

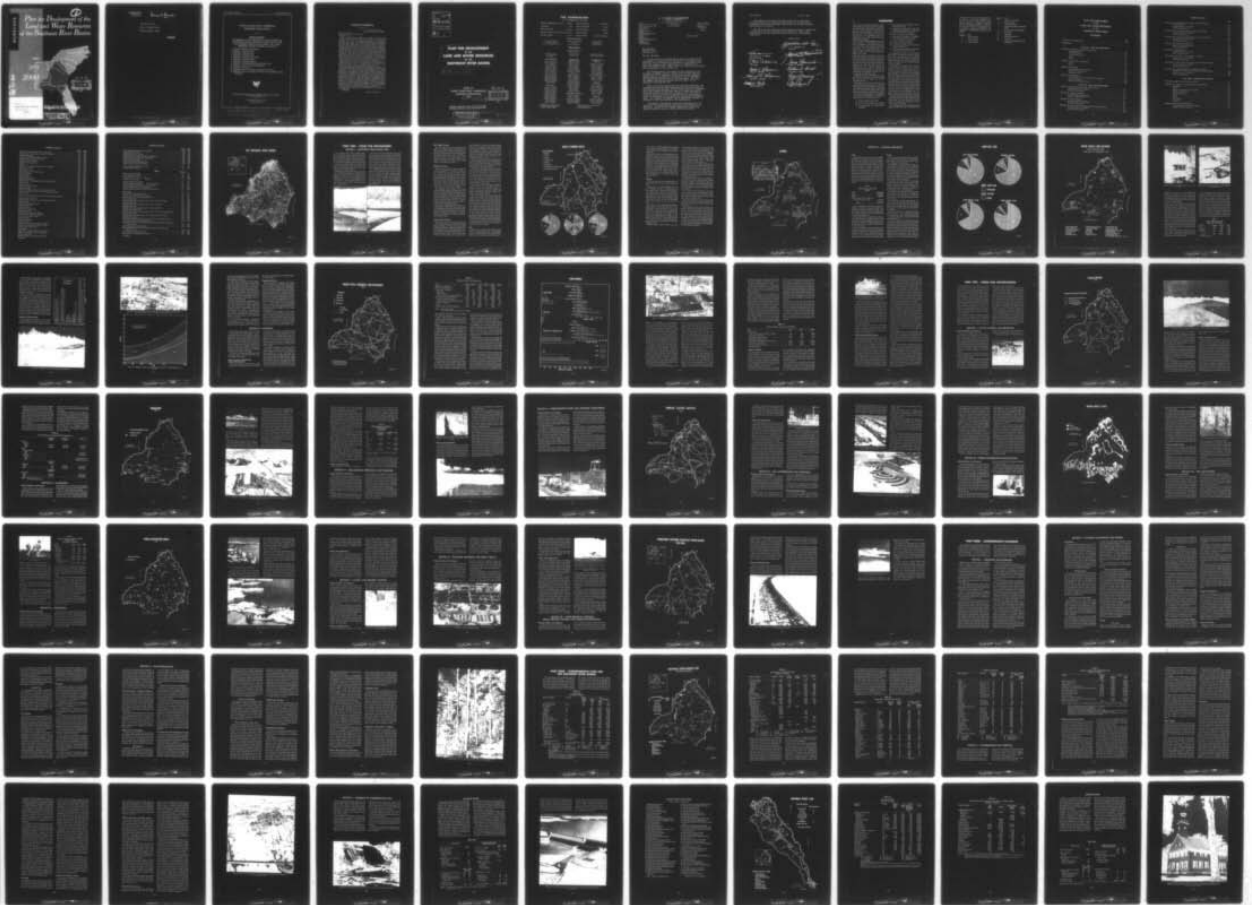
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UNITED STATES STUDY COMMISSION SOUTHEAST RIVER BASINS--ETC F/G 8/6
PLAN FOR DEVELOPMENT OF THE LAND AND WATER RESOURCES OF THE SOU--ETC(U)
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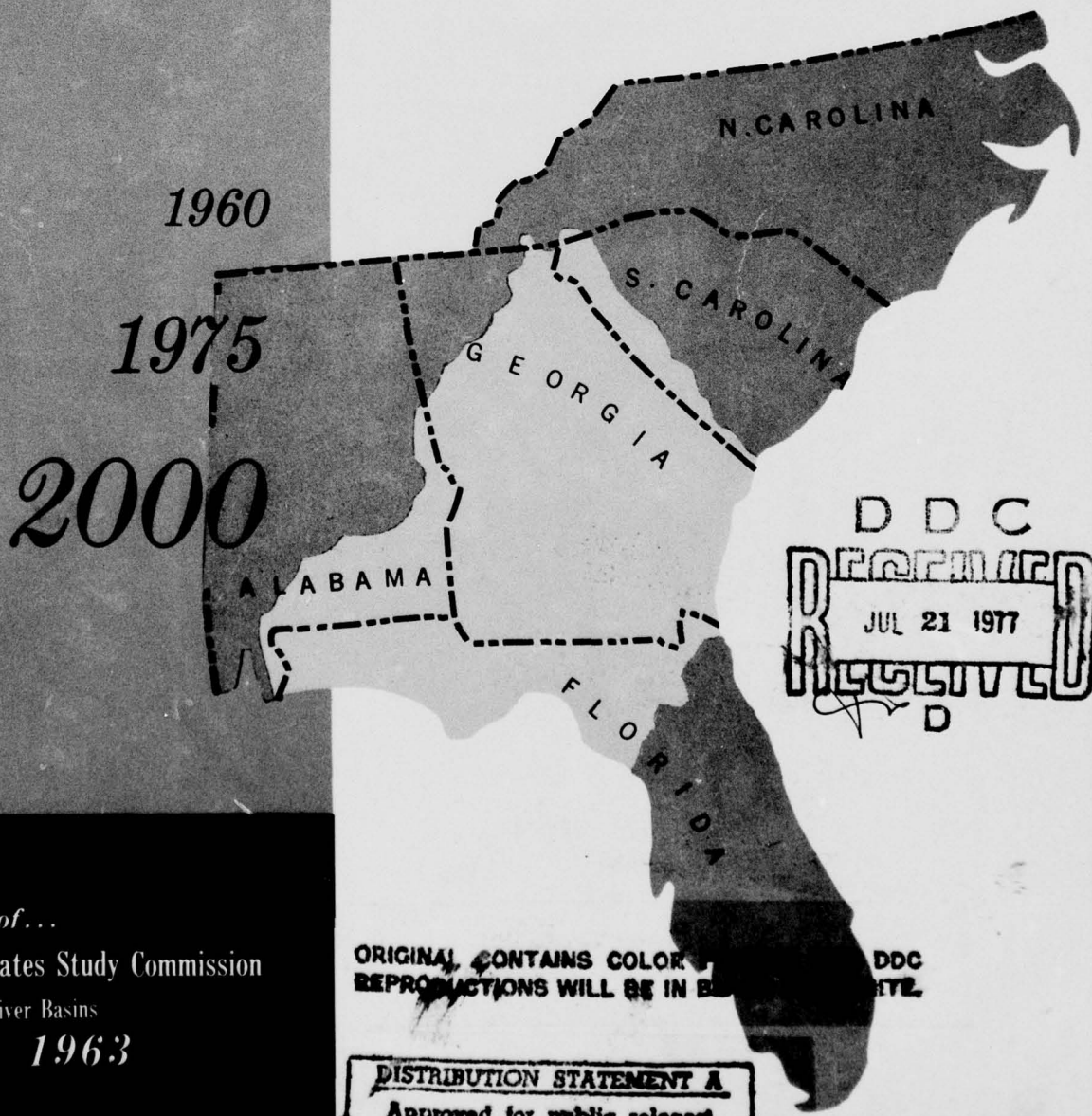
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Plan for Development of the Land and Water Resources of the Southeast River Basins



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Report of...
 United States Study Commission
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UNITED STATES STUDY COMMISSION
SOUTHEAST RIVER BASINS

FINAL REPORT

TRANSMITTED TO THE CONGRESS BY THE PRESIDENT OF
THE UNITED STATES PURSUANT TO SECTION 9(c) OF THE
ACT APPROVED AUGUST 28, 1958 (PUBLIC LAW 85-850),
COMPRISING TWELVE VOLUMES AS FOLLOWS

1. Report of Commission on its Studies
2. Appendix 1—Savannah Basin
3. Appendix 2—Ogeechee Basin
4. Appendix 3—Altamaha Basin
5. Appendix 4—Satilla-St. Mary's Basin
6. Appendix 5—Suwannee Basin
7. Appendix 6—Ochlockonee Basin
8. Appendix 7—Apalachicola-Chattahoochee-Flint Basins
9. Appendix 8—Choctawhatchee-Perdido Basins
10. Appendix 9—Economics
11. Appendixes 10 & 11—Hydrology, and Engineering and Cost
12. Appendixes 12 & 13—Planning, and History and Organization of the Commission



DECEMBER 21, 1963.—Referred to the Committee on Public Works and Ordered
to be Printed With Attachments

U.S. GOVERNMENT PRINTING OFFICE

93-111

WASHINGTON : 1963

410 288

United States Study Commission
Southeast River Basins, Atlanta, Ga.

J. M. C.

LETTER OF TRANSMITTAL

THE WHITE HOUSE,
Washington, December 21, 1963.

HON. CARL HAYDEN,
President of the Senate Pro Tempore,
Washington, D.C.

DEAR SENATOR HAYDEN: Pursuant to section 9(c) of the act approved August 28, 1958 (Public Law 85-850), I am transmitting the final report of the U.S. Study Commission on the Savannah, Altamaha, St. Marys, Apalachicola-Chattahoochee and Perdido-Escambia River Basins and intervening areas (commonly known as the U.S. Study Commission—Southeast River Basins). The Commission has presented the results of its studies made in formulating a comprehensive plan of improvement for the conservation, utilization, and development of the land and water resources of the southeast river basins. The comments of the Governors of Alabama, Florida, Georgia, and North Carolina, and of the Federal agencies who have an interest in the plan, are included as a part of the report. No comments have been received from the Governor of South Carolina. The act provides that I transmit the final report of the Commission to the Congress with my views, comments, and recommendations within 90 days after its receipt by me from the Commission.

This report is the product of a cooperative river basin planning effort conducted under the study commission form of organization. It offers a flexible plan to serve as a guide to meet the needs of the area for land and water resources development to the year 2000.

The need to plan and coordinate action programs, of course, does not end with submission of this report and termination of the Study Commission. In the future, as projects are completed, as the economy develops, and as population increases in the study area, plans must be reviewed and modified to meet needs that cannot be fully foreseen at this time. Arrangements for keeping the plan current can be adequately provided for under provisions of the proposed Water Resources Planning Act. Legislation has been introduced this session (S. 1111) for which I affirm my support if modified as recommended in the report of the Secretary of the Interior to the Senate Committee on Interior and Insular Affairs. Until necessary legislation is enacted, the Commission will arrange with the Interagency Committee on Water Resources to provide an interim organization so that necessary continuity of effort may be maintained.

I commend the final report of the Commission to the Congress for its consideration.

Sincerely,

LYNDON B. JOHNSON.

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**PLAN FOR DEVELOPMENT
OF THE
LAND AND WATER RESOURCES
OF THE
SOUTHEAST RIVER BASINS.**

9 *Final rept.*

REPORT OF
 UNITED STATES STUDY COMMISSION
 SOUTHEAST RIVER BASINS, *Atlanta*

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TELEPHONE:
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IN REPLY
REFER TO:

June 19, 1963

The President
The White House
Washington, D. C.

Dear Mr. President:

We take pleasure in transmitting our Report on a Plan for the Development of the Land and Water Resources of the Southeast River Basins for your consideration and transmittal to the Congress with your views, comments, and recommendations, in compliance with Public Law 85-850 (72 Stat. 1090). Part Five contains the conclusions and recommendations of this Commission.

The proposed Report of the Commission was transmitted to the Governors of Alabama, Florida, Georgia, North Carolina, and South Carolina; and to the Secretaries of Agriculture; Army; Commerce; Health, Education, and Welfare; and Interior; and the Chairman of the Federal Power Commission for review and comment. The views and comments received are reproduced with the Report of the Commission, following Part Six.

Each of the review comments has been carefully considered. The Commission believes that each comment deserves continuing review as new information and techniques are developed; however, the assumptions and criteria adopted and decisions made as the Commission studies progressed continue, at this time, to appear valid. The effect of recent and future legislation on implementation of plan proposals should be considered on a continuing basis by the Resources Advisory Board. The findings, conclusions, and recommendations contained in the Report reflect the consensus of the Commissioners.

The Chairman, individually, compliments the Commissioners for their spirit of cooperation with him and the staff members of the Commission. Because of this valuable ingredient in the working formula, divergent views were resolved rather than evaded.

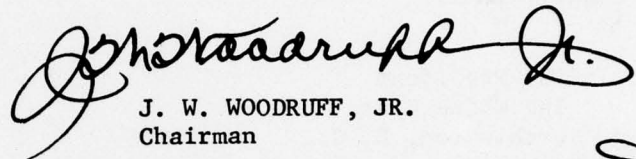
The President

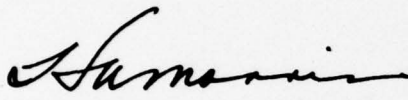
June 19, 1963


The comments of the States and Federal agencies are appreciated. Continuing review by an appropriate organization such as the proposed Resources Advisory Board, Southeast River Basins, may indicate desirable plan changes in the future.


The efforts of the States and Federal agencies represent a substantial contribution to the plan and Report of the Commission. Such a study could not have been successfully concluded without their wholehearted cooperation.

Respectfully,

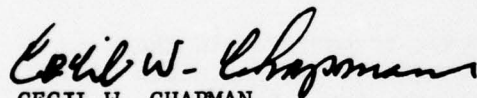

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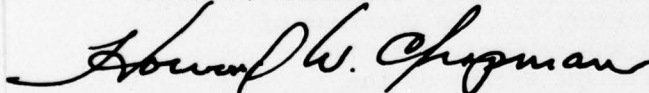

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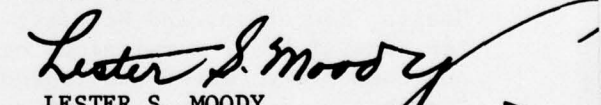

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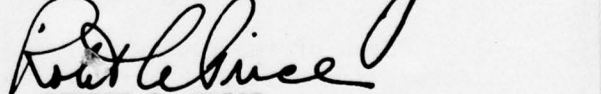

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FOREWORD

The United States Study Commission, Southeast River Basins, summarizes herein the results of its studies made in formulating a comprehensive plan of improvement for the conservation, utilization, and development of the land and water resources of the Southeast River Basins. The Report on the comprehensive plan is intended to serve as a guide to resources development in the study area.

Data relevant to the development of the land and water resources of the Southeast River Basins are summarized in this Report in six inter-related parts. The matter contained in each part is pertinent to the comprehensive plan. The reader is urged to consider the Report in the aggregate rather than to consider selected material out of context.

Part One includes a description of the area, a discussion of its resources, and a presentation of the present and future population and economy. Part Two presents the level of needs by purpose. Part Three describes planning procedures as applied to this study. Part Four presents the comprehensive plan, including improvements warranting early action. Part Five contains the conclusions and recommendations, and Part Six acknowledges the assistance of public and private agencies and individuals.

Comments on a draft of the Commission's proposed Report which have been received from the States and Federal agencies are included following Part Six.

The Report of the United States Study Commission summarizing the plan for the Southeast River Basins is made in response to the provisions of Public Law 85-850 (72 Stat. 1090) dated August 28, 1958, which established the United States Study Commission, Southeast River Basins.

The authorizing Act provides for an integrated and cooperative investigation to formulate a comprehensive and coordinated plan for:

- (1) Flood control and prevention;
- (2) domestic and municipal water supplies;
- (3) the improvement and safeguarding of navigation;

- (4) the reclamation and irrigation of land, including drainage;
- (5) possibilities of hydroelectric power and industrial development and utilization;
- (6) soil conservation and utilization;
- (7) forest conservation and utilization;
- (8) preservation, protection, and enhancement of fish and wildlife resources;
- (9) the development of recreation;
- (10) salinity and sediment control;
- (11) pollution abatement and the protection of public health; and
- (12) other beneficial and useful purposes not specifically enumerated in the Act.

The comprehensive plan for the Southeast River Basins is formulated to meet the needs of the area for land and water resources development to the year 2000. Projects and programs existing and under construction in 1960 are included in the plan, but only 1960-2000 developments are analyzed.

The plan for the development of the resources of the Southeast River Basins is the result of cooperative work of Federal, State, and local and private agencies having interest in the area and knowledge of its needs and requirements. Public hearings were held early in the planning process to obtain firsthand knowledge of conditions and problems in the study area and to secure suggestions for their solution. Throughout the study, liaison was maintained with interested groups and agencies by means of conferences and committee and advisory group meetings. When a tentative plan was developed, public presentations were held by the Commission to inform interested persons and organizations and to request comments. These comments were considered in preparing the final plan and Report.

Although many individuals, groups, and agencies have participated in the studies, the Commission takes full responsibility for the plan, and for the projections, assumptions, and analyses on which it is based.

The Commission plan for the Southeast River Basins is supported by data contained in 13 ap-

pendixes. Data on the plan for development of the resources in the eight geographic areas studied in the Southeast River Basins are contained in Appendixes 1 through 8. Technical data and information applicable to both the entire study area and the several geographic areas are contained in Appendixes 9 through 13. The appendixes to the Commission Report are as follows:

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1	Savannah Basin
2	Ogeechee Basin
3	Altamaha Basin

Appendix	Title
4	Satilla-St. Marys Basins
5	Suwannee Basin
6	Ochlockonee Basin
7	Apalachicola-Chattahoochee-Flint Basins
8	Choctawhatchee-Perdido Basins
9	Economics
10	Hydrology
11	Engineering and Cost
12	Planning
13	History and Organization of the Commission

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 OF THE
 LAND AND WATER RESOURCES
 OF THE
 SOUTHEAST RIVER BASINS
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* Photograph

THE SOUTHEAST RIVER BASINS

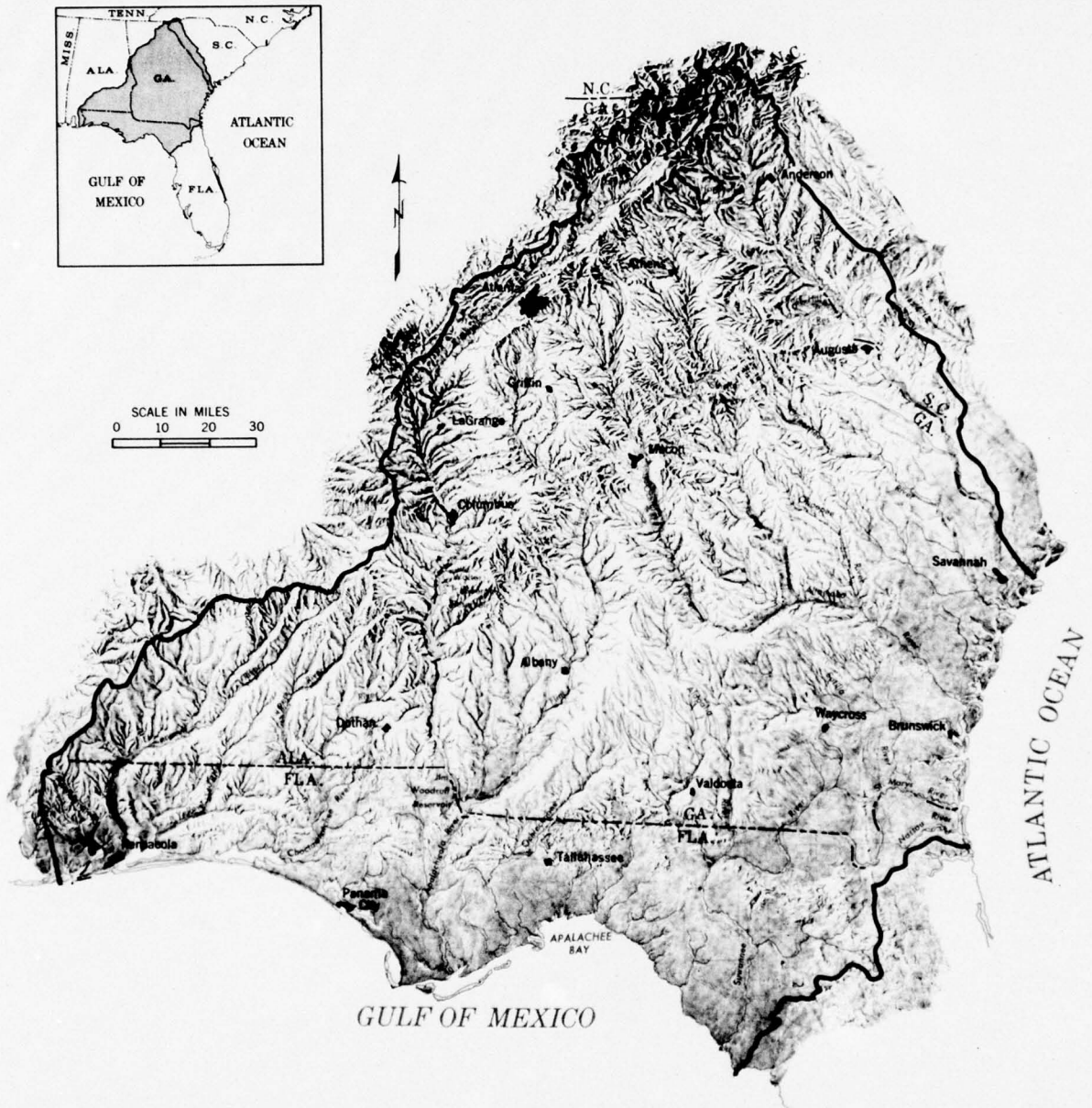


Figure 1.1

PART ONE – STAGE FOR DEVELOPMENT

SECTION I – SOUTHEAST RIVER BASINS AREA

The Southeast River Basins, 88,000 square miles of land and water, include parts of the States of Alabama, Florida, Georgia, North Carolina, and South Carolina. About 60 percent of the area drains southward a maximum distance of some 380 miles through several river systems to the Gulf of Mexico. The remainder, with about 250 miles from headwater to tidewater, drains to the Atlantic Ocean. Elevations range from sea level to about 5,500 feet.

Woodlands occupying some 70 percent of the area are interspersed with open farmland and urban lands. Natural lakes are common only in Florida, but there are many manmade lakes throughout the area. Vast swamplands occur in the nearly flat, lower portions. Beaches, bays, tidal marshes, and near-shore islands make up the coastal margins.

The land is used for commercial forests, row crops, pastures, orchards, poultry, and livestock farming. Towns and cities, industrial and recreation areas, and arteries of land transport are significant features of the landscape. Some of the rivers have been partially harnessed for power, flood control, water supply, navigation, and recreation. The coastal waters are used for commercial fishing and navigation and for recreation.

For planning purposes, the Southeast River Basins area, sometimes referred to as the study area, was divided into eight segments which bear the names of the major rivers within them. The area includes portions of three physiographic provinces; the Blue Ridge, Piedmont, and Coastal Plain. The latter is identified in two parts, Upper Coastal Plain and Lower Coastal Plain.



Figure 1.2 *Contrasts in the Landscape of the Southeast River Basins.*

Blue Ridge Province

The northernmost tip of the Southeast River Basins area extends into the mountains of the Blue Ridge province. The Savannah River draining to the Atlantic Ocean and the Apalachicola-Chattahoochee-Flint River system draining to the Gulf of Mexico have their sources in this province. The steep and forested slopes on the ancient crystalline rock merge with the hilly margin of the Piedmont province.

Piedmont Province

The Piedmont province is broadly rolling hill country, generally 500 to 1,400 feet above sea level, which meets the Coastal Plain province in a relatively narrow band of steeply sloping hills. Streams on the Atlantic slope cut across the prevailing gneisses and schists, which are interspersed with other metamorphic and igneous rock, while streams on the Gulf slope tend to follow the trend of these formations. Erosion has produced a Fall Line where Piedmont crystalline rock meets Coastal Plain sediment.

The generally narrow valleys of the major streams with their sharply sloping valley walls and the scattered, isolated, low mountains are major relief features. Slopes of major streams generally average 2.5 to 6 feet per mile but reach 10 feet or more per mile at the Fall Line. Tracts of pine and mixed pine and oak are common. Natural lakes and ponds are few, but there are numerous manmade impoundments.

The Atlanta metropolitan area, with over a million people in 1960, is the major urban center of the Piedmont province and the whole Southeast. Other important Piedmont cities, with populations exceeding 20,000 in 1960, include Anderson, South Carolina; and Athens, LaGrange, and Griffin, Georgia.

Coastal Plain Province

The inner margin of the Upper Coastal Plain is in the band of sand and clay hills, having summit elevations of about 500 feet, which straddle the Fall Line. Seaward of the Fall Line are progressively more recent geological formations. Major stream valleys, often terraced, constitute the major relief features. The entire Coastal Plain is underlain by a mixture of low-

grade limestones, claystones, sandstones, shales, and sands. In southwest Georgia and northern Florida, where limestones are cavernous, sink-hole topography occurs; but the remainder of the Upper Coastal Plain is largely an upland of rolling broad-topped hills. Elevations in the Upper Coastal Plain are generally between 100 and 400 feet above sea level.

The lower margins of the Upper Coastal Plain include the higher of the recent sedimentary terraces, and the uplifted limestones of north Florida. Elevations of these terraces range downward from 200 feet to less than 100 feet.

The Upper Coastal Plain contains some of the most productive agricultural and forest land of the Southeast River Basins. Streams rising in this area are generally clear. Especially clear streams issue from the large springs common to the lower portion of the limestone areas. Sink-holes, some forming lakes and ponds, are numerous. Slopes of major streams generally average from 0.9 to 2 feet per mile.

The principal cities of the Upper Coastal Plain include the three large metropolitan cities of Augusta, Macon, and Columbus, Georgia, all located where major streams cross the Fall Line; Albany and Valdosta, Georgia; Dothan, Alabama; and Tallahassee, Florida.

