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ADDENDUM
June 1975

WATERSHED WORK PLAN
Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed

Itawamba, Lee, and Monroe Counties, Mississippi

448317

CONTENTS

INTRODUCTION

Part 1 - Discount rate comparison

Part 2 - Display of impacts to national economic development,
environmental quality, regional development, and
social well-being accounts.

Part 3 - Display of the abbreviated environmental quality plan

INTRODUCTION

This addendum is based on the Water Resources Council's Principles and Standards for Planning.

The Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed work plan is developed using current (1974) construction costs and 5 5/8 percent discount rates. Current (6 1/8 percent) discount rate comparison is displayed.

Effects resulting from evaluation of the selected work plan alternative are displayed under separate accounts for National Economic Development, Environmental Quality, Regional Development, and Social Well-being.

The abbreviated environmental quality plan has been developed by an inter disciplinary team using information and data assembled during investigations and analysis for the watershed work plan. The procedure begins with recognition of the watershed problems and needs. Desired environmental effects or component needs are translated from the problems and needs and provide a base for examining appropriate water and land resource use and management opportunities. Opportunities that emphasize contributions to the component needs were selected and are shown as plan elements of the alternative. The cost of \$4,267,500 for its installation is a preliminary estimate. The expected environmental effects of the alternative are shown.

Implementation of features of this alternative will require acceptance by the local people. Adequate legislative authorities exist for implementation; however, funding is presently not available.

DISCOUNT RATE COMPARISON
Mantachie, Bogue Fala, and Bogue Eucuba Creeks
Watershed, Mississippi

This display shows the result of using the current discount rate (6 1/8%) in the economic evaluation. Annual project costs, benefits, and benefit-cost ratio for the current discount rate (6 1/8%) are as follows:

1. Project costs	\$ 322,300
2. Project benefits	613,100
3. Project benefit-cost ratio	1.9 to 1.0
4. Project benefits less external economics	562,700
5. Project benefit-cost ratio excluding external economics	1.7 to 1.0

SELECTED ALTERNATIVE
 NATIONAL ECONOMIC DEVELOPMENT ACCOUNT
 Mantachie, Bogue Fala, and Bogue Eauuba Creeks Watershed, Mississippi

<u>Components</u>	<u>Measures of Effects</u> 1/	<u>Measures of Effects</u> 1/
	- - - Dollars - - -	- - - Dollars - - -
<u>Beneficial effects:</u>		
A. The value to users of increased outputs of goods and services		
1. Flood prevention	321,100	
2. Recreation	193,400	
3. RAD	42,100	
Total beneficial effects	556,600	
<u>Adverse effects:</u>		
A. The value of resources required for a plan		
1. Floodwater retarding structures, multiple-purpose structures, and recreation facilities		205,400
		26,300
		71,500
Total adverse effects		303,200
Net beneficial effects		253,400

1/ Average annual

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT
Mantachie, Bogue Falls, and Bogue Eucuba Creeks Watershed, Mississippi

<u>Components</u>	<u>Measures of Effects</u>	<u>Components</u>	<u>Measures of Effects</u>
Beneficial and adverse effects:			
A. Area of natural beauty	<ol style="list-style-type: none"> 1. The amount of unsightly eroded hill sides will be reduced. 2. The construction of 79 ponds, 12 floodwater retarding structures, and 2 multiple-purpose structures will provide opportunities for scenic water settings. 	C. Biological resources and selected ecosystems (continued)	<ol style="list-style-type: none"> 2. The construction of 79 ponds will create additional fish and wildlife habitat. 3. Installation of adequate land treatment measures on 19,756 acres will enhance wildlife habitat. 4. Periodic interruption of wildlife use on 1,419 acres of land due to the fluctuation of flood pools will both enhance and disturb wildlife and fishing resources
B. Quality consideration of water, land, and air resources	<ol style="list-style-type: none"> 1. Erosion and sediment production will be reduced, thereby reducing water pollution. 2. Water pollution will be increased during project construction. 3. Air and water quality will be decreased during project construction. 4. Sediment in the water leaving the watershed will be reduced, thereby reducing downstream pollution. 		<ol style="list-style-type: none"> 5. Forestland wildlife habitat will be increased on 700 acres of critical openland to be planted to trees. 6. Loss of wildlife habitat on 983 acres of land inundated in the sediment and recreation pool areas.
C. Biological resources and selected ecosystems	<ol style="list-style-type: none"> 1. The fishery and waterfowl potential will be increased by the establishment of 633 surface acres of water in the sediment pools, and 350 surface acres in the recreation pool. 		

(continued)

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT
Mantachie, Bogue Faia, and Bogue Eucuba Creeks Watershed, Mississippi

<u>Components</u>	<u>Measures of Effects</u>	<u>Components</u>	<u>Measures of Effects</u>
C. Biological resources and selected ecosystems (continued)	<p>7. Wildlife habitat will be enhanced through 100 acres of development and 500 acres of preservation.</p> <p>8. Reduction in available feeding and resting waters for migratory waterfowl due to reduction of area, depth, and duration of winter flood plain flooding.</p> <p>9. Temporary increase in forest fire hazard will occur on 2,000 acres due to buildup of dead and dying material from planned stand improvement.</p>	E. Irreversible or irretrievable commitment	<p>1. The sediment and recreation pools will cover 983 acres of land.</p> <p>2. The dam sites, spillways, and work areas commitment will be 225 acres of land.</p> <p>3. There will be 1,545 acres of land committed to the flood pools, recreation area, and access roads.</p> <p>4. The necessary capital, materials, energy, and labor required to install the project.</p>
D. Historical, archeological, and geological	<p>1. The maximum elevation of the flood pool above Floodwater Retarding Structure No. 9 will be about two feet deep on the fill of the proposed Natchez Trace Parkway.</p>		

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

<u>Components</u>	<u>Measures of Effects 1/ State of Mississippi</u> - - - Dollars - - -	<u>Measures of Effects 1/ State of Mississippi</u> - - - Dollars - - -	<u>Rest of Nation</u> - - - Dollars - - -
Income:			
Beneficial effects:			
A. The value of increased output of goods and services to users residing in the region			
1. Flood prevention	321,100		
2. Rural area development	42,100		
3. Recreation	193,400		
B. The value of output users residing in the region from external economics			
1. Induced by and stemming from effects	50,500		
Total beneficial effects	607,100		
Adverse effects:			
A. The value of resources contributed from within the region to achieve the output			
1. Floodwater retarding structures		27,200	94,600
2. Multiple-purpose structures and recreation facilities			
Project installation		30,600	53,000
3. Project Administration		4,200	22,100
4. O&M		71,500	0
Total adverse effects		133,500	169,700
Net beneficial effects		473,600	-169,700
(continued)			

1/ Average annual

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
Mantachie, Bogue Falls, and Bogue Eucuba Creeks Watershed, Mississippi

<u>Components</u>	<u>Measures of Effects</u> State of <u>Mississippi</u>	<u>Rest of</u> <u>Nation</u>	<u>Measures of Effects</u> State of <u>Mississippi</u>	<u>Rest of</u> <u>Nation</u>
Employment:				
Beneficial effects:				
A. Increase in number and types of jobs.				
1. Employment for project construction	332.7 semi-skilled jobs for construction period	--	0	0
2. Employment for project OM&R	4.7 permanent semi-skilled jobs			
3. Employment in service and trade activities induced by and stemming from project operation	195 permanent semi-skilled jobs			
Total beneficial effects	332.7 semi-skilled jobs for construction period. 199.7 permanent semi-skilled jobs.		0	0
Adverse effects:				
A. Decrease in number and type of jobs			0	0
Total adverse effects			0	0
Net beneficial effects			332.7 semi-skilled jobs for construction period. 199.7 permanent semi-skilled jobs.	

(continued)

SELECTED ALTERNATIVE
 REGIONAL DEVELOPMENT ACCOUNT
 Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Components

	<u>Measures of Effects</u>
<u>State of Mississippi</u>	<u>Rest of Nation</u>

Regional Economic Base and Stability

Beneficial effects:

The level of protection is sufficient to maintain a sustained agricultural program on 17,873 acres of flood plain lands below structures. This will tend to keep an area, that has been well developed agriculturally available for increased agricultural production. The recreation pools and areas will accommodate about 129,000 annual visitor days. The project will create 332.7 man years of semi-skilled jobs during the construction period and 199.7 man years of semi-skilled employment each year during the life of the project.

Adverse effects:

SELECTED ALTERNATIVE
SOCIAL WELL-BEING ACCOUNT
Mantachie, Bogue Falls, and Bogue Eucuba Creeks Watershed, Mississippi

Components

Beneficial and adverse effects:

A. Real income distribution

Measures of Effects

1. Create 199.7 man-years of semi-skilled permanent employment.
2. Create regional income benefit of \$556,600. Data needed to determine income distribution among income classes are not readily available.
3. Local cost to be borne by region total \$133,500. Data needed to determine cost distribution among income classes are not readily available.

B. Life, health, and safety

Provide protection from road and bridge damages reducing the hazards of traveling these roads in times of floods. Provide a reduction in vector habitat. Provide a reduction in the threat to the safety for those who have to move livestock in times of high water.

C. Educational, cultural, and recreational

Provide recreation facilities with an expected visitation of about 129,000 people annually.

ABBREVIATED ENVIRONMENTAL QUALITY PLAN

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

ENVIRONMENTAL QUALITY ALTERNATIVE

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Environmental Quality Problems

The Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed contains approximately 113,585 acres or about 177.5 square miles of land and is located in the western part of Itawamba County (72,590 acres), the eastern part of Lee County (38,050 acres), and the northern part of Monroe County (2,945 acres). The current land use of the watershed is about 13,901 acres of cropland (12%), 8,473 acres of pastureland (8%), 78,574 acres of forestland (69%), and 12,637 acres of other lands and miscellaneous uses (11%).

There is a problem in the watershed of air pollution (dust) resulting from the miles of gravel and dirt roads. This becomes a source of irritation to farm families who reside near such roads particularly during extremely dry periods.

Land quality is a problem in the watershed in that there are approximately 80,879 acres of land in the watershed which are classed as having an erosion problem. Of these, 710 acres are gullies and are producing sediment at a rate of 200 to 300 tons per acre per year. There are 1,656 acres that are producing sediment at a rate of 50 to 150 tons per acre per year. The erosion of the uplands has resulted in sediment deposition in the channels. Insufficient channel capacity for the removal of surface storm runoff has resulted because of sediment deposition, siltation, debris, trash, and other restrictions. The overflow onto bottomlands has resulted in sediment deposition and land degradation in the bottomland areas.

There is a need in the watershed to preserve and/or enhance a portion of the natural setting for the present as well as future generations.

Water quality is a problem in the watershed with respect to the presence of pollution sources including town and rural sewage, farm waste, and sediment from land erosion. The towns have inadequate sewage facilities and many of the rural houses do not have adequate sanitary facilities. The stream pollution problem is compounded by the presence of egg laying houses, hog parlors, and other livestock activities, and by sediment from erosion of agricultural soils.

Needs exist in the area of human enjoyment for facilities related to lake and water based recreation and associated camping, hiking, boating, and fishing activities. Also needed are community recreational parks emphasizing swimming, picnicking, and sports facilities.

Component Needs and Plan Elements

1. Eliminate Air Pollution From Gravel Roads

The surfacing of the existing gravel and dirt roads of the watershed will virtually eliminate the pollution of the atmosphere by dust particles from this source.

Initial cost of construction and surfacing with DBST materials	-	\$630,000
Annual operation and maintenance	-	15,000

2. Treatment to Increase Land Quality by Reduction of Erosion

Sponsors should work with the Boards of Supervisors of the respective counties, the Soil and Water Conservation Districts, with the appropriate federal and state agencies, and landowners to perform the necessary land treatment measures to reduce significantly the amount of erosion and resultant sedimentation taking place annually in the watershed.

Cost of establishing land treatment measures	-	\$943,900
--	---	-----------

3. Preserve and/or Enhance the Natural Setting of Selected Portions of the Watershed

There are several Indian mounds and camp sites in the watershed. These sites should be preserved for their archaeological and historical values.

Wildlife habitat should be enhanced in the watershed through the use of good management practices. Some of the management practices that would help to enhance the wildlife habitat are the maintaining of existing open areas and creation of additional open areas within the forest areas, the planting and/or retaining the mast producing trees, the use of harvesting methods that are responsive to wildlife management, the planting and maintaining of food and cover plants, provision of travelways, and provision of blocks of cover in openland areas for wildlife.

Cost of preserving Indian Mounds	-	\$ 10,000
----------------------------------	---	-----------

4. Treatment to Increase Water Quality by Reduction of Pollution

Sponsors should work with responsible town and community officials, Boards of Supervisors, and appropriate federal agencies to make loans or to provide adequate sewage and waste treatment systems and individual sanitary facilities (septic systems) for the homes and businesses in the watershed. In addition, the land treatment as discussed in the component needs section for the land quality problem is a necessary item for the maintenance and enhancement of the water quality.

Initial construction cost of treatment systems	-	\$216,000
Annual operation and maintenance	-	20,000
Cost of rural sanitary facilities	-	700,000

5. Providing Lake and Parks Recreational Facilities

The sponsors should work with responsible officials of local governments and with appropriate federal and state agencies to provide needed lake and park recreational facilities in the watershed.

Construction of two recreational lakes with associated camping, boating, fishing, and hiking facilities	-	\$1,479,400
Annual operation and maintenance	-	15,000
Construction of public recreation parks with swimming pools, bath houses, and sporting facilities	-	232,200
Annual operation and maintenance	-	6,000

Effects of the Environmental Quality Plan

1. The elimination of air pollution as a result of road dust from the surface of the gravel and dirt roads of the watershed will result in relatively dust-free homes and farmsteads in the vicinity of such roads. In general, paving of the roads will affect the quality of the air, the quality of living, and the general health of watershed inhabitants.
2. The installation of land treatment measures and the stabilization of the critically eroded areas will effect a decrease in the watershed erosion rate, will improve the hydrologic characteristics of the soil allowing for greater water infiltration and soil moisture holding capabilities, will increase and improve habitat suitable for wildlife, will enhance the aesthetic values of the rural countryside, will decrease the land degradation occurring in the watershed, and decrease the opportunity for pollutants to be transported into the stream system by the sediment particles and by the runoff waters.
3. The preservation of these natural settings will assure that there will always be a place that people of the watershed area, as well as visitors to the area, will be able to observe natural surroundings of the area.
4. The installation of adequate sewage and waste treatment systems and sanitary facilities will result in significant decreases in the amounts of partially decomposed human, animal, and industrial waste products entering the surface and ground waters of the watershed. This will result in better health conditions. Treatment of the critically eroded

lands will decrease the sediment produced from this source and will increase the quality of wildlife habitat and scenic beauty of the affected area.

5. The installation of a recreational lake with fishing, boating, camping, and hiking facilities will provide lake fishing resources and related recreation facilities to the public in the general geographic area of the watershed.

The installation of recreation park facilities will fulfill local needs for such facilities by people of the smaller communities of the watershed.

WATERSHED WORK PLAN AGREEMENT

between the

Mantachie, Bogue Fala, and Bogue Eucuba Master Water
Management District

Itawamba County Soil and Water Conservation District
Lee County Soil and Water Conservation District
Monroe County Soil and Water Conservation District

(hereinafter referred to as Sponsoring Local Organization)

STATE OF MISSISSIPPI

and the

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

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, State of Mississippi, under the authority of the Watershed Protection and Flood Prevention Act (P.L. 566, 83rd Congress; 68 Stat. 666), as amended; 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 Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, State of Mississippi, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about six years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Sponsoring Local Organization 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 Sponsoring Local Organization and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (Percent)	<u>Service</u> (Percent)	<u>Estimated Land Rights Cost</u> (Dollars)
Multiple-Purpose Structure No. 5 and Recreational Facilities			
Payment to landowner for about 433 acres	50	50	129,900
Multiple-Purpose Structure No. 11 and Recreational Facilities			
Payment to landowners for about 393 acres	50	50	117,900
All other structural measures	100	0	481,750

The Sponsoring Local Organization agrees 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 Sponsoring Local Organization assures that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsoring Local Organization and the Service as follows:

	<u>Sponsoring Local Organization</u> (Percent)	<u>Service</u> (Percent)	<u>Estimated Relocation Payment Costs</u> ^{1/} (Dollars)
Relocation Payments	32.63	67.37	0

^{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 Sponsoring Local Organization 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 percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization (Percent)</u>	<u>Service (Percent)</u>	<u>Estimated Construction Cost (Dollars)</u>
Multiple-Purpose Structure No. 5	29.56	70.44	360,000
Recreational Facilities No. 5	50	50	220,300
Multiple-Purpose Structure No. 11	21.81	78.19	299,100
Recreational Facilities No. 11	50	50	220,300
12 Floodwater Retarding Structures	0	100	1,495,300

5. The Itawamba, Lee and Monroe County Soil and Water Conservation Districts will provide assistance to landowners and operators to assure the installation of the land treatment shown in the watershed work plan. Costs of treating critically eroding areas will be shared by the soil and water conservation districts in agreement with the landowners and operators and the Service by the following division of work:
 - a. For the critically eroding areas to be treated with grasses, the Service will furnish fertilizer, seed and other materials and the sponsors will prepare the seedbed, incorporate the fertilizer and seed, and otherwise establish vegetation.
 - b. For the critically eroding areas to be treated with trees, the Service will pay the cost of preparing the site and planting the trees and the sponsors will furnish the trees and protect the tree seedlings.
6. The percentages of engineering costs for services to be borne by the Sponsoring Local Organization and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization (Percent)</u>	<u>Service (Percent)</u>	<u>Estimated Engineering Cost (Dollars)</u>
Multiple-Purpose Structure No. 5	0	100	43,200
Recreation Facilities MPS No. 5	50	50	26,400
Multiple-Purpose Structure No. 11	0	100	35,900
Recreation Facilities MPS No. 11	50	50	26,400
12 Floodwater Retarding Structures	0	100	179,600

7. The Sponsoring Local Organization and the Service will each bear their costs for project administration, estimated at \$73,900 and \$391,700, respectively.
8. The Sponsoring Local Organization will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.
9. The Sponsoring Local Organization will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.
10. The Sponsoring Local Organization will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
11. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.
12. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.
13. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the availability of appropriations for this purpose.

A separate agreement will be entered into between the Service and the Sponsoring Local Organization 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. The watershed work plan may be amended or revised, and this agreement may be modified or terminated only by mutual agreement of the parties hereto except for cause. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organization has failed to comply with the conditions of this agreement. The Service shall promptly notify the Sponsoring Local Organization in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organization or recoveries by the Service under projects terminated for cause shall be in accord with the legal rights and liabilities of the parties. An amendment to incorporate changes affecting one specific structural measure may be made by mutual agreement between the Service and the sponsor(s) having specific responsibilities for the particular structural measure involved.
15. No member of or delegate to congress, or resident commissioner, shall be admitted to any share or part of this agreement, 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 C. F. R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any activity receiving federal financial assistance.
17. This agreement will not become effective until the service has issued a notification of approval and authorizes assistance.

Mantachie, Bogue Fala, and Bogue Eucuba
Master Water Management District
Local Organization

By _____

Title _____

Address _____ Zip Code _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Mantachie, Bogue Fala, and Bogue Eucuba Master Water Management District adopted at a meeting held on _____.

Secretary, Local Organization _____

Address _____ Zip Code _____

Date _____

Itawamba County Soil and Water
Conservation District
Local Organization

By _____

Title _____

Address _____ Zip Code _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Itawamba County Soil and Water Conservation District adopted at a meeting held on _____.

Secretary, Local Organization _____

Address _____ Zip Code _____

Date _____

Lee County Soil and Water
Conservation District
Local Organization

By _____

Title _____

Address _____ Zip Code _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Lee County Soil and Water Conservation District adopted at a meeting held on _____.

Secretary, Local Organization _____

Address _____ Zip Code _____

Date _____

Monroe County Soil and Water
Conservation District
Local Organization

By _____

Title _____

Address _____

Zip Code _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Monroe County Soil and Water Conservation District adopted at a meeting held on _____.

Secretary, Local Organization _____

Address _____

Zip Code _____

Date _____

Appropriate and careful consideration has been given to the environmental statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:

State Conservationist

Date

WATERSHED WORK PLAN

MANTACHIE, BOGUE FALA, AND BOGUE EUCUBA CREEKS WATERSHED

ITAWAMBA, LEE, AND MONROE COUNTIES, MISSISSIPPI

Prepared under the Authority of the Watershed Protection
and Flood Prevention Act (Public Law 566, 83rd Congress;
63 Stat. 666), as amended.

Prepared by:

Mantachie, Bogue Fala, and Bogue Eucuba
Master Water Management District
Itawamba County Soil and Water Conservation District
Lee County Soil and Water Conservation District
Monroe County Soil and Water Conservation District

With Assistance by:

U. S. Department of Agriculture, Soil Conservation Service

U. S. Department of Agriculture, Forest Service

June 1975

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SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

Figure 1

MULTIPLE-PURPOSE STRUCTURE NO. 5 RECREATION MAP

Figure 2

MULTIPLE-PURPOSE STRUCTURE NO. 11 RECREATION MAP

Figure 3

PROJECT MAP

Figure 4

WATERSHED WORK PLAN

MANTACHIE, BOGUE FALA, AND BOGUE EUCUBA CREEKS WATERSHED

ITAWAMBA, LEE, AND MONROE COUNTIES, MISSISSIPPI

June 1975

SUMMARY OF PLAN

The Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed contains approximately 113,585 acres or about 177.5 square miles of land and is located in the western part of Itawamba County (72,590 acres), the eastern part of Lee County (38,050 acres), and the northern part of Monroe County (2,945 acres).

The watershed is sponsored by the Mantachie, Bogue Fala, and Bogue Eucuba Master Water Management District and the Itawamba, Lee, and Monroe County Soil and Water Conservation Districts.

The major problems of the watershed are (1) severe erosion, including gully and sheet erosion; (2) floodwater and drainage problems; (3) sediment damage to flood plain areas; (4) low farm income which affects the economy of the watershed and the surrounding area, and (5) a shortage of recreation areas.

These problems will be reduced to such an extent as is economically feasible by the establishment of land treatment measures and the construction of 12 floodwater retarding structures and two multiple purpose structures with associated recreational facilities.

The application of the proposed works of improvement will accomplish the following: (1) Reduce erosion damage to roadsides and upland soil areas; (2) Gradually reduce gross erosion by 32 percent, and assist in providing sediment damage reduction benefits of \$44,600 annually; (3) Sediment and flood damage will eventually be reduced approximately 81 and 71 percent, respectively, for the entire watershed; (4) The economy of the watershed will be improved through annual increase in net income on approximately 17,873 acres of benefited flood plain land, through reduction in damages to fixed improvements within the watershed, through increases in agricultural production and associated agribusiness, and through project construction activities; and (5) Provide adequate recreational facilities for the people of the watershed.

