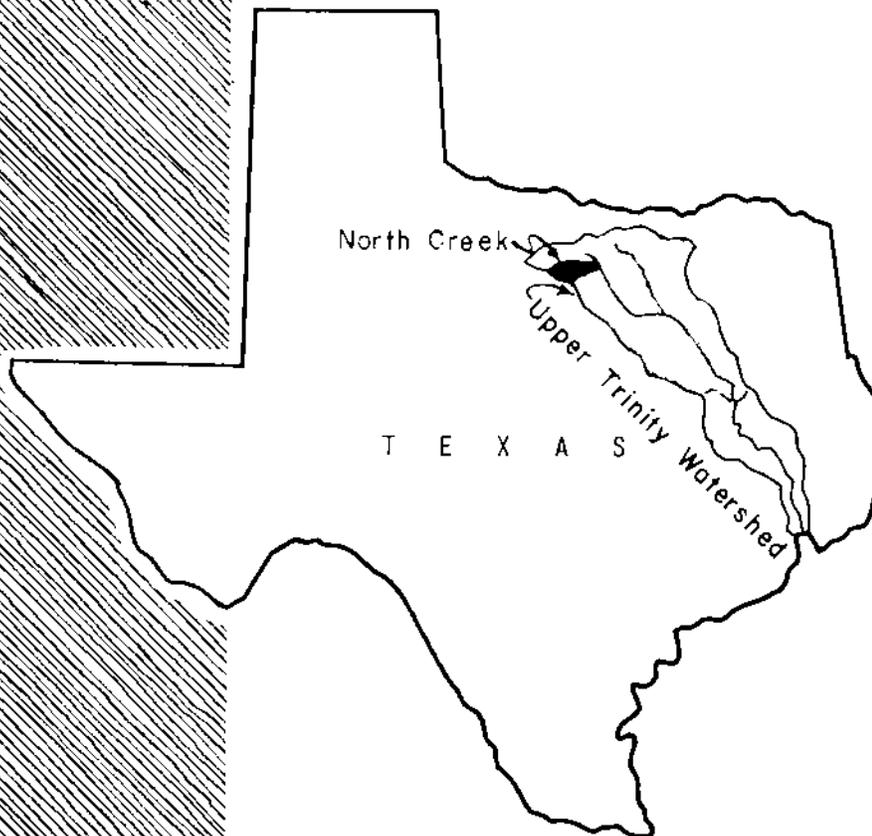


SUPPLEMENTAL  
WORK PLAN NO. II

# NORTH CREEK WEST FORK ABOVE BRIDGEPORT WATERSHED

OF THE TRINITY RIVER WATERSHED  
JACK COUNTY, TEXAS



Prepared By  
SOIL CONSERVATION SERVICE  
U. S. DEPARTMENT OF AGRICULTURE  
Temple, Texas  
July 1972

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SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT NO. II

Between the

Upper West Fork Soil and Water Conservation District  
Local Organization

Jack County Commissioners Court  
Local Organization

State of Texas  
(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service  
United States Department of Agriculture  
(hereinafter referred to as the Service)

Whereas, the Watershed Work Plan Agreement for the North Creek, West Fork Above Bridgeport Watershed, State of Texas, executed by the Sponsoring Local Organization named therein and the Service, became effective on the 23rd day of May 1961; and

Whereas, the Supplemental Watershed Work Plan Agreement for the North Creek, West Fork Above Bridgeport Watershed, State of Texas, executed by the Sponsoring Local Organization named therein and the Service, became effective on the 20th day of September 1971; and

Whereas, in order to carry out the watershed work plan, as supplemented, for said watershed, it has become necessary to modify said Watershed Work Plan Agreement, as supplemented; and

Whereas, it has been found necessary to modify the watershed work plan by deleting the 6.45 miles of planned channel improvement and planned floodwater retarding structures Nos. 27, 28, and 29, and adding floodwater retarding structure No. 28A.

