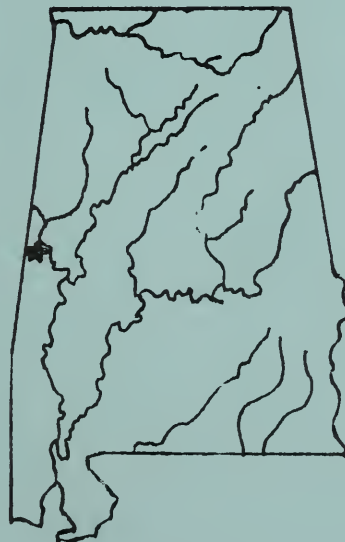


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

aTC425
F28F28
Copy 2

WATERSHED PLAN
AND
ENVIRONMENTAL IMPACT STATEMENT
FOR
WATERSHED PROTECTION AND FLOOD
PREVENTION
FACTORY CREEK



SUMTER COUNTY, ALABAMA

AD-33 Bookplate
(1-63)

NATIONAL

**A
G
R
I
C
U
L
T
U
R
A
L**



LIBRARY

aTC425
1 F28 F28
C.2

FINAL WATERSHED PLAN AND ENVIRONMENTAL IMPACT STATEMENT

FACTORY CREEK WATERSHED

Sumter County, Alabama

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

Factory Creek Watershed Conservancy District

Sumter County Soil and Water Conservation District

Sumter County Commission

With Assistance By

U. S. Department of Agriculture
Soil Conservation Service

U. S. Department of Agriculture
Forest Service

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

JUN 29 1982

CATALOGING = PREP.

February 1978

PREFACE

Enclosed are two documents--the Watershed Plan and Environmental Impact Statement for Factory Creek Watershed, Alabama. All information and data, except as otherwise noted, were collected during watershed planning investigations by the Soil Conservation Service and the U. S. Forest Service, USDA. References cited are listed in appendix K.

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.

TABLE OF CONTENTS

PART I

WATERSHED PLAN

	<u>PAGE</u>
SUMMARY AND DESCRIPTION.....	P-1
PLANNED PROJECT.....	P-3
INSTALLATION COSTS - MONETARY.....	P-4
ECONOMIC BENEFITS.....	P-6
INSTALLATION AND FINANCING.....	P-7
Installation.....	P-7
Financing.....	P-7
OPERATION, MAINTENANCE, AND REPLACEMENT.....	P-9
WATERSHED PLAN AGREEMENT.....	P-10
TABLES	
Table 1 - Estimated Installation Cost.....	P-16
Table 1A- Status of Watershed Works of Improvement...	P-18
Table 2 - Estimated Cost Distribution.....	P-19
Table 3 - Structure Data.....	P-20
Table 4 - Annual Cost.....	P-21
Table 5 - Estimated Average Annual Flood Damage Reduction Benefits.....	P-22
Table 6 - Comparison of Benefits and Costs.....	P-23

PART 11
ENVIRONMENTAL IMPACT STATEMENT

	<u>PAGE</u>
AUTHORITY.....	E-1
SPONSORING LOCAL ORGANIZATIONS.....	E-1
SUMMARY.....	E-2
PROJECT OBJECTIVES.....	E-5
PLANNED PROJECT.....	E-7
Land Treatment Measures.....	E-7
Structural Measures.....	E-8
Floodwater Retarding Structures.....	E-8
General.....	E-10
Operation, Maintenance, and Replacement.....	E-11
Project Costs.....	E-12
ENVIRONMENTAL SETTING.....	E-13
Physical Resources.....	E-13
General.....	E-13
Soils and Land Capabilities.....	E-13
Geology and Topography.....	E-14
Climate.....	E-15
Mineral and Ground Water Resources.....	E-15
Land Use.....	E-17
Surface Water Resources.....	E-17
Wetlands.....	E-20
Present and Projected Population.....	E-20
Economic Resources.....	E-21
Plant Resources.....	E-22
Forestland.....	E-22
Cropland.....	E-23
Pastureland.....	E-23
Idle Lands.....	E-23
Animal Resources.....	E-24
Recreational Resources.....	E-26
Archaeological, Historical and Unique Scenic Resources...	E-27
Soil, Water and Plant Management Status.....	E-27
Projects of Other Agencies.....	E-28

	<u>PAGE</u>
WATER AND RELATED LAND RESOURCE PROBLEMS.....	E-29
Land and Water Management.....	E-29
Floodwater Damage.....	E-29
Erosion Damage.....	E-32
Sediment Damage.....	E-32
Drainage Problems.....	E-32
Plant and Animal Problems.....	E-33
Water Quality Problems.....	E-33
Economic and Social Problems.....	E-33
RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS.....	E-35
ENVIRONMENTAL IMPACT.....	E-36
Conservation Land Treatment.....	E-36
Structural Measures.....	E-37
Economic and Social.....	E-40
Adverse Environmental Impacts.....	E-41
ALTERNATIVES.....	E-43
SHORT-TERM VS. LONG-TERM USES OF RESOURCES.....	E-47
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES.....	E-48
CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS	
General.....	E-49
Comments & Responses.....	E-51
LIST OF APPENDICES.....	E-55
Appendix A - Display Accounts for Selected Alternative - Table A	
Appendix B - Definition of Resources Management Systems	
Appendix C - Letters of Comment on Draft Document	
Appendix D - Project Map	
Appendix E - Soil Association Map	
Appendix E-1 - Land Capability Classes and Subclasses	
Appendix F - Land Use Map	
Appendix G - Archaeological and Historical Survey of Five FRS Sites Within Factory Creek Watershed	
Appendix H - Section of Typical Floodwater Retarding Structure (Single Stage Riser)	
Appendix I - Section of a Typical Floodwater Retarding Structure (Two Stage Riser)	
Appendix J - Scientific Names of Plants and Animals	
Appendix K - Literature Cited	

WATERSHED PLAN

FACTORY CREEK WATERSHED

Sumter County, Alabama

FACTORY CREEK WATERSHED PLAN

SUMMARY AND DESCRIPTION

General

Factory Creek Watershed is located in rural Sumter County in West Central Alabama. The total drainage area is 51,600 acres. It is about 50 miles southwest of Tuscaloosa, Alabama, 40 miles northeast of Meridian, Mississippi, and 10 miles north of Livingston, Alabama.

This watershed plan was prepared by the Factory Creek Watershed Conservancy District, the Sumter County Soil and Water Conservation District, and the Sumter County Commission. Technical assistance was provided by the Soil Conservation Service and Forest Service of the U. S. Department of Agriculture.

The watershed flood plain consist of about 4,800 acres. The major soil and water problems in the watershed are flood damages occurring on the 2,505 acres of flood plain land along Factory Creek, 952 acres on Tom's Creek, 102 acres on Turkey Creek, and 576 on Jones Creek and sheet erosion on 3,950 acres of upland cropland throughout the watershed. The estimated average annual flood damages and indirect damages total \$41,550 based on current normalized prices.

Erosion in the watershed is slight to moderate occuring during periods of high storm runoff. The sediment resulting from this erosion is deposited on crops and pastures and in road ditches.

Project objectives include the proper use, treatment, and management of soil and water resources in the watershed, protection of flood plain lands and property, and stimulation of economic development. The project as formulated meets these objectives.

The Factory Creek Watershed Plan proposes a project for watershed protection and flood prevention by means of conservation land treatment measures and three single-purpose floodwater retarding structures (see appendix D).

Accelerated conservation land treatment will adequately protect much of the watershed area and will reduce sediment yield by 35 percent. The structural measures in combination with land treatment will reduce sediment yield by 50 percent. Land treatment will reduce runoff by an estimated 5 percent and will enhance watershed aesthetic qualities. Floodwater retarding structures will reduce average annual flood damages by 37 percent on Factory Creek.

Installation of this project will result in the loss of 81 acres of wildlife habitat, increased sediment in streams during construction, and a slight increase in stream temperatures below impoundments.

Conservation land treatment will be installed throughout the watershed within a 5-year period at a total cost of \$760,425. The planned structures, as shown on the project map, will be installed within a 5-year period at a total cost of \$722,750. Total cost of installing the project is estimated to be \$1,483,175 (see table 1).

Average annual benefits from the project will accrue to National Economic Development (NED) at an estimated rate of \$71,900 per year. Average annual cost based on 6 5/8 percent interest will be \$50,250 (see table 4). The resulting benefit-cost ratio is 1.4:1.0 (see table 6).

Conservation land treatment measures will be installed, financed, and maintained by the landowners. Accelerated technical assistance will be provided by the Soil Conservation Service (SCS) through the Sumter County Soil and Water Conservation District. Structural measures will be financed by PL-566 and other funds (see table 2) and will be maintained by the local sponsoring organizations. An operation and maintenance plan will be developed to assure the proper functioning of all structural measures. The estimated average annual cost of operation and maintenance is \$2,250.

PLANNED PROJECT

Conservation plans will be developed for individual farms and will provide details on the land treatment measures needed on each farm. These plans provide for accelerated technical assistance to land users, through the Sumter County Soil and Water Conservation District (S&WCD), in planning and applying land treatment measures. Accelerated conservation land treatment goals are for 700 acres of cropland, 4,400 acres of pastureland, and 170 acres of other land to be adequately treated during the 5-year project installation period. Planned measures consist of conservation cropping systems, contour farming, land smoothing, minimum tillage, crop residue use, critical area planting, drainage field ditches, drainage mains and laterals, pasture and hayland management, pasture and hayland planting, wildlife upland habitat management, grassed waterways and outlets, diversions, and ponds. These practices are defined in appendix B of the Environmental Impact Statement. (See table 1A for status of conservation land treatment measures already applied.)

Structural measures to be installed include three single-purpose flood-water retarding structures (see appendix D). These structures will provide protection to the flood plain downstream of the structures by reducing flood damages to cropland, pastureland, and roads and bridges. For details of the planned structures and the method of installation, see the environmental impact statement, "Planned Project" section.

INSTALLATION COSTS - MONETARY

The installation costs for conservation land treatment are provided through the going program and the accelerated program.

The total cost of the going program is \$155,675. The costs for establishing conservation practices are \$12,700 for cropland, \$110,000 for pastureland, \$13,200 for forest land, and \$3,675 for other lands. These costs will be borne by the land users with some assistance from the present going Agricultural Conservation Program. The Alabama Forestry Commission (AFC) will provide \$2,000 for fire control from their regular program. The cost for technical assistance is \$14,100 which will be funded by the present going programs.

The total estimated installation cost of the accelerated conservation land treatment program is \$604,750. This includes the cost for design, lay-out, application and construction of the proposed land treatment measures. Some measures will not require construction but will require a change in cultural practices. A cost for time and labor has been included for the changes in cultural practices. The technical assistance cost is the estimated cost of an SCS planner and a technician assisting landowners with the planning and application of conservation land treatment measures (see table 1 and 1A).

The costs for establishing these accelerated conservation land treatment measures are \$44,450 on cropland, \$484,000 on pastureland, and \$12,000 on other lands. These costs will be borne by the land users with some assistance from the going Agricultural Conservation Program. The total costs for accelerated technical assistance is \$64,300. The technical assistance costs will be paid from PL-566 funds.

The total installation cost of the floodwater retarding structures is estimated to be \$722,750 (see table 2) which includes \$535,300 for construction. The construction cost includes the engineer's estimate and a 12 percent allowance for contingencies. 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, and vegetation. The unit cost for the specific items was based on actual cost of similar structural measures.

The cost of engineering services is estimated to be \$40,950. This includes costs of engineers and other technicians for surveys, investigation, design and preparation of plans, and specifications for structural measures including the vegetative work.

Total cost for land rights is estimated at \$51,750. This includes \$1,020 for appraisals. Project administration is estimated at \$94,750. The costs for project administration include sponsor's cost and PL-566 costs for contract administration, recordkeeping, construction inspections, etc. For more detailed information on costs and cost sharing, see tables 1 and 2.

ECONOMIC BENEFITS

Reduced flooding will provide average annual benefits to crops and pasture of about \$10,050 and to agricultural fixed improvements of about \$2,850. Nonagricultural benefits from reducing flood damage are estimated to average \$1,000 annually. Benefits from reducing indirect* damage will be \$1,500 annually. Average annual benefits from reduced flood damages for the watershed total \$15,400 (see table 5).

As flood protection is realized, the use of some land that is now in pasture or is marginal or unproductive will change to productive agriculture. Also, farmers will apply more intensive land use practices. Average annual benefits from changes in agricultural land use are estimated to be \$44,100. Average annual benefits resulting from more intensive land use are estimated to be \$1,900 (see table 6).

Employment benefits are expected to average \$10,500 annually. The local economy will benefit from the value of local labor, services, and materials used in project installation and maintenance.

The net effect of the project on regional externalities is estimated to be \$90,900 annually. These benefits result from economic activity stimulated by the project for production, utilization, and disposition of intermediate goods and services. Regional externalities were not used for project justification.

Total average annual benefits from structural measures are estimated to be \$71,900 while average annual costs will be about \$50,250. This gives a benefit-cost ratio of 1.4:1.0 (see table 6).

*Losses incurred indirectly. An example is costs of detouring traffic when a bridge is washed out.

INSTALLATION AND FINANCING

INSTALLATION

It is expected that landowners will establish the planned conservation land treatment measures on their land within the 5-year installation period in cooperation with the Sumter County Soil and Water Conservation District. The District 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 land treatment measures are voluntarily installed by the landowners and operators.

The Sumter County Commission will serve as the contracting local organization during project installation. The SCS will prepare plans, specifications, and cost estimates; provide construction inspection; and cooperate in the final inspection of the structural measures. The structural measures are expected to be installed during a 5-year installation period. As required by Public Law 93-291, the Service will notify the Secretary of the Interior if any archaeological materials are found during construction.

The Factory Creek Conservancy District will acquire all necessary land rights for installation of structural measures. They will also arrange for the modification of utility lines, roads, etc., needed to install the structural measures. 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 for each structure site before PL-566 funds are made available.

FINANCING

Land treatment measures will be voluntarily financed by landowners and operators at their expense. Cost sharing assistance under other programs as available may be used in applying conservation land treatment measures. PL-566 funds will finance the accelerated technical assistance provided by the SCS.

Federal assistance for installing the works of improvement on non-federal 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 pursuant to the following conditions:

1. All land rights have been acquired.
2. PL-566 funds are available.
3. Project agreements have been signed.
4. Operation and maintenance agreements have been signed.

Public Law 566 will finance 100 percent of the construction and engineering cost of the floodwater retarding structures. The Sumter County Commission will finance from existing local tax sources the costs of land rights and operation, maintenance, and replacement.

PL-566 will finance all administrative costs, such as construction inspection, travel, etc., incurred by the Government. The local sponsors will provide for administrative costs which they incur.

Prior to entering into agreements that obligate funds of the Soil Conservation Service, the Sumter County Commission will develop a code of conduct governing the performance of its officers, employees, and agents in contracting with or expending PL-566 funds. The Commission shall develop 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 shall be reported with sponsors' requests for advance or reimbursement from the Service. The total estimated PL-566 and "other" costs to be obligated during the 5-year installation period are as follows:

Year	Public Law 566		Other Funds		Total
	Land Treatment	Structural Measures	Land Treatment*	Structural Measures	
1	\$12,850	\$ 30,700	\$139,225	\$ 2,000	\$184,775
2	12,850	117,700	139,225	21,800	291,575
3	12,850	363,000	139,225	27,350	542,425
4	12,850	149,600	139,225	10,600	312,275
5	12,900	None	139,225	None	152,125
Total	<u>\$64,300</u>	<u>\$661,000</u>	<u>\$696,125</u>	<u>\$61,750</u>	<u>\$1,483,175</u>

*Includes going land treatment program.

OPERATION, MAINTENANCE, AND REPLACEMENT

Land treatment measures will be maintained by landowners under the cooperative agreements with the Sumter County Soil and Water Conservation District. The SCS will provide technical assistance through the District for operation and maintenance of land treatment measures. The Alabama Forestry Commission, in cooperation with the U. S. Forest Service, will furnish technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program.

The Sumter County Commission will be responsible for performing, or having performed, without cost to the Service, all maintenance of the structural measures. The estimated average annual cost of operation and maintenance of structural measures is \$2,250. The sponsors will see that operation and maintenance is performed in a timely, adequate, and otherwise appropriate manner to assure efficient operation and functioning of the structures for the life of the project.

The sponsors will maintain vegetation associated with structural measures beginning immediately after the Service determines that the initial vegetative work is adequate, but no later than three years following completion of each structural measure. Maintenance of the floodwater retarding structures will consist of, but not be limited to, items such as controlling undesirable vegetation by mowing, hand cutting, or using herbicides; painting metal parts; repairing gates and trash racks; and repairing eroded areas.

The mowing for the most part will be done with a farm-type tractor and shredder. Use of herbicides will be in accordance with state regulations.

Annual inspections will be performed and documented by a responsible official of the County, preferably accompanied by a landowner actively farming within the project area. The inspection will be made in late spring or early summer so that needed maintenance can be completed before the rainy season. More frequent inspections may be required when unusually severe storms occur. These inspections will help identify problems early and prevent other storms from compounding the problem. The SCS will participate in the inspections in the first three years and thereafter as deemed necessary.

An operation and maintenance (O&M) agreement will be entered into by the Sumter County Commission and SCS prior to the signing of a project agreement. The O&M agreement will contain, in addition to specific sponsor responsibilities for structural measures, specific provisions for retention and disposal of real and personal property acquired in whole or in part with PL-566 funds. The O&M agreement will also contain a reference to the State Watersheds Operation and Maintenance Handbook. A plan for O&M will be prepared for each structural measure.

AGREEMENT

between the following local organizations:

FACTORY CREEK WATERSHED CONSERVANCY DISTRICT

SUMTER COUNTY SOIL AND WATER CONSERVATION DISTRICT

SUMTER COUNTY COMMISSION

(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 Factory Creek Watershed, State of Alabama, under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 10011008); 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 local organizations and SCS this plan for works of improvement for the Factory Creek 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 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 (Percent)</u>	<u>SCS (Percent)</u>	<u>Estimated Land Rights Cost (Dollars)</u>
Floodwater Retarding Structures			
Payment to landowners for about 146 acres	100	0	\$35,480
Land Appraisal Fees	100	0	1,020
Legal Fees, Survey Costs, Flowage Easements and other	100	0	15,250

The Sponsors agree that all land acquired by 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.

- 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 (Dollar)</u>
Relocation Payments	8.5	91.5	0.0 */

- 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.

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

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 Costs (Dollars)</u>
Floodwater Retarding Structures	0	100	535,300

5. 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>
Floodwater Retarding Structures	0	100	40,950

6. The Sponsors and SCS will each bear the costs of Project Administration which it incurs, estimated to be \$10,000 and \$84,750, respectively.
7. The Sponsors will obtain agreements from owners of not less than 50 percent of the land above each floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.
8. The Sponsors will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed plan.
9. The Sponsors will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
10. 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.
11. 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.

12. This agreement is not a fund obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
13. A separate agreement will be entered into between SCS and 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.
14. This plan may be amended, revised, or terminated only by mutual agreement of the parties hereto except that SCS may terminate financial and other assistance in whole, or in part, 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 termination, together with the effective date. Payments made to the Sponsors or recoveries by SCS under projects terminated shall be in accord with the legal rights and liabilities of the parties.
15. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
16. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15.1-15.12), 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.

Factory Creek Watershed
Conservancy District _____ By _____

Title _____

Address _____ Zip Code _____ Date _____

The signing of this plan was authorized by a resolution of the governing body of the Factory Creek Watershed Conservancy District adopted at a meeting held on _____.

(Secretary) Factory Creek Watershed _____ Address _____ Zip Code _____
Conservancy District

Date _____

Sumter County Commission _____ By _____

Title _____

Address _____ Zip Code _____ Date _____

The signing of this plan was authorized by a resolution of the governing body of the Sumter County Commission adopted by a meeting held on _____.

(Secretary) Sumter County Commission _____ Address _____ Zip Code _____

Date _____

Sumter County Soil and Water
Conservation District _____ By _____

Title _____

Address _____ Zip Code _____ Date _____

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

(Secretary) Sumter County Soil and
Water Conservation District

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
Factory Creek Watershed, Alabama

Installation Cost Item	NUMBER	ESTIMATED COST (DOLLARS) 1/							
		Unit	Nonfederal Land	P. L. 566 Funds			Other		TOTAL
				Nonfederal land	Nonfederal land	Nonfederal land	Nonfederal land	Nonfederal land	
		SCS 3/	FS 3/	Total	SCS 3/	FS 3/	Total	FS 3/	Total
LAND TREATMENT - GOING PROGRAM									
Land Areas 2/ Cropland		Acres to be treated	200	-	-	12,700	-	12,700	12,700
Pastureland			1,000	-	-	110,000	-	110,000	110,000
Forest Land			1,600	-	-	-	13,200	13,200	13,200
Other Land			75	-	-	3,675	-	3,675	3,675
Individual Practices such as - Fire Control			-	-	-	-	2,000 4/	2,000	2,000
Technical Assistance			-	-	-	12,600	1,500	14,100	14,100
SUBTOTAL			2,875	-	-	138,975	16,700	155,675	155,675
LAND TREATMENT - ACCELERATED									
Land Areas 2/ Cropland		Acres to be treated	700	-	-	44,450	-	44,450	44,450
Pastureland			4,400	-	-	484,000	-	484,000	484,000
Forest Land			-	-	-	-	-	-	-
Other Land			170	-	-	12,000	-	12,000	12,000
Technical Assistance			-	64,300	64,300	-	-	-	64,300
SUBTOTAL			5,270	64,300	64,300	540,450	-	540,450	604,750
TOTAL LAND TREATMENT			8,145	64,300	64,300	679,425	16,700	696,125	760,425

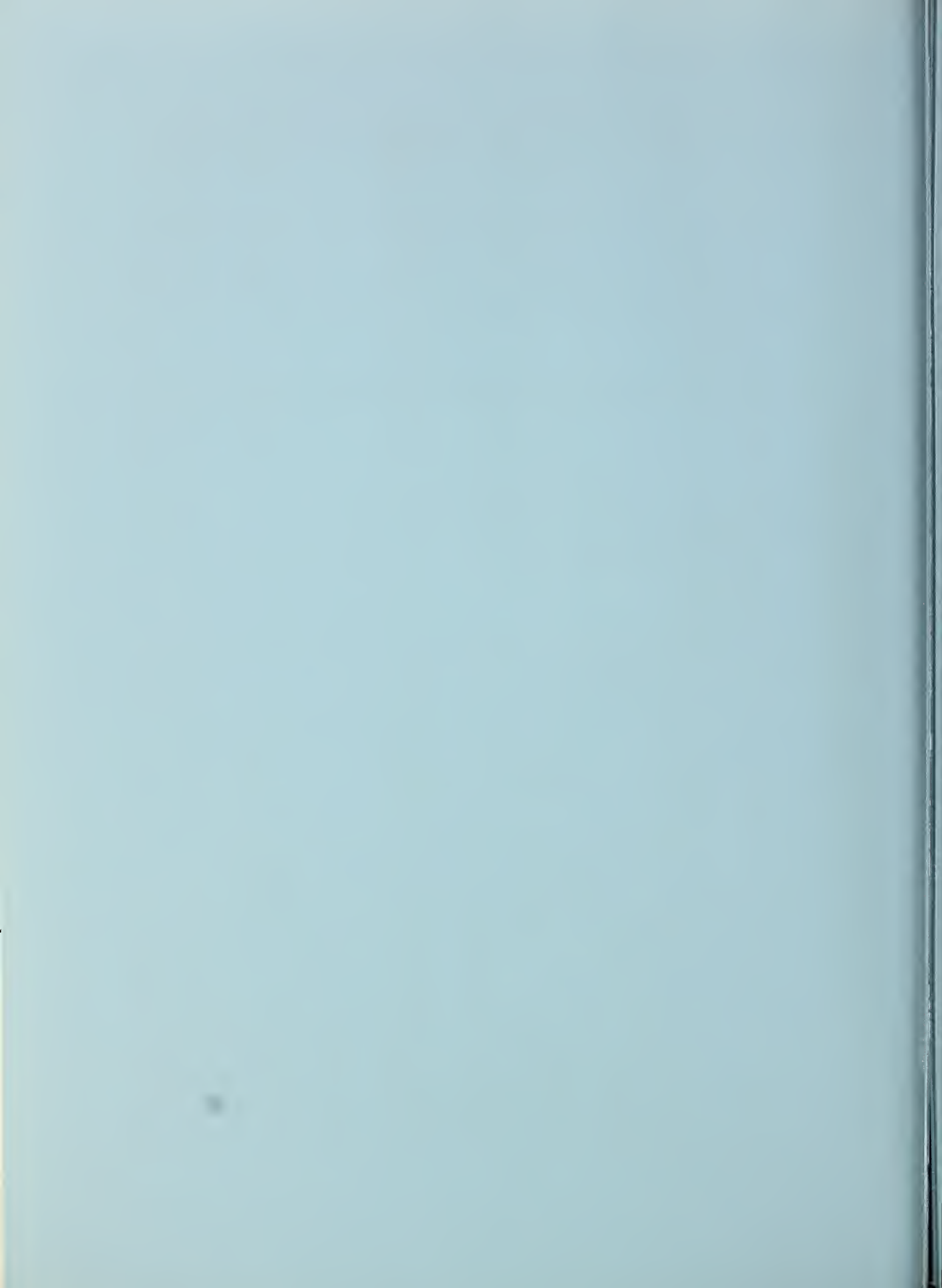


TABLE 1 - ESTIMATED INSTALLATION COST (CONT'D)
 Factory Creek Watershed, Alabama

Installation Cost Item	NUMBER	ESTIMATED COST (DOLLARS) 1/							
		Unit	Nonfederal Land	P. L. 566 Funds			Other		TOTAL
				Nonfederal land	Nonfederal land	Nonfederal land	Nonfederal land		
No.		SCS 3/	FS 3/	Total	SCS 3/	FS 3/	Total		
<u>STRUCTURAL MEASURES</u>									
Floodwater Retarding Structures	3	576,250	-	576,250	51,750	-	51,750	628,000	
<u>PROJECT ADMINISTRATION</u>									
Construction Inspection Other	-	52,950	-	52,950	6,250	-	6,250	59,200	
SUBTOTAL - Administration for Structural Measures	-	31,800	-	31,800	3,750	-	3,750	35,550	
TOTAL PROJECTS COSTS 5/	-	84,750	-	84,750	10,000	-	10,000	94,750	
TOTAL ALL COSTS	-	725,300	-	725,300	602,200	-	602,200	1,327,500	
	-	725,300	-	725,300	741,175	16,700	757,875	1,483,175	

1/ Price base 1976.