There are approximately 78,574 acres of forestland in the watershed. Forestry measures are proposed on 4,100 acres of forest lands and 700 acres of critically eroded lands.

The project will be installed over a period of six years at an estimated total cost of \$5,045,550, of which about \$3,399,170 will be financed from P.L. 566 funds and about \$1,646,380 will be financed from Other funds (See Table 1).

The land treatment measures will be installed, operated, and maintained on private land by individual farmers through conservation farm plans in cooperation with their respective Soil Conservation District. The measures will be installed at an estimated total cost of \$943,900, of which it is estimated that \$395,400 will be financed from P.L. funds.

The floodwater retarding structures, multiple-purpose structures, and recreation facilities will be installed by contract by the Commissioners of the Water Management District. The floodwater retarding structures will be installed at an estimated total cost of \$2,156,650, of which about \$1,674,900 will be financed from P.L. 566 funds and \$481,750 will be financed from Other funds. The multiple-purpose structures and recreational facilities will be installed at an estimated cost of \$1,479,400, of which \$937,170 will be financed from P.L. funds and \$542,230 will be financed from Other funds (See Table 2).

The floodwater retarding structures and multiple-purpose structures will be operated and maintained by the Mantachie, Bogue Fala, and Bogue Eucuba Master Water Management District. The estimated average annual cost for operation and maintenance of these structural measures is \$71,500. An annual assessment will be made on the benefited areas to provide operation and maintenance costs for the flood prevention aspects of these structures. A use fee will be charged to provide operation and maintenance costs for the recreational aspects of the multiple-purpose structures and basic facilities.

The average annual cost of structural measures is estimated to be \$303,200. The average annual benefits are estimated to be \$607,100 with the estimated benefit-cost ratio to be 2.0 to 1.0 (See Table 6).

The Mantachie, Bogue Fala, and Bogue Eucuba Master Water Management District is a legal subdivision of the State of Mississippi and has legal authority under the laws of the state to operate and maintain a Master Water Management District. The District will apply for a Farmers Home Administration loan to finance its share of the project costs. The District will levy an annual tax to assure that funds will be available as needed.

WATERSHED RESOURCES - ENVIRONMENTAL SETTING

Physical Data

Location and Size

The watershed is located in northeast Mississippi and contains 113,585 acres with 72,590 acres in the western part of Itawamba County, 38,050 acres in the eastern part of Lee County, and 2,945 acres in the northern part of Monroe County. The Mantachie Sub-Watershed contains approximately 44,533 acres, the Bogue Fala Sub-Watershed contains approximately 35,604 acres, the Bogue Eucuba Sub-Watershed contains approximately 14,168 acres, and an area adjacent to the Tombigbee River between the Mantachie Sub-Watershed and the Bogue Fala Sub-Watershed contains approximately 19,280 acres.

The towns within the watershed boundary are Mantachie, Dorsey and Mooreville. All three contain small rural populations. Tupelo (population 20,000) is located approximately eight miles west of the watershed and Fulton, (population 3,000) the county seat of Itawamba County, is located approximately three miles east of the watershed boundary. The population of Lee and Itawamba Counties has experienced past declines but has been increasing since 1960. The population of the watershed is about 9,700 and is considered to be all rural.

The watershed is located in the Tombigbee River Basin of the South Atlantic-Gulf Water Resource Region.

The Atlantic-Gulf Water Resource Region, a land area of abundant natural resources, is located in the southeastern portion of the U. S. and is composed of a majority of the states of Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, and Mississippi. The topographic characteristics of the region vary from the mountainous areas of southern Virginia and western North Carolina to the flatlands of Florida and the coastal plain and prairie lands of Alabama and Mississippi. Temperatures and precipitation patterns of the region vary from the hot humid climate and abundant rainfall of the coastal areas to the more temperate climate of the high mountain areas.

The Tombigbee River Basin is located in the western part of the Atlantic-Gulf Region. It drains approximately 11,000 square miles of land in eastern Mississippi and western Alabama. This area is roughly 85 miles wide and 210 miles long. The basin contains three major land resource areas. These are the Upper Coastal Plain, the Blacklands or Prairie, and the Interior Flatwoods.^{1/} Average rainfall for the basin area ranges from 50 to 55 inches per year. Most of the rainfall occurs from November through April.

^{1/} Water and Related Land Resources - Tombigbee River Basin, USDA, June 1964.

Average temperatures vary from 63 degrees in the north, to 65 in the south. Average length of the growing season is from 200 days in the northern part of the basin to 225 days in the south. The first killing frost usually occurs from the first to the middle of November, while the last is from the first to the latter part of March.

The watershed is located in the northern part of the Tombigbee River Basin and in the western part of the Atlantic-Gulf Region. Because of its location, conditions and characteristics of the watershed are similar to those of that particular portion of the region and sub-region. Topography ranges from relatively flat and gently sloping in the prairie portions of the watershed to rugged relief in the hilly portions of the watershed. Climate has been classed as warm and humid with abundant rainfall.^{1/} Winters are mild and summers are hot and humid. Winter and spring are the wettest seasons, and fall is the driest season of the year.

Soil and Water Resource Problem Areas

Approximately 107,000 or 95 percent of the total land acreage of the watershed has either an erosion or a water problem. Of this acreage approximately 26,000 acres have water problems due to either flooding or poor internal drainage. These lands are located primarily in stream flood plain areas or are relatively flat upland areas which lack adequate surface and subsurface drainage. Approximately 80,000 acres of upland areas in the watershed have erosion problems of one kind or another. Approximately 700 acres are classed as critically eroded lands in the form of raw gullies. These areas have an annual sediment producing rate of from 200 to 300 tons per year. In addition, there are approximately 1,600 acres of cropland in the watershed with erosion rates of from 50 to 150 tons per acre per year. The remaining acreage has moderate sheet erosion problems.

Land

The watershed falls within two land resource areas, that of the Upper Coastal Plain, locally known as the Tombigbee River Hills and the Blackland Prairie or Black Belt.^{2/}

In general the Tombigbee River Hills average about 100 feet in relief. They consist of a series of valleys and ridges that run in a southern and southeastern direction. The northeast and east facing slopes are generally short and steep and the southwest and west facing slopes are long and gently sloping. This area is for the most part underlain by sands, clays, and shales of the Selma and Eutaw geologic formations.

The Blackland Prairie Belt is underlain by chalk which belongs to the Mooreville member of the Selma formation. The topography is nearly level to rolling with a local relief of 40 to 50 feet.

^{1/} Soil Survey, Lee County, Mississippi, USDA, 1973.

^{2/} Ibid.

The elevation of the watershed area as a whole ranges from 230 feet above mean sea level near the Tombigbee River to 505 feet along the northern rim of the watershed.^{1/}

The soils in the watershed are in two Land Resource Areas--Coastal Plain and Blackland Prairie.

The Coastal Plain soils are Boswell, Cahaba, Falkner, Kinston, Luverne, Mantachie, Mashulaville, Ora, Prentiss, Quitman, Ruston, Savannah, and Stough. The Prairie soils are Catalpa, Leeper, Marietta, Oktibbeha, and Sumter.

Cahaba and Ruston are deep, well-drained upland soils formed in thick beds of loamy material. They have moderate infiltration and are low in natural fertility. When properly managed they will produce all locally grown crops.

Mashulaville, Ora, Prentiss, Quitman, Savannah, and Stough are formed from thick, medium to moderately coarse textured coastal plain sediments. They have fragipans at depths of 16 to 24 inches.

Ora, Prentiss, and Savannah soils are moderately well drained. Quitman and Stough are somewhat poorly drained, and Mashulaville is poorly drained. Infiltration and permeability are moderate above the fragipan and slow in the fragipan. Except for Mashulaville, these soils are low in organic matter and have moderate natural fertility and when properly managed will produce all locally grown crops. Mashulaville soils are low in organic matter and natural fertility. They are wet in winter and droughty in summer but are suited to limited row crop production.

Luverne soils are clayey soils underlain by stratified beds of clay, sands, and shales. They are well drained and are low in organic matter and natural fertility. Permeability and infiltration are moderate. When properly managed, they will produce most locally grown crops.

Boswell and Falkner are moderately well-drained soils formed in thick beds of fine-textured marine sediments. Boswell soils are clayey throughout and are low in organic matter and moderate in natural fertility.

Permeability and infiltration are slow. Falkner soils are silty in the upper 16 to 24 inches and clayey below. Infiltration and permeability are moderate in the upper part and slow in the lower part of the soils. When properly managed, they will produce most locally grown crops.

Mantachie and Kinston are strongly acid, loamy bottom land soils. They have formed in loamy alluvium from coastal plain soils. Mantachie soils are somewhat poorly drained and Kinston poorly drained. They are low in organic matter and moderate in natural fertility. Infiltration and permeability are moderate. If properly managed, after excess water is removed, these soils will produce all locally grown crops.

^{1/} U. S. Geologic Survey, Tupelo, Mississippi, Quadrangle 1921.

The Prairie soils include Oktibbeha, Sumter, Catalpa, Leeper, and Marietta. Oktibbeha and Sumter are upland soils formed from clay over calcareous marl and chalk. Oktibbeha is moderately well drained and acid in the upper part of the soil. The organic matter content is low and natural fertility moderate. Infiltration and permeability are slow. They will produce good yields of most pasture plants but are not suited to row crops. Sumter soils are calcareous. They are moderate in natural fertility. Permeability and infiltration are slow. They will produce good yields of most pasture plants.

Catalpa, Leeper, and Marietta are slightly acid to alkaline prairie bottom land soils. They have formed in alluvium from Prairie and Coastal Plain upland soils. Catalpa and Leeper are clayey and Marietta is loamy. They are somewhat poorly and moderately well drained. Infiltration and permeability are slow in Catalpa and Leeper and moderate in the Marietta soils. The organic matter is low to moderate and natural fertility is moderate. When properly managed these soils will produce all locally grown crops.

Climate

Lee County in which a large portion of the watershed lies has a warm, humid climate and abundant rainfall. Average temperatures range from a low of about 34° F in January to a high of 92° F in July and August. High and low temperatures recorded in the area were 109° F in July 1930 and -14° F in January 1940. Relative humidity is 60 to 100 percent of saturation about 64 percent of the time yearly.

Rainfall averages about 53 inches per year. Winter and spring are the wettest seasons and fall is the driest. Rains in winter and spring may last for several days but they normally occur as brief showers along the leading edge of a cold mass of air. Rains in the summer come as local thundershowers that may bypass areas for days and weeks while providing other areas with adequate moisture for crop growth. The wettest year on record was 1932 when more than 75 inches of rain fell, and the driest year was 1943 when a rainfall of 15.24 inches was recorded. October is usually the driest month of the year and March is the wettest.

Although tropical storms and hurricanes have never caused winds of gale or hurricane force in the area, they have caused heavy rains that have resulted in floods and ruined unharvested crops. During the past 45 years eight tornadoes, seven hailstorms, and 16 damaging thunderstorms have been recorded in the general vicinity of the watershed area.

Ground Water and Mineral Resources

Northeast Mississippi, of which the watershed is a part, is underlain by several important aquifers of the Cretaceous system. Large quantities of water are available from the thick permeable aquifers which underlie the area.^{1/}

^{1/} Water Resources of Mississippi, Mississippi Geological, Economic, and Topographic Survey, Bulletin 113, 1970.

Most major ground water development in the region is from aquifers in the Upper Cretaceous. The beds outcrop in a general north-south belt with younger beds exposed to the west and south. The beds dip gently at the rate of 20-35 feet per mile. The Cretaceous deposits are composed of unconsolidated sediments consisting of sand, silt, gravel, limestone, and chalk or mixtures of these. Thickness of the deposits are up to 2,500 feet in portions of the region. The Upper Cretaceous deposits are divided into several formations or groups which include in ascending order the Tuscaloosa Group which is subdivided into the Massive sand (Lower Tuscaloosa), Coker (Middle Tuscaloosa), and Gordo (Upper Tuscaloosa), the Eutaw formation which includes the McShan; and the Selma Group which includes the Mooreville chalk, and the Owl Creek.

The aquifers in the Upper Cretaceous include the Tuscaloosa, McShan, and Eutaw, and the Coffee sand and Ripley of the Selma Group.

The Tuscaloosa Group, which includes the Massive sand, Coker, and Gordo aquifers, is an important source of water throughout most of northeast Mississippi. This group is about 500 feet in thickness near its outcrop and underlies most of northeast Mississippi. Numerous municipal, industrial, and domestic wells are completed in these aquifers. The Tuscaloosa group consists of coarse sand, angular and rounded gravel and clay. The 100- to 200-foot thick sand and gravel deposits are capable of yielding 500 to 2,000 gpm to properly developed wells.^{1/}

The Eutaw aquifer is the most widely used and has the greatest potential for ground-water development throughout northeast Mississippi. The Eutaw overlies the Tuscaloosa Group. The thickness of the Eutaw, including the McShan formation, is up to 400 feet. The Eutaw sediments consist of sand, silt, and clay. Domestic and other small wells are completed in the Eutaw aquifer throughout much of the area. Large capacity wells for municipal and industrial use have been completed in the Eutaw at many locations. The average yield from this aquifer is about 250 to 500 gpm, although slightly greater yields are possible at some locations. A number of industrial and municipal wells are drilled through the Eutaw sand to reach the coarse sand and gravel of the underlying Tuscaloosa aquifers.

The Coffee sand is located above the Mooreville chalk and below the Demopolis chalk. It is an important aquifer in the more western portions of northeastern Mississippi. It is exposed at the surface in a belt from central Lee County to the Tennessee line. Thickness of the Coffee sand in the subsurface averages about 250 feet. Sediments include sand, sandy clay, and calcareous sandstone. Potential yields from the Coffee sand are from 200-300 gpm maximum. This yield is low in comparison to other aquifers in the area. The Ripley formation, which in the northern part of the area includes the McNairy sand member, contains important aquifers. Thickness of the Ripley is from 50 to 460 feet and includes the 200-foot thick McNairy member. The McNairy sand member is an excellent source of ground water in a number of counties in north Mississippi.

^{1/} Water Resources of Mississippi, Mississippi Geological, Economic, and Topographic Survey, Bulletin 113, 1970.

Water levels in northeast Mississippi are from flowing wells with 44 feet of head to as much as 250 feet below the land surface. Flowing wells are common along the Tombigbee River and its tributaries and many small diameter wells have been flowing for years in the lowlands of that river basin.^{1/}, ^{2/} Heavy pumpage in local industrial or municipal areas results in a cone of depression being developed in the water levels at certain locations.

Generally, the ground water in northeast Mississippi is of good quality for most purposes. Most of the water from the Cretaceous aquifers is soft and low in mineral content. Excessive iron is present in some of the aquifers, particularly the Tuscaloosa in the eastern part of the region near the outcrop.

Mineralization of the water increases with depth and southward along the strike. The Eutaw aquifer contains water too highly mineralized for domestic use along the southern and western periphery of the Northeastern Mississippi region. The lower Tuscaloosa (massive sand) yields water of the best quality throughout most of the region. Water from the Eutaw is good and is widely used for municipal, industrial, and domestic wells in the area.

Fluoride is present in the water from some of the Cretaceous aquifers. Locally the fluoride content may be excessive and is up to 7 ppm in some places.

There are no known oil, gas, or other mineral deposits of commercial value within the watershed boundary.^{3/} However, gas, deposits of bentonite, ceramic clays, sand, and gravel of commercial value are being mined from other parts of surrounding land areas.^{4/} Market conditions and the depletion of resources elsewhere could renew interest in exploration for these minerals within the watershed.

The commitment of mineral resources to be used for construction, inundated by reservoirs, or otherwise preempted by project measures, will have only a slight impact for this project. This would hold true even if the market conditions and the depletion of these resources elsewhere could renew interest in exploration. With modern techniques in the exploration and exploitation field (and in particular to off-set drilling), this project will have no impact on exploration for, or extraction of oil and gas resources which may exist in the immediate area.

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- ^{1/} Water Resources of Mississippi, Mississippi Geological, Economic, and Topographic Survey, Bulletin 113, 1970.
 - ^{2/} Public and Industrial Water Supplies in a Part of Northern Mississippi, Mississippi Geological Survey, Bulletin No. 90, 1960.
 - ^{3/} Mississippi State Oil and Gas Board Bulletin, Vol. 73, No. 3, May 1973.
 - ^{4/} Mississippi Geological, Economic, and Topographic Survey, Bulletin 112, Economic Minerals of Mississippi, 1970.

Land Use

The current land use of the watershed is about 13,901 acres of cropland (12 percent), 8,473 acres of pastureland (8 percent), 78,574 acres of forest land (69 percent), and 12,637 acres of other lands and miscellaneous uses (11 percent). Land use by capability classes is shown in the table below.

Capability Classes	Cropland	Forest Land	Pastureland	Other	Total	Percent of Watershed
<u>Land Use by Capability Classes of the Erosion Problem Areas</u>						
I	215			25	240	0.2
IIe	2,074	1,431	428	1,123	5,056	4.4
IIIe	1,973	3,991	1,232	169	7,365	6.5
IVe	1,187	6,186	2,300	889	10,562	9.3
VIe	408	15,439	1,917	848	18,612	16.4
VIIe	105	38,157	740	282	39,284	34.6

Land Use by Capability Classes of the Water Problem Areas

IIw	6,908	4,810	1,207	1,198	14,123	12.4
IIIw	891	257	545	1,549	3,242	2.9
IVw	140	3,882	104	55	4,181	3.7
Vw	0	4,421	0	0	4,421	3.9
Miscl. (water, towns, roads, highways)					6,499	5.7
Total Watershed Area					113,585	100.0

The capability classification^{1/} is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to conservation practices. In this system all kinds of soils are grouped at three levels--the capability class, subclass, and unit. The capability classes are designated by Roman numerals I through VIII, the subclasses are indicated by adding a small letter to the class numeral, and the unit is identified by numbers assigned locally. The subclasses indicate major kinds of limitations within the classes and the units indicate management needs.

Soils in Class I have no subclasses because the soils of this class have few limitations. Soils in Class II have some limitations that reduce the choice of plants or require moderate conservation practices. Soils in Class III have severe limitations that reduce the choice of plants and/or require special conservation practices. Class IV soils have very severe limitations that restrict the choice of plants and/or require very careful management. Class V soils are not erodible but have other limitations (impractical to remove) that limit their use largely to pasture, forest, or wildlife food and cover. Class VI soils

^{1/} Soil Survey, Lee County, Mississippi, USDA, Soil Conservation Service in cooperation with Mississippi Agricultural Experiment Station.

have severe limitations that make them unsuitable for cultivation and that limit their use largely to pasture, forest, or wildlife food and cover. Class VII soils have very severe limitations that make them unsuitable for cultivation without major reclamation and restrict their use largely to pasture, forest, or wildlife food and cover. Class VIII soils and land forms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or esthetic purposes (none in this watershed).

The subclass "e" shows that susceptibility to erosion or past erosion is the dominant problem, and subclass "w" shows that susceptibility to wetness or past wetness is the dominant problem.

There are 80,879 acres of upland soils in the watershed that are susceptible to erosion or past erosion. There are 25,967 acres of bottom and terrace land that are susceptible to wetness or past wetness. There are 2,356 acres of the subclass "e" soils that are critically eroding and 17,873 acres of the subclass "w" soils that are subject to flooding.

Surface Water Resources

The watershed stream pattern consists of three major drainages. Mantachie and Bogue Fala Creeks begin in the eastern portion of Lee County and flow in a southeasterly direction to their confluence with Tombigbee River. Bogue Eucuba Creek begins in the eastern part of Lee County and flows in a southeasterly direction and joins Bogue Fala Creek approximately 1.5 miles upstream of the Tombigbee River.

Approximately 17 miles of the lower portion of Main Mantachie, 22 miles of the lower portion of Bogue Fala, and 12 miles of the lower portion of the Bogue Eucuba channels are previously modified channels. Approximately 106 miles of tributaries of the three main streams have modified channels. The remaining streams throughout the watershed are in a natural state and have not been modified. Thirty-five miles of the lower portion of the Mantachie, Bogue Fala, and Bogue Eucuba channels were constructed by the Drainage Districts organized in 1913.

Mantachie Creek is intermittent in its upper portion down to approximately State Highway 371; from this point to its junction with the Tombigbee River, the stream is perennial. Bogue Fala and Bogue Eucuba are intermittent except in the extreme lower reaches. According to Regulation WFC-3-70, Air and Water Pollution Control Commission, State of Mississippi, all streams which have a 7-day, 10-year minimum flow equal to "o" are classified as drainage. Therefore, the upper portion of Mantachie, Bogue Fala, and Bogue Eucuba are classified as drainage. The lower portion of Mantachie, Bogue Fala, and Bogue Eucuba are classified as fish and wildlife. The tables on the following pages show the various stream characteristics.

STREAM CHARACTERISTICS

Stream and Reach	Bottom	Side	Depth	Degree	In	Channel	Immediate	Degree	Degree	Type of			
	Width	Slopes	Feet	of	Bank	Bottom	Over Bank	of Sedi-	of Bank	Degree of			
	Feet			Obstruc-	Material	Use	Land Use	ment de-	Stabl.	Channel			
				tion				position		Beaver Dams			
Mantachie Creek													
From the Tombigbee River to U.S. Hwy. #73	37-75	2:1&3:1	9-20	minor	weeds	silt	grasses	high	stable	minor	M	P	minor
From U.S. Hwy #78 to the first road-crossing above the town of Mantachie	20-23	1.5:1	13-21	severe	drift	silt	crops	moderate	caving	occ.	M	I	minor
From the first road-crossing above the town of Mantachie to FWRS #9	10-25	1:1-2:1	7-5-21	appreciable	trees	clay	crops	light	slight	freq.	M	I	minor
Tributaries below FWRS's 10, 11, 6, 7, 8	5-16	2:5:1	6-14	severe	drift	silt	grasses	light	stable	freq.	M&N	I	minor
Bogue Falls Creek													
From the Tombigbee River to near the junction of the tributary containing FWRS #5	10-30	2:1	16-25	appreciable	trees	silt	row	moderate	stable	minor	M	P	appreciable
From the junction of the tributary below FWRS #5 to a point west of the community of Greenwood	10-22	1:1	10-14	severe	weeds	silt	row	light	fairly	stable	M	P	minor
From west of Greenwood to U.S. Hwy. #76	10-12	1.5:1	9-11	severe	weeds	silt	trees	light	fairly	freq.	N	I	minor

STREAM CHARACTERISTICS (Cont'd)

Stream and Reach	Bottom: Width : Slopes :	Side : feet :	Depth : feet :	Degree : of Obstruction :	In : Bank : Veg. :	Channel : Bottom : Material :	Over Bank : Land Use :	Immediate : Sediment position :	Degree : of Bank Stabl. :	Degree : of Bank Stabl. :	Meander : Channel :	Type of : Degree of : Beaver Dams :
Bogue Falgula Creek (Cont'd)												
From U.S. Hwy. #78 to FWRS 2 & 3	3-18	1:1-2:5:1	6-13	severe	trees: weeds: brush: drift:	silt: clay	trees	light	fairly: stable:	freq. bends	M: I	minor
Bogue Euruba Creek												
From Bogue Fala Creek to State Hwy. # 371	15-30	2:1	15	appreciable	brush: drift:	silt: clay	crops: trees	moderate	fairly: stable:	minor	M: P	minor
From State Hwy. #371 to FWRS #1	7-17	1.5:1	12	appreciable	brush: trees: drift:	silt: clay	crops	light	stable:	minor	M: I	minor

1/ M - Man-made channel or previously modified channel or stream.
 N - All unmodified, well defined natural channel or stream.
 P - Perennial: Flows at all times except during extreme drought.
 I - Intermittent: Continuous flow through some seasons of the year but little or no flow through other seasons.

