediment Pools Below Lowest Ungated Outlet	289	21	570	0	1	881
Sediment Pools Above Lowest Ungated Outlet	528	50	699	1	3	1,281
Floodwater Retarding Pools ^{2/}	1,935	217	1,692	25	14	3,883
Dikes	95	0	35	0	0	130
Municipal and Recreation Water Storage ^{3/}	313	0	374	6	2	695
Recreation Area	55	0	1	0	0	56
Buffer Area ^{4/}	29	0	66	0	0	95
Flowage Easements	23	0	17	0	0	40
TOTAL	3,506	310	3,602	33	21	7,472

- ^{1/} Includes the areas needed for the dams and spillways of the floodwater retarding structures and the multiple-purpose structure (223 acres) and the areas to be fenced and managed for wildlife habitat (188 acres).
- ^{2/} Includes the areas affected by the floodwater retarding pools of the floodwater retarding structures and the multiple-purpose structure.
- ^{3/} Represents the maximum area affected by municipal water storage.
- ^{4/} Area adjacent to the detention pool of multiple-purpose structure No. 19.

The 223 acres needed for construction of the dams and emergency spillways will be cleared of all vegetation. The dams and emergency spillways will be vegetated after construction with selected multi-use plants. The remaining 188 acres in the easement area will be fenced and managed for wildlife habitat. Investigations indicate that the sediment pools below the elevation of the lowest ungated outlets and the municipal water storage pool will initially store water. The sediment pools will fill with sediment over a period of about 100 years. Land in the floodwater retarding pool areas (3,883 acres) will be affected by periodic inundation. Land use in this area may or may not be changed depending on the frequency of inundation.

Prime Farmland Soils

The project will adversely affect about 665 acres of prime farmland soils by permanent or periodic inundation or by converting it to dams and spillways. However, the project will eliminate the frequent flooding hazard on about 3,000 acres that would be prime farmland except for its frequently flooded condition. Thus, the project will result in a net increase of about 2,335 acres of prime farmland soils. The following list shows the present and expected future acreage of prime farmland soils:

Acres of Prime Farmland Soils

	<u>Acres</u>
Present condition	95,000
Area directly affected by project	665
Acres made prime by project	3,000
Total acres of prime with project	97,335
Net increase	2,335

Floodwater

Floodwater damage occurs on 32,340 acres of flood plain land along Big Creek and other stream systems within the designated watershed area (Appendix B-3). Agricultural land, roads, bridges, etc., are affected by flooding. For a more complete description of the floodwater damages, see the "Watershed Problems and Opportunities" section of this report.

Installation of the project will reduce the acres flooded from the 100-year storm event from 32,340 acres to 26,068 acres. The following tabulation shows the acres damaged by floodwaters by reaches for selected storm recurrence intervals:

Area Affected By Floodwaters Per Storm Event

Evaluation Reach (Appendix B-3)	Annual Chance of Occurrence Per Storm Event					
	1 Percent		20 Percent		50 Percent	
	Without Project	With Project	Without Project	With Project	Without Project	With Project
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
1A	4,284	3,130	1,431	637	921	393
1B	4,462	3,392	2,685	1,316	2,454	657
1C	4,025	3,423	2,715	1,180	2,456	1,108
2A	1,187	1,148	1,092	1,031	1,083	999
2B	558	547	526	510	520	505
2BB	259	229	214	204	209	199
2C	2,421	2,282	1,996	1,775	1,910	1,688
3	4,900	4,646	4,187	3,525	3,978	3,099
4	2,251	1,962	1,275	1,098	1,136	942
5	592	592	330	330	211	211
6	1,343	832	789	306	674	207
7	2,238	955	1,005	188	796	101
8	2,333	1,860	1,382	607	1,198	361
9	966	762	507	194	401	79
10	521	308	394	28	325	0
<u>Total^{1/}</u>	<u>32,340</u>	<u>26,068</u>	<u>20,528</u>	<u>12,929</u>	<u>18,272</u>	<u>10,549</u>

^{1/} Does not include areas of water, wetlands, or stream channels.

The following tabulation shows the average annual acres flooded and the average annual floodwater damages:

Average Annual Acres Flooded
and
Average Annual Floodwater Damages^{1/}

Reach	Without Project		With Project	
	Acres	Dollars	Acres	Dollars
1A	1,416	99,880	531	36,330
1B	8,114	353,250	792	38,360
1C	6,262	290,190	4,015	204,600
2A	3,364	164,410	1,489	73,120
2B	2,165	46,880	1,594	28,750
2BB	840	12,570	694	6,520
2C	7,335	244,400	5,865	162,750
3	10,457	341,590	3,969	142,830
4	2,225	76,770	1,364	49,040
5	423	17,370	423	17,370
6	1,284	56,660	475	17,840
7	941	27,180	148	4,090
8	1,837	59,220	539	18,420
9	458	13,910	128	3,560
10	516	30,160	32	2,250
Total	47,637	1,834,440	22,058	805,830

^{1/} Does not include damages from flood-related sediment or erosion.

Installation of the project will reduce the flood hazard on land below the structural measures. It will provide land users the opportunity to utilize these lands according to their capability by converting to higher value crops. More intensive land use is expected on 4,420 acres, 58 percent of the 7,599 acres protected from flooding by the 20 percent chance storm. The discounted average annual monetary benefits based on the intensified acreage are \$336,070.

Erosion

About 1,280 acres are damaged annually by flood plain scour. Damages in terms of reduced productive capability of flood plain soils range from 10 to 40 percent.

Installation of the planned structural measures will reduce flood plain scour 41 percent.

It is not expected that the streambank erosion on Mussel Run Creek will be significantly affected by project action.

Sedimentation

Sediment damages are occurring in the form of channel fill deposits and overbank deposition. Overbank deposition damages an average of 1,300 acres

annually in the flood plain. Damage in terms of reduced productivity of the flood plain soils ranges from 10 to 50 percent.

The estimated average amount of sediment carried out of the watershed is 255,000 tons annually. This volume results in an estimated average concentration of 1,780 milligrams per liter in the estimated 5.34 inches of average annual runoff at the mouth of the watershed.

Installation of the planned structural measures will reduce deposition of sediment on the flood plain by 51 percent. It is estimated the current average of 255,000 tons of suspended sediment (1,780 mg/l) carried out of the watershed annually will be decreased by 66,790 tons to 188,210 tons (1,330 mg/l), a reduction in weight and volume of 26 percent and 25 percent, respectively.

Municipal Water

Water usage in the city of Marlin averaged 1.6 million gallons per day (mgd) in 1980. Based on past trends, average day water use is projected to increase to 2.7 mgd by the year 2010 and to 3.4 mgd by the year 2030. This demand exceeds the present supply capacity (see page 17).

Multiple-purpose structure No. 19 will provide storage for 2,590 acre-feet of municipal and industrial water and will provide a yield of 1.5 mgd, which will supplement the present supply for the city of Marlin. The report of the consulting engineering firm employed by the city indicates that this water supply in combination with the present facilities, Marlin Lake and the Brazos River water, will be adequate to meet the projected needs of the city at least through the year 2030. The average annual discounted benefits for this water supply amount to \$169,120.

According to studies made by the city of Marlin's consultant, this water will be of suitable quality for drinking water and for use for contact sports (see page 21 for a discussion of water quality).

Recreation

According to local and statewide studies, there is a need for additional recreation facilities in the watershed (see page 18 for a discussion of the estimated needs for recreation facilities in the area).

The multiple-purpose structure will provide a needed water-based public recreation development for residents of the watershed and surrounding area. The reservoir and surrounding land will provide recreation in the form of picnicking, biking, sport games, swimming, boating, water-skiing, and fishing for about 55,000 visitor days annually. The discounted average annual benefit is \$152,960.

Streams and Lakes

Surface water resources for livestock and domestic uses in the watershed are from small farm ponds, streams, and reservoirs such as Marlin Lake. The existing area of surface water is about 1,850 acres. There are about 236 miles of intermittent streams and 6.5 miles of perennial streams in the watershed.

Construction of the structures will result in the loss of about 26 miles of intermittent streams and will be replaced by water stored in the sediment and conservation pools. The project will create 1,572 acres of open water. Installation of the structures will also cause a change in the flow regime of the affected streams. During periods of runoff, the depth, velocity, and duration of out-of-channel flows will be reduced downstream from the structures. The duration of low flows (within channel) will be increased. The project will cause an initial reduction of 1.5 percent in average annual streamflow from the watershed. These estimates are based on an anticipated 5.7 percent reduction in average annual streamflow at the structure sites which will control 36 percent of the drainage area of the watershed. The magnitude of the 5.7 percent reduction at the structure sites will diminish downstream from the structures because part of the flow is lost into the streambed. In addition, flows from uncontrolled drainage areas enter the stream.

Surface Water Quality

Water quality analysis studies indicate that water within the watershed is within the limits recommended by state standards and by the Environmental Protection Agency. The only water quality problem identified is the sediment load caused by erosion (see page 21 for a discussion of water quality).

Installation of the floodwater retarding structures and the multiple-purpose structure will impact on water quality because of the reduction in pollution associated with the reduction of sediment load in surface waters. It is estimated that the current average of 255,000 tons of suspended sediment (1,780 mg/l) carried out of the watershed annually will be decreased by 66,790 tons to 188,210 tons (1,330 mg/l). Construction activities associated with installation of the structural measures will result in a short-term increase in turbidity of streamflows. When completed, the floodwater retarding structures and the multiple-purpose structure will immediately reduce sedimentation by trapping the sediment. The project will produce long-term reductions in the quantity of sediment carried in runoff water.

Wildlife Habitat

The fish and wildlife problems of the watershed are typical of problems experienced throughout the Blackland Prairie. Quality of wildlife habitat has been decreased by indiscriminate brush eradication, and the conversion of native ecosystems into monocultures of crops or pasture. The large acreages of cropland provide food but do not provide needed cover for deer, quail, and other species of wildlife.

Installation of the project will affect 7,472 acres of wildlife habitat. Installation of the project will destroy or alter 3,454 acres. The remaining 4,018 acres are located within or on detention pool, buffer, and flowage easement areas and would not be significantly impacted. The easement areas needed to construct the dams, emergency spillways, and the dikes will be planted with vegetation that is suitable for erosion control and wildlife food (see "Mitigation Features" on page 40). The areas expected to be inundated with permanent water (the lowest ungated outlet areas) will require 1,576 acres. Vegetation in the sediment pools will be cleared as necessary for construction and proper functioning of the measures. Specific areas of woody vegetation within the easement areas of the dams and emergency spillways and the upper portion of the sediment pools will be protected from clearing. Remaining vegetation above the shorelines in the sediment pool areas (1,281 acres) and in the detention pool areas (3,883 acres) will be affected by periodic inundation. The following table shows the habitat types affected by construction of the floodwater retarding structures, the multiple-purpose structure, and the dikes:

Habitat Types Affected by Project Installation

Big Creek (Tri-County) Watershed, Texas

(Acres)

Habitat Types ^{1/}	Dams and Emergency ^{2/} Spillways ^{3/}		Sediment Pools		Detention Pools	Recreation Area	Dike ^{4/}	Buffer Area ^{4/}	Flowage Easement Area	Total
	Below LDO	Above LDO	Below LDO	Above LDO						
Cropland	239	602	528	1,935	55	95	29	23	3,506	
Pastureland	22	21	50	217	0	0	0	0	310	
Open Rangeland	47	329	379	921	0	24	28	0	1,728	
Mesquite	61	140	133	410	1	9	10	0	764	
Postoak	0	20	0	10	0	0	2	0	32	
Hardwoods (Mixed)	40	455	187	351	0	2	26	17	1,078	
Urban and Built-up	1	6	1	25	0	0	0	0	33	
Water	1	3	3	14	0	0	0	0	21	
Total	411	1,576	1,281	3,883	56	130	95	40	7,472	

^{1/} Names of the habitat types are descriptive and are not intended to imply pure stands of vegetative types.

^{2/} Includes the floodwater retarding structures and multiple-purpose structure No. 19.

^{3/} LDO - Lowest ungated outlet of the floodwater retarding structures and includes the municipal water storage pool of multiple-purpose structure No. 19.

^{4/} Area adjacent to the detention pool of multiple-purpose structure No. 19.

Fish Habitat

Fish habitat in Big Creek watershed is limited to farm ponds, reservoirs such as Marlin Lake, a few potholes in Big Creek and its tributaries, and Mussel Run, which carries the only perennial streamflow in the watershed. The lower reach of Mussel Run serves as spawning grounds for fish from the Brazos River. During periods of high flow, fish move upstream into Big Creek and are confined to scattered potholes when the flow ceases. Flathead and channel catfish are the predominant sport fish in the stream.

The 1,572 acres of open water associated with the floodwater retarding structures and the multiple-purpose structure will make more water available for use of the fishery resource. Reductions in erosion and sediment will result in improvement in water quality. Water in the multiple-purpose structure and some of the floodwater retarding structures will be stocked and managed for fish production by the landowners. These areas will provide an excellent fishery resource.

Endangered Species

The watershed is in the range of occurrence of two designated endangered species: the Arctic peregrine falcon and the whooping crane. Neither of these species is known to inhabit the watershed. Installation of the project will not affect any known threatened or endangered species of flora and fauna. Consultation with the Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act of 1973 (Public Law 93-205, as amended) has been completed.

Wetlands

Construction of the floodwater retarding structures will result in the loss of about 26 miles of intermittent streams. No wetland areas were identified in the stream reaches which will be disturbed by construction of the project. The disturbed stream areas will be affected by water stored in the sediment and conservation pools and by the dams and emergency spillways.

Reduction of overbank flooding of identified wetlands would be minimal.

It is expected that wetlands will be created at the retarding structures and along the fringe areas of the 1,572 acres of open water areas.

Thus, the overall effect of the project is expected to increase the total wetland areas in the watershed.

Social and Cultural

Beneficial or adverse impacts of the project will not be altered because of the ethnic race or origin of the affected public.

There will be no apparent displacements or relocations of persons, businesses, or farm operations as a result of installation of the project.

All federal contracts for construction of the structural measures of the project will be awarded to equal opportunity employers, which will permit equal participation by the minority population in job opportunities.

Transportation

The average annual floodwater damage to roads and bridges is based on the average cost of repairing improvements to their before-damage condition.

Installation of the project will reduce damages to the roads and bridges by lowering the flood stages and decreasing the flow velocity of the remaining floodwater. This decreased damage will also create a savings in material and energy and prolong the useful life of the roads and bridges. Average annual cost for repairing floodwater damages will be reduced by 69 percent.

Archeological and Historical Data

Surveys completed on 12 key locations in the watershed during planning of the project revealed that there was no evidence of any cultural resources at 3 of the locations, minimal evidence in the form of scattered surface lithic materials at 6 locations, and the presence of materials in sufficient amounts at 3 locations to require further testing to determine significance.

Seven of the structure locations surveyed have remained in the final plan. The other locations were dropped out of the plan. Included in the plan are two locations with no evidence of sites, three locations with only minimal evidence of site, and two locations needing further testing and survey work.

In accordance with Programmatic Memorandum of Agreement with the Advisory Council on Historic Preservation for protecting archeologic and historic resources, the SCS will implement the procedures contained in the proposed final regulations (7CFR 656), SCS Policy and Procedures for Protecting Archeologic and Historic Properties (Cultural Resources), as published in the SCS General Manual, Title 420, Part 401. This will be done prior to installation of the planned measures.