The Lower Coastal Plain is generally flat, swampy, and forested. Sea islands along the Atlantic coast are remnants of lower terraces on which dunes have formed. Elevations along the Gulf slope seldom exceed 50 feet, whereas those of the Atlantic slope reach elevations above 100 feet. Streams throughout much of the area are tidal, sluggish, and dark with slopes generally less than a foot per mile. Okefenokee Swamp is the most notable fresh-water swamp, but there are other large fresh-water swamps on the low flood plains of major Atlantic streams. Pine and bottom land hardwoods are the dominant forest types, and there are extensive marine marshlands.

Major cities of the area are Waycross, Savannah, and Brunswick in Georgia and Pensacola and Panama City in Florida.

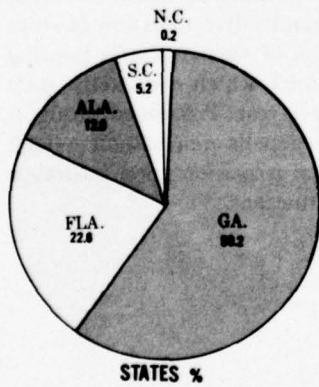
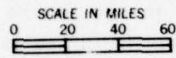
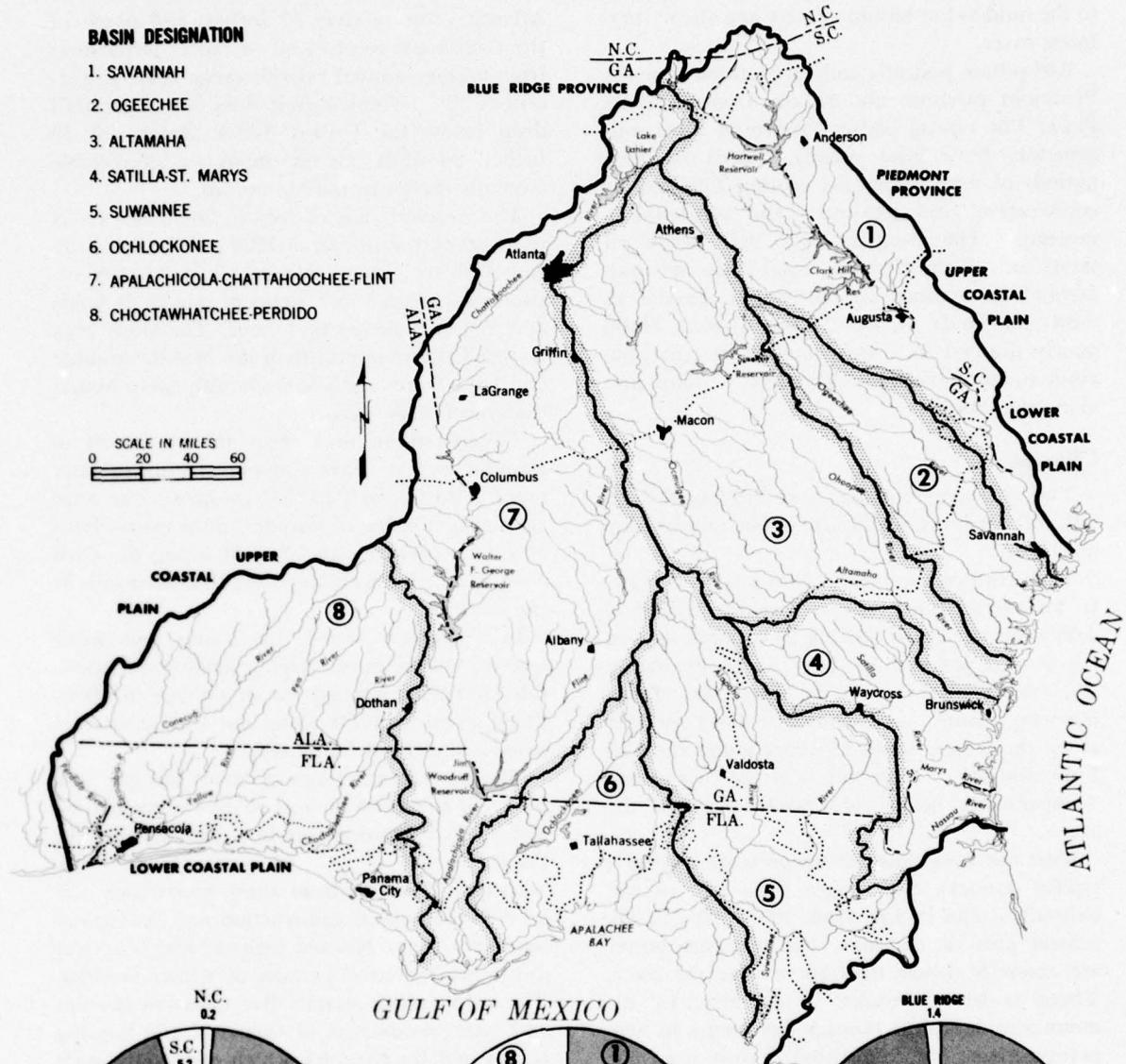
Soils

Generally, the bedrock of the Southeast River Basins is deeply mantled by unconsolidated products of weathering and of stream and marine deposition. The upper portion of this mantle, or

BASIN PLANNING AREAS

BASIN DESIGNATION

1. SAVANNAH
2. OGEECHEE
3. ALTAMAHA
4. SATILLA-ST. MARYS
5. SUWANNEE
6. OCHLOCKONEE
7. APALACHICOLA-CHATTAHOOCHEE-FLINT
8. CHOCTAWHATCHEE-PERDIDO



GULF OF MEXICO

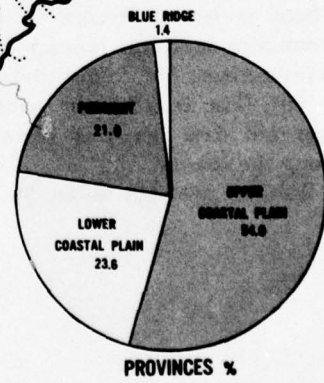
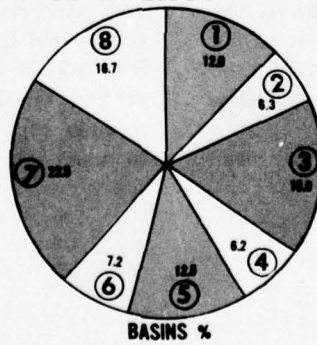


Figure 1.3

soil — the part in which things grow, has taken on new characteristics through eons of exposure to the mild-to-hot humid climate and the natural forest cover.

Red-yellow podzolic soils predominate in the Piedmont province and in the Upper Coastal Plain. The typical podzol profiles of these soils generally have been greatly altered by long periods of man-accelerated erosion followed by constructive land treatment and reforestation measures. The comparatively well developed sandy soils of the Upper Coastal Plain are most favored for commercial cultivation. In the almost flat lands of the Lower Coastal Plain, poorly drained soils are common. Recent alluvium predominates in the valley bottoms and along the shores.

Climate

The area generally has well-distributed rainfall, mild winters, and warm-to-hot humid summers.

Temperatures over 100° Fahrenheit are rare. In an average year, 90° is reached during 70 days along the coasts, during 90 or more days in the central portion, 50 days in the Piedmont, and during 30 or less in the mountains. Freezing temperatures occur about 10 times per year along the coasts, about 40 times along the Fall Line, and 70 or more times in the mountains. Temperatures below zero rarely occur in the area.

Near the coast, the air temperature during a typical January day ranges from 45° to 60° Fahrenheit and in July from 70° to 90°. In the central part of the area, winter temperatures are about 5° lower than those near the coast. There is less difference in summer. In the mountains, a typical January day ranges in temperature from 30° to 50° and in July from 60° to 80°. The frost-free or growing season averages 240 days per year inland and 300 days along the coasts.

Rainfall averages about 50 inches per year.

It ranges from 44 inches in east-central Georgia to more than 80 inches in the mountains. The Atlantic coast receives 52 inches, and much of the Gulf coast receives 60 or more. Departures from average annual rainfall range from 50 percent to 150 percent. Rarely does annual rainfall drop below the United States average of 30 inches. Snowfall seldom occurs in appreciable amounts except in the mountains.

The heaviest rain of record, 20 inches in 24 hours, occurred in March 1929 at Elba in south-east Alabama. About once in 10 years many stations experience 5 to 7 inches of rain in 24 hours and 2½ or 3 inches in 1 hour. The study area is slightly more humid than the Middle Atlantic and Lake States and is considerably more humid than most of the Nation.

Thunderstorms may occur in any month of the year but are most common during summer months, particularly in the afternoon. The average yearly number of thunderstorms ranges from 50 in the northeast to 70 or 80 along the Gulf coast. Hail seldom accompanies thunderstorms in the Southeast.

In a 10-year period, hurricanes and lesser tropical storms cause varying amounts of wind, tide, and flood damage on an average of about three times at points along the Gulf coast and twice along the Atlantic coast.

The tornado incidence of about five per year is similar to that of the rest of the eastern United States and is considerably less than that for the Prairie States.

General freedom from snow and frozen soil permits economical construction and year-round outdoor activity. Normal highway and waterway use is not restricted because of winter weather. The mild climate permits diversification of crops and rapid production of timber. Little housing is required for livestock which commonly graze 8 months or more per year. Prolonged droughts are rare, but short, dry spells are common enough to make supplemental irrigation good insurance in many farming situations.

CLIMATE

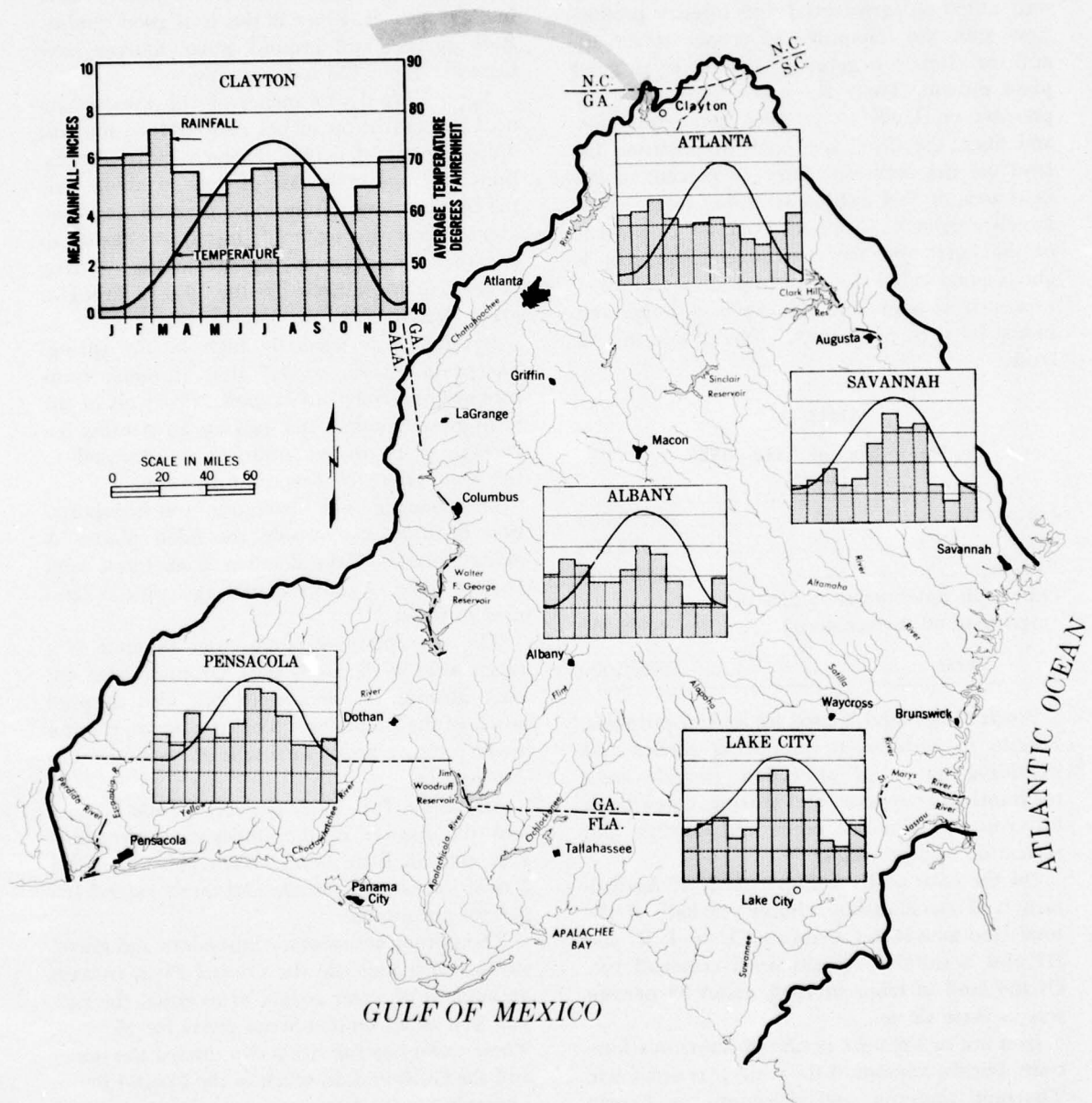


Figure 1.4

SECTION II - NATURAL RESOURCES

Land

The Southeast River Basins area is generally well suited to agricultural and forestry production. Soils are responsive to proper treatment, and the climate is generally conducive to good plant growth. There has never been any great pressure on lands to produce maximum food and fiber; therefore, very little competition for land use has occurred. Some 70 percent of the land area, or 38.4 million acres, has forest cover, largely regrowth. Cropland occupies 15 percent of the land, and the remaining 15 percent is about equally divided between pasture and other uses such as roads and rights-of-way, home and industrial sites, powerlines, airports, and marshlands.

TABLE 1.1
Major Uses of Land—1959
(acres)

Forest	38,400,000
Crop	8,500,000
Pasture	4,000,000
Other (includes water bodies of less than 40 surface acres)	4,500,000
Total	55,400,000

Much of the land is used for several purposes. Forests, in addition to producing timber and providing watershed protection, provide areas for hunting, recreation, and grazing. Open lands fill crop and livestock needs and hunting and recreation opportunities.

On the basis of U. S. Department of Agriculture land classification, almost one-half of the total land area is in Capability Classes I, II, and III and is suitable for sustained cropland use. Of the land in crops in 1959, about 89 percent was in these classes.

Iron ore or limonite occurs in numerous locations, but the amount of the reserves is unknown. Thorium, titanium, and zirconium are known to exist in "heavy sands" along the Atlantic and Gulf coasts. Iron ore, kaolin, brick clay, building stone, and limestone are mined commercially.

Water

The vast quantity of surface and ground water in the Southeast River Basins is of good quality. Both surface and ground water sources have been developed for water supply.

Approximately 15 inches of the average annual rainfall of 50 inches run off into streams. This amount of runoff is nearly twice the national average. The rate of flow in about half the streams ranges from more than 35 times the average flow during brief, infrequent floods to less than one-twentieth of the average during occasional dry periods. In the 1954-56 drought, many streams dried up completely.

Streamflow is normally high in the spring. Except in certain coastal areas, summer rains produce relatively little runoff. Nearly all of the rainwater that does not run off in streams, an average of 35 inches annually, is returned to the atmosphere by evapotranspiration.

Most houses, other structures, and transportation facilities are outside the flood plains. A major portion of the flooding is on forest land and on some of the potential agricultural land now in forest.

The tremendous ground water resource is a major asset in the study area. Ground water not only sustains the area wells but also supplies much of the streamflow. Near the ocean, ground water pressure resists intrusion of sea water into the aquifers.

Above the Fall Line, the soil mantle is thin, and the fissures in the underlying crystalline rock contain little water. Wells generally yield 5 to 25 gallons per minute and rarely exceed 100 gallons per minute.

The porous sedimentary limestones and gravel strata which underlie the Coastal Plain contain an amount of water estimated to equal the normal flow of all United States rivers for 15 years. These water-bearing strata dip toward the ocean and the Gulf; and, in much of the Coastal Plain, impervious clay layers confine this water and produce artesian conditions. These strata are supplied with water which enters them readily at recharge areas. At many places the strata cannot

LAND USE-1959

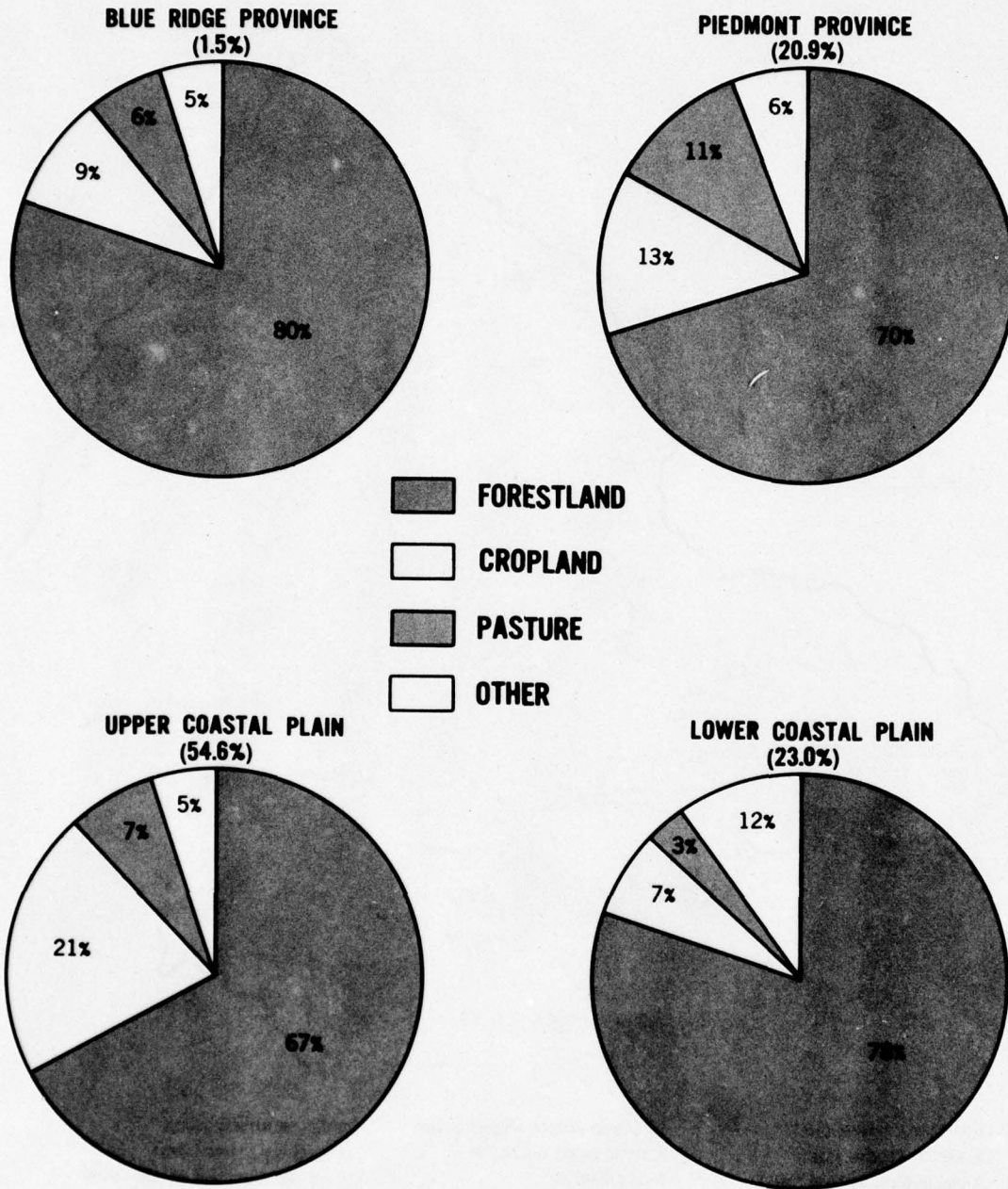


Figure 1.5

MAJOR PUBLIC LAND HOLDINGS

25,000 ACRES OR MORE
EXCLUSIVE OF RESERVOIRS - 1960



SCALE IN MILES
0 20 40 60

- | | | |
|---------------------------------|--------------------------------------|---|
| 1. NANTAHALA NATIONAL FOREST | 7. PIEDMONT NATIONAL WILDLIFE REFUGE | 13. CONECUH NATIONAL FOREST |
| 2. SUMTER NATIONAL FOREST | 8. ATOMIC ENERGY COMMISSION | 14. BLACKWATER STATE FOREST |
| 3. CHATTHOOCHEE NATIONAL FOREST | 9. FORT BENNING | 15. OKEFENOKEE NATIONAL WILDLIFE REFUGE |
| 4. CLARK HILL RESERVOIR | 10. FORT STEWART | 16. EGLIN AIR FORCE BASE |
| 5. FORT GORDON | 11. FORT RUCKER | 17. APALACHICOLA NATIONAL FOREST |
| 6. OCONEE NATIONAL FOREST | 12. WAYCROSS STATE FOREST | 18. OSCEOLA NATIONAL FOREST |
| | | 19. ST. MARKS NATIONAL WILDLIFE REFUGE |

Figure 1.6



Figure 1.7 *The Southeast River Basins Area Has Ample Water.*



Figure 1.8 *Water Resources Must Be Wisely Developed to Satisfy Most Needs.*

absorb the water as fast as it is supplied, and marshes and swamps are formed. The Coastal Plain aquifers supply some of the world's largest flowing springs, and the yield of many individual wells would supply the normal demands of a city of 10,000 people.

Surface water in the study area is generally of high quality with hardness usually less than 50 parts per million, ranging from less than 10 over large areas to more than 100 parts per million in the Coastal Plain. Over much of the United States, 300 parts per million is common, and 1,000 or more parts per million occurs in many parts of the West. Ground water tends to be harder than surface water because of longer contact with soluble minerals. Ground water hardness averages about 50 parts per million above the Fall Line and about 150 parts per million below the Fall Line. Ground water hardness is locally a problem in the southeastern part of the study area.

Much of the Coastal Plain surface water has a dark, organic coloration. Sediment loads in streams are relatively light, particularly in the flat portions of the Coastal Plain.

In an average year, total surface water runoff is about 70 million acre-feet, about twice that of the driest year. The total withdrawal of fresh surface water in 1960 was less than 3 million acre-feet. The 1960 ground water withdrawal of nearly 1 million acre-feet is estimated to be about 1/25,000 of the stored ground water and equals about 2 percent of the maximum yield which could be sustained indefinitely. Most of the well water is discharged to surface streams after use. However, in spite of the general availability of water, local conditions frequently make necessary the storage and regulation of surface flows and coordinated development of water resources.

TABLE 1.2
Water Withdrawals—1960
(thousands of acre-feet)

Systems	Ground	Surface	Total
Rural	150	100	250
Municipal	140	250	390
Industrial	570	*2,990	3,560
Total	860	3,340	4,200

* Includes saline water.

WATER RESOURCES

1960

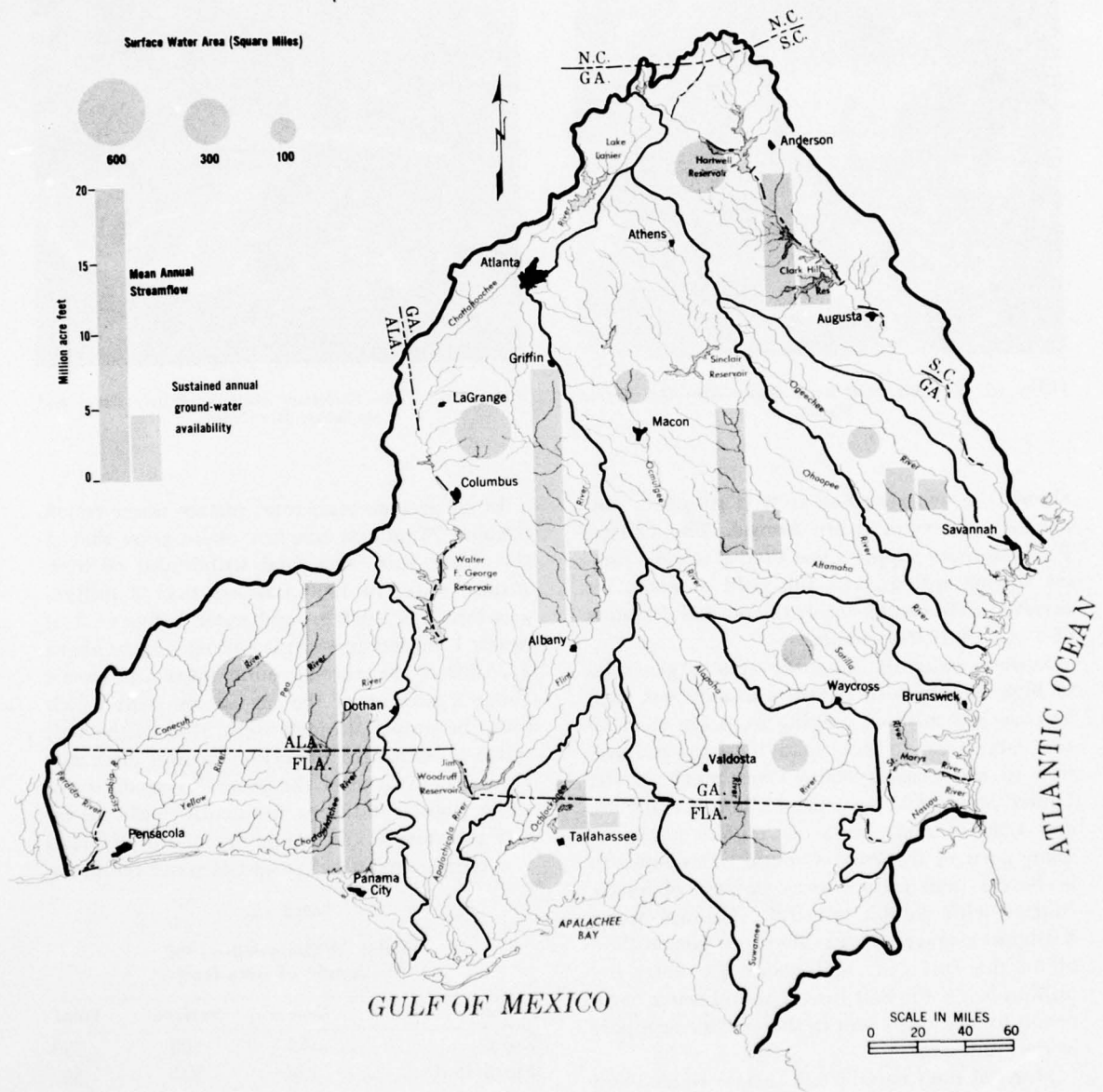


Figure 1.9

Eight percent of the water withdrawal is evaporated, transpired, or incorporated in a product. The remaining 92 percent is available for reuse. Public utilities withdrew 2.6 million acre-feet for cooling in 1960. The total annual consumption of fresh water is about one-third of a million acre-feet which is roughly one-half of 1 percent of the average annual streamflow. This indicates the tremendous quantity of water available in the study area as a whole.

