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SECOND BROAD RIVER WATERSHED

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FINAL ENVIRONMENTAL IMPACT STATEMENT

McDowell, Rutherford, and Cleveland Counties
North Carolina



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Second Broad River Watershed
Rutherford, McDowell, and Cleveland Counties, North Carolina

Final Environmental Impact Statement

Jesse L. Hicks
State Conservationist
Soil Conservation Service

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Sponsoring Local Organizations

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Rutherford Soil and Water Conservation District
Sevil Horn, Chairman
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McDowell Soil and Water Conservation District
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August 1975

Prepared by:

United States Department of Agriculture
Soil Conservation Service
Raleigh, North Carolina 27611

USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT

for

Second Broad River Watershed

Rutherford, Cleveland, and McDowell Counties, North Carolina

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USDA ENVIRONMENTAL IMPACT STATEMENT

Second Broad River Watershed
Rutherford, McDowell, and Cleveland Counties,
North Carolina

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

SUMMARY SHEET

- I Final
- II Soil Conservation Service
- III Administrative
- IV Brief Description of Action: This action is a watershed project to be carried out in Second Broad River Watershed (parts of Rutherford, Cleveland, and McDowell Counties, North Carolina) under the provisions of Public Law 566. The project proposes conservation land treatment over the watershed, 10 single-purpose floodwater retarding structures, and two multiple-purpose structures (floodwater retention and recreation).
- V Summary of Environmental Impact and Adverse Environmental Effects: Create 79 jobs during project installation; create 29 jobs for project life; improve income of watershed residents; reduce gross erosion by 30 percent; reduce overbank sediment deposition damages 60 percent; reduce sediment damages to reservoirs 55 percent; reduce floodwater damages to crops, pasture, and other agricultural property by 65 percent; reduce sediment transported to the mouth of the watershed by 21,150 tons (65 mg/l) annually; provide 152,000 visitor-days of recreation annually; create 470 surface acres of fishery habitat; create 19 acres of managed waterfowl feeding area; provide 323 acres for upland wildlife habitat; reduce sediment associated pollutants; stabilize 430 acres of critical eroding land; locate areas of archaeological significance; temporarily increase sedimentation during construction; eliminate 10 miles of stream fishery habitat; eliminate 470 acres of wildlife habitat; eliminate 399 acres of productive forest land.
- VI Alternatives considered: Accelerated land treatment program; diking and pumping with land treatment; floodwater-retarding structures with land treatment; channel work; flood plain purchase; other considerations; and no project.

VII Departments, Agencies etc., and Others From Which Written Comments Have Been Received: U. S. Department of Health, Education, and Welfare, U. S. Department of Transportation; U. S. Department of the Army; U. S. Department of the Interior; U. S. Environmental Protection Agency; North Carolina Department of Natural and Economic Resources, Division of Natural and Economic Resources, Division of Environmental Management, State Soil and Water Conservation Committee, Division of Forest Resources, Wildlife Resources Commission, Office of Assistant Secretary; North Carolina Department of Human Resources, Division of Health Services; North Carolina Department of Cultural Resources; North Carolina Department of Administration (State Clearinghouse), Office of Intergovernmental Relations; North Carolina State University, Agricultural Extension Service; Sierra Club, Joseph Le Conte Chapter.

VIII Draft Statement received by CEQ on April 11, 1975.

USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

Second Broad River Watershed
Rutherford, McDowell, and Cleveland Counties, North Carolina

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

SPONSORING LOCAL ORGANIZATIONS

Rutherford County Watershed Commission
Rutherford Soil and Water Conservation District
McDowell Soil and Water Conservation District

PROJECT PURPOSES AND GOALS

The purposes of this project are watershed protection, flood damage reduction, the provision of water-based recreational facilities, and the improvement of wildlife resources within the watershed.

The goal for the watershed protection function of the project is the adequate conservation treatment of 50 percent of all the cropland and 83 percent of all the pastureland and hayland in the watershed and the development of plans on 65 percent of the farms in the watershed. Application of the conservation treatment on the crop and pasture land, as well as the forestry improvement measures, will represent an important step toward enhancing and protecting the overall environmental quality of the watershed.

The purpose of flood damage reduction has as its goal the reduction of flood damages to cropland, pastureland, agricultural property, roads and bridges, and other property to the maximum extent that would be economically feasible and possible under P. L. 566.

The project will also provide two multiple-purpose structures which are intended to greatly enhance the water-based recreational needs of the watershed over the life of the project. These two structures will provide 152,000 visitor-days of recreation in the watershed annually.

The purpose of fish and wildlife enhancement has as its goal the management of 323 acres specifically for upland wildlife (food plantings, cover, etc.), the management of 19 acres specifically for waterfowl in the structures, and the enhancement and protection of the smallmouth bass habitat in Second Broad River through sediment reduction and a cold-water release device on structures 11, 22 and 23.

PLANNED PROJECT

Land Treatment

This phase of the watershed project involves an accelerated land treatment program on 15,795 acres of cropland, grassland, and miscellaneous land and forest land treatment measures on 24,223 acres. Technical assistance for planning and installation of land treatment measures will be provided by the Soil Conservation Service through the Rutherford and McDowell Soil and Water Conservation Districts. The North Carolina Division of Forest Resources in cooperation with the U. S. Forest Service will provide the technical assistance for planning and installing all forestry measures.

The planned land treatment measures are necessary to properly conserve, develop, and improve land and to insure realization of benefits which justify structural measures. Cropland, grassland, and miscellaneous land treatment includes vegetative and mechanical measures. Vegetative measures will consist of conservation cropping systems, crop residue use, field border planting, stripcropping, minimum tillage, and pastureland and hayland planting and management. Mechanical measures will include contour farming, grassed waterways, diversions, terracing, subsurface and open drains, and land smoothing. Planned forestry measures include tree planting for critical area stabilization and watershed protection, stand improvement measures, and continuation of the present Cooperative Forest Fire Control Program.

Land treatment on both cropland and forestland may involve a combination of several practices to obtain an adequate level of treatment. Therefore, a particular acre may be included more than once in the following description of individual practices, and the summation of acres to be treated by individual practices will exceed the actual acres to be treated. Land adequately treated is defined as land used within its capability on which the conservation practices that are essential to its protection and planned improvement have been applied.

Approximately 430 acres of critically eroding areas will be treated. (See Figure 1). Of these 430 acres, 273 will be planted to trees and 157 will be planted in grasses and legumes. Some of the critical areas (82 acres) are located above the planned reservoirs. The sponsors are responsible for treating 75 percent (62 acres) of the critical areas before the advertisement of bids for construction of the reservoirs.

The planned project includes the use of conservation cropping systems on 2,026 acres. Conservation cropping systems are used to protect the soil against erosion, maintain its fertility, and to aid in the control of insects and diseases.

CRITICAL SEDIMENT AREAS



Severe eorsion and sediment resulted when a new shopping center area was graded in 1969 and left with no protective vegetation. This is near Spindale in Rutherford County.



This abandoned dirt road has been ravaged by erosion, causing heavy siltation. This area will be painted to trees. It is near Camp Creek in Rutherford County.

Figure 1

Planned Project

Cover crops are planned for use on 1,109 acres. The cover crop protects the soil from erosion, adds organic matter, and generally improves the soil tilth.

Grasses and legumes in rotation are planned on 427 acres as part of conservation cropping systems. They are established for a definite number of years to produce forage, reduce soil and water loss, supply organic matter, and improve soil productivity. Crop residue use will be initiated on 1,423 acres also for the purpose of adding organic matter and improving growing conditions in the soil. (See Figure 2).

Minimum tillage incorporates the use of chemical and limited cultural operations to keep the disturbance of the soil to a minimum. (See Figure 3). This measure will be used on 1,049 acres.

A total of 27,900 linear feet of field border planting is planned for the watershed. The field border is a strip of perennial vegetation established at the edge of a field to prevent erosion, reduce competition from adjacent forestland, provide wildlife food and cover, and improve the appearance of the field. (See Figure 4).

Stripcropping is another practice used to reduce soil erosion and control water. It will be used on 262 acres as part of the land treatment program. (See Figure 5).

There are 1,884 acres of pastureland and hayland in the watershed that are scheduled to be brought under an improved management program. New pastureland and hayland will be established on 7,300 acres. (See Figure 6). The main areas where the new pastureland and hayland will be established are presently areas of idle land or areas which are presently being used for crops where the land is not suitable for crops. This will represent a significant conversion of land to a more desirable and suitable use.

One of the most beneficial mechanical conservation practices to be applied to the sloping cropland is contour farming. (See Figure 7) Contour farming will be used on 1,749 acres of sloping cropland in the watershed.

A second mechanical measure planned involves terracing, oftentimes needed in conjunction with contour farming to intercept runoff water and remove it at a non-erosive velocity. (See Figure 8) The goal for this project is installation of 349,800 linear feet of terrace systems on the sloping cropland.

The diversion (See Figure 9) is very similar to a terrace except its location and purpose are different. Its purpose is to divert undesirable or excess water from one area to another where it can be used or disposed of safely. Approximately 52,420 linear feet of diversions will be built.

CROP RESIDUE USE



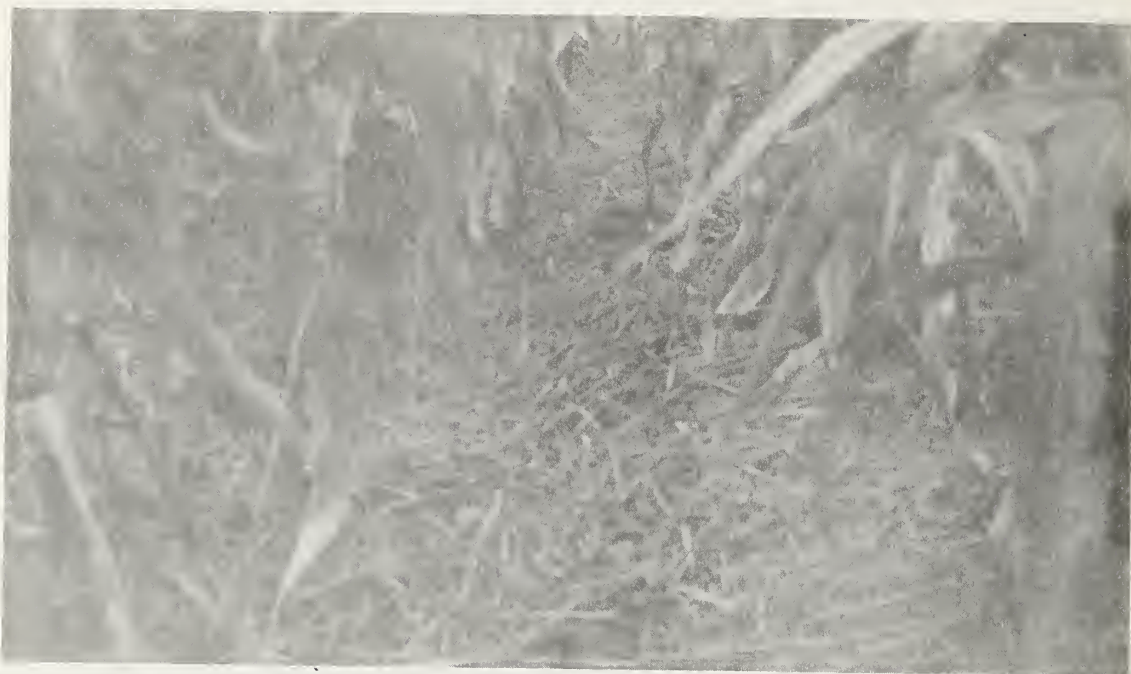
After this corn is harvested, pulverized stalks and other residue will remain to protect the soil through the winter. Plowed under in the spring, the residue will provide organic nutrients to the soil. This field is near Sunshine in Rutherford County.



A corn crop was produced on this field near Gilkey, in Rutherford County, by minimum tillage cultivation. Fescue, which acted as a mulch between rows, is still visible.

Figure 2

MINIMUM TILLAGE



This corn near Lamb's Store (Rutherford County) is planted in rye residue by minimum tillage. Residue gives a protective covering to the ground.



This is minimum tillage planting with row crop being planted in grass. Note the chemical sprays behind the planter. In a single operation seed is planted, fertilizer applied, and chemicals added. This is near Old Springs Church in Rutherford County.

Figure 3

FIELD BORDERS



Fescue has been planted along the edge of this road near Oakland, in Rutherford County, to constitute a field border to the field at right, which is planted in small grain.



A wide grassy strip forms a field border around this field. The wide area provides turning room for farm equipment and also prevents "erosion".

Figure 4

STRIPCROPPING



Stripcropping on this field in Rutherford County has alternate bands of alfalfa and corn; the corn has just started to emerge in rows at center.



Here stripcropping--planting alternate "strips" of different crops--has small grain planted between grass strips. Location - Rutherford County.

Figure 5

PASTURELAND AND HAYLAND MANAGEMENT



Holstein cattle graze on excellent fescue pasture near Rutherfordton. Good management really paid off here!



Although seeded less than a year, this three-acre field of alfalfa in Rutherford County has already produced 165 bales of hay, and four to five tons a year per acre is expected. Hayland planting is an important part of this watershed project.

CONTOUR FARMING



This Rutherford County apple orchard is planted on land contours. Notice the well-established fescue between the apple trees.



Planting row crops on the contour is one of the most effective methods of combating soil erosion on sloping cropland. This field is in Mecklenburg County.

Figure 7

TERRACES

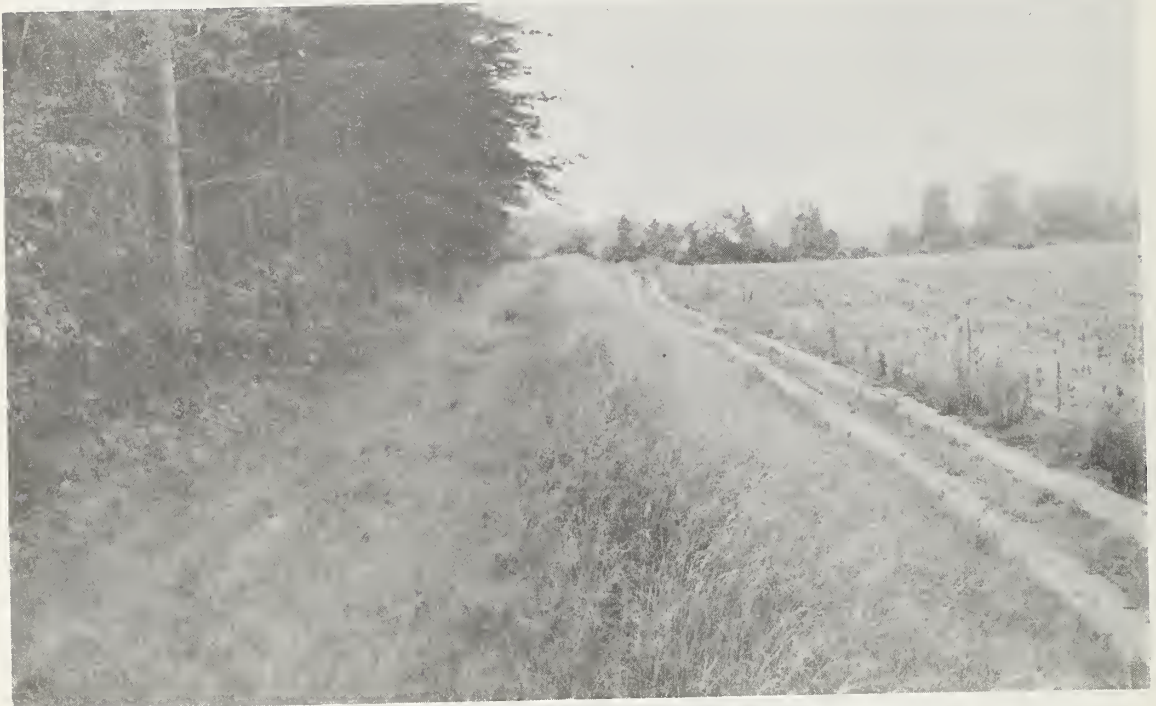


This grader is constructing a terrace in Rutherford County, leaving a ridge and channel at left to convey water. Apple trees will be planted along the ridge of the terrace.



Terraces work well on this steeply sloping field to intercept water and carry it safely off the field. Notice channels between the ridges.

DIVERSIONS



This diversion between the forestland and cultivated field at right protects the 14 acres of Rutherford County bottom land from water which runs from higher ground behind the forested area.



This diversion, at left center in photo, routes water around the cultivated field at right.

Figure 9

Another land treatment practice involves the use of grassed waterways (See Figure 10) as outlets for terrace systems or other places where runoff tends to accumulate. A total of 46 acres of waterways will be installed.

Approximately 29,415 linear feet of subsurface drains, 8,880 linear feet of drainage mains and laterals, and 2,220 linear feet of field ditches will be installed. The subsurface drains and some of the open drains will serve to lower the water table on areas having drainage problems. (See Figure 11)

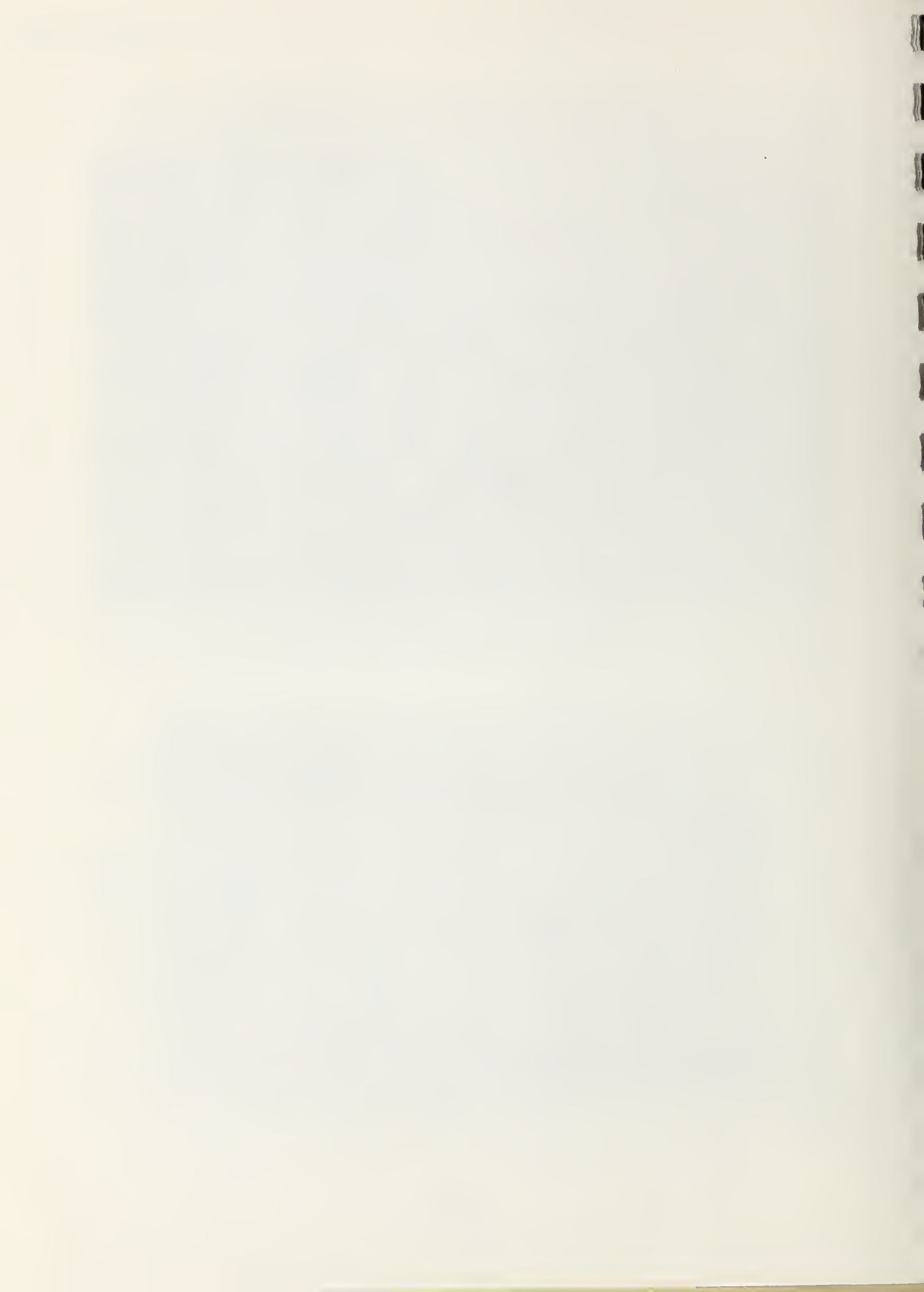
Land smoothing which will be done on 282 acres involves the removal of surface irregularities such as depressions, mounds, old terraces, and turn rows by use of special equipment. This practice is used to improve surface drainage, provide for more effective use of precipitation and to facilitate cultivation.

A total of 342 acres will be managed as wildlife habitat. This includes wildlife plantings (food and cover plants) on 274 acres, improvement and a higher level of management on 49 acres of existing habitat, and management of 19 acres of wetland habitat in three of the floodwater retarding structures.

An estimated 1,480 acres of cropland and 1,265 acres of pastureland and hayland will receive partial treatment. This will be in addition to the acres of crop and pasture land described previously which will receive adequate treatment. Partially treated land has had one or more conservation measures applied on it, but it still needs other measures to be fully and adequately treated.

An estimated 44,000 acres of soil mapping will be needed during the project installation period to successfully carry out the planned measures. About 60 percent of this mapping will be accomplished as part of the accelerated technical assistance and 40 percent will be done under the present soil and water conservation district program.

The forestry phase of the land treatment program involves a forest management program, including tree planting on 273 acres of critically eroding land, as mentioned previously; 8,180 acres of tree planting for watershed protection; and stand improvement measures on 15,770 acres of forestland. Of these 15,770 acres, 12,370 acres are in private ownership and 3,400 acres are in industrial ownership. The tree planting will serve the purpose of controlling erosion, reinforcing understocked stands and replacement of less desirable species, and improving the natural beauty and aesthetic value of the treated forestland (see Figures 12 and 13). The continued increase in efficiency and effectiveness of fire control activities through the going Cooperative Forest Fire Control Program will keep pace with any future increase in hazard or risk of forest fire. All forestry measures will be carried out with maximum precautions for preventing forest fires.



GRASSED WATERWAYS

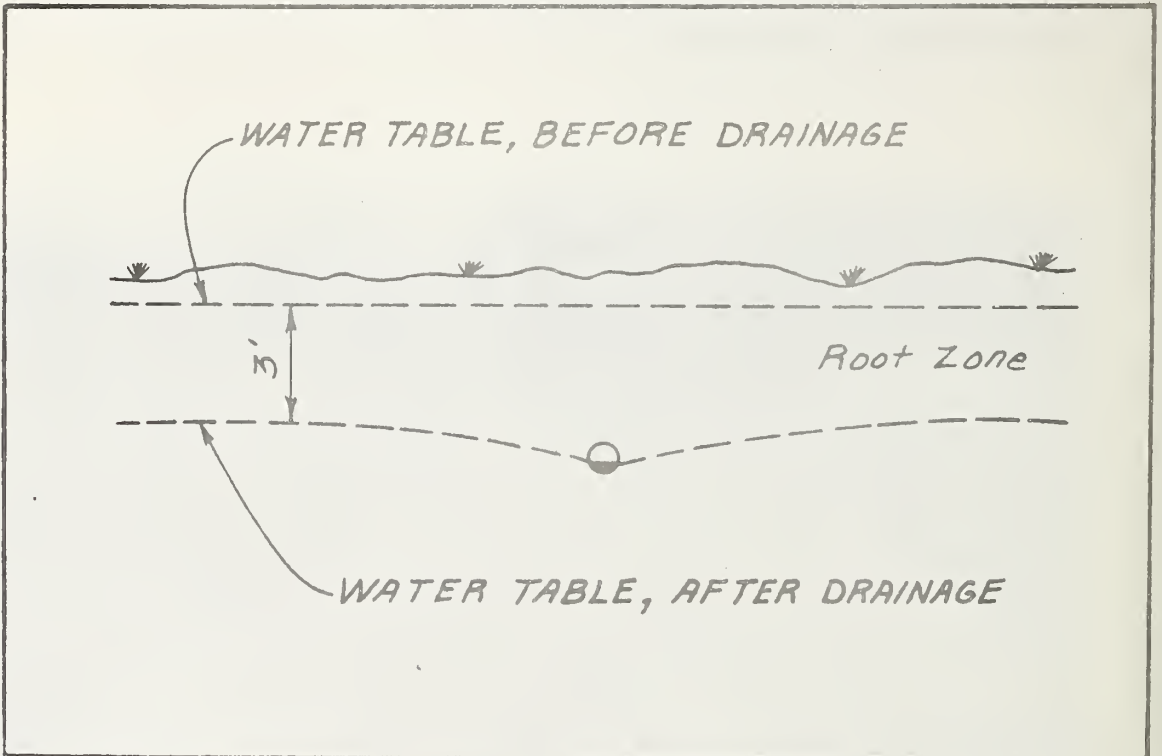
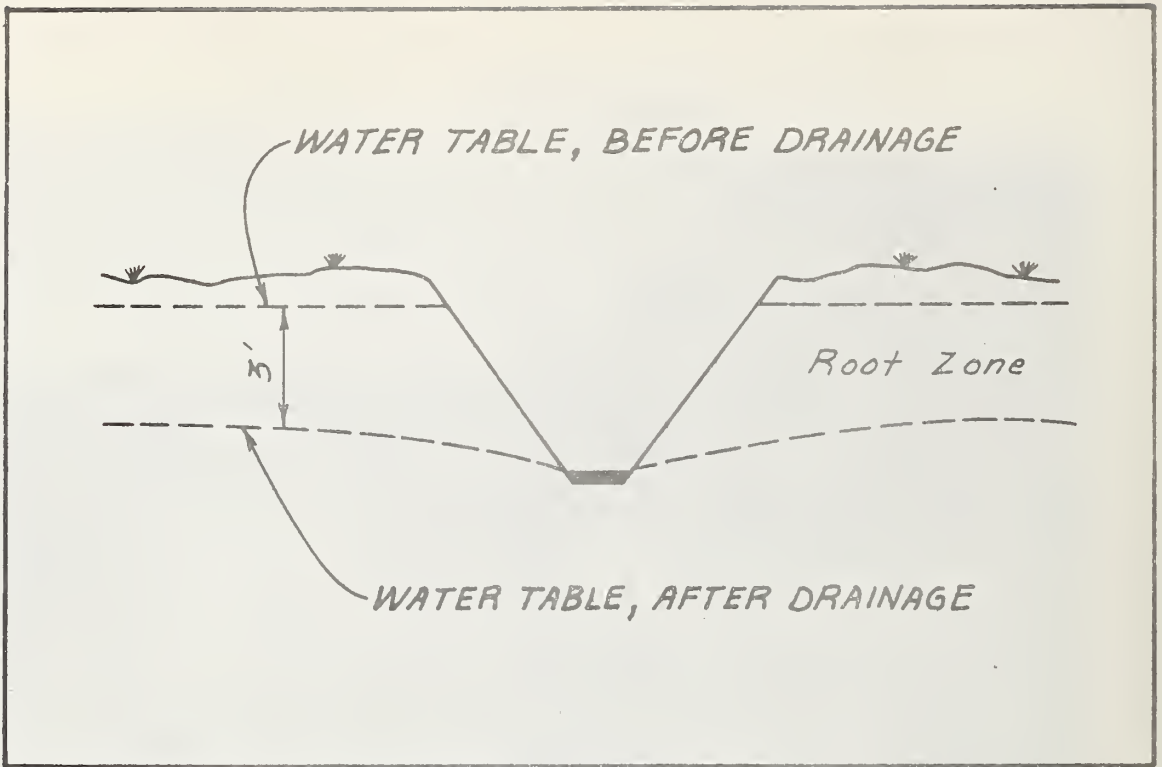


This grassed waterway safely disposes of surplus water in this Rutherford County apple orchard.



This grassed waterway between two planted areas of soybeans does a good job carrying water from contoured crops.

Figure 10



TILE AND OPEN DRAINS

Figure 11

TREE PLANTING



A Properly Thinned Pine Forest

Periodic thinning during the life of a pine or hardwood forest is necessary to provide adequate growing space, assure optimum increment, and maintain healthy growing conditions.

(N. C. Division of Forestry Photo)

Figure 12

SEEDED LOGGING ROAD



A properly engineered and maintained forest road system provides permanent access with minimum damage to other forest resource values. This road was seeded to grass after forest improvement measures were completed. It now helps to control erosion, provides food and open space habitat for wildlife, serves as a trail for hikers and hunters, provides access for forest fire protection.

(U. S. Forest Service Photo)

Figure 13

The forest management program is aimed at meeting watershed needs and objectives. The forestlands will be managed to fulfill timber, wildlife, and recreation needs to the extent that such management is compatible with the overall watershed management. Hardwoods will be maintained on suitable hardwood sites and pine-hardwood mixtures will be encouraged on pine lands. A balance will be maintained between food-bearing, den, and potential timber trees. Any problems arising from urban development taking place in the forested part of the watershed will be alleviated through the co-ordinated effort of the watershed forester and planning commissions, land developers, or the particular organization involved.

The North Carolina Division of Forest Resources, with guidance from the North Carolina Wildlife Resources Commission, will provide technical assistance to forestland owners in the planning and application of forestland wildlife habitat improvement practices.

It is estimated that conservation plans will be developed for an additional 394 units during the project installation period and that 376 additional landowners will enter into co-operative agreements with soil and water conservation districts for assistance in installing land treatment measures. These plans will cover forest areas as well as cropland and pastureland.

Structural Measures

Proposed structural works of improvement consist of two multiple-purpose structures (one with a complete recreational development and one with water resource improvement for recreation) and 10 single-purpose floodwater retarding structures.

The single-purpose floodwater retarding structure is a structure designed to provide for temporary floodwater storage and for its controlled release. (See Figure 14). The only additional storage in this structure is that provided for sediment anticipated to accumulate in the structure over its designed life. (See Figure 15). A multiple-purpose structure has storage capacity for one or more beneficial uses (e.g. recreation) in addition to its floodwater and sediment storage. (See Figure 16). The multiple-purpose structures in this project are designated as Numbers 2 and 3A. (See project map). All proposed structures are designed for a 100-year life and will thus have 100-year sediment storage. However, 297 acre-feet of storage capacity allotted to sediment in the 12 structures will initially be available for floodwater storage.

The 10 single-purpose structures will control the runoff from 21,958 acres (15%) of the watershed. The two multiple-purpose structures will control an additional 6,413 acres and the total area controlled by structures will be 28,371 acres (20% of watershed).