Air Quality

There are no known problems of air quality within the watershed. The metropolitan area of Waco is about 30 miles northwest of the watershed and contributes only marginal influence because of the prevailing southerly winds.

There will be a slight increase in dust in localized areas of the project due to construction activities. The impact will be of short duration.

Visual Resources

The visual resources in the watershed are characterized by the gently sloping lines of the horizon and low vertical lines of geologic formations and manmade structures such as buildings, grain storage bins, and windmills. The horizon is seldom broken by a dominant geologic feature or by vegetation. The woody vegetation tends to be of uniform height that provides a short vertical accent.

Most of the structural measures of the project will be visible to the rural population of the watershed and will change the present visual resource at the structure sites from a mixture of open land or brushy land to areas of open water, dams, spillways, or dikes. Landscape plantings will be made where the visual resource is adversely affected and where the adverse impact is apparent to the public.

Visual aspects of the watershed may be enhanced, deteriorated, or unchanged, depending upon the personal observation and feeling of the viewer. However, the presence of a body of impounded water may give the observer an esthetically pleasing feeling. The observance of pleasing sights and sounds serves to promote a tranquil atmosphere and enhance a quality environment.

Ground Water

The selected plan has no significant impact on ground water.

Human Health and Safety

Installation of the project will provide a basis for the protection, improvement, and sustained use of the resources of the watershed and will provide a safer, more enjoyable environment for the public to live, work, and play.

EFFECTS OF THE RECOMMENDED PLAN ON RESOURCES OF PRINCIPAL NATIONAL RECOGNITION

The following table displays the effects of the recommended plan on specific types of resources that are recognized by federal policies:

Effects of the Recommended Plan on Resources
of Principal National Recognition

Types of Resources	Principal Sources of National Recognition	Measurement of Effects
Air quality	Clean Air Act, as amended (42 U.S.C. 1857h-7 et seq.)	Temporary increase of airborne dust particles during construction
Areas of particular concern within the Coastal Zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.)	Not present in planning area
Endangered and threatened species critical habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	Not present in planning area
Fish and wildlife habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.)	Terrestrial habitat lost: 1,572 acres Aquatic habitat gained: 1,572 acres
Flood plains	Executive Order 11988, Flood Plain Management	1 percent chance flood plain reduced from 32,340 acres to 26,068 acres
Historic and cultural properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec. 470 et seq.)	No effect
Prime and unique farmland	CEQ Memorandum of August 1, 1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act	Creation of 3,000 acres Destruction or alteration of 665 acres
Water quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)	No effect
Wetlands	Executive Order 11990, Protection of Wetlands Clean Water Act of 1977, (42 U.S.C. 1857h-7, et seq.)	Creation of 1,572 acres of Type 5 wetlands
Wild and scenic rivers	Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.)	Not present in planning area

RELATIONSHIP TO LAND AND WATER PLANS, POLICIES, AND CONTROLS

The Big Creek watershed is a contributing part of the Brazos River Basin. This watershed has a total drainage area of about 370 square miles, or about 1.25 percent of the basin. Therefore, the total effect of this project on the Brazos River Basin will be insignificant.

The long-term habitability and contribution to the economic well-being of the area will be improved with only minimal detriment to a few features of the existing environment. In total, the natural environment of the area will be benefited over that which would exist in the long-term without project action.

CONSULTATION AND PUBLIC PARTICIPATION

Land users in the Big Creek watershed have been interested in controlling the floods since as early as 1904. The following is a brief history showing their concerns:

Chronological History of Big Creek Planning Activities

- | | |
|----------------|--|
| 1912 | Big Creek Drainage and Levee Project was organized by local land users to study the flood problem. |
| Mid-1930's | A Works Progress Administration (WPA) project was initiated to control floods by clearing brush along the channel below State Highway 6. |
| 1954 | Big Creek Watershed Committee was organized by local land users. This organization made a written request to the SCS for assistance. |
| September 1954 | Limestone-Falls and McLennan County Soil Conservation Districts made a formal request for assistance under Public Law 566. |
| May 1955 | The SCS made a field examination and determined that a watershed project would be feasible. The sponsorship at that time did not include a unit of government that had power of eminent domain or taxation. |
| 1956 | Falls County Water Control and Improvement District was organized. This organization had the power of eminent domain. |
| May 1970 | The application was amended to include the Commissioners Courts of Falls, Limestone, and McLennan Counties as sponsors of the project. (The Limestone County Commissioners voted in September 1984 to withdraw as sponsor. The McLennan County Commissioners Court voted in October 1984 to withdraw their sponsorship.) |

June 1975

Big Creek (Tri-County) watershed was authorized for PL 566 planning by the Administrator of the SCS.

1980

The City of Marlin became a sponsor of the project based on their need for M&I water and recreation facilities.

In October of 1975, an environmental assessment was made by an interdisciplinary team consisting of soil conservationists, soil scientists, economists, biologists, a geologist, and an agronomist. The SCS contracted with Environmental Sciences of San Marcos, Texas, to make an investigation of the water quality of the watershed. The study covered the period of September 1977 to September 1978. Also, the SCS contracted with Nunley Multimedia Productions of Dallas, Texas, to make an archeological resources survey of portions of the Big Creek watershed. Public involvement has been solicited through publicizing and holding a number of public meetings to inform interested persons and agencies of the proposed project. The public was invited to participate in identifying problems and measures to solve these problems. All of this information was used to guide detailed planning activities.

Meetings were held on numerous dates to scope concerns from other federal and state agencies and the general public. Newspapers serving the watershed area published articles announcing the public meetings and reported information and conclusions resulting from these meetings. Brochures describing the project were distributed throughout the watershed area to inform the public of project planning.

A coordination plan was developed between the SCS, the Fish and Wildlife Service, and the Texas Parks and Wildlife Department which established specific steps for joint resource assessment and procedures to evaluate future with- and without-project conditions. This plan also established procedures to resolve any disagreement.

The Texas Department of Health was contacted for state requirements for the sanitary facilities being planned in conjunction with the recreation facilities.

The City of Marlin contracted with the consulting engineering firm of Henningson, Durham, & Richardson of Austin, Texas, to assist them in their participation in the development of a water storage reservoir and recreation facilities.

On October 26, 1979, the SCS, in cooperation with the sponsors, held another public scoping meeting at the Falls County Court House in Marlin. The purpose of this meeting was to determine if any new issues needed to be addressed and to confirm project objectives. Forty-one persons registered their attendance. Numerous persons voiced their concern for eliminating flooding and resultant damages and urged continued diligence in completing plans for the project. No opposition to the project was voiced at this meeting.

One landowner requested that studies include an analysis of a channel connecting Big Creek to the Brazos River immediately below Highway 6. During routine watershed planning investigations and analyses, it was determined that this type of channel would be unfeasible because of unstable soil material in the channel area.

Meetings were also held during June and July 1981 with landowners who would be directly affected by construction activities. At these meetings most landowners indicated no objections to the project, providing they were compensated for their losses. Some landowners, especially those in the area near Mart (in the upper reaches of the watershed area), were opposed to any involvement of their property.

Subsequent to these meetings, several letters opposing a project were written. Also, reports of the opposition were published in the Mart Herald newspaper.

During the review period for the Draft Plan-EIS, 17 letters from individuals were received concerning the recommended plan. Nine of the letters expressed support for the project and eight letters expressed opposition. Seven of the eight letters opposing the project stated a personal loss of land to the project; one letter stated that the project ". . . will be so detrimental to so many people, especially the ones giving up land . . ." The letters supporting the project listed the need for municipal water and the general benefit to ". . .tens of thousands of people . . ." as the primary motivation for their support.

One petition was received during the review period. It contained 186 signatures and opposed the project on the basis ". . . will take the land out of production and decrease the market value of all the land in the upper portion of the Big Creek Watershed." It also stated that the project was ". . . economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up for the monetary loss to the people involved. . . ."

The petition further stated: "By our signatures below, we wish to express our opposition to all persons concerned and ask that it not be approved or funded out of Federal, state, or county tax dollars."

Letters of comment were also received from six federal agencies and three state agencies. These comments and the responses to these comments are printed on the following pages. All letters of comment and the petition which were received are reproduced in Appendix A.

After considering all letters of comment, the sponsors notified the SCS that they urged completion of the plan.

DISCUSSION AND DISPOSITION OF EACH COMMENT ON DRAFT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Comments were requested from the following federal, state, and local agencies and organizations:

Federal

Department of the Army
Department of Commerce
Department of Health and Human
Resources
Department of Education
Department of the Interior

Advisory Council on Historic
Preservation
Environmental Protection Agency
Federal Power Commission
Office of Equal Opportunity, USDA
U.S. Coast Guard

State and Other

Heart of Texas Council of Governments
Environmental Defense Fund
Friends of the Earth
Brazos River Authority
National Audubon Society
Office of the Governor (Budget and Planning Office and state clearing-
house)

National Resources Defense Council
National Wildlife Federation
Texas Committee on Natural
Resources
Wildlife Management Institute

The following agencies and organizations submitted comments on the Draft Plan-
EIS:

Federal

Environmental Protection Agency
Department of the Army
Department of the Interior
Department of Health and Human Resources
Office of Equal Opportunity, USDA
Advisory Council on Historic Preservation

State

Office of the Governor
Texas Department of Water Resources
State Department of Highways and Public Transportation
Texas Parks and Wildlife Department

Other

Seventeen personal cards and letters from individuals
One petition with 186 names

The responding agencies' comments and the disposition of each are as follows:

Environmental Protection Agency

Comment: The agency classified the Draft EIS as LO-1 and stated that they
have no objections to the project.

Response: Noted.

Comment: The agency stated that the Draft EIS contained sufficient information to evaluate the associated environmental impacts.

Response: Noted.

Comment: The agency stated that they will publish their classification in the Federal Register in accordance with their responsibility to inform the public on their views on the proposed federal action under Section 309 of the Clean Air Act.

Response: Noted.

Department of the Army

Comment: The Department stated that the U.S. Army Corps of Engineers regulates the discharge of dredges and fill materials into waters of the United States and that all of the floodwater retention structures will involve such discharges but are located upstream of the headwaters and may be authorized by a nationwide permit. The only requirement for this authorization is that the work is in compliance with the following conditions:

- (1) That the discharge will not be located in the proximity of a public water supply intake;
- (2) That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act or destroy or adversely modify the critical habitat of such species;
- (3) That the discharge will consist of suitable material free from toxic pollutants in toxic amounts;
- (4) That the fill created by the discharge will be properly maintained to prevent erosion and other nonpoint sources of pollution;
- (5) That the discharge will not occur in a component of the National Wild and Scenic Rivers Systems; and
- (6) That the following best management practices should be followed to the maximum extent practicable:

In addition to the conditions specified in the nationwide permit, the management practices listed below should be followed to the maximum extent practicable, in the discharge of dredged or fill material allowed under the permit. These practices will minimize the adverse effects of the discharges on the aquatic environment. Failure to comply with these practices may result in action to suspend authorization under the nationwide permit and require an individual permit.

- (1) Discharges of dredged or fill material into the waters of the United States should be avoided or minimized through the use of other practical alternatives.
- (2) Discharges in spawning areas during the spawning season shall be avoided.
- (3) Discharges shall not restrict or impede the movement of aquatic species indigenous to the waters or the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).
- (4) If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized.
- (5) Discharges in wetlands areas shall be avoided.
- (6) Heavy equipment working in wetlands shall be placed on mats.
- (7) Discharges into breeding and nesting areas for migratory waterfowl shall be avoided.
- (8) All temporary fills shall be removed in their entirety.

Response: Noted.

Comment: The Department stated that the proposed channel improvement shown on Appendix B-4 may require authorization by individual permit if the work will involve the discharge of fill material into the old channel.

Response: Appendix B-4 - Potential Location of Structural Measures map shows the location of structural measures studied during the planning process. Some of these measures are not in the recommended plan because of economic, environmental, or other reasons. The channel improvement work is not part of the recommended plan for this project. The proposed project measures are shown on Appendix C - Project Map.

Comment: The Department stated:

"On Page 72 of the DEIS it is stated that wetlands will not be affected by the project. However, Appendix B4 shows a proposed dike from structure 34 south to a point near the town of Highbank. This dike will directly impact a wetland adjacent to Big Creek."

Response: Appendix B-4 - Potential Location of Structural Measures - shows the location of structural measures studied during the

planning process. Some of these measures are not in the recommended plan because of economic, environmental, or other reasons. The dike mentioned in this comment is not part of the recommended plan for this project. The proposed project measures are shown on Appendix C - Project Map.

Comment: The Department stated ". . . the floodwater retention structures [in the watershed will have adverse impacts on wetlands dependent on overbank] flooding to maintain their wetland characteristics.

Response: Planning investigations indicated that this impact will be minimal. The "Wetlands" section in the "Effects of the Recommended Plan" section has been expanded to address this comment and a comment from the U.S. Fish and Wildlife Service, which participated in the field investigation.

Department of the Interior

Comment: The Department stated:

"We conclude that the subject document adequately describes the existing problems within the watershed and presents the proposed watershed development plan and alternatives and expected impacts therefrom in a clear manner."

Response: Noted.

Comment: The Department stated that the Summary and Comparison of Candidate Plans chart that appears on pages 33 and 34 should clarify the difference between "Without Project" and "Alternative 1 (No Project)."

Response: The "Without Project" column has been changed to "Expected Future Conditions Without Project." This column is used to establish baseline data which can be compared to future conditions with no project action and the future conditions with project action."

Comment: The Department stated:

"We wish to commend your biological staff for coordinating their activities closely with biologists of our Fort Worth Ecological Services Field Office, U.S. Fish and Wildlife Service, since inception of the proposed project planning effort. As a result, we find that, with minor exceptions, the subject document adequately describes the anticipated impacts on fish and wildlife that would be associated with the proposed action."

Response: Noted.

Comment: The Department stated:

"On page 70 of the document, it is stated that, 'Installation of the project will affect 3,454 acres of wildlife habitat.' However, the table that appears on page 71 indicates that 7,472 acres of habitat would be affected. While we are able to decipher that the additional 4,018 acres would be located within or on project detention pool, buffer and flowage easement areas and, thus, would not be significantly impacted, the discrepancy in the two figures should be clarified nevertheless."

Response: Wording has been added to page 70 to indicate that installation of the project will affect 7,472 acres of wildlife habitat.

Comment: The Department stated:

"On page 72, the statement is made that, 'Wetlands in the project will not be affected by the project.' A similar indication is made on page 4. It is our opinion that some impacts to wetlands would occur. Streams in which structures would be placed would be affected, as is mentioned in the second paragraph on page 69 and the extent of the area that presently is subjected to flooding would be reduced by the emplacement of control structures and dikes. We believe that the 'Wetlands' section should be expanded to address these impacts, as well as recognize that wetlands would probably be created at the retarding structures and along the fringes of the 1,572 acres of open water that would be created."

Response: The "Wetlands" section in the "Effects of the Recommended Plan" section has been expanded as suggested.

Comment: The Department stated that the document would be enhanced by the inclusion of a section on the status of the mineral industry in the three-county area. They suggested that the Minerals Yearbook, a publication of the U.S. Bureau of Mines, be consulted.