Forestry Resources

The forest types within the watershed are loblolly-shortleaf pine--46 percent, shortleaf pine-oak--17 percent, mixed bottom land hardwoods--37 percent. These lands consist of pole size to small sawtimber size stands of trees. Except for the 488 acres of forest land within the Natchez Trace Parkway right-of-way, all forest land is in small private holdings.

Wetlands Resources

In the flood plain adjacent to the main streams are 17,873 acres of Type I wetlands as described in Circular-39, Wetlands of the United States, Fish and Wildlife Service, U. S. Department of the Interior. In addition, there are two areas classed as "artificial wetlands." Both have been created by beavers. One is approximately 80 acres of marsh 5-7 years old on the south side of the old Mantachie Creek run and the other is approximately 15 acres of the old Bogue Fala Creek run.

Fish and Wildlife Resources

Deer, squirrel, and other indigenous wildlife species are present throughout the watershed. The flood plain, for the most part, is in row crops and pastures. Therefore, most forest game habitat is confined to the upland areas. The narrow strips of woody vegetation along channels, streams, and field borders create excellent small game habitat in the cleared bottoms.

There are many small tributaries throughout the watershed. The flood plains of these tributaries are narrow and are farmed in such crops as corn and soybeans. These relatively narrow bottoms surrounded by forested uplands create excellent habitat for farm game such as quail, rabbit, and dove, as well as deer.

Waterfowl use soybean and corn fields when flooding conditions occur during the winter months. Two beaver ponds create wetland marshes that provide excellent fish and wildlife habitat for a variety of game and nongame species as well as nesting habitat for wood ducks.

Mantachie Creek has some pollution from the town of Mantachie (population 250), and this pollution adversely affects water quality factors on the fish and wildlife resources during periods of prolonged droughts. Erosion in the upland areas has resulted in moderate siltation in some of the stream channels. This siltation has reduced the fishery resource by filling some of the deep holes which provided fish habitat.

The low extremities of Mantachie and Bogue Fala Creeks provide some stream fishing opportunity and are available to the general public. Good catches of bream, bass, and catfish are reported during early spring months. Other fishing in the watershed is provided by privately



owned lakes and farm ponds. Also, there is some 25 miles of Tombigbee River that is available to the public for fishing.

There are no endangered species in the watershed. Potential habitat is available for species of the Southern Red Cockaded Woodpecker in a 488-acre area contained in the right-of-way of the Natchez Trace Parkway, which crosses the upper portion of the watershed.

Economic Data

The watershed area is agricultural in nature and is classified as rural. Approximately 1,420 farms are located wholly or partially within the watershed and are primarily of the family farm type. The average farm size is approximately 150 acres with an estimated average value of \$35,000 including land and buildings.^{1/} Flood plain lands have an estimated value of \$200 per acre and watershed uplands are \$175 per acre. The major farm enterprises consist of row crops and livestock.

The forest land on the watershed averages 1,500 board feet per acre for pine sawtimber, and about $2\frac{1}{2}$ cords of pine pulpwood. Hardwood volumes average about 800 board feet for sawtimber and two cords of pulpwood per acre. Total average value per acre for all forest products at present prices is \$120 per acre.

Average growth for all forest products will yield \$11.00 per acre per year.

In 1969, about 63 percent of the farm operators worked off-farm part-time with about 49 percent working off-farm 100 or more days per year. In 1969, about 65 percent of the farms in Itawamba County and 61 percent of the farms in Lee County had gross incomes of less than \$2,500. The gross value of all farm products sold in the watershed area in 1969 averaged about \$5,800 per farm.^{2/}

Principal crops grown in the watershed and their average yields per acre are cotton (550 lbs.), corn (50 bu.), soybeans (25 bu.), and hay (2 tons). Pastures yield approximately 5 animal unit months of grazing per acre per year. The principal crops grown in the flood plain and their average yields per acre are cotton (750 lbs.), corn (75 bu.), soybeans (35 bu.), and hay (3 tons). Flood plain pastures yield about 7 animal unit months of grazing per acre.

The entire watershed area is in private ownership with the exception of 488 acres within the right-of-way area of the Natchez Trace Parkway in the northern portion of the watershed and the areas occupied by public roads and highways rights-of-way. Sixteenth Section lands are not public lands in this area.

^{1/} 1969 Census of Agriculture.

^{2/} Ibid.

Numerous county roads, State Highways 363 and 371, and U. S. Highway 78 provide easy access to nearby Fulton, Amory, and Tupelo. There are no railroads in the watershed.

A shirt manufacturing plant at Mantachie, a sawmill at Dorsey, and other local merchants provide some off-farm employment to local watershed residents. Off-farm employment is also available in Fulton, about 3 miles east of the watershed, and Tupelo, about 7 miles west of the watershed.

The local churches throughout the watershed serve as centers for community and cultural activities for the watershed residents. There are elementary schools located in Dorsey, Mantachie, and Mooreville. Public high schools are located in Mantachie and Mooreville and Itawamba Junior College is located at Fulton.

The watershed is located in the Tombigbee River Valley Water Management District (a political sub-division of the State of Mississippi), the Tombigbee River Basin, the Appalachia Region, and the Northeast Mississippi Resource Conservation and Development Project. A Comprehensive Overall Development Program (OEDP) for Lee, Itawamba, and Monroe Counties has been prepared by their respective Rural Area Development Associations.

Recreational Data

Recreational resources within the watershed are limited to private lands and waters. Fishing in private ponds, the lower portion of Bogue Fala and Mantachie Creeks, the Tombigbee River, and hunting on private lands are the primary recreational pursuits. Pickwick Lake, a large TVA reservoir offering full facilities, is 60 miles from the watershed, and Lake Lamar Bruce (330 acres) also offering full recreational facilities is 20 miles from the watershed.

Other recreation areas in the vicinity of the proposed project include the Tombigbee State Park which is located approximately six miles southeast of Tupelo and the John Bell Williams Wildlife Management Area which is located approximately ten miles north of Fulton, Mississippi. The State Park is made up of 822 acres of land and contains an 80-acre lake. Facilities offered to the public include fishing, boating, swimming, camping, and picnicking. Approximately 100,000 people make use of the park each year.

The Wildlife Management Area consists of approximately 11,000 acres of both upland and bottomlands and is devoted largely to wildlife and timber management and public hunting. Limited facilities are offered for camping and hiking activities.

Two relatively large reservoirs (Bay Springs and Amory-Aberdeen) are proposed by the Corps of Engineers in connection with the Tombigbee River Waterway Project. They will be located, respectively, 30 miles to the northeast and 30 miles to the south of the watershed.

Archeological and Historical Resources

An archeological survey was conducted by the Mississippi Department of Archives and History in accordance with a contract with the Soil Conservation Service.

The survey revealed 14 sites in or near the project area. Thirteen of these sites will be affected by the construction of the floodwater retarding structures. All of the sites however, are small and have previously been destroyed by intensive agriculture. They are considered to be archeologically expendable.

According to the State Historical Preservation Officer, who is also the Director of the Mississippi Department of Archives and History, there are no National Register sites in the project area and none of the revealed sites are considered eligible for inclusion in the National Register of Historic Places.

The Natchez Trace, a historical old road from Natchez, Mississippi, to Nashville, Tennessee, crosses the upper portion of the watershed. There are 488 acres contained in the right-of-way of this uncompleted section of the Natchez Trace Parkway which is owned and operated by the National Park Service of the U. S. Department of the Interior.

Soil, Water, and Plant Management Status

The trends in land use changes are from corn, pasture, and perennial grasses to soybean production. The Soil and Water Conservation Districts have assisted landowners and operators in establishing conservation land treatment measures. Important accomplishments are shown in the following table:

Land Treatment Measures Established

Cropland

Conservation cropping systems	9,370 ac.
Terraces	30 mi.
Grassed waterways	65 ac.
Contour farming	4,721 ac.
Crop residue management	9,150 ac.
Mains and laterals	15 mi.
Drainage field ditches	22 mi.
Diversions	25 mi.

Grassland

Pasture planting	8,038 ac.
Pasture management	1,725 ac.
Farm ponds	200 ac.
Critical area planting	225 ac.
Brush control	767 ac.
Mains and laterals	10 mi.
Drainage field ditches	20 mi.

(continued)

Land Treatment Measures Established (Cont'd)

Forest land

Tree planting	4,000 ac.
Forest land improvement	400 ac.
Firebreaks	10 mi.

Wildlife

Habitat management and development	3,000 ac.
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There are 396 soil and water conservation plans already prepared which cover about 65 percent of the watershed with about 60 percent of the planned conservation practices established. Soil surveys have been completed on the entire watershed. The degree to which committed factors of production (land, labor, and capital) are employed inefficiently on marginal uplands is moderate but is extensive on flood plain areas subject to frequent flooding.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Problems

There are 80,879 acres of land in the watershed which are classed as having an erosion problem. Of these, 700 acres are gullies and are producing sediment at a rate of 200 to 300 tons per acre per year. There are 1,656 acres of cropland with erosion rates varying from 50 to 150 tons per acre per year. The remaining 78,523 acres have a sheet erosion problem which is considered to be moderate. The soils in this area vary in organic matter and natural fertility is low to moderate. However, vegetation can be established on all of these soils including the low fertility soils when properly treated and managed.

An estimated 25,967 acres of land in the watershed are classed as having a water problem. There are 17,873 benefited acres in the flood plain and 8,094 acres have poor internal drainage due to flat slopes and soil texture. The soils in this area are low in organic matter and vary from low to moderate in natural fertility.

Land use adjustments are needed in the watershed on the 2,356 acres that have a serious erosion problem. Of these acres, 1,656 are in cultivation and should be planted to some type of close-growing vegetation such as grasses or legumes. The treatment needs for the other 700 acres of critical area consist of planting trees. The remaining 78,523 acres of erosive land will need treatment on the cropland consisting of conservation cropping systems, crop residue management, land smoothing, diversions, terraces, vegetative waterways, contour farming, drainage field ditches, and mains and laterals. Grassland treatment needs include pasture planting, renovation, management, farm ponds, drainage field ditches, and mains and laterals. The forest land treatment needs consist of open field planting, underplanting, and improving hydrologic conditions for manipulations of stand composition.

The economic conditions in the watershed are such that most of the land treatment measures will be established by the individual landowners and operators. However, cost-sharing will be needed to assist the low-income farm families in establishing these measures on their lands.

Floodwater Damage

The watershed flood plain area as described above, consists of 17,873 benefited acres. This is the area inundated by a 24-hour, 100-year frequency storm. Approximately 8.2 inches of rainfall are associated with a storm of this magnitude. A two-year, 24-hour storm produces approximately 4.0 inches of rainfall and results in the flooding of about 5,200 acres. Flooding occurs on portions of the flood plain an average of four times each year.

Flood plain land use includes 57 percent cropland, 21 percent pastureland, and 22 percent forest land. These lands are owned by 740 landowners.

The ownership ranges in size from one acre to 300 acres and the value is about \$200 per acre. There are 10 residences and two small businesses located in the flood plain areas.

The average annual floodwater damage is estimated to be \$278,800 to crops, pastures, and haylands; \$50,500 to roads and bridges; and other fixed improvements, \$46,200; and \$37,600 indirect damages.

Frequent spring and summer floods delay land preparation, planting, cultivation, and other management procedures. Floods that occur after normal planting time make reparation and replanting necessary. The results are uneven stands, reduced crop yields, increased cost of production, and sometimes complete crop losses.

In addition to damage to crops, flooding results in damages to pastures, haylands, and fixed improvements such as public roads and bridges, fences, field ditches, and farm bridges in the watershed. The greatest proportion of average annual damage to crops, pastures, and haylands is caused by the smaller, more frequent spring and summer floods. Damages to fixed improvements are caused predominantly by the larger, less frequent winter and early spring floods.

Erosion Damage

Moderate sheet erosion occurs throughout the watershed and is considered to be the primary sediment source. Critical gully erosion is occurring on 700 acres located throughout the watershed, but the most of it is in the upland areas of Bogue Fala and Mantachie Creeks in Lee County. This produces 200-300 tons of sediment per acre per year. There is also critical erosion occurring on 1,656 acres scattered throughout the watershed varying in nature from small gullies to sheet and rill erosion due to cultivation of steep hill lands.

Average gross erosion rates in tons per acre per year by land use over the entire watershed are:

	<u>Upland</u>	<u>Bottom Land</u>
Crops	28	12
Pastures	8	3
Woodlands	6	1
Other	11	2

Sediment Damage

Deposition of sediment has occurred to a moderate degree in stream channels, road culverts, under bridges, on flood plains, and in the numerous small farm ponds scattered throughout the watershed. Sediment damages vary from slight (15%) to moderate (30%) on the 17,873 acres of flood plain lands and were evaluated monetarily. The estimated average annual damage due to sediment deposition is \$54,800.

The present sediment yield at the lower boundary of the Mantachie Sub-Watershed is estimated to be 99,000 tons per year, or expressed in terms of sediment concentration in water, an average of 935 parts per million or mg/l. The sediment yield at the lower boundary of the Bogue Fala Sub-Watershed is estimated to be 77,000 tons per year or an average concentration of 906 parts per million or mg/l. On the Bogue Eucuba Sub-Watershed, the sediment yield is estimated to be 26,000 tons per year, or an average concentration of 736 parts per million or mg/l.

Drainage Problems

There are 8,094 acres that have poor internal drainage due to flat slopes and soil texture. The existing watershed channels provide sufficient depth and capacity to meet internal drainage needs. However, additional on-farm drainage measures are needed.

Recreation Problems

The only fishing and recreational areas available in the watershed are private ponds, the lower portions of Mantachie and Bogue Fala Creeks, and the Tombigbee River. Therefore, there is a need to provide water storage for recreation together with recreational facilities for use by the general public.

According to the Itawamba County Comprehensive Water and Sewer Plan, the 1960 population of Itawamba County was about 15,000. The projected population to 1990 is 17,000, an increase of about 13 percent.

According to the Lee County Comprehensive Water and Sewer Plan, the 1960 population of Lee County was 40,600. The projected population to 1990 is 69,500, an increase of about 71 percent. These projected population increases reflect a greater demand in future years for surface recreation waters.

Plant and Animal Resource Problems

Since the dredging of the channels by the Drainage Districts which were organized in 1913, there has been considerable land clearing in the bottom lands adjacent to the channels. This clearing has caused a permanent loss of habitat for deer and squirrel, but created better habitat for quail, rabbit, and dove. Erosion of the upland soils has caused siltation in the stream channels. This, together with channel work, has caused damage to fish and fishery habitat in the extreme lower sections of the three main streams. There is a need for more fishery habitat, and there is also a need for additional wildlife food and cover plantings.

Water Quality Problems

All streams in the watershed are classified by the Air and Water Pollution Control Commission as "fish and wildlife." The only water-quality problem

that exists is turbidity caused by erosion and the small amount of pollution caused by the town of Mantachie (population 250) to Mantachie Creek during periods of prolonged drought.

Economic and Social Problems

Floodwater and sediment damages average \$467,900 per year and have forced many of the farm operators to supplement their farm income by taking part-time or full-time jobs in nearby towns. In 1969, about 63 percent of farm operators worked off-farm part time. About 49 percent worked 100 or more days per year off-farm.

The farms which employed as much as one and one-half man-years of hired labor are in a small minority, and their operations comprise a very small percent of the benefited area as compared to the family-type farm operation.

The watershed is within an area designated by the U. S. Department of Commerce as qualified for assistance through the Public Works and Economic Development Act of 1965.

The following table shows income for Lee and Itawamba Counties^{1/} by farm income groups and is considered to be representative of the watershed:

	<u>Lee County</u>		<u>Itawamba County</u>	
	<u>1964</u>	<u>1969</u>	<u>1964</u>	<u>1969</u>
Total Farms	1,797	1,264	1,489	1,094
Farms by Economic Class:				
Commercial Farms				
Class I, \$40,000 or more	181	137	13	44
Class II, \$20,000 - 39,999	56	52	58	40
Class III, \$10,000 - 19,999	48	46	67	49
Class IV, \$5,000 - 9,999	122	48	139	104
Class V, \$2,500 - 4,999	225	68	220	147
Class VI, \$50 - 2,499	201	47	293	182
Totals	<u>833</u>	<u>398</u>	<u>790</u>	<u>566</u>
Other Farms				
Part-Time	44	41	448	359
Part-Retirement	28	13	251	169
Totals	<u>72</u>	<u>54</u>	<u>699</u>	<u>528</u>
Percent of Total Farms with Less than \$2,500 Total Income	15%	1%	67%	65%
Value of All Farm Products Sold (average per farm) (Dollars)	5,966	10,887	3,932	5,862

^{1/} 1969 Census of Agriculture.

Itawamba County contains 64 percent of the watershed, Lee County contains 33 percent, and Monroe County contains only 3 percent. However, the Itawamba County income statistics are more representative of the watershed, and show that 67 percent of all farms had incomes of less than \$2,500 in 1964 and 65 percent had incomes of less than \$2,500 in 1969.^{1/}

In 1969 Itawamba County had \$2,023 per capita income annually (55 percent of the national average).^{2/}

In Itawamba County, 35.8 percent of the workers worked outside the county, whereas the average for Mississippi was 13.7 percent. From 1960 through 1970, there was a decline of 59.5 percent in the farm population.^{3/}

Elderly people contribute to the economic problem in the area.^{4/} This is illustrated by the following table:

<u>Item</u>	<u>Itawamba County</u>	<u>Mississippi</u>
Medium age - years	30.5	25.1
Persons over 65 - percent	11.8	10.1
Over 65, below low income level - percent	26.5	15.5

^{1/} 1964 and 1969 Census of Agriculture.

^{2/} 1969 Census of Agriculture.

^{3/} County and City Data Book, 1972.

^{4/} Ibid.

PROJECTS OF OTHER AGENCIES

A Comprehensive River Basin Study has been prepared on the Tombigbee River of which this watershed is a part. The 12 floodwater retarding structures, the two multiple-purpose structures, and the land treatment measures planned for this watershed are in harmony with the works of improvement planned for the Basin.

The Corps of Engineers, Mobile District, has an authorized project for 5.17 miles of channel improvement work on the lower portion of the main Mantachie Creek channel to its confluence with Tombigbee River. The planned works of improvement have been completed.

There are 488 acres contained in the right-of-way of the Natchez Trace Parkway which is owned and operated by the U. S. Department of the Interior.

PROJECT FORMULATION

There have been three organized drainage districts in the watershed. They were the Mantachie Drainage District, Drainage District No. 20 (Bogue Fala), and the Bogue Eucuba Drainage District. These districts were organized in 1913, 1925, and 1922 respectively, for the purpose of constructing 35 miles of ditches. The districts have since been dissolved and reorganized into the present Master Water Management District.

Formal application was made in January 1968 by the officials of the Mantachie, Bogue Eucuba, and Bogue Fala Master Water Management District, and the Northeast Mississippi Soil Conservation District and the Monroe County Soil Conservation District for federal assistance under the Watershed Protection and Flood Prevention Act. The purpose of the assistance was to carry out plans for works of improvement for the Mantachie, Bogue Eucuba, and Bogue Fala Creeks Watershed which is located in the counties of Lee, Itawamba, and Monroe, State of Mississippi.

A field examination of the watershed had been conducted prior to 1968 by members of the watershed planning party. The examination included a reconnaissance of the watershed, a study of the land use, crops flooding conditions, and critically eroded areas. Also observed were the condition of stream channels, possible sites for floodwater retarding structures, and for additional land treatment measures and land use changes.

A field tour of the watershed was made during the early part of 1968 by commissioners of the Water Management District and representatives of the Soil Conservation Service. The purpose of the tour was to observe conditions in the watershed, to locate structure sites, and to assist in development of the overall watershed work plan.

A preliminary field study of the watershed was made by an SCS biologist during early 1968.

Agencies were advised of the development of the plans for the watershed during May 1968. Among those notified were the National Park Service, USDI, the Federal Water Pollution Control Administration, and the U. S. Corps of Engineers, Mobile District.

A meeting was arranged between representatives of the SCS and the Commissioners of the watershed to discuss the developments of the project and to determine the need for additional surveys in the watershed.

Forestry resources were scheduled to be surveyed, beginning in October 1968 by the U. S. Forest Service.

A review of recreational facility sites by members of the Mississippi State Board of Health and the Air and Water Pollution Control Commission was made during the fall of 1968.

A detailed investigation was made by members of the Watershed Planning Staff during early 1969 of the drainage area above Multiple-Purpose Structure No. 11 (recreation). The purpose of this examination was to determine possible pollution and/or contamination potential of this area on the proposed recreational site.

Arrangements were made for a meeting between members of the SCS and the Commissioners of the Watershed on July 16, 1969. The purpose of this meeting was to finalize project plans regarding protection of the flood plain, to firm up decisions regarding recreational aspects of the plan, and to concur on works of improvement of the project.

Arrangements were made for a meeting to be held December 17, 1969, between representatives of the SCS and the Water Management District. The purpose of this meeting was to be a discussion of further recreation facilities for the watershed.

On December 17, 1969, the watershed application was amended because a change in name of the sponsorship from Northeast Mississippi Soil Conservation District and the Monroe County Soil Conservation District to the Itawamba, Lee, and Monroe Counties Soil Conservation Districts.

During March 1970, the Water Management District decided to obtain a loan from the Farmers Home Administration to help pay the cost of sponsoring the Watershed District.

Representatives of the U. S. Fish and Wildlife Service and the Mississippi Game and Fish Commission made a tour of the watershed in June 1970.

A public meeting was held November 5, 1970. The purpose of this meeting was to inform the public concerning the watershed project and to give the people an opportunity to make a statement as to whether they were for or against the project.

An archeological survey was completed in April 1975 of the watershed by the Mississippi Department of Archives and History. The survey revealed 14 sites in or near the project areas. Thirteen of the sites will be affected. All of these are small and have been previously destroyed by intensive agricultural practices. They are considered to be archeologically expendable. There are no National Register sites in the project area and none of the revealed sites are considered eligible for inclusion in the National Register of Historic Places.

Consultation with the Mississippi Park Commission, Bureau of Outdoor Recreation, revealed that the watershed plans are in accord with the Statewide Comprehensive Outdoor Recreation Plan for the State of Mississippi.