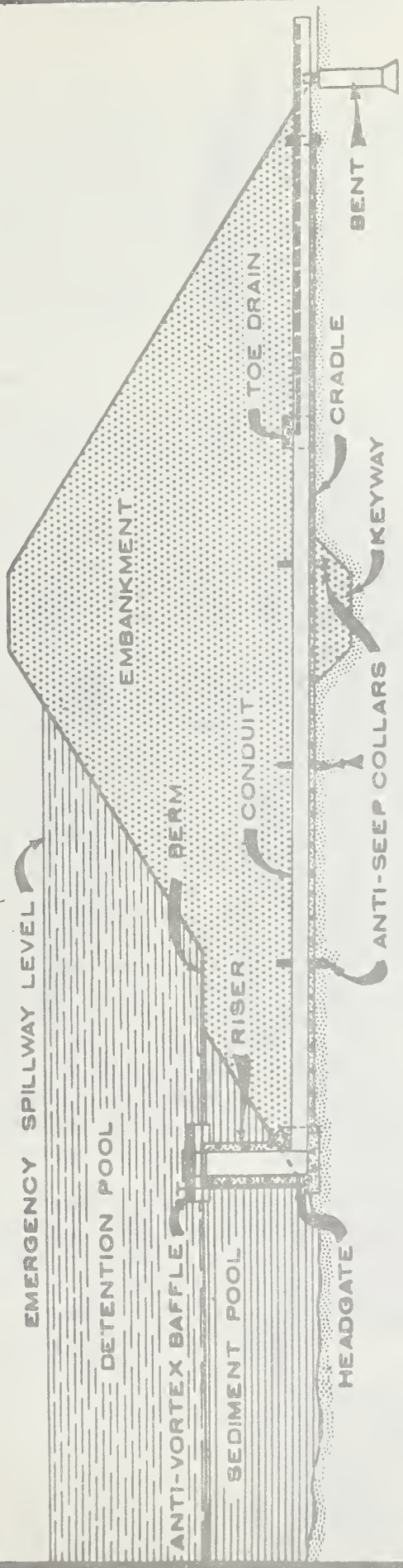
FLOODWATER RETARDING STRUCTURES



A recently constructed floodwater retarding structure on the Stewarts Creek-Lovills Creek Watershed Project in North Carolina.

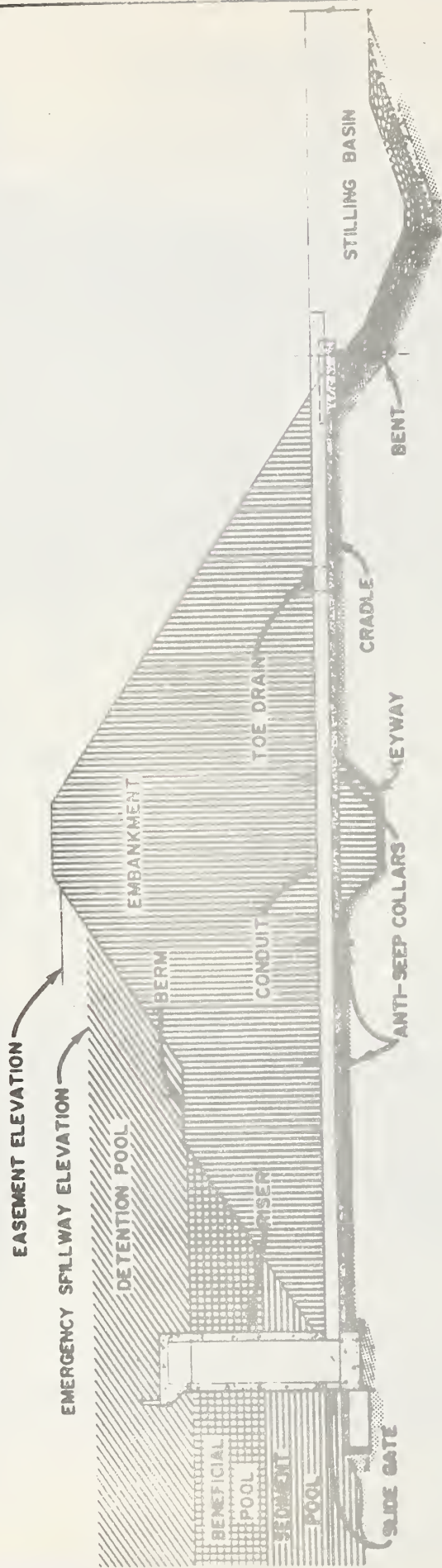


Another view of the same structure showing the dam and concrete riser.



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

Figure 15



SECTION OF A TYPICAL
MULTIPLE - PURPOSE STRUCTURE

Figure 16

Structures 4, 13, 16, and 22 are considered as hazard class "a", Structures 1A, 2, 3A, 7A, 10A, 14, and 23 are hazard class "b" while one structure, No. 11, is considered as hazard class "c". However, all structures, with the exception of No. 11, are designed using "b" criteria; that is, the emergency spillway will operate on the average of once in a 50-year period. The emergency spillway of Structure No. 11 will operate on the average of only once in a 100-year period. All emergency spillways will be excavated and vegetated while principal spillway systems will consist of reinforced concrete risers with reinforced concrete pipe through the dam.

Foundation conditions for the dam and emergency spillway of the proposed structures will be yielding. Sufficient fill material (silts and clays - MH and ML) for the dam will be available from the emergency spillway areas and sediment pools. All structure sites will be cleared up to the lesser of (a) two feet vertically from the normal pool or (b) 15 feet horizontally from the normal pools. From a point 1.5 feet below the normal pool up to the upper limit of clearing all trees, brush, etc., will be cut off flush with the ground. Below this point tree stumps may be left no higher than one foot above the ground surface.

The 10 floodwater retarding structures will have a total floodwater storage capacity of 7,888 acre-feet. Capacities of individual structures will range from 344 acre-feet of floodwater storage in the smallest structure to 1,574 acre-feet in the largest structure. The total volume allotted for sediment in the structures amounts to 1,750 acre-feet. The floodwater retarding pool (area inundated when all the floodwater storage capacity is used) will range from 25 to 140 surface acres in the individual structures while the height of the dam will range from 37 feet to 61.0 feet.

Multiple-purpose Structure No. 2, to be located on Catheys Creek, will have a compacted earthfill dam (62.5 feet high) with a 36-inch reinforced concrete pipe through the dam. Its reinforced concrete riser will set the elevation of the recreation pool at 1,035.5 feet mean sea level. At this elevation the pool will have 155 surface acres for recreation with 49 of these 155 acres being in the sediment pool. Sediment storage will be 392 acre-feet while 2,000 acre-feet of recreational storage will be provided. The emergency spillway elevation will be at 1,046.5 feet mean sea level, enabling the structure to temporarily store 2,025 acre-feet of floodwater and control the runoff from 4,314 acres.

Multiple-purpose Structure No. 3A, planned on Little Camp Creek, will have a compacted earthfill dam (52 feet high) with a 30-inch reinforced concrete pipe through the dam. The reinforced concrete riser will set the elevation of the permanent pool at 953.0 feet mean sea level. There will be 103 surface acres for recreation in the structure of which 23 acres are located in the sediment pool. Sediment storage capacity is 137 acre-feet and beneficial storage amounts to 1,476 acre-feet. The emergency spillway

Planned Project

will be set at elevation 960.5 feet mean sea level, allowing for the temporary storage of 843 acre-feet of floodwater. Run-off from 2,099 acres will be controlled by Structure 3A.

A complete recreational development will be constructed in connection with Structure 2. This development will include camping facilities (primitive and trailer), picnic facilities, sanitary facilities (restroom comfort station, sewage disposal system), swimming and boating facilities, a water and electrical distribution system, access facilities, etc. (See recreational development map for further details.) The design of these facilities will be done by a private engineering firm under the provisions of an architectural and engineering contract negotiated by the Soil Conservation Service and the Rutherford County Watershed Commission. Daily design loads and design capacities for the development are as follows:

	<u>Design Load</u>	<u>Design Capacity</u>
Trailer camping	160	160
Primitive camping	200	200
Swimming	800	600
Boating and fishing	210	210
Picnicking	<u>750</u>	<u>500</u>
Total	2,120	1,670

The physical characteristics of the recreation area planned at Structure 2 will allow septic treatment of sewage. Construction of the system will be in compliance with all county health rules and regulations.

Recreational facilities will also be designed to accommodate the handi-capped.

Construction of Structure 2 will require the raising of Secondary Road 1321. It will be carried across the lake on a causeway during the construction of the structure.

Structure 3A will have, as a minimum, a public access road, parking lot, boat ramp and dock, and sanitary facilities as part of the water resource improvement for recreation.

The sponsors will discourage recreational use at the 10 single-purpose structures where there will be no public access or sanitary facilities. This will be done by fencing, posting, or patrolling by enforcement officers.

All structures will be constructed in accordance with the North Carolina Division of Health Services "Regulation on Control of Impounded Water" and will be constructed in accordance with the intent of the North Carolina Sediment Control Act of 1973.

Planned Project

Installation of the proposed structures will involve a certain number of modifications to fixed works of improvement. Following is a summary of those modifications by structures:

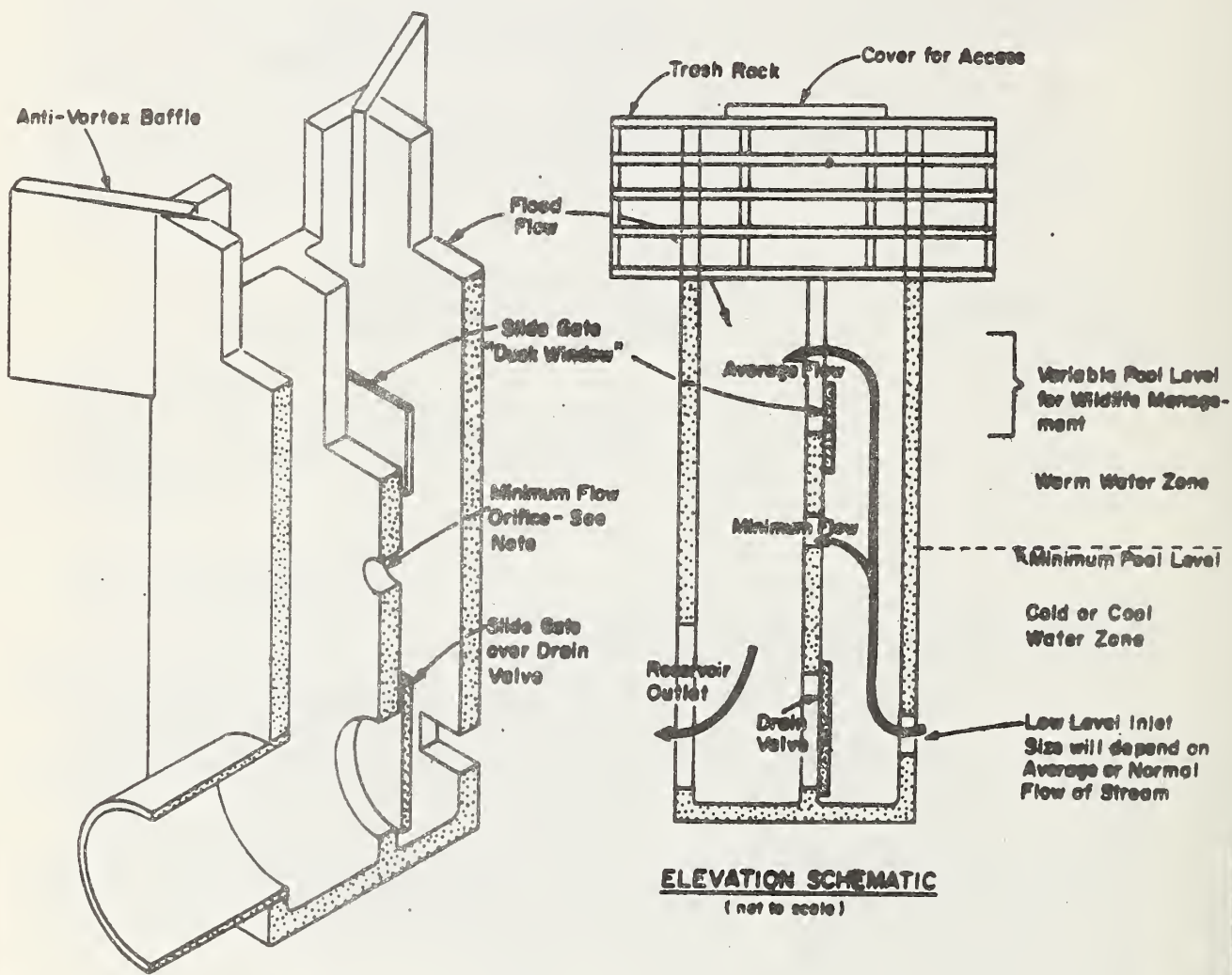
<u>Structures</u>	<u>Modification Required</u>
1A	Public road alteration Power line modification Telephone line modification
2	Public road alteration Power line alteration
7A	Public road alteration
11	Public road alteration Power line modification Telephone line modification
14	Public road alteration Power line alteration Telephone line modification
23	Power line alteration

Also involved with structural measures will be the displacement of 12 persons from farms and four persons from dwellings as defined by the Uniform Relocation and Real Properties Acquisition Act.

Land rights on 1,449 acres will be required for installation of the proposed structures. The 10 single-purpose structures will require 848 acres for their installation while 405 acres will be needed for Structure 2 and 168 acres for Structure 3A. Flowage easements on about 10 acres will also be needed in connection with No. 2. In addition, 140 acres around Structure 2 (see recreational development map) will have to be purchased for the recreational development and three acres around Structure 3A will be bought to provide public access. Shoreline access will be limited to the recreational development areas of Structures 2 and 3A.

All planned structures will have installed an ungated orifice to provide continuous automatic release from the sediment pool. The purpose of this orifice is to insure that downstream flow will be maintained during periods of minimum flow to the reservoir. The orifice will be located a minimum of two feet below the sediment pool. (See Figure 17) It will be sized to maintain a downstream flow at least equal to the 10-year, seven-day low flow in the stream; that is, the lowest average flow that could be expected

EXAMPLE OF A MINIMUM-FLOW ORIFICE,
DUCK WINDOW, AND COLD-WATER
RELEASE SYSTEM



CUTAWAY VIEW
(not to scale)

ELEVATION SCHEMATIC
(not to scale)

Note: Minimum Flow Orifice Size will depend on 7 Day 10 Year Minimum Flow of Record.

Minimum Flow Orifice Provides Downstream Flow during Periods of Minimum Inflow to Reservoir.

DROP INLET STRUCTURE WITH INTERIOR WILDLIFE GATE, LOW LEVEL INLET, DRAIN VALVE AND MINIMUM FLOW ORIFICE

4-88FW-70

PLATE 2

Planned Project

to occur in the stream for seven consecutive days on the average of once in 10 years. This release rate, as obtained from information published by the U. S. Geological Survey, is 0.30 cubic feet per second per square mile of controlled drainage area. Under normal conditions, the water release through this orifice will be negligible when compared to the normal outflow from the structure.

Single-purpose floodwater retarding Structures 11, 22, and 23 will have duck windows and cold-water release devices installed. The cold-water release will be located at such depth in each of the structures as to assure the most efficient and successful operation possible. The duck window will consist of a movable metal gate which will permit fluctuation of the sediment pool by as much as three feet. (See Figure 17) This will enable duck and wildlife food to be planted along the edge of the water during the spring and summer. During winter, these areas can be flooded and waterfowl will have a feeding area.

The cold-water release device will consist of an auxiliary riser, open at top and bottom, which will be attached to the principal spillway. A gate will be at the top of the principal spillway so that normal flow will enter the bottom of the auxiliary spillway and be discharged into the principal spillway. (See Figure 17) During periods of heavy inflow, water will enter the top of the principal spillway as well as the auxiliary spillway. By use of this device, water discharged from the structure will normally be coming from the bottom of the pool where water temperatures are cooler.

All exposed embankment areas, spillways, borrow areas, and other areas disturbed during construction will be vegetated. Selected borrow areas will be planted to wildlife food and cover plants.

Sediment control during construction will be accomplished by: (a) installation of sediment traps on each side of the stream above and below the dams; (b) installation of diversions above and below borrow areas and other disturbed areas to divert sediment loaded runoff into the sediment traps; (c) clearing only those areas immediately needed for use as construction progresses; and (d) temporary vegetative and mechanical erosion control measures during winter shutdown.

A contract was let with the North Carolina Department of Cultural Resources Division of Archives and History, for an investigation of the proposed structure sites to determine if there are items of archaeological or historical significance that would be affected by the structures. Based on the investigation, the National Park Service, U.S.D.I., has determined that the six sites recommended in the report for additional investigation and evaluation are eligible for listing in the National Register of Historic Places.

If any previously unidentified evidence of cultural values are discovered during detailed investigations or construction, the National Park Service will be notified and procedures in PL 93-291 followed. Since this is a federally assisted local project, there will be no change in the existing responsibilities of any federal agency under Executive Order 11593 with respect to archaeological and historical resources.

Land-Use Changes

Installation of planned land treatment and structural measures will require adjustments in land use in the watershed. The following table illustrates the general land-use changes resulting from the project (See also the Land Use Diagram on page 58):

<u>Land Use</u>	<u>Before Project</u>	<u>After Project</u>	<u>Changes</u>	
	<u>Installation</u> (acres)	<u>Installation</u> (acres)	<u>Acres</u>	<u>Percent</u>
Cropland	17,263	16,258	-1,005	- 6
Grassland	14,691	20,565	+5,874	+40
Forestland	94,693	95,966	+1,273	+ 1
Idle Land	8,097	265	-7,832	-97
Miscellaneous Land (roads, urban, etc.)	9,556	11,246	+1,690	+18

Part of these land-use changes will occur in the flood plain below the proposed reservoirs. Following is a brief summary of these changes:

<u>Land Use</u>	<u>Below Structures</u> <u>Without Project</u> (acres)	<u>Below Structures</u> <u>With Project</u> (acres)
Crop and Pastureland	2,589	3,047
Idle, Miscellaneous, Open Land	570	201
Forestland	<u>1,525</u>	<u>1,436</u>
Total	4,684	4,684

The 12 structures planned for this project will permanently commit to water 543 acres, of which 295 are now in woods and 248 in crops and pasture. In addition to land to be permanently converted to water, 521 acres are located in the flood detention pools and will be temporarily inundated at times. Presently 280 of these acres are in woods, and 241 are in crops and pasture. However, no significant change in land use in the flood detention pools is expected. Approximately 80 acres of mostly forestland also will be converted to dams and spillways due to the construction of these 12 structures.

Operation and Maintenance

With land treatment measures on open land to be maintained by the land-owners or operators, maintenance will be promoted and encouraged through the soil and water conservation districts, with technical assistance furnished by the Soil Conservation Service. An operation and maintenance agreement will be made and signed by the sponsoring local organization and the Soil Conservation Service prior to the start of construction. This document will set forth arrangements and provisions for operating and maintaining all structural works of improvement. The district supervisors, or their representatives, will make an annual review of the installed land treatment to insure maintenance. Provisions for the maintenance of critical area planting will be included in the soil and water conservation for the individual farm where plantings are located. Landowners and operators will maintain the forestland treatment measures under agreement with the Rutherford Soil and Water Conservation District and the McDowell Soil and Water Conservation District. The North Carolina Division of Forest Resources, in co-operation with the United States Forest Service, will provide technical assistance necessary under the ongoing Cooperative Forest Management Program. It will also continue to furnish fire protection under the present Cooperative Fire Control Program.

The Rutherford County Watershed Commission will be responsible for the operation and maintenance of all structural measures and may carry out these responsibilities with its staff or may enter into necessary agreements with other entities. In addition, funds for the operation and maintenance of structural measures will also be provided by the Rutherford County Watershed Commission.

The 10 single-purpose floodwater retarding structures and the two multiple-purpose structures will be properly operated and maintained to serve their designed purposes. To this end, sponsors will discourage public use of the single-purpose reservoirs because adequate sanitary facilities will not be provided. This will be done by fencing, posting, or patrolling by enforcement officers. Estimated annual cost of operation and maintenance of these structures is \$9,500. Maintenance will consist of but not be limited to:

- A. Removal and disposal of debris from the principal and emergency spillways.
- B. Refilling, smoothing, and vegetating rilling on embankments, spillways, and borrow areas.
- C. Mowing of embankments, spillways, and borrow areas as needed to control woody growth.
- D. Maintaining good vegetative cover on spillways, embankments, and borrow areas.
- E. Required replacement of metal used in construction.

Cost of operating and maintaining the recreational development in and around Structure 2 is estimated at \$34,000. The operation and maintenance of the development will consist of, but not be limited to:

A. Services

Superintendent
Semi-skilled labor, such as carpenters, mechanics, etc.
Laborers for ground care, road repairs, trash pickup, etc.
Lifeguards
Workmens' Compensation, medical, and other worker benefits

B. Operating Supplies

Seed, fertilizer, paint, lumber, etc.
Repair parts for water systems, machinery, etc.
Utilities (telephone, electricity, etc.)
Sanitary supplies (soap, paper supplies, etc.)

C. Equipment and Replacement as Needed

Maintenance shop, office, and furnishings
Tractors
Pickup or other truck for refuse collection, etc.
Boat and motor for rules enforcement and emergencies
Beach equipment
Playground and sports equipment
Hand tools and minor equipment

Although plans for full recreational development of multiple-purpose Structure 3A have not been developed, public access is expected to be provided. Sanitary facilities, which will form the nucleus of the development, will be operated and maintained under standards equal to, or better than, state requirements.

The operation of the duck windows in Structures 11, 22, and 23 will include the following provisions:

- A. Metal gates will be fully opened not earlier than April 1, but not later than May 15 of each year.
- B. The area exposed by lowering the water level within the lakes will be fertilized and seeded to suitable duck food plants as early in the spring as weather conditions permit.
- C. Metal gates will be fully closed not earlier than October 1, but not later than October 15 of each year.

Project Cost

Total project cost is estimated to be \$8,908,680. The following table summarizes the important element of total project cost:

<u>Item</u>	<u>P. L. 566</u>	<u>Other</u>	<u>Total Cost</u>
Land Treatment	\$ 457,390	\$1,865,790	\$2,323,180
Structural Measures	<u>4,629,694</u>	<u>1,955,806</u>	<u>6,585,500</u>
Total	\$ 5,087,084	\$3,821,596	\$8,908,680

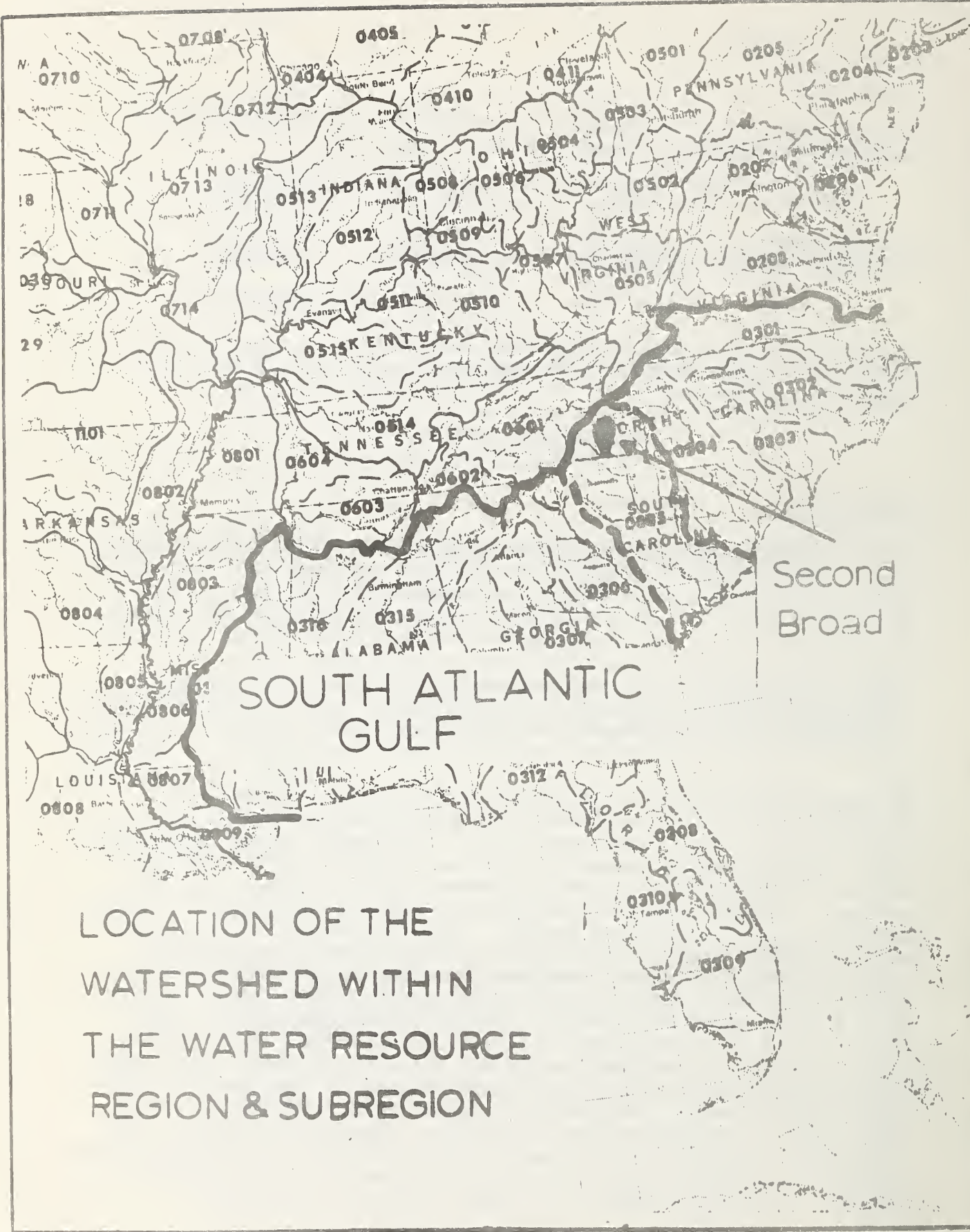
Construction cost, a part of structural measures cost, is estimated at \$3,962,050 of which Public Law 566 funds will pay \$3,452,888 and other funds will pay \$509,162.

ENVIRONMENTAL SETTING

Physical Data

About 144,300 acres in size, the watershed is located in the southwestern part of North Carolina in Rutherford, McDowell, and Cleveland Counties and is part of the Santee River Basin. Approximately 124,100 acres are in Rutherford County, 19,500 in McDowell County, and 700 in Cleveland County. The towns of Caroleen and Cliffside are located entirely in the watershed with portions of the towns of Rutherfordton (population 3,245) (1), Spindale (population 3,848) (1), and Forest City (population 7,179) (1) also located within the watershed. Asheville (population 57,681) (1) lies about 50 miles northwest, and Spartanburg, South Carolina, (population 44,352) (2) is about 30 miles south.

The watershed is located in subregion 0305 of the South Atlantic Gulf Water Resources Region as defined by the Water Resources Council (3). (See Figure 18) The 276,000 square miles of the region extend from the North Carolina-Virginia boundary line at the Atlantic Ocean to the mouth of Lake Pontchartrain on the Gulf of Mexico in Louisiana, (4). It encompasses parts of North Carolina, Georgia, Alabama, Louisiana, Mississippi, and all of South Carolina and Florida. Climatic characteristics include well-distributed rainfall, mild winters, and warm-to-hot humid summers and average rainfall varying from over 80 inches in the mountains to 44 inches in central Georgia. Annual natural runoff ranges from 10.5 inches to 20.8 inches among the subregions; however, variations of individual river basins may be considerable. The quality of streams in the region is generally excellent although turbidity and color sometimes impair water physical quality in the coastal plain and moderate to sometimes high sediment loads are common. The quality of ground water is suitable for most uses; however, the yield varies considerably, depending on the type aquifer and the location within the region. In addition, the topography differs considerably throughout the region from rugged densely wooded mountains to rolling, well-drained plains to flatlands, wetlands, and marshes.



LOCATION OF THE
 WATERSHED WITHIN
 THE WATER RESOURCE
 REGION & SUBREGION

Figure 18

Environmental Setting

Subregion 0305 is made up of the Santee and Edisto River Basins in North and South Carolina (3). It is representative of the range of conditions in the region as a whole. The subregion varies from mountains to piedmont to coastal plain, and there is a wide range in characteristics of water resources.

Typical of the upper piedmont in the South Atlantic Gulf Region and Subregion 0305, the watershed has average annual precipitation of nearly 50 inches according to the weather station at Caroleen in the southern part of the watershed (5). The average temperature ranges from about 43 degrees Fahrenheit in January to around 79 degrees Fahrenheit in July, with an average annual temperature of approximately 60 degrees Fahrenheit (6). The average freeze-free period extends approximately from the middle of April to the middle of October (6).

The topography is mountainous in the upper 20 percent of the watershed and rolling to steeply rolling in the lower 80 percent. Valleys are narrow and have a high gradient, and hard rock ledges across the valleys prevent channel degradation. Some of the ridges in the watershed are 1,000 to 1,300 feet above the valley floor. Elevations generally range from about 700 feet mean sea level at the confluence of Second Broad and Broad Rivers up to about 2,200 feet in the mountainous headwaters. The upper portion of the watershed is in the Blue Ridge land resources area, and the lower portion is in the Southern Piedmont land resources area.

All of the land in the watershed is in private or industrial ownership. Industrial forestry concerns own and manage 6,800 acres of the 94,693 acres of forestland, the remainder being in non-industrial private holdings.

Principal land uses in the watershed are as follows:

<u>Land Use</u>	<u>Acres</u>	<u>Percent of Watershed</u>
Cropland	17,263	12
Hayland and pastureland	14,691	10
Forestland	94,693	66
Idle land	8,097	5.5
Miscellaneous land (roads, urban, etc.)	9,556	6.5

The cropland in the watershed also has been broken down into land capability groups (7) which show in a general way the suitability of soils for particular uses. The groups are classified according to the limitations of the soils for particular uses, the risk of damages or losses involved in their use 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 requiring special management.

Those familiar with capability classification can use it to infer much about the potential behavior of soils, but this classification is not a substitute for interpretations designed to show suitability and limitations of soils for range, for forest trees, or engineering.

In the capability system, all kinds of soils are grouped at three levels: the capability class, subclass, and unit; and these are discussed 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 that 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 largely to pasture, range, forestland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and that limit their use largely to pasture, range, forestland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, range, forestland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and that restrict their use to recreation, wildlife, water supply, or to esthetic purposes.

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

Environmental Setting

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, for example, there are no subclasses because the soils of this class have few limitations. Furthermore, Class V can contain, at the most, only the subclasses indicated by w, s, and c, because the soils in Class V are subject to little or no erosion though they have other limitations that restrict their use largely to pasture, range, forestland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol; for example, IIe-2. Thus, in one symbol the Roman numeral designates the capability class or degree of limitation, as defined in the foregoing paragraph, and the Arabic numeral specifically identifies the capability unit within each subclass. The capability unit is often omitted if all the soils of a certain class and subclass (i.e., IIe) fall in the same capability unit. So, although cropland in the watershed has been broken down into capability class and subclass, capability units have not been included because of this reason stated above.

The acres of cropland by capability group are as follows:

<u>Capability Group</u>	<u>Acres</u>	<u>Percent of Total Cropland</u>
IIe	3,966	23
IIIe	8,063	47
IVe	3,129	18
VIe	1,343	8
IIw	524	3
IIIw	238	1

As can be seen by these classifications, much of the cropland in the watershed has fairly severe erosion and water management problems, and there is great need for the conservation practices included in the project.

A further examination of the soils in the watershed reveals that they are generally acidic and low to moderate in inherent fertility (8) and are derived principally from the underlying gneiss and schist. Principal soils are in the Cecil, Hiwassee, Madison, and Wilkes series in the piedmont and in the Hayesville and Chester series in the mountains. The dominant flood plain soils are Congaree and Chewacla.

Well-drained soils on nearly level to steep topography of the piedmont, Cecil soils (9) typically have a sandy loam surface layer about seven inches thick. The subsoil is red, firm clay which extends from 40 to 60 inches below the surface, and common crops grown on this soil include small grains, corn, cotton, and tobacco.