Response: The 1982 Minerals Yearbook does not disclose the amount of stone, clays, sand, and gravel that was produced in Limestone and McLennan Counties in 1980 and 1981. No nonfuel mineral production was reported in Falls County. Very little of the production in Limestone and McLennan Counties is within the watershed. The project impacts on mineral resources is low. No further discussion in the Plan-EIS is warranted.

Comment: The Department noted that at least 10 pipelines traverse the watershed and suggested that the project plan be coordinated with the pipeline operators in order to avoid any potential disruption to pipeline facilities.

Response: Careful surveys failed to identify any pipeline involvement because of project action. If previously unidentified pipeline involvement is identified, the pipeline operators will be consulted before construction proceeds.

Comment: The Department stated:

"Since only portions of the watershed have been surveyed, as stated on page 25 of the subject document, we do not believe that the requirements of Section 106 of the National Historic Preservation Act and the regulations contained in 36 CFR 800 have been fully complied with, as is concluded in the chart that appears on page 42. Therefore, it is recommended that the State Historic Preservation Officer, which in Texas is Mr. Curtis Tunnell, Texas Historical Commission, Post Office Box 12276, Capitol Station, Austin, Texas 78711, be consulted to determine the need for a complete cultural resources survey of all areas subject to impact by the proposed project.

"The procedures, which appear on page 41, that would be followed if previously unidentified cultural resources are discovered should be specifically delineated. In the event of an emergency discovery, an additional contact should be the National Park Service's Departmental Consulting Archeologist, Washington, D.C., at commercial telephone number (202) 343-4101, or FTS 343-4101.

"On page 47, it is stated that 'The National Park Service will be responsible for funding the cost of mitigation which exceeds one percent of Public Law 566 construction cost of each measure that affects archeological resources.' This statement is not entirely correct. The Archeological and Historical Preservation Act, Public Law 93-29, provides that a Federal agency can either undertake the requisite recovery, protection and preservation of cultural resources themselves in coordination with the Secretary of the Interior, or transfer a maximum of one percent of the total project appropriation to the Secretary of the Interior for this purpose.

"We note in the fourth paragraph on page 73 that impacts to cultural resources would be mitigated by salvage. It is our position that salvage is generally less preferable than preservation in situ. Only after all possible avenues to avoid impacts to cultural resources have been considered should mitigation plans be prepared. Typically, this should be accomplished under the Section 106 process mentioned previously."

Response: The actions taken to date on cultural resources in the watershed are in accord with the Programmatic Memorandum of Agreement with the Advisory Council on Historic Preservation giving authority to follow the final proposed regulations 7CFR 656, SCS Policy and Procedures for Protecting Archeological and Historic Properties (Cultural Resources) as published in the SCS General Manual, Title 420, Part 401. The procedures outlined in Section 401.7 will be fully implemented before installation of the project measures.

Department of Health and Human Resources

Comment: The Department noted that public recreational use will be prohibited at all sites except Site No. 19, where public access and facilities will be provided.

Response: Noted.

Comment: The Department stated that the Final EIS should indicate the type of sanitary facilities that are planned and also the planned operation and maintenance of these facilities.

Response: The discussion on page 39 has been expanded to indicate the type of sanitary facilities planned. Plans for operation and maintenance of the recreation facilities are discussed on pages 47, 48, and 59.

Comment: The Department recommended that the appropriate state and local health departments be consulted for relevant requirements and approval of these facilities.

Response: Pursuant to this comment, the SCS contacted a representative of the Texas Health Department, who concurred in the conceptual planning of this sanitary facility. A record of this contact was added to the "Consultation and Public Participation" section of the Final Plan-EIS.

Comment: The Department stated:

"The installation of the proposed project will reduce the downstream flood hazards and will provide land users the opportunity to more effectively utilize these lands. However, it is stated on page 63 that the project impact on land management within the total watershed is 'insignificant.' We have concerns about future land use. The 'Operation and Maintenance' section of the Draft EIS alludes to this concern by indicating that 'sponsors should discourage development in potential impact areas.' Since it is understood that inappropriate land uses in the future could change the existing hazard classification of the planned structures, we recommend that actions be taken prior to project implementation to ensure the long term prevention of adverse impacts upon health and safety, as well as upon property. We suggest that sponsors consult with appropriate regional and local land use planning and zoning authorities regarding the future land use of impact areas. The Final EIS should discuss these future use mitigation plans."

Response: The project impacts are the differences between with-project and without-project conditions at some projected future point in time. The projections for this project area did not indicate any significant development. Most land was projected to remain in agricultural use. The statement that "the project impact on

land management within the total watershed is insignificant" is therefore valid.

The inconsistency intimated by the reference to the "Operations and Maintenance" section requirement that "sponsors should discourage development in potential impact areas" does not exist. The O&M section is addressing an administrative requirement to investigate and identify areas that would be impacted by an instantaneous breach of the floodwater retarding dams. This is a highly improbable event and certainly not a projected event from which impacts are determined. The administrative process has recognized these breaches as possible eventualities, no matter how remote the odds of occurrence are, that should be brought to the attention of the local people.

The possibility that new development could change the hazard classification does exist. The county commissioners courts, as project sponsors, are the nearest thing to "appropriate regional and local land use planning and zoning authorities" in existence today in this part of the country. Even some of the counties themselves question their actual authority. Land use regulation is an emerging concern. The Plan-EIS requirement that the sponsoring local organizations be informed and encouraged to publicize potential impact areas is consistent with existing policies. Additional discussion in the Plan-EIS of nonexistent use plans is not warranted.

Comment: The Department stated that the final document should indicate if the project is in compliance with Executive Order 11988, Flood Plain Management.

Response: A table has been added on page 75 to indicate the effects of the recommended plan on resources of principal national recognition. The project is in compliance as shown on page 42.

USDA Office of Equal Opportunity

Comment: The Office stated that their review was to assess the civil rights impact on the minority populations living in or near the affected area.

Response: Noted.

Comment: The Office stated that, based on the information provided in the Draft Plan-EIS, the proposed project will have no adverse impact on the minority populations in the watershed and that it appears the project will benefit minority residents and landowners through improved drainage of their properties, increased recreational opportunities that ensure accessibility and usability by the physically handicapped, and a reduction of floodwater on the flood plain land.

Response: Noted.

Advisory Council on Historic Preservation

Comment: The Council stated:

"We have received and reviewed the above-referenced document and note that considerations relevant to the protection of archaeological and historic resources are briefly addressed on page 25. We also find that on page 42, 'Compliance of the Selected Plan with WRC - Designated Environmental Statutea' is listed as in 'Full Compliance' with the Archaeological and Historic Preservation Act and with National Historic Preservation Act--that is, 'Having met all requirements of the statute for the current stage of planning (either pre-authorization or post-authorization.)' It is our understanding that this reference to compliance with historic preservation laws and regulations pertains only provisionally to steps taken thus far in the watershed planning process and not to the entire project and its eventual implementation. To our knowledge, none of the provisions set forth in National Historic Preservation Act of 1966, as amended, and none of the procedures called for in its implementing regulations, as set forth in 36 CFR Part 800, have been initiated or fulfilled relative to this project to date. Therefore, though contacts with the appropriate Historical Commission chairpersons have not indicated any known threats to historic sites, we recommend that a historic resources survey be conducted in accordance with 36 CFR 800.4(a), to identify and evaluate historic properties (both historic and prehistoric) that may be affected by this undertaking, as described at 36 CFR 800.4(a). If significant properties are identified, a formal Determination of Effect should be developed, in accordance with 36 CFR 800.4(b), (c), and (d), in consultation with the State Historic Preservation Officer and subsequently forwarded to the Council for review. Then, if appropriate, mitigation plans may be developed, in further consultation with the SHPO and the Council, which address means for avoiding or alleviating any adverse impact on significant historic properties that may result from implementation of this watershed plan.

Response: The actions taken to date on cultural resources in the watershed are in accord with the Programmatic Memorandum of Agreement with the Advisory Council on Historic Preservation giving authority to follow the final proposed regulations 7CFR 656, SCS Policy and Procedures for Protecting Archeological and Historic Properties (Cultural Resources) as published in the SCS General Manual, Title 420, Part 401. The procedures outlined in Section 401.7 will be fully implemented before installation of the project measures.

Office of the Governor

Comment: The Office stated that review comments received indicate this project will benefit area residents by providing additional water supplies needed in the future.

Response: Noted.

Texas Department of Water Resources

Comment: The Department stated that upon review of the draft, they found that the report and described projects are adequate.

Response: Noted.

Comment: The Department stated:

"Long-range water planning projections show that the City of Marlin and other cities and unincorporated areas of Falls County will need additional water supplies before the year 2010. The multi-purpose reservoir No. 19 discussed in the Big Creek Watershed Plan could provide additional water supplies needed by the city and county."

Response: Noted.

State Department of Highways and Public Transportation

Comment: The Department stated the proposed improvements will not adversely affect facilities on the existing or proposed state highway system.

Response: Noted.

Texas Parks and Wildlife Department

Comment: The Department stated that the American alligator (Alligator mississippiensis) is no longer classified as endangered by the federal government as stated on page 23 of the draft.

Response: The section on "Endangered Species" has been corrected.

Comment: The Department stated:

"Since this agency has participated in field surveys and the development of the stated mitigation plan, this Department is in agreement with the proposed features. Implementation of the mitigation plan would effectively minimize impacts of the project upon fish and wildlife resources."

Response: Noted.

The responding individuals' comments are grouped into general concerns as follows:

Comment: Nine letters were received from 14 individuals expressing their support for the project. Their main concerns were the need for an adequate supply of water for municipal and industrial use. Other concerns expressed were to reduce flooding to improve the land.

Response: Noted.

Comment: Eight letters were received from 10 individuals expressing their opposition to the project. Their main concerns were the effect of construction and water impoundment on their land.

Response: Guidelines are established through Public Law 566 for the local sponsors to acquire land rights on all land affected by construction or inundation. Land rights may be donated or acquired through negotiation for compensation of damages. This compensation is part of the project cost for land rights which is described in the Plan-EIS.

Comment: One letter opposed the construction of the two dikes because "it will destroy approximately (sic) 1/2 mile of the most productive springs I was told in all of Texas."

Response: The springs referred to in this comment were identified during project planning. Dike D-1, which is planned for construction near this area, will be designed to avoid interruption of the springs.

Comment: The same letter expressed concern that the dikes would destroy natural animal resources.

Response: A team of biologists representing SCS, the U.S. Fish and Wildlife Service, and the Texas Parks and Wildlife Department studied the proposed project and agreed that the planned mitigation measures were adequate to protect the wildlife habitat in the watershed.

Comment: Another letter expressed concern that a particular tract of hardwood trees which is used as a family recreation facility will be under water at flood stage and that the trees will be lost.

Response: The hardwood trees and recreation area referred to in this comment will be flooded for periods up to 10 days after inflow ceases following major storm events. Plant scientists have stated that this short and infrequent period of inundation will not adversely affect the hardwood trees.

Comment: One petition bearing 186 names was received expressing opposition to the project. Signatures on the petition represented "property owners and taxpayers." The petition stated that ". . . the cost

of construction of the retention dams and the loss of productive farming land combine to make the project economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up the monetary loss to the people involved. . . ."

Response: Cost figures used in planning the project are based on actual construction costs of similar structures in this geographical area of Texas. All costs are based on current prices. Estimated cost of the land rights needed for the installation of the project exceeded the value of the productivity of the land. Project benefits were evaluated using current normalized prices and established procedures dictated by Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies published by the U.S. Water Resources Council. These evaluations determined that the project is economically feasible.

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Other Governmental Agencies with Major Input:

USDI, Fish and Wildlife Service
Texas Parks and Wildlife Department

Private Agencies Providing Information Under Contract:

Nunley Multimedia Productions, Dallas
Environmental Sciences of San Marcos

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APPENDIX A

Letters and oral comments received on Draft Plan-EIS.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
INTERFIRST TWO BUILDING, 1201 ELM STREET
DALLAS, TEXAS 75270

APR 23 1984

Billy C. Griffin
State Conservationist
USDA-Soil Conservation Service
101 South Main
Temple, Texas 76501

Dear Mr. Griffin:

We have completed our review of your agency's Draft Plan and Environmental Impact Statement (EIS) for the proposed Big Creek Watershed Project, Falls, Limestone, and McLennan Counties, Texas.

We classify your Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the proposed project action. The statement contained sufficient information to evaluate the associated environmental impacts. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on the proposed Federal action under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and to the adequacy of the EIS at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft EIS. Please send our office five (5) copies of the Final EIS at the same time it is sent to our Office of Federal Activities, U.S. Environmental Protection Agency, Washington, O.C. -

Sincerely yours,


Dick Whittington, P.E.
Regional Administrator

Enclosure

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102
April 16, 1984

REPLY TO
ATTENTION OF:

Planning Division

Mr. Billy C. Griffin
State Conservationist
Soil Conservation Service
101 South Main
Temple, Texas 76501-7682

Dear Mr. Griffin:

We have reviewed the Draft Environmental Impact Statement for Big Creek. (Tri-County) Watershed, Texas, and have the following comments:

The project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the discharge of dredged and fill material into waters of the United States. All of the floodwater retention structures will involve such discharges but are located upstream of the headwaters and may be authorized by a nationwide permit. The only requirement for this authorization is that the work is in compliance with the conditions listed on the enclosure. The proposed Channel Improvement of Big Creek shown on Appendix B4 may require authorization by individual permit if the work will involve the discharge of fill material into the old channel.

On Page 72 of the DEIS it is stated that wetlands will not be affected by the project. However, Appendix B4 shows a proposed dike from structure 34 south to a point near the town of Highbank. This dike will directly impact a wetland adjacent to Big Creek. In addition, the floodwater retention structures flooding to maintain their wetland characteristics.

Thank you for the opportunity to present our comments.

Sincerely,

H. Roger Hamilton
Chief, Environmental Resources Branch

Enclosure

DISCHARGES INTO CERTAIN WATERS OF THE UNITED STATES

The U.S. Army Corps of Engineers regulates the *discharge of dredged and fill material* into the waters of the United States under authority of *Section 404* of the Clean Water Act (Public Law 95-217, dated 27 December 1977). A general permit has been issued on a nationwide basis for the placement of dredged and fill material into *certain waters* of the United States. These include: nontidal rivers, streams, and their impoundments, including their adjacent wetlands all of which are located above the headwaters of the stream. *Headwaters* is defined as that point on a nontidal stream above which the average annual flow is less than five cubic feet per second. This permit also authorizes discharges into other nontidal waters of the United States that are not part of a surface tributary system to interstate waters or navigable waters of the United States. Activities authorized under this nationwide permit are subject to the following conditions:

- (1) That the discharge will not be located in the proximity of a public water supply intake;
- (2) That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or destroy or adversely modify the critical habitat of such species;
- (3) That the discharge will consist of suitable material free from toxic pollutants in toxic amounts;
- (4) That the fill created by the discharge will be properly maintained to prevent erosion and other nonpoint sources of pollution;
- (5) That the discharge will not occur in a component of the National Wild and Scenic Rivers Systems; and
- (6) That the best management practices listed on the reverse side should be followed to the maximum extent practicable.

If your project is to be constructed within the terms of these criteria no further administrative action is necessary. If the project does not fit the criteria you should make application for an individual permit. Application should be made to the District Engineer; ATTN: Chief, Operations Division, SWFOD-O; P.O. Box 17300; Fort Worth, Texas 76102. If you have any further questions you may contact the Permits Section at 817-334-2681.

