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WATERSHED

PLAN

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AND

ENVIRONMENTAL IMPACT STATEMENT

FOR

WATERSHED PROTECTION AND RECREATION

**SOUTHEAST CHOCTAWHATCHEE  
RIVER**



DALE, GENEVA AND HOUSTON COUNTIES  
ALADAMA

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WATERSHED PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED

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Dale, Geneva, and Houston Counties, Alabama

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

Prepared by

Dale County Soil and Water Conservation District

Dale County Commission

Geneva County Soil and Water Conservation District

Geneva County Commission .

Houston County Soil and Water Conservation District

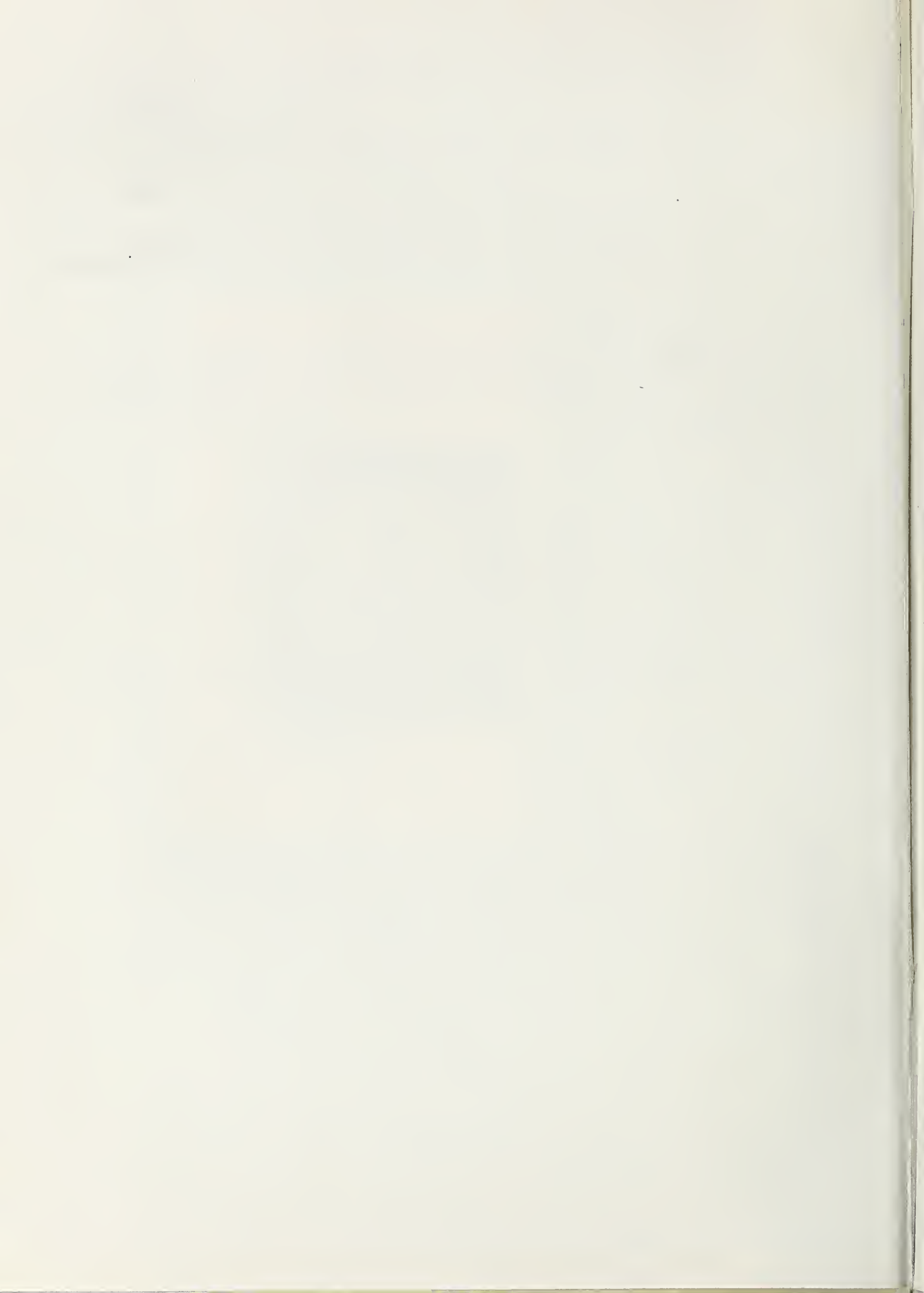
Houston County Commission

Alabama Department of Conservation and Natural Resources

U. S. Department of Agriculture, Soil Conservation Service

U. S. Department of Agriculture, Forest Service

April 1980



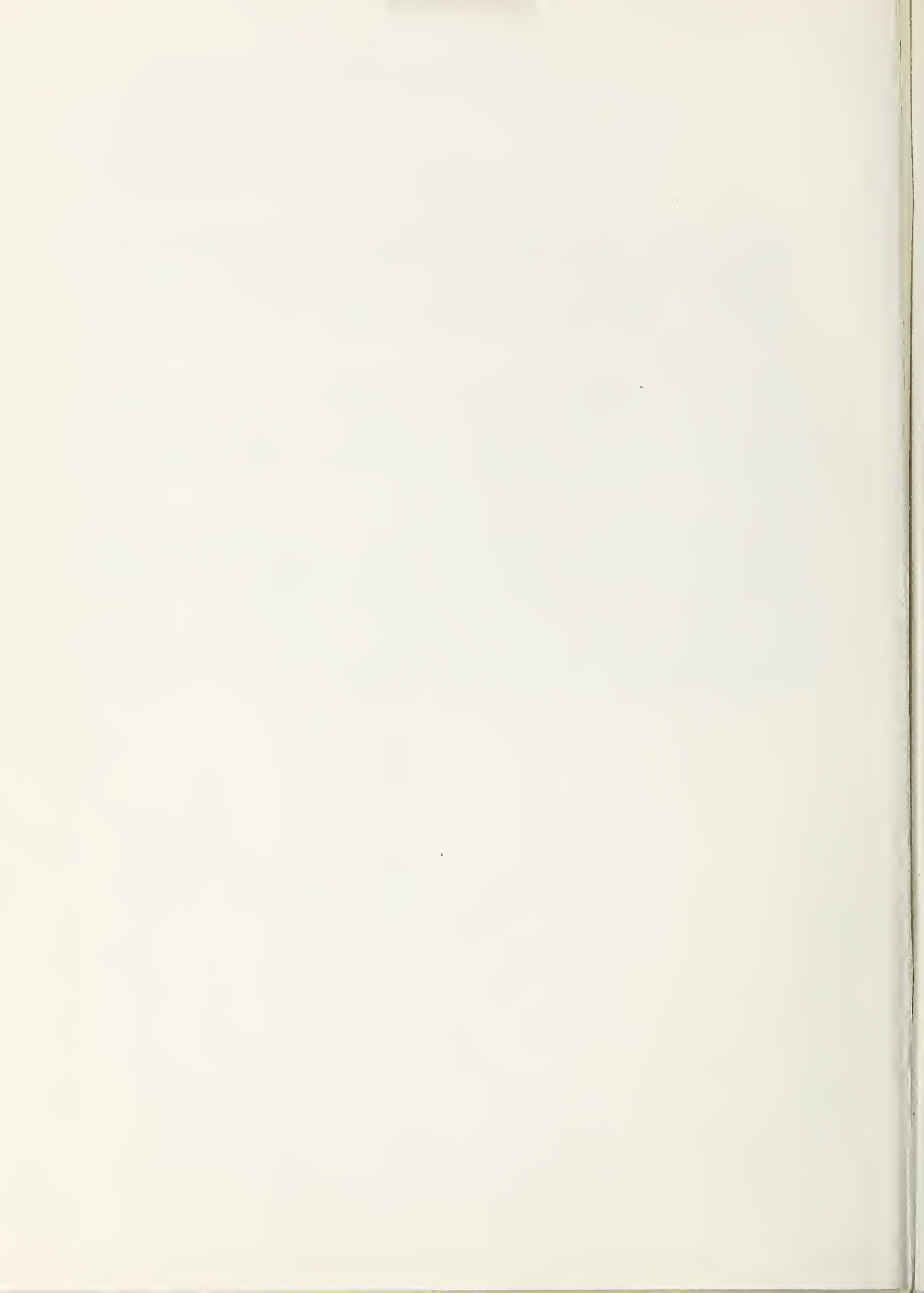
PREFACE

Enclosed are two documents--the Watershed Plan and Environmental Impact Statement for Southeast Choctawhatchee River Watershed, Alabama. All information and data, except as otherwise noted, were collected during watershed investigations by the Soil Conservation Service and U. S. Forest Service, U.S.D.A.

The Watershed Plan has been developed by the local sponsors with the assistance of the U. S. Department of Agriculture and is the basis for the authorization of federal assistance to implement the proposed project in accordance with the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 USC 1001-1008).

The Environmental Impact Statement has been prepared by the U. S. Department of Agriculture in compliance with Section 102(2)(C) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq.).

The Environmental Impact Statement contains the detailed information on project area, planned project, problems, impacts, alternatives, etc.





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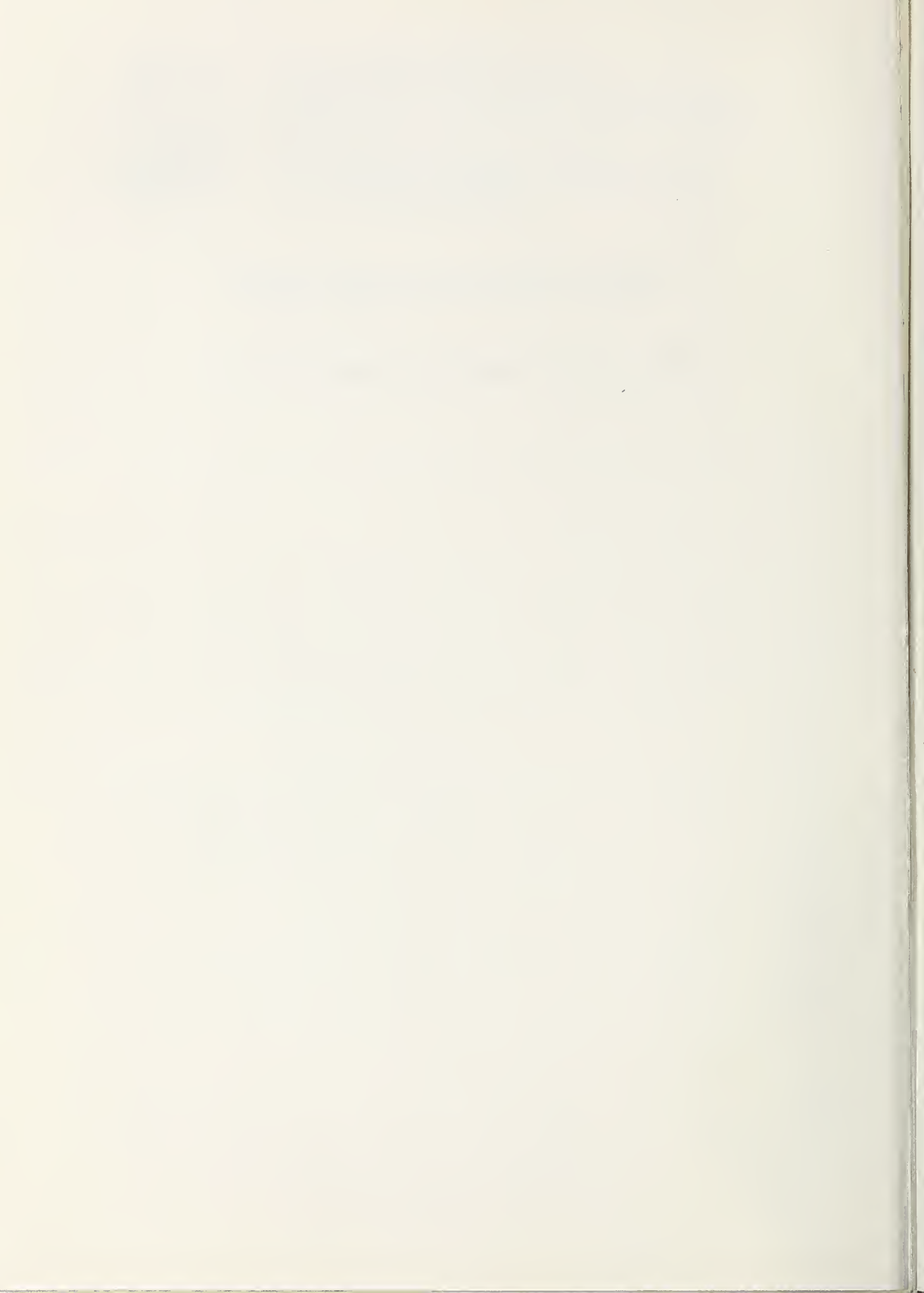
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WATERSHED PLAN

SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED

Dale, Geneva, and Houston Counties, Alabama



# SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED PLAN

Dale, Geneva, and Houston Counties, Alabama

## SUMMARY AND DESCRIPTION

Southeast Choctawhatchee River Watershed is located in parts of Dale, Geneva, and Houston Counties in southeast Alabama and has a total drainage area of about 170,000 acres. It is about 100 miles north of Panama City, Florida, and 100 miles southeast of Montgomery, Alabama.

This watershed plan was prepared by the Soil and Water Conservation Districts and the County Commissions of Dale, Geneva, and Houston Counties along with the Alabama Department of Conservation and Natural Resources. Technical assistance was provided by the Soil Conservation Service (SCS) and Forest Service (FS) of the U. S. Department of Agriculture.

The major problems in the watershed are soil erosion from gullies and cropland and a lack of adequate recreational facilities. Also, the movement of sediment downstream fills in the flood plain, reducing timber growth and wildlife habitat and increasing flood potential. The watershed project will reduce erosion, downstream sedimentation, and land voiding from the watershed by using conservation land treatment measures, critical area treatment, and grade stabilization structures.

Conservation practices applied during the installation period will result in 10,400 acres of cropland, 8,000 acres of pastureland, 3,900 acres of forest land, and 800 acres of other land being adequately protected. The land treatment program will result in an additional 5,500 acres of cropland, 2,400 acres of pastureland, and 400 acres of forest land being partially protected through the application of conservation practices. Critical area treatment will be accomplished on 1,192 areas occurring in fields and 357 areas along roadsides. About 300 acres of trees will be planted in the voided area of the Class II, III, and IV gullies as part of the land treatment program.

Structural measures include about 609 grade stabilization structures in conjunction with shaping and vegetation. A 780-acre recreation lake with associated facilities for boating, camping, swimming, picnicking and fishing, along with nature study trails and play areas will be constructed.

The project will be installed during a ten-year installation period at an estimated cost of \$32,551,300 with PL-566 cost of \$24,222,100 and "Other" cost of \$8,329,200 (see table 1). These costs include the costs of the going land treatment program.

The environmental impacts of the project area are reduction in land voiding and depreciation on 19,339 acres and over a 75 percent reduction in sediment delivered at the outlets of the watershed. Crop production will be maintained on 5,542 acres in the drainage area of the gullies. One of the most significant impacts will be to eliminate most of the drastic gully erosion. Stabilizing the gullies and installation of land treatment measures will result in lines and forms more harmonious to the natural landscape. The scenic quality of the land will be improved. The safety hazards of land users around the gullies will be reduced, if not eliminated. Sediment reduction on the flood plain will benefit about 6,300 acres on about 200 farms. Stabilizing about 609 gullies will directly benefit about 415 farms. Grade stabilization structures will therefore benefit about 615 farms and about 25,639 acres. Critical area treatment will benefit about 900 farms and about 17,175 acres.

The installation of the recreation lake will create an area of scenic beauty. Wetland types to be inundated include 178 acres of Type 1, 25 acres of Type 2, 5 acres of Type 3, 16 acres of Type 4, 8 acres of Type 5, 16 acres of Type 6, and 299 acres of Type 7. Inundation will convert the 477 acres to Type 5 wetlands. About one hundred and eighty acres of wetland within the pool area and 470 acres of wildlife habitat around the perimeter of the lake will be preserved as a mitigation measure. The lake will also provide a 780-acre resting area for migratory waterfowl.

The Soil and Water Conservation Districts and County Commissions of the three counties will be responsible for the operation and maintenance of the structural measures in their respective counties. Landowners and operators of farms on which land treatment measures are installed under agreements with the Soil and Water Conservation Districts will be responsible for maintaining the measures. Estimated average annual cost of operation and maintenance is \$243,600.

Estimated average annual benefits total \$2,094,800 with average annual costs estimated at \$1,721,400. The benefit-cost ratio is 1.2:1.0 (see table 6).



## PLANNED PROJECT

This section provides a brief summary of the planned project. The Planned Project Section in the attached EIS provides a more detailed description of the measures to be installed.

The plan as formulated proposes a program of accelerating the application of conservation measures, installing structural measures for flood prevention (land stabilization), and a public water-based recreation development to be accomplished over a ten-year period.

### LAND TREATMENT

In addition to the going program, the planned project will provide technical and financial assistance to landowners and land users throughout the watershed at an accelerated rate in an effort to get an additional 10,400 acres of cropland, 8,000 acres of pasture and hayland, 3,900 acres of forest land, and 800 acres of other lands adequately protected over the ten-year installation period. An additional 5,500 acres of cropland, 2,400 acres of pastureland, and 400 acres of forest land, will be partially protected through the application of conservation practices during the installation period. This technical assistance will be available from the Alabama Forestry Commission, in cooperation with the FS, and the SCS, through the Soil and Water Conservation Districts, in the development and revision of conservation plans, and the planning and application of individual conservation practices. Financial assistance will be made available to landowners and land users on a cost-sharing arrangement through PL-566 to treat about 1,549 areas which have a critical erosion problem which affects 15,500 acres dependent upon these areas for water disposal. This includes assistance for treating 1,192 areas in fields and 357 areas along roadsides. About 300 acres of trees will be planted in the Class II, III, and IV gullies as part of the land treatment program. Critically eroding areas are defined as those areas which usually cannot be stabilized by ordinary conservation treatment and management and, if left untreated, would cause severe erosion or sediment damage.

### FLOOD PREVENTION

Works of improvement for the purpose of flood prevention (land stabilization) consist of about 609 grade stabilization structures needed to sustain intensive land use and stop the deterioration of 19,339 acres of cropland, pastureland, and forest land, along with the resultant downstream sediment damages.

## PUBLIC WATER-BASED RECREATION

The public water-based recreation development consists of a single-purpose dam and lake along with associated recreational facilities. The dam, with a drainage area of 20.2 square miles, will create a reservoir with a capacity of 8,000 acre-feet and a surface area of 780 acres. The lake will have 18 miles of shoreline. Two areas, comprising 347 acres, will be developed for recreational use by installing facilities for camping, picnicking, swimming, fishing, etc. Support facilities, such as roads, sanitation, water, electrical, etc., will also be provided. The development will require the acquisition of approximately 1,569 acres in fee simple, of which about 650 acres will be preserved for fish and wildlife. Flowage easements will be required on about 436 acres.

## INSTALLATION COSTS - MONETARY

This section describes the cost of each item contained in table 1. Any major cost item not shown separately in table 1 is itemized by amount and purpose.

The installation costs for conservation land treatment measures on noncritical areas will be borne by the landowners and operators with assistance as may be available under other State and Federal funding programs. Technical assistance will be provided by the SCS and the Alabama Forestry Commission, operating through the Dale, Geneva, and Houston County Soil and Water Conservation Districts, and the FS.

PL-566 funds will be provided for accelerated technical assistance by the SCS and the FS for planning and application of needed critical area treatment and land treatment measures during the ten-year installation period. For critical area tree planting and critical areas in fields, PL-566 will also provide funds for shaping and for purchase of all needed materials. Through a cooperative agreement with land users, the Sponsors will prepare seedbeds and apply materials. For critical roadsides, PL-566 will provide funds for contracting the vegetative work. The County Commissions will serve as the contracting organization for their counties. The County Commissions will do the shaping and grading needed to prepare roadbank sites. For remedial treatment on all critical area work, PL-566 will provide funds for the purchase of all materials and the Sponsors will apply the materials and do all other necessary items of work.

The total installation cost of the structural measures includes costs for construction of grade stabilization structures, construction of a recreation lake, and construction of recreational facilities. The cost of associated structural measures (on-farm terracing) is also included.

The construction cost includes the engineer's estimate and a 20 percent allowance for contingencies on grade stabilization structures and 12 percent allowance on recreational development. The engineer's estimate was made by determining the amount or quantity of specific items that will be needed for construction of each individual structure. Such items include, but are not limited to, land clearing, embankment fill, excavation, concrete pipe, corrugated metal pipe, concrete, fencing, and vegetation. The unit cost for the specific items was based on actual cost of structural measures in similar areas modified to conditions found in this watershed.

The cost of engineering services is also included in the total installation cost. Engineering services include costs of engineers and other technicians for surveys, investigation, design and preparation of plans and specifications for structural measures including the vegetative work. The cost of engineering and architectural development of a master plan, designs, and specifications for the planned recreational facilities is also included.

Total land rights costs include \$738,200 for road and bridge alterations, \$10,500 for raising power lines, \$5,000 for removal of a farm pond, \$114,600 for easements on 4,017 acres where grade stabilization structures will be installed, and \$821,200 for fee simple acquisitions on 1,569 acres to install the recreation lake and facilities. The \$821,200 consists of the following: land acquisitions and easements - \$664,300; land appraisals - \$11,000; and surveys and legal fees - \$145,900. Flowage easements on 436 acres above that permanently required will be donated. These 436 acres are of marginal productivity; therefore, no additional costs will be incurred.

The costs for project administration include Sponsors' costs and PL-566 costs for contract administration, recordkeeping, construction inspections, etc.

For more detailed information on cost sharing and costs, see the Agreement Section and tables 1, 2, and 2A.

## ECONOMIC BENEFITS

Average annual benefits due to erosion damage reduction are estimated at \$1,423,700 (see table 5). These benefits will accrue to a total of 19,339 acres of cropland, pastureland, and forest land due to prevention of impaired land use and a reduction in land voiding and depreciation.

The greatest monetary benefit is evaluated for 5,542 acres of cropland in the drainage area of the gullies, which are dependent upon gully stabilization for a stable outlet from terrace systems. The project will enable farmers to maintain intensive cropping systems in these areas, preventing impaired land use. Without the project, land use will change from cropland to pastureland and forest. Average annual benefits are estimated at \$912,300.

A second benefit to cropland, pastureland, and forest land results from the reduction in permanent land damage. This benefit is based on annual physical losses for land voiding and depreciation. Average annual benefits are estimated at \$511,400 for the 19,339 acres.

Installation of the lake and associated recreational facilities will increase opportunities for water-based recreation by 186,600 annual visitor days. Average annual benefits for recreation are estimated at \$587,800 (see table 6).

Project installation will result in average annual employment benefits of \$83,300. An estimated 178 unskilled, 23 semiskilled, and 86 skilled jobs will be provided during the ten-year installation period. In addition, an estimated 22 unskilled and eight semiskilled permanent jobs will be created for project operation and maintenance.

The average annual cost of the structural measures (amortized cost plus annual operation, maintenance, and replacement cost) is \$1,555,200. The estimated average annual cost (amortized cost) of project administration is \$166,200. Average annual primary benefits are estimated at \$2,094,800. The ratio of average annual benefits (\$2,094,800) to the average annual cost (\$1,721,400) is 1.2:1.0 (see table 6).

Without the project, approximately 135,000 tons of sediment from the watershed reach Choctawhatchee Bay annually. With the project, this will be reduced to about 31,500 tons. This gives an average sediment reduction of 103,500 tons. The benefit attributed to sediment damage reduction should at least equal the cost

of sediment removal, estimated at \$176,200. However, no monetary benefit for sediment damage reduction is included in the benefits for project justification.

External economic benefits (secondary benefits) average \$2,331,200 annually and will result from increased income to wholesalers, processors, and suppliers in the immediate trade area. These benefits occur as a result of the increased agricultural production and local availability of recreational opportunities, all stemming from project installation. These benefits are not included in the benefits for project justification.

## INSTALLATION AND FINANCING

Landowners will establish the planned conservation land treatment measures on their land within the ten-year installation period in cooperation with the Dale, Geneva, and Houston County Soil and Water Conservation Districts. The Districts will provide technical assistance for the planning, application, and maintenance of land treatment measures. The SCS using PL-566 funds, will supplement the technical assistance provided under the going district program. This additional technical assistance will accelerate planning, and will expedite the application of conservation land treatment measures. The Alabama Forestry Commission, in cooperation with the FS, will provide technical assistance in the planning and application of forest land treatment measures.

The going land treatment measures will be voluntarily installed and financed by landowners and operators at their expense. Cost-sharing assistance under other programs, such as the Agricultural Conservation Program, as available may be used in applying conservation land treatment measures.

PL-566 will provide funds for cost sharing for critical area stabilization and roadside stabilization. Critical area stabilization and roadside stabilization will be installed under a division of work arrangement. The SCS and FS will provide technical assistance for planning and application of treatment measures. For critical areas in fields, SCS will also provide funds for shaping and for purchase of all needed materials. Through a cooperative agreement with land users, the County Commissions will prepare seedbeds and apply materials. The County Commissions will also serve as the contracting organization for their counties. For critical roadsides, SCS will provide funds for contracting the vegetative work. The County Commissions will do the shaping and grading needed to prepare roadbank sites. For remedial treatment on all critical area work, SCS will purchase materials and the County Commissions will apply the materials and do all other necessary items of work. Critical area tree planting will be accomplished with the FS providing funds for shaping and for purchase of all needed materials. The County Commissions will be responsible for preparation of seedbeds and application of materials. The share of work SCS is to perform will not exceed the cost sharing rates for such practices applicable under other cost sharing programs.

Federal assistance for installing the works of improvement on nonfederal land, as described in this watershed 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). This assistance is contingent on the appropriation of funds for this purpose and the sponsoring local organizations meeting their necessary prior obligations.

Structural measures will be installed after all necessary land rights and permits have been acquired and the project agreement and operation and maintenance agreements have been signed. Structural installation is also contingent upon the availability of PL-566 funds and funds from the local sponsoring organizations. Land treatment, critical area treatment, and grade stabilization structures in the drainage area of the lake must be 75 percent completed prior to or concurrently with construction of the recreation lake and facilities.

The Dale, Geneva, and Houston County Commissions will acquire all necessary land rights for installation of critical area treatment and structural measures in their respective counties. Each county commission will also arrange for the modification of utility lines, roads, etc., needed to install the structural measures within their respective counties. Powers granted by the State, including the power of eminent domain, will be used if necessary to obtain the necessary land rights. All necessary land rights will be acquired before PL-566 funds are made available.

The Dale, Geneva, and Houston County Commissions will work with the SCS and serve as the contracting local organizations during project installation for that portion of the project which is to be installed within their respective counties. The SCS will prepare plans, specifications and cost estimates; provide construction inspection; and cooperate in the final inspection of the structural measures. Final layout and design of the recreational facilities will be prepared through contractual arrangements with an architectural and engineering firm.

Funds for procuring the local share of the cost for installation of structural measures in each county and for operation, maintenance, and replacement will be provided from existing local tax sources. PL-566 will finance all administrative costs, such as construction inspection, travel, etc., incurred by the government. The Sponsors will provide for administrative costs which they incur.

As required by Public Law 93-291, the SCS will notify the Secretary of the Interior if any archaeological materials are found during construction.

Prior to entering into agreements that obligate funds of the SCS, the Dale, Houston, and Geneva County Commissions will each develop a code of conduct governing the performance of its officers, employees, or agents in contracting with or expending PL-566 funds; and a financial management system for control, accountability, and disclosure of PL-566 funds received and for control and accountability for property and other assets purchased with PL-566 funds.



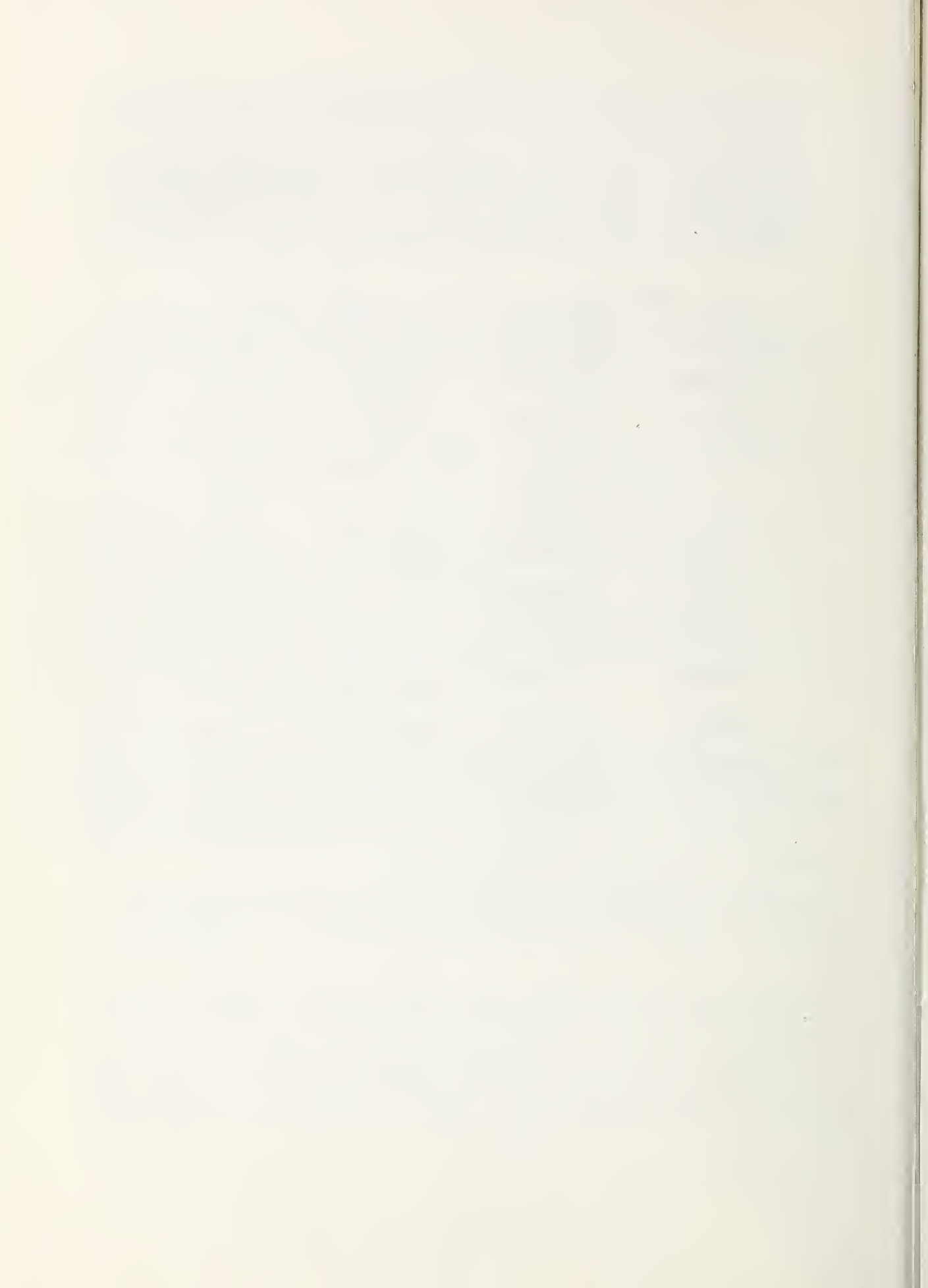
Program income earned during the grant period will be reported with Sponsors' request for advance or reimbursement from the SCS.

Structural measures will be installed during a ten-year installation period. The lake and recreational facilities will be installed during the first three years of the installation period. The total estimated costs to be obligated during the ten-year installation period are as follows:

Year	PL-566 Funds		Other Funds		Total
	Land Treatment	Structural Measures	Land* Treatment	Structural Measures	
1	\$658,400	\$2,360,200	\$524,800	\$870,300	\$4,413,700
2	658,400	2,360,100	524,800	870,300	4,413,600
3	658,400	2,360,100	524,800	870,200	4,398,500
4	658,400	1,508,300	524,800	67,300	2,758,800
5	658,400	1,508,300	524,800	67,200	2,758,700
6	658,400	1,508,300	524,800	67,200	2,758,700
7	658,300	1,508,300	524,800	67,200	2,758,600
8	658,300	1,508,300	524,800	67,200	2,758,600
9	658,300	1,508,300	524,800	67,200	2,758,600
10	658,300	1,508,300	524,700	67,200	2,758,500
TOTAL	\$6,583,600	\$17,638,500**	\$5,247,900*	\$3,081,300**	\$32,551,300*

\* Includes the going land treatment program.

\*\* Includes administration of structural measure cost.



## OPERATION, MAINTENANCE, AND REPLACEMENT

### LAND TREATMENT

Land treatment measures installed by land user funds and through going programs will be operated and maintained by landowners and operators of each county under cooperative agreements with the Dale, Geneva, and Houston County Soil and Water Conservation Districts.

The Alabama Forestry Commission, in cooperation with the FS, will furnish technical assistance necessary for operating and maintaining the forest land treatment measures under the existing cooperative forest management program. The Alabama Forestry Commission will continue to furnish fire protection under the cooperative forest fire control program.

### LAND TREATMENT ON CRITICAL AREAS

The county commissions of Dale, Geneva, and Houston Counties will be responsible for operation and maintenance of critical areas that occur in their respective counties. The actual performance of the work will be accomplished by the individual landowners through agreements executed between their respective commissions and the individual landowner. After treatment and stabilization, critical areas will be restricted to continuous vegetative cover with limited use consistent with sound technical standards. Critical area treatment on roadbanks will be maintained by the responsible commission in each county. Operation and maintenance work normally required on critical areas is numerous; however, the most common practices include liming, fertilizing, mowing, reshaping rills, reseeding, and the removal of sediment.

### STRUCTURAL MEASURES

The structural measures include the Bear Creek Lake, recreational facilities, and about 609 grade stabilization structures. Operation and Maintenance Agreements will be signed by the county commissions of Dale, Geneva, and Houston Counties and the SCS prior to the start of project installation in each county. Specific details on procedures in line with recognized assignments of responsibility for the operation, maintenance and necessary replacement of all structural works of improvement in each county will be set forth, and will also include specific provision for retention and disposal of property acquired or improved with PL-566 financial assistance. The SCS will accept these signed agreements as evidence that the project will be properly operated and main-

tained during the life of the project. These responsible sponsors will use as a guide the Soil Conservation Service Operation and Maintenance Handbook for Watersheds in Alabama in developing a maintenance program.

The county commissions will be responsible for and promptly perform, or have performed, without cost to the SCS, all maintenance of the structural measures located in their respective counties as determined to be needed by either the county commissions or the SCS immediately following completion of the structures by the contractor. They will also assure that the preservation area for fish and wildlife will not be altered by cultural practices. Funds for Operation, Maintenance, and Replacement (OM&R) will be provided from the counties' general tax revenue and user fees.

Additional work is defined as work needed on a completed measure to assure establishment of adequate vegetation. The State Conservationist may authorize cost sharing for additional work on vegetative applications, after the Sponsors have assumed responsibility for operation and maintenance, if the original vegetative application fails to establish through no fault of the Sponsors or contractor. Cost sharing for additional work shall be pursuant to a new project agreement. The PL-566 cost share rate shall not exceed the rate authorized for the original vegetative application.

Average annual cost for OM&R for the structural measures is estimated to be as follows:

	Operation & Maintenance	Replacement	Total
Grade Stabilization Structures	\$79,100	\$200	\$79,300
Associated Structural Measures (On-farm Terracing)	15,000	-	15,000
Bear Creek Lake Structure	1,100	-	1,100
Recreational Facilities	140,000	8,200	148,200
GRAND TOTAL			\$243,600

Replacement costs include the replacing of recreational facilities and the replacement of corrugated metal pipes used for gully stabilization that have deteriorated. Operation and maintenance work will normally include such action as removing rubbish from the parks, repairing and replacing the recreational facilities, and maintaining adequate vegetative cover to prevent site deterioration. Vegetative cover maintenance will include mowing, fertilization, periodic irrigation during drought periods, and selective sodding, sprigging, or seeding in heavy-use areas. A user fee will be charged by the Sponsors to help offset operation, maintenance, and replacement costs of the recreational facilities.

The county commissions, or a designated representative from each county, and the SCS will make a joint inspection in the respective counties of each structural measure at least annually and also after any severe flood or other unusual condition that might adversely affect the structural measures. A report will be prepared on each inspection summarizing the maintenance work needed, showing estimated cost, and indicating a work schedule. Followup reports will be submitted to the State Conservationist of the SCS when the maintenance has been completed. These joint annual inspections are to continue for three years following installation of each structure and at least once every two years following the initial three-year period. In addition, a detailed engineering inspection will be conducted at least once every five years following construction.

The Geneva and Houston County Commissions will work with the State Health Department on a monitoring program for Bear Creek Lake to assure water quality is maintained for the proposed recreational activities.

A system for monitoring will be developed to assure the continuing well-being of wetlands, particularly those above proposed Ray Bass Park Road. The Environmental Protection Agency (EPA) proposes to provide infrared aerial photography as a baseline prior to placement of the proposed dam. An interagency task force of State and Federal agencies will develop criteria that assay the wetlands being monitored. EPA will provide, within fiscal constraints, additional infrared photography on a three-to-five-year interval. The Operation and Maintenance Agreement, which will be signed by the SCS and the Sponsors prior to any construction, will reflect the above considerations and provisions will allow water level fluctuations downward if the task force deems necessary.

The three county commissions will be responsible for maintenance of vegetation associated with structural measures in their respective counties after the initial vegetation work is adequately completed and accepted from the contractor by the SCS; but, no later than three years after the initial vegetation is installed. Maintenance on the structural measures will consist of such items as controlling undesirable vegetation by mowing, handcutting, or using herbicides; painting metal parts; shaping and revegetating eroded areas; removing debris from trash racks, spillways and the lake outlet channel; fertilizing, and reseeding bare areas. Mowing operations will be accomplished with farm-type tractors and rotary mowers. The use of herbicides will be in accordance with State and Federal regulations.

The Operation and Maintenance agreement between the three county commissions and the SCS will be executed prior to the signing of

land rights, relocation, or project agreement. It will list in detail the factors pertinent to the measures to be constructed and will cover such specifics as source of funds, user fees, method of providing maintenance, annual maintenance inspection, and the responsibility for providing these funds and services.

AGREEMENT

between the following local organizations

DALE COUNTY SOIL AND WATER CONSERVATION DISTRICT

DALE COUNTY COMMISSION

GENEVA COUNTY SOIL AND WATER CONSERVATION DISTRICT

GENEVA COUNTY COMMISSION

HOUSTON COUNTY SOIL AND WATER CONSERVATION DISTRICT

HOUSTON COUNTY COMMISSION

ALABAMA DEPARTMENT OF CONSERVATION  
AND NATURAL RESOURCES

(Referred to herein as Sponsors)

STATE OF ALABAMA

and the

SOIL CONSERVATION SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE

(Referred to herein as SCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by local organizations for assistance in preparing a plan for works of improvement for the Southeast Choctawhatchee River Watershed, State of Alabama, under the authority of the Watershed Protection and Flood Prevention Act (16 USC 1001-1008); and

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

Whereas, there has been developed through the cooperative efforts of the Sponsors and SCS this plan for works of improvement for the Southeast Choctawhatchee River Watershed, State of Alabama:

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

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

<u>Works of Improvement</u>	<u>Sponsors</u> (percent)	<u>SCS</u> (percent)	<u>Estimated Land Rights Costs</u> (dollars)
Bear Creek Lake, Structure & Recreational Facilities:			
Payment to land-owners for about 1569 acres	50	50	664,300
Land Appraisal Fees	50	50	11,000
Cost of Alteration or Modification of Improvements	50	50	753,700
Legal Fees, Survey Costs, Flowage Easements and Other	100	0	145,900
Grade Stabilization Structures	100	0	114,600

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

Approximately 650 acres will be preserved in its present state and will remain absolutely unaltered by cultural practices to mitigate for the clearing and inundation of approximately 600 acres. The 600 acres lie within the proposed lake between the dam and proposed Ray Bass Park Road. The 650 acres consist of 470 acres in the variable width buffer zone (greater than or equal to 100 feet) located between the proposed lake level and the fee simple take line, and 180 acres in the lake area above the Ray Bass Park. Acreage within the two park boundaries (Ray Bass and Houston County) will not be used in these calculations.



2. The Sponsors assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide 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 Act 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 Sponsors and the SCS as follows:

<u>Item</u>	<u>Sponsors (Percent)</u>	<u>SCS (Percent)</u>	<u>Estimated Relocation Payment Costs (Dollars)</u>
Relocation Payments	23.8	76.2	0.0 <u>1/</u>

3. The Sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.
4. The percentages of construction costs to be paid by the Sponsors and by SCS are as follows:

<u>Works Of Improvement</u>	<u>Sponsors (Percent)</u>	<u>SCS (Percent)</u>	<u>Estimated Construction Cost (Dollars)</u>
Grade Stabilization Structures	0	100	12,363,200
Associated Structural Measures (On-farm Terracing)	100	0	487,800
Bear Creek Lake Structure	50	50	1,850,000
Recreational Facilities	50	50	1,042,800

- 1/ Investigation has disclosed that under present conditions, the project measures will not result in 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.

5. The percentages of critical area treatment to be paid by the Sponsors and by SCS will not exceed the rate of going program.

Treatment of critical areas included in the land treatment program will be by division of work. The SCS and the Sponsors will perform or cause to be performed the following work items to achieve the initial stabilization:

<u>Works Of Improvement</u>	<u>Sponsors</u>	<u>SCS</u>
Critical Area Treatment Tree Planting	Application of materials	Site preparation and materials
Fields	Preparation of seedbeds and application of materials	Materials
Roadside Stabilization	Shaping and grading needed to prepare roadside sites	Funds for contracting the vegetative work and for materials

Additional work required to achieve complete stabilization will be installed under the following arrangements:

<u>Works Of Improvement</u>	<u>Sponsors</u>	<u>SCS</u>
Remedial Work	Application of materials and site preparation	Materials

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

<u>Works Of Improvement</u>	<u>Sponsors (Percent)</u>	<u>SCS (Percent)</u>	<u>Estimated Engineering Cost (Dollars)</u>
Grade Stabilization Structures	0	100	741,800
Bear Creek Lake Structure	0	100	111,000
Recreational Facilities	50	50	104,200

7. The Sponsors and SCS will each bear the costs of Project Administration which it incurs, estimated to be \$120,000 and \$2,209,500 respectively.
8. The Sponsors will obtain agreements from owners of not less than 50 percent of the land above the recreation lake that they will carry out conservation farm or ranch plans on their land. Not less than 75 percent of the effective land treatment measures must be installed, or their installation provided for, on those sediment source areas which, if uncontrolled, would require a material increase in the cost of construction, operation, or maintenance of the lake.
9. The Sponsors will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed plan.
10. The Sponsors will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
11. The Sponsors will be responsible for the operation, maintenance, and replacement of the 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 plan 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 SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
14. A separate agreement will be entered into between SCS and Sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
15. This plan may be amended or revised only by mutual agreement of the parties hereto except that SCS may deauthorize funding at any time it determines that the Sponsors have failed to comply with the conditions of this agreement. In this case, SCS shall promptly

notify the Sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by SCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized.

16. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
17. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15.1-15.12), 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.

Dale County Commission

By Frank Duce

P. O. Box 246

Title Chairman

Ozark, Alabama 36360  
Address Zip Code

Date May 14, 1980

The signing of this plan was authorized by a resolution of the governing body of the Dale County Commission adopted at a meeting held on February 12, 1979

Sheila W. Willis  
(Secretary) Dale County Commission

P. O. Box 246  
Ozark, Alabama 36360  
Address Zip Code

Date May 14, 1980

Dale County Soil and Water Conservation District

By Jahunie Byrd

Madison City  
Box 89 36550  
Address Zip Code

Title Superior  
Date 5-13-80

The signing of this plan was authorized by a resolution of the governing body of the Dale County Soil and Water Conservation District adopted at a meeting held on January 24, 1979

Ralph Duce  
(Secretary) Dale County Soil and Water Conservation District

302 Painter Ave.  
Ozark, Al. 36360  
Address Zip Code

Date May 14, 1980

Geneva County Commission

By W B Wise

P.O. Box 430

Title Chairman

Geneva, Al 36340  
Address Zip Code

Date 5-19-80

The signing of this plan was authorized by a resolution of the governing body of the Geneva County Commission adopted at a meeting held on 1-22-80

Ellen Lape  
(Secretary) Geneva County  
Commission

P.O. Box 430  
Geneva, Al 36340  
Address Zip Code

Date 5-20-80

Geneva County Soil and Water Conservation District

By A B Kistner

P.O. Box 669

Title Chairman

Geneva, Al 36340  
Address Zip Code

Date May 13, 1980

The signing of this plan was authorized by a resolution of the governing body of the Geneva County Soil and Water Conservation District adopted at a meeting held on May 7, 1980

Joyce Wood  
(Secretary) Geneva County Soil and  
Water Conservation District

Geneva, Al 36340  
Address Zip Code

Date May 13, 1980

Houston County Commission

By Charles Wheddon

Box 1124

Title Chairman

Dothan, Al 36302  
Address Zip Code

Date May 13, 1980

The signing of this plan was authorized by a resolution of the governing body of the Houston County Commission adopted at a meeting held on January 22, 1979

Diane D. Edgar  
(Secretary) Houston County Commission

1818 Fairfield Circle  
Dothan, Al 36303  
Address Zip Code

Date May 13, 1980

Houston County Soil and Water Conservation District

By Ol Juey

Webb, Al 36376  
Address Zip Code

Title Chairman  
Date 5-13-80

The signing of this plan was authorized by a resolution of the governing body of the Houston County Soil and Water Conservation District adopted at a meeting held on \_\_\_\_\_

A. A. Middleton  
(Secretary) Houston County Soil and Water Conservation District

Rt. 2 Dothan, Al 36301  
Address Zip Code

Date 5/13/80

Alabama Department of  
Conservation & Natural Resources

By

Cowhill

Title

Asst Chief of Fish

Address

Montgomery 36130

Zip Code

Date

May 13, 1980

The signing of this plan was authorized by a resolution of the governing body of the Alabama Department of Conservation and Natural Resources adopted at a meeting held on \_\_\_\_\_

(Commissioner) Alabama Department  
of Conservation and Natural  
Resources

Address

Zip Code

Date \_\_\_\_\_

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

Soil Conservation Service  
United States Department of Agriculture

Approved by:

\_\_\_\_\_  
W. B. Lingle  
State Conservationist.

\_\_\_\_\_  
Date



TABLE 1 - ESTIMATED INSTALLATION COST  
Southeast Choctawhatchee River Watershed, Alabama

Installation Cost Item	NUMBER		ESTIMATED COST (DOLLARS) 1/						TOTAL		
			PL-566 Funds			Other					
			Unit	Adequately Protected	Nonfederal Land	SCS 2/	FS 2/	Total		SCS 2/	FS 2/
<b>LAND TREATMENT - GOING PROGRAM</b>											
Land Areas											
Cropland	ac.	2,600	1,400				228,400			228,400	
Pastureland (Existing Cropland)	ac.	2,000	600				363,000			363,000	
Forest Land	ac.	3,900	100				47,000	47,000		47,000	
Other Land	ac.	200	---				5,600			5,600	
Technical Assistance	XXX	XXX	XXX				118,000	5,000		123,000	
<b>SUBTOTAL</b>							<b>715,000</b>	<b>52,000</b>		<b>767,000</b>	
<b>LAND TREATMENT - ACCELERATED</b>											
Land Areas											
Cropland	ac.	10,400	5,500				913,600			913,600	
Pastureland (Existing Cropland)	ac.	8,000	2,400				1,451,800			1,451,800	
Forest Land	ac.	3,900	400				47,000	47,000		47,000	
Other Land	ac.	800	---				22,400			22,400	
Critical Area Treatment											
Tree Planting	ac.		300					7,300		7,300	
Fields	no.		1,192				4,661,600			1,553,900	
Roadside Stabilization	no.		357				1,424,600			474,900	
Technical Assistance	XXX		XXX				428,400 3/	40,000		468,400	
<b>SUBTOTAL</b>							<b>6,514,600</b>	<b>69,000</b>		<b>6,583,600</b>	
<b>TOTAL LAND TREATMENT</b>	XXX		XXX				<b>6,514,600</b>	<b>69,000</b>		<b>6,583,600</b>	
							<b>5,131,600</b>	<b>116,300</b>		<b>5,247,900</b>	
											<b>11,831,500</b>

April 1980



TABLE 1 - ESTIMATED INSTALLATION COST (CONT'D)  
 Southeast Choctawhatchee River Watershed, Alabama

Installation Cost Item	NUMBER		ESTIMATED COST (DOLLARS) 1/						TOTAL
			PL-566 Funds			Other			
			Unit	Nonfederal Land	SCS 2/	FS 2/	Total	SCS 2/	
<b>STRUCTURAL MEASURES</b>									
Grade Stabilization Structures	No	609	13,105,000		13,105,000	114,600		114,600	13,219,600
Associated Structural Measures (On-farm Terracing)	Ac.	5,542				487,800		487,800	487,800
Bear Creek Lake Structure	No	1	1,662,500		1,662,500	1,665,100		1,665,100	3,327,600
Recreational Facilities	No	2	661,500		661,500	693,800		693,800	1,355,300
<b>SUBTOTAL STRUCTURAL MEASURES</b>			15,429,000		15,429,000	2,961,300		2,961,300	18,390,300
<b>PROJECT ADMINISTRATION</b>									
Construction Inspection			1,380,900		1,380,900	70,000		70,000	1,450,900
Other			828,600		828,600	50,000		50,000	878,600
<b>SUBTOTAL - PROJECT ADMINISTRATION FOR STRUCTURAL MEASURES</b>			2,209,500		2,209,500	120,000		120,000	2,329,500
<b>TOTAL PROJECT COSTS</b>			24,153,100	69,000	24,222,100	7,497,900	64,300	7,562,200	31,784,300
<b>TOTAL ALL COSTS</b>			24,153,100	69,000	24,222,100	8,212,900	116,300	8,329,200	32,551,300

- 1/ Price base 1979.
- 2/ Federal agency responsible for assisting in installation of works of improvement.
- 3/ Includes \$20,400 for assistance to install associated structural measures (on-farm terracing).
- 4/ Excludes Land Treatment - Going Program.

April 1980



TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Southeast Choctawhatchee River Watershed, Alabama

Land Treatment Measures	Unit	Applied to Date	Total Cost
Conservation Cropping System	Ac.	23,522	\$705,660
Contour Farming	Ac.	22,648	90,592
Crop Residue Use	Ac.	25,262	50,524
Drainage Field Ditches	Ft.	10,190	4,076
Drainage Mains and Laterals	Ft.	18,235	12,765
Field Border	Ft.	66,236	6,624
Grassed Waterways and Outlets	Ac.	263	105,200
Land Smoothing	Ac.	3,829	114,870
Ponds	No.	99	396,000
Pasture and Hayland Management	Ac.	14,120	395,360
Pasture and Hayland Planting	Ac.	26,684	2,668,400
Submerged Drains	Ft.	14,027	28,054
Terracing	Ft.	7,907,726	395,386
Tree Planting	Ac.	1,200	30,000
Wildlife Upland Habitat Management	Ac.	420	23,100
Wildlife Wetland Habitat Management	Ac.	300	12,000
Woodland Improvement	Ac.	854	21,350
Woodland Improved Harvest	Ac.	8,237	39,538
<b>TOTAL</b>			<b>\$5,099,499</b>

April 1980



TABLE 2 - ESTIMATED COST DISTRIBUTION

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Item	Installation Cost-PL-566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engi- neering	Land Rights	Total PL-566	Construction	Engi- neering	Land Rights	Total Other	
<b>STRUCTURAL MEASURES</b>									
Grade Stabilization Structures:									
Class II	7,648,200	458,900		8,107,100			80,700 2/	80,700	8,187,800
Class III	2,493,500	149,600		2,643,100			14,900 3/	14,900	2,658,000
Class IV	2,221,500	133,300		2,354,800			19,000 4/	19,000	2,373,800
Associated Structural Measures (On-farm Terracing)					487,800			487,800	487,800
Bear Creek Lake									
Structure	925,000	111,000	626,500 5/	1,662,500	925,000		740,100 6/	1,665,100	3,327,600
Recreational Facilities	521,400	52,100 7/	88,000 8/	661,500	521,400	52,100 7/	120,300 9/	693,800	1,355,300
SUBTOTAL	13,809,600	904,900	714,500	15,429,000	1,934,200	52,100	975,000	2,961,300	18,390,300
PROJECT ADMINISTRATION				2,209,500				120,000	2,329,500
GRAND TOTAL				17,638,500				3,081,300	20,719,800

1/ Price base 1979.