Another soil group, the Hiwassee, (9) is comprised of well-drained soils on gently sloping to steep topography of the piedmont uplands and high terraces. Typically, these soils have a dark reddish-brown surface layer and a dark red, firm clay subsoil which extends 40 to 60 inches below the surface. Principal crops grown on cleared areas of this soil are corn, small grain, hay and pasture grasses. Various species of oak, with some hickory, elm, and pine, grow on uncultivated areas. This soil does not have a flood hazard problem but erosion problems are common.

The Madison soils (9) are well-drained soils on nearly level to steep topography of the piedmont uplands. Typically, these soils have brown gravelly fine sandy loam surfaces and yellowish-red to micaceous clay to clay loam subsoils. The cultivated soils are used principally for cotton, corn, soybeans, wheat, oats, peaches, apples, and vegetables. Shortleaf and loblolly pine are common in abandoned fields. Erosion is the main conservation problem.

Limited in use because of their shallow depth to rock, Wilkes soils (9) are well-drained shallow soils on gently sloping to steep piedmont topography. These soils have a grayish-brown sandy loam surface layer and a thin, firm clay subsoil. A high percentage of the soils is in trees and pasture.

Still another series found are the Hayesville soils (9), well-drained soils occurring on gently sloping to moderately steep inter-mountain plateaus and valleys. They have brown loam surface layers and red clay subsoils. The forested areas of these soils are generally in native forest of various oaks, hickory, maple, yellow poplar, and various other trees. Cleared areas are used for pasture, corn, small grain, hay, some fruit trees, burley tobacco, and vegetable crops.

The Chester series (9) consist of well-drained, gently sloping to moderately steep soils on low rolling hills in inter-mountain valleys. Typically, these soils have a dark yellowish-brown or brown loam surface layer about eight inches thick. The subsoil is yellowish-red clay loam about 30 inches thick. Principal crops are orchards, pasture, and general farm crops, and native vegetation is mixed hardwood dominated by oaks.

Congaree soils (9), one of the main flood plain soils, consist of well-drained, moderately permeable, bottomland soils. They have dark brown loamy surface layers and dark brown loamy subsurface layers that are

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stratified. Normally located on flood plains, they are also subject to a frequent flood hazard. Most areas have been cleared and are used primarily for corn, small grain, vegetables, pasture, and hay. Native vegetation consists of oaks, hickory, gum, poplar, and loblolly pine.

Chewacla soils (9), another of the main flood plain soils, occur on nearly level, somewhat poorly drained alluvial soils on flood plains. Typically, these soils have a brown loam surface layer and a yellowish-brown silt loam to silty clay loam subsoil that is mottled with gray within 24 inches of the soil surface.

Another facet of the watershed setting involves mineral resources and recent development of these resources in the watershed has been limited to sand, gravel, and clay. Some deposits of graphite and sillimanite have been located in the watershed. During and immediately after World War II, however, monazite (thorium ore) was produced in commercial quantities from placer deposits, and a very small amount of gold was mined during the same period.

A directory of principal mineral producers of North Carolina published by the N. C. Division of Mineral Resources lists Miller Creek quarry as being a source of crushed rock. Information Circular 16, "Mineral Localities of North Carolina", N. C. Division of Mineral Resources, 1958, lists several areas of known mineral locations of interest to mineral and rock collectors. Minerals listed include garnet, milky quartz crystals, fuchsite, corundum, and diamond.

The watershed area is underlain by an assemblage of metamorphic rock types (8). The eastern part is underlain by mica and granite schist. Hornblende gneiss, interlain with some granite, underlies the western part.

If we examine water resources in the watershed, we see that available data (8) indicate that a moderate amount of ground water can be obtained almost anywhere in the watershed area. Yields of individual wells in the area range from zero to about 45 gallons per minute, with the average being about four to eight gallons per minute (8). The yield and depth of wells in metamorphic or crystalline rock may vary greatly from area to area, as well as from well to well within a particular area (8). The available data indicate wells drilled in gneiss have slightly higher yields than wells drilled in schist (8).

Most of the towns and industries within the watershed obtain their water supply from such wells (10) although there are some towns and industries that depend on watershed streams. The towns of Forest City and Cliffside, for example, obtain their water from the Second Broad River. Several large textile industries also obtain their water supply directly from Second Broad, while Rutherfordton and Spindale receive water from Duke Power Company which uses water from Catheys Creek and Holland Creek.

Second Broad River, another principal water resource, originates in the southern part of McDowell County and flows in a southeasterly direction through Rutherford County. (See project map) It empties into the Broad River near the Rutherford-Cleveland County Line. Principal tributary streams on the northeast side of Second Broad River are Camp Creek,

Little Camp Creek, Cane Creek, and Robinson Creek. Catheys Creek is the main tributary entering from the southwest side of the river. The stream pattern of the watershed is primarily dendritic; that is, each stream or tributary branches out into smaller tributaries.

The main stem of Second Broad River and its major tributaries are permanently flowing streams with an average annual runoff of about 19.6 inches (11).

Surface water records for Second Broad River at Cliffside (11) show that the largest flow in the river for the period of record has been 15,000 cubic feet per second. The minimum flow at this same location has been four cubic feet per second. The drainage area at this gauge comprises about 94 percent of the total watershed drainage area.

There are no major reservoirs in the watershed. On Second Broad River, however, there are three minor dams owned by textile companies and used for power generation. Duke Power Company also has a small dam on Catheys Creek. In addition, there are about 115 farm ponds of two acres or less in the watershed which are in private ownership and used for fishing, live-stock water supply, etc.

The streams of the watershed have been classified in accordance with the system used by the Office of Water and Air Resources of the N. C. Department of Natural and Economic Resources (12). The classification of Second Broad River, Camp Creek, Cane Creek, Robinson Creek, Little Camp Creek, and the upper portion of Catheys Creek and Holland Creek is "AII"; Catheys Creek from the Duke Power Company dam is classified "C" to its junction with Second Broad River (13). Holland Creek is classified "C" from Duke Power Company raw water intake to Catheys Creek (13). Most of the other minor streams in the watershed are classified "AII" with the exception of a few "C" streams (13).

The "AII" classification designates the water as suitable for water supply, culinary, or food processing purposes after approved treatment equal to coagulation, sedimentation, filtration, and disinfection, etc., and for any other usage requiring water of lower quality. The "C" classification designates water as suitable for fishing and fish propagation and any other usage requiring water of lower quality.

Reporting on the general water quality of a number of North Carolina streams, including the Second Broad River, Slack and Wilder of the United States Geological Survey (14) show this river to have an average hardness concentration of 11 to 30 milligrams per liter (expressed as CaCo₃), a concentration generally considered to represent "soft" water.

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Average chlorides concentrations fall in the range of 0.0 to 2.9 milligrams per liter from the headwaters of the river to its junction with Cane Creek, and 3.0 to 5.9 milligrams per liter from that point to the confluence with Broad River. The average nitrate concentration in Second Broad is 0.0 to 0.5 milligrams per liter from the headwaters to the junction of Cane Creek, and 1.0 to 1.9 milligrams per liter from that point to the confluence with Broad River. The water quality information shows that the average natural color in the streams of the watershed ranges from 0 to 10 units. This color is that which comes from decomposition of organic matter and industrial pollution. It does not include any color associated with sediment. Natural color becomes detectable to the human eye at about five units; while weak tea, for example, has a color equivalent of 300 units. Other water quality information published by the U. S. Geological Survey (15) shows that the pH value of Second Broad River ranges from lows of 5.8 to highs of around 10, with the pH normally falling between 6.3 to 6.8. The dissolved solids concentration of the river ranges from a recorded low of 36 milligrams per liter to a recorded maximum of 77 milligrams per liter (16). Specific conductance has ranged from the recorded minimum of 26 micromhos to a maximum of 137 micromhos (16). This information also reveals that water temperature records for Second Broad River (16) indicate a maximum of around 80 degrees Fahrenheit and a minimum at the freezing point. Wintertime water temperatures average 45 to 55 degrees Fahrenheit (17); while summertime temperatures average 70 to 75 degrees Fahrenheit (17). The average annual sediment delivered to the mouth of the river has been estimated by the Soil Conservation Service to be 38,750 tons (119 mg/l).

Plant and Animal Resources

The major feature of the plant community in this watershed is the forestland segment. Approximately 66 percent (94,693 acres) of the land in the watershed is forested with 42 percent pine; some 5 percent pine-hardwood; 29 percent hardwood-pine; and 24 percent hardwood. Although principal species are Virginia pine, shortleaf pine, black cherry, various oaks (scarlet, chestnut, post, red, and white), yellow poplar, maple, cedar, hickory, and white pine, minor species such as black walnut, sourwood, dogwood, hornbeam, and beech are also present. The forested areas most often are dominated by a mixture of Virginia or shortleaf pine, yellow poplar, red maple, and various oaks. Where the bottomlands have been cleared, the streams are usually bordered by a narrow margin of hardwoods, primarily yellow poplar, sycamore, willow, river birch, and alders, with an occasional mast tree. Areas of loblolly pine plantations are scattered over the watershed.

There are no Type 1 or Type 7 wetlands in the watershed as defined by the U. S. Fish and Wildlife Service (18).

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Populations of upland wildlife species, such as squirrel, quail, rabbit, and mourning dove, are moderate. There are low populations of deer and waterfowl with some scattered remnants of turkey flocks. Hunting pressure for all types of wildlife in the watershed is presently low.

Wildlife habitat consists mainly of upland hardwoods and pines interspersed with agricultural lands, with the latter particularly prevalent along the streams. Wildlife, primarily squirrel, quail, rabbit, and mourning dove, also use hayland and idle land.

Varying considerably, the fishery resource has as its main species: smallmouth bass, redbreast sunfish, carp, catfish, Dace-trickle, and sucker. Various other sunfishes are present to a lesser degree. The Catalog of Inland Fisheries in North Carolina (19) lists a seven-mile section of the Second Broad River (from confluence of Little Camp Creek to the McDowell County line) with an ecological classification of smallmouth and states: "this reach supports a large population of redbreast sunfishthe only substantial population of smallmouth bass found in the Broad River Watershed." Second Broad upstream from the McDowell County line is listed with an ecological classification of Dace-trickle and reported to have ". . . . very little gamefish habitatwith a large sucker population." The catalog also lists Catheys Creek, one of the major tributaries of Second Broad, with an ecological classification of sucker and reports it to be ". . . . devoid of gamefish habitat with a limited sucker fisher." Most of the other streams in the watershed are narrow and shallow and provide poor fish habitat. This is also true of the streams where the impoundments are to be located. Although these smaller streams may not have a significant fishing value, they may be important to the fishery in Second Broad River and the larger tributaries.

Public access to fishery resources is limited to the two commercially operated lakes (see recreational resources), farm ponds and along the streams where individual landowners give permission to fish.

Sediment and sediment associated pollutants are the major problems facing fishery resources, while a lack of management is the major problem of the wildlife resources.

Neither the Bureau of Sports Fisheries and Wildlife nor the Department of Natural and Economic Resources lists any endangered species for this watershed.

Economic Resources

Practically all land in the watershed is in private ownership. There are no lands administered by the U. S. Forest Service. Industrial companies own and manage about 6,800 acres of forestland. The remaining forestland is in small, privately owned tracts.

Major farm enterprises in the watershed are corn, soybeans, small grains, beef cattle, poultry production, and dairying. Corn is the major crop grown in the flood plain. Current estimated annual per acre yields for crops grown in the flood plain are as follows:

Corn	75 bushels
Corn Silage	15 tons
Soybeans	30 bushels
Wheat	45 bushels
Pasture	4 AUM

The value of the average farm, according to the 1969 Census of Agriculture (20), was about \$22,830 including buildings, land, and other improvements. The average value of upland is \$200-\$300 per acre, while flood plain land goes for around \$450-\$600 per acre, and urban land values range from \$1,000 to \$5,000 per acre. Some of the larger farms, especially livestock and dairy farms, have capital investments well in excess of \$100,000.

The watershed is served by an adequate network of highways, primary roads, secondary roads, and railroads. U. S. Highways 64, 74, 22, and 221-A pass through the watershed. They provide good routes, connecting the watershed to major metropolitan and industrial areas in the mountain and piedmont sections of North and South Carolina. Accessibility of farms to this system of roads is generally fair, except during periods of high water, which may block or close some private and public roads and bridges.

The total watershed population is about 25,000 persons with about 9,225 rural residents and 15,775 urban residents (21). Population increased by about five percent during the past decade. The general trend in the watershed, as well as Rutherford County, has been toward increased town and decreased rural population.

In the watershed population has declined in the upstream rural areas, as shown in the following table:

	<u>1950</u>	<u>1960</u>	<u>1970</u>
Camp Creek Township - Rutherford County	1,329	1,199	1,084
Gilkey Township - Rutherford County	1,142	896	746
Brackett Township - McDowell County	200	166	135

Environmental Setting

The economy of the watershed is characterized by a strong dependence on manufacturing, non-manufacturing, and other non-agricultural employment. Work force estimates prepared by the Employment Security Commission of North Carolina (22) show that Rutherford County had a 1970 civilian work force of 19,130 employed by the various groups shown below:

Manufacturing (mainly textiles, furniture, etc)	9,400
Non-manufacturing (construction, trade, government, etc.)	5,980
Agriculture	840
Other non-agricultural employment	<u>2,170</u>
Total employed	18,390

About 740 persons were unemployed for a rate of 3.9 percent compared to the 3.1 percent unemployment rate of 1969, and to the 6.4 percent rate of 1962 (22).

In 1970 per capita income was \$2,931 for Rutherford County compared to \$3,208 for the state (21) as a whole. The median family income in the county was \$6,646 (21). Many of the less affluent families are located on low-income family farms and it appears that underemployment is a more critical problem than is unemployment. Most people are employed, but many are working in jobs that do not produce an adequate family income.

A U. S. Department of Commerce report showed that the number of farms in Rutherford County in 1969 was 883 (20), including part-time and retirement farms. Farms average about 110 acres in size and the value of the average farm is about \$22,830, including buildings, land, and other improvements.

Nearly all farms in the watershed are owner-operated. The percentage of farm tenancy in Rutherford County has steadily decreased over the past 20 years. Twenty-six percent of all farms were tenant-operated in 1950 but only three percent were tenant-operated in 1969.

Farm income was low for almost all types of farming operations in the watershed. About 80 percent of the farms in the county had sales of less than \$2,500 in 1969 (20). Of this 80 percent, there were 121 farms with full-time operators, all of which are low-income producing family farms. The census (20) lists the number of commercial farms in the county in 1969 as 189. The commercial farm is defined as having more than \$2,500 annual sales. However, 69 (37 percent) of the commercial farms had sales of less than \$5,000 per year. There are also approximately 2,400 land management units in the county in addition to those classified as farms in the census. An operating unit is defined by the National Handbook for Resource Conservation Planning (23) as all land operated as a single management unit, regardless of the number, size, or contiguity of tracts involved. Units, for example, are operated as farms, ranches, gamelands and hunting preserves, or tree farms.

Environmental Setting

The value of all farm products sold in Rutherford County in 1969 was \$3,252,392 (20) and livestock sales accounted for \$2,554,201 (78.5 percent) (20). The value of livestock products sold in 1950 was \$751,747 or 55 percent of the value of farm products sold (20). This increased importance of livestock sales in Rutherford County is typical of the watershed as a whole.

In 1969 sales of forestry products from farms in Rutherford County amounted to \$34,418 (20).

The fourth Forest Survey of North Carolina's timber resource (1974) shows the following statistics for Rutherford County:

<u>Item</u>	<u>Units</u>	<u>Softwood</u>	<u>Hardwood</u>	<u>Total</u>
		-----million of units-----		
Growing stock	(cubic feet)	135.0	163.4	298.4
Sawtimber volume	(board feet)	301.2	403.3	704.5
Net annual growth				
a. Growing stock	(cubic feet)	7.1	9.1	16.2
b. Sawtimber				
volume	(board feet)	25.1	24.2	49.3
Net annual removals				
a. Growing stock	(cubic feet)	5.2	4.0	9.2
b. Sawtimber				
volume	(board feet)	9.9	13.1	23.1

In 1966, there were three primary wood-using industries situated in Rutherford County. This number has increased to ten by 1974. The annual value (1974) of the forest products cut from growing stock was approximately 4.8 million.

In another facet of the economic portrait, industries (mostly textile) within and near the watershed provide employment opportunities for a large portion of the watershed population. A high percentage of rural families also has one or more members employed away from the farm to supplement farm income and maintain an adequate standard of living.

The watershed is in the area covered by the Appalachian Regional Development Act of 1969. This act provides federal aid for economic redevelopment in the region covered by the act, assistance to the region in solving its particular problems, and the general utilization and development of the region's resources.

Recreational Resources

In the watershed the most intensively used recreation resources are located in the urban corridor along U. S. Highway 74 in the central part of Rutherford County. (See project map) This corridor lies along the western boundary of the watershed approximately half actually being in the watershed.

Environmental Setting

Composed of the adjacent municipalities of Ruth, Rutherfordton, Spindale, Forest City, and Alexander Mills, this area in 1970 had a population of 15,620, one-third of the total 47,337 population of Rutherford County (21).

According to the N. C. Department of Local Affairs (24), the following public facilities are operated by municipal governments in the watershed area:

<u>Town</u>	<u>Facility</u>	<u>Acres</u>	<u>Activities</u>
Forest City	City Park	658	Picnicking, tennis, golf, baseball, and swimming
Rutherfordton	City Park	650	Picnicking, tennis, golf, and swimming
Rutherfordton	City Pool	140	Picnicking, tennis, outdoor sports, and swimming
Rutherfordton	City Golf Course	800	Regulation golf (nine holes)
Spindale	Spindale House	--	Indoor activities, games, basketball, bowling alley, and meeting rooms
Spindale	Spindale Swimming Pool	5	Swimming

Annual attendance at some of these facilities has been estimated by the N. C. Department of Natural and Economic Resources (25) as follows:

Forest City Park (Callison Recreation Center)	47,500
Rutherfordton City Park (Crestview Park area)	25,350
Rutherfordton Municipal Pool and Park	3,700
Spindale House	5,000

Private recreational facilities in the watershed include:

- A. Camp Golden Valley, owned by the Pioneer Girl Scout Council, near Sunshine. Camping is the major activity, and annual attendance is estimated at 4,000.
- B. Camp McCall, owned by Western North Carolina Methodist Conference, near Bostic. Swimming is the major activity at this site which has sleeping facilities for 20 persons. Overnight and weekend use accounts for 35 percent of the annual attendance of 7,000.

Environmental Setting

- C. Dogwood Valley Golf Course at Caroleen. Annual attendance at this club is estimated at 10,000.
- D. Rutherfordton Golf Club, just outside the watershed. Annual attendance is estimated at 8,550.
- E. Cleghorn Golf and Country Club (just outside the watershed) at Rutherfordton. Annual attendance is estimated at 8,550.

Commercial facilities include:

- A. Golf driving range at Spindale - annual attendance of 9,940.
- B. Harris Speedway at Forest City - annual attendance of 30,000.

In addition, there are about 115 farm ponds of two acres or less in the watershed suitable for fishing. Only two commercially operated lakes are open to the public on a fee basis. These are Morning Star Lake, a two-acre lake near Rutherfordton, and the five-acre Toms Lake near Forest City. Estimated annual attendance at these lakes is 12,500.

According to a report by the Rutherford Soil and Water Conservation District (26), there are 21 potential water impoundment sites of ten acres or more in the watershed including the 12 sites where structures are planned in this project. Sites which could not be utilized without incurring excessive costs or relocation of people were not counted in this appraisal. This report also evaluated the potential for 11 major types of outdoor recreation in Rutherford County, and the county was considered to have a high potential for vacation housing, camping, small and big game hunting, vacation farms and ranches, and water sports if a proposed impoundment is built on Broad River. This impoundment would be a Corps of Engineers flood control structure, and its proposed location is a short distance upstream from the confluence with the Second Broad River.

Although not actually located within the watershed, several large lakes are within a 50-mile radius of the proposed recreational site. Following is a list of those lakes and the estimated annual attendance where available (25).

Lake Hickory	420,000
Lake Rhodiss	263,000
Lake James	239,000
Lake Lure	50,000
Lake Adgar	2,000
Greenville Reservoir (South Carolina)	Not available
Rainbow Lake (South Carolina)	Not available

These lakes receive heavy pressure from large nearby metropolitan centers such as Asheville, Greenville, Spartanburg, and Charlotte. They offer fishing, boating, picnicking opportunities, etc. The type of recreational opportunities to be offered by the proposed recreational structure will be less intense and more attractive to local watershed residents rather than residents of the large metropolitan areas.

Several state parks in North Carolina and South Carolina are located within 50 miles of the proposed recreation sites. These parks are subjected to high usage just as the lakes, however, as the population within a 50-mile radius of the proposed recreational site is estimated at over 1,000,000.

Archaeological and Historical Resources

The National Register of Historic Places lists two sites in Rutherford County. Trinity Lutheran Church is located in Rutherfordton which is situated on the watershed boundary. Fox Haven Plantation is located outside the watershed 1.4 miles north of the intersection of Secondary Road 1157 and N. C. Highway 108. The Register listing for McDowell County, Carson House, is located in the vicinity of Marion which is also outside the watershed.

Contact with the North Carolina Department of Art, Culture, and History, Office of Archives and History and the Research Laboratories of Anthropology at the University of North Carolina in Chapel Hill revealed no known archaeological or historical values in the watershed. A survey contracted with the Department of Art, Culture and History covering areas to be affected by construction identified six sites as needing test excavations to determine which, if any, warranted intensive excavation to preserve adequate indications of the culture that previously inhabited the region. No early historic structures were discovered within the dam areas although several very old homesteads and cemeteries were located in close proximity. The Department of Interior, Office of Archaeology and Historic Preservation has determined the six sites are eligible for nomination to the National Register.

Soil, Water, and Plant Management Status

A high percentage of the upland in Rutherford County has been cleared for cultivation. In 1929, the county produced 36,000 acres of cotton. This acreage remained high until 1949 when 26,000 acres were grown. At that time the county had basically an agricultural economy. Time, low income, and industrial growth have brought about many changes. Much upland, formerly in row crops, has either been abandoned, converted to pasture or hay crops, or planted to trees. Pulpwood companies have acquired considerable acreages in the county for timber growing purposes. All of these changes have had considerable effect on the agricultural and economic life of the area.

Factors of production cannot presently be efficiently used in large portions of the flood plains of this watershed. Flooding damages cause late plantings, partial harvests, excessive erosion damage repair, sediment damage to crops and increased cultivation to control weeds brought in by floodwaters. Due to flooding of the bottoms, some extremely steep, erosion-prone land is being used for crops when it is not suitable or needs some intense conservation practices to justify its use for crops.

Presently, 480 of the 1,665 operating units in the watershed have conservation plans covering 43,025 acres. These plans cover about 29 percent of the operating units, and about 30 percent of the cropland.

Adequate conservation treatment has been applied to 4,680 acres of cropland in the watershed. This includes 3,730 of the 16,501 acres of cropland subject to erosion. Of the 14,691 acres of pastureland and hayland, 4,200 acres are now adequately treated.

All of the forestland is adequately protected from forest fire under the going Cooperative Forest Fire Control Program. Forest management assistance is available to landowners under the Cooperative Forest Management Program but most of the forest land is unmanaged. In some areas, pulpwood companies have obtained and planted considerable acreages of abandoned upland to trees and manage these areas for timber production.

The privately owned farm ponds are managed primarily for private recreation, irrigation, livestock watering, etc. In addition, the U. S. Geological Survey has a stream monitoring station at Cliffside at which daily discharges, flood peaks, and other hydrologic data measurements are made. Water quality measurements are also made occasionally at this station. Partial records are also kept at several other locations within the watershed. The Water Quality Division, N. C. Department of Natural and Economic Resources, is responsible for monitoring pollution sources and enforcing state water quality regulations.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Treatment Problems

Approximately 70 percent of the cropland in the watershed needs additional conservation practices in order to be adequately treated. Among the more critically needed practices are: conservation cropping systems, crop residue use, contour farming, grassed waterways, stripcropping, terracing, and minimum tillage. Some of the steeper areas being used for row crops need to be converted to permanent vegetation such as grass or trees. Shifting of row crops from this steep land to the level, more productive flood plain would make more effective use of factors of production (land, labor, and capital investment). At present, possible losses due to flooding prevent this land use shift. The hydrologic conditions of crop and pastureland vary from fair to poor.

In addition to flooding, other land treatment problems involve owner attitudes. Small farms and small fields are sometimes difficult to get treated because the landowner does not feel treatment would be worthwhile. Absentee landowners also often balk at conservation measures because their lack of frequent contact with the land prevents an understanding of the needs.

The large amount of land around this area bought and sold in speculation additionally presents a problem to the conservationist for this type of landowner is interested mainly in profit from land sales and not in preserving the land's productivity.

Inadequate conservation treatment also is contributing to stream pollution, for rapid runoff not only transports soil particles but also carries with it other pollutants, such as animal wastes and chemicals.

The 94,693 acres of forest soils within the watershed have a hydrologic condition ranging from very good to very poor. The majority of these soils are in the poor to very poor condition which is the result of past misuse of the land. Some of the factors which caused this poor condition were overcutting, overgrazing, and cultivation on lands now returned to forest. Much of the forestland in the poor hydrologic category is partially protected and there is still much forest land treatment needed. Again, a major problem would be in getting certain landowners interested enough to take the needed action. Logging road and skid trail damage is occurring over certain areas of the watershed where preventive measures have not been taken. Figure 13 on page 17 illustrates a properly engineered and rehabilitated logging road.

Good forest soil hydrology is of great importance in the rolling and steep topography. The severity of flooding in valleys below is directly related to the water holding capacity of the forested slopes. Studies at Coweeta, N. C., and other research watersheds document the effect of good forest cover on the movement of water over and through the soil.

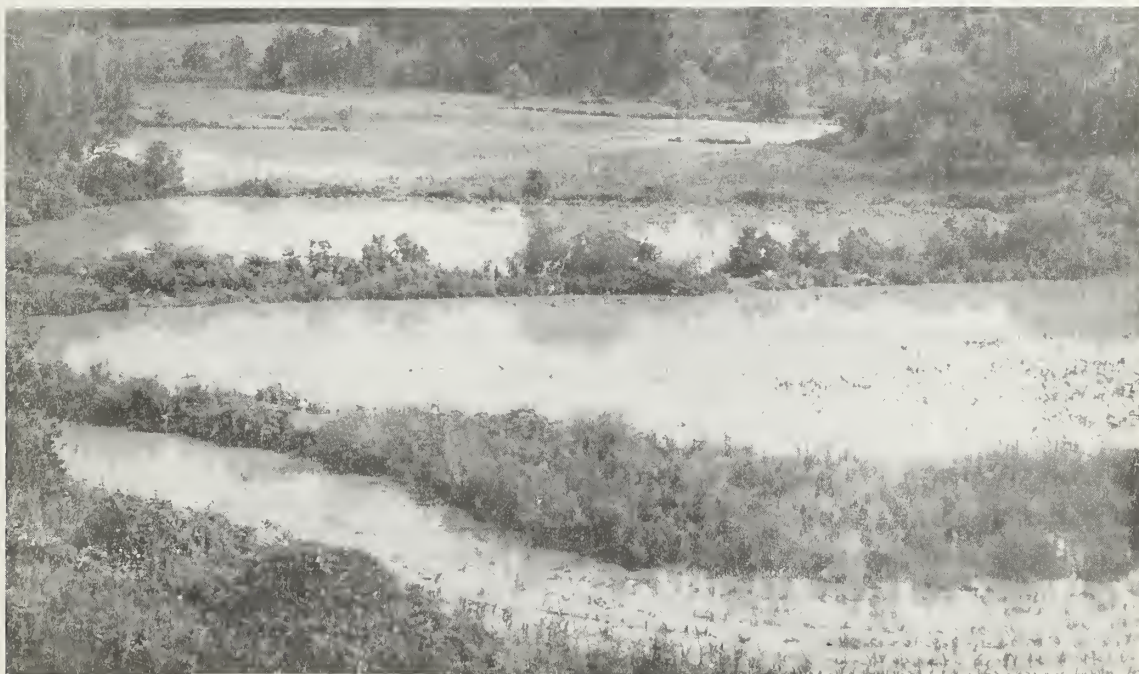
Floodwater Damages

Flooding of crop and pasture land is one of the main problems of agriculture in the watershed. (See Figure 19) About 40 percent of flooding occurs from April through July and most floodwater damages result from small, frequent floods. For example, the two-year, one-year, and six-month frequency storms account for about 70 percent of average annual acres inundated. However, storms of 10-year and higher frequency create conditions that contribute to frequent flooding in filling channels with sediment, by sloughing of channel banks, and washing trees and debris into channels. These conditions were noted in the lower reaches of the watershed after the storm of August 8, 9, and 10, 1970, a storm of about a 50-year frequency in the lower reaches but of less magnitude in the upper reaches. Damage to crops was considerably less than a similar storm occurring earlier in the growing season would have caused. Damage from deposition of infertile material on pastureland was severe on the common flood plain of Second Broad River and Robinson Creek. Several roads and bridges in Reach 12 were damaged (See Figure 20) and closed to traffic, and some private bridges were washed out.

AGRICULTURAL FLOOD DAMAGES



Damage to bottom land along Second Broad River from August, 1970, flood.



Damage to corn from floodwaters of Hollands Creek.

FLOOD DAMAGES TO ROADS AND BRIDGES



Bridge completely washed out on Highway 1745 near Sunshine by August, 1970, flood.

Figure 20

Water and Related Land Resource Problems

Local efforts to reduce flooding, mainly clearing and snagging of channels, have been made in Reach 6 (see project map) and proved valuable during the August, 1970, storm. Flood plain land in many instances is in a less intensive land use than it would be with flood protection.

Downstream from the proposed structures, there are 4,684 acres that are flooded by the 100-year frequency storm.

Estimated average annual floodwater damages are as follows:

Crops and pasture	\$79,000
Other agricultural property (fences, farm roads, etc.)	21,000
Non-agricultural property (public roads, bridges, buildings, etc.)	<u>23,300</u>
Total	\$123,300

The following statements are quoted from the sponsors' application for assistance:

"Much of the most productive land and potentially productive land in Rutherford County lies along Second Broad River and its tributaries. Very little of this land is producing close to its potential, which is a direct result of the flooding problem.

"In years past much damage has been done by flooding. There has been flood plain scouring, pot holes washed out, sand and mud deposited and stream beds have filled. Hundreds of acres have been abandoned as a result of these conditions.

"The bottom lands are the backbone of feed production for dairy and beef cattle.

"Farmers along Second Broad River must face the fact that once or twice each year the river is going to overflow its banks. Usually it is not a question of 'will the river get out?' but 'when?'.

"Since modern agriculture is requiring larger financial investments, the (flood) problem has become more intense for present farmers. Large amounts of cash are needed annually to meet obligations, to provide food, clothing, and other necessities of modern-day living for the farm family. Therefore, a loss due to flooding can be a significant factor in the economic life of a modern farmer.

"In conclusion, the people of Rutherford County are convinced that flood control, pollution control, and erosion control are basic to permanent progress. We are committed to the ideal of good living for ourselves and leaving a better land for future generations."

Erosion Damages

Total erosion in the watershed from all sources is 913,110 tons annually with sheet erosion from the 134,744 acres of agricultural land (crop, hay and pasture, idle, and fores) accounting for 640,042 tons. The average sheet erosion rate for crop, pasture, and idle land is 4.75 tons per acre per year, and the average erosion rate for forest land is 0.40 tons per acre per year.

Erosion from 3,650 acres of roads amounts to another 124,100 tons annually. Unpaved roads account for 58,400 tons and paved roads amount to 65,700 tons annually, with the average annual erosion rate for roads being 34 tons per acre.