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

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

4/ Alabama Forest Commission fire control.

5/ Excludes going program - Land treatment.

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

Factory Creek Watershed, Alabama

Land Treatment Measures	Unit	Applied To Date	Total <u>1/</u> Cost
Conservation Cropping System	Ac.	1,250	\$37,500
Contour Farming	Ac.	400	1,600
Critical Area Treatment	Ac.	35	8,750
Crop Residue Use	Ac	1,275	3,825
Diversions	Ft.	4,000	3,200
Drainage Field Ditches	Ft.	4,000	2,000
Drainage Mains and Laterals	Ft.	2,000	1,500
Grassed Waterways and Outlets	Ac.	40	14,000
Land Smoothing	Ac.	700	52,500
Minimum Tillage	Ac.	300	6,000
Ponds	No.	18	36,000
Pasture and Hayland Management	Ac.	5,400	135,000
Pasture and Hayland Planting	Ac.	3,800	342,000
Wildlife Upland Habitat Management	Ac.	200	12,000
Tree Planting	Ac.	100	3,000
Woodland Improvement	Ac.	800	32,000
Woodland Improved Harvest	Ac.	1,500	18,000
TOTAL	XXX	XXX	\$708,875
AREA ADEQUATELY TREATED	Acres	8,145	XXXXX

1/ Base Price 1976.

July 1976

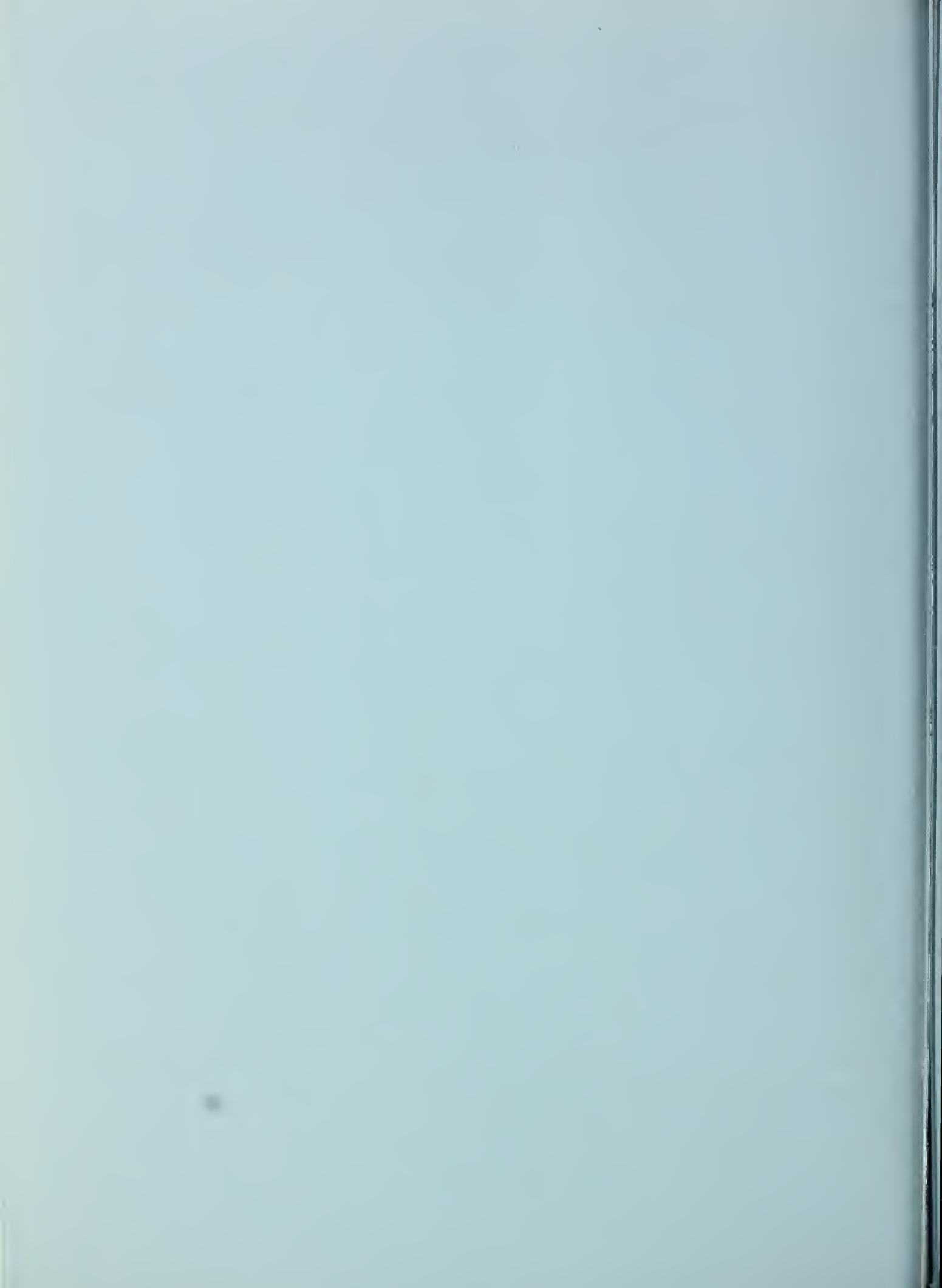


TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Factory Creek Watershed, Alabama

(Dollars) 1/

Item	Installation Cost P. L. 566 Funds			Installation Cost Other Funds		Total Installation Cost
	Construction	Engi- neering	Total P. L. 566	Land Rights	Total Other	
STRUCTURAL MEASURES Floodwater Retarding Structures:						
No. 6	315,000	18,900	333,900	23,750	23,750	357,650
No. 7	118,500	11,850	130,350	8,900	8,900	139,250
No. 8	101,800	10,200	112,000	19,100	19,100	131,100
Subtotal	535,300	40,950	576,250	51,750	51,750	628,000
Project Administration	-	-	84,750	-	10,000	94,750
GRAND TOTAL	-	-	661,000	-	61,750	722,750

1/ Price Base 1976.

February 1978

TABLE 3 - STRUCTURE DATA
 FLOODWATER RETARDING STRUCTURES
 Factory Creek Watershed, Alabama

ITEM	UNIT	FRS STRUCTURE NO.			TOTAL
		6	7	8	
Class of Structure	---	b	b	b	---
Drainage Area	Sq. Mi.	10.20	2.12	2.75	15.07
Curve No. (1-day) (AMC II)	---	84	83	86	---
Tc	Hrs.	2.85	1.11	2.36	---
Elevation Top of Dam	MSL	188.1	179.2	176.8	---
Elevation Crest Emergency Spillway	MSL	183.9	176.1	173.6	---
Elevation Crest High Stage Inlet	MSL	179.4	165.6	170.2	---
Elevation Crest Low Stage Inlet	MSL	169.6	---	163.8	---
Volume of Fill	Cu. Yds.	143,200	60,000	54,800	258,000
Total Capacity	Ac. Ft.	4,042	782	1,245	6,069
Sediment Submerged 1st 50 years	Ac. Ft.	3/ 66	31	53	150
Sediment Submerged 2nd 50 years	Ac. Ft.	3/ 68	31	54	153
Sediment Aerated	Ac. Ft.	7	3	5	15
Retarding	Ac. Ft.	3,901	717	1,133	5,751
Between high and low state	Ac. Ft.	2,078	---	591	2,669
Surface Area					
Sediment pool 1/	Acres	65	28	53	146
Retarding pool 2/	Acres	530	115	194	839
Principal Spillway					
Rainfall Volume (areal) (1 day)	In.	8.30	8.30	8.30	
Rainfall Volume (areal) (10 day)	In.	14.90	14.90	14.90	
Runoff Volume (10 day)	In.	10.91	10.66	11.38	
Capacity of Low Stage (Max.)	cfs.	130	---	37	
Capacity of High Stage (Max.)	cfs.	372	53	94	
Frequency operation - Emer. Spillway	% chance	2	2	2	
Size of Conduit (diameter)	In.	54	24	30	
Emergency Spillway					
Rainfall Volume (ESH) (areal)	In.	9.50	9.50	9.50	
Runoff Volume (ESH)	In.	7.55	7.41	7.79	
Type	---	Veg.	Veg.	Veg.	
Bottom Width	Ft.	300	150	150	
Velocity of flow (Ve)	Ft/Sec	4.40	3.70	3.85	
Slope of exit channel	Ft/Sec	0.039	0.045	0.043	
Maximum water surface elevation	Ft.	185.0	176.9	174.5	
Freeboard					
Rainfall Volume (FH) (areal)	In.	16.40	16.40	16.40	
Runoff Volume (FH)	In.	14.31	14.00	14.59	
Velocity of flow (Ve)	Ft/Sec	9.32	8.20	8.30	
Maximum water surface elevation	Ft.	188.1	179.2	176.8	
Capacity Equivalents					
Sediment Volume	In.	0.26	0.58	0.76	
Retarding Volume	In.	7.17	6.34	6.97	

1/ Surface area of the 100 year sediment pools
 2/ Includes area of sediment pools.
 3/ Dry Pool - All sediment is aerated.

February 1978

TABLE 4 - ANNUAL COST

Factory Creek Watershed, Alabama

(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost <u>2/</u>	Operation, Maintenance, and Replacement Cost	Total
Strs. 6, 7, & 8	41,700	2,250	43,950
Project Administration	6,300	-	6,300
GRAND TOTAL	48,000	2,250	50,250

1/ Price base: 1976

2/ Amortized @ 6 5/8 percent interest rate for 100 years.

February 1978



TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Factory Creek Watershed, Alabama

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit <u>2/</u>
	Without Project	With Project	
Floodwater			
Crop and Pasture	23,550	13,500	10,050
Other Agricultural	7,350	4,500	2,850
Nonagricultural (Road and Bridge)	6,300	5,300	1,000
Subtotal	37,200	23,300	13,900
Indirect	4,350	2,850	1,500
Total	41,550	26,150	15,400

1/ Price Base: Crop and pasture damages, current normalized prices (October 1976), other damages 1976 prices.

2/ Excludes Effects of Accelerated Land Treatment Measures.

February 1978



TABLE 6 - COMPARISON OF BENEFITS AND COSTS

Factory Creek Watershed, Alabama

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS <u>1/</u>					Avg. Annual Cost <u>3/</u>	Benefit Cost Ratio
	Damage <u>2/</u> Reduction	More Intensive Land Use	Changed Land Use	Employment	Total		
Floodwater Retarding Structures Nos. 6, 7, & 8	15,400	1,900	44,100	10,500	71,900	43,950	1.6:1.0
Project Administration						6,300	
GRAND TOTAL	15,400	1,900	44,100	10,500	71,900	50,250	1.4:1.0

1/ Price base: Crop and pasture benefits, current normalized prices (October 1976), other benefits 1976 prices.

2/ From Table 5

3/ From Table 4

February 1978



FINAL ENVIRONMENTAL IMPACT STATEMENT

FACTORY CREEK WATERSHED

Sumter County, Alabama

February 1978



FACTORY CREEK WATERSHED
SUMTER COUNTY, ALABAMA

FINAL ENVIRONMENTAL IMPACT STATEMENT

W. B. Lingle
State Conservationist
Soil Conservation Service

Sponsoring Local Organizations

Factory Creek Watershed Conservancy District
T. M. Nelson, Chairman
Epes, Alabama 35460

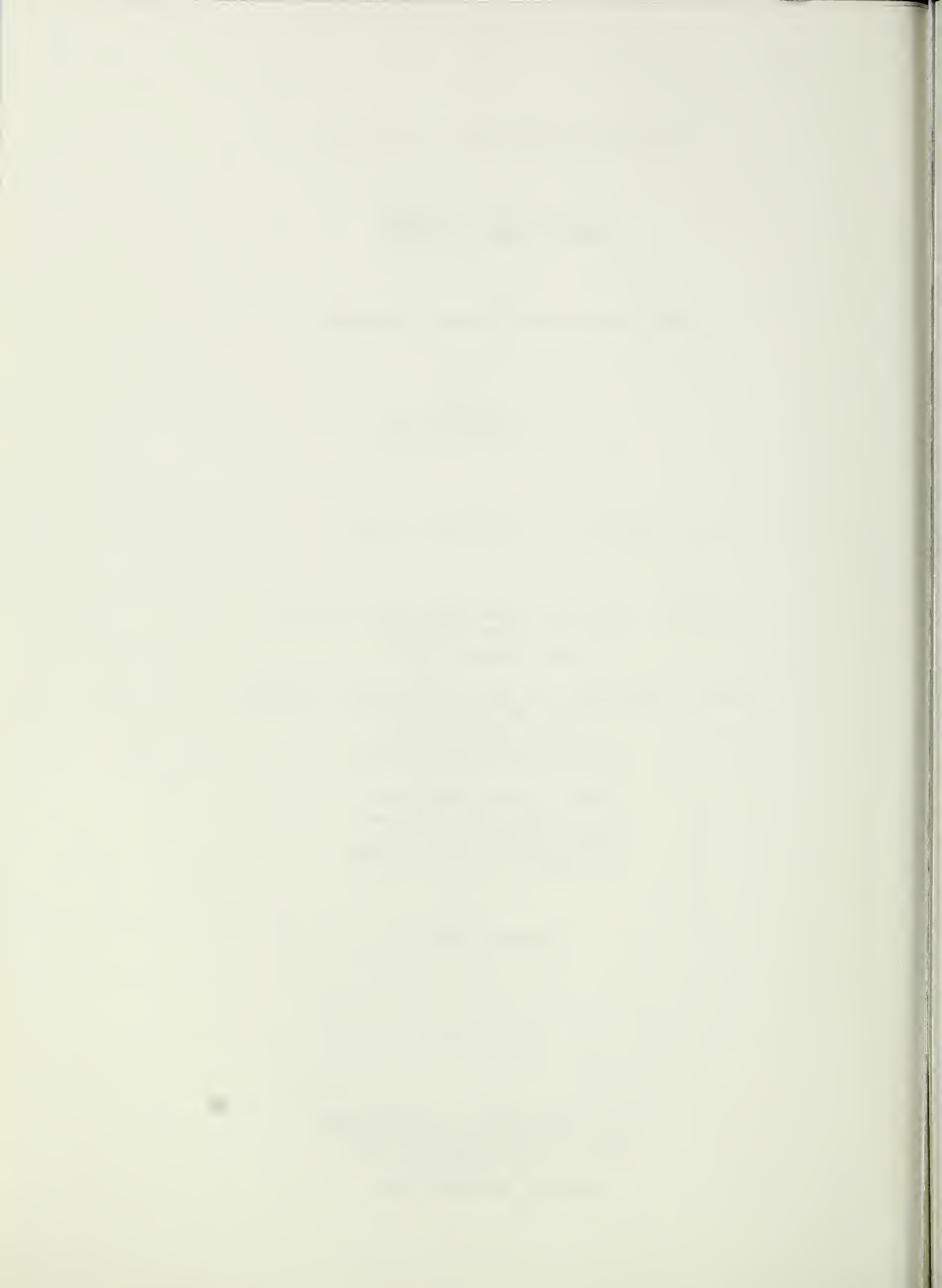
Sumter County Soil and Water Conservation District
John R. Besh, Chairman
Route 1, Box 1132
Livingston, Alabama 35470

Sumter County Commission
W. T. Lockard, Chairman
Sumter County Courthouse
Livingston, Alabama 35470

February 1978

Prepared By

U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service
P. O. Box 311
Auburn, Alabama 36830



USDA SOIL CONSERVATION SERVICE FINAL ENVIRONMENTAL
IMPACT STATEMENT

for

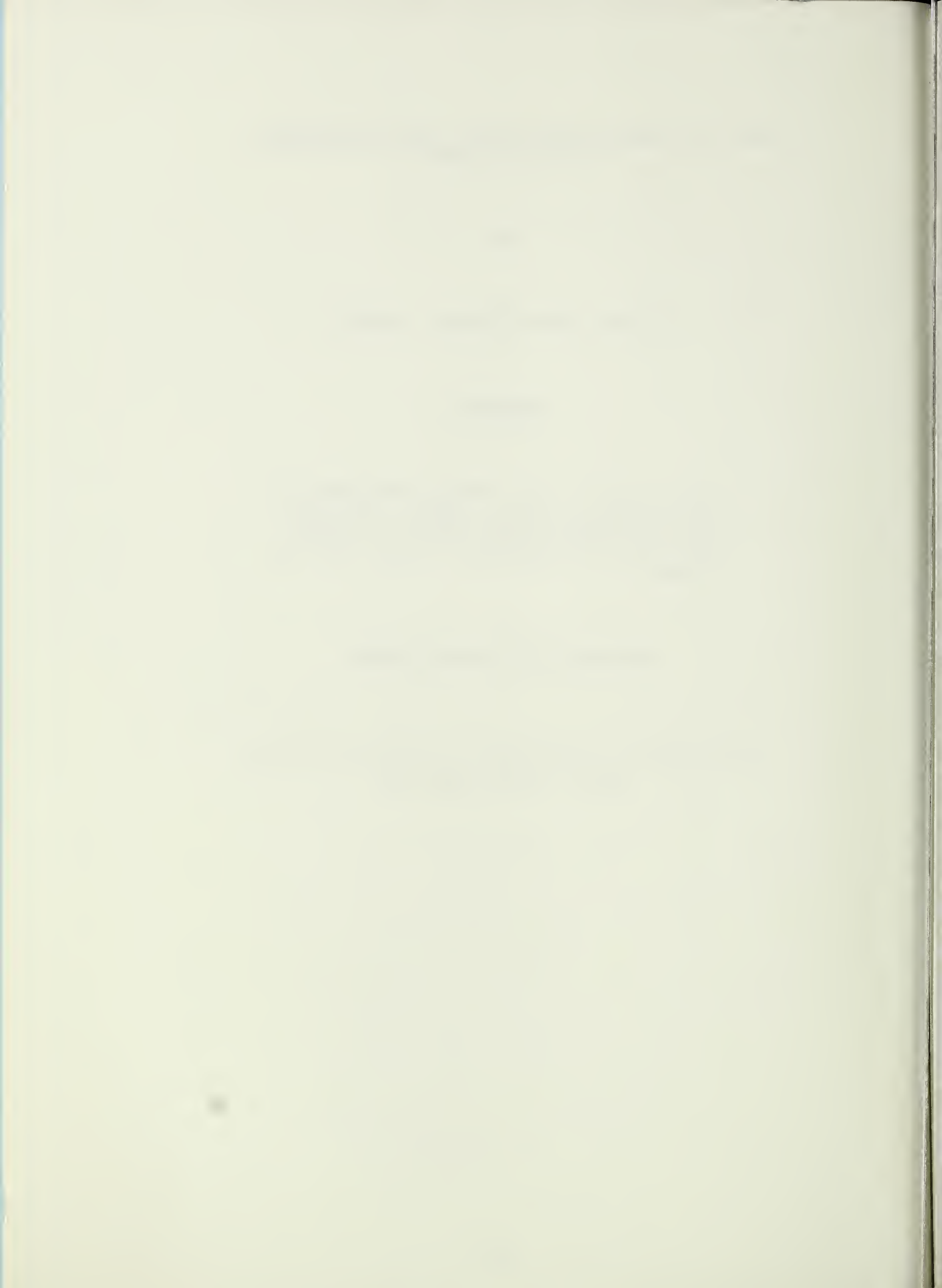
FACTORY CREEK WATERSHED, ALABAMA

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

Factory Creek Watershed Conservancy District
Sumter County Soil and Water Conservation District
Sumter County Commission



USDA ENVIRONMENTAL IMPACT STATEMENT

FACTORY CREEK WATERSHED PROJECT

Sumter County

Alabama

Prepared in Accordance with
Sec. 102(2)(c) of P.L. 91-190

SUMMARY

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of project purpose and action: A project for watershed protection and flood prevention in Sumter County, 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 conservation land treatment and three single-purpose floodwater retarding structures. The single-purpose structures (Nos. 6, 7 and 8) will retard runoff from 15.07 square miles of drainage area.
- V. Summary of Impacts:
 1. Reduce sediment yield at mouth of watershed by 50 percent.
 2. Reduce sediment accumulation on flood plain by 48 percent.
 3. Reduce fertilizer losses and improve farming efficiency.
 4. Improve aesthetics on uplands.
 5. Reduce average annual acres flooded along Factory Creek by 57 percent.
 6. Reduce road and bridge damages.
 7. Create 81 acres of diverse aquatic habitat in two impoundments.
 8. Increase real estate tax base.