Surface waters in streams, in natural and man-made lakes, and in landlocked bays occupy some 2,100 square miles of the study area. This vast water resource is available for water supplies, recreation, fish and wildlife, navigation, pollution dilution and natural purification, irrigation,

and hydroelectric power. Commercial navigation extends to Augusta and Columbus at the Fall Line and to lesser distances inland at other places. The Intracoastal Waterway parallels much of the coastline; and Pensacola, Panama City, Port St. Joe, and Fernandina Beach, Florida; and Brunswick and Savannah, Georgia, are deep-water ports.

Water is very important to outdoor recreation activities in the Southeast River Basins. The study area offers spectacular waterfalls, swift mountain streams, unusual swamps, wide and placid coastal plain rivers, tree-bordered lakes, and white, sandy ocean and gulf beaches. Many of these water playgrounds await improved access and development.

SECTION III — PEOPLE

The Indians who occupied the Southeast River Basins area when Europeans first arrived belonged to the Cherokee and Creek tribes. The Cherokees lived in the mountain areas, and the Creeks occupied the Coastal Plain of Alabama, Georgia, and northern Florida.

The success of Spanish explorations elsewhere in the New World spurred interest in southeastern North America. By the late 1500's, numerous Spanish forts and missions had been established along the Georgia coast and across northern Florida. In 1732, the English were successful in establishing a colony on the Savannah River. By that time, Indian rebellions had forced Spain to abandon its missions on the Georgia coast.

At the outbreak of the Revolutionary War, many Tories sought refuge in Florida and caused considerable unrest among the local Creek tribes. After the war, the surge of settlers against the southern Indian frontier started a long struggle for the Indian lands. General Andrew Jackson broke the power of the Indians at the battle of Horseshoe Bend, just west of the study area in Alabama; and by 1838, most of them had been removed to Oklahoma.

Great population influxes followed each cession of territory by the Indians. Settlement of the Southeast was rapid, and thousands of farms were developed on the better farmlands. Most of the settlers came from eastern Georgia, the Carolinas, Tennessee, Kentucky, and Virginia.

Negro slaves were imported to work the larger farms and plantations. Coastal communities shipped large amounts of cotton, rice, tobacco, lumber, and naval stores. As the interior was settled, trails and roads were built. The 1840's saw expansion of the railroads. By the outbreak of the Civil War, cash cropping, mostly of cotton, had spread throughout much of the Southeast.

In the post-Civil War period, farmers resumed growing cotton and, consequently, suffered or prospered as the cotton crop and the cotton market fluctuated. Since that time, technical advances have changed the character of farming in the Southeast. These changes have been most rapid during the last 30 years and have brought about a more diversified, commercial agriculture. As a result of greatly improved management and methods, including mechanization, agriculture requires fewer people to produce increasing quantities of agricultural products.

Recent Population Development

In 1930, the population of the Southeast River Basins area was 3,687,000. By 1960, it had increased to 4,948,000 or about 34 percent. The average increase for the Nation during this same period was about 46 percent. The slower rate of increase in the area, despite a high birth rate and gains in urban areas, has been due to heavy migrational losses.

With changing farming patterns, exemplified by trends toward consolidation and mechanization, and the accumulation of large areas in timber holdings, many rural residents of the Southeast are leaving the land and moving to the cities, some to other parts of the United States. These factors, plus increasing urban opportunities, point to a decreased but continuing migration from farms.

By the year 2000, the Southeast River Basins area is expected to gain population at a rate only slightly lower than that for the Nation. Total gains will be primarily attributable to increased urban industrial opportunities. Analysis of migration indicates that the trend may reverse and produce a net migration gain around 1980. This change will require a high level of economic activity in the Southeast River Basins area and the Nation. The 1960 area population of about 5 million people is projected to increase to more than 10 million by the year 2000.

Population Characteristics

The population characteristics of the Southeast River Basins area differ from those of the rest of the Nation in several respects. The most

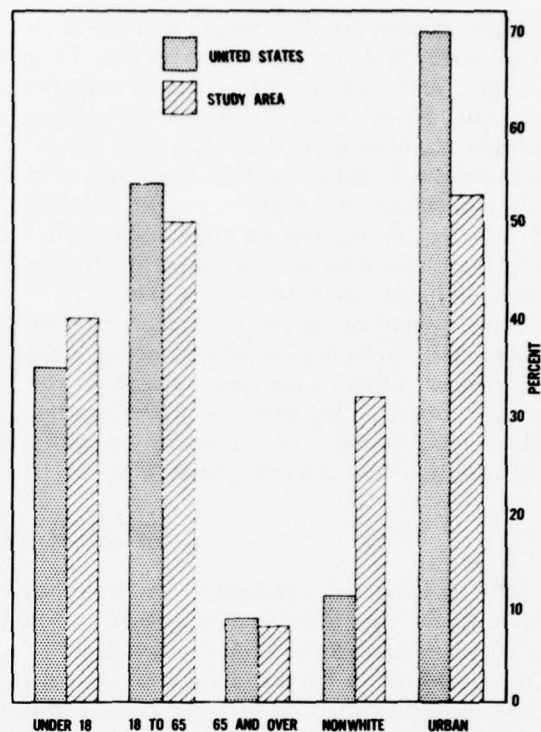


Figure 1.10 Characteristics of the Study Area Population in 1960 Differ Noticeably from Those of the Nation.



Figure 1.11 Planning Is for People — Recreation Area at Lake Sinclair.



Figure 1.12 *The Atlanta Five-County Metropolitan Area, the Most Populous in the Southeast, Affects the Economy of Most of the Southeast River Basins Area.*

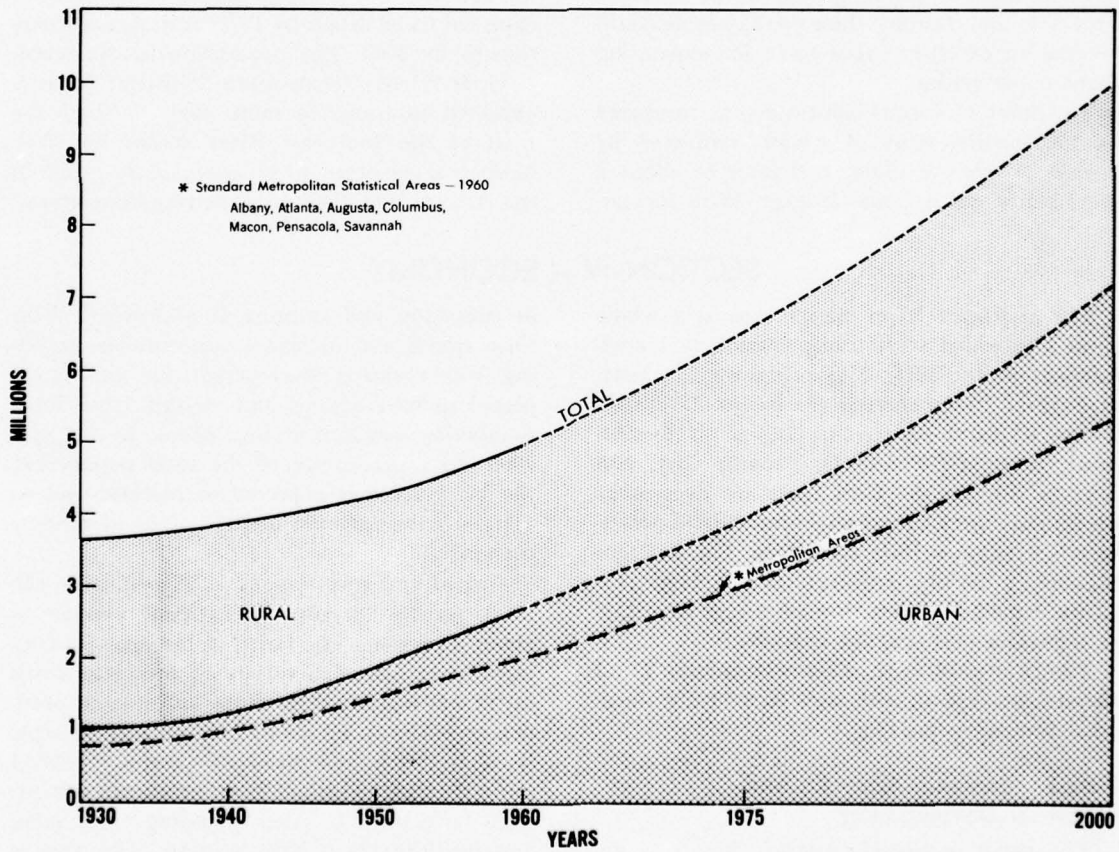


Figure 1.13 *Population Trends and Projections Indicate Strong Urban and Metropolitan Area Growth.*

evident of these characteristics are the comparatively high percentages of rural and of nonwhite residents in the area.

In 1930, almost three-fourths of the residents were rural. Only in recent years has the urban population exceeded the rural. In contrast, the national population was well over one-half urban in 1930 and was 70 percent urban in 1960.

One-third of the Southeast River Basins population is nonwhite, whereas only one-tenth of the national population is nonwhite. Most of the nonwhites are native-born Negroes. The proportion of nonwhites is declining slowly, but is expected to remain high.

As a result of many years of high birth rates and heavy out-migration of adults, the population of the area has a low median age, 25.2 years. The United States average is 29.5. The working-age group is comparatively small and must support and educate a proportionately large number of young people. With sufficient education and training, these young people could become an excellent labor force for expanding economic activities.

The level of formal education, as measured by the median years of school completed by people 25 years or older, is 9 years or about 2 years below the national average. With increas-

ing emphasis on education, the average level in the area is rising.

Population Growth

The population of the Southeast River Basins area was projected to year 2000 as a basic guideline for resource utilization and development. The area population projections reflect projections of the national population and an analysis of past trends and future economic potentials. Relatively high birth rates are expected to continue but will slow and approach the national average with continued urbanization and reduction of the rural farm population. The rural farm population is expected to continue to decrease; but, with growth in the rural nonfarm areas near urban centers, total rural population is expected to cease declining and begin to show small gains near the midpoint of the 40-year planning period.

Three-fifths of the population of the area is expected to be urban by 1975, and almost three-fourths by 2000. The population of the seven, 1960, Standard Metropolitan Statistical Areas is expected to comprise more than one-half the total of the Southeast River Basins by 2000. Growth is expected to be particularly rapid in the Atlanta and Pensacola metropolitan areas.

SECTION IV - ECONOMY

The Southeast River Basins area as a whole is well provided with transportation and communication facilities. Major highway, railway, and airline routes traverse the basins. Savannah, Brunswick, and Fernandina Beach on the Atlantic coast and Pensacola, Panama City, and Port St. Joe on the Gulf coast are deep-water ports; and there are coastal and inland waterways for shallow-draft commerce. Oil and gas pipelines cross the area. Sources of energy, particularly electric power through a vast interstate transmission network, are available.

The large cities serve as financial centers. Local investment capital, although historically somewhat limited, is growing.

Future Economic Growth And Industrial Development

The trend in many economic factors makes the outlook for the future favorable. The level

of education and training is improving. With these trends and increased opportunities resulting from resource development, the area is expected to have a large and capable labor force numbering almost 4 million people by the year 2000. As a percentage of the total population, the labor force is expected to increase and to approach the national average of 40 percent by the year 2000.

Agricultural employment, at 13 percent of the total, greatly exceeds the national average of about 8 percent. The farms of the area produce large quantities of a variety of products. Gross cash farm receipts from crops and related products in 1959 totaled about \$346 million; receipts from livestock and livestock products totaled more than \$413 million. Total gross cash receipts from farm product sales, including wood sales, amounted to about \$774 million. The area is a major producer of cotton, tobacco, and pea-

TABLE 1.3
Economic Factors of the Study Area

Item	1960	Percent	1975	Percent	2000	Percent
Population (thousands)	4,948	---	6,408	---	10,050	---
Labor force (thousands)	1,890	---	2,482	---	3,922	---
Employment (thousands)	1,753	100	2,343	100	3,789	100
Agriculture	227	13.0	170	7.3	130	3.4
Manufacturing	398	22.6	553	23.6	932	24.6
Trade, services, government, and other	1,128	64.4	1,620	69.1	2,727	72.0
Personal income (million dollars) ¹	7,828	100	14,110	100	39,420	100
Nonfarm wages and salaries	5,272	67.4	9,649	68.4	27,570	69.9
Farm proprietors and agricultural wages	378	4.8	587	4.2	918	2.3
Nonfarm proprietors	770	9.8	1,305	9.2	3,377	8.6
Other	1,565	18.0	2,566	18.2	7,558	19.2
Per capita personal income (dollars) ¹	1,582	---	2,202	---	3,922	---

NOTES: ¹ 1960 dollar equivalent.

² Net after \$157 million in social insurance payments.

nuts; of poultry, beef, pork, and dairy products; and of peaches and pecans.

About a billion cubic feet of wood with a stumpage value of about \$100 million were harvested in 1959. In addition, the leasing value of trees producing gum products was about \$5 million.

While agricultural and forestry production is already large, there is an excellent potential for a continued increase through progressive development and improved resource utilization. As projected, forest production will more than double by the year 2000 and, with improved technology and accelerated resource development, agricultural production will double. Livestock and poultry numbers will increase greatly. More pastureland will be needed. Annual production of about one billion more pounds each of beef, of pork, and of poultry is projected for 2000. These and other increased production expectations would be met with fewer farms, fewer farm workers, and with a smaller acreage of total agricultural land, including woodland. On the average, individual farms are expected to be about 40 percent larger and the present level of capital investment is expected to more than double.

The proportion of total employment in manufacturing is below the national average. Industry in the area is characterized by a high proportion of female employees, low wages, and low value added. However, manufacturing activity

has maintained a steady growth in the past two decades, with employment, payrolls, plant and equipment investment, and value added by manufacture all showing substantial increases.

Future prospects for manufacturing employment appear to be very good. A rapidly expanding population with increasing incomes in the South is providing an ever-increasing market for goods. The Southeast River Basins area is strategically located to serve as the manufacturing center for this expanding market. A plentiful supply of properly trained labor would prove an additional asset.

Manufacturing currently accounts for about 23 percent of the total employment. Although the textile industries have been dominant, they are declining in relative importance as other types of manufacturing industries increase. Of the nine major industry groups in 1960, all except textiles are expected to gain employment over the next 40 years.

In 1939, the textile industries accounted for approximately 46 percent of total manufacturing employment. By 1960, although these industries as a group were still the largest employer, employment had declined to 27 percent. By 2000, this group is expected to have less than 10 percent of employment and rank fourth as an employer. In 1960, 55 percent of textile employment was concentrated in 11 counties. Because of consolidation and automation, concentration will

EMPLOYMENT

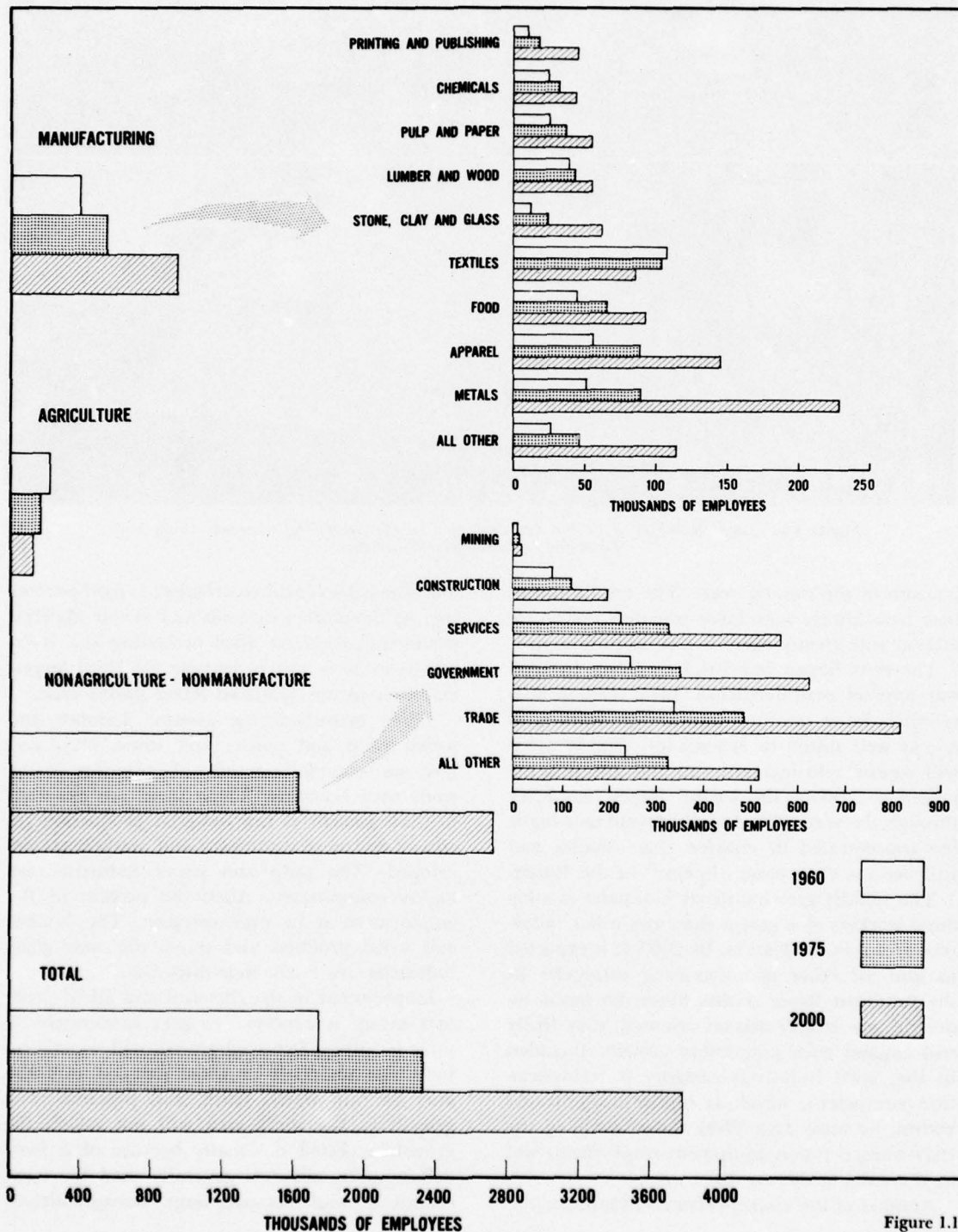


Figure 1.15

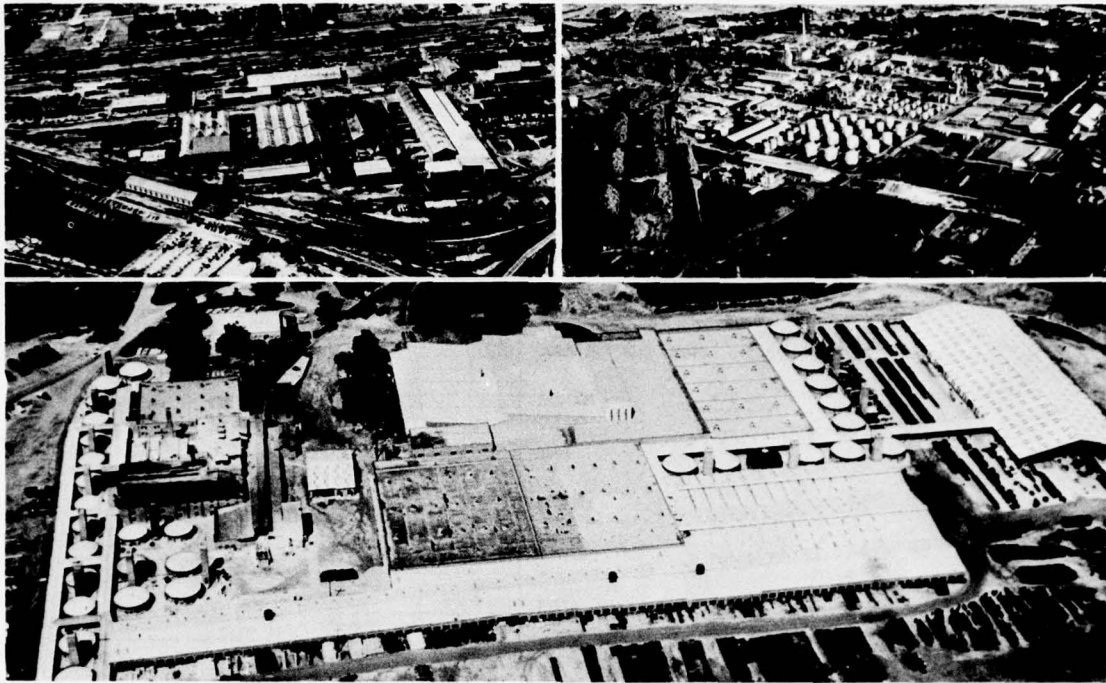


Figure 1.16 *Large Numbers of People Are Employed in Manufacturing Concerns Using Both Local and Imported Raw Materials.*

increase in the coming years. The textile industries have always been labor oriented, and automation will greatly affect future employment.

The next largest industrial employer in 1960 was apparel manufacturing. Like textiles, this group is labor oriented but, unlike textiles, is not as well suited to automation. Employment will continue to increase, and this group is expected to remain the second largest employer through the year 2000. Apparel manufacturing is less concentrated in location than textiles and will become even more dispersed in the future.

The rapidly growing metal industries employ more workers as a group than any other industrial group in the Nation. By 2000, it is expected to lead all other manufacturing categories in the Southeast River Basins. Since the metal industries are largely market oriented, they likely will expand with population growth. Included in the metal industries category is transportation equipment, which is highly concentrated within the study area. Over three-fourths of the 1958 transportation equipment employment was in the Atlanta metropolitan area.

Another of the market-oriented industries, and

one that is also resource oriented, is food processing. As the market expands and as raw material production increases, food processing also is expected to grow and to become the third largest employer in the Southeast River Basins area.

Three manufacturing groups: Lumber and wood; pulp and paper; and stone, clay, and glass are resource oriented and important to the study area economy. These three are expected to show growth as raw material production increases and as new products and markets are developed. The pulp and paper industries are highly concentrated. About 80 percent of the employment is in nine counties. The lumber and wood products and stone, clay, and glass industries are fairly well dispersed.

Employment in the chemical and allied products group is expected to gain moderately in some localities. Expected growth will depend on local raw materials or those shipped into the area by rail, water, truck, and pipeline. The growth in the study area will not match the growth expected nationally because of a local deficiency in minerals generally used for basic chemicals, and because large nonagricultural

markets for chemicals are lacking. The chemical industries are highly concentrated with 78 percent of the employment in six counties.

Printing and publishing are other market-oriented industries expected to show employment gains to the year 2000. These industries will exhibit more growth as the economy becomes more highly developed.

Besides depending on market expansion, industrial development in the Southeast River Basins to the year 2000 will be greatly influenced by development of higher education, vocational training, and research facilities. Industrial promotion groups and development boards will be called upon for greater effort to adapt to a changing economy and new techniques in industry.

About 64 percent of the total employment in 1960 was in activities other than agriculture and manufacturing. Although this is somewhat below the national average, such activities are increasing rapidly. Wholesale and retail trade more than doubled in the last two decades. Other major categories such as services, government, and construction are growing rapidly. Develop-

ment of the excellent land and water resources of the area for residential and leisure-time use will contribute substantially to increased economic activity in services, trades, and construction. These and other categories of nonagricultural and nonmanufacturing activity are expected to expand in line with expansion of the basic agricultural and manufacturing industries. By 2000, these activities are expected to have about 72 percent of total employment. This will more nearly parallel the distribution of national employment.

If the area is to attain the level of economic growth projected on the basis of reasonably conservative estimates of the physical and economic potentials, 2 million new job opportunities must be created by 2000. Over 500,000 of these additional jobs are expected to be in manufacturing.

As resource development and economic growth proceed in the manner reflected by the projections, total income in the area will rise and the level of per capita income will be improved substantially.

TABLE 1.4
Economic Factors — Study Area and Nation

Item	1960	1975	2000
United States			
Gross national product (billion dollars)*	500	888	2,300
Population (millions)	180	235	380
Per capita income (dollars)*	2,222	3,012	4,733
Southeast River Basins area			
Total personal income (million dollars)*	7,828	14,110	39,420
Population (thousands)	4,948	6,408	10,050
Per capita income (dollars)*	1,582	2,202	3,922

* 1960 dollar equivalent.

Economic Problems

The principal economic problem of the Southeast River Basins is one of low income in both the agricultural and nonagricultural sectors. This results in part from inadequate development capital, from limited opportunity and incentive to develop managerial talent, and from a labor force inadequately trained for employment in modern agriculture and industry.

Change, particularly in the last two decades, in the orientation of the economy from agricul-

ture to industry and other related nonagricultural pursuits and from rural to urban has been prevalent in the area. This change has resulted in an oversupply of manpower in an increasingly mechanized agriculture, particularly in the Coastal Plain, and an undersupply of manpower trained for industry.

Per capita incomes are considerably below the average level for the United States. Local savings and investment capital are not readily available for promoting development and growth. However, the availability of outside public and pri-



Figure 1.17 *Abandoned Houses Are Monuments to the Fact that the Small Farm and the Tenant Farmer Are Gradually Disappearing from the Rural Scene.*

vate investment capital is increasing in the area.