2/ Includes \$32,300 for survey, legal fees, and other costs.

3/ Includes \$3,900 for survey, legal fees, and other costs.

4/ Includes \$3,400 for survey, legal fees, and other costs.

5/ Includes \$4,200 for appraisal fees, \$369,100 for altering 5 county roads, \$5,250 for raising a powerline, and \$2,500 for removal of farm pond.

6/ Includes \$369,100 for altering 5 county roads, \$5,250 for raising powerline, \$2,500 for removal of farm pond, and \$113,600 for survey, legal fees, and other costs and \$4,200 for land appraisal fees.

7/ Engineering services contract costs to be borne: \$52,100 by PL-566 funds and \$52,100 by other funds.

8/ Includes \$1,200 for appraisal fees.

9/ Includes \$32,300 for survey, legal fees, and other costs and \$1,200 for appraisal fees.

April 1980





TABLE 2A - RECREATIONAL FACILITIES

ESTIMATED CONSTRUCTION COSTS

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Item	Number	Estimated Unit Cost	Total Construction Cost
<b>HOUSTON COUNTY PARK</b>			
<u>Roads and Parking</u>			
double-lane paving	4,000'	\$13/L.F.	\$52,000
single-lane paving	5,000'	\$9/L.F.	45,000
curbing around parking	3,000'	\$5/L.F.	15,000
car/trailer spaces	160	\$400/Unit	64,000
car spaces	310	\$300/Unit	93,000
marking for parking	8,000'	\$.10/L.F.	800
road pipe, 18" diameter	4	\$600	2,400
flumes	100 Cu.Yds.	\$150/Cu. Yd.	15,000
<b>SUBTOTAL</b>			<b>\$287,200</b>
<u>Water, Electrical and Sanitation System</u>			
water supply-well, pump and tank	2	\$6,000/ea	\$12,000
distribution- 2" pipe	8,000'	\$4/L.F.	32,000
underground electrical service	8,000'	\$2/L.F.	16,000
security lights	20	\$500/ea	10,000
comfort station with septic tank & field lines (4 toilets) and 4 lavatories	2	\$15,000/ea	30,000
comfort stations with showers, septic tank and field lines (4 toilets, 4 showers, & 4 lavatories)	2	\$18,000/ea	36,000
bathhouse with dressing rooms & showers (8 toilets, 6 showers, 6 lavatories, 2 urinals, septic tank & field lines	1	\$36,000/ea	36,000
dumping station with septic tank & field lines	1	\$5,000/ea	5,000
water points	10	\$250/ea	2,500
<b>SUBTOTAL</b>			<b>\$179,500</b>

April 1980



TABLE 2A - RECREATIONAL FACILITIES  
ESTIMATED CONSTRUCTION COSTS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Item	Number	Estimated Unit Cost	Total Construction Cost
<u>Basic Facilities</u>			
concrete picnic tables	100	\$175/ea	\$17,500
trash receptacles with stands	65	\$50/ea	3,250
group shelters each with 10 tables & a fireplace	2	\$10,000/ea	20,000
metal grills	60	\$75/ea	4,500
beach (includes grading, shaping, sanding and curbing)	800'	\$10/L.F.	8,000
diving platforms with ropes, markers & buoys	2	\$2,000/ea	4,000
playground areas with special surface treatment & playground equipment	4	\$4,000/ea	16,000
wooden benches	50	\$50/ea	2,500
field sports areas - 9-acres (cleared, shaped & grassed)	3	\$3,200/ea	9,600
trailer camping sites with utilities, pad, table, grill, trash receptacles	50	\$1,200/ea	60,000
tent camping spaces with pad, table, grill, trash receptacles	50	\$800/ea	40,000
boat ramp, triple	1	\$8,000	8,000
boat ramp, single	1	\$4,000	4,000
docking piers	3	\$1,000/ea	3,000
fishing piers (wooden or earthen)	4	\$2,000/ea	8,000
access/nature trails	8,000'	\$1/L.F.	8,000
<u>SUBTOTAL</u>			\$216,350
<u>General</u>			
entrance gates	1	\$2,000	\$ 2,000
concrete walks	1,000'	\$7/L.F.	7,000
fencing (4' high)	2,000'	\$3/L.F.	6,000
control booth (20'x20')	1	\$20/Sq.Ft.	8,000

April 1980



TABLE 2A - RECREATIONAL FACILITIES  
ESTIMATED CONSTRUCTION COSTS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Item	Number	Estimated Unit Cost	Total Construction Cost
recreational area planting, thinning and pruning turf & sod establishment	L.S.	\$3,000	3,000
	L.S.	\$5,000	5,000
plantings for screening, foot traffic control, & landscaping	L.S.	\$5,000	5,000
grading, shaping for basic facilities	300 hrs.	\$25/hr.	7,500
SUBTOTAL			\$43,500
TOTAL COST - Houston County Park			\$726,550
12% contingencies			87,150
TOTAL			\$813,700
RAY BASS PARK			
<u>Roads and Parking</u>			
double-lane paving	4,200'	\$13/L.F.	\$54,600
car/trailer spaces	80	\$400/Unit	32,000
car spaces	60	\$300/Unit	18,000
curbing	1,600'	\$5/L.F.	8,000
marking for parking	2,500'	\$.10/L.F.	250
SUBTOTAL			\$112,850
<u>Water, Electrical and Sanitation System</u>			
water supply - well, pump & tank	1	\$10,000	\$10,000
distribution - 2" pipe	2,000'	\$4/L.F.	8,000
water points	4	\$250	1,000
underground electrical service	2,000'	\$2/L.F.	4,000
security lights	8	\$500	4,000
comfort station with septic tank (2 toilets and 2 lavatories)	1	\$12,000	12,000
SUBTOTAL			\$39,000

April 1980



TABLE 2A - RECREATIONAL FACILITIES  
 ESTIMATED CONSTRUCTION COSTS (CONT'D)  
 Southeast Choctawhatchee River Watershed, Alabama  
 (Dollars) 1/

Item	Number	Estimated Unit Cost	Total Construction Cost
<u>Basic Facilities</u>			
concrete picnic tables	32	\$125	\$ 4,000
metal grills	16	\$75	1,200
trash receptacles with stands	20	\$50	1,000
group shelter, 26'x40', with 10 wooden tables & fireplace	1	\$10,000	10,000
field sports area with tot-lot & equipment	1	\$5,000	5,000
wooden benches	10	\$50/ea.	500
double boat ramp	1	\$6,000	6,000
fishing piers (wooden or earthen)	3	\$2,000/ea.	6,000
boat dock	1	\$2,000	2,000
walking trails	2,000'	\$1/L.F.	2,000
SUBTOTAL			\$37,700
<u>General</u>			
concrete walks recreational area planting, thinning & pruning	500'	\$7/L.F.	\$ 3,500
sod establishment	L.S.	\$1,500	1,500
plantings & landscaping	L.S.	\$2,000	2,000
control booth (10'x10')	L.S.	\$2,500	2,500
signs	1	\$15/Sq.Ft.	1,500
grading & shaping for basic facilities	L.S.	\$1,000	1,000
	100 hrs.	\$30/hr.	3,000
SUBTOTAL			\$15,000
TOTAL COST - Ray Bass Park			\$204,550
12% contingencies			24,550
TOTAL			\$229,100
TOTAL - Houston County Park			\$813,700
TOTAL - Ray Bass Park			229,100
GRAND TOTAL			\$1,042,800

1/ Price base 1979.

April 1980





TABLE 3 - STRUCTURE DATA  
BEAR CREEK RECREATION LAKE

Southeast Choctawhatchee River Watershed, Alabama

Item	Unit	Bear Creek Recreation Lake
Class of Structure	---	b
Drainage Area	Sq. Mi.	20.2
Curve No. (1-day)(AMCII)	---	72
Time of Concentration	Hrs.	7.3
Elevation Top of Dam	M.S.L.	240.8
Elevation Crest Chute Spillway	M.S.L.	232.0
Maximum Height of Dam	Ft.	42
Volume of Fill	Cu. Yds.	259,000
Total Capacity (Chute Spillway Crest)	Ac. Ft.	8,000
Sediment Submerged (100 years)	Ac. Ft.	1,150
Sediment Aerated	Ac. Ft.	200
Recreation Use	Ac. Ft.	6,650
Surface Area of Recreation Pool	Ac.	780
Principal Spillway Size of Conduit	Dia. In.	42
Crest Elevation	M.S.L.	232.0
Orifice Invert Elev.	M.S.L.	231.5 <u>1/</u>
Emergency Spillway Rainfall Volume (ESH) (areal)	In.	9.93
Runoff Volume (ESH)	In.	6.42
Storm Duration	Hrs.	7.3
Type	---	R/Concrete Chute
Bottom Width	Ft.	100
Maximum water surface elevation		236.7
Freeboard Rainfall Volume (FH)(areal)	In.	16.55
Runoff Volume (FH)	In.	12.65
Storm Duration	Hrs.	7.3
Maximum water surface elevation	Ft.	239.8
Capacity Equivalents Total Sediment Volume	In.	1.25
Beneficial Volume	In.	6.18

1/ Slotted orifice located on the side of the riser.

April 1980



TABLE 4 - ANNUAL COST

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost <u>2/</u>	Operation, Maintenance, and Replacement Cost	Total
Grade Stabilization Structures; Bear Creek Lake, Structure and Recreational Facilities	1,311,600	243,600 <u>3/</u>	1,555,200
Project Administration	166,200		166,200
GRAND TOTAL	1,477,800	243,600	1,721,400

1/ Price base 1979.2/ Amortized @ 7 1/8 percent interest rate for 100 years.3/ Includes \$8,200 for replacement of the recreational development and \$200 for replacement of grade stabilization structures.

April 1980



TABLE - 5 ESTIMATED AVERAGE ANNUAL DAMAGE REDUCTION BENEFITS

Southeast Choctawhatchee River Watershed, Alabama

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit <u>2/</u>
	Without Project	With Project	
Erosion			
Land Voiding and Depreciation	538,300	26,900	511,400
Impaired Land Use (Interdependent Area)	912,300	-	912,300
Total	1,450,600	26,900	1,423,700

1/ Price base: Current normalized prices (October 1979).

2/ Excludes Effects of Accelerated Land Treatment Measures.

April 1980



TABLE 6 - COMPARISON OF BENEFITS AND COSTS

Southeast Choctawhatchee River Watershed, Alabama

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/				Average Annual Cost 3/	Benefit: Cost Ratio
	Damage Reduction 2/	Recreation	Employment	Total		
Grade Stabilization Structures; Bear Creek Lake, Structure and Recreational Facilities	1,423,700	587,800	83,300	2,094,800	1,555,200	1.3:1.0
Project Administration					166,200	
GRAND TOTAL	1,423,700	587,800	83,300	2,094,800	1,721,400	1.2:1.0

1 Price base: Damage Reduction - current normalized prices (October 1979), Recreation - current Water Resource Council prices, and Employment - 1979 prices.

2/ From Table 5

3/ From Table 4





ENVIRONMENTAL IMPACT STATEMENT

SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED

Dale, Geneva, and Houston Counties, Alabama

April 1980



SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED  
DALE, GENEVA, AND HOUSTON COUNTIES, ALABAMA

FINAL ENVIRONMENTAL IMPACT STATEMENT

W. B. Lingle  
State Conservationist  
Soil Conservation Service

Sponsoring Local Organizations:

Dale County Soil and Water Conservation District  
D. Kyser Wilson, Chairman  
Box 3  
Ariton, Alabama 36311

Dale County Commission  
Frank Snell, Chairman  
P. O. Box 246  
Ozark, Alabama 36360

Geneva County Soil and Water Conservation District  
Robert A. Howell, Chairman  
Route 1, Box 375  
Hartford, Alabama 36344

Geneva County Commission  
Harold B. Wise, Chairman  
P. O. Box 430  
Geneva, Alabama 36340

Houston County Soil and Water Conservation District  
Olaff S. Ivey, Chairman  
Route 1  
Webb, Alabama 36376

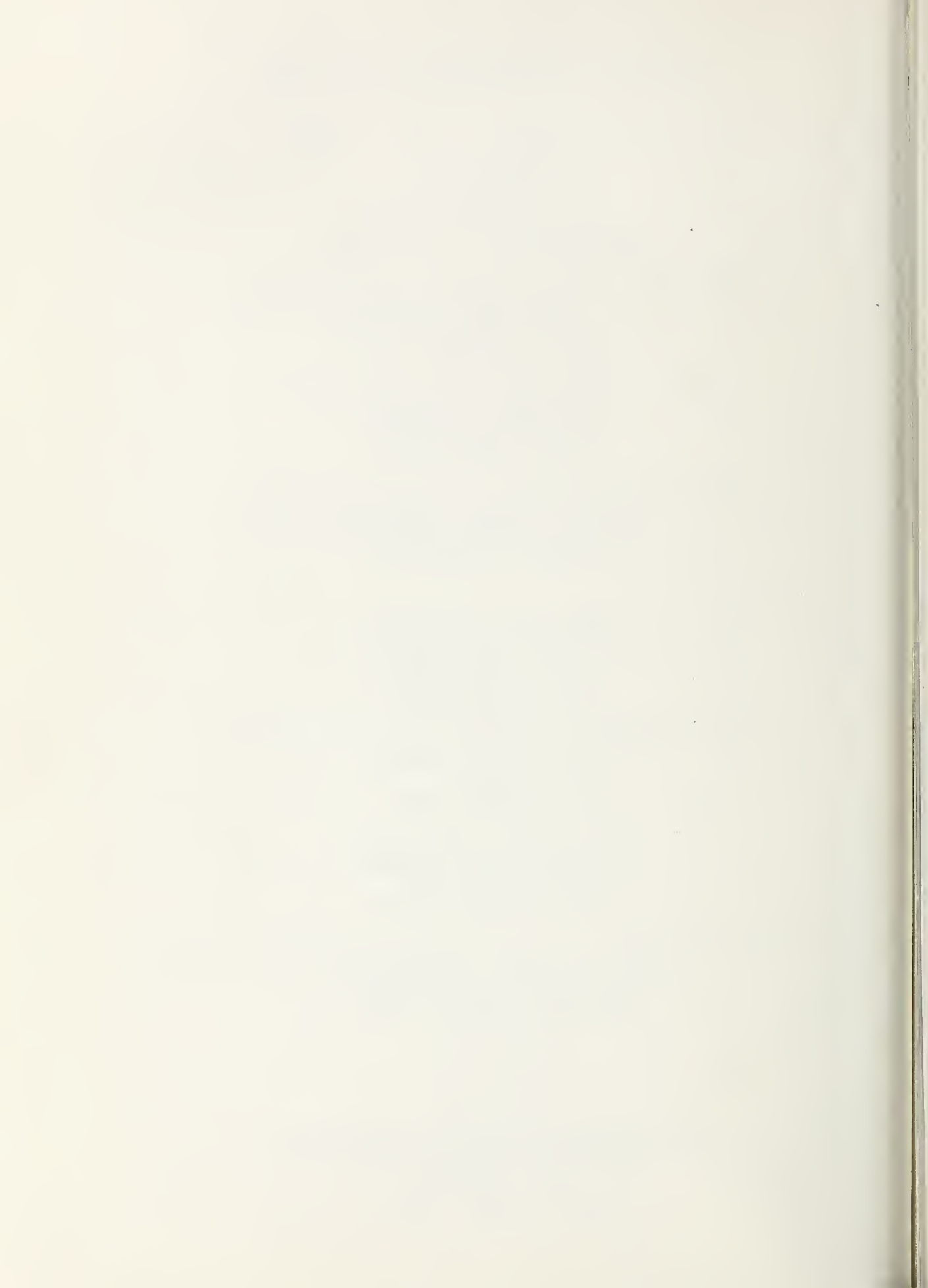
Houston County Commission  
Charles Whiddon, Chairman  
P. O. Box 1124  
Dothan, Alabama 36302

Alabama Department of Conservation and Natural Resources  
Richard A. Forster, Commissioner  
Administrative Building  
Montgomery, Alabama 36130

April 1980

Prepared By

UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
P. O. Box 311  
Auburn, Alabama 36830



# USDA ENVIRONMENTAL IMPACT STATEMENT

## SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED

Dale, Geneva, and Houston Counties,

Alabama

Prepared in accordance with Section 102(2)(c)  
of PL 91-190

### SUMMARY

#### I. Final

#### II. Soil Conservation Service

#### III. Administrative

IV. Description of project purpose and action: A project for watershed protection, land stabilization, and recreation in Dale, Geneva, and Houston Counties, Alabama, to be implemented under authority of the Watershed Protection and Flood Prevention Act (PL-566, 83rd Congress, 68 Stat. 666), as amended. The planned works of improvement include accelerated conservation land treatment, critical area treatment and roadside stabilization, stabilization of about 609 gullies and construction of a 780-acre single-purpose recreation lake and recreational facilities. The project will reduce erosion and provide for an average of 186,600 recreation visits annually.

#### V. Summary of Impacts:

1. Reduce sediment yield at outlet of the watershed by over 75 percent.
2. Reduce suspended sediment in streams.
3. Improve scenic and esthetic qualities of the watershed.
4. Reduce nutrient and pesticide movement in streams by reducing sediment.
5. Increase air and water pollution during project construction.
6. Provide wildlife food and cover from vegetation planted on the exposed areas of the grade stabilization structures.
7. Inundate about six miles of stream that could support 110 man-days of fishing annually.

8. Alter wildlife habitat on 780 acres by creating an impoundment.
9. Create about 780 acres of lake-type aquatic habitat.
10. Preserve about 180 acres of wetland and about 420 acres of wildlife habitat.
11. Provide 780 acres of resting area at the lake for migratory waterfowl.
12. Inundate 178 acres of Type 1, 25 acres of Type 2, 5 acres of Type 3, 16 acres of Type 4, 8 acres of Type 5, 16 acres of Type 6, and 299 acres of Type 7 wetlands.
13. Land treatment will enhance wildlife habitat and food supply.
14. Reduce sediment by 95 percent immediately downstream from the grade stabilization structures.
15. Enhance the appearance of about 900 farms by shaping and vegetating critical areas.
16. Improve tilth, permeability, and increase water absorption capability of the soils through measures on 31,400 acres on about 400 farms.
17. Increase local employment by 357 unskilled, 23 semi-skilled and 86 unskilled jobs during ten-year installation period.
18. Create 186,600 recreational visitor-day activities primarily for a rural population.
19. Increase travel distance and time between affected areas by closing Houston County Road 40.
20. Reduce land voiding and depreciation on 19,339 acres.
21. Reduce safety hazard around gullies.
22. Enable intensive crop production to be maintained on 5,542 acres.
23. Stabilize about 609 gullies on about 415 farms, which will directly benefit about 19,339 acres.
24. Reduce sediment on about 6,300 acres of flood plain, a benefit to about 200 farms.

VI. Alternatives Considered in Project Development.

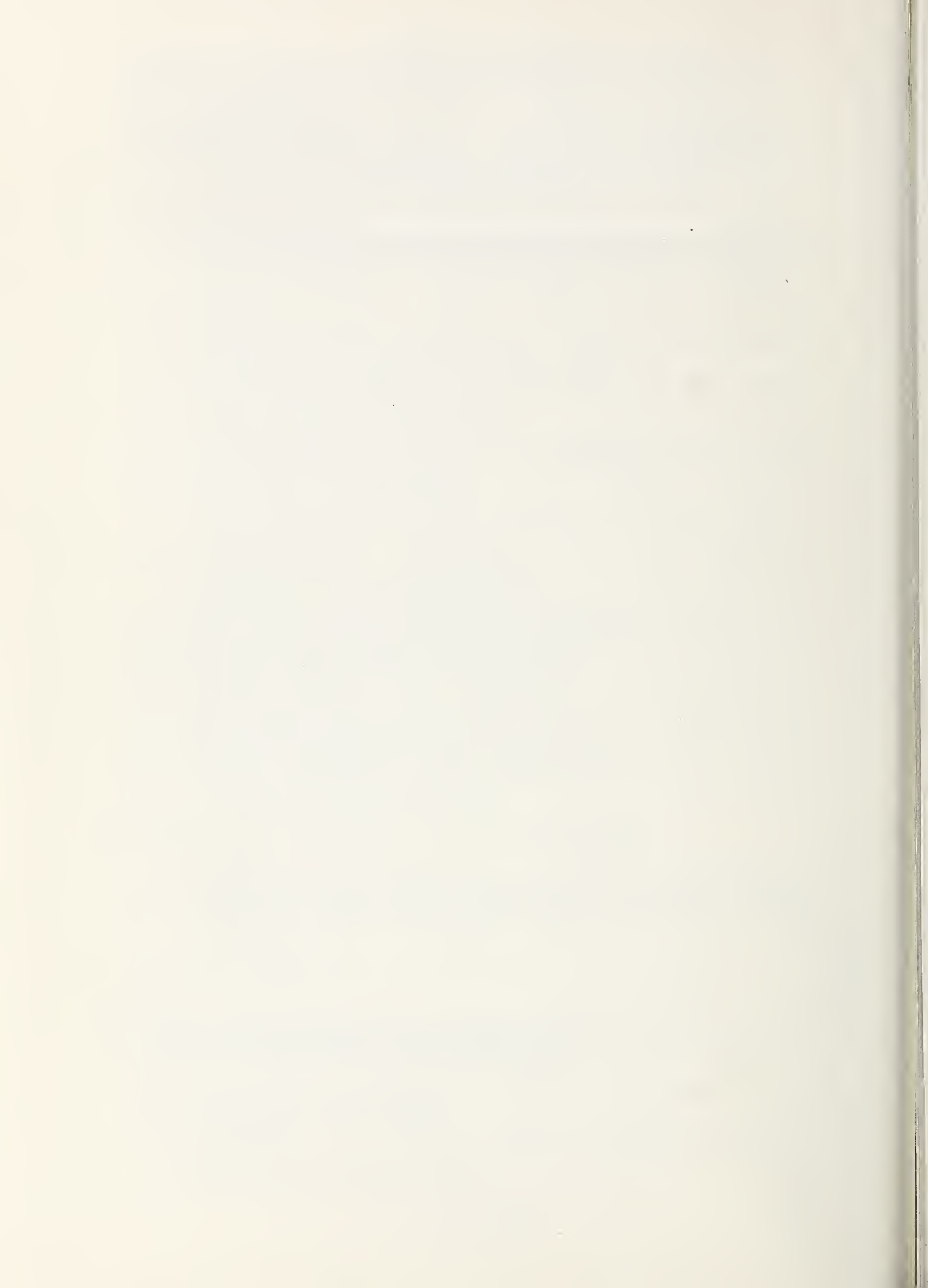
1. Accelerated Conservation Land Treatment, Critical Area Treatment, and Grade Stabilization Structures (Plan which satisfies component needs of environmental quality).
2. No Project.

VII. Sources From Which Written Comments Were Received on Draft Plan and Environmental Impact Statement:

1. Department of Agriculture, Office of Equal Opportunity
2. Department of the Army
3. Department of Commerce, National Marine Fisheries Service
4. Department of the Interior

5. Environmental Protection Agency
6. Alabama Development Office, Geological Survey of Alabama
7. Alabama Development Office, State Soil and Water Conservation Committee
8. Alabama State Soil and Water Conservation Committee  
(Governor's Designated Representative)
9. Alabama State Highway Department
10. Alabama Cooperative Extension Service

VIII. Draft Document Transmitted to CEQ on August 26, 1977.





USDA SOIL CONSERVATION SERVICE  
FINAL ENVIRONMENTAL IMPACT STATEMENT

For

SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED  
DALE, GENEVA, AND HOUSTON COUNTIES, ALABAMA

AUTHORITY

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83rd Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Dale County Soil and Water Conservation District

Dale County Commission

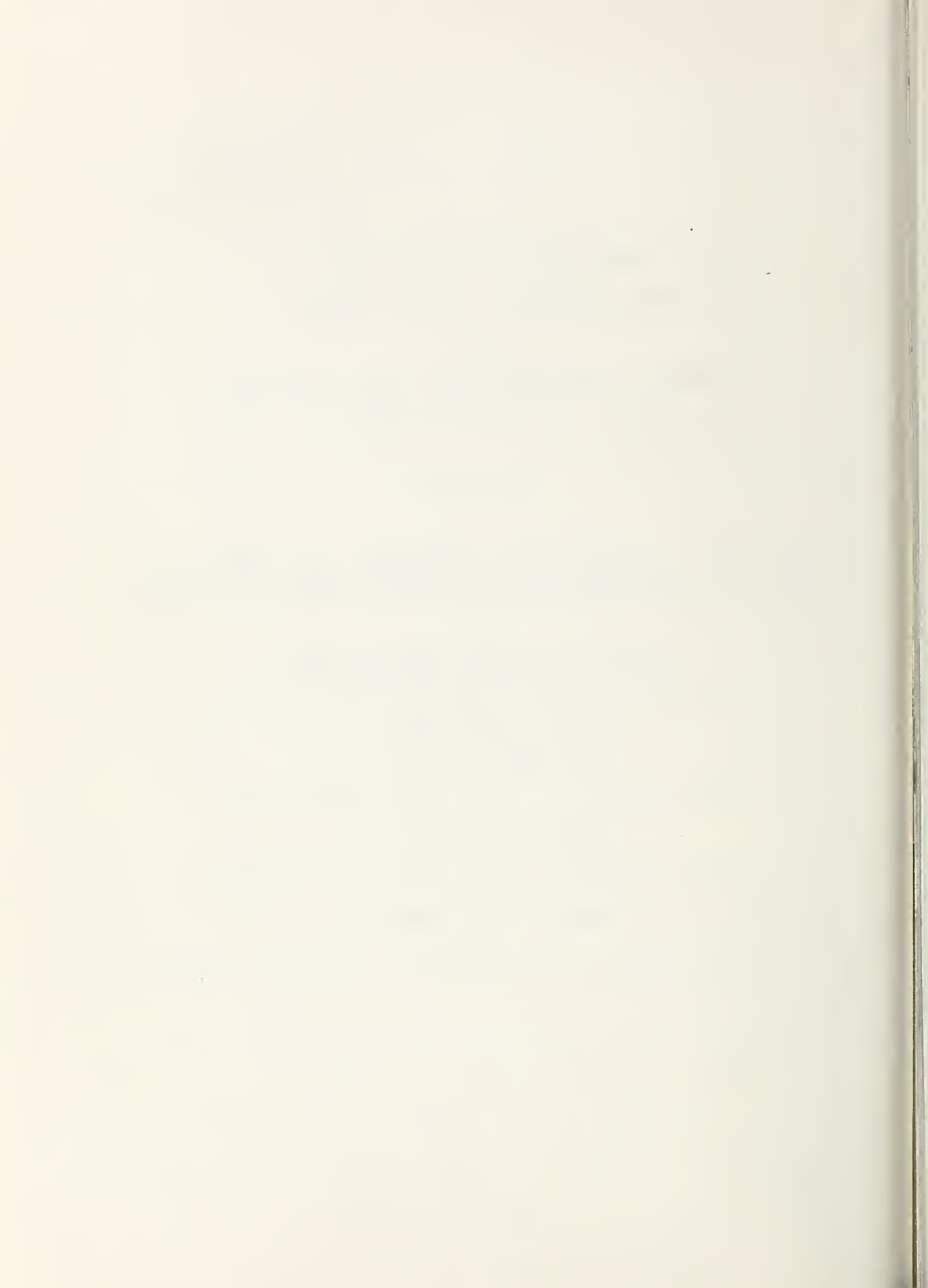
Geneva County Soil and Water Conservation District

Geneva County Commission

Houston County Soil and Water Conservation District

Houston County Commission

Alabama Department of Conservation and Natural Resources



## PROJECT OBJECTIVES

The overall aim of the project is to improve the quality of life of watershed residents. Two broadly-based planning objectives guided this effort . . . national economic development (NED) and environmental quality (EQ). National economic development is directed toward increasing the value of the Nation's output of goods and services or improving economic efficiency. Environmental quality, in contrast, deals with the nonmonetary aspects of man's surroundings (e.g.--cultural resources, ecological systems, or quality aspects of the nonrenewable natural resource base, etc.).

The Sponsors considered a broad range of goals which would contribute to the two planning objectives. These goals were identified through public involvement, input from State and Federal agencies, and inventories and evaluations of the watershed's resources. The following is a listing of the initial goals which were identified:

### OBJECTIVE

### GOAL

National Economic  
Development

1. Increased and more efficient output of agricultural products through...
  - a. Reduction of sheet and rill erosion on cropland,
  - b. Stabilization of critically eroding areas,
  - c. Reduction in land voided and depreciated as a result of gully erosion, and
  - d. Provision of stable outlets for water disposal systems,
2. Increased outdoor water-based recreational opportunities,
3. Reduced sedimentation, and
4. Improved forest land management.

Environmental Quality

1. Management, preservation, and enhancement of biological resources through...
  - a. Creation of additional wildlife habitat,
  - b. Improved management of forest land to enhance value of wildlife habitat,
  - c. Creation of a lake fishery, and
  - d. Provision of a resting area for migratory waterfowl,

2. Enhancement of quality aspects of land and water through...
  - a. Reduction in sheet and rill erosion on cropland,
  - b. Reduction in sedimentation,
  - c. Stabilization of critically eroding areas, and
  - d. Reduction in land voided or depreciated as a result of gully erosion,
3. Creation of an area of scenic beauty for man's enjoyment, and
4. Improvement of esthetic quality of the watershed.

## PLANNED PROJECT

### LAND TREATMENT MEASURES

Conservation land treatment is a basic element in formulating the watershed program. It is defined as "applying management, cultural, and structural conservation practices in such a manner that the land is used within the limits of its capabilities and soil losses from erosion are held to acceptable levels." Land treatment is accomplished primarily through the development and implementation of conservation plans (documents that guide deliberate actions to accomplish land treatment) and forest management plans (documents describing conditions and treatment needs for individual units of forest lands).

The planned land treatment program consists of accelerated technical and financial assistance to watershed landowners and/or operators. Approximately \$478,400 of accelerated technical assistance will be provided over a ten-year period for planning and application of needed resource management systems.

Resource management systems consist of various groupings of conservation measures and management practices necessary for the maintenance and/or improvement of a land or water resource in a given use. Descriptions of typical resource management systems applicable to the project area are presented in appendix M.

Under the going program, approximately 2,600 acres of cropland, 2,000 acres of pastureland, 3,900 acres of forest land, and 200 acres of other land will be adequately protected at the end of the ten-year installation period. An additional 1,400 acres of cropland, 600 acres of pastureland, and 100 acres of forest land will be partially protected to the extent that some, but not all, of the needed conservation practices in a resource management system will be applied.

The watershed project will result in conservation planning activities being accelerated to about five times the present rate. As a result of the accelerated conservation land treatment program, an estimated 10,400 acres of cropland, 8,000 acres of pastureland and 3,900 acres of forest land, and 800 acres of other lands will be adequately protected during the installation period. Approximately 5,500 acres of cropland, 2,400 acres of pastureland, and 400 acres of forest land will be partially protected.

Approximately 10,000 acres of seriously eroding cropland will be converted to pasture to reduce its erosion rate to acceptable

limits. This includes 2,000 acres of pasture under the going program and 8,000 acres under the accelerated program. Tree planting will be accomplished on about 300 acres of critically eroded area in the Class II, III, and IV gullies as part of the accelerated land treatment program.

Technical assistance will be made available to land users (both owners and operators) by the SCS through Soil and Water Conservation Districts (S&WCD's) and by the Alabama Forestry Commission (AFC) in cooperation with the FS. This technical assistance will be provided for planning, implementing plans, and maintaining conservation measures. 1/ The Dale, Geneva, and Houston County S&WCD's will provide technical assistance in the portion of the watershed that occurs in their respective counties. This assistance normally involves site investigation, design, layout and supervision of construction for the more difficult practices such as ponds, waterways, terraces, and other structural measures. Less complex practices, such as contour farming, usually require only minor surveys and layout work. Management and cultural practices, such as pasture and hayland management, require only consultative assistance.

#### Critical Area Treatment

Accelerated financial assistance will be provided for the treatment of approximately 1,549 critically eroding areas (Class I gullies described on page E-13). This includes about 1,192 areas in eroding fields and 357 areas along roadsides. For approximate locations of these areas, see appendices E-1, E-2, and E-3. Two of the problem areas are pictured on page E-47. Critical area treatment consists of four primary methods:

1. Shaped gully with vegetated waterway.
2. Shaped gully with jute mesh and vegetation.
3. Shaped gully with jute mesh, vegetation, and underground outlet system.
4. Shaped and vegetated roadsides.

Vegetative cover will consist of a mixture of common bermuda and Bahia grass. The table on page E-13 displays more information on the treatment of these areas. Pictured on the following page is a typical "before" and "after" condition of a once critically eroding area.

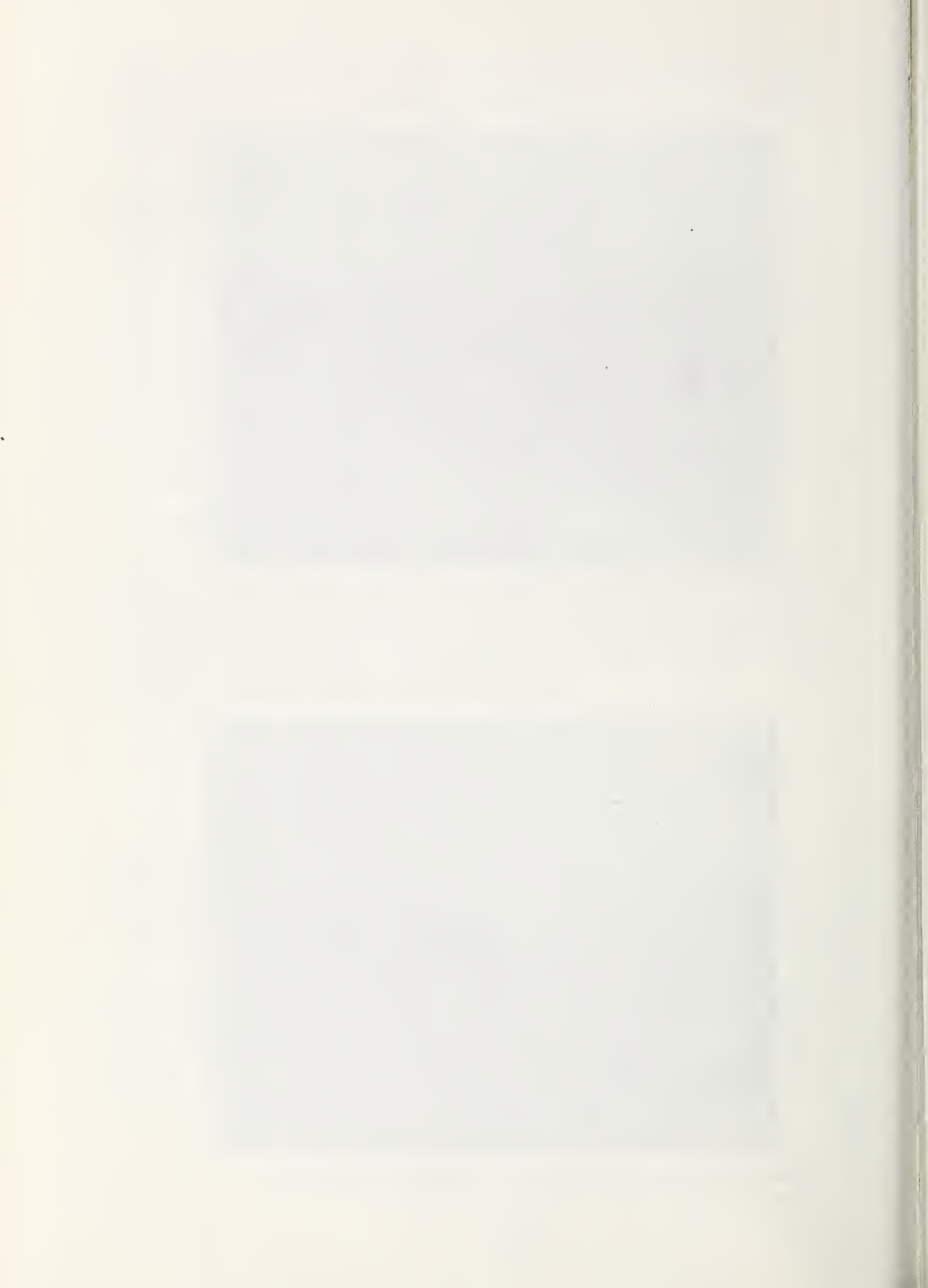
Treatment of critical areas will be contingent upon landowners making needed land use adjustments and application of essential conservation practices in the drainage areas above the critically eroding areas. Remedial followup will be made as necessary in the year following initial treatment in order to insure the establishment of adequate vegetative cover.



Gully before land treatment.



Gully after land treatment by shaping, seeding, and fertilizing.





CRITICAL AREA TREATMENT (CLASS I GULLIES)  
 CLASSIFICATION SUMMARY 1/  
 SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED, ALABAMA

GULLY CLASSIFICATION	SUBCLASS	CHARACTERISTICS		TREATMENTS 5/				NO. OF AREAS REQUIRING WORK
		MAXIMUM DRAINAGE AREA 2/ (ACRE)	MAXIMUM DEPTH @ LIP (FEET)	SHAPED GULLY WITH VEGETATED WATERWAY	SHAPED GULLY WITH JUTE MESH 3/ AND VEGETATION	SHAPED GULLY, VEGETATED WITH JUTE MESH, WITH UNDERGROUND OUTLET SYSTEM	SHAPED & VEGETATED ROADSIDES 4/	
I	A	40	20	X				501
	B	40	20		X			898
	C	40	20			X		97
	D	40	20				X	53
TOTAL								1,549

Note: The "X" indicates that the column is a part of the requirements in classification and treatment of the gullies.

1/ Classification based on Alabama Advisory ENG-AL-6 (Feb. 1973).

2/ Gullies in easily erodable soils should be placed in a higher class when the drainage area is greater than 20 Ac. unless otherwise determined satisfactory by classifier.

3/ The jute mesh or other appropriate material will be used to initially stabilize waterway system.

4/ Also 62 roadsides will be treated by method IA and 242 roadsides will be treated by method IB.

5/ All these treatments will be designed to meet appropriate SCS criteria.

Decisions to apply land treatment rest with the landowners involved. Land users will use their own funds and funds available from other funding sources to finance the installation of all practices except critical area treatment which will be installed with cost sharing assistance using PL-566 funds.

### STRUCTURAL MEASURES

The planned structural measures consist of a single-purpose recreation lake, recreational facilities, and about 609 grade stabilization structures. See appendices D, D-1, D-2, D-3, D-4 and D-5 for locations and planned features.

#### Recreation Lake

The recreation lake is to be located on Bear Creek and will have a surface area of 780 acres and a shoreline of about 18 miles. About 20.2 square miles of land area drain into the lake site.

The dam will be constructed of compacted earth on 3:1 side slopes. See appendix H for a typical cross section and table 3 in part I of this document for design details. The upstream embankment slope will be protected from wave erosion by rock riprap. The top of the dam and the exposed areas will be vegetated.

An impervious cutoff will be installed across the flood plain by excavating to bedrock and backfilling with compacted clay. The sandy materials on each abutment will necessitate the installation of impervious blankets on the abutments to reduce seepage. A foundation trench drain with blind relief wells will be installed to intercept seepage through the foundation.

Borrow material for the embankment and abutment blanketing will be obtained from areas adjacent to both ends of the dam. The borrow materials are generally clayey sands, sandy and silty clays, and silty sands. Borrow areas will be cleared and stripped only as needed for use in construction.

A 42-inch diameter reinforced concrete pipe will be installed through the embankment with an inlet riser on the upstream end. The pipe will be placed on a compacted earth fill foundation and will outlet into an impact basin or rock riprap plunge pool. A slide gate will be installed at the base of the inlet riser and a slotted orifice at the top. Elevation of the slotted orifice will be set at the permanent pool level. Purpose of the conduit and riser is to pass storm runoff through the structure during construction, carry base stream flows, and allow for manipulation of the permanent water level for lake operation and maintenance activities.

The principal spillway will be a concrete chute spillway 100 feet in width and will pass the routed runoff produced by the emergency and freeboard storms. The chute will be located in the dam about midway of the flood plain (see appendix G). A chain link fence will be installed around the spillway as a safety measure. Flow depths in the chute spillway for the various frequency discharges are as follows:

<u>Principal Spillway Routing</u> <u>Frequency Storm by Years</u>	<u>Concrete Chute Spillway</u>	
	<u>Flow Depth</u> (feet)	<u>Elevation</u> (feet)
2	2.0	234.0
5	3.1	235.1
10	3.3	235.3
25	4.0	236.0
50	4.4	236.4
100	5.0	237.0

A Saint Anthony Falls (SAF) energy dissipater (see appendix G) will be used to reduce velocity of water leaving the chute to a nonscouring rate below the dam. Rock riprap will be installed along the channel banks for about 300 feet downstream from the SAF basin. The outlet channel will have an initial width of 100 feet and transition to 60 feet wide downstream from the riprap section. Side slopes will be 3:1. Spoil will be spread along both banks.

Storage will be provided in Bear Creek Lake for sediment accumulation expected during the 100-year life of the project. The anticipated volume is 1,350 acre-feet.

The areas needed for construction of the dam, outlet channel, and that utilized for borrow and spoil disposal areas will be cleared of existing vegetation as necessary. In addition, woody vegetation within the area of the permanent pool below elevation 232 between the dam and Ray Bass Park will be cleared. Clearing will be only that needed for adequate and safe performance and operation of the structure and for practical and reasonable maintenance. The pool area above Ray Bass Park and the fee simple buffer zone around the perimeter of the lake will be retained in its present condition as a fish & wildlife habitat mitigation measure. The dam, borrow areas, outlet channel, and spoil disposal areas, and all other disturbed areas above the normal pool elevation that are not otherwise protected will be vegetated with plants adapted to the area (see appendix K). Detailed structure layout, clearing, and vegetative planting will be planned to preserve and/or enhance the esthetic quality of the area to the maximum feasible extent. Fish and wildlife losses will be further minimized by constructing "fish shelters" or brush shelters at strategic locations in the lake.

To install Bear Creek recreation lake, the following alterations, modifications or changes in locations of existing improvements will be necessary: (A) Houston County - close County Road 40, (B) Geneva County - raise or relocate six roads in the pool, relocate or raise two transmission towers, and remove one earth dam.

Installation of the lake will require the purchase of 1,222 acres of land as shown below:

	<u>Present Land Use</u>		<u>Total</u>
	<u>Forest Land</u>	<u>Open Land</u>	
Permanent Pool	757	23	780
Dam, Borrow Areas & Outlet Channel	40	6	46
Area Above Permanent Pool	363	33	396
	<u>1,160</u>	<u>62</u>	<u>1,222</u>

In addition to the above 1,222 acres, a flood easement of 436 acres will be required to the top of dam elevation. This area will be inundated for a maximum of three days during extremely heavy rainfalls.

Under present conditions, the installation of the lake will not require the displacement of any dwellings, outbuildings or any people.

As a precondition to construction, 50 percent of the land upstream of the lake must be under conservation agreement with the Houston and Geneva County Soil and Water Conservation Districts. Seventy-five percent of the critical area treatment and grade stabilization structures planned in the drainage area of the lake must be installed before or concurrently with the installation of the dam.

### Recreational Facilities

Two water-based recreation developments will be installed on about 347 acres of land (see appendices D-1 and D-2, and table 2A in part I of this document). These areas will be adjacent to the proposed 780-acre lake on Bear Creek. Facilities will include campsites, beaches, picnic sites, water supplies, sanitary facilities, electrical services, access roads, a system of access trails, fishing facilities, and play areas.

Houston County Park will contain about 302 acres of gently rolling, loamy sand land on the west side of the proposed impoundment. Planned facilities include 100 concrete picnic tables; 65 trash receptacles with stands; 60 metal grills; two group shelters served by water and electrical services with 10 wooden tables and a fireplace; four playground areas with equipment and

safety fencing; 50 wooden benches; 50 tent camping sites; 50 trailer camping sites with utilities, pad, table and grill; one triple boat ramp; one single boat ramp; three docking piers; four fishing piers; three multipurpose field sport areas for volleyball, softball, and other games; and 8,000 feet of nature trails. About 800 feet of beach and two diving platforms will be provided.

Water will be supplied to the recreational development from two deep wells to be drilled into the Tuscahoma sand aquifer. This aquifer should provide an adequate quality and quantity of water for all present and future needs. The system will include 8,000 feet of 2-inch pipe and 10 water points.

There will be two comfort stations with four toilets and four lavatories; two comfort stations with four showers, four toilets and four lavatories; and one bathhouse with eight toilets, six showers, six lavatories and two urinals. The comfort stations will have septic tanks and field lines for waste disposal. Such facilities will be designed and installed in accordance with State and local public health regulations. The electrical service will be underground with 8,000 feet of lines and 20 security lights. Approximately 4,000 feet of double-lane roads and 5,000 feet of single-lane roads will be provided. The roads will be hard surfaced. Three hundred and ten parking spaces for cars and 160 car/trailer spaces will be constructed and marked to serve the picnic area and fishing pier. There will be 3,000 feet of curbing around the parking areas.

A chain link fence about 2,000 feet long and four feet high will enclose portions of the park, and one centrally located entrance will be at an existing county road. Recreational facilities will be designed so that the physically handicapped can participate to the maximum extent possible. Pedestrian access to the various recreational facilities will be provided by 1,000 feet of concrete walks four feet wide.

Approximately 35 acres of vegetative treatment such as planting, thinning, pruning and sod establishment will be needed around the recreational facilities. An additional 300 man-hours of grading and shaping of the landscape will be needed for basic facilities. About 100 cubic yards of concrete for flumes will be installed along access roads to remove surface runoff.

The Ray Bass Park recreational development will be installed on about 45 acres of land. This area will be adjacent to the east side of the impoundment in Geneva County. Planned facilities will include 32 concrete picnic tables; 20 trash receptacles with stands; 16 metal grills; one group shelter with water, electrical services, 10 wooden tables, and one fireplace; 10 wooden benches; one double boat ramp; one boat dock; three fishing piers; one field sports area with tot-lot and equipment.

Water will be supplied to this recreational facility from one deep well. This system will include 2,000 feet of 2-inch pipe, a storage tank, and four water fountains. There will be one comfort station with two toilets and two lavatories. The comfort station will have septic tanks and field lines for waste disposal. Such facilities will be designed and installed in accordance with State and local public health regulations. The electrical services will be underground with 2,000 feet of lines and eight security lights.

Approximately 4,200 feet of double-lane roads will be provided. The roads will be hard surfaced. Sixty parking spaces for cars and 80 car/trailer spaces will be constructed and marked to serve the picnic area and fishing pier. There will be 1,600 feet of curbing around the parking areas.

Approximately 15 acres of vegetative treatment will be needed around the recreational facilities. In addition, about 100 man-hours of landscape grading and shaping will be needed for basic facilities.

The lake will be generally zoned for specific recreational activities to avoid conflict of interest. From the upper reaches to Ray Bass Park, the lake will be restricted to fishing. From Ray Bass Park to Houston County Road 40, water skiing will be allowed in the main lake area with fishing in the coves. The area between Houston County Road 40 and the dam will be utilized for swimming and fishing (see appendix D).

#### Grade Stabilization Structures

Approximately 609 gullies will be stabilized. (See Appendix K for a description of vegetative cover). Treatment of gullies consists of five primary methods:

1. Shape gully banks and use concrete flumes to convey runoff to a stable outlet.
2. Divert runoff to a stable outlet by the use of surface diversions with pipe or flume outlets.
3. Install cantilever pipe outlet with hood inlet at lip of gully.
4. Install detention basin with graded inlet and pipe outlet.
5. Install underground outlet waterway system.

Each of these methods will also include vegetating all areas that have been shaped or otherwise disturbed. The number and type of gullies to be treated are listed in the table on page E-21. Also, three of the gullies to be treated are pictured on pages E-49 and E-51. For approximate location of gullies by class and subclass, see appendices D-3, D-4, and D-5. A typical Class III gully "before" and "after" stabilization is pictured on the following page.



Class III gully before stabilization treatment.



Same gully after treatment.





GULLY CLASSIFICATION SUMMARY I/  
SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED, ALABAMA

GULLY CLASSIFICATION	SUBCLASS	CHARACTERISTICS				TREATMENTS				NO. OF GULLIES REQUIRING WORK
		MAXIMUM DRAINAGE AREA (ACRE)	MAXIMUM DEPTH @ LIP (FEET)	GULLY FLOOR SLOPE % - 3 X GULLY LENGTH BELOW STR <1,000	GULLY FLOOR SLOPE % - 3 X GULLY LENGTH BELOW STR <2,000	SHAPED GULLY WITH CONCRETE FLUME	SURFACE DIVERSION WITH FLUME OR PIPE OUTLET	DETENTION BASIN-GRADED INLET & PIPE OUTLET		
II	A	60	30	2/ X	---	X	---	---	196	
	B	60	30	X	---	---	X	---	158	
	D	60	30	X	---	---	---	X	143	
SUBTOTAL									497	
III	A-1	40	40	---	2/ X	---	X	---	8	
	B	100	40	---	X	---	---	X	52	
SUBTOTAL									60	
IV	---	---	---	---	---	X	X	X	52	
TOTAL									609	

NOTE: THE "X" INDICATES THAT THE COLUMN IS A PART OF THE REQUIREMENTS IN CLASSIFICATION AND TREATMENT OF GULLIES. ALL GULLY TREATMENTS WILL BE DESIGNED TO MEET SCS CRITERIA

- 1/ Classification based on Alabama Advisory ENG-AL-6 (Feb. 1973) for Gullies that Require Structural Measures in Addition to Vegetative Treatment for Stabilization.
- 2/ Does not apply to roadside stabilization.
- 3/ Exceeds one or all of the conditions listed as gully characteristics for Class II & III Gullies. Treatment will be similar to that planned for Class II & III Gullies.

Most areas where gullies are to be treated are above the flood plain and will be in a dry condition during construction. Occasionally, however, a wet area will be encountered and will require a drainage system to relieve the uplift pressures caused by the saturated condition. The predominant soil materials where the gullies occur are clayey sand (SC), silty clay (CL), and silty sand (SM).

### General

Every reasonable effort will be made to protect the environment from damage during project installation. Contractors will be required to adhere to strict guidelines set forth in each construction contract to minimize environmental damages. Clearing, excavation, and other construction operations will be scheduled and controlled to prevent exposure of excessive amounts of unprotected soil. Erosion control measures will be uniquely specified at each work site and will include, as applicable, use of temporary vegetation or mulches, diversions, brush dams, and mechanical retardation of runoff.

Construction equipment will be required to be muffled to reduce noise. Dust and other pollutants inherent to the construction process will be held to minimum practical limits. Access roads, haul roads, excavation areas and other work sites will be sprinkled with water as needed to keep dust within tolerable limits. Contract specifications will require that fuel, lubricants, and chemicals be adequately labeled and stored safely in protected areas. Disposal at work sites will be by approved methods and procedures.