Gully, or critical area erosion, is 80,000 tons annually and the average annual gully erosion rate is estimated to be 186 tons per acre.

Urban and residential areas account for 68,970 tons annually with the average erosion rate being 126 tons per acre per year.

Critical sediment source areas are limited to roadbanks, dirt roads, and 430 acres of gully erosion. Gully erosion and roadbank erosion occur in small areas scattered throughout the watershed. Several thousand acres of former cropland have been damaged by past gully erosion to the extent that the land is now suitable only for forest use.

Sheet erosion has removed most of the topsoil from uplands used for crops now or in the past. Some land has reverted to grass and trees, and production potential on land remaining in cultivation has been reduced about 33 percent because of sheet erosion.

As a result of erosion, the land area devoted to crops is considerably less today than it was during the 1930's and although the watershed population has increased, the number of man-days utilized for agriculture has decreased.

Sediment Damages

Overbank deposition has damaged 2,765 acres of crops and pasture in the flood plain. Damage to production ranges from 5 to 70 percent of the undamaged values. Although the current rate of deposition is less than

that during the peak erosion period of the 1920's and 1930's, productivity of crop and pasture land is still reduced by sediment deposition. Depth of deposited material ranges from about 6 to 50 inches. The sand and loamy sand sediments have been deposited on the fine sandy loams and silt loams constituting the original undamaged flood plains.

Sediment damages also occur in downstream reservoirs on the Broad River and to industrial water supplies due to required filtering of the water before its use.

At the mouth of the watershed current annual sediment yield is approximately 38,750 tons or 119 milligrams per liter, with milligrams per liter (mg/l) a unit for expressing the concentration of chemical constituents in solution. It thus represents the weight of solute per unit volume of water. Turbidity also is increased by the suspended sediment load and this sediment can transport chemicals and other pollutants which lower water quality. Progressive swamping has almost ceased with the decline in upland erosion. Furthermore, sediment can damage downstream reservoirs by lowering their capacity and can injure industrial water supplied by requiring more expensive filtering processes.

The overall average annual damage from sediment is estimated to be \$130,600.

Drainage and Irrigation Problems

Drainage and irrigation problems in the watershed have been minimal; therefore, these have never been major considerations in formulating the project. However, drainage is needed on scattered areas of wet crop and pasture land in the flood plain.

Municipal and Industrial Water Problems

The cities of Rutherfordton, Forest City, and Spindale receive their water from the streams of the watershed and their present supplies are limited. The U. S. Army, Corps of Engineers, is studying a proposed Broad River impoundment a short distance upstream from the confluence with the Second Broad River. This proposed impoundment will most logically be the future source of municipal and industrial water for the entire area of Rutherford County.

Recreational Problems

According to the application for assistance, there are no convenient outdoor recreational facilities for citizens in the watershed and the need for recreation was stressed during the campaign for the countywide vote on the watershed improvement tax. The Governmental Services and Recreation Study and Plan (24), published by the N. C. Department of Local Affairs, Division of Community Planning, states: "The county should provide facilities and programs which by nature are county-wide and are, therefore, beyond the role of municipal governments (activities such as the development of lakes and multi-purpose large parks for boating, canoeing, camping, horseback riding, golfing, sledding, etc.)."

Except for privately owned fishing ponds, there is a general lack of water-based recreation within the watershed and surrounding area. The two commercially operated lakes provide the only public fishing. According to the North Carolina Department of Administration (28), the region made up of McDowell, Rutherford, Polk, and Cleveland Counties has 29.46 surface acres of water per 1,000 population (lakes of 100 plus acres), a low ratio compared to the state average of 53.09 acres/1,000 population. The region has 0.43 percent of its total surface area in lakes of 100 plus acres as compared to the state average of 0.79 percent.

Water quality of the streams where recreational development is proposed is high enough to present no problems. The present quality classification (AII) is higher than that required by law for recreation (B); the AII classification being suitable as a source of water supply for drinking, culinary or food processing, after approved treatment; and the B classification being suitable for outdoor bathing and any other usage requiring waters of lower quality. Land above these structures is mainly forested with some scattered areas of crop and pasture land. Sediment will not be a problem except after large storms when land in row crops and logging roads might produce enough sediment to temporarily muddy the reservoir waters. Agricultural pollution from pesticides, herbicides, and fertilizers can be expected to be minimal above the proposed recreational sites due to the low density of agricultural activity.

All of Polk and Rutherford Counties and most of McDowell, Burke, and Cleveland Counties lie within 30 miles of the proposed watershed recreational sites. The 1970 population and the population projected for 2020 by the Environmental Protection Agency are as follows:

<u>County</u>	<u>1970</u>	<u>2020 (Projected)</u>
Rutherford	47,337	56,500
Polk	11,735	14,500
McDowell	30,648	50,000
Burke	60,364	88,500
Cleveland	<u>72,556</u>	<u>101,500</u>
Total	222,640	311,000

Water and Related Land Resource Problems

The present population within 50 miles of the proposed recreational site is well over one million.

Plant and Animal Resource Problems

Fishery resources within the watershed are limited for its streams are often turbid, especially after rains, and provide poor fish habitat. The heavy sediment loads in these streams come primarily from eroding crop fields, sand dredging operations, and critical areas, such as bare road-banks. Sediment pollution is the major factor influencing the fishery resources.

Wildlife habitat is primarily of the upland type. Wetland habitat is generally lacking in the watershed. Turkey populations, once abundant, are now almost non-existent due to past land use patterns and severe overhunting.

Probably the greatest problem relating to wildlife resources is the lack of management practices specifically designed to benefit wildlife. Virtually no wildlife habitat management practices are in evidence. Good management for the improvement or preservation of habitat types for the upland species is needed.

The N. C. Department of Natural and Economic Resources also came to much the same conclusions in its study of the Broad River (10). Following are quotations taken from its report on that study.

"The major conclusions on the effects of pollution in the Basin were the following; in the Piedmont soil erosion is the most important factor limiting the production of game fish"

and,

"The wildlife resources of the Broad River Basin are generally only fair. There appears to have been only a little concern for wildlife management in the past, and thus game populations are far below their potential."

Water Quality Problems

Sediment is one of the greatest water pollutants in the watershed. Chemicals such as plant nutrients, insecticides, etc., are often attached to the sediment particles. Sediment and associated pollutants come from agricultural, municipal, and industrial sources.

Water and Related Land Resource Problems

There are several potential point sources of pollution discharge in the watershed (10). These sources and the receiving streams include:

<u>Source</u>	<u>Receiving Stream</u>
Rutherford Furniture Company	Catheys Creek
Doncaster Collar and Shirt Company	Holland Creek
Town of Spindale - Sewage Treatment Plant	Holland Creek
Town of Forest City - Sewage Treatment Plant	Second Broad River
Town of Rutherfordton - Sewage Treatment Plant	Second Broad River
Mastercraft, Inc.	Second Broad River
Burlington Industries - Caroleen Mills	Second Broad River
Burlington Industries - Henrietta Mills	Second Broad River
Cone Mills, Hayes Plant, Henrietta	Second Broad River
Town of Cliffside and Cone Mills	Second Broad River

These potential pollution sources have treatment plants which provide at least secondary treatment. At present all treatment plants are maintaining adequate treatment, although the Rutherfordton plant is now slightly overloaded.

Water quality of the streams where recreational development is proposed is high enough to present no problems. The present quality classification (AII) is higher than that required by law for recreation (B); the AII classification being suitable as a source of water supply for drinking, culinary or food processing, after approved treatment; and the B classification being suitable for outdoor bathing and any other usage requiring waters of lower quality. Land above these structures is mainly forested with some pasture. Sediment will not be a problem except after large storms when scattered areas of row crops and logging roads will produce enough sediment to temporarily muddy the reservoir waters. Agricultural pollution from pesticides, herbicides, and fertilizers lost from the few scattered areas of open land can be expected to be minimal above the proposed recreational sites.

Economic-Social Problems

The greatest economic problem in the watershed is the large number of farms which sell less than \$2,500 worth of products annually. Well over 90 percent of the farms in Rutherford County had total sales of less than \$5,000 according to the Census of Agriculture (20). The Census also reports that 121 farms in the county with full-time operators had sales of less than \$2,500. These are the low-income producing family farms.

The problems of low-income, underemployment, and poor quality public facilities have generally been associated with the depopulation of rural areas. Promotion of rural community development is needed most in the upper reaches of the watershed. This area has lost population as the number of farms has declined. Camp Creek Township population declined from 1,329 in 1950 to 1,084 in 1970, and Gilkey Township declined from 1,142 to 746 over the same period.

In the urban, downstream area population has increased--particularly in and around Forest City. However, the N. C. Office of State Planning Division (21) estimates the rate of out-migration from Rutherford County at 4.21 percent for the decade 1961-1970. This places net out-migration at approximately 2,000 persons.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment

When the land treatment program is installed, erosion and sediment will be reduced. Sheet erosion in the watershed will be reduced approximately 35 percent. Critical area erosion (gullies, etc.) will be reduced about 40 percent after stabilization measures are installed. Total erosion from all sources will be reduced from the present 913,110 tons annually to 639,180 tons (30 percent). Sediment delivered into the streams will be reduced from 133,550 tons to 88,500 tons (34 percent). After the land treatment and structural measures are installed, sediment delivered to the mouth of the watershed will be reduced from the present 38,750 tons (119 milligrams per liter) annually to about 17,600 tons (54 milligrams per liter).

As erosion rates are reduced, related sediment damage will also be lowered. Conservation land treatment will control sheet erosion from open farmland, the most significant sediment source in the watershed. The amount of overbank deposition, or sediment deposited on the flood plain, will be reduced 85 percent.

With the proposed land treatment installed, 50 percent of all cropland and 83 percent of all pastureland and hayland will have adequate conservation treatment. By contributing significantly to the reduction of erosion and the resulting sediment damages to cropland, the program will improve the tilth and moisture holding capacity of the soil which will help in maintaining and improving productivity. The land treatment will tend to slow down the rate of runoff from treated areas, also helping to a certain extent in reducing flooding, although flood runoff cannot be completely eliminated by land treatment. However, with vegetative measures to be installed in the watershed, the runoff rates will be reduced. Land treatment measures which result in deep fertile topsoil, a high level of organic matter, good tilth and vegetative cover increase the infiltration rate and moisture holding capacity of the soil. This reduces the runoff and makes more water available for crop production.

Although flooding from short, intense rains can be reduced by these measures since they increase the rate of infiltration and water storing capacity of the soil, such land treatment measures have little effect during major floods when the soil is saturated.

The tree planting on 273 acres of critically eroding area will return this land to production. Planting of 8,180 acres of trees on open land (2,320) and understocked stands (5,860) will help improve the watershed economy through sale of various products from this land. Other forestry measures include hydrologic stand improvement on 1,577 acres of forestland. The hydrologic condition of the forest soil will be improved. Water runoff will be less, flooding will decrease, erosion from old logging roads and skid trails will be reduced and fewer runoff conveyed pollutants will reach flowing streams.

The changes in land use in the watershed will bring about other critically needed adjustments. Presently, there are some areas being used for cropland when they are simply not suited. Also, much land is lying idle when it could be converted, for example, to grassland or forestland under the project. About six percent of the cropland in the watershed will be converted to a more suitable use and idle land will be reduced by approximately 97 percent. About 5,117 acres of idle land will be converted to grassland and 1,293 acres will be converted to forestland which will help reduce its erosion losses. The diagram on the next page illustrates the general land use changes resulting from the project. These land-use changes include the 711 acres (383-forestland and 216 crop and pasture) that will be converted to permanent water and the 711 acres 383 forestland and 328 crop and pasture) that will be within the flood pools and recreation areas of the structures.

Reduced erosion will also lessen the amount of plant nutrients and other agricultural chemicals entering the water from agricultural sources. Stanford (29) and Frink (30) have stated that the element phosphorous, for example, is lost to drainage waters mainly through erosion and that erosion control practices tend to control water pollution from this element. Since sediment also has been shown to be the major carrier of nitrogen (31) and insecticides (32), erosion control practices are expected to reduce both the possibility of eutrophication of the stream waters from cropland and the possible adverse effects to aquatic resources from pesticides, etc. Land treatment measures will also provide variety, diversity, and edge effect beneficial to wildlife.

Furthermore, the land treatment program will help to reduce the amount of water lost through surface runoff, providing more water for ground water recharge. The water table will be lowered two to three feet on those areas of wet bottomland receiving improved drainage, but it will not be lowered enough to significantly affect ground water recharge. Any ground water recharge lost in these areas of improved drainage will be more than compensated for by the impounded water in the 12 structures which will result in some increase in ground water recharge around these areas.

Structural Measures

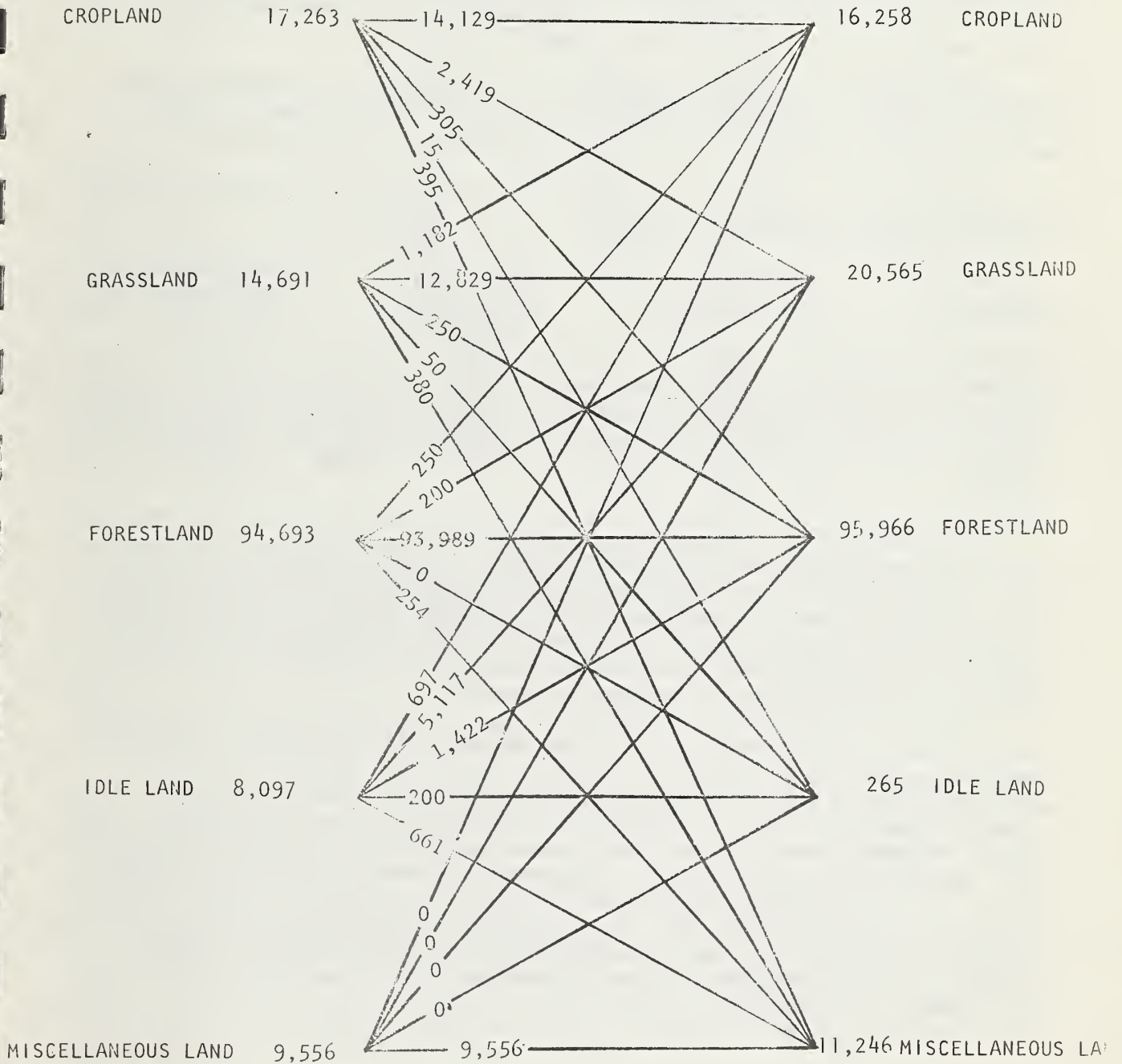
Structural measures will reduce flooding and flood damages on 4,684 acres of flood plain land.

At the junction of Catheys Creek and Second Broad River (see project map), the reduction in stage and _____ for the 100-year frequency storm is 2.63 feet and 2,100 cubic feet per second. For the six-month frequency storm, the reduction is 129 cubic feet per second and 1.52 feet

LAND-USE CHANGE DIAGRAM

BEFORE PROJECT
ACRES

AFTER PROJECT
ACRES



Environmental Impacts

in stage at this point. At the junction of Robinson Creek and Second Broad River, the reduction in the 100-year frequency flow and stage is 2,100 cubic feet per second and 2.39 feet, respectively. At this location the peak flow and stage for the six-month storm is reduced by 126 cubic feet per second and 0.87 feet, respectively.

Floodwater damage to crops and pasture and to other agricultural property will be reduced by about 83 percent with damage reduction ranging from about 10 percent in Reach 17 to almost 100 percent in Reaches 5 and 12.

The following table shows effects of structural measures in terms of reduction of acres flooded and reduction of flood damages:

<u>Storm Frequency</u>	<u>Reduction in Acres Flooded</u>	<u>Reduction in Acres Flooded (percent)</u>	<u>Reduction of Flood Damage (percent)</u>
100-year	784	17	32
25-year	931	22	36
10-year	1,171	31	47
5-year	1,101	32	49
2-year	663	29	46
1-year	434	37	59
6-month	192	51	73

The reduction in flooding will permit farmers to plant about 1,963 acres of row crops and 1,084 acres of high yielding pasture in the flood plain below the structures. Increased use of flood plain land will permit converting 1,700 acres of steep upland from cropland and idle land to forest and pasture use, resulting in more efficient use of committed factors of production (land, labor, and capital investment).

Some increased ground water recharge can be expected as a result of the impoundments and their sustained release flows. All sites will have a permanent pool; that is, standing water. Field investigations show no excessive seepage losses are expected from any site. Hence, no large volumes of ground water recharge will occur as a result of the structures. Minor amounts of natural seepage (incidental recharge) will occur throughout the pool areas where exposed rock contains fractures and joints. No practical estimate of this increase in recharge around the impounded areas was made. The quality of water infiltrating the soils and rocks beneath the pools will not adversely affect the quality of the existing ground water resource within the watershed.

Environmental Impacts

As a result of the project, the following changes are expected to take place in crop acreages and yields on the flood plain land.

<u>Crop</u>	<u>Without Project</u> (acres)	<u>With Project</u> (acres)	<u>Without Project</u> (yield)	<u>With Project</u> (yield)
Corn	982	818	75 bu	115 bu
Pasture	724	1,084	4 aum	12 aum
Corn Silage	254	356	15 tons	20 tons
Hay	188	188	130 bales	160 bales
Sorghum (molasses)	---	98	---	250 gal
Soybeans	378	440	30 bu	50 bu
Wheat	63	63	45 bu	60 bu

The project will, of course, result in the destruction of practically all vegetation within the 470 acres (254 forestland and 216 crop and pasture) to be converted permanently to water. However, the tree plantings and the areas managed as wildlife habitat will insure that overall forestland production and wildlife habitat will not be detrimentally affected.

Approximately 10 miles of stream habitat will be converted to reservoir habitat in the upper tributaries of the watershed area (see project map). Only three of the stream reaches with proposed dams are classified in A Catalog of Inland Fishing Waters in North Carolina: Little Camp Creek (Structure 3) and Second Broad River (Structure 11), with an ecological classification of Dace-trickle; and Robinson Creek (Structure 7A) with an ecological classification of sucker. Streams under both classifications generally have a low productive fish capability. Estimated maximum potential sustained annual harvest for streams under these classifications would be: Dace-trickle - 8 lbs/surface acre and sucker - 15 lbs/surface acre (33).

The productivity of water impounded by the structures would be considerably higher than that in the streams before impoundment. Thus, the estimated maximum potential sustained annual harvest would be 100 pounds/surface acre in the three larger reservoirs (Structures 2, 3, and 7A) and a maximum potential of 400 pounds/surface acre in the smaller impoundments (33).

One possible adverse effect of the structures, however, would be that they might block access to the upstream reaches used as spawning areas by fish in Second Broad River and the lower portions of the tributaries. Some of the streams with planned structures may be too small to be of importance as spawning areas.

Also analyzed after a review of pertinent literature were effects of the structures on water temperatures and dissolved oxygen levels of the streams where they are to be located.

Environmental Impacts

Considerable information may be found on water temperatures, stratification, dissolved oxygen, etc., in large reservoirs. Therefore, in trying to ascertain possible effects of the structures, we must consider the scientific principles involved.

Impounded water warms up more than that in a stream because of the increased surface area exposed to the sun. Circulation of water in ponds is such that limited stratification of temperature or oxygen occurs. During the summer, top waters become warmer than bottom waters; as a result, only the warm top layer (called the epilimnion) circulates, not mixing with the colder bottom layer (called the hypolimnion) and creating a zone with a steep temperature gradient in between (called the thermocline). If the thermocline is deeper than effective sunlight penetration, the oxygen supply in the hypolimnion is rapidly depleted. If, however, stratified waters are transparent enough to permit growth of phytoplankton below the thermocline, oxygen will be present (34).

Stratified lakes with top-water releases also discharge the warmer surface waters and tend to trap nutrients from upstream. A bottom-water release from such lakes would retain the warmer waters and release the colder, nutrient-rich, bottom waters (34). Such releases from an oxygen-poor hypolimnion would be low in oxygen; however, the water is quickly reoxygenated by stream turbulence. Dillion (35) states that water from the bottom of a floodwater retarding structure picks up oxygen as it goes through the primary outlet and is normally saturated when it comes out below the structure. Due to turbulence of the water discharging from the structures, the dissolved oxygen levels in the reaches downstream from the proposed structures should therefore be at least as great as present conditions.

Shumacher (36) found that water drawn 10 feet below the surface of a relatively small reservoir (4.3 surface acres) was discharged an average three degrees Fahrenheit warmer than the stream inflow during the summer months. This study was made in the mountains of Georgia where average air and stream temperatures were cooler than would be expected in the Piedmont area.

All of the planned Second Broad reservoirs would have more surface area exposed to the sun than in the Georgia study, thereby tending to heat the water more. However, the reservoirs with planned cold-water releases (Structures 11, 22, and 23) range in depth from 20 to 50 feet. These reservoirs should stratify in the summer, causing water being drawn from near the bottom to be as cold or colder than that of the incoming stream.

Any adverse effects to the fishery resources resulting from increased water temperatures and lower dissolved oxygen levels will be avoided in the reaches downstream from Structures 11, 22, and 23. The other structures will probably tend to warm the waters and reduce the oxygen content in the stream reaches below. However, none of the reaches that will be adversely affected have valuable fishery resources and any adverse effects to aquatic resources resulting from the increased water temperatures will be negligible.

No adverse effects will result to the streams in the watershed from a low flow or base flow standpoint. During periods of normal inflow to the structures, the outflow will approximately equal the inflow, assuring that the normal flow of the stream below the structure remains about the same as it would be with no structures. The low flow orifices on all the planned structures will insure that a flow at least equal to the 10-year, seven-day low flow will occur in the streams at all times.

When installed, the project should enhance the fishery resources in the lower reaches of Second Broad River and in the Broad River by reducing sediment and associated pollutants delivered to these downstream areas. Fish food organism production and spawning success should improve as a result of sediment reduction.

Approximately 470 acres (254 forestland and 216 crop and pasture) of wildlife habitat will be inundated in the permanent pool area of the 12 impoundments. In addition, due to the recreation development and heavy human use at Structure 2, forest game habitat in and around the recreation facilities will be affected. However, forest game (deer, squirrel, rabbit, quail, dove) in the periphery of the recreation area use the area to some degree adding to the enjoyment of the visitors.

Also, there are approximately 521 acres (280 forestland and 241 cropland, and pastureland) in the flood pool area which will periodically inundated. The duration of flooding on these lands will be of such a limited extent, however, that their value as wildlife habitat should not be significantly affected. The possible primary detrimental effect would be increased hazard to reproduction of small game species, such as rabbit and quail.

In addition to being lost as wildlife habitat, the 254 acres of forestland to be converted to permanent water and the 80 acres of forestland in dams and spillways will be lost as timber producing areas. The forestland involved in the areas to be developed for recreation will likewise be reduced in value for commercial production.

Nonetheless, the 323 acres to be managed as upland wildlife habitat and the forestland management program will insure that the overall wildlife habitat remains at least equal to its present value. In fact, this type of management will represent a significant and positive commitment on the part of the landowners to preserve or improve the watershed's overall wildlife habitat. Additionally, land treatment practices, such as mulch planting, critical area stabilization, and field border planting, will also be beneficial to wildlife.

Waterfowl populations can be expected to use all 12 impoundments as resting areas. The duck windows on Structures 11, 22, and 23 should, if properly managed, allow the planting of wildlife food. There will be a total of 19 acres of managed waterfowl feeding areas in these three structures. These feeding areas and other structures will greatly increase the waterfowl habitat within the watershed. The waterfowl habitat at the Bostic brickyard will not be affected by the project.

Environmental Impacts

The need for public water-based recreation will be greatly enhanced by multiple-purpose Structures 2 and 3A. It has been estimated that multiple-purpose Structures 3A will provide an average of 17,000 visitor-days of fishing and boating annually. Structure 2, with facilities for swimming, picnicking, trailer camping, primitive camping, fishing, and boating, will provide an average of 135,000 visitor-days annually with an estimated design capacity of 1,375 visitors.

After installation of the project, watershed residents will have easy access which they do not have now to most types of water-based recreation.

The waterfowl habitat management and the land treatment also should improve hunting conditions within the watershed. Increased populations of upland wildlife resulting from the wildlife management areas and the increased waterfowl populations in the structures will make hunting more attractive.

Archaeological, Historic and Scientific Impacts

Six sites, all aboriginal in content, were identified by the archaeological survey as being affected by structural measures. Rf-54 is a deeply buried site located in the permanent pool of structure No. 7A. Rf-51 is a thickly concentrated site located in the permanent pool of structure No. 3A. The largest aboriginal pottery component encountered in the survey is site Rf-75 found just south of the construction area of structure No. 4. This site would be affected by the access road to the dam. Structure No. 4 would also affect site Rf-74 located in the emergency spillway and construction area. Site Rf-86 is found in the proposed recreational area of structure No. 2 and Rt-82 is found in the floodpool of structure No. 13.

Economic and Social

Estimates suggest that during the installation period, the project will generate 79 man-years of employment and \$792,000 in wages (at \$10,000 per man-year). The operation and maintenance of structural works and recreational facilities will, directly or indirectly, create six jobs to be filled by local residents. Higher agricultural productivity is expected to generate another 23 jobs.

Multiple-purpose Structures 2 and 3A are expected to provide 152,000 visitor-days of recreation annually to nearby residents. Creation of the lakes will help supply the high demand for water-based recreation in the area as well as improve the quality of life for watershed residents. As a result of recreational activity around the lakes, local businesses such as sporting goods dealers, service stations, bait and tackle shops, etc., will benefit from increased business.

It is estimated that 350 farms will be benefited by the project. More efficient use of land, labor, and capital resources will improve the economic condition of farm families. Reduction of flooding will result in increased production from flood plain soils. An estimated 20 percent of the benefited flood plain is in farms that use one and one-half man-years or more of hired labor.

Installation of the project will result in increased noise, litter, dust, etc., around the area of work during construction. Observation of the project map, however, shows that none of the proposed structures are located within or nearby towns. Therefore, any inconvenience during construction will be limited to those persons living in nearby rural areas and to persons using those roads requiring modifications. No major disruptions of rural community life as a result of the project are expected. Vector controls, in compliance with North Carolina state law, will be enforced around the construction areas.

It is estimated that securing land rights for structures will cause 16 displacements as defined by the rules and regulations of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. Four displacements from dwellings and 13 displacements from farms are anticipated.

Displacements at each structure site are as follows:

<u>Structure Site</u>	<u>No. of Displacements</u>	<u>Persons Displaced</u>
1A	2	
2		2
3A	2	
7A	4	
11	2	2
13	1	
14	<u>1</u>	—
Total	12	4

The law requires that replacement housing be safe, sanitary, and decent regardless of the condition of the present dwelling and also requires that a relocation assistance advisory service be provided. It is the general intent of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 that no displaced person, business, or farm operation shall suffer economic loss as a result of project measures.

FAVORABLE ENVIRONMENTAL EFFECTS

- A. Create about 79 jobs during project installation
- B. Create about 29 jobs for the project life
- C. Improve income of the watershed residents
- D. Reduce gross erosion by 30 percent
- E. Reduce overbank sediment deposition damages 60 percent
- F. Reduce sediment damages to reservoirs 55 percent
- G. Reduce sediment damages to industrial water supplies 35 percent

Favorable Environmental Effects

- H. Reduce floodwater damages to crops, pasture, and other agricultural property by 65 percent
- I. Reduce sediment transported to the mouth of the watershed by 21,150 tons (65 mg/l) annually
- J. Provide 152,000 visitor-days of recreation annually
- K. Create 470 surface acres of fishery habitat
- L. Create 19 acres of managed waterfowl feeding area
- M. Provide 323 acres of upland wildlife habitat
- N. Stabilize 430 acres of critically eroding land
- O. Reduce sediment associated pollutants
- P. Locate areas of archaeological significance

ADVERSE ENVIRONMENTAL EFFECTS

- A. Temporarily increase sedimentation during construction
- B. Eliminate 10 miles of stream fishery habitat
- C. Eliminate approximately 470 acres of wildlife habitat
- D. Remove 216 acres of crop and pasture from production
- E. Cause 16 displacements
- F. Remove 399 acres of forestland from production

ALTERNATIVES

Accelerated Land Treatment Program - This alternative consists of an accelerated land treatment program on 15,795 acres of crop, pasture, and miscellaneous land and 24,223 acres of forestland. Technical assistance for installation of this alternative would be provided by the Soil Conservation Service and the Forest Service.

The land treatment measures in this alternative are discussed under Planned Project (p. 2). Benefits derived from land treatment include a reduction in annual erosion from 913,100 tons to 639,200 tons. A reduction from 133,550 tons to 88,500 tons in annual sediment delivered into the streams also would be realized. This sediment reduction, together with associated pollutants, would benefit the fishery resource and the municipal and industrial water users who obtain their water supplies from streams in the watershed. Less sediment would be deposited through overbank deposition. However, while helping to some degree in reducing flood damages from smaller, less intensive storms, land treatment would have little effect in reducing damages from heavy extended rainfalls. Average annual benefits from the reduction in floodwater damage and sediment are estimated to be \$35,700. Additional benefits would be attributed to upland wildlife habitat through wildlife plantings on 274 acres and more intensive management of 49 acres of existing habitat.

Alternatives

Adverse environmental effects caused by the planned project, such as elimination of 10 miles of stream fishery habitat and 470 acres of wildlife habitat and removal of 214 acres of crop and pasture land, would be avoided. Future productivity of the land on which land treatment measures are applied also would be assured.

However, favorable environmental effects of the planned project, such as 152,000 visitor-days of recreation annually, 470 acres of fishery habitat and 19 acres of managed waterfowl feeding area, will be foregone with this alternative. In addition, average annual floodwater damages amounting to \$100,000 would continue. The total installation cost of this alternative is \$2,151,000 or about \$121,500 annually.