9. Improve the local agricultural economy.
10. Create employment.
11. Increase sedimentation and stream turbidity during construction.
12. Temporarily increase noise and air pollution.
13. Cause the loss of 18 acres of forest land due to construction of three structures, and cause possible damage to 78 acres of forest land in flood pools of structures due to temporary inundation during floods.
14. Cause temporary closing of county road No. 24 above structure 8 during unusually large floods (probably two or three times during the life of the project).
15. Type 5 wetlands will increase from 243 acres to 324 acres.
16. Flood reduction will reduce losses of flood plain wildlife.
17. There will be a temporary reduction in the quality of fish habitat in the lower reaches of Factory Creek during construction of the floodwater retarding structures.
18. The project will create a favorable habitat for horseradish, a species of special concern.
19. There will be a temporary reduction in the quality of aquatic habitat immediately downstream of the floodwater retarding structures during construction.
20. Local employment will increase by 32 man-years during project installation.
21. Installation of the floodwater retarding structures will result in the loss of 81 acres of low value wildlife habitat.
22. The project will result in 5270 acres of land being adequately treated and an additional 1745 acres adequately protected.
23. Ambient air quality will decrease slightly and noise will temporarily increase during construction.
24. There will be a loss of 1.3 miles of low value stream fishery habitat.

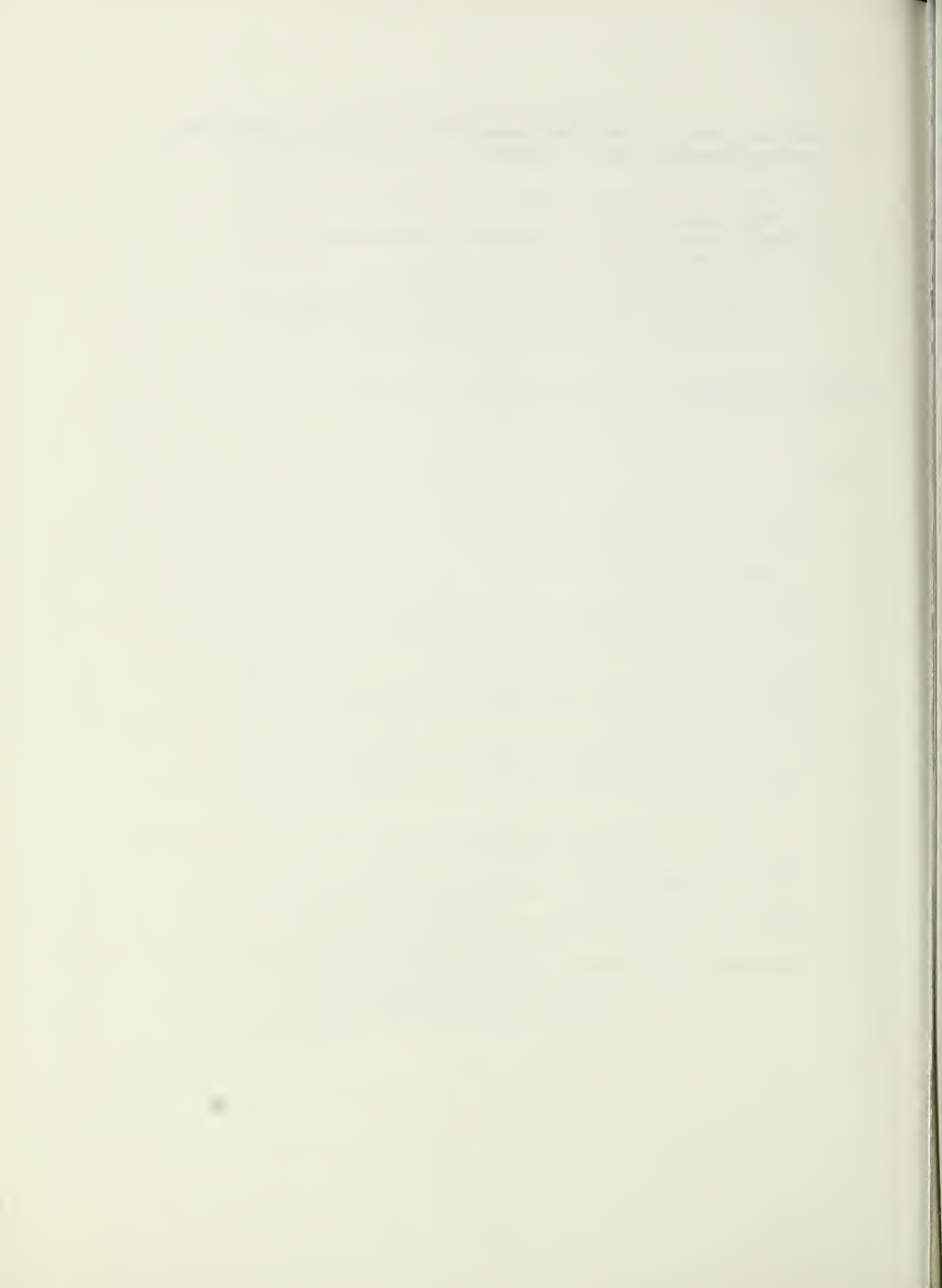
VI. Alternatives Considered in Project Development:

1. Accelerated conservation land treatment and five floodwater retarding structures.
2. Accelerated conservation land treatment and four floodwater retarding structures.
3. Accelerated conservation land treatment and two floodwater retarding structures.
4. Accelerated conservation land treatment.
5. No project.

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

1. Department of Agriculture
2. Department of The Army
3. Department of Health, Education, and Welfare
4. Department of The Interior
5. U.S. Environmental Protection Agency
6. Alabama State Soil and Water Conservation Committee
7. Alabama State Soil and Water Conservation Committee
(Governors' designated representative)

VIII. Draft Document Transmitted to CEQ on December 1, 1977.



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 non-renewable natural resources 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	<ol style="list-style-type: none">1. Increased and more efficient output of agricultural production through...<ol style="list-style-type: none">a. Reduction in the frequency, duration and depth of flooding,b. Reduction in erosion on cropland,c. Improvement of drainage on cropland and forest land, andd. Improvement in management of forest land for production of forest products.
Environmental Quality	<ol style="list-style-type: none">1. Management, preservation and enhancement of valuable resources through...<ol style="list-style-type: none">a. Creation of additional wildlife habitat,b. Improve a management of forest land to enhance value as wildlife habitat, andc. Creation of additional pond fishery habitat.2. Enhancement of quality aspects of land and water through...<ol style="list-style-type: none">a. Reduction of erosion on cropland andb. Reduction of sediment being delivered to streams

As planning progressed, it became apparent that all goals could be satisfied. Drainage problems occur on small areas throughout the

watershed, and it is expected that the landowners will install drainage systems as part of their land treatment program. Forest management practices should be installed along with other approved conservation application. The Forest Service feels that there is no need for accelerated forest land treatment.

Those goals remaining (see previous list) served as the basis for formulating alternative plans.

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 \$64,300 of accelerated technical assistance will be provided over a 5-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 B.

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 700 acres of cropland, 4,400 acres of pasture and hayland, and 170 acres of other lands will be adequately protected during the installation period.

Technical assistance will be made available to land users (both owners and operators) by the Soil Conservation Service (SCS) through Soil and Water Conservation Districts (S&WCD) and by the Alabama Forestry Commission (AFC) in cooperation with the Forest Service (FS). This technical assistance will be provided for planning, implementing plans, and maintaining conservation measures. 1/ The Sumter County S&WCD will provide technical assistance. 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. 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.

STRUCTURAL MEASURES

Floodwater Retarding Structures

The drainage area (80.6 square miles) entering into the Tombigbee River from Factory and Jones Creeks will be partially controlled by three floodwater retarding structures (F.R.S.). The structures will control about 20 percent of the total drainage area. These F.R.S. are designed to temporarily retard floodwater runoff and release it at a rate that will reduce downstream flooding. The proposed locations for the F.R.S. are shown in appendix D.

All of the dams will be constructed on a yielding foundation. The principal spillways and outlet structures will be installed below flood plain elevation on a non-yielding foundation.

The total capability for the 100-year sediment accumulation is 318 ac-ft. The principal spillway crest for the single stage riser on structure No. 7 will be located at the elevation where the 100-year sediment level occurs. Structures No. 6 and 8 will be two-stage risers with the low-stage crest located at the 100-year sediment level. Structure No. 6 will be designed with a low-stage port so that water is retained in the sediment pool only during storms.

The dams will be constructed of compacted earth and will have an upstream berm (see appendices H and I) located at the 100-year sediment pool level to prevent erosion from wave action and to increase embankment stability.

The maximum low-stage release from the two-stage inlets is 13.5 cubic feet per second per square mile (CSM) of drainage area controlled by the structure. The maximum high-stage release will range from 34 to 36 CSM. The maximum release from the single-stage inlet is 25 CSM.

A plunge basin or impact basin will be installed at the outlet of the principal spillways to reduce the velocity of water to a non-erosive level before entering the downstream channel.

All structures are designed to be functional for at least 100 years. The emergency spillways should not function on an average of more than twice during the design life of the project.

Preliminary geologic investigations indicate that all required fill materials for the embankments can be taken from the emergency spillways and from within the sediment pools. These materials are primarily alluvial deposits ranging from moderate to highly plastic clays. Some of the material from the emergency spillways will be a chalky material that will break down into moderately plastic silt. This material will be placed in the downstream section of the embankment. The chalky material has a high lime content. Top soil will be

placed over this material to allow the establishment of a vegetative cover.

Top soil material under the embankments will be stripped and stock piled for placing on the exposed surfaces of the dams and emergency spillways.

Installation of the three structures will require 167 acres of the following types of land:

	<u>Pasture- land (Ac)</u>	<u>Forest land (Ac)</u>
Dams, Emergency Spillways, and Borrow Areas	17	4
Sediment Pools	132	14

An additional 693 acres of land will be temporarily inundated by the flood pools of which 615 acres are pasture and 78 acres forest land.

The areas needed for construction of the dams, emergency spillways, and borrow areas will be cleared of all existing vegetation. In addition, woody vegetation within the sediment pools will be cleared. This should allow the floodwater retarding structures to operate in a safe and adequate manner. The precise area to be cleared will be determined during the installation phase at each site. The dams, emergency spillways, and all other disturbed areas will be vegetated with adapted plants. The vegetation will control erosion and improve the aesthetic quality of the area.

The following vegetation will be applied to the disturbed areas as the structures are completed or a construction phase is completed:

<u>Area to be Vegetated</u>	<u>Season</u>	<u>Recommended Vegetation</u>
Dam, borrow areas, outlet channel bank, spoil disposal areas, and other adjacent disturbed areas.	Spring & Summer	Common Bermuda & Bahia Grass
	Fall	Rye, Bahia Grass & unhulled Bermuda.

The installation of this project will not require any relocation or displacement of any individuals, businesses, or farm buildings.

General

Every reasonable effort will be made to protect the environment against 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. Other noise control measures will be used as appropriate for each construction site.

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 of these products after use 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 off-site locations or by controlled burning.

During installation of the three F.R.S., 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 on site 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 inspections to be made 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 G). If sites are uncovered during construction, the Department of the Interior, National Park Service, 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 measures will be maintained by landowners under cooperative agreements with the Sumter County Soil and Water Conservation District. The SCS will provide technical assistance through the S&WCD for operation and maintenance of land treatment measures. The Alabama Forestry Commission, in cooperation with the U. S. Forest Service, will furnish technical assistance necessary for operating and maintaining the forest land treatment measures under the going cooperative programs.

The Sumter County Commission will be responsible for performing, or having performed, without cost to SCS, all maintenance of the structural measures as determined to be needed by either the sponsors or SCS immediately following completion of the structures by the contractor. Funds for O&M will be provided from the county's general tax revenue. The estimated average annual cost of operation and maintenance is \$2,250.

The sponsors will maintain the vegetation associated with structural measures after SCS determines that the initial vegetation work is completed; this maintenance will begin no later than three years following completion of each structural measure. Maintenance of the structures will consist of, but not be limited to, items such as controlling undesirable vegetation, painting metal parts, repairing gates and trash racks, and repairing eroded areas. Mowing operations, for the most part, will be done with a farm tractor and mower.

Annual inspections will be performed and documented by a responsible official of the county, preferably accompanied by a landowner actively farming within the project area. The inspections are usually made in late spring or early summer so that needed maintenance can be completed before the start of the rainy season. Additional inspections will be made soon after each major storm. More frequent inspections may be required when unusually severe storms occur. These inspections may help identify problems early and prevent other storms from compounding the problem. The SCS will assist the Sumter County Commission in the inspections the first three years and thereafter as deemed necessary.

An operation and maintenance agreement will be entered into by the sponsors and the Service prior to signing land rights, relocation, and project agreements. The O&M agreement will contain, in addition to specific sponsor responsibilities for structural measures, specific provisions for retention and disposal of real and personal property acquired in whole or in part with PL-566 funds. The O&M agreement will also contain a reference to the State Watersheds Operation and Maintenance Handbook.

PROJECT COSTS

The total project installation cost is estimated to be \$1,483,175. This cost is shared by Public Law 566 funds and other funds as follows:

	-----Dollars-----		
	<u>PL-566</u>	<u>Other</u>	<u>Total</u>
Conservation Land Treatment*	64,300	696,125	760,425
Floodwater Retarding Structures	661,000	61,750	722,750
	<u>** (535,300)</u>	<u>--</u>	<u>(535,300)</u>
TOTAL	725,300	757,875	1,483,175

* Includes the going conservation land treatment program.

** Number in parentheses is estimated construction cost.

ENVIRONMENTAL SETTING

PHYSICAL RESOURCES

General

Factory Creek Watershed is located in rural Sumter County in West Central Alabama. The total drainage area is 51,600 acres. It is about 50 miles southwest of Tuscaloosa, Alabama, 40 miles northeast of Meridian, Mississippi, and 10 miles north of Livingston, Alabama.

The watershed is located in the South Atlantic Gulf Water Resource Region and the Tombigbee subregion. There are three major streams patterns in the watershed: Jones, Toms, and Factory Creeks. These streams have a common outlet into the Tombigbee River which is the eastern boundary of the watershed. The Tombigbee flows southward emptying into the Mobile River.

Sumter County had a 1970 population of 16,974 of which 11,572 were rural residents and 5,402 were urban residents. Per capita income in Sumter County in 1970 was \$1,488. Per capita income in 1970 for the water resource subregion was estimated at \$2,600. The economy of the county is based on nonmanufacturing activities with government providing 18 percent of the employment, nonmanufacturing other than government 27 percent, agriculture 31 percent, and manufacturing 24 percent. Most of the watershed occupants operate family-type farm units. There is one cooperative farm in the watershed operated by the Federation of Southern Cooperatives.

Soil and water resource problems exist throughout the watershed. The area ranges from nearly level to sloping. Floodwater problems occur frequently because of high runoff and low stream capacities. About 4,800 acres of flood plain are subject to flooding each year; however, the 2,505 acres of flood plain along Factory Creek receive the majority of the damages.

Soil and Land Capabilities

The soils in the watershed are described by soil associations, see appendix E. Land capability classes and subclasses are defined in appendix E-1.

The Catalpa association consists of nearly level, moderately well-drained, clayey soils on flood plains. These soils have good potential for pasture, hay and cultivated crops. The potential for developing campsites and hiking trails is poor because of flooding and clayey surface textures. Flooding and high shrink-swell properties of the soils are major deterrents to urban development.

The Ochlockonee association consists of nearly level, well-drained loamy soils on flood plains. These soils have good potential for

pasture, hay, and cultivated crops. The potential for recreational and urban development is poor because of flooding.

The Sumter-Oktibbeha association consists of gently sloping to sloping well-drained, clayey soils on uplands. These soils have good potential for pasture and hay but have fair potential for cultivated crops and poor potential for woodland. These soils have poor potential for recreational and urban development because of high shrink-swell potential and clayey textures. These soils are mostly in capability subclasses IIIe and IVe.

The Sumter-Vaiden-Eutaw association consists of gently sloping and sloping, well-drained to somewhat poorly drained, clayey soils on uplands. These soils have good potential for pasture and hay but have fair potential for cultivated crops and poor potential for woodland. The potential for recreational and urban development is poor because of high shrink-swell potential and clayey textures. These soils are mostly in capability subclasses IIIe and IVw.

Prime farmland is land best suited for producing food, feed, forage, fiber, and oilseed crops. Prime farmland can 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, according to modern farming methods. The soil association, major capability subclass and percentage of prime farmland is shown in the following table:

<u>Soil Association</u>	<u>Major Capability Subclass</u>	<u>Percent of Prime Farmland</u>
1. Catalpa	IIw	28
2. Ochlockonce	IIw	84
3. Sumter-Oktibbeha	IIIe & IVe	68
4. Sumter-Vaiden-Eutaw	IIIe & IVw	53

Geology and Topography 1/

The rocks that outcrop in the watershed are sedimentary and are of Upper Cretaceous age and of marine origin. They consist of chalk, limestone, and calcareous clay or marl and are assigned to the Demopolis Formation of the Selma Group. The Demopolis consists predominantly of compact, pure chalk with about 520 feet maximum thickness. The upper member of the Demopolis, the Bluffport Marl member, consists of chalk or marl that contains more clay and sand than the lower part of the formation.

The strike of the formation is about N. 70° W. and the dip ranges from 40 to 50 feet per mile to the S. 20° W. The regional strike and dip is modified locally by minor faults and folds.

A thin veneer of sandy alluvium is found adjacent to most streams of the watershed, while terrace deposits of Quaternary age border the Tombigbee River and the lower reaches of the larger streams.

The watershed is physiographically located in the Black Prairie belt and the inner part of the Gulf Coastal Plain province at the extreme southeastern corner of the Mississippi Embayment. The topography is characterized by broad, flat flood plains and gently rolling hills of the prairies. Elevations range from about 60 to 210 feet mean sea level, giving a total relief of 150 feet.

Climate 2/

The average annual rainfall in the watershed is approximately 51 inches. October is normally the driest month and March the wettest, with a mean monthly precipitation of 2.19 and 5.86 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. The average annual temperature is 63 degrees, with temperatures ranging from an average low of 45 degrees in December to an average of 80 degrees in July. The length of the growing season is approximately 233 days, with the first killing frost generally occurring in November and the last in March.

Mineral and Ground Water Resources 1/

Sand and gravel have been mined from the Quaternary deposits adjacent to the Tombigbee River for use in the construction of Interstate Highway 59.

Within the immediately surrounding area of the watershed, chalk has been mined for use as an agricultural soil conditioner and is potentially suitable for the manufacture of cement. Also, chalk has been quarried for production of light-weight aggregate.

The watershed is located within a zone of potential oil and gas production. It lies between large oil and gas reserves in southwest Alabama and smaller gas reserves in the counties immediately north. However, there are not any existing oil or gas wells within the watershed.

Ground water in the watershed occurs under water-table and artesian conditions. Water-table conditions occur in the river valley and in the lower portions of the watershed where the water-bearing formations are not confined by impermeable strata. These alluvial aquifers may be as much as 70 feet thick but are generally about 25 to 50 feet.

Here, wells usually extend from 15 to 40 feet deep and yield about 10 gallons per minute (gpm) for domestic and stock needs.

Deeper wells must extend to depths of from 400 to 750 feet to tap the artesian sand and gravel aquifer in the Lutaw Formation. Yields range from 100 gpm at the 400-foot depth to more than 500 gpm at 750 feet.

Land Use

Land uses within the watershed are as follows:

LAND USE	ACRES	PERCENT
Cropland	3,950	7.6
Pastureland	32,850	63.7
Forest Land	12,300	23.8
Other Land	2,500	4.9
TOTAL	51,600	100.0

Land uses within the flood plain of Factory, Toms, Turkey and Jones Creeks are as follows:

LAND USE	ACRES	PERCENT
Cropland	245	6
Forest Land	1,181	29
Pastureland	2,709	65
TOTAL	4,135	100

Land use in the flood plain has shifted from cropland to pastureland. Flood plain soils are some of the most productive soils in the watershed. Flooding prevents landowners from utilizing this resource for crops; consequently, the predominant land use in the flood plain is pastureland.

Surface Water Resources

Factory Creek originates approximately 12 miles west of Epes, Alabama, (population 293), and meanders generally to the east to its confluence with the Tombigbee River, 1 mile upstream of Epes. There are approximately 70 ponds in the watershed ranging in size from approximately 0.25 acre to 30 acres. About 90 percent of these impoundments are 5 acres or smaller with 8 being 10 acres or larger.

Streamflow in the headwaters of Factory Creek changes from ephemeral to intermittent where County Road No. 24 crosses the creek. Factory Creek is intermittent from this point for about 5.5 miles downstream to Alabama Highway 39. From this point downstream to the confluence of Factory Creek with the Tombigbee River the stream is perennial.

Streamflow on the tributaries on which floodwater retarding structures are planned is ephemeral from the headwaters downstream to the vicinity of the structure sites. From this point to their confluence with Factory Creek the streams are intermittent. The two other major streams making up Factory Creek Watershed, Toms Creek and Jones Creek, are intermittent to a point about 1 mile above their outlets, where the flow becomes perennial.

The flood plain of Factory Creek is relatively wide averaging about 2,500 feet. The flood plain is straight, having practically no meander; however, Factory Creek meanders considerably within its wide-straight flood plain. This meander occurs over the entire length of the stream.

Streamflow records from U. S. Geological Survey Gage No. 4494 were analyzed to determine past flow rates for this stream. This gage is located at the bridge on Alabama Highway 39 over Jones Creek and monitors flow from a 11.7 square mile drainage area. Being located on Jones Creek, this gage does not reflect flows on Factory Creek; however, it does give an indication of stream characteristics for the watershed.

The mean monthly discharges have been compiled for this gage based on data from water years*, 1959-1965 inclusive. These mean discharges in cubic feet per second (cfs) are as follows:

J	F	M	A	M	J	J	A	S	O	N	D
$\frac{J}{37}$	$\frac{F}{49}$	$\frac{M}{44}$	$\frac{A}{29}$	$\frac{M}{3}$	$\frac{J}{6}$	$\frac{J}{7}$	$\frac{A}{1}$	$\frac{S}{1}$	$\frac{O}{5}$	$\frac{N}{6}$	$\frac{D}{31}$

The largest storm during the 6-year period of record provided 7.51 inches of rainfall on February 21 and 22, 1961. This resulted in a streamflow of 5,160 cfs at the gage. This flow rate approximates the discharge from a 25-year, 24-hour storm according to the publication, Floods in Alabama.

Gage 4494 indicates there are periods every year in which no streamflow occurs. The longest no-flow period of record began July 31, 1963 and ended December 11, 1963.

Very few water quality determinations have been made in Factory Creek Watershed. The Geological Survey of Alabama provided data from four sampling trips between 1956 and 1966, all of which were recorded at U. S. Geological Survey Gage No. 4494. The dates and measured values are as follows:

* A water year begins October 1 and ends September 30.

Date	(cfs) Discharge	(mg/l) Hardness	(micromhos) Conductance	pH
April 8, 1956	2.7	-	-	7.9
Nov. 5, 1959	0.17	148	434	7.1
Nov. 3, 1960	1.8	228	438	7.4
Feb. 17, 1966	23.6	-	-	8.3

The SCS made water quality determinations at six stations on streams in Factory Creek Watershed during the period February 10-12, 1976. A Hach Chemical Company Kit, Model AL-36B, was used in these determinations. The water quality determinations are as follows:

Physical and Chemical Parameters
Evaluated in Factory Creek Watershed
February 10-12, 1976

Parameters							
Station	Air Temp. °F	Water Temp. °F	DO* mg/l	CO ₂ ** mg/l	pH	Total Hard. mg/l	Total Alkalinity mg/l
1	66	45	11	25	9.5	374	306
2	56	48	10	10	9.0	221	170
3	58	45	11	10	9.5	323	289
4	52	46	9	10	9.5	289	238
5	58	50	8	10	9.0	187	153
6	55	48	10	5	9.0	153	135

*Dissolved Oxygen

**Dissolved Carbon Dioxide

Stations 1, 6 - Factory Creek
 Station 2 - Toms Creek
 Stations 3, 5 - Jones Creek
 Station 4 - Tributary Jones Creek

The water quality determinations made in Factory Creek Watershed indicate that the parameters tested are within desirable fishery ranges with the exception of pH.