Clearing and disposal of brush and vegetation will be carried out in accordance with applicable laws, ordinances, and regulations with respect to burning. Each contract will set forth specifications for burning to prevent uncontrolled grass or brush fires. Disposal of brush and vegetation will be by burying or hauling to approved offsite locations or by controlled burning.

During project installation, necessary sanitary facilities, including garbage disposal facilities, will be placed no closer to live streams, wells, or springs than will be allowed by Federal, State, and local water pollution control regulations. Conformance to all environmental control requirements will be monitored constantly by a construction inspector who will be onsite during all phases of construction.

The environment will continue to be protected from erosion and water pollution following completion of construction. Project Sponsors will operate and maintain the structural measures in accordance with a specific operation and maintenance agreement. The agreement will set forth the required inspections, monitoring and the maintenance to be performed to prevent soil erosion and water pollution.

According to the Alabama Historical Commission, no archaeological sites of value exist within the proposed construction or inundated areas of this project (see appendix I). If sites are uncovered during construction, the Department of the Interior, National Park Service, University of Alabama and the Alabama Historical Commission will be notified. If any archaeological sites of value are identified, provisions of Public Law 93-291 will be followed. The project, as planned, will not affect any cultural resources listed in the National Register of Historic Places, nor will it affect any known cultural resources eligible for nomination to the National Register of Historic Places.

### OPERATION, MAINTENANCE, AND REPLACEMENT

#### Land Treatment

Land treatment measures on private land will be operated and maintained by landowners or operators under cooperative agreements with the Dale, Geneva, and Houston County Soil and Water Conservation Districts. Critical area treatment on roadbanks will be maintained by the commissions of the three involved counties through operation and maintenance agreements entered into with the SCS.

The Alabama Forestry Commission, in cooperation with the FS, will furnish technical assistance necessary for operating and maintaining the forest land treatment measures under the existing cooperative forest management program. The Alabama Forestry Commission will continue to furnish fire protection under the cooperative forest fire control program. Technical assistance for operation and maintenance of land treatment measures on other land will be provided by the SCS through the local Soil and Water Conservation Districts.

Operation and maintenance activities on land treatment measures include, but are not limited to the following:

- liming
- fertilizing
- mowing
- reshaping rills and reseeding
- removal of sediment

#### Structural Measures

Operation and maintenance agreements will be signed by the county commissions of Dale, Geneva, and Houston Counties and the Soil Conservation Service prior to signing land rights, relocation, and/or project agreements. Specific details for operating and maintaining all structural works of improvement in each county will be set forth in the agreements, as will specific provisions for retention and/or disposal of property acquired or improved

with PL-566 financial assistance. The SCS will accept these signed agreements as evidence that the project will be properly operated and maintained during the life of the project. The Sponsors will use as a guide the SCS Operation and Maintenance Handbook for Watersheds in Alabama in developing a maintenance program.

The three county commissions will be responsible for and promptly perform or have performed, without cost to the SCS, all maintenance of structural measures located in their respective counties once the work is accepted from the contractor by the SCS. Maintenance on the structural measures will consist of such items as controlling undesirable vegetation by mowing, hand-cutting, or using herbicides; painting metal parts; shaping and revegetating eroded areas; removing debris from trash racks, spillways and outlet channels; fertilizing, and reseeding bare areas. Mowing operations will be accomplished with farm-type tractors and rotary mowers. The use of herbicides will be in accordance with State and Federal regulations. Operation and maintenance work on the recreation developments will normally include, but will not be limited to, such action as removing rubbish from the parks and maintaining adequate vegetative cover to prevent site deterioration. Maintenance of vegetative cover will include mowing, fertilizing, periodically irrigating during drought periods, and selective sodding and seeding in heavy use areas.

Additional work is defined as work needed on a completed measure to assure establishment of adequate vegetation. The State Conservationist may authorize cost sharing for additional work on vegetative applications, after the Sponsors have assumed responsibility for operation and maintenance, if the original vegetative application fails to establish through no fault of the Sponsors or contractor. Cost sharing for additional work shall be pursuant to a new project agreement. The PL-566 cost share rate shall not exceed the rate authorized for the original vegetative application.

The commissions, or a designated representative, and the SCS will make a joint inspection in the respective counties of each structural measure at least annually and also after any severe flood or other unusual condition that might adversely affect the structural measures. A report will be prepared on each inspection summarizing the maintenance work needed, showing estimated cost, and indicating a work schedule. Followup reports will be submitted to the State Conservationist when the maintenance has been completed. These joint annual inspections are to continue for three years following installation of each structure and at least once every two years following the initial three-year period. In addition, a detailed engineering inspection will be conducted at least once every five years following construction.

The Geneva and Houston County Commissions will operate the recreation development in accordance with existing State and local public health and safety regulations.

The estimated average annual cost of operation and maintenance is \$243,600 which includes \$8,200 for replacement of recreational facilities, and \$200 for replacement of deteriorated corrugated metal pipes used in grade stabilization structures.

The Sponsors will charge admission or use fees for the recreational facilities. These fees will not produce revenues in excess of that required to amortize the Sponsors' investment and provide adequate operation, maintenance, and replacement of recreational facilities. Supplemental revenue needed to operate and maintain the recreation development as well as the grade stabilization structures will be provided from the counties' general tax revenues.

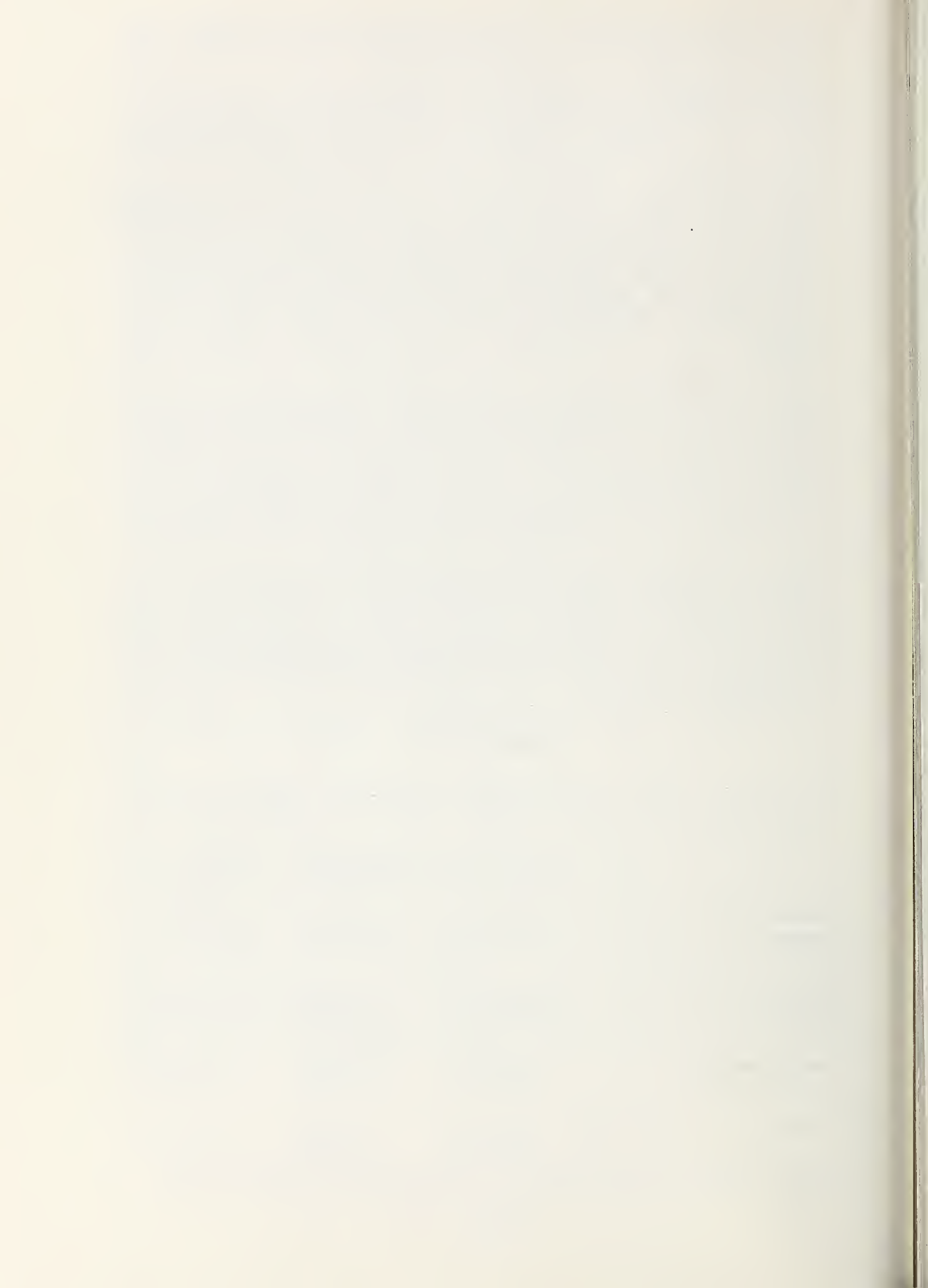
The watershed plan agreement reflects the proposed mitigation and legally requires these areas to remain absolutely unaltered by cultural practices. A system for monitoring will be developed to assure the continuing well-being of wetlands, particularly those above the proposed Ray Bass Park Road. The Environmental Protection Agency (EPA) proposes to provide infrared aerial photography as a baseline prior to placement of the proposed dam. An inter-agency task force of State and Federal agencies will develop criteria that assay the wetlands being monitored. EPA will provide, within fiscal constraints, additional infrared photography on a three-to five-year interval. The Operations and Maintenance Agreement, which will be signed by the SCS and the Sponsors prior to any construction, will reflect the above considerations and provisions will allow water level fluctuations downward if the task force deems necessary.

PROJECT COSTS

The total project installation cost is estimated to be \$31,784,300. This cost is shared by PL-566 funds and other funds as follows:

	-----DOLLARS-----		
	<u>PL-566</u>	<u>Other</u>	<u>Total</u>
Conservation Land Treatment	6,583,600	4,480,900	11,064,500
Grade Stabilization Structures	15,083,100 (12,363,200)	672,400 (487,800)	15,755,500
Bear Creek Lake Structure	1,810,500 (925,000)	1,701,100 (925,000)	3,511,600
Recreational Facilities	744,900 (521,400)	707,800 (521,400)	1,452,700

Note: Numbers in parenthesis are estimated construction costs.



## ENVIRONMENTAL SETTING

### PHYSICAL RESOURCES

Southeast Choctawhatchee River Watershed is located in parts of rural Dale, Geneva, and Houston Counties in southeast Alabama with a total drainage area of about 170,000 acres. It is about 100 miles southeast of Montgomery, Alabama and about 100 miles north of Panama City, Florida. About one-third of the city of Dothan, Alabama, is located within the eastern portion of the watershed.

The watershed is located in the South Atlantic Gulf Water Resource Region and the Saint Josephs-Perdido and Apalachicola subregions. 2/ The Choctawhatchee River is the western boundary of the watershed and flows southward, emptying into the Gulf of Mexico.

#### Soil and Land Capabilities

The soils in the drainage area are described by soil association (see appendix F). Land capability classes and subclasses are defined in appendix N.

The Orangeburg-Red Bay-Dothan association is the predominant association in the watershed with 85,400 acres. This association consists of deep, well-drained loamy soils on large upland flats and broad ridgetops. These soils are well suited to growing row crops, pasture, hay crops and trees. Orangeburg and Red Bay soils have a high potential for urban developments and recreational uses. Dothan soils have a moderate to low potential for many urban uses because of a seasonal high water table. Most of the soils in this association are in land capability classes I and II.

Alaga-Lucy-Troup association has 12,900 acres and consists of deep, well-drained sandy soils on ridgetops and side slopes. The potential for growing crops on these soils is reduced because of their droughty nature. The more gently sloping areas have a high potential for most urban and recreational uses. Land capability classes are mostly III and IV.

The Dothan association, 66,900 acres, consists of deep, well-drained soils on large upland flats and broad ridgetops. The soils have a high potential for growing crops, pasture, hay crops and trees. A seasonal high water table reduces their potential for most urban uses. The soils are mostly in land capability classes I and II.

Eustis-Kalmia-Bibb association includes 4,900 acres and consists of deep, well-drained to poorly drained soils on streams, terraces and bottoms. The farming potential is low because of the sandy nature of the Eustis soils and the poorly drained nature of the Bibb soils. A seasonal high water table and the hazard of flooding limits their uses for urban and recreational developments. Land capability classes are mostly II, III, and IV.

### Prime Farmlands

The table below shows the acreages of prime farmland by soil association. Prime farmland is that land best suited for producing food, feed, forage, fiber, and oilseed crops. Prime farmland could be cropland, pastureland, rangeland, forest land, or other land but not urban built-up land or water. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed.

Soil Associations	Major Capability Classes and Subclasses	Total Watershed Acres	Prime Farmland In Watershed (Acres)
1. Orangeburg-Red Bay-Dothan	I & IIe	85,300	64,900
2. Alaga-Lucy-Troup	IIIs & IVs	12,900	8,380
3. Dothan	I & IIe	66,900	58,200
4. Eustis-Kalmia-Bibb	IIe, IIs, & IVw	4,900	1,000
Total		170,000	132,480

### Geology and Topography 3/

The watershed lies within the Coastal Plain Land Resource Area and is in that portion of Alabama known as the Wiregrass Region. The geologic formations of the watershed range in age from Tertiary to Quaternary. They are of sedimentary origin and consist of sand, gravel, clay, silt, siltstone, sandstone, and limestone. The units include the Tallahatta and Lisbon Formations, Ocala Limestone, and Moodys Branch Formation undifferentiated, and residuum of Tertiary age; and alluvium and terrace deposits of Quaternary age. Most of the surface material is a mixture of reworked sands and clays. This condition is a result of solution and removal of the limy material originally present.

The geologic formations have a westward strike and a gentle dip of 15 to 40 feet per mile southward. Thickness of the Tertiary formations is about 300 feet.



The topography is in a young stage of development with broad nearly level ridges, long gentle slopes with fairly steep breaks near the streams, and poorly developed flood plains. Elevations range from about 110 to 360 feet above mean sea level giving a total relief of 250 feet.

#### Climate 4/

The average annual rainfall in the watershed is approximately 53 inches. October is normally the driest month and March the wettest, with a mean monthly precipitation of 2.0 and 6.0 inches respectively. Intense showers and thunderstorms of short duration are common during the spring months. Severe droughts are uncommon, but dry conditions prevail from midsummer to late fall. Winters are relatively mild and summers are warm. Temperatures range from an average low of 40 degrees in January to high of 92 degrees in July and August. The length of the growing season is approximately 280 days, with the last killing frost generally occurring in March and the first in November.

#### Mineral and Ground Water Resources 3/ 5/ 6/

Brown iron ore deposits of unproven grade and extent occur in the southern and southeastern parts of the watershed. The deposits are thin and irregular and no mining activity has been carried out within the boundary of the watershed.

Sand occurs in the alluvial and terrace deposits adjacent to the streams throughout the northern and northwestern parts of the watershed. Thin lenses of gravel occur in terrace deposits near the Little Choctawhatchee River in the northwestern part.

Water for farm use is adequately supplied by surface runoff, whereas all water for domestic use comes from wells. Minor aquifers occurring at depths of 100 to 200 feet yield from 10 to 50 gallons per minute. Deeper wells, such as those which supply water for the city of Dothan, range in depth from 115 to 684 feet and yield as much as 50 to 620 gallons per minute. The water from these wells is of good quality.

#### Land Use

Land use in the watershed is as follows:

LAND USE	ACRES	PERCENT
Cropland	66,440	39.1
Pasture and Hayland	30,190	17.8
Forest Land	55,130	32.4
Urban Land	10,720	6.3
Miscellaneous	7,520	4.4
TOTAL	170,000	100.0

## Surface Water Resources

Southeast Choctawhatchee River Watershed contains over 600 miles of streams. The general drainage of the major streams is toward the northwest into the Choctawhatchee River. The Little Choctawhatchee River is the largest stream in the project area and drains the northeastern half of the watershed. Barnes Creek, Hurricane Creek, and Pates Creek are the main drainage outlets in the southwestern half of the watershed. Several smaller tributaries also flow directly into the Choctawhatchee River but serve only a small percentage of the total drainage area.

The Alabama Water Improvement Commission (AWIC) has classified three of the streams within the watershed. These are (1) Hurricane Creek from its source to Choctawhatchee River, (2) Mill Creek from Hurricane Creek to Hartford, and (3) Little Choctawhatchee River from its source to the Choctawhatchee River. All three are classified as "Fish and Wildlife." The other AWIC classifications used in the State are (1) Public Water Supply, (2) Swimming and Other Whole-Body Water-Contact Sports, and (3) Shellfish Harvesting.

The AWIC has one water quality trend station on the Little Choctawhatchee River at Houston County Road 49. In addition, the U. S. Geological Survey (USGS) had two low-flow partial-record stations--one on the Little Choctawhatchee River at State Highway 123 and one on Hurricane Creek at State Highway 52. These are the only known locations for which low-flow data are available; these data are shown below:

<u>USGS Station</u>	<u>Date</u>	<u>Flow</u>
Little Choctawhatchee River	9-6-51	.79.4 cfs
	11-19-63	111.0 cfs
	10-9-68	87.4 cfs
Hurricane Creek	10-8-68	9.17 cfs
	11-19-73	11.5 cfs

The Soil Conservation Service implemented a water quality study within the watershed beginning in March 1976. Thirteen sampling sites were selected on 10 streams (see appendix J). Sites were located so that water quality of all major drainage areas could be evaluated; however, one site (No. 12) was located on a small branch that appeared to be typical of the smaller drainage areas within the watershed. The two largest streams (Little Choctawhatchee River and Hurricane Creek) and Bear Creek, the site of the recreational lake, each had two sampling sites.

An environmental engineering firm collected samples and analyzed water quality at two-week intervals between March 2 and August 31, 1976. A summary of the data collected is shown in appendix J.

Stream discharge, total residue, non-filterable residue, dissolved oxygen, and specific conductance were measured at regular two-week intervals at all sites. Total Kjeldahl nitrogen (organic plus ammonia nitrogen), nitrite plus nitrate nitrogen, total phosphorus, and pH were tested at four-week intervals at all sites. In order to confirm that the water quality of Bear Creek is suitable for recreational purposes, tests were conducted at sites 1 and 2 for fecal coliform bacteria, fecal streptococci, five-day biochemical oxygen demand ( $BOD_5$ ), color, and turbidity; these tests were taken at eight-week intervals during the sampling period. In addition, five fecal coliform samples were collected at the proposed dam site at one-week intervals beginning July 6, 1976.

The data collected provide a fairly comprehensive picture of water quality in the watershed. When these data are compared with EPA and AWIC criteria, it appears that the water quality in the streams of the Southeast Choctawhatchee River Watershed are generally adequate for freshwater aquatic life. Based on guidelines on water hardness, the surface waters of the area would all be classified as "soft". 7/ Total alkalinity is low in all streams evaluated and is actually lower than the 30-130 milligrams per liter (mg/l) established by EPA as a desirable range for freshwater wildlife. 8/ No numerical limits on alkalinity are presented for freshwater aquatic life.

Bacteriological quality was evaluated in relation to the criteria established by the AWIC for swimming and other whole-body water-contact sports. According to these criteria, water is acceptable for these purposes when a sanitary survey reveals no sources of dangerous pollution and when the fecal coliform density does not exceed a geometric mean of 200 bacteria per 100 milliliters (ml) for samples evaluated. The two water sampling stations that were located within the confines of the proposed lake were sites 1A and 2. Since the geometric mean concentrations of fecal coliforms for these two sites were 148 per 100 ml and 155 per 100 ml, respectively, the AWIC criterion for number of bacteria was satisfied.

The pH of the 10 streams evaluated fell within the recommended 6.0-9.0 range for both freshwater aquatic life and freshwater wildlife. The average pH at site 2 on Bear Creek was within EPA's "must be" range of 5.0 to 9.0 for recreational waters; however, it was slightly below the "acceptable" lower limit of 6.5. The maximum and minimum pH values at site 2 were 6.8 and 6.1, respectively.

Dissolved oxygen (DO) was generally above the desirable 5.0 mg/l at all sites; site 2 was the notable exception. At site 2 the DO ranged from 1.2 to 7.6 mg/l with an average of 3.6 mg/l for the

12 sampling trips. In terms of percent saturation, the DO ranged from 15 to 78 with a mean of 40.

An analysis of the nutrient assimilative capacity of the proposed lake was conducted by a company of environmental scientists and engineers in 1977. The analysis was based on water quality information gathered at sites 1 and 2 during 1976 and on land use, watershed slope, depth characteristics of the impoundment, and etc. Loading rates for subtropical lacustrine systems was used. 9/

The permissible loading rate for nitrogen 10/ for Bear<sub>2</sub>Creek Lake is 4.5 grams of nitrogen per square meter per year ( $N/m^2/yr$ ). The analysis revealed that nitrogen loading exceeded this rate only in March and December at site 1; at site 2 it exceeded only in March. The yearly averages in grams  $N/m^2/yr$  for sites 1 and 2 were 3.87 and 1.99, respectively.

The permissible phosphorus loading was determined to be 0.29 grams phosphorus per square meter per year ( $P/m^2/yr$ ). The critical level was exceeded in mid-and late-March at site 2. Phosphorus loading was below critical levels for all other months.

The range of values for nitrogen and phosphorus for the water samples collected at all 13 sites is shown below:

Low/High Values for Nitrogen and Phosphorus in Streams of Southeast Choctawhatchee River Watershed Between March 2 and August 31, 1976.

Site No.	Total Kjeldahl Nitrogen (mg/l)	Nitrite & Nitrate Nitrogen (mg/l)	Total Phosphorus (mg/l)
1	0.24/0.57	0.10/0.17	0.01/0.03
2	0.35/0.56	0.01/0.17	0.01/0.11
3	0.95/2.79	0.33/0.51	0.32/0.99
4	0.17/0.43	0.23/0.55	0.04/0.17
5	0.19/0.42	0.25/0.64	0.01/0.05
6	0.17/0.38	0.12/0.26	0.01/0.05
7	0.23/0.49	0.33/0.56	0.09/0.22
8	0.05/0.27	0.29/0.39	0.01/0.23
9	0.16/0.36	0.14/0.44	0.01/0.04
10	0.10/0.40	0.18/0.31	0.01/0.14
11	0.19/0.43	0.24/0.37	0.02/0.07
12	0.06/0.17	0.70/1.85	0.01/0.30
13	0.14/0.32	0.66/1.67	0.02/0.30

Neither EPA nor AWIC has established a desirable range of values for nitrogen for the fish and wildlife classification of streams. However, high quality water for a public water supply is limited to 10 mg/l nitrate-nitrogen and 1 mg/l nitrite-nitrogen.

While EPA and AWIC have not yet published limits for phosphorus, the Federal Water Pollution Control Administration in its Water Quality Criteria (1968) stated that "allowable amounts of phos-

phorus will vary, but in general it is believed that a desirable guideline is 100 micrograms/liter (0.10 mg/l) for rivers..." 8/ Site 3 on Newton Creek is the only stream which consistently had a total phosphorus concentration above that figure. The fact that both nitrogen and phosphorus content are high at site 3 than any of the other sites is most likely a result of the urban influence on this particular stream. Beaver Creek, one of the tributaries entering Newton Creek, reaches well into the city of Dothan and receives the effluent from one of the city's three sewage treatment plants. This plant has a capacity of 2.5 million gallons per day (MGD) and consists of two primary settling basins, two anaerobic digestors, two trickling filters, and one final settling basin. This plant is in the process of being upgraded to provide a capacity of 6 MGD. The discharge from Dothan's two other sewage treatment plants does not enter the Southeast Choctawhatchee River Watershed. (See map, appendix J, for location of sewage treatment plants).

The city of Slocumb has a one-cell, nonaerated lagoon for its municipal waste treatment system. This is a 75,000 gallons per day system which discharges into Pine Log Branch, a tributary of Hurricane Creek.

The Hartford waste treatment system consists of three lagoons with a design flow of 0.25 MGD. Effluent from the system flows into Dowling Branch and enters Hurricane Creek about one-half mile above sampling site 11.

Midland City has a small "package" sewage treatment plant with an 11,000 gallon capacity. Treatment is by extended aeration and discharge flows through Mill and Harrison Creeks into the Little Choctawhatchee River.

All municipal waste treatment systems in the watershed have the necessary State and Federal discharge permits.

Besides the natural surface waters, there are 99 farm ponds in the watershed. No water quality data are available for these ponds.

### Wetlands

Wetlands within the watershed were delineated on USGS quad sheets in accordance with definitions described in the U. S. Department of the Interior Circular 39. Field investigations conducted during the summer of 1975 indicated that 6,980 acres of wetland existed in the watershed. Comments on the draft statement resulted in additional studies in January 1978 which indicated that 7,266 acres of wetland existed in the watershed. Acres by type are as follows:

#### Acres By Wetland Type

Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
2,358	335	64	207	112	207	3,983

In as much as Circular 39 was developed primarily to identify important waterfowl habitat, it is not readily adaptable to classifying the conglomerate of wetlands in the Southeast Choctawhatchee River Watershed. In particular, many "wet" areas are relatively recent in origin, resulting to a great extent from man's use of the land. This situation is further compounded by beaver activities and variable rainfall.

#### PRESENT AND PROJECTED POPULATIONS

Total population in Dale county increased 41 percent between 1960 and 1970. Population in 1960 was 31,066 and 52,983 in 1970. 9/ The large increase was due to the rapid growth of the U.S. Army Aviation School located at Fort Rucker in Dale County during the Vietnam War. Present trends indicate a reduction in military activities in the area resulting in a decline of Dale County's rate of future growth. The county contains 11 municipalities; however, only two, Ozark and Daleville, have populations greater than 2,500. Ozark and Daleville had 1960 populations of 9,534 and 2,940, respectively. In 1970, populations were 13,555 for Ozark, a 42 percent increase, and 5,025 for Daleville, a 71 percent increase. 11/ More than 50 percent of Dale County's population gains stemmed from increases in military personnel and dependents at Fort Rucker. The remaining nine towns have acted as small service communities and most began as agricultural markets. The town of Napier Field was originally established during World War II as a military installation but now continues as a municipality adjacent to the largest public airport in the region. The towns of Grimes and Kelly and portions of Pinckard and Midland City are located in Dale County's portion of the watershed. 12/

Total population in Geneva County decreased by two percent between 1960 and 1970. Population in 1960 was 22,310 and 21,924 in 1970. 11/ Population in Geneva County has been decreasing since 1940. The county is experiencing an outmigration of the rural farm and rural nonfarm population to incorporated places, especially those with populations in excess of 2,500. Geneva County contains eight municipalities of which two, Geneva and Hartford, have population in excess of 2,500. The cities of Geneva and Hartford had 1960 populations of 3,840 and 1,956, respectively. In 1970 the populations were 4,371 for Geneva, a 14 percent increase, and 3,001 for Hartford, a 53 percent increase. 11/ Four municipalities, Geneva, Hartford, Samson, and Slocomb, are located partially within the watershed and the town of Malvern is completely within the watershed. Malvern, along with the other small communities, has been losing population since the turn of the century while serving as a small service center for the immediate area. 12/

Total population in Houston County increased 12 percent between 1960 and 1970. Population in 1960 was 50,718 and 56,574 in 1970. 11/ The city of Dothan is the only large municipality in the county and is located partially within the watershed. The city is a trade center for the region and has absorbed some of the outmigration from surrounding areas. There are ten other municipalities in Houston County, all with populations less than 2,500. Wicksburg is the only other town located within the watershed in Houston County. All are essentially rural agricultural communities and are experiencing a population decline and physical deterioration. 12/ The city of Dothan had a 1960 population of 31,440 and a 1970 population of 36,733, a 17 percent increase.

Houston County is projected to continue increasing in population. Dale and Geneva Counties are expected to continue losing population. Population projections by counties are as follows:

POPULATION PROJECTIONS.

COUNTY	1970	1980	1990	2000
Dale (OBERS)	52,938	30,400	31,000	32,900
Dale (SEARPD*)	52,938	43,602	44,216	Not Available
Geneva (OBERS)	21,924	21,500	21,200	20,300
Houston (OBERS)	56,574	70,200	69,000	71,500
Region** (SEARPD)	236,184	277,900	229,400	233,400

\* Southeast Alabama Regional Development Commission Projections

\*\* Seven county area of Barbour, Coffee, Covington, Dale, Geneva, Henry and Houston.

There is a marked concentration of the region's population in Dale and Houston Counties. These counties contained 30.2 percent of the region's population in 1940 compared to 46.4 percent in 1970. The only gain in numbers, as projected, will be in Houston County. 12/

Practically all of Houston County's projected gain is attributed to the metropolitan growth of Dothan. Growth in Dale County will be uncertain due to the influence of Fort Rucker. Two projections are shown in the table of projections for Dale County. The planning commission projections were also displayed because the OBERS projections showed an unrealistic projection in population for Dale County due to the phase down of Fort Rucker in the early 1970's.

Geneva County is not located on a heavily traveled transportation route and has not experienced significant industrial development except in agribusiness. Hence, the county will continue to lose population. 12/

The nonwhite or minority group in the three county area is almost exclusively black. The black population in Dale County has been steadily increasing since 1950. As of 1970, black residents accounted for 13 percent of the total population in Dale County. By contrast, Geneva and Houston Counties have been steadily decreasing in black population since 1950. As of 1970, black residents accounted for 13 percent of the total population in Geneva County and 24 percent of the total in Houston County. The 1950 and 1970 black populations by counties are as follows:  
11/

<u>COUNTY</u>	<u>1950 POPULATION</u>	<u>1970 POPULATION</u>
Dale	4,843	6,718
Geneva	3,409	2,896
Houston	13,669	13,375

The nonwhite population is expected to continue to decline as a whole. However, Dale County's black population will fluctuate in proportion to the activities associated with Fort Rucker.

Fifteen percent of all families in Dale County had incomes below the poverty level in 1970. The mean family income for these families was \$1,808. Of this group, 27 percent were minority families with a mean family income of \$2,164. 11/

Fifteen percent of all families in Geneva County had incomes below the poverty level in 1970. The mean family income for these families was \$1,930. Of this group, 24 percent were minority families with a mean family income of \$2,338. 11/

Twenty percent of all families in Houston County had incomes below the poverty level in 1970. The mean family income for these families was \$1,983. Of this group, 46 percent were minority families with a mean family income of \$2,189. 11/

#### ECONOMIC RESOURCES

All land in the watershed is privately owned. There are about 1,936 farm operating units, primarily family type, within the watershed. Farm units average about 80 acres. Cropland leasing is used by operators to expand their production base. On the average, 13 percent of all farm operators in the area will be operating under some type of farm lease agreement. Land values in the watershed range from \$800 to over \$1,500 per acre for agricultural uses.

Major farm enterprises are peanuts, beef cattle, corn, and hogs. Enterprises with less significance include truck crops, soybeans, small grains, hay and chickens. Average crop yields are as follows:



	<u>UNIT</u>	<u>WATERSHED PRESENT YIELD/AC.</u>
Peanuts	ton	1.25
Corn	bu.	70.0
Pasture	AUM*	6.0
Soybeans	bu.	25.0

\*Animal Unit Month is the amount of grazing that it takes to satisfy the grazing needs of one mature cow for one month.

Forest lands in the watershed are in fair silvicultural condition. The average basal area is about 60 square feet per acre. Site index, the height of a tree at 50 years of age, averages 80 feet.

Transportation facilities serving the watershed provide excellent accessibility to markets in the area. The area is served by U. S. Highways 84 and 231 and by State Highways 52, 103, and 123. Railway service is provided by the Atlantic and Saint Andrews Bay Line Railroad, the Seaboard Coast Line Railroad and the Central of Georgia Railroad. In addition, commercial air service is available at the Dothan Municipal Airport.

Dale County had a work force of 9,329 for the year ending December 31, 1975, with nine percent unemployed. 13/ Most of the employment was created by government, manufacturing of durable goods, and wholesale and retail trade. 14/

Geneva County had a work force of 10,436 for the year ending December 31, 1975, with six percent unemployed. 13/ Most of the employment was manufacturing of durable goods, and services. 16/

Houston County had a work force of 31,455 for the year ending December 31, 1975, with six percent unemployed. 13/ Most of the employment was created by wholesale and retail trade, construction, government, manufacturing of durable goods, and services. 16/

The economy of the watershed is dependent upon agriculture. Peanuts, beef cattle, corn and hogs are the major sources of income. However, the importance of agriculture to the economic base of the region has been declining while manufacturing and services have increased. The area economy is oriented primarily toward manufacturing and government services. Despite this trend, the value of farm products sold has continued to increase. A decrease in the number of farms and an increase in average size has resulted in an increase in the dollar output per farm. 12/

The table on the following page shows the number and percent of farms by sales of farm products for Dale, Geneva, and Houston Counties. These conditions are representative of the watershed.

## PLANT AND ANIMAL RESOURCES

### Plant Resources

A cooperative agreement was entered into between the Soil Conservation Service and Auburn University for the purpose of studying the vegetation of the watershed. One objective of the study was to identify and describe the general plant communities. Information on plant resources in this section is an abbreviated summary of the vegetation study report. The report on the vegetation study is included as appendix L of this document.

Forest - The most abundant forest community is one that occurs on the broad flood plains. Dominant overstory plants include water oak (Quercus nigra), red maple (Acer rubum), yellow poplar (Liriodendron tulipifera), sweetgum (Liquidambar styraciflua), hickories (Carya spp.) and oak (Quercus spp.) species. Southern magnolia (Magnolia grandiflora) and sweet bay magnolia (M. virginiana) are dominant species in areas that have high soil moisture. Dominant understory and shrubby species include American beautyberry (Callicarpa americana), American holly (Ilex opaca), devilwood (Osmanthus americana), chinese privet (Ligustrum sinense), common blackberry (Rubus argutus) and red maple. Woody vines and ground cover plants include muscadine grape (Vitis rotundifolia), poison ivy (Rhus radicans), greenbrier (Smilax spp.), Japanese honeysuckle (Lonicera japonica), yellow jessamine (Gelsemium sempervirens) and Virginia creeper (Parthenocissus quinquefolia).

The most extensive upland forest plant community occurs on steeper slopes and very sandy soils that are not well suited to cultivated crops. Dominant overstory plants include water oak, slash pine (Pinus elliottii), loblolly pine (P. taeda), sweetgum, yellow poplar, hickories, black cherry (Prunus serotina), persimmon (Diospyros virginiana), maple and southern magnolia. The most common understory and shrubby plants include common blackberry, American beautyberry and flowering dogwood (Cornus florida). Native grasses and forbs are most abundant where overstory canopies are thin.

Planted stands of pines, primarily slash and loblolly, occur in small fields throughout the watershed. Many native plants invade the pine plantations and remain for 8 to 12 years. The native grasses and forbs become greatly reduced as the pine canopy closes and only the most shade tolerant plants remain.

NUMBER OF FARMS IN A THREE-COUNTY AREA  
BY SALES OF FARM PRODUCTS

SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED, ALABAMA

SALES OF FARM PRODUCTS	COUNTY								TOTAL
	DALE		GENEVA		HOUSTON		Number	Percent	
	Number	Percent	Number	Percent	Number	Percent			
\$100,000 and over	26	3.9	50	4.6	55	4.5			131
\$40,000 to \$99,999	59	8.9	87	8.0	147	12.2			293
\$20,000 to \$39,999	64	9.7	135	12.3	153	12.7			352
\$10,000 to 19,999	93	14.0	199	18.2	216	17.9			508
\$ 5,000 to \$9,999	109	16.5	175	16.0	204	16.9			488
\$2,500 to \$4,999	91	13.7	146	13.3	150	12.4			387
Under \$2,500	221	33.3	302	27.6	283	23.4			806
TOTAL	663	100.0	1,094	100.0	1,208	100.0			2,965

\*Data taken from 1974 Census of Agriculture.

Cropland - The most important cultivated crops include corn, peanuts, soybeans, small grain, grain sorghum, and truck crops. Plants of the cropland community include the cultivated crops and weeds. Farmers use cultural, mechanical and chemical practices to curtail the invasion of weeds; however, many weeds still occur in the cultivated fields. The kind and amount of weeds that invade crops are influenced by both natural and cultural factors such as site selection, weather conditions, previous land use, timeliness of weed control operations, and effectiveness of chemical herbicides. Weeds that commonly invade cultivated crops include Florida pusley (Richardia scabra), common ragweed (Ambrosia artemisiifolia), Florida beggarweed (Desmodium tortuosum), southern sandbur (Cenchrus echinatus), sicklepod (Cassia obtusifolia), morning glories (Ipomoea spp.), nutsedges (Cyperus spp.), camphorweed (Heterotheca subaxillaris) and panicgrass (Panicum sp.).

Grassland - The plant composition of improved pastures and haylands is primarily either bahia grass (Paspalum notatum) or coastal bermuda grass (Cynodon dactylon) and native grass and forb invaders. Common bermuda grass and Dallis grass (Paspalum dilatatum) are dominant forage plants in some pasture fields. Annual legumes are often overseeded on permanent pastures and managed to improve the quality of perennial grass pastures. The annual legumes most frequently used include ball clover (Trifolium nigrescens), crimson clover (T. incarnatum), arrowleaf clover (T. vesiculosum) and vetches (Vicia spp.). Rye (Secale cereale) and annual ryegrass (Lolium multiflorum) are often planted on croplands following harvest and less frequently drilled on perennial pastures for late fall, winter, and early spring grazing. Weeds that commonly invade perennial pastures are essentially the same as those listed as occurring in cropland and idle land.

Idle Land - The idle lands in the watershed are most frequently small abandoned cropland fields that remain idle for a few years before they are converted to pasture or revert back to forest by secondary plant succession. Various successional stages as described by Oosting, 18/ Billings, 19/ and Odum 20/ are recognized; however, no attempt has been made to describe the plant composition of the different stages. The first invaders are the weeds that normally occur in cropland. The next seral stage is dominated by the more persistent annual and perennial herbaceous plant. Woody plants such as water oak, black cherry, persimmon, sweetgum, hickories and pine become established after the land has been idle for a few years. Appendix L contains a list of common "old field" herbs.

## Animal Resources

The existing habitat supports harvestable populations of bobwhite quail, cottontail rabbits, and mourning doves. Stream fish habitat is poor to fair with a harvest production of game fish averaging 6 to 10 pounds per acre.

On November 24-25, 1975, a team of interagency biologists representing SCS, U. S. Fish and Wildlife Service, and the Alabama Department of Conservation and Natural Resources made a objective rating of the major fish and wildlife resources in the watershed and in the proposed impoundment site. The following is a summary of this field work:

Species	Watershed*			Impoundment Site*		
	Habitat Rating	Population Density	Extent of Utilization	Habitat Rating	Population Density	Extent of Utilization
Sport fish	2	3	2	3	3	2
Other fish	3	3	3	3	3	2
Bobwhite quail	4	4	4	3	3	3
Gray squirrel	3	3	2	3	3	2
Cottontail rabbit	4	3	2	3	2	2
Whitetail deer	2	2	2	2	1	1
Wild turkey	2	2	2	2	1	1
Mourning dove	4	4	4	3	3	4
Waterfowl	3	2	2	4	3	2
Raccoon	4	3	3	4	4	2
Bobcat	3	3	2	3	2	2
Songbirds	4	4	2	4	4	1

\*1, None; 2, Below Average; 3, Average; 4, Above Average; 5, High.

The wetland areas are used for incidental timber production, livestock watering, and to a limited extent for hunting and fishing. The waterfowl use of the area is primarily by wood ducks. These areas are also above average habitat for several species of songbirds. This is particularly true of those bird species which feed upon the many insect forms living in or emerging from the wetland areas. Nesting sites provided by these wetlands are preferred by many species of birds.

The Alabama Department of Conservation and Natural Resources' District Fisheries Biologist conducted a fish population study of the Bear Creek Site on November 4-5, 1975. The results are listed in the following table. He also estimated that less than 400 man-days of stream fishing occur on Bear Creek each year.

List of Species Collected from Bear Creek, Houston and Geneva Counties, on November 4-5, 1975.

Sites at which collected	Scientific Name	Common Name
3	<u>Anguilla rostrata</u>	American eel
3	<u>Esox americanus americanus</u>	Redfin pickeral
1-2-3	<u>Esox niger</u>	Chain pickeral
2	<u>Notemigonus crysoleucas</u>	Golden shiner
1-2-3	<u>Notropis texanus</u>	Weed shiner
1	<u>Moxostoma poecilurum</u>	Blacktail redhorse
1-2-3	<u>Minytrema melanops</u>	Spotted sucker
2	<u>Erimyzon sucetta</u>	Lake chubsucker
1-2-3	<u>Ictalurus natalis</u>	Yellow bullhead
1-2	<u>Ictalurus nebulosus</u>	Brown bullhead
1-2-3	<u>Noturus gyrinus</u>	Tadpole madtom
3	<u>Noturus leptacanthus</u>	Speckled madtom
1-2-3	<u>Aphredoderus sayanus</u>	Pirate perch
1-2-3	<u>Fundulus olivaceus</u>	Blackspotted topminnow
1-2-3	<u>Gambusia affinis</u>	Mosquitofish
1-3	<u>Ambloplites rupestris</u>	Rock bass
1-2	<u>Centrarchus macropterus</u>	Flier
1-2	<u>Lepomis gulosus</u>	Warmouth
1-2-3	<u>Lepomis macrochirus</u>	Bluegill
2	<u>Lepomis marginatus</u>	Dollar sunfish
1-2-3	<u>Lepomis megalotis</u>	Longear sunfish
1-2	<u>Lepomis punctatus</u>	Spotted sunfish
1-2-3	<u>Micropterus salmoides</u>	Largemouth bass
1-2	<u>Pomoxis nigromaculatus</u>	Black crappie
1	<u>Etheostoma davisoni</u>	Choctawhatchee darter

Collection Sites

1. R. 25E. T. 3N. Section 28 (NW $\frac{1}{4}$ ) Houston County Road 40 at Bridge.
2. R. 25E. T. 3N. Section 33 (SE $\frac{1}{4}$  of NW $\frac{1}{4}$ ) Geneva County Road 68 at Bridge.
3. R. 25E. T. 2N. Section 8 (NE $\frac{1}{4}$  of NE $\frac{1}{4}$ ) Bridge on Dirt Road.

Threatened and Endangered Animals

No threatened or endangered animals are known to reside in the watershed. 21/ In a recent fish survey of the Choctawhatchee River drainage area, Mettee reported only one endemic species, Etheostoma okaloosae, in his collections. 22/

## RECREATIONAL RESOURCES

Recreation resources are limited in the three counties immediately surrounding the watershed. There are about 40 sites within Dale, Geneva, and Houston Counties listed in a recent recreation and open space inventory. Most of these areas are typically small parks that have one or two types of recreation facilities. Most of the areas are open to the general public. Below is a brief listing of selected recreation facilities in the three-county area:

<u>Facilities</u>	<u>1972 Existing</u>
Camping (sites)	135
Picnicking (tables)	193
Fishing (acres)	4,458
Beach Swimming (linear feet)	85
Water skiing (acres)	1,489
Boating (acres)	1,489
Parks (acres)	138

Source: Southeast Alabama Regional Planning and Development Commission.

## ARCHAEOLOGICAL, HISTORICAL, AND UNIQUE SCENIC RESOURCES

Recently, the Alabama Historical Commission through a cooperative agreement with SCS studied the watershed for archaeological or historical sites that might be affected by the project. The results of the study indicate that no such sites exist within the planned areas of construction or inundation (see appendix I).

## SOIL, WATER, AND PLANT MANAGEMENT STATUS

Land use trends in the watershed are toward more grassland and urban land and away from forest land. The rate of change has been slow, however. The greatest change has occurred in and around Dothan where agricultural land is changing to urban land. Cotton production has drastically declined during the past ten years. The land once used for cotton production has generally been converted to peanuts, soybeans and some of the less productive areas have gone to pasture.

The three Soil and Water Conservation Districts are active in promoting conservation measures. Each of the three districts publishes newspaper articles each week, conducts radio programs

each week, publishes an annual district progress report in January of each year, and sponsors or cosponsors land judging and forestry judging contests for students each year. About 18 television programs are annually conducted by the three districts. The districts also sponsor conservation tours for the general public and conduct conservation programs for civic groups on a timely basis. These activities serve to inform land users about conservation services that are available and conservation measures that have been accomplished and provide conservation information to students and the general public.

Conservation plans have been prepared on 485 of the 1,936 farms in the watershed. These plans cover 66,791 acres or about 39 percent of the total watershed area. Conservation practices have been applied on 36,167 acres of land covered by conservation plans to the extent that the land is considered to be adequately treated. An additional 60,233 acres are considered to be adequately protected. Land adequately treated is defined as being used within its capability and on which the conservation practices that are essential to its protection and planned improvement have been applied. Land adequately protected is defined as land on which soil, water and plant resources are protected from deterioration.

The entire watershed is included in the Wiregrass Resource Conservation and Development (RC&D) Project Area. Approximately 8.5 acres of critical roadbanks in the Geneva County portion of the watershed have been treated as an RC&D project measure since 1968. Twenty-one gullies in the watershed were treated with special funds provided by Agricultural Conservation Program (ACP) within the RC&D Project Area. In 1969, 3.4 miles of channel work was installed as an RC&D project measure in the Slocumb, Alabama, area.

#### PROJECTS OF OTHER AGENCIES

There are no water resource development projects planned or being planned by other agencies within the Southeast Choctawhatchee River Watershed.



# WATER AND RELATED LAND RESOURCE PROBLEMS

## SUMMARY

There are four major resource problems in the watershed. These include erosion, sedimentation, damage to plant and animal habitats, and a lack of adequate recreational facilities.

Erosion is the most significant problem in the watershed area. Sheet, rill and gully erosion result in an average of 1,333,000 tons of soil being eroded each year under present conditions and is increasing in severity. The average annual erosion rate for the watershed is 7.2 tons per acre and varies from nearly zero tons on the flatter slopes to over 463 tons in the more severely eroding gullies. Sheet and rill erosion accounts for 51 percent of the total erosion and gully erosion accounts for 49 percent.

Sheet and rill erosion is most severe on 66,440 acres of cropland located on the steep, sandy and loamy sand soils where conservation practices either have not been installed or have become ineffective due to damage. This damage is caused by the gullies eroding into terraces and waterways. The erosion rate on these soils ranges from nearly zero to over 100 tons per year. There are 9,313 acres of cropland located in the drainage areas of 609 gullies which either do not have conservation practices installed or the practices are becoming ineffective. The practices cannot be installed or maintained because of the downstream gullies.

The second resource problem -- sedimentation -- is inseparable from the erosion problem. It refers to the damage caused when the soil from heavily eroded areas deposits on vegetation (including crops), clogs pipes and waterways, fills ponds and lakes, and covers flood plain areas with silt and sand. Nearly one million tons of sediment are entering the streams of the watershed each year from all forms of erosion. Over 300,000 tons are deposited on the land annually, resulting in a loss of crops and other vegetation and increased maintenance costs to landowners.

The destruction of habitat for aquatic plants and animals is another major resource problem. The streambeds in areas where erosion is heaviest are covered with silt and sand. Thus, bottom vegetation cannot be productive nor can any aquatic animals that depend on bottom-dwelling flora and fauna for sustenance. Many stream segments in the watershed are ecologically deficient because of sedimentation.

The fourth major problem is a lack of adequate water-based recreational sites for the area. Population projections indicate that the acute shortage that currently exists will only worsen in the years ahead.

Water quality is a major problem only as it relates to the sedimentation problem. If the sediment problem did not exist, the only water quality problem would be the low dissolved oxygen concentrations in Bear Creek. This problem should be eliminated with construction of the recreational lake.

Minor problems are associated with flooding, a lack of good drainage in some areas, and social and economic conditions. No significant problems are associated with water needs for irrigation or for municipal and industrial water supply.

#### EROSION DAMAGE

Sheet, rill, and gully erosion are the greatest resource problems in the watershed. Such erosion is a progressive process, accelerated by cultivation of agricultural crops and other activities of man. Total erosion in the watershed is estimated to average about 1,333,000 tons annually of which about 631,000 tons are from sheet and rill erosion and about 702,000 tons from gully erosion.

Annual erosion rates vary from nearly zero to over 463 tons per acre per year in the most critically eroding gullies. The following table shows by land use the erosion problem:

Land Use	Acres	Average Annual Erosion Rates				
		(Tons/Acre/Year)				
		0-5	5-10	10-20	20-100	100+
		(Acres)				
Cropland	66,440	25,738	32,562	8,140	-	-
Pastureland	30,190	23,686	5,854	650	-	-
Forest land	55,130	55,130	-	-	-	-
Urban	10,720	10,720	-	-	-	-
Other	7,520	1,844	2,520	-	1,676	1,480
<b>Total</b>	<b>170,000</b>	<b>117,118</b>	<b>40,936</b>	<b>8,790</b>	<b>1,676</b>	<b>1,480</b>

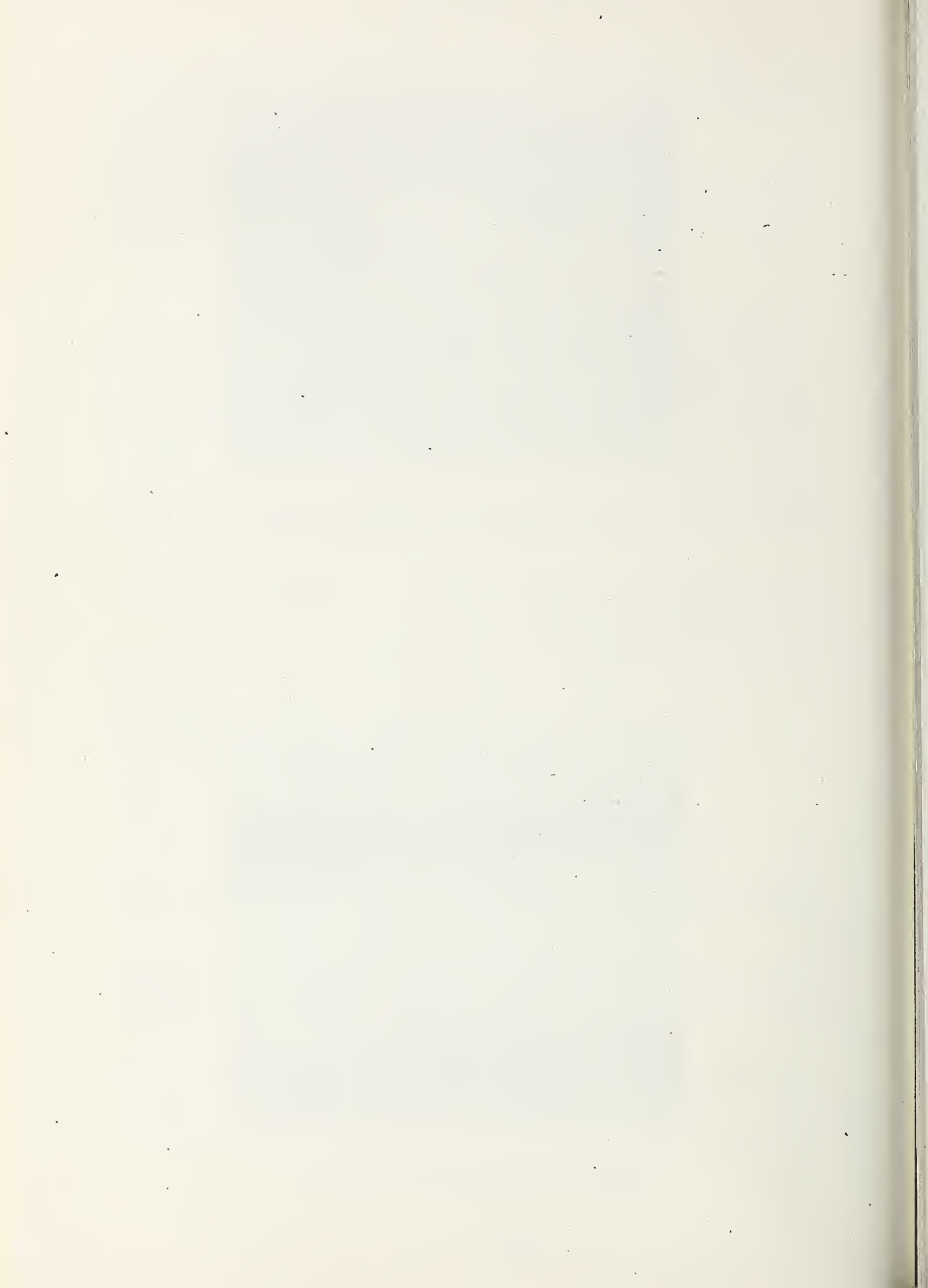
There are about 52,882 acres or 31 percent of the watershed with an erosion rate in excess of five tons per year. The rate of five tons is about the maximum rate which can be allowed without seriously affecting productivity.