Now, therefore, the Sponsoring Local Organization and the Service hereby agree upon the following modifications of the terms, conditions, and stipulations of said Watershed Work Plan Agreement:

1. Floodwater Retarding Structures Nos. 27, 28 and 29 and the 6.45 miles of channel improvement are hereby deleted from the Work Plan.
2. Floodwater Retarding Structure No. 28A is hereby added to the Work Plan.

The Sponsoring Local Organization and the Service further agree to all other terms, conditions, and stipulations of said Watershed Work Plan Agreement, as supplemented, not modified herein.

Upper West Fork Soil and Water Conservation District  
Local Organization

By *Ellis Henderson*  
ELLIS HENDERSON  
Title *Chairman*  
Address *Rt. 3, Jacksboro, Texas 76056* Zip Code  
Date *June 7, 1973*

The signing of this agreement was authorized by a resolution of the governing body of the Upper West Fork Soil and Water Conservation District Local Organization adopted at a meeting held on *June 7, 1973*

*GEO. CUNNIUS*  
(Secretary, Local Organization)  
GEO. CUNNIUS  
Address *Rt. 1 Decatur, Texas 76234* Zip Code  
Date *June 7, 1973*

Jack County Commissioners Court  
Local Organization

By *John E. Lindsey*  
JOHN E. LINDSEY  
Title *County Judge*  
Address *Courthouse, Jacksboro, Texas 76056* Zip Code  
Date *August 13, 1973*

The signing of this agreement was authorized by a resolution of the governing body of the Jack County Commissioners Court Local Organization adopted at a meeting held on *August 13, 1973*

*Marvin Tilghman*  
County Clerk (Secretary, Local Organization)  
MARVIN TILGHMAN  
Address *Courthouse, Jacksboro, Texas 76056* Zip Code  
Date *August 13, 1973*

Soil Conservation Service  
United States Department of Agriculture

By *Edward E. J. ...*  
State Conservationist  
Date *8-31-73*

SUPPLEMENTAL WORK PLAN NO. II

NORTH CREEK  
WEST FORK ABOVE BRIDGEPORT WATERSHED  
Of the Trinity River Watershed  
Jack County, Texas

Plan Prepared and Works of Improvement  
to be Installed Under the Authority of  
the Flood Control Act of 1936 as Amended  
and Supplemented

Participating Agencies

Upper West Fork Soil and Water Conservation District  
Jack County Commissioners Court

Prepared By:  
Soil Conservation Service  
U.S. Department of Agriculture  
July 1972

## SUPPLEMENTAL WORK PLAN NO. II

### NORTH CREEK WEST FORK ABOVE BRIDGEPORT WATERSHED Of the Trinity River Watershed Jack County, Texas

July 1972

#### PURPOSE OF THE SUPPLEMENTAL WORK PLAN

Floodwater retarding structures have been operational on this watershed for a significant period of time to observe their effects on the flood plain. A suitable degree of protection will be accomplished with land treatment and floodwater retarding structures. Therefore, the sponsors have requested that stream channel improvement be deleted from the work plan.

Using current design criteria for stream channel improvement the installation cost exceeds the benefits derived from the added protection. This supplement deletes 6.45 miles of stream channel improvement from the work plan.

This supplement also incorporates the effects of deleting Floodwater Retarding Structure Nos. 27, 28 and 29 and adding Floodwater Retarding Structure No. 28A, which was accomplished with a minor revision to the work plan approved on October 20, 1965.

To simplify cost-sharing arrangements, it is necessary to modify the Watershed Work Plan, as supplemented, to reflect current terminology relative to engineering and project administration costs. The cost of all structural measures not constructed and for technical assistance for installation of planned land treatment measures are updated to 1971 price levels to reflect current cost estimates and reaffirm economic feasibility.

All damages and benefits are updated from long-term prices as projected USDA, ARS-AMS, September 1957, to adjusted normalized prices, Water Resources Council, April 1966.

Changes and modification which follow are made in appropriate sections of the Watershed Work Plan, as supplemented.