Many of the industries prominent outside metropolitan areas such as textiles, apparels, lumber, food processing, and stone are typically low-wage, slow-growth industries. This situation, the generally low farm incomes, and the lack of rural job opportunities are manifestations of the economic problems facing the area. Evidence of the changes taking place are most striking in the larger cities, notably Atlanta. While the problems of rapid change are mounting, civic initiative to solve these problems is likewise an increasingly strong force.

Local financing of resources development, while not impossible, creates a greater problem in this area than in many other sections of the country. Outside assistance may be necessary for the more costly developments.

Social and Institutional Factors

The change from an agricultural to a more industrial economy is introducing complex social and institutional problems. Many of these are deep rooted and resistant to change. Other changes, too, such as improved transportation facilities, may require modification of local practices and of public governing agencies. Consolidation of governing areas could, in many instances, result in greatly improved services for the taxpayers. However, determining which city or community should give up its county seat or district headquarter status is difficult because, among other things, administering services is often a substantial source of employment in these localities. Consolidation of schools has started, but here also, artificial governing district boundaries, loss of local jobs, and local rivalries cause

the transition to be slow and cumbersome.

The expanding cities are facing common problems. Their growth along main arteries of transportation creates obstacles to sound city planning and development and generally makes provision of services more costly. Planning is needed if haphazard development is to be avoided.

Industrial expansion will help build local economies. Too often, however, industries are granted concessions which, in the long run, prove harmful to both the community and the industry. Local initiative and control will be needed to insure that this type of problem does not arise and also to insure that water and air pollution, health, and other problems are recognized.

The Southeast River Basins area has, in general, passed through the tenancy stage. Most of the farmland is owner operated and is in small, scattered holdings. A shift away from a multitude of small, scattered holdings is underway, however, and the number of these holdings is expected to decrease rapidly in the next several decades. Industrial and estate holdings are substantial and are increasing as the agricultural situation changes. These changes, while often beneficial in the end, can cause temporary or long-range local disruptions of such services as schooling and road maintenance and building and can cause difficulties for special improvement districts such as those for drainage and flood control.

Lack of public access to streams and lakes and lack of public hunting areas are problems in the study area. These problems are being solved in part through landowner permissiveness and through acquisition of lands for public use, but the problem remains as one deserving greater attention.

Devices and procedures enabling area organizations to plan and act more efficiently in the changing economic environment are technically and legally available within the Southeast River Basins from branches of State and Federal Governments and from private firms. These include consolidations of public service functions, rural and urban zoning, area redevelopment, and other area planning and programs which cross municipal and county lines when necessary. Coordinated local efforts along these lines appear to hold the most promise among recognized possibilities for betterment.

PART TWO – NEEDS AND OPPORTUNITIES

The human needs to be satisfied by land and water resources conservation and development furnish both the reason for planning and the scale of the ultimate plan. Substantial resource conservation and development have already been accomplished in the Southeast River Basins. Some unsatisfied needs exist, and some will develop as the area population increases. Determination of the status of existing developments and programs and projection of data to simulate future conditions are essential. In general, the needs, expressed as quantities, for resource conservation and development have been determined by applying unit per capita or unit per-acre resources requirements to projected population or acreage.

State and Federal agencies administer land and water resources conservation and development programs in the area. Other public and private interests participate and cooperate in many of the same activities and, in addition, carry out numerous separate land and water resources pro-

grams and project developments.

Existing developments are parts of the overall comprehensive plan; some have reserve capacity or can be developed further to meet needs. Except where otherwise noted, projects and program facilities in place or under construction in 1960—as given in text and illustrations—are taken as existing. The location of these resources and the undeveloped resources controls where and how needs are to be met. Only a general assessment of these opportunities for conservation and development is included in this Report. More detailed treatment by individual basins is included in Appendixes 1 through 8 to this Report.

Needs and opportunities are presented in 12 sections corresponding to the 12 purposes listed in the authorizing legislation. The text on each purpose treats that purpose only and neither includes discussion of interrelationships with other purposes nor describes specific projects and programs. Interrelationships and projects and programs are discussed later in the Report.

SECTION I – FLOOD CONTROL AND PREVENTION

Existing Facilities and Programs

The Corps of Engineers has constructed, for flood control, two multiple-purpose reservoirs and a local protection facility in the Savannah basin, a local protection project in the Altamaha basin, a snagging and clearing operation on the Nassau River in the Satilla-St. Marys basins, and a multiple-purpose reservoir and three local protection works in the Apalachicola-Chattahoochee-Flint basins. Existing facilities are maintained either by the Corps of Engineers or by local interests.

Two local protection works in the Choctawhatchee-Perdido basins were built by the Works Progress Administration.

As of January 1, 1960, 13 upstream watersheds had been approved for installation of works of improvement. These projects, for which technical assistance was furnished by the Soil Conservation Service, include flood damage prevention as a primary purpose. Appropriate State agencies

helped select and plan these watersheds, and the Governors approved the final plan for each.

Flood plain management by regulation of use



Figure 2.1 Suwannee River Flooding Farmland, Buildings, and Highways near Ellaville, Florida, in 1948.

FLOOD CONTROL 1960

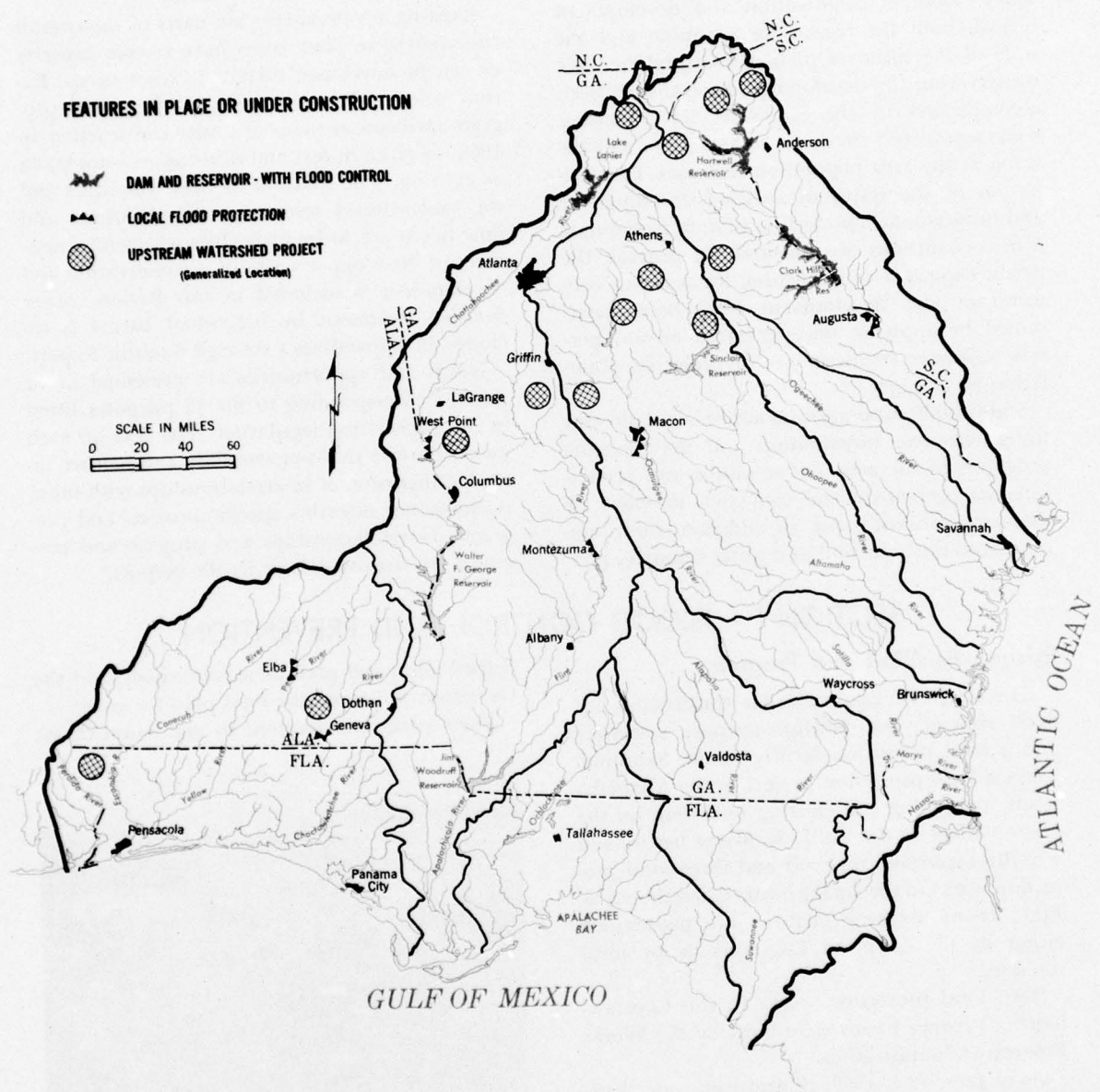


Figure 2.2

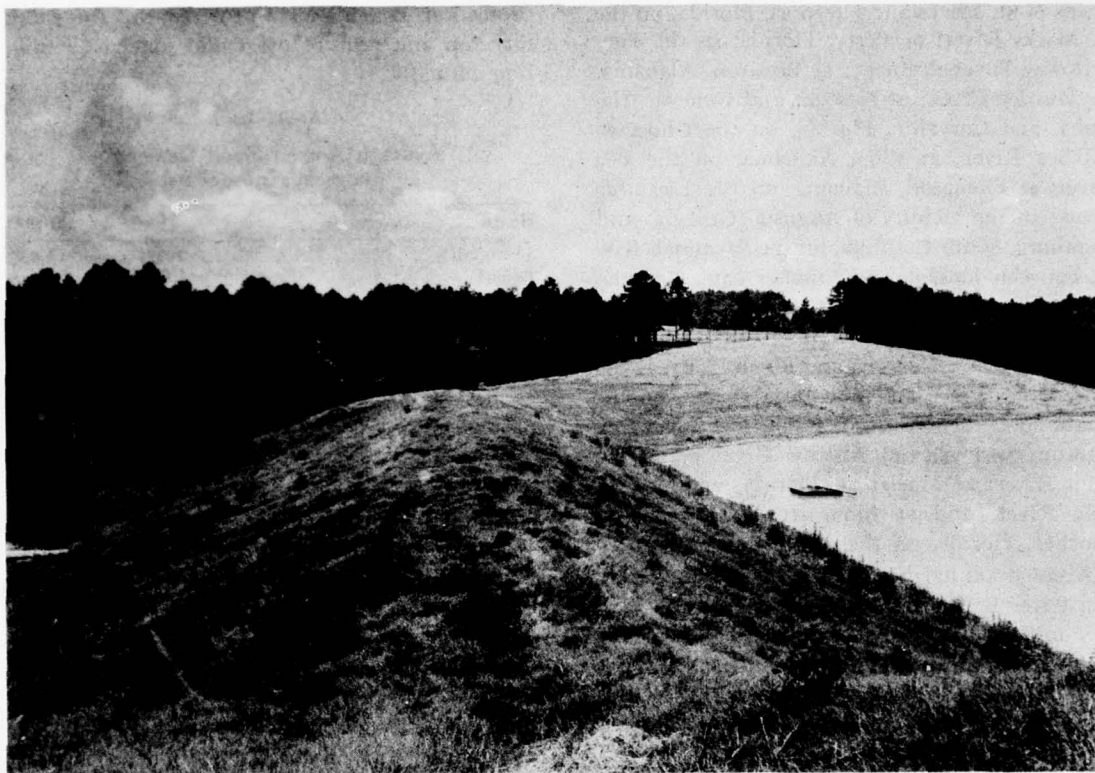


Figure 2.3 *Upstream Watershed Flood Losses Are Reduced by Dams and Reservoirs.*

through zoning or other measures normally is not being practiced in the Southeast River Basins area, nor is there existing legislation which has flood plain management as its only purpose. However, all States in the area have enabling legislation for planning and zoning in cities and some counties. All except Florida have legislation for subdivision control.

Communities can obtain flood plain information studies and reports from the Corps of Engineers as authorized by Section 206, Public Law 86-645, approved July 14, 1960. Such reports are essential in developing sound flood plain management. Each State has a coordinating agency, designated by its Governor, to which requests should be made.

The U. S. Geological Survey, Water Resource Division, also supplies local communities with flood plain information and cooperates with each State through one or more of the State agencies.

The U. S. Weather Bureau, as part of its regular river forecasting, makes flood forecasts for

most of the larger streams in the Southeast River Basins.

Needs and Opportunities

Flood problems in the study area are now severe in some places and deserve careful consideration. The most serious problems are in upstream areas of the Piedmont and Blue Ridge provinces where considerable damage occurs to agricultural crops and fixed improvements. In addition, much land that was once cultivated is not now used for crop production because of flood hazards. These lands now mainly in woodland could again be used for crop and pasture production when the need arises, if they are cleared and given reasonable flood protection.

Several areas along the main streams also have flood problems of sufficient magnitude to warrant attention. Expected development in areas along the lower reaches of the Suwannee and Ochlockonee Rivers could result in greatly increased damages. Flood problems exist at the

towns of St. Marks and Newport, Florida, on the St. Marks River; at Perry, Florida, in the Fenholloway River drainage; at Brewton, Alabama, on Murder Creek; at Newton and Geneva, Alabama, and Caryville, Florida, on the Choctawhatchee River; at Elba, Alabama, on the Pea River; at Flomaton, Alabama, on Big Escambia Creek; in the vicinity of Augusta, Georgia, and Hamburg, South Carolina, on the Savannah River; between Jackson and Lumber City, Georgia, on the Ocmulgee River, at Callahan, Florida, on Mills Creek in the Nassau basin; at Columbus and West Point, Georgia, and Phenix City, Langdale, River View, and Lanett, Alabama, on the Chattahoochee River; at Bainbridge, Newton, Radium Springs, and Albany, Georgia, on the Flint River; at Marianna, Florida, on the Chipola River; and at Blountstown and Chattahoochee, Florida, on the Apalachicola River.

Average annual flood damages for the Southeast River Basins are estimated to be more than \$7.7 million under 1960 conditions of development. Expected increased industrial, urban, and residential use of the flood plains will raise this to more than \$10.5 million by the year 2000 if additional flood control or prevention is not provided. Flood plain land in upstream watersheds could be used more intensively if given flood

protection. Benefits from protection of this land for crop and pasture use could exceed \$5 million annually.

TABLE 2.1
Average Annual Flood Damages
(thousands of dollars)

Basin	1960	2000*
Savannah	1,820	1,830
Ogeechee	250	250
Altamaha	1,260	1,270
Satilla-St. Marys	30	40
Suwannee	100	230
Ochlockonee	100	190
Apalachicola-Chattahoochee-Flint	3,490	5,220
Choctawhatchee-Perdido	690	1,540
Total	7,740	10,570

* Under expected future conditions with no additional flood prevention or protection.

Measures such as dams, levees, channel work, flood plain zoning, flood forecasting, and strict building codes are important in planning for flood damage prevention. Of the structural measures, levees appear to offer the best possibilities for protection in downstream areas where a high loss potential occurs in a small area. In upstream areas where damages are not generally concentrated, small floodwater detention structures appear to be the most likely measures.

SECTION II – WATER SUPPLIES

Existing Facilities and Programs

State agencies establish overall water quality standards and supply regulations, but municipal and local agencies and individuals who plan, finance, construct, maintain, and operate water systems are primarily responsible for meeting their own water supply needs.

Technical assistance relating to water quality and supply is available from the Public Health Service, State agencies, and other public and private sources. Assistance for group development of rural water supplies is available from Farmers Home Administration. Assistance is also available to municipalities from the Housing and Home Finance Agency.

A 1960 inventory of rural domestic water supplies indicated that an estimated 1.5 million people used an average of 76 million gallons of water a day for domestic purposes. This water was obtained from 330,000 individual wells and



Figure 2.4 Substandard Resource Developments Such as This Well Still Exist in Some Rural Areas.

other sources. Irrigation on cropland and pastureland and stock water use amounted to about 170,000 acre-feet in the same year.

An average total use of 441 million gallons of water a day was indicated by an inventory of 600 water systems providing water to 3.45 million persons in communities, Federal installations, and governmental institutions. Approximately 20 percent of the water supplied by municipal systems was used by industry or Federal installations.

A survey indicated that 321 large industrial plants operate private water systems which supply 817 million gallons of water a day for industrial use, including some cooling water.

Municipal and industrial uses are primarily nonconsumptive, and it is estimated that about 96 percent of the water was returned to water-courses after use.

Needs and Opportunities

The Southeast River Basins area has abundant

fresh-water resources. Although there will be increasing competition for water, the quantity of water will be of secondary importance as compared to the quality. Even though the overall supply is plentiful, some localities will still need additional water.

Many wells serving individual dwellings or a small group of homes are not properly covered, sealed, or equipped with satisfactory pumps and pressure systems but could be improved to meet acceptable standards. Some sources fail to supply adequate water during dry periods. Water from a small number of supplies has objectionable amounts of sulfur, iron, and hardness.

Rural per capita water demand for domestic purposes is expected to increase from an estimated 50 gallons per person in 1960 to 100 gallons per person by the year 2000. The estimated 924,000 persons to be served in 2000 by individual domestic water supplies will require approximately 92.4 million gallons of water per day. Successful development of ground water is sometimes very costly in areas with limited

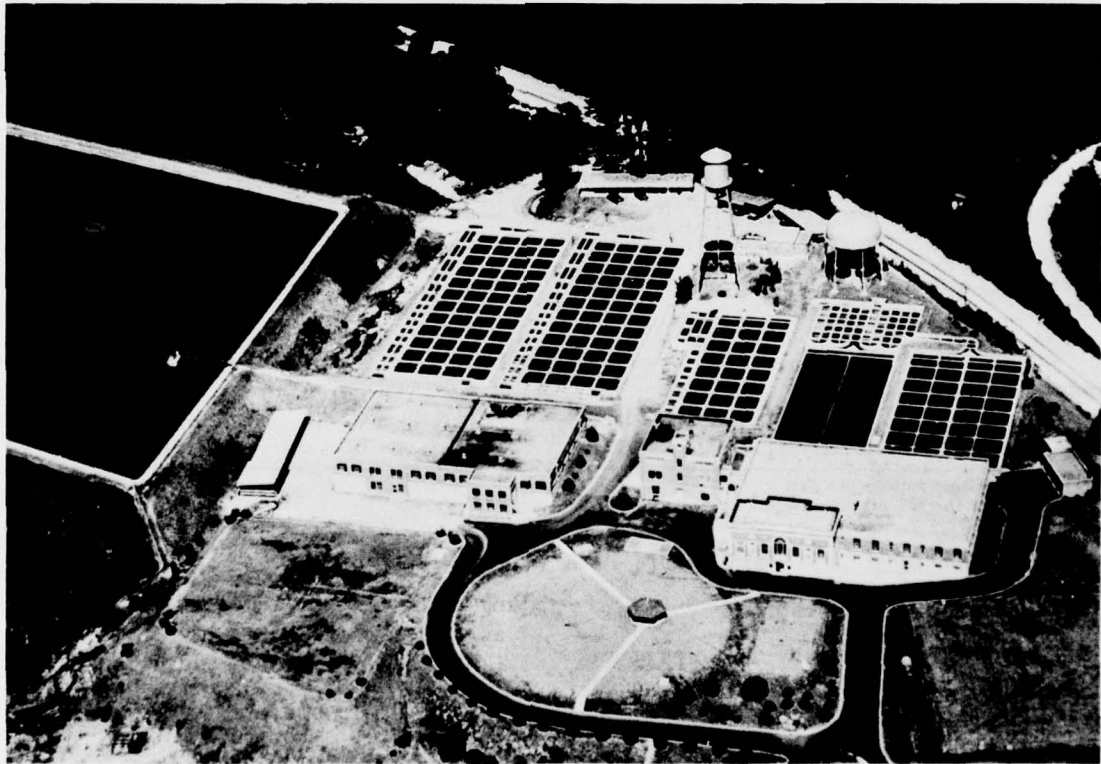


Figure 2.5 Modern Filtration Plants Help to Satisfy Needs for High Quality Water.

ground water sources, and community supplies could advantageously replace individual wells.

By 2000, it is estimated that about 9.1 million persons will obtain water from municipal systems; and daily water requirements, including approximately 20 percent for industrial and commercial purposes, will be 1.83 billion gallons. The use and reuse of surface water for municipal and industrial purposes will become increasingly important.

It is estimated that 1.85 billion gallons of water per day will be taken from private industrial systems by the year 2000. This does not include an additional 3 billion gallons per day

which will be used for cooling water at steamplants nor does it include water for hydroelectric powerplants.

Maintenance of satisfactory water quality in the Southeast River Basins required a minimum flow of 15 billion gallons per day in 1960 and will require 23 billion gallons per day by 2000. In establishing dilution flow requirements, it was assumed that all waste would be treated to effect a substantial reduction in the biochemical oxygen demand prior to its discharge to receiving streams. Dilution is not considered as a substitute for primary and secondary treatment in long-range planning.

TABLE 2.2
Rural, Municipal, and Industrial Water Requirements

	<u>Number of supplies</u>	<u>Population served</u>	<u>Water use</u>
Rural			
Domestic			
1960	334,000	1,521,000	76 m.g.d. ¹
2000	206,000	924,000	92 m.g.d.
Other			
Stock watering			
1960	---	---	63 m.g.d.
2000	---	---	135 m.g.d.
Irrigation			
1960	---	---	98,100 acre-ft./yr.
2000	---	---	307,000 acre-ft./yr.
	<u>Number of systems</u>		
Municipal			
1960	606	3,427,000	348 m.g.d.
2000	606	9,129,000	1,826 m.g.d.
	<u>Number of employees</u>		
Industrial			
1960	² 94,000	---	858 m.g.d.
2000	932,000	---	1,850 m.g.d.

NOTES: ¹ Million gallons per day.
² For the 321 plants surveyed.

SECTION III - NAVIGATION

Existing Facilities and Programs

Federal agencies, principally the Corps of Engineers, plan, construct, and maintain most navigation channels and navigation aids including those serving shallow-draft and deep-draft harbors. State and municipal port authorities, ship-

ping companies, and industrial establishments plan, finance, construct, and maintain most port facilities for cargo handling and storage.

Extensive development of inland streams for modern commerce has taken place on the Savannah River and on the Apalachicola-Chattoohchee-Flint River system. Improvements provide

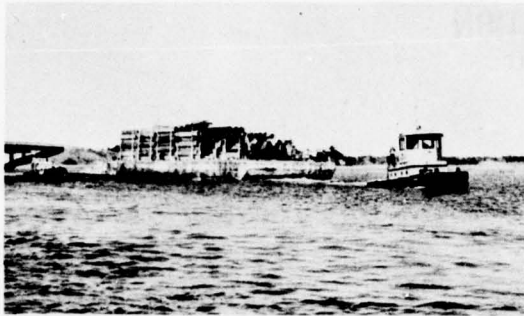


Figure 2.7 *Traffic on Intracoastal Waterways Is Increasing.*

a 9-foot channel depth to Augusta, Georgia, on the Savannah River; to Columbus, Georgia, and Phenix City, Alabama, on the Chattahoochee River; and to Bainbridge, Georgia, on the Flint River.

The Atlantic Intracoastal Waterway, which extends from Norfolk, Virginia, to the St. Johns River in Florida, has been completed to the authorized 12-foot depth in the study area; but

shoaling in some reaches reduces this depth between periods of maintenance dredging. Minimum channel width is 150 feet in open waters and 90 feet in restricted channels and cuts.

The Gulf Intracoastal Waterway has a 12-foot depth and 125-foot minimum width from Carrabelle, Florida, westward across the study area boundary to Brownsville, Texas. Numerous spur channels connect the Gulf Intracoastal Waterway with shallow-draft harbors along its route. An extension from Carrabelle eastward to Apalachee Bay has been authorized by Congress, but no funds have been made available for construction. East of Apalachee Bay and southward to the Anclote River, which is outside the study area, some 40 miles north of Tampa Bay, no improvement for through traffic has been made or authorized. Intracoastal traffic on this reach uses the open Gulf of Mexico.

The estimated waterborne transportation volume for inland waterways and the Intracoastal Waterway totaled 549 million ton miles in 1960.



Figure 2.8 *New Georgia Ports Authority Facilities at Savannah, the Busiest Port in the Study Area — Over 4 Million Tons in 1960.*

Principal commodities moved were petroleum and petroleum products, logs and other wood products, and chemicals and fertilizers.

Six harbors are deep-draft commercial ports: Savannah and Brunswick, Georgia, and Fernandina Beach, Florida, on the Atlantic Ocean and Port St. Joe, Panama City, and Pensacola, Florida, on the Gulf of Mexico. All have entrance channels from the sea at least 32 feet deep and inner channels at least 27 feet deep. Kings Bay Terminal, a privately operated port under lease from the U. S. Army Transportation Corps, also accommodates deep-draft vessels.

Shallow-draft harbors exist on both coasts and on the Savannah, Chattahoochee, and Flint Rivers. Of the coastal shallow-draft harbors, only four handle cargo in excess of 90,000 tons annually. These are St. Marys on the Atlantic Ocean, and St. Marks, La Grange Bayou, and the Escambia River estuary on the Gulf of Mexico. Numerous small piers, wharves, and landings along the coasts and inland lakes are used by fishing and recreational craft.

Public terminal wharves and storage space have been built at Savannah, Augusta, Brunswick, and Bainbridge by the Georgia Ports Authority and at Brunswick by the Brunswick Port Authority. Public terminals recently have been completed or are nearing completion at Columbus, Georgia, at Columbia, Alabama, and at Phenix City, Alabama.

Needs and Opportunities

Improvement for commercial navigation is

physically feasible for various distances inland on most of the large streams, but present commerce suitable for river transport is generally not sufficient to make this economical. Intracoastal and inland waterway traffic is expected to increase 6.6 billion ton miles, and deep-draft ports are expected to handle about three times the 1960 cargo by 2000 if facilities are provided.

TABLE 2.3
1960 and Projected Waterborne
Traffic Movements
(thousands)

Unit	Intracoastal and inland waterways	Deep-draft ports	Total
1960			
Ton	6,307	*8,743	15,050
Ton mile	548,630	—	548,630
1975			
Ton	22,780	14,150	36,930
Ton mile	2,400,000	—	2,400,000
2000			
Ton	50,770	25,280	76,050
Ton mile	7,141,000	—	7,141,000

* In addition, 62,000 tons were handled at Kings Bay Terminal in 1960.