Sheet and rill erosion occurs throughout the entire watershed. The most significant problems occur on steeper slopes that are frequently used to grow cultivated crops. In general, the less sloping cropland fields are fairly well protected by conservation practices to the extent that erosion is held either within or

areas (Class I gullies),



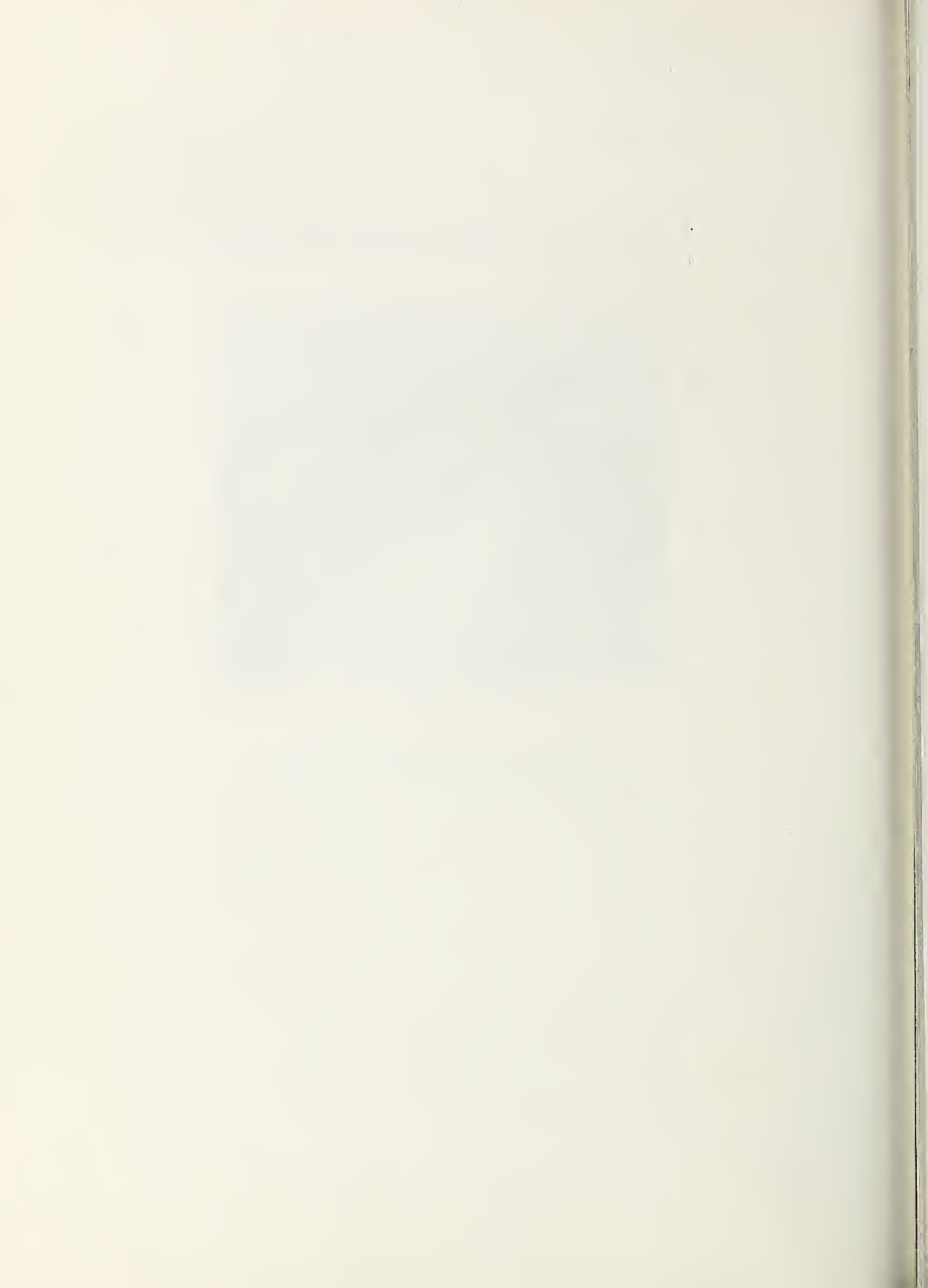
Typical cropland erosion problems  
resulting from inadequate outlets.



A Class II gully with average width-10 feet; depth-8 feet; length-150 feet; and drainage area-20 acres.



Caving type gully in a moderately advanced stage of erosion resulting from concentration of runoff on an unstable outlet.



A Class III gully with average width-50 feet; depth-30 feet; length-300 feet; and drainage area-60 acres.



A Class IV gully with average width-70 feet; depth-60 feet; length-1500 feet; and drainage area-125 acres.



Caving type gullies in advanced stage of erosion.





near tolerance limits. Cropland is most susceptible to sheet and rill erosion because of the lack of protective soil cover. Sheet erosion causes a reduction in soil fertility and exposes the less fertile, more easily erodible subsoil to the forces of wind and water. Such erosion is widespread with many areas in all land uses undergoing erosion of a level that damages the resource base; that is, the erosion exceeds the capacity of the land to recover annual fertility and soil condition losses. Over 60 percent of the cropland areas in the watershed are losing soil at a rate exceeding five tons per acre per year.

The estimated average gross erosion rates for sheet and rill erosion within the watershed under present conditions are as follows:

	Tons/acre/year
Cropland	8.0
Pasture and Hayland	1.0
Forest Land	0.6
Other	2.0

Gully erosion occurs, to some extent, throughout the entire watershed; however, it is more common on steep uplands adjacent to the Choctawhatchee and Little Choctawhatchee River and the lower portions of their larger tributaries. A unique combination of topography and soils makes this area most susceptible to gully erosion. These areas are characterized by steep slopes with sand and loamy sand soils that occur adjacent to the flood plain. The steep slopes usually have a forest cover. The ridgetops are usually broad and are used extensively for cultivated crops.

As surface runoff moves from cropland fields during major storms, water frequently concentrates on the steep, sandy and loamy sand soils before reaching a stable outlet. These soils provide little resistance to erosion, particularly when the flow is concentrated. The result is the formation of gullies.

Gullies have been classified by four general types. Gullied areas range in size from less than one-quarter acre to more than ten acres. Depth varies from two or three feet to more than 40 feet.

The first type of gully (Class I), common throughout the watershed, usually develops within cropland fields, overgrazed pastures, and along roadsides. This type is usually small, does not have vertical walls, and is frequently associated with steep, sandy slopes. Such gullies usually develop slowly and can be successfully treated by shaping and planting with sod forming perennial grasses. Approximately 1,549 of these Class I gullies exist within the watershed and affect about 1,676 acres. Of these areas, 357 occur along roadsides. The combined drainage area of these gullies is about 17,175 acres.

Gullies that form in the loose sandy soils develop vertical walls which result from undermining and collapsing of the banks. These were generally categorized as Class II, III, and IV gullies. Such gullies continue to get broader and elongate, even into the more resistant soils, as long as they continue to receive sufficient runoff water to cause undermining of the banks. The normal development of these gullies starts near the base of the steep, sandy slopes and progressively moves uphill. There are about 609 gullies of types II, III, and IV within the watershed.

The following table presents the average erosion rates for Class I, II, III, and IV gullies:

	<u>Number</u>	<u>Tons/acre/year</u>
Class I	1,549	100
Class II	497	376
Class III	60	463
Class IV	<u>52</u>	256
TOTAL	<u>2,158</u>	

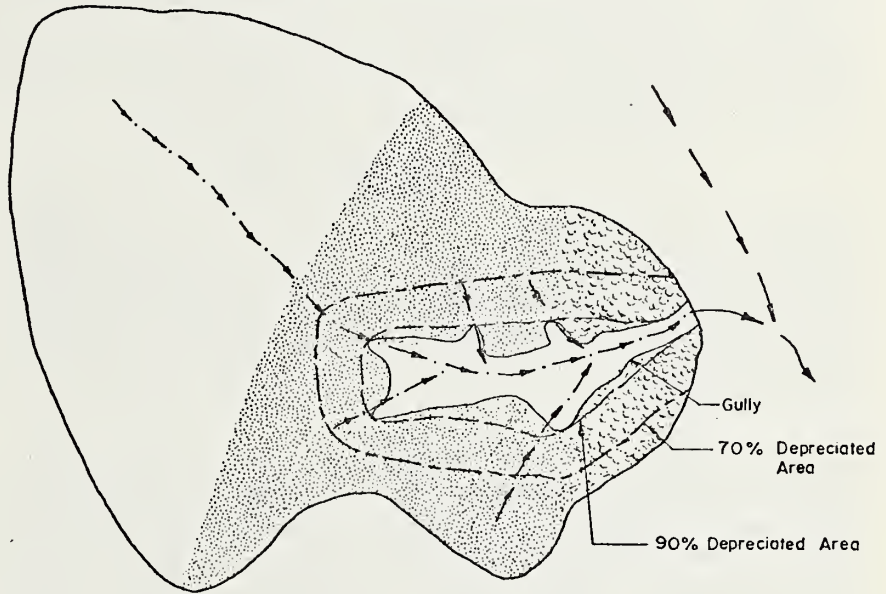
Gully erosion has resulted in 4,017 acres being either voided or depreciated. Voiding refers to complete destruction or loss of productive capacity, whereas depreciation refers to a partial loss. Of the 4,017 acres currently damaged, 1,933 acres have been 70 percent depreciated, 604 acres 90 percent depreciated and 1,480 acres voided. Based on historical rates, an additional 71 acres are being voided each year, 71 acres 90 percent depreciated, and 189 acres 70 percent depreciated.

A major problem associated with the gullies is the inability of the landowner/operator to install needed conservation practices on cropland and pastureland. Practices such as terraces and waterways which are essential to reducing erosion cannot be installed due to unstable outlets.

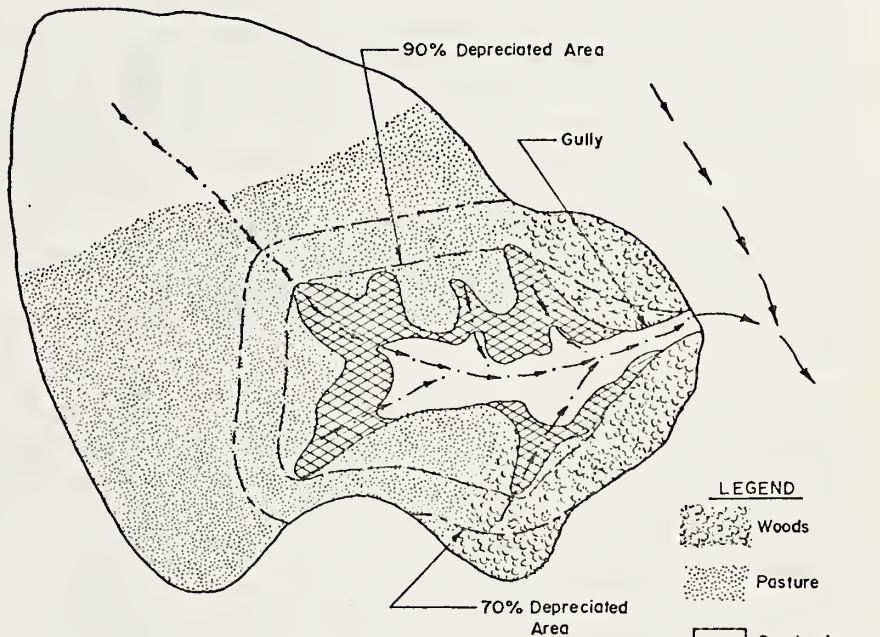
The portions of the drainage area upstream from active gullies that are subject to shift from cropland to pasture and forest are termed interdependent areas. A number of such areas have already been shifted from crop production to pasture due to the lack of stable outlets for terrace systems and the impracticality of maintaining conservation systems for erosion control and water disposal. Several gullies are located downstream from the roads and pose a threat to the roads by cutting into or eroding away the side slopes, making them unsafe for traffic. A schematic drawing of the above described situation is shown on the following page.

Gullies located in pastures and cropland present a danger in mowing and plowing operations, both to the operator and to the machine. If the machine is operated too near the edge of an undermined gully bank, the gully could cave in and could result in injury and expensive repairs. Gullies in pastures that are not fenced are also dangerous to livestock. Livestock are lost each year when they wander over the gully edges.

TYPICAL CLASS II GULLY SCHEMATIC




PRESENT





FUTURE WITHOUT PROJECT  
(After Year 2010)

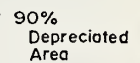
LEGEND

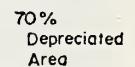
 Woods

 Pasture

 Cropland

 Drainage

 90% Depreciated Area

 70% Depreciated Area

 Gully Increase

Many of the gullied areas are now being used as garbage dumps, creating unsightly areas and unsanitary conditions. All types of rubbish, such as old car bodies, household garbage, and waste materials from construction sites, are being placed in the gullies in an effort to retard their growth. This has been unsuccessful in even slowing down the gullies growth. As the storm runoff water moves through the gullies, this rubbish is moved downstream. The following page summarizes present and future erosion for the drainage area of the gullies.

#### SEDIMENT DAMAGE

Sediment, the by-product of erosion, is a serious problem in the watershed. Of the 631,000 tons of annual sheet and rill erosion, about 316,000 tons is deposited in close proximity to the fields from which it was eroded. The remaining 315,000 tons enters the watershed stream system, as does all of the gully erosion (702,000 tons annually).

That sediment which falls out before reaching the streams (316,000 tons) is deposited in terrace channels in crop fields, at slope breaks, and in minor fans at the base of rills. This deposition is generally less fertile, coarser in texture, and has less organic matter than the original soil from which it was eroded. Such deposition increases the maintenance cost of on-farm conservation systems and reduces soil productivity.

Of the sediments which enter the stream system, approximately 747,000 tons are deposited each year within the watershed in ditches, drainageways, stream channels, and on flood plain areas. Such deposition restricts drainage, increases the incidence of out-of-bank flows, and limits the biological productivity of project surface water resources and associated wetland areas.

Approximately 270,000 tons of sediment reach the Choctawhatchee River each year via the project stream system. About 135,000 tons of this total reach Choctawhatchee Bay, the remainder being deposited within the river and on adjacent flood plain areas.

The watershed is a small part of the total drainage area of the Choctawhatchee River and as such is a minor contributor of runoff and total sediment. Since sediment is continually being lost in transit, each tributary is an important source of sediment in the mainstream reach immediately downstream from the tributary. It logically follows that a large percentage of the sediment damage in the reach of the Choctawhatchee River from the Little Choctawhatchee to Geneva (confluence with the Pea River) is from the Southeast Choctawhatchee River Watershed. This reach of the river has many sandbars and the flood plains are receiving massive deposition.

Sediment accumulation has occurred throughout much of the densely wooded flood plain within and outside the watershed. Damage to timber ranges from minor in some areas to a complete loss in

EROSION SUMMARY  
 INTERDEPENDENT AREAS FOR THE 609 GRADE STABILIZATION STRUCTURES  
 SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED, ALABAMA

Land Use	Present Condition		Year 1990						Year 2010					
	Acres	Tons	Future With Project		Future Without Project		Future If Land Stays In Present Use Without Project		Future With Project		Future Without Project		Future If Land Stays In Present Use Without Project	
			Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons
Cropland	8,868	70,944	8,868	44,340	4,988	39,904	8,868	44,340	8,220	131,520	8,220	44,340	3,086	24,688
Pasture	7,695	7,695	7,695	5,771	10,796	10,796	7,695	5,771	7,134	14,268	7,134	5,771	12,071	
Forest	2,776	1,666	2,776	1,110	2,813	1,688	2,776	1,110	2,573	2,573	2,573	2,776	1,662	
Other														
Class II Gullies*	930	349,680	930	17,670	1,302	489,552	930	17,670	1,674	629,424	1,674	17,670	629,424	
Class III Gullies*	210	97,230	210	4,830	336	155,568	210	4,830	462	213,906	462	4,830	213,906	
Class IV Gullies*	340	87,040	340	4,420	584	149,504	340	4,420	756	193,536	756	4,420	193,536	
TOTAL	20,819	614,255	20,819	78,141	20,819	847,012	20,819	78,141	20,819	1,185,227	20,819	78,141	1,075,287	

\* The acres shown are surface areas of the gullies (100% depreciated or voided).

others. Such areas range in size from one to 10 acres. Regeneration has been restricted throughout all forested flood plain areas.

Damage to ecosystems is also significant. Siltation of waterways is an important destructive force in stream ecosystems. The accumulation of sediment causes a constantly changing substrate which severely limits the diversity of plants and animals. The erratic nature of the sedimentation process also contributes to instability in the ecosystems with most deposition occurring during large, "gully washer" storms in the winter and spring.

Of the sediment reaching Choctawhatchee Bay, most is deposited in the delta and upper bay. At present there seems to be little shoaling caused by sediment in the Gulf Intercoastal Waterway, but damage may be imminent. Local citizens report significant sedimentation in the delta and the upper bay in recent years. Sediment encroachment into the waterway can be expected in the near future if the present pattern of sedimentation continues.

The Choctawhatchee delta and upper bay is an important estuarine fishery and marine nursery resource. Whereas sedimentation in these areas is not to be considered 100 percent damaging, it is reasonable to assume that the heavy sediment load carried by the Choctawhatchee River limits the productive potential of the fishery.

#### PLANT AND ANIMAL PROBLEMS

The water and related land resource problems in the watershed have only slight effects on changes in plant communities. The advancement of deep, caving gullies into cropland fields results in cropland being converted to idle land and forest land. Sediment produced from sheet, rill, and gully erosion is deposited on flood plains and in stream channels, resulting in some very slow changes to more water tolerant plant species in the flood plain. The upland forest that once occurred extensively on well-drained soils has subsequently been converted into farmland. Few, if any, extensive areas of undisturbed upland forests remain. Most forest are now limited to relatively steep slopes along streams, where the terrain is less suitable for tillage of crops than the rolling, well-drained, upland hills.

The current economic conditions, which influence the intensive upland cropping and the repeated timber cutting, will continue to affect the water and land resource problems. The current land use trends favor small game populations that require idle land, cropland and pastureland. There is a noticeable lack of large, mature forest land tracts that favor production of deer and turkey.

Other problems such as flooding, erosion, and sediment influence fish and wildlife resources. Aquatic life is greatly inhibited by the large volume of sediment entering the stream systems.

Fish production is often limited by the siltation of eggs and contamination of their environment from chemical pollutants attached to soil particles.

### RECREATION PROBLEMS

The Recreation and Open Space Plan for Southeast Alabama indicates that recreation facilities are inadequate to handle the resident demand. <sup>23/</sup> The report further stated that projected population growths in the area will only worsen the deficiencies.

All three counties surrounding the proposed recreation site are described as having an acute or substantial need for all kinds of developed recreational facilities, especially those planned for the Bear Creek site. The Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP), Volume 2, presents demand, supply, and needs for outdoor recreation by districts. District 7 includes the following Alabama counties: Barbour, Coffee, Covington, Dale, Geneva, Henry, and Houston. The SCORP illustrates the problem of inadequate recreation facilities and supports the need for facilities similar to those planned for the Bear Creek site. The demand and supply for selected recreation activities are shown in the following table:

DEMAND, SUPPLY, AND NEEDS FOR SELECTED <sup>1/</sup>  
RECREATION ACTIVITIES, DISTRICT 7, ALABAMA

ACTIVITY	UNITS	DEMAND		SUPPLY	NEEDS	
		1980	2000	1974	1980	2000
Picnicking	tables	1,272	1,580	890	382	690
Lake swimming	acs. beach	45	66	33	12	33
Transient camping	no. sites	711	1,356	533	178	823
Weekend camping	no. sites	347	624	190	157	434
Freshwater fishing <sup>2/</sup>	acres	31,383	42,367	36,164	+4,781	6,203
Water skiing <sup>2/</sup>	acres	3,111	4,356	13,806	+10,695	+9,450
Power boating <sup>2/</sup>	acres	6,667	10,000	13,806	+7,139	+5,806
Field sports area	occasions	343,000	480,000	NOT DETERMINED		

<sup>1/</sup> Source: SCORP, Volume 2.

<sup>2/</sup> The table indicates a surplus supply of facilities related to these activities. This is due primarily to a large Corps of Engineers impoundment on the eastern edge of the district. There is, in fact, no large impoundment (500 acres) available for public use within 50 road miles of the proposed park.

### WATER QUALITY PROBLEMS

One of the major water quality problems in the watershed is sedimentation in the streams. As noted previously, about 243,000 tons of sediment are transported annually through the outlets of the watershed. Analyses of suspended solids (non-filterable residue) and bed material were made on March 2 and August 31, 1976, to determine the total load being transported through the major outlets of the watershed. The results show that 69 and 88

tons of sediment (bed load and suspended load) were transported past sites 7, 8, 11, 12, and 13 on these two respective days. (See map, Appendix J). It is important to note that both days were clear and the flow not influenced by storm runoff. Since sediment yield usually increases geometrically with storm runoff rate 24/ and large storms frequently contribute 30 percent or more of the total annual sediment yield, 25/ it is obvious that the measured sediment yield during runoff-producing storms would greatly exceed the values reported for clear weather days. Moreover, the large volumes of sediment produced by the hundreds of gullies complicate the sediment problem even further. It is conservatively estimated that the amount of sediment leaving the watershed during a heavy runoff-producing storm could exceed 1,000 tons per day.

Dissolved oxygen (DO) at site 2 ranged between 1.2 mg/l and 7.6 mg/l for the six-month sampling period from March through August; the average DO was 3.3 mg/l. To provide an optimum environment for warm-water biota, including game fish, the daily DO concentration should be 5.0 mg/l or above with normal seasonal and daily variations below this concentration permitted for short periods when all other parameters are within acceptable limits.

Several factors may have contributed to the low DO readings (average 1.5 mg/l) at site 2 in July and August 1976. One factor is the unusually low amount of rainfall that occurred during these months. Normal rainfall in Geneva County for July and August totals 11.88 inches while actual rainfall was only 6.20 inches. As a consequence, maximum velocity in the cross section of the stream at site 2 was only 0.07 feet per second on both sampling days in August. In addition, the stream at site 2 is deep (averaged 6.4 feet in August) and relatively narrow. Thus, the reaeration potential at this site during July and August was negligible.

Complicating the situation further is the fact that an old, shallow beaver pond is located about 100 feet upstream from the sampling site. The large surface area, low flow, and shallow depth made the water conducive to being warmed by the sun. In addition, the chance for natural aeration by the wind was reduced by the heavy growth of trees and other vegetation around the pond. Thus, warming of the quiescent water in the pond and lack of natural aeration would tend to depress the DO.

Another factor which would help to lower the DO is the oxygen demand created at the bottom of the beaver pond. The pond serves as a settling basin for leaves and other organic matter, and as this material is biologically oxidized, the dissolved oxygen in and near the bottom is consumed.

DO at all other sites was normally above 5.0 mg/l.

#### FLOODWATER DAMAGE

As previously mentioned, sediment entering the stream and flood plain systems has materially reduced their water carrying capacity.



This is causing increased flooding and a continuous reduction in timber production and quality of wildlife habitat, since regeneration is being restricted. The flood plain is predominantly wooded. At present, the flood plain is flooding 6 to 8 times each year. The increasing flooding problem is also restricting the harvest of the merchantable timber as well as increasing harvest cost. Based upon interviews with long-time residents of the watershed, the stream channels have filled as much as 20 feet in some areas. Alluvial fans in the flood plain are over 18 feet deep as measured in 1978. The frequency of flooding will continue to increase without treatment of the sediment sources.

#### DRAINAGE PROBLEMS

Drainage problems are minor in the watershed. There are areas that can benefit from the installation of drainage mains and laterals. These practices can be applied as part of the landowners' conservation land treatment program.

#### IRRIGATION PROBLEMS

Truck crops, especially tomatoes, are the primary crops being irrigated in the watershed. Landowners who irrigate get their water supply primarily from farm ponds constructed for that purpose. Farms on which irrigation is performed are fairly well distributed evenly throughout the Geneva County portion of the watershed with a few in the Houston County portion. On the average, rainfall is sufficient to supply the water needs for most crops grown in the area. Crops that mature during May (an historically dry month), such as the truck crops, are irrigated and other crops are not, due to an insufficient profit margin. Overall, the need for irrigation is not a problem in the watershed.

#### MUNICIPAL AND INDUSTRIAL WATER PROBLEMS

All municipalities rely on ground water for supplying the water needs of residents. At present, there are adequate supplies of ground water available. There may be a need for future development of additional municipal and industrial water supplies. To date the water supply is adequate to meet the needs of the residents in the watershed and adjoining municipalities.

#### ECONOMIC AND SOCIAL PROBLEMS

The early settlement of the area provided for the establishment of the small family farm system. In 1940, the average size farm was about 90 acres. At present, the average size farm is about 80 acres. The family farm is predominant in the watershed and the residents are generally of modest means. In 1974, the average value of all agricultural products sold for the three-county area was \$22,928 per farm. However, 33 percent of all farms

in Dale County, 27 percent of all farms in Geneva County, and 22 percent of all farms in Houston County had gross sales less than \$2,500 in 1974. 17/ Off-farm employment provided the greater part of income for farms with less than \$2,500 annually.

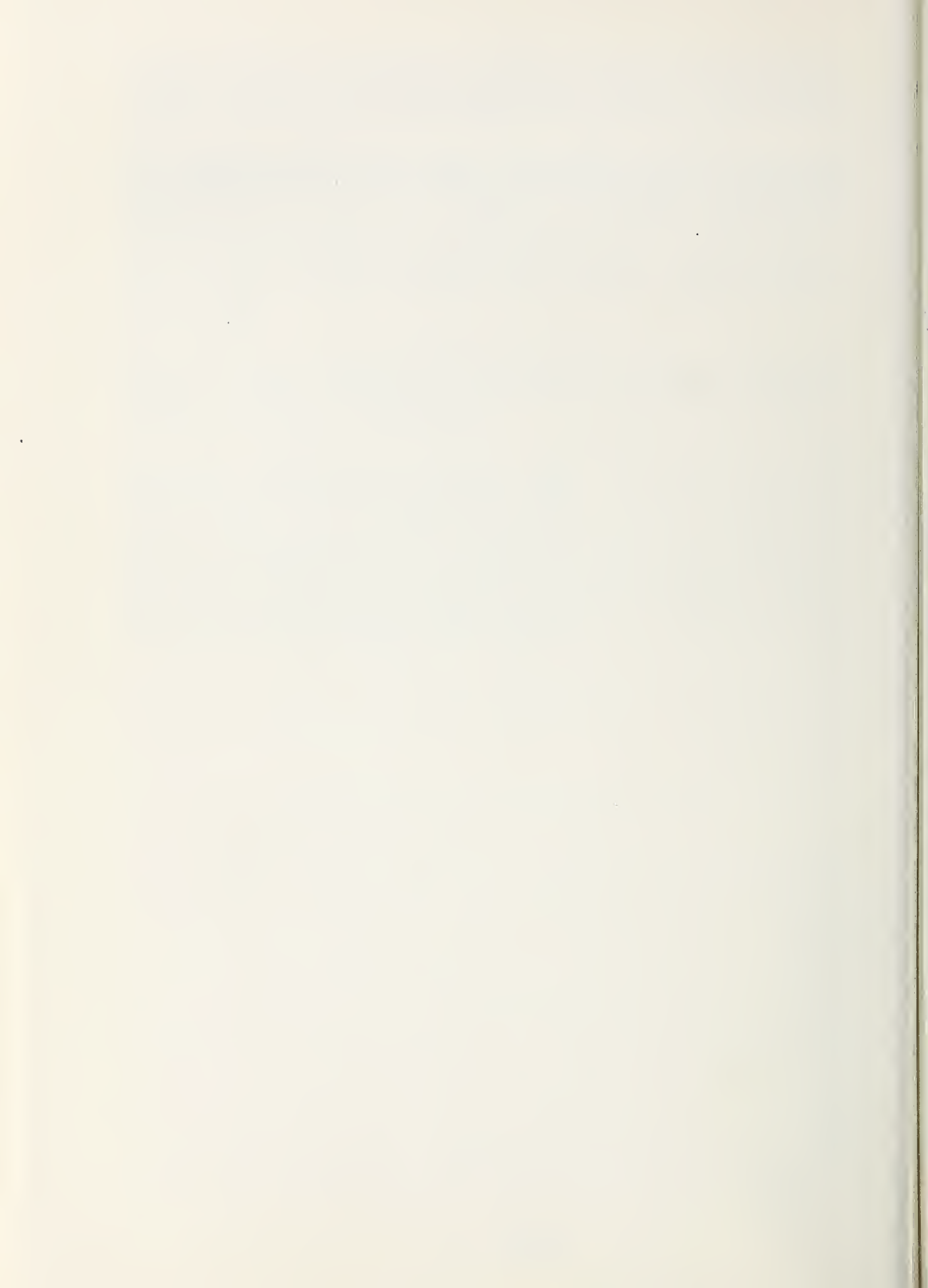
Dale and Geneva Counties have been designated as Redevelopment Areas (RA) by the Economic Development Administration of the United States Department of Commerce. An RA lags economically behind the nation due to a combination of one or more of the following basic factors: (1) high unemployment; (2) high outmigration rate; and (3) low median family income. Houston County has continued to grow and projections indicate this trend will continue. 26/

Many residents of the watershed work at Fort Rucker. A concerted effort in rural community development is needed to increase income and employment opportunities since there is a potential decline in activity at Fort Rucker.

Increased employment opportunities would help stabilize the population particularly in Geneva County. In 1969, there were 3,630 farmers in the three-county area. In 1974, there were 2,965 farmers, an 18 percent decrease. 17/ Farm numbers as well as farm operators will continue to decline increasing the number of people searching for employment. This fact associated with the uncertainty of employment at nearby Fort Rucker, emphasizes the need for further diversification of the area economy so that the displaced workers can be absorbed.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

There are no Federal, State, or local land use plans, policies, or controls in effect for Dale, Geneva, and Houston Counties, Alabama at the present time.



## ENVIRONMENTAL IMPACTS

### SUMMARY

Controlling erosion and sediment in the watershed will have a very favorable impact on both the land and water resources and on the associated biological communities. Land treatment measures will be applied to more than 31,000 acres on 400 farms. Over 17,000 acres will be protected as conservation practices are applied to 1,549 critically eroding areas or Class I gullies located on 900 farms. Grade stabilization structures will directly or indirectly benefit nearly 26,000 acres on 615 farms. Benefits will accrue to water quality and to fish and other aquatic life as turbidity is reduced and as the streambeds are protected from the devastating effects of sediment.

The construction of a recreational lake will eliminate 576 acres of wetland (Types 1 through 7) while creating 780 acres of Type 5 wetland. Approximately 650 acres around the perimeter of the lake will be set aside as a mitigation measure. These acres will be maintained in good condition as a functioning wetland. The lake will improve water quality in Bear Creek by raising the dissolved oxygen concentrations to acceptable levels. The primary goal of the impoundment will be to provide 186,600 visitor-days of annual recreation to the population within a 50-mile radius.

The entire project will have a beneficial effect on social and economic conditions in the watershed. Jobs will be created due to construction, and the recreation site will create both primary and secondary economic benefits for the life of the installation. In addition, the farmlands protected by the project will be able to produce 156,000 bushels per year of corn and 3,000 tons per year of peanuts that would otherwise be lost due to erosion.

During the assessment process, analyses of impacts on a broad range of environmental, economic, and social factors were made and their significance to decisionmaking was evaluated. See the following table:

Analysis of Impacts for Southeast Choctawhatchee River

Economic, Environmental, and Social Factors	Degree of Impact	Significant to Decisionmaking	Remarks
Floodwater and Drainage	minor	no	
Erosion and Sedimentation	major	yes	
Recreation	major	yes	
Wetlands	major	yes	
Fish and Wildlife	minor	no	
Water Quality	major	yes	
Water Table	none	no	
Economic and Social	moderate	yes	
Land Use	moderate	yes	
Prime Farmland	moderate	yes	
Visual Resource	major	yes	
Endangered and Threatened Plants and Animals	none	no	None Present
Transportation	none	no	
Air and Noise	minor	no	
Mineral Resources	none	no	None Present
Cultural Resources of National Significance	none	no	None Present

EROSION

Installation of land treatment measures will reduce sheet and rill erosion on cropland from 74,500 tons per year to 38,800 tons per year, and forest land from 1,900 tons per year to 1,000 tons per year. Pastureland will increase from 4,800 tons per year to 5,200 tons due to the increased pastureland acreage; however, the rate of soil loss will be reduced from 1.0 ton per acre current average to 0.75 ton per acre. The accelerated land treatment program will result in conservation practices being applied on 31,400 acres and will benefit about 400 of the 1,936 farms in the watershed.

Soil tilth will be improved, available moisture for plant growth increased, and inherent fertility conserved.

Erosion rates on 1,549 areas of critically eroding lands (Class I gullies) will be reduced from 100 tons per acre per year to 5.0 tons. This will result in a reduction in total tons of soil loss from 167,600 tons to 8,380 tons per year. Treatment of the critical areas (Class I gullies) will benefit about 17,175 acres on about 900 farms.

Grade stabilization structures will reduce erosion from the 609 active gullies to be treated by an average of 95 percent. The following table reflects the expected reduction by gully class:

<u>Class</u>	<u>Soil Loss (ton/acre/year)</u>	
	<u>Without Project</u>	<u>With Project</u>
II	376	19
III	463	23
IV	256	13

An estimated 19,339 acres of watershed land on about 415 farms will benefit from erosion damage reduction through the installation of the grade stabilization structures. Of this total, approximately 7,060 acres will be voided or 100 percent of its productive capability lost. This area consists of approximately 1,183 acres of cropland, 4,728 acres of pastureland, and 1,149 acres of forest land.

Grade stabilization structures will also provide stable outlets for on-farm conservation systems, allowing 5,542 acres (interdependent areas) to be retained in intensive agricultural production. Landowners have already begun shifting from cropland to pastureland where they can no longer maintain production or income due to the erosion process. Some landowners may abandon the land, allowing it to reestablish as forest land, or may actually plant to forest land. The estimated land use in the interdependent area with and without project is as follows:

<u>Future W/O Project (2010)</u>			<u>Future With Project</u>		
<u>Land Use</u>	<u>Percent</u>	<u>Acres</u>	<u>Land Use</u>	<u>Percent</u>	<u>Acres</u>
Cropland	16	3,086	Cropland	46	8,868
Pastureland	63	12,071	Pastureland	40	7,695
Forest land	14	2,770	Forest land	14	2,776
Other	7	1,412	<u>TOTAL</u>	100	19,339
<u>TOTAL</u>	100	19,339			

A number of potential safety hazards will be eliminated, livestock losses reduced, and visual appearance of the countryside improved as a result of installation of grade stabilization structures. An annual reduction of approximately 1,269,500 tons of soil loss from approximately 1,333,000 tons to 63,500 tons will be realized.

#### SEDIMENT

Sediment deposition will be significantly reduced throughout the watershed area. Yield at the watershed outlets will diminish over 75 percent, from 270,000 tons to 63,000 tons annually. Water-

shed sediment reaching Choctawhatchee Bay will be reduced from 135,000 to 31,500 tons annually.

Reduction of sediment deposition on flood plain areas will increase the natural restocking rate on forest lands. Productivity of such areas will be improved and timber kills reduced. Likewise, the productivity of cropland areas affected by deposition of infertile sediments will be enhanced. About 6,300 acres of flood plain on about 200 farms will benefit.

Maintenance costs of on-farm drainage and erosion control systems will also be reduced, biological productivity of receiving streams increased, and maintain capacity of such streams to transport flood flows. The overall visual quality of project surface water resources will be improved through a reduction of turbidity. Average annual suspended sediment concentrations will be reduced from 660 milligrams per liter to 155 milligrams per liter.

### RECREATION

Installation of the recreation lake and associated recreation developments will provide 186,600 visitor-days of annual recreation use. This will satisfy in part the projected recreational needs of the population within a fifty-mile radius of the recreation development. The users within this fifty-mile radius are considered to be local identifiable beneficiaries for the purpose of PL-566. The table below reflects the expected annual participation in the various recreational activities. A typical visitor is expected to participate in an average of 1.5 activities on each visit.

<u>Activity</u>	<u>Annual Participation</u>
Fishing	31,200 <u>27/</u>
Boating	51,600
Picnicking	64,800
Camping	20,000
Swimming	50,000
Water skiing	16,000
Other	46,400

Impoundment of the reservoir on Bear Creek will inundate six miles (11 acres) of stream fishery and 780 acres of wildlife habitat. This represents a potential loss of 110 man-days of stream fishing and 780 man-days of hunting based upon averages contained in the Alabama Statewide Comprehensive Outdoor Recreation Plan, Volume 2, July 1975.

The area where the lake is to be constructed is mostly in woods with some scattered pastureland above the flood plain. There



will be about 670 acres of forest land cleared for the lake and recreation area. The acreage and types of timberland to be altered are as follows:

Cypress-Gum-Bay	Pine-Oak
Permanent pool - 277 acres	Permanent pool - 300 acres
Outlet channel - <u>18</u> acres	Borrow area - 21 acres
295 acres	Park area - 20 acres
	Buffer area - <u>34</u> acres
	375 acres

Approximately 62 acres of pastureland will be required for the recreation lake and development.

### WETLANDS

About 780 acres of Type 5 wetlands will be created by the project. The lake will inundate 178 acres of Type 1 wetland, 25 acres of Type 2, 5 acres of Type 3, 16 acres of Type 4, 8 acres of Type 5, 16 acres of Type 6, and 299 acres of Type 7.

The acreage within the permanent pool, from proposed Ray Bass Park Road downstream to the proposed dam site will be mitigated on a 1:1 basis. This area is approximately 600 acres. To mitigate those acreages inundated, the minimum 100-foot variable width buffer zone around the permanent pool (approximately 470 acres), through agreement with the Sponsors, will remain absolutely unaltered by cultural practices. Acreage inside the two proposed recreation developments will not be included in this calculation for mitigation purposes. The area within the permanent pool above proposed Ray Bass Park Road (approximately 180 acres) will not be cleared and will be maintained in good condition as a functioning wetland. The total acreage within these two areas (the buffer zone, excluding the parks, and the permanent pool above State Highway 103) is approximately 650 acres. All of this acreage will be acquired by fee simple.

The Environmental Protection Agency (EPA) will provide infrared aerial photography prior to construction of the proposed dam. This photography will serve as a baseline from which to monitor the wetlands. An interagency task force of State and Federal agencies will develop criteria that assay the wetlands being monitored. EPA will provide additional infrared photography on a three-to five-year interval.

The waterline of the lake will create an environment that is conducive to becoming established with water loving and water tolerant plants. The minimum 100-foot variable width buffer zone around the perimeter of the lake will allow for the natural development and succession of wetlands and upland habitats similar to those now found in the watershed.

## FISH AND WILDLIFE

There will be a loss of 780 acres of wildlife habitat (mostly forest land) and a displacement of the associated wildlife as a result of inundation by the impoundment. This will not significantly alter public hunting or fishing as the area to be impounded is not currently open to public use. A lake fishery of 780 acres will be created which will also provide resting areas for migratory waterfowl.

There will be a temporary adverse impact on the downstream aquatic ecosystem due to the reduced flow in Bear Creek while the lake is filling. Fish species using this reach of stream can migrate to the Little Choctawhatchee River during this period. Impoundment of the lake will not interrupt fish migration routes of significance. Vegetation to be established on the critical areas will provide additional food, nesting, and travel areas for wildlife.

## WATER QUALITY

The various land treatment measures aimed at controlling erosion will generally reduce the volume of agricultural pollutants and turbidity which would normally enter the streams in runoff water. 28/ Research has shown that conservation practices that reduce runoff and erosion are effective in reducing the movement of pesticides and plant nutrients. The conservation practices that will be installed as a result of the project should result in less fertilizer and pesticides entering the streams and ground water. Those forms of nitrogen, phosphorus, and pesticides which become attached to the soil particles will be controlled to the same extent that soil erosion is controlled.

Flow in Bear Creek will be reduced when the lake is filling. When the design capacity is reached, flow downstream will be restored to near-normal levels. Since the new lake will increase the exposed water surface above that of the natural stream, the loss of water due to evaporation will increase. In arid areas, this would be a significant problem; however, in southeastern Alabama where annual rainfall exceeds 50 inches, the problem of evaporation losses should be minimal and base flow should be reduced only slightly.

Dissolved oxygen (DO) levels on Bear Creek should be greatly improved with the construction of the recreational lake. Current DO levels at a point in the stream about two miles above the dam site are generally below the 5.0 mg/l<sup>1</sup> recommended for fish and wildlife. The elimination of the conditions which are causing the low DO (see water quality problems) will help to raise the DO to acceptable levels.

When the stream is impounded, a circulation zone (epilimnion) will be created in the upper level of the lake. Here the wind creates currents and "the oxygen absorbed at the surface is distributed by the water circulating within the epilimnion." <sup>29/</sup> Other literature substantiates the fact that wind plays an important part in aerating surface waters. <sup>30/ 31/ 32/</sup> Thus a greater concentration of dissolved oxygen should be found in the waters leaving the lake than in the waters now passing from this section of Bear Creek.

DO levels on SCS constructed lakes in Alabama have been found to range from 7.0 to 10.0 mg/l in the epilimnion even during the warmest months. DO downstream of all structures evaluated are consistently above 5.0 mg/l and are generally higher than the levels in the reservoirs. The higher DO levels downstream are attributed to reaeration created as the water falls through the riser and passes through the outlet pipe to the plunge basin.

In the lower depths of the lake, as with most lakes, the levels of dissolved oxygen will drop and the carbon dioxide and other gases of decomposition will increase. However, since water from the lake will be drawn from the epilimnion, a satisfactory level of dissolved oxygen should be available in the release water almost all the time. Pool discharges, taken from the surface, will have a warming effect on that portion of the receiving stream immediately below the structure. Studies by Auburn University and by SCS reflect thriving populations of fish and fish food organisms downstream of several impoundments.

#### WATER TABLE

Direct storm runoff will be reduced an estimated four to five percent as a result of the application of planned conservation land treatment. This will produce a corresponding increase in ground water storage during periods of wet weather. Such an increase in storage will be temporary in nature since the ground water system in the project is presently in equilibrium. Temporary rises in the water table will therefore be slowly returned to normal through drainage to streams during periods of low flow.

The Bear Creek recreation lake will create an incidental ground water recharge of about five percent in the immediately surrounding area. The lake seepage is not expected to recharge any underlying aquifer due to the presence of an impermeable stratum beneath the flood plain. The recharged area will return water to the stream channel downstream from the dam.

#### ECONOMIC AND SOCIAL

The project will serve as a stimulus to the economy by providing new employment opportunities. A total of about 357 unskilled, 23 semiskilled, and 86 skilled jobs will be provided during the ten-year installation period. Of this total, 144 unskilled, 17

semiskilled, and 62 skilled jobs will result from installation of grade stabilization structures, 179 unskilled jobs from installation of critical area treatment measures, and 34 unskilled, six semiskilled, and 24 skilled jobs from installation of the recreation lake and associated facilities. An additional 30 man-years of employment will be needed to operate and maintain the project. Employment from operating and maintaining the grade stabilization structures will account for about 14 unskilled jobs of this number and operation and maintenance of recreation facilities eight semiskilled and eight unskilled jobs. Operation and maintenance of the proposed project, as well as those measures already installed, will have a continuing favorable effect on the local economy.

Erosion reduction effects of the project will protect the value of project land and preserve the tax base. Installation of the recreation development will increase the value of the land adjacent to the development.

The land treatment program is expected to improve economic conditions of watershed residents. Production will be increased with corresponding increases in net returns to landowners. The physical appearance of farms will be enhanced by shaping and vegetating the critical areas. Without the grade stabilization structures and the associated land treatment systems, an annual production loss of 156,000 bushels of corn and 3,000 tons of peanuts will result. Much of the peanut and soybean production is disposed of through international trade. These products are needed to help meet the world demand for food and fiber.

The quality of life will be enhanced by the recreation facilities and the stabilization of gullies. Raw eroding areas will be eliminated and sediment deposition in streams will be reduced. Water will be clearer and the associated eroded areas that will be vegetated will enhance the landscape of the area. Residents of the watershed will not have to travel long distances to participate in water-based recreation activities. In addition, increased employment opportunities should help maintain population stability, and the family farm pattern should be strengthened through increased production potentials. It is estimated that the total effect of the project will increase crop yields about 25 percent and pasture yields about 30 percent.

Local external economic benefits will accrue in the watershed and surrounding areas as a result of the project. The increase in agricultural production will result in a greater demand for agricultural machinery, equipment, and supplies. The increased availability of recreational facilities will increase the demand for recreation items such as boats, motors, skis, fishing equipment, and other recreation items. The sale of these items will increase the external economic benefits of the area due to the drawing

attraction to residents outside of the immediate area. The additional income will have a multiplier effect (the spending and respending of income) in the area. Increased profits by local businesses will increase the demand for transportation, processing, marketing, and associated items.

The construction of the lake and installation of the recreation facilities will have little influence on local population. However, development and growth in the vicinity of the lake could be accelerated.

The proposed project will not result in any distinctive negative impacts on minority persons.

### LAND USE

The land uses of the watershed, present, future without project, and future with project are as follows:

<u>LAND USE</u>	<u>PRESENT (AC.)</u>	<u>FUTURE WITHOUT PROJECT (AC.)</u>	<u>FUTURE WITH PROJECT (AC.)</u>
Cropland	66,440	56,775	63,500
Pasture and Hayland	30,190	36,156	35,500
Forest Land	55,130	50,921	51,300
Urban Land	10,720	13,000	13,000
Other Land	<u>7,520</u>	<u>13,148</u>	<u>6,700</u>
	170,000	170,000	170,000

### PRIME FARMLAND

Project installation will assist in protecting and conserving much of the 132,480 acres of prime farmland in the watershed. This land will continue to be available for the production of food, feed, forage, fiber, and oilseed crops.

### VISUAL RESOURCE

The major factor detracting from the existing landscape is erosion. Erosion causes rills and gullies in cropland and fields and adds a harshness to the normal agricultural patterns. Gully erosion and the resulting sedimentation of fields, roads, and streams also present a displeasing view.

Many of the gullied areas are now being used as garbage dumps, creating unsightly areas and unsanitary conditions. All types of rubbish, such as old car bodies and waste materials from construction sites, are being placed in the gullies in an effort to retard their growth. This has been unsuccessful in slowing down the growth of the gullies. In addition, many gullies have become dumping grounds for household garbage and dead animals. As the

storm runoff water moves through the gullies, this rubbish is moved downstream, creating potential public health problems from contaminated surface waters.

The project will create a more orderly landscape within the watershed. The installation of land treatment and the grade stabilization structures will result in lines and forms more harmonious with the natural landscape. The scenic quality of the countryside will be improved. The overall visual quality of the project surface water resources will be improved through a reduction in turbidity.

#### GENERAL

Exhaust emissions and the dust produced by construction equipment will have a slight detrimental effect on ambient air quality. Noise pollution will increase during construction because of the heavy equipment used in project installation. The effects of noise pollution will be negligible because the areas where construction will be performed are secluded from thickly populated areas. The air and noise quality will only be affected for about ten hours per day during construction.

Acquisition of the needed land rights for installation of the structural measures will not require any displacements of persons, businesses, or farm operations.

Visitation to the park will increase traffic by as much as 400 to 500 vehicles on peak-use days. This increase in traffic is not expected to significantly affect air quality within the area. There will be an increase in noise level in and around the park area. However, these impacts should be insignificant considering the sparse population of the rural area surrounding the parks.

The impoundment of Bear Creek Lake will require the closing of Houston County Road 40 and the modification of about 0.3 miles of unpaved road and 0.8 miles of paved roads. Closing of the road will cause increased traffic on the roads modified and minor inconvenience to affected local residents. Inconvenience will be caused by increased travel distance and time. Four bridges and/or culverts will require enlarging or replacing to facilitate boat traffic on the lake and to allow the passing of storm flows with minor backwater effects.

#### FAVORABLE ENVIRONMENTAL IMPACTS

1. Reduce sediment yield from the watershed by over 75 percent.
2. Reduce sediment deposited within the watershed.
3. Improve scenic and esthetic qualities of the watershed.
4. Reduce suspended sediment in streams.
5. Provide wildlife food and cover from vegetation planted on the exposed areas of the grade stabilization structures.

6. Create about 780 acres of lake-type aquatic habitat.
7. Mitigate loss of about 600 acres inundated by preservation of about 180 acres of wetlands in the permanent pool and about 470 acres of wildlife habitat around the perimeter of the lake.
8. Provide 780 acres of resting area at the lake for migratory waterfowl.
9. Land treatment will enhance wildlife habitat and food supply.
10. Reduce sediment by 95 percent immediately downstream from the grade stabilization structures.
11. Enhance the physical appearance of about 900 farms by shaping and vegetating critical areas.
12. Vegetative land treatment measures on cropland will improve soil tilth, soil permeability, and increase water absorption capacity of the soils.
13. Project will result in an increase of local employment by 357 unskilled, 23 semiskilled and 86 skilled jobs during the ten-year installation period.
14. Create 186,600 recreational visitor-days opportunities.
15. Land voiding and depreciation will be reduced on 19,339 acres.
16. Reduce sediment reaching Choctawhatchee Bay.
17. Reduce safety hazard around gullies.
18. Reduce sheet, rill and gully erosion.
19. Maintain intensive land use on 5,542 acres of cropland in the interdependent area.
20. Improve the visual quality of the watershed by stabilizing about 609 gullies on about 415 farms.
21. Improve the watershed esthetics with land treatment on about 400 farms.
22. Reduce sediment deposition on 6,300 acres of flood plain, which will benefit about 200 farms.

#### ADVERSE ENVIRONMENTAL IMPACTS

1. Air and water pollution will be temporarily increased during project construction due to construction related dust and sediment.

2. Inundate six miles of stream having a potential of about 110 man-days of fishing.
3. Alter wildlife habitat on 780 acres as a result of inundation by the impoundment.
4. Inundate 780 acres including the following: wetlands, 178 acres of Type 1, 25 acres of Type 2, five acres of Type 3, 16 acres of Type 4, eight acres of Type 5, 16 acres of Type 6 and 299 acres of Type 7; upland forest 210 acres and open land 23 acres.
5. Disruption in tranquility of the rural environment by 186,600 visitor-days.
6. Increase travel time by closing Houston County Road 40.
7. There will be a temporary adverse impact on the downstream aquatic ecosystem while Bear Creek Lake is filling.



## ALTERNATIVES

Alternatives considered during the formulation of the selected plan were of two basic types: those which would satisfy component needs identified by publics for national economic development (NED) and environmental quality (EQ), and those which would further reduce or eliminate adverse impacts to the environment resulting from the selected plan. Structural, nonstructural, and land treatment (conservation practices) were initially considered in developing alternative plans. For the purpose of facilitating incremental analysis, an economic evaluation of stabilizing gullies by class was performed. The table on the following page shows the total cost, PL-566 cost, average annual cost, average annual benefits, net benefits over costs, and benefit:cost ratio as evaluated for incremental analysis. As shown in the table, the selected plan maximizes net benefits over costs and is the NED plan.