#### WORKS OF IMPROVEMENT TO BE INSTALLED

Sixteen of the planned 17 floodwater retarding structures included in the plan have been installed or are under contract to be constructed. Floodwater Retarding Structure No. 20 has not been constructed. The system of floodwater retarding structures will provide the desired degree of protection.

to flood plain lands that cannot be provided by land treatment along. All stream channels and bridges will have sufficient capacity to carry release flows from floodwater retarding structures.

The location of the planned floodwater retarding structures is shown on Figure 3.

#### EXPLANATION OF INSTALLATION COSTS

The total installation cost of the structural measures is estimated to be \$1,291,930. The federal cost will be \$1,019,740 for construction, \$58,430 for engineering services and \$146,420 for project administration for a total of \$1,224,590.

Engineering service costs consist of, but are not limited to, detailed surveys, geologic investigations, laboratory analyses, reports, designs and cartographic services. Federal project administration cost consists of construction inspection, maintenance of records and accounts and contract administration.

The local costs will be \$58,840 for land rights and \$8,500 for project administration for a total cost of \$67,340.

Land rights costs consists of legal fees, land surveys, value of easement and modification of fixed improvements. Local project administration costs includes Sponsoring Local Organization's cost relative to contract administration, overhead and organizational costs and whatever construction inspection they desire to make at their own expense.

#### EFFECTS OF WORKS OF IMPROVEMENTS

With the installation of the combined program of land treatment and structural measures, the average annual flooding will be reduced from 4,887 acres to 2,357 acres, a reduction of 52 percent.

Reduction in area inundated varies with respect to location within the watershed. This is presented in the following table by evaluation reaches as to average annual acres flooded; area flooded by 2-day, 25-year frequency storm; area flooded by 2-day, 5-year frequency storm and the number of major floods in evaluation series.

Area Inundated

	<u>Evaluation Reach</u>					Total
	:	:	:	:	:	
	1	2	3	4		
<b>Average Annual Acres Flooded:</b>						
Without Project - Acres	1,932	1,152	845	958		4,887
With Project - Acres	1,193	333	430	401		2,357
Percent Reduction	38	71	49	58		52
<b>Area Flooded by 2-day, 25-Year Frequency Storm:</b>						
Without Project - Acres	1,496	1,734	651	997		4,878
With Project - Acres	1,346	706	511	634		3,197
Percent Reduction	10	59	22	36		34
<b>Area Flooded by 2-Day, 5-Year Frequency Storm:</b>						
Without Project - Acres	1,326	1,260	567	832		3,985
With Project - Acres	1,065	477	408	445		2,395
Percent Reduction	20	62	28	47		40
<b>Number of Major Floods in Evaluation Series: <u>1/</u></b>						
Without Project	61	20	59	43		
With Project	34	0	23	4		

1/ Inundates 50 percent or more of the flood plain area in elevation reach.

The average annual crop and pasture damage, excluding restoration of former productivity, will be reduced approximately 61 percent.

The average annual other agricultural damage will be reduced by approximately 58 percent.

The average annual non-agricultural (road and bridge) damage reduction will be about 76 percent.

The average annual flood plain scour damage on 161 acres is expected to be reduced about 69 percent.

The average annual reduction of overbank sediment deposition on flood plain will be about 52 percent on 1,305 acres.

The average annual sediment deposition from the watershed in the Bridgeport Reservoir will be reduced from 65 to 33 acre-feet, or about 49 percent.

The average annual indirect damage which is estimated to be 10 percent of direct damage will be reduced approximately 62 percent.

The total average annual damage will be reduced by approximately 62 percent.

Some former cultivated lands are expected to be returned to higher value crop production. This restoration of a portion of the flood plain land, 696 acres, to its former level of production will be made possible by reduced frequency, area and depth of flooding. The loss in original production has been considered a crop and pasture damage, and the increased net income from restoration, a benefit.

With the amount of reduced flooding in Reach No. 2, it is estimated that that the owners and operators of the flood plain in this area will improve management on at least half of the cropland by increased fertilization and other good management practices to reach optimum use of the flood plain land. It is estimated that more intensive land use will be applied to 666 acres of small grain and hay land.