Wetlands

The only types of wetlands observed within the watershed during the environmental assessment were Type 1 and Type 5 as defined in Wetlands of the United States, Circular 39, Fish and Wildlife Service, U. S. Department of the Interior. There are 576 acres of Type 1 on Jones Creek, 102 acres on Turkey Creek, 629 acres from the junction of Factory and Toms Creeks to the Tombigbee River, 1,876 acres on Factory Creek, and 952 acres on Toms Creek (see appendix D). There are 243 acres of Type 5 wetlands as farm ponds. The principal species of plants found on Type 1 wetland were: Oak (Water, Willow, Red), Sweetgum, Sycamore, Hackberry, Shagbark Hickory, pasture grasses and forbs.

PRESENT AND PROJECTED POPULATION

Sumter County's population in 1970 was 16,974. This represents a net loss of some 10,500 persons since 1940. The loss over the 30-year period has occurred entirely from the black sector. The 1970 population data showed a net increase of 100 white persons from the 1940 figure. The loss in black population has occurred in the black rural farm division. This reduction can be expected to continue if the county follows the trends set in other counties in the region. The heaviest losses should occur in the rural farm population with a smaller percentage reduction in the rural non-farm population.

There are six towns or municipalities in Sumter County. In 1970 four towns, Geiger, Epes, Cuba, and Gainesville, had populations less than 400. The municipalities of Livingston and York had populations of 2,358 and 3,044 respectively. Population projections through the year 2000 for Sumter County are as follows:

	1970	1980	1990	2000	Percent Change
Sumter*	16,974	15,600	14,500	13,800	-17
BEA Economic Area 136**	393,042	412,400	427,800	429,000	+ 8

*OBERS Series "E" Population Projections for Alabama Counties.

**OBERS Series "E" Population Projections for Economic Area 136.

BEA Economic Area 136 includes the following counties, categorized by state: Alabama - Choctaw, Marengo, and Sumter; Mississippi - Clarke, Covington, Forrest, Jasper, Jones, Kemper, Lamar, Lauderdale, Neshoba, Newton, Perry, Wayne, and Winston.

The black population of Sumter County accounts for 66 percent of the total population with the white population comprising the remaining 34 percent.

Forty-five percent of all families in Sumter County had incomes less than the poverty level in 1970. The mean family income for these families was \$1,827. Of this group, 40 percent were minority families with a mean family income of \$1,923.

ECONOMIC RESOURCES

All land in the watershed is privately owned except for one cooperative farm. There are about 149 farms within the watershed, most of which are family operations. Farm units average about 346 acres. There are about 32 farms in the flood plain.

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

	<u>Unit</u>	<u>Watershed Present Yield Per Acre</u>
Pasture	AUM*	6
Soybeans	Bu.	25
Corn	Bu.	70

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

U. S. Highway 11 and State Highway 39 serve the watershed and are supplemented by farm-to-market roads. Railway service is provided by the Southern Railroad which crosses the southeastern part of the watershed. Interstate Highway 59 is under construction in the southeastern portion of the watershed and will be open to traffic in the near future. Water transportation is available on the Tombigbee River. Tow service for river traffic is available out of the Port of Mobile. The nearest commercial air field is Key Field in Meridian, Mississippi, about 40 miles southwest of the watershed.

Sumter County had a work force of 7,335 in October 1976 with 3½ percent unemployed. Most of the employment was created by the nonmanufacturing sector of which government employment comprised 40 percent of the labor force.

The economy of the watershed is dependent upon agriculture. Beef cattle and soybean production are the major sources of agricultural income. In 1974 about 42 percent of all farms in Sumter County were

operated on a part-time basis. Forty-five percent of all farms had incomes greater than \$2,500. The remaining 55 percent have a value of farm products sold less than \$2,500.

The watershed is located within both the Tombigbee Resource Conservation and Development project area and the Tombigbee River Basin.

PLANT RESOURCES

The information on plant resources was obtained by the SCS staff during watershed planning. It is not intended to represent a detailed scientific study of all the watershed flora. The descriptions of various plant communities include species of the most common plants.

The State of Alabama has prepared a proposed list of threatened or endangered organisms, and several plants found in Sumter County are included on this list. These plants and their classifications are listed below:

Threatened:

Meadow Rue

Endangered:

Schisandra
Turk's Cap
Evening Primrose

Species of Special Concern:

Gerardia
Evening-Primrose
Pennyroyal
Strawberry Bush
Horseradish
Narrow-leaved Trillium
Sunnybell

Forest Land

The forested area between Factory Creek and Tombigbee River covers two separate forest types. The area underlain by Ochlockonee silt loam (80%), is primarily a hardwood area supporting a mixed stand of sugarberry-American elm-green ash and Bald cypress-water tupelo, plus related species. The area underlain by Cahaba fine sandy loam and Ochlockonee stand with some eastern red cedar, and several acres of loblolly pine plantations about 15 years old.

This area along the Tombigbee River contains the majority of the forest land on the watershed. The stream bottoms away from this area are primarily agricultural area, with some wood lots used for shade for livestock and as fringes of trees (usually one tree wide) along stream banks.

The upland is primarily Selma Chalk outcrop with scrub cedar of little value, except soil protection. The cedar is having trouble surviving in these areas.

Twenty-four percent or 12,300 acres of the watershed is low grade forest.

Cropland

The kind and amount of weeds that invade crops are influenced by site selection, weather conditions, previous land use, timeliness of weed control operations, and effectiveness and selectivity of chemical herbicide.

Weeds that invade cultivated crops include crabgrass, johnson grass, ragweed, cocklebur, morning glories, and camphor weed.

Pastureland

The plant composition of improved pastures is mostly dallisgrass, white-clover, bahia grass, and native grass and forb invaders. The most common invaders include dog fennel, vaseygrass, smutgrass, camphor weed, red sorrell, and curly dock. Naturalized plants, including bermudagrass and johnson grass, are common invaders on the better soils; however, they are readily consumed by livestock. Many annual plants occur in the plant composition, mainly in the spring of the year.

Idle Lands

The small areas of idle land in the watershed are usually abandoned cropland fields that remain idle for a few years before they are converted to pasture or reverted to forest by secondary plant succession.

First invaders are dominated by crabgrass, carpetgrass, woody mint, and canary grass. Common ragweed, goldenrod, and broomsedge become dominant during the second, third, and fourth growing seasons. The grass-shrub state includes ragweed, bluestem, goldenrod, greenbrier, sumac, persimmon, and osage orange.

See appendix J for scientific names for plants.

ANIMAL RESOURCES

Fishing activity is highest in the lower reaches of the watershed at the confluence of Factory and Jones Creeks with the Tombigbee River, where the river creates a backwater effect for approximately 2 miles. The principal species of sport fish are largemouth bass, bluegill, and crappie. Other species utilized are catfish, carp, buffalo, drum and suckers. Observations of the streams in the upper reaches of the watershed with regard to size and habitat indicate that very little fishery is available. Local residents report that most of the streams in the watershed dry out in the summer. Chemical determinations of pH values of the stream in the upper reaches of the watershed confirm to some degree the low fishery value placed on this portion of the watershed. The pH values ranged from 9.0 to 9.5. Natural waters with a pH of 9.5 will support fish, but such waters are not highly productive. Swingle 5/ states that waters with a pH of 9.5 to 10.5 before daybreak have a very low fish production capability. For most productive, fresh, natural waters, the pH values are between 6.5 and 8.5 (except when increased by photosynthetic activity). 4/ The absence of dense plant growths in these small, shallow streams precludes photosynthetic activity as a cause of the high pH values. The alkaline death point for fishes is a pH value of 11.0. 5/

The watershed does not contain an abundance of good habitat for upland game. The low grade forests in the watershed do provide habitat for many species of non-game animals.

Farm game such as rabbits, doves, and quail derive some benefit from the 3,950 acres of cropland. Idle land, field borders, and the edge between open lands and woods provide additional habitat for farm game.

Rabbit, squirrel, and quail populations are low to moderate. Hunting is moderate for these game animals.

Dove populations are considered high throughout the watershed. Hunting for doves is also considered heavy.

The deer population is considered moderate and the wild turkey population low. Deer hunting is considered heavy while turkey hunting is moderate. Beaver, mink, muskrat, fox, and raccoon populations are considered moderate. Trapping activities for these fur bearers is considered moderate but could increase if pelt prices increase.

Waterfowl populations are considered moderate with hunting activity low.

There are no known threatened or endangered organisms, as currently listed in the Federal Register, 3/ occurring in the watershed.

Fishes occurring in Sumter County on the proposed Alabama list and their classifications are:

Threatened: Blue Sucker

Endangered: Ala. shovelnose sturgeon and Frecklebelly madtom

The last reported collection of the Blue Sucker from Sumter County was July 31, 1953, from the main channel of the Tombigbee River near Epes.

The last reported collection of the Frecklebelly madtom from Sumter County was June 7-8, 1972, from the Tombigbee River at T23N, R2W, Sec. 28, which is approximately 15 miles north of the watershed. No dates are listed for the last collection of the Alabama shovelnose sturgeon from Sumter County. 6/ Dates listed for other collections of the shovelnose are 1961, 1968, and 1969 from the Alabama River system.

Of the endangered mammals appearing on the proposed Alabama list, the watershed could lie within the range of the Florida Black Bear and the Florida Panther. The panther was reported in Baldwin County in 1974 and 1975. There is one undated report for Greene County north of Sumter County. The panther is also listed by the U. S. Fish and Wildlife Service as endangered.

The only mammal species of special concern as appearing on the proposed Alabama list possibly occurring in the watershed is the Southeastern Shrew.

There are no threatened birds on the current federal list for Alabama. Appearing on the proposed state list for Alabama as endangered or as species of special concern are the following:

Endangered:

Golden Eagle
Bald Eagle*
Osprey
Red-cockaded Woodpecker*
Bachman's Warbler*
Wood Stork
Swallow-tailed Kite
Sharp-shinned Hawk
Coopers's Hawk
Red-shouldered Hawk
Swainson's Warbler
Bewick's Wren
Bachman's Sparrow
Peregrine Falcon*

*Listed on federal list as endangered.

While none of the above birds have been reported within the watershed, by virtue of their ranging habits, any one species or more could have appeared or may appear in the watershed.

See appendix J for scientific names for animals.

No known threatened or endangered species or species of special concern of amphibians or reptiles are known to occur in the watershed. There are 16 species of bivalve mollusks on the proposed Alabama list of threatened or endangered organisms which are listed as endangered of which one or more could possibly occur in the lower reaches of the watershed. The species are:

<u>Epioblasma penita</u>	<u>Elliptio arcus</u>
<u>Lampsilis perovalis</u>	<u>Pleurobema marshalli</u>
<u>Medionidus meglameriae</u>	<u>Pleurobema taitianum</u>
<u>Medionidus conradicus</u>	<u>Pleurobema curtum</u>
<u>Toxolasma cylindrellua</u>	<u>Pleurobema perovatum</u>
<u>Toxolasma lividus lividus</u>	<u>Pleurobema decisum</u>
<u>Obovaria unicolor</u>	<u>Quadrula stapes</u>
<u>Obovaria jacksoniana</u>	<u>Lasmigona holstonia</u>

The current status of the freshwater bivalve mollusk populations and their distribution is not well known in Alabama. ^{6/} Much of the data on occurrence are either too meager or too old.

There are no threatened species of mollusks or species of special concern listed which could occur in the watershed. There are no crayfishes or shrimps as listed on the proposed Alabama list suspected to occur in the watershed.

RECREATIONAL RESOURCES

Recreational facilities are noticeably absent in Factory Creek Watershed. Basically there are opportunities for hunting and fishing on privately owned land if one is able to obtain permission. Public fishing is available on the Tombigbee River and nearby Black Warrior River.

Lake Demopolis on the Black Warrior River is about 40 miles from the watershed. Lake L. U. is on the campus of Livingston University and provides public water-based recreational facilities. Lake L. U., which is 54 acres in size, is located about 10 miles from the watershed. Completion of the Gainesville Lock and Dam project will provide additional recreational facilities less than 10 miles from the project area.

ARCHAEOLOGICAL, HISTORICAL, AND UNIQUE SCENIC RESOURCES

The Alabama Historical Commission has listed three homes in the watershed as being eligible for inclusion in the National Register of Historic Places. The Hodges Dial Home, 2 miles northeast of Sumterville, was built in 1849 with a front verandah with lattice-work columns. The Cedars, slightly southeast of Sumterville, was built in 1848. The house was built by John Evander Brown and is two and a half stories with a pedimented double verandah. Loudon, 1835, is located east of Sumterville. It was built by Jeremiah H. Brown, who was reputed to have been the largest slave owner in Alabama.

On the west bluff of the Tombigbee River near Epes, Alabama, Fort Tombigbee was established by the Frenchman Bienville in 1735. It was used as an outpost in the war against the Chickasaws. This fort was taken over by the English and renamed Fort York in 1763. After its abandonment the Spanish repaired it and it became Fort Confederation.

There are no known sites of archaeological or unique scenic value within the watershed.

SOIL, WATER, AND PLANT MANAGEMENT STATUS

Land use trends in the watershed are toward a slight increase in cropland. Some pastureland and forest land has been converted to cropland with most from pastureland.

The Soil and Water Conservation District (S&WCD) has been providing technical assistance for land treatment throughout the county since 1958.

The Sumter County S&WCD is active in promoting conservation measures. The district supervisors publish weekly newspaper articles on conservation activities, conduct a weekly radio program, and publish an annual report. They also conduct conservation programs for schools and civic groups, sponsor an annual land judging contest for vocational agricultural students in the county, and either sponsor or co-sponsor field demonstrations and tours to promote the installation of conservation measures. These activities serve to inform land users and the general public about conservation services that are available and conservation measures that have been accomplished. Conservation plans have been prepared on 85 of the 149 farms in the watershed. These plans make up a total of 35,434 acres.

Conservation practices have been applied on 22,198 acres of the land covered by conservation plans; this land is now considered adequately treated. 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 the soil, water, and plant resources are adequately protected.

PROJECTS OF OTHER AGENCIES

The U. S. Army Corps of Engineers are in the process of developing the Tombigbee River for navigation, by dredging, and installing locks and dams. This is a part of the Tennessee-Tombigbee Waterway.

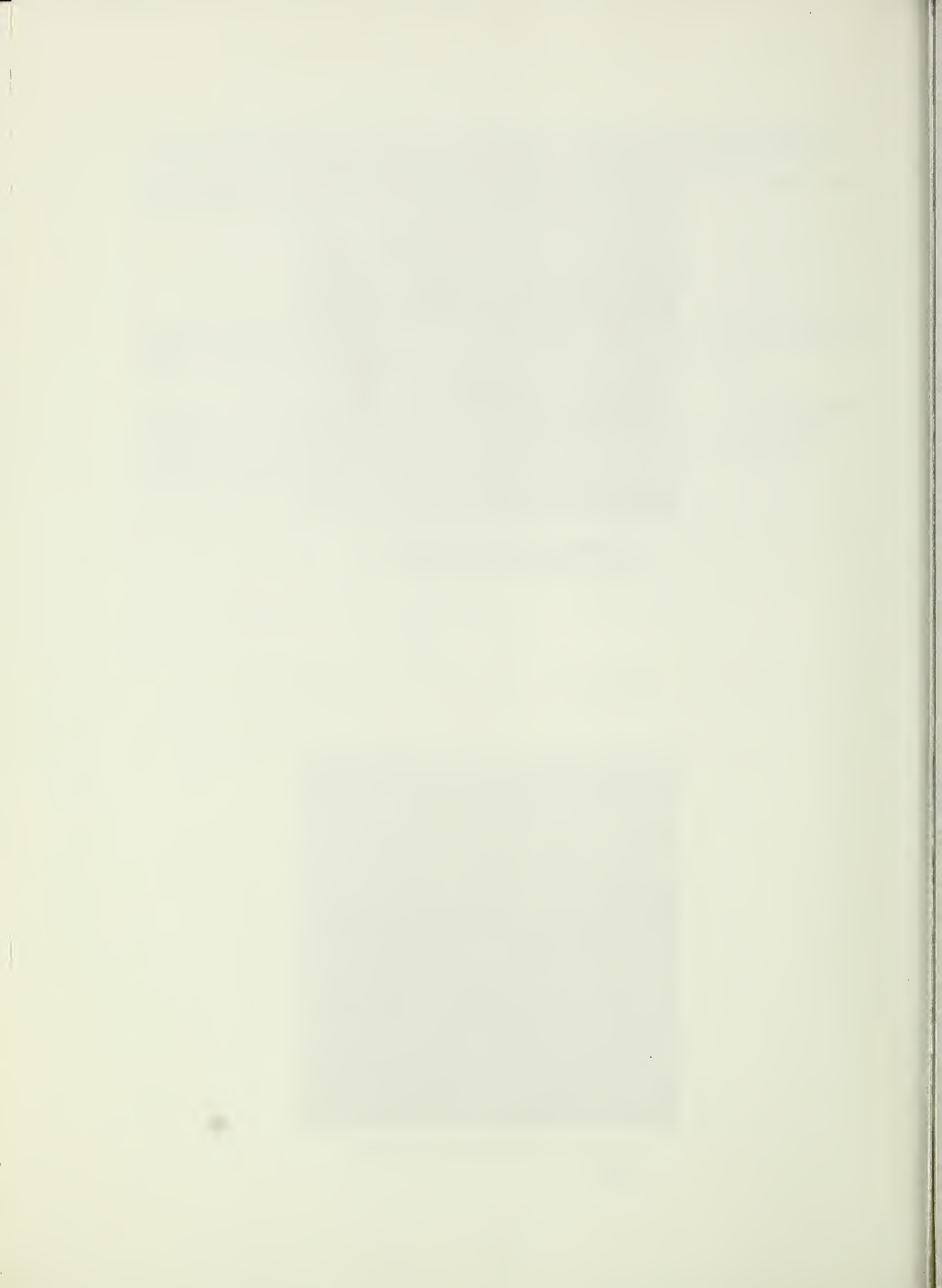
A public water-based recreational facility, Lake L. U. in Livingston, Alabama, is nearing completion and is cost-shared in by Livingston University, City of Livingston, Sumter County Commissioners, and Resource Conservation and Development funds.



Flooding of pastureland within the flood plain of Factory Creek



Flooding of cropland along Factory Creek

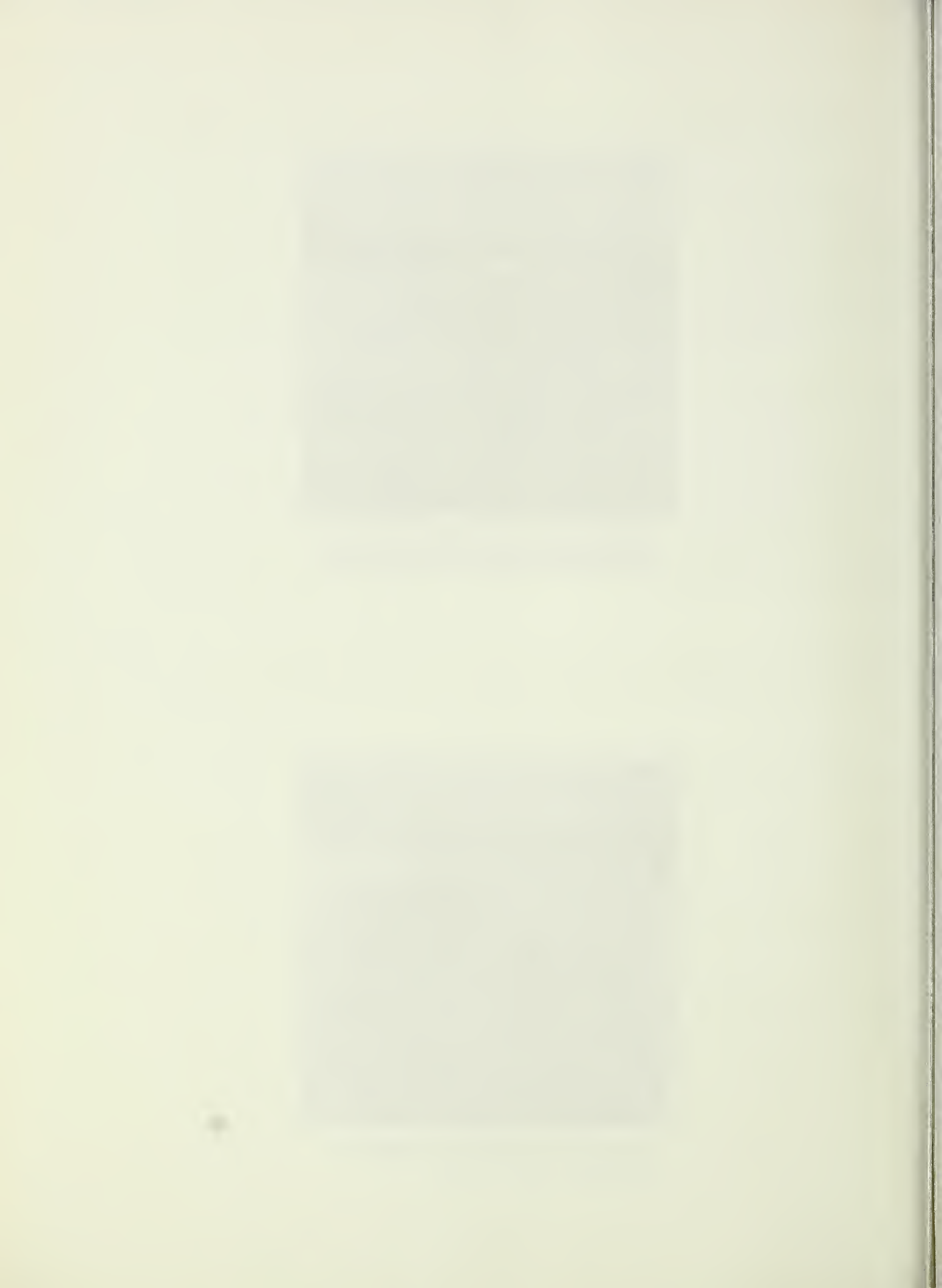




Flooding of Sumter County Highway 21
within the flood plain of Factory Creek



Flooding of Sumter County Highway 21
bridge over Factory Creek



WATER AND RELATED LAND RESOURCE PROBLEMS

LAND AND WATER MANAGEMENT

Land treatment problems consist of poor physical conditions of the soils, low financial resources of land users, and low management ability of the land users. The texture of the soils is heavy causing tillage problems, droughty conditions, and erosion problems. Early agricultural uses of the land have caused severe deterioration of the soil resource base. There are many old erosion scars and there has been a significant loss of topsoil which adversely effects tillage operation and yields.

Additional conservation practices are needed throughout the watershed for cultivated row crops. Problems with cultivated crops include soil erosion, low yields, insects, weeds, and diseases. Another problem related to cultivation is a shortage of qualified farm workers.

Monoculture is common with corn and soybeans. This type of agriculture intensifies insect, disease, weed, and erosion problems. Many kinds of soil conservation practices are needed including conservation cropping systems. Better land selection, proper use of fertilizers and/or lime according to soil tests, and improved management are needed.

Accelerated technical assistance should be provided to hasten the planning and application of conservation measures.