Dikes and Pumps with Land Treatment - A system of dikes, collection ditches, and pumping plants used in conjunction with an accelerated land treatment program was considered as an alternate method of providing flood protection. Benefits from erosion and sediment reduction were estimated to be the same as with the accelerated land treatment alternative previously discussed. With a wildlife management program, the area (2,450 acres) committed to the dikes and ditches would benefit wildlife in the watershed. In addition, there would be flood protection for 2,336 acres of flood plain. Adverse effects associated with floodwater retarding structures, such as elimination of 10 miles of stream fishery habitat and family and farm displacements, would be avoided. Average annual benefits, derived principally from floodwater damage reduction, are estimated to be \$150,000.

Approximately 2,450 acres of flood plain would be committed to the dikes and collection ditches, thus creating "uneconomic remnants" and causing displacement of some farm operations. Favorable environmental effects associated with floodwater retarding structures, such as 152,000 annual visitor-days of recreation, 504 acres of fishery habitat, and 19 acres of managed waterfowl feeding area, would be foregone with this alternative. The total installation cost of diking and pumping is estimated at \$10,000,000 with an annual operation and maintenance cost of \$220,000. These costs are equivalent to an average annual cost of \$880,000.

Channel Work with Land Treatment - Channel work in combination with an accelerated land treatment program was originally considered as a possible solution to the flooding problem in the watershed. Preliminary investigations, however, revealed that channel excavation or channel clearing and snagging would increase velocities to the point that an unstable channel would result. Because of the amount of excavation and clearing and snagging needed to provide capacity for the peak of the five-year, 24-hour frequency storm and the high cost involved in grade stabilization structures to provide a stable channel, under the criteria of Technical Release 25, all alternatives involving channel work were omitted from further consideration.

Flood Plain Purchase With Land Treatment - The purchase of flood plain land in combination with an accelerated land treatment program was considered as an alternative to structural measures in solving the flooding problem. The future use of the land purchased would be limited to those uses which would tolerate periodic flooding, such as forestland managed for multiple products, timber, recreation, wildlife and aesthetics. An abundance of picnic areas, bike trails, etc., could be created. There would be 3,230 acres available for recreational use and timber production. This alternative would prevent an estimated \$100,000 annually in agricultural floodwater damages. In addition, adverse environmental effects associated with the planned project would be avoided.

Benefits from the land treatment program would, of course, be the same as described under the accelerated land treatment alternative on page 65. These include the overall reduction in watershed erosion from 913,100 tons to 639,200 tons, a 45,050 ton annual reduction in sediment delivered into streams along with associated improvements in water quality. Some reduction in floodwater damage, especially from the smaller, less intense storm would also be realized. Wildlife plantings and habitat management will benefit upland wildlife.

Average annual floodwater damages to public roads and bridges in the amount of \$23,300 and sediment damages of \$95,500 would continue with this alternative. The purchase of 3,230 acres of crop and pasture land is estimated to cost \$2,580,000. At least 150 farmers who own flood plain land would be affected by the purchase. An additional \$440,000 would, therefore, be required for relocation costs. The relocations would also increase the outmigration rate from the rural areas in the watershed. The average annual cost of this alternative is estimated to be \$171,000, exclusive of land treatment costs.

Other Considerations - The Federal Crop Insurance Program has been discontinued for all crops in Rutherford County, and thus, offers no solution or compensation for the flooding problem.

At this time there are no other federal nor state programs which offer possible alternate uses of the entire flood plain land in the watershed. The recently implemented Rural Environmental Conservation Program offers some possibilities of alternate uses on an individual basis.

No Project - Leaving the watershed in its existing state would avoid the elimination of 470 acres (256 forest land and 214 crop and pasture land) of wildlife habitat and 10 miles of stream fishery habitat. However, the steep uplands would continue to be used for production of row crops increasing erosion and sedimentation problems (see pp 51-52). Flooding problems would worsen as channels continue to be filled with sediment and debris. There would be 470 acres of fishery habitat and 19 acres of managed waterfowl feeding area and 152,000 visitor-days annually of recreation foregone with this alternative. The total estimated average annual net benefits foregone with no project would be \$135,385.

SHORT-TERM VERSUS LONG-TERM USE OF RESOURCES

In the Second Broad River Watershed, past agricultural trends have been very similar to those in the Broad River Basin as a whole. A study of the basin's history and projected future changes and trends was made by the North Carolina Department of Natural and Economic Resources, and the Soil Conservation Service believes that these findings apply equally to agriculture in the Second Broad River Watershed itself. Following are some excerpts from the Department's report of its study (10):

"The agricultural sector in the basin has been, and still is, in a period of transition. The most significant change has been the large decrease in farm employment (almost a 50% decline during the sixties). Other changes include the increase in average farm size, decreases in total farm acreage and the value of crops, and the growth in the raising of livestock. Below, brief predictions describe what agriculture may resemble during the next fifty years.

"Employment in Farming

Employment was projected to continue the downward trend experienced over the last few decades. The rate of decline will probably be slower over the next thirty years, and after that, employment may be quite steady. It is thought that further mechanization and more acreage being put into pasture will enable future farmers to produce at levels of output higher than today.

"Acreages

During the period 1965-1970, total acres in farm tracts has (sic) been decreasing at an average rate of about 1.5 percent per year. In Rutherford County, for example, farmland decreased from 235.3 thousand acres to 216.0 thousand. Such a trend is expected to continue, and during the next fifty years, more than 150,000 acres of farmland may be transferred to other uses, reducing total farmland from 613.1 thousand acres to about 450 thousand.

Also, the number of acres in harvested cropland is expected to decrease, perhaps to only one-half of the 73.6 thousand acres in 1970. Similarly, idle cropland may decrease significantly; however, if present trends continue, pasture land may almost triple in acreage, from the 79.1 thousand acres in 1970 to over 200 thousand acres.

Resources

"Livestock and Crops

In the short run, the trends of the past will continue, livestock production will increase at a high rate; food crops will decrease, generally, but wheat will increase; hays will increase greatly; cotton will decrease; soybeans will increase.

Thirty to fifty years from now the agricultural environment may be significantly changed. Technological change may bring farmers some sort of weather control, while new machines may allow faster planting and harvesting.

"Timber

Due to the spreading of the population into the rural environment, it is expected that the amount of forest lands in the Basin will decrease. And yet, saw timber production may not decline if better forest management practices are followed. Indeed, the return of hilly, hard-to-farm lands into forest and pastures may help improve the soil, livestock production, and timber production."

Therefore, it could generally be said that the agricultural aspect of Second Broad River Watershed, as well as that of the surrounding areas, will most likely continue to undergo changes. With the projected general decrease in acres of farmland and in the acres of harvested cropland, it will be necessary to make maximum use of those acres remaining in cultivation. The land treatment measures of the proposed plan are designed to accomplish this end since the planned structures will help protect the valuable bottomlands from flooding.

The study cited above also points out the desirable trend for hilly land, or land otherwise unsuitable for production, to be converted to more suitable uses such as forest and the pastureland especially needed for projected livestock increases. The need for improved forest management practices to maintain timber production is also pointed out. The proposed project calls for the establishment of 7,300 acres of new pastureland, tree planting on 273 acres of critically eroding areas, tree planting on 8,180 acres for watershed protection, and stand improvement measures for increased timber production on 15,770 acres of existing forestland. These measures will be an important step in bringing about some of the needed changes in the agriculture of the watershed and will help to offset future production losses due to urban encroachment, industrialization, etc.

In addition, project measures will not interfere with possible technological advancements in agriculture requiring larger equipment, new cultural practices, etc.; and overall, the project is expected to be compatible with the watershed's future agricultural profile.

Resources

The same study (10) also points out some of the problems and needs of the Broad River Basin and some of the solutions. Below are report excerpts concerning soil erosion, wildlife management, and water control problems.

"The fight to control soil erosion is taking place in the counties of the Broad River Basin. Unfortunately, the amount of land being treated is not large: approximately 20 percent of all rural and farmland areas were protected in 1967. . . . Further information indicates that land treatment on croplands is needed in all classes of lands, not just on the hillsides and steeper slopes. Also, much pasture and forest lands require erosion control.

"The Division of Inland Fisheries (N. C.) made a survey of the Broad River and its tributaries in 1965. The major conclusions on the effects of pollution in the Basin were the following: in the Piedmont, soil erosion is the most important factor limiting the production of game fish;

"The wildlife resources of the Broad River Basin are generally only fair. There appears to have been only a little concern for wildlife management in the past, and thus game populations are far below their potential. ,

"Also good soil and water conservation practices should be used to minimize the movement of wastes into streams. Higher rates of runoff result in heavier pollution. Even when land disposal sites are poorly located, the amount of pollution entering streams is usually low, and watershed factors, such as surface culture and ease of erosion, are of primary importance in governing the magnitude of pollution which reaches the streams."

Therefore, the beneficial effects of the planned project will contribute to much more than the agricultural portion of the watershed. Reduced sediment will aid the fishery resource as well as help reduce pollution. Wildlife management, both upland and wetland, is also an important part of the proposed plan. Thus, it is apparent that many people in the watershed and in the Broad River Basin would benefit from a project of this type and that proposed measures would be an integral part of any formal land-use plans or river basin plans that might be developed in the future.

This permanent commitment represents the most feasible way to aid in solving the immediate flooding problems now occurring. The land treatment program will, of course, aid in solving the immediate problems of erosion, flooding, etc., but they will not reduce the options available for long-term uses of any land.

Resources

The project measures in this plan are based on the assumption of a 100-year life of the project. Although the economic analyses and the design assumptions are based on this 100-year period, this does not mean that the project measures will become ineffective at the end of that span. The land treatment measures can be effective for much longer if they are properly maintained and carried out. The impoundments have a built-in storage allotment for the expected sediment accumulations over the 100-year period. Under normal circumstances, the structure would still have all its floodwater-retarding storage or all its multiple-purpose storage available at the end of 100 years. After this time, of course, any sediment deposited in the structure would cut down on the floodwater-retarding storage. However, the structure would still have a significant beneficial effect in providing floodwater retardation or multiple-purpose storage long after the 100-year project life. If project measures are properly maintained, the beneficial effects of this project can, therefore, last much longer than 100 years and can contribute to the regional development and enhancement long after the project life.

Since the program's inception, participation in the Public Law 566 program in the South Atlantic Gulf Region and subregion 0305 has been fairly good. Projects completed and projects under construction are fairly well distributed over the region and subregion.

The South Atlantic Gulf Region is one which receives abundant rainfall, and thus water management problems have usually centered around flooding and inadequate drainage. Projects in the mountain and piedmont areas usually involve floodwater-retarding structures and grade control structures to solve flooding and erosion problems. Multiple-purpose storage (recreation, municipal water, etc.) is often included in built or planned structures. Projects in the coastal plain areas of the region and subregion most often involve channel work and artificial drainage of some type to solve water problems. A conservation land treatment program is normally included in all projects.

There are, at present, 24 Public Law 566 projects in subregion 0305. These 24 projects include five that have been completed, 15 that are in the operations stage, and four that are in the planning stage. Second Broad River Watershed is included among those in the planning stage.

Other water resource projects in the Santee-Edisto system have generally been concerned with such things as hydroelectric power generation, navigation, and flood control on a large scale. The rivers have been developed extensively for hydroelectric power. Some of these reservoirs, such as those planned in the structures for Second Broad, do offer recreational activities. The United States Army, Corps of Engineers, has completed several flood control and navigation projects in the Santee-Edisto, including the Upper Saluda River project. Projects by the Corps of Engineers are generally on a much larger scale than Public Law 566 projects.

According to the Federal Power Commission's 1970 report, there were 50 hydroelectric projects in the Santee system. Duke Power Company operates 25 of these projects; South Carolina Electric and Gas Company operates four; and South Carolina Public Service Authority operates two. The remaining projects are operated by industrial mills and municipalities.

The only water resource projects similar to the planned measures on Second Broad include the Public Law 46 projects and the Resource Conservation and Development projects. Public Law 46 provides for soil and water conservation projects on a localized scale much smaller than that under Public Law 566. Resource Conservation and Development projects involve the development and implementation of land conservation and land utilization activities. There are three such projects in the Santee Basin.

Although there are several projects now under construction, there have been no Public Law 566 projects completed to date in the Broad River Basin. Thus, there have been no cumulative effects from this type project. The impoundments located in the Broad River Basin have been designed mainly for hydroelectric power and, therefore, do not offer a great deal of flood protection. The measures planned for Second Broad River will have little or no effect on overall resources in the Broad and Santee River Basins. Second Broad River Watershed makes up less than four percent of the Broad River Basin and only about one percent of the Santee River Basin. The watershed project, however, would reduce downstream flooding on the Broad below Second Broad to a small degree. A hydrologic analysis of Second Broad River showed the 100-year peak flow at the mouth to be 20,239 cubic feet per second and 17,383 cubic feet per second for the without-project and with-project conditions, respectively. The gauge on Broad River near Boiling Springs, North Carolina (three miles downstream from junction with Second Broad), shows that the maximum flow in the 75-year period of record is 73,300 cubic feet per second (11). If we consider this as approximately the 100-year frequency, the 2,856 cubic feet per second reduction in flow at the mouth of Second Broad would reduce the peak about 3.5 to 4.0 percent in the Broad River at Boiling Springs, North Carolina.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will commit approximately 470 acres of crop, pasture, and forest land to permanent water. Of this amount, 258 acres will be in the recreational pools. Approximately 80 acres of mostly forestland also will be committed to the dams and emergency spillways. There also will be 596 acres used for the detention pools, and although this land would not be available for any uses which cannot tolerate periodic flooding, it could still be used for parks, wildlife areas, etc. Approximately 115 acres of land will be committed to the recreational developments around Structures 2 and 3A. Unless appropriate salvage operations or documentation studies are performed, six archaeological sites will be either destroyed by construction or covered with impounded water. No other permanent commitment of resources is known to be required for this project.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

An application for federal assistance under the Watershed Protection and Flood Prevention Act was filed for the Camp Creek-Cane Creek Watershed with the State Soil and Water Conservation Committee in February, 1965. The administrator authorized planning assistance in July, 1966.

An investigation and report of the Camp Creek-Cane Creek Watershed was made under the joint authority of Section 206 of the Appalachian Regional Development Act of 1965 and Public Law 566, 83d Congress; 68 Stat., 666, as amended. The work was a joint effort of the Economic Research Service, Forest Service, and the Soil Conservation Service.

A field examination of Camp Creek-Cane Creek Watershed was held on February 17, 1965, and the following organizations were invited to participate in this study:

- North Carolina Department of Conservation and Development
- North Carolina Wildlife Resources Commission, Game Division
- North Carolina Wildlife Federation
- North Carolina State Highway and Public Works Commission
- North Carolina Commissioner of Agriculture
- North Carolina Department of Conservation and Development,
Director of State Parks
- North Carolina Department of Water Resources
- North Carolina State Board of Health
- North Carolina State Stream Sanitation Committee
- North Carolina Experiment Station
- North Carolina State University, College of Agriculture
- North Carolina State Soil and Water Conservation Committee
- North Carolina Extension Service
- Agricultural Stabilization and Conservation Service (USDA)
- Farmers Home Administration (USDA)
- Forest Service (USDA)
- Office of General Counsel (USDA)
- Soil Conservation Service (USDA)
- United States Fish and Wildlife Service (USDI)
- United States Bureau of Mines (USDI)
- United States Army, Corps of Engineers
- United States Weather Bureau

Interest in the Second Broad River developed to the extent that an application for federal assistance was submitted in November, 1966, and in March, 1967, the application on Second Broad was amended to include the Camp Creek-Cane Creek Watershed.

All interested agencies and individuals were consulted during the application and planning stage. The North Carolina Division of Forest Resources and the United States Forest Service made inputs into the work plan. The North Carolina Wildlife Resources Commission and the United States Bureau of Sport Fisheries and Wildlife comments have been co-ordinated with the plan's proposed improvement. All interested agencies, state and federal, were invited to participate in all the meetings during the application and planning stages.

The United States Bureau of Sport Fisheries and Wildlife suggested that:

- (1) Bottom intakes and minimum flow orifices be included in three impoundments structures to provide suitable downstream flows and water temperatures for maintenance of smallmouth bass habitat in the Second Broad River; and
- (2) a duck window be installed in each impoundment outlet structure.

Several public meetings concerning project development have been held. On November 20, 1970, about 85 interested citizens met to discuss the proposed plan. There was close co-operation between these sponsors and the Soil Conservation Service in developing the work plan finally accepted by the sponsors.

A preliminary draft environmental statement was developed in 1971. In August, 1971, the revised work plan along with a preliminary draft environmental statement was reviewed by the Washington Office of the Soil Conservation Service.

Comments on the preliminary draft environmental statement led to reconsidering planned channel work to determine if some of the clearing and snagging could be omitted without lowering the acceptable level of protection for the crops involved. After an analysis, about 22.7 miles of the clearing and snagging were eliminated from the plan. Incorporating this particular change and other changes suggested, a revised work plan and a draft environmental statement were developed in 1973. Also included in the plan are North Carolina Department of Transportation and Highway Safety cost estimates for road modifications around the structure sites.

The revised work plan was reviewed by the sponsors in February and March, 1973, and they made some comments and raised a few questions later resolved in the draft work plan.

Further studies in May of 1974 revealed that channel excavation or channel clearing and snagging would increase velocities to the point that an unstable channel would result. Based on these studies, all channel work has been eliminated from the presently planned project.

In accordance with Section 800.4(a) (2) of the procedures of the Advisory Council on Historic Preservation, steps were undertaken to identify properties that may be eligible for inclusion in the National Register. Through cooperative efforts with the North Carolina Department of Cultural Resources, Division of Archives and History, a study was made and a report was prepared for use by the Soil Conservation Service. The report recommended test excavations on six sites

to further determine their archaeological significance. In April of 1975 the report was transmitted to the National Park Service, USDI, for their comments. In July of 1975 a response was received stating that the six sites are eligible for listing in the National Register of Historic Places.

A meeting was held with the State Historic Preservation Office for information and assistance in following procedures of PL 89-665 and 36 CFR 800, Procedures for the Protection of Historic and Cultural Properties. The Service will comply with Section 106 of PL 89-665, Executive Order 11593, and 36 CFR 800 prior to any construction being started.

A representative of the U. S. Forest Service met with representatives of the North Carolina Department of Natural and Economic Resources, Division of Forest Resources to resolve comments made on the draft statement.

A rating of ER-2 was assigned to the environmental statement by Environmental Protection Agency based on their comments transmitted May 30, 1975. Responses to their comments indicating changes in the final statement was forwarded to CEQ on June 18, 1975. EPA responded on July 29, 1975 that they had no objection to the project.

The following agencies were asked to comment on the draft environmental statement:

United States Department of the Army, Corps of Engineers; United States Department of Commerce; United States Department of Health, Education and Welfare; United States Department of the Interior; United States Department of Transportation; Environmental Protection Agency; Advisory Council on Historic Preservation; Federal Power Commission; North Carolina Department of Natural and Economic Resources (for the Governor); North Carolina Department of Administration, State Planning Division (State Clearinghouse); and other interested parties.

Comments were received from the following agencies and groups:

U. S. Department of Health, Education, and Welfare; U. S. Department of Transportation; U. S. Department of the Army; U. S. Department of the Interior; U. S. Environmental Protection Agency; North Carolina Department of Natural and Economic Resources, Division of Environmental Management, State Soil and Water Conservation Committee, Division of Forest Resources, Wildlife Resources Commission, Office of Assistant Secretary; North Carolina Department of Human Resources, Division of Health Service, North Carolina Department of Cultural Resources; North Carolina Department of Administration (State Clearinghouse), Office of Intergovernmental Relations; North Carolina State University, Agricultural Extension Service; Sierra Club, Joseph LeConte Chapter.

A summarization of comments received on the draft environmental impact statement with appropriate response is listed below:

United States Department of Health, Education, and Welfare

1. Comment The proposed action will have only a minor impact upon the human environment within the scope of this Department's review. The impact statements have been adequately addressed for our comments.

Response No response needed.

United States Department of Transportation, U.S. Coast Guard

1. Comment We have no comments to offer, nor do we have any objection to this project.

Response No response needed.

United States Department of the Army, Corps of Engineers

1. Comment We have reviewed the draft statement and have no comment at this time.

Response No response needed.

United States Department of the Army, Office of the Assistant Secretary

1. Comment We have reviewed the work plan and foresee no conflict with any project or current proposal of this Department. The draft environmental impact statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as this Department of concerned.

Response No response needed.

United States Department of the Interior

1. Comment A mineral survey of the study area should be undertaken in order to evaluate the project's impact.

Response Additional information on mineral resources has been added to the final statement under Environmental Setting page 36. This information indicates the project would not have a significant impact on the mineral resources in the watershed and therefore did not warrant a survey.

2. Comment The plan of development will not have a significant adverse effect on the hydrology of the watershed.

Response No response needed.

Consultation

3. Comment We find it difficult to accept a sediment runoff of 1,117,210 tons annually as shown on page 51.
- Response The statement shows, on page 51, 913,100 tons of erosion in the watershed annually. This comes from agricultural land (640,042), roads (124,100 tons), critical area (80,000 tons) and urban and residential (68,970 tons). The sediment yield at the mouth of the watershed is given on page 52 as 38,750 tons. Calculations for erosion and sediment figures used in the statement are on file in the state office.
4. Comment We suggest that cultural resources be included as a component of the Environmental Quality Account and Social Well Being Account on pages 3 and 6 of the Work Plan.
- Response We have included cultural resources as a component of the Environmental Quality and Social Well Being Accounts.
5. Comment We suggest that a problem concerning cultural resources be included and that requirements for solving the problem be discussed.
- Response The abbreviated environmental quality plan recognizes the need for identifying, preserving and/or salvaging the cultural resources under archaeological and historic on pages 9, 11, and 13.
6. Comment The work plan agreement should contain information on responsibilities of the Soil Conservation Service and the sponsoring local organizations in complying with cultural resource preservation procedures. Land treatment measures which may be the responsibility of the sponsoring local organization as presented may affect cultural resources.
- Response The work plan agreement states that the work plan is a part of the agreement. Responsibilities for cultural resources are discussed in the planned project section, environmental impact section, and the consultation section. Land treatment measures are designed to allow the continued use of the land resource without destroying. They should therefore have little affect on the cultural resources.
7. Comment The "Summary of Plan" in the Watershed Work Plan should be rewritten to show evidence of compliance with cultural preservation procedures.
- Response The summary has been revised to include the archaeological survey made during the planning process.

Consultation

8. Comment The final work plan should be revised to reflect the findings of a survey carried out by professionals to ascertain the presence or absence of cultural resources.
- Response The final work plan has been revised to reflect the findings of the reconnaissance survey of archaeological sites, "An Archaeological Survey of the Upper Second Broad Watershed" by D. H. Journey, Jr. and C. M. Downing. (See "Investigations and Analysis-Cultural Resources, p. 91).
9. Comment Both the work plan and environmental statement provide an adequate discussion of the project's effect on fish and wildlife resources, however, we recommend that the work plan include a long-range fishery management plan, particularly at Structures 2 and 3A.
- Response Paragraph 12 of the work plan agreement and page 27 of the environmental impact statement recognizes that an operation and maintenance agreement will be made and signed by the sponsors and the Service indicating the arrangements and provisions for operating and maintaining all structural works of improvement. The Service agrees that a fish management plan is necessary where benefits are expected from the use of the fishery resource.
10. Comment Reference is made in the top paragraph, page 18 of the management of forest lands to fulfill timber, wildlife, and recreation needs to the extent that such management is compatible with overall watershed management. The final environmental statement should indicate the type of recreation needs for which provision is to be made and the nature and extent of that provision.
- Response The forestry program is committed to encourage and promote the multiple use of all forest resources. Recreational uses could include hiking, birdwatching, hunting, and nature trails and still permit timber production and wildlife habitat.
11. Comment Reference is made to raising Secondary Road 1321 and carrying it across the lake on a causeway in the future. This does not correspond with the statement on page 54 (draft Work Plan) indicating the road will be raised during the construction of Structure 2.
- Response The statement has been revised to show the road will be raised during construction.
12. Comment In the discussion on land rights (E.S. page 24) there should be included reference to shoreline access control in order that the recreational resources at Structures 2 and 3A are protected from incompatible development.

Consultation

Response A statement has been added to show that shoreline access will be limited to the recreational development areas of structures 2 and 3A. Use of land surrounding the lake will be limited to that that would not interfere with the intended use of the lake-recreation and flood control.

13. Comment The draft Environmental Statement under Planned Project-Recreational Resources, is deficient in explanation as to the need for water-oriented outdoor recreation.

Resource The need for water-oriented outdoor recreation in the county is described under "Water and Related Land Resource Problems - Recreational Problems", page 53.

14. Comment The February 1973 National Register of Historic Places may have been outdated when consulted and we suggest consultation with the February 1975 Register as it lists two historic places in Rutherford County.

Response The Federal Register as amended has been consulted and places listed for Rutherford County are described in the statement.

15. Comment The final statement should contain information evidencing compliance with the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties".

Response Additional information including the results of the archaeological survey, eligibility of sites for nomination of the National Register and consultation with the State Historic Preservation Officer made to date has been added to the final EIS.

16. Comment The discussion (Environmental Setting - Archaeological and Historical Resources p. 45) is not a description of the cultural resources of the watershed.

Response The section in question has been rewritten based on the findings of the archaeological survey and is now a description of the cultural resources. A copy of the report of the survey has been forwarded to the Department of Interior and a copy is in the Services files.

17. Comment The reference to "the county" (Water and Related Land Resource Problems - Recreational Problems) is unclear as the watershed spans portions of three counties.

Response The reference to "county" has been changed to "watershed".

18. Comment The conclusion (Environmental Impacts - Structural Measures, p. 62) regarding needs being met for public water-based recreation lacks substantiation.
- Response The conclusion is based on recreational needs in the watershed as determined from basic data contained in the three primary references (nos. 24, 25, 26, p. E-2,) used regarding recreation.
19. Comment The section, Environmental Impacts - Structural Measures, of the statement must contain a full evaluation of the project's impact on the cultural resource base.
- Response See response to comment No. 15 above
20. Comment We find the discussion in the "Alternatives" section of the impact statement very difficult to evaluate.
- Response Alternatives section is intended to give the reader the components of the alternatives, level of protection or development provided, expected environmental impacts and the benefits and costs of the alternative. An understanding of the environmental setting and the impacts of the planned project is necessary in order to understand the alternatives.
21. Comment The comments of the State Historic Preservation Officer should be included in the Environmental Statement (Consultation and Review with Appropriate Agencies and Others).
- Response A paragraph has been added to the section in question which describes the cooperative steps taken with the North Carolina Department of Cultural Resources, Division of Archives and History.

United States Environmental Protection Agency

Comments listed below were received in a letter dated May 30, 1975. (See pages F-12 and F-13) After further consultation with the Environmental Protection Agency, the Service received a letter dated July 29, 1975 stating the agency had no objection to the project. (See page F-14).

1. Comment It is stated that dam construction would eliminate upstream spawning habitat for smallmouth bass, but no mention is made that dam releases could detrimentally affect smallmouth bass fisheries. If proposed dams are located in smallmouth bass stream habitat, they would further diminish an important fishery in the Southeast.
- Response We recognize in the statement that loss of ten miles of stream fishery habitat as a result of the permanent pools of the floodwater retarding structure. However, it should be noted as stated on page 54 paragraph 2 and page 69 paragraph 3 of the draft statement, that the present fishery resource is limited mainly because of sediment. Land treatment and the floodwater retarding structures will reduce the amount of sediment in the channels. We also propose coldwater releases in structures 22 and 23 to provide water being released at a temperature more nearly that of the

Consultation

present stream. Water flowing through the principle spillway will be aerated so that dissolved oxygen should not be a limiting factor. In short, even though ten miles of stream fishery habitat will be lost, evidence points to a possible improvement in the fishery resources.

2. Comment We believe that a more sound approach to soil conservation and improvement to the waterways would be the alternative of floodplain purchase with land treatment outlined on page 66 of the Statement. The proposed land treatment would decrease sediment load to the creek and rivers, and purchase of floodplains would reduce the destruction of capital improvements.

Response We agree that the alternative of floodplain purchase and land treatment would be a solution to the problems in the watershed. Use of the land could be changed so that flooding could occur with little damage. However, we know no existing federal program which would allow total purchase of floodplain. This alternative has been revised to show more nearly the total cost. The \$3,000,000 cost shown in the draft statement gives the cost of buying floodplain crop and pasture land and moving expense. Buying floodplain land would leave uneconomic remnants. These remnants would have to be purchased and loss of business would have to be compensated under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. Remnants are estimated, based on a 1969 Census of Agriculture value of farms in Rutherford County less the floodplain land cost, to cost \$845,000. The loss of business could cost up to \$15,000 per farm or \$2,250,000. This would be a total cost for the alternative of \$6,115,000 compared with the structural measures of the planned project cost of \$6,585,500. In addition \$220,000 average annual recreational benefits with the planned project would be foregone with the alternative. Additional cost would be involved with the alternative in carrying out a plan for its future use. Another factor which has to be considered is the desires of the local people. There was no local support in formulation of this alternative as the planned project.

3. Comment It is stated (on page 27) that the project would reduce idle land in the watershed by 97 percent. We suggest that floodplains are not idle lands and perform a useful function during floods and at low-water periods.

Response It was not the intent, on page 27, to imply that idle land is useless. It is a classification of land use by the Soil Conservation Service indicating no agricultural production. The idle land mentioned is for the entire watershed and not located just in the floodplain.

4. Comment Precautions to control erosion, sediment and water pollution should be implemented throughout the life of the project. In addition, noise levels during the land clearing and construction should not violate any State or Local ordinance.

Consultation

Response The project will be useful in controlling erosion, sediment, and water pollution through the land treatment and sediment pools of the floodwater retarding structures. It is the policy of the Service to comply with all state and local regulations and ordinances in all our projects.

N. C. Department of Natural and Economic Resources, Division of Environmental Management

1. Comment In connection with the multi-purpose structure No. 2, a waste water treatment plant is proposed in which the connecting sewerline is to be laid across the lake bottom. The Water Quality Section would recommend against the construction of a sewerline under water since past projects of this nature have resulted in excessive infiltration of lake water.

Response The physical characteristics of the recreation area planned at site no. 2 will allow septic treatment of sewage as an alternative to a "package sewage treatment plant." Reference to the treatment plant system has been deleted in lieu of the addition of the septic treatment system.

2. Comment This Division concurs with the statements regarding forest policy.

Response No response needed.

3. Comment Construction in the flood plains should be discouraged by means of Flood Plain Management Ordinances.

Response The sponsors have been made aware of the hazards involved in additional development taking place in the unprotected floodplain.

4. Comment Particular attention should be given to agricultural runoff into lakes.

Response The land treatment program of the project promotes adequate measures to control agricultural runoff.

5. Comment The Division would recommend against a broad program of constructing sediment traps in streams, and would hope that this type of sediment control is dropped in favor of retaining soil on the land.

Response Land treatment is the primary consideration in controlling soil erosion. Sediment traps in streams are in addition to the land treatment program.

Consultation

6. Comment The Division is in basic agreement with the project. The above statements are intended to insure that certain points have been given adequate consideration.

Response No response needed.

N.C. Department of Natural and Economic Resources, State Soil and Water Conservation Committee

1. Comment We have reviewed both the Work Plan and the Environmental Impact Statement. In checking the tables in the work plan we found several errors which have been pointed out to the planning section (SCS) and we understand these are to be corrected in the final plan.