BEST MANAGEMENT PRACTICES

In addition to the conditions specified in the nationwide permit, the management practices listed below should be followed to the maximum extent practicable, in the discharge of dredged or fill material allowed under the permit. These practices will minimize the adverse effects of the discharges on the aquatic environment. Failure to comply with these practices may result in action to suspend authorization under the nationwide permit and require an individual permit.

- (1) Discharges of dredged or fill material into the waters of the United States should be avoided or minimized through the use of other practical alternatives.
- (2) Discharges in spawning areas during the spawning season shall be avoided.
- (3) Discharges shall not restrict or impede the movement of aquatic species indigenous to the waters or the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).
- (4) If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized.
- (5) Discharges in wetlands areas shall be avoided.
- (6) Heavy equipment working in wetlands shall be placed on mats.
- (7) Discharges into breeding and nesting areas for migratory waterfowl shall be avoided.
- (8) All temporary fills shall be removed in their entirety.



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-84/368

MAY 1 1984

Mr. Billy C. Griffin
State Conservationist
Soil Conservation Service
Department of Agriculture
101 South Main
Temple, Texas 76501-7682

Dear Mr. Griffin:

The Department of the Interior has reviewed the draft Watershed Plan - Environmental Impact Statement for the Big Creek (Tri-County) Watershed, Texas, and offers the following comments.

General

We conclude that the subject document adequately describes the existing problems within the watershed, and presents the proposed watershed development plan and alternatives and expected impacts therefrom in a clear manner. However, the Summary and Comparison of Candidate Plans chart that appears on pages 33 and 34 should clarify the difference between "Without Project" and "Alternative 1 (No Project)."

Fish and Wildlife Resources

We wish to commend your biological staff for coordinating their activities closely with biologists of our Fort Worth Ecological Services Field Office, U.S. Fish and Wildlife Service, since inception of the proposed project planning effort. As a result, we find that, with minor exceptions, the subject document adequately describes the anticipated impacts on fish and wildlife that would be associated with the proposed action.

On page 70 of the document, it is stated that, "Installation of the project will affect 3,454 acres of wildlife habitat." However, the table that appears on page 71 indicates that 7,472 acres of habitat would be affected. While we are able to decipher that the additional 4,018 acres would be located within or on project detention pool, buffer and flowage easement areas and, thus, would not be significantly impacted, the discrepancy in the two figures should be clarified nevertheless.

On page 72, the statement is made that, "Wetlands in the project will not be affected by the project." A similar indication is made on page 4. It is our opinion that some impacts to wetlands would occur. Streams in which structures would be placed would be affected, as is mentioned in the second paragraph on page 69 and the extent of the area that presently is subjected to flooding would be reduced by the emplacement of control structures and dikes. We believe that the "Wetlands" section should be expanded to address these impacts, as well as recognize that wetlands would probably be created at the retarding structures and along the fringes of the 1,572 acres of open water that would be created.

Mineral Resources

The document would be enhanced by the inclusion of a section on the status of the mineral industry in the three county area. The Minerals Yearbook, a publication of the U.S. Bureau of Mines, illustrates that in the past the mineral sector has contributed significantly to the economic welfare of the three county region.

We note from the proposed project area map that at least ten pipelines traverse the watershed. It is suggested that the project plan be coordinated with the pipeline operators in order to avoid any potential disruption to pipeline facilities.

Cultural Resources

Since only portions of the watershed have been surveyed, as stated on page 25 of the subject document, we do not believe that the requirements of Section 106 of the National Historic Preservation Act and the regulations contained in 36 CFR 800 have been fully complied with, as is concluded in the chart that appears on page 42. Therefore, it is recommended that the State Historic Preservation Officer, which in Texas is Mr. Curtis Tunnell, Texas Historical Commission, Post Office Box 12276, Capitol Station, Austin, Texas 78711, be consulted to determine the need for a complete cultural resources survey of all areas subject to impact by the proposed project.

The procedures, which appear on page 41, that would be followed if previously unidentified cultural resources are discovered should be specifically delineated. In the event of an emergency discovery, an additional contact should be the National Park Service's Departmental Consulting Archeologist, Washington, D.C., at commercial telephone number (202) 343-4101, or FTS 343-4101.

On page 47, it is stated that "The National Park Service will be responsible for funding the cost of mitigation which exceeds one percent of Public Law 566 construction cost of each measure that affects archeological resources." This statement is not entirely correct. The Archeological and Historical Preservation Act, Public Law 93-29, provides that a Federal agency can either undertake the requisite recovery, protection and preservation of cultural resources themselves in coordination with the Secretary of the Interior, or transfer a maximum of one percent of the total project appropriation to the Secretary of the Interior for this purpose.

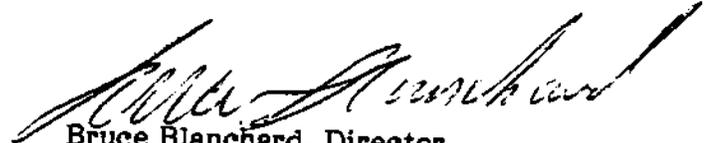
We note in the fourth paragraph on page 73 that impacts to cultural resources would be mitigated by salvage. It is our position that salvage is generally less preferable than preservation in situ. Only after all possible avenues to avoid impacts to cultural resources have been considered should mitigation plans be prepared. Typically, this should be accomplished under the Section 106 process mentioned previously.

Mr. Billy C. Griffin

3

The opportunity to comment on the subject draft Watershed Plan - Environmental Impact Statement is appreciated.

Sincerely,



Bruce Blanchard, Director
Environmental Project Review

Centers for Disease Control
Atlanta GA 30333

April 25, 1984

Mr. Billy C. Griffin
State Conservationist
Soil Conservation Service
101 South Main
Temple, Texas 76501-7682

Dear Mr. Griffin:

We have completed our review of the Draft Watershed Plan and Environmental Impact Statement (EIS) for Big Creek (Tri-County) Watershed, Falls, Limestone, and McLennan Counties, Texas. We are responding on behalf of the U.S. Public Health Service.

We note that public recreational use will be prohibited at all sites except site Number 19, where public access and facilities will be provided. The Final EIS should indicate the type of sanitary facilities that are planned and also the planned operation and maintenance of these facilities. We recommend that you consult with the appropriate State and local health departments for relevant requirements and approvals for these facilities.

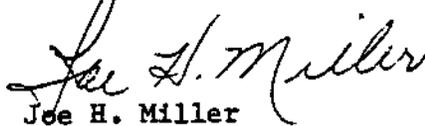
The installation of the proposed project will reduce the downstream flood hazards and will provide land users the opportunity to more effectively utilize these lands. However, it is stated on page 63 that the project impact on land management within the total watershed is "insignificant." We have concerns about future land use. The "Operation and Maintenance" section of the Draft EIS alludes to this concern by indicating that "sponsors should discourage development in potential impact areas." Since it is understood that inappropriate land uses in the future could change the existing hazard classification of the planned structures, we recommend that actions be taken prior to project implementation to ensure the long term prevention of adverse impacts upon health and safety, as well as upon property. We suggest that sponsors consult with appropriate regional and local land use planning and zoning authorities regarding the future land use of impact areas. The Final EIS should discuss these future use mitigation plans.

With regard to the affected floodplains within the project area, the final document should indicate if the project is in compliance with Executive Order 11988, Floodplain Management.

Page 2 - Mr. Billy C. Griffin

We appreciate the opportunity to review this draft document. Please forward a copy of the Final EIS when it becomes available. If you should have questions regarding our comments, please contact Mr. Ken Holt of our staff at (404) 452-4161.

Sincerely yours,

A handwritten signature in cursive script that reads "Joe H. Miller". The signature is written in dark ink and is positioned above the typed name.

Joe H. Miller
Acting Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health



United States
Department of
Agriculture

Office of
the Secretary

Office of
Equal
Opportunity

Washington, D.C.
20250

SUBJECT: Draft Watershed Plan and Environmental
Impact Statement for Big Creek (Tri-
County) Watershed

TO: Billy C. Griffin
State Conservationist

THRU: Peter C. Myers, Chief
Soil Conservation Service

The draft Watershed Plan-Environmental Impact Statement for Big Creek (Tri-County) Watershed in Falls, Limestone, and McLennan Counties, Texas, was reviewed by this office to assess the civil rights impact on the minority populations living in or near the affected area.

Based on the information provided in your draft plan and EIS, your proposed project will have no adverse impact on the minority populations in the watershed. Based on the information provided in the plan, it appears that the project will benefit minority residents and landowners through improved drainage of their properties, increased recreational opportunities that ensures accessibility and useability by the physical handicapped, and a reduction of floodwater on the flood plan land.

Thank you for the opportunity to review the draft plan-EIS.

ALMA R. ESPARZA
Director

Advisory Council On Historic Preservation

1522 K Street, NW
Washington, DC 20005

Reply to:

730 Simms Street, Room 450
Golden, Colorado 80401

April 17, 1984

Mr. Billy C. Griffin
State Conservationist
Soil Conservation Service
101 South Main
Temple, TX 76501-7682

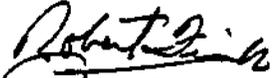
REF: Draft Watershed Plan and Environmental Impact Statement,
Big Creek (Tri-County) Watershed

Dear Mr. Griffin:

We have received and reviewed the above-referenced document and note that considerations relevant to the protection of archaeological and historic resources are briefly addressed on page 25. We also find that on page 42, "Compliance of the Selected Plan with WRC - Designated Environmental Statutes" is listed as in "Full Compliance" with the Archeological and Historic Preservation Act and with National Historic Preservation Act--that is, "Having met all requirements of the statute for the current stage of planning (either pre-authorization or post-authorization.)" It is our understanding that this reference to compliance with historic preservation laws and regulations pertains only provisionally to steps taken thus far in the watershed planning process and not to the entire project and its eventual implementation. To our knowledge, none of the provisions set forth in National Historic Preservation Act of 1966, as amended, and none of the procedures called for in its implementing regulations, as set forth in 36 CFR Part 800, have been initiated or fulfilled relative to this project to date. Therefore, though contacts with the appropriate Historical Commission chairpersons have not indicated any known threats to historic sites, we recommend that a historic resources survey be conducted in accordance with 36 CFR 800.4(a), to identify and evaluate historic properties (both historic and prehistoric) that may be affected by this undertaking, as described at 36 CFR 800.4(a). If significant properties are identified, a formal Determination of Effect should be developed, in accordance with 36 CFR 800.4(b), (c), and (d), in consultation with the State Historic Preservation Officer and subsequently forwarded to the Council for review. Then, if appropriate, mitigation plans may be developed, in further consultation with the SHPO and the Council, which address means for avoiding or alleviating any adverse impact on significant historic properties that may result from implementation of this watershed plan.

We look forward to hearing from you again on these matters. If you have questions in the meantime, or if we can provide anything further, please contact Dean Shinn of my staff at (303) 234-4946, an FTS number.

Sincerely,



Robert Fink
Acting Chief, Western Division
of Project Review



OFFICE OF THE GOVERNOR

MARK WHITE
GOVERNOR

June 8, 1984

Mr. Billy C. Griffin
Soil Conservation Service
U.S. Department of Agriculture
181 South Main
Temple, Texas 76501

Dear Mr. Griffin:

The Governor's Planning Office has received for review the draft Environmental Impact Statement (EIS) to the Big Creek Watershed area in Falls, Limestone, and McLennan Counties. The State EIS Identifier number assigned to your application is 4-03-50-010.

Review comments received indicate this project will benefit area residents by providing additional water supplies needed in the future. Comments are enclosed for your information.

The Governor's Planning Office appreciates the opportunity to review your EIS for more effective state coordination. If we may be of assistance, please contact this office.

Sincerely,

A handwritten signature in cursive script, reading "John M. Gosdin".

John M. Gosdin, Coordinator
Natural Resources, Water and Environment

JMG:clt

Enclosures

TEXAS DEPARTMENT OF WATER RESOURCES

1700 N. Congress Avenue

Austin, Texas



Charles E. Nemir
Executive Director

April 16, 1984

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Ralph Roming

ADD 18 1084

OFFICE OF PLANNING

Mr. Robert E. McPherson
Governor's Planning Director
Regional Planning/TRACS Section
P. O. Box 13561
Austin, Texas 78711

Dear Mr. McPherson:

Re: Review of Big Creek (Tri-County) Watershed Work Plan, EIS #4-03-50-010

Upon review of the draft, Watershed Plan and Environmental Impact Statement for Big Creek Watershed, we find that the report and described projects are adequate.

Long-range water planning projections show that the City of Marlin and other cities and unincorporated areas of Falls County will need additional water supplies before the year 2010. The multi-purpose reservoir No. 19 discussed in the Big Creek Watershed Plan could provide additional water supplies needed by the city and county.

Thank you for the opportunity to review this report, and if I or the staff can be of further assistance, please feel free to call.

Sincerely,


Charles E. Nemir
Executive Director





COMMISSION

ROBERT C. LANIER, CHAIRMAN
ROBERT H. DEDMAN
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

AUSTIN, TEXAS 78701

April 23, 1984

ENGINEER-DIRECTOR
MARK G. GOODE

IN REPLY REFER TO
FILE NO.

D8-E 854

4-03-50-010
Big Creek (Tri-County) Watershed
Falls, Limestone & McLennan Counties

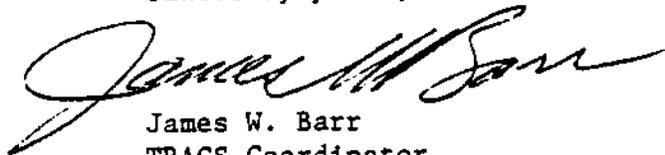
Mr. Robert E. McPherson
Governor's Planning Director
Regional Planning/TRACS Section
P.O. Box 13561
Austin, Texas 78711

Dear Mr. McPherson:

Thank you for the opportunity to review the draft watershed plan and environmental impact statement covering the Big Creek (Tri-County) Watershed in Falls, Limestone and McLennan Counties.

The proposed improvements will not adversely affect facilities on the existing or proposed State Highway System.

Sincerely yours,


James W. Barr
TRACS Coordinator





TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road Austin, Texas 78744

CHARLES D. TRAVIS
Executive Director

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Lubbock

WM. M. WHELESS, III
Houston

May 21, 1984

Mr. Billy C. Griffin, State
Conservationist
101 South Main
Temple, Texas 76501-7682

Re Big Creek (Tri-County) Watershed;
Draft Watershed Plan and EIS,
February 1984

Dear Mr. Griffin:

The following comments are provided concerning the above-referenced document.

Page 23, Endangered Species: The American alligator (Alligator mississippiensis) is no longer classified as endangered by the federal government.

Page 40 & 41 Mitigation Features: Since this agency has participated in field surveys and the development of the stated mitigation plan, this Department is in agreement with the proposed features. Implementation of the mitigation plan would effectively minimize impacts of the project upon fish and wildlife resources.

I appreciate the cooperative efforts of your staff and the coordination afforded this Department during project planning.