FLOODWATER DAMAGE

The major problem in the watershed is extensive flooding along Factory Creek (see appendix D). A storm event expected to occur an average of one time in 100 years would flood 2,505 acres on Factory Creek, 952 acres on Toms Creek, 102 acres on Turkey Creek, and 576 acres on Jones Creek. These acreages only include that portion of the watershed which were considered for flood protection in the alternatives. Flooding occurs from the confluence of Factory and Jones Creeks to the proposed floodwater retarding structures. Floods occur from one to four times each year on Factory Creek with one or more floods normally occurring during the growing season.

The flood plain on Factory Creek is 6 percent cropland, 36 percent forest land, and 58 percent pastureland. The flood plain on Toms Creek is 1 percent cropland, 75 percent pastureland and 24 percent forest land. The flood plain on Turkey Creek is 68 percent pastureland, and 32 percent forest land. The flood plain on Jones Creek is 82 percent pastureland and 18 percent forest land.

EROSION DAMAGE

The estimated gross erosion rates for the watershed under present conditions are as follows:

Cropland	6.10	tons/acre
Pastureland	0.69	tons/acre
Forest Land	0.85	tons/acre
Other Land	5.00	tons/acre

Gully and roadside erosion is evident in many places; however, the affected areas are small and sediment produced by these areas is usually deposited immediately below the sites. Flood plain erosion and scour damages are only minor.

Sheet erosion causes most of the erosion damage in the uplands. Sheet erosion results in a reduction in soil fertility and exposes the less fertile, more easily eroded subsoil to the forces of wind and water. Average gross erosion on the upland cropland is greater than the maximum soil-loss tolerance. On this cropland, productivity cannot be sustained economically for an indefinite period if the present rate of erosion continues.

There is a need for land use adjustments in the uplands. Areas which are now being used beyond their capabilities should be changed to a use which is more productive. Soils and slopes generally determine the capabilities of a given area.

SEDIMENT DAMAGE

Sediment production from the watershed is slight to moderate. During periods of overbank flow, fine sediment is deposited on crops and pasture.

Storm runoff has a high concentration of suspended sediment, especially during periods of land preparation. Sediment is deposited in fields and road ditches where slopes or vegetation reduce the velocity of runoff water. These deposits can be prevented by proper maintenance.

Sediment yield at the mouth of the watershed is about 21,000 tons per year.

DRAINAGE PROBLEMS

Drainage problems occur on small areas scattered throughout the watershed. These areas are predominantly on the Catalpa soil association,

(see appendix E), and are being used for pasture. These areas are producing at about 70-80 percent of their capability. Poor drainage limits the species of pasture plants that can be grown and intensifies weed problems.

The existing capacity of Factory Creek and its tributaries is adequate to allow individual landowners to install on-farm drainage systems. Drainage mains and laterals and drainage field ditches are needed to solve the drainage problems. These practices can be applied as part of the landowners' conservation land treatment program.

PLANT AND ANIMAL PROBLEMS

The water and related land resource problems in the watershed have only a slight effect on changes in plant communities. Flooding, drainage, and sediment problems result in very slow changes to more water tolerant plant species in the flood plain.

Land use changes in the watershed have only a small effect on the present loss of wildlife habitat. Land use trends are toward a slight increase in cropland with the major portion of the converted land being pasture.

The resident aquatic and terrestrial organisms appear to have adapted to the annually occurring floods and related problems. However, continued indiscriminate use of the water and related land resources will result in declining quantity and quality of habitat for most organisms.

WATER QUALITY PROBLEMS

During the course of the environmental assessment no point sources of water pollution were observed or detected. It was observed at several bridge crossings that garbage, trash, or dead animals had been thrown into the streams creating a pollution problem at these locations. There are undetermined amounts of pollution resulting from the non-point sources of 3,950 acres of cropland and the 32,850 acres of pasture and hayland.

ECONOMIC AND SOCIAL PROBLEMS

The family farm is predominant in the watershed. In Sumter County, 55 percent of all farms have gross annual sales of less than \$2,500 and off-farm employment provided the greater part of income for farms with less than \$2,500 annually. Sumter County has been experiencing an

out-migration of persons for the last twenty years. This out-migration was due primarily to technology changes in agricultural production which required less hired labor on farms.

In recent years, there has been a growing shortage of the productive age group from 18 to 64 years. The county has a low unemployment rate, but this figure could be misleading, especially with the high out-migration rate. Rather than remain in the area and look for employment, the productive age group migrates to other areas seeking employment opportunities. Low family income is a major problem of the county. All groups have median earnings considerably less than the state and the nation.

In 1960, the average size farm was 198 acres. This average increased to 233 acres in 1964 and 427 acres in 1974. The increase size of farms is a result of a decrease in farm numbers and population that has been occurring for the past 20 years. This trend is expected to continue as the cost of labor and equipment continue to increase, forcing marginal farmers out of production.

Cropland in the county has experienced a slight increase in total area. At present there is 90,000 acres. The traditional crops, corn and cotton, have decreased substantially. Cotton has been replaced by soybeans as the leading crop in the county. Livestock and livestock products produce the largest economic returns.

Income from soybeans could bring about some basic changes in land use such as converting pastureland to cropland. There is also a need to promote rural community development to increase income and employment opportunities for area residents. Increased agricultural production should renew emphasis on commercial activities associated with agriculture.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

There are no federal, state, or local land use policies or controls in effect for Sumter County, Alabama, at the present time. A land use plan is under development for the county by the Alabama-Tombigbee Rivers Regional Planning and Development Commission. The U. S. Army Corps of Engineers is studying the existing land use patterns, recreational facilities, and transportation systems of west Alabama. The project as proposed does not conflict with this land use plan.



ENVIRONMENTAL IMPACT

CONSERVATION LAND TREATMENT

The planned accelerated land treatment program includes 5,270 acres expected to be adequately treated during the installation period. This includes 700 acres of cropland, 4,400 acres of pasture and hayland, and 170 acres of other land. An additional 2,875 acres will be adequately treated, and 1,745 acres are expected to be adequately protected under the going program.

Crop production can be sustained on lands where conservation practices are applied. These practices will result in the land retaining more water for plant use. It is expected to be a reduction in soil losses from erosion resulting in soils with better physical properties, increased nutrient supply, and improved biological activities. Implementation of conservation plans will result in the use of agricultural plants that are better suited to soil conditions resulting in increased crop yields. Cultivated row crop yields should increase on the flood plain because of reduced flooding and sediment deposition.

Under the going land treatment program, 41 additional farm ponds will be constructed, creating additional fishery habitat.

Research has provided some understanding of the processes involved in fertilizer and chemical movement from soils to ground and surface waters, but technology has not advanced to the point that valid quantitative estimates can be made.

Nitrogen and phosphorous are the fertilizing elements most frequently related to water quality. These elements are transferred from soil to water by soil erosion and resulting sediment, surface runoff, and leaching. However, the pollution potential should be negligible when applications of fertilizers are made at recommended rates through the conservation land treatment program.

Chemical pesticides are removed from agricultural areas by runoff water and eroded soil particles. Conservation measures will reduce runoff and erosion rates, and will result in reducing the movement of pesticides as well as plant nutrients.

The expected changes in land use for the watershed after project installation are as follows:

<u>Land Use</u>	<u>Present</u>	<u>Future Without Project (Ac.)</u>	<u>Future With Project (Ac.)</u>
Cropland	3,950	4,200	4,575
Pasture & Hayland	32,850	32,850	32,347
Forest Land	12,300	12,300	12,282
Other Land	<u>2,500</u>	<u>2,250</u>	<u>2,396</u>
TOTAL	51,600	51,600	51,600

Following the installation of planned land treatment measures, the estimated average gross erosion rates are expected to be reduced as follows:

LAND USE	SOIL-LOSS (TONS/ACRE)		REDUCTION (PERCENT)
	W/O LAND TREATMENT	W/LAND TREATMENT	
Cropland	6.10	4.11	33
Pastureland	0.69	0.20	71
Forest Land	0.85	0.84	1
Other Land	5.00	5.00	--

Following installation of land treatment measures, the erosion rates on a majority of the cropland will be within the accepted soil-loss tolerance level of about 4 tons per acre per year.

Due to land treatment measures, the average annual sediment yield at the mouth of the watershed will be reduced from 21,000 tons to 13,700 tons, a reduction of 35 percent.

Direct storm runoff should be reduced by an estimated four to five percent as a result of conservation land treatment. Even though land treatment will not be performed on each acre, ground water storage is expected to increase by about five percent during periods of wet weather. This increased storage will be temporary since the ground water will gradually seep into streams during periods of low flow.

Employment opportunities should increase slightly within the immediate area by installing the land treatment program. This employment will help improve economic conditions within the watershed.

Conservation land treatment will have a slight effect on the aesthetics of the watershed. The installation of land treatment practices should result in lines, forms, and patterns that are more harmonious with the natural landscape.

STRUCTURAL MEASURES

Adverse effects to stream fish habitat are expected to be minor because habitat values in the upper reaches of the watershed at structure sites are very low. Approximately 1.3 miles of low value stream fishery will be lost at two of the three structure sites. Increased turbidity and transport of sediment downstream during construction may temporarily reduce the quality of fish habitat in the lower reaches of Factory Creek.

The construction of floodwater retarding structures Nos. 7 and 8 will result in the creation of 81 acres of warm water fishery habitat. Floodwater retarding structure No. 6 will be operated as a dry structure.

The project may alter the wetland resource in the watershed. Type 1 wetlands could be reduced from 4,135 acres to 3,520 acres due to flood protection from floodwater retarding structures. The Type 1 loss will occur on the outer margins of the flood plain. Land use at present is pasture and has low wildlife value. Type 5 wetlands are expected to increase from 243 acres to 324 acres with the addition of the 2 FRS. Increased turbidity during construction of floodwater retarding structures will temporarily and adversely affect the aquatic habitat in the immediate vicinity and for some distance downstream. This increased sediment could prevent fish reproduction, destroy bottom organisms, or be generally irritating to all aquatic organisms. Ground nesting birds and mammals should benefit from flood reduction in the flood plain. Some losses may occur among young birds and mammals during heavy rains or flash floods where due to man's influence, suitable cover for many birds and mammals may be limited to land too wet, steep, or unproductive. Birds known to utilize flood plain nesting sites are the Bobwhite quail, woodcock, meadowlark, killdeer and Chuck Wills Widow.

Clearing of 18 acres of low value forest land to construct floodwater retarding structures will eliminate such wildlife habitat as is associated with these areas. These disturbed areas will be revegetated with shrubs and grasses adapted to the area and having wildlife values. In most instances the revegetated areas will have a higher wildlife cover and food value than that present before project. Such plant cover could include partridge pea, bicolor lespedeza, bahia grass, sesbania, bull paspalum, common lespedeza or sericea.

The structural work planned for the watershed will have minor impacts on plant communities. Favorable habitat for horseradish, another species of special concern, is expected to be created behind one of the floodwater retarding structures.

No disturbance to stream channel conditions other than that resulting from floodwater retarding structure construction is expected.

It is estimated that flood protection will have the effect of converting 375 acres of flood plain land into row crop production. Estimated future land use in the flood plain is projected as follows:

Use	Future W/O Project		Use	Future With Project	
	Percent	Acres		Percent	Acres
Cropland	6	245	Cropland	15	620
Forest Land	29	1,181	Forest Land	29	1,181
Pastureland	65	2,709	Pastureland	56	2,334
	100	4,135		100	4,135

The land converted to cropland is pastureland. This is the most economical conversion with the level of protection provided and the large amount of pastureland in the flood plain.

Flood plain acres flooded with and without project on Factory Creek where the three floodwater retarding structures are planned are as follows:

Storm Frequency	Acres Flooded W/O Project	Acres Flooded With Project
0.167	46	45
0.50	95	490
1.0	1,847	1,112
2.33	2,494	1,710
5.0	2,949	2,317
10.0	3,281	2,716
25.0	3,558	3,053
100.0	4,135	3,521

Sediment accumulation on the flood plain is light; however, this accumulation will be reduced by about 48 percent. Due to both land treatment and structural measures, the average annual sediment yield at the mouth of the watershed will be reduced from 21,000 tons to 10,500 tons, a reduction of 50 percent. The foundation where the FRS's are proposed is a dense, impermeable chalk (Selma Formation). This foundation will restrict water movement, resulting in little or no effect on the water table levels in the vicinity of the structures or downstream.

Water temperature of perennial streams should not be significantly affected. A slight warming effect may occur from structure discharges on a portion of the stream below the structures. Baseflows in perennial streams should not be significantly affected; however, there could be a slight prolonging of flows in the intermittent streams below structure sites.

There will be no changes in the natural conditions of stream channels downstream of floodwater retarding structures. This includes oxbows and meanders.

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. Noise pollution will be negligible because the areas where construction will be performed is secluded from populated areas. The air and noise quality will only be affected for about 10 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. Project installation should not significantly affect the real estate tax base of the watershed.

The installation of structure No. 8 will require the temporary closing of county road No. 24 during periods of high flooding. This should not occur over 2 or 3 times during the life of the project.

Installation of the structural measures will increase employment and demand for goods and services resulting in increased economic activity in the watershed and surrounding area. Both yield and quality of agricultural commodities will be increased resulting in increased net income to producers and processors.

ECONOMIC AND SOCIAL

The project will serve as a stimulus to the economy by providing new employment opportunities. Installation of the three structures will create an estimated 32 man-years of employment. The accelerated land treatment program will create an estimated three man-years of employment. An additional 0.45 man-years of employment will be needed to operate and maintain the project. Operation and maintenance of the project will have a continuing favorable effect on the local economy.

Application of land treatment measures will increase opportunities for watershed residents. Land adequately treated will result in increased yields requiring more hired labor to produce and harvest the added production. Increased yields result in more income, some of which will be spent at retail outlets.

Additional income will be received by the laborers employed during construction and by farmers from the increased sales of farm products as a result of damage reduction and agricultural enhancement.

Reduced flooding will allow more efficient use of available land resources. Land use adjustments can be made and better management practices applied that do not deplete the soil of essential nutrients.

The average value of cropland in the flood plain is \$500. After the project is completed, it is estimated that the average value will have risen to \$850. Similarly flood plain pastureland now valued at \$350 to \$450 will be appraised at \$600 to \$650. Forest land in the flood plain now has an estimated average value of \$180 to \$250; after project installation \$450 to \$500.

Flood reduction will result in increased yields, requiring more hired labor to produce and harvest the added production. The increased

purchase of items or services required to produce and market the expanded production represents new income to local farm supply dealers, transporters, and processors.

The new income will generate additional consumer expenditures for basic necessities, items which improve the standard of living, and other goods and services. These expenditures will initiate a chain of spending whereby each successive recipient spends a portion of the amount received. Business activity in other sectors of the local economy and region will increase as this new income is spent and respent. Also, more employment opportunities will be provided in these sectors.

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.

The improved economic climate will enable the county to better support new or improved schools, parks, roads, health facilities, and other public projects that will add to the enjoyment of life.

The project will affect the local agricultural economy by increasing farm income in four ways: (1) reducing the likelihood of having to replant or plant late, (2) reducing crop losses from floods, (3) enabling farmers to produce higher yields and better quality crops, and (4) improving the conditions for harvesting crops. Soybeans is an important crop in the watershed, requiring planting at the proper time for maximum yields.

Local external economic benefits will accrue in the watershed and surrounding area as a result of the project. The increase in agricultural production will result in a greater demand for agricultural machinery, equipment, and supplies. The sale of these items will increase the external economic benefits of the 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 proposed project will not result in any distinctive negative impacts upon minority persons.

ADVERSE ENVIRONMENTAL IMPACTS

There will be a temporary reduction in the quality of fish habitat in the lower reaches of Factory Creek and a temporary reduction in the quality of aquatic habitat immediately downstream of the floodwater retarding structures during construction. Ambient air quality will

decrease slightly and noise will temporarily increase during construction.

Installation of the floodwater retarding structures will result in the loss of 81 acres of low value wildlife habitat. There will also be a loss of 1.3 miles of low value stream fishery habitat.



ALTERNATIVES

Alternatives considered during the formulation of the selected plan were of two basic types. The first involved those which would satisfy goals identified by the public for national economic development and environmental quality (see "Project Objectives" section for a listing of goals). The second dealt with alternatives which would reduce or eliminate adverse impacts to the environment resulting from the selected plan (see preceding section for a listing of adverse impacts).

A brief description of all alternatives is presented below. Formulation of alternatives of the first type was approached by identifying complementary measures or particular measures under consideration which presented no conflicts to the satisfaction of identified goals. Such measures provided a common nucleus for all alternatives of the first type.

Alternative 1 (NED Plan) - This alternative optimizes contributions to the identified goals for national economic development. It is the selected plan for Factory Creek Watershed and consists of an accelerated land treatment program and three floodwater retarding structures. A complete description of this alternative is presented in the "Planned Project" section. The "Environmental Impact" section of this document presents a detailed description of the environmental impacts. Economic, environmental and social impacts believed to be of greatest significance for this and other alternatives is presented in Figure 1 (Summary Comparison Table).

Alternative 1a - This alternative is the same as Alternative 1 with the exception of two additional floodwater retarding structures. Design of these structures was similar to other structures in Alternative 1. One structure was located on Jones Creek, approximately 3/4 miles upstream of its confluence with State Highway 39 and controlled 7.16 square miles of drainage area. Sediment pool was 30 acres and flood pool area 275 acres. Height of this dam was 31 feet. The second structure was located on Toms Creek, about 3 miles upstream from its confluence with State Highway 39. About 2.27 square miles of drainage area were controlled. The sediment pool area was 57 acres and flood pool was 202 acres. Height of this structure was 16 feet.

Alternative 1b - This alternative is the same as Alternative 1a with the floodwater retarding structure on Jones Creek deleted.

Alternative 1c - This alternative is the same as Alternative 1a only with the floodwater retarding structure on Toms Creek deleted.

Alternative 1d - This alternative is the same as Alternative 1 with floodwater retarding structure 8 deleted.

Alternative 2 (EQ Plan) This alternative was formulated to emphasize contributions to the identified goals for environmental quality. Measures included in this alternative were limited because of a lack of available program authorities to assist with implementation and a corresponding lack of public interest. Formulation, consequently, was approached by excluding measures from the NED plan which were in conflict with the identified EQ goals. The alternative consists of the same accelerated land treatment program as Alternative 1, but no structural measures.

Alternative 3 - This alternative consisted of foregoing implementation of a project. The going conservation land treatment program for the area would continue.

Channel work was considered, but the cost for stabilization revealed that it was unfeasible. It was also environmentally destructive to stream fisheries in the watershed. For these reasons channel work was not considered in any of the above alternatives.

Of the alternatives described above, alternative 1 is viable. A viable alternative is one which is acceptable to USDA and for which a public body has expressed a capability to implement.

*SUMMARY COMPARISON TABLE (Figure 1)

Economic Environmental or Social Indicator	ACTUAL				RESULTS			Alternate 3 Accelerated LT (EQ Plan)	Alternate 2 Accelerated LT (EQ Plan)	Alternate 1 Accelerated LT (NEP Plan)
	Alternate 1 Accelerated LT and 3 FRS	Alternate 1a Accelerated LT and 5 FRS	Alternate 1b Accelerated LT and 4 FRS	Alternate 1c Accelerated LT and 4 FRS	Alternate 1d Accelerated LT and 2 FRS	Alternate 2 Accelerated LT and 2 FRS	Alternate 3 Accelerated LT and 2 FRS			
Total Installation Cost	\$1,483,175	\$2,028,775	\$1,721,075	\$1,828,025	\$1,337,425	\$700,425	---	---	---	
Annual Cost (exclusive of LT)	\$ 50,250	\$ 85,350	\$ 64,100	\$ 71,200	\$ 39,800	---	---	---	---	
Annual Benefits (exclusive of LT)	\$ 71,900	\$ 91,700	\$ 78,600	\$ 85,050	\$ 54,850	---	---	---	---	
Areas of Scenic Beauty	create impoundments with 81 surface acres	create impoundments with 168 surface acres	create impoundments with 138 surface acres	create impoundments with 111 surface acres	create impoundments with 28 surface acres	No effect	No effect	No effect	No effect	
Social well-being	37% flood damage reduction	49% flood damage reduction	44% flood damage reduction	42% flood damage reduction	32% flood damage reduction	No effect	No effect	No effect	No effect	
Surface water quality	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	Sediment deposition reduced at the mouth of watershed by 50%	
Fishery Resources	1.3 miles of low value stream fishery inundated	2.8 miles of low value stream fishery inundated	1.8 miles of low value stream fishery inundated	2.2 miles of low value stream fishery inundated	1.0 miles of low value stream fishery inundated	No effect	No effect	No effect	No effect	
Wildlife Resources	81 acres of lake fishery created	168 acres of lake fishery created	138 acres of lake fishery created	111 acres of lake fishery created	28 acres of lake fishery created	No effect	No effect	No effect	No effect	
Endangered or threatened species	Temporary reduction in the quality of aquatic habitat immediately downstream of the FRS during construction	Temporary reduction in the quality of aquatic habitat immediately downstream of the FRS during construction	Temporary reduction in the quality of aquatic habitat immediately downstream of the FRS during construction	Temporary reduction in the quality of aquatic habitat immediately downstream of the FRS during construction	Temporary reduction in the quality of aquatic habitat immediately downstream of the FRS during construction	No effect	No effect	No effect	No effect	

1/ Land treatment effects not determined in monetary terms.

*SUMMARY COMPARISON TABLE (Figure 1)
(Continued)

	ACTUAL					RESULTS		
	Alternate 1 Accelerated LT and 3 FRS (MED Plan)	Alternate 1a Accelerated LT and 5 FRS	Alternate 1b Accelerated LT and 4 FRS	Alternate 1c Accelerated LT and 4 FRS	Alternate 1d Accelerated LT and 2 FRS	Alternate 2 Accelerated LT (EQ Plan)	Alternate 3	
Economic Environmental or Social Indicator								
Cultural Resources of National Significance	No impact	No impact	No impact	No impact	No impact	No impact	No effect	
Regional Employment	32 jobs during project instal- lation	55 jobs during project instal- lation	40 jobs during project instal- lation	46 jobs during project instal- lation	26 jobs during project instal- lation	No effect	No effect	
	2.2 man-years employment due to increased agricultural production	2.7 man-years employment due to increased agricultural production	2.4 man-years employment due to increased agricultural production	2.5 man-years employment due to increased agricultural production	1.7 man-years employment due to increased agricultural production	No effect	No effect	
Land Treatment	8145 acres ade- quately treated	8145 acres ade- quately treated	8145 acres ade- quately treated	8145 acres ade- quately treated	8145 acres ade- quately treated	8145 acres ade- quately treated	2875 acres adequately treated	
	1745 additional acres adequately protected	1745 additional acres adequately protected	1745 additional acres adequately protected	1745 additional acres adequately protected	1745 additional acres adequately protected	1745 additional acres adequately protected	1745 addi- tional acres adequately protected	

* Abbreviations

LT = land treatment
NED = national economic development

EQ = environmental quality
FRS = floodwater retarding structure

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Trends in the Factory Creek Watershed indicate future land use will be agricultural. Project installation will help protect the agricultural land which is one of the county's major economic assets.

This project is expected to be 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 county. Implementation of the proposed project should not preclude any options available for long-term use of the area. It is expected to 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 floodwater retarding structures will protect the land and reduce flooding throughout the 100-year life of the project.

The watershed is in the Tombigbee subregion of the South Atlantic Gulf Resource Region. The U.S. Corps of Engineers Tennessee-Tombigbee Waterway Project is partly in the regional subarea. One PL-566 project, Little New River, is complete. The completed watershed and the proposed Factory Creek projects are expected to have a minor cumulative effect in the region.



IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Land permanently required for the proposed floodwater retarding structures totals 167 acres. Of this amount, 18 acres are in woods and 149 acres in open land. Land cleared that remains open can be used for wildlife habitat. Increased agricultural production of the benefited area is expected to offset any production lost on acres committed to the project. Temporary storage of floodwater will require 693 acres for the three structure sites.



CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

GENERAL

The local sponsoring organization applied for planning assistance on the Factory Creek Watershed to the Alabama State Soil and Water Conservation Committee on May 20, 1969. Their application was approved on September 25, 1969, and preliminary investigations were initiated to determine project feasibility.

The preliminary investigation (PI) report indicated a feasible plan for watershed protection and flood prevention. This PI report was presented to the sponsors and interested individuals on January 15, 1971. Planning objectives were discussed in detail at this meeting.

A request for planning authorization was made to the Administrator of the SCS and it was approved on May 24, 1971. Federal and State agencies were informed by letter of planning approval, and their assistance in watershed planning was requested.

On February 10, 1976, a field review of the watershed was made by representatives from the U. S. Fish and Wildlife Service, Alabama Department of Conservation, and the Soil Conservation Service to study fish and wildlife aspects of the watershed. These data and information on how the proposed project would affect fish and wildlife habitat were included in a report that was used in plan formulation.

The Alabama Historical Commission made an intensive archaeological and historical survey of the watershed. Based on the results of this survey, the planned watershed project will have no adverse effects on the historical and archaeological resources within the project area.

The sponsors have carried on an active public information program in an effort to keep the public informed of project formulation.

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:

<u>COMMENTS REQUESTED</u>	<u>COMMENTS RECEIVED</u>
Department of Agriculture	
Office of Equal Opportunity	X
Department of the Army	X
Department of Commerce	
Department of Health, Education, and Welfare	X

COMMENTS REQUESTED

COMMENTS RECEIVED

Department of Housing and Urban Development	
Department of the Interior	X
Secretary of the Interior	
Department of Transportation	
Environmental Protection Agency	X
Federal Power Commission	
Alabama Attorney General	
Alabama Development Office	
Soil and Water Conservation Committee (also Governor's designated representative)	XX
Alabama Department of Conservation and Natural Resources	
State Health Department	
Alabama-Tombigbee Rivers Regional Planning and Development Commission	
Alabama Forestry Commission	
Geological Survey of Alabama	
Alabama State Highway Department	
Alabama State Department of Education	
Alabama Commissioner of Agriculture	
Alabama Historical Commission	
Alabama Water Improvement Commission	
Alabama Association of Soil and Water Conservation Districts	
Auburn University, Cooperative Extension Service	
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	
Environmental Impact Assessment Project	
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: "We recommend that you include in your Final Environmental Statement an assessment of the effects of the proposed project on the minority population."

Response: A statement about the project impact on minority persons has been added to the Environmental Impact Statement.

Department of the Army

1. Comment Summary: A Corps of Engineers Section 404 permit will be required for fill material if placed in a wetland area averaging more than one cubic yard per running foot or if placed in such a way or manner as to impair surface flow into or out of any wetland area.

Response: Noted, the Sponsors will apply for the 404 permit after Congressional approval of the plan.

2. Comment: "Mosquito control should be discussed for the proposed activities."

Response: Mosquitos will not be a problem at FRS No's. 7 and 8 for the following reasons: (1) depth of water at shoreline sufficient to prevent development of breeding habitat; (2) water levels fluctuate; and (3) fish in the permanent pools will feed upon mosquito larva and pupal stages.

FRS No. 6 will have a dry pool; water will only be stored during flood periods for a few days. Also, investigation of the site indicates there will not be any low areas which would not drain.

If mosquitos did breed, they would not cause any problems due to the remoteness of the structure sites from populated areas.

3. Commeny Summary: Botanical descriptions should be added for the wetland types discussed.

Response: The wetland types discussed are based on circular 39 referenced in the statement. Botanical descriptions are in the referenced material. Additional information has been added to the document to identify the particular species of wetland plants in the watershed.

4. Comment Summary: "BEA Economic Area 136" should be defined.

Response: A definition of BEA Economic Area 136 has been added to the document.

5. Comment: "The Federal Register concerning threatened or endangered organisms in the watershed should be specified and listed in the 'Literature Cited' Section."

Response: The named Federal Register has been added to Literature Cited section.

6. Comment Summary: The discussion of Recreational Resources should be expanded to include the Gainesville Lock and Dam project.

Response: The change was made in the document. No recreational benefits were claimed for this project.

7. Comment Summary: Elimination of flooding will reduce the natural productivity of the flood plain; therefore the flood damage costs do not reflect "true" costs.

Response: As stated in the EIS, sediment depositions are slight to moderate. These depositions do not significantly affect production in the flood plain. The project will reduce flooding on approximately 600 acres of flood plain on Factory Creek. Reduced flooding will result in increased crop yields and better quality crops. Modern farm management techniques call for the proper application of fertilizer and the planned conservation land treatment measures will result in reduced runoff and soil erosion. Productivity in the flood plain should therefore show a net increase. No change made in the EIS.

Department of Health, Education, and Welfare

1. Comment: "The impact statement has been adequately addressed for our comments."

Response: Noted, no response needed.

Department of Interior

1. Comment: "From the fish and wildlife resource standpoint, we believe that adequate consideration has been given to previous technical information furnished to your office by the Fish and Wildlife Service. The statement indicates this consideration and reflects that impacts to the fish and wildlife resources will be minimal."

Response: Noted, no response needed.

2. Comment: The relatively small flood control pools should not create any serious interference with future oil or gas development.

Response: Noted, no response needed.

3. Comment: The statement should locate on an appropriate map existing oil or gas wells (if any) in and adjacent to the watershed.

Response: Additional information has been added to the document to indicate that there aren't any oil or gas wells existing in the watershed.

4. Comment: Any abandoned wells should be plugged by the proper authorities in an accepted manner.

Response: As stated above, no wells exist in the area affected by the project.

5. Comment: "We suggest that the probable effects of the proposed floodwater retarding structures on water table levels in the vicinity of the structures and downstream should be assessed."

Response: Additional information has been included in the document.

6. Comment Summary: We find that the Type I wetland loss will be 615 acres which is stated to occur on the outer margins of the flood plain. This point is expressed as a reduction from 4,135 to 3,520 acres. Under future use with project, we see 4,135 acres listed as cropland, forest land, and pastureland. Does this mean a total loss of Type I wetlands?

Response: Type I wetlands are those areas subject to flooding. In Factory Creek Watershed the 4,135 acre flood plain has been classified as Type I wetlands. This area consists of 245 acres of cropland, 1,181 acres of forest land, and 2,709 acres of pastureland. After the project is installed, the flood plain subject to flooding will be reduced from 4,135 acres to 3,520 acres. By definition, the Type I wetlands will be 3,520 acres after project is installed. The 3,520 acres consist of 620 acres of cropland, 1,181 acres of forest land, and 2,334 acres of pastureland. The 615 acres of Type I wetland lost have a present and future land use of cropland, forest land, and pastureland. The information as presented in the document is factual.

U.S. Environmental Protection Agency

1. Comment Summary: In reviewing the draft environmental impact statement on the Factory Creek Watershed, we believe the plan is acceptable from an environmental standpoint. As such, we have rated it LO-1, i.e., lack of objections and no additional information is needed.

Response: Noted, no response needed.

Alabama State Soil and Water Conservation Committee (Governor's designated representative)

1. Comment Summary: On behalf of Governor George C. Wallace the State Soil and Water Conservation Committee has reviewed and approved the "preliminary draft plan", and draft environmental impact statement.

Response: Noted, no response needed.

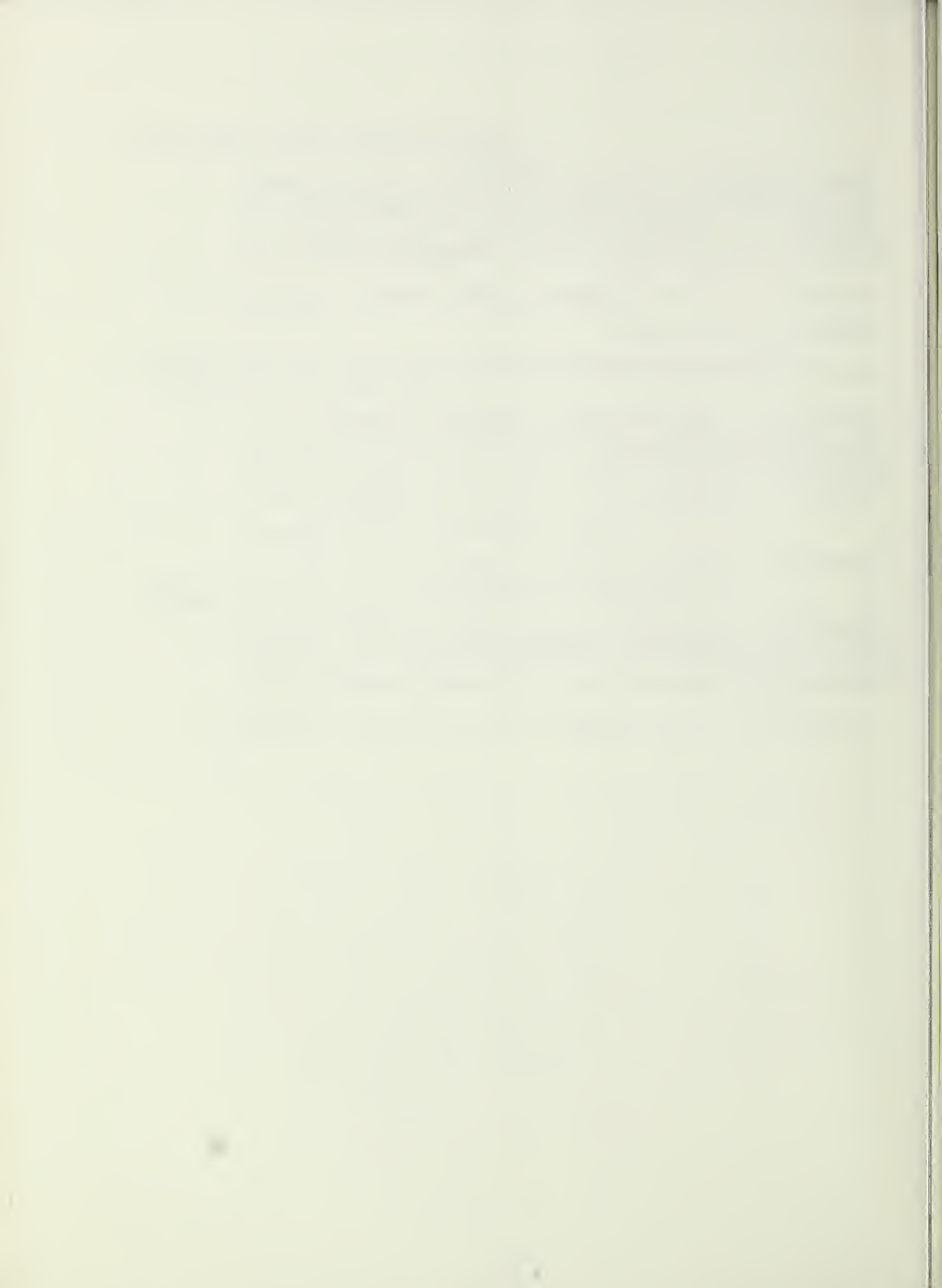
Alabama State Soil and Water Conservation Committee

1. Comment: "The State Soil and Water Conservation Committee has reviewed the proposed 'combined draft watershed plan and environmental impact statement' and finds same to be in proper order."

Response: Noted, no response needed.

APPENDICES

- Appendix A - Display Accounts for Selected Alternative
- Appendix B - Definition of Resource Management Systems
- Appendix C - Letters of Comment on Draft Document
- Appendix D - Project Map
- Appendix E - Soil Association Map
- Appendix E-1 - Land Capability Classes and Subclasses
- Appendix F - Land Use Map
- Appendix G - Archaeological and Historical Survey of Five FRS Sites Within Factory Creek Watershed
- Appendix H - Section of a Typical Floodwater Retarding Structure (Single Stage Riser)
- Appendix I - Section of a Typical Floodwater Retarding Structure (Two Stage Riser)
- Appendix J - Scientific Names of Plants and Animals
- Appendix K - Literature Cited



APPENDIX A - DISPLAY ACCOUNTS FOR SELECTED ALTERNATIVE

SELECTED ALTERNATIVE
 NATIONAL ECONOMIC DEVELOPMENT ACCOUNT
 Factory Creek Watershed, Alabama

<u>Components</u>	<u>Measures of effects</u>	<u>Components</u>	<u>Measures of effects</u>
Beneficial effects:	(Average Annual) <u>1/2/</u>	Adverse effects:	(Average Annual) <u>1/2/</u>
The value to users of increased outputs of goods and services			
1. Flood prevention	\$15,400	The value of resources required for a plan:	
2. Changed land use	\$44,100	1. Floodwater retarding structures	\$41,700
3. More intensive land use	\$ 1,900	Project Installation	\$ 2,250
4. Utilization of unemployed and underemployed labor resources		OM&R	
Project construction	\$10,500	2. Project administration	\$ 6,300
Total beneficial effects	<u>\$71,900</u>	Total adverse effects	<u>\$50,250</u>
		Net beneficial effects	\$21,650

NOTE: Land treatment beneficial effects were not evaluated. Land treatment costs are \$760,425.

1/ 100 years @ 6 5/8 percent interest
2/ Price base: 1976

SELECTED ALTERNATIVE
 ENVIRONMENTAL QUALITY ACCOUNT
 Factory Creek Watershed, Alabama

<u>Components</u>	<u>Measures of effects</u>	<u>Components</u>	<u>Measures of effects</u>
-------------------	----------------------------	-------------------	----------------------------

Beneficial and adverse effects:

- | | | | |
|--|--|---|--|
| <p>A. Areas of natural beauty.</p> <ol style="list-style-type: none"> 1. Accelerated conservation land treatment will enhance the physical appearance of 51,600 acres. 2. Create lakes with 81 surface acres. 3. Increase Type 5 wetlands by 81 acres. 4. Inundate 81 acres of land. 5. Visual quality of the area will be reduced by removal of trees and excavation during the construction process. | <ol style="list-style-type: none"> 1. Accelerated conservation land treatment will enhance the physical appearance of 51,600 acres. 2. Create lakes with 81 surface acres. 3. Increase Type 5 wetlands by 81 acres. 4. Inundate 81 acres of land. 5. Visual quality of the area will be reduced by removal of trees and excavation during the construction process. | <p>C. Biological resources and selected ecosystems.</p> <ol style="list-style-type: none"> 1. Land treatment will enhance wildlife habitat & food supply & improve aesthetic qualities. 2. Provide 81 acres resting area at the reservoirs for migratory waterfowl. 3. Create 81 acres of warm water fishery habitat. 4. Inundate 81 acres of pastureland which provides limited habitat for wildlife. | <ol style="list-style-type: none"> 1. Land treatment will enhance wildlife habitat & food supply & improve aesthetic qualities. 2. Provide 81 acres resting area at the reservoirs for migratory waterfowl. 3. Create 81 acres of warm water fishery habitat. 4. Inundate 81 acres of pastureland which provides limited habitat for wildlife. |
| <p>B. Quality consideration of water, land, and air resources.</p> <ol style="list-style-type: none"> 1. Reduce sediment by 50 percent at the mouth of watershed. 2. Reduce sediment accumulation on flood plain by 48 percent. 3. Air and water pollution will be increased during project construction. | <ol style="list-style-type: none"> 1. Reduce sediment by 50 percent at the mouth of watershed. 2. Reduce sediment accumulation on flood plain by 48 percent. 3. Air and water pollution will be increased during project construction. | <p>D. Irreversible or irremediable commitments.</p> <ol style="list-style-type: none"> 1. Conversion of 167 acres of forest land and pastureland to reservoir pools, dams, spillways, etc. | <ol style="list-style-type: none"> 1. Conversion of 167 acres of forest land and pastureland to reservoir pools, dams, spillways, etc. |

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
Factory Creek Watershed, Alabama

<u>Components</u>	<u>Measures of effects</u> State of Alabama	<u>Rest of Nation</u>	<u>Components</u> Income:	<u>Measures of effects</u> State of Alabama	<u>Rest of Nation</u>
	(Average Annual) 1/2/			(Average Annual) 1/2/	
Beneficial effects:			Adverse effects:		
A. The value of increased output of goods & services to users residing in the region			A. The value of resources contributed from within the region to achieve the outputs		
1. Flood prevention	\$ 15,400	0	1. Floodwater retarding structures		
2. Changed land use	\$ 44,100	0	Project installation	\$ 3,400	\$38,300
3. More intensive land use	\$ 1,900	0	OM&R	\$ 2,250	0
4. The utilization of regional unemployed or underemployed labor resources			2. Project administration	\$ 700	\$ 5,600
Project construction	\$ 10,500	0			
5. Additional wages & salaries accruing to the region for implementation of the plan			Subtotal	<u>\$ 6,350</u>	<u>\$43,900</u>
OM&R	\$ 1,500	-\$1,500	Negative Beneficial Effects	0	\$ 1,500
			Total Adverse Effects	\$ 6,350	\$45,400
B. The value of output to users residing in the region from pecuniary external economics			Net Beneficial Effects	<u>\$157,950</u>	0
Indirect activities associated with increased net returns from flood prevention and recreation	<u>\$ 90,900</u>	<u>0</u>			
Total beneficial effects	\$164,300	-\$1,500			
1/ 100 years @ 6 5/8 percent interest			2/ Price base: 1976		

SELECTED ALTERNATIVE
 REGIONAL DEVELOPMENT ACCOUNT (CONT'D)
 Factory Creek Watershed, Alabama

<u>Components</u>	<u>Measures of Effects</u>	
	State of (Alabama)	Rest of Nation
Population Distribution		
Beneficial effects	Create 0.45 permanent semi-skilled jobs and 32 semi-skilled jobs during 5-year installation period where part of the economy lags behind the rest of the state.	-
Adverse effects	---	-
Regional Economic Base and Stability		
Beneficial effects	Create 0.45 permanent semi-skilled jobs and 32 semi-skilled jobs during 5-year installation period where 45 percent of the families have incomes less than the poverty level.	-
Adverse effects	---	-

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT (CONT'D)
Factory Creek Watershed, Alabama

Components	Measures of effects		Components	Measures of effects	
	State of Alabama	Rest of Nation		State of Alabama	Rest of Nation
Employment:					
Beneficial effects:					
A. Increase in the number and types of jobs			A. Decrease in number and types of jobs		
1. Agricultural employment	Utilization of 2 man-years of employment in agricultural production	--	1. Lost in agricultural employment of project take area	.2 man-years of agricultural employment	--
2. Employment for project construction	32 semi-skilled jobs during 5 year installation period	--			
3. Employment for project O&M	.45 permanent semi-skilled jobs	--			
Total beneficial effects	.45 permanent semi-skilled jobs	--	Total adverse effects	.2 permanent semi-skilled jobs	--
	32 semi-skilled jobs during 5 year installation period	--	Net beneficial	2.25 permanent semi-skilled jobs	--
				32 semi-skilled jobs during 5 year installation period	--
			Note:	External economic benefits equal \$90,900. Employment will be enhanced throughout the region. However, number of jobs created by this benefit is impossible to qualify without extensive research.	

SELECTED ALTERNATIVE

SOCIAL WELL-BEING ACCOUNT

Factory Creek Watershed, Alabama

Components

Measures of effects

Beneficial and adverse effects:

A. Real income distribution

1. Create 0.45 low to medium income permanent jobs for area residents.
2. Create average annual regional income benefit distribution of \$164,300 in an area where 45 percent of rural population is below poverty level.
3. Average annual local costs to be borne by region total \$6,350.

B. Life, health and safety

1. Reduce average annual flood damages on Factory Creek by 37 percent.
2. Increased output of food and fiber with some land use changes.

APPENDIX B

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 long-term 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.

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.

APPENDIX C

Letters of comment received on the draft
plan and environmental impact statement.



UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

DEC 16 1977

OFFICE OF EQUAL OPPORTUNITY

IN REPLY 8140 Supplement 8

REFER TO:

SUBJECT: Draft Watershed and Environmental Impact Statement for
the Factory Creek Watershed, Alabama

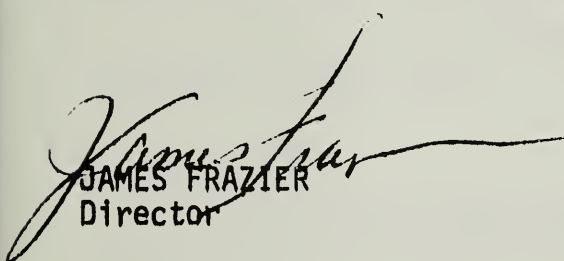
TO: W. B. Lingle
State Conservationist

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

The Draft Watershed Plan and Environmental Impact Statement (EIS) for the Factory Creek Watershed were 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.

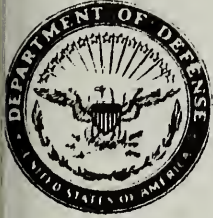
In the section of the EIS entitled "Economic and Social Impact," pages 42-43, no mention is made of the impact of the project on the large minority population living in the affected area (66.5 percent in Sumter County).

We recommend that you include in your final Environmental Statement an assessment of the effects of the proposed project 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

MOBILE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2288
MOBILE, ALABAMA 36628

REPLY TO
ATTENTION OF:

SAMPD-EE

19 January 1978

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

Dear Mr. Lingle:

We have reviewed the draft environmental impact statement for Watershed Protection and Flood Prevention, Factory Creek, Sumter County, Alabama, and we are providing the following comments:

- a. A Corps of Engineers Section 404 permit will be required for fill material if placed in a wetland area averaging more than one cubic yard per running foot along the bank or if it is placed in any locality or manner so as to impair surface water flow into or out of any wetland area.
- b. Mosquito control should be discussed for the proposed activities.
- c. Botanical descriptions should be added for the wetland types discussed on page E-22.
- d. "BEA Economic Area 136" discussed on page E-22 should be defined.
- e. The Federal Register concerning threatened or endangered organisms in the watershed should be specified and listed in the "Literature Cited" section.
- f. The discussion of Recreational Resources on page E-28 should be expanded. The Tombigbee River adjacent to the project area is presently impounded by the Demopolis Lock and Dam and is, therefore, considered a part of Demopolis Lake. The Gainesville Lock and Dam, which should be completed this year, is less than ten miles from the project area. The recreational developments on Gainesville Lake will significantly affect the Factory Creek Watershed area.



SAMPD-EE

Mr. W. B. Lingle

19 January 1978

g. From the discussion on Floodwater Damage on pages E-31 and E-32, it appears that the floodwater structures will provide partial flood control for about 150 acres of cropland (the area which suffers most from flooding). As noted on page E-32, the flood plain contains the most productive cropland and pastureland in the watershed. The nature of this productivity is related to periodic flooding. Elimination of this flooding will reduce natural productivity of the area; therefore, we do not feel that the damage costs presented on page E-32 are "true" costs.

Thank you for the opportunity to comment on this document.

Sincerely yours,



JAMES B. HILDRETH
Chief, Environmental Quality Section





DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGION IV
101 Marietta Tower, Suite 1503

ATLANTA, GEORGIA 30323

January 20, 1978

OFFICE OF THE
REGIONAL DIRECTOR

HEW 836-1-78

Control No. 143C

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

Dear Sir:

Subject: Factory Creek Watershed
Sumter County, Alabama

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that the proposed action will have only a minor impact upon the human environment within the scope of this Department's review. The impact statement has been adequately addressed for our comments.