Projected waterborne traffic movements can be accommodated through a variety of means, such as: Enlargement and extension of existing waterways, construction of new waterways, expansion and improvement of port and terminal facilities, and improvement of vessels and navigation aids.

SECTION IV – RECLAMATION, IRRIGATION, AND DRAINAGE

Existing Facilities and Programs

Many Federal and State agencies provide direct or indirect assistance to landowners for reclamation activities. Of these activities, this study includes drainage and irrigation. State agricultural agencies and the U. S. Department of Agriculture provide or undertake most of the technical assistance, loans, cost sharing, education, and research programs in these activities. The Department of the Army has constructed drainage projects.

In 1960, 110,000 acres were irrigated, mostly by individual farmers or small groups of landowners using about 98,100 acre-feet of water. Approxi-

mately 34,000 acres of tobacco and 21,000 acres of vegetables were irrigated, as were lesser acreages of pasture, corn and other field crops, orchards, grass, and hay. Ponds, wells, and streams provided 66 percent, 19 percent, and 15 percent, respectively, of the irrigation water. Irrigation, mainly by sprinkler systems, was used on about 6,450 out of approximately 140,000 farms.

About 126,000 acres of cropland, 115,000 acres of pastureland, 208,000 acres of woodland, and over 29,000 acres of land in other uses had been adequately drained by 1960. Most of the drainage for these 478,000 acres was installed by individual farm operators.



Figure 2.9 *Farmland Drainage by Ditching Is a Widely Employed Improvement in the Coastal Plain of the Southeast.*

Needs and Opportunities

Considering physical properties only, about 30 million acres including 12.7 million acres of land now used for crop and pasture production have a potential for irrigation. Generally, ample water is available for irrigation. Individual operators are expected to install irrigation facilities to improve their competitive position through in-

creased yields, greater efficiency, and improved product uniformity.

Possibilities exist for development of nearly 1.3 million acres of irrigation in potential upstream watershed projects. However, project-type or group action solely for irrigation will not be required to meet production needs to year 2000.

Additional studies may be required to identify areas where local streams and wells cannot provide adequate irrigation water. Some water for irrigation could be provided in multiple-purpose impoundments.

There are now 16.6 million acres of land having problems related to excess water. Included are 1.3 million acres in crop and pasture. Opportunity exists for draining additional large acreages through individual and small group action. Other acreage is expected to be drained through joint-purpose flood prevention and drainage facilities installed in tributary watersheds. Channels provided in these upstream watershed projects, by furnishing outlets, will facilitate some of the individual drainage. Although tile drains will be used more extensively in the future than in the past, open channels can provide most of the drainage required. In the Lower Coastal Plain, drainage by pumping is a possibility where gravity outlets are not available.



Figure 2.10 *Most Irrigation in the Southeast Is by Sprinkler Irrigation Systems.*

SECTION V – HYDROELECTRIC POWER AND INDUSTRIAL DEVELOPMENT

Existing Facilities and Programs

Hydroelectric and thermal-electric power is produced at plants in the study area which were built by both private and public entities. Federal and State agencies have various regulatory functions concerning development and operation of hydroelectric projects. These regulatory functions are assigned by statute.

The large interconnected power regions of the United States are subdivided into power supply areas embracing interconnected and coordinated electric facilities. The Southeast River Basins are part of four power supply areas. The study area has a network of transmission facilities which interconnect the sources of supply within and adjacent to the area. These transmission facilities are largely privately owned, however, there are some non-Federal publicly owned facilities within the study area.

Privately owned power companies serve all classes of customers in rural areas as well as those in most urban and suburban areas not served by

municipally owned systems. Privately owned companies also serve most industries within the service areas of municipally owned systems. Municipal systems generally are within city limits and usually extend into nearby suburban areas. The electric membership cooperatives serve customers in nearly all rural sections and in many suburban areas.

The per capita use of electricity in the Southeast River Basins area in 1959 amounted to about 3,000 kilowatt-hours which was below the average for the Southeastern region, which, in turn, was below the national average.

Energy requirements in the Southeast River Basins in 1959 totaled about 15 billion kilowatt-hours with a demand of about 2.9 million kilowatts. Hydroelectric plants generated about 3 billion kilowatt-hours that year and had a peak capacity of nearly 900,000 kilowatts. The area is connected to generating sources in adjacent areas through transmission lines ranging from 34,000 to 230,000 volts.

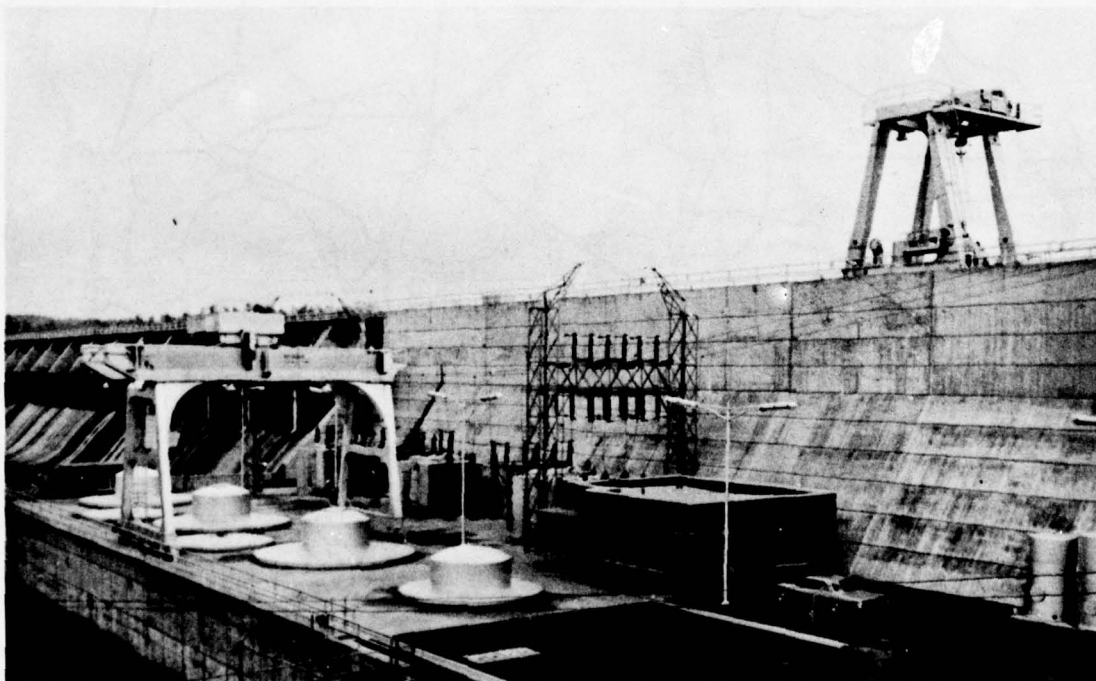


Figure 2.11 Oliver Dam and Hydroelectric Plant Is One of Eight Private Installations Utilizing About 350 Feet of Head on the Chattahoochee River Between Columbus and West Point, Georgia.

PRINCIPAL ELECTRIC FACILITIES

1961

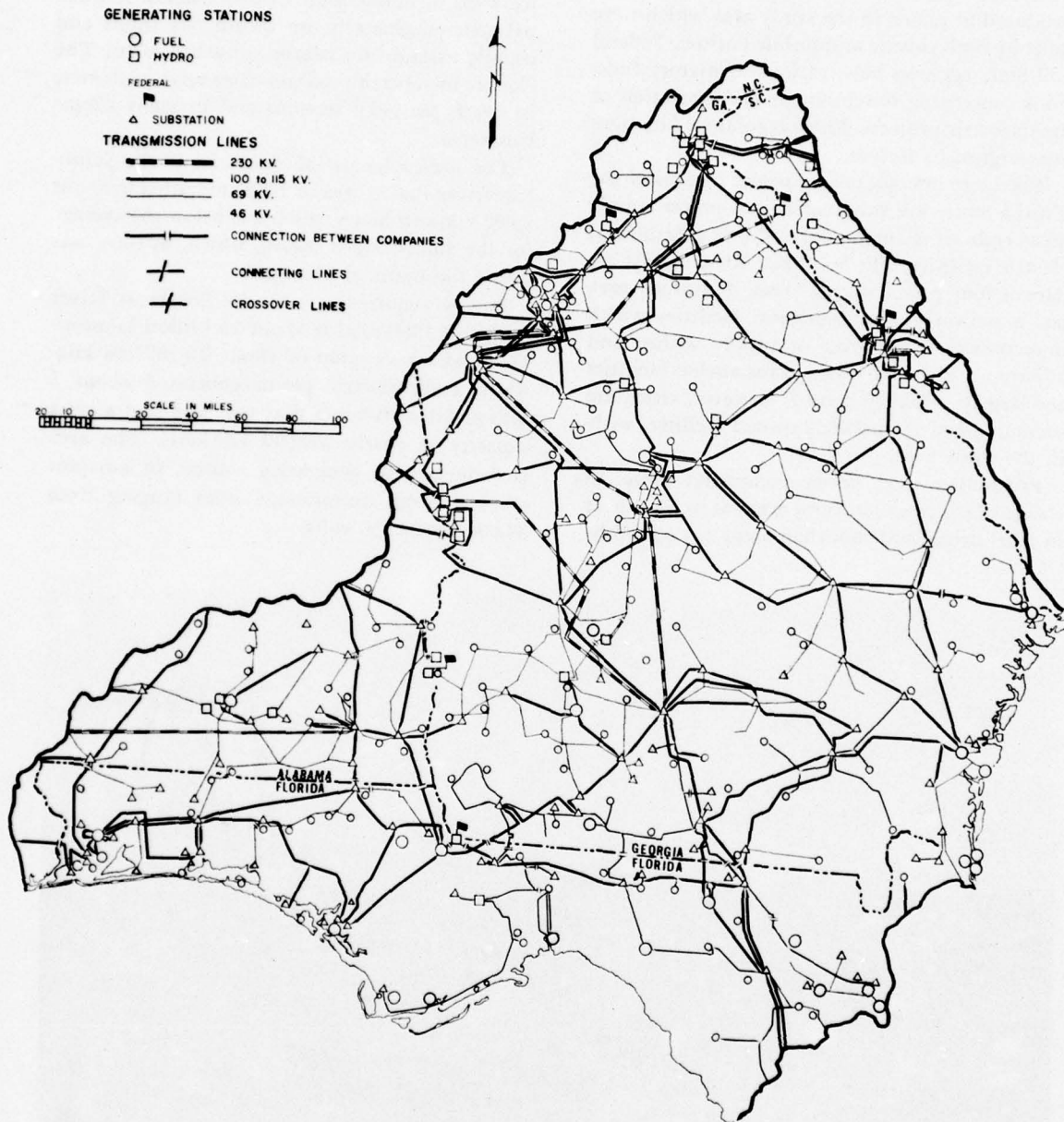


Figure 2.12

Industrial development, particularly the manufacturing segment of the total industrial complex, is closely allied with the field of electric energy production. Expansion of manufacturing is, also, closely tied to national and regional production goals and to overall resource development.

Needs and Opportunities

By 1975, the projected per capita use of about 7,600 kilowatt-hours per year will closely approach both the projected market area and national averages. Electrical energy requirements in 1975 are projected to 49 billion kilowatt-hours with a demand of about 9.1 million kilowatts. By 2000, total electrical requirements are expected to reach at least 119 billion kilowatt-hours with a demand for about 22 million kilowatts of capacity. Per capita use is expected to be at least 11,700 kilowatt-hours annually.

Technological improvements in transformer construction and in high-voltage insulation could make the transmission of large amounts of electrical energy over longer distances economically feasible. Large, efficient, central generating plants near sources of fuel and cooling water could generate and transmit energy to load-centered substations for distribution to existing and expanded transmission systems. Interconnections on a very large regional basis for seasonal and other interchanges of power will permit more efficient use of generating capacity. Additional hydroelectric power developments could contribute to meeting the overall power needs with improved system efficiency.

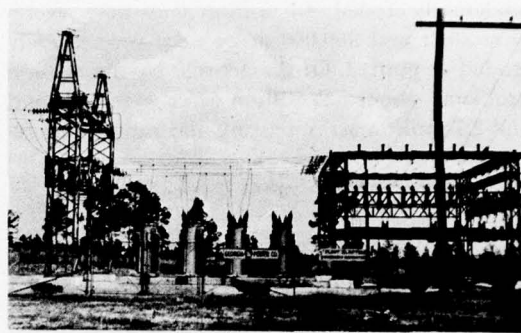


Figure 2.13 *Typical Power Substation—Part of an Expanding Electric System.*

Substantial industrial development is essential to the growth of the projected area economy. Intensive efforts for industrial progress are needed to expand industrial employment as an essential part of providing job opportunities for an increasing labor force and to facilitate the shift away from agriculture. The additional jobs created by an expanding industry will be potent factors in stemming the current regional loss due to out-migration of workers and eventually turning the tide in favor of a gain rather than a loss of workers. Assumptions as to industrial development are reflected in the projections of employment given in Part One.

As nuclear materials become more competitive with fossil fuels, many of the centrally located large thermal plants may be fired by these materials. Peaking capacity and large quantities of cooling water will be needed for efficient operation. Installation of pump storage at many existing and potential hydroelectric powersites could improve the overall efficiency of the system.

SECTION VI – SOIL CONSERVATION AND UTILIZATION

Existing Facilities and Programs

Programs for the conservation and efficient utilization of the soil resources, sponsored by Federal and State agencies, are well established; and considerable progress has been made in conservation and utilization of area farmlands. Soil and water conservation districts which have been organized throughout the study area and other farm groups have had major roles in this progress.

Included in the services provided by the various public agencies are: Cost-sharing assistance; loans for improvements directly related to soil

conservation, development, and use; technical assistance to individual farmers in planning and applying conservation practices and for related activities; and research, education, and information.

An estimated 40 to 50 percent of the cropland, pastureland, and rangeland in the study area has had some degree of conservation treatment.

Needs and Opportunities

In 1959, about 5 million of the 55 million acres in the Southeast River Basins had minor erosion problems; almost 10 million acres were

moderately eroded; 4.7 million acres were severely eroded; and 900,000 acres were very severely eroded or gullied. Of the acreage having erosion problems, about 6.2 million acres were cropland and 2.7 million acres, pasture and range. The re-

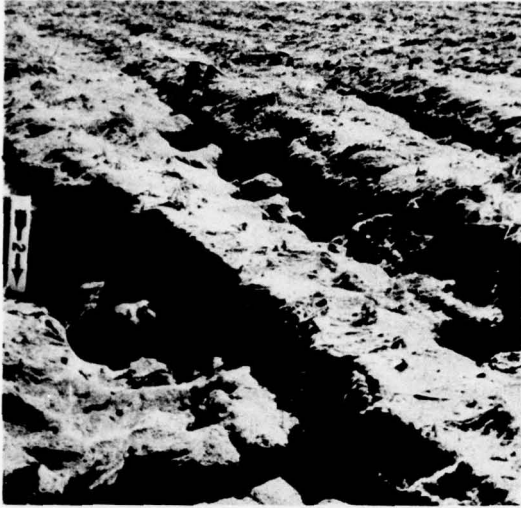


Figure 2.14 *Poor Cropping Practices Coupled with Heavy Rains Result in Serious Erosion.*

mainder of land with erosion problems was largely forest land.

Some 2.9 million acres of cropland and 700,000 acres of pastureland or rangeland had other unfavorable soil conditions such as acidity, low fertility, stoniness, salinity, and low moisture-holding capacity.

Serious erosion of roadbanks and ditches occurs along some 27,000 miles of road, or slightly more than 20 percent of the county, State, and Federal highways and roads in the Southeast River Basins area. Soil loss from these roadside problem areas amounts to an estimated 3.6 million tons, an average of 133 tons per mile annually.

Soil, including the moisture in it, is the basic resource for most food and fiber production. For this reason, soil conservation, primarily through erosion and runoff control measures, has long been recognized as deserving of both private and public support as has the protection of the soil for future use. Although great strides have been made toward applying conservation measures in the Southeast River Basins, opportunities remain for widely extending these applica-



Figure 2.15 *Contour Strip Cropping, Farm Ponds, and Water-Disposal Areas on Upper Coastal Plain Farmland Are Examples of Conservation Measures Employed in the Southeast.*

tions. Proper land use and conservation measures would improve greatly all unprotected or partially protected lands. Conservation measures combined with other good land management practices not only conserve soil and moisture but also contribute to long-term production efficiencies.

By 1975, cropland conservation treatment will be required to conserve the soil resource on 3.5 million acres where erosion is the dominant problem and on 1.8 million acres where unfavorable soil condition is the dominant problem. Conservation treatment also will be required on 3.5 million acres of pasture and range to conserve the soil and protect the plant cover.

By 2000, about 7.8 million acres are expected to be in cropland, and 7 million acres will be used for pasture and range. Cropland conservation treatment will be required to conserve the soil resource on 3.3 million acres where erosion is the dominant problem and on 1.6 million acres where unfavorable soil condition is the dominant problem. Conservation treatment will be required on 3.8 million acres of pasture and range to conserve the soil resource and protect the plant cover. The changes in acreage figures from 1975 to 2000 reflect changed land use.

More than 300,000 acres of nonagricultural

land classed as "other," including roadbanks, strip-mined areas, utility line rights-of-way, and other erodible areas including woodland, will need conservation treatment due to erosion and unfavorable soil conditions in 2000. This acreage could be stabilized, when necessary, by vegetative and structural measures. Due to the varied uses and complexities involved, individually designed plans of treatment will be required for areas classed as "other".

Shifts in land use, or land conversion, will be continuous. Land conversion will be made to improve farm efficiency, to meet production requirements for agricultural commodities, and to offset losses of agricultural land to other uses. About 223,000 acres generally not suitable for cropping were planted in 1959. Most of this land is expected to be shifted out of cropping by 2000. It is estimated that by 2000, some 1.2 million acres now in pasture, woodland, and other uses will be converted to cropland. This will provide for more crops to be on better adapted soils on Land Capability Classes I, II, and III. Also, some 1.6 million acres of cropland, woodland, and other land are expected to be converted from cropland, woodland, and other uses to pasture and range by 2000.

SECTION VII – FOREST CONSERVATION AND UTILIZATION

Existing Facilities and Programs

State forestry organizations are responsible for most of the public forestry programs carried out on non-Federal forest lands in the States. Federal agencies, primarily the U. S. Forest Service, cooperate and assist in many of these programs. On Federal lands, the agency administering the lands is usually responsible for managing and protecting the forest resource. Large scale private forestry programs are also underway.

Commercial forest lands capable of producing crops of timber cover more than 38 million acres, or 70 percent of the total land area. In recent years, stocking and growth of both softwoods and hardwoods have been increasing as a result of improvements in forest practices in the Southeast River Basins.

Better fire protection has probably been the most effective single factor in the rise in timber stocking and growth. Most of the commercial

forest area has been under organized protection for 10 years or more.

In order to improve forage for cattle, a great deal of unwise woods burning was formerly done. Today, increased dependence upon improved pastures and the reduction of open range areas have substantially reduced woods burning for



Figure 2.16 *Fire Exacts Its Toll.*

MAJOR FOREST TYPES

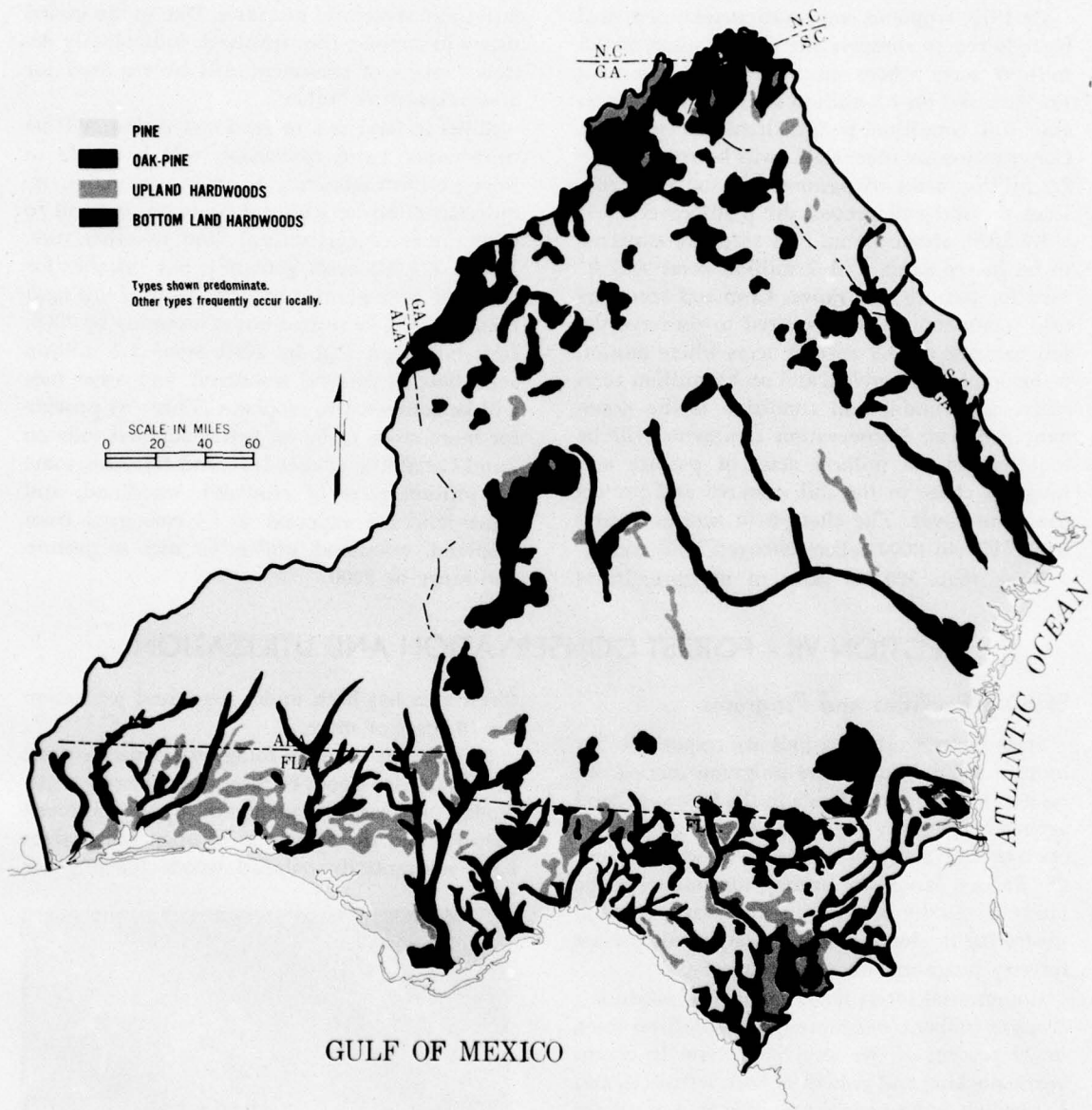


Figure 2.17

forage and subsequent damage to tree reproduction from grazing.

Accelerated planting programs have increased pine stocking and will result in substantial rise in volume growth. The number of pine seedlings distributed annually increased from an estimated 79 million in 1950 to 466 million in 1959.

Many areas have been included in timber-stand improvement programs under which cull and poor quality trees have been killed or harvested to permit growth of better trees. The full contribution of the planting and timber-stand improvement programs will not be fully realized in terms of wood growth for another 20 to 30 years, but the contributions will be substantial.

Accelerated programs providing information and education, research, insect and disease control, management assistance, better gum-naval-stores practices, and improved utilization have also helped to bring about improved conditions.

Needs and Opportunities

The share of the estimated national annual timber growth needed by 2000, which might reasonably be expected in the Southeast River Basins area, is 2.2 billion cubic feet. In 1959, timber harvest totaled slightly less than 1 billion cubic feet.

The need for naval-stores production is not expected to increase greatly in the next 40 years. However, the source of production will change. Wood-naval-stores production, obtained from tree stumps, will gradually diminish as available stumpwood is exhausted; and gum-naval-stores production, obtained by tapping live trees, will



Figure 2.18 *Marking Trees for Selective Cutting.*

have to be doubled to make up the deficit.

The woodlands can produce the wood- and gum-naval stores to meet projected requirements by the year 2000. Growing sites are generally favorable for wood production, and there are great opportunities for initiating, accelerating, and improving forestry programs. The most necessary measures in the next 40 years will be tree planting and timber-stand improvement and protection.

The protection and management programs needed for increased timber production will generally result in improved soil conditions and likely will reduce erosion. Recreation facilities and fish and wildlife habitat will also generally be improved.

SECTION VIII – FISH AND WILDLIFE

Existing Facilities and Programs

The primary responsibility for administering the fish and wildlife resources, except the federally protected migratory birds, is vested in the State game and fish departments. Federal agencies cooperating with State conservation agencies include the Bureau of Sport Fisheries and Wildlife, Bureau of Commercial Fisheries, Soil Conservation Service, Forest Service, and Corps of Engineers and other agencies of the Department of Defense. Management efforts are directed mostly toward increasing hunting and fishing opportunity, preserving rare and vanishing species,

and further developing commercial fisheries.

Out of 55 million acres of land in the Southeast River Basins area, about 37 million acres are suitable for big game, 55 million acres for small game, and 3.4 million acres for waterfowl. These areas support an estimated 32 million game animals and waterfowl.

There are 701,000 acres of fresh-water fish habitat including 119,000 acres of warm-water streams, 430,000 acres of large impoundments, and 152,000 acres of small impoundments. Also, there are about 500 miles of cold-water streams in the mountains and approximately 450 miles of salt-water coastline which afford sport fishing.



Figure 2.20 *Shrimp Boats Make Up an Important Segment of the Commercial Fishing Fleet.*

In 1960, nearly 2,400 commercial fishing craft and about 4,000 commercial fishermen were operating in coastal waters. Most of the catch landed at coastal ports is processed and distributed by 43 plants.