Sincerely,


Charles D. Travis
Executive Director

CDT:RWS:mo

Wilson Brothers

C O M P A N Y I N C O R P O R A T E D

201 LIVE OAK • MARLIN, TEXAS 76661

QUALITY CLOTHES

May 2, 1984

Mr. Billy Griffin, State Conservationist
Soil Conservation Service
101 So. Main
Temple, TX 76502

Dear Mr. Griffin:

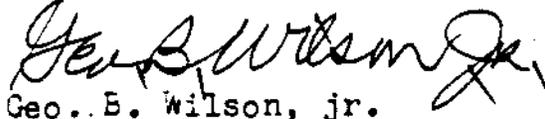
This is to advise you of my support for the Big Creek Watershed project. Your efforts to get this project started and completed as soon as possible will be greatly appreciated by me and the majority of people in Falls County.

My primary concern is caused by Marlin's need for a new and larger water supply. The enlarged Brushy Creek reservoir *WOULD* solve this problem adequately. As far as I know, this is about the only location that will provide Marlin with an adequate supply of water.

I own land in Big Creek bottom that is practically worthless and is appraised accordingly. It has been in this sorry condition since time in memorial. Completion of this project would make it just as productive and valuable as the best land in the Brazos bottom.

Nothing that is in sight would help Falls County as much as the full fruition of this flood control project.

Very truly yours,



Geo. E. Wilson, jr.

MARLIN DAILY DEMOCRAT

Dwight L. Thomas
Publisher

211 Fortune Street
P.O. Box 112
Marlin, Texas 76661
(817) 883-2554

April 20, 1984

Billy C. Griffin
State Conservationist
U.S. Soil Conservation Service
101 South Main
Temple, Texas 76501

Dear Mr. Griffin:

The most pressing need for Marlin, Falls and McLennan Counties is the vital water and flood control project known as the Big Creek Watershed plan.

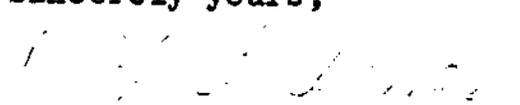
Future growth of these areas, the necessity of providing water for flood control, water needs of tens of thousands of residents, the demands of prospective industries and the reclamation of thousands of acres into productive status are all dependent on implementation of this plan. Recreational facilities to be gained on the 695 acres of lake to be constructed will add enjoyment for many people.

All these enumerated needs far out-shadow the selfish desires of a few landowners and their legal advisors.

I firmly advocate the initiation of the Big Creek Watershed project with its series of 21 dams and all the benefits that will be derived by so many in the future.

Enclosed is an editorial that I wrote on the topic to state the positive aspects of this project that I wish to add to my letter. May this project come to pass soon.

Sincerely yours,


Dwight L. Thomas

Act now for future growth . . .

The biggest water and flood control project to insure the future growth of Marlin, Falls and eastern McLennan counties is in the balance. Your support of the Big Creek Watershed plan is needed. The project will be beneficial to tens of thousands of area residents. It also will provide an abundant water supply for the City of Marlin for years to come.

Big Creek Watershed project plan includes 21 dam structures along Big Creek, from north of Mart to the Brazos River 14 miles south of Marlin. Part of the plan includes a large dam which will create a 695-surface acre lake to be used for City of Marlin water supply and area recreational facilities.

The project will cut the 47,000 acres of land along the length of the watershed currently subject to extensive and regular flooding to 22,000 acres, removing over 50 percent of the acreage currently subjected to flooding. Cost savings would be reduced from \$1.8 million in annual damage to \$805,000 if the plan is implemented. This will salvage over 25,000 acres from flooding that can be reclaimed for productive use.

You are urged to respond favorably before the May 4 deadline to insure that this vital and far-reaching project will come into reality. Act now for future growth of this area and guarantee that an adequate water supply will be provided. Write to Billy C. Griffin, State Conservationist, U.S. Soil Conservation Service, 101 S. Main, Temple, Texas 76501.

MURRAY WATSON, JR.

ATTORNEY-AT-LAW
111 So. 18th Street
Waco, Texas 76701

MURRAY WATSON, JR.
DENNIS G. GREEN (Associate)

P.O. BOX 1308
WACO, TEXAS 76703-1308
(817) 763-0913

April 24, 1984

United States
Department of Soil Conservation
101 South Main
Temple, Texas 76501-7682

Attention: Mr. Billy Griffin

RE: Big Creek (Tri-County)
Watershed Plan

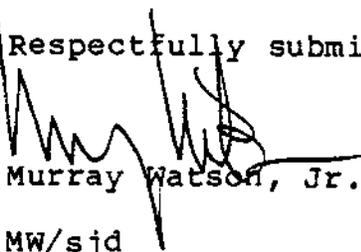
Dear Mr. Griffin:

This is to renew my objection to the proposed Big Creek Watershed plan as it effects our property in Limestone County.

We own property which will be effected adversely on proposed reservoir 5, 7, 8, 9 and possibly 2 but I can not tell from the map.

There will be petitions forthcoming in opposition to this project from land owners and taxpayers in the community.

Respectfully submitted,


Murray Watson, Jr.

MW/sjd

407 Maryland
Marlin, Ia. 76661

April 21, 1984

Mr. Billy C. Griffin
State Conservationist
U.S. Soil Conservation Service
101 S. Main
Temple, Ia. 76501

Dear Mr. Griffin:

As a member of the City Council of Marlin I offer you my full support in any way possible to the Big Creek Watershed Plan. Having an adequate water supply for Marlin is our most pressing need and it is vital to the future of Marlin. If there is anything I can do personally to promote this project, please let me know.

Yours truly,
Chester Tate

May 11, 1984

Bill Paske
3225 Morrow
Waco, Texas 76706

Billy Griffin
U.S. Soil Conservation Service
West 304 N. Roberts
Waco, Texas

To Whom It May Concern:

I strongly oppose the construction of two dikes you have intention of building on my property. First off-it will destroy approximately 1/2 mile of the most productive springs I was told in all of Texas. This is nature's water of which we are badly in need of.

Second the dikes will in no way help in retaining water because its to far down in the Brazos River bottom where the land is all flat. It will only cause it to spread over thousands of acres of land that's in cultivation now.

Third I realize you people have done a wonderful job in helping so many of us out in the past, but in my case you will be destroying one of the most natural animal resources that I know of in this part of the country. I only own a little over 100 acres on this creek, and I would like to see it stay like it is. I would like my grandchildren and their friends in the future to know what animals look like alive such as rabbits squirrel, skunk, etc, plus many kinds of birds you only see them in the cities - not - in the country any more.

Im asking you to please consider my request and let my water and tree stand.

Thank you,

Respectively
Bill Paske

Bill Paske

CC. ENVIRONMENTAL PROTECTION AGENCY

April 17, 1984

Dear Mr. Griffin:

I heartily endorse the Big Creek Watershed project. As a citizen of Falls County I wish to do anything I can to achieve that great benefit to County.

Sincerely,



Hazel Goddard

Hazel Goddard

3 May 1984

From: Richard L. CURBELLO, 3205 Tanglebriar, Pasadena, Texas 77503
To: Billy C. GRIFFIN, State Conservationist, U. S. Soil Conservation Service, 101 So. Main, Temple, Texas 76501

Subj: Big Creek Watershed Project; Opposition of

Ref: (1) Phoncon between myself and Jerry KAZDA, 0930 3 May 1984
(2) Marlin Daily Democrat dtd 13 April 1984
(3) Waco Tribune-Herald dtd 13 April 1984

1. I was unable to be at the meeting held 12 April 1984 in Marlin, TX concerning the Watershed Project due to my being on Active Duty for Training in Washington, D. C. Therefore, after the phone conversation (Ref 1) with Jerry KAZDA, I am following his advise with this correspondence for inclusion into the Watershed Project portfolio.
2. As a property owner and having a vested interest with the Big Creek Watershed Project, I am therefore voicing my strongest opposition possible to this Project.
3. Though my property (Located within 5000 Ft of said structure) will not have permanet water nor flood water from the floodwater-retarding structure (Site # ALT 1 N-16) being proposed on the Shirley STONE & W. D. WOLF #1 property. However, this structure will cause irrevocable damage to my Father-In-Law's farm. (Mr. C. O. PATTERSON) It is for this reason that my vested interests are at stake.
4. My Father-In-Law's farm will have 46.4 acres directly involved with the floodwater-retarding structure (Site # ALT 1 N-16). This is the amount of acreage that will have water covering it for a period of at least ten (10) days. Futher-more, because of the topography, at flood stage, the entire back 80 acres will be isolated for more than ten (10) days. The low areas would require more additional time to dry inorder to allow vehicular traffic to cross. This precludes one from being able to reach his cattle or getting the cattle to the barn feeding area(s).
5. Also within this acreage there are approximately 40 acres for crop availability and is crossed fenced for grazing as directed by the County Soil Conservation Office; Two (2) large stocked ponds built at the direction of the Soil Conservation Office; A five (5) acre tract of the only hard wood trees cultivated to be used in conjunction with one of the ponds to serve as a recreational facility foe the family and other people within the community. In fact, there have been numerous 4th of July picnics held there and attended by over 100 people at any particular time. At flood stage all of this will be totally UNDER WATER!
6. My Father-In-Law purchased this farm in 1964 from his aunt and plans to retire there in 1986. The farm has been in the PATTERSON family since the late 1800's. Great effort and time has been put forth by my Father-In-Law and the rest of the family to ensure that the farm remains a vital part of the family's tradition and heritage. You can be assured that No consent will ever be forthcoming from the PATTERSON or CURBELLO families for the purpose of building this Watershed Project!

7. I have deep reservations concerning the statical presentation given by Beade O. NORTHCUT during the meeting held on the 12th of April 1984 in Marlin, TX. First " That the project would cut the 47,000 acres of land along the lenght of the watershed currently subject to extensive and regular flooding to 22,000 acres." (Ref 2) His word choice of "extensive" might be detable since he stated that annually about \$1.8 Million in damages (Ref 2) over a 370 square mile area (Ref 3) are incurred. Granted \$1.8 Million is alot of money but not to magnitude as depicted by Mr. NORTHCUT. Just where does he get his figures and where is the documentation to back these figures?

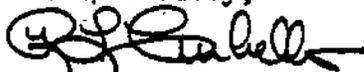
8. Secondly, Mr. NORTHCUT stated that 25,000 acres would be reclaimed at an annual savings of \$995,000 in flood damage (Ref 2). This statement might be true but it is very misleading. What he does not say is that there will be thousands of acres of already productive land flooded elsewhere at a multi-million dollar cost to accomplish this task. By the time you take the flooded acreage away from the projected 25,000 acres reclaimed, the net acreage reclaimed is no where near the 25,000 figure he stated. I do not even want to speculate the monetary figure of damage in the new areas flooded. This hardly seems to be a thorough and thoughtout decision.

9. As one reviews the historical aspects of this particular project (Ref 2), several questions are brought to mind. The project came into existance in 1954 and shortly thereafter it was shelved, for what reason? Why, if my calculations are correct, was there a period of nearly 20 years before the WCID Board began working the project again? Since 1975 they (WCID) were unconcerned or did not deem it necessary to communicate with the landowners directly involved. Why? I did not begin to here about this project until late 1983.

10. I truly beleive that there is an under lying reason for this project other than those stated. In the first place, the WCID Board went to great lenghts to present only the positive points and failed to show the negative points either by deliberate omission or the lack of professional ethics. Futhermore, all the listed sponser in reference 2 with the exception of the Soil & Water Conservation Offices are tax levying authorites. The project would definiately increase tax revenues without raising the tax base. Because the land values increase and so does tax monies, they are directly proportional. That way the taxing authorities do not have to pass a tax increase.

11. In closing, I want to inform you that a copy of this correspondence will be forwarded to all appropriate State and Federal Reprmentatives & Senators expressing my opposition to this superfluous project.

Respectfully,


R. L. CURBELLO

John Chatmas, II
Manager Emeritus

747 Westwood Drive
Marlin, TX 76661
Office: 817-883-5943
The Prudential Insurance Company of America

Soil Conservation Service

101 S. Main

Temple, Texas 76501

Billy Griffin

Dear Sir:

Prudential

4/13/84

It is with regret, ^(in fact) that only the selfish landowners are against Big Creek Flood Control program.

Its hard to believe that about one hundred people can block conservation of water and flood that will benefit thousands of people.

It is my hope that you will keep this in mind proceed with great vigor.

May I hear positive news from you?

Thank you

Sincerely



John Chatmas II

April 27, 1984

Billy C. Griffin
State Conservationist
U. S. Soil Conservation Service
101 South Main
Temple, TX 76501

Re: Big Creek Watershed Project

Dear Mr. Griffin:

I am a landowner that would be adversely effected by the results of the Big Creek Watershed Project. The projected plans are to take 23 acres of my land that would be under water. I object to this since I rent 100 acres which joins the back part of my land. The only way the cattle have access from the rented land to my land is where the 23 acres of water will be.

I was not notified that there was going to be a meeting concerning the project; however, I did hear from a friend and was able to go and air my feelings. I do not feel that this would be to the advantage of most landowners.

Sincerely yours,

W. D. Wolf
Mr. J. D. Day
W. D. WOLF
Rt. 1, Box 123
Groesbeck, TX 76642

April 29, 1984

Gentlemen

I would like for this letter to be recorded expressing my objection and displeasure to the water retention dam, proposed by the sponsors of the Big Creek Watershed Project, to be built commencing on the W. D. Wolf tract #1 adjoining our west property line in Lime-Stone county.

Of the 117 acres we own, this dam would flood up to 46.5 acres for a period of up to ten days with no permanent water on our land. Due to terrain conditions we would not have access to the back eighty acres of our land until the water receded and the low area dried enough for vehicle crossing.

This project would take approximately forty acres of our land out of row crop availability and completely flood some tracts cross fenced for grazing when needed as suggested by the Soil Conservation Office in our county. This would not only prohibit us from leaving our cattle in these tracts but also prevent access of our cattle to the barn feeding area located at the front of our property.

This 117 acre farm and ranch is not just some land located in a bottom no one cares about. It has been in my family since the late 1900's. My wife and I purchased it in 1964 and started improvements. We have traveled weekly from Harris County to farm and ranch this land and prepare

1986 at which time we will need full production of this property.

Since 1976 we have preserved approximately 5 acres of the only hard wood timber on this land for a campground, Community picnic area and wild life habitat. The Soil Conservation office has approved and helped us build two large stock ponds.

At high flood stage, all of this will be flooded and the loss of these trees, ponds and campgrounds will be a tremendous loss to our family.

I have no intention of ever giving my consent for our land to be used for this purpose as proposed by the sponsors of the Big Creek Water Shed Project.

Sincerely,
Carson O. Patterson

April 17, 1984
Marlin, Texas

To: Mr. Billy C. Griffin
State Conservationist
U.S. Soil Conservation Ser.
101 S. Main
Temple, Tx. 76501

From: Gib Kendrick
522 W. Maryland
Marlin, Tx. 76661

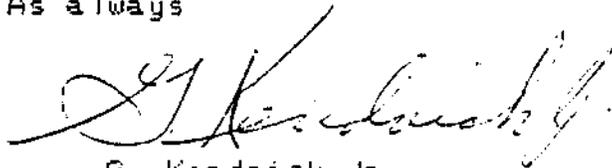
Subject: Big Creek Watershed Project

Dear Sir,

First let me tell you who I am. I am a land owner who has land in the watershed of the Big Creek Project. Most of my land is creek bottom land, North of FM 147 in the ODDS area. I use the land for cattle grazing and try to plant the open land in Summer and Winter grazing crops. We are trying to get bermuda grass established as fast as we can on the suitable land.