Objectives

The objectives of the project are directly related to the problems of the watershed.

Primary objectives of the project are to provide a higher degree of watershed and floodwater protection, to provide public water-based outdoor recreation, to improve the economy of the watershed area, and to maintain and/or improve wildlife and fisheries resources of the watershed.

Specific goals for achieving these objectives are as follows:

1. The acceleration of land treatment establishment on the 113,585 acres of the watershed.
2. Adequate treatment of approximately 19,756 acres of cropland, pastureland, forest land, and critically eroded land during the project installation period.
3. To provide flood protection on approximately 17,873 acres of flood plain land.
4. To convert approximately 3,000 acres of idle land to productive uses.
5. To virtually eliminate flooding caused by the two-year, 24-hour storm.

Land treatment measures to be established on the lands of the watershed have been discussed in detail under the heading of Works of Improvement to be Installed (See page 30). However, a discussion of the levels of attainment of Project Objectives requires the following information. Land to be adequately treated during the installation period amounts to a total of 19,756 acres. This consists of 8,200 acres of cropland, 5,100 acres of pasture and hayland, 4,100 acres of forest land and 2,356 acres of critically eroded land. Other land will be partially treated.

Critically eroded areas will be given priority and will be treated during the first three years of the six-year installation period.

Land treatment measures above structure sites will be established or installed during the first four years of the project installation period. Those land treatment measures which are contingent on the installation of the planned structural measures will be established or installed during the last two years of the installation period.

Land treatment measures over the entire watershed will gradually reduce gross erosion by 32 percent.

All structural measures will be installed by contract during the second, third, and fourth years of the six-year installation period. It is estimated that the structures combined with the land treatment measures will eventually reduce the annual sediment damage about 81 percent for the entire watershed.

It is estimated that the 12 floodwater retarding structures and two multiple-purpose structures will reduce by 87 percent the acres flooded by a 2-year, 24-hour storm. These structural measures will also reduce the peak discharge about 22 percent.

Environmental Considerations

Environmental considerations of the project include: (1) Water quality for recreational purposes; (2) Stream fishery and wildlife resources and habitat quality maintenance; (3) Lake and pond fishery resources; (4) Upland wildlife habitat; (5) Historical and archaeological sites; (6) Low income farm families; and (7) Health and quality of life aspects of watershed people.

Water quality was given careful consideration in the selection of the multiple-purpose structural sites in order to insure pollution free recreation areas. Studies were made of the drainage areas above potential sites to determine the existence and extent of homes, livestock operations, garbage dumps, land use, sediment yield, industrial areas, junkyards, and burned-over areas.

Stream channel work on approximately six miles of channels was cancelled from the original project. This will reduce the amount of cover along the channel bank that would be destroyed and the amount of stream fisheries resources and habitat and wildlife resources and habitat that would have been disturbed.

Lake and pond fishery resources were given consideration in the planning of project measures. This is evidenced by the fact that 983 surface acres of reservoir water will have been provided for fishing as a result of the project. In addition, approximately 79 farm ponds will be built during the period of project installation. These will provide a 40 percent increase over the present pond fisheries resources of the watershed.

Consideration for the wildlife of the watershed is evidenced by the fact that approximately 600 acres of wildlife land will be adequately treated as a project measure during the period of project installation.

The downstream effects that will occur from this project will be the reduction in flood stages, reduction in sediment leaving the watershed, a better quality of water will be leaving the watershed, and there will be less potential for sediment damage to downstream flood plains.

Critically eroded areas of the watershed were given consideration and will be treated by the planting of trees and/or other cover. This will reduce the production of damaging sediment and will put otherwise unproductive land into productive use, and will provide additional cover for wildlife.

Consideration was given to the possibility of the presence of historical or archaeological sites. A preliminary archaeological survey was made of

the watershed by the Department of Archives and History, State of Mississippi. This survey indicated that there are Indian mounds and other historical sites scattered throughout the watershed. Care was taken to be certain that none of these were located within the project construction areas.

Consideration was given to increasing the income and standard of living of the low income farm families of the watershed area. This will in part be accomplished by reducing flooding and sediment damage to land, crops, and utilities, and by removing hazards to production allowing for better utilization of production factors.

Health and quality of life aspects of the people of the watershed were given consideration in providing measures that will decrease erosion, sedimentation, flooding, and provide recreational areas which are needed but have not been available locally prior to the formation of this plan.

Alternatives

Several alternatives were studied in the project evaluation process. The more reasonable ones were evaluated to the point of determining cost and impacts. Those considered were (1) establishing needed land treatment at an accelerated rate; (2) accelerated land treatment and channel work; (3) accelerated land treatment, a combination of floodwater retarding structures, multiple-purpose structures with recreation facilities, and channel clearing; (4) land treatment, flood proofing, and converting present flood plain to uses less susceptible to flood damages; and (5) no project.

The first alternative "establishing needed land treatment at an accelerated rate" would require installation of those measures described under the heading of "Works to be Installed - Land Treatment." This alternative would eliminate those adverse impacts associated with the installation of planned structural measures. Gross erosion and associated sedimentation would be reduced 32 percent. Fish and wildlife habitat would be improved by the installation of and stocking of ponds, vegetating eroding areas, wildlife habitat improvement and preservation, and multiple use and management of forest. Floodwater damages would be reduced about 5 percent. The cost of this alternate was estimated to be about \$943,900. About \$353,210 of flood damage would still occur annually.

A second alternative considered was accelerated land treatment and channel work. This alternate would retain the favorable impacts as listed for the alternate of needed land treatment, would effect about a 40 percent reduction in floodwater damages and would eliminate the commitment of forest and open land to dams and pools associated with the proposed project. This alternate would require constructed channels of increasing size as one proceeds downstream resulting in near total destruction of stream fisheries resources and major clearing of hardwood timber along channel rights-of-way. This alternate would increase flood stages downstream of the channel construction areas due to concentration of flood flow. This alternative was estimated to cost about \$1,843,900.

Another alternative consisted of accelerated land treatment, a combination of nine floodwater retarding structures, two multiple-purpose structures with recreation facilities and approximately 6 miles of channel clearing. Favorable impacts associated with land treatment measures would be retained. This alternate would eliminate the extensive channel work and resultant loss of bottomland woody vegetation and associated wildlife habitat. Minor disturbance would be created in water quality resulting from sediment disturbance during channel work periods. This alternate would create a reduction of upland wildlife habitat on approximately 910 acres of forested land and open land. Gross erosion would be reduced by about 32 percent and sedimentation would be reduced approximately 50 percent. Fish and wildlife habitat would be improved through the creation of 906 acres of surface water behind the floodwater retarding and multiple-purpose structures but would result in disturbance of fisheries resources in the six miles of channel to be cleared. Floodwater and sediment damages would be reduced by about 68 percent. The cost of this program was estimated to be about \$3,900,000.

The fourth alternate consisted of land treatment, flood proofing, and converting present agricultural flood plain to uses less susceptible to flood damages, would retain the favorable impacts of the land treatment alone alternate and would eliminate all of the adverse impacts previously described for structural measures. In order to flood proof the existing buildings, roads, highways, and other property, it would be necessary to raise their useable levels above the elevation of the 100-year frequency storm. About 10 houses, 2 small businesses, 20 miles of county gravel roads, 13 miles of county and/or state-aid paved roads, 3 miles of U. S. Highway, and a number of electric telephone and water utility lines would be affected. The conversion of present agricultural flood plain to uses less susceptible to flood damages would require changed land use on about 11,600 acres of land now used for growing crops and improved pastures. This conversion would result in the gross loss of agricultural income of about \$1,067,200 per year. The estimated cost of this alternate would be about \$4,168,750.

The fifth alternate, "no project at all", would eliminate all of the adverse impacts associated with the planned project. Flooding would continue on 17,873 acres of bottom land causing \$467,900 of damages annually. None of the existing problems in the watershed would be lessened or eliminated. If this alternate was selected, there would be \$607,100 of estimated net average annual benefits foregone.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment

Land treatment measures were considered basic in formulating the project and are essential to its successful functioning. The project provides for technical assistance for accelerating the establishment of land treatment measures throughout the 113,585 acres watershed. During the project installation period, 19,756 acres will be adequately treated. These will consist of 8,200 acres of cropland, 5,100 acres of pasture and hayland, 4,100 acres of forest land, and 2,356 acres of critically eroding land. Other lands will receive partial treatment. These areas are in addition to the lands already adequately treated and the additional areas that will be treated after the project installation period.

The measures planned for cropland areas consist of conservation cropping systems, crop residue management, land smoothing, diversions, terraces, vegetative waterways, contour farming, drainage field ditches, and drainage mains and laterals. Measures planned for pasture and hayland consist of pasture planting, renovation and management, ponds, drainage field ditches, and drainage mains and laterals. Treatment of critical eroding lands consists of planting grasses and legumes, trees, and other adapted vegetation.

Conservation cropping systems are the growing of crops in combination with needed cultural and management measures including crop rotation. Crop residue management (crop residue use) is the use of plant residues to protect cultivated fields during critical erosion periods. A diversion is a constructed watercourse with a supporting ridge on the lower side constructed across the slope so as to keep hill water from running directly down onto bottom land. A terrace is an earth embankment or ridge and channel constructed across the slope for the orderly removal of water from sloping cultivated lands. A vegetated waterway or outlet is a natural or constructed watercourse or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field, diversion, terrace or other structure. Contour farming is the farming of sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. A drainage field ditch is a graded ditch for collecting excess water within a field. Drainage mains and laterals are open drainage ditches constructed to a designed size and grade. Pasture planting, renovation, and management is establishing or reestablishing long-term stands of adapted species of perennial, biennial, or reseeding forage plants and the proper use and treatment of pastureland. A pond is a water impoundment made by constructing a dam or embankment or by excavating a pit or "dugout".

Forest land measures consist of open-field planting, under-planting, and improving hydrologic conditions for manipulation of stand composition.

These consist of 700 acres of tree planting on critically eroding open land, 2,100 acres of tree planting in understocked stands, and 2,000 acres of stand manipulation for improvement of hydrologic conditions through release and improvement cuts. In addition, the cooperative FOREST FIRE Control Program will be accelerated on 78,574 acres.

The estimated 700 acres of critical area to be planted to trees will be planted to loblolly pine. These plantings will be scattered throughout the steeper, upland areas of the watershed. Site preparation will consist of brush dams as necessary and the establishment of love grass or other drought-resistant grasses to hold the soils in place until the seedlings are established. The areas will be fertilized, fenced, and protected from fire.

The estimated 2100 acres of tree planting in understocked stands will consist of planting of loblolly pine in most of the open areas of the scattered stands. These plantings will be in the upland areas and scattered throughout the watershed. The site preparation will vary according to the needs of the individual site, but in most cases will consist of planting the seedlings on existing soils with no preparation. These plantings will be fenced where there is high grazing risk damage. These plantings will be protected from fire to reduce fire damage and so that normal plant succession can take place. It is anticipated in both the critical area plantings and the understocked stand plantings that other species such as blackberry vines, green briars, honeysuckle, native grasses, elm, hickory, sweet gum, black gum, red oak, and other native species will be present in the resultant stand.

Land treatment measures to be applied by private landowners that will improve wildlife and fishery habitat consist of 79 farm ponds, 100 acres of wildlife development, and 500 acres of wildlife preservation. Additional land treatment measures that will benefit wildlife will be the planting of 700 acres of gullies to various tree species.

Floodwater Retarding Structures

There are 12 floodwater retarding structures planned to be installed in this project, the primary purpose being to retard runoff and retain sediment. A floodwater retarding structure is a compacted homogenous earth filled dam with provisions for permanent storage of sediment and temporary retardation of runoff water from the drainage area above the structure. All earthen embankments will be vegetated. The structures in this plan are designed for release of water. Floodwaters are released at a predetermined rate compatible with project needs and goals downstream from the impoundments.

The proposed structures range in height from 15.0 to 33.4 feet; the sediment detention pools vary from 15 to 120 acres; and the retarding pools range from 34 to 333 acres.

The minimum acres of land rights committed to the installation of the floodwater retarding structures is approximately 1,927, of which about 65 percent is in crops and pastures and about 35 percent is forested.

There are approximately 633 acres in the sediment pools of the 12 floodwater retarding structures, of which about 418 acres are in crops and pastures and the remaining 215 acres are in mixed pine and hardwoods. The forest land will be cleared. The hydrologic cover condition of the sediment pool area in crops and pastures is poor and the cover condition of the woodland is fair. The land use and cover conditions are applicable to the areas planned for the emergency spillway and the dam site.

A breakdown of floodwater retarding structures by sub-watershed is as follows:

Mantachie Creek Sub-Watershed - Five floodwater retarding structures are planned for the control of damaging floodwater and sediment. They will provide 4,847 acre feet of flood detention capacity. This is the equivalent of 4.34 inches of runoff from their combined drainage areas of 20.92 square miles or 1.31 inches of runoff from this sub-watershed. They will impound in detention storage from 3.82 to 4.81 inches from their respective drainage areas which total 30.07 percent of the sub-watershed. (See Multiple-Purpose Structure No. 11 for additional information.)

Bogue Fala Creek Sub-Watershed - Six floodwater retarding structures are planned for the control of damaging floodwater and sediment. They will provide 3,126 acre feet of flood detention capacity. This is the equivalent of 4.38 inches of runoff from their combined drainage areas of 13.39 square miles or 1.05 inches of runoff from this sub-watershed. They will impound in detention storage from 3.30 to 4.74 inches from their respective drainage areas which total 24.06 percent of the sub-watershed. (See Multiple-Purpose Structure No. 5 for additional information.)

Bogue Eucuba Creek Sub-Watershed - One floodwater retarding structure is planned in this sub-watershed for the control of damaging floodwater and sediment. It will provide 2,092 acre feet of flood detention capacity. This is the equivalent of 1.77 inches of runoff from its drainage area of 6.95 square miles. It will impound in detention storage 5.64 inches from its drainage area which is 31.41 percent of the sub-watershed.

The 12 floodwater retarding structures were designed for a 100-year sediment storage accumulation. All of the floodwater retarding structures were planned with single-stage risers. The elevation of the sediment pool was set at the elevation of the 50-year sediment storage in all of the structures except Nos. 4 and 7. Storage for sediment was made available in the sediment pool reserved for the second 50-year period for submerging 80 percent of the second 50-year period and aerating 10 percent of the first 50-year period. Storage for sediment was made available in the flood detention pools for aerating 10 percent of the first 50-year period and 20 percent of the second 50-year period of sediment accumulation.

In preparing the design for Structures Nos. 4 and 7, the storage of the 50-year sediment created unsatisfactory impoundment of water. At the

request of the Watershed Sponsors and with the approval of the State Conservationist, the sediment storage was increased to 100-year storage, thereby creating satisfactory impoundment of water above these two structures.

It is expected that the flood pool above Floodwater Retarding Structure No. 9 at maximum elevation will be approximately two feet deep on the fill of the proposed Natchez Trace Parkway. As this will be a very infrequent occurrence, no damages are anticipated to the Natchez Trace Parkway. There are county roads that will be affected by the flood or sediment pools of Floodwater Retarding Structures Nos. 1, 2, 4, 6, and 10. These roads will either be abandoned or raised to an elevation of at least three feet above the proposed maximum flood pool elevations.

There are no unusual foundation or soil conditions that will create problems in the construction of the floodwater retarding structures or emergency spillways. The emergency spillways will be vegetated.

There are no pipelines, gravel pits, or oil or gas wells that will be affected by the construction of the floodwater retarding structures.

Measures included to minimize the adverse effects to fish and wildlife habitat include the selection of sites which would create minimal disturbance of resource habitat, the stocking with game fish of water areas created by the floodwater retarding structures, the design of the structures to provide adequate sediment trapping capabilities, thereby providing better water quality to stream fishery resources below the structures and the revegetation of disturbed construction areas as soon as is reasonably possible.

There were no relocations as a result of project action.

A typical section of a floodwater retarding structure is shown in Figure 1. Design data for the 12 floodwater retarding structures are shown on Table 3.

Multiple-Purpose Structures

There are two multiple-purpose structures planned for this project (Nos. 5 and 11) and they are similar to floodwater retarding structures except they contain additional water storage for recreational purposes. Their heights are 32.6 and 35.5 feet, respectively. Minimum land rights required for the recreational aspects associated with these structures amount to approximately 826 acres of land.

Bogue Fala Creek Sub-Watershed

Multiple-Purpose Structure No. 5 is planned for the control of damaging water flow, sediment, and for added water storage for recreational purposes. This structure will provide 1,039 acre feet of floodwater detention volume and 1,905 acre feet of storage for recreational purposes.

The detention capacity is the equivalent of 6.73 inches of runoff from its drainage area of 2.89 square miles or 0.35 inches of runoff from the sub-watershed. The drainage area of the multiple-purpose structure totals 5.20 percent of the sub-watershed.

The maximum depth of the sediment pool for Structure No. 5 (100-year submerged) will be 7.2 feet and the depth of the recreational pool above the sediment pool will be 14.5 feet. The maximum depth of the permanent pool will be 21.7 feet. The surface area of the recreational pool will be about 135 acres.

There are approximately 185 acres in the sediment and recreational pool of the multiple-purpose structure, of which about 35 acres are in pastures and the remaining 150 acres are in mixed pine and hardwoods. The forest land will be cleared. The hydrologic cover condition of the sediment pool area in pastures is fair and the cover condition of the woodland is fair. The land use and cover conditions are applicable to the areas planned for the emergency spillway and the dam site.

The approximate kinds and amounts of facilities to be installed in connection with Multiple-Purpose Structure No. 5 are itemized in Table 2B.

The approximate total area involved in land rights for Multiple-Purpose Structure No. 5 is 433 acres. These acres are estimated as follows: 72 acres for the sediment pool, 110 acres for the recreational pool, 57 acres for the flood pool, 109 acres for shoreline access, 80 acres for recreational facilities area, and 2 acres for access road.

Mantachie Creek Sub-Watershed

Multiple-Purpose Structure No. 11 is planned for the control of damaging water flow, sediment, and for added water storage for recreational purposes. This structure will provide 778 acre feet of floodwater detention volume and 821 acre feet of storage for recreational purposes. The detention capacity is the equivalent of 5.76 inches of runoff from its drainage area of 2.53 square miles or 0.21 inches of runoff from the sub-watershed. The drainage area of the multiple-purpose structure totals 3.64 percent of the sub-watershed.

The maximum depth of the sediment pool for Structure No. 11 (100-year submerged) will be 9.0 feet and the depth of the recreational pool above the sediment will be 7.3 feet. The maximum depth of the permanent pool will be 16.3 feet. The surface area of the recreational pool will be about 165 acres.

There are approximately 165 acres in the sediment and recreational pool of the multiple-purpose structure, of which about 55 acres are in crops and pastures and the remaining 110 acres are in mixed pine and hardwoods. The hydrologic cover condition of the sediment pool area in crops and

pastures is good and the cover condition of the woodland is poor. The land use and cover conditions are applicable to the areas planned for the emergency spillway and the dam site.

The approximate kinds and amounts of facilities to be installed in connection with Multiple-Purpose Structure No. 11 are itemized in Table 2C.

The approximate total area involved in land rights for Multiple-Purpose Structure No. 11 is 393 acres. These acres are estimated as follows: 63 acres for the sediment pool; 94 acres for the recreational pool; 74 acres for the flood pool; 72 acres for shoreline access; 80 acres for recreational facilities area; and 2 acres for access road.

Water level control devices (midlevel gates) will be installed in Multiple-Purpose Structures Nos. 5 and 11. These gates will be used for fishery and waterfowl management. They will also aid in the control of aquatic vegetation and for mosquito control purposes.

There are no roads that will be involved in the construction of the two multiple-purpose structures.

The state and local public health agency requirements will be met in the installation of these multiple-purpose structures. Sewage treatment plant effluent will be discharged downstream from the proposed structure reservoir spillways. All garbage and solid waste materials will be disposed of at a public disposal plant or area.

The plans and specifications for the water supply facilities and for the recreation area facilities will be reviewed and approved by the Mississippi State Board of Health prior to construction to assure proper design for health and physically handicapped use considerations. The Mississippi Air and Water Pollution Control Commission will be asked to review and approve the sewerage treatment facilities prior to construction.

Floodwater Retarding and Multiple-Purpose Structures

The 12 floodwater retarding structures and the two multiple-purpose structures will provide 11,882 acre feet of floodwater detention capacity. This is the equivalent of 4.77 inches of runoff from their combined drainage areas of 46.68 square miles or 1.51 inches of runoff from the entire watershed. (Does not include that portion of the watershed on which only land treatment measures are planned.) They will impound in detention storage from 3.30 to 6.73 inches of runoff from their respective drainage areas which total 32 percent of the watershed. The designed life of the structures is 100 years. Approximately 51 percent of the sediment capacity in seven floodwater retarding structures and approximately 80 percent in the multiple-purpose structures and five floodwater retarding structures will initially store water. A low flow device will be installed to release cool water into the streams below the dams. They will be sized to release approximately 0.1 cubic feet per square mile of drainage area.

There is potential for incidental recreation use at some of the structure measure sites. Included among these are structures Nos. 1, 2, 4, 8, and 9. However, since public access will not be provided, the Watershed Commissioners will discourage their use for such purposes because of lack of sanitary facilities, increased maintenance of flood prevention features, and safety precautions.

The water quality is expected to be adequate for the intended uses in this project.

Design data for the floodwater retarding and multiple-purpose structures are shown on Table 3. The approximate kinds and amount of facilities to be installed with the two multiple-purpose structures are identified in Tables 2B and 2C. Figures showing the locations of the multiple-purpose structures and facilities are shown in the appendix.

A temporary seeding and fertilization program will be accomplished on all disturbed areas as construction progresses. When construction is completed, a more intensive vegetation program will follow on all disturbed areas. Suitable permanent-type grasses will be established on disturbed areas and on newly constructed dams and borrow areas.

Artificial wood duck nesting boxes (10 per dam) will be installed in the upper reaches of each of the two recreation pool areas.

Installation Procedures - Structural Measures

Soil erosion and water, air, and noise pollution will be minimized by following SCS Engineering Memorandum-66 and applicable state guidelines related to erosion and pollution. Some of the measures which will be used to reduce erosion and sediment are: 1. Limiting the exposure of erodible soils to the shortest time reasonably possible; 2. Use of temporary vegetation where exposure time of erodible soils will be excessive; 3. Retardation of runoff by mechanical means where necessary; and 4. Trapping sediment in debris basins.

Some of the measures which will be used to reduce water, air and noise pollution are: 1. Application of dust suppressors or water on haul roads and construction areas for dust control; 2. Use of temporary bridges or culverts on running streams; 3. Careful handling of chemicals, fuel, lubricants, sewage, etc., to prevent spillage; 4. Maintenance of construction equipment engines, muffler and exhaust systems in good working condition; 5. Regulation of burning at construction sites to times when wind and burning conditions are proper; and 6. Location of access and haul roads away from homes as much as possible.