Sincerely yours,

Philip P. Sayre
Regional Environmental Officer
DHEW-Region IV



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-77/1088

JAN 27 1978

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

Dear Mr. Lingle:

This is in response to your December 1, 1977, letter requesting our review of your draft watershed work plan and draft environmental statement for Factory Creek, Sumter County, Alabama. We have the following comments on the environmental statement.

From the fish and wildlife resource standpoint, we believe that adequate consideration has been given to previous technical information furnished to your office by the Fish and Wildlife Service. The statement indicates this consideration and reflects that impacts to the fish and wildlife resources will be minimal.

The relatively small flood control pools should not create any serious interference with future oil or gas development. However, the statement should locate on an appropriate map existing oil or gas wells (if any) in and adjacent to the watershed. Any abandoned wells should be plugged by the proper authorities in an accepted manner.

We suggest that the probable effects of the proposed floodwater retarding structures on water table levels in the vicinity of the structures and downstream should be assessed.

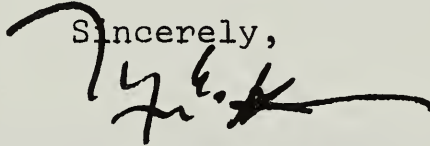
On page E-40 of the statement we find that the Type I wetland loss will be 615 acres which is stated to occur on the outer margins of the flood plain. This point is expressed as a reduction from 4,135 acres to 3,520 acres. Yet, though possibly



a coincidence, at the bottom of this page, under Future Use with Project, we see 4,135 acres listed as cropland, forest, and pastureland. Does this mean a total loss of Type I wetlands? We believe the statement must be improved by clarification of the wetlands loss and identification of the areas and their size on the project map.

We hope these comments will be of assistance to your project.

Sincerely,

A handwritten signature in black ink, appearing to read "L. E. Meierotto", with a long horizontal flourish extending to the right.

Larry E. Meierotto
SECRETARY





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

January 31, 1978

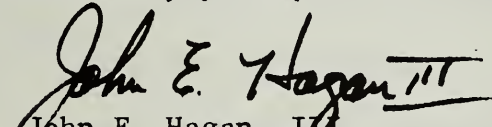
Mr. W. B. Lingle
State Conservationist
Soil Conservation Service
P. O. Box 311
Auburn, Alabama 36830

Dear Mr. Lingle:

We have reviewed the Draft Environmental Impact Statement (DEIS) on the Factory Creek Watershed. From an environmental standpoint, we believe the plan is acceptable. As such, we have rated it LO-1, i.e., lack of objections and no additional information is requested.

Please furnish us a copy of the Final EIS. If we can be of further assistance, feel free to call on us.

Sincerely yours,


John E. Hagan, III
Chief, EIS Branch

Faint, illegible text at the top of the page, possibly a header or title.

Second line of faint, illegible text.

Third line of faint, illegible text.

Fourth line of faint, illegible text.

Fifth line of faint, illegible text.

Sixth line of faint, illegible text.

Seventh line of faint, illegible text at the bottom of the page.



ALABAMA STATE SOIL AND WATER CONSERVATION COMMITTEE

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

November 8, 1977

WILBUR B. NOLEN, JR.
EXECUTIVE SECRETARY

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
AGRI-BUSINESS 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

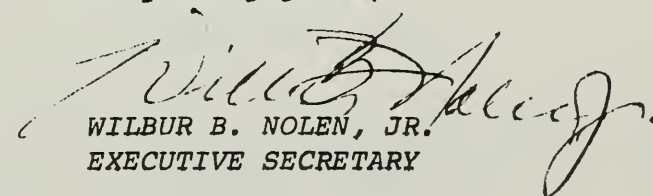
Dear Mr. Lingle:

On behalf of Governor George C. Wallace the State Soil and Water Conservation Committee has reviewed and approved the "preliminary draft plan", and draft environmental impact statement, for the proposed Factory Creek Watershed Project located in Sumter County, 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.

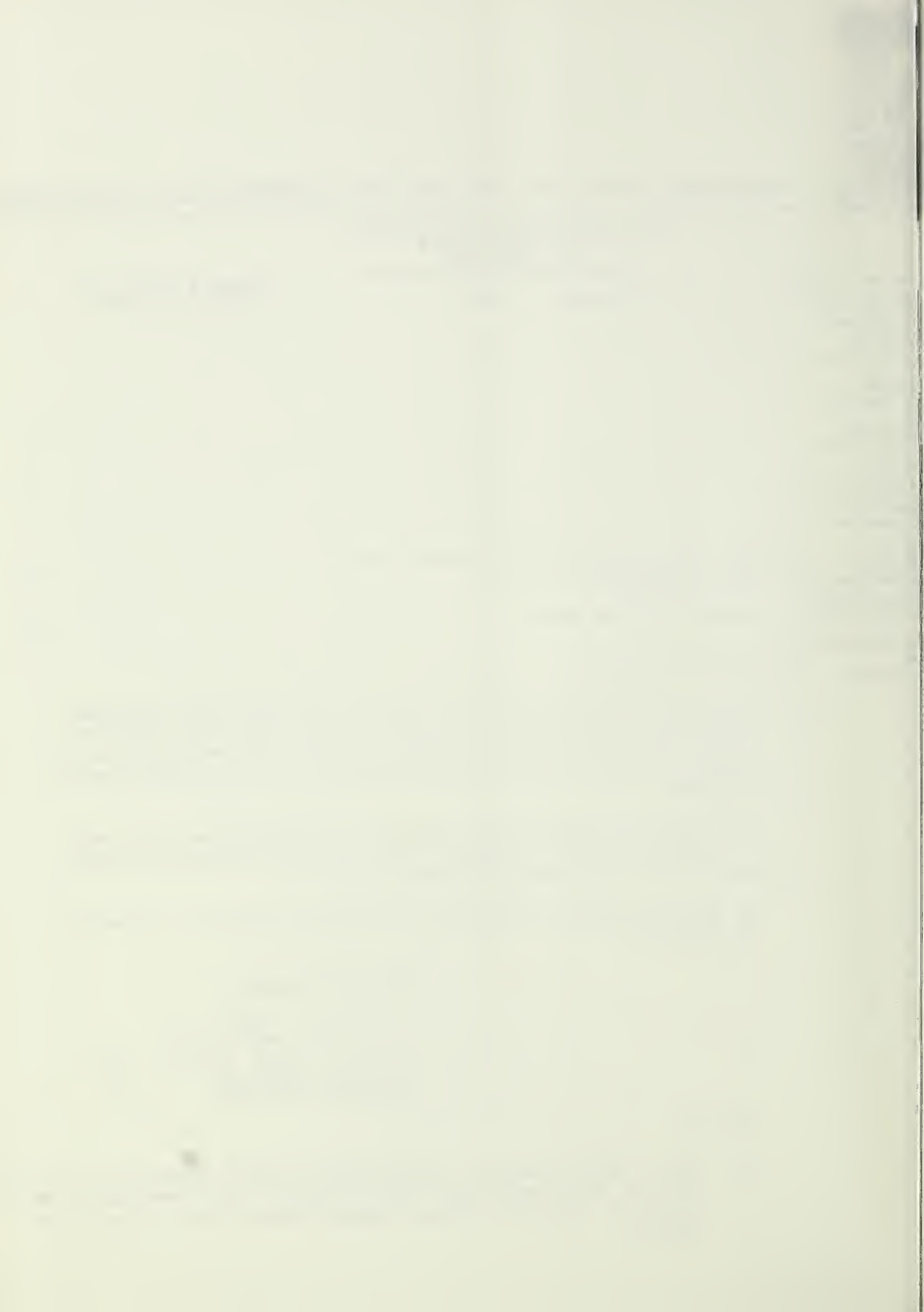
Very truly yours,



WILBUR B. NOLEN, JR.
EXECUTIVE SECRETARY

WBN:msh

cc: John R. Besh, Chairman, Sumter Soil and Water Conservation District
James M. McCullough, Area Conservationist, Soil Conservation Service
Richard C. Zellmer, District Conservationist, Soil Conservation Service





ALABAMA STATE SOIL AND WATER CONSERVATION COMMITTEE

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

December 6, 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

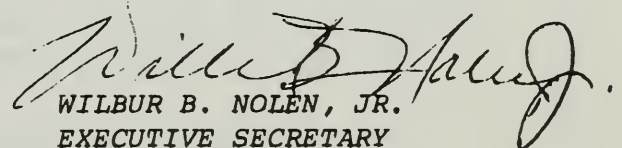
Dear Mr. Lingle:

The State Soil and Water Conservation Committee has reviewed the proposed "combined draft watershed plan and environmental impact statement" for the Factory Creek Watershed located in Sumter County, Alabama, and finds same to be in proper order. The application for assistance in preparation of this plan was approved by the Committee on March 11, 1970.

The State Committee unanimously concurs with the local sponsors in their view that this proposed development is definitely needed and, furthermore, that it will enhance rather than degrade the project area environment.

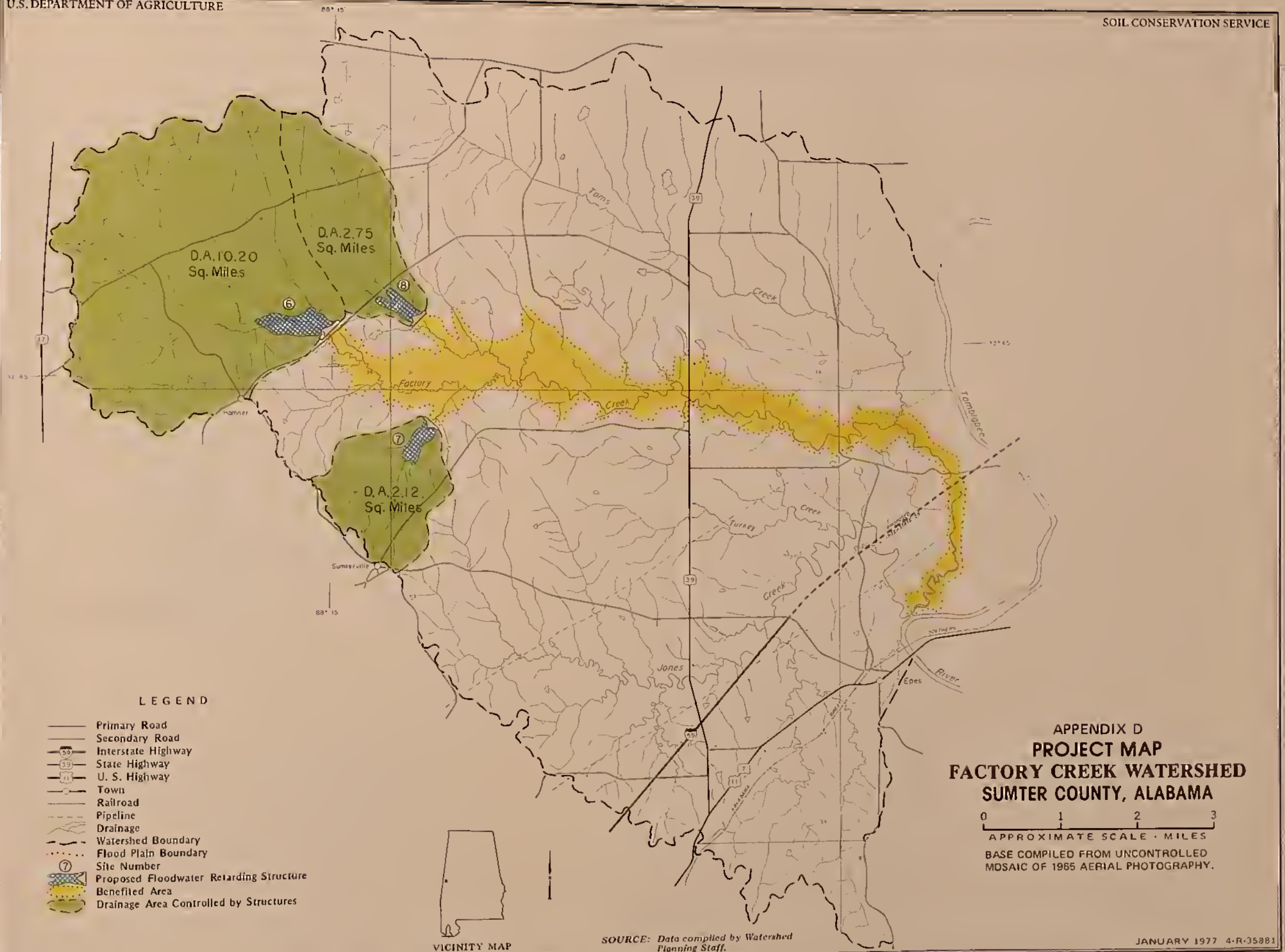
Anything that you or the Soil Conservation Service Administrator can do to expedite this proposal will be greatly appreciated, by both the Sponsors and the State Committee.

Very truly yours,


WILBUR B. NOLEN, JR.
EXECUTIVE SECRETARY

WBN:msh





LEGEND

- Primary Road
- Secondary Road
- Interstate Highway
- State Highway
- U. S. Highway
- Town
- Railroad
- Pipeline
- Drainage
- - - Watershed Boundary
- · · · · Flood Plain Boundary
- ⑦ Site Number
- ▨ Proposed Floodwater Retarding Structure
- Benefited Area
- Drainage Area Controlled by Structures

APPENDIX D
PROJECT MAP
FACTORY CREEK WATERSHED
SUMTER COUNTY, ALABAMA

0 1 2 3
 APPROXIMATE SCALE - MILES

BASE COMPILED FROM UNCONTROLLED
 MDSAIC OF 1965 AERIAL PHOTOGRAPHY.



VICINITY MAP

SOURCE: Data compiled by Watershed
 Planning Staff.

JANUARY 1977 4-R-35881











REVISED JANUARY 1977 BASE 4-R-30723



LEGEND

- 1 CATALPA ASSOCIATION
- 2 OCHLOCKONEE ASSOCIATION
- 3 SUMTER-OKTIBBEHA ASSOCIATION
- 4 SUMTER-VAIDEN-EUTAW ASSOCIATION

BASE LEGEND

-  Primary Road
-  Secondary Road
-  Interstate Highway
-  State Highway
-  U. S. Highway
-  Town
-  Railroad
-  Pipeline
-  Drainage
-  Watershed Boundary



VICINITY MAP

APPENDIX E
SOIL ASSOCIATION MAP
FACTORY CREEK WATERSHED
SUMTER COUNTY, ALABAMA



BASE COMPILED FROM UNCONTROLLED
 MOSAIC OF 1965 AERIAL PHOTOGRAPHY.

SOURCE: Data compiled by Watershed
 Planning Staff.

JANUARY 1977 4-R-35880



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.

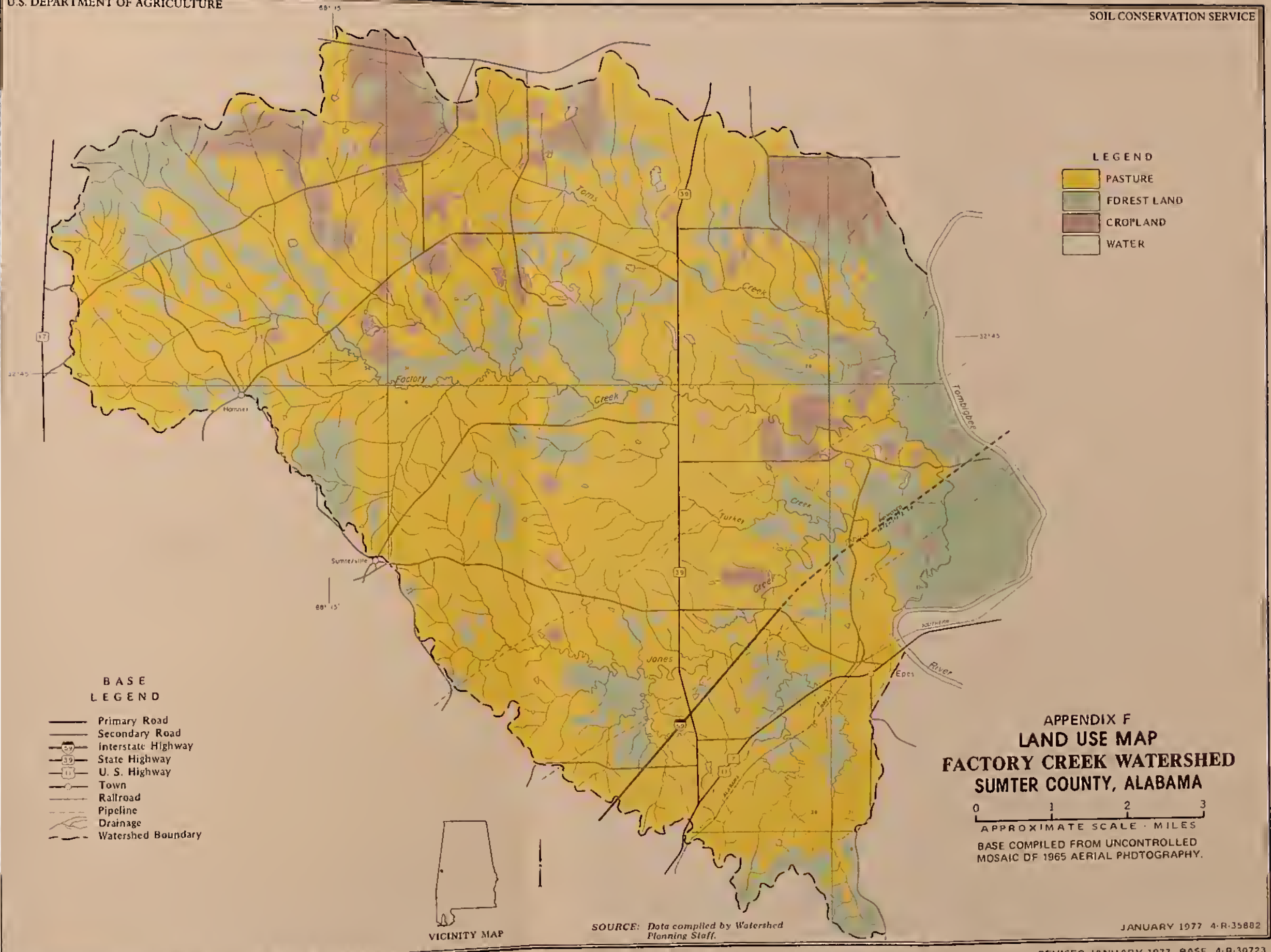
Class VI soils have severe limitations that make them generally unsuitable for cultivation.

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.



LEGEND

- PASTURE
- FOREST LAND
- CROPLAND
- WATER

BASE LEGEND

- Primary Road
- Secondary Road
- Interstate Highway
- State Highway
- U. S. Highway
- Town
- Railroad
- Pipeline
- Drainage
- Watershed Boundary

**APPENDIX F
LAND USE MAP
FACTORY CREEK WATERSHED
SUMTER COUNTY, ALABAMA**

0 1 2 3
APPROXIMATE SCALE - MILES

BASE COMPILED FROM UNCONTROLLED
MOZAIC OF 1965 AERIAL PHOTOGRAPHY.



SOURCE: Data compiled by Watershed Planning Staff.

JANUARY 1977 4-R-35882

REVISED JANUARY 1977 BASE 4-R-30723



APPENDIX G

AN INTENSIVE ARCHAEOLOGICAL AND HISTORICAL SURVEY OF
FIVE PROPOSED FLOODWATER RETARDING STRUCTURE SITES WITHIN
THE FACTORY CREEK WATERSHED IN SUMTER COUNTY, ALABAMA.

by
ALABAMA HISTORICAL COMMISSION
725 Monroe Street
Montgomery, Alabama 36130

with
W. Warner Floyd, Executive Director
Bascom Mack Broom, Principal Archaeologist

May 28, 1976

Note: The complete report is on file and available for inspection at the office of the Soil Conservation Service, 138 South Gay Street, Auburn, Alabama 36830. The following is a reprint of the "Conclusions and Recommendations" section of the report. Note should also be taken that floodwater retarding structures 1 and 13 mentioned in the archaeological report are no longer a part of the proposal set forth in the "Planned Project" section of this document. Also, it should be noted that floodwater retarding structure 6 will be a "dry structure" and will not impound water except for short periods following rainstorms.

Conclusions and Recommendations

The Factory Creek Watershed and surrounding area does have a considerable number of historic and prehistoric sites. The greatest concentration of historic structures is in Sumterville, which is located on the southwest border of the watershed. Neither the town of Sumterville, nor any of its historic structures will be affected by the construction of the retarding structures. The closest historic structure to any of the proposed reservoirs is the Louden Home, east of Sumterville. The house will be near the Structure 13 impoundment, but will not be damaged by it. The impoundments will have no adverse effect on any of the remaining Alabama Inventory sites mentioned in this report.

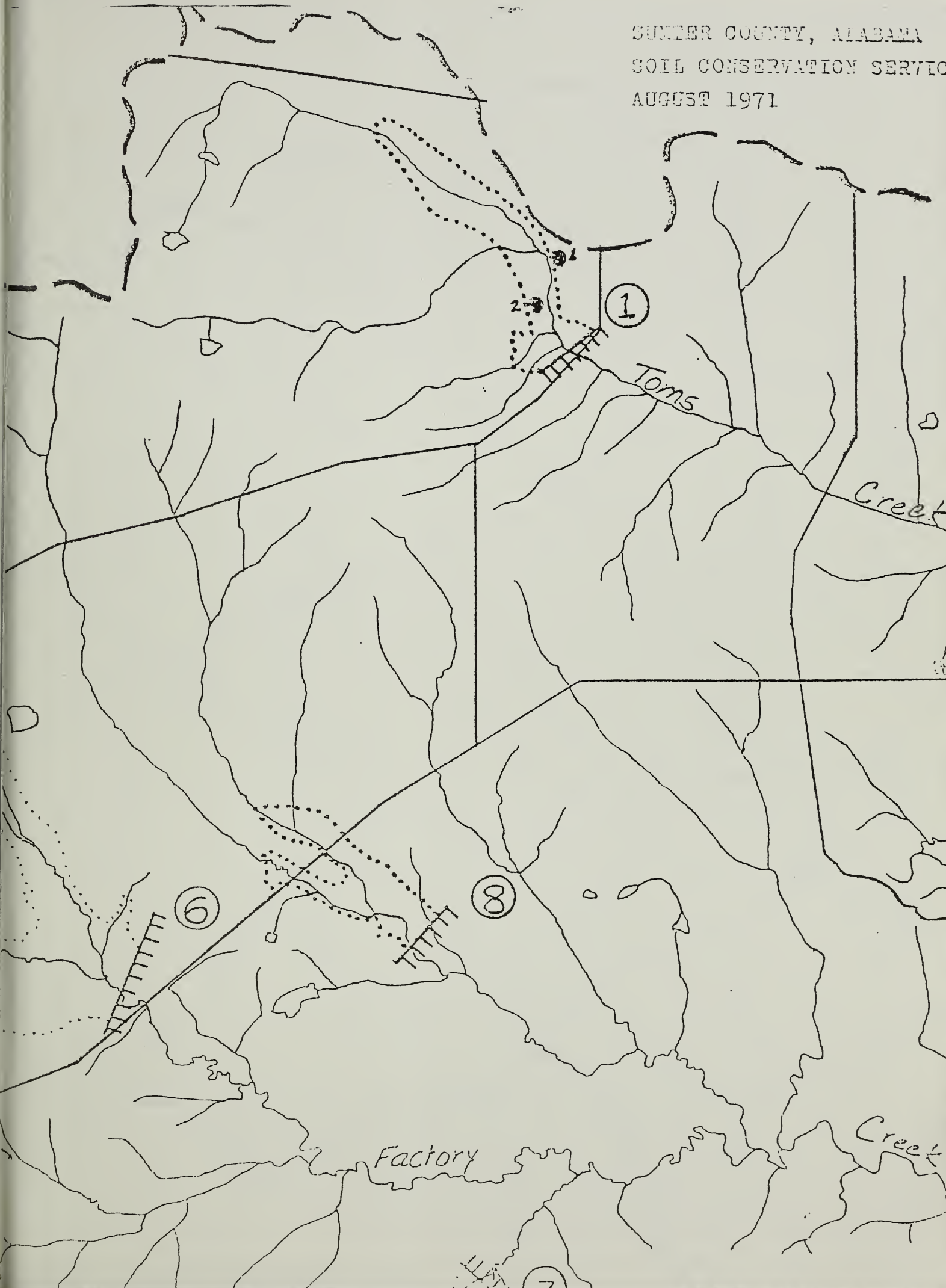
The Choctaw town of Pickbone has been mentioned as being located on the headwaters of Factory Creek. No evidence of the historic Indian town was found during the survey and the site has not been recorded in the Alabama Site Files. It has been mentioned in early histories of Alabama, but the exact location is not known. The data obtained from this survey suggests that Pickbone must be located further downstream where the proposed floodwater retarding structures will actually help preserve it. The other historic Indian towns mentioned are in adjacent watersheds and will not be affected.