There are 4.4 million acres of publicly owned or managed wildlife lands in the basins. These consist of national and State forests, parks, wildlife refuges and management areas, and military and defense lands. Most of the large impoundments are open to the public and are utilized extensively by sport fishermen. In addition, there are 12 State owned and managed fishing lakes with a combined area of over 1,000 acres.

Hunting and fishing for sport provided about 14 million user-days of outdoor activity in 1960. This left an estimated 4 million user-days of demand for hunting and fishing unsatisfied.

Commercial fish landings in the Southeast River Basins from 1955 to 1959 averaged 90.4 million pounds a year. The average yearly catch was worth \$7 million to the fishermen. Food fish constituted about 55 percent, by weight, of the catch and the remainder was used for animal feed supplements, oil and other industrial uses, pet food, and fish bait.

Needs and Opportunities

Commercial Fisheries

Commercial fishing, in general, has not kept pace with the economic growth of the Nation.

TABLE 2.4
Annual Commercial Catch Requirements
(thousands of pounds)

Catch	1960*	1975	2000
For food			
Selected finfish	12,700	13,900	18,600
Shrimp	12,000	12,600	13,900
Crabs	17,800	22,200	33,800
Oysters	1,500	1,900	2,800
Miscellaneous finfish and shellfish	5,000	6,000	8,000
Other fishes	—	7,200	26,100
Subtotal	49,000	63,800	103,200
For other than food	41,400	55,600	90,000
Total	90,400	119,400	193,200

* Based on average annual catch 1955-59.

Among the factors responsible are: Fluctuations in supply, increased operating costs, competition from other animal protein foods, a steady increase in imports of fishery products, and insufficient knowledge of the sea and its resources. However, increases in national and area population, coupled with improved technological and marketing practices, are expected to result in an increase in demand for fishery products. The fisheries of the study area with improved technology and reduced costs are expected to supply 193 million pounds annually for the national market by 2000.

Seafood catch requirements can be met by expansion of fishing operations; through reestablishment of the oyster industry by restoring formerly productive oyster reefs; and by pond culture of shrimp, pompano, and other high value seafoods under controlled conditions. Improved fishing gear, more efficient handling and processing of catch, discovery of new sources of supply, aggressive marketing, and the continuing enactment and enforcement of sound regulations can also contribute to satisfying catch requirements.

Wildlife and Sport Fisheries

Projected hunting and sport fishing activities are expected to increase to a total of 42 million user-days by 2000, or roughly two and one-half times that of 1960. The rates of increase will generally exceed the projected population growth rate for the Southeast River Basins area until about 1975. The rates will then lag behind, re-



Figure 2.21 *White-Tailed Deer Are Increasing in Number and Distribution.*

flecting a reduction in per capita demand as population increases in large urban areas.

Use of publicly owned and managed areas will continue to increase at a rate far greater than the general increase in population and overall hunting and fishing effort. This, too, reflects the impacts of urbanization. Closure of private lands to public use makes it increasingly difficult for the urbanite to fish and hunt, despite increases in travel opportunity, leisure time, and personal income.

Land use trends favor the distribution and abundance of white-tailed deer and wild turkey. With proper management, needs for big game can be met.

Small game now support much of the hunting effort, but future opportunities will be limited by supply and availability of bobwhite quail and mourning doves. Practices to increase production are being applied effectively in some localized areas, but costs are too high for widespread application of such management.

The wetlands of the study area have considerable potential for habitat improvement and

TABLE 2.5
1960 and Projected Hunting and Sport
Fishing Needs
(thousands of user-days)

Activity	1960	1975	2000
Hunting			
Big game	880	1,640	2,650
Small game	3,600	4,820	6,090
Waterfowl	180	210	250
Subtotal	4,660	6,670	8,990
Sport fishing			
Fresh water	10,580	16,200	25,400
Salt water	2,690	4,290	7,700
Subtotal	13,270	20,490	33,100
Total hunting and sport fishing	17,930	27,160	42,090

increased production of resident and migratory species of waterfowl; however, the prospects for increasing the wintering waterfowl population are not encouraging. Waterfowl numbers are declining gradually after several years of little change.

More intensive use of lakes, ponds, and streams for sport fishing is expected. Additional user-day capacity will be needed. Farm ponds are numerous and more are in prospect, but water features are lacking in the vicinity of urban centers. Sites are available for both large and small impoundments for public fishing. Production of desirable game fish in existing ponds could be increased several times and stream habitat improved to meet fishing pressures. Better public access to water is essential.

Investigations of marine sport fisheries indicate that the abundant game fish would support fishing pressures through the year 2000. More and improved facilities and services are needed to enhance this sport.

SECTION IX – RECREATION

Existing Facilities and Programs

Americans everywhere are seeking greater outdoor recreational opportunities. This drive toward the out-of-doors is one of the most striking social phenomena of the post World War II period in the United States. In the future, the pressure for public outdoor recreation areas and facilities will continue to mount as leisure time, money, and mobility of people increase.

The Outdoor Recreation Resources Review Commission in its January 1962 report to the President finds that "most people seeking outdoor recreation want water – to sit by, to swim and to fish in, to ski across, to dive under, and to run their boats over." Recreation in the Southeast River Basins is no exception to this finding. Both coastal and inland waters afford opportunities for these activities.

PUBLIC RECREATION AREAS 1960



Figure 2.22



Figure 2.23 *Atlantic and Gulf Coastal Beaches Offer Outstanding Recreational Opportunities.*

As used in this study, recreation encompasses all forms of public outdoor recreation except (1) hunting and fishing, which are treated in Section VIII, and (2) municipally oriented out-

door activities like golf, tennis, and spectator sports. The seven major activity categories adopted for planning purposes are sightseeing, picnicking, swimming, boating, camping, hiking, and cultural. Federal and State agencies are active in development and management of resources for these activities.

Recreation reached an estimated level of 35 million user-days in 1960. Study area residents and visitors are accommodated at a wide variety of areas and facilities. Travel studies indicate that about 20 percent of the people passing through also use public outdoor recreation facilities in the area.

Within the area are 50 State parks and 4 national monuments aggregating some 60,000 acres, 5 large and many smaller reservoirs, large tracts of forest, historical attractions, and many other opportunities for recreation which are available to the public. These publicly and privately administered recreation areas and facilities are widely distributed and take advantage of many



Figure 2.24 *Large Impoundments Such as Lake Lanier Greatly Expand Recreational Opportunities.*

favorable combinations of land and water resources. They not only satisfy some existing needs but also, through expansion possibilities and potentials for increased accessibility, offer important opportunities for satisfying future needs.

Needs and Opportunities

A large increase in outdoor recreation is expected. Facilities for a projected 230 million user-days of public outdoor recreation will be needed by the year 2000. Many large and small areas of land and water, accessible to the public, will be required. Population and income in the Southeast River Basins area are expected to more than double in this period with the majority of the increase in urban centers. Increases in leisure time will come about through expected decreases in hours worked per week, averaging 20 percent, and increases in paid vacations and in the number of observed holidays. The time in-

involved in the estimate of the total projected user-days of public outdoor recreation, including those for people passing through, would be equivalent to only about 15 percent of the leisure time available to the individuals involved.

Desirable recreation resources are by no means limited to the more widely known attractions such as Stone Mountain, Lake Lanier, Callaway Gardens, Wakulla Spring, and Okefenokee Swamp. Ocean beaches on both the Atlantic and Gulf shores, shaded streams, lakes, and mountains offer attractive recreation opportunities for development and use. The vast forests of the area, while not widely used, have a significant potential. Only 40 of the 300 miles of sand beaches fringing the shores have been developed for high-density use; and there are 2,100 square miles of inland water in streams, reservoirs, lakes, and land-locked bays which are undeveloped or only partially developed. Opportunities also exist for developing points of historic and scenic interest to round out the recreational attractions.

SECTION X – SALINITY AND SEDIMENT CONTROL

Existing Facilities and Programs

Many Federal and State conservation programs, particularly those related to agriculture, have significant sediment control effects. Federal and State highway and road agencies consider erosion problems in their construction standards. The Corps of Engineers has facilities in the Savannah and Apalachicola-Chattahoochee-Flint basins for measuring sediment characteristics of streams, and the U. S. Geological Survey collects sediment samples at points along several streams.

Rates of sediment production vary by physiographic provinces. The annual gross erosion rate averages about 2,500 and 5,600 tons per square mile in the Blue Ridge and Piedmont provinces, respectively. The average rate of erosion in the Coastal Plain province is relatively small.

Most of the natural salinity occurs on some 517,000 acres of salt marsh in portions of 25 counties along the Atlantic Ocean and Gulf of Mexico. These saline areas are used mainly for wildlife and cattle range.

Needs and Opportunities

Although ground water salinity is not a wide-

spread problem, regulation of water use from some aquifers in the Coastal Plain is required to prevent salt-water intrusion into water supplies. At least nine seaside communities have

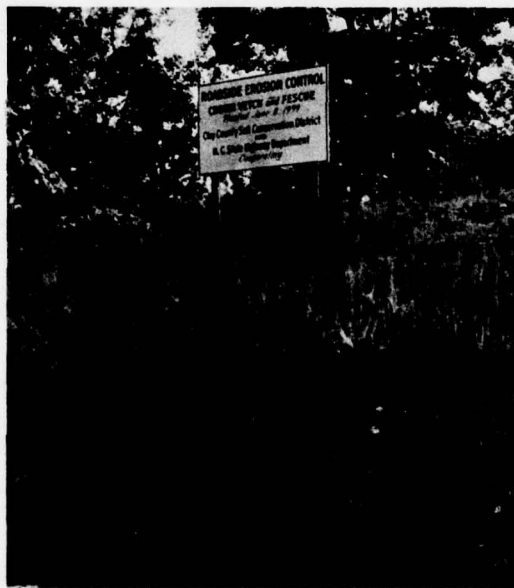


Figure 2.25 Sedimentation Curbed at Its Source by Erosion Control.

had varying amounts of salt water in their water supply wells. Additional surface water sources are generally available to help meet the increasing water demand and in the process help prevent salt-water intrusion of ground water. Some island residents may need to obtain their water supplies from the mainland.

Soil salinity is generally not a problem in the area. Sediment related damages are minor and

generally do not warrant special remedial measures. However, an appreciable lessening in sediment damage will normally result from land use adjustments, provision for sediment storage in reservoirs, proper stabilization of roads and roadbanks, and the application of soil conservation practices on rural and urban land where cover has been disturbed or is otherwise insufficient to prevent erosion.

SECTION XI – POLLUTION ABATEMENT AND PUBLIC HEALTH

Existing Facilities and Programs

The air pollution and radiation monitoring programs in the Southeast River Basins area are administered by the State health agencies, but Federal agencies also have certain responsibilities. Statewide air pollution surveys have been made in Florida and Georgia. The State departments of public health cooperate with the U. S. Public Health Service in a national air sampling program network.

State and local health departments have au-

thority to control the collection, storage, and disposal of solid wastes. However, in 1960, only 53 municipalities disposed of their solid wastes in sanitary landfills or by incineration. Other municipalities had inadequate programs for solid-waste disposal.

Stream conditions below waste-discharge points indicate that municipal and industrial wastes are often discharged without adequate treatment. Of the 375 municipalities served by sewerage systems in 1960, only 234 had waste-treatment facilities, and approximately one-half of these



Figure 2.26 *As Urban Population Grows, Waste-Treatment Facilities Must Be Expanded to Protect Water Quality in Southeast Streams.*

facilities was inadequate. A number of municipalities had no sewage collection systems. Of the 309 industrial plants with separate waste systems surveyed in 1960, only 132 provided some treatment of their wastes before discharge to the streams. In only a few of these cases was treatment of liquid wastes adequate.

Control programs for disease-carrying vermin and other pests such as mosquitoes, flies, fleas, chiggers, ticks, and rats are limited.

Needs and Opportunities

Urban and industrial growth will demand water of suitable quality. Wherever the effluent of secondary treatment facilities overloads the receiving streams, measures for low-flow augmentation could be installed to maintain the desired water quality. However, low-flow augmentation is not a substitute for primary or secondary treatment and is considered supplementary to secondary or equivalent treatment.

In places with 800 people or more, a population of 2,514,000 was served by 375 sewerage systems in 1960. About 37 percent of these systems provided primary and secondary treatment and 25 percent provided primary treatment. The estimated population to be served in 2000 of 9,079,000 would require 538 sewerage systems; 83 percent providing primary and secondary treatment and the balance, primary treatment.

Some 43 percent of the 309 industries surveyed in 1960 treated their liquid wastes. It is estimated that two and one-half times as many industrial waste treatment facilities will be required by 2000, and these facilities will need to be more effective individually than those now in use.

Efficiencies can usually be attained if all the communities in a metropolitan area will coordinate their plans for handling all wastes.

Diseases carried by pests, although not a major health problem at present, are a continuous



Figure 2.27 *Disposal of Solid Wastes in a Sanitary Landfill Is Effective.*

threat to public health. Considerable discomfort is caused by insects such as houseflies, eye gnats, salt-marsh mosquitoes, and sand flies. A system of contiguous insect control districts could efficiently control salt-marsh mosquitoes and other biting insects of the coastal areas with both temporary and permanent control measures. Other vermin control measures could also be expanded.

There is no serious widespread air pollution, but problems do exist in and adjacent to urban and industrial areas. Air pollution may impair the growth of vegetation and be harmful to man. A survey of sources of air pollution and radioactivity could form a basis for the development of suitable control programs.

Open dumping and open burning of solid waste are objectionable because of the health problems and nuisances created. Sanitary landfill is the most economical and desirable method for disposing of solid wastes, although large cities may require incinerators to reduce the volume of waste before disposal.

SECTION XII – OTHER BENEFICIAL PURPOSES

BEACH EROSION CONTROL AND HURRICANE PROTECTION

Existing Facilities and Programs

Of the land and water related resource considerations other than those already discussed, beach erosion control and hurricane protection

warrant attention. Another resource related consideration—deficiencies in basic data—is cited in Part Three. The Federal Government, mainly through the Corps of Engineers, cooperates with

HURRICANES ENTERING SOUTHEAST RIVER BASINS 1910-1960

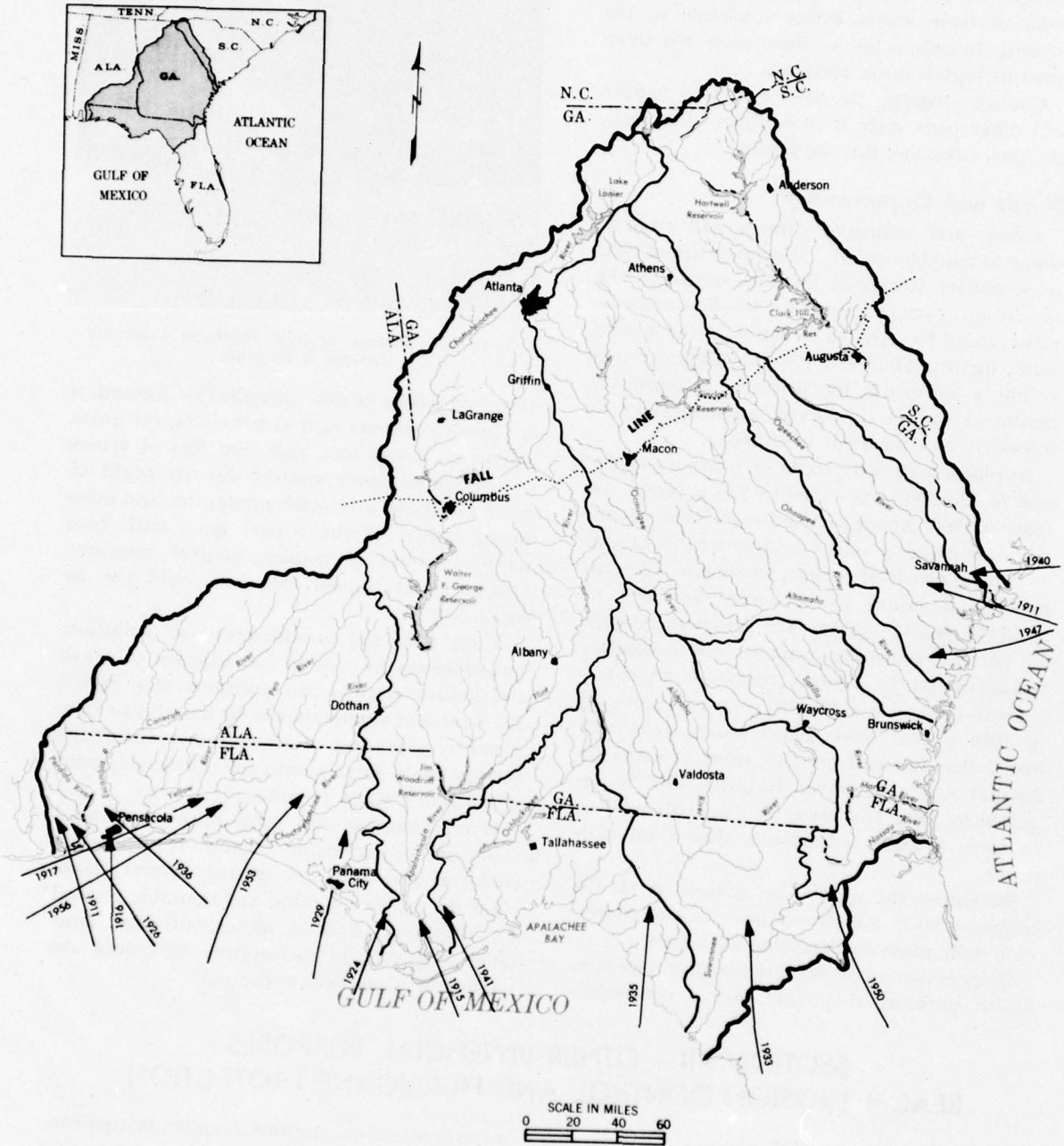


Figure 2.28

States agencies in making detailed beach erosion studies. Studies of Sea Island and St. Simons Island, Georgia; Amelia Island, Florida; and Perdido Bay, Alabama, have been completed. No works of improvement were found to be economically feasible at the time of these studies. State and Federal agencies advise and give assistance for dune stabilization measures and cooperate in protecting against natural disasters.

Hurricane warning service for coastal areas is supplied by the U. S. Weather Bureau. District disaster organizations notify designated authorities and leaders when areas are in jeopardy.

Needs and Opportunities

Large sums of money have been spent for construction of protective works in some localities, mostly by individuals who often have built homes and other installations too close to the shoreline. On unprotected beaches, owners are

facing complete loss of property or heavy expenditures to protect their land. The possibility of damage from beach erosion and hurricanes must be recognized in planning for coastal development.

Rapid and extensive fluctuations of the high-water shoreline have occurred along the Atlantic coast of Georgia and Amelia Island, Florida. The configuration of the barrier islands changes rapidly because of littoral drift and tidal currents. The Gulf of Mexico shoreline along the panhandle of Florida west from the mouth of the Suwannee River to the vicinity of Apalachee Bay has been quite stable. Westward, the shoreline is characterized by barrier islands and sand spits undergoing continual change. The rate of loss or addition of sand varies, but annual horizontal changes of from 10 to 100 feet are common. Average annual beach erosion damage under 1960 conditions is estimated at \$2 million



Figure 2.29 *Unprotected Developments That Are Occurring in Many Coastal Areas Create Potential Hurricane Hazards.*



Figure 2.30 *Jekyll Island and Other Beaches of the Study Area Are Vulnerable to Costly Erosion.*

and, with the expected development of the Southeast River Basins area, could rise to \$15

million by the year 2000, unless appropriate preventive action is taken.

The Atlantic and Gulf shorelines are subject to damaging tides during highly destructive hurricanes. Of the large number of these storms which have brought death and destruction to the area, the 19 most severe caused a total damage of about \$23 million in or near the Southeast River Basins area. Estimated average annual damage from hurricanes under 1960 conditions is \$600,000 and could reach \$3 million by the year 2000.

Surveys are needed to delineate problem areas and develop satisfactory solutions. The existing hurricane warning system could be supplemented and evacuation routes established for newly developed areas. Provisions could be made for adopting and enforcing building codes, establishing auxiliary power supplies, and for constructing protective seawalls or similar structures. Other possibilities for ultimately reducing hazards exist in storm modification which is the subject of continuing study.

PART THREE - COMPREHENSIVE PLANNING

The procedures used in developing an internally coordinated, comprehensive plan are briefly summarized in the following four steps: (1) An inventory was made of basic resources and related developments; (2) needs for goods and services were projected to the year 2000; (3) alternative ways of meeting needs for each pur-

pose were studied; and (4) projects and programs that would best serve all purposes and meet requirements for resource conservation and development were selected. Information on planning and plan formulation is presented here and in the Planning, Economics, Hydrology, and Engineering and Cost Appendixes.

SECTION I - OBJECTIVES AND GUIDELINES

Objectives and specific planning guidelines adopted to govern the study and Report follow.

(1) A coordinated, comprehensive plan for the development of the land and water resources of the Southeast River Basins through the year 2000 will be presented in the Report.

(2) The comprehensive plan will be recommended to the Governors and legislatures of the States of the study area and to the President and the Congress for use as a guide for land and water resources development in the Southeast River Basins area.

(3) The comprehensive plan will set forth an early action phase which will include projects and programs found to be needed, feasible, and desirable for accomplishment by 1975.

(4) It will be recognized that additional studies of recommended programs and projects may be required to support specific requests for State and Federal support and for development by private agencies.

(5) All of the purposes enumerated in the Act will be given equal attention. In the completed plan, each purpose will be developed to a level consistent with the needs and economic capacities of the area and its basin segments. Treatment of industrial development will be limited generally to indications of the effects of the plan on rates of development and to development implied in the projections of manufacturing employment. Recreation studies will be limited to public outdoor recreation related to land and water resources and to types beyond those normally provided by individuals and municipalities. Public health studies will be oriented primarily toward determining the effects upon public health associated with the development

of land and water resources.

(6) In determining the composition of the comprehensive plan, each separable component will be considered on the basis of the contribution that it makes in net benefits to the Southeast River Basins and to the Nation. When intangible considerations play a major part in the decisions affecting an element of the program, they will be explained as fully as possible in narrative form.

(7) The comprehensive plan will: Provide information on benefits and costs, including monetary and nonmonetary values; contain information on the expected economic impacts created by the recommended elements of the plan; include general recommendations on cost sharing, reimbursement, and project payout; designate whether recommended developments should be implemented primarily by non-Federal or Federal entities; and designate which of the Federal agencies has the major responsibility for the Federal aspects of a project or program.

(8) The comprehensive plan will recognize and protect the rights and interests of individuals and of the States in determining the development of land and water resources and the preservation and protection of established uses.

(9) The comprehensive plan will include the existing, authorized, and formally proposed works and programs of the Federal and non-Federal agencies with proposed modifications limited to those found desirable, feasible, and consistent with the study objectives.

(10) Recommendations will be made for periodic review of the comprehensive plan. This review will serve as a basis for keeping the plan current and for subsequent action.

SECTION II - PLANNING ASSUMPTIONS AND CRITERIA

Assumptions

The comprehensive plan is based upon a series of assumptions. The broadest of these are: (1) That the Nation is entering a period of relative stability in international relations with no worsening of the cold war and no widespread outbreak of hostilities; and (2) that throughout the period covered by the plan, to the year 2000, the Federal Government and non-Federal interests will cooperate in encouraging and implementing economic growth and development throughout all segments of society and all areas of the Nation. Projections of population and economic data reflecting these and other assumptions were used as planning guidelines.

Population Growth

Three principal assumptions concerning the rate of national population growth were adopted: (1) The present fertility level, 1955-57 average, will remain constant to sometime between 1975 and 1980, then decline to the 1949-51 level by 2005-2010; (2) there will be moderate declines in mortality rates to the end of this century; and (3) net immigration will be constant at about 300,000 per year. State and area population estimates were made in conformance with the general assumptions, but special attention was given to conditions reflected by study and analysis of individual areas.

Economic Growth and Development

The assumptions concerning trends toward world peace and United States and regional population growths are paralleled by assumptions of upward trends in employment, production, consumption, and foreign trade. For planning purposes, the gross national product was projected to increase from about \$500 billion in 1960 to \$888 billion by 1975 and \$2,300 billion by the year 2000.

A continuation of the trend in the human diet toward more red meats and more of some fruits and vegetables is reflected in the projections and plans for food production and land use. It was assumed that per capita consumption of food would increase until about 1975 and then remain about constant.

In line with the general expansion of the national and regional economy, it was assumed that investment capital required to attain projected industrial growth and resource development will be available and that the education and technical skills necessary for an expanding industrial economy also will be available. It was further assumed, as a working procedure for preliminary studies, that land and water resources and electric power supply would not be limiting factors in attaining the projected economy.

It was recognized that the economy of the study area is an integral part of the national economy.

National and Regional Viewpoints

Because of the widespread effects of land and water resource development, a responsibility falls on all levels of government and on the private economy to participate in resource planning and in the execution of resource programs.

In developing the Southeast River Basins plan, future needs for food and fiber and for services are included at those levels warranted by the comparative advantage and existing economic potential of the Southeast River Basins area in relation to national resources and needs. Thus, the primary benefits shown for projects and programs provide a means of indicating project efficiency from the national point of view as well as a principal measure of regional and local benefits. Secondary benefits and impact studies provide additional evidence of the regional and local effects of resource development.

In developing projects and programs, consideration was given to national policy guides pertaining to land and water resources development that have resulted from legislation and to administrative policies or decisions that have prevailed. Policy guides and statements of national objectives used in the planning processes are discussed in the technical appendixes.

Criteria

Price Levels

Price levels prevailing in or about January 1960 were used for evaluating present and future

benefits and costs, except that an adjustment was made in agricultural prices based upon an assumption of a long-range parity ratio of 89 between prices paid and prices received by farmers.

Interest Rates

An interest rate of $2\frac{5}{8}$ percent was used as far as practicable in analyzing costs and benefits in project formulation. In certain instances, benefits and costs were extracted from available data, and it was impractical to adjust the interest rate when the interest rate mix of the data was uncertain. The $2\frac{5}{8}$ percent interest rate meets the need for a relatively risk-free and inflation-deflation-free rate for use in evaluation of the economic effects of Federal resource projects and programs. For converting certain non-Federal costs and benefits to an annual equivalent basis, a $4\frac{1}{4}$ percent interest rate was used.