The Reservoir Salvage Act of 1960, as amended (93-291) is applicable to this project because several of the sediment pools surface areas and the recreation pool surface areas are larger than 40 acres. The Secretary of the Interior will be notified of this fact at the proper time.

An archeological survey was conducted by the Mississippi Department of Archives and History in accordance with a contract with the Soil Conservation Service.

The survey revealed 14 sites in or near the project area. Thirteen of these sites will be affected by the construction of the floodwater retarding structures. "All of the sites however, are small and have been destroyed by intensive agriculture in the area and therefore are considered to be archeologically expendable. Construction of the reservoirs and adjoining recreation areas will not destroy any significant archeological or historical sites."

According to the State Historical Preservation Officer, who is also the Director of the Mississippi Department of Archives and History, there are no National Register sites in the project area and none of the revealed sites are considered eligible for inclusion in the National Register of Historic Places.

If, during the time of construction, any evidence is discovered that indicates the area may contain additional historical and archaeological data (including relics and specimens) than is now known, construction will be halted and the Soil Conservation Service will notify the Secretary of the Interior and the Mississippi Department of Archives and History in order that a survey may be made to ascertain the existence of data which should be preserved in the public interest.

EXPLANATION OF INSTALLATION COSTS

Land Treatment Measures

Land treatment measures will be installed at an estimated total cost of \$943,900 of which about \$395,400 will be financed from P.L. 566 funds and about \$548,500 will be financed from Other funds (Table 1).

The P.L. 566 funds are for additional technical assistance to accelerate the land treatment program and for cost-sharing on installation of critical area plantings. The costs allocated to Other funds are for the installation of the land treatment measures, technical assistance, and cost-sharing on the installation of the critical area plantings.

The P.L. 566 technical assistance cost will be used to prepare and revise conservation farm plans and for preparing forest management plans; for planning, establishing, and maintaining conservation cropping systems, contour farming, crop residue management, terraces, vegetated waterways, diversions, surface field ditches, mains and laterals, land smoothing, pasture planting, management and renovation, farm ponds, wildlife development and preservation, and stocking and management of fish ponds. The above items are a combination of practices on which the cost has been established but adequate treatment will be achieved through various combinations of these practices.

The cost of installing the forestry measures on the private land program was developed by the Mississippi Forestry Commission and the U. S. Forest Service. The technical assistance costs were based on present costs of the going Cooperative Forest Management Program. The forestry installation costs were based on present prices paid by landowners or operators to establish measures in the locality.

The estimated cost of the entire forest land treatment program is \$189,300. Of this, \$102,900 will be provided from P.L. 566 funds, and \$86,400 from other sources. The P.L. 566 funds include \$58,000 for critical area stabilization, \$3,900 fire prevention, and \$41,000 for accelerated technical assistance.

The Mississippi Forestry Commission will provide \$12,900, of which \$9,500 will be for accelerated technical assistance, and the going Cooperative Forest Management Program will provide additional services valued at \$700.

The Commission will contribute \$1,900 for a fire contactor program and accelerated capital outlay of \$800 under the going Cooperative Forest Fire Program. The landowners and operators will provide \$73,500 for installation of the forestry measures on their lands.

Expectations are that the Rural Environmental Assistance Program will make available funds on a cost-share basis to qualified landowners on forest land designated for treatment measures.

The unit cost for establishing land treatment measures is based on current values in this area (1974 prices). The basis for cost-sharing on critical area land treatment measures was based on the current cost-sharing rate for establishing similar measures under the Rural Environmental Assistance Program.

On critical areas to be planted to grasses and legumes, the Soil Conservation Service will furnish the seed, fertilizer, lime, and wire for fencing if area is to be fenced. The watershed sponsors will furnish the equipment, labor, and materials for land preparation. If the area is to be fenced, the sponsors will provide the posts and construct the fence.

On critical areas to be planted to pine trees, the local sponsors will make site preparation, plant the trees, and construct the fence if area is to be fenced. The U. S. Forest Service, through the State Forestry Commission, will furnish the pine seedlings for planting the area. The Soil Conservation Service will furnish the wire for fencing if area is to be fenced.

Structural Measures

Floodwater Retarding Structures

The 12 floodwater retarding structures will be installed at an estimated total cost of \$2,156,650 of which \$1,674,900 will be financed from P.L. 566 funds and about \$481,750 will be financed from Other funds (Table 2).

The P.L. 566 funds include cost for construction, \$1,495,300 (which includes 12 percent for contingencies) and engineering, \$179,600. The construction costs will be used for constructing the floodwater retarding structures and engineering costs will be used for making detailed surveys and preparing plans and specifications.

The Other funds cost for land rights amounts to approximately \$481,750. This cost will be used for purchase of land rights and the miscellaneous costs necessary in obtaining these land rights.

Multiple-Purpose Structures

Multiple-Purpose Structures Nos. 5 and 11 and associated recreational facilities are to be installed at a total installation cost of \$1,479,400 of which \$937,170 will be financed from P.L. 566 funds and \$542,230 will be financed from Other funds. The joint cost of these multiple-purpose structures was allocated to flood prevention and recreation by the "Use of Facilities" method.

Using the "Use of Facilities" method for Structure No. 5, 40.88 percent of the joint installation cost was allocated to flood prevention and 59.12 percent was allocated to recreation. The land to be obtained in fee simple title (about 75 acres for the sediment pool, 110 acres for the recreational pool, 57 acres for the flood pool, and 109 acres for shoreline access) was considered as a specific cost for recreation. For flood prevention, P.L. 566 funds will bear the cost of construction and engineering services.

On cost-sharing for the recreation portion of Multiple-Purpose Structure No. 5, 50 percent of the construction cost, 100 percent of the engineering services cost, and 50 percent of the land rights cost were allocated to P.L. 566 funds; 50 percent of the construction cost, and 50 percent of the land rights cost were allocated to Other funds.

Using the "Use of Facilities" method for Structure No. 11, 56.38 percent of the joint installation cost was allocated to flood prevention and 43.62 percent was allocated to recreation. The land obtained in fee simple title (about 63 acres for the sediment pool, 94 acres for the recreational pool, 74 acres for the flood pool, and 72 acres for shoreline access) was considered as a specific cost for recreation. For flood prevention, P.L. 566 funds will bear the cost of construction and engineering services.

On cost-sharing for the recreation portion of Multiple-Purpose Structure No. 11, 50 percent of the construction cost, 100 percent of the engineering services cost, and 50 percent of the land rights cost were allocated to P.L. 566 funds; 50 percent of the construction cost and 50 percent of the land rights cost were allocated to Other funds.

No cost-sharing will be provided for engineering, legal, administrative services, or other costs incurred by the local organization for acquiring land rights for these multiple-purpose structures.

Recreational Facilities

The basic facilities with Multiple-Purpose Structures Nos. 5 and 11 are to be installed at an estimated total installation cost of \$271,300 (for each structure) of which about \$135,650 or about 50 percent will be financed from P.L. 566 funds and \$135,650 or about 50 percent will be financed from Other funds.

Cost-sharing on the basic facilities for each structure was allocated equally between P.L. 566 funds and Other funds for construction and land rights. P.L. 566 and Other funds will each pay 50 percent of any engineering contract cost.

There are 82 acres contained in the recreational facilities area for each structure which includes 2 acres for access road.

Project Administration

The expected cost for administering this project (structural measures) is estimated to be \$465,600 of which about \$391,700 will be financed from P.L. 566 funds and \$73,900 will be financed from Other funds.

The P.L. 566 funds costs include \$215,500 for construction inspection of structural measures on which P.L. 566 construction funds are spent; \$22,000 for reviewing, servicing and construction inspection on architectural and engineering contracts to protect the Government's interest in basic recreational facilities in connection with Multiple-Purpose Structures Nos. 5 and 11; and \$154,200 other costs for Soil Conservation Service for administration costs.

The Other funds costs include none for construction inspection; \$22,000 for reviewing, servicing and construction inspection on architectural and engineering contracts to protect the local interest in basic recreational facilities in connection with Multiple-Purpose Structures Nos. 5 and 11, \$46,900 other costs for administrative costs in project installation; and \$5,000 for relocation advisory services.

Costs

The unit costs used in this project are based on actual construction costs in the State of Mississippi and on the actual value of land and services in the watershed.

Estimated Schedule of Funds by Project Years

<u>Project Year</u>	<u>P. L. 566 Funds</u>	<u>Other Funds</u>	<u>Total</u>
<u>First</u>			
Land Treatment	\$ 65,900	\$ 91,400	\$ 157,300
Subtotal	65,900	91,400	157,300
<u>Second</u>			
Land Treatment	\$ 65,900	\$ 91,400	\$ 157,300
Structural	806,970	389,530	1,196,500
Subtotal	872,870	480,930	1,353,800
<u>Third</u>			
Land Treatment	\$ 65,900	\$ 91,400	\$ 157,300
Structural	663,700	200,750	864,450
Subtotal	729,600	292,150	1,021,750
<u>Fourth</u>			
Land Treatment	\$ 65,900	\$ 91,400	\$ 157,300
Structural	1,141,400	433,700	1,575,100
Subtotal	1,207,300	525,100	1,732,400
<u>Fifth</u>			
Land Treatment	\$ 65,900	\$ 91,400	\$ 157,300
Subtotal	65,900	91,400	157,300
<u>Sixth</u>			
Land Treatment	\$ 65,900	\$ 91,500	\$ 157,400
Subtotal	65,900	91,500	157,400
Project Administration	\$ 391,700	\$ 73,900	\$ 465,600
Total	\$3,399,170	\$1,646,380	\$5,045,550

EFFECTS OF WORKS OF IMPROVEMENT

Land Treatment

The installation of planned land treatment measures will reduce erosion, flooding, and sedimentation of channels, streams, and ponds. Land treatment measures over the entire watershed will gradually reduce annual gross erosion by 32 percent. This will assist in providing sediment damage reduction benefits of \$44,600 annually. The reduction in gross erosion will correspondingly increase the efficiency of sediment basins and will reduce overbank sediment deposition within the project area. The combined land treatment and structural measures will eventually reduce the annual sediment damage about 81 percent for the entire watershed. Reduction of sediment rates will reduce sediment pollution of the fish and wildlife, resource habitat, and recreational waters, and will result in better water quality.

The improvement and stabilization of vegetation cover on 2,356 acres of critically eroded land and the planting of trees on 700 more acres of open land will result in the improvement of wildlife habitat and improved physical conditions of the soil including increased soil aeration and water infiltration. Reduced overcutting, better fire protection, and forest management practices will increase timber growth and enhance forest hydrologic processes. Tree planting, stand improvement measures, and thinning will temporarily increase herbs, forbs, shrubs, and other wildlife foods and will reduce erosion and sediment by reducing overland runoff. The fire hazard will be temporarily increased on approximately 2,000 acres of forest lands due to buildup of material from planned timber thinning and stand improvement.

The addition of 79 farm ponds and the desilting basins will add fishery habitat and provide wildlife habitat around the edges of these water bodies. Additionally, it is expected that improved wildlife habitat will be created through the planting of wildlife food and cover areas.

There are 100 acres of wildlife development and 500 acres of wildlife preservation planned which will benefit wildlife, especially upland species. The reduction in area, depth, and duration of winter flooding of bottom lands will reduce available feeding and resting waters for migratory waterfowl.

The other land treatment measures listed in the Works of Improvement to be Installed section will affect wildlife resources either directly or indirectly through the supply of food, cover, and water or by the reduction of erosion, flooding, and sediment.

Structural Measures

The 12 floodwater retarding structures and two multiple-purpose structures will reduce peak discharges and stages for storms at all magnitudes and

frequencies, thereby reducing the amount of acres being flooded by these storms. The 2-year, 24-hour storm will be effected at different points in the watershed as follows: On Mantachie Creek the peak discharge will be reduced 24 percent at the confluence with Tombigbee River, 30 percent just above U. S. Highway 78, and 51 percent just above State Highway 371. The stages on the flood plains will be reduced 1.0, 1.3 and 2.0 feet at the respective locations. On Bogue Fala Creek, the peak discharge will be reduced 23 percent at the confluence with Bogue Eucuba Creek, 27 percent at about Station 800+00 and 45 percent at Station 483+63. The flood stages on the flood plains will be reduced 1.6, 2.7, and 0.7 feet at the respective locations. On Bogue Eucuba Creek, the peak discharge will be reduced 19 percent at the confluence with Bogue Fala Creek and 31 percent at State Highway 371. The flood stages on the flood plain will be reduced 1.2 feet.

The 100-year, 24-hour storm will be effected as follows: On Mantachie Creek the discharge will be reduced about 30 percent at the confluence with Tombigbee River, 35 percent just above U. S. Highway 78, and 49 percent about 4,000 feet upstream from State Highway 371. The stages will be reduced 29, 28, and 57 percent, respectively. On Bogue Fala Creek, the discharge will be reduced 28 percent at the confluence with Bogue Eucuba Creek, 30 percent at about Station 800+00, and 48 percent at about Station 483+63. The stages will be reduced 31, 53, and 24 percent, respectively. On Bogue Eucuba Creek, the discharge will be reduced 23 percent at the confluence with Bogue Fala Creek, and 34 percent at State Highway 371. The stages will be reduced 31 and 21 percent, respectively.

Approximately 17,873 flood plain acres will be benefited by the structural measures. They represent 740 landowners with benefited acreage ranging up to 300 acres each. Floodwater damages to the fixed improvements, crops, and pastures will be reduced about 71 percent annually.

The recreation facilities associated with the two multiple-purpose structures will accommodate 128,928 annual visitor days. The recreation facilities planned are for fishing, swimming, camping, picnicking, and other water-based recreational pursuits.

The 983 acres of surface water created by the 14 structures will provide feeding and resting areas for waterfowl. They will provide excellent potential for increased fisheries resources in the watershed area. Approximately 983 acres of upland wildlife habitat will be permanently destroyed as a result of inundation of land behind the structures and wildlife habitat will be temporarily disturbed on about 225 acres of work area adjacent to the impoundments. Existing stream fishery resources in the stream areas that will be inundated will be incorporated with those of the respective structure pool.

There will be a temporary increase in erosion and resulting stream turbidity during and shortly after periods of construction. Air and noise pollution will be experienced during periods of construction.

Table - Acres Flooded for Present Conditions & With Project & Percent Reductions for Three Different Storms

Evaluation Reach	100-Year, 24-Hour Storm <u>1/</u>			5-Year, 24-Hour Storm <u>2/</u>			2-Year, 24-Hour Storm <u>3/</u>		
	Present Condition	With Project	Percent Reduction	Present Condition	With Project	Percent Reduction	Present Condition	With Project	Percent Reduction
Mantachie Creek									
E-I <u>4/</u>	1,537	1,466	5	1,276	938 <u>5/</u>	26	544	0	100
E-II <u>6/</u>	2,419	1,819	25	1,721	690	60	999	272	73
E-III <u>7/</u>	2,215	933	58	1,312	108	92	613	0	100
E-IV <u>8/</u>	1,470	277	81	888	175	80	527	45	91
Subtotal	<u>7,641</u>	<u>4,495</u>	<u>41</u>	<u>5,197</u>	<u>1,911</u>	<u>63</u>	<u>2,683</u>	<u>317</u>	<u>38</u>
Bogue Fala Creek									
E-I <u>9/</u>	1,409	1,107	21	964	622	35	591	275	53
E-II <u>10/</u>	1,429	877	39	647	457	29	475	0	100
E-III <u>11/</u>	769	513	33	511	256	50	309	0	100
E-IV <u>12/</u>	1,195	442	63	817	69	92	366	36	90
Subtotal	<u>4,802</u>	<u>2,939</u>	<u>39</u>	<u>2,939</u>	<u>1,404</u>	<u>52</u>	<u>1,731</u>	<u>311</u>	<u>32</u>
Bogue Eucuba Creek									
E-I <u>13/</u>	613	501	18	155	64	59	0	0	0
E-II <u>14/</u>	1,807	1,052	42	1,046	495	53	504	0	100
Subtotal	<u>2,420</u>	<u>1,553</u>	<u>36</u>	<u>1,201</u>	<u>559</u>	<u>53</u>	<u>504</u>	<u>0</u>	<u>100</u>
Grand Total	14,863	8,987	40	9,337	3,874	59	4,918	628	87
<u>1/</u>	The 100-year, 24-hr. storm precipitation - 8.20 inches.								
<u>2/</u>	The 5-year, 24-hr. storm precipitation - 5.10 inches.								
<u>3/</u>	The 2-year, 24-hr. storm precipitation - 4.00 inches.								
<u>4/</u>	Reach 1 - Mantachie - Tombigbee River to about 800 feet upstream from U. S. Highway 78.								
<u>5/</u>	These acres are adjacent to the Tombigbee River and consist of hardwood timber; therefore, they are allowed to flood more frequently to enhance wildlife habitat.								
<u>6/</u>	Reach 2 - Mantachie - From about 800 feet upstream from U. S. Highway 78 to about 4,000 feet upstream from State Highway 371.								
<u>7/</u>	Reach 3 - Mantachie - From about 4,000 feet upstream from State Highway 371 to FWRs No. 9.								
<u>8/</u>	All tributary streams with floodwater retarding structures.								
<u>9/</u>	Reach 1 - Bogue Fala - From confluence with Bogue Eucuba Creek to about Station 800+00.								
<u>10/</u>	Reach 2 - Bogue Fala - From about Station 800+00 to about Station 483+63.								
<u>11/</u>	Reach 3 - Bogue Fala - From about Station 483+63 to about 1,200 feet south of U. S. Highway 78.								
<u>12/</u>	Reach 4 - Bogue Fala - From about 1,200 feet south of U. S. Highway 78 to FWRs No. 2, & all tributaries with a FWRs.								
<u>13/</u>	Reach 1 - Bogue Eucuba - From confluence with Bogue Fala Creek to State Highway 371.								
<u>14/</u>	Reach 2 - Bogue Eucuba - From State Highway 371 to FWRs No. 1.								
<u>15/</u>	Figure does not include 3,010 acres of indirectly benefited flood plain land.								

A bedload transport study indicates that some slight degradation can be expected in the existing channel reaches immediately downstream from the proposed floodwater retarding structures. The floodwater retarding structures, acting as sediment traps, would pass less turbid waters through them and the cleaner water would then tend to seek equilibrium with the channel materials. The bedload study indicates that this degradation will be very slight, if any, and will not significantly affect the channel reach.

Thirteen archeological sites will be affected by the construction of the floodwater retarding structures. All of the sites are small and have been previously destroyed by intensive agriculture. They are considered to be archeologically expendable.

There will be a weighted average loss of about \$67 per acre in value of crops, pastures, and timber caused by the inundation of the sediment pools of the floodwater retarding structures and a weighted average loss of about \$1.00 per acre caused by the limited use of flood pools. The weighted average loss per acre of the lands inundated by the recreational pools amount to about \$38 per acre on the two multiple-purpose structures.

Economic and Social

The watershed's economy will be improved through the \$240,800 annual increase in associated production cost for such items as seed, fertilizer, labor, and machinery. There will be an annual increase in the net income for the 17,873 acres of benefited flood plain land. The \$266,800 reduction in crops, pasture, and fixed improvement damage will boost the economy. Project construction will stimulate the general economy. Production costs will be reduced due to increased efficiency of production.

Local labor estimated to be used during the installation of the project will amount to 69,200 man-hours. In addition, local labor used for operation and maintenance will amount to 9,780 man-hours annually for the project life.

Based on findings reported in Agricultural Economics Technical Publication No. 13, Department of Agricultural Economics, Mississippi Agricultural and Forestry Experiment Station, Mississippi State, Mississippi, the annual increase in net income that will accrue due to the project will increase the employment in the area by 187 man-years. The increase in man-years used in the transportation, wholesale and retail, and service sector will amount to eight. Therefore, permanent employment due to the project will amount to 195 jobs.

The average gross income per farm in the watershed will be increased by \$373 annually and thereby aid in the retention and distribution of population in the watershed. The increased income will improve the quality of living and enhance the possibilities for farmers to stay in the farming business, thus reducing migration to cities. This improved economy will increase the tax base. The reduction of \$64,000 damages annually to

roads, bridges, and other fixed improvements will reduce the expenditure of tax money for their repair. This will give the local units of government the option of reducing the tax rate or keeping the same rate and providing better services such as better roads, improved schools, assistance to the aging, and upgrading health services.

The recreational structures and facilities will provide an opportunity to meet the water-based recreational and social needs within the watershed area.

There will be little or no impact on existing recreational resources of surrounding areas as present resources do not adequately supply existing recreation demands.

PROJECT BENEFITS

The estimated total average annual benefits accruing to the structural measures which were evaluated and used in project justification amount to \$607,100 (See Table 6). In addition, it is estimated that land treatment measures will provide damage reduction benefits of \$17,000.

The damage reduction benefits are estimated as follows: crops and pastures, \$202,800; roads and bridges, \$33,000; other agricultural, \$31,000; sediment, \$44,600; and indirect, \$26,700.

The application of the planned project works of improvement will reduce the average annual damages presently occurring to crops and pastures from \$278,800 to \$76,000; other agricultural from \$46,200 to \$15,200; roads and bridges from \$50,500 to \$17,500; sediment from \$54,800 to \$10,200; and indirect from \$37,600 to \$10,900.

Planned recreational benefits accruing to the project are estimated to be \$193,400. The recreational benefits evaluated are limited to those which are expected to accrue from use by the general public or organized groups.

Secondary benefits amount to \$50,500 and accrue from the production, transportation, processing, and marketing of project goods and services accruing within the zone of influence of the project.

The watershed is located in the Appalachia Region, the Northeast Mississippi Resource Conservation and Development Project, and the counties are eligible for Economic Development Administration assistance. Redevelopment benefits were evaluated and amount to about \$42,100. These benefits result from the construction, operation, and maintenance of this project by giving additional employment to the unemployed and underemployed, low-income people within the watershed and adjacent area. Also, the construction of this project will contribute significantly to the business activities in the general area.

Fishing potential in the watershed will be increased by the construction of 12 floodwater retarding structures and two multiple-purpose structures. Where feasible these reservoirs will be properly stocked with fingerling fish from Federal hatcheries. Technical assistance will be given landowners on stocking and managing these reservoirs for fish production.

The watershed sponsors will be encouraged to permit use of the lakes above the floodwater retarding structures for fishing and other recreational purposes. Facilities for public health safeguards in accordance with existing regulations will be the responsibility of landowners and operators of land on which the structures are located. Sanitary facilities will be installed, operated and maintained in accordance with state and local health regulations at each floodwater retarding structure which will be open to the general public for recreational use. The sponsors will discourage public recreational use at those sites which do not have adequate sanitary facilities.

Water level control devices will be installed in the two multiple-purpose structures. These devices are vertical sliding gates and will allow the sediment pool levels to be drawn down 2 to 3 feet. A much better Fish and Waterfowl Management Program is proposed with these facilities for fluctuating the water level. These devices will also aid in the control of aquatic vegetation.