The sediment pools of the floodwater retarding structures will provide a more dependable water supply than regular water tanks for livestock and wildlife. The sediment pools will provide a water supply for 28 land owners, thereby eliminating the need for at least 28 livestock watering tanks.

Secondary benefits from the installation of a complete project for flood prevention will accrue in the trade area as a result of increased business to those who furnish farming and ranching equipment, petroleum products,

fertilizer, farm supplies and various services associated with a farming and ranching community. The increased agricultural production will provide added income, thereby improving the standard of living. The project will create additional employment for local residents. The firms contracting for installation of the floodwater retarding structures will hire some local employees. The operation and maintenance of project measures will also provide employment for local residents. In addition, there are intangible benefits such as increased sense of security and better living conditions.

### PROJECT BENEFITS

The estimated average annual monetary damages, including \$12,080 from restoration of former productivity, will be reduced from \$70,200 to \$21, a reduction of approximately 70 percent. This is an average annual damage reduction benefit of \$48,730 (Table 5).

The following tabulation shows average annual damage by reaches and reduction, excluding restoration of former productivity:

	Evaluation Reach				Total
	1	2	3	4	
<b>Average Annual Damages:</b>					
Without Project - Dollars	14,380	24,250	8,720	9,570	56,920
With Project - Dollars	6,990	6,860	3,950	3,670	21,470
Percent Reduction	51	72	55	62	60
<b>Floodwater Damage by 2-day, 25-year Frequency Storm:</b>					
Without Project - Dollars	23,490	45,480	9,620	13,390	91,980
With Project - Dollars	14,460	12,270	5,980	7,530	40,240
Percent Reduction	38	73	38	44	60
<b>Floodwater Damage by 2-Day, 5-year Frequency Storm:</b>					
Without Project	13,740	25,520	7,010	8,820	55,090
With Project	7,420	7,540	3,820	4,140	22,920
Percent Reduction	46	70	46	53	58

The average annual net income will increase an estimated \$4,410 to owners and operators of flood plain land from more intensive land use.

Incidental livestock water benefits from use of the sediment pools are expected to be \$3,070 annually.

It is estimated that the project will produce local secondary benefits, which excludes indirect benefits in any form, averaging \$6,920 annually. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

#### COMPARISON OF BENEFITS AND COSTS

The total average annual cost of the structural measures (amortized total installation and project administration costs, plus operation and maintenance) is \$48,390 (Table 4). These measures are expected to produce average annual benefits, excluding secondary benefits of \$53,480, resulting in a benefit-cost ratio of 1.1:1.0.

The ratio of total average annual project benefits, accruing to structural measures, \$60,400, to the average annual cost of structural measures, \$48,390 is 1.2:1.0 (Table 6).

**TABLE 1 - ESTIMATED PROJECT INSTALLATION COST**  
**North Creek, West Fork Above Bridgeport Watershed, Texas**  
**(Trinity River Watershed)**

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) <sup>1/</sup>			Total
			Federal Funds		Other	
			Non-Fed Land S.C.S.	Non-Fed Land S.C.S.		
<b>LAND TREATMENT</b>						
Land Areas <sup>2/</sup>						
Cropland	Acre	5,900	-	106,680	106,680	
Pastureland	Acre	1,880	-	80,786	80,786	
Rangeland	Acre	47,487	-	441,984	441,984	
Other land <sup>3/</sup>	Acre	1,567	-	1,570	1,570	
Technical Assistance			20,750	-	20,750	
<b>TOTAL LAND TREATMENT</b>			<b>20,750</b>	<b>631,020</b>	<b>651,770</b>	
<b>STRUCTURAL MEASURES</b>						
<u>Construction</u>						
Floodwater Retarding Structures	No.	17	1,019,740	-	1,019,740	
Subtotal - Construction			1,019,740		1,019,740	
Engineering Services			58,430	-	58,430	
<u>Project Administration</u>						
Construction			86,620	1,700	88,320	
Other			59,800	6,800	66,600	
Subtotal - Administration			146,420	8,500	154,920	
<u>Other Costs</u>						
Land Rights			-	58,840	58,840	
Subtotal - Other			-	58,840	58,840	
<b>TOTAL STRUCTURAL MEASURES</b>			<b>1,224,590</b>	<b>67,340</b>	<b>1,291,930</b>	
<b>TOTAL PROJECT</b>			<b>1,245,340</b>	<b>698,360</b>	<b>1,943,700</b>	

1/ Price Base: 1971 prices for floodwater retarding structure No. 20.