Response The errors pointed out in the tables regarding retarding volumes and sediment storage have been corrected.

N.C. Department of Natural and Economic Resources, Division of Forest Resources

1. Comment Very few comments covering the October 1974 draft were incorporated in the January 1975 revision. The Division of Forest Resources still considers the importance and influence of the forest resource on the flood problem as not adequately identified and presented in the Work Plan.

Response Representatives of the U. S. Forest Service and the North Carolina Division of Forest Resources met to consider the comments made on the forest resources. The final environmental impact statement and the work plan have been revised to reflect the changes agreed to by the representatives.

N.C. Department of Natural and Economic Resources, Wildlife Resources Commission

1. Comment The deletion of all forms of channel work downstream from the structures when the work plan was revised went far towards eliminating project conflicts with our interests.

Response No response needed.

2. Comment On balance, we believe the many benefits associated with the project as currently planned justify the anticipated net cost to our interests.

Response No response needed.

3. Comment We note that public use of the ten floodwater retarding structures, including the three in which duck windows are being installed, was eliminated when the project was revised. The entire cost of the duck windows will be met with public funds and public use should be permitted.

Response Sanitary facilities would be needed at each site if public use was made a part of the plan. The sponsors felt the public interest would be better served if their monetary resources were applied to structures No. 2 and 3A.

4. Comment In summary, we believe the draft work plan and draft environmental statement adequately portray the benefits of the Second Broad River Watershed Project as well as the environmental costs to our interests.

Response No response needed

N.C. Department of Natural and Economic Resources, Office of Assistant Secretary

The comments received from the Assistant Secretary's office are a summarization of comments of all the Department's divisions. In some cases the reader is referred to the specific division's section for the responses to these comments.

1. Comment The importance and influence of the forest resource was not adequately presented in the draft EIS.

Response (See responses to N.C. Division of Forest Resources).

2. Comment Our staff will not recommend this project to the Environmental Management Commission until appropriate floodplain management measures are included.

Response The Soil Conservation Service encourages consideration of flood plain management measures in the formulation of a project under the PL-566 program. Floodway maps are being developed in anticipation of the State's requirement of a floodplain ordinance.

3. Comment Figure 20 in the work plan should be changed to show the minimum flow orifice two feet below the "minimum pool level" if our interpretation of the "sediment pool" being the same as "minimum pool" is correct.

Response The minimum pool level is not intended to be the sediment pool level as indicated by the warm water zone above the minimum level. The minimum flow orifice will be set at an elevation to insure discharge of the 7 day 10 year minimum flow.

4. Comment We wonder about the feasibility of using one or more of the flood control structures for municipal water supply storage.

Consultation

Response The drainage area and the topography gives the floodwater retarding structures a potential for additional storage. The cost for municipal storage would likely be less in a multiple purpose structure than a single purpose one. There was no interest expressed during the planning process for additional storage, however, it could be added prior to construction or the structure could be modified in the future.

5. Comment SCS has already received comments from our Division of Environmental Management regarding the water quality aspects of the project. These comments should be considered as part of our response to the EIS.

Response (See responses to the Division of Environmental Management's comments)

N.C. Department of Human Resources, Division of Health Services

1. Comment We recommend that the Division of Environmental Management, Department of Natural and Economic Resources be contacted to determine if the quality of the water at the planned recreation sites is suitable for body contact recreation.

Response A letter has been sent to the Division requesting bacterial level data for the waters to be impounded at the recreation sites.

2. Comment Care should be taken to assure that the A-II classification is not contravened by any of the recreational uses.

Response The project as planned will not contravene the A-II water classification by any of the recreational uses.

3. Comment We recommend that the flood retarding structures be constructed in accordance with the Commission for Health Services impoundment regulations.

Response All structures proposed will be constructed in accordance with the Division of Health Services "Regulation on Control of Impounded Water". A statement to this effect has been added to the Work Plan and Environmental Impact Statement.

N.C. Department of Cultural Resources

1. Comment An initial archaeological survey was made of those areas where construction or earth moving was anticipated. Several sites were located which were recommended for further testing. To date this testing and evaluation has not been completed.

Response The final environmental impact statement has been revised to show the results of the survey and the procedures followed since completion of the survey. The Service will comply with section 106 of PL 89-665, Executive Order 11593 and 36 CFR 800, Procedures for the Protection of Historic and Cultural Properties prior to construction in the watershed.

2. Comment Those areas which were not surveyed but are contained within the watershed should also be surveyed in accordance with Executive Order 11593.

Response It is the Services policy to make or cause to be made two types of archaeological and historical investigations in PL-566 projects. The first is a literature search and summation of data presently known. It is used to determine the detail of the second investigation which is a reconnaissance or on-the-ground examination of selected portions of the area to be affected to assess the general nature and probable impact of proposed measures on the archaeological and historical resources. Both investigations have been made in the Second Broad River Watershed.

N. C. Department of Administration, Office of Intergovernmental Relations

The Department of Administration, acting as a clearinghouse for all the various N.C. State departments, division, offices, etc., sent to the Soil Conservation Service, copies of comments they received from the various state departments. Most of these comments were sent directly to SCS and responses to them can be found listed under each individual department, division, office, etc.

1. Comment The percentage figures of 65 (p.1, work plan) and 70 (p. 18 work plan), regarding cropland needing land treatment, do not agree and should be corrected.

Response The percentage figures in question have been changed to agree with each other.

2. Comment All references to "D" classifications of streams should be changed to "C" classifications.

Response All references to "D" classifications have been changed to "C".

3. Comment Change "0.03 cfs" to "0.30 cfs" (p. 55, work plan).

Response The typing error has been corrected.

4. Comment We request that plans to lay a sewer line underwater at site no. 2 be modified.

Response Plans to lay a sewer line underwater have been deleted in lieu of septic treatment of sewage at site No. 2..

Consultation

5. Comment The importance and influence of the forest resources is not adequately presented.
- Response (See specific responses to the N.C. Division of Forest Resources comments)
6. Comment The first sentence (p. 53, EIS) should be modified to better describe the situation regarding recreational resources.
- Response Additional information has been added to support the description of recreational resources.
7. Comment The statement (p. 1, draft EIS) that the two multiple-purpose structures will "meet" the water-based recreation needs of the watershed should be changed to "greatly enhance".
- Response The term "meet" has been changed.
8. Comment Local sponsors should take steps to have responsible local governments delineate floodways and adopt floodway regulations.
- Response (See response to comment no. 2 from the Office of Assistant Secretary, DNER).

N. C. State University, Agricultural Extension Service

1. Comment Estimated yields used in the economic analysis of corn, corn silage, soybeans, etc., may be slightly low.
- Response We agree that the estimated yields used in the economic analysis may be slightly low. The yields were adjusted to take into account the existing land damages in the watershed.
2. Comment Mention should be made of the sediment control measures in reference to the construction of the impoundments and facilities and that these measures would be in accordance with the Sediment Control Act of 1973.
- Response Measures to control sediment during construction are described in the Work Plan (p. 57) and in the Environmental Impact Statement (p. 26). The measures described are in accordance with the intent of the Sediment Control Act of 1973.

Sierra Club, Joseph Le Conte Chapter

1. Comment While we are pleased to see recreation incorporated in this watershed project, we do not think the EIS addresses the need and existing potential for passive recreation (as opposed to the intensive recreation aspects of the project). Various use levels should be considered in this project.

Response The Sponsors have been made aware of the various levels of recreational use. The project does not preclude the future addition of more passive forms of recreation to meet the desires and needs of the local people.

2. Comment We urge the SCS to encourage control of water volume and nonpoint sources of pollution which will be significantly increased because of this project.

Response Erosion control as stated on page 56 will reduce non-point pollution as various pesticides, fertilizers, etc., are transported by sediment particles. No use can be made in and around the structures which would interfere with the purpose for which they were constructed. Structures are designed for the future anticipated conditions of the watershed. See also Department of Natural and Economic Resources comment No. 2 page 83.

3. Comment The high quality of the water makes us wonder why water supply was not a consideration in the design of these lakes.

Response See response to Department of Natural and Economic Resource comment No. 4, page 84.

4. Comment The agricultural characteristic of this area will be intensified and we are concerned that farm runoff will become a major problem in this area because of the intent of the watershed project.

Response The intent of the project is to protect and improve existing farm lands. Land treatment and retarding structures are the primary items in accomplishing these goals. As stated on page 56 of the statement erosion and sediment will be reduced. See response to comment No. 2 above.

Comment We suggest that the cold water release and duck windows be incorporated into the design of all of the lakes and we do not see in the statement why this has been limited to only three of the lakes.

Response The operation and maintenance of the duck windows will require man power and money to fluctuate the water table and plant duck and wild-life food. The sponsors are required to see that the operation and maintenance is carried out for the life of the project. Location of the structure with respect to its surrounding, is also important in having a successful feeding area.

5. Comment We suggest a vegetative survey, similar to the archaeological survey, for this project and we believe this function should be performed as an automatic parameter in project design.

Consultation

Response The plant resources described on page 38 is a result of a forestry survey of the watershed. It indicated a further search for unique vegetation was not warranted.

6. Comment We found the EIS to be well written and many innovative considerations included. We offer our suggestions in an effort to expand the total benefits of this project and others planned in North Carolina.

Response No response needed.

LIST OF APPENDIXES

Appendix A - Comparison of Benefits and Costs for Structural Measures
(taken from watershed work plan)

Appendix B - Project Map

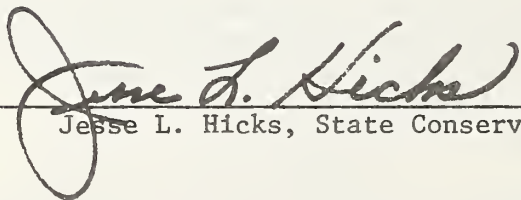
Appendix C - Problem Location Map

Appendix D - Public Recreation Development Map

Appendix E - Bibliography

Appendix F - Comments received on Draft Environmental Impact Statement

Approved by


Jesse L. Hicks, State Conservationist

Date

October 10, 1975

APPENDIX A

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Second Broad River Watershed
McDowell, Rutherford, and Cleveland Counties, North Carolina

(Dollars)

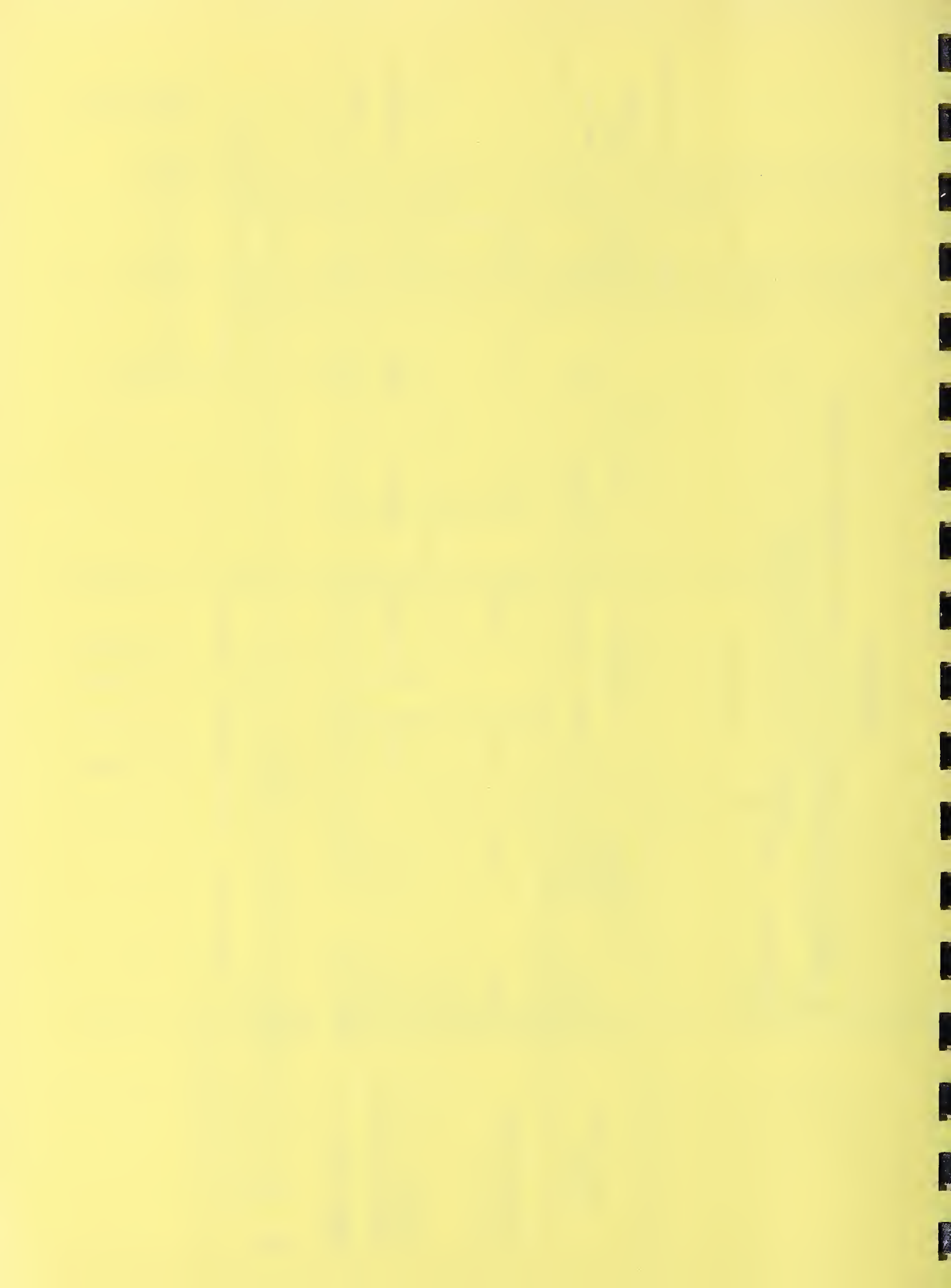
Evaluation Unit	Average		Annual	Benefits ^{1/}		Average Annual Cost ^{2/}	Benefit Cost Ratio	
	Damage Reduction	Intensive Land Use		Recreation	Secondary: Redevelopment			Total
All Structural Measures	139,500	58,400	56,400	220,000	57,100	531,400	393,535	1.4
Project Administration	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	38,180	xxxxxx
GRAND TOTAL	139,500^{3/}	58,400	56,400	220,000	57,100	531,400	431,715	1.2:1.0

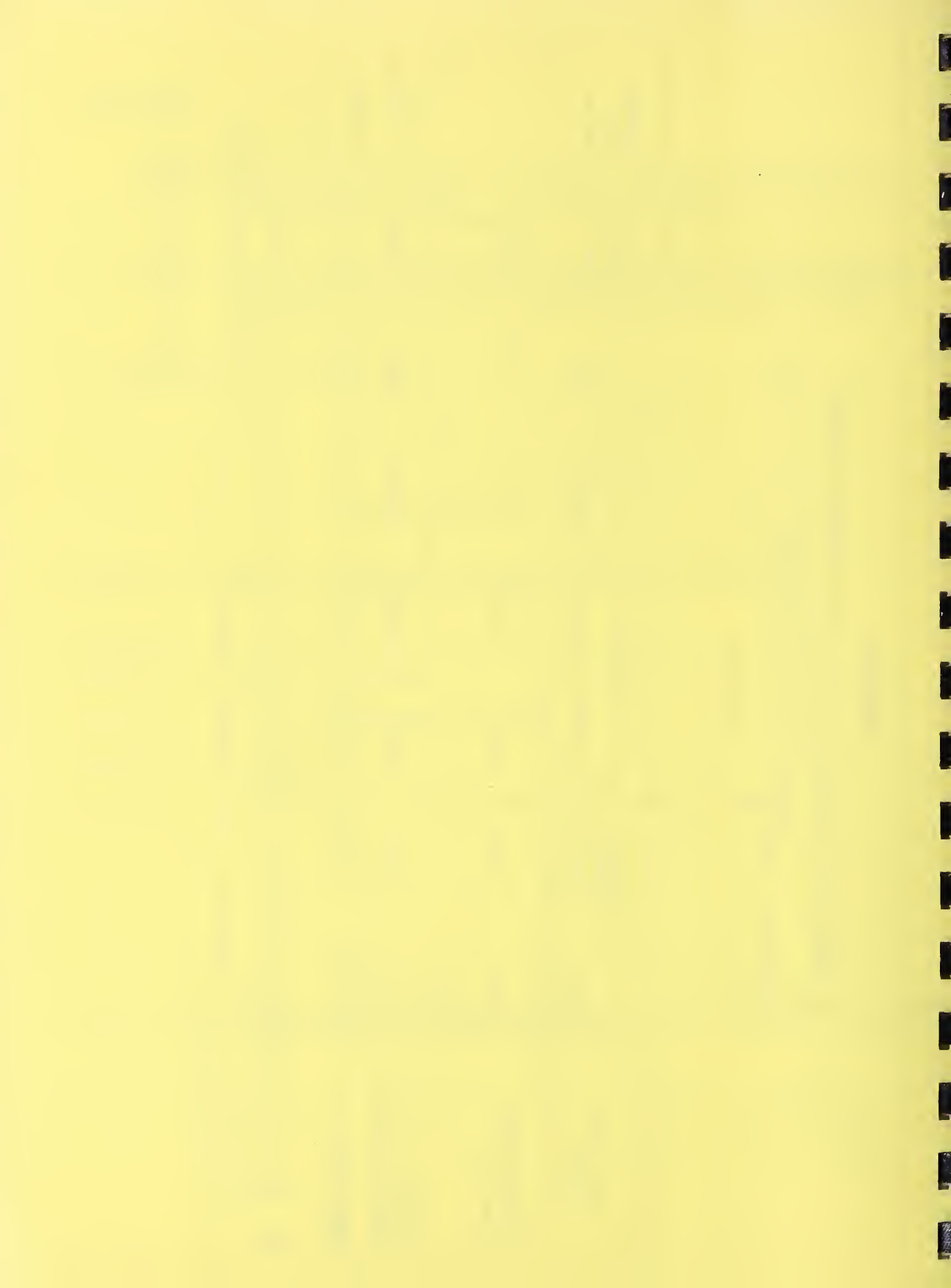
^{1/} Price base: Adjusted Normalized and 1974.

^{2/} O&M cost of \$43,500 at 1974 prices. Remaining cost at 1974 prices amortized at 5 7/8 percent for 100 years.

^{3/} In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$35,700 annually.

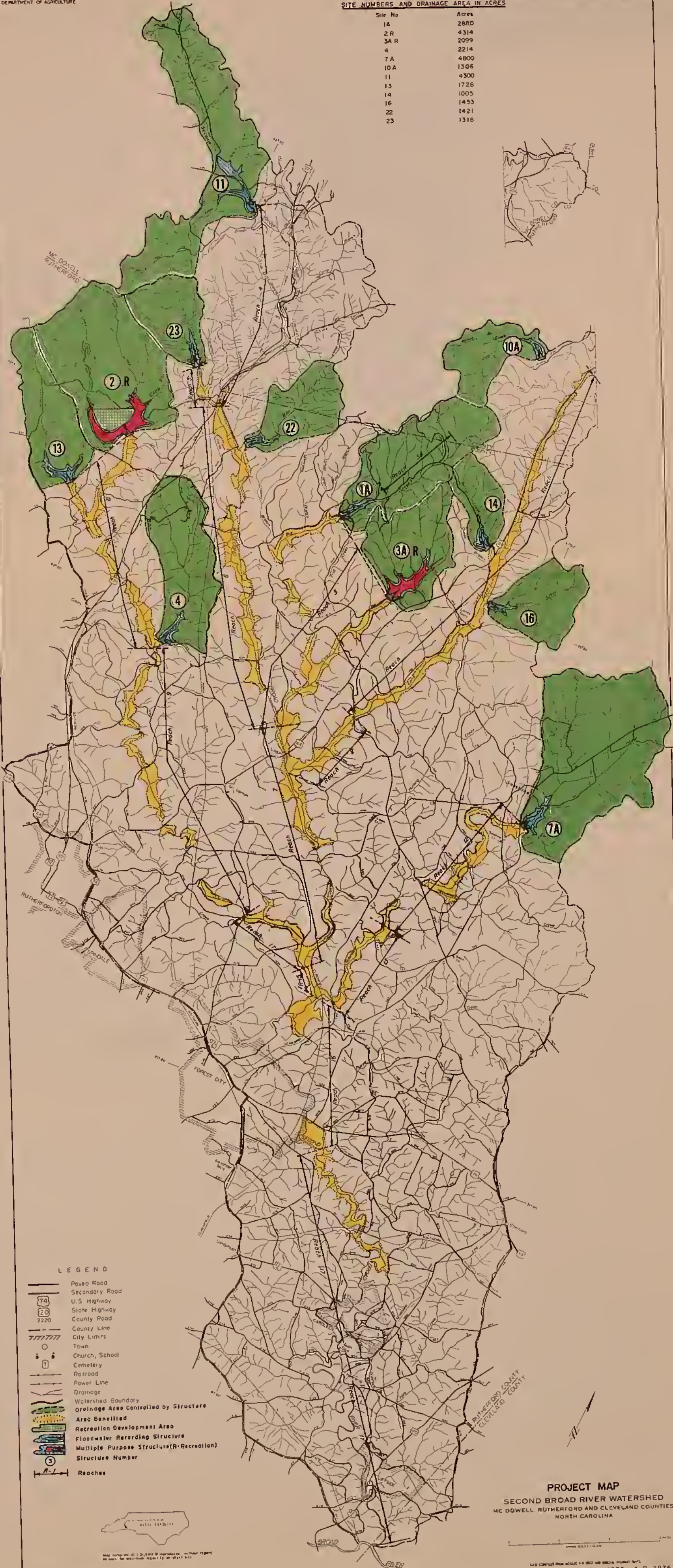
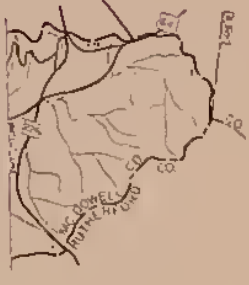
Date: January 1975





SITE NUMBERS AND DRAINAGE AREA IN ACRES

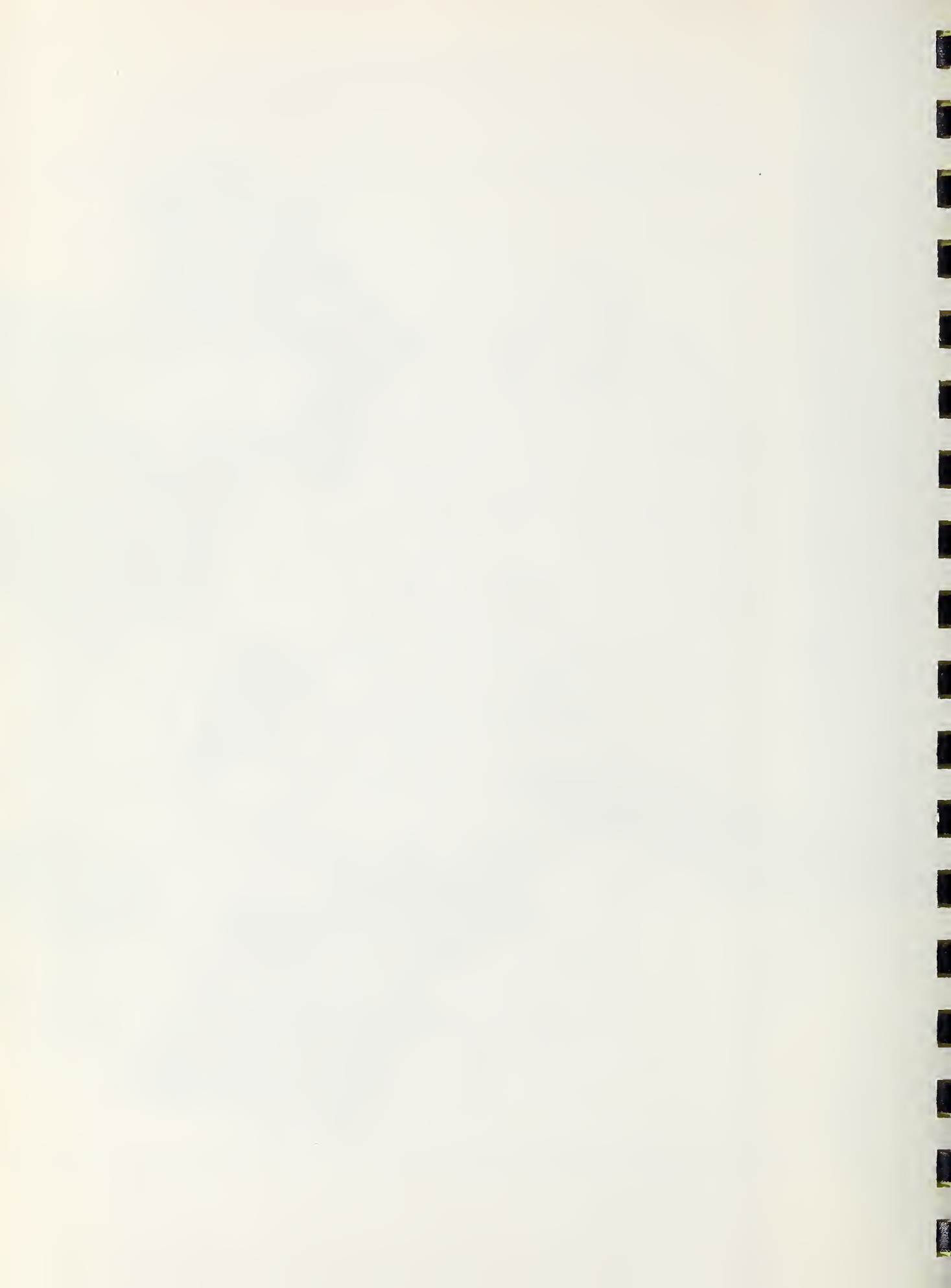
Site No	Acres
1A	2880
2 R	4314
3A R	2099
4	2214
7 A	4800
10 A	1306
11	4300
13	1728
14	1005
16	1453
22	1421
23	1318

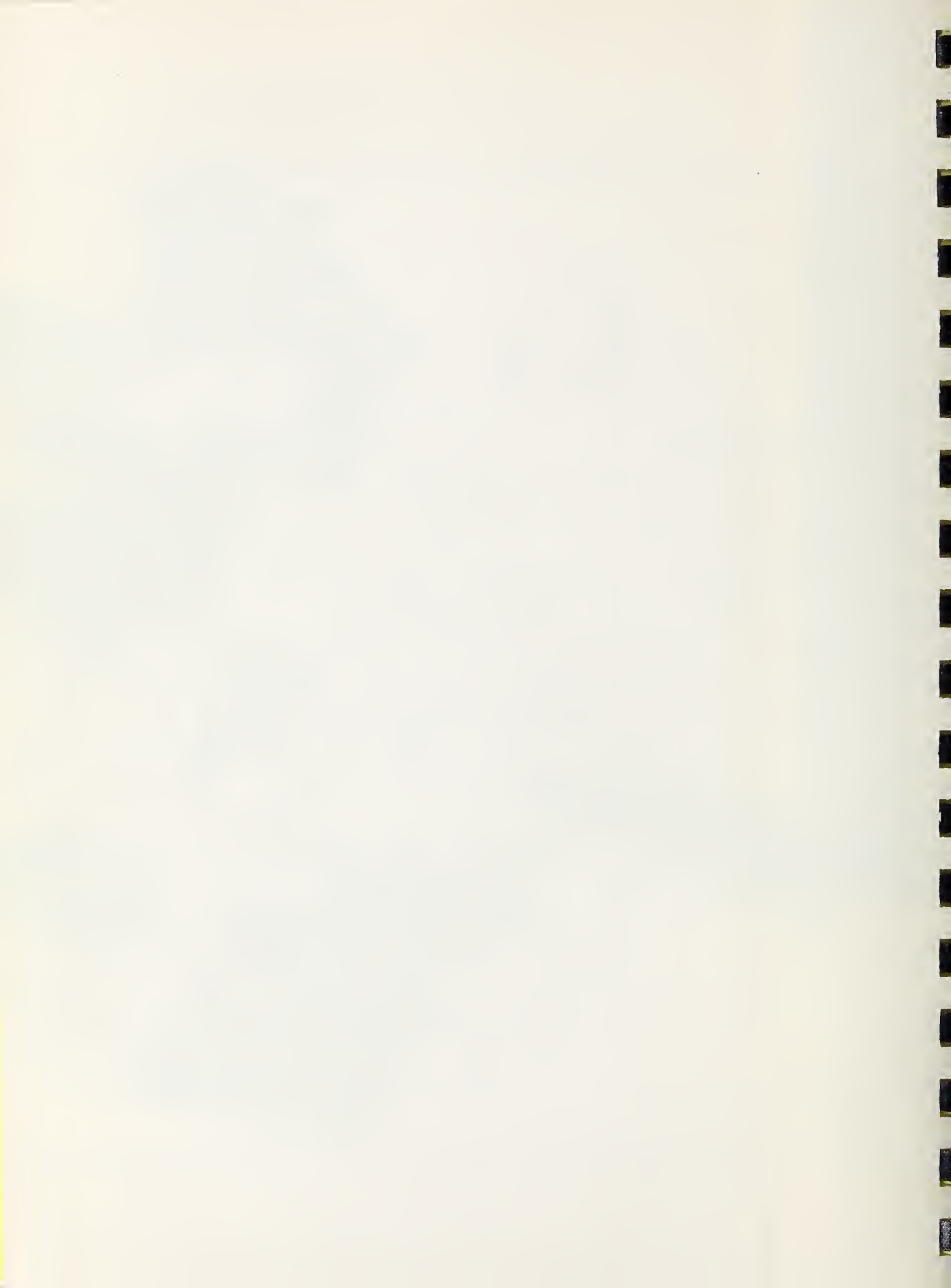


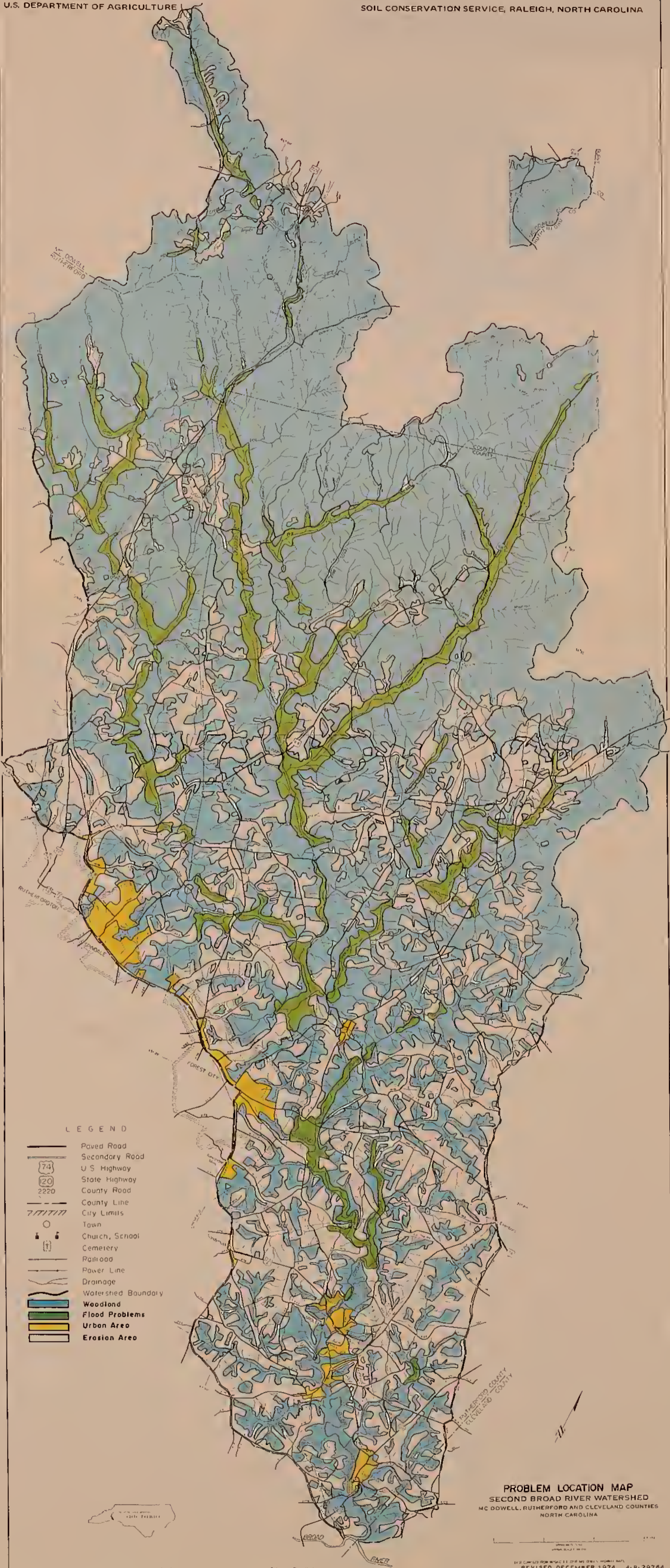
LEGEND

- Paved Road
- Secondary Road
- U.S. Highway
- State Highway
- County Road
- County Line
- City Limits
- Town
- Church, School
- Cemetery
- Railroad
- Power Line
- Drainage
- Watershed Boundary
- Drainage Area Controlled by Structure
- Area Benefitted
- Recreation Development Area
- Floodwater Retarding Structure
- Multiple Purpose Structure (R-Recreation)
- Structure Number
- Reaches