The watershed sponsors and landowners will be encouraged to seek professional assistance for operating and maintaining the reservoirs for maximum fish and wildlife utilization.

The proposed forest land measures will improve the hydrologic condition and productivity of the forest land. This will reduce sediment and retard storm runoff. Good management and continued fire protection will increase productivity of forest lands.

COMPARISON OF BENEFITS AND COSTS

The floodwater retarding structures and the multiple-purpose structures (including basic facilities), are to be installed, operated and maintained at an estimated annual cost of \$303,200 and will have estimated annual benefits, exclusive of secondary, of \$556,600 with a benefit-cost ratio of 1.8 to 1.0. Total estimated benefits will be \$607,100 with a benefit-cost ratio of 2.0 to 1.0 (See table 6).

PROJECT INSTALLATION

All land treatment measures will be installed during the six-year installation period by the farmers through conservation farm plans in cooperation with their respective Soil Conservation District.

Land treatment measures above structural measures will be installed during the first four years of the installation period. Those land treatment measures in the flood plain, which are contingent upon the installation of the planned structural measures, will be installed primarily during the last two years of the installation period.

These land treatment measures will be planned and applied farm by farm within the watershed consistent with the objectives of the respective county Soil Conservation Districts and this plan. Additional technical assistance to accelerate the installation of these measures will be provided by the Soil Conservation Service.

Critical area treatment measures will be installed by the Commissioners of the Master Water Management District during the first three project years. The technical assistance required for establishing the critical area measures (grasses and legumes) will be provided by the Soil Conservation Service. For critical area lands to be treated with grasses the Service will furnish fertilizer, seed, and other material and the sponsors through agreement with the landowners and operators will prepare the seedbed, incorporate the fertilizer and seed, and otherwise establish vegetation. For critical area lands to be treated with trees the Service will pay the cost of preparing the site and planting the trees and the sponsors will furnish the trees and protect the tree seedlings. Another method sometimes used to share the work for treatment with trees is for the sponsors to prepare the site and protect the seedlings with the Service paying for the remainder of the materials and work necessary for establishment.

Forest landowners will be encouraged to apply and maintain the best forestry measures on their lands.

The U. S. Forest Service, by and through the Mississippi Forestry Commission, will provide technical assistance for the planning and application of the forest land treatment measures. One of the first objectives of the forester will be the preparation of watershed management plans on the woodlands, as a part of the conservation farm plans.

All structural measures will be installed by contract during the second, third, and fourth years of the six-year installation period. The sponsors intend to do the contracting and will establish a financial management system and a financial reporting system that will provide disclosure of the financial results of each undertaking with PL-566 funding. This system will meet the requirements of Federal Management Circular 74-7.

The Soil Conservation Service will provide engineering services for all structural measures except for the basic facilities planned in connection with Multiple Purpose Structures Nos. 5 and 11. The engineering services for these basic facilities will be cost-shared on a 50-50 basis of which the detailed engineering surveys and designs will be provided through a negotiated architectural engineering contract.

All land rights for the project will be secured by the Master Water Management District. The District has sufficient legal authority (including the power of eminent domain) as provided by Mississippi House Bill 670, regular session 1960, and will exercise this authority as needed to acquire necessary land rights.

Sequence of Doing Work

The structural measures are planned to be constructed during the second, third, and fourth years of the installation period in the general sequence as follows:

Second Project Year - Floodwater Retarding Structures Nos. 1 and 4, Multiple-Purpose Structure No. 11, together with basic facilities.

Third Project Year - Floodwater Retarding Structures Nos. 7, 8, 9, and 10.

Fourth Project Year - Floodwater Retarding Structures Nos. 2, 3, 6, A, B, and C, Multiple-Purpose Structure No. 5, together with basic facilities.

FINANCING PROJECT INSTALLATION

Federal assistance for carrying out the works of improvement on non-Federal land as described in this plan will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) as amended.

The sponsors plan to apply for a Farmers Home Administration loan to purchase the necessary land rights, to finance the necessary administrative costs, for cost-sharing on the construction of Multiple-Purpose Structures Nos. 5 and 11 and facilities, and for any other cost that may be incurred in the installation of the planned works of improvement. A letter of intention has been filed with the local Farmers Home Administration.

The Master Water Management District will levy an annual tax to assure that the necessary funds will be available as needed. The assessment rolls and the annual tax assessments will be set up as soon as the plan is approved.

The total cost for establishing the land treatment measures is estimated to be \$943,900 (See Table 1).

Land treatment measures will be established on the non-critical areas by the individual landowners and operators. They will utilize the Rural Environmental Assistance Program to the extent possible; however, additional REAP cost-sharing will be needed to assist the low-income farm families in establishing these measures.

The Master Water Management District is responsible for establishing land treatment on the critical areas. The establishing of grasses and legumes will be cost-shared by the Soil Conservation Service under P. L. 566 and the Master Water Management District. Tree planting on non-Federal land will be cost-shared by the U.S. Forest Service, in cooperation with and through the Mississippi Forestry Commission, under P. L. 566 and the Master Water Management District. The District will contribute its share of installing these measures in the form of labor, equipment for site preparation, transportation of supplies, and/or similar contributions from landowners and operators.

The other than P. L. 566 share of the costs involved in the application of forestland treatment measures will be provided by the landowners and operators. Expectations are that the Agricultural Stabilization and Conservation Service will provide cost sharing to qualified landowners in the installation of these measures.

Structural measures will be installed at an estimated total cost of about \$4,101,650 of which about \$3,003,770 will be financed from P. L. 566 funds and about \$1,097,880 will be financed from Other funds. The Master Water Management District will finance its share of project costs by utilizing the loan provisions of Section 8, P. L. 566 as amended by P. L. 1018. The loans will be repaid through assessments as provided by Mississippi House Bill 670, regular session 1960.

Financial and other assistance to be furnished by the Soil Conservation Service and the U. S. Forest Service in carrying out this project under P.L. 566 is contingent upon the appropriation of funds for this project.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land treatment measures on private land will be established and maintained by landowners and operators under cooperative agreements with their Soil Conservation District. The establishment and maintenance of these measures will be the financial responsibility of the individual operators and landowners. Land treatment measures on public lands (Natchez Trace Parkway) are to be established and maintained by the administering agency in charge of these lands. Maintenance of critical area plantings will be financed by the Master Water Management District from its regular maintenance funds.

The forestland treatment measures will be maintained by the landowners and operators under agreement with the Itawamba, Lee, and Monroe Counties Soil Conservation Districts. The U. S. Forest Service, by and through the Mississippi Forestry Commission, will furnish the technical assistance necessary for establishing and maintaining the forestland treatment measures under the going Cooperative Forest Management Program. They will also continue to furnish fire protection under the Cooperative Forest Fire Control Program.

The Master Water Management District fully understands their obligation for operation and maintenance and will execute specific operation and maintenance agreements prior to the issuance of invitations to bid on the construction of structural measures. This O&M agreement will contain a statement of provisions for retention and disposal of real and personal property acquired in whole or in part with PL-566 funds. The O&M agreements will be prepared following the State Watershed Operation and Maintenance Handbook which requires an O&M plan for each structural measure.

The Master Water Management District will assume responsibility to operate and maintain the floodwater retarding structures. Operation and maintenance funds will be secured through assessments as provided by Mississippi House Bill 670, regular session 1960. The estimated annual cost for operating and maintaining the floodwater retarding structures is \$10,700.

The Master Water Management District will also assume the responsibility to operate and maintain Multiple Purpose Structures Nos. 5 and 11. A full-time caretaker will be provided during the summer months and on a part-time basis during the winter months at each structure. Use fees will be charged to recreation users at each structure and such fees will be limited to the amount needed to amortize the initial investment and to provide adequate operation, maintenance, and replacement of facilities. In the event that the use fees are found to be inadequate to cover the necessary costs, the amount of the difference will be provided by the Master Water Management District. Operation and maintenance funds for the Master Water Management District will be secured through assessments as provided by Mississippi House Bill 670, regular session 1960. The estimated annual cost for operating and maintaining Multiple Purpose Structure No. 11 and the minimum basic facilities is \$30,300. The estimated annual cost for operating and maintaining Multiple Purpose Structure No. 5 and the minimum basic facilities is \$30,500.

Each year the Commissioners of the Master Water Management District will budget sufficient funds for operation and maintenance of the structural works of improvement. Maintenance will be accomplished through the use of contributed services in kind such as labor, equipment hire, and materials by the benefited landowners and operators in the watershed. These services will be arranged for by the Master Water Management District.

Access roads used during construction will be maintained as access roads for maintenance of the works of improvement.

Joint inspections will be made annually by the sponsors and the Soil Conservation Service employee responsible for operation and maintenance inspections on floodwater retarding structures and the multiple purpose structures. They will also make inspections after unusually severe storms and after the occurrences of any other unusual conditions that might adversely affect the structural measures. These inspections will continue for a period of three years following construction. Inspections after the third year will be made annually by the sponsors. They will prepare a report and send a copy to the Soil Conservation Service employee responsible for operation and maintenance inspections and follow-up. Where needed, the Soil Conservation Service employee may continue to provide assistance after the third year as determined by the State Conservationist.

For the floodwater retarding structures, items of inspection will include, but will not be limited to, the condition of the principal spillway, the earthfill, the emergency spillway, the vegetative cover, and other appurtenances installed as a part of the structures. For the release flow channel, items of inspection will include, but will not be limited to, the degree of scour, sediment deposition, bank erosion, obstructions to the flow caused by debris accumulation, and excessive brush and tree growth within the channel. The items of inspection listed are those most likely to require maintenance. The Soil Conservation Service will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspection and technical guidance necessary.

Provisions will be made for free access of representatives of the sponsoring local organization and the Federal Government to inspect and provide maintenance for all structural measures at any time.

Detailed plans for operation and maintenance will be contained in the Watershed Protection Operation and Maintenance Agreement, and this agreement will be executed prior to issuing invitations to bid.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST
Mantachie, Bogue Falls, and Bogue Eucuba Creeks Watershed, Mississippi

Installation Cost Item	Unit	Number	Estimated Cost / (Dollars)							Total Installation Costs	
			PL-566 Funds			Other Funds					
			S.C.S.3/	Non-Federal Land	Federal	S.U.S.3/	Non-Federal Land	Federal	Total		
LAND TREATMENT											
Land Areas 2/											
Cropland	Ac.	8,200	0	0	0	100,100	0	100,100	0	100,100	100,100
Pastureland	Ac.	5,100	0	0	0	242,400	0	242,400	0	242,400	242,400
Forest land	Ac.	4,100	0	0	0	0	73,500	73,500	0	73,500	73,500
Cooperative Forest Fire Control Program	Ac.	(78,574)	0	3,900	3,900	0	0	2,700	2,700	0	6,600
Critical Area Stabilization	Ac.	700	0	58,000	58,000	0	0	3,500	3,500	0	61,500
Tree Planting	Ac.	1,656	107,700	0	107,700	58,000	0	58,000	0	58,000	165,700
Grasses and Legumes											
Technical Assistance			184,800	41,000	225,800	61,600	6,700	68,300	6,700	68,300	294,100
TOTAL LAND TREATMENT			292,500	102,900	395,400	462,100	86,400	548,500	86,400	943,900	
STRUCTURAL MEASURES											
Construction											
Floodwater Retarding Structures	No.	12	1,495,300	0	1,495,300	0	0	0	0	0	1,495,300
Multiple Purpose Structures	No.	2	487,470	0	487,470	174,630	0	174,630	0	174,630	659,100
Recreation Facilities	No.	2	220,300	0	220,300	220,300	0	220,300	0	220,300	440,600
Subtotal - Construction			2,203,070	0	2,203,070	391,930	0	391,930	0	391,930	2,595,000
Engineering Services											
Project Administration			285,100	0	285,100	26,400	0	26,400	0	26,400	311,500
Construction Inspection											
Review and Service Contracts			215,500	0	215,500	0	0	0	0	0	215,500
Relocation Assistance Advisory Services			22,000	0	22,000	22,000	0	22,000	0	22,000	44,000
Other			0	0	0	5,000	0	5,000	0	5,000	5,000
Subtotal - Administration			391,700	0	391,700	73,900	0	73,900	0	73,900	465,600

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST (Continued)
 Mantachie, Bogue Falls, and Bogue Eucuba Creeks Watershed, Mississippi

Installation Cost Item	Unit	Number	Estimated Cost 1/ (Dollars)						Total Installation Costs
			PL-566 Funds			Other Funds			
			S.C.S. 3/	F.S. 3/	Non-Federal Land	S.C.S. 3/	Non-Federal Land	Other	
STRUCTURAL MEASURES (cont/d)									
Other Costs									
Land Rights									
			123,900	0	123,900	605,650	0	605,650	729,550
TOTAL STRUCTURAL MEASURES			3,003,770	0	3,003,770	1,097,880	0	1,097,880	4,101,650
TOTAL PROJECT			3,296,270	102,900	3,399,170	1,559,980	86,400	1,646,380	5,045,550

1/ Price base 1974.

2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.

3/ Federal agency responsible for assistance in installation of works of improvement.

TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT
(at time of Work Plan Preparation)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Measures	Unit	Applied To-Date	Total Cost (Dollars) ^{1/}
<u>LAND TREATMENT</u>			
<u>Cropland</u>			
Conservation Cropping System	Ac.	9,370	18,740
Terraces	Mi.	30	4,500
Grassed Waterways	Ac.	65	4,091
Contour Farming	Ac.	4,721	9,442
Cover Cropping	Ac.	1,800	5,400
Crop Residue Use	Ac.	9,150	18,300
Mains and Laterals	Mi.	15	27,000
Surface Field Ditches	Mi.	22	8,250
Diversions	Mi.	25	13,200
Land Clearing	Ac.	2,000	600,000
Row Arrangement	Ac.	4,100	8,200
Subtotal			717,123
<u>Pasture and Hayland</u>			
Pasture Planting	Ac.	8,038	361,710
Pasture Renovation	Ac.	3,958	79,160
Pasture Management	Ac.	1,725	34,500
Farm Pond	No.	200	4,000
Mains and Laterals	Mi.	10	18,000
Brush Control	Ac.	767	1,534
Surface Field Ditches	Mi.	20	7,500
Critical Area Planting	Ac.	225	14,006
Land Clearing	Ac.	2,000	160,000
Subtotal			680,410
<u>Wildlife Land</u>			
Wildlife Habitat Development	Ac.	75	3,750
Wildlife Habitat Preservation	Ac.	225	1,125
Subtotal			4,875
<u>Woodland</u>			
Planting and Seeding	Ac.	4,000	60,000
Release	Ac.	1,500	22,500
Improvement Cuts	Ac.	400	-
Fire Lanes	Mi.	10	1,500
Subtotal			84,000
TOTAL			1,486,400

^{1/} Price base 1974.

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

(Dollars) 1/

Item	Installation Costs - FL-566 Funds				Installation Costs - Other Funds				Total
	Con- struction	Engi- neering	Land Rights	Reloca- tion	Con- struction	Engi- neering	Land Rights	Reloca- tion	
Floodwater Retarding Structures:									
No. 1	187,100	22,500	0	0	209,600	0	83,250	0	83,250
No. 2	112,400	13,500	0	0	125,900	0	50,500	0	50,500
No. 3	91,500	11,000	0	0	102,500	0	22,500	0	22,500
No. 4	129,700	15,600	0	0	145,300	0	58,750	0	58,750
No. 6	107,500	12,900	0	0	120,400	0	26,750	0	26,750
No. 7	99,900	12,000	0	0	111,900	0	32,500	0	32,500
No. 8	149,400	17,900	0	0	167,300	0	54,500	0	54,500
No. 9	242,100	29,100	0	0	271,200	0	78,750	0	78,750
No. 10	101,200	12,100	0	0	113,300	0	35,000	0	35,000
No. A	91,500	11,000	0	0	102,500	0	16,500	0	16,500
No. B	91,500	11,000	0	0	102,500	0	13,750	0	13,750
No. C	91,500	11,000	0	0	102,500	0	9,000	0	9,000
Subtotal - FWRS	1,495,300	179,600	0	0	1,674,900	0	481,750	0	481,750
Multiple Purpose Structure No. 5	253,600	43,200	52,650	0	349,450	106,400	52,650	0	159,050
Recreation Facilities	110,150	13,200	12,300	0	135,650	110,150	13,200	12,300	135,650
Subtotal - MFS No. 5	363,750	56,400	64,950	0	485,100	216,550	64,950	0	294,700
Multiple Purpose Structure No. 11	233,870	35,900	46,650	0	316,420	65,230	46,650	0	111,880
Recreation Facilities	110,150	13,200	12,300	0	135,650	110,150	13,200	12,300	135,650
Subtotal - MFS No. 11	344,020	49,100	58,950	0	452,070	175,380	58,950	0	247,530
SUBTOTAL	2,203,070	285,100	123,900	0	2,612,070	391,930	605,650	0	1,023,980

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION (Continued)
 Mantachie, Bogue Falls, and Bogue Fucuba Creeks Watershed, Mississippi

(Dollars) 1/

Item	Installation Costs - PL-566 Funds			Installation Costs - Other Funds		
	Engi- :neering: :Rights	Land :Reloca- :tion	Total : PL-566 : Payments:	Engi- :neering: :Rights	Land :Reloca- :tion	Total : Other : Payments:
Project Administration	--:	--:	391,700:	--:	--:	73,900:
GRAND TOTAL	2,203,070:	285,100:	2,488,170:	26,400:	605,650:	2,093,820:
						465,660:

1/ Price base 1974.

TABLE 2-A - COST ALLOCATION AND COST SHARING SUMMARY
 Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

(Dollars) $\frac{1}{2}$

Item	Cost Allocation				Cost Sharing				
	Flood		Recreation		Flood		Recreation		Other
	Prevention	Total	Prevention	Total	Prevention	Total	Prevention	Total	
Multiple Purpose Structure No. 5	164,860	343,640	508,500	184,590	164,860	349,450	0	159,050	159,050
Recreation Facilities	0	271,300	271,300	0	135,650	135,650	0	135,650	135,650
Subtotal-MFS & Basic Facilities	164,860	614,940	779,800	164,860	164,860	485,100	0	294,700	294,700
Multiple Purpose Structure No. 11	188,880	239,420	428,300	188,880	188,880	316,420	0	111,880	111,880
Recreation Facilities	0	271,300	271,300	0	135,650	135,650	0	135,650	135,650
Subtotal-MFS & Basic Facilities	188,880	510,720	699,600	188,880	188,880	452,070	0	247,530	247,530
Subtotal - FWRS	2,156,650	0	2,156,650	1,674,900	1,674,900	481,750	0	481,750	481,750
GRAND TOTAL	2,510,390	1,125,660	3,636,050	2,028,640	583,430	2,612,070	481,750	542,230	1,023,980

$\frac{1}{2}$ Price base 1974.

TABLE 2-B - RECREATIONAL FACILITIES

ESTIMATED CONSTRUCTION COSTS

Multiple Purpose Structure No. 5

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed

(Dollars) 1/

Item	Unit	Number	Est. Unit Cost	Total Construction Cost
<u>Picnicking</u>				
Picnic Tables (concrete uprights, wood tops and seats)	Each	30	250:	7,500
Garbage can mounts	Each	15	31.67:	475
Group shelter (15' x 30')	Sq. Ft.:	<u>2/</u> 450	3.78:	1,700
Metal Bar-B-Q on post	Each	15	43.33:	650
Comfort station (4-unit)	Each	2	6,250:	12,500
Parking	Sq. Yd.:	<u>2/</u> 1,500	2.68:	4,025
Parking barriers	Each	15	56.67:	850
<u>Swimming</u>				
Beach & water area (1 ac. x 12")	Cu. Yd.:	<u>2/</u> 1,613	3.75:	6,050
Bath house (4 flush toilets and 2 showers)	Each	1	10,625:	10,625
Parking	Sq. Yd.:	<u>2/</u> 4,000	2.69:	10,750
Parking barriers	Each	50	56:	2,800
Lifeguard stand	Each	1	175:	175
Rescue station	Each	1	75:	75
Boundary markers	Each	5	185:	925
<u>Fishing and Boating</u>				
Launching ramp (100' x 20' x 6")	Cu. Yd.:	<u>2/</u> 37	50:	1,850
Fishing pier (5' x 160')	Each	1	4,150:	4,150
Boat dock (100' x 4')	Each	1	2,450:	2,450
Parking	Sq. Yd.:	<u>2/</u> 2,000	2.69:	5,375
Parking barriers	Each	10	55:	550
Fish cleaning facilities	Each	1	375:	375
<u>Camping</u>				
Raised tent mound (concrete curb and pea gravel)	Each	10	625:	6,250
Comfort station (4 flush toilets, 2 showers)	Each	1	10,625:	10,625
Garbage can mounts	Each	10	30:	300
Tables (concrete uprights and wood tops and seats)	Each	10	250:	2,500
Fireplaces	Each	10	80:	800

TABLE 2-B - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed

Item	Unit	Number	Est. Unit Cost	Total Construction Cost
<u>Water and Disposal System</u>				
Well and pump (complete)	Lump Sum	1	3,750:	3,750
Drinking fountains	Each	2	62.50:	125
Water faucets	Each	15	13.33:	200
Distribution lines	Lin. Ft.	<u>2/</u> 2,000	2.50:	5,000
Sewage treatment plant	Gal.	<u>2/</u> 8,000	1.50:	12,000
<u>Access Roads</u>				
	Mi.	<u>2/</u> 2	31,250:	62,500
<u>Nature Trails</u>				
	Lin. Ft.	<u>2/</u> 6,000	0.19:	1,125
<u>Miscellaneous</u>				
Fencing	Lin. Ft.	<u>2/</u> 5,700	0.94:	5,375
Clearing and shaping	Ac.	<u>2/</u> 10	250:	2,500
Landscaping	Ac.	<u>2/</u> 10	250:	2,500
Signs and markers	Each	10	37.50:	375
Cattle gap and gate	Each	1	625:	625
Electrical distribution	Lump Sum	--	--:	6,250
Subtotal				196,650
Contingencies				23,400
GRAND				
TOTAL				220,250

1/ Price base 1974

2/ Estimated quantity, subject to minor variation at the time of detailed planning.