Life of Projects and Period Covered by Analysis

The period of analysis used in the studies for this Report was the economic life of each project or 50 years, whichever was the lesser. The possibility of a longer maximum period, up to 100 years, was considered in recognizing certain long-range effects of intangibles and other impacts, but effects beyond 50 years were not evaluated in monetary terms.

The plan was formulated to meet only those needs expected to develop up to the year 2000, and the evaluations generally reflect no increase in use of facilities after the year 2000. Needs will naturally continue to grow after the year 2000, and many of the proposed projects and programs, by adding facilities, will have the capacity to absorb some of the growth. The potential of the plan to meet needs that develop after the year 2000 has not been evaluated.

The assumptions and criteria used are considered conservatively low. If more liberal criteria had been used, such as a period of analysis of 100 years and an increasing need after the year 2000, the projects and programs included in the plan would appear even more favorable.

Basis for Comparison of Projects Effects

Comparison and evaluation of the proposed projects and programs in the plan were made to determine the most effective use of economic resources, such as land, water, labor, and ma-

terials. In this way, actions and opportunities throughout the economy form a check on what is economically justified in the way of new plans and efforts.

The value of the projects or programs included in the plan are computed on the basis of future conditions "with" the projects or programs included in the plan as compared to future conditions "without" the projects or programs included in the plan.

The future "with" conditions for individual project or program analysis include all development which would be expected during the period of analysis with the project or program in existence.

The future "without" conditions include all developments that are existing or under construction as of January 1960, assuming adequate operation and maintenance of those developments. Technological gains not directly associated with the projects and programs in the comprehensive plan were recognized as part of the "without" condition. It was assumed that no part of the project or program would develop in the absence of the project or program. This is not to deny that, in the absence of the proposed plan, other plans would develop which might include many features similar to those in the recommended plan.

Timing of Development

Plans covering long periods into the future provide for needs which have not yet developed. Not all developments are needed at once or at the same time, and, therefore, plan implementation is scheduled to meet the needs as they occur. A precise schedule of year-to-year development was not considered necessary, but a general order of priority was established. Those developments needed first are included in an early action phase and are generally based on filling the needs to the year 1975. If need arises, however, projects scheduled in the 1975-2000 period may and should be initiated earlier. Likewise, the rate of project initiation may be slowed down if conditions warrant slower action.

Discount Principles

Program or project benefits and costs, which are estimated to accrue at different times and

over varying periods of time, were converted to annual equivalent values by use of compound interest or discount rates. The resulting values reflect the present worth at the inception of each program or project and provide a common basis of measurement.

Benefits

The ultimate aim of resource projects and programs, in common with all other productive activity, is to satisfy human needs and desires. Goods and services are produced to achieve this end. These goods and services have value in accordance with the demand for them and their availability. Benefits are of two general kinds, primary and secondary. Primary benefits are the increase in the value of goods or services directly resulting from a project, less all associated non-project costs incurred in their realization. Primary benefits are usually evaluated at the first point in the chain of effects of a project where the goods or services produced have an actual or estimated market value. Secondary benefits are the value of goods and services created in secondary activities affected by the project, less all associated costs incurred in their realization. The major part of the value of these goods and services is not measured from the national public point of view because it is assumed that an investment similar to that made in the project would create a similar effect in secondary activities if invested in other projects or other areas. However, overall secondary benefits are considered appropriate in illustrating the significance of projects from a regional point of view.

Primary Tangible Benefits

Primary tangible benefits represent the estimated increase in the value of the actual goods, services, and satisfactions of a project or program expected for the period under study and from which any induced losses to other projects or programs have been deducted.

Justification of facilities included in the plan for drainage, irrigation, and soil conservation is based on the increased net return to the farmer from the estimated production response.

Benefits from drainage and flood-loss prevention, resulting from the upstream watershed projects, are measured as net values for expected changes in land use, the increased productivity

of land, the reduction of direct damage to agricultural crops and fixed improvements, and reduction of management costs.

Benefits from hydroelectric power are taken to be the cost of equivalent power from a modern steam-electric powerplant.

Benefits from the forestry program are estimated as the net stumpage value of increased production and the net leasing values received from the increased number of faces expected to be worked for production of gum-naval stores.

Benefits from the commercial fisheries program are measured as the estimated value of increased landings of commercial fish.

Benefits from the sport fisheries and wildlife program are taken to be the estimated value of projected increases in user-days of hunting and fishing.

Benefits from the recreation program are taken as the estimated value of increased user-days of recreational activity.

Benefits of domestic, municipal, and industrial water supplies are assumed to be at least equal to the cost of obtaining water of similar quality and quantity from the cheapest alternative source and are evaluated in monetary terms only for water supply storage in multiple-purpose reservoirs.

Benefits of flood control are measured as the difference between flood losses "with" and "without" protection. For upstream watershed and local protection projects, enhancement and restoration benefits are also included where applicable.

Benefits of navigation are taken to be the savings in rate differential; the savings in shipping time; the reductions in operation and maintenance costs; the value of any filled land obtained through spoiling; and, for new deep-draft harbor facilities, the increased gross revenues (increased costs associated with cargo handling are included as project costs); and savings due to use of larger vessels.

Benefits of programs of vector control, solid-waste collection and disposal, air pollution and radiation monitoring, and pollution abatement, except storage for augmenting low streamflows, are generally considered intangible. A dollar benefit value was determined for pollution abatement storage based on the 5-day biochemical oxygen requirements of secondary treatment

plant effluents. In multiple-purpose projects including storage to provide for low-flow augmentation, the pollution abatement portion is premised on the alternative cost of a single-purpose reservoir, or the cost of tertiary treatment, whichever is the lesser.

Secondary Benefits and Impacts

Although, for purposes of this study, a monetary evaluation of secondary economic effects of various resource projects and programs was not made, the importance of these secondary effects of resource development was recognized.

The projects and programs involving increased production of commodities will require additional raw materials, processing equipment, and services to sustain the processing operation. These increased activities will extend throughout the area. Trades and services especially would be stimulated by recreation, sport fishing, and wildlife developments. These impacts would particularly affect fishing camps, marinas, commercial boat docks, motels, sporting goods stores, service stations, boat dealers, restaurants, and many related new businesses. This induced growth should not be viewed as a net benefit, however, as there are major costs embodied in efforts to realize these benefits.

Land enhancement as an induced effect of project and program development, most obvious adjacent to large reservoirs, will stem, to some extent, from all features of the comprehensive plan. Increased values would, in turn, support higher tax revenues which may substantially exceed those lost where project land is removed from tax roles. Collectively, the impacts of the plan would encourage area growth. As economic growth with increasing productive capabilities and opportunities develops, migration from the Southeast will eventually decrease and be more than balanced by an influx of people from outside the area.

Construction projects create a temporary influx of workers who spend money in local areas; but, at the same time, such projects will create problems of housing, schooling, transportation, and other community services. The solution of these short-term problems could result in long-range gains with construction of facilities that would be needed to meet future expansion.

Many counties either wholly or partially with-

in the Southeast River Basins have been designated redevelopment areas by the Area Redevelopment Administration. These counties were so designated for varying reasons such as low median family income and persistent and substantial unemployment or underemployment. Implementation of the comprehensive plan would assist in the relief of these conditions and aid in raising the economic level. Substantial net secondary benefits are most frequently realized in areas where resource development projects make it possible to utilize unemployed and underemployed labor and unused facilities and resources.

Intangible Benefits

Intangible benefits are those which are not evaluated in monetary terms. Like tangible benefits, these may be primary or secondary in character. Many programs and projects make substantial contributions to public security, to private and public health, and to public safety and tranquility, all of which include large elements of intangible value. Intangible benefits are recognized in analyses of programs and projects.

Costs

Costs are the value of labor, goods, and services exchanged to gain goods and services valued more highly. Where the costs are tangible values, the assumption is made that the needs of the project are taken from present uses at marginal unit prices and, therefore, the values foregone represent the least important uses that the market would allow. In a resource program as complex as that recommended for the Southeast River Basins, there are also many intangible costs involved.

The costs of proposed projects and programs include the initial investment which would be incurred in one or more stages of construction and the annual expenditures required for operation, maintenance, and replacements. Taxes which would be paid by a private utility were included as a project cost for hydroelectric power projects without regard to whether governmental or private interests would develop the project. Investment costs include the capital expenditures associated with constructing a project and carrying out a program. However, interest during construction is omitted where the period of construc-

tion was not expected to exceed 2 years. Where the period of construction was estimated to be more than 2 years, the investment included simple interest on one-half of the construction costs for the period of construction.

Capital investment and operation and maintenance costs of multiple-purpose projects were allocated to the several purposes served so as to form a basis for reimbursement and cost-sharing arrangements that may be required.

Intangible Costs

In evaluating resource programs and projects, many program and project effects cannot be adequately measured in monetary terms. Loss of scenic values is an example of an intangible cost frequently associated with resource development. Treatment of these intangible project effects has been subjected to many of the requirements applicable to tangible effects. These include: (1) Considering effects in terms of differences "with the project" and "without the project" and (2) considering intangible costs to the same degree or extent as intangible benefits.

Cost Sharing

Cost sharing is concerned primarily with the distribution of costs among the participating interests. The division of cost is shown in two groups: Federal and non-Federal. For each specific project or program, the actual division of cost among the Federal and non-Federal interests was determined by the nature of the development and on the basis of circumstances expected to prevail during the evaluation period.

Generally, where the impacts of projects and programs are largely local, the costs are the responsibility of non-Federal interests. Projects and programs of national significance are the responsibility of the Federal Government. Between these two positions there are a number of projects and programs where the costs are to be shared by the Federal and non-Federal groups.

In determining the degree of Federal participation in programs and projects of less than national significance, consideration was given to: (1) The need for demonstrating new approaches to resource development and use; (2) the usefulness of a local project or program in research and experimentation which has more than local

implications; (3) the support of projects or programs which by policy or legislation have become accepted as Federal or part Federal responsibilities, such as flood control; and (4) the possible justification for Federal participation in the cost of local works and improvements where counties, areas, or regions are designated as distressed and in need of economic assistance.

Financing

Determination of effective ways for financing land and water development is an essential part of resource planning. Financing as used here relates to the immediate source of funds needed for construction and management of proposed works. Financing requirements were developed only as Federal and non-Federal although, in the analyses, State, county, municipal, and private financing were considered.

The following criteria were used in determining appropriate methods for financing land and water resource developments.

(1) Developments of natural resources that do not involve national consideration will be the responsibility of private, local, and State interests.

(2) Where the costs of projects and programs are to be shared between the Federal and non-Federal interests, each will provide for the financing of its share, except as noted under item (3) following. The Federal share will be provided under such laws and regulations as are applicable at the time of financing. In addition to direct government and private appropriations for the non-Federal share, development funds, authority funds, special bond issues, and revenue bonds are available for financing.

(3) For projects such as those for hydroelectric power and water supply, Federal financing may be needed, with provision for reimbursement from non-Federal beneficiaries, as is now practiced. Federal financing may also be required for projects of the types not adequately covered by traditional approaches. This includes large-scale recreation projects and some types of fish and wildlife work.

(4) When the Federal Government assumes the full cost of a project or program, the Federal Government will be responsible for full financing of the work.

SECTION III – PLAN FORMULATION

Selecting and fitting planning segments together and considering alternatives in the search for the proper programs, the proper number of projects, and the best size for each element of the overall plan required extensive analysis. By a series of approximations using the incremental approach and limited by consideration of alternatives and judgment, a plan was formulated containing those programs and projects that are expected to result in maximum benefits above costs in meeting needs to the year 2000.

General Character of Resource Planning

Generally, resource planning recognizes the consequences of land and water resource development and the need to anticipate the future requirements for land and water essential to growth and welfare. The physical and economic aspects of the planning task have been emphasized, particularly as they relate to the scale, sequence, and timing of development plans. However, these considerations have been tempered by the recognition of social, legal, and other institutional factors.

The plan has been developed on the basis that free enterprise persists in the area and in the Nation with Federal and State Governments undertaking those tasks which are beyond individual or voluntary group capacity or which require such action for special physical, economic, social, or other reasons. Local and regional viewpoints were recognized in formulating the plan.

Guides for Plan Formulation

A number of general land and water resource development guides and planning aids were used in weighing and selecting those alternatives which were fitted into an effective plan. In all cases, the effective use of these guides and planning techniques required adherence to the assumptions and criteria outlined in Section II.

Plan Evaluation

Comparison of benefits with costs was one of the principal guides used in plan formulation. These comparisons attempted to cover all beneficial and adverse effects. While favorable primary tangible benefit-cost relations were gener-

ally the principal basis used in selecting programs and projects, intangible costs and benefits were also considered in making the plan. Measurements made reflected existing and probable future economic conditions, including estimates of the probable needs for the many goods and services which land and water development make possible.

Increments and the Scale of Development

To achieve a reasonable scale of development, it was necessary in the formulation process to divide the work into manageable units. Planning units, usually called separable segments or increments, were the smallest units on which there was a practical opportunity for inclusion in or omission from the plan.

To meet the general objectives of maximizing net economic returns and satisfactions from the economic resources used in the plan, each part of the plan was formulated to include each separable segment or increment which would provide benefits at least equal to the cost of that segment or increment with full consideration of intangible values. Plan formulation was completed when analyses demonstrated that: (1) There was need for the goods and services produced, (2) total benefits exceeded total costs, (3) each separable segment or purpose provided benefits at least equal to its cost, (4) the scale of development was such as to provide the maximum net benefits, and (5) there were no more economical means of accomplishing the same purposes.

The Nucleus Plan and the Multiple-Purpose Concept

A specific initial proposal generally was chosen as the nucleus around which planning proceeded. This nucleus usually represented a project or program which seemed to offer promise of meeting a major objective or objectives.

After the initial proposals of development were selected for analysis and benefits and costs measured, consideration was given to larger or smaller scales of development. Variations in the scope of each separable increment were made and tested, and the possibility of additions or omissions examined. Early in this process, the possibility of multiple-purpose projects was con-

sidered. By the process of elimination, the most promising combination of projects and programs was identified and tested to determine where a justified nucleus had been found. The incremental analysis was continued by adding segments of size, purpose, or means, and by evaluating the resulting increments of benefits and costs. Thus, the incremental analysis was a series of comparisons of alternative plans "with" and "without" the inclusion of particular segments. Short cuts were frequent and necessary, but these principles were followed. By this fitting process, modifications were made in the initial plan. This process was continued within practical limitations until the best combination was evolved to meet the established needs.

Sequence of Development

The sequence of project development is basic to maximizing overall project benefits. Project benefit and cost comparisons are misleading unless they represent the incremental benefits and costs of projects in a specified sequence of development. This problem was recognized in the studies by dividing proposed developments into those requiring early action and those which could be accomplished by later action. Further refinement in timing could lead to some changes in incremental benefits and costs.

General Information and Basic Data

Some of the general information essential to planning was available but not always in the most useful form. Much of it required reorganization prior to analysis. While little original research was undertaken, professional interpretations of data and problems were made in the planning processes. The available data on past and current programs and on resource plans underway by Federal and State agencies and, to some degree, those underway by private agencies became a part of the basic planning information.

As the studies progressed, the lack of certain basic data became increasingly evident. Adequate topographic maps with satisfactory contour intervals and horizontal scales for planning, such as the 7½-minute quadrangle sheets, are available for only a small percentage of the area. Hydrologic data are available, on at least a short-term basis, for most major streams, but little data are available for tributaries. Data on water

quality are also generally lacking. Ground water information is meager. Geologic information, also very important, is limited to local areas and to generalized data. Pertinent economic statistics have been less than adequate, except during the last few years. Much of this lack of data can be attributed to the fact that the area has never approached full development of its resources. Consequently, there has been minimum effort to collect basic data. However, greater competition for resource use is beginning, and selection between uses will be increasingly important as the demands increase. Adequate basic data are essential in making proper selections; therefore, steps need to be taken to insure that information will be available when it is needed.

Single-Purpose Planning

Single-purpose planning for each purpose was carried to the point of establishing needs and determining most likely ways of meeting the needs with the least expenditure of resources. Studies for some purposes were carried into more detail than others in examining alternative ways of meeting needs. Where it was apparent that a single-purpose plan could be used without major modification in the comprehensive plan, the single-purpose studies were carried to more detail than in those cases where the purpose would be included, with perhaps major modifications, in a multiple-purpose development.

Multiple-Purpose Planning

Information developed in single-purpose planning and the special problems of the area were the initial bases for development of a multiple-purpose plan.

The programs and projects which served as nuclei for the initial planning were based on the character of the resources, the nature of the problems, and the nature of the land and water projects already established or planned as portrayed in the single-purpose plans. Proposals considered for inclusion in the plan came from many sources. Citizens throughout the area and local development organizations expressed interests in projects of many kinds and suggested combinations of resource use and development which they believed would meet particular needs. Federal and State agencies were also the

source of much information on possible projects and project combinations.

Consideration was given to complementary land and water uses. Following the development of single-purpose ways for meeting needs, studies of compatible resource uses and areas of potential conflict in resource use were made. It was found that needs for forestry, recreation, and fish and wildlife could frequently be met by proper utilization of the same land resource. Similarly, water resource development plans could acceptably serve the purposes of flood control, hydroelectric power, water supply, fishing, and recreation, although operating adjustments had to be considered so that the most favorable multiple-purpose operating arrangements could be assured to maximize overall net benefits.

When sufficient preliminary study had been made, a series of detailed studies were undertaken to choose from among the alternatives those filling the needs most effectively. In this process, the problem of deciding among competing uses sometimes arose and there was always present the need to seek arrangements whereby the greatest play of complementary values would occur. This process involved a repetitious series of adjustments, in varying degrees of refinement, combined with progressively refined economic, hydrologic, and engineering comparisons, until the best combination of proposed developments was found.

In the course of planning, consideration was also given to possibilities for accommodating purposes not specifically identified in the authorizing Act such as providing for road or railroad routing over dams. Consideration was also given to unplanned effects such as those related to water storage reservoirs: That of lost valley storage on flood movements and that of storage on water quality. These effects are not considered to be prejudicial to plan features, however, detailed consideration of them is required prior to construction of reservoir projects.

Nature and Treatment of Alternatives

In resources planning, comparison of alternatives is a vital part of the planning process. It is necessary to understand the nature of projects

and programs rejected and the reasons for rejection, as well as the character of those accepted in the plan. Information on alternatives considered is summarized in the basin appendixes. Additional detail concerning the nature of the alternatives considered and the reasons for their acceptance or rejection in the final plan are included in the Planning Appendix.

Competitive Uses

Many resource uses are competitive in character. The principal guidelines established and generally followed in determining the use of land and water resources are summarized as follows: (1) Resource utilization was based on and limited to the projected future needs, and (2) economic efficiency was a major governing criterion in deciding between alternative uses of a given resource, with due consideration given to social, political, and physical factors. Some of the situations requiring special attention are: (1) Existing, reserved, or special use land and water resources; (2) public health; (3) special requirements involving areas that provide a particular type of land or water use that cannot be duplicated elsewhere at a reasonable cost; and (4) those resources to which priority considerations should be given because of long established or firmly fixed development trends.

Adjustment Among Basins in Planning

Interbasin relations were recognized, to the extent practicable, when Southeast River Basins needs were developed and distributed among basins to provide planning objectives for each basin. For example, user-days of recreation demand for a given population center were distributed to all basins within reasonable travel distance from the center rather than being allocated exclusively to the basin within which the center lies. A check was made to insure that the overall cost of meeting each need was not inflated by unreasonable disparities in unit costs. Adjustments among the basin segments were made where reasonable alternatives were available and where overall efficiencies could be improved by the adjustments.



Figure 3.1 Forests, Major Resources in Each of the Eight Basin Planning Segments, Provide Wildlife Habitat and Recreational Opportunities as Well as Forest Products.

PART FOUR – COMPREHENSIVE PLAN FOR THE SOUTHEAST RIVER BASINS

The comprehensive and coordinated plan for the Southeast River Basins is a multi-billion dollar plan which, when implemented, will produce many beneficial physical and economic effects. This complex plan is designed to serve a wide range of purposes by many different means.

The comprehensive plan for the Southeast

River Basins includes land and water resource developments that contribute to meeting the needs projected to the year 2000. Resource developments existing and under construction as of 1960 are a necessary part of the plan to meet the needs. However, only proposals for new developments and for expansion of existing devel-

TABLE 4.1
Plan Features
(thousands of dollars)

Project or program	Purpose ¹	Benefits Annual equiva- lent ²	Costs		
			Annual equiva- lent	Early action	Total Investment
Local flood protection	FC	1,327	596	6,619	13,920
Upstream watersheds	FC, D	14,310	6,510	92,820	134,800
Water supplies ³					
Domestic	WS	⁴	4,312	110,400	110,400
Municipal	WS	⁴	45,990	175,100	590,700
Industrial	WS	⁴	10,390	20,180	55,420
Navigation ³	N	6,615	5,558	9,050	51,280
Irrigation ³	I	14,980	6,866	14,150	29,120
Drainage ³	D	3,453	281	1,083	2,795
Soil conservation	SC	28,750	20,610	83,490	202,000
Forest conservation	F	44,400	24,900	310,700	643,400
Sport fisheries and wildlife ³	F&W	28,560	15,370	11,290	50,620
Commercial fisheries	F&W	5,062	3,615	700	1,434
Recreation ³	R	97,490	29,780	175,300	442,400
Pollution abatement ³	PA	⁵	28,870	402,500	926,500
Public health ³	PH	⁵	13,660	8,600	18,460
Water-access areas	R, F&W	27,830	7,532	41,940	78,850
Specific projects					
Savannah basin	P, R, F&W, N	73,500	54,320	279,300	808,900
Ogeechee basin	R, F&W	5,140	1,553	22,460	26,710
Altamaha basin	P, R, F&W, WS	25,140	17,940	185,400	317,400
Satilla-St. Marys basins	F&W, R, PH, I, FC, PA	3,366	1,308	16,310	25,330
Suwannee basin	FC, R, I, PA, F&W	6,980	3,507	27,910	61,470
Ochlockonee basin	R, F&W, PA, PH, T, L, D, WS, N	9,614	6,032	11,300	127,500
Apalachicola-Chattahoochee- Flint basins	P, N, FC, R, F&W, WS, PA	55,750	39,930	274,500	754,900
Choctawhatchee-Perdido basins	FC, R, F&W, P	8,063	3,944	56,610	65,580

NOTES: ¹ FC – Flood control I – Irrigation F&W – Fish and wildlife PH – Public health
 WS – Water supplies P – Hydroelectric power R – Recreation L – Landfill
 N – Navigation SC – Soil conservation PA – Pollution abatement T – Transportation
 D – Drainage F – Forest conservation

² Primary tangible only.

³ Data presented are exclusive of benefits and costs associated with multiple-purpose projects included elsewhere in this table.

⁴ Benefits are assumed to be at least equal to the cost of the cheapest alternative and are assigned monetary values only for multiple-purpose developments.

⁵ Justification is based largely on intangible benefits except for pollution abatement resulting from dilution water provided by multiple-purpose projects.

TABLE 4.2
Plan Features — Investment by States
(thousands of dollars)

Project or program	Purpose ¹	Georgia	South Carolina	North Carolina	Florida	Alabama
Local flood protection	FC	8,710	—	—	870	4,343
Upstream watersheds	FC, D	90,620	11,610	—	32,530	—
Water supplies						
Domestic	WS	78,820	10,300	500	12,790	7,970
Municipal	WS	446,200	23,630	—	91,580	29,280
Industrial	WS	22,260	50	—	23,310	9,800
Navigation	N	27,190	—	—	22,690	1,400
Irrigation	I	22,420	889	8	4,383	1,420
Drainage	D	2,014	185	3	342	251
Soil conservation	SC	143,300	8,619	131	23,010	26,910
Forest conservation	F	353,900	36,060	2,110	181,400	69,950
Sport fisheries and wildlife	F&W	38,440	1,315	—	8,749	2,117
Commercial fisheries	F&W	687	30	—	717	—
Recreation	R	199,200	2,096	—	170,500	27,450
Pollution abatement	PA	653,700	32,670	—	191,400	48,700
Public health	PH	15,450	460	—	2,300	250
Water-access areas	R, F&W	39,000	1,809	—	31,600	6,492
Specific projects ²						
Savannah basin		148,100	120,000	25,330	—	—
Ogeechee basin		26,710	—	—	—	—
Altamaha basin		317,400	—	—	—	—
Satilla-St. Marys basins		21,430	—	—	3,900	—
Suwannee basin		60,200	—	—	1,270	—
Ochlockonee basin		10,460	—	—	117,000	—
Apalachicola-Chattahoochee-Flint basins		384,600	—	—	3,530	2,250
Choctawhatchee-Perdido basins		—	—	—	15,660	10,400
Undistributed between States						
Georgia		—	478,900	—	12,000	379,900
Georgia, North Carolina, South Carolina		52,400	52,400	52,400	—	—
South Carolina		478,900	—	—	—	—
Florida		12,000	—	—	—	39,520
Alabama		379,900	—	—	39,520	—

NOTES: ¹ FC — Flood control D — Drainage F — Forest conservation PA — Pollution abatement
 WS — Water supplies I — Irrigation F&W — Fish and wildlife PH — Public health
 N — Navigation SC — Soil conservation R — Recreation

² See basin plan tables in Section II for projects and purposes.

opments to be made during the period 1960-2000 are presented in Part Four and their costs and benefits evaluated. Projects and programs that are necessary to meet the area needs in the immediate future are in the early action phase.

The comprehensive plan is intended as a guide toward more efficient satisfaction of the human needs than would be the case in the absence of the plan. The needs to be satisfied are local, regional, and national. They have been quantified for planning purposes by using projections of population, income, and related indicators of human need. Justification of the plan features

is found not only in the tangible benefits but also in the intangibles associated with resources conservation and development.

Because surface water resources are prominent in the area and can best be viewed in a drainage basin context, the area is subdivided into eight planning segments named for the principal stream or streams within them. Programs for conservation, management, and food and fiber production are areawide for the most part. In general, their intensity is divided among the eight basin planning segments in accordance with the area of suitable land available. Proj-

ects involving water storage tend to be less evenly distributed among and within basins because of physical variations and a nonuniform distribution of population. Pertinent data and the comprehensive plan for each basin segment are summarized in Section II of this Part.