PROJECT MAP
 SECOND BROAD RIVER WATERSHED
 MC DOWELL, RUTHERFORD AND CLEVELAND COUNTIES
 NORTH CAROLINA



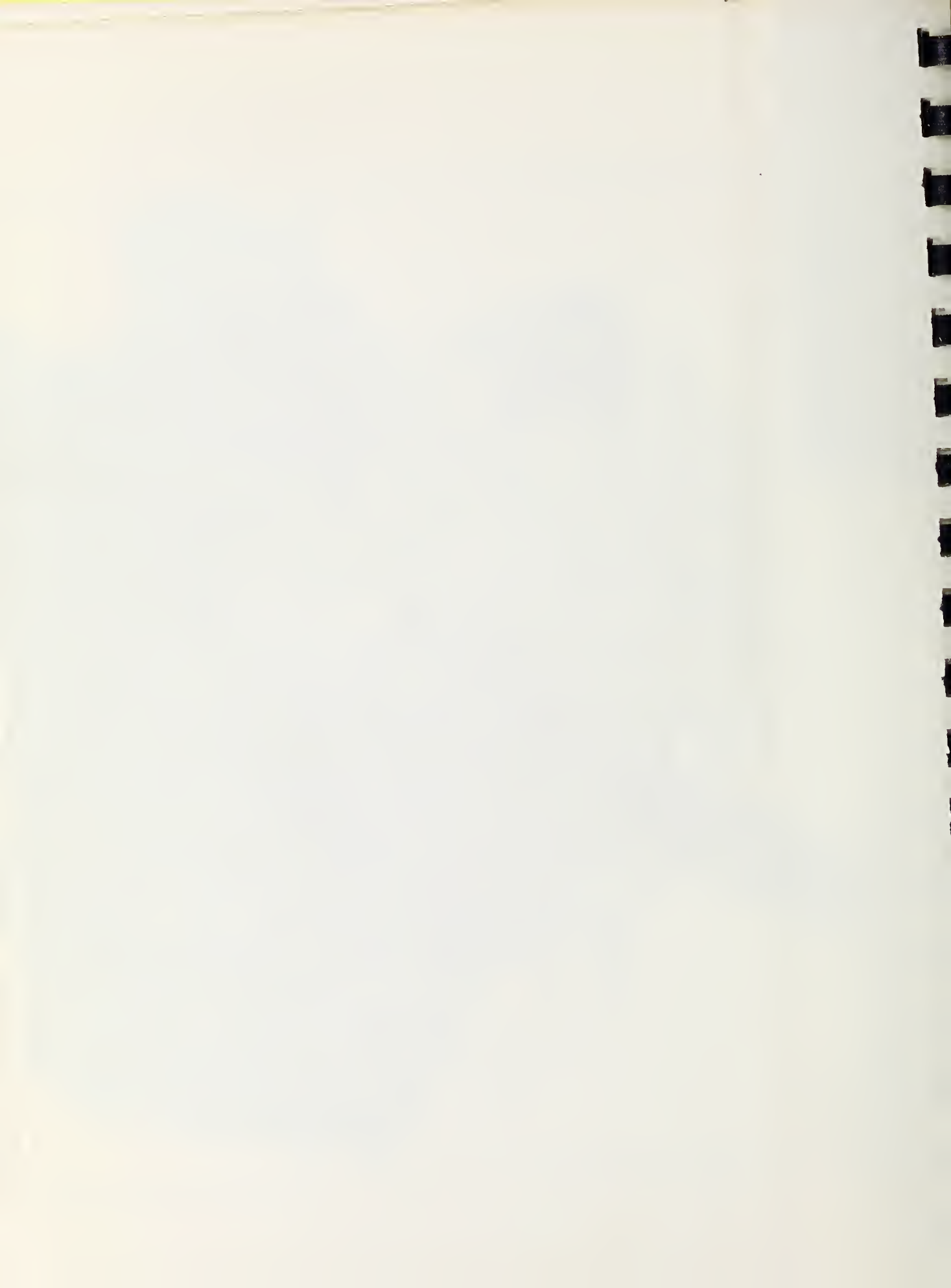




- Paved Road
- Secondary Road
- U.S. Highway
- State Highway
- County Road
- County Line
- City Limits
- Town
- Church, School
- Cemetery
- Railroad
- Power Line
- Drainage
- Watershed Boundary
- Woodland
- Flood Problems
- Urban Area
- Erosion Area

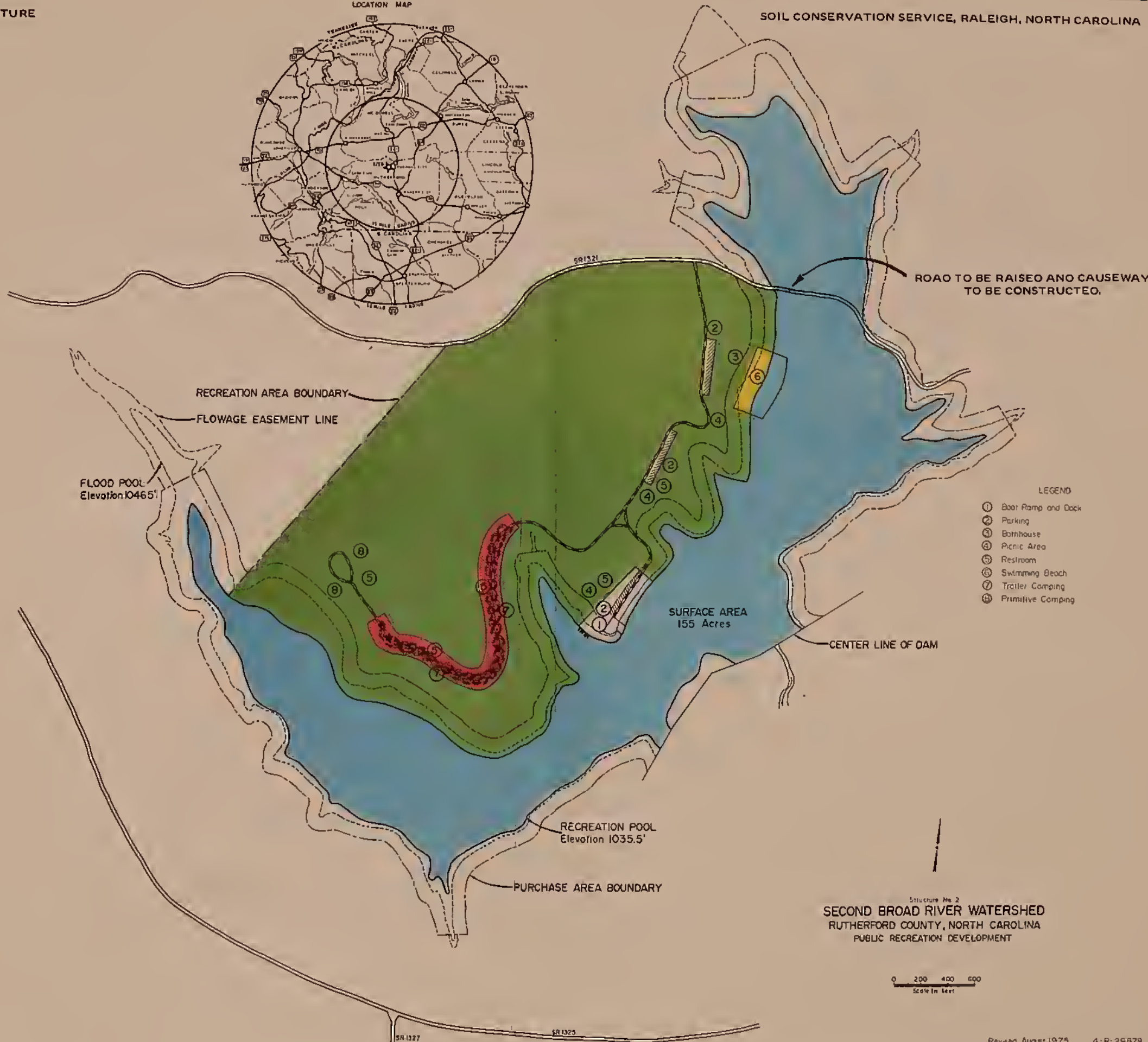
PROBLEM LOCATION MAP
 SECOND BROAD RIVER WATERSHED
 MC DOWELL, RUTHERFORD AND CLEVELAND COUNTIES
 NORTH CAROLINA

REVISED DECEMBER 1974 4-R-29764





LOCATION MAP



FLOOD POOL
Elevation 10465'

RECREATION AREA BOUNDARY
FLOWAGE EASEMENT LINE

SURFACE AREA
155 Acres

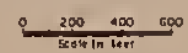
CENTER LINE OF DAM

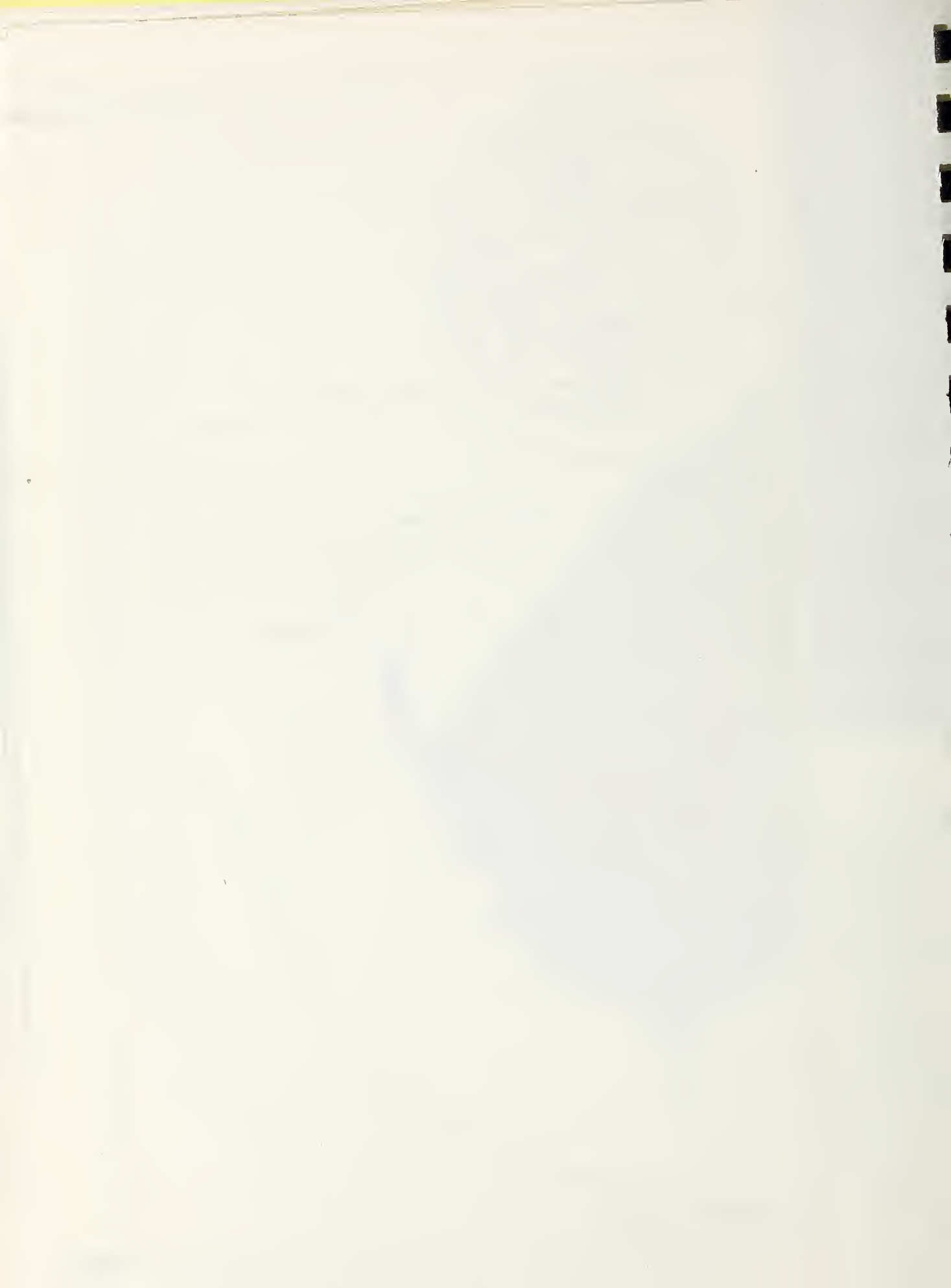
RECREATION POOL
Elevation 10355'

PURCHASE AREA BOUNDARY

- LEGEND
- ① Boat Ramp and Dock
 - ② Parking
 - ③ Bathhouse
 - ④ Picnic Area
 - ⑤ Restroom
 - ⑥ Swimming Beach
 - ⑦ Trailer Camping
 - ⑧ Primitive Camping

Structure No. 2
SECOND BROAD RIVER WATERSHED
RUTHERFORD COUNTY, NORTH CAROLINA
PUBLIC RECREATION DEVELOPMENT





APPENDIX E
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APPENDIX F

COMMENTS ON THE
SECOND BROAD RIVER WATERSHED
DRAFT ENVIRONMENTAL IMPACT STATEMENT

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION IV
107 1/2 STREET N.E.
ATLANTA, GEORGIA 30321

May 20, 1975

OFFICE OF THE
REGIONAL DIRECTOR

Mr. Jessie L. Hicks
State Conservationist
Soil Conservation Service
Department of Agriculture
Post Office Box 27307
Raleigh, North Carolina 27611

Re: HEW 515-4-75

Subject: Second Broad River Watershed
McDowell, Rutherford and
Cleveland Counties
North Carolina

Dear Mr. Hicks:

We have reviewed the revised 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 statements have been adequately addressed for our comments.

Sincerely yours,

Philip P. Sayre
Regional Environmental Officer



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

• 29 APR 1975

Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
P. O. Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

This is in response to your letter of 26 March 1975 addressed to Commandant, U. S. Coast Guard concerning a draft environmental impact statement for the Second Broad River Watershed, McDowell, Rutherford, and Cleveland Counties, North Carolina.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

S. A. WALLACE
Captain, U. S. Coast Guard
Acting Deputy Chief, Office of
Marine Environment and Systems
By direction



DEPARTMENT OF THE ARMY

CHARLESTON DISTRICT, CORPS OF ENGINEERS

P. O. BOX 919

CHARLESTON, S. C. 29402

SANGR

8 April 1975

Mr. Jesse L. Hicks
Soil Conservation Service
P. O. Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

This is in response to your letter dated 26 March 1975, requesting our comments on your draft environmental statement for the Second Broad River Watershed, McDowell, Rutherford and Cleveland Counties, North Carolina project.

We have reviewed the draft statement and have no comment at this time.

Sincerely,

A handwritten signature in cursive script, reading "Harry S. Wilson, Jr.", written in dark ink.

HARRY S. WILSON, JR.
Colonel, Corps of Engineers
District Engineer

Copy furnished:
HQDA (DAEN-CWP-V)
WASH DC 20314

Division Engineer, South Atlantic
ATTN: SADYN

General Counsel (10 cys)
Council on Environmental Quality
Executive Office of the President
722 Jackson Place, N.W.
Washington, D. C. 20006



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

22 MAY 1975

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist of North Carolina by letter of 26 March 1975 requested the views of the Chief of Engineers on the work plan and draft environmental statement for the Second Broad River Watershed, North Carolina.

We have reviewed the work plan and foresee no conflict with any project or current proposal of this Department. The draft environmental impact statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as this Department is concerned.

Sincerely,

A handwritten signature in cursive script, reading "Charles R. Ford".

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





United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

JUN 3 1975

PEP ER-75/320

Dear Mr. Hicks:

Thank you for the letter of March 26, 1975, requesting our views and comments on the work plan and draft environmental impact statement for the Second Broad River Watershed, McDowell, Rutherford and Cleveland Counties, North Carolina. We have completed our review of these two documents and submit the following comments on the work plan and environmental statement.

Draft Work Plan

The work plan does not indicate whether a mineral survey of the study area has been completed or if a survey is planned for the area. We believe such a survey should be undertaken in order to evaluate the project's impact on the mineral resource base of the area. In the absence of such a study, we have no basis for evaluating mineral resource impacts and can only state that no known mineral resources or mineral recovery operations would be affected by this project.

We note that the plan proposes to construct 11 small reservoirs on very small upstream watersheds which are, at present, heavily forested. This plan of development will not have a significant adverse effect on the hydrology of the watershed.

The maps included in the work plan indicate that Second Broad River drains mostly forest lands. Cleared land is located on ridge tops and flood plains in the central and southern parts of the basin. In light of the foregoing, we find it difficult to accept a sediment runoff of 1,117,210 tons annually as shown on page 51. More data is needed to support this sediment estimate.



Addendum Parts I, II-Selected Plan 1-6

We suggest that cultural resources be included as a component of the Environmental Quality Account and Social Well Being Account on pages 3 and 6.

Part III-Environmental Quality Problems and Needs for Solving Environmental Quality Problems

We suggest that a problem concerning cultural resources be included and that requirements for solving the problems be discussed in compliance with procedures and guidelines of 36 CFR, Part 800 and 7 CFR, Part 650.

Watershed Work Plan Agreement

Preliminary archeological investigations indicate a potentially rich archeological area. The work plan agreement should contain information on responsibilities of the United States Department of Agriculture, Soil Conservation Service, and the sponsoring local organizations in complying with cultural resource preservation procedures. Land treatment measures which may be the responsibility of the sponsoring local organization as presented may affect cultural resources. The impact may be either primary or secondary. Inadvertent destruction or alteration of cultural resources of local, regional or national significance must be avoided.

Watershed Work Plan-Summary of Plan Archeological and Historical Values and Unique Scenic Areas

This section should be rewritten to show evidence of compliance with cultural preservation procedures. Cultural resources are to be considered at the earliest time in planning procedures, not after firm decisions have been made on structure location and design.

Work Plan-Investigation and Analysis

This section does not contain any data to demonstrate compliance with the established procedures and guidelines for cultural resource preservation. Hence we cannot assess the impacts on the cultural resource base which stem from

the proposed structural measures, land treatment, or from those proposals which were considered in lieu of the recommended plan. The final work plan should be revised to reflect the findings of a survey carried out by professionals to ascertain the presence or absence of cultural resources and the appropriate sections of the work plan and impact statement should discuss the impact of the proposal and alternative solutions on this cultural resource base.

Both the work plan and environmental statement provide an adequate discussion of the project's effect on fish and wildlife resources. However, we do have one suggestion for improving the fish and wildlife resource discussion set forth in the work plan.

The creation of 504 acres of lake fish habitat is listed in the work plan as a "favorable environmental impact" of this project. In paragraph 3, page 64, of the work plan, it is estimated that maximum potential sustained annual harvest would be 100 pounds/surface acre in structures 2, 3A, and 7A and 400 pounds/surface acre in the smaller impoundments. However, the work plan contains no reference to a fish management plan by which these potentials might be achieved. Nevertheless, project benefits are calculated for 152,000 visitor days annually at the two impoundments to be open to public use (Structures 2 and 3A). The large ratio of drainage area to permanent surface water area (56.3:1) in the project indicates that fluctuations in water level and rate of water exchange will be extreme, which will be detrimental to the development and maintenance of a quality fishery in the impoundments. Furthermore, the unrestricted recreational use of Structure 2 will adversely affect fishing in that lake. Therefore, we recommend that the work plan include a long-range fishery management plan, particularly at Structures 2 and 3A.

Draft Environmental Statement

In summary, we do not believe the draft statement provides sufficient information on the cultural or recreation resource base to assess the impact of the work plan features on these resources. Hence, we recommend that the final environmental statement give full consideration to the following comments as they relate to the specific subsections of the impact statement.

Planned Project, Land Treatment, page 18

Reference is made in the top paragraph to the management of forest lands to fulfill timber, wildlife, and recreation needs to the extent that such management is compatible with overall watershed management. The final environmental statement should indicate the type of recreation needs for which provision is to be made and the nature and extent of that provision.

Planned Project, Structural Measures, page 23

Reference is made to raising Secondary Road 1321 and carrying it across the lake on a causeway in the future (emphasis ours). This does not correspond with the statement on page 54 in the Draft Work Plan indicating the road will be raised during the construction of Structure 2. We assume the road would be raised during dam construction, and we further assume that sufficient vertical clearance would be provided to allow for boat access to the Harris Creek arm of the lake. These items should be clarified in the final statement.

Planned Project, Structural Measures, page 24

In the discussion on land rights, there should be included reference to shoreline access control in order that the recreational resources at Structures 2 and 3A are protected from incompatible development, thereby ensuring maximum public opportunity and enjoyment for the public investment involved. This is seen as critical relative to these impoundments due to their relatively small size and recreational use projected for them. We strongly recommend that shoreline controls be adopted and enforced to prohibit all private access to project waters other than limited concessionaire-operated facilities open to public use. Moreover, control over incompatible land use should be extended to land areas noncontiguous to the lake-shore where such use would affect the project investment.

Environmental Setting, Recreational Resources, pages 42-45

The final statement should reference pertinent information contained in the Statewide Comprehensive Outdoor Recreation Plan as compiled by the State Recreation Planning Section,

Division of Resource Planning and Evaluation, Department of Natural and Economic Resources. The draft statement is notably deficient in explanation as to the need for water-oriented outdoor recreation opportunity in the Second Broad River watershed. An identification of the extent of the need for the types of recreation opportunity the project would provide should be included in this section of the statement. Without the presentation of such an analysis, much of the information now included lacks significance. Consultation with State recreation planners should be included in the analysis effort and should be referenced in the final statement.

Environmental Setting, Archeological and Historical Resources,
page 45

We are pleased to note that the National Register of Historic Places and the North Carolina Office of Archives and History have been consulted. The National Register lists only known cultural resources and is under constant revision. The February 1973 National Register may have been outdated when consulted and we suggest consultation with the February 1975 Register as it lists two historic places in Rutherford.

The final statement should contain information evidencing compliance with the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR, Part 800).

The discussion is not a description of the cultural resources of the Second Broad River Watershed. It is a statement of actions which should have taken place during the planning stage. All other resources for which the Soil Conservation Service has planning responsibilities are extensively described. This same consideration is not evident for historic, archeological and architectural resources.

The Second Broad River Watershed is a fairly contained ecological zone. Stratified archeological sites, in the piedmont or mountain areas, showing a continuum of human occupation have not been recognized in North Carolina. There is a potential for finding such resources in the project area.

This section should contain information adequately describing cultural resources ascertained from existing sources and required surveys. The recognition of these resources in the watershed would be a benefit to the cultural heritage of the human environment as recognized in Section 101 (b)(4) NEPA.

Water and Related Land Resource Problems, Recreational Problems, pages 53, 54

The references in the first paragraph to "the county" are unclear as the watershed spans portions of three counties. To the extent possible, information should be presented for the entire watershed and any other area from which the project is expected to draw recreationists.

The previous comments on the use of the Statewide Comprehensive Outdoor Recreation Plan also apply here in that the Plan should be useful in identifying any problems in the project area. Consultation with State recreation planners should also yield pertinent information.

Environmental Impacts, Structural Measures, page 62

The conclusion stated in the first sentence of the top paragraph lacks substantiation. The above comments regarding consultation with State recreation planners and the Statewide Recreation Plan apply here.

In addition to the total recreation use estimates for Structures 2 and 3A, it would be appropriate to indicate an estimate of the non-diverted, or "new," recreation use to be generated by the project if, indeed, the total use estimates are made up of these two different recreation user groups. Recreation benefit evaluation should reflect this recreation use calculation.

Environmental Impacts - Cultural Resources

This section of the statement must contain a full evaluation of the project's impact on the cultural resource base. Of particular concern is the lack of a full evaluation of the project's impact on the archeological resources of the study area. We also believe the statement should discuss the plans for mitigating any adverse effects on the archeological resources which might arise during construction and subsequent operation of the plan of development. We believe the archeological resources of the study area should be surfaced at the same time the work plan is formulated so that design flexibility can take full advantage of all actions that will protect this resource base.

Alternatives, pages 64-66

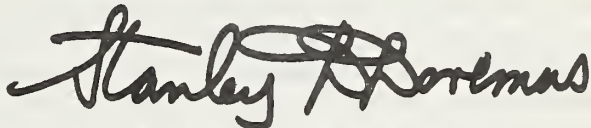
We find the discussion in this section of the impact statement very difficult to evaluate. The presentation discusses benefits, benefits foregone and costs and, in the absence of a summary, it is difficult for the reviewer to make any comparative analysis of the various solutions presented. For clarification purposes we suggest that the monetary values be tabularized as to their positive and negative effects and this could be done for each proposal individually or in a summary table concerning all alternatives. This information coupled with the discussion of non-monetary impacts of each proposal will enhance the ability of any reviewer to assess the merits of each solution presented.

Consultation and Review with Appropriate Agencies and Others

The comments of the State Historic Preservation Officer should be included in the document. This section should be expanded to include consultation on cultural resources.

We trust the foregoing comments will be of assistance to you in processing this report to the Congress.

Sincerely yours,



Deputy Assistant Secretary of the Interior

Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
Department of Agriculture
Post Office Box 27307
Raleigh, North Carolina 27611



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

May 30, 1975

Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

We have reviewed the Draft Environmental Impact Statement for the Second Broad River Watershed (in Rutherford, Cleveland, and McDowell Counties, North Carolina) and find that we have environmental reservations about some aspects of the project. We are especially concerned about the potentially serious impacts of Dams No. 22 and No. 23 on smallmouth bass fisheries of the Second Broad River.

It is stated that dam construction would eliminate upstream spawning habitat for smallmouth bass, but no mention is made that dam releases could detrimentally affect smallmouth bass fisheries. If proposed dams are located in smallmouth bass stream habitat, they would further diminish an important fishery in the Southeast.

We believe that a more sound approach to soil conservation and improvement to the waterways would be the alternative of floodplain purchase with land treatment outlined on page 66 of the Statement. The proposed land treatment would decrease sediment load to the creek and rivers, and purchase of floodplains would reduce destruction of capital improvements.

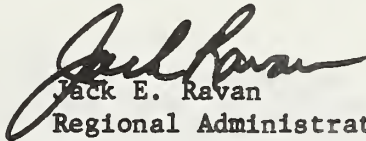
It is stated (on page 27) that the project would reduce idle land in the watershed by 97 percent. We suggest that floodplains are not idle lands and perform a useful function during floods and at low-water periods.

Finally, precautions to control erosion, sediment and water pollution should be implemented throughout the life of the project. In addition, noise levels during the land clearing and construction should not violate any State or local ordinance.

In light of our review and in accordance with procedures, we have assigned a rating of ER- (environmental reservations) to the project and 2 (insufficient information) to the Impact Statement.

We would like to have five copies of the final environmental impact statement when it is available, and if we can be of further assistance in any way, please let us know.

Sincerely,


Jack E. Ravan
Regional Administrator



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

July 29, 1975

Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

We have reviewed the Pre-Final Information on the Draft Environmental Impact Statement for the Second Broad River Watershed and have no objection to the project. It would be helpful if the Soil Conservation Service would delineate specific erosion and water pollution control measures that would be followed during construction of the project.

If we can be of further assistance, please let us know.

Sincerely,

A handwritten signature in cursive script that reads "David R. Hopkins".

David R. Hopkins
Chief, EIS Branch

April 25, 1975

Mr. Jesse L. Hicks
State Conservationist
United States Department of Agriculture
Post Office Box 27307
Raleigh, North Carolina 27611

Subject: Staff Review
Second Broad River
(1) Watershed Work Plan
(2) Watershed Environmental Impact Statement

Dear Mr. Hicks:

The Water Quality Section of the Division of Environmental Management, North Carolina Department of Natural and Economic Resources, has reviewed the proposed Watershed Work Plan and Environmental Impact Statement, and wishes to include the following comments as part of the Division's response to the project.

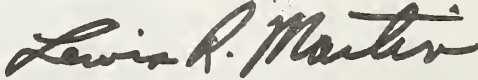
- (1) In connection with the multi-purpose structure No. 2, a wastewater treatment plant is proposed in which the connecting sewerline is to be laid across the lake bottom. Of course, before the wastewater treatment plant and sewerline can be constructed, a Permit is required from the Division of Environmental Management. The Water Quality Section would recommend against the construction of a sewerline under water since past projects of this nature have resulted in excessive infiltration of lake water.
- (2) This Division concurs with the statements regarding forest policy. Since approximately sixty-six percent of the watershed is classified as forestland, close attention is needed in the area of forest practices so that less sediment will reach the flood plain as a result of stormwater runoff. In addition, construction in the flood plains should be discouraged by means of Flood Plain Management Ordinances.
- (3) Particular attention should be given to agricultural runoff into lakes. Nutrients can accumulate and could eventually cause eutrophication of lakes if adequate control measures are not practiced on agricultural land.

Mr. Jesse L. Hicks
April 25, 1975
Page No. 2

- (4) With regards to sediment control, there are reservations as to the advisability of controlling sediment in a stream. Certainly it is more desirable to control sediment at its source if possible. This Division would recommend against a broad program of constructing sediment traps in streams, and would hope that this type of sediment control is dropped in favor of retaining soil on the land.

This Division is in basic agreement with the objectives of the work plan. The above statements are intended to insure that certain points have been given adequate consideration.

Sincerely,


Lewis R. Martin

cc: Mr. L. P. Benton, Jr.
Mr. Roy M. Davis
Mr. Harold E. Sellers



North Carolina Department of
Natural & Economic Resources

JAMES E. HOLSHOUSER, JR., GOVERNOR • JAMES E. HARRINGTON, SECRETARY

STATE SOIL AND
WATER CONSERVATION
COMMITTEE

S. GRADY LANE
DIRECTOR

BOX 27687, RALEIGH 27611
TELEPHONE 919 829-4776

May 7, 1975

Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
P. O. Box 27307
Raleigh, N. C. 27611

Dear Mr. Hicks:

I appreciate very much your sending the State Soil and Water Conservation Commission an advance copy of the Second Broad River Watershed Work Plan and Environment Impact Statement for review.