TABLE 2-C - RECREATIONAL FACILITIES

ESTIMATED CONSTRUCTION COSTS

Multiple Purpose Structure No. 11

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed

(Dollars) 1/

Item	Unit	Number	Est. Unit Cost	Total Construction Cost
<u>Picnicking</u>				
Picnic tables (concrete uprights, wood tops and seats)	Each	30	250	7,500
Garbage can mounts	Each	15	31.67	475
Group shelter (15' x 30')	Sq. Ft.	<u>2/</u> 450	3.78	1,700
Metal Bar-B-Q on post	Each	15	43.33	650
Comfort station (4-unit)	Each	2	6,250	12,500
Parking	Sq. Yd.	<u>2/</u> 1,500	2.68	4,025
Parking barriers	Each	15	56.67	850
<u>Swimming</u>				
Beach & water area (1 ac. x 12")	Cu. Yd.	<u>2/</u> 1,613	3.75	6,050
Bath house (4 flush toilets, 2 showers)	Each	1	10,625	10,625
Parking	Sq. Yd.	<u>2/</u> 4,000	2.69	10,750
Parking barriers	Each	50	56	2,800
Lifeguard stand	Each	1	175	175
Rescue station	Each	1	75	75
Boundary markers	Each	5	185	925
<u>Fishing and Boating</u>				
Launching ramp (100' x 20' x 6")	Cu. Yd.	<u>2/</u> 37	50	1,850
Fishing pier (5' x 160')	Each	1	4,150	4,150
Boat dock (100' x 4')	Each	1	2,450	2,450
Parking	Sq. Yd.	<u>2/</u> 2,000	2.69	5,375
Parking barriers	Each	10	55	550
Fish cleaning facilities	Each	1	375	375
<u>Camping</u>				
Raised tent mound (concrete curb and pea gravel)	Each	10	625	6,250
Comfort station (4 flush toilets, 2 showers)	Each	1	10,625	10,625
Garbage can mounts	Each	10	30	300
Tables (concrete uprights and wood tops and seats)	Each	10	250	2,500
Fireplaces	Each	10	80	800



TABLE 2-C - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed

Item	Unit	Number	Est. Unit Cost	Total Construction Cost
<u>Water and Disposal System</u>				
Connect to Mantachie Community water system	: Lump Sum:	--	: 3,750:	3,750
Drinking fountains	: Each	: 2	: 62.50:	125
Water faucets	: Each	: 15	: 13.33:	200
Distribution lines	: Lin. Ft.:	: <u>2/2,000</u>	: 2.50:	5,000
Sewage treatment plant	: Gal.	: <u>2/8,000</u>	: 1.50:	12,000
<u>Access Roads</u>				
	: Mi.	: <u>2/</u> 2	: 31,250:	62,500
<u>Nature Trails</u>				
	: Lin. Ft.:	: <u>2/6,000</u>	: 0.19:	1,125
<u>Miscellaneous</u>				
Fencing	: Lin. Ft.:	: <u>2/5,700</u>	: 0.94:	5,375
Clearing and shaping	: Ac.	: <u>2/</u> 10	: 250:	2,500
Landscaping	: Ac.	: <u>2/</u> 10	: 250:	2,500
Signs and markers	: Each	: 10	: 37.50:	375
Cattle gap and gate	: Each	: 1	: 625:	625
Electrical distribution	: Lump Sum:	--	: --:	6,250
Subtotal	:	:	:	196,650
Contingencies	:	:	:	23,400
GRAND TOTAL	:	:	:	220,250

1/ Price base 1974.

2/ Estimated quantity, subject to minor variation at time of detailed planning.

TABLE 3 - STRUCTURE DATA

STRUCTURES WITH PLANNED STORAGE CAPACITY

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Item	Unit	Structure Number		
		1	2	3
Class of Structure		a	a	a
Drainage Area	Sq. Mi.	6.95	4.28	1.86
Curve No. (1-day) (AMC II)		80	70	70
T _c	Hrs.	4.66	1.96	1.50
Elevation Top of Dam	Ft.	348.2	400.3	374.1
Elevation Crest Emergency Spillway	Ft.	346.2	398.3	372.1
Elevation Crest High Stage Inlet	Ft.	334.0	387.4	364.3
Elevation Crest Low Stage Inlet <u>3/</u>	Ft.	-	-	-
Maximum Height of Dam	Ft.	33.4	30.1	23.6
Volume of Fill	Cu. Yds.	151,956	68,917	48,899
Total Capacity	Ac. Ft.	2,604	1,588	520
Sediment Submerged 1st 50 years	Ac. Ft.	230	237	88
Sediment Submerged 2nd 50 years <u>4/</u>	Ac. Ft.	224	212	82
Sediment Aerated	Ac. Ft.	58	56	22
Beneficial Use (Recreation)	Ac. Ft.	-	-	-
Retarding	Ac. Ft.	2,092	1,083	328
Between high and low stage <u>3/</u>	Ac. Ft.	-	-	-
Surface Area				
Sediment Pool	Acres	58	62	28
Beneficial Use Pool (Recreation)	Acres	-	-	-
Retarding Pool	Acres	333	202	90
Principal Spillway				
Rainfall Volume (areal) (1 day)	In.	<u>2/</u> 7.00 <u>2/</u>	7.00	6.75
Rainfall Volume (areal) (10 day)	In.	<u>2/</u> 12.60 <u>2/</u>	12.60	12.20
Runoff Volume (10 day)	In.	<u>2/</u> 7.85 <u>2/</u>	5.79	5.47
Capacity of Low Stage (Max.) <u>3/</u>	CFS	-	-	-
Capacity of High Stage (Max.)	CFS	163	64	58
Frequency Operation - Emer. Spillway	% Chance	2.8	2.8	4.0
Size of Conduit	Dim.	36"	24"	24"
Emergency Spillway				
Rainfall Volume (ESH) (areal)	In.	<u>2/</u> 7.10 <u>2/</u>	5.70	5.80
Runoff Volume (ESH)	In.	<u>2/</u> 4.79 <u>2/</u>	2.57	2.64
Type		veg.	veg.	veg.
Bottom Width	Ft.	90	64	43
Velocity of Flow (V _e) <u>1/</u>	Ft./Sec.	-	-	-
Slope of Exit Channel <u>1/</u>	Ft./Ft.	-	-	-
Maximum Water Surface Elevation <u>1/</u>	Ft.	-	-	-
Freeboard				
Rainfall Volume (FH) (areal)	In.	<u>2/</u> 11.13 <u>2/</u>	8.60	8.70
Runoff Volume (FH)	In.	<u>2/</u> 8.61 <u>2/</u>	4.98	5.07
Maximum Water Surface Elevation	Ft.	348.2	400.3	374.1
Capacity Equivalents				
Sediment Volume	In.	1.38	2.21	1.94
Retarding Volume	In.	5.64	4.74	3.30

TABLE 3 - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Item	Unit	Structure Number		
		4	5	6
Class of Structure		a	b	a
Drainage Area	Sq. Mi.	4.66	2.89	2.38
Curve No. (1-day) (AMC II)		72	70	70
T _c	Hrs.	3.00	1.50	1.50
Elevation Top of Dam	Ft.	309.0	304.7	358.0
Elevation Crest Emergency Spillway	Ft.	307.0	302.5	356.0
Elevation Crest High Stage Inlet	Ft.	299.8	297.2	346.9
Elevation Crest Low Stage Inlet <u>3/</u>	Ft.	-	-	-
Maximum Height of Dam	Ft.	22.6	32.6	29.0
Volume of Fill	Cu. Yds.	58,350	59,640	70,481
Total Capacity	Ac. Ft.	1,441	3,222	779
Sediment Submerged 1st 50 years	Ac. Ft.	285	235	133
Sediment Submerged 2nd 50 years <u>4/</u>	Ac. Ft.	-	-	128
Sediment Aerated	Ac. Ft.	52	43	33
Beneficial Use (Recreation)	Ac. Ft.	-	1,905	-
Retarding	Ac. Ft.	1,104	1,039	485
Between high and low stage <u>3/</u>	Ac. Ft.	-	-	-
Surface Area				
Sediment Pool	Acres	120	75	39
Beneficial Use Pool (Recreation)	Acres	-	185	-
Retarding Pool	Acres	235	242	107
Principal Spillway				
Rainfall Volume (areal) (1 day)	In.	<u>2/</u> 7.00	8.65	<u>2/</u> 7.00
Rainfall Volume (areal) (10 day)	In.	<u>2/</u> 12.60	13.30	<u>2/</u> 12.60
Runoff Volume (10 day)	In.	<u>2/</u> 6.11	6.34	<u>2/</u> 5.79
Capacity of Low Stage (Max.) <u>3/</u>	CFS	-	-	-
Capacity of High Stage (Max.)	CFS	92	64	63
Frequency Operation - Emer. Spillway	% Chance	2.8	2	2.8
Size of Conduit	Dim.	30"	24"	24"
Emergency Spillway				
Rainfall Volume (ESH) (areal)	In.	<u>2/</u> 7.10	8.65	<u>2/</u> 7.10
Runoff Volume (ESH)	In.	<u>2/</u> 3.91	5.03	<u>2/</u> 3.70
Type		veg.	veg.	veg.
Bottom Width	Ft.	69	104	118
Velocity of Flow (V _e) <u>1/</u>	Ft./Sec	-	-	-
Slope of Exit Channel <u>1/</u>	Ft./Ft.	-	-	-
Maximum Water Surface Elevation <u>1/</u>	Ft.	-	-	-
Freeboard				
Rainfall Volume (FH) (areal)	In.	<u>2/</u> 11.13	15.50	<u>2/</u> 11.13
Runoff Volume (FH)	In.	<u>2/</u> 7.53	11.33	<u>2/</u> 7.25
Maximum Water Surface Elevation	Ft.	309.0	304.7	358.0
Capacity Equivalents				
Sediment Volume	In.	1.36	1.80	2.32
Retarding Volume	In.	4.44	6.73	3.82

TABLE 3 - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Item	Unit	Structure Number		
		7	8	9
Class of Structure		a:	a:	a
Drainage Area	Sq. Mi.	3.13:	5.49:	7.38
Curve No. (1-day) (AMC II)		70:	70:	70
T _c	Hrs.	1.50:	3.00:	3.00
Elevation Top of Dam	Ft.	376.4:	361.7:	387.0
Elevation Crest Emergency Spillway	Ft.	374.4:	359.4:	384.0
Elevation Crest High Stage Inlet	Ft.	366.0:	348.8:	373.3
Elevation Crest Low Stage Inlet <u>3/</u>	Ft.	-:	-:	-
Maximum Height of Dam	Ft.	21.1:	31.5:	32.5
Volume of Fill	Cu. Yds.	53,941:	90,714:	176,959
Total Capacity	Ac. Ft.	1,161:	1,831:	2,425
Sediment Submerged 1st 50 years	Ac. Ft.	343:	256:	343
Sediment Submerged 2nd 50 years <u>4/</u>	Ac. Ft.	-:	239:	319
Sediment Aerated ₁	Ac. Ft.	62:	62:	83
Beneficial Use (Recreation)	Ac. Ft.	-:	-:	-
Retarding	Ac. Ft.	756:	1,274:	1,680
Between high and low stage <u>3/</u>	Ac. Ft.	-:	-:	-
Surface Area				
Sediment Pool	Acres	45:	78:	83
Beneficial Use Pool (Recreation)	Acres	-:	-:	-
Retarding Pool	Acres	130:	218:	315
Principal Spillway				
Rainfall Volume (areal) (1 day)	In.	<u>2/</u> 7.00: <u>2/</u>	<u>2/</u> 7.00: <u>2/</u>	7.00
Rainfall Volume (areal) (10 day)	In.	<u>2/</u> 12.60: <u>2/</u>	<u>2/</u> 12.60: <u>2/</u>	12.60
Runoff Volume (10 day)	In.	<u>2/</u> 5.79: <u>2/</u>	<u>2/</u> 5.79: <u>2/</u>	5.79
Capacity of Low Stage (Max.) <u>3/</u>	CFS	:	:	:
Capacity of High Stage (Max.)	CFS	55:	107:	163
Frequency Operation - Emer. Spillway	% Chance:	2.8:	2.8:	2.8
Size of Conduit	Dim.	24":	30":	36"
Emergency Spillway				
Rainfall Volume (ESH) (areal)	In.	<u>2/</u> 7.10: <u>2/</u>	<u>2/</u> 7.10: <u>2/</u>	7.10
Runoff Volume (ESH)	In.	<u>2/</u> 3.70: <u>2/</u>	<u>2/</u> 3.70: <u>2/</u>	3.70
Type		veg.:	veg.:	veg.
Bottom Width	Ft.	99:	85:	62
Velocity of Flow (V _e) <u>1/</u>	Ft./Sec.:	-:	-:	-
Slope of Exit Channel <u>1/</u>	Ft./Ft.:	-:	-:	-
Maximum Water Surface Elevation <u>1.</u>	Ft.	-:	-:	-
Freeboard				
Rainfall Volume (FH) (areal)	In.	<u>2/</u> 11.13: <u>2/</u>	<u>2/</u> 11.13: <u>2/</u>	11.13
Runoff Volume (FH)	In.	<u>2/</u> 7.25: <u>2/</u>	<u>2/</u> 7.25: <u>2/</u>	7.25
Maximum Water Surface Elevation	Ft.	376.4:	361.7:	387.0
Capacity Equivalents				
Sediment Volume	In.	2.42:	1.89:	1.89
Retarding Volume	In.	4.52:	4.35:	4.27

TABLE 3 - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Item	Unit	Structure Number	
		10	11
Class of Structure		a	c
Drainage Area	Sq. Mi.	2.54	2.53
Curve No. (1-day) (AMC II)		74	72
T _c	Hrs.	1.50	1.50
Elevation Top of Dam	Ft.	369.3	344.8
Elevation Crest Emergency Spillway	Ft.	367.3	340.3
Elevation Crest High Stage Inlet	Ft.	357.9	336.3
Elevation Crest Low Stage Inlet <u>3/</u>	Ft.	-	-
Maximum Height of Dam	Ft.	24.9	35.5
Volume of Fill	Cu. Yds.	55,809	104,283
Total Capacity	Ac. Ft.	932	1,882
Sediment Submerged 1st 50 years	Ac. Ft.	128	239
Sediment Submerged 2nd 50 years <u>4/</u>	Ac. Ft.	121	-
Sediment Aerated	Ac. Ft.	31	44
Beneficial Use (Recreation)	Ac. Ft.	-	821
Retarding	Ac. Ft.	652	778
Between high and low stage <u>3/</u>	Ac. Ft.	-	-
Surface Area			
Sediment Pool	Acres	43	63
Beneficial Use Pool (Recreation)	Acres	-	165
Retarding Pool	Acres	140	239
Principal Spillway			
Rainfall Volume (areal) (1 day)	In.	<u>2/</u> 7.00	8.00
Rainfall Volume (areal) (10 day)	In.	<u>2/</u> 12.60	14.50
Runoff Volume (10 day)	In.	<u>2/</u> 6.60	7.68
Capacity of Low Stage (Max.) <u>3/</u>	CFS	-	-
Capacity of High Stage (Max.)	CFS	58	108
Frequency Operation - Emer. Spillway	% Chance	4.0	1.0
Size of Conduit	Dim.	24"	30"
Emergency Spillway			
Rainfall Volume (ESH) (areal)	In.	<u>2/</u> 7.10	12.30
Runoff Volume (ESH)	In.	<u>2/</u> 4.14	8.62
Type		veg.	veg.
Bottom Width	Ft.	51	190
Velocity of Flow (V _e) <u>1/</u>	Ft./Sec.	-	4.00
Slope of Exit Channel <u>1/</u>	Ft./Ft.	-	.04
Maximum Water Surface Elevation <u>1/</u>	Ft.	-	341.3
Freeboard			
Rainfall Volume (FH) (areal)	In.	<u>2/</u> 11.13	30.00
Runoff Volume (FH)	In.	<u>2/</u> 7.82	25.79
Maximum Water Surface Elevation	Ft.	369.3	344.8
Capacity Equivalents			
Sediment Volume	In.	2.06	2.83
Retarding Volume	In.	4.81	5.76

1/ Emergency spillway hydrograph insignificant.

2/ Approaching Class "b" criteria.

3/ Single stage only.

4/ Includes some aerated sediment from 1st 50 years.

TABLE 3 - (Continued)

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

Item	Unit	Structure Number			
		A	B	C	Total
Class of Structure		a:	a:	a:	
Drainage Area	:Sq. Mi.	: 1.29:	: 0.73:	: 0.57:	: 46.68
Curve No. (1-day) (AMC II)	:	: 70:	: 70:	: 70:	: xxxxxx
T _c	:Hrs.	: 1.30:	: 1.20:	: 1.20:	: xxxxxx
Elevation Top of Dam	:Ft.	: 409.2:	: 359.5:	: 334.0:	: xxxxxx
Elevation Crest Emergency Spillway	:Ft.	: 407.2:	: 357.5:	: 332.0:	: xxxxxx
Elevation Crest High Stage Inlet	:Ft.	: 404.0:	: 355.6:	: 330.0:	: xxxxxx
Elevation Crest Low Stage Inlet	:Ft.	: 400.1:	: 353.0:	: 326.0:	: xxxxxx
Maximum Height of Dam	:Ft.	: 20.0:	: 15.0:	: 18.0:	: xxxxxx
Volume of Fill	:Cu. Yds.	: 51,000:	: 41,500:	: 40,000:	: 1,072,449
Total Capacity	:Ac. Ft.	: 473:	: 242:	: 168:	: 19,268
Sediment Submerged 1st 50 years	:Ac. Ft.	: 129:	: 63:	: 35:	: 2,744
Sediment Submerged 2nd 50 years	:Ac. Ft.	: 5/:	: 5/:	: 5/:	: 1,325
Sediment Aerated	:Ac. Ft.	: 23:	: 12:	: 10:	: 591
Beneficial Use (Recreational)	:Ac. Ft.	: -:	: -:	: -:	: 2,726
Retarding	:Ac. Ft.	: 321:	: 167:	: 123:	: 11,882
Between high and low stage	:Ac. Ft.	: 141:	: 79:	: 62:	: 282
Surface Area	:	:	:	:	:
Sediment Pool	:Acres	: 32:	: 30:	: 15:	: 771
Beneficial Use Pool (Recreational)	:Acres	: -:	: -:	: -:	: 350
Retarding Pool	:Acres	: 64:	: 53:	: 34:	: 2,402
Principal Spillway	:	:	:	:	:
Rainfall Volume (areal) (1 day)	:In.	: 6.75:	: 6.75:	: 6.75:	: xxxxxx
Rainfall Volume (areal) (10 day)	:In.	: 12.20:	: 12.20:	: 12.20:	: xxxxxx
Runoff Volume (10 day)	:In.	: 5.47:	: 5.47:	: 5.47:	: xxxxxx
Capacity of Low Stage (max.)	:CFS	: 13:	: 7:	: 6:	: xxxxxx
Capacity of High Stage (max.)	:CFS	: 28:	: 23:	: 25:	: xxxxxx
Frequency Operation - Emer. Splwy.	:% Chance	: 4.0:	: 4.0:	: 4.0:	: xxxxxx
Size of Conduit	:Dim.	: 18":	: 18":	: 18":	: xxxxxx
Emergency Spillway	:	:	:	:	:
Rainfall Volume (ESH) (areal)	:In.	: 5.80:	: 5.80:	: 5.80:	: xxxxxx
Runoff Volume (ESH)	:In.	: 2.64:	: 2.64:	: 2.64:	: xxxxxx
Type	:	: veg.:	: veg.:	: veg.:	: xxxxxx
Bottom Width	:Ft.	: 40:	: 30:	: 30:	: xxxxxx
Velocity of Flow (V _e)	:Ft./Sec.	: -:	: -:	: -:	: xxxxxx
Slope of Exit Channel	:Ft./Ft.	: -:	: -:	: -:	: xxxxxx
Maximum Water Surface Elevation	:Ft.	: -:	: -:	: -:	: xxxxxx
Freeboard	:	:	:	:	:
Rainfall Volume (FH) (areal)	:In.	: 8.70:	: 8.70:	: 8.70:	: xxxxxx
Runoff Volume (FH)	:In.	: 5.07:	: 5.07:	: 5.07:	: xxxxxx
Maximum Water Surface Elevation	:Ft.	: 407.5:	: 457.7:	: 332.8:	: xxxxxx
Capacity Equivalents	:	:	:	:	:
Sediment Volume	:In.	: 2.20:	: 1.93:	: 1.39:	: xxxxxx
Retarding Volume	:In.	: 4.65:	: 4.30:	: 4.04:	: xxxxxx

5/ 100-year sediment in sediment submerged.

TABLE 4 - ANNUAL COST

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

(Dollars) 1/

Evaluation Unit	: Amortization of <u>2/</u> : : Installation Cost	: Operation and : Maintenance Cost	: Total
Mantachie Creek	: 96,700	: <u>3/</u> 35,300	: 132,000
Bogue Fala Creek	: 92,200	: <u>4/</u> 35,300	: 127,500
Bogue Eucuba Creek	: 16,500	: 900	: 17,400
Project Administration	: 26,300	: --	: 26,300
GRAND TOTAL	: 231,700	: 71,500	: 303,200

1/ Price base 1974.

2/ 100 years at 5 5/8 percent interest.

3/ Includes \$30,300 for operation, maintenance, and replacement for the recreational development at Multiple Purpose Structure No. 11.

4/ Includes \$30,500 for operation, maintenance, and replacement for the recreational development at Multiple Purpose Structure No. 5.

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi

(Dollars) ^{1/}

Item	: Estimated Avg. Annual Damage:			Damage Reduction Benefits
	: Without Project	: With Project	:	
<u>Floodwater</u>	:	:	:	:
Crop and Pasture	: 278,800	: 76,000	:	: 202,800
Other Agricultural	: 46,200	: 15,200	:	: 31,000
Road and Bridge	: 50,500	: 17,500	:	: 33,000
Subtotal	: 375,500	: 108,700	:	: 266,800
<u>Sediment</u>	:	:	:	:
Over Bank Deposition	: 54,800	: 10,200	:	: 44,600
Subtotal	: 54,800	: 10,200	:	: 44,600
<u>Indirect</u>	: 37,600	: 10,900	:	: 26,700
TOTAL	: 467,900	: 129,800	:	: 338,100

^{1/} Price base: Crop and pasture damage - current normalized prices; other damages - 1973 prices.

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Mantachie, Bogue Fala, and Bogue Eucuba Creeks Watershed, Mississippi
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/					Total	Average Annual Cost 3/	Benefit Cost Ratio
	Damage Reduction	Recreation	Redevelopment	Secondary	Annual			
Mantachie Creek	171,500	94,600	19,100	26,100	311,300	132,000	2.4:1.0	
Bogue Fala Creek	95,700	98,800	20,700	19,200	234,400	127,500	1.8:1.0	
Bogue Eucuba Creek	53,900	0	2,300	5,200	61,400	17,400	3.5:1.0	
Project Administration:						26,300		
GRAND TOTAL	<u>2/</u> 321,100	193,400	42,100	50,500	607,100	303,200	2.0:1.0	

1/ Price Base - Crops and pasture damage - current normalized prices; other damages-1973 prices.
 2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$17,000 annually.
 3/ From Table 4.

INVESTIGATIONS AND ANALYSES

Land Use and Treatment

Land Use was determined from soil surveys. Detailed information concerning the use of cultivated land was furnished by the District Conservationist.

Soil surveys have been completed on the entire watershed. Soil survey maps show the type of soil, slope, degree of erosion, and major land use.