I am writing to you to endorse the Big Creek Program for many reasons. First I think it will help my land, next I like to fish and by far not the least, I live in Marlin, and we need a good source of water, bad. There are a lot more things I could say, but as I understand it you only want to hear from us pro or con. If you need any additional comments please let me know.

As always



G. Kendrick Jr.

April 29, 1984

Gentlemen:

I wish to take this opportunity to express my personal objections to the flood control device to be constructed in the "Little Elm" community of Limestone County beginning on the property of W. D. Wolf.

We own 117 acres of the land affected. This land was purchased by my husband's Grandfather, J. M. Patterson, in 1894. We purchased the land in 1964 - the fulfillment of a life long dream. All improvements have been made by the two of us.

The Board wants 46 acres of this land not for permanent water but as a flood area. This would make more than 40% of our total acreage unaccessible for at least 10 days after what they consider flood stage.

We have invested a large part of our lives in this land over the past 20 years. At this time we are there at least 2 days every week and spend all of our vacation there. We plan to retire in 1986 and make this our permanent home.

We will never give our consent for our land to be used for such a project. Thank you for your consideration

Sincerely,

Mrs. Casson O. Patterson

Billy Griffin

April 17, 1984

Dear Mr. Griffin:

My husband and I live in Falls County and we support the Big Creek Watershed project. We certainly want to continue to have a good supply of water.

Sincerely,

Concha Morin

Concha Morin
Blas Morin

July 25, 1984

Dear Bob

I am very much against the Big Creek
contorted project, a great deal of my land
would be destroyed. I know that water would
come all the way up to me if my town or
the flood were to come and you'll would
take the water a great deal of pasture
would be destroyed by water being on it
for a while. We hope you will let the land
owners have their say about things. I would
like that someone could come up with
a better plan than you have now, so you
would not destroy so much farm and pasture
land. Remember we are against it.

Thank you,
Ben Dieterich Sr.
Edith Dieterich

Ben A. Dieterich Sr.
Route 2, Box 218
Riesel, Texas 76682

April 17, 1984

Dear Mr. Griffin:

For the future growth of Marlin, Falls and eastern McLennan counties and particularly for a guarantee of adequate water supply, the John D. Dugats heartily support the Big Creek Watershed project.

Sincerely yours,

Laurie Dugat

Mr. and Mrs. John D. Dugat
P. O. Box 6, Reagan, Texas 76680

202 N. Lumpkin St.
Mart, Tx 76664
April 04, 1984

To: Mr. Billy C. Giffin
State Conservationist, SCS
1015 Main St.
Temple, Texas 76501

Subject: Comments concerning The Big Creek
(Tri County) Watershed Plan, Draft, February 1984.

1. Thank you for providing me a copy of the draft of the Big Creek Watershed Plan.

2. My position regarding this project remains unchanged for the following reasons:

The farm we own is small (89 acres) and is located within site #1 of the floodwater retarding structure. In reviewing Appendix C (project map) it appears that at high water level approximately 1/3 of our tillable farm land would be under water. This would result in an obvious reduction in income from the property due to decreased production. There are no provisions to provide compensation to us for this loss. This compounds the problems of the

Small landowner by reducing income from property which presently provides a very low yield on the investment when all tillable acres are utilized to the fullest extent.

3. Consequently, I am inalterably opposed to participation in The Big Creek Watershed Plan Project which includes our land unless adequate compensation is made for the loss of production and use of land which is being used in support of this project. The value of the Project is not in proportional value for those in our geographical area and it would be, in my opinion, inequitable and grossly unfair if the project was completed without proper compensation being made to the owner and operator for land rendered unusable in support of the project described in your draft.

W. C. Rivers
W. C. RIVERS

4-28-84

WE ARE IN FAVOR of the "Big CREEK
WATERshed" PROJECT.

Mrs. Marwin L. Ramby
Mr. Marwin L. Ramby
Charlotte Ramby
Rt 1 Box 181
Marlin TX 76661

Miss Rose Evelyn Taylor
Rt 1 Box 150
Marlin, Texas 76661

Rt. 2, Box 214
Riesel, Texas 76682
May 9, 1984

Mr. Beade O. Northcut
U. S. Soil Conservation Service
RepublicBank Tower
Waco, Texas 76701

Dear Mr. Northcut:

After reading your comment in Tuesday's News Tribune, my husband and I wish to take this opportunity to voice our protest against the Big Creek Water Project, pointing out the following for your consideration:

1. It is hard to understand how it can benefit anyone when it will be so detrimental to so many people, especially the ones who are giving up land which they use to make a living. And we all know how hard it is on the farmers now.
2. Many in this area have already spent large amounts of money in past years on soil conservation and floodwater control. In addition to the money spent by individuals, just look at the records and see how many thousands have been spent by the Federal Government on all these projects.
3. In these days of such poor economy, can the taxpayers really afford such a move as you're contemplating now? You may have money budgeted for such things, but do you really have to spend it all just because it is budgeted?
4. Soending money for recreation facilities now sounds like frivolous spending to us- not good management. There are so many lakes and parks now.
5. Think how it might affect your bosses, the politicians running for office in this election year!

Thank you for your consideration of our opinions.

Very truly yours,



Doris J. Basinger
for Doris J. & Howard D. Basinger, Sr.

Copy: Marvin Leath
J. S. Williams, Jr.

MURRAY WATSON, JR.
ATTORNEY-AT-LAW
111 So. 18th Street
Waco, Texas 76701

MURRAY WATSON, JR.
DENNIS G. GREEN (Associate)

PO BOX 1004
WACO, TEXAS 76703-1004
(817) 753-0911

May 15, 1984

Soil Conservation Service
Limestone County Courthouse
Groesbeck, Texas

Re: Opposition to Big Creek
Watershed

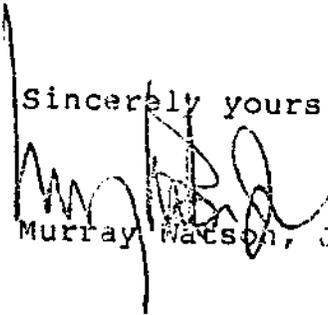
Dear Sirs:

Enclosed please find Xerox copies of Petitions circulated in the upper tributaries of Big Creek Watershed in opposition of the construction of flood retention dams on properties in Limestone, McLennan, and upper Falls County.

I would appreciate your making note of this and anything you can do to help prevent the inundation and loss of productive farm land in the upper areas.

With best regards, I am

Sincerely yours,


Murray Watson, Jr.

MW:cr
Enclosures

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

The proposed retention dams will take the land out of production and decrease the market value of all the land in the upper portion of the Big Creek Watershed.

The cost of construction of the retention dams and the loss of productive farming land combine to make the project economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up the monetary loss to the people involved. The federal government is operating with a deficit, we should be looking for ways to save tax dollars and not incur unnecessary spending on projects such as the Big Creek Watershed project. We the undersigned, recommend that the Big Creek Watershed project not be approved or funded.

By our signatures below, we wish to express our opposition to all persons concerned and ask that it not be approved or funded out of federal, state, or county tax dollars.

This project has been in the making almost twenty years now, and we would like to get it finally laid to rest. We request that it be deleted as a project and that the people who work in Soil Conservation use their time and energy more productively.

WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>Wayne Olm</u>	<u>RT 3 Box 247 B</u>
<u>Ralph Garland</u>	<u>G. B. Overbank Rd</u>
<u>Miller Mae Garland</u>	<u>1102 S. Spruce St</u>
<u>Harold Carter</u>	<u>Monte Vista 76664</u>
<u>W. E. Thompson</u>	<u>Monte Vista 76664</u>
<u>Mildred Thompson</u>	<u>Route 1, Box 104 H. B. Overbank</u>
<u>Evelyn Schumper</u>	<u>76642</u>
	<u>RT 1 Box 34</u>
	<u>Thomson Tex 76687</u>

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>Ann Marie Perry</u>	<u>3677 Grand, Mart TX</u>
<u>Mrs. Geo. H. Archer</u>	<u>313 N. Criswell</u>
<u>R. L. Burchick</u>	<u>305 South Gladland</u>
<u>Wesley Schaffer</u>	<u>Mart, Tex</u>
<u>Ray Denton</u>	<u>518 Towns</u>
<u>Mary Baker</u>	<u>Mart TX</u>
<u>Harley H. Fogle</u>	<u>605 S. Elm St.</u>
	<u>Mart Tex</u>
	<u>203 - 3 - Johnson</u>
	<u>Mart Texas</u>
	<u>307 Cowan</u>
	<u>Mart Texas</u>

NAME

ADDRESS

NAME	ADDRESS
Claudell Hudsonman	814 McJennan Mart
Karon M. Galley	571 North Goddard Mart, Taylor 8664
George Mc Lane	502 SOUTH MAIN MART
Dorothy Header	1111 Texan Ave
Gene Leckewy	1411 Navarre, Mart
C C Jones	1302 McJenna Mart
Wattie Young	Appt 526
Louie Schroeder	507 N. Goddard Mart
David Schroeder	507 N. Goddard Mart
Lessie Earl	509 Bourne
Otis Penchard	RT 2
Mrs. R. L. Bowen	1102 McJennan Mart
Mrs. L. M. Lipad	314 S. Smalley - Mart
Mrs. Carl G. Phillips	116 S. Lumphkin St Mart.
Charles H. Davis	RT 2 Mart, Tex
Blanche King	

NAME

ADDRESS

C. L. Leggy Bunch

216 N. Criswell,
Mart, Texas

Mrs. J. H. Fowler

205 N. Criswell,
Mart, Texas

Mrs. L. E. Brelend

P.O. Box 304
Mart Tex 76664

Mrs. H. E. Price

201 N. Criswell,
Mart Tex. 76664

H. E. Price

201 N. Criswell
Mart. Tex. 76664

M. J. Belman

507 N. Haskell
Mart Tex. 76664

Edney Wilson

209 Emma Mart
" "

Edith M. Wilson

209 N. Emerson St. Mart
310 N. Criswell

Mrs. Roy L. Curry

Mart Texas 76664

Mrs. Mrs. Louis Sawyer

317 N. Criswell
Mart, Tex. 76664

Delores L. Hartman

301 N. Criswell
Mart Texas 76664

Mrs. Mrs. Lennie Lewis

318 N. Criswell
Mart, Texas 76664

Mrs. Bobbie Evans

213 N. Criswell. 76664
Mart, Texas.

NAME

ADDRESS

NAME	ADDRESS
<u>A. B. Beralik</u>	<u>217 Commerce</u>
<u>Julio Baker</u>	<u>Mart, Tex</u>
	<u>303 N. Waco St.</u>
<u>Elin Curry</u>	<u>Mart, Texas</u>
	<u>113 N. Criswell</u>
<u>Mrs. Jennie Thompson</u>	<u>Mart, Tex</u>
	<u>301 N. Lumpkin</u>
<u>Marie Lanner</u>	<u>Mart, Tex 76664</u>
	<u>Mart, Tex -</u>
	<u>1013 McLennans</u>
<u>H. D. Thachley</u>	<u>710, Limestone</u>
	<u>Mart, Tex</u>
<u>Mary F. Wack</u>	<u>315 Clay St.</u>
	<u>Mart, Texas 76664</u>
<u>Frank Danen</u>	<u>210 McLennan</u>
	<u>Mart, Tex</u>
<u>Fane Esterfield</u>	<u>306 N. Criswell</u>
<u>Doris Esterfield</u>	<u>Mart, Tex</u>
<u>Lucille W. Madley</u>	<u>314 N. Criswell St</u>
<u>John W. Madley</u>	<u>Mart, Texas</u>
	<u>316 N. Criswell</u>
<u>May Falley</u>	<u>Mart, Texas</u>
	<u>315 N. CRISWELL</u>
<u>Ray Gibson</u>	<u>MART, TEX</u>
	<u>315 N. Criswell</u>
<u>Mrs. Ray Gibson</u>	<u>Mart, Texas</u>
	<u>309 N. Criswell</u>
<u>Mrs. May Matthey</u>	<u>Mart, Tex</u>
<u>Mrs. Patrick Vera</u>	<u>302 N. Criswell</u>
<u>Patrick Vera</u>	<u>Mart, Texas</u>

**PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED**

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>William Magee</u>	<u>Rt. 1 Box 266</u>
<u>Doug Magee</u>	<u>Mart, Texas 76664</u>
_____	<u>Rt. 1 Box 268</u>
_____	<u>Mart Texas 76664</u>
<u>Charles Pl</u>	_____
<u>Harry Bulson</u>	<u>203 N. Pearl</u>
_____	<u>Mart Texas 76664</u>
<u>C. M. Green</u>	<u>408 N. Emerson</u>
_____	<u>Mart, TX 76664</u>
<u>C. D. Glaser</u>	<u>Rt. 1 Box 356 Mart, Tex</u>
_____	<u>Rt 2 Box 155</u>
_____	<u>Mart, TX 76664</u>

NAME

ADDRESS

Robert E. Wood

Box 406

Mont TX 76664

O. W. Barnard

P.O. Box 426 "

RT 1 Box 436

Kenneth Ellis

Mont Tex

P. B. Barnhart

P.O. Box 162 Mont 76664

S. E. Jones

1013 Jones Mont 76664

Roy Suttles

313 N. Smith Mont

Ernest Federwisch, Jr

RT 1, Box 453 - Mont TX

J. P. Waldman

Rt. 1, Box 430 Mont, Tex.

George H. Jones

Box 300 - Mont, TX.

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

The proposed retention dams will take the land out of production and decrease the market value of all the land in the upper portion of the Big Creek Watershed.

The cost of construction of the retention dams and the loss of productive farming land combine to make the project economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up the monetary loss to the people involved. The federal government is operating with a deficit, we should be looking for areas to save tax dollars and not incur unnecessary spending on projects such as the Big Creek Watershed project. We the undersigned, recommend that the Big Creek Watershed project not be approved or funded.

By our signatures below, we wish to express our opposition to all persons concerned and ask that it not be approved or funded out of federal, state, or county tax dollars.

This project has been in the making almost twenty years now, and we would like to get it finally laid to rest. We request that it be deleted as a project and that the people who work in Soil Conservation use their time and energy more productively.

WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>JR Schlemmer</u>	<u>Rt 1</u> <u>Mart, Tex 76664</u>
<u>Quady C. McMillin</u>	<u>Rt 2</u> <u>MART, TEX 76664</u>
<u>Johnny M. Miller</u>	<u>Rt. 2 Mart, TX 76664</u>
<u>Lloyd E. Walker</u>	<u>Rt 1 Mart 412 76664</u>
<u>John R Schlemmer</u>	<u>205 N. Carpenters</u> <u>Mart, TX 76664</u>
<u>Ed Williams</u>	<u>Mart, Tex Rt. 1 Box 160-76664</u>
<u>Ernest Caldwell</u>	<u>Rout 1 Box 17</u> <u>Mart Tex</u>

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>Miss Jerry Beaman</u>	<u>P.O. Box 214</u>
<u>Carole G. Full</u>	<u>Route 1, TX 76682</u>
<u>William D. Full</u>	<u>Box 212</u>
<u>William D. Full</u>	<u>Route 2, TX 76682</u>
<u>Lydia M. Dieterich</u>	<u>Box 212 Rural TX 76682</u>
<u>Ben Dieterich Sr.</u>	<u>Route 2 Box 218 Rural Texas</u>
<u>L. D. Neumann</u>	<u>Route 2 Rural Texas</u>
<u>Willie Plegans</u>	<u>Route 2, Rural Texas</u>

NAME

ADDRESS

Alice Plagem

Riesel Tex # 2

W. Fleischhauer

Route 2 Box 207

Annice Fleischhauer

Route 2 Box 207

Patsy Booher

Rt 2 Riesel, Tx

W. L. Booher

Rt 2 Riesel Tex

Lydia Grote

R 2 Riesel Texas

Mrs Paul Kuhnke

P-1 Box 113 Marlin, Tex

Paul Kuhnke

Rose Jensen

Rt 2 Box 220

Riesel Texas

Leo Jensen

Rt 2 Box 220

Riesel, Tex

Adolf Disten

Alva E. Eble

Rt 2 Riesel Tx

Law Dab

1117 Redoubt - Waco Tx

Jerry Beaman

Rt 2 Box 216 Riesel Tx

Nina Hill Williamson

P O Box 869

Marlin, Texas 76661

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>Eugene J. Stenk</u>	<u>P.O. Box 173 Mart Texas</u>
<u>Lecia Stenk</u>	<u>P.O. Box 173 Mart Texas 76664</u>
<u>Margie Collins</u>	<u>Mart, Tex. 76664 (Rt 1)</u>
<u>Arthur Cox</u>	<u>Rt 1 - Mart Tex 76664</u>
<u>Fred R. Schlemmer</u>	<u>Route 1 Mart Texas 76664</u>
<u>Becky S. Gotton</u>	<u>205 So. Carpenter Mart, Texas 76664</u>
<u>Theresa Mae Wright</u>	<u>Box 526 Lampasas Texas 76850</u>

NAME

ADDRESS

Robert A. Wright Jr

Box 526 Lampasas TX 76150

Estaline Cain

221 Emerson
Mant, Texas 76664

Spring Watson

398 Texas Ave.
West Texas 76664

Archie Watson

908 Texas Ave
Mant, Texas, 76664

Murray Watson Jr

308 Texas Ave
Mant Texas 76664

NAME

ADDRESS

George J. Gills

711 So. Commerce Street

Murray Watson Jr

305 Taylor St Mart

Conrad Skiles

mart Rt 1

Mrs. Earl Suttle

Mrs. W. J. Baker

Rt. #1 Box 24 Mart Tex

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>W. Rivera</u>	<u>202 N. Lumbkin St.</u> <u>Mart, Tex 76664</u>
<u>Debra A. Rivera</u>	<u>202 N. Lumbkin</u> <u>Mart, Tex. 76664</u>
<u>J. W. Lindly</u>	<u>202 N. Lumbkin Rd Mart Tex 76664</u>
<u>Dorothy Lindly</u>	<u>R-1, Mart, Tex 76664</u>
<u>J. W. Coates</u>	<u>101 Park View Terrace</u> <u>Brownwood Tex 76801</u>
<u>Mrs J. Magister</u>	<u>101 Park View Terrace</u> <u>Brownwood Tex 76801</u>
<u>Paula L. Swanson</u>	<u>P.O. Box 1407</u> <u>MART, TEXAS</u> <u>76664</u>

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

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The cost of construction of the retention dams and the loss of productive farming land combine to make the project economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up the monetary loss to the people involved. The federal government is operating with a deficit, we should be looking for areas to save tax dollars and not incur unnecessary spending on projects such as the Big Creek Watershed project. We the undersigned, recommend that the Big Creek Watershed project not be approved or funded.

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>Eugene J. Shank</u>	<u>P.O. Box 173 Mart TX 76664</u>
<u>Leona Shank</u>	<u>P.O. Box 173 Mart Texas 76664</u>
<u>Margie Collins</u>	<u>Mart, Tex. 76664 (Rt 1)</u>
<u>Arthur Cox</u>	<u>Rt 1 - Mart Tex. 76664</u>
<u>Fred R. Schlemmer</u>	<u>Route 1 Mart Texas 76664</u> <u>205 So. Carpenter</u>
<u>Becky S. Cotton</u>	<u>Mart, Texas 76664</u>
<u>Virginia May Haight</u>	<u>Box 526</u> <u>Lampasas Texas 76850</u>

POSITION IN OPPOSITION
FLOOD WATER RETENTION ON
BIG CREEK WATERSHED

The undersigned, are property owners and farmers within the Big Creek Watershed, and wish, by signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Denton, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

The proposed retention dams will take the land out of production and decrease the market value of all the land in the upper portion of the Big Creek Watershed.

The cost of construction of the retention dams on the most productive farming land combine to make the project financially not feasible. The cost figures allocated to the study are unrealistic and are not adequate to cover the advisory fees to the people involved. The State is operating with a deficit, and should be saving for ways to save tax dollars and not incur unnecessary expenses on projects such as the Big Creek Watershed. The undersigned, recommend that the Big Creek project not be approved or funded.

By our signatures below, we wish to express our opposition to the persons concerned and ask that it not be funded out of Federal, State, or county funds.

The project has been in the making almost twenty years, and we would like to get it finally laid to rest. We would like to see it deleted as a project and that the people who work for Soil Conservation end their time and effort on this project.

WITNESS OUR HANDS this _____ day of April, 1968

[Handwritten signatures]

ADDRESS
[Handwritten address]
West, Tx 75110

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

We, the undersigned, are property owners and taxpayers within the Big Creek Watershed, and wish, by our signature below, to renew our opposition and objection to the construction of flood retention dams and the impounding of water on the upper tributaries of the Big Creek Watershed in Limestone, Falls, and McLennan Counties. The most valuable and productive land we have in the upper tributaries are our creek bottoms.

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The cost of construction of the retention dams and the loss of productive farming land combine to make the project economically not feasible. The cost figures allocated for these in the study are unrealistic and are not adequate to make up the monetary loss to the people involved. The federal government is operating with a deficit, we should be looking for areas to save tax dollars and not incur unnecessary spending on projects such as the Big Creek Watershed project. We the undersigned, recommend that the Big Creek Watershed project not be approved or funded.

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WITNESS OUR HANDS this _____ day of April, 1984.

NAME

ADDRESS

Mary Frances Hargrove 114 So. Limestone, Mart TX

G. W. Hargrove

114 So Limestone
Mart Texas

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

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<u>NAME</u>	<u>ADDRESS</u>
<u>Harold Bynum</u>	<u>Rt 1 Mart TX</u>
<u>Ray Dujardin</u>	<u>Rt 1 Mart, Texas</u>
<u>Howard J. Smith</u>	<u>Rt 1 Mart TX</u>
<u>Chas W. Harris</u>	<u>2727 Columbus Waco</u>
<u>Anne Harris</u>	<u>2727 Columbus Waco</u>
<u>John C. Holmes</u>	<u>Rt 5 COUNTY LINE MART, TX 76854</u>
<u>Edgar Rockwell</u>	<u>Mart TX 76854</u>

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

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<u>NAME</u>	<u>ADDRESS</u>
<u>Ross L. Coker</u>	<u>1501 Navarro, Mart 576664</u>
<u>J. M. Coker</u>	<u>1501 Navarro</u>
<u>John Kasner</u>	<u>Route 2 Mart Tex 76664</u>
<u>D. H. Walter</u>	
<u>Linné Walter</u>	
<u>Mike W. Coker</u>	<u>1501 Navarro</u>
	<u>Mart, Texas 76664</u>

PETITION IN OPPOSITION TO
FLOOD WATER RETENTION DAMS ON
BIG CREEK WATERSHED

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WITNESS OUR HANDS this _____ day of April, 1984.

<u>NAME</u>	<u>ADDRESS</u>
<u>R. S. Gilliam</u>	<u>708 Jey Ave. Mart. Tex</u>
<u>Mrs. R. S. Gilliam</u>	<u>708 Jey - Ave -</u> <u>Mart Tex - 76664</u>
<u>Mrs. William B Young</u>	<u>Bl. 2 Box 1507</u> <u>Magnolia, Texas 77355</u>
<u>Mr. William B Young</u>	<u>Bl. 2 Box 1507</u> <u>Magnolia Texas 77355</u>
_____	_____
_____	_____
_____	_____
_____	_____

APPENDIX B

Support Maps:

- B1 - Recreational Development Map
- B2 - Section of Typical Floodwater Retarding Structure
- B3 - Problem Location Map
- B4 - Potential Location of Structural Measures
- B5 - Potential Impact Area Map

F. M. 147

LEGEND

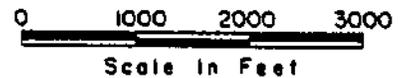
-  Recreation Area Boundary
-  Paved Road
-  County Road
-  Access Road
-  Boat Ramp
-  Boat Deck
-  Sanitary Facility
-  Group Shelter
-  Parking Area
-  Beach Area
-  Water Supply

Municipal Pool
Elev. 380.5

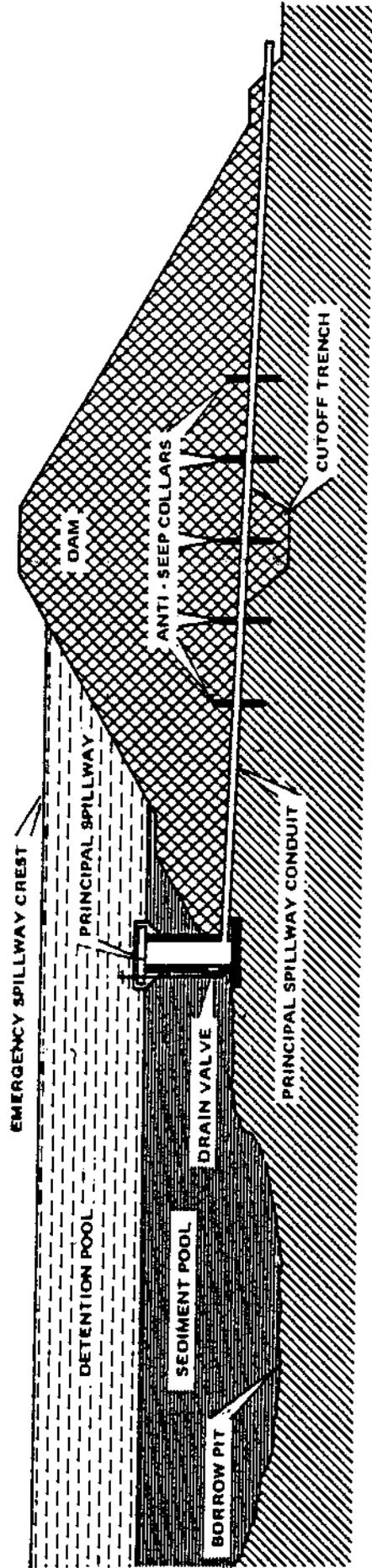
Spillway Crest
Elev. 389.2

Game Area

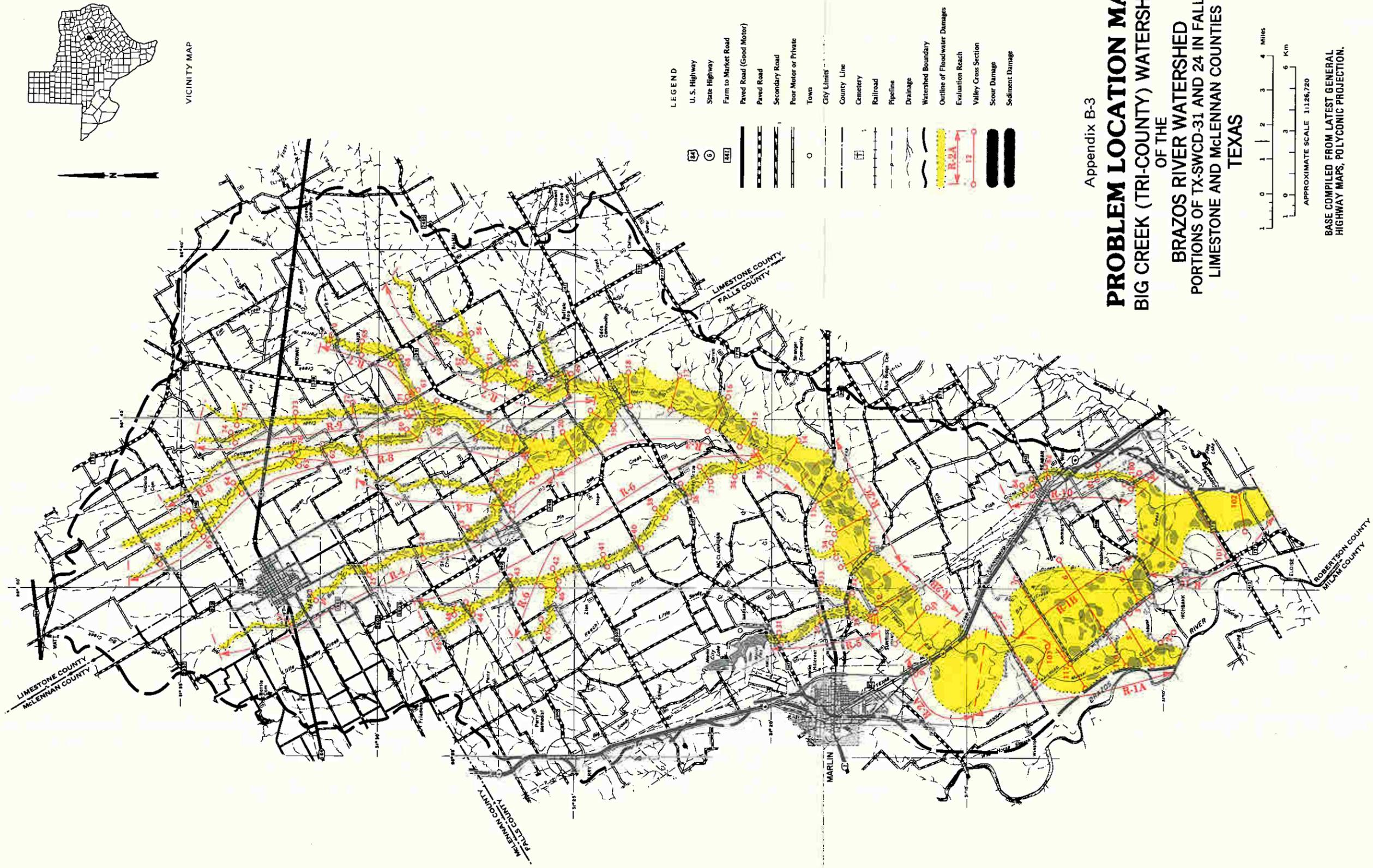
Picnic Area



APPENDIX B-1
RECREATION DEVELOPMENT
BIG CREEK (TRI-COUNTY) WATERSHED
SITE NO. 19
Falls County, Texas
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS



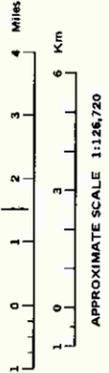
APPENDIX B.2
SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE



VICINITY MAP

- LEGEND**
- U.S. Highway
 - State Highway
 - Farm to Market Road
 - Paved Road (Good Motor)
 - Paved Road
 - Secondary Road
 - Poor Motor or Private
 - Town
 - City Limits
 - County Line
 - Cemetery
 - Railroad
 - Pipeline
 - Drainage
 - Watershed Boundary
 - Outline of Floodwater Damages
 - Evaluation Reach
 - Valley Cross Section
 - Scour Damage
 - Sediment Damage