Actual cost for 16 structures which are constructed or under contract.

2/ Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to addquately treated areas.

3 Wildlife are treatment.

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION  
 North Creek, West Fork Above Bridgeport Watershed, Texas  
 (Trinity River Watershed)

(Dollars) 1/

Item	Federal Installation Costs		Installation Cost		Total Installation Costs
	Construction	Engineering	Federal	Other Funds	
			Total	Land	Other
Floodwater Retarding Structures: 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 28A, 30, 31, and 20	1,019,740	58,430	1,078,170	58,840	58,840
Project Administration			146,420	8,500	154,920
Total	1,019,740	58,430	1,224,590	58,840	67,340
					1,291,930

1/ Price Base: 1971 prices for floodwater retarding structure No. 20.  
 Actual cost for 16 structures which are constructed  
 or under contract.

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TABLE 4 - ANNUAL COST  
 North Creek, West Fork Above Bridgeport Watershed, Texas  
 (Trinity River Watershed)

(Dollars) 1/

Evaluation Unit	: Amortization of : Installation Cost <u>2/</u>	: Operation and : Maintenance Cost	: Total
Floodwater Retarding Structures Nos. 13 through 26,28A, 30 and 31.	41,090	1,700	42,790
Project Administration	5,600	-	5,600
GRAND TOTAL	46,690	1,700	48,390

1/ Price Base: Installation 1971 prices for Floodwater Retarding Structure No. 20.  
 Actual cost for 16 structures which are constructed or under contract.  
 Operation and Maintenance - Adjusted Normalized Prices 1966.

2/ 50 years at 2-5/8 percent interest.

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TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS  
North Creek, West Fork Above Bridgeport Watershed, Texas  
 (Trinity River Watershed)

(Dollars) 1/

Item	: Estimated Average Annual Damage :		Damage Reduction Benefits
	: Without Project	: With Project	
Floodwater			
Crop and Pasture	33,820	8,520	25,300
Other Agricultural	13,680	5,750	7,930
Nonagricultural (Road and Bridge)	10,970	2,770	8,200
Subtotal	58,470	17,040	41,430
Sediment			
Overbank Deposition	2,570	1,230	1,340
Bridgeport Reservoir	2,060	1,030	1,030
Subtotal	4,630	2,260	2,370
Erosion			
Flood Plain Scour	720	220	500
Indirect	6,380	1,950	4,430
TOTAL	70,200	21,470	48,730

1/ Price Base: Adjusted normalized prices 1966.

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TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES  
 North Creek, Neat Fork Above Bridgeport Watershed, Texas  
 (Trinity River Watershed)

(Dollars)

	AVERAGE ANNUAL BENEFITS <sup>1/</sup>				Average Annual Cost	Benefit-Cost Ratio
	Damage Reduction	More Intensive Land Use	Incidental Livestock Water	Secondary		
Floodwater Retarding Structures Nos. 13 through 26, 28A, 30 and 31.	46,000	4,410	3,070	6,920	42,790	1.4:1.0
Project Administration					5,600	
GRAND TOTAL	46,000 <sup>3/</sup>	4,410	3,070	6,920	60,400	1.2:1.0

<sup>1/</sup> Price Base: Adjusted normalized prices 1966.

<sup>2/</sup> From Table 4.

<sup>3/</sup> In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$2,730 annually.