I personally think this is one of the best work plans and environmental impact statements that I have seen. Mr. Lonnie Thompson and I both reviewed these documents. In checking the tables pages 74-86 in the Work Plan, Mr. Thompson has found several errors which he has pointed out to the planning section and I understand these are to be corrected in the final plan.

Again thanks for the Plan and Statement.

Sincerely,

A handwritten signature in cursive script that reads 'W. O. Lambeth'.

W. O. Lambeth, Assistant Director,
Watersheds

WOL:tl



North Carolina Department of
Natural & Economic Resources

DIVISION OF
FOREST RESOURCES

RALPH C. WINKWORTH
DIRECTOR

BOX 27537, RALEIGH 27611
TELEPHONE 919 329-4141

JAMES E. HOLSHOUSER, JR., GOVERNOR • JAMES E. HARRINGTON, SECRETARY

April 11, 1975

MEMORANDUM

TO: Thayer Broili
FROM: Lyell Hicks
SUBJECT: Second Broad River ESI and Work Plan - January 1975 Draft

The January 1975 draft of the Second Broad River Watershed Work Plan and EIS has been reviewed. Very few of my comments covering the October 1974 draft were incorporated in the January 1975 revision.

The Division of Forest Resources still considers the importance and influence of the forest resource on the flood problem is not adequately identified and presented in the Work Plan.

The following comments refer to the items in my memorandum of February 14, 1975:

I. Summary of Plan

Poor management of the forest resource was incorporated in the second paragraph.

II. Watershed Resources - Environmental Setting - Pages 10 & 13

The revised Forest Resource Data was included in the January draft. However, this revised data was not incorporated with the forest resource information on Page 10 under one FOREST RESOURCES Subtitle.

Soil, Water & Plant Management Status - Page 18, 3rd paragraph

The paragraph was not reworded. Much of the forest land is not being managed. Suggested wording is: "All of the forest land is adequately protected from forest fire under the going Cooperative Forest Fire Control Program. Forest management assistance is available to landowners under the Cooperative Forest Management Program but most of the forest land is unmanaged."

III. Water and Related Land Resource Problems, Page 19, 3rd paragraph

The forest resource is the major land use (66%) and should be treated under the subheading Forest Resource treatment problems and references made only to the forest in paragraphs 3 and 4.

April 11, 1975

III. Water and Related Land Resource Problems, Page 19, 3rd Paragraph continued

The 3rd sentence states the majority of these soils are in poor to very poor (hydrologic) condition... The U. S. Forest Service defines hydrologic condition as "the relative ability of the specified combinations of soil and vegetative cover to absorb precipitation and retard runoff." (See Forest Land Plan, - Camp - Cane Creek Watershed - September 27, 1966). The forest soil in poor hydrologic condition is not adequately protected.

The fourth sentence in paragraph ^{therefore} should be reworded to read: "Much of the forest land in the poor hydrologic category is partially protected and there is still much forest land treatment needed."

Page 19 - 4th paragraph

Delete (and non-forested) from the second sentence.

IV. Project Formulation

Objectives - Page 29, 1st paragraph - No revision. Improvement of soil hydrology was not listed as an objective.

Page 33 - 1st paragraph, 2nd sentence

No revision - timber production was not included as one of the multiple uses of the forest land.

Page 35

No objection to not identifying the forest land losses.

Works of Improvement, Pages 43 thru 49

No revision made.

The Division of Forest Resources, having responsibility for the forest resource treatment, needs to know how much of planned tree planting will be needed for land use changes - crop land to forest land; pasture land to forest land, and how much will be reinforcement of understocked forest land.

V. Effects of Works of Improvement, Page 61, 4th paragraph

No revision as suggested.

If Flood Prevention is the major objective of the Watershed Project then improvement of the hydrologic condition of the forest resource should be the major objective of the forest improvement practices.

V. Effects of Works of Improvement - Page 61, 4th paragraph continued
Page 62 - last paragraph

The number of acres to be planted was not estimated.

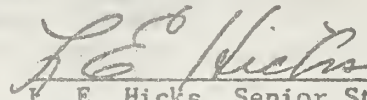
The corresponding sections of the EIS should also be revised.

The following additional comment is made.

Work Plan - Page 24, Erosion Damages, Fifth paragraph, last sentence

"Several thousand acres of former cropland have been damaged by past gully erosion to the extent that the land is now suitable only for forest use."

Has all but the 273 acres of scheduled critical area tree planting now have a satisfactory stand of forest trees as a result of natural reforestation?



L. E. Hicks, Senior Staff Forester
Cooperative Programs

LEH:ljc

cc: Roger Rich
Tex Kunselman

February 14, 1975

MEMORANDUM

TO: Thayer Broili
FROM: Lyell Hicks
SUBJECT: Second Broad River EIS and Workplan

The October 1974 draft of the Second Broad River Watershed Workplan and EIS incorporate of the suggestions made in the review of the March draft. However, the general comment on the revision is that the importance and influence of the forest resource is still not adequately presented.

To be sure the sponsors and his landowners within the watershed boundaries are fully informed, it is suggested that the influence of the forest resource on the problem, and the proposed solution, be covered in a subtitle (Forest Resources) under each of the major workplan headings.

I. Summary of Plan - Workplan - Page 1 - 2nd Paragraph

Poor management of the forest resource and the resulting inadequate forest cover and poor forest soil hydrology is a major problem in the watershed. It should be included in this paragraph.

II. Watershed Resources - Environmental Setting - Pages 10 and 13

Combine the forest resource data on these two pages under one Forest Resource subtitle. Revised Forest Resource Data has been forwarded to the State Conservationist by the U. S. Forest Service, Forest Resource Planning Group.

Page 18, 3rd paragraph

Reword this paragraph. The Forest resource is adequately protected under the going Cooperative Forest Fire Control Program and Forest Resource Management assistance is available under the going Cooperative Forest Management Program.

The number of landowners who practice good forest management is not documented, but the percent is undoubtedly even less than the present who have adequately treated their crop and pasture land.

III. Water and Related Land Resources Problems - Page 19, 3rd paragraph

Title this Forest Resources. The 1971 Conservation Needs Inventory shows 82% of the forest land in Rutherford County needing improvement and/or re-establishment or enforcement and it is reasonable to assume that this condition exists in approximately the same ratio within the watershed. Therefore, the fourth sentence should be revised to read "Much of the forest land in the poor hydrologic category is partially protected and there is still much forest land treatment needed." Expand the paragraph to state that because of the inadequate forest cover and poor forest soil hydrology the runoff from the 94,693 acres is excessive.

IV. Project Formulation

Objective - Page 29, 1st paragraph

Revise to include paragraph - adequate treatment of some portion of the forest land to increase forest cover and improve soil hydrology as well as increase income from the small forest holding. Forest land planning should be incorporated into the conservation farm plans.

Page 33 - 1st paragraph - 2nd sentence

Revise to read "The future use of the land purchased would be limited to those uses which would tolerate periodic flooding, such as forest land managed for multiple products, timber, recreation, wildlife and aesthetics."

Page 35

Identify the forest land changes - Forest acre lost to impoundments, etc. Forest acre lost to crop and pasture. Forest acre lost to wildlife. Forest acre gained from land use changes.

V. Works of Improvement, Pages 43 through 49

Summarize and identify all of the forest practices under a Forest Resource heading:

Tree planting - Critical Area 273 acres

Tree planting - Watershed protection 8180

Open land - Land Use changes from crop land _____?

" pasture land _____?

Reinforcement planting _____?

Memo to Thayer Broili
Page 3
February 14, 1975

VI. Effects of Works of Improvement Page 61 - fourth paragraph

Revise last two sentences to read: The hydrologic condition of the forest soil will be improved. Water runoff will be less, flooding will decrease, erosion from old logging roads and skid trails will be reduced and fewer runoff conveyed pollution will reach flowing streams.

Page 62, last paragraph

Identify the acreage that will go to forest land. If 1,084 acres of flood plain will be planted to high yielding pasture, why not plant all of the steep upland to trees?

The above comments supplement those made by the Forest Resource Planning Group, U. S. Forest Service, Decatur, Georgia.

L. E. Hicks, Sr. Staff Forester
Cooperative Programs

LEH:ljk

cc: Tex Kunselman
USFS - S&PF



State of North Carolina

Wildlife Resources Commission

RALEIGH, N. C. 27611

April 16, 1975

ROSCOE D. SANDLIN, JACKSONVILLE
CHAIRMAN

W. K. ANDERSON, NEWLAND
WALLACE E. CASE, HENDERSONVILLE
D. JACK HOOKS, WHITEVILLE
ROY A. HUNEYCUTT, LOCUST

CLYDE P. PATTON, RALEIGH
EXECUTIVE DIRECTOR

DR. LATHAN T. MOOSE, WINSLOW
JAY WAGGONER, GRAHAM
V. E. WILSON, III, ROCKY MOUNT
O. L. WOODHOUSE, GRANDY

Mr. Jesse L. Hicks, State Conservationist
United States Department of Agriculture
Soil Conservation Service
Post Office Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

We have reviewed the February, 1975 draft copies of the Work Plan and the Environmental Statement for your Second Broad River Watershed Report.

Except for the more costly provisions of the Environmental Quality Plan which has been added, (some of which would be beneficial to our interests) we found no essential change in the February documents from the earlier drafts dated October, 1974.

Our comments upon the October drafts were submitted to you under date of February 12, 1975. These comments are equally applicable to the February drafts.

We do, however, appreciate the opportunity for further comments upon this project.

Yours very truly,

Robert B. Hazel
Assistant Executive Director

FFF:en



State of North Carolina

Wildlife Resources Commission

RALEIGH, N. C. 27611

February 12, 1975

SCOE D. SANDLIN, JACKSONVILLE
CHAIRMAN
K. ANDERSON, NEWLAND
LACE E. CASE, HENDERSOVILLE
JACK HOOKS, WHITEVILLE
Y A. HUNEYCUTT, LOCUST

CLYDE P. PATTON, RALEIGH
EXECUTIVE DIRECTOR
DR. LATHAN T. MOOSE, WINGFIELD
JAY WAGGONER, GRAHAM
V. E. WILSON, III, ROCKY MOUNT
O. L. WOODHOUSE, GRANDY

Mr. Jesse L. Hicks
State Conservationist
United States Department of Agriculture
Soil Conservation Service
Post Office Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

We have reviewed the draft environmental statement and draft work plan for the Second Broad River Watershed that accompanied your notice of field review on January 23rd.

The only areas of conflict with Commission interests under the revised work plan are the twelve structural measures. These will require the destruction of some 629 acres of upland wildlife habitat -- 399 acres of woods and 230 acres of crop and pasture lands -- through inundation in the permanent pools of the twelve impoundments. In addition, the wildlife potential of some 800 acres will be reduced in varying degree either by intermittent inundation in the flood control pools or through proximity to high density human use of the recreational area.

Partially, offsetting this loss will be the voluntary wildlife management of 19 acres of waterfowl feeding areas and of 323 acres of privately-owned farm lands that the SCS will recommend to the land owners.

The project will create 504 acres of flat water fishing -- 288 acres of which will be open to public use under the terms of the current work plan.

February 12, 1975

The deletion of all forms of channel work downstream from the structures when the work plan was revised went far towards eliminating project conflicts with our interests.

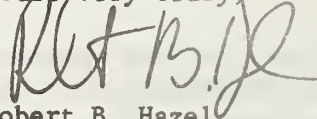
On balance, we believe the many benefits associated with the project as currently planned justify the anticipated net cost to our interests. The latter are principally in terms of upland wildlife habitat which is not in short supply.

We do note, however, that public use of the ten floodwater retaining structures, including the three in which duck windows are being installed, also was eliminated when the project was revised. The entire cost of the duck windows will be met with public funds and, in our opinion, public use should be permitted as it was under your 1971 Work Plan.

In summary, we believe the 1974 draft work plan and draft environmental statement adequately portray the benefits of the Second Broad River Project as well as the environmental costs to our interests.

We wish to thank you for the opportunity of reviewing these documents in their draft stages.

Yours very truly,



Robert B. Hazel
Assistant Executive Director

FFF:en



North Carolina Department of
Natural & Economic Resources

JAMES E. HOLSHOUSER, JR., GOVERNOR • JAMES E. HARPINGTON, SECRETARY

ARTHUR W. COOPER
ASSISTANT SECRETARY

BOX 27527, RALEIGH 27611
TELEPHONE 919 829-4334

May 9, 1975

RECEIVED

MAY 09 1975

MEMORANDUM

TO: Jane Pettus

FROM: Art Cooper 

SUBJECT: Clearinghouse File No. 032-75; Draft Work Plan and DEIS for Second Broad River Watershed, McDowell, Rutherford and Cleveland Counties

The Department of Natural and Economic Resources has reviewed the subject documents which are revisions of a draft Work Plan and DEIS which were circulated by Clearinghouse in January and February, 1975 (Clearinghouse File No. 002-75).

The subject documents have incorporated many of the changes which were recommended in our comments to CIC File No. 002-75. However, there are still some aspects of the proposed project that need further discussion. Foremost among them is the discussion of the forest resources in the project area and their interrelationship with the project. In our comments of February 28, 1975, on CIC File No. 002-75, we commented that the importance and influence of the forest resource was not adequately presented in the EIS. In connection with this comment, several suggestions, intended to upgrade the discussion of the forest resources in the project area were made. Most of these recommended changes were apparently ignored or deemed unreasonable by SCS, since they are not incorporated in the subject draft. We attach the comments of our forestry staff so as to indicate our remaining concerns. The draft EIS remains unsatisfactory until our views are more adequately incorporated. We suggest (next paragraph) further discussions to resolve these matters.

In our opinion evaluation of forest resources and subsequent management schemes are an integral portion of any watershed improvement program. Further, we are sure that SCS will readily agree with this statement. In order to resolve these issues, we request that Mr. Dick Folsche of the SCS contact Mr. Ralph Winkworth, Director of the Division of Forest Resources, DNER, and arrange for a meeting between appropriate persons on their respective staffs to discuss our concerns relating to the subject project and the general topic of forest resources in watershed improvement projects and how that subject should best be handled with respect to the preparation of future watershed work plans and EISs. Hopefully, such a meeting will be of benefit to all parties involved and will assist in resolving our differences on the subject project.

Memorandum to Janè Pettus
Page 2
May 9, 1975

In DNER's comments of February 28, 1975, we requested that local sponsors be urged to delineate floodways and adopt floodway regulations along the Second Broad River from a point below each structure to the confluence of the Second Broad River with the Broad. We reiterate this request here. The Abbreviated Environmental Quality Plan on page 10 of the Work Plan mentions the use of floodplain management but such a statement does not appear in the main text of the Work Plan. Our staff will not recommend this project to the Environmental Management Commission until appropriate floodplain management measures are included.

We have two additional comments concerning the Work Plan. On page 56, in Figure 20, we note that the minimum flow orifice should be located "a minimum of two feet below the sediment pool..." (page 55, third paragraph). The figure shows this orifice at the same level as the minimum pool level which we interpret as being the sediment pool. Thus, some changes should be made in this figure. The point here is that the orifice should be positioned so that a minimum flow is always being discharged from each structure. A minimum flow orifice could also be shown on Figure 18, page 51.

Our second comment involves the use of these 12 structures for downstream water supply purposes. On page 25, SCS notes that the "Army Corps of Engineers is studying a proposed Broad River impoundment..." (Clinchfield). This project is no longer being actively studied by the Corps, as the State of North Carolina has given a very low priority to it. Referring to page 26-183 of our Broad River Basin, Volume II (Draft) (enclosed), DNER agrees that supplies on Holland and Catheys Creeks and on the Second Broad River are "limited." It is felt, however, that with sufficient off-stream storage they are adequate unless a large water-using industry locates in the vicinity. DNER knows that the properly designed low flow orifices of the 11 structures upstream of the water intakes will improve the low-flow characteristics of these streams. DNER also knows it is rather late in the planning process to suggest major changes, but we wonder about the feasibility of using one or more of these flood control structures for municipal water supply storage. What is the potential of these sites? Could a municipality buy storage in one or more of these structures, thus offsetting the additional cost involved? DNER feels this section (page 25) ought to be expanded and the real and potential possibilities discussed.

SCS has already received by letter of April 25, 1975, from Lewis E. Martin, comments on the water quality aspects of this project. These should be considered as a part of our response to the EIS, and I include a copy here for the Clearinghouse record. Please note that several matters we mentioned in our earlier comments are still unresolved, including the waste-water line under structure #2 and eutrophication. SCS should resolve these matters as further planning progresses.

Attachments

cc Thayer Broili, Dan McDonald,
Ralph Winkworth, Lyle Hicks,
John Wells



STATE OF NORTH CAROLINA
DEPARTMENT OF HUMAN RESOURCES

JACOB KOOMEN, M.D., M.P.H.
DIRECTOR

Division of Health Services

P. O. Box 2091

Raleigh 27602

May 15, 1975

JESSE E. HOLSHOUSER, JR.
GOVERNOR

DAVID T. FLAHERTY
SECRETARY

Mr. Jesse L. Hicks
State Conservationist
United States Department of Agriculture
Soil Conservation Service
P. O. Box 27307
Raleigh, North Carolina 27611

RE: Draft
Second Broad River Watershed
Work Plan and Environmental
Impact Statement

Dear Mr. Hicks:

Thank you for submitting the draft copy of the Second Broad River Watershed Work Plan and Environmental Impact Statement for our review.

Our engineers had reviewed a previous draft of this document on February 3, 1975. At that time we recommended that:

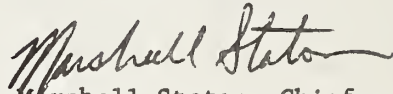
1. The Division of Environmental Management, Department of Natural and Economic Resources be contacted to determine if the quality of the water is suitable for body contact recreation because although A-II is a higher classification than the B required for this activity, the bacterial level allowable in A-II waters is higher than that allowed in B waters.
2. Care be taken to assure that the A-II classification is not contravened by any of the recreational uses.
3. The flood retarding structures proposed by this project be constructed in accordance with the Commission for Health Services' impoundment regulations.

These recommendations were not mentioned in the new draft.

Mr. Jesse L. Hicks
Page 2
May 15, 1975

We would appreciate receiving a copy of the finalized document when it becomes available.

Very truly yours,

A handwritten signature in cursive script that reads "Marshall Staton".

Marshall Staton, Chief
Sanitary Engineering Section

cc: Mr. Howard Ellis

STATE OF NORTH CAROLINA
Department of Cultural Resources
Raleigh 27611

Memorandum

Date: 22 April 1975

TO : OIR Clearinghouse
Dept of Administration

RECEIVED

FROM : L. E. Babits *LB*
Archaeology Section

MAY 06 1975

SUBJECT: Draft Environmental Impact Statement, 2nd Broad Watershed, 032-75

An initial archaeological survey was made of those areas where construction or earth moving was anticipated. Several sites were located which were recommended for further testing. To date this testing and evaluation has not been completed.

In addition, those areas which were not surveyed but are contained within the Second Broad River Watershed should also be surveyed in accordance with Executive Order 11593.

For further information, please contact, L. E. Babits, 919 829 7342.



North Carolina Department
of Administration

OFFICE OF
INTERGOVERNMENTAL
RELATIONS

EDWIN DECKARD
DIRECTOR

JAMES E. HOLSHOUSER, JR., GOVERNOR • BRUCE A. LENTZ, SECRETARY

June 13, 1975

Mr. Jesse L. Hicks
State Conservationist
Post Office Box 27307
Raleigh, North Carolina 27611

Dear Mr. Hicks:

Re: Draft Work Plan & Draft Environmental
Impact Statement on Second Broad River
Watershed, Rutherford & Cleveland Co.,
N. C. File No. 032-75

Enclosed you will find comments on the above reference, for your use
and file.

Sincerely yours,

Jane Pettus (Miss)
Clearinghouse Supervisor

JP:mw

Enclosure

F-32

MEMORANDUM

February 28, 1975

TO: N.C. Clearinghouse and Information Center

FROM: Art Cooper

SUBJECT: Clearinghouse File No. 002-75; DEIS and Work Plan, Second Broad River Watershed, McDowell, Rutherford and Cleveland Counties, Soil Conservation Service, USDA

The North Carolina Department of Natural and Economic Resources has reviewed the subject documents and offers the following comments pertaining to topics covered in the DEIS and Work Plan.

Land Treatment - On page 1, Work Plan, it is stated that "(1) and treatment is of major importance in this plan, as about 65 percent of the cropland in the watershed is in need of some type of conservation treatment." On page 18, Work Plan, it is stated that "(a)pproximately 70 percent of the cropland in the watershed needs additional conservation practices in order to be adequately treated." These two comments are contradictory and should be adjusted in the final Work Plan and EIS.

Water Resources - Those streams classified "D" in the last paragraph on page 9, Work Plan, should be changed to "C." In September, 1974, all "D" streams in that part of the Broad River Basin were upgraded to "C."

In the third paragraph on page 55, Work Plan, the 0.03 cfs/m given as the low-flow release rate should be changed to 0.3 cfs/m. The 0.03 cfs/m may have been a typing error, as 7-day, 10-year low flows in this part of the Piedmont are always above 0.2 cfs/m.

In connection with multi-purpose structure #2, a wastewater treatment plant is proposed in which the connecting sewer line is to be laid across the lake bottom. Before the wastewater treatment plant and sewer line can be constructed, a permit is required from the Division of Environmental Management, DNER. The Water Quality Section of the Division of Environmental Management recommends against the construction of the sewer line under water since past projects of this nature have resulted in excessive infiltration of the lake water, and in some instances, exfiltration of wastewater. We request that these plans be modified in the final draft so that this proposed underwater sewer is removed.

Forest Resources - The October 1974 draft of the Second Broad River Watershed Work Plan and EIS incorporate most of the suggestions made in the Division of Forest Resources' review of the March draft. However, the general comment on the revision is that the importance and influence of the forest resource is still not adequately presented.

February 28, 1975

To be sure the sponsors and the landowners within the watershed boundaries are fully informed, it is suggested that the influence of the forest resource on the problem, and the proposed solution, be covered in a subtitle (Forest Resources) under each of the major Work Plan headings.

I. Summary of Plan - Work Plan - Page 1, second paragraph

Poor management of the forest resource and the resulting inadequate forest cover and poor forest soil hydrology is a major problem in the watershed. It should be included in this paragraph.

II. Watershed Resources - Environmental Setting - Pages 10 and 13

Combine the forest resource data on these two pages under one Forest Resource subtitle. Revised Forest Resource Data has been forwarded to the State Conservationist by the U.S. Forest Service, Forest Resource Planning Group.

Page 18, third paragraph

Reword this paragraph. The forest resource is adequately protected under the going Cooperative Forest Fire Control Program and Forest Resource Management assistance is available under the going Cooperative Forest Management Program.

The number of landowners who practice good forest management is not documented, but the percent is undoubtedly even less than the percent who have adequately treated their crop and pasture land.

III. Water and Related Land Resource Problems - Page 19, third paragraph

Title this Forest Resources. The 1971 Conservation Needs Inventory shows 82% of the forest land in Rutherford County needing improvement and/or re-establishment or enforcement and it is reasonable to assume that this condition exists in approximately the same ratio within the watershed. Therefore, the fourth sentence should be revised to read: "Much of the forest land in the poor hydrologic category is partially protected and there is still much forest land treatment needed." Expand the paragraph to state that because of the inadequate forest cover and poor forest soil hydrology the runoff from the 94,693 acres is excessive.

IV. Project Formulation

Objectives - Page 29, first paragraph

Revise to include paragraph - adequate treatment of some portion of the forest land to increase forest cover and improve soil hydrology as well as increase income from the small forest holding. Forest land planning should be incorporated into the conservation farm plans.

Page 33 - first paragraph, second sentence

Revise to read "The future use of the land purchased would be limited to those uses which would tolerate periodic flooding, such as forest land managed for multiple products, timber, recreation, wildlife and aesthetics."

February 28, 1975

Page 35

Identify the forest land changes - Forest acre lost to impoundments, etc. Forest acre lost to crop and pasture. Forest acre lost to wildlife. Forest acre gained from land use changes.

V. Works of Improvement, Pages 43-49

Summarize and identify all of the forest practices under a Forest Resource heading:

Tree planting - Critical Area 273 acres

Tree planting - Watershed protection 8180 acres

Open Land - Land Use changes from crop land _____?

" pasture land _____?

Reinforcement planting - _____?

VI. Effects of Works of Improvement, Page 61, fourth paragraph

Revise last two sentences to read: "The hydrologic condition of the forest soil will be improved. Water runoff will be less, flooding will decrease, erosion from old logging roads and skid trails will be reduced and fewer runoff conveyed pollutants will reach flowing streams.

Page 62, last paragraph

Identify the acreage that will go to forest land. If 1,084 acres of flood plain will be planted to high yielding pasture, why not plant all of the steep upland to trees?

Recreation Resources - On page 53 of the DEIS, the first sentence should be modified to better describe the situation. There are surely some "convenient outdoor recreational facilities" although the water-based facilities may be in short supply.

The statement on page 1, paragraph 4, DEIS, that the two multiple-purpose structures will "meet the water-based recreation needs of the watershed over the life of the project" should be modified to indicate that the water-based recreation provided by the structures will greatly enhance (but not completely meet the needs) of recreation in the watershed over the life of the project. Our recreation planners feel that the needs of water-based recreation in the subject area are broader than those provided by the proposed project. However, the water-based recreation that will be provided by the subject project will be extremely beneficial in meeting the overall needs.

Prevention of Flood Damages - As part of the Watershed Work Plan, the local sponsors should take steps to have responsible local governments delineate floodways and adopt floodway regulations along the Second Broad River from a point below each of the twelve structures to the confluence of the Second Broad River with the Broad River. The local governments should have the Soil Conservation Service delineate these floodways before the completion of the flood control structures. This action has been the recent policy of the Environmental Management Commission, which must approve watershed projects.

Memorandum Re Clearinghouse File No. 002-75

Page 4

February 28, 1975

Floodway delineation and appropriate local regulations will be included as a departmental requirement when this project is submitted to the Environmental Management Commission for approval.

The comments of the North Carolina Wildlife Resources Commission have been forwarded directly to the Soil Conservation Service. A copy of these comments is attached.

Attachment

cc Lyle Hicks
Dan McDonald
John Wells
John Layden
Perry Nelson
Page Benton

AGRICULTURAL EXTENSION SERVICE

NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

SCHOOL OF AGRICULTURE AND LIFE SCIENCES

May 26, 1975

AGRICULTURE EXTENSION SERVICE
AGRONOMY SPECIALIST
Box 5155
RALEIGH, N. C. 27607

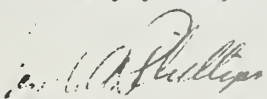
Mr. Jesse L. Hicks
State Conservationist
Soil Conservation Service
P. O. Box 27307
Raleigh, N. C. 27611

Dear Mr. Hicks:

I have reviewed the advance copy of the draft plan and draft environmental impact statement for the Second Broad River Watershed, McDowell, Rutherford, and Cleveland Counties, North Carolina. The only two comments I would offer are that the estimated yields used in the economic analysis of corn, corn silage, soybeans, etc., may be slightly low. The second comment would have to do with the sediment control program for the construction projects under Public Law 566. Maybe some mention should be made, at least in the environmental impact statement, regarding this aspect of the program and that the construction of the impoundment and facilities would be in accordance with the Sediment Control Act of 1973.

I believe this is a very beneficial program and I appreciate the opportunity to review the drafts.

Sincerely yours,


Joseph A. Phillips
Extension Agronomy Specialist

JAP:gw

cc: Dr. George Hyatt, Jr.

May 27, 1975

Mr. Jesse L. Hicks, State Conservationist
United States Department of Agriculture
Soil Conservation Service
Post Office Box 27307
Raleigh, North Carolina 27611

RE: SECOND BROAD RIVER WATERSHED DRAFT EIS

Dear Mr. Hicks:

Thank you for the opportunity to comment on the above captioned impact statement.

We do have some suggestions to make in the following areas:

RECREATION: While we are pleased to see recreation incorporated into this watershed project, we do not think the EIS addresses the need and existing potential for passive recreation (as opposed to the intensive recreation aspects of the project.) Various use levels should be considered in this project. Greenways for pedestrian, equestrian and bicycle use should be planned around every lake and linked by the natural floodplains of the tributaries. Until such time as those who benefit from the project pay the costs involved, we urge that these flood control structures be available for public access. Greenways to link the cities and towns downstream from the lakes will give taxpayers an alternate mode of transportation to the recreation areas. One mile of linear corridor about 200 feet wide per each 48 hikers would be a suggested standard. Multiple use of sewer easements and other utility easements should at least be suggested to the local governments through this environmental impact statement.

We believe that all of the lakes could incorporate some form of passive recreation if only in the form of greenway access around them. All existing public recreation in the area seems to be intensive use oriented. Greenway opportunity along the floodplains will never be more available.

WATER QUALITY: Present water quality appears to be excellent and this feature, together with the appeal of the flood control lakes and planned recreation will encourage tourist and second home growth in the area. While this secondary impact was not addressed in the EIS (and, we think, should have been) we urge the SCS to encourage control of water volume and nonpoint sources of pollution which will be significantly increased because of this project. Stormwater control ordinances should be a prerequisite to any development.

Mr. Jesse Hicks
Page 2
May 27, 1975

The growth encouraged in the vicinity of these lakes should be anticipated and adequate land use controls are not apparent in the EIS. Floodplain zoning should be a part of this watershed project from and above the lakes throughout the watershed to the Broad River.

MUNICIPAL WATER SUPPLY: The high quality of the water makes us wonder why water supply was not a consideration in the design of these lakes. The Corps of Engineers project referred to by SCS does not appear imminent and we feel this is an obvious planning opportunity which has not been adequately discussed.

AGRICULTURAL RUNOFF: The agricultural characteristic of this area will be intensified and we are concerned that farm runoff, not regulated in the N. C. Sediment Pollution Control Act, will become a major problem in this area because of the very intent of this watershed project. These nonpoint sources of pollution, added to the existing point sources of pollution presently causing problems, may well degrade these waters in violation of federal laws and North Carolina clean water goals.

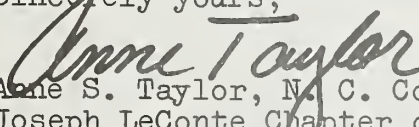
WILDLIFE: We suggest that the cold water release and duck windows be incorporated into the design of all of the lakes and we do not see in the statement why this has been limited to only three of the lakes.

VEGETATION: We suggest a vegetative survey, similar to the archeological survey, for this project and we believe this function should be performed as an automatic parameter in project design. Universities are equipped to handle this inventory of our natural areas on a site basis to preclude devastation of unique vegetation which might be removed to botanical gardens, etc. We feel this is inadequately discussed on page 38 of the EIS.

We do commend you for including a tree survey and for the recreation presently included in the statement and we apologize for the negative tone of our comments. We found the EIS to be well written and many innovative considerations included. We offer our suggestions in an effort to expand the total benefits of this project and others planned in North Carolina.

With kind regards, I am

Sincerely yours,


Anne S. Taylor, N. C. Conservation Chairwoman
Joseph LeConte Chapter of Sierra Club
4217 Laurel Ridge Drive, Raleigh, N. C. 27612

cc: Dr. Arthur Cooper
Dr. James Wallace