The identified component needs for NED and EQ are described in the Project Objectives section and the adverse impacts resulting from installation of the selected plan are described in the preceding section. The selected plan will satisfy all the identified component needs for both NED and EQ objectives; however, the recreation lake and facilities cause minor adverse impacts to some aspects of the environment (wetlands, increased noise and air pollution). Therefore, an alternative plan was developed which deleted those elements whose primary function was to contribute to the NED objective. This alternative consists of accelerated conservation land treatment and flood prevention by critical area treatment and land stabilization. This alternative consists of the same land treatment measures and land stabilization as described in the selected plan, and impacts would be the same as those shown for the land stabilization portion of the selected plan. The land treatment would be applied and financed by local landowners with technical and financial assistance provided by the Soil Conservation Service and the Forest Service. Both favorable and adverse impacts created by the installation of the recreation lake and facilities would be foregone. This alternative was found to be viable and is compared with the selected plan in appendix B. A viable alternative is one which can be implemented with assistance under existing USDA authorities and for which a public body has expressed a capability to implement.

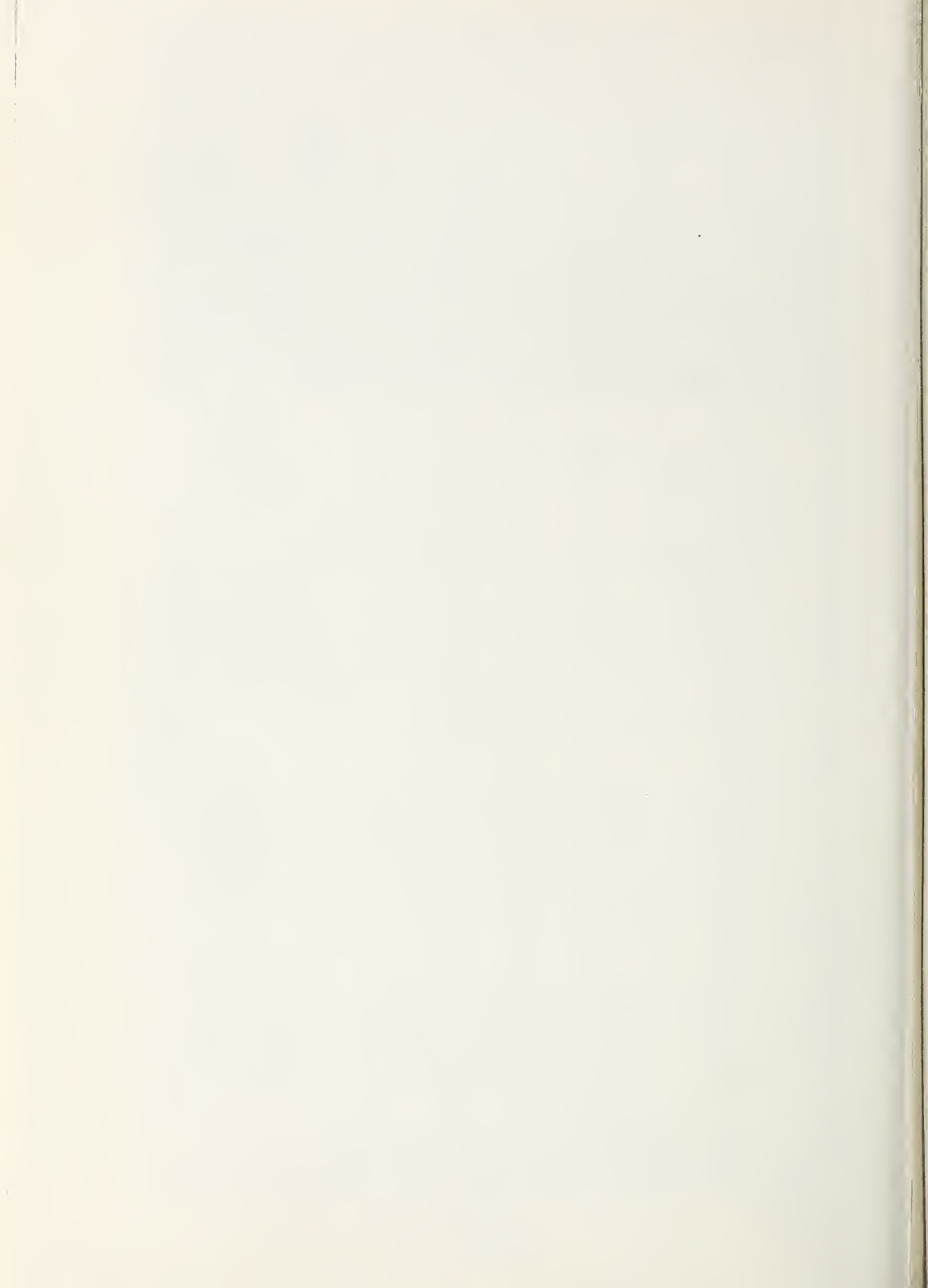
Another alternative considered which would eliminate or reduce the adverse environmental impacts of the selected plan is no project. There would be no accelerated land treatment program under this alternative, but the going land treatment program would continue. Land treatment measures expected to be installed under the going program would reduce the average annual sediment yield at the mouth of the watershed by 15 percent. The agricultural damages in monetary terms would continue to increase as the prices for farm products rise. This alternative would not require any land clearing or any excavation. All of the resources would be allowed to remain in their present condition.

DISPLAY OF INCREMENTAL ANALYSIS  
SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED, ALABAMA

Item	Selected Plan and NED Plan - Acceler- ated Land Treatment, Critical Area Treatment Grade Stabilization Structures and Recreation Lake and Facilities <u>1/</u>	EQ Plan - Accelerated Land Treatment, Criti- cal Area Treatment, and Grade Stabiliza- tion Structures	Accelerated Land Treatment, Criti- cal Area Treatment, and Grade Stabiliza- tion Structures for Class II Gul- lies only	Accelerated Land Treatment, Criti- cal Area Treatment, and Grade Stabiliza- tion Structures for Class III Gul- lies only	Accelerated Land Treatment, Criti- cal Area Treatment, and Grade Stabiliza- tion Structures for Class IV Gul- lies only	No Project
Total Installation Cost <u>2/</u>	\$32,551,300	\$27,587,000	\$21,650,000	\$14,967,300	\$14,632,700	\$767,000
PL-566 Cost <u>2/</u>	\$24,222,100	\$21,666,700	\$15,914,400	\$ 9,625,700	\$ 9,293,800	0
Average Annual Cost <u>3/</u>	\$ 1,721,400	\$ 1,218,000	\$ 764,200	\$ 236,400	\$ 217,400	0
Average Annual Benefits	\$ 2,094,800	\$ 1,491,200	\$ 978,000	\$ 231,200	\$ 282,000	0
Net Benefits over Costs	\$ 373,400	\$ 273,200	\$ 213,800	0	\$ 64,600	0
Benefit: Cost Ratio	1.2:1.0	1.2:1.0	1.3:1.0	1.0:1.0	1.3:1.0	0

1/ The NED plan includes stabilizing Class III gullies because the difference between benefits and costs is insignificant (\$5,200).  
2/ Includes cost of the going land treatment program.  
3/ Amortized installation cost of structural measures @ 7 1/8 percent for 100 years plus annual O, M, & R.

Nonstructural elements which would achieve the objectives of water-based recreation, flood prevention, and erosion control are very limited. There is not a nonstructural element available to satisfy the needs for water-based recreation. Nonstructural elements to reduce erosion and prevent the destruction of land (flood prevention) are very limited due to the nature of the problem. It is physically impossible to stop the active gully erosion without structural measures. It would be possible to relocate the cropland outside of the drainage area of the gullies or to possibly use alternative conservation practices to partially reduce the sheet and rill erosion. This could be accomplished through practices such as conservation tillage on land used for corn. However, conservation tillage cannot be effectively practiced on land used to grow peanuts. In essence the nonstructural element of relocation of the damageable property will be achieved by foregoing implementation of the plan. The land will be converted to less intensive use as the gully advances and sheet and rill erosion reduce the productivity of the soil.



## SHORT TERM VS. LONG TERM USE OF RESOURCES

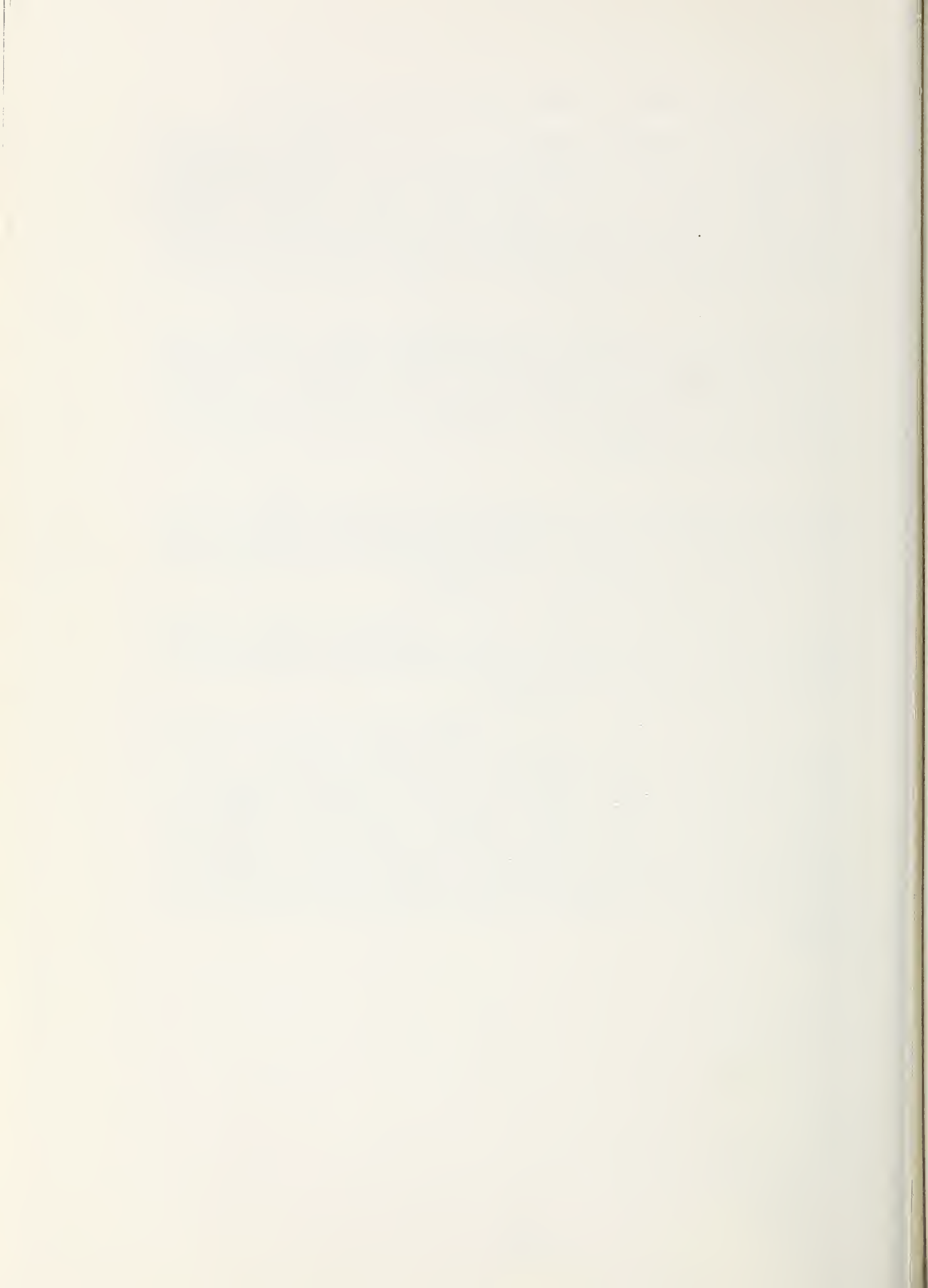
Trends in the Southeast Choctawhatchee River Watershed indicate future land use will be agricultural with some rural-residential development. Project installation will help protect the agricultural land which is one of the areas major economic assets. Recreation facilities are compatible with the Alabama Statewide Comprehensive Outdoor Recreation Plan and will aid in meeting the resident and non-resident demand for outdoor recreational activities in the area.

This project is compatible with long term uses of land, water, and other natural resources and with current and expected future uses within both the watershed and the three counties. Implementation of the proposed project will not preclude any options available for long term use of the area. It will remain effective in conserving land, water, and wildlife resources beyond its design life of 100 years.

Adequate maintenance of the conservation land treatment measures and grade stabilization structures will protect the land and reduce erosion and sediment damages throughout the 100-year life of the project. Sediment and turbidity in the Choctawhatchee River and its tributaries will be reduced.

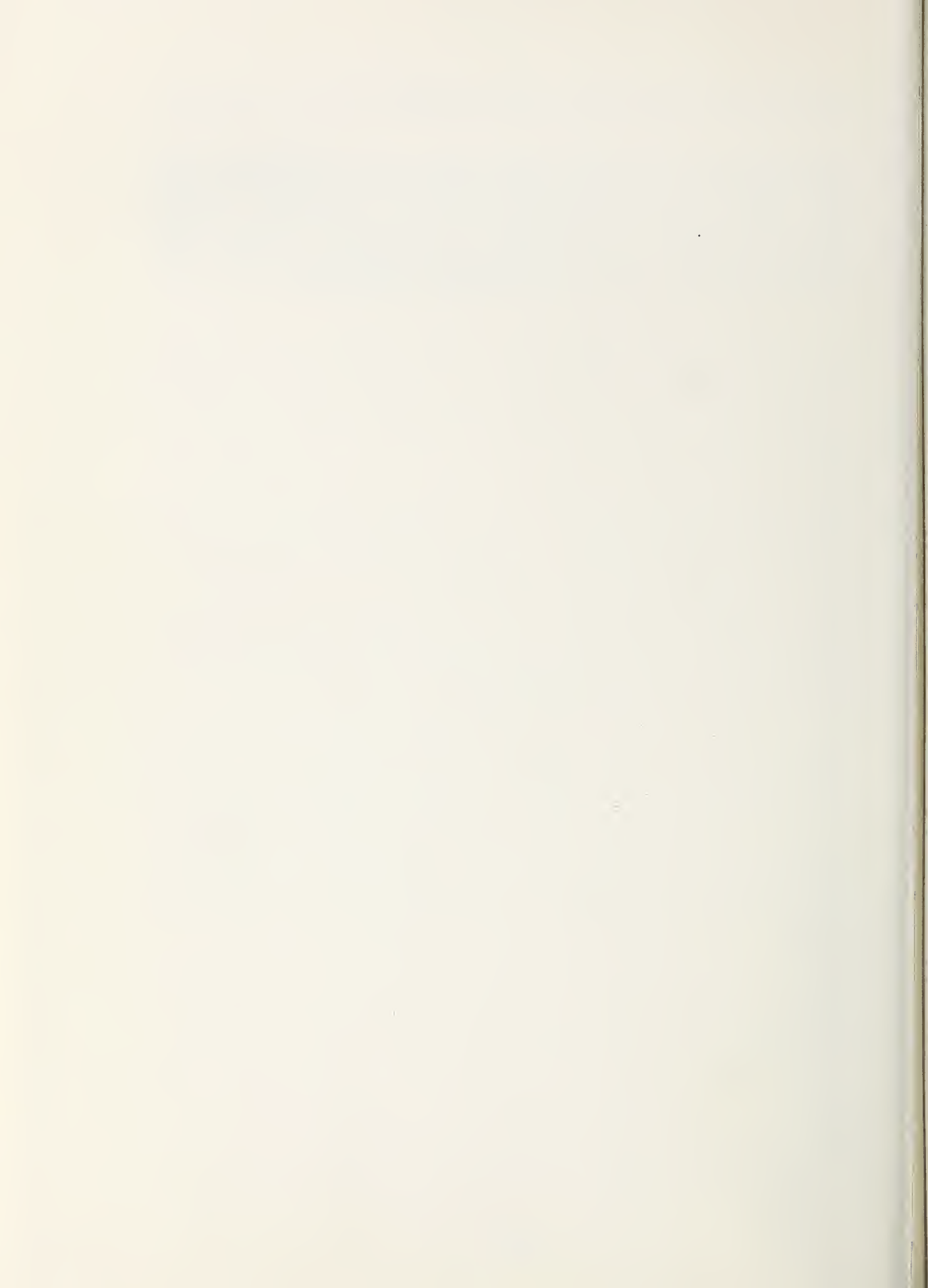
Reducing the suspended solids in the stream will help to reduce aggradation of stream channels. The reduction in turbidity will improve fish and wildlife populations and raise the esthetic quality of the streams in the area.

The watershed is within the St. Josephs-Perdido and Apalachicola subareas of the South Atlantic Gulf Resource Region. Only a small portion of the watershed located in Houston County is in the Apalachicola subarea. There are no water resource projects in Alabama's part of this regional subarea. There are three water resource projects with active approved applications in the St. Josephs-Perdido subarea of Alabama. One project is approved for construction and two projects are complete. These projects are widely scattered and will not have a cumulative effect in the region.



## IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Installation of the project will require the commitment of 1,459 acres of woodland and 110 acres of open land to the dam, emergency spillway, the permanent pool, and the recreational development. The production of agricultural crops and forest products will be foregone on such areas. In addition, the labor and capital resources used in installing and operating and maintaining the project will be irreversibly committed.





CONSULTATION AND REVIEW WITH  
APPROPRIATE AGENCIES AND OTHERS

GENERAL

Application for assistance in solving problems related to land and water resources in the Southeast Choctawhatchee River Watershed was made in 1969 by the Soil and Water Conservation Districts and County Commissioners of Houston, Dale, and Geneva Counties. These groups, acting as Sponsors for the watershed project, applied for planning assistance to the Alabama State Soil and Water Conservation Committee on January 16, 1970. The Sponsors and local people involved wanted to develop a watershed plan that would provide the following: 1) recreation, 2) control gullies, 3) treat eroding roadbanks, 4) improve crop production, 5) improve timberlands, 6) improve pasturelands, 7) and control the sediment going into Choctawhatchee River. Their application was approved on March 11, 1970, and SCS conducted preliminary investigations to determine the feasibility of the project.

A preliminary investigation report indicating a feasible alternative for watershed protection, land stabilization and a recreational development was presented to the Sponsors and interested individuals on May 11, 1970. The meeting was held at the Wiregrass REA Building in Hartford, Alabama. About 75 people were present. Planning objectives were discussed in detail at this meeting and SCS agreed to assist in achieving the goals that had been established.

After the Sponsors reviewed the preliminary report, detailed planning assistance was requested from the SCS Administrator on November 27, 1970. The request was approved by the Administrator on June 26, 1972. Federal and State agencies were informed by letters of this action, and their assistance in planning was solicited.

A field review of the watershed was made on July 14, 1970, by representatives of the U. S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources and the Soil Conservation Service to study fish and wildlife resources of the watershed. The staff biologist of the Soil Conservation Service prepared a report on the field review. It was the consensus of the group that the proposed project would not have a significant adverse effect on any species of wildlife present in the watershed. This conclusion was based on the assumption that (1) few species, if any, were present in large concentrations; (2) the few species present were heavily utilized; (3) the existing wildlife habitat within the area rated only fair; (4) the environmental change resulting from the impoundment would create a more desirable habitat for some of the wildlife species now present.

Another field review was made on November 24 and 25, 1975, with the same agencies being represented. The findings were essentially the same with only one exception. During this review, more emphasis was placed on the modifications of wetlands where the 780-acre lake is proposed.

Representatives from the U. S. Forest Service and the Soil Conservation Service made a field review on August 26, 1970, to evaluate sediment damages to forest land. They concluded that below the dam site there was no appreciable damages to the bottom land hardwood caused by sediment. They also examined areas just downstream from gullies and found that sediment damages to forest land were significant.

Prior to organizing a watershed association, nine public meetings were held at various locations within the watershed. On September 6, 1972, a meeting was held in Dothan, Alabama, and the Southeast Choctawhatchee River Watershed Association was organized. The association is sponsored by the Soil and Water Conservation Districts and county commissions of Dale, Geneva, and Houston Counties and the Alabama Department of Conservation and Natural Resources. It was agreed at this meeting that the association will work closely with SCS, Extension Service, FS, Farmers Home Administration, Agricultural Stabilization and Conservation Service, other Federal and State agencies, the Southeast Alabama Regional Planning and Development Commission, and others in planning of the watershed project.

The association recognized that the success of the watershed project rested to a large degree on public understanding and acceptance. They agreed that every available opportunity should be utilized to inform the public of progress being made in the watershed.

The association agreed to keep the newspapers in the area informed of the activities of the association and to participate in radio and T.V. programs as appropriate. Also, the association agreed to publish a newsletter to keep all concerned fully informed of the progress in planning the watershed. Four newsletters, with a circulation of 600, have been published to inform watershed residents of activities associated with project development.

Also, about 24 television programs have been presented over the local television station to keep the public informed of the activities associated with the development of the watershed.

The association had also agreed to have open meetings at least four times each year to keep local people, and State and Federal agencies informed of the developments in formulation of the watershed plan and EIS on Southeast Choctawhatchee River Watershed, and

to give these groups an opportunity to make their suggestions and other inputs into project formulation. As of December 1976, 16 regularly scheduled meetings and two special meetings have been held.

A public meeting was held on November 14, 1974, at the Ramada Inn in Dothan, Alabama. This meeting was to provide information on the development of a plan and EIS on the Southeast Choctawhatchee River Watershed project and to give anyone the opportunity to ask questions and make comments about the project. There were about 45 people present at the meeting representing the following:

- 1) Farmers and district cooperators
- 2) Bankers and officials of financial institutions
- 3) Chambers of Commerce, Kiwanis, Rotary, and Lions Clubs
- 4) Local, state and national farm organizations - Farm Bureau, Cattleman's Association, and Swine Producers Association.
- 5) Farm editors, radio and T.V. - WTVY, WDHN, WAGF, WDIG and WOOF
- 6) Newspaper farm editors - Dothan Eagle and Dothan Progress
- 7) State Senators and Representatives
- 8) County Officials
- 9) Schools and libraries
- 10) Sportsmen's Organizations (Napier Field)
- 11) Garden Clubs
- 12) Youth Organizations
- 13) Implement dealers and farm suppliers
- 14) Sponsors of watershed from Houston, Dale, and Geneva Counties
- 15) Soil Conservation Service personnel
- 16) And other publics interested in the project.

This meeting was announced in the newspapers, on television and over the radio several times prior to the meeting. Every reasonable effort was made to contact anyone interested in the project.

Questions were answered about various aspects of the project. The Chairman then asked the audience if they had any objections to the project as it was explained, and if so, to speak out. No opposition was expressed.

On April 14, 1975, the Houston County Commission made application to the Department of Housing and Urban Development for funds under the Community Development Block Grant Program. These funds were to be used to acquire real property for the dam site and recreation park on Bear Creek. Prior to submission of the application, public hearings were held on March 25 and 27, 1975. Notices of the hearings were publicized locally by radio, television and newspapers. A total of 47 interested citizens attended these hearings and expressed their views of the proposed recreation lake and facilities.

Between the time the Preliminary Investigation Report was published in 1972 and the public meeting held on November 14, 1974, a number of meetings were held between the Sponsors, representatives of the SCS, U. S. Fish and Wildlife Service, Alabama Forestry Commission, FS, State Highway Department, Alabama Water Improvement Commission, State and Local Health Departments, Alabama Department of Conservation and Natural Resources, U. S. Geological Survey, U. S. Bureau of Outdoor Recreation (now the USDI-Heritage Conservation and Recreation Service), Alabama Historical Commission and many landowners.

During an association meeting on August 12, 1975, in the Farm Center Building in Dothan, Alabama, it was determined that water quality and vegetative studies were needed. In addition, the Soil Conservation Service with the U. S. Fish and Wildlife Service would collect fish from Bear Creek. These studies were made and used in arriving at a watershed plan and EIS for the proposed project.

In response to comments received on the draft EIS from the Environmental Protection Agency (EPA) and the U. S. Fish and Wildlife Service (F&W/L) on the alteration of 547 acres of wetlands Types 1 through 7, additional studies were made by biologists from SCS and these agencies. After much negotiation the mitigation measures described on page E-69 of this document were agreed upon by the Sponsors, SCS, EPA, and F&W/L.

#### DISCUSSION AND DISPOSITION OF EACH COMMENT ON THE DRAFT EIS

The following Federal and State agencies and concerned groups and individuals were asked to comment on the draft plan and environmental impact statement (EIS):

<u>COMMENTS REQUESTED</u>	<u>COMMENTS RECEIVED</u>
Department of Agriculture	
Office of Equal Opportunity	X
Department of the Army	X
Department of Commerce	
Deputy Assistant Secretary for Environmental Affairs	X
Department of Health, Education and Welfare	
Director - Office of Environmental Affairs	
Department of Housing and Urban Development	
Department of the Interior	
Secretary of the Interior	X
Director - Office of Environmental Project Review	
Department of Transportation	
U. S. Coast Guard	
Environmental Protection Agency	
Administrator, Washington, D. C.	
Regional Administrator, Atlanta, Georgia	X

COMMENTS REQUESTED

COMMENTS RECEIVED

Federal Power Commission	
Alabama Attorney General	
Alabama Development Office	
Soil and Water Conservation Committee (also Governor's designated representative)	X
Geological Survey of Alabama	X
State Environmental Health Administration	
Southeast Alabama Regional Planning and Development Commission	
Alabama Forestry Commission	
Alabama State Soil and Water Conservation Committee (Governors' designated representative)	X
Alabama State Highway Department	X
Alabama State Department of Education	
Alabama Commissioner of Agriculture	
Alabama Historical Commission	
Alabama Water Improvement Commission	
Alabama Association of Soil and Water Conservation Districts	
Alabama Cooperative Extension Service	X
Auburn University, Alabama Cooperative Fisheries Unit	
Natural Resources Defense Council	
National Wildlife Federation	
Alabama Wildlife Federation	
Environmental Defense Fund	
Friends of the Earth	
National Audubon Society	
Alabama Archaeological Society	
The Alabama Conservancy	
Sierra Club	
Alabama Sportsman Conservation Club	
Bradley, Arant, Rose and White; Attorneys	

Comments and Responses

Each issue, problem, or objection is summarized or quoted and a response given on the following pages. The letters of comment are attached as appendix C.

Department of Agriculture, Office of Equal Opportunity

1. Comment Summary: No mention of effects on minority persons as a result of the proposed action was found in the draft EIS. The final statement should address the effects of the project action upon minority persons in, near or using the affected area.

Response: The EIS has been revised to reflect this point.

Department of the Army

1. Comment: "We have reviewed this work plan and foresee no conflict with any projects or current proposals of this department."

Response: Noted, no response needed.

2. Comment Summary: The EIS does not discuss adverse environmental effects which cannot be avoided.

Response: Adverse effects of the project are listed in the EIS. No change made in EIS.

3. Comment Summary: The EIS does not discuss interest and considerations of Federal Policy which are thought to offset the adverse environmental effects of the proposed action.

Response: Although the EIS does not cover this subject in a particular section for this purpose, information can be found throughout the document. As a result of comments received on the draft EIS, additional studies of the project's impacts on wetlands were undertaken. Mitigation to offset the adverse environmental effects of the proposed lake is now described in the "Impacts" section, "Wetlands" subsection, page E-69.

4. Comment: "The Alabama State Conservationist should be informed that a regulatory permit (Section 404 of PL 92-500, 86 Stat. 816, 33 U.S.C. 1344) will be required for the proposed dam and a request for such a permit should be made to the Mobile District Office of the Corps of Engineers at the earliest possible date."

Response: The watershed sponsors will make application for the 404 permit after congressional approval of the plan.

Department of Commerce

1. Comment Summary: Since improved water quality is one of the project objectives, we suggest that the cost of water quality monitoring be included in the report. Post-project water quality monitoring would also provide a measure of the project's overall success.

Response: There are no plans at present to monitor water quality during and following construction. Granted, it would be desirable to further quantify the expected favorable impacts of the project on water quality. When viewed in perspective however, the magnitude of water quality issues do not appear to warrant the suggested effort.

2. Comment Summary: Certain migrating and anadromous fish found within the project area should be added to the species list.

Response: The species list in the document is that list of fishes found during a fishery study of the proposed lake site and is not intended to represent a species list for the entire watershed.

3. Comment Summary: The term "benthic oxygen demand" should be more fully explained.

Response: Changes have been made to clarify the wording.

4. Comment Summary of Paragraphs 7 and 9: Mitigation measures are needed for the loss of 780 acres of wetlands and six miles of streams.

Response: The draft EIS was not clear with respect to the impacts on project wetlands. Of the 780 acres within the permanent recreation pool, only 547 acres are wetlands under the USDI Circular 39 classification. The project's impact will be to increase the Type 5 wetlands from eight acres to 780 acres and to eliminate 178 acres of Type 1, 25 acres of Type 2, five acres of Type 3, 16 acres of Type 4, eight acres of Type 5, 16 acres of Type 6, and 299 acres of Type 7. These adjustments in wetland areas and associated impacts on fish and wildlife communities were discussed with project sponsors along with the impacts of inundating six miles of Bear Creek. Mitigation measures are discussed under "Wetlands" subsection of the "Environmental Impacts" section, page E-69.

The SCS, in planning the proposed lake has attempted to minimize, to the extent possible, adverse impacts associated with its installation. An interagency team of biologists representing SCS, Alabama Department of Conservation and Natural Resources, and USDI (Fish and Wildlife Service) made field evaluations of the proposed reservoir site on two occasions. Findings of these studies are reported in the "Consultation" section of this document.

Department of Interior

1. Comment: "In view of EPA's letter dated December 7, 1978, and your Service's letter dated December 22, 1978, we find the mitigation measures now proposed for the project to be adequate in lessening the degree of resource damage induced by the project. Acquiring the 470 acre buffer zone and 180 acre wetland area above Ray Bass Park in fee simple and preventing any further cultural practices in these areas will facilitate Fish and Wildlife resource conservation in the area."

Response: Noted, no response needed.

2. Comment: "The Fish and Wildlife Service will withdraw its opposition to the project if the mitigation is carried out as it is documented in the above mentioned letters. We reserve the right to oppose the project at anytime if the mitigation measures are altered from their present form."

Response: Noted, no response needed.

Environmental Protection Agency (letter of comment dated October 21, 1977)

Comment Summary: EPA's letter of comment on the draft EIS assigned an ER-2 rating to the project.

Response: The issues raised were discussed and negotiated, resulting in mutual agreement set forth in EPA's letter dated January 4, 1979.

Environmental Protection Agency (letter of comment dated January 4, 1979)

1. Comment: "The revisions (see U. S. Environmental Protection Agency letters dated December 7, 1978 and November 14, 1978) made to the Southeast Choctawhatchee River Watershed Plan have resolved the ER-2 (Environmental Reservations) rating which we assigned to the Draft Environmental Impact Statement."



Response: Noted, no response needed.

2. Comment: "We look forward to working with you and your staff to insure that future projects of this nature will begin with the excellent criteria outlined in your letter of December 22, 1978."

Response: Noted, no response needed.

Alabama Development Office, Geological Survey of Alabama

1. Comment: "The sections on geology, minerals and water resources, water quality and flood prone areas are rather general."

Response: These sections were reviewed and are considered adequate.

2. Comment: "Since the EIS was written, a new publication on Alabama's endangered and threatened wildlife has been published. This should be incorporated into the final EIS."

Response: This subject was appropriately documented in the draft EIS. No change is needed.

Alabama Development Office, State Soil and Water Conservation Committee

1. Comment: "The State Committee has reviewed this D.E.I.S. and finds same to be in proper order. This proposed development, which originated with local citizen sponsorship in the area involved is urgently needed, and we endorse the earliest possible implementation thereof."

Response: Noted, no response needed.

Alabama State Soil and Water Conservation Committee

1. Comment: "On behalf of Governor George C. Wallace, the State Soil and Water Conservation Committee has reviewed and approved the combined draft plan and draft environmental impact statement for the proposed Southeast Choctawhatchee River Watershed Project located in Dale, Geneva, and Houston Counties, Alabama."

Response: Noted, no response needed.

Alabama State Highway Department

1. Comment: "We have reviewed the material and have no comments to offer. However, should any of the proposed actions affect any state highway, please advise."

Response: Noted. The project as planned will not affect any state highway within the watershed. Some coordination will be required with the county engineers and the State Highway Department in modifying county roads and bridges in the lake area and on grade stabilization structures and critical area treatment on roadbanks.

Alabama Cooperative Extension Service

1. Comment Summary: The draft plan and EIS for Southeast Choctawhatchee River Watershed is being circulated to appropriate staff for review. Any comments or suggestions will be forwarded to your office.

Response: No comments were received.

## LIST OF APPENDICES

- Appendix A - Display Accounts for Selected Alternative
- Appendix B - Summary Comparison of Alternative Plans
- Appendix C - Letters of Comment Received on Draft Plan and Environmental Impact Statement
- Appendix D - Project Map
- Appendix D-1 - Houston County Recreation Park
- Appendix D-2 - Ray Bass Recreation Park
- Appendix D-3 - Land Stabilization, Geneva County
- Appendix D-4 - Land Stabilization, Houston County
- Appendix D-5 - Land Stabilization, Dale County
- Appendix E-1 - Critical Area Locations, Geneva County
- Appendix E-2 - Critical Area Locations, Houston County
- Appendix E-3 - Critical Area Locations, Dale County
- Appendix F - General Soil Map
- Appendix G - Isometric View of Concrete Chute Spillway
- Appendix H - Typical Section of a Dam, Riser and Outlet
- Appendix I - An Historical and Archaeological Survey of Two Proposed Impoundments within the Choctawhatchee River Watershed in Houston and Geneva Counties, Alabama
- Appendix J - Water Quality Monitoring Data
- Appendix K - Vegetative Cover for Structural Measures
- Appendix L - Vegetation of the Southeast Choctawhatchee River Watershed
- Appendix M - Definition of Resource Management Systems
- Appendix N - Land Capability Classes and Subclasses
- Appendix O - Literature Cited



DISPLAY ACCOUNTS FOR SELECTED ALTERNATIVE



SELECTED ALTERNATIVE

NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u> <u>Beneficial effects:</u>	<u>Measures of Effects</u> <u>(Average Annual) 1/2/</u>	<u>Components</u> <u>Adverse effects:</u>	<u>Measures of Effects</u> <u>(Average Annual) 1/2/</u>
A. The value to users of increased outputs of goods and services:		A. The value of resources required for a plan:	
1. Land stabilization	\$1,423,700	1. Grade stabilization structures, recreational development, and recreation facilities	\$1,311,600
2. Recreation	587,800	Project installation OMSR	243,600
3. Utilization of unemployed and underemployed labor resources		2. Project administration	<u>166,200</u>
a. Project construction	<u>83,300</u>		
Total beneficial effects	\$2,094,800	Total adverse effects	\$1,721,400

Net beneficial effects \$373,400

Note: Land treatment beneficial effects were not evaluated. Land treatment costs are \$11,831,500.

1/ 100 years @ 7 1/8 percent interest.  
2/ Price base 1979.

SELECTED ALTERNATIVE

ENVIRONMENTAL QUALITY ACCOUNT

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u>	<u>Measures of effects</u>
Beneficial and Adverse Effects:	
A. Areas of scenic beauty	<ol style="list-style-type: none"><li>1. Project will make available funds and resources that can be used to enhance the physical appearance of about 900 farms by shaping and vegetating critical areas.</li><li>2. Create a recreational lake with 780 surface acres.</li><li>3. Inundate 780 acres.</li><li>4. Disruption in tranquility of rural environment by 186,600 visitor days.</li><li>5. Improve visual quality of the watershed by stabilizing about 609 gullies on about 415 farms.</li><li>6. Visual quality of the area for the recreation development will be reduced.</li><li>7. Reduce sediment deposition on 6,300 acres of flood plain, which will benefit about 200 farms.</li></ol>
B. Quality consideration of water, land, and air resources.	<ol style="list-style-type: none"><li>1. Reduce sediment by 95 percent immediately downstream from the grade stabilization structures.</li><li>2. Reduce nutrient and pesticide movement in streams by reducing sediment. Chemicals attached to soil particles would not be transported by the erosion.</li><li>3. Air and water pollution will be increased during project construction.</li></ol>
C. Biological resources and selected ecosystems	<ol style="list-style-type: none"><li>1. Provide wildlife food and cover from vegetation planted on the exposed areas of the grade stabilization structures.</li><li>2. Temporarily displace wildlife in the area of project construction.</li><li>3. Alter wildlife habitat on 780 acres as a result of inundation by the lake.</li></ol>



SELECTED ALTERNATIVE

ENVIRONMENTAL QUALITY ACCOUNT (Cont'd)

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u>	<u>Measures of effects</u>
C. Biological resources and selected ecosystems (continued)	<ol style="list-style-type: none"><li>4. Create about 780 acres of lake-type aquatic habitat.</li><li>5. Inundate 178 acres of Type 1, 25 acres of Type 2, 5 acres Type 3, 16 acres Type 4, 8 acres of Type 5, 16 acres of Type 6, and 299 acres of Type 7 wetlands.</li><li>6. Inundate about 6 miles of stream that could support 110 man-days of fishing.</li><li>7. Land treatment will enhance wildlife habitat and food supply.</li><li>8. Provide 780 acre resting area at the reservoir for migratory waterfowl.</li></ol>
D. Irreversible or irretrievable commitments	<ol style="list-style-type: none"><li>1. Conversion of 1,160 acres of phreato-phytes and forest land to a reservoir pool and outlet channel.</li></ol>

SELECTED ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT

Southeast Choctawhatchee River Watershed, Alabama

	<u>Components</u>		<u>Measures of effects</u>		<u>Measures of effects</u>	
	Alabama	Rest of Nation	Alabama	Rest of Nation	Alabama	Rest of Nation
<b>Income:</b>						
			<u>Income:</u>			
<b>Beneficial effects:</b>			<u>Adverse effects:</u>			
			<u>(Average Annual) 1/ 2/</u>		<u>(Average Annual) 1/ 2/</u>	
A. The value of increased output of goods and services to users residing in the region						
1. Land stabilization	\$1,423,700	0				
2. Recreation	558,400	\$29,400			\$211,200	\$1,100,400
3. The utilization of regional unemployed or underemployed labor resources.					243,600	0
a. Project construction	83,300	0			8,600	157,600
4. Additional wages & salaries accruing to the region from implementation of the plan						
a. Project OMSR (structures and recreation facilities)	235,200	-235,200			- 32,800	-32,800
B. The value of output to users residing in the region from pecuniary external economies.					\$496,200	\$1,225,200
1. Indirect activities associated with increased net returns from land stabilization and recreation	\$2,331,200	0				
<b>Total beneficial effects</b>	\$4,631,800	\$-205,800				-205,800
					\$4,135,600	\$1,431,000

1/ 100 years @ 7 1/8 percent interest  
 2/ Price base 1979.

SELECTED ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT (Cont'd)

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u>	<u>Measures of Effects</u>	<u>Rest of</u>
	State of Alabama	Nation
C. Population distribution		
Beneficial effects	Create 37 permanent unskilled and 8 permanent semiskilled jobs and 357 unskilled, 23 semi-skilled, and 86 skilled jobs during ten-year installation period where part of the area economy lags behind the rest of the state.	-
	Reduced voiding and depreciation of land for agricultural production should help maintain the family farm system.	-
Adverse effects	-----	-
D. Regional economic base and stability		
Beneficial effects	Create 37 permanent unskilled and 8 permanent semiskilled jobs and 357 unskilled, 23 semi-skilled, and 86 skilled jobs during ten-year installation period where 16 percent of the families have incomes less than the poverty level.	
Adverse effects	-----	-

SELECTED ALTERNATIVE

SOCIAL WELL-BEING ACCOUNT

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u>	<u>Measures of Effects</u>		
Beneficial and Adverse Effects:			
A. Real income distribution	1. Create 45 low-to medium-income permanent jobs for area residents. 2. Create average annual regional income benefit distribution of \$4,631,800 in an area where per capita income in 1970 was about \$2,200.		
	<u>Income class dollars</u>	<u>Percentage of gross income by class</u>	<u>Percentage benefits in class</u>
	Less than \$3,000	17	8
	3,000-10,000	53	62
	More than 10,000	30	30
	3. Average annual local costs to be borne by region total \$496,200 with distribution by income class as follows:		
	<u>Income class dollars</u>	<u>Percentage of gross income by class</u>	<u>Percentage benefits in class</u>
	Less than \$3,000	17	8
	3,000-10,000	53	62
	More than 10,000	30	30
B. Life, health & safety	1. Stabilize about 609 caving gullies eliminating danger around the gullies. 2. Reduce sediment movement which reduces movement of associated materials that have a potential to cause pollution problems.		

SELECTED ALTERNATIVE

SOCIAL WELL-BEING ACCOUNT (Cont'd)

Southeast Choctawhatchee River Watershed, Alabama

<u>Components</u>	<u>Measures of Effects</u>
B. Life, health & safety (cont'd)	3. Reduce sediment deposited in streams and road ditches reducing the need for sediment removal by public funds.
C. Recreational opportunities	1. Creates 186,600 recreational visitor-day activities primarily for a rural population.



SUMMARY COMPARISON OF ALTERNATIVE PLANS





SUMMARY COMPARISON OF ALTERNATIVE PLANS

Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES, AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
---------	---	--

National Economic Development

Beneficial effects	\$2,094,800	\$1,491,200
Adverse effects	<u>1,721,400</u>	<u>1,218,000</u>
Net beneficial effects	\$ 373,400 .	\$ 273,200

Environmental Quality

Beneficial and adverse effects

A. Areas of scenic beauty

Project output will make available regional funds and resources that can be used to enhance the physical appearance of about 900 farms by shaping & vegetating critical areas.

Project output will make available regional funds and resources that can be used to enhance the physical appearance of about 900 farms by shaping & vegetating critical areas.

Create a recreational lake with 780 surface acres.

No Effect

Inundate 780 acres.

No Effect

Disruption in tranquility of rural environment by 186,600 visitor days.

No Effect

SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONT'D)  
Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES, AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
A. Areas of scenic beauty (cont'd)	Improve visual quality of the watershed by stabilizing about 609 gullies on about 415 farms.	Improve visual quality of the watershed by stabilizing about 609 gullies on about 415 farms.
	Improve watershed esthetics with land treatment on about 400 farms.	Improve watershed esthetics with land treatment on about 400 farms.
B. Quality considerations of water, land and air resources	Reduce sediment by 95 percent immediately downstream from the stabilization structures.	Reduce sediment by 95 percent immediately downstream from the grade stabilization structures.
	Reduce nutrient and pesticide movement in streams by reducing sediment. Chemicals attached to soil particles would not be transported by erosion process.	Reduce nutrient and pesticide movement in streams by reducing sediment. Chemicals attached to soil particles would not be transported by erosion process.
	Reduce average annual yield of sediment at mouth of watershed by over 75 percent.	Reduce average annual yield of sediment at mouth of watershed by over 75 percent.
	Air and water pollution will be increased during project construction.	No Effect
	Reduce sediment deposition on 6,300 acres of flood plain, which will benefit about 200 farms.	Reduce sediment deposition on 6,300 acres of flood plain, which will benefit about 200 farms.

SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
C. Biological resources and selected ecosystems.	Provide wildlife food and cover from vegetation planted on the exposed areas of the grade stabilization structures.	Provide wildlife food and cover from vegetation planted on the exposed areas of grade stabilization structures.
	Temporarily displace wildlife in the area of project construction.	No Effect
	Alter wildlife habitat on 780 acres as a result of inundation by the lake.	No Effect
	Create about 780 acres of lake-type aquatic habitat.	No Effect
	Inundate 178 acres of Type 1, 25 acres of Type 2, 5 acres Type 3, 15 acres Type 4, 8 acres of Type 5, 16 acres of Type 6 and 299 acres of Type 7 wetlands.	No Effect
	Inundate about 6 miles of stream that could support 110 man-days of fishing.	No Effect
	Land treatment will enhance wildlife lake for migratory waterfowl.	Land treatment will enhance wildlife habitat and food supply.

SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES, AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
C. Biological resources and selected ecosystems. (cont'd)	Provide 780 acres resting area at the lake and outlet channel.	No Effect
D. Irreversible or irretrievable commitments.	Conversion of 1,160 acres of phreatophytes and forest land to a reservoir pool and channel.	No Effect
<u>Regional Development</u> State of Alabama		
A. Income:		
Beneficial effects	\$4,631,800	\$3,507,400
Adverse effects	\$ 496,200	168,800
Net beneficial effects	\$4,135,600	\$3,338,600
B. Employment		
Agricultural employment	Utilization of 19 man-years of employment in agricultural production.	Utilization of 19 man-years of employment in agricultural production.
Project construction	178 unskilled, 23 semi-skilled, and 86 skilled jobs during installation period.	144 unskilled, 17 semiskilled, and 62 skilled jobs during installation period.
Project operation & maintenance.	22 skilled and 8 semi-skilled permanent jobs	14 unskilled permanent jobs.

SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES, AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
B. Employment (cont'd)		
Land treatment construction	179 unskilled jobs during installation period.	179 unskilled jobs during installation period.
Lost in agricultural employment of project take area.	2 man-years of agricultural employment.	No Effect
<u>Social Well-Being</u>		
A. Real income distribution	Create 47 low-to medium-income permanent jobs for area residents.	Create 33 low-to medium-income permanent jobs for area residents.
	Create average annual regional income benefits distribution of \$4,135,600.	Create average annual regional income benefit distribution of \$3,338,600.
	Average annual local costs to be borne by region totals \$496,200.	Average annual local costs to be borne by region totals \$168,800.
B. Life, health & safety	Stabilize about 609 gullies.	Stabilize about 609 gullies.
	Reduce sediment movement and associated materials that cause pollution.	Reduce sediment movement and associated materials that cause pollution.

SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONT'D)

Southeast Choctawhatchee River Watershed, Alabama

ACCOUNT	SELECTED PLAN AND NATIONAL ECONOMIC DEVELOPMENT PLAN-ACCELERATED LAND TREATMENT, GRADE STABILIZATION STRUCTURES, AND RECREATION LAKE AND FACILITIES	ENVIRONMENTAL QUALITY PLAN-ACCELERATED LAND TREATMENT AND GRADE STABILIZATION STRUCTURES
B. Life, health & safety (cont'd)	Reduce nutrient deposition in streams and road ditches.	Reduce sediment deposition in streams and road ditches.
C. Recreational opportunities	Create 186,600 recreational visitor-day activities.	No Effect

NOTE: Land treatment beneficial effects were not evaluated. Land treatment costs for all plans are \$11,831,500.

LETTERS OF COMMENT RECEIVED ON THE DRAFT PLAN  
AND ENVIRONMENTAL IMPACT STATEMENT

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UNITED STATES DEPARTMENT OF AGRICULTURE

OFFICE OF THE SECRETARY

WASHINGTON, D.C. 20250

SEP 27 1977

OFFICE OF EQUAL OPPORTUNITY

IN REPLY: 8140 Supplement 8

REFER TO:

Draft Environmental Impact Statement and Watershed Plan  
for the Southeast Choctawhatchee River Watershed, Alabama

SUBJECT:

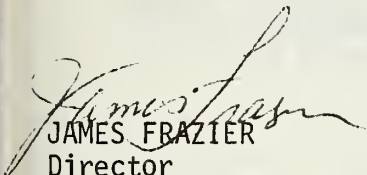
TO: W. B. Lingle  
State Conservationist

THRU: Verne M. Bathurst, Deputy Administrator  
for Management, Soil Conservation Service

The Draft Environmental Impact Statement (EIS) and Watershed Plan for the Southeast Choctawhatchee River Watershed was reviewed by this office for the purpose of assessing the socio-economic impact of the project on minority groups living in or near the affected area.

In the section entitled "Economic and Social Impact," pages 70-72, no mention is made of the impact of the plan on the minority population living in the affected areas (13.4 percent in Geneva County, 24 percent in Houston County and 15.7 percent in Dale County). Because of this void, we are unable to properly assess the civil rights impact of the socio-economic effects on the minority population.

We recommend that you include in your final statement a more detailed assessment of the effects the project will have on the minority population. This should be accomplished in accordance with Soil Conservation Service guidelines for preparing environmental impact statements (Federal Register, Vol. 39, No. 107, June 3, 1974).



JAMES FRAZIER

Director



DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY  
WASHINGTON, D.C. 20310

14650  
OCT 27 1977

Honorable Rupert Cutler  
Assistant Secretary of Agriculture  
Washington, D.C. 20250

Control No. 14650  
06 -  
Referred to: SCS  
Date: \_\_\_\_\_  
B OCT 27 1977

Dear Mr. Cutler:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the Acting State Conservationist of Alabama by letter of 26 August 1977, requested the views of the Chief of Engineers on the combined draft watershed plan and draft environmental impact statement for the Southeast Choctawhatchee River Watershed, Alabama.

We have reviewed this work plan and foresee no conflict with any projects or current proposals of this Department. We note that the draft environmental impact statement does not cover: (1) any adverse environmental effects which cannot be avoided, and (2) other interests and considerations of Federal policy that are thought to offset the adverse environmental effects, as required by CEQ guidelines.

The Alabama State Conservationist should be informed that a regulatory permit (Section 404 of PL 92-500, 86 Stat. 816, 33 U.S.C 1344) will be required for the proposed dam and a request for such a permit should be made to the Mobile District Office of the Corps of Engineers at the earliest possible date.

Sincerely,

Charles R. Ford  
Acting Assistant Secretary of the Army  
(Civil Works)





October 12, 1977

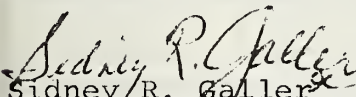
Mr. W.B. Lingle  
State Conservationist  
Soil Conservation Service  
Department of Agriculture  
P.O. Box 311  
Auburn, Alabama 36830

Dear Mr. Lingle:

This is in reference to your draft environmental impact statement entitled "Southeast Choctawhatchee River." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving four (4) copies of the final statement.

Sincerely,

  
Sidney R. Galler  
Deputy Assistant Secretary  
for Environmental Affairs

Enclosure - Memo, National Marine Fisheries Service,  
October 4, 1977



UNITED STATES DEPARTMENT OF COMMERCE  
 National Oceanic and Atmospheric Administration  
 NATIONAL MARINE FISHERIES SERVICE  
 Duval Building  
 9450 Gandy Boulevard  
 St. Petersburg, FL 33702

October 4, 1977

FSP61/JRH

TO: Director, Ofc. of Ecology & Environmental Conservation, EEOCT 1, 1977

THRU: *for [Signature]* Acting Assistant Director for Scientific & Technical Services, F5

FROM: *[Signature]* William H. Stevenson Regional Director

SUBJECT: Comments on Draft Environmental Statement - Watershed Protection and Recreation, Southeast Choctawhatchee River, Alabama (SCS) (DEIS #7708.43)

The draft environmental impact statement for the Soil Conservation Service to construct a watershed protection and recreation project for the Southeast Choctawhatchee River in Dale, Geneva, and Houston Counties, Alabama, that accompanied your memorandum of September 1, 1977, has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

General Comments:

The statement is generally comprehensive; however, certain areas of interest should be more fully discussed. Several species of migratory marine and anadromous fish have been found in the project area and should be listed. Also, the statement claims that the proposed project will reduce levels of pesticides entering the Choctawhatchee River but mechanisms to measure existing and future contaminant levels are not provided. Finally, mitigation is apparently not contemplated for the loss of 780 acres of wetlands that currently provide habitat for fish and wildlife resources and help to promote water quality by filtering upland run-off.

Specific Comments:

Tables for Estimated Costs



Pages P23 - P33. Since improved water quality is one of the project objectives, we suggest that these tables include costs of water quality monitoring. Post-project water quality monitoring would also provide a measure of the project's overall success.

#### Environmental Setting

##### Surface Water Resources

Pages E29 - E32 + Appendix J. This section and appendix would be enhanced by illustrating existing pesticide levels on a yearly basis.