A fairly large portion of the plan is phased for early action in the near future, which is taken as the first 15 years of the 40-year implementation period. Not only are the needs growing but there are also existing unsatisfied needs requiring resources development. The remainder of the plan is to be implemented as required through the last 25 years of the period.

Implementation of the comprehensive plan

requires a combination of non-Federal and Federal effort. Further detailed planning and data collection will be needed as portions of the plan are implemented as will regular review and adjustment to keep the plan responsive to changing conditions. The broad non-Federal and Federal responsibilities are cited as part of the plan and the Federal agency with principal Federal responsibility is designated. Cost sharing and financing considerations are also part of the plan.

Several proposals have been designated as having special value for demonstrating new approaches to resource development. Additional Federal financial assistance is considered desirable for these demonstration projects.

TABLE 4.3
Physical Data — Multiple-Purpose Storage

Basin and project	Purpose*	Drainage area (sq. mile)	Height of dam (ft.)	Reservoir — normal full pool	
				Area (acre)	Capacity (1,000 acre-ft.)
Savannah					
Horsepasture	P, R	33	190	475	22
Jocassee	P, R, F&W	147	360	7,000	1,080
Newry-Old Pickens	P, R, F&W	451	160	18,400	920
War Woman	P, R	163	195	3,110	148
Sand Bottom	P, R	178	105	115	5
Rogues Ford	P, R	193	133	253	11
Camp Creek	P, R, F&W	258	126	260	15
Tallow Hill	P, R, F&W	749	215	18,500	1,020
Anthony Shoals	P, R, F&W	1,490	77	14,400	245
Trotters Shoals	P, R, F&W	2,890	170	21,800	845
Burtons Landing	N, P, R, F&W	8,650	65	59,000	730
Stokes Bluff	N, P, R, F&W	9,850	55	55,000	750
Gaffney Landing	N, R, F&W	10,000	20	2,800	20
Ogeechee					
Groveland	R, F&W	845	53	16,750	320
Altamaha					
Curry Creek	F&W, R, WS	181	78	5,800	172
Big Flat Creek	R, F&W	38	70	1,420	22
New Bethel	R, F&W	191	85	1,540	33
Laurens Shoals	P, R, F&W	1,840	165	38,700	1,070
Peachstone	P, R, F&W	372	123	6,500	197
Goose Creek project					
(a) Ohoopee	P, R, F&W	13,220	65	46,000	665
(b) Goose Creek	P, R, F&W	60	85	4,000	86
Abbeville	P, R, F&W	4,500	73	54,200	1,475
Coopers Ferry	P, R, F&W	4,950	71	54,000	1,050
Satilla-St. Marys					
Big Satilla	F&W, R, I	252	50	7,500	81
Axson	F&W, R, PA, I	400	50	6,000	61
Nassau River Embayment	F&W, R, FC, PH	339	30	25,000	73
Upper Hurricane	F&W, R, PA, I	97	40	5,400	54
Broxton	F&W, R, PA	50	35	1,000	7

(continued)

TABLE 4.3—Continued

Basin and project	Purpose*	Drainage area (sq. mile)	Height of dam (ft.)	Reservoir — normal full pool	
				Area (acre)	Capacity (1,000 acre-ft.)
Suwannee					
Shiloh	FC, PA, I, R, F&W	866	55	14,000	150
Franks Creek	F&W, R	30	40	800	10
Tifton	PA, R, I, FC, F&W	110	28	3,400	27
Hixtown Marsh	F&W, R, I	60	8	9,900	22
Moultrie	FC, PA, I, R, F&W	29	34	1,650	19
Mud Swamp	F&W, R, I	22	17	2,400	9
Okapilco	FC, R, I, F&W, PA	270	45	7,600	77
Quitman	R, F&W	279	24	640	4
Nashville	FC, I, R, F&W, PA	125	48	3,900	65
Ashburn	I, R, FC, PA, F&W	16	30	500	3
Alapaha	PA, F&W, R, FC, I	631	37	10,200	84
Ochlockonee					
Doerun	PA, R, F&W	31	35	740	7
Quincy	WS, R, F&W, PA	9	42	490	10
Thomasville	R, F&W, PA, FC	316	46	4,100	36
Tired Creek	R, F&W, PA, WS	33	45	1,350	19
Apalachicola-Chattahoochee-Flint					
Cedar Creek	P, FC, R, F&W	2,430	87	16,300	318
Dog River	F&W, PA	66	117	3,400	100
Franklin	P, N, R, F&W	2,682	88	6,750	118
West Point	P, FC, R, F&W	3,380	120	23,500	553
New Riverview	P, N, R, F&W	4,600	60	3,000	50
Columbus	P, N, R, F&W	4,640	60	1,000	20
Spewrell Bluff	P, N, FC, R, F&W	1,210	180	16,800	500
Lazer Creek	P, N, FC, R, F&W	1,410	142	9,900	297
Lower Auchumpkee	P, N, FC, R, F&W	1,970	130	15,600	403
Raccoon Creek	N, R, F&W	5,570	58	2,900	20
Lower Vada	P, N, R, F&W	7,110	70	12,800	117
Kinchafoonee	F&W, FC	159	70	1,200	10
Muckalee Creek	FC, R, F&W, WS	52	45	1,200	14
Omussee Creek	R, F&W	50	45	1,000	9
Choctawhatchee-Perdido					
Crestview	P, R, F&W	616	100	49,500	1,580
Ariton	FC, R, F&W	592	50	5,000	40
Deadening Lakes Development	F&W, R	70	50	300	3
*FC — Flood control		I — Irrigation		F&W — Fish and wildlife	
WS — Water supplies		P — Hydroelectric power		R — Recreation	
N — Navigation		SC — Soil conservation		PA — Pollution abatement	
D — Drainage		F — Forest conservation		PH — Public health	

SECTION I — COMPREHENSIVE PLAN PURPOSES

The comprehensive plan data in this Section relate to the new features and to expansions or improvements of existing features. Plan purposes are introduced in the order they appear in Public Law 85-850 authorizing the study. Tables contain primary tangible benefits and costs.

Secondary and intangible benefits and other

impacts are also important considerations in plan formulation and justification. Where appropriate, these are treated in narrative to indicate special related effects over and above those of general environmental improvement.

Investments earmarked for the early action phase of the plan are shown separately.

TABLE 4.4
Benefits and Costs of the Comprehensive Plan
 (thousands of dollars)

Purpose	Benefits	Costs	
	Annual equivalent ¹	Annual equivalent	Investment
Flood control (FC)	14,130	8,342	180,700
Water supplies (WS)	²	60,810	759,000
Navigation (N)	30,170	26,430	401,600
Irrigation (I) and drainage (D)	23,530	8,725	65,700
Hydroelectric power and industrial development (P) ³	66,030	62,930	1,042,000
Soil conservation (SC)	28,750	20,610	202,000
Forest conservation (F)	44,400	24,900	643,400
Fish and wildlife (F&W)	42,410	26,000	180,700
Recreation (R)	197,300	63,300	947,000
Salinity and sediment control	⁴	⁴	⁴
Pollution abatement (PA) and public health (PH)	⁵	49,130	1,063,000
Other beneficial purposes ⁶	2,304	2,210	55,350

NOTES: ¹ Primary tangible only; the intangible and secondary benefits and impacts considered are presented in narrative.
² Benefits are assumed to be at least equal to the cost of the cheapest alternative and are assigned monetary values, totaling \$162,000, only for multiple-purpose developments.
³ No specific features for industrial development.
⁴ Included in soil conservation, forest conservation, and flood control.
⁵ Justification is based largely on intangible benefits except for pollution abatement resulting from dilution water and vector control, totaling \$11,120,000, provided by multiple-purpose projects.
⁶ Beach erosion control and hurricane protection (studies only), landfill, land transportation, and low-flow augmentation in addition to that needed for pollution dilution.

Flood Control and Prevention

The flood control features are of two general types: (1) Upstream watershed projects and (2) facilities for mainstream flood control and protection. The latter includes provision of storage, chiefly in major impoundments, and of local protection works. The upstream watershed projects, while identified with flood control and prevention, also generally include provisions for land treatment and drainage.

Flood control benefits would be provided by one major impoundment in the Satilla-St. Marys basins, seven in the Suwannee basin, one in the Ochlockonee basin, seven in the Apalachicola-Chattahoochee-Flint basins, and one in the Choctawhatchee-Perdido basins. Local protection works, mainly levees, included in the plan would be for St. Marks, Florida; for nine areas on the Apalachicola-Chattahoochee-Flint and Chipola Rivers in Georgia, Alabama, and Florida; and for two locations in the Alabama portion of the Choctawhatchee-Perdido basins. In addition to

the features in the plan specifically for flood control, storage capacity designed for other purposes would provide some degree of additional control in the basins affected.

Upstream watershed projects in the plan would provide watershed protection, flood damage reduction, and water resources development for other purposes. These projects would be located in tributary areas aggregating 12.2 million acres. Of these, 11.6 million acres are in addition to those approved as of January 1960. The upstream watershed projects would have substantial beneficial effects in reducing sediment damages. To the extent that the upstream watershed projects are developed and made available to the general public, they would provide recreation and fish and wildlife benefits. They would also provide a physical base for development of municipal and industrial water supplies and other purposes which have not been included as features of the plan. As such developments occur in the upstream watershed projects, the fea-

tures included in the Southeast River Basins comprehensive plan to meet projected needs in water supply, recreation, or other purposes would be adjusted during the course of periodic plan reviews.

In addition to the flood damage reduction afforded by measures in the plan which physically alter the character of flooding, reduction or prevention of flood damages can be accomplished by flood forecasting and warning systems and through flood plain management which utilizes zoning, building codes, and other regulatory devices to prevent encroachments and to reduce susceptibility of property to flood damage.

Projects in the plan would reduce average annual flood damages, which, otherwise, could be expected to occur under conditions projected for the year 2000, by about \$4.5 million. Many areas of low production agricultural land would be protected sufficiently to permit conversion to more productive uses. These effects of the plan would bring about substantial benefits in addition to those from flood-damage prevention under existing land uses. With some of the local protection works, there are also measured benefits from the higher use of land for industrial and other purposes encouraged by the plan features.

Water Supplies

The features for municipal, industrial, and domestic water supplies include the development or improvement of water supplies, treatment facilities, and distribution systems. Water made available by the features of the plan would supply municipal, industrial, and domestic needs of about 3.8 billion gallons per day by the year 2000.

An increase of municipal water systems to include all communities projected to reach 800 or more people by the year 2000 is envisioned. Surface sources would be developed for the larger centers. Water supply is a planned purpose in four of the multiple-purpose projects and could be developed at others. Included in the system development would be treatment facilities, disinfecting equipment, elevated storages, and expansions of the distribution systems. The municipal water supply features of the plan would provide about 1.83 billion gallons of

water per day by the year 2000.

Industrial water requirement for the year 2000 is projected to be about 1.85 billion gallons per day in addition to that which would be supplied by municipal water supply systems. These industrial requirements would be met by the development of new wells, surface water intakes, treatment plants, and storage facilities.

Domestic water systems are expected to decline in number between 1960 and the year 2000 because of the decline in rural farm population and the expansion of municipal water systems. However, the domestic water supply features of the plan include new wells, covers and seals for existing wells, additional pressure systems, and pumps and motors to make up for deficiencies. The plan features would provide 92 million gallons per day of domestic water by the year 2000.

Navigation

Measures for improving and safeguarding navigation include enlarging facilities and capabilities of deep-water ports, coastal waterways, and inland waterways. These projects would permit the handling of an additional 16.5 million tons annually at the six deep-water ports and would permit the passage of 44.5 million tons annually or 6.6 billion ton miles of additional traffic on the coastal and inland waterways of the Southeast River Basins by the year 2000. The major new features of the navigation plan include the extension of navigation from Columbus to Atlanta on the Chattahoochee River and to Albany on the Flint River, the extension of the Intra-coastal Waterway through the southeastern coastal reach of the Ochlockonee and Suwannee basins, and improvement of the existing navigation on the Savannah River to Augusta. The project for extension of navigation from Columbus to Atlanta is based upon the estimated need for waterway movement of bulk commodities in the future and on current practices and techniques in the transportation field, rather than on possible technical improvements. More detailed analyses of the transportation network in general, and of this waterway extension in particular, will be required prior to its construction.

Industries that supply or consume large quantities of bulk commodities generally find it advantageous to locate on navigable waterways. Improved waterways and harbors, in one sense,

are parts of mass-production lines for moving raw, partially processed, and finished bulk materials. The bulk handling industries, such as those utilizing or producing large volumes of agricultural products, metals, fuels, and forest products, attract many corollary industries and thereby extend the important economic impacts of the improvements.

Reclamation, Irrigation, and Drainage

The features for irrigation, mainly by sprinklers, and drainage, mainly by open ditches, would be areawide. The increased production from the acreage involved in applying these measures would replace that which otherwise would come from economically marginal lands.

An additional 209,000 acres are expected to be irrigated by individual systems by the year 2000. Two cash crops, tobacco and vegetables, would account for most of the irrigation; however, it would also be used for other crops, pasture, and nurseries where this would give an economic advantage.

Individual farm drainage is expected to be applied to an additional 183,000 acres of cropland and pastureland. Also, some group drainage development would be accomplished by channels in upstream watershed projects. Drainage in forests is included in forestry measures. Land drainage would be applied to both the agricultural and forest land largely by surface facilities. It would generally be employed to increase operating efficiencies. The outlets provided by the joint-purpose channels in upstream watershed projects will facilitate installation of some of the individual farm drainage.

Water for lawns and gardens in municipal, industrial, and park areas is included in the water supply features of the plan rather than as irrigation.

Hydroelectric Power and Industrial Development

The projected demands for electricity in the Southeast River Basins far exceed any potential which the area has for hydroelectric power development. The plan features would develop much of the remaining area potential for hydroelectric power, largely for peaking. Peaking power fitted into system load is high-value power.

The facilities in the plan would produce 3.6 billion kilowatt-hours of energy from an installed capacity of 2.5 million kilowatts. All of the hydroelectric power would be developed in multiple-purpose projects. The installed capacity in 12 projects in the Savannah basin would total 1,466,000 kilowatts; in 5 projects in the Altamaha basin, 388,000 kilowatts; in 9 projects in the Apalachicola-Chattahoochee-Flint basins, 600,000 kilowatts; and in 1 project in the Chocotawhatchee-Perdido basins, 47,000 kilowatts.

The availability of additional hydroelectric power for peaking, coupled with other factors favorable to manufacturing growth, would help to spur industrial development. The plan will also provide more dependable and better quality water for use by steam-power installations.

There are no features that will directly provide industrial development. However, this plan will enhance the environment for industrial development. Nearly all of the planned projects and programs will have some encouraging effects on the growth of manufacturing as well as non-manufacturing industries. The projected growth of industry is discussed in Part One.

Soil Conservation and Utilization

The features for soil conservation and utilization are areawide in their application. Included as conservation features are contour farming, establishing grassed waterways, terracing, and other modern management practices for cropland, pastureland, and rangeland. Grassland would be renovated, pastures planted, and proper range uses employed. These measures would be applied in some degree on about 6.7 million acres. Also included are land-use adjustments to provide for use of land within its capabilities, and important conservation aspects of upstream watershed projects.

In addition to conserving the soil resource, these improved practices would provide a base for increased agricultural production. Conservation practices also would provide collateral benefits through reduction of turbidity in streams and sediment damage to drainage ways, cropland, roads, fish and wildlife habitat, and reservoirs. The soil conservation and utilization program, along with the drainage and irrigation measures, will promote overall agricultural development in the area. Some lands not now

needed for food and fiber production could be developed for recreation use as an interim measure. The impacts of an improved agricultural environment will be felt throughout the area economy.

Forest Conservation and Utilization

The forestry program would be areawide and would affect about 65 percent of the total land area in the Southeast River Basins. Major items in the forestry plan are: (1) Technical assistance for managing and harvesting timber and for applying other recommended measures; (2) commercial and noncommercial thinning to help bring forest stands to better operating conditions; (3) tree planting and site preparation for natural regeneration and seeding; (4) detecting and controlling insect and disease infestations; (5) woodland drainage to help eliminate standing surface water in the forest, with drainage ditches gated to maintain desired water levels; (6) forest-fire protection by providing additional facilities such as tractors and fire towers and by increasing the number of personnel assigned to detection, fire weather forecasting, and suppression activities; (7) fencing overgrazed woodland areas to control grazing and prevent damage to tree seedlings by livestock; (8) road building for management and protection purposes, using drainage ditch spoil where feasible; (9) intensified education and information programs; and (10) accelerated studies.

Employment of these measures over and above the degree already practiced would enable woodland owners to meet the need for an increase of about 1.2 billion cubic feet per year in forest production by the year 2000. Production requirements for pulpwood, gum-naval stores, and other wood products would be met.

Increased timber production is of great importance to the Southeast River Basins because raw materials are necessary for the growth of manufacturing both in the area and in the Nation. Pulp and paper employment is expected to more than double by the year 2000, and lumber and wood products manufacturing is expected to make substantial gains. Increased forest activities can mean increased expenditures for equipment, supplies, taxes, services, payrolls, and housing, and these will have positive economic impacts.

Implementation of the forestry program would improve the condition of forest soil and as a result would reduce erosion and storm runoff. Recreation possibilities would be enhanced and better wildlife habitat provided.

Fish and Wildlife

Features for fish and wildlife are of two general types: (1) Commercial fisheries and (2) sport fishing and wildlife. The plan for commercial fisheries includes expansion of existing operations; development of methods for optimum utilization of desirable species in both marine and fresh waters; rehabilitation of oyster-producing reefs; and cultivation of shrimp, pompano, and other high quality food fish under controlled conditions. Also included are acceleration and expansion of existing facilities and going programs with a view toward more efficient harvest, better methods of handling and processing the catch, new sources of supply, sound regulations and enforcement, and increasing the demand for domestic products.

The commercial fishing industry generally is plagued by the vagaries of weather, seasonal fluctuation of supplies, pollution, precarious market conditions, lack of good conservation practices, and competitive products. Under these circumstances, it is doubtful that many persons will attempt to develop the commercial fishery potentials of the basins until the economic feasibility of such ventures can be clearly demonstrated. The opportunities available, however, are of such magnitude as to justify vigorous effort. An improved fishing industry would have the side effect of increasing employment in boat building, supplies, and other related services in the coastal areas. The plan envisions an increase in commercial fishery landings of about 100 million pounds by the year 2000; a little more than half of this would be for food. The remainder would be for fish meal, animal food, and other purposes. Large quantities of fish now discarded or not harvested may be used in the future for fish protein concentrate, a high protein diet supplement.

The wildlife and sport fishery features would be instituted throughout the land and water areas of the Southeast River Basins. Features of the areawide wildlife program include (1) habitat improvement on State-owned land not ad-

ministered for wildlife purposes, (2) further development of habitat within the national forests and other large publicly managed land holdings, (3) establishment and development of additional wildlife management areas, (4) development of dove fields and other public hunting areas, (5) acquisition and development of certain selected wetlands in the area, (6) extensive management of wildlife habitat by interested landowners in cooperation with State and Federal conservation agencies, and (7) the expansion of current activities and research, planning, education and information, management, and enforcement.

The features for sport fisheries include measures to improve rivers for sport fishing; renovation and more intensive management of existing and prospective large and small impoundments; development of public access areas to streams and large impoundments; expansion of services and facilities for marine sport fishermen, including additional fishing piers and artificial reefs; the expansion of existing hatcheries to meet the needs for stocking and renovation of surface waters; and the expansion of current research, planning, education, information, management, and enforcement activities.

The measures for sport fish and wildlife would provide for an additional 22.7 million user-days of fishing, about three-quarters of which would be on fresh waters, and 4.6 million more user-days of hunting, while at the same time maintaining adequate fish and wildlife populations. Fish and wildlife, as a purpose, is included in nearly all of the multiple-purpose projects.

The expenditures of sportsmen utilizing these new or improved facilities would add much to the economic activities of the area. Additional employment opportunities would be afforded by many small businesses engaged in such activities as boat building, dock operation, supplies, and services to the sportsmen. Less tangible are the benefits to be derived through the general enhancement of recreational opportunities.

Recreation

In addition to the facilities or opportunities for increased hunting and fishing, the comprehensive plan provides a broad program for outdoor recreation. Projects and facilities in the plan for recreation are generally of two types:

Those for esthetic and physical enjoyment; and those of historical or cultural interest. For both of these types, the plan includes expansion or improvement of existing features and the development of new areas. As with the sport fishing facilities, a large percentage of the recreation opportunities provided for in the plan would be associated with major water-storage developments and public access areas. Over 200 of these recreation access areas are in the plan. They would provide not only right-of-way but also parking, picnicking, and boat launching facilities on streams and lakes. These areas, although available for use by fishermen, are in addition to access strictly for fishing as provided in the fish and wildlife aspects of the plan.

The expansion of existing recreation areas and development of new areas in accordance with the comprehensive plan would provide for an estimated increase between 1960 and 2000 of 195 million user-days annually in outdoor recreation, thus raising the total provided for to 230 million user-days. Expansion of existing facilities and areas would accommodate some 44 percent of this increase, and new development would accommodate 56 percent. Coastal beaches with improved access and development would accommodate one-third of the increase; developments on inland reservoirs, about one-third; and other areas such as the access areas, the mountains, and the historic and unique sites would account for the remainder.

In addition to meeting the demands for recreational activities, as such, the proposals in the plan would enhance the related and highly important tourist industry and make the area generally much more attractive to other industries and potential residents from other parts of the country. The recreation proposals, when implemented, would also tend to perpetuate the land and water resources in a condition suitable for continued use and appreciation.

Salinity and Sediment Control

No measures are included in the comprehensive plan exclusively for salinity or sediment control. Soil salinity is not generally a problem in the area since it is confined almost entirely to tidal marshlands. Salinity is, however, a threat to water supplies in some coastal sites where pumping from fresh-water aquifers has been ex-

cessive. This threat can be removed by rationally controlled development of water supplies in the coastal area. Sediment control would result largely from land-treatment measures applied on rural and urban land where cover has been disturbed or is otherwise insufficient to prevent erosion and prudent highway construction and maintenance practices.

Pollution Abatement and Public Health

The pollution abatement and public health features of the comprehensive plan would have areawide implementation. The pollution abatement features are designed to provide satisfactory water quality in the face of the large projected growth. All towns with 800 or more people would be served by systems of sanitary sewers and treatment plants designed to remove at least 35 percent of the organic contamination before waste water is discharged into streams. A higher degree of pollution abatement is included in the plan for the larger, more concentrated, municipal sources of pollution.

In addition to the pollution control obtained through sewage treatment and collection facilities, water-quality improvement would result from the low-flow augmentation from storage provided in many of the multiple-purpose water-storage projects in the plan. Regulated flows from reservoirs not specifically including abatement storage would also be beneficial, but these effects have not been evaluated.

For related public health measures, the plan includes provision of sanitary landfills or incinerators for disposing of solid waste at all towns estimated to have over 500 people by 2000. There would be areawide insect and rodent control programs, including surveillance by qualified conservationists. There would be monitoring of air contamination as needed to develop control and protection measures.

The public health features of the plan would greatly improve the environment and thereby enhance land values not only for recreation and fishing habitat but also for industrial and residential developments.

Other Beneficial Purposes

There are no development features specifically identified for purposes other than those listed

above, except that highway transportation and landfill are set out as purposes in one multiple-purpose project. Streamflow improvement for general betterment not specifically identified with pollution abatement, water supply, recreation, fish and wildlife, hydroelectric power, and other identifiable purposes is recognized as a valid project purpose. However, all augmentation water provided for in the plan is for one or more of the purposes named above.

The plan proposes continuation and improvement in the hurricane warning system and further studies of beach erosion control and hurricane protection possibilities. Also outlined is the need to obtain topographic and geologic maps, streamflow data, data on changes in water quality, and information on land and water use to improve and add to the basic data on area resources. These additional data are essential to the final design and implementation of many of the comprehensive plan features.

Measures in the comprehensive plan will require thorough evaluation of program and project effects in the detailed planning prior to plan implementation. Such planning studies should include an evaluation of changed characteristics in flood movement where a reservoir inundates natural valley storage areas and an evaluation of likely changes in the quality of stored water.

The forecasting of streamflow is essential in the proper management of water resources. Flood forecasting is a widely used technique in reservoir operation and for warnings in areas unprotected by physical control of floodwater. Future use and regulation of streams will require forecasts of flow, both high and low, as far in advance as is practicable. All river-related purposes, such as recreational boating, fishing, navigation, hydropower operation, water supply, pollution abatement, public health, irrigation, and flood control, are benefited by advance information as to the expected flows. The costs of forecasting are relatively small and are included in the overall project and program costs. The benefits are also included in the assumption that the best possible forecasts will be available. These benefits are not achieved automatically. A deliberate program which recognizes the necessary lead time for development of a reporting network and other facilities is required.



Figure 4.2 *Phenix City, Alabama, and Columbus, Georgia, at the Head of Barge Navigation on the Chattahoochee River.*

SECTION II – SEGMENTS OF COMPREHENSIVE PLAN

The overall needs and production goals of the Southeast River Basins, as determined by analyses of current conditions and trends and projections, were allotted to the basin segments according to the growth potentials exhibited in each. Plans for each basin segment share in the satisfactions of needs of the basin, the study area, and the Nation.

Some similarities exist among all the basin segments in resources capabilities and opportunities for development. Differences also are apparent. Equally obvious are intrabasin differences resulting from geologic and economic patterns.

Two of the basins, Savannah and Apalachicola-Chattahoochee-Flint, extend from the mountains to the sea. These basins have the major hydropower developments and potentials for

development in the study area. They are the only ones extensively developed for inland navigation. Together, these two basins embrace all or part of five of the seven Standard Metropolitan Statistical Areas in the study area.

Each of the basins has extensive forests as well as important agricultural lands. All have resources with potentials for developing or expanding recreation possibilities.

Each of the basins has resource related problems to face now and in the future. All share, to some extent, the problems attending the shift from rural to urban-industrial emphasis in the economy.

The