A systematic field survey showed ground cover forest and hydrologic condition, and treatment needs. This survey, supporting data, and information from other agencies and forestry officials determined the amount of remedial measures. The measures recommended contribute to flood reduction and soil stabilization.

Future land use and treatment measures needed were planned for the entire watershed based on a realistic analysis of soil survey data, stereoscopic studies of the area, field examinations, conservation needs, inventory, and farm plans.

Engineering Investigations

A photo mosaic was used as a base map of the watershed. Aerial photographs were used to locate valley cross sections and to survey the centerlines of the floodwater retarding structures. Mean sea level elevations of bench marks located in and near the watershed were obtained from the U. S. Coast and Geodetic Survey.

Seventeen potential floodwater retarding structure sites were studied; however, only 14 were used in developing the watershed work plan. Two of these sites are to be multiple-purpose. These 14 sites, provide an acceptable solution to the sponsor's objectives.

Surveys for the floodwater retarding and multiple-purpose structures consisted of running and plotting centerlines on aerial photographs and, where coverage was available, on quadrangle maps. Additional cross sections and point elevations were plotted on photographs and contours drawn in by the use of a stereoscope. Storage curves were developed from these contours and from contours on quadrangle maps. These surveys are adequate for preliminary cost estimates and land rights, and proportioning the floodwater retarding structures. A detailed survey and the furnishing of final land rights at a later time than outlined in the Watershed Protection Handbook has been agreed to by the State Conservationist and the Director of the STSC.

The criteria outlined in the Watershed Protection Handbook were followed in developing the multiple-purpose structures. The criteria outlined in State Engineering Memorandum MS -20 and Engineering Memorandum SCS -27 were used in determining water and sediment storage requirements and flood routing procedures for the floodwater retarding structures and multiple-purpose structures.

All of the floodwater retarding structures were classified as "a" structures. Multiple-Purpose Structure No. 5 was classed as a "b" due to the added water storage for recreation. Multiple-Purpose Structure No. 11 was classed as a "c" structure because of added water for recreation and its proximity to State Highway No. 371. Storage and emergency spillway requirements for Floodwater Retarding Structures Nos. 1, 2, 4, 8, and 9 were increased as their estimated cost exceeded \$110,000.

Hydraulic and Hydrologic Investigations

The following steps were taken as part of the hydrologic and hydraulic investigations:

1. Basic meteorologic and hydrologic data were tabulated from U. S. Weather Bureau Climatological Bulletins, U. S. Geological Survey Water Supply Papers, and local records. These data were analyzed to determine average precipitation, depth-duration relationships, seasonal distribution of precipitation, the historical flood series to be used in the evaluation of the project, and frequency of occurrence of meteorological events.
2. The before-project hydrologic conditions of the watershed were determined on the basis of cover condition, land use and treatment, soil groups, and crop distribution. The condition II curve number for the hydrologic soil cover complex was determined to be 75 by sampling the entire watershed. Due to the present cover condition of the watershed and the small amount of row crops, it was determined that the curve number of 75 would also be applicable for without-project conditions.
3. Engineering surveys were made of valley cross-sections, highwater marks, bridges and other features pertinent in determining the extent of flooding. The cross-sections were selected to represent the stream hydraulics and flood plain area. Evaluation reaches were delineated after joint study with the economist and geologist.
4. Cross-section rating curves were developed from field survey data and water surface profile computations made by the computer at Fort Worth, Texas.
5. Stage-area inundated curves were developed from field survey data for each portion of the valley represented by a cross-section. Area inundated data by incremental depths of flooding were developed for each evaluation reach, using the runoff-peak discharge relationships for selected storms with known frequencies and durations.
6. The without project and with project runoff-peak discharge relationships were determined by flood routing the 100-year, 25-year, 5-year, 2-year, 1-year, and 0.5-year, 24-hour storms as selected from Technical Paper No. 40, U.S. Weather Bureau, using the TR-20 Program at Fort Worth, Texas.

Sedimentation Investigations

Erosion rates were determined by the use of soil decline relationships according to present and proposed land use conditions above the two multiple purpose structures and 12 floodwater retarding structures. Detailed sediment storage requirements for each of these structures were computed in accordance with State Engineering Memorandum MS-34. Information obtained from this detailed study, which represented approximately 30 percent of the watershed, was expanded to determine present and future sediment yields for the entire watershed.

A field and stereoscopic examination of the watershed was made to determine gully erosion. Sediment damages were determined by mapping representative samples and expanding to the entire area of the flood plain within the designated reach.

Geologic Investigations

Geologic conditions of the watershed were determined through field observations of geologic outcrops, review of available literature, and by making hand auger borings. Preliminary foundation, spillway, and borrow material investigations at one multiple purpose structure site and three floodwater retarding structure sites were made by drilling six to eight holes along the centerline with a hand auger. These sites are considered typical of the remaining seven sites, at which only general observations were made. Adequate borrow material in sufficient quantities is available at or near the sites. No unusual conditions were encountered which would affect construction of the floodwater retarding structures. The two multiple purpose structures (MPS #5 and #11) are located in the Cretaceous system, Eutaw formation, with #5 located on the Lower Eutaw member and #11 located on the Tombigbee member. The preliminary investigation indicates that these sites have a silty clay capping mantle overlying the clayey and silty sands of the formations. This capping mantle is sufficient to prevent water loss to the underlying sands. A detailed foundation investigation will be made prior to final design. By properly selecting borrow material sites to prevent disturbing this mantle, these sites can be constructed to insure the water-holding capability for recreational use. There are several private and state-owned lakes within a 20-mile radius, with sizes of 20 acres up to 330 acres surface area, that are holding water very well.

Economic Investigations

Three evaluation units--Mantachie, Bogue Fala, and Bogue Eucuba Creeks--were used in the evaluation of the effects of land treatment and structural measures. The Mantachie and Bogue Fala flood plains were each divided into four evaluation reaches and the Bogue Eucuba flood plain was divided into two evaluation reaches. The breakdown by three evaluation units and twelve evaluation reaches was made because of the varying hydrologic effects, the varying damageable values, frequency of flooding, and flood plain characteristics.

Damage schedules were obtained within each reach from landowners and operators farming approximately 35 percent of the open flood plain land. Information collected was used to determine land use without and with the project, yield data, anticipated use, characteristics of flooding, damage to crops, pastures, other agricultural damage and historical information on flooding. This information was supplemented with information from local agricultural workers familiar with the watershed.

Damageable values were determined by evaluation reach. Average flood-free yields were based on information from landowners and operators and supplemented with information obtained from local agricultural leaders with allowances made for expected use and yield increases due to improved technology during the life of the project. Flood damages to crops and pastures were determined for a 22-year period (1946-1967) by using a historical storm series. Damages were related to area inundated and depth of inundation. Crop and pasture damage rates were related to season of occurrence. Adjustments were made for recurrent flooding.

Other agricultural damages to property such as fences, water gaps, equipment, farm roads, farm bridges, farm buildings, ditches, and cost of removal of debris from fields, and livestock losses were determined from information collected in the field and by using the 22-year historical storm series.

Sediment (overbank deposition) damages and benefits were estimated on the basis of net income without and with the project due to the reduction of the sediment hazard. Added floodwater damages due to higher damageable values after project and associated costs were deducted from gross benefits. Gross benefits were discounted at 5-5/8 percent interest for the lag in accrual according to the recovery period of five to fifteen years to determine net benefits.

Data obtained from public utility officials, county supervisors, and the State Highway Department were used as a basis to establish stage damages.

Indirect damages involve such items as interruption of travel, re-routing and delay of school busses and mail deliveries, and loss of business sustained by business establishments in the area. Delays and inconvenience in caring for livestock when creeks are flooding are considered indirect damages. It was determined that 10 percent of the direct damages would be an equitable estimate for indirect damages.

Floodwater, sediment, and indirect damages were calculated without project and with project (with land treatment and structural measures). The difference between the average annual damages constitutes the benefits.

Secondary benefits of a local nature stemming from the project were considered to be 10 percent of the direct primary benefits accruing to structural measures. These calculations are in accordance with the present procedures approved by the Soil Conservation Service.

Redevelopment benefits were estimated to be 20 percent of the construction cost of project structural measures amortized over the 100-year evaluation period. These benefits from operation and maintenance of structural measures were estimated to be 50 percent. They were limited to a 20-year period and were used as a decreasing annuity and amortized to convert the benefits to an average annual equivalent over the 100-year evaluation period.

Recreation benefits were based upon the user-days of the recreational facilities and are estimated to be 65,830 and 63,098 respectively for Multiple Purpose Structures Nos. 5 and 11. The estimate is based upon the number of people that will use the facilities from Lee, Itawamba, Monroe, and Prentiss Counties, Mississippi.

The "Use of Facilities" method was used to allocate costs of the multiple-purpose structures between flood prevention and recreation. The factor used to allocate costs was obtained by dividing the acre feet of storage for each purpose by the total storage capacity as follows:

<u>Structure</u>	<u>Flood Prevention</u>	<u>Recreation</u>
5	$\frac{1,317}{3,222} = 40.88\%$	$\frac{1,905}{3,222} = 59.12\%$
11	$\frac{1,061}{1,882} = 56.38\%$	$\frac{821}{1,882} = 43.62\%$

Construction costs allocated to recreation on the multiple purpose structures were cost-shared equally between P.L. 566 and Other. Land rights costs allocated to recreation were cost-shared equally between P.L. 566 and Other. Public Law 566 funds will bear the costs of engineering services.

The basic facilities costs for construction, engineering, and land rights on Multiple Purpose Structures Nos. 5 and 11 were cost-shared equally between P.L. 566 and Other funds.

The local sponsoring organizations set the values of land rights used which were \$150 per acre for channel improvement, \$175 per acre for floodwater retarding structures, and \$200 per acre for multiple purpose structures and recreational facility areas.

The average annual cost of operation and maintenance of project channels varied according to the bottom widths. An average cost per mile of \$121 was used and is considered adequate for this area.

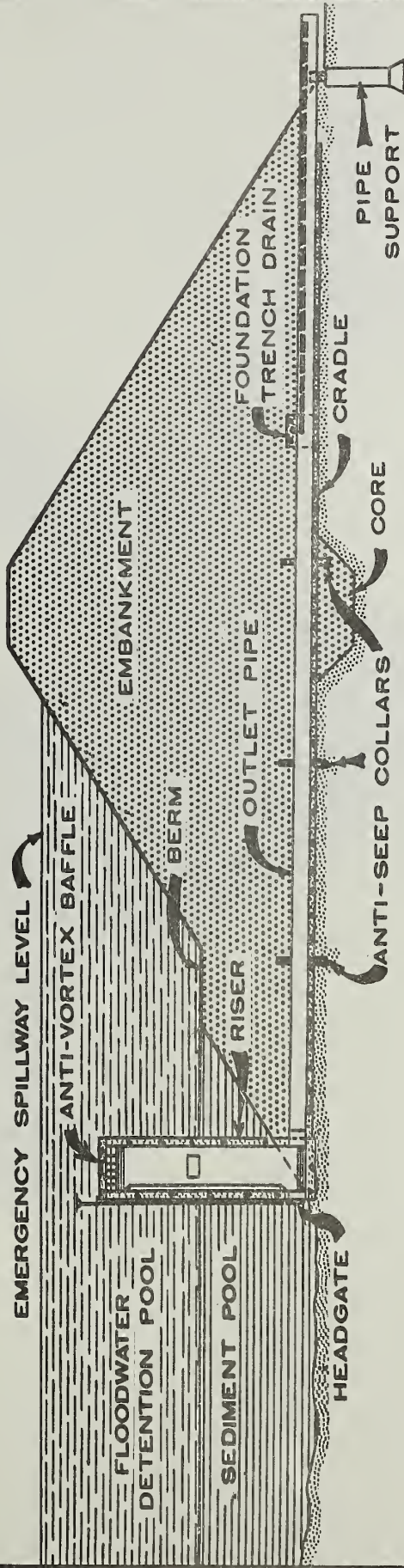
Replacement costs on operation and maintenance equipment such as tractors, pick-up mowers, etc., were by the sinking fund method on a 5-5/8 percent interest rate with an expected life of 4 and 5 years.



Current normalized prices were used in annual benefit evaluations to crops and pastures from floodwater and sediment damage reduction. Other benefits were evaluated on 1973 prices. Present (1974) prices were used for installation cost, and annual operations and maintenance costs computations. The cost of structural measures was amortized over a 100-year evaluation period with interest rates of 5-5/8 percent.

Fish and Wildlife

A field review was made by the U. S. Fish and Wildlife Service, the Mississippi Game and Fish Commission, and the Biologist of the Soil Conservation Service. The results of their findings are described in Section I of this plan. It is anticipated that the proposed works of improvement will have an overall beneficial effect on fish and wildlife resources.



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE (TWO STAGE DROP INLET)

Figure 1.



- LEGEND**
- ① Sewage Disposal
 - ② Beach
 - ③ Parking
 - ④ Bath House
 - ⑤ Boat Ramp
 - ⑥ Boat Dock
 - ⑦ Fishing Pier
 - ⑧ Comfort Station
 - ⑨ Group Shelter
 - ⑩ Picnicking
 - ⑪ Camping



RECREATION MAP
MULTIPLE PURPOSE STRUCTURE NO. 5
MANTACHIE CREEK WATERSHED
 ITAWAMBA COUNTY, MISSISSIPPI
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 JACKSON, MISSISSIPPI

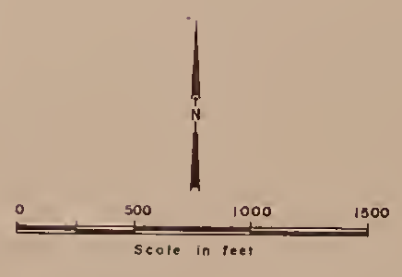
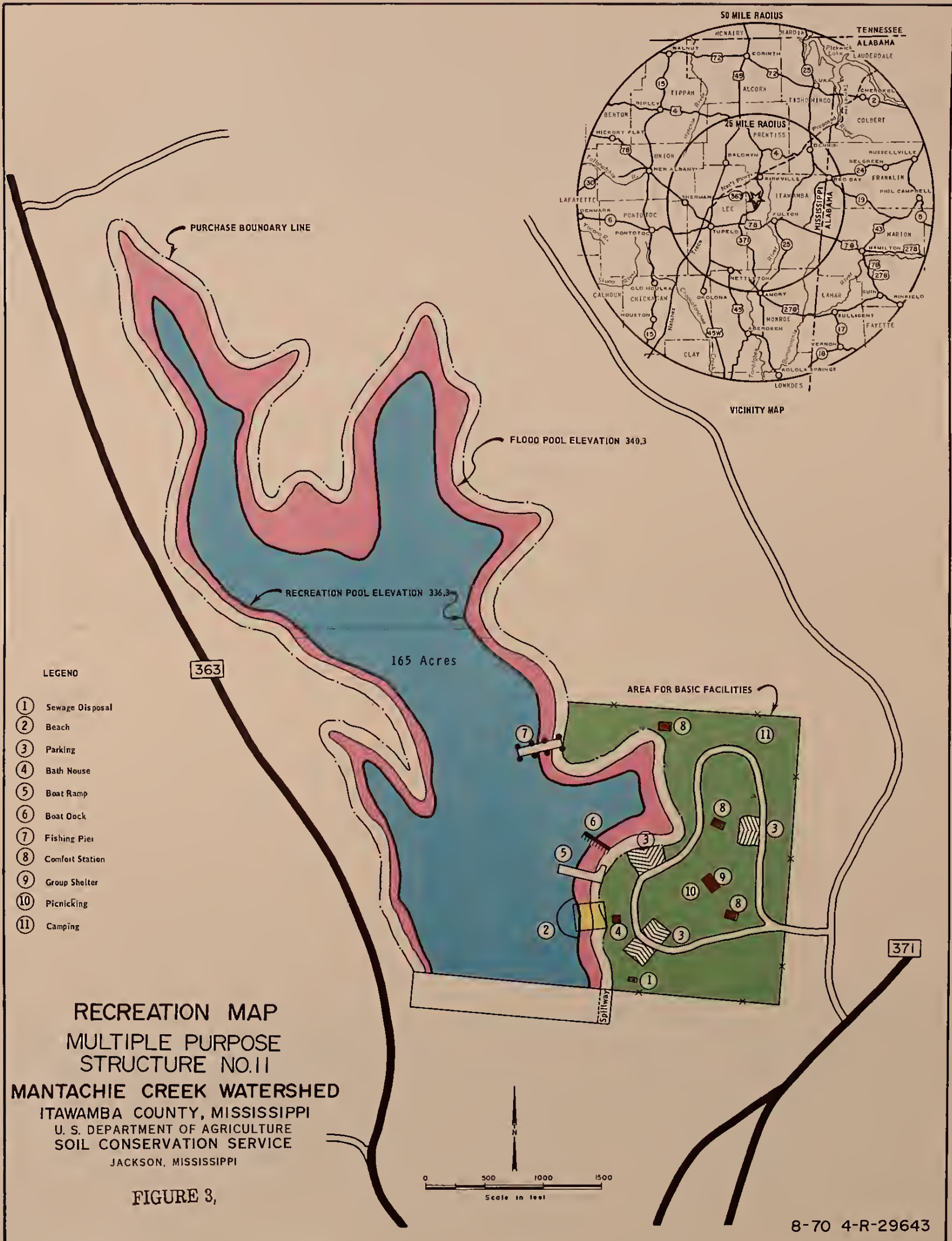


Figure 2.





LEGEND

- ① Sewage Disposal
- ② Beach
- ③ Parking
- ④ Bath House
- ⑤ Boat Ramp
- ⑥ Boat Dock
- ⑦ Fishing Pier
- ⑧ Comfort Station
- ⑨ Group Shelter
- ⑩ Picnicking
- ⑪ Camping

RECREATION MAP
 MULTIPLE PURPOSE
 STRUCTURE NO.11
 MANTACHIE CREEK WATERSHED
 ITAWAMBA COUNTY, MISSISSIPPI
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 JACKSON, MISSISSIPPI

FIGURE 3,



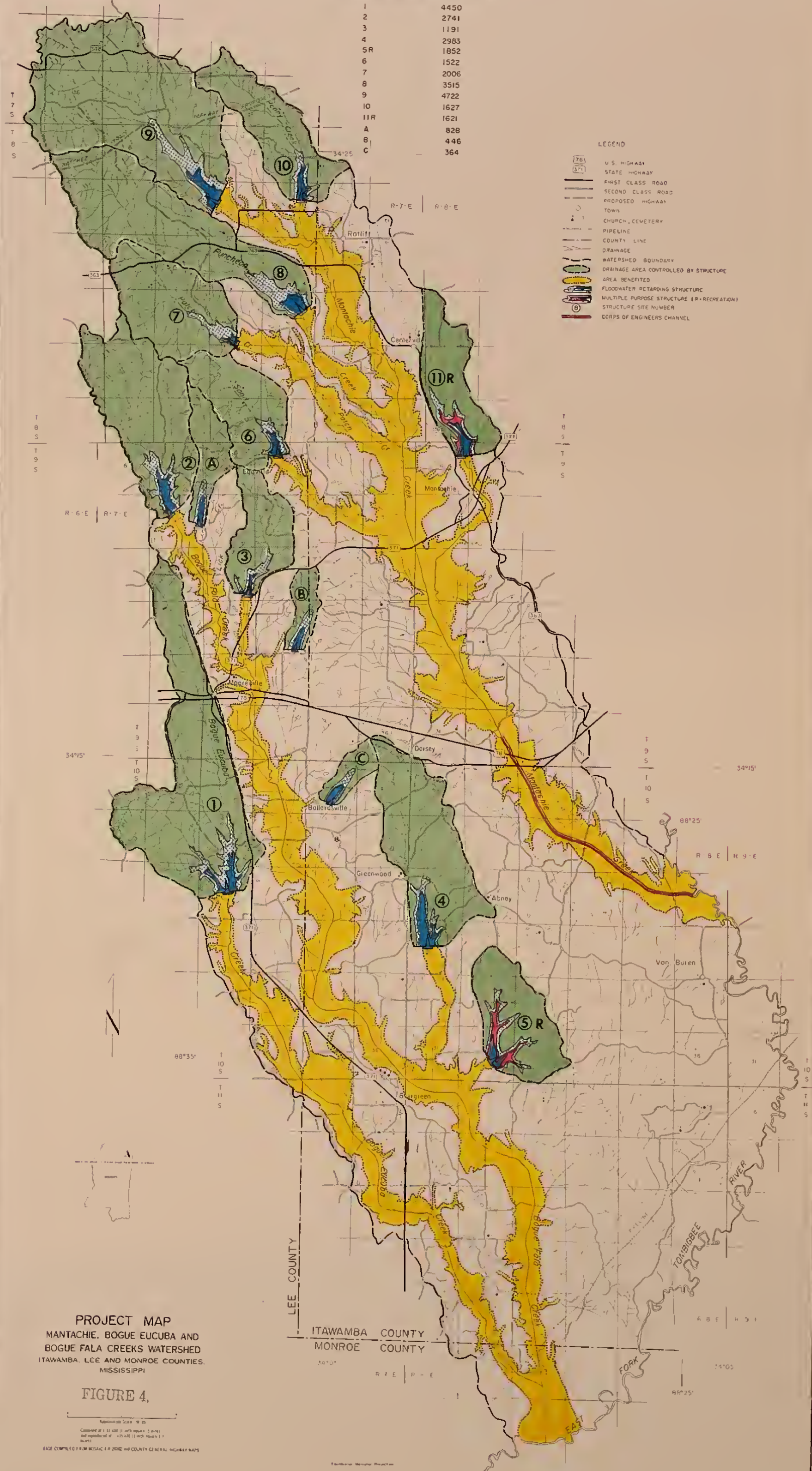
8-70 4-R-29643



Site No	Acres
1	4450
2	2741
3	1191
4	2983
5R	1852
6	1522
7	2006
8	3515
9	4722
10	1627
11R	1621
A	828
B	446
C	364

LEGEND

- U.S. HIGHWAY
- STATE HIGHWAY
- FIRST CLASS ROAD
- SECOND CLASS ROAD
- PROPOSED HIGHWAY
- TOWN
- CHURCH, CEMETERY
- PIPELINE
- COUNTY LINE
- DRAINAGE
- WATERSHED BOUNDARY
- DRAINAGE AREA CONTROLLED BY STRUCTURE
- AREA BENEFITED
- FLOODWATER RETARDING STRUCTURE
- MULTIPLE PURPOSE STRUCTURE (R-RECREATION)
- STRUCTURE SITE NUMBER
- CORPS OF ENGINEERS CHANNEL



PROJECT MAP
MANTACHIE, BOGUE EUCUBA AND
BOGUE FALA CREEKS WATERSHED
ITAWAMBA, LEE AND MONROE COUNTIES,
MISSISSIPPI

FIGURE 4,

Natural Scale 1" = 10'
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and reproduced by J. J. Galt (1954) and J. R. Galt (1954)

BASE COMPILED FROM MISSISSIPPI COUNTY GENERAL HIGHWAY MAPS