#### Plant and Animal Resources

##### Animal Resources

Pages E41 - E43. The following migratory marine and anadromous fish found within the project area should be added to the species list: skipjack herring, Alosa chrysochloris; hogchoker, Trinectes maculatus; Atlantic sturgeon, Acipenser oxyrinchus<sup>1/</sup>; Alabama shad, Alosa alabamiae; and striped bass, Morone saxatilis<sup>2/</sup>.

#### Water and Land Resource Problems

##### Plant and Animal Problems

Page E58. A more specific description of "chemical pollutants" attached to soil particles should be provided.

##### Water Quality Problems

Page E60. The term "benthic oxygen demand" should be more fully explained.

#### Environmental Impact

##### Land Stabilization

Page E66. Although the EIS states that the project will reduce movements of pesticides into adjacent waters, measurements of current pesticide levels are not provided nor are procedures to monitor future pesticide levels described. We recommend that monitoring procedures be incorporated into the program and that the statement note the need for them.

---

1/ Swingle, H.S. 1957. Choctawhatchee River Survey. Alabama Polytechnic Institute. Auburn University, Auburn, AL 23p.

2/ Personal communication, James Barkuloo, U.S. Fish and Wildlife Service, Panama City, FL.

Recreation

Pages E67-E69. We suggest that mitigation measures for the loss of 780 acres of wetlands by the project be described in this section.

Favorable Environmental Impacts

Page E73. Since descriptions of current pesticide levels do not appear in the statement, the favorable impact of reducing nutrient and pesticide movement to streams should be more fully explained. We further recommend implementing a baseline survey of pesticide levels followed by post-project monitoring. The project's success in reducing pesticide levels could thereby be determined.

Adverse Environmental Impacts

Page E74. Mitigation measures to offset the loss of 780 acres of wetlands and 6 miles of streams should be discussed and described.

It is requested that one copy of the Final EIS be sent our Area Supervisor, Environmental Assessment Branch, P.O. Box 4218, Panama City, FL 32402.

CC:  
FSE613  
F53 (3)



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

200 EAST PASCAGOULA STREET, SUITE 490

JACKSON, MISSISSIPPI 39201

January 5, 1978

Mr. W. B. Lingle  
Soil Conservation Service  
P. O. Box 311  
Auburn, Alabama 36830

Dear Mr. Lingle:

In reference to recent inter-agency discussions concerning mitigation measures proposed for the Southeast Choctawhatchee River Watershed plan, the Fish and Wildlife Service is prepared to make the following comments.

In view of EPA's letter dated December 7, 1978 and your Service's letter dated December 22, 1978 we find the mitigation measures now proposed for the project to be adequate in lessening the degree of resource damage induced by the project. Acquiring the 470 acre buffer zone and the 180 acre wetland area above Ray Bass Park in fee simple and preventing any further cultural practices in these areas will facilitate Fish and Wildlife resource conservation in the area.

The Fish and Wildlife Service will withdraw its opposition to the project if the mitigation is carried out as it is documented in the above mentioned letters. We reserve the right to oppose the project at anytime if the mitigation measures are altered from their present form.

We appreciate your time and effort spent in attempting to resolve the environmental conflicts with this project.

Sincerely,

[Redacted] Area Manager

cc: Decatur

REFERENCED LETTERS FOLLOW AS ATTACHMENTS 1 AND 2



4SA-EIS

December 7, 1978

Mr. Ray Swicegood  
USDA - Soil Conservation Service  
138 South Gay Street  
P. O. Box 311  
Auburn, Alabama 36830

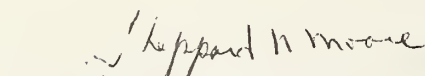
Dear Mr. Swicegood:

Pursuant to your conversation on December 5, 1978, with Gerald Miller of this office regarding the proposed Southeast Choctawhatchee River Project, I would like to clarify/modify certain points of our previous letter:

- A. The variable width buffer zone ( $\geq 100'$ ) can be included in the mitigation land calculation if legal agreement is made with the sponsor that this acreage will remain absolutely unaltered by cultural practices.
- B. We understand that the lake level can only be altered downward below the point of the ultimately chosen dam elevation.
- C. That area above Ray Bass Park characterized in your conversations as the "Beaver Dam" can be included as mitigation land. However, the acreage within the two park boundaries (Ray Bass and Houston County) will not be used in these calculations.
- D. The lake area from the dam site to the Houston County Road #40 will be mitigated on the same ratio (1:1) as the remainder of the project. However, the topography and community composition (upland species) there may make it necessary to increase the buffer zone at other points in the project area to encompass more valuable floodplain species.

I hope that this information sufficiently clarifies our position on this project. However, if you need anything further, feel free to call on us.

Sincerely yours,

  
John E. Hagan, III  
Chief, EIS Branch

ATTACHMENT #1



UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 311, Auburn, AL 36830

December 22, 1978

Mr. John White  
Regional Administrator  
Environmental Protection Agency  
345 Courtland St., NE  
Atlanta, GA 30308

Dear Mr. White:

This is to confirm the mutual agreement reached between our technical staffs for the proposed Southeast Choctawhatchee River watershed plan. The draft plan/EIS, which underwent interagency review August 26 through October 25, 1977, will be revised to reflect the following items:

1. Approximately 650 acres will be preserved in its present state to mitigate for the clearing and inundation of approximately 600 acres (agreement was for a ratio of 1:1). The 600 acres lie within the proposed lake between the dam and Ray Bass Park Road. The 650 acres consist of 470 acres in the variable width buffer zone (2100') located between the proposed lake level and the fee simple take line, and 180 acres in the lake area above the Ray Bass Park. Acreage within the two park boundaries (Ray Bass and Houston County) will not be used in these calculations.

2. The watershed plan agreement will reflect the proposed mitigation and legally require these areas to remain absolutely unaltered by cultural practices. A system for monitoring will be developed to insure the continuing well-being of wetlands, particularly those above the Ray Bass Road. The Environmental Protection Agency (EPA) proposes to provide infrared aerial photography as a baseline prior to placement of the proposed dam. An interagency task force of state and federal agencies will develop criteria that assay the wetlands being monitored. EPA will provide, within fiscal constraints, additional infrared photography on a three to five year interval. The Operations and Maintenance Agreement, which will be signed by the SCS and the Sponsors prior to any construction, will reflect the above considerations and provisions will allow water level fluctuations downward if the task force deems necessary.

The above items are discussed in your November 14, 1978, letter and a follow-up letter to Ray Swicegood on December 7, 1978, from John Hagan, III. We

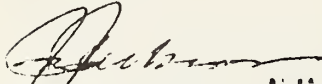


Mr. John White

Page 2

appreciate the cooperation of you and your staff in accomplishing this agreement. A letter from you resolving the former ER-2 rating is needed for inclusion in the final EIS.

Sincerely,



W. B. Lingle Acting  
State Conservationist

cc:

C. D. Kelley, Montgomery, AL  
R. D. Earnest, Jackson, MI  
John Hester, Decatur, AL

SEPA

JAN - 4 1979

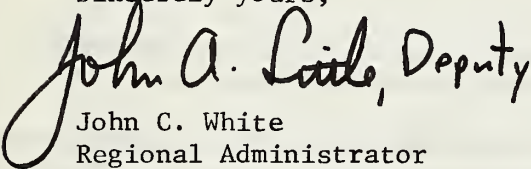
REF: 4SA-EIS

Mr. W. B. Lingle  
State Conservationist  
USDA - Soil Conservation Service  
P. O. Box 311  
Auburn, Alabama 36830

The revisions (see U. S. Environmental Protection Agency letters dated December 7, 1978 and November 14, 1978) made to the Southeast Choctawhatchee River Watershed Plan have resolved the ER-2 (Environmental Reservations) rating which we assigned to the Draft Environmental Impact Statement.

We look forward to working with you and your staff to insure that future projects of this nature will begin with the excellent criteria outlined in your letter of December 22, 1978. If we can be of further assistance, feel free to call on us.

Sincerely yours,

 John C. White, Deputy  
John C. White  
Regional Administrator

REFERENCED LETTERS FOLLOW AS ATTACHMENTS 1 AND 2



4SA-EIS

December 7, 1978

Mr. Ray Swicegood  
USDA - Soil Conservation Service  
138 South Gay Street  
P. O. Box 311  
Auburn, Alabama 36830

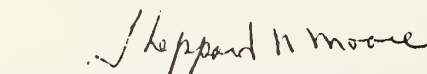
Dear Mr. Swicegood:

Pursuant to your conversation on December 5, 1978, with Gerald Miller of this office regarding the proposed Southeast Choctawhatchee River Project, I would like to clarify/modify certain points of our previous letter:

- A. The variable width buffer zone ( $\geq 100'$ ) can be included in the mitigation land calculation if legal agreement is made with the sponsor that this acreage will remain absolutely unaltered by cultural practices.
- B. We understand that the lake level can only be altered downward below the point of the ultimately chosen dam elevation.
- C. That area above Ray Bass Park characterized in your conversations as the "Beaver Dam" can be included as mitigation land. However, the acreage within the two park boundaries (Ray Bass and Houston County) will not be used in these calculations.
- D. The lake area from the dam site to the Houston County Road #40 will be mitigated on the same ratio (1:1) as the remainder of the project. However, the topography and community composition (upland species) there may make it necessary to increase the buffer zone at other points in the project area to encompass more valuable floodplain species.

I hope that this information sufficiently clarifies our position on this project. However, if you need anything further, feel free to call on us.

Sincerely yours,

  
John E. Hagan, III  
Chief, EIS Branch

ATTACHMENT #1

C-12



NOV 14 1978

REF: 4E-ER

Mr. W. B. Lingle  
State Conservationist  
U.S. Soil Conservation Service  
P.O. Box 311  
Auburn, Alabama 36830

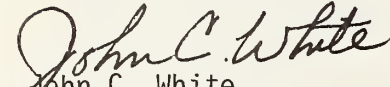
Dear Mr. Lingle:

Interagency discussions during meetings on July 12, 1978, and October 31, 1978, have led to agreement on issues concerning the proposed Southeast Choctawhatchee Watershed Plan. Mitigation for the alteration of wetlands that are within the contours of the proposed pool include development of a buffer zone between the pool edge and the uplands. Acreage to be included in the buffer zone will be equal to the pool acreage (from the proposed dam up to the Ray Bass Road). Pool elevation will be no higher than 232 feet, but will be lower if necessary. Recognizing that a 100-foot buffer strip around the pool was designed into the project, and is not wetland acreage, the mitigation acreage in the buffer zone is in addition to the acreage included within the 100-foot buffer strip. A maximum amount of the mitigation acreage will be located in draws, sloughs, and areas on tributaries to Bear Creek where watershed drainage is greater.

A system for monitoring will be developed to insure the continuing well-being of wetlands, particularly those above the Ray Bass Road. The Environmental Protection Agency (EPA) proposes to provide infrared aerial photography as a baseline prior to placement of the proposed dam. An interagency task force of State and Federal agencies will develop criteria that assay the wetlands being monitored. EPA will provide, within fiscal constraints, additional infrared photography on a three to five year interval. The O&M Operations Manual

will reflect the above considerations and provisions will allow water level fluctuations if the task force deems necessary. This Agency looks forward to continued interagency cooperation that leads to the most environmentally sound project possible.

Sincerely yours,

  
John C. White  
Regional Administrator

cc: Mr. Charles D. Kelley, Director  
Alabama Game and Fish Division

Mr. Russell D. Earnest, Area Manager  
U. S. Fish and Wildlife Service  
Jackson, Mississippi

Mr. John Hester, Field Supervisor  
U. S. Fish and Wildlife Service  
Decatur, Alabama



STATE OF ALABAMA

**ALABAMA DEVELOPMENT OFFICE**

GEORGE C. WALLACE  
GOVERNOR

R. C. "RED" BAMBERG  
DIRECTOR

W. M. "BILL" RUSHTON  
ASSISTANT DIRECTOR

October 18, 1977

TO: Mr. W. B. Lingle, State Conservationist  
Soil Conservation Service  
U. S. Department of Agriculture  
P. O. Box 311  
Auburn, Alabama 36830

FROM: *Michael R. Amos*  
Michael R. Amos  
State Clearinghouse  
State Planning Division

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT

Applicant: Soil Conservation Service

Project: Draft Environmental Impact Statement and Watershed Plan for  
the Southeast Choctawhatchee River Watershed, Alabama

State Clearinghouse Control Number: ADO-014-77

The Draft Environmental Impact Statement for the above project has been reviewed by the appropriate State agencies in accordance with Office of Management and Budget Circular A-95, Revised.

The comments received from the reviewing agencies are attached.

Please contact us if we may be of further assistance. Correspondence regarding this proposal should refer to the assigned Clearinghouse Number.

A-95/05

Attachments

Agencies Contacted For Comment:

Southeast Alabama Regional Planning and Development Comm.  
Conservation and Natural Resources - White  
Historical Commission  
Soil and Water Conservation  
Geological Survey of Alabama  
Environmental Health Administration

REQUEST FOR REVIEW OF PROJECT NO. IFICATION

TO: Mr. Wilbur B. Nolen, Jr.  
Soil & Water Conservation

CH Number ADO-014-77

Applicant Soil Conservation Service

Program D.E.I.S. and Watershed Plan for the  
Southeast Choctawhatchee River Watershed, Alabama

DATE: Sept. 19, 1977

Return Prior to: Oct. 28, 1977  
Date

Please review the attached environmental impact statement and indicate your comment with respect to any environmental impact involved.

Comments: (Please check one block.)

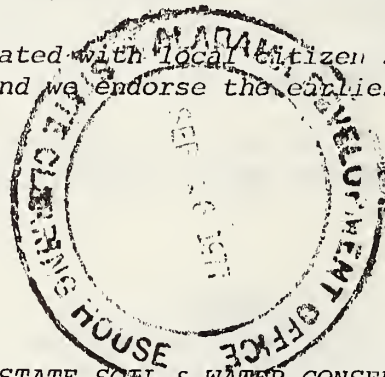
No comment (Environmental impact statement is in order and no additional comments are offered.)

Comments (Elaborate below.)

Comment here:

*The State Committee has reviewed this D.E.I.S. and Watershed Plan and finds same to be in proper order.*

*This proposed development, which originated with local citizen sponsorship in the area involved is urgently needed, and we endorse the earliest possible implementation thereof.*



STATE SOIL & WATER CONSERVATION COMMITTEE

*Wilbur B. Nolen, Jr.*  
Signature EXECUTIVE SECRETARY

Please Return Original to:

Alabama Development Office  
Office of State Planning  
State Clearinghouse  
State Office Building  
Montgomery, Alabama 36104

FORM CH-2a  
8/71



REQUEST FOR REVIEW OF PROJECT IDENTIFICATION

Mr. Tom Joiner  
Geological Survey of Ala.

CH Number ADO-014-77

Applicant Soil Conservation Service

Program D.E.I.S. and Watershed Plan for the Southeast Choctawhatchee River Watershed, Alabama

RECEIVED: Sept. 19, 1977

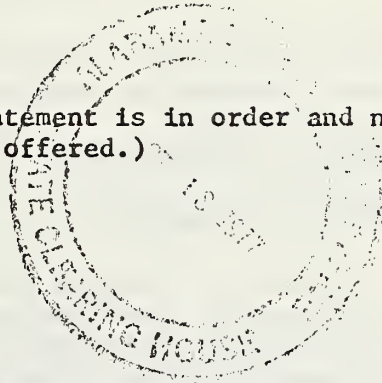
Return Prior to: Oct. 28, 1977  
Date

Please review the attached environmental impact statement and indicate your comment with respect to any environmental impact involved.

Comments: (Please check one block.)

No comment (Environmental impact statement is in order and no additional comments are offered.)

Comments (Elaborate below.)



Comment here:

Several members of my staff have received the environmental impact statement on the Southeast Choctawhatchee River. Their comments are given below:

1. The sections on geology, minerals and water resources, water quality and flood prone areas are rather general.
2. Since the EIS was written, a new publication on Alabama's endangered and threatened wildlife has been published. This should be incorporated into the final EIS.

Except for these comments, the EIS appears to be in good order. Care should be taken however, during the construction phase of the project to retard any unnecessary erosion

*Thomas J. Joiner*  
\_\_\_\_\_  
Signature

Thomas J. Joiner, Acting State Geologist

Please Return Original to:

Alabama Development Office  
Office of State Planning  
State Clearinghouse  
State Office Building  
Montgomery, Alabama 36104

FORM CH-2a  
8/71



ALABAMA STATE SOIL AND WATER CONSERVATION COMMITTEE

ROOM 203 RICHARD BEARD BUILDING
1445 FEDERAL DRIVE
P. O. BOX 3336
MONTGOMERY, ALABAMA 36109

September 9, 1977

WILBUR B. NOLEN, JR.
EXECUTIVE SECRETARY

STATE COMMITTEE MEMBERS

A. D. HOLMES, JR.
DISTRICT SUPERVISOR

JOE HAMILTON
DISTRICT SUPERVISOR

JOE TRAYLOR
DISTRICT SUPERVISOR

E. P. GRANT, JR.
DISTRICT SUPERVISOR

ROBERT GAY
DISTRICT SUPERVISOR

E. C. GIBBS, JR.
DISTRICT SUPERVISOR

J. C. HOLLIS
STATE SUPERVISOR
AGRIBUSINESS EDUCATION

DR. R. DENNIS ROUSE
DEAN OF AGRICULTURE

DR. J. MICHAEL SPROTT
DIRECTOR
EXTENSION SERVICE

Mr. W. B. Lingle, State Conservationist
Soil Conservation Service
P. O. Box 311
Auburn, Alabama 36830

Dear Mr. Lingle:

On behalf of Governor George C. Wallace the State Soil and Water Conservation Committee has reviewed and approved the "combined draft plan", and "draft environmental impact statement", for the proposed Southeast Choctawhatchee River Watershed Project located in Dale, Geneva and Houston Counties, Alabama.

The Committee would greatly appreciate any assistance which your office might render, in helping the Sponsors to expedite development of this much needed Watershed Plan.

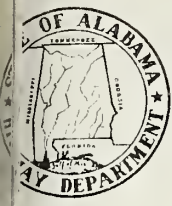
If our office may be of further assistance, it will be a pleasure to serve you.

Very truly yours,

Handwritten signature of Wilbur B. Nolen, Jr.
WILBUR B. NOLEN, JR.
EXECUTIVE SECRETARY

WBN:msh

cc: Merlyn Borland, Chairman, Dale County Soil & Water Conservation
C. B. Johnson, Chairman, Geneva County Soil & Water Conservation
Olaff S. Ivey, Chairman, Houston County Soil & Water Conservation
Charles H. Harper, Area Conservation, Soil Conservation Service
A. A. Middleton, Project Coordinator, Southeast Choctawhatchee Watershed Association



STATE OF ALABAMA  
HIGHWAY DEPARTMENT

MONTGOMERY, ALABAMA 36130

RAY D. BASS  
RAY DIRECTOR

September 6, 1977

Mr. J. H. Dent, Acting State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
P. O. Box 311  
Auburn, Alabama 36830

RE: Southeast Choctawhatchee River  
Watershed in Alabama

Dear Mr. Dent:

Thank you for your letter dated August 26, 1977 and attached Draft Environmental Impact Statement for the Southeast Choctawhatchee River Watershed in Alabama. We have reviewed the material and have no comments to offer. However, should any of the proposed actions affect any state highway, please advise.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. F. Freeman".

J. F. Freeman, Engineer  
Bureau of Surveys and Plans

JFF/WMR/bl

cc: Mr. Paul G. Stough

 Alabama  
Cooperative  
Extension Service

STATE HEADQUARTERS / AUBURN, AL 36830  
TEL. (205) 826-5323

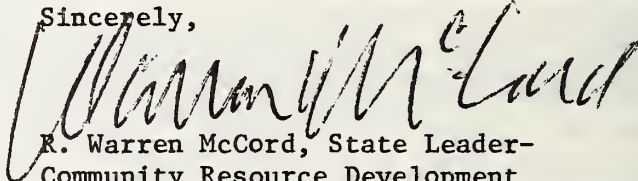
September 7, 1977

Mr. W. B. Lingle  
State Conservationist  
Soil Conservation Service  
P.O. Box 311  
Auburn, Alabama 36830

Dear Mr. Lingle:

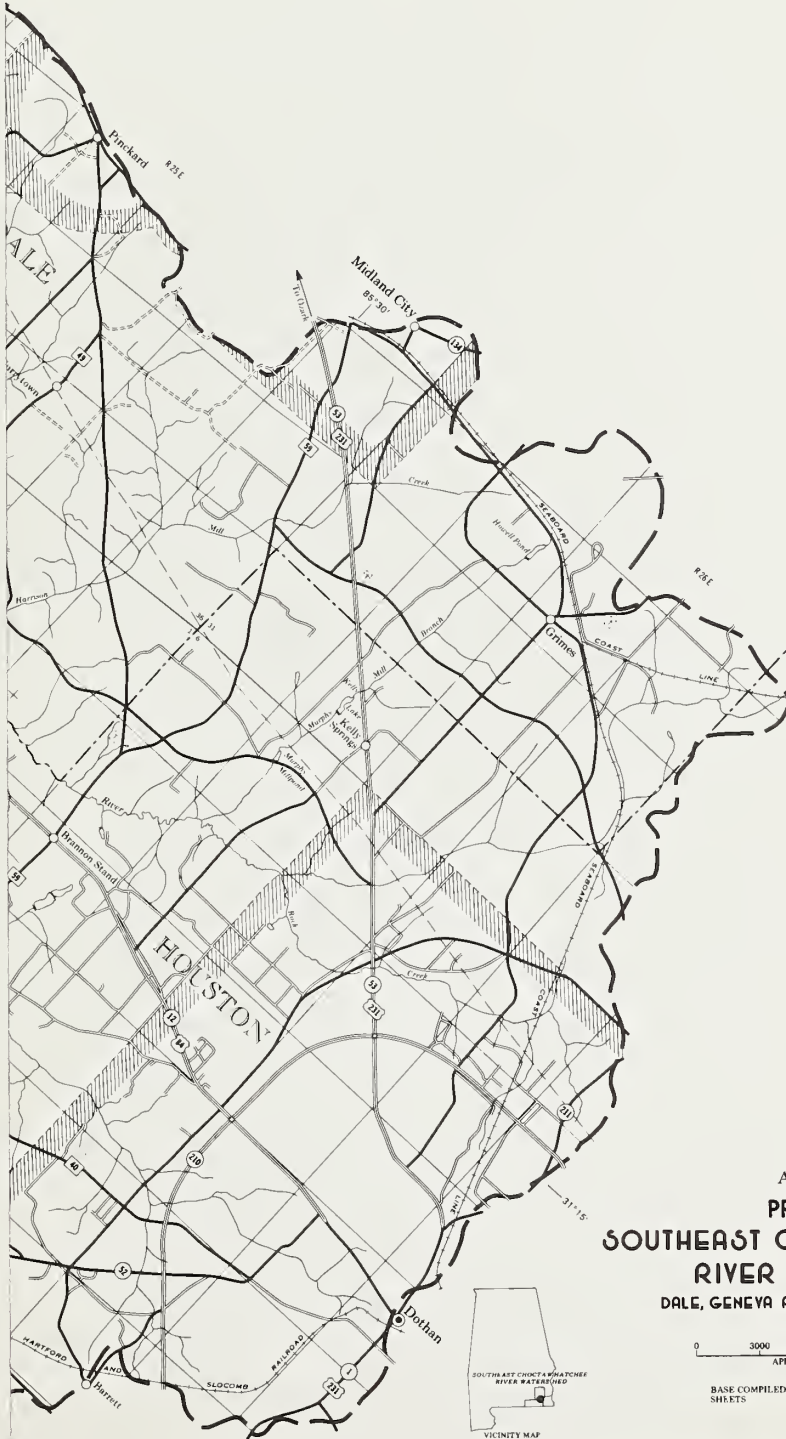
I am circulating, for Director Sprott, the draft watershed plan and EIS for the Southeast Choctawhatchee River Watershed to appropriate staff for review. Any comments or suggestions will be forwarded to you by October 25, as you requested.

Sincerely,

  
R. Warren McCord, State Leader-  
Community Resource Development

/jj

cc: Dr. Ray Cavender  
Dr. J. Michael Sprott



Appendix D  
**PROJECT MAP**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS





SOURCE: Soil Conservation Service, Watershed Planning Staff.

Appendix D  
**PROJECT MAP**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

0 2000 4000 6000 8000 10000 FEET

SCALE COMPILY BY BARTH & ZIMMEL, INC., ALBUQUERQUE, N.M.



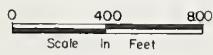
September 1976 4-R-35709  
 September 1976 Base 4-R-29560







21 | 22  
28 | 27



Appendix D-1  
**HOUSTON COUNTY RECREATION PARK**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

September 1976 4-R-35713-1

Source - Reproduction  
 Fort Worth, Texas.

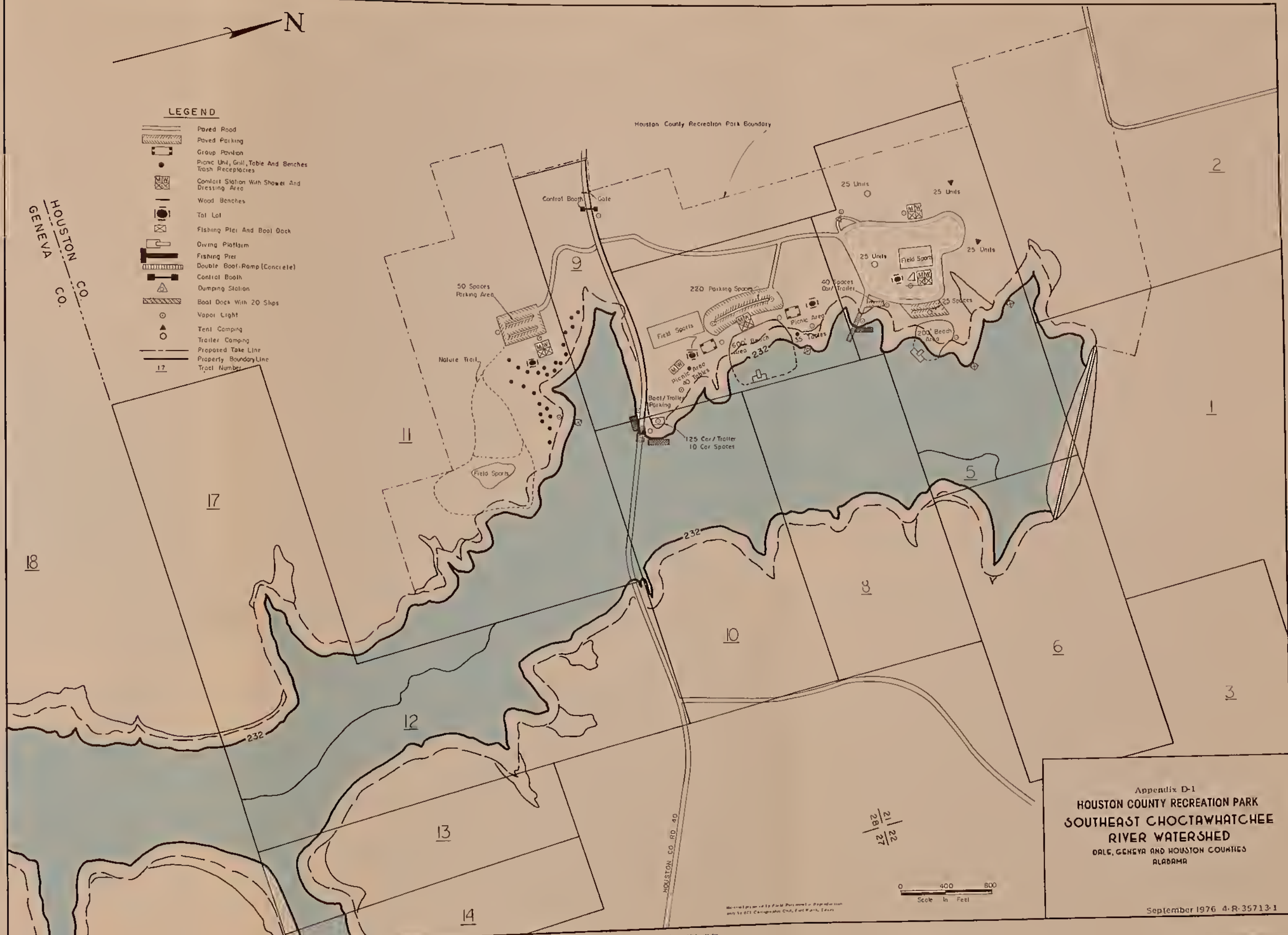




**LEGEND**

- Paved Road
- Paved Parking
- Group Pavilion
- Picnic Unit, Grill, Table And Benches
- Trash Receptacles
- Complaint Station With Shower And Dressing Area
- Wood Benches
- Toll Lot
- Fishing Pier And Boat Dock
- Diving Platform
- Fishing Pier
- Double Boat Ramp (Concrete)
- Control Booth
- Dumping Station
- Boat Dock With 20 Ships
- Vapor Light
- Tent Camping
- Trailer Camping
- Proposed Take Line
- Property Boundary Line
- Trail Number

HOUSTON CO.  
 GENEVA CO.



Appendix D-1  
**HOUSTON COUNTY RECREATION PARK**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

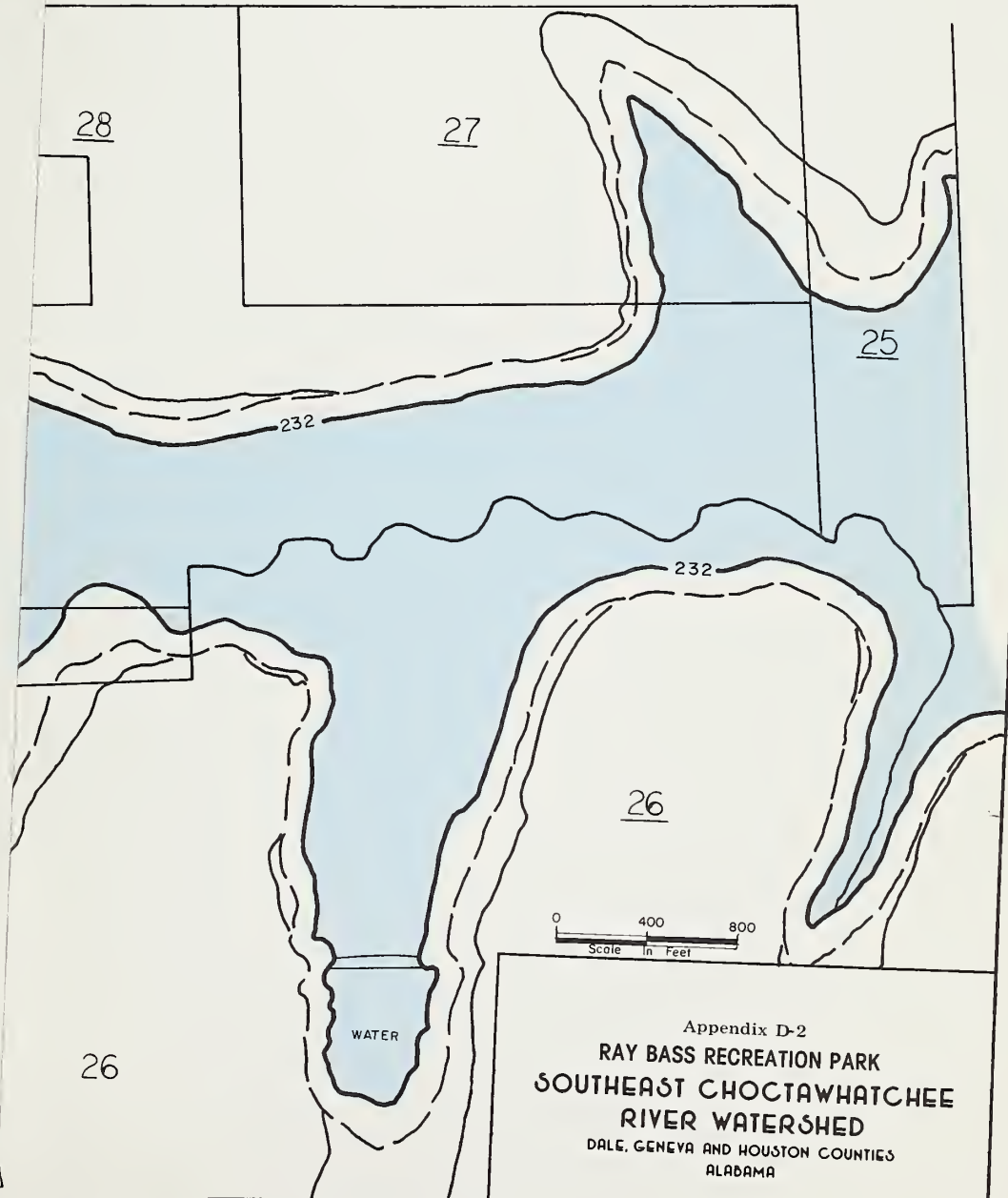
21  
 28  
 22  
 27

0 400 800  
 Scale In Feet



NOTE:

For Legend See Appendix D-1

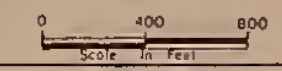
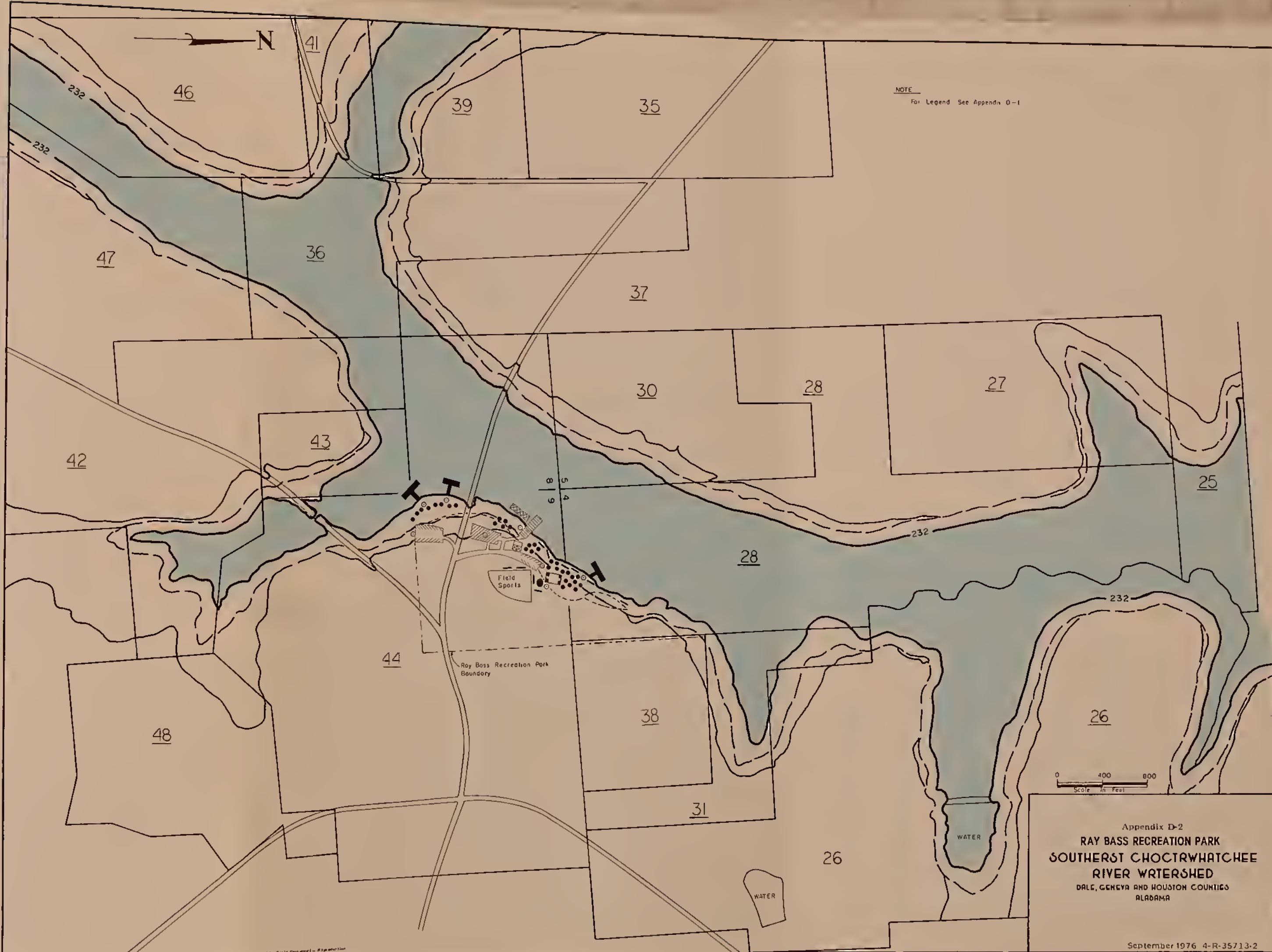


Appendix D-2  
RAY BASS RECREATION PARK  
SOUTHEAST CHOCTAWHATCHEE  
RIVER WATERSHED  
DALE, GENEVA AND HOUSTON COUNTIES  
ALABAMA





NOTE  
For Legend See Appendix D-1

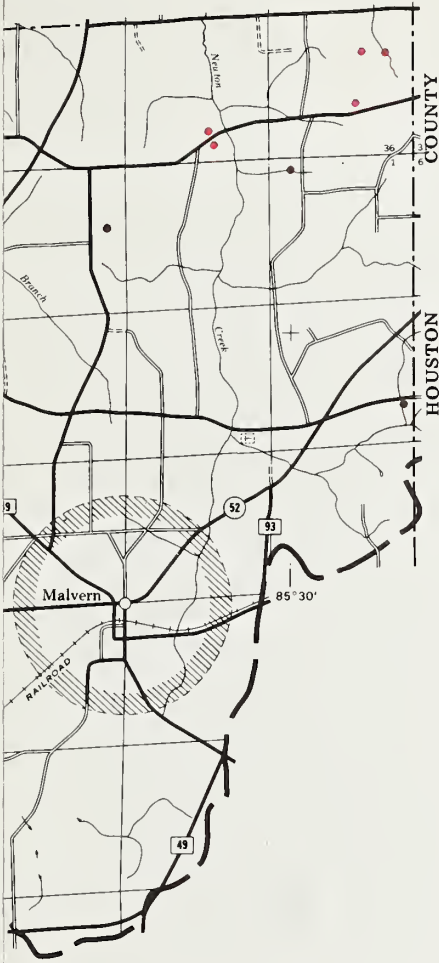


Appendix D-2  
RAY BASS RECREATION PARK  
SOUTHERST CHOCTAWHATCHEE  
RIVER WATERSHED  
DALE, CENEVA AND HOUSTON COUNTIES  
ALABAMA

Map prepared by Field Division, Department of Conservation and Forestry, Alabama Department of Natural Resources, Montgomery, Alabama







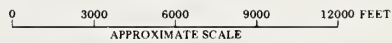
VICINITY MAP

LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits



Appendix D-3  
**LAND STABILIZATION**  
**GENEVA COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

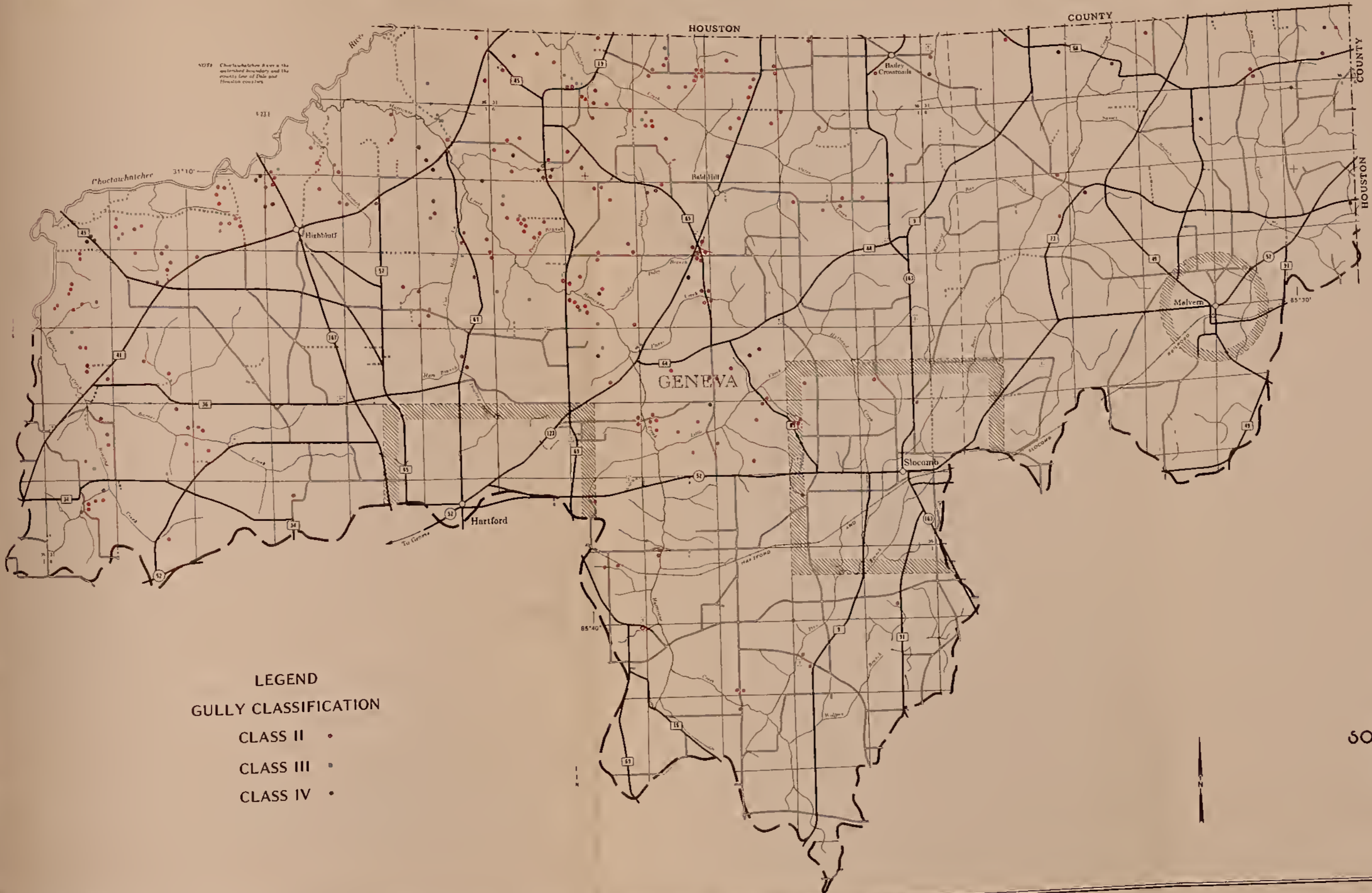


BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS.

SOURC







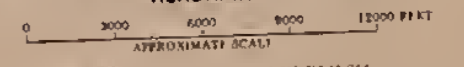
**LEGEND**  
**GULLY CLASSIFICATION**  
 CLASS II •  
 CLASS III •  
 CLASS IV •



VICINITY MAP

- LEGEND**
- U.S. Highway
  - State Highway
  - Farm to Market Road
  - Divided Road
  - Primary Road
  - Secondary Road
  - Unimproved or Private Road
  - Railroad
  - Powerline
  - Town
  - Cemetery
  - County Boundary
  - Drainage
  - Watershed Boundary
  - City Limits

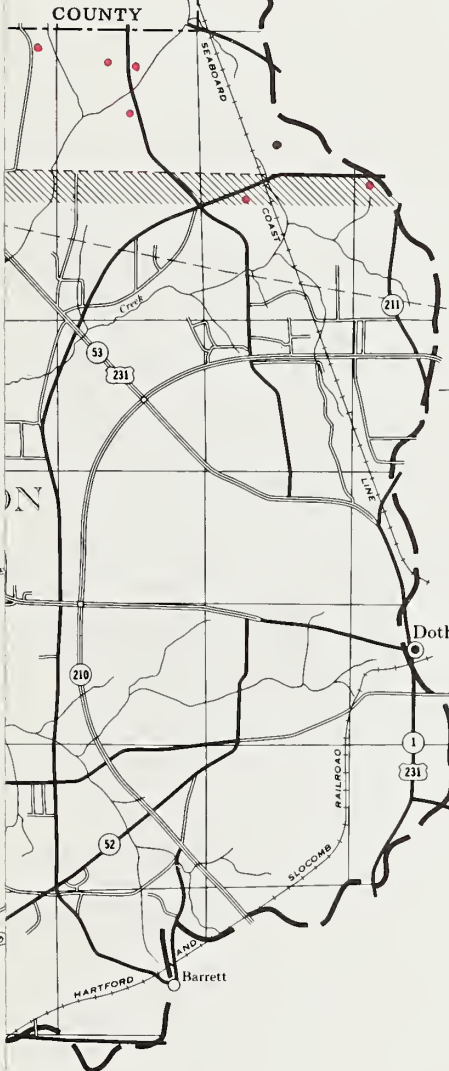
Appendix D-3  
**LAND STABILIZATION**  
**GENEVA COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASED ON U.S. QUADRANGLE SHEETS





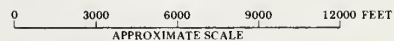


VICINITY MAP

LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

Appendix D-4  
**LAND STABILIZATION**  
**HOUSTON COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1 24000 USGS QUADRANGLE SHEETS.



SOUR







VICINITY MAP

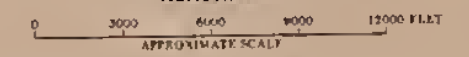
LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

LEGEND  
GULLY CLASSIFICATION

- CLASS II •
- CLASS III •
- CLASS IV •

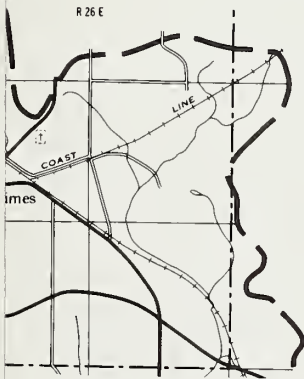
Appendix D-4  
**LAND STABILIZATION**  
**HOUSTON COUNTY**  
OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
DALE, GENEVA AND HOUSTON COUNTIES  
ALABAMA



BASE COMPILED FROM 1:24000 U.S.G.S. QUADRANGLE SHEETS





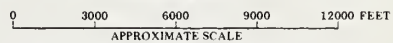


VICINITY MAP

LEGEND

-  U.S. Highway
-  State Highway
-  Farm to Market Road
-  Divided Road
-  Primary Road
-  Secondary Road
-  Unimproved or Private Road
-  Railroad
-  Powerline
-  Town
-  Cemetery
-  County Boundary
-  Drainage
-  Watershed Boundary
-  City Limits

Appendix D-5  
**LAND STABILIZATION**  
**DALE COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS.

SOUR



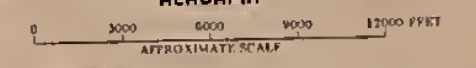


VICINITY MAP

- LEGEND
- U.S. Highway
  - State Highway
  - Farm to Market Road
  - Divided Road
  - Primary Road
  - Secondary Road
  - Unimproved or Private Road
  - Railroad
  - Powerline
  - Town
  - Cemetery
  - County Boundary
  - Drainage
  - Watershed Boundary
  - City Limits

- LEGEND
- GULLY CLASSIFICATION
- CLASS II •
  - CLASS III •
  - CLASS IV •

Appendix D-5  
**LAND STABILIZATION**  
**DALE COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS

September 1976 4-R-35711-3  
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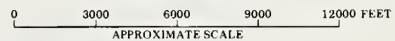


VICINITY MAP

LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

Appendix E-1  
**CRITICAL AREA LOCATIONS**  
**GENEVA COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

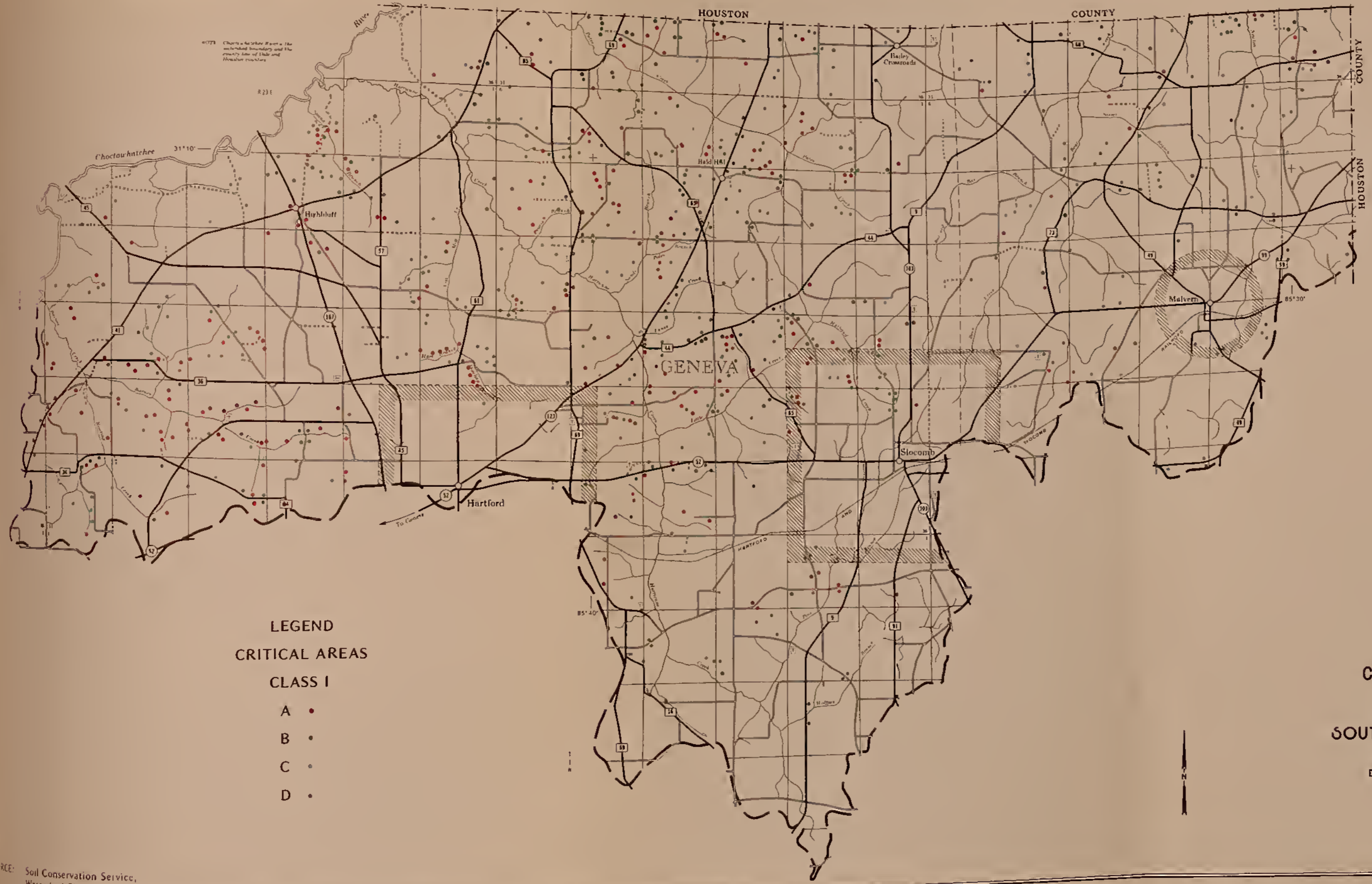


BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS.