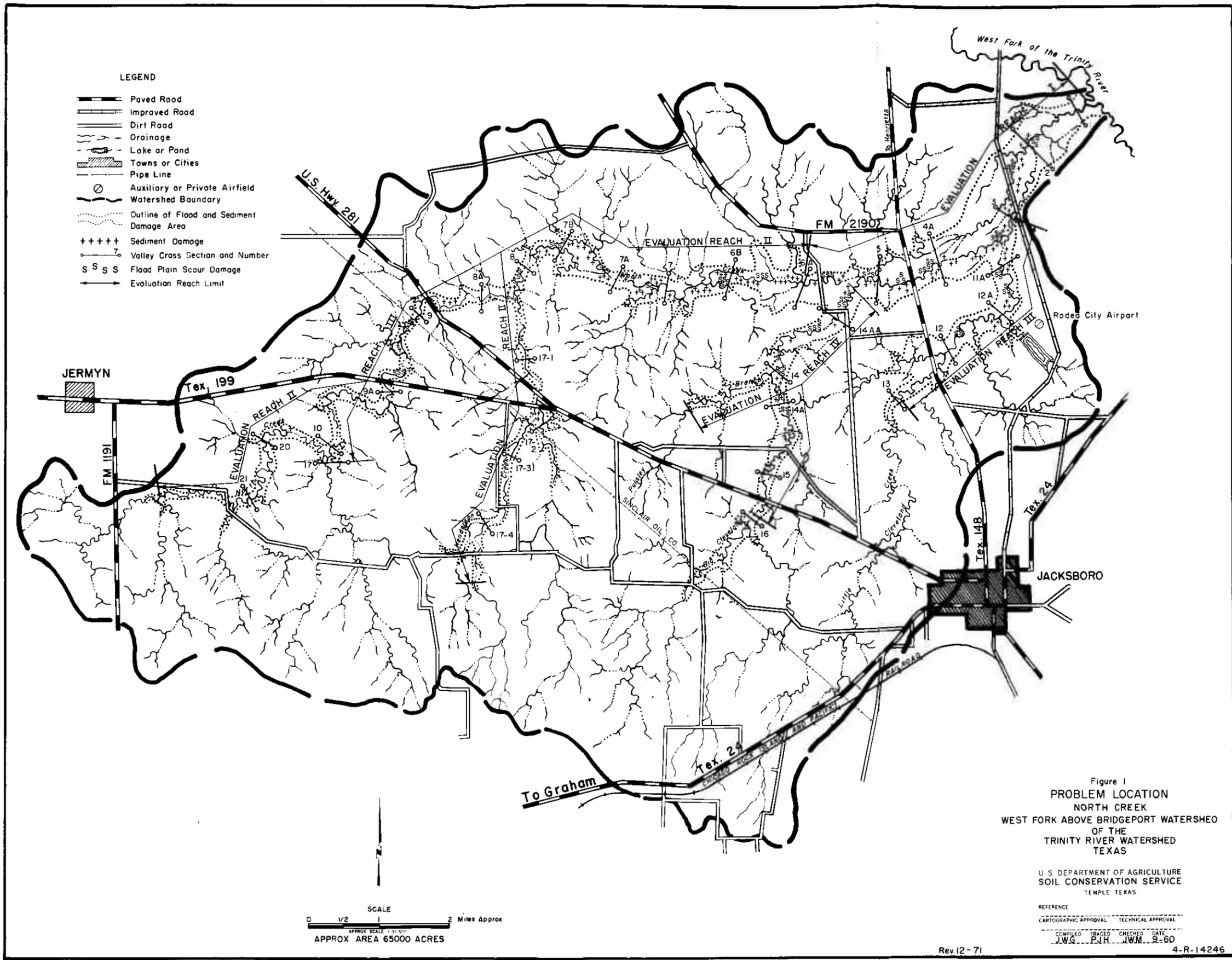




Figure 3  
**PROJECT MAP**  
 NORTH CREEK  
 WEST FORK ABOVE BRIDGEPORT WATERSHED  
 OF THE  
 TRINITY RIVER WATERSHED  
 TEXAS

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

REFERENCE  
 CARTOGRAPHIC APPROVAL      TECHNICAL APPROVAL

COMPILED	TRACED	CHECKED	DATE
J. W. G.	J. E. L.	J. W. M.	6-15-50

Rev. 12-71      4-R-14247

Revised 6-60      BASE 4-R-7614