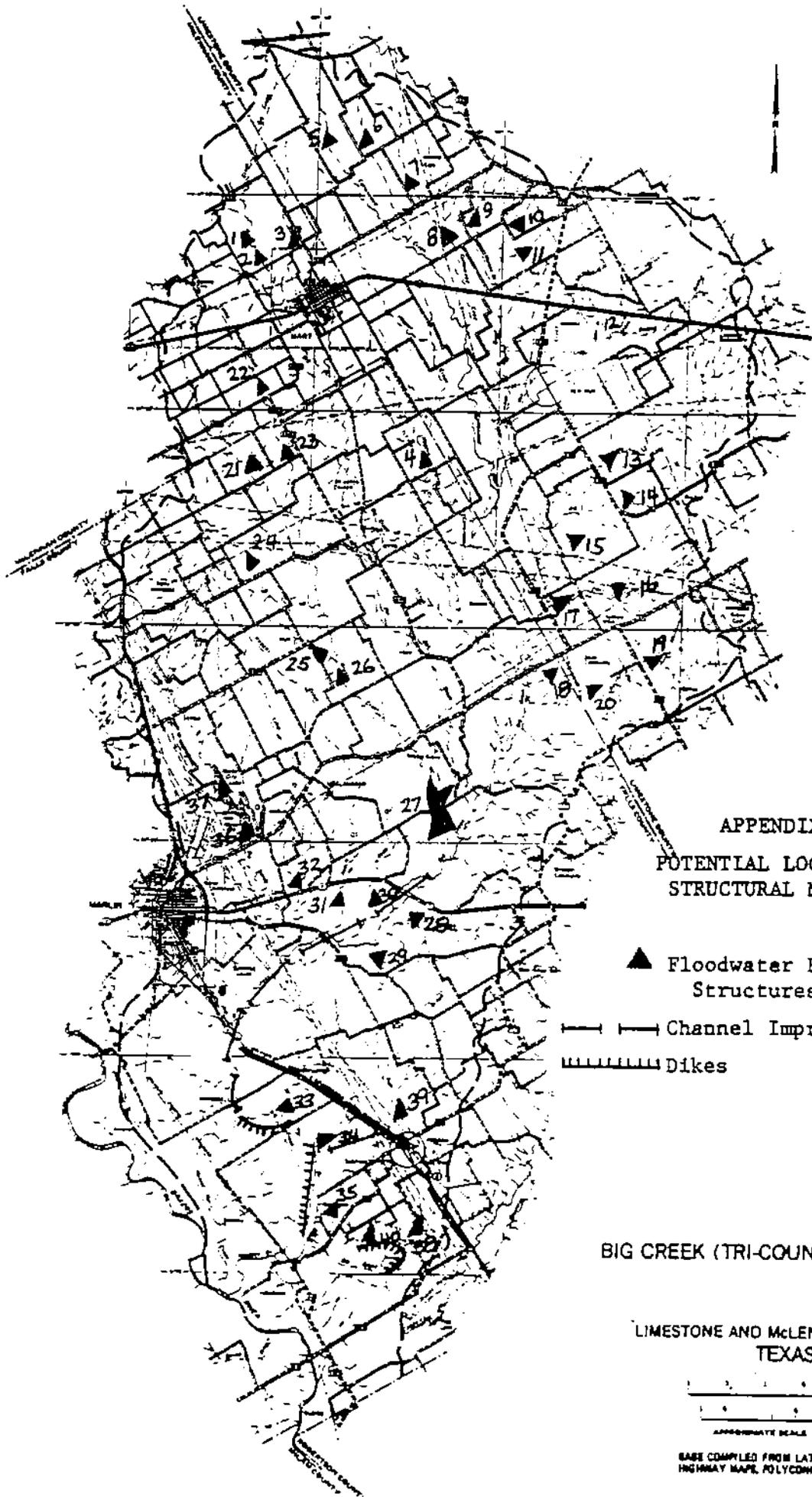
Appendix B-3
PROBLEM LOCATION MAP
 OF THE
BRAZOS RIVER WATERSHED
 PORTIONS OF TX-SWCD-31 AND 24 IN FALLS,
 LIMESTONE AND MCLENNAN COUNTIES
 TEXAS



BASE COMPILED FROM LATEST GENERAL HIGHWAY MAPS, POLYGONIC PROJECTION.



VICINITY MAP

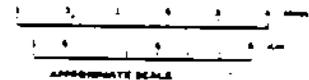


APPENDIX B 4
POTENTIAL LOCATION OF
STRUCTURAL MEASURES

- ▲ Floodwater Retarding Structures
- == Channel Improvement
- ~~~~~ Dikes

BIG CREEK (TRI-COUNTY) WATERSHED

LIMESTONE AND McLENNAN COUNTIES
TEXAS

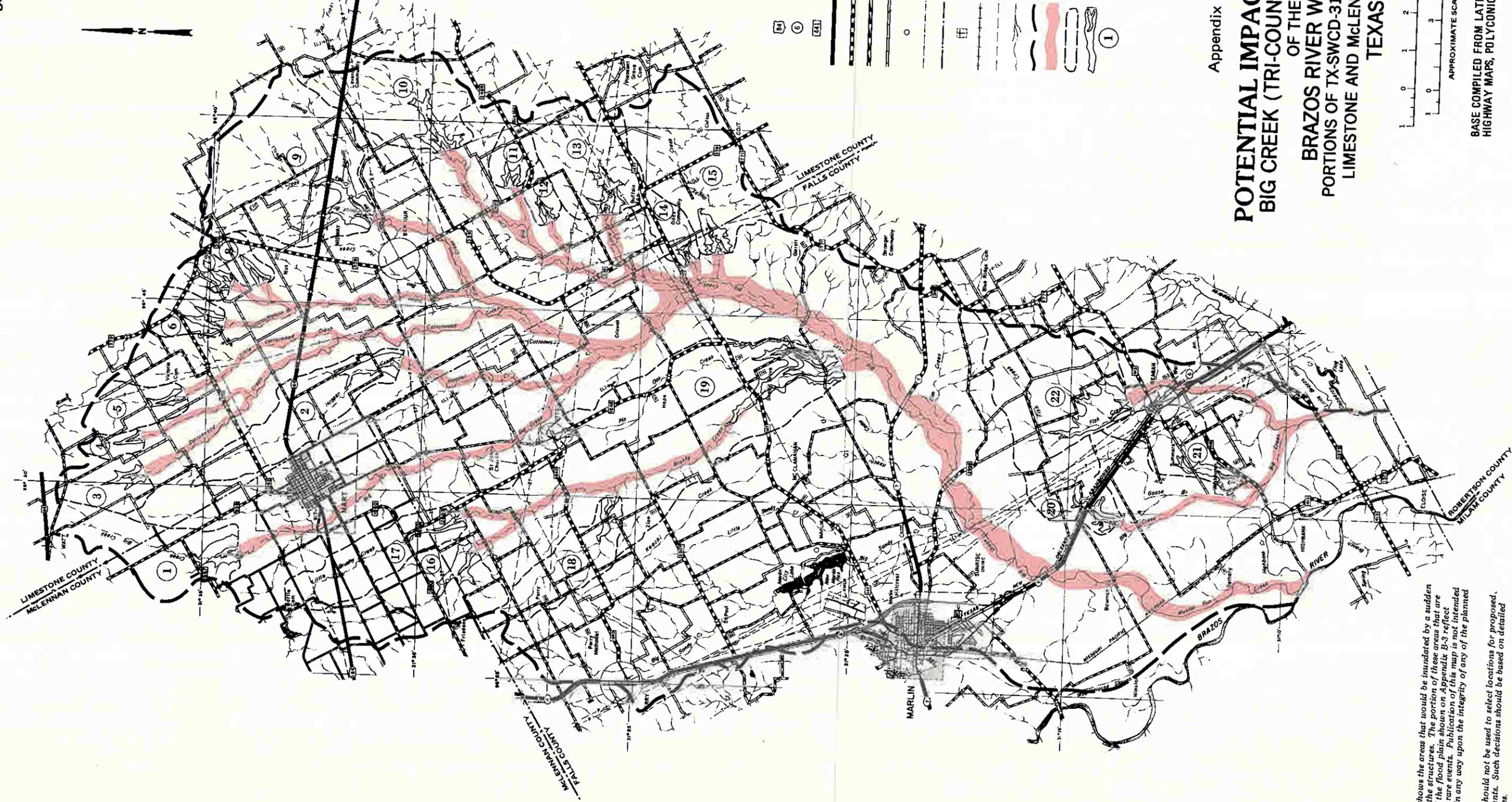


APPROXIMATE SCALE

BASE COMPILED FROM LATEST GENERAL
HIGHWAY MAPS, POLYCONIC PROJECTION.



VICINITY MAP



LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Paved Road (Good Motor)
- Paved Road
- Secondary Road
- Poor Motor or Private
- Town
- City Limits
- County Line
- Cemetery
- Railroad
- Pipeline
- Drainage
- Watershed Boundary
- Overflow - Sudden Dam Failure
- Drainage Area Controlled By Structures
- Floodwater Retarding Structure
- Site Number

Appendix B-5

**POTENTIAL IMPACT AREA MAP
OF THE
BIG CREEK (TRI-COUNTY) WATERSHED
BRAZOS RIVER WATERSHED
PORTIONS OF TX-SWCD-31 AND 24 IN FALLS,
LIMESTONE AND MCLENNAN COUNTIES
TEXAS**



BASE COMPILED FROM LATEST GENERAL HIGHWAY MAPS, POLYCONIC PROJECTION.

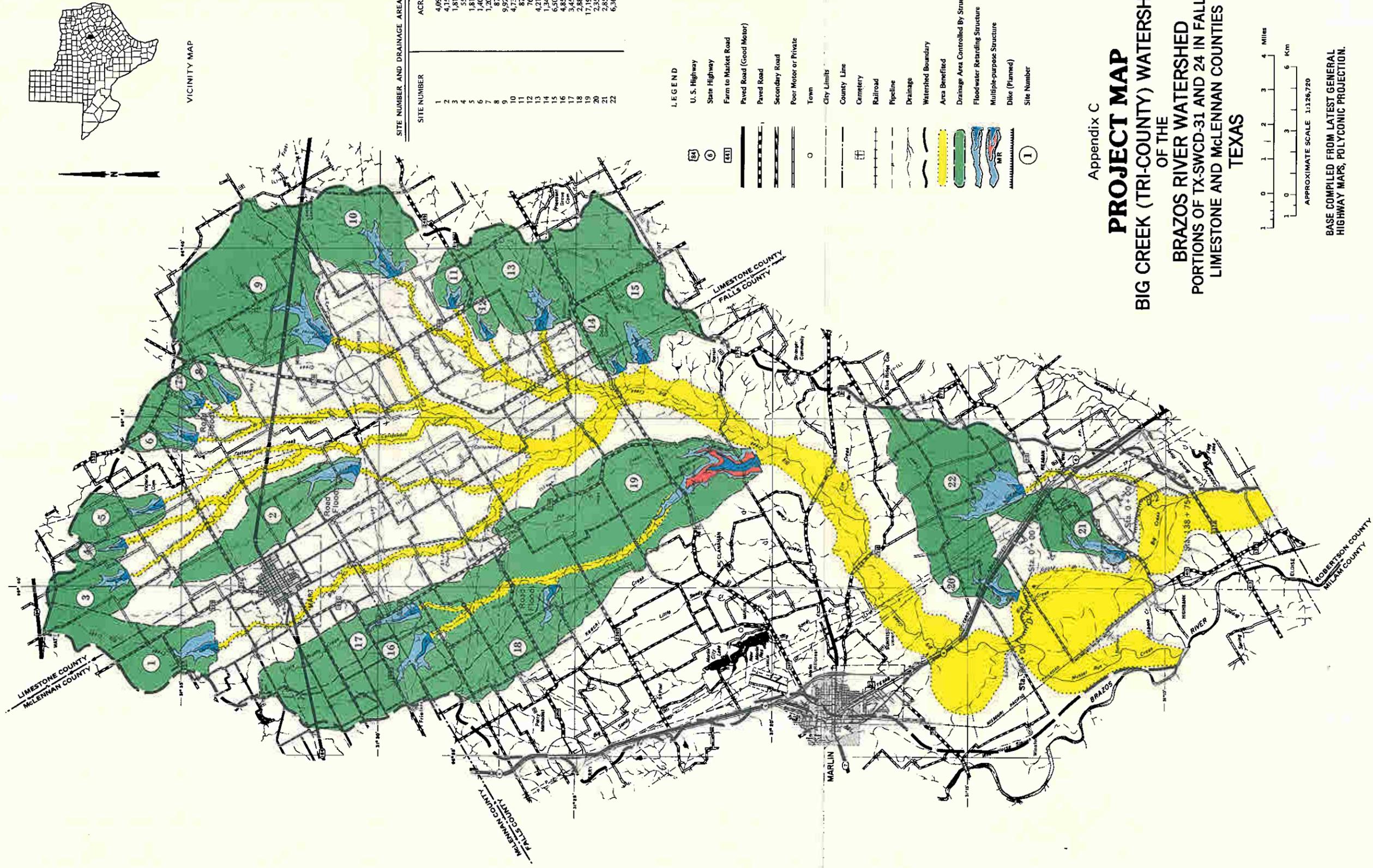
The map shows the areas that would be inundated by a sudden breach of the structures. The portion of these areas that are outside of the flood plain shown on Appendix B-3 reflect extremely rare events. Publication of this map is not intended to reflect in any way upon the integrity of any of the planned structures.

This map should not be used to select locations for proposed improvements. Such decisions should be based on detailed site analyses.

Approximate Drainage Area 236,620 Acres.

APPENDIX C

Project Map

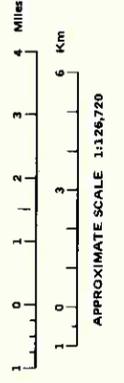


VICINITY MAP

SITE NUMBER	ACRES
1	4,096
2	4,154
3	1,811
4	550
5	1,818
6	1,402
7	1,877
8	9,926
9	4,736
10	877
11	762
12	4,211
13	1,344
14	6,502
15	4,851
16	3,450
17	2,886
18	17,190
19	2,355
20	2,854
21	6,368
22	

- LEGEND**
- U.S. Highway
 - State Highway
 - Farm to Market Road
 - Paved Road (Good Motor)
 - Paved Road
 - Secondary Road
 - Poor Motor or Private
 - Town
 - City Limits
 - County Line
 - Cemetery
 - Railroad
 - Pipeline
 - Drainage
 - Watershed Boundary
 - Area Benefited
 - Drainage Area Controlled By Structures
 - Floodwater Retarding Structure
 - Multiple-purpose Structure
 - Dike (Planned)
 - Site Number

Appendix C
PROJECT MAP
 OF THE
BIG CREEK (TRI-COUNTY) WATERSHED
 PORTIONS OF TX-SWCD-31 AND 24 IN FALLS,
 LIMESTONE AND MCLENNAN COUNTIES
 TEXAS



BASE COMPILED FROM LATEST GENERAL HIGHWAY MAPS, POLYGONIC PROJECTION.