SOUR







**LEGEND**  
**CRITICAL AREAS**  
**CLASS I**  
 A •  
 B •  
 C •  
 D •



VICINITY MAP

**LEGEND**

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

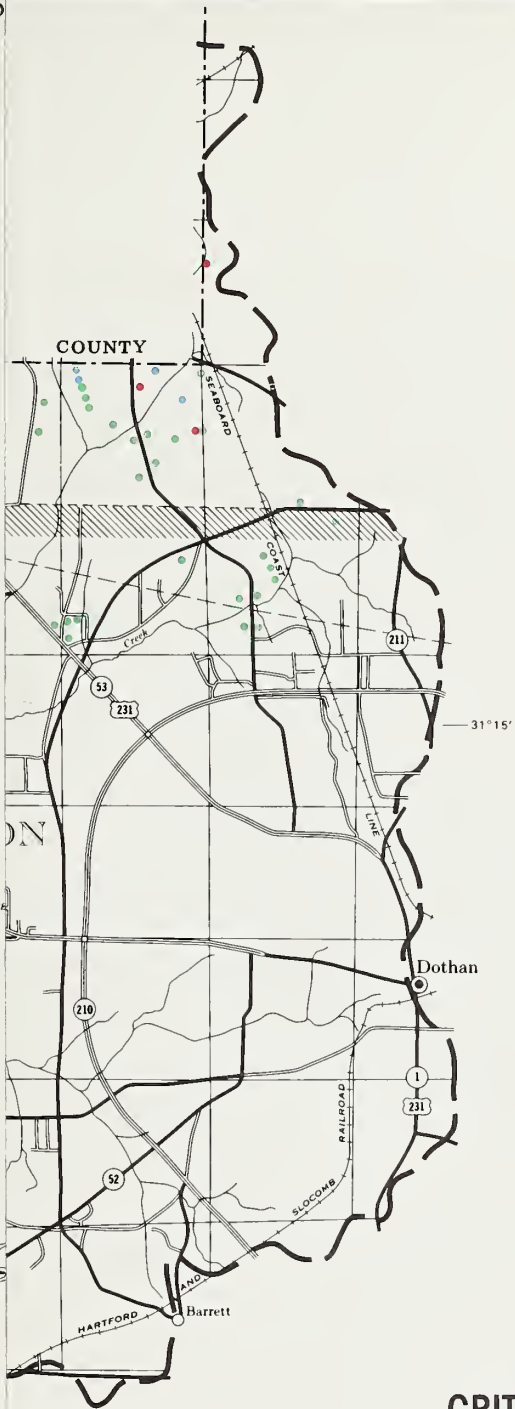
Appendix E-1  
**CRITICAL AREA LOCATIONS**  
**GENEVA COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

0 3000 6000 9000 12000 FEET  
 APPROXIMATE SCALE

BASE COMPILED FROM U.S. GEOLOGICAL SURVEY QUADRANGLE SHEETS





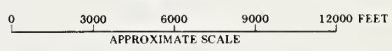


VICINITY MAP

LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

Appendix E-2  
**CRITICAL AREA LOCATIONS**  
**HOUSTON COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS

SOUR

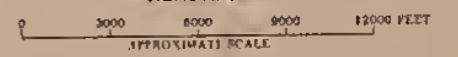




- LEGEND
- U.S. Highway
  - State Highway
  - Farm to Market Road
  - Divided Road
  - Primary Road
  - Secondary Road
  - Unimproved or Private Road
  - Railroad
  - Powerline
  - Town
  - Cemetery
  - County Boundary
  - Drainage
  - Watershed Boundary
  - City Limits

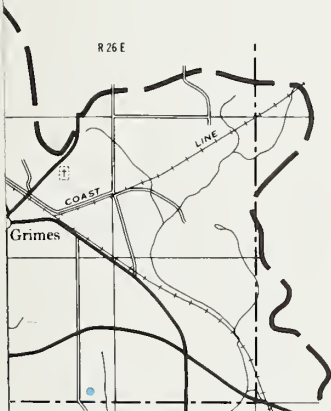
- LEGEND
- CRITICAL AREAS
- CLASS I
- A •
  - B •
  - C •
  - D •

Appendix E-2  
**CRITICAL AREA LOCATIONS**  
**HOUSTON COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:25000 USGS QUADRANGLE SHEETS



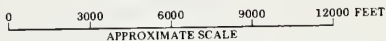


VICINITY MAP

LEGEND

- U.S. Highway
- State Highway
- Farm to Market Road
- Divided Road
- Primary Road
- Secondary Road
- Unimproved or Private Road
- Railroad
- Powerline
- Town
- Cemetery
- County Boundary
- Drainage
- Watershed Boundary
- City Limits

Appendix E-3  
**CRITICAL AREA LOCATIONS**  
**DALE COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS.



SOU







VICINITY MAP

- LEGEND
- U.S. Highway
  - State Highway
  - Farm to Market Road
  - Divided Road
  - Primary Road
  - Secondary Road
  - Unimproved or Private Road
  - Railroad
  - Powerline
  - Town
  - Cemetery
  - County Boundary
  - Drainage
  - Watershed Boundary
  - City Limits

- LEGEND
- CRITICAL AREAS
- CLASS I
- A •
  - B •
  - C •

Appendix E-3  
**CRITICAL AREA LOCATIONS**  
**DALE COUNTY**  
 OF THE  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 TINGS QUADRANGLE SHEETS.

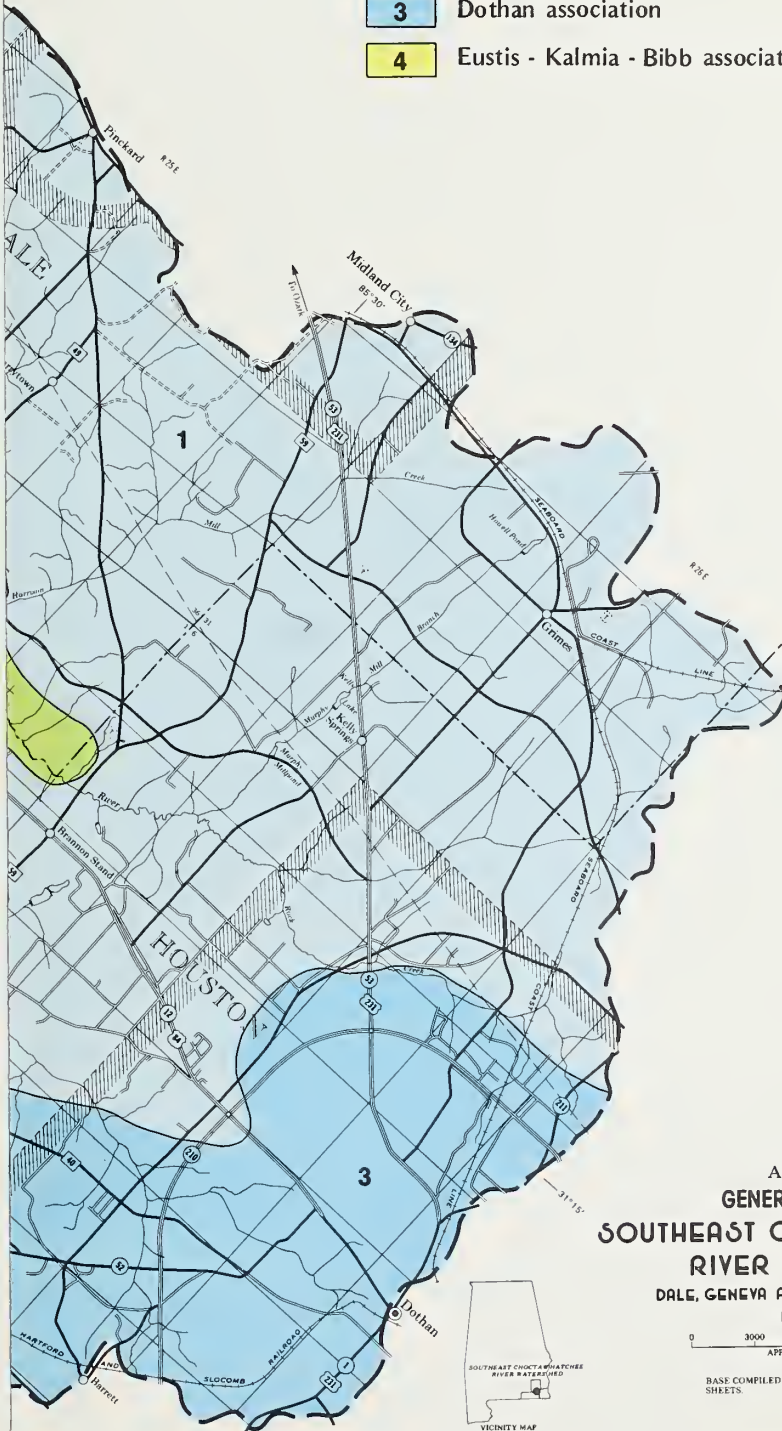






SOIL ASSOCIATION LEGEND

- 1 Orangeburg - Red Bay - Dothan association
- 2 Alaga - Lucy - Troup association
- 3 Dothan association
- 4 Eustis - Kalmia - Bibb association

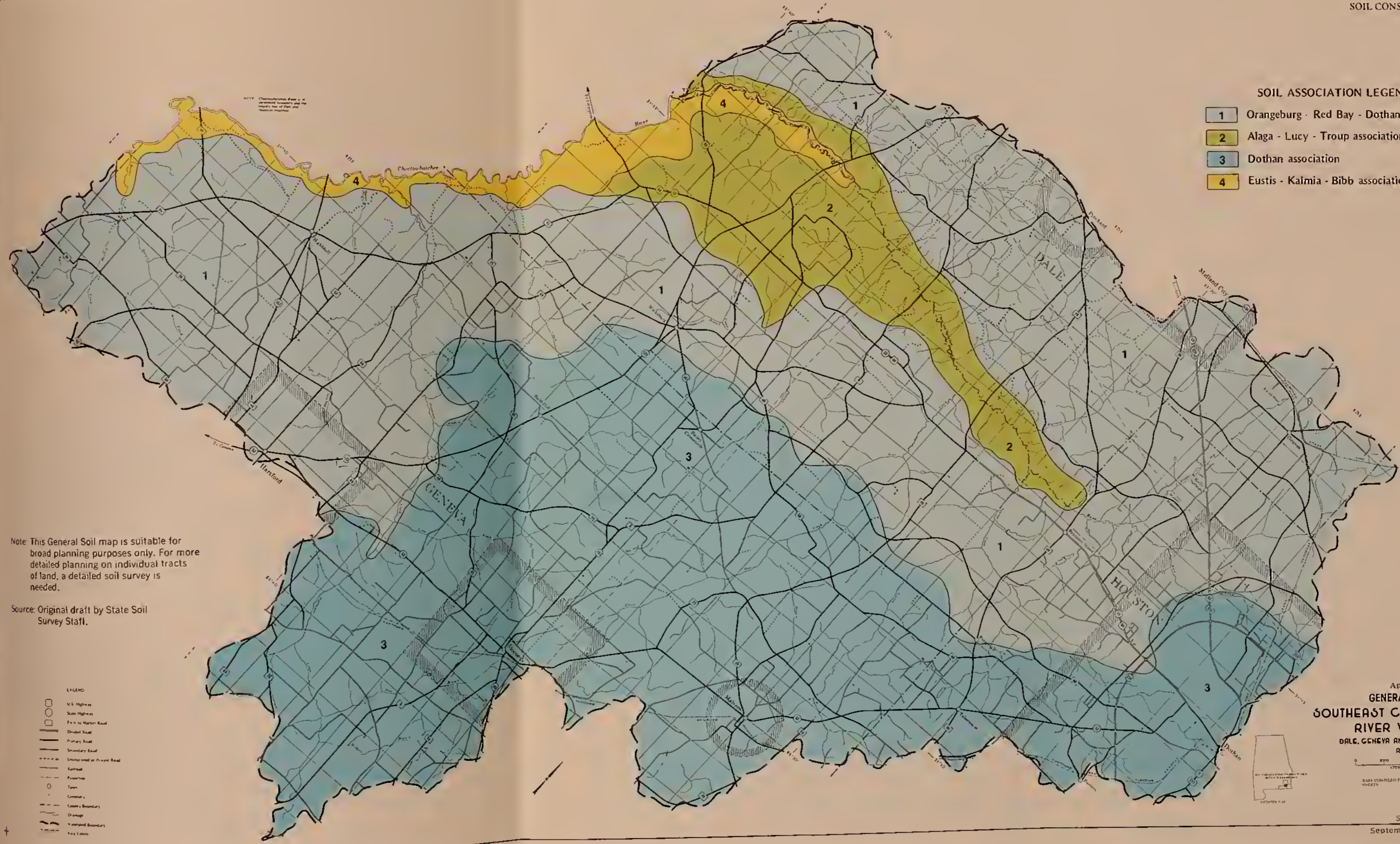


Appendix F  
**GENERAL SOIL MAP**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA



BASE COMPILED FROM 1:24000 USGS QUADRANGLE SHEETS





- SOIL ASSOCIATION LEGEND**
- 1 Orangeburg - Red Bay - Dothan association
  - 2 Alaga - Lucy - Troup association
  - 3 Dothan association
  - 4 Eustis - Kalmia - Bibb association

Note: This General Soil map is suitable for broad planning purposes only. For more detailed planning on individual tracts of land, a detailed soil survey is needed.

Source: Original draft by State Soil Survey Staff.

- LEGEND**
- U.S. Highway
  - State Highway
  - Fed. to State Road
  - Divided Road
  - Primary Road
  - Secondary Road
  - Unimproved or Private Road
  - Railroad
  - Powerline
  - Town
  - County
  - County Boundary
  - Drainage
  - Watershed Boundary
  - Key Lines

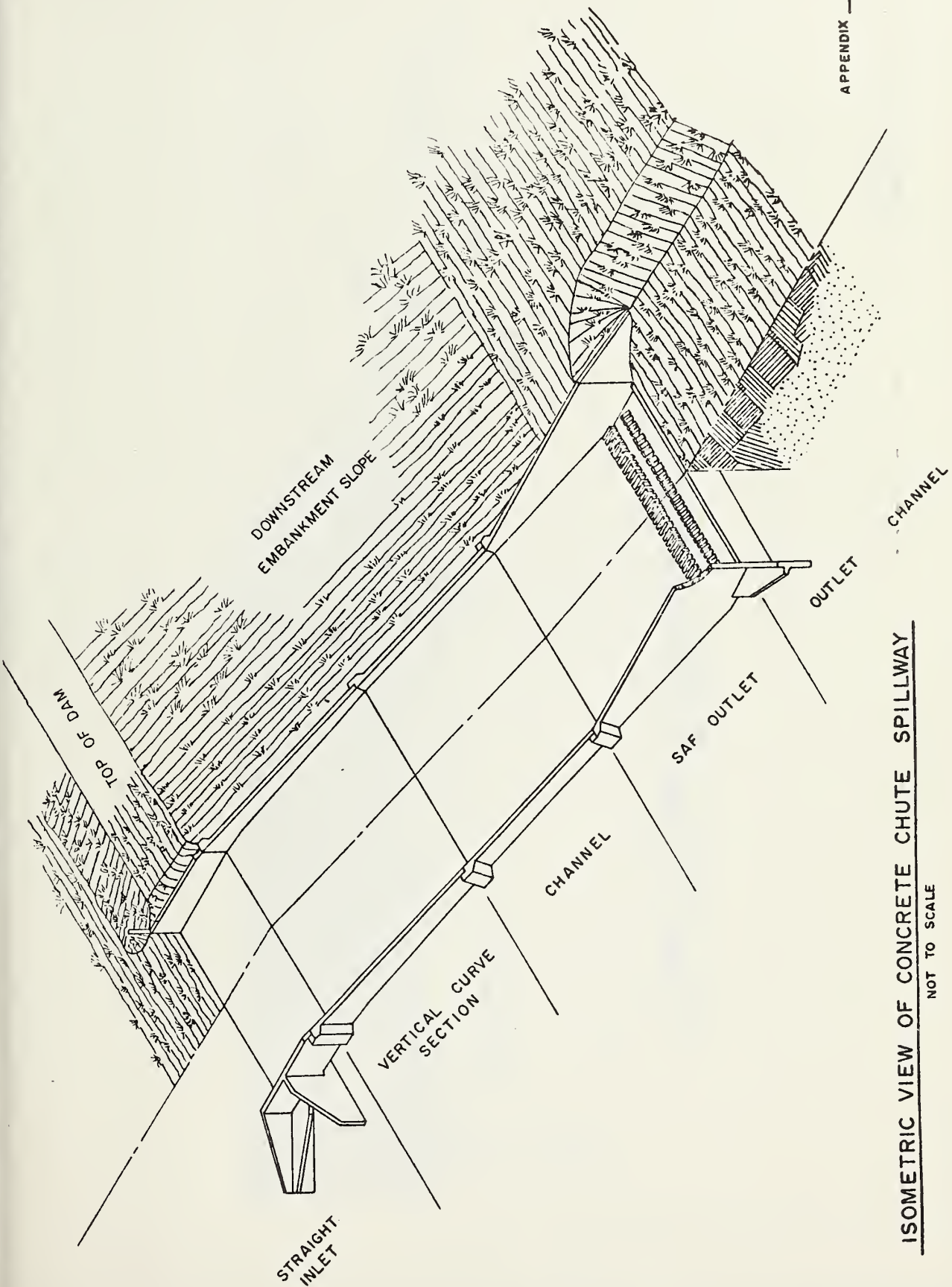
Appendix F  
**GENERAL SOIL MAP**  
**SOUTHEAST CHOCTAWHATCHEE**  
**RIVER WATERSHED**  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

0 2000 4000 8000 FEET  
 APPROPRIATE SCALE



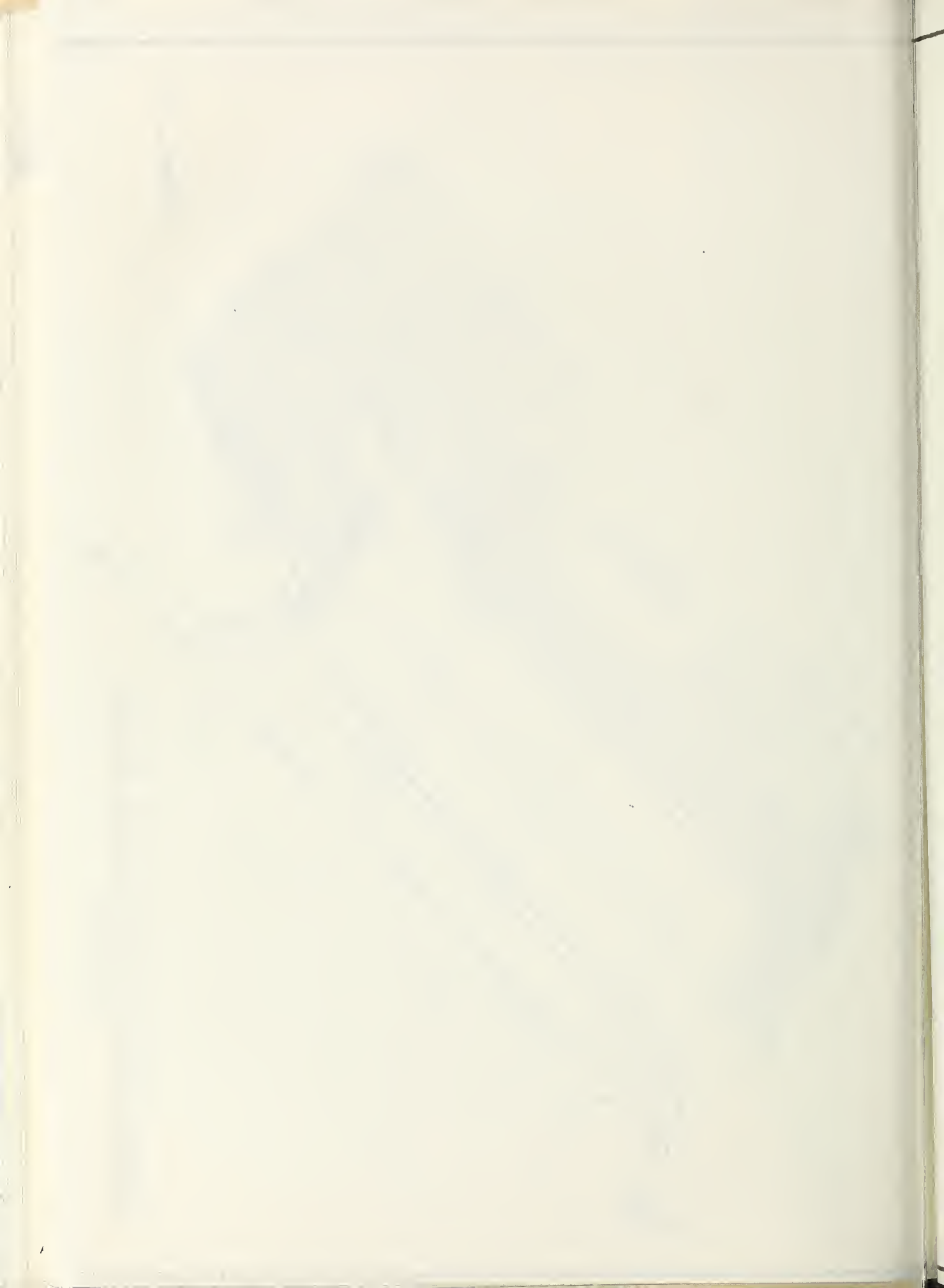
September 1976 4-R-35710  
 September 1976 Base 4-R-29560

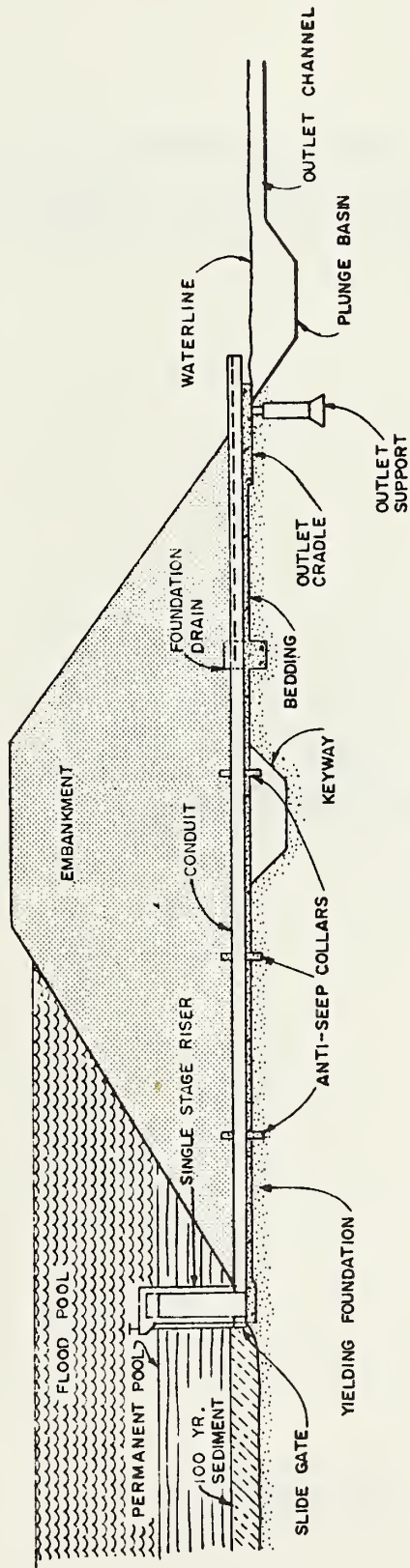




ISOMETRIC VIEW OF CONCRETE CHUTE SPILLWAY

NOT TO SCALE





TYPICAL SECTION OF DAM, RISER AND OUTLET

NOT TO SCALE





AN INTENSIVE ARCHAEOLOGICAL AND HISTORICAL SURVEY OF TWO  
PROPOSED IMPOUNDMENTS WITHIN THE CHOCTAWHATCHEE WATERSHED  
IN HOUSTON AND GENEVA COUNTIES, ALABAMA

By  
Bascom Mack Brooms

December 15, 1975

### Conclusions and Recommendations:

Geneva and Houston Counties, Alabama, contain many historic and prehistoric sites. A comprehensive literature search showed no known historic places within the proposed impoundment areas of Hurricane Creek or Bear Creek. Both known historic and prehistoric sites within and around this part of the Choctawhatchee Watershed have already been discussed. The nearest known site is Hurricane Creek Methodist Church and cemetery. According to the technical specifications of the permanent sediment pool level and the top dam elevation of the Hurricane Creek reservoir, it will not be affected. The field reconnaissance did not reveal any previously unknown historic sites on either creek.

Fifteen prehistoric sites were discovered during the survey of Bear Creek. They have been culturally associated with the Late Woodland-Early Mississippian Period of Alabama's prehistory. A strong cultural affiliation with the Weeden Island Period of the Florida Gulf Coast is evident. Weeden Island pottery types and large stemmed projectile points suggest a date of around 900 A.D.

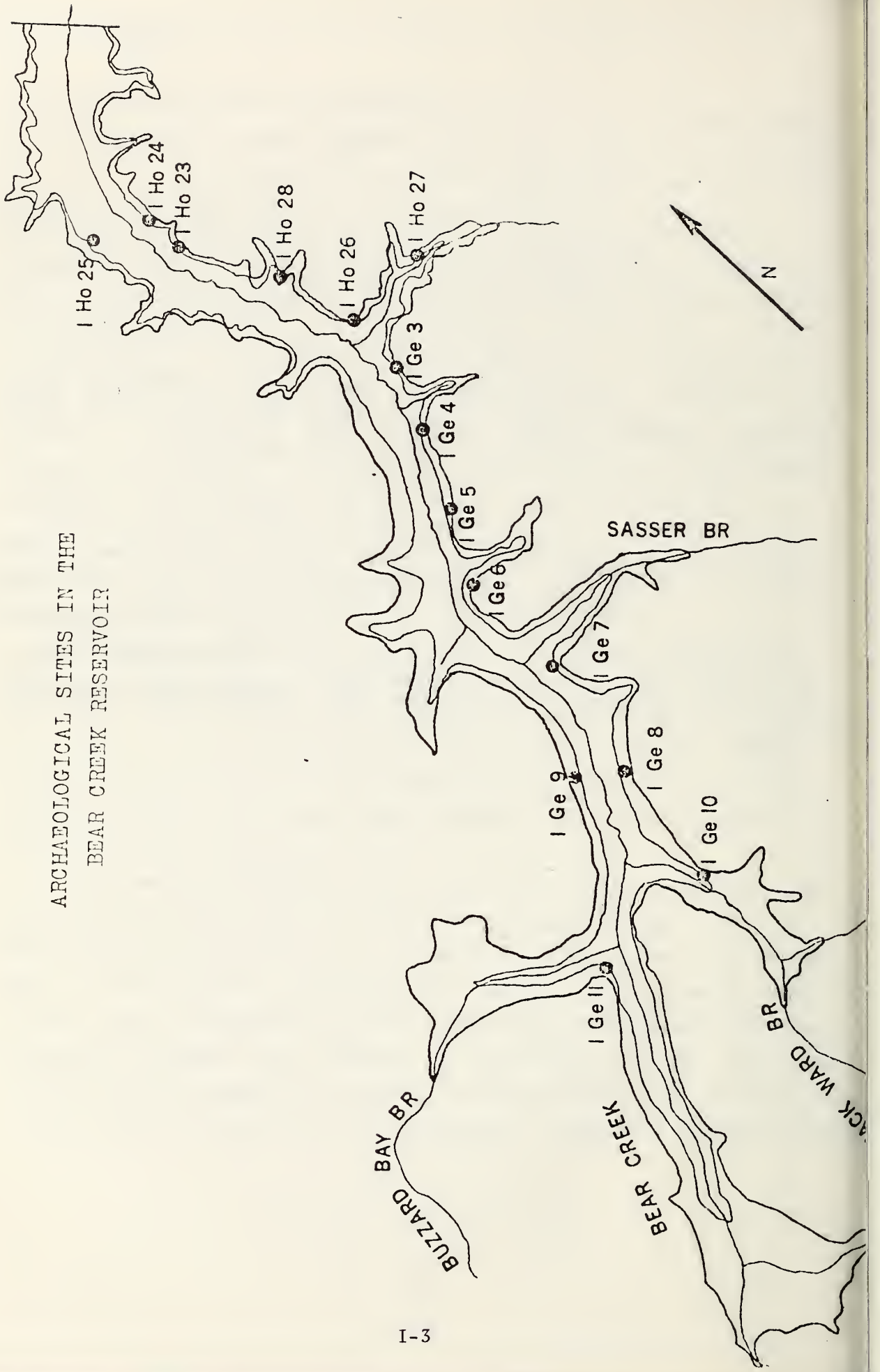
The swampy floodplain of Bear Creek influenced the choice of sites by prehistoric inhabitants. Fourteen of them are located at an elevation of at least 230 feet above sea level. Due to this natural environmental factor, only a small portion of the outer boundaries of the sites will be affected by the proposed permanent pool level. 1 Ho 25 will be the only site to be totally covered by water. Approximately 50% of 1 Ge 10 on Jack Ward Branch will be inundated. However, both of these

sites have been previously destroyed by natural and man-made occurrences to the extent that further investigations are not deemed necessary.

Since the greatest portion of the remainder of the sites will not be affected even during top dam elevation water levels, further investigations are not warranted along Bear Creek. Many of the sites have only a limited amount of cultural material still present due to extensive cultivation of the area. Actual excavations would not be feasible unless consent were negotiated to investigate the portions of these sites outside the proposed impoundment boundary.

Therefore, it is the opinion of the Alabama Historical Commission that the Soil Conservation Service may proceed with the impoundment of Bear Creek and Hurricane Creek. This action will not have destructive effects on significant archaeological and historical sites. In the event that borrow pits and access roads are to be located near the recorded sites, it is recommended that a professional archaeologist be consulted.

ARCHAEOLOGICAL SITES IN THE  
BEAR CREEK RESERVOIR



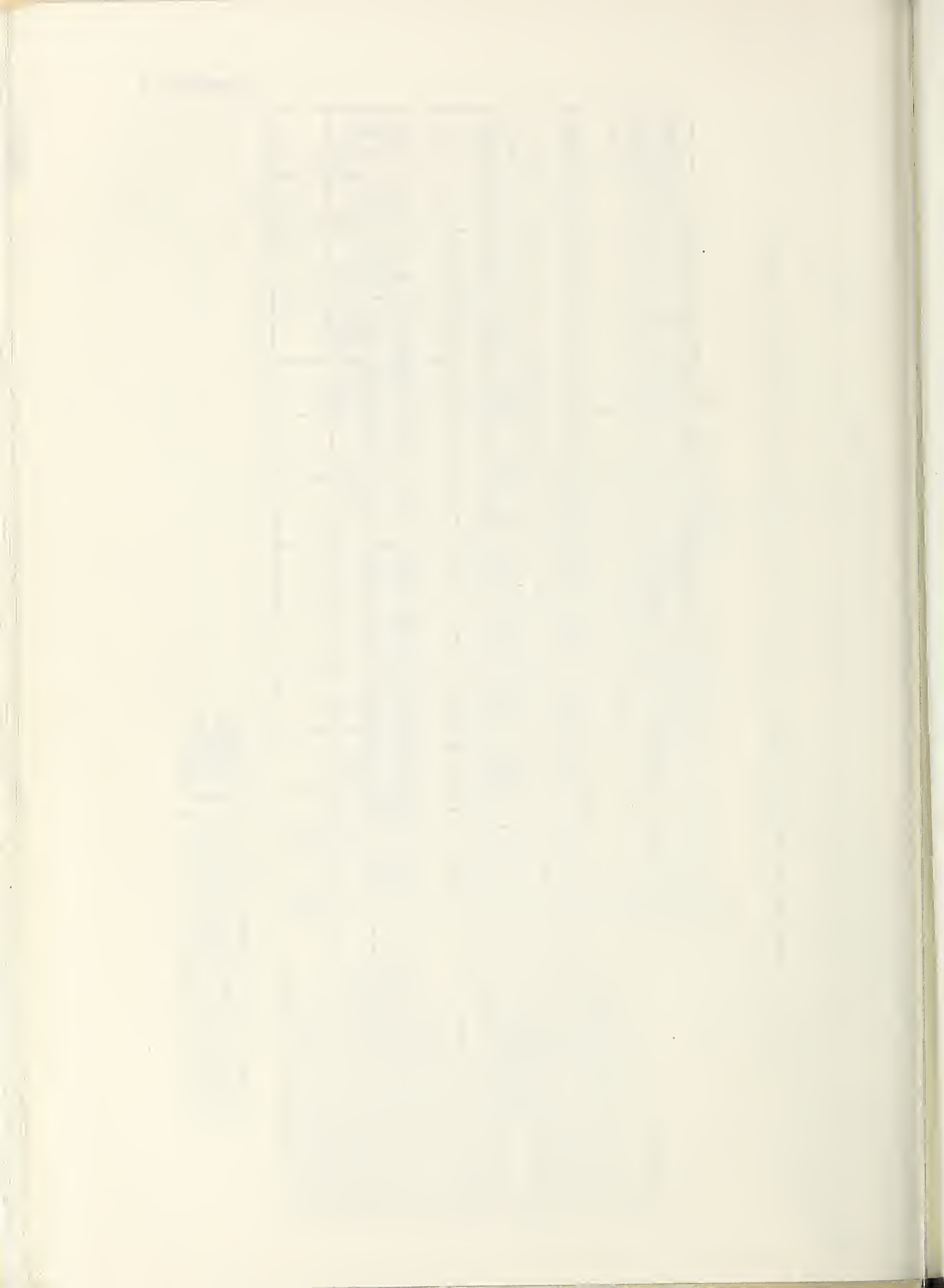
WATER QUALITY MONITORING DATA



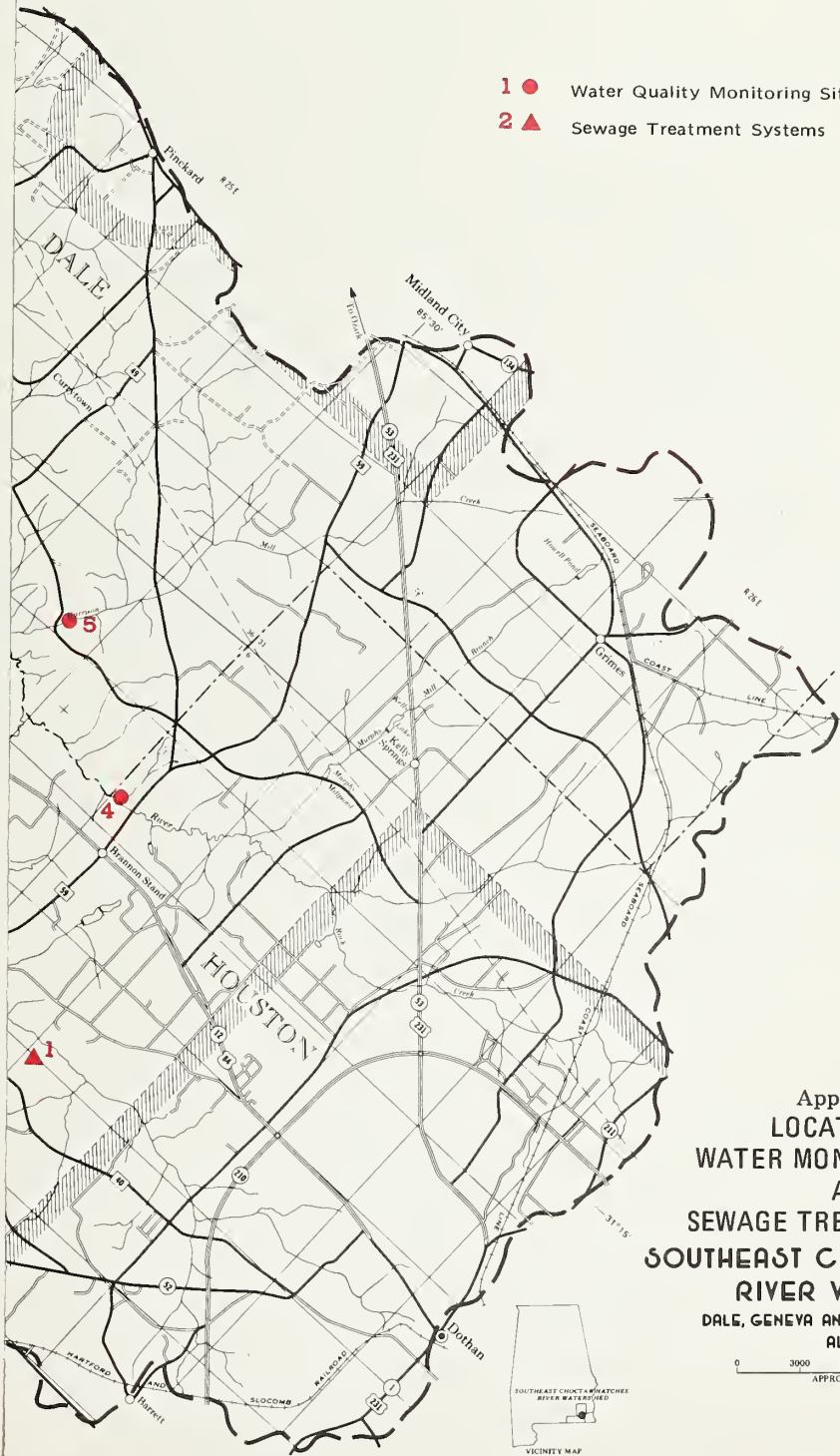
Mean Values for Water Quality Parameters in the Southeast Choctawhatchee Watershed.

Parameter	Mean Values Water Quality Monitoring Sites With Drainage Areas (Sq. Mi.)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Stream Discharge (CFS) 1/ Meas. Suspended Sediment Discharge (TONS/DAY) 1/	26.4 0.55	15.7 0.25	45.9 1.53	42.0 2.97	17.5 0.54	20.1 0.46	227.7 13.05	26.1 0.93	12.2 0.58	25.5 0.63	81.4 3.70	1.9 0.07	22.6 1.05
Water Temperature (DEG C) 1/ Apparent Color (PCU) 2/	21.6 90	21.5 151	22.1 -	20.4 -	20.8 -	22.0 -	21.4 -	20.1 -	20.1 -	20.1 -	21.7 -	19.5 -	20.2 -
Specific Conductivity (UMHOS/CM) 1/	58.5 46.1	42.1 53.7	101.2 81.1	77.6 86.3	44.6 52.6	40.7 48.1	59.3 73.3	44.1 57.1	55.1 55.7	45.9 52.3	47.8 58.9	20.4 40.7	39.2 54.9
Total Residue (MG/L) 1/ Nonfilterable Residue (MG/L) 1/ Turbidity (NTU) 2/	4.8 10.2	7.5 9.0	13.5 -	22.9 -	10.9 -	7.5 -	20.5 -	12.5 -	14.7 -	8.3 -	16.1 -	13.5 -	16.8 -
pH (STD UNITS) 1/ Total Kjeldahl Nitrogen (MG N/L) 3/	6.6 0.56	6.4 0.43	6.8 1.8	6.9 0.27	6.6 0.26	6.6 0.25	6.9 0.31	7.1 0.19	6.6 0.24	6.6 0.26	6.9 0.28	6.3 0.11	6.9 0.23
Nitrite & Nitrate (MG N/L) 3/ Total Phosphorous (MG P/L) 3/ Dissolved Oxygen (MG P/L) 1/ Dissolved Oxygen (% SAT) 1/	0.16 0.02 7.5 83	0.10 0.04 3.8 40	0.42 0.64 4.7 52	0.44 0.09 6.9 75	0.40 0.03 7.1 77	0.21 0.02 7.1 79	0.44 0.13 8.0 89	0.35 0.05 8.7 94	0.22 0.02 7.6 80	0.25 0.04 7.5 80	0.32 0.04 7.9 89	0.92 0.05 9.0 95	0.86 0.06 8.7 92
ECG (MG/L) 2/ Fecal Coliform (MPN) 4/ Fecal Streptococci (MPN) 4/	1.1 416 125	1.4 155 81	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

1/ Based on the arithmetic mean of 15 samples.  
 2/ Based on the arithmetic mean of 5 samples.  
 3/ Based on the arithmetic mean of 8 samples.  
 4/ Based on the geometric mean of 5 samples.











1 ● Water Quality Monitoring Sites  
 2 ▲ Sewage Treatment Systems

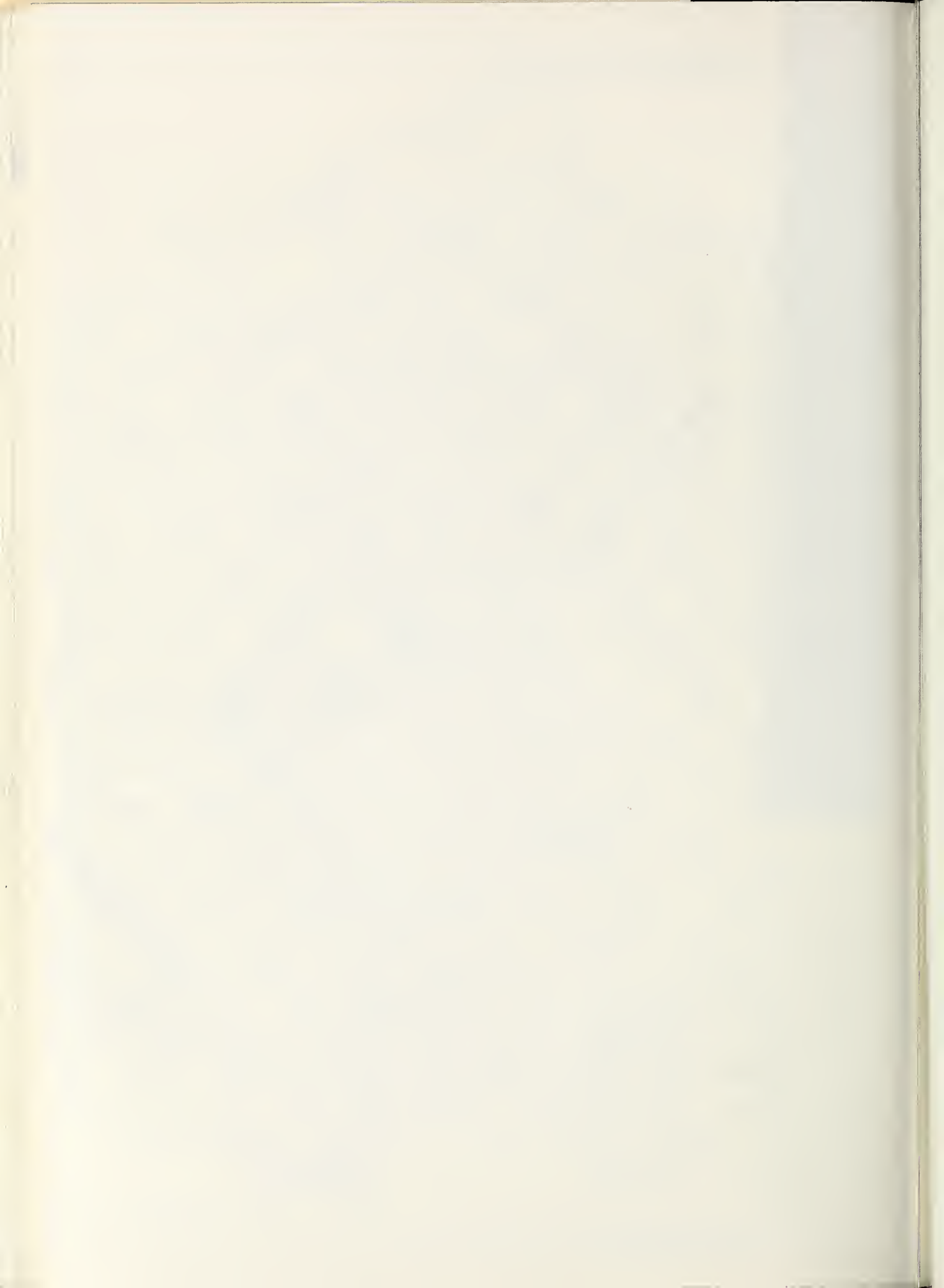
LEGEND  
 U.S. Highway  
 State Highway  
 Farm to Market Road  
 Divided Road  
 Primary Road  
 Secondary Road  
 Unimproved or Private Road  
 Railroad  
 Pipeline  
 Tower  
 Contour  
 County Boundary  
 Drainage  
 Unincorporated Boundary  
 Locals

SOURCE: Soil Conservation Service, Watershed Planning Staff.

Appendix J  
 LOCATIONS OF  
 WATER MONITORING SITES  
 AND  
 SEWAGE TREATMENT PLANTS  
 SOUTHEAST CHOCTAWHATCHEE  
 RIVER WATERSHED  
 DALE, GENEVA AND HOUSTON COUNTIES  
 ALABAMA

0 5000 10000 15000 FEET  
 APPROXIMATE SCALE

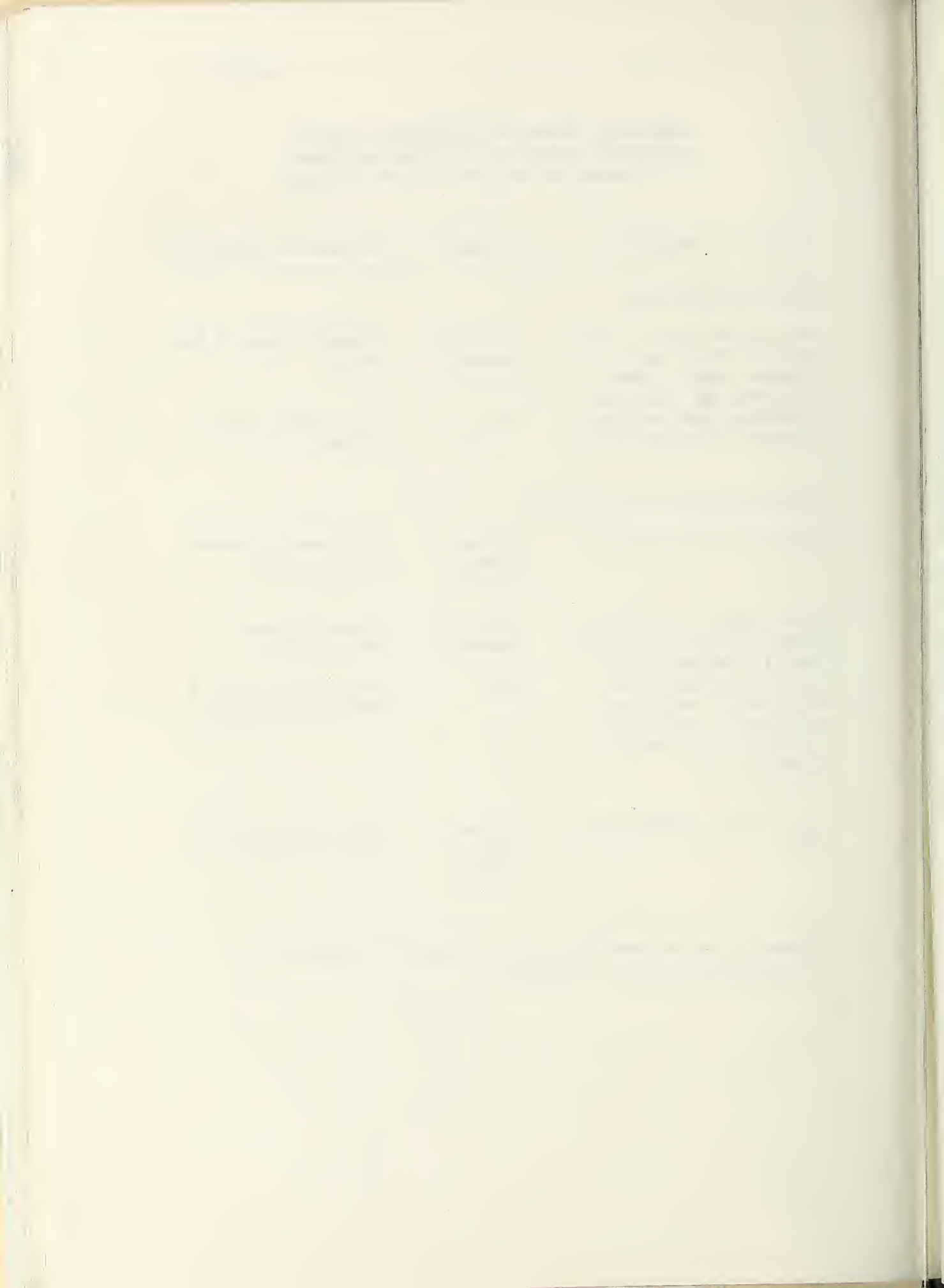
March 1977 4-R-35828  
 September 1976 Base 4-R-29560



VEGETATIVE COVER FOR STRUCTURAL MEASURES  
SOUTHEAST CHOCTAWHATCHEE RIVER WATERSHED  
Dale, Geneva and Houston Counties, Alabama

Areas to be Vegetated	Season*	Recommended Vegetation
<u>Bear Creek Reservoir</u>		
Dam, borrow areas, outlet channel banks, spoil disposal areas, areas disturbed for shoreline deepening, and any other adjacent disturbed areas.	Spring & Summer	Common Bermuda & Bahia Grass
	Fall	Rye, Bahia Grass & Bermuda
<u>Gullies (Class II, III &amp; IV)</u>		
Areas bordering flume	Spring, Summer & Fall	Centipede, Bermuda, or Bahia Sod
Areas shaped to install flume, areas disturbed to install surface diversions, embankment plug with graded inlet and pipe outlet and all areas disturbed during construction.	Spring & Summer	Common Bermuda & Bahia Grass
	Fall	Rye, Bahia Grass, & Unhulled Bermuda
Outlet below embankment plug	Winter & Early Spring	Pine trees or other suited woody plants.

\*Season in which construction or a phase of construction is completed and ready to vegetate.



VEGETATION OF THE SOUTHEAST CHOCTAWHATCHEE  
RIVER WATERSHED

31 January 1976

John D. Freeman, Project Leader

J. D. Allen, Graduate Assistant (Field Research)

D. W. Rutland, Graduate Assistant (Field Research)

J. W. Short, Graduate Assistant (Herbarium Research)

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## I. INTRODUCTION

The Coastal Plain of Alabama is poorly known floristically in comparison with the rest of the State. Until recently its vegetation has been subjected to very little intensive study. This situation stimulated interest in the study reported here, a field-oriented project in a watershed being considered for extensive erosion control and management by the USDA-Soil Conservation Service. The environmental impact statement required by law as a planning step in major construction or habitat alterative projects thus led to the initiation of the present study.

It was conducted during the summer of 1975 and necessarily reflects the summer aspect dominants for many herbaceous plant communities. Little could be learned about herbaceous elements present during the spring and fall seasons due to the limited time frame available. The woody plant communities (forests) are believed to have been adequately sampled, however. These, as the main stabilizers of the ecosystem in agricultural regions, should represent the primary concern in developing plans for the watershed.

## II. OBJECTIVES

Three primary objectives were established for the study:

1. Identify and describe the general plant communities, including their relative importance and locations.
2. Document the occurrence of plant species by sampling and collecting.
3. Estimate the effects of present erosion and sedimentation on these communities and the probable environmental impact of corrective measures.