Five previously unknown prehistoric sites were located and recorded during the field reconnaissance and all of them will suffer at least partial destruction from the Structure 1 and 6 reservoirs. Relating the data obtained from the sites with information already available on the area, a chronological position of Miller I to Miller II Phase of the Woodland Period of Alabama's prehistory was assigned. All five were small, seasonal camp sites which apparently were not occupied for an extended period of time. Each of the five sites have been disturbed by natural erosion of the knolls and/or extensive cultivation. They are not considered significant and neither mitigation nor preservation is recommended.

In view of this survey, it is the opinion of the Alabama Historical Commission that the construction of Floodwater Retarding Structures 1, 6, 7, 8, and 13 will have no adverse effect on Alabama's cultural resources. No further investigations are recommended. In the event that the construction of any of the dams, borrow areas, or spillways reveals subterranean archaeological features, it is recommended that the Soil Conservation Service contact the Alabama Historical Commission immediately.



SUMNER COUNTY, ALABAMA
SOIL CONSERVATION SERVICE
AUGUST 1971



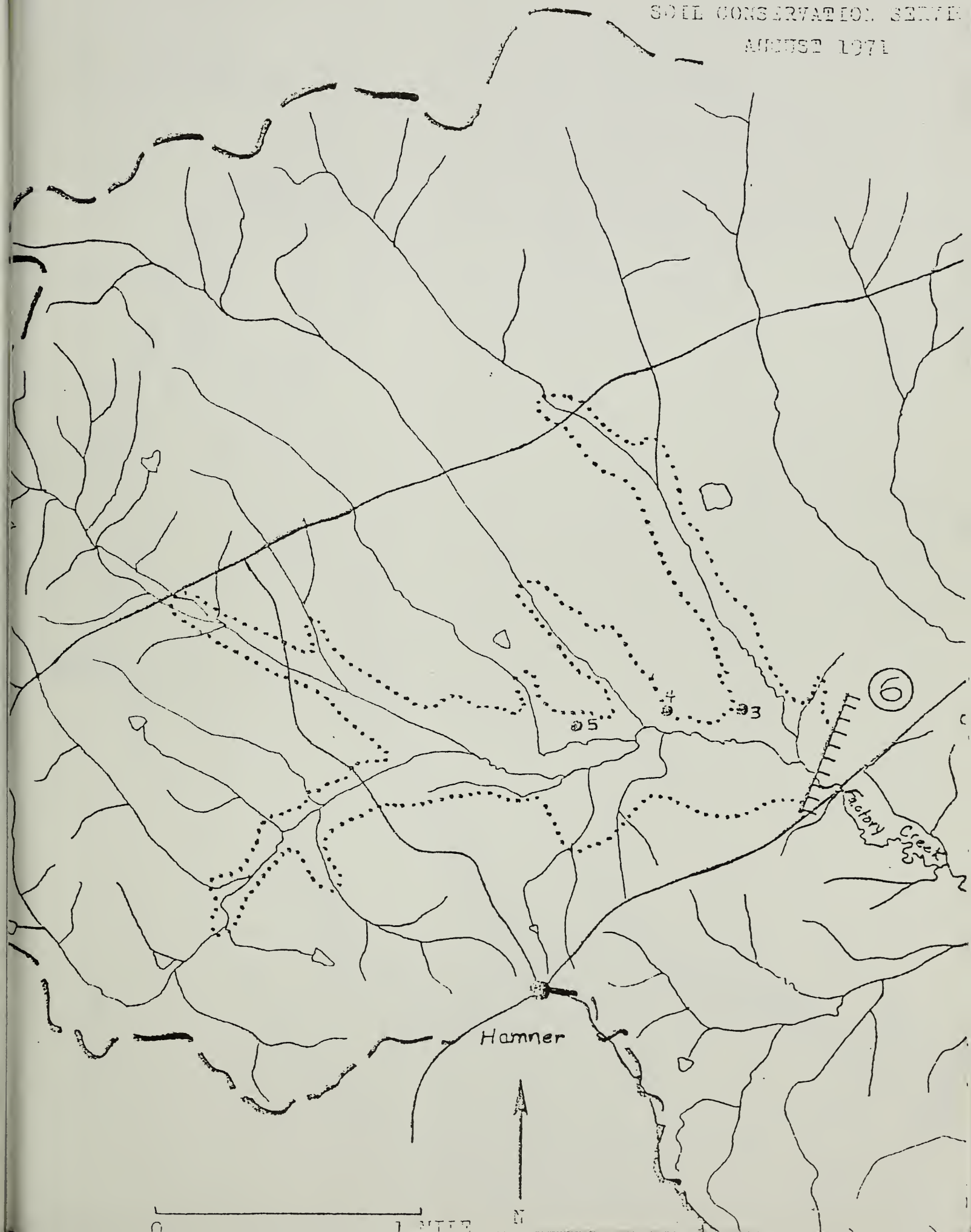


FACTORY CREEK WATERSHED

STATER COUNTY, ALABAMA

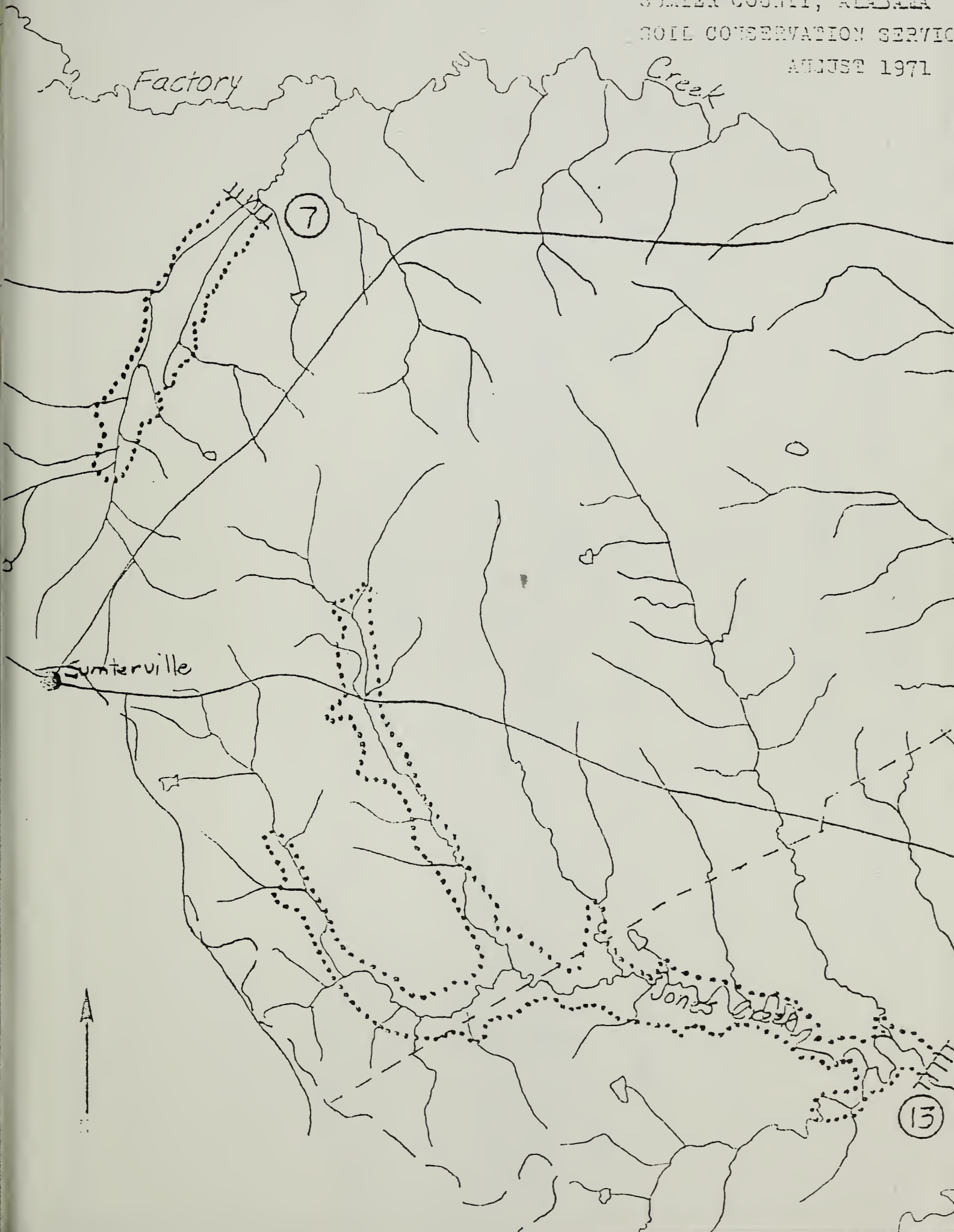
SOIL CONSERVATION SERVICE

AUGUST 1971

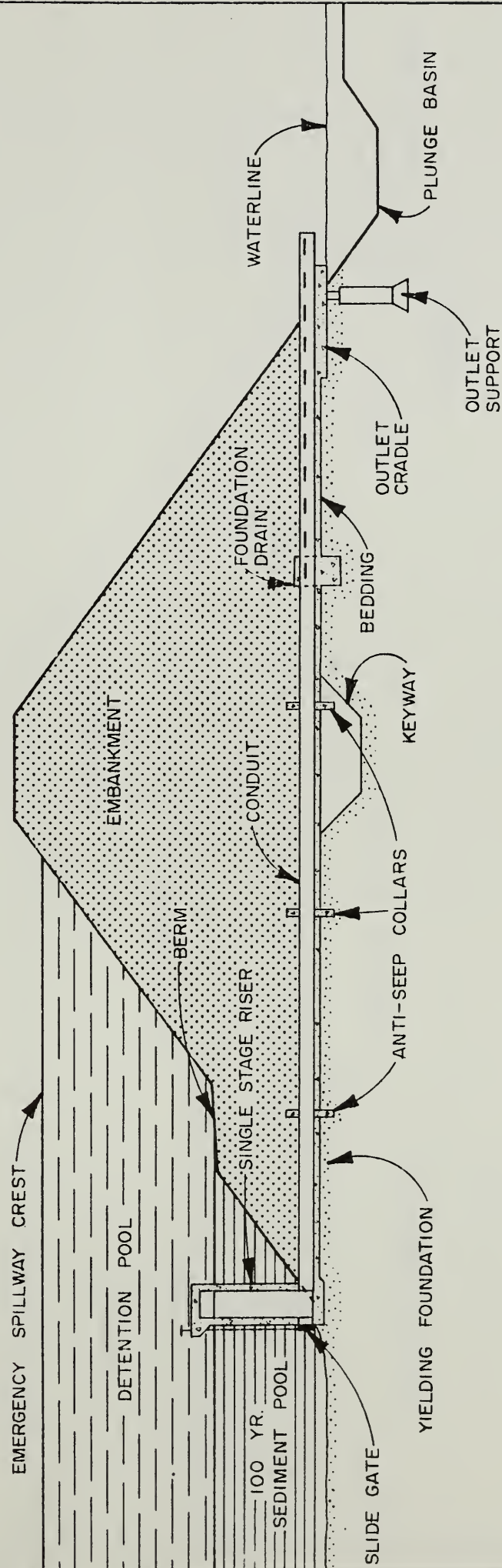




FACTORY CREEK WATERSHED
SUMTER COUNTY, ALABAMA
SOIL CONSERVATION SERVICE
AUGUST 1971

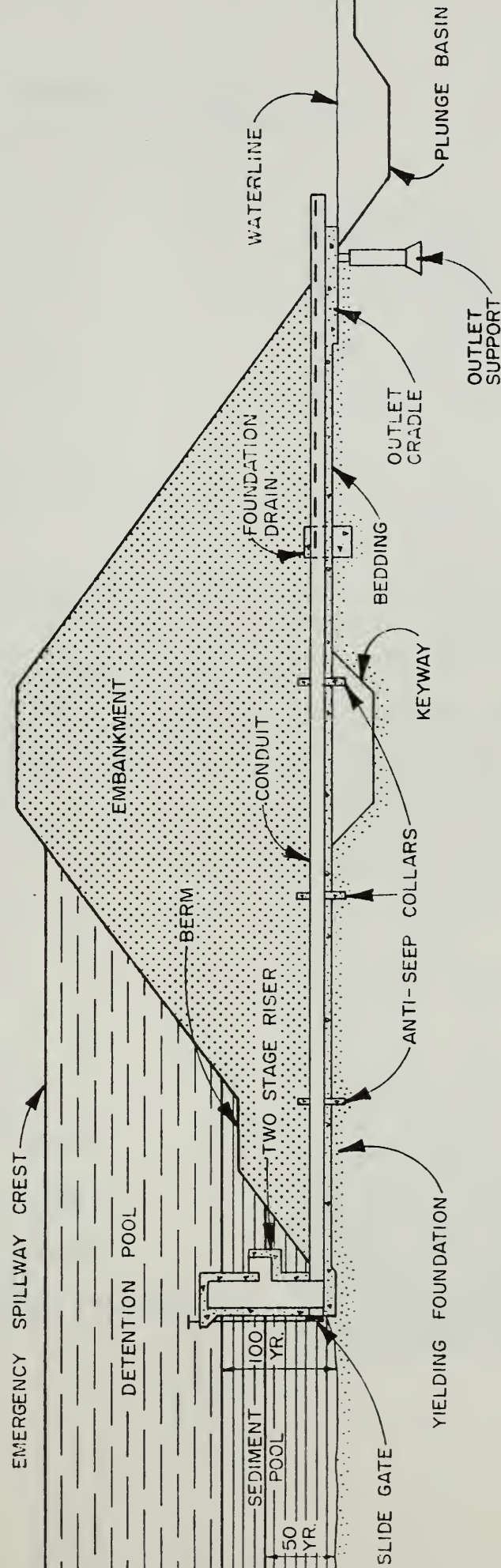






SECTION OF A TYPICAL
FLOODWATER RETARDING STRUCTURE
(Single Stage Riser)





SECTION OF A TYPICAL
FLOODWATER RETARDING STRUCTURE
(Two Stage Riser)

APPENDIX J

COMMON AND SCIENTIFIC NAMES
OF PLANTS AND ANIMALS

Sweetgum	<u>Liquidambar styraciflua</u>
Water Oak	<u>Quercus nigra</u>
Willow Oak	<u>Quercus phellos</u>
Sycamore	<u>Platanus occidentalis</u>
Cottonwood	<u>Populus deltoides</u>
Winged Elm	<u>Ulmus alata</u>
Osage Orange	<u>Maclura pomifera</u>
Persimmon	<u>Diospyros virginiana</u>
Black Willow	<u>Salix nigra</u>
Greenbrier	<u>Smilax spp.</u>
Virginia Creeper	<u>Parthenocissus quinquefolia</u>
Poison Ivy	<u>Rhus radicans</u>
Uniola	<u>Uniola sessiliflora</u>
Crabgrass	<u>Digitaria spp.</u>
Johnson Grass	<u>Sorghum halepense</u>
Ragweed	<u>Ambrosia artemisiifolia</u>
Cocklebur	<u>Xanthium pennsylvanicum</u>
Morning Glories	<u>Ipomea spp.</u>
Camphor Weed	<u>Heterotheca subaxillarius</u>
Dallisgrass	<u>Paspalum dilatatum</u>
White-clover	<u>Trifolium repens</u>
Bahia Grass	<u>Paspalum notatum</u>
Dog Fennel	<u>Eupatorium capillifolium</u>
Vassey-grass	<u>Paspalum urvillei</u>
Smutgrass	<u>Sporobolus porretii</u>
Red Sorrell	<u>Rumex acetosella</u>
Curly Dock	<u>Rumex crispus</u>
Goldenrod	<u>Solidago spp.</u>
Broomsedge	<u>Andropogon virginicus</u>
Bluestem	<u>Andropogon spp.</u>
Sumac	<u>Rhus spp.</u>
Meadow Rue	<u>Thalictrum debile</u>
Schisandra	<u>Schisandra glabra</u>
Turk's Cap	<u>Lilium superbum</u>
Evening Primrose	<u>Oenothera grandiflora</u>
Gerardia	<u>Agalinis heterophylla</u>
Evening Primrose	<u>Oenothera heterophylla</u>
Pennyroyal	<u>Hedeoma drummondii</u>
Strawberry Bush	<u>Euonymus atropurpureus</u>
Horseradish	<u>Armoracia aquatica</u>
Narrow-leaved Trillium	<u>Trillium recurvatum</u>
Sunnybell	<u>Schoenolirion croceum</u>

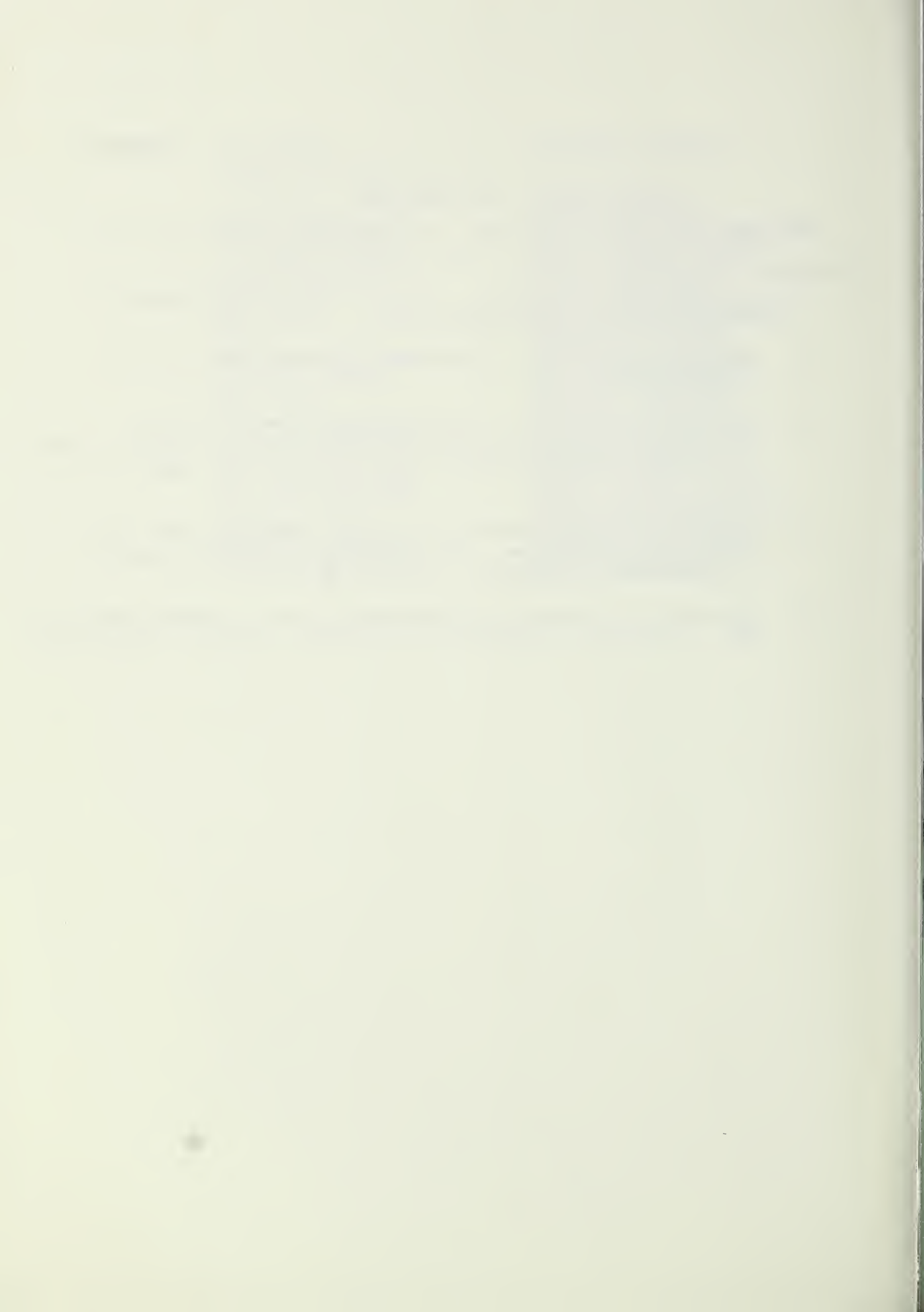
Blue Sucker
Alabama Shovelnose
Sturgeon
Frecklebelly Madtom
Florida Black Bear
Florida Panther
Southeastern Shrew
Golden Eagle
Bald Eagle
Osprey
Red-cockaded Woodpecker
Bachman's Warbler
Wood Stork
Swallow-tailed Kite
Sharp-shinned Hawk
Cooper's Hawk
Red-shouldered Hawk
Swainson's Warbler
Bewick's Wren
Bachman's Sparrow
Peregrin Falcon

Cycleptus elongatus
Scaphirhynchus sp.
Noturus munitus
Ursus americanus floridanus
Felis concolor coryi
Sorex longirostris longirostris
Aquila chrysaetos
Haliaeetus leucocephalus
Pandion haliaetus
Dendrocopos borealis
Vermivora bachmanii
Mycteria americana
Elanoides forficatus
Accipter striatus
Accipter cooperii
Buteo lineatus
Limnothlypis swainsonii
Thryomanes bewickii
Aimophila aestivalis
Falco peregrinus

APPENDIX K

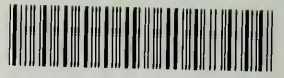
LITERATURE CITED

- 1/ Geological Survey of Alabama. Environmental Geology of an area in West-Central Alabama. Atlas Series 7, 1975.
- 2/ U. S. Department of Commerce. National Oceanic and Atmospheric Administration. Climatological Data.
- 3/ Federal Register. Vol. 42, No. 135 - Thursday, July 14, 1977. pp. 36420-36431.
- 4/ Water Quality Criteria. A Report of the National Technical Advisory Committee to the Secretary of the Interior. April 1, 1968. Federal Water Pollution Control Administration. Washington, D. C. 234 pp.
- 5/ Swingle, H. S. Relationship of pH of Pond Waters to Their Suitability for Fish Culture. Proceedings Pacific Science Congress 9 (1957), Vol. 10, Fisheries. 1961. 4 pp.
- 6/ Symposium on Endangered and Threatened Species in Alabama, March 6-7, 1975. University of Tuscaloosa. Tuscaloosa, Alabama. Unpublished.





R0000 903567



R0000 903567