### III. SELECTION OF SITES AND SAMPLING METHODS

Due to the size of the study area, the short time available and the necessity of sampling vegetation of as wide a variety of land use and soil types as possible, a completely randomized site selection procedure was employed. Selection of sites was facilitated by the fact that the watershed lies within a 1056 mi<sup>2</sup> area comprising Townships 1-4 North and Ranges 23-26 East. Townships, ranges and sections for possible sites within this 24 mi. x 24 mi. grid were determined by use of a random numbers table (Fisher & Yates, 1963). The first 25 sections falling within the watershed boundaries were used to locate vegetation study sites. To avoid duplication of map points, the northeast corner of each section served as the starting point for transect lines. Compass lines were determined for proposed transects, again by use of the random numbers table. As a result of this selection procedure the actual transect lines commonly in a section adjacent to the one used in the selection process. Nevertheless, randomization was assured, and the sites selected are as follows (see Appendix I):

Transect #	Township, Range & Section			Origin Corner	Transect Direction	County
1	T2N	R23E	Sec. 11	SW	45° (NE)	Geneva
2	T2N	R23E	Sec. 23	NW	126° (SE)	"
3	T2N	R23E	Sec. 2	NW	107° (SE)	"
4	T3N	R23E	Sec. 36	SW	45° (NE)	"
5	T2N	R24E	Sec. 5	SE	344° (NW)	"
6	T2N	R24E	Sec. 28	NW	169° (SE)	"
7	T3N	R24E	Sec. 35	SE	0° (N)	"
8	T2N	R25E	Sec. 9	SE	0° (N)	"
9	T2N	R25E	Sec. 23	NW	173° (SE)	"
10	T2N	R25E	Sec. 11	NE	225° (SW)	"
11	T3N	R24E	Sec. 16	NE	236° (SW)	"
12	T3N	R24E	Sec. 29	SE	305° (NW)	Houston
13	T3N	R24E	Sec. 23	SE	338° (NW)	"
14	T3N	R25E	Sec. 5	SE	315° (NW)	"
15	T3N	R25E	Sec. 16	SW	71° (NE)	"

Transect #	Township, Range & Section			Origin Corner	Transect Direction	County
16	T3N	R25E	Sec. 22	NW	128 <sup>0</sup> (SE)	Houston
17	T3N	R25E	Sec. 25	SW	13 <sup>0</sup> (NE)	"
18	T3N	R26E	Sec. 8	NW	178 <sup>0</sup> (SE)	"
19	T3N	R26E	Sec. 19	SE	285 <sup>0</sup> (NW)	"
20	T3N	R26E	Sec. 28	NE	248 <sup>0</sup> (SW)	"
21	T4N	R26E	Sec. 33	NE	265 <sup>0</sup> (SW)	"
22	T4N	R26E	Sec. 29	SW	66 <sup>0</sup> (NE)	Dale
23	T4N	R26E	Sec. 19	SE	311 <sup>0</sup> (NW)	"
24	T4N	R26E	Sec. 16	SW	36 <sup>0</sup> (NE)	"
25	T4N	R26E	Sec. 27	NE	199 <sup>0</sup> (SW)	"

Transects were 500 yards long and were sampled according to the type of vegetation present. Presence of all species observed along each transect was recorded by scientific name. Five specific sample points were located along each transect: #1 at 0 yards, #2 at 100 yards, #3 at 200 yards; #4 at 300 yards, and #5 at 400 yards. Woody plants providing cover for the first 50 feet along the transect at each of these points were recorded and their DBH noted. Herbaceous species were recorded by tally for 1 x 10 yard plots or quadrats situated along these transects at the respective sample points. For transects in cultivated fields, since great variation exists from season to season due to controls employed, crop rotation, etc., only presence lists were kept. Each transect in uncultivated land thus yielded woody plant data for five 50 foot sub-transects and herbaceous plant data for five 1 x 10 yard quadrats nested within the respective sub-transects. Data from adjacent sampled areas were compared for possible correlation with the topography, soils, land use and history, and/or successional stage. On certain sites an additional sample was taken at the end of the 500 yard transect when it appeared that major vegetational changes were occurring along the transect.

Preliminary mapping of these localities and transects on Soil Survey Maps indicated that each major soil type was represented several times and

that various land uses were also represented. The transects were found to cover both level and sloping land, river swamps, creek floodplains, hilltops urban areas, etc. The sites appeared to be distributed fairly evenly within the watershed area, also, allowing additional observation and collection of plants along various roadways as the sites were visited.

#### IV. PLANT COMMUNITIES

In order to estimate the relative amounts of land under different uses within the Southeast Choctawhatchee River Watershed, the 125 sample points visited during our study were classified according to the general categories presented in this section. The approximately 170,000 acres within the watershed include 39,000 in forest, 77,000 of tilled cropland, 15,000 in grassland, 13,000 idle land, 23,000 in urban land and 3,000 miscellaneous. Further breakdown of these categories yielded the information included under these headings in the following pages. It must be emphasized that the data presented here are approximations based upon random sampling and do not represent actual measurements of acreages. The purpose of our calculations simply was to attempt to evaluate the extent and importance of various land uses as they relate to the entire watershed. Common and scientific names used in this report conform to the report on standardization of names of weeds and other plants (Alex, et al., 1971) in so far as possible or else were obtained from available taxonomic references (Radford, Ahles and Bell, 1968; Small, 1933; Clark, 1971).

##### A. Forest Types

Forest community types observed and sampled in the watershed included

two basic natural types, the various seral stages preceeding their development, and planted stands of pines. The more abundant forest type, covering some 23,000 acres, is one that occurs in wet or swampy land often unsuitable for agriculture. The floodplains of major and minor streams that remain wet essentially the year around and seepage areas and depressions in the more upland, better drained soils are generally forested by mixed hardwood and pine species. Most such forests in the watershed appear to have been repeatedly cut over for timber and pulpwood, allowing certain species to reach the canopy layer, which in a more stable forest would remain as understory or be eliminated through competition. Presence classes for the overstory tree species found in 17 swampy habitats sampled in the watershed are presented in the following table:

Presence Class	Common Name	Scientific Name
I. (81-100%)	None	None
II. (61-80%)	tuliptree water oak red maple	<u>Liriodendron tulipifera</u> <u>Quercus nigra</u> <u>Acer rubrum</u>
III. (41-60%)	southern magnolia sweetbay magnolia American holly	<u>Magnolia grandiflora</u> <u>Magnolia virginiana</u> <u>Ilex opaca</u>
IV. (21-40%)	white oak sweetgum hickory species Florida maple	<u>Quercus alba</u> <u>Liquidambar styraciflua</u> <u>Carya</u> spp. <u>Acer saccharum</u> ssp. <u>floridanum</u>
V. (1-20%)	loblolly pine American hornbeam willow oak black cherry baldcypress blackgum live oak sugarberry shortleaf pine persimmon water tupelo sassafras	<u>Pinus taeda</u> <u>Carpinus caroliniana</u> <u>Quercus phellos</u> <u>Prunus serotina</u> <u>Taxodium distichum</u> <u>Nyssa sylvatica</u> <u>Quercus virginiana</u> <u>Celtis laevigata</u> <u>Pinus echinata</u> <u>Diospyros virginiana</u> <u>Nyssa aquatica</u> <u>Sassafras albidum</u>

Presence classes for the understory and shrubby species comprise the following:

Presence Class	Common Name	Scientific Name
I. (81-100%)	American beautyberry	<u>Callicarpa americana</u>
II. (61-80%)	red maple	<u>Acer rubrum</u>
III. (41-60%)	American holly	<u>Ilex opaca</u>
	common blackberry	<u>Rubus argutus</u>
	devilwood	<u>Osmanthus americana</u>
	Chinese privet	<u>Ligustrum sinense</u>
IV. (21-40%)	hazel alder	<u>Alnus serrulata</u>
	blueberry species	<u>Vaccinium spp.</u>
	Florida anisetree	<u>Illicium floridanum</u>
	devils-walkingstick	<u>Aralia spinosa</u>
	flowering dogwood	<u>Cornus florida</u>
V. (1-20%)	mountain laurel	<u>Kalmia latifolia</u>
	sassafras	<u>Sassafras albidum</u>
	silky dogwood	<u>Cornus amomum</u>
	Carolina holly	<u>Ilex ambigua</u>
	switch cane	<u>Arundinaria tecta</u>
	sweet pepperbush	<u>Clethra alnifolia</u>
	none	<u>Leucothoe racemosa</u>
	southern waxmyrtle	<u>Myrica cerifera</u>
	American elder	<u>Sambucus canadensis</u>
	black titi	<u>Cyrilla racemiflora</u>
	cabbage palmetto	<u>Sabal palmetto</u>
	sebastianbush	<u>Sebastiania ligustrina</u>
	hobblebush viburnum	<u>Viburnum alnifolium</u>
	possumhaw	<u>Viburnum nudum</u>
	eastern redbud	<u>Cercis canadensis</u>
	male blueberry	<u>Lyonia lucida</u>
summerhaw	<u>Crataegus flava</u>	
chickasaw plum	<u>Prunus angustifolia</u>	
red buckeye	<u>Aesculus pavia</u>	

Woody vines were important elements of the vegetation in swampy habitats and included the following species:

I. (81-100%)	muscadine grape	<u>Vitis rotundifolia</u>
II. (61-80%)	none	none

Presence Class	Common Name	Scientific Name
III. (41-60%)	poison ivy	<u>Rhus radicans</u>
	laurel greenbrier	<u>Smilax laurifolia</u>
	Japanese honeysuckle	<u>Lonicera japonica</u>
IV. (21-40%)	yellow jessamine	<u>Gelsemium sempervirens</u>
V. (1-20%)	climbing hydrangea	<u>Decumaria barbara</u>
	saw greenbrier	<u>Smilax bona-nox</u>
	Virginia creeper	<u>Parthenocissus quinquefolia</u>
	trumpetcreepèr	<u>Campsis radicans</u>
	'kudzu	<u>Pueraria lobata</u>

The woodlands covering uncultivated wet areas of the Lower Choctawhatchee River Watershed are by no means uniform. Slight undulations in the flood-plains of a stream often result in major shifts in the species present. Likewise a stream terrace only a few feet above wet bottomland may have species typical of the upland forest type, which is the second major forest community in the watershed.

The upland forest once occurred extensively on well drained soils that subsequently have been converted into farmland. Few, if any, extensive areas of undisturbed upland woods remain, most of it now being limited to relatively steep slopes along streams where the terrain is less suitable for tillage of crops than the rolling well drained upland hills. About 12,000 acres of this type forest are estimated to exist in the watershed.

The nine habitats sampled that seemed to represent upland forest yielded the following presence classes for canopy species:

Presence Class	Common Name	Scientific Name
I. (81-100%)	none	none
II. (61-80%)	water oak	<u>Quercus nigra</u>
III. (41-60%)	slash pine	<u>Pinus elliotii</u>
	sweetgum	<u>Liquidambar styraciflua</u>
	persimmon	<u>Diospyros virginiana</u>

Presence Class	Common Name	Scientific Name
IV. (21-40%)	black cherry	<u>Prunus serotina</u>
	tuliptree	<u>Liriodendron tulipifera</u>
	Florida maple	<u>Acer saccharum ssp. floridanum</u>
	southern magnolia	<u>Magnolia grandiflora</u>
V. (1-20%)	loblolly pine	<u>Pinus taeda</u>
	mockernut hickory	<u>Carya tomentosa</u>
	white oak	<u>Quercus alba</u>
	black willow	<u>Salix nigra</u>
	longleaf pine	<u>Pinus palustris</u>
	eastern redcedar	<u>Juniperus virginiana</u>
	white basswood	<u>Tilia heterophylla</u>
	American beech	<u>Fagus grandifolia</u>
	sourwood	<u>Oxydendron arboreum</u>
	live oak	<u>Quercus virginiana</u>
	American holly	<u>Ilex opaca</u>
	sassafras	<u>Sassafras albidum</u>
red maple	<u>Acer rubrum</u>	

The understory and shrubby species were not as varied as in the wet habitats but included a number of species not found in lowland forest:

I. (81-100%)	none	none
II. (61-80%)	common blackberry	<u>Rubus argutus</u>
III. (41-60%)	none	none
IV. (21-40%)	American beautyberry	<u>Callicarpa americana</u>
	flowering dogwood	<u>Cornus florida</u>
V. (1-20%)	southern crabapple	<u>Malus angustifolia</u>
	spoonleaf hawthorn	<u>Crataegus spathulata</u>
	winged sumac	<u>Rhus copallina</u>
	eastern baccharis	<u>Baccharis halimifolia</u>
	chickasaw plum	<u>Prunus angustifolia</u>
	southern waxmyrtle	<u>Myrica cerifera</u>
	Chinese privet	<u>Ligustrum sinense</u>
	silky dogwood	<u>Cornus amomum</u>
	spreading pricklypear	<u>Opuntia compressa</u>
	summerhaw	<u>Crataegus flava</u>
	American plum	<u>Prunus americana</u>
dwarf pawpaw	<u>Asimina parviflora</u>	
highbush blueberry	<u>Vaccinium elliotii</u>	
St. Andrews cross	<u>Hypericum hypericoides</u>	



Woody vines were very common, possibly due to the usually sparse growth of trees in upland woods bordering fields, streams, etc. The species, however, were about the same as those found in swampy habitats:

Presence Class	Common Name	Scientific Name
I. (81-100%)	none	none
II. (61-80%)	muscadine grape	<u>Vitis rotundifolia</u>
III. (41-60%)	Japanese honeysuckle	<u>Lonicera japonica</u>
IV. (21-40%)	poison ivy Virginia creeper	<u>Rhus radicans</u> <u>Parthenocissus quinquefolia</u>
V. (1-20%)	saw greenbrier laurel greenbrier yellow jessamine kudzu	<u>Smilax bona-nox</u> <u>Smilax laurifolia</u> <u>Gelsemium sempervirens</u> <u>Pueraria lobata</u>

Planted stands of pines, primarily slash (Pinus elliottii) and loblolly (P. taeda), account for only a small percentage of the watershed area. Our samples indicated only about 3400 acres in pine monoculture. The upland hills suitable for growth of pines evidently are utilized more profitably for row cropping and pastureland.

Unless closely managed, pine stands gradually become dominated with hardwood species whose seedlings readily grow in shade where pine seedlings fail. The sampled pine stands appeared to have been planted probably as a means of checking erosion and were not managed to any visible extent. In many respects such stands are closely similar to some of the later stages of old field succession just preceding development of hardwood dominated forest

#### B. Tilled Cropland

An estimated 77,000 acres were planted in tilled crops during 1975 in

the portions of Dale, Geneva and Houston counties within the Southeast Choctawhatchee Watershed Project area. The calculations for various commodity crops based upon our samples were in general agreement with those published in Alabama Agricultural Statistics (Jones and Berger, 1974) and are indicated below:

<u>Crop</u>	<u>Acres</u>
Corn	37,500
Peanuts	15,000
Soybeans	11,000
Hay, Wheat & Sorghum	8,000
Cotton	1,500
Misc. (Tomatoes, Watermelons, various vegetables)	<u>4,000</u>
	77,000

Since shifts in the acreages used in the production of these commodities are likely to occur as demands and prices change from year to year, our major interest was in the documentation of the occurrence of weedy species in tilled cropland. These species are generally abundant in a variety of disturbed sites, especially roadsides and fencerows, and appear to form dense stands in the majority of cultivated fields we visited.

Presence categories were determined for weedy species found growing in 34 tilled areas sampled during the study. Samples taken at the edges of fields were excluded for purposes of this evaluation. The results of this weed-ranking system, primarily based on fields of corn, peanuts and soybeans are as follows:

Presence Class	Common Name	Scientific Name
I. (81-100%)	Florida pusley	<u>Richardia scabra</u>
II. (61-80%)	common ragweed	<u>Ambrosia artemisiifolia</u>
III. (41-60%)	heartleaf cocklebur	<u>Xanthium strumarium</u>
	large crabgrass	<u>Digitaria sanguinalis</u>
	Florida beggarweed	<u>Desmodium tortuosum</u>
	southern sandbur	<u>Cenchrus echinatus</u>
IV. (21-40%)	bristly starbur	<u>Acanthospermum hispidum</u>
	sicklepod	<u>Cassia obtusifolia</u>
	smallflower morningglory	<u>Jacquemontia tamnifolia</u>
	cypressvine morningglory	<u>Ipomoea quamoclit</u>
	false nutsedge	<u>Cyperus strigosus</u>
	yellow nutsedge	<u>Cyperus esculentus</u>
	panicgrass	<u>Panicum sp.</u>
	camphorweed	<u>Heterotheca subaxillaris</u>
V. (1-20%)		24 other species

Study of aerial photographs suggested and field observations supported the fact that almost all of the tilled fields of the watershed area are on the upland soils. The implications of this fact, i.e. the erosive effects caused by this land usage, are discussed later in this report. Suffice it to state here that with current economic conditions there seems to be little prospect of altering the present pattern of land usage by the land owners to any appreciable degree. The best soils for farming are upland and the less productive ones are those still forested along the streams.

### C. Grassland

In terms of acreage, grassland is the third most extensive type of vegetation in the Southeast Choctawhatchee River Watershed, behind tilled land and forest land, especially if lawns and grassy roadsides are included in the total. Under this category we have classified an estimated 15,000 acres used primarily for pasture. Pastures, primarily of either bahiagrass

(Paspalum notatum var. saurae) or coastal bermudagrass (Cynodon dactylon), have been developed on various soils within the watershed. Most are on relatively level upland soils, but many are found on sloping land from which the forest has been cleared.

Some pastured areas are not included in the acreage estimated above because primary usage is for other purposes. For example, Geneva and Houston counties rank third and fourth, respectively, in pecan production, each having about three million pounds per year (Jones and Berger, 1974). Much of the land planted with pecans is also sown in bahiagrass and pastured. Very few acres used in this way were observed in the watershed area, but a few small pecan orchards were visited. Hay is also harvested from fields used as pasture during part of the year. These acres and those for wheat (probably no more than 8,000 total) were included in the category of tilled cropland.

Houston and Geneva counties rank first and second in the State for production of hogs and pigs, and there are more than 50,000 head of cattle and calves in each of these counties. Dale County has more than 20,000 head of cattle. These figures (Jones and Berger, 1974) emphasize the importance of grassland pasturage to the area in which the Southeast Choctawhatchee River Watershed is located. Since some livestock are allowed to forage in woodland whereas others are kept in feedlots, a direct equation between numbers of livestock and acres of grassland could not be derived. It is clear, however, that more acreage is used annually for pasture than that classified as grassland through our calculations, perhaps twice as much.

Weeds observed in pastures were essentially the same species as those listed as occurring in tilled land or in idle land, the weed list for which is presented next.

#### D. Idle Land

Samples collected in this study indicated approximately 13,000 acres of idle land within the Southeast Choctawhatchee Rivershed. This acreage appears inflated until it is realized that this total includes not only land presently out of cultivation or pasture but also all the fencerows, roadsides, terraces and abandoned sites that interlace managed farm and urban lands.

Whereas areas of idle land generally are not expansive within the watershed, they are numerous, represent many acres, and approximate many of the early stages of secondary (or old field) succession. The weeds of fencerows and roadsides are those found in old fields. The woody species that replace them in these situations usually are those that occur in later seral stages also. Land that could be returned to productive agriculture without improvement (that is, fallow land) represents very little of the 11,000 acres considered here as idle.

Several of the "old-field" weeds also occur commonly among crops. The list of species presented here is based upon samples taken in fencerows, abandoned fields and roadside areas not managed by mowing or spraying and consists of the names of species normally found in old fields and fencerows but usually lacking in cultivated soil. To the number of species listed here could be added those found in tilled fields because field borders harbor a wide variety of plants that are troublesome weeds in adjacent fields.

The following herbs were characteristic of old fields and similar idle land habitats in the Southeast Choctawhatchee River Watershed during Summer 1975:

<u>Scientific name (in alphabetical order)</u>	<u>Common name</u>
<u>Andropogon virginicus</u>	broomsedge
<u>Cassia fasciculata</u>	partridgepea
<u>Cassia nictitans</u>	sensitive partridgepea
<u>Cassia occidentalis</u>	coffee senna
<u>Cnidoscolus stimulosus</u>	bullnettle
<u>Crotalaria angulata</u>	none
<u>Croton glandulosus</u> var. <u>septentrionalis</u>	tropic croton
<u>Desmodium</u> spp.	beggarweeds
<u>Erigeron canadensis</u>	horseweed
<u>Erigeron strigosus</u>	rough fleabane
<u>Eupatorium capillifolium</u>	dog fennel
<u>Eupatorium serotinum</u>	late eupatorium
<u>Gaillardia aestivalis</u>	autumn gaillardia
<u>Gaillardia pulchella</u>	rosering gaillardia
<u>Gnaphalium obtusifolium</u>	fragrant cudweed
<u>Gnaphalium purpureum</u>	purple cudweed
<u>Haplopappus divaricatus</u>	none
<u>Helenium amarum</u>	bitter sneezeweed
<u>Heterotheca subaxillaris</u>	camphorweed
<u>Ipomoea coccinea</u>	scarlet morningglory
<u>Ipomoea pandurata</u>	bigroot morningglory
<u>Lactuca canadensis</u>	tall lettuce
<u>Oenothera biennis</u>	common evingprimrose
<u>Panicum</u> sp.	panicgrass
<u>Paspalum notatum</u> var. <u>saurae</u>	bahiagrass
<u>Phytolacca americana</u>	common pokeweed
<u>Plantago aristata</u>	bracted plantain
<u>Polygala grandiflora</u>	large flowered candyroot
<u>Polypremum procumbens</u>	polypremem
<u>Schrankia microphylla</u>	sensitive brier
<u>Setaria</u> sp.	foxtail
<u>Sida rhombifolia</u>	arrowleaf sida
<u>Solanum carolinianum</u>	horsenettle
<u>Solidago</u> spp.	goldenrod species
<u>Sporobolus poiretii</u>	smutgrass
<u>Tragia urens</u>	none
<u>Verbena bonariensis</u>	tall vervain
<u>Verbena brasiliensis</u>	brazilian vervain
<u>Verbena tenuisecta</u>	cutleaved vervain
<u>Wahlenbergia marginata</u>	none

The woody plants commonly found in fencerows and land left uncultivated for 20 years or more are those that normally replace the herbaceous weeds in old field succession. The tree species first appearing in idle land along fences are, in order of abundance, water oak, black cherry, chinaberry,

persimmon, hackberry, sweetgum, hickory and white oak. Generally, along fencerows the hardwood species seem to develop to the exclusion of pines, possibly because their seeds and fruits are carried about by birds that perch on the fences and by small mammals that find cover in fencerow vegetation. The pine seedlings become established more often in larger expanses of idle land than that bordering tilled fields. In numerous localities almost solid stands of blackcherry were found to exist along fences, no doubt because the cherry pits had been deposited there in bird droppings.

The shrubby species commonly found along fences support the probable mode of seed dispersal suggested above. Blackberry, American beautyberry, chickasaw plum and Chinese privet, all with fleshy fruits, were the predominant species.

Woody vines found in idle land include Japanese honeysuckle, muscadine grape, yellow jessamine, trumpetcreeper, Virginia creeper and kudzu.

The occurrence of these tree, shrub and woody vine species as major vegetational components in both upland and swampy habitats suggests that the forests sampled are in a subclimax state and that forest composition has been significantly altered by human activities in the watershed area. This conclusion certainly is true to the vegetational type classified here as urban.

#### E. Urban Land

Corporate limits of six municipalities extend into the Southeast Choctawhatchee River Watershed. These towns and their approximate included acreages are indicated in the following table:

<u>City or Town:</u>	<u>Approx. SCRW Acreage</u>
Hartford	1,850
Slocomb	3,850
Malvern	900
Dothan	10,800
Pinckard	800
Midland City	800
	<hr/>
	Total 19,000

Of these cities only Dothan can be considered a major urban and industrial area. Surrounding a small nucleus of business area with urban-type buildings in each city, however, exists a concentration of residences often extending beyond the corporate limits, especially along major highways. Residential property in these cities is not unlike that on farms in the watershed, except for its concentration. Some farmland and forestland also exists inside the city limits of these cities. Including rural residences as well as those in towns, our estimation of the residential property within the entire watershed area based upon the random sample method also indicated 23,000 acres.

Residential property was typically landscaped, planted with ornamental shrubs, and sown or sodded with commercially available lawn grasses. The vegetation in older neighborhoods often was also enhanced by large trees, usually native pines, pecans or other hardwoods planted for ornamental purposes. The identity of the species present under conditions of intensive maintenance such as in yards and lawns was not determined. Most businesses and municipal buildings in the various cities also were landscaped similar to the residences described above and were not sampled for species presence.

Urban and suburban land can best be viewed as having an open grassland vegetation (lawns) on which various numbers of trees and shrubs are maintained.



This artificial vegetation type is kept relatively stable through human effort. It appears to experience relatively little threat from erosion for relatively long periods. During the time that lawn development is taking place, however, some erosion does occur, but the problem in urban, suburban and residential land is nothing to compare with the loosened unprotected soils of the upland tilled fields.

#### F. Other Land Uses

Approximately 3,400 acres in the watershed are completely devoid of vegetation and likely will not develop plant life in the foreseeable future. This category includes the paved highways, streets, sidewalks, air strips and parking lots and the bodies of standing water such as farm ponds and lakes. The bodies of water, in particular, are subject to the gradual processes of hydrarch succession or perhaps draining and conversion to farm land. This possibility is considered to be of little significance in changing the vegetational composition of the watershed.

### V. DISCUSSION

Plant communities and land uses described in the previous section of this report form an intricate mosaic and network pattern within the limits of the Lower Choctawhatchee River Watershed area. The vegetation types present are interrelated not only spatially but also developmentally and require further consideration and discussion. In particular need of attention is the probable effects of present land use on the plant life of the area.

Ecological succession is the orderly, progressive change in plant and animal communities in a given area, which culminates in a stabilized ecosystem

(Odum, 1971). The stabilized, self-perpetuating ecosystem that is the end product of succession is known as the climax community. A seral stage is one of the several transitory stages, usually identified by a characteristic group of organisms, that occurs before the climax is reached. Clearing of forest for use of the land in crop production or simply harvesting of timber itself will set back the process of succession to some subclimactic seral stage (Oosting, 1956; Ovington, 1965). This has been occurring throughout the watershed since its agricultural potential was first recognized, but we cannot be sure that climax forest existed there just before the area was settled by white man. Certainly things have changed dramatically since the first farms were established by Indians, and the changes have been much accelerated by the mechanical agriculture of the past 50 years.

It has been established that the loblolly and shortleaf pine forests of the southeastern Coastal Plain progress naturally in time toward a composition of mixed hardwood species. Thus, although the "original" forest of the Coastal plain may have been pine, this forest type fails to maintain itself without management, and hardwoods eventually replace pines as dominants. The suggestion has been made that perhaps aboriginal man accidentally discovered how periodic burning increases wildlife food availability and that Indian fires were responsible for maintaining the vast southeastern pine forest region eventually settled by white man (Quarterman and Keever, 1962). Whatever the basis, pine-dominated forest was probably the major vegetation type in the Lower Choctawhatchee River Watershed when European man entered the area. Subsequent activities of those practicing agriculture in the watershed have reversed plant succession completely in open tilled land and partially in idle, urban and forested land. Little, if any, climax vegetation

presently exists, and its probable components can only be postulated.

In general, the hardwood species we observed in the areas we sampled are those that will in time assume dominance if the forested area is not disturbed by man or other agents (such as natural fires caused by lightning) (Quarterman and Keever, 1962).

Siltation of waterways is an important destructive force in river ecosystems, and a stable forest (usually hardwood) is the major deterrent opposing siltation (Oglesby, et al. 1972). In the Southeast Choctawhatchee River basin the exposed upland soils, where most farming is done, fail to catch and hold sufficient rainfall to prevent sheet erosion and thus contribute to a siltation problem of which the appearance of gullies in surrounding hills is symptomatic. The accumulation of sediments in the floodplains along major and minor tributaries of the Choctawhatchee River has apparently reached depths of several feet judging by former roadbeds and bridge foundations. This sediment limits the variety of plants (and animals) suited to the lowland forest community, kills some species outright by burying their roots, and causes a very unstable substratum for the stream. Species observed in abundance in heavily silted areas of floodplains were several species of rushes (Juncus spp.) and some of the shrubs observed in idle land such as hawthorns (Crataegus spp.) and oaks (especially water oak, Quercus nigra).

The present rarity of large stands of stable hardwood forest may account for our inability to find any populations of rare or endangered plants in the study area. We were constantly observant for such species and investigated likely places throughout the watershed. The conclusion was eventually reached that the area was so completely modified by farming, pulping and timbering that stable habitats for such species were long since destroyed or reduced to very small sites. Our only find of possible interest as far

as site protection is concerned was a population of Apteria aphylla (Nutt.) Barnh. (Burmanniaceae), a small saprophyte that grows in decaying leaves of moist woods and on edges of bogs from Georgia westward to Texas. This orchid-like plant of infrequent occurrence was discovered in considerable abundance on the south slope of the Little Choctawhatchee River, T3N, R25E, SE  $\frac{1}{4}$  of Sec. 5, on the property of Mr. Melton Allgood. The vast majority of species we observed were abundant to the point of being weedy.

## VI. CONCLUSIONS

1. Herbaceous ground cover, with the exception of weedy species, is virtual absent from forests of the study area during the months of July and August; studies on these species should be made during the spring and early summer.
2. Existing forest within the watershed is mostly of a lowland type dominated by hardwoods and appears to be maintained presently in a subclimax state by the effects of timber harvesting and sedimentation.
3. Gully formation and heavy sediment load in streams are two major results of extensive removal of stabilizing forest vegetation from upland soils of the watershed.
4. Choices of remedies for the accelerated erosion rate now occurring in the area are limited by widespread use of fertile upland soils for row cropping; reforestation would otherwise appear desirable.
5. The various plant communities of the watershed, particularly the lowland hardwood forest, would be protected from sediment accumulation and thus move toward a more stable ecosystem if and when run-off from upland fields is reduced and gully enlargement controlled.

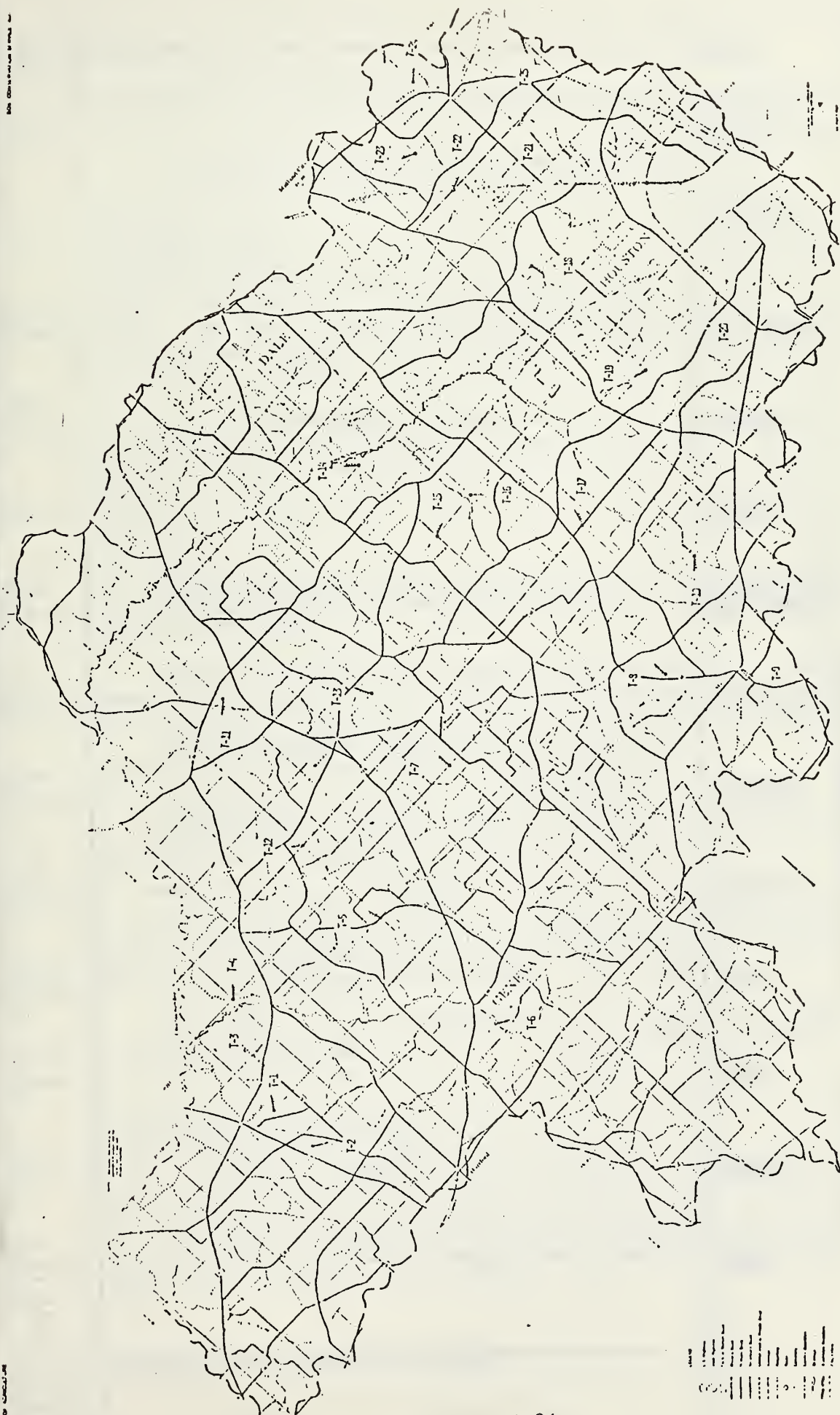
6. The measures required to reduce or stop gully encroachment of upland farmland and stream floodplain sedimentation should not be as detrimental to the ecosystem of the Southeast Choctawhatchee River as would be failure to undertake these measures.

#### VIII. LITERATURE CITED

- Alex, J. et al. 1971. Composite List of Weeds: Report, Subcommittee on Standardization of Common and Botanical Names of Weeds. *Weed Science* 19(4): 435-476.
- Clark, R. C. 1971. Woody plants of Alabama. *Ann. Missouri Bot. Gard.* 58: 99-242.
- Fisher, R. A. and F. Yates. 1963. Statistical Tables for Biological, Agricultural and Medical Research, 6th Ed. Edinburgh and London: Oliver & Boyd.
- Jones, D. B. and E. J. Berger. 1974. Alabama Agricultural Statistics. Montgomery: Alabama Department of Agriculture and Industries.
- Odum, E. P. 1971. Fundamentals of Ecology. Philadelphia: W. B. Saunders
- Oglesby, R. T., C. A. Carlson, and J. A. McCann. 1972. River Ecology and Man. New York: Academic Press.
- Oosting, H. J. 1956. The Study of Plant Communities. San Francisco. W. H. Freeman.
- Ovington, J. D. 1965. Woodlands. London: The University Press, Ltd.
- Quarterman, Elsie and Catherine Keever. 1962. Southern Mixed Hardwood Forest: Climax in the Southeastern Coastal Plain, U.S.A. *Ecol. Monogr.* 32: 167-185.

Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of the Vascular  
Flora of the Carolinas. Chapel Hill: University of North Carolina Press.

Small, J. K. 1933. Manual of the Southeastern Flora. New York: publ.  
by the author.



Appendix I: Map of Southeast Choctawhatchee Watershed, showing locations of transects.

Appendix II. Tabulation of Sampled Areas According to Habitat

Transect	FOREST				TILLED CROPLAND										IDLE LAND	RESIDENTIAL or URBAN	PAVED, POND or OTHER	TOTALS
	SWAMP	UPLAND	PINE	CORN	PEANUTS	SOYBEANS	VEGETABLES	HAY, WHEAT, & SORGHUM	COTTON	PASTURE								
1				5														
2				1														1.5
3	5																	
4			1	1														
5																		
6	1																	
7				2														
8				5														
9	1			1														
10	1			2														
11				1														
12				3														
13	1	4																
14	1	2																
15			1.5	1.5														
16	1																	
17				2														
18	1	1																
19	5	2																
20				2														
21																		
22																		
23																		
24																		
25				2														
TOTAL	17	9	2.5	27.5	11	8	3	6	1	11	9.5	17	2.5	125				
% of total	13.6	7.2	2.0	22.0	8.8	6.4	2.4	4.8	.8	8.8	7.6	13.5	2.0	100				
Acres	23,120	12,240	3400	37,400	14,960	10,880	4080	8160	1360	14,960	12,920	23,120	3100	170,000				



## DEFINITION OF RESOURCE MANAGEMENT SYSTEMS

CROPLAND SYSTEMS

Resource management system to be installed on cropland will include one or more of the practices and/or measures listed below. A typical system used on project croplands includes conservation cropping system, contour farming with terraces, critical area treatment, crop residue use, and grassed waterways.

Conservation Cropping Systems - Cultivating crops in combination with needed cultural and management measures. Cropping systems include rotations that contain grasses and legumes, as well as rotations in which the desired benefits are achieved without use of such crops. (Cover crops are also included in this practice).

Contour Farming - Farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour.

Critical Area Planting - Planting vegetation such as trees, shrubs, vines, grasses, or legumes on critically eroded areas.

Crop Residue Use - Using plant residues to protect cultivated fields during periods of critical erosion.

Field Border - A border or strip of perennial vegetation established at the edge of a field by planting or by converting it from trees to herbaceous vegetation or shrubs

Grassed Waterway or Outlet - A natural or constructed waterway or outlet shaped or graded and established in vegetation suitable to safely dispose of runoff from a field, diversion, terrace, or other structure.

Terracing - An earth embankment or a ridge and channel constructed across the slope at a suitable spacing and with an acceptable grade.

PASTURE AND HAYLAND SYSTEMS

Resource management system to be installed on pastureland and hayland will include one or more of the practices and/or measures listed below. A typical system used on project pastureland includes pasture and hayland planting, pasture and hayland management, critical area treatment, pond, and proper grazing use.

Pasture and Hayland Planting - Establishing and re-establishing longterm stands of adapted species of perennial, biennial, or reseeding forage plants.

Pasture and Hayland Management - Proper treatment and use of pastureland and hayland to prolong life of desirable forage species, to maintain or improve the quality and quantity of forage, and to protect the soil and reduce water loss.

Pond - A water impoundment made by constructing a dam or embankment, or by excavating a pit or "dug out."

Proper Grazing Use - Grazing at an intensity which will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation.

### FOREST LAND SYSTEMS

Resource management system to be installed on forest land will include one or more of the practices and/or measures listed below. A typical system used on project forest lands include forest release, forest improvement cutting, tree planting, and forest site preparation.

Forest Release - Freeing a tree or group of trees from more immediate competition by cutting or otherwise eliminating growth that is overtopping or closely surrounding them.

Forest Improvement Cutting - Eliminating or suppressing the less valuable trees in favor of more valuable tree growth.

Tree Planting - Planting tree seedlings to provide a stand of trees.

Forest Site Preparation - Treating areas to encourage natural seeding or desirable trees or to permit reforestation by planting or direct seeding.

### WILDLIFE LAND SYSTEMS

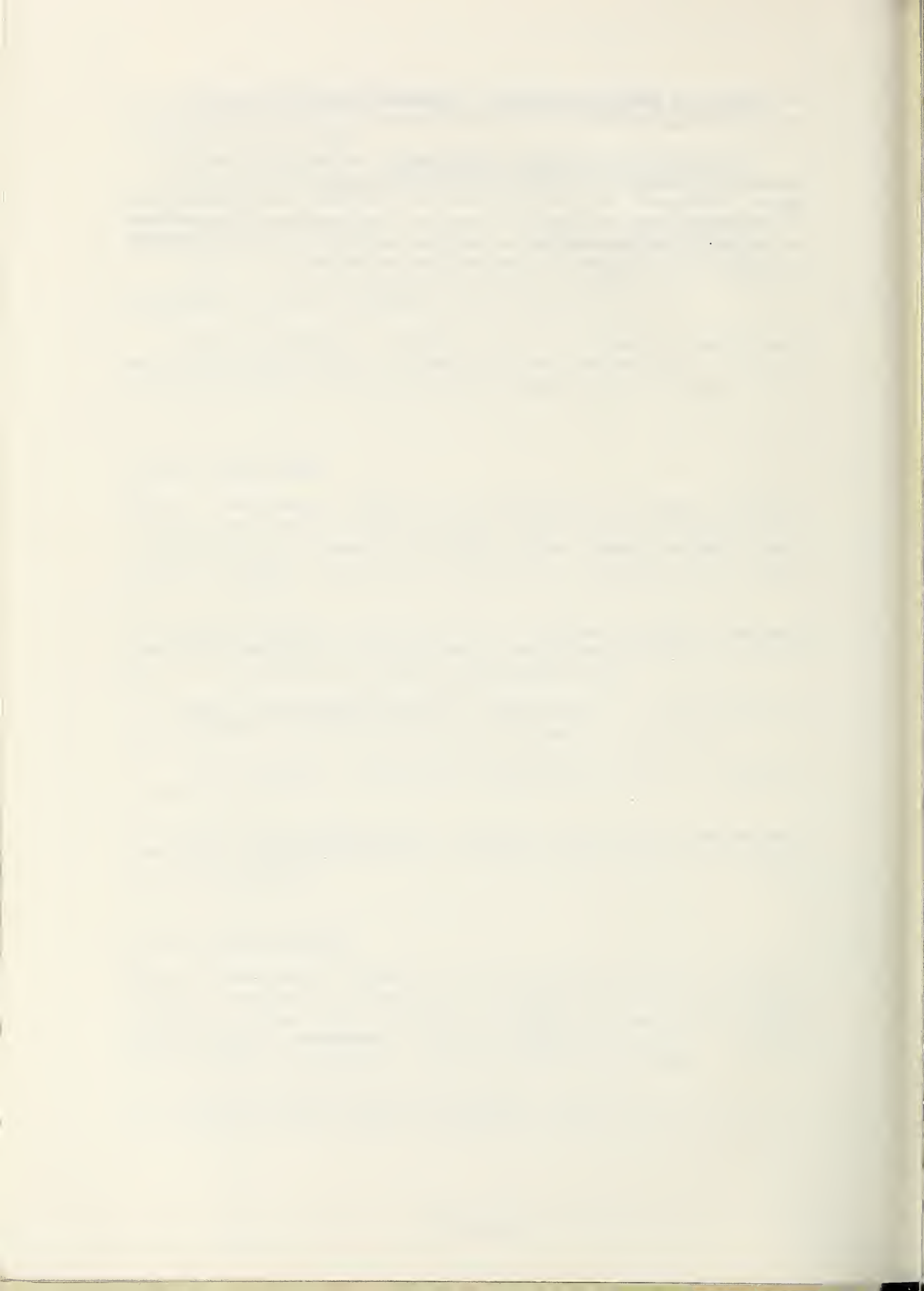
Resource management systems to be installed on wildlife land will include one or more of the practices and/or measures listed below. A typical system used on project wildlife land includes wildlife upland habitat management, wildlife watering facility, wildlife wetland habitat management, and field border plantings.

Wildlife Upland Habitat Management - Retaining, creating, or maintaining wildlife habitat for upland wildlife species.

Wildlife Watering Facility - Constructing, improving or modifying watering facilities for wildlife.

Wildlife Wetland Habitat Management - Retaining, creating or maintaining habitat for wetland wildlife species.

Field Border - A border or strip of perennial vegetation established at the edge of a field by planting or by converting it from trees to herbaceous vegetation or shrubs.



LAND CAPABILITY CLASSES AND SUBCLASSES

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. This classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering purposes. The capability classes and subclasses are defined in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial plants.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In Class I there are no subclasses, because the soils of this class have few limitations. Class V contains only the subclasses indicated by w, s, or c, because the soils in Class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, range, woodland, wildlife habitat, or recreation.

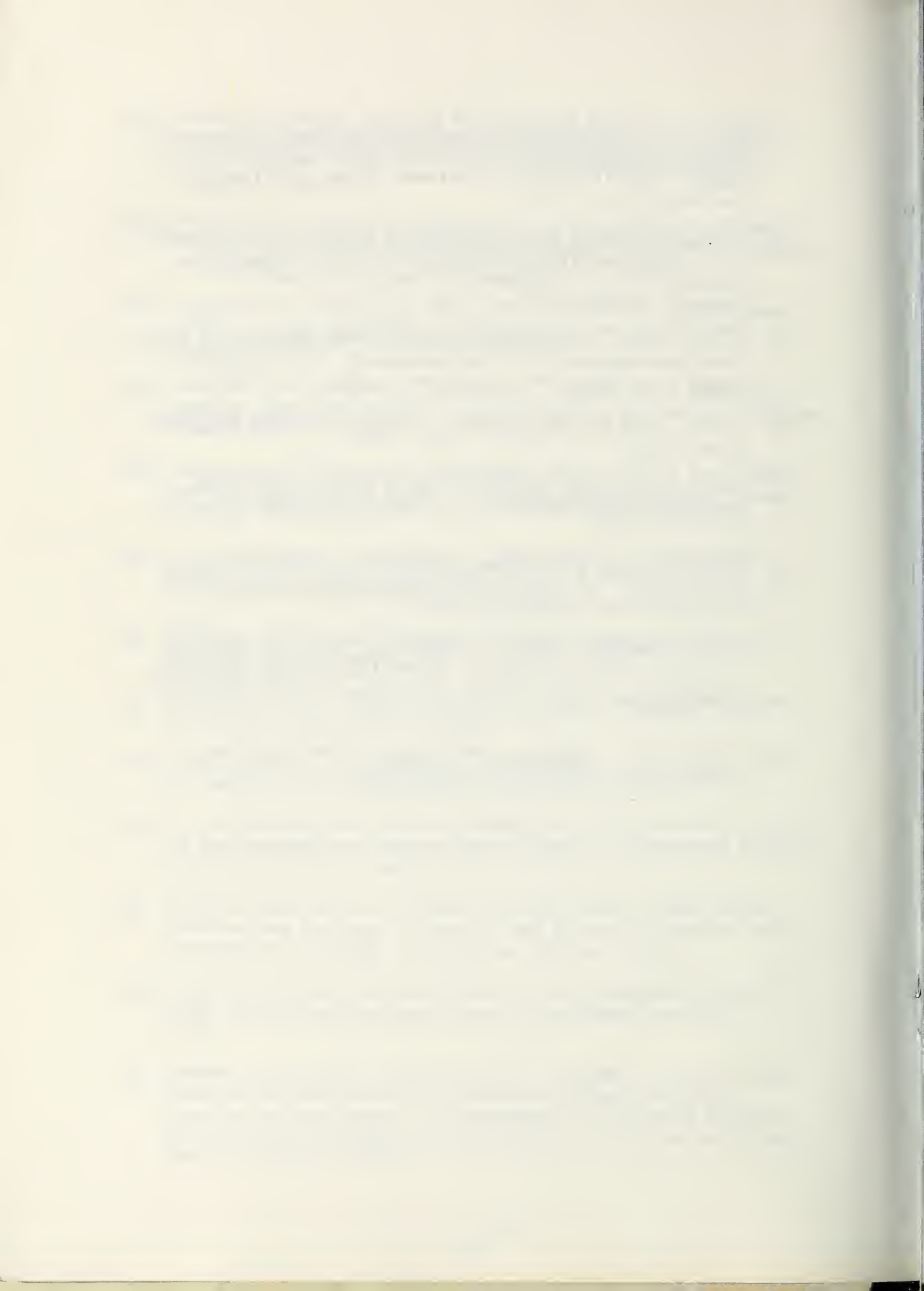
## LITERATURE CITED

- 1/ USDA - Soil Conservation Service, The Soil Conservation Service, SCS-CI-17, U. S. Government Printing Office, Washington, D. C., May 1969.
- 2/ U. S. Department of Commerce, OBERS Projections; Volume 3, U. S. Government Printing Office, Washington, D. C., September 1972.
- 3/ Geological Survey of Alabama, Mineral and Water Resources, Houston County, Alabama, Information Series 38, 1969.
- 4/ U. S. Department of Commerce, Climatological Data, National Oceanic and Atmospheric Administration, Environmental Data Service.
- 5/ USDA-Soil Conservation Service, Soil Survey, Houston County, Alabama, 1968.
- 6/ Jones, Walter B., Water Resources and Hydrology of Southeastern Alabama, Alabama Geological Survey Spec. Rpt. 20, Table 28, 1949.
- 7/ Sawyer, C. N. and P. L. Macarty Chemistry for Sanitary Engineers, McGraw-Hill Book Co., New York, 1967.
- 8/ U. S. Department of the Interior, Federal Water Pollution Control Administration, Report of the Committee on Water Quality Criteria, Washington, D. C., 1968.
- 9/ Vollenweider, R. A., "Scientific fundamentals of the eutrophication of lakes and flowing waters with particular reference to nitrogen and phosphorous as factors in eutrophication", Organization for Economic Cooperation and Development DAS/CSI/68.27, 1968.
- 10/ Shannon, E. E. and P. L. Brezonik, "Relationships between lake trophic state and nitrogen and phosphorous loading rates", Environmental Sciences and Technology, 6:719725, 1972.
- 11/ U. S. Department of Commerce, OBERS Projections; Volume 3, U. S. Government Printing Office, Washington, D. C., February 1973.

- 12/ Southeast Alabama Regional Planning and Development Commission, Southeast Alabama Land Use Inventory and Conceptual Plan, National Technical Information Service, Springfield, Virginia, June 1972.
- 13/ Department of Industrial Relations, Alabama State Employment Service, Affirmative Action Data, Alabama, Montgomery, Alabama, March 1976.
- 14/ Department of Industrial Relations, Alabama State Employment Service, Labor Market News, Dale County, Ozark, Alabama, September 1975.
- 15/ Department of Industrial Relations, Alabama State Employment Service, Labor Market News, Geneva County, Enterprise, Alabama, October 1975.
- 16/ Department of Industrial Relations, Alabama State Employment Service, Dothan Area Manpower Trends, Houston County, Dothan, Alabama, September 1975.
- 17/ U. S. Department of Commerce, 1974 Census of Agriculture, Alabama, State and County Data, Volume I, Part 1, U. S. Government Printing Office, Washington, D. C., January 1974.
- 18/ Oosting, Henry J., The Study of Plant Communities, Second Edition, W. H. Freeman, San Francisco, Calif., 1956.
- 19/ Billings, W. D., Plants and the Ecosystem, Wadsworth Publishing Co., Belmont, Calif., 1965.
- 20/ Odum, Eugene P., Fundamentals of Ecology, Third Edition, W. B. Sanders, Co., Philadelphia, Pennsylvania, 1971.
- 21/ U.S. Department of Interior, Endangered and Threatened Species of the Southeastern United States, Region 4 Endangered Species Handbook, Atlanta, Georgia, 1979.
- 22/ Mettee, Maurice Jr., "A Survey of the Fishes of the Choctawhatchee Bay Drainage in Alabama and Florida", Masters Thesis, University of Alabama, Tuscaloosa, Alabama, 1970.
- 23/ Southeast Alabama Regional Planning and Development Commission, "Recreation and Open Space for Southeast Alabama", 1973.
- 24/ Shuman, G. E., R. F. Priest, and R. G. Spomer, "Physical and Chemical Characteristics of Sediments Originating from Missouri Valley Losses" in Proceedings of the Third Federal Inter-Agency Sedimentation Conference, Water Resources Council, Denver, Colorado, 1976.



- 25/ Hem, J. D., Study and Interpretation of Chemical Characteristics of Natural Water, U. S. Geological Survey Water Supply Paper 1473, U. S. Government Printing Office, Washington, D. C., 1970.
- 26/ Southeast Alabama Regional Planning and Development Commission, Southeast Alabama Human and Economic Potentials, National Technical Information Service, Springfield, Virginia, October 1971.
- 27/ Uhlig, Hans G. and Charles V. Bohart, "An Analysis of Recreation Developments in PL-566 Watersheds", Soil Conservation Service, Broomall, PA., and Lincoln, Neb., July 1975.
- 28/ Viets, Frank G., "Fertilizers.", Journal of Soil and Water Conservation, Vol. 26, pp. 51-57, 1971.
- 29/ Fair, G. M., J. C. Geyerand, and D. A. Okun, Water and Wastewater Engineering, Vol. 2, John Wiley and Sons, Inc., New York, 1968.
- 30/ Mattingly, Georg E., "Experimental Study of Wind Effects on Reaeration". Journal of the Hydraulics Division Vol. 103 No. HY3, March 1977, pp. 311-323.
- 31/ Banks, Robert B., and F. F. Herrera, "Effect of Wind and Rain on Surface Reaeration", Journal of the Environmental Engineering Division (ASCE), Vol. 103, No. EE3, June 1977, pp. 489-504.
- 32/ Welch, P. S., Limnology, New York: McGraw-Hill Book Company, Inc., 1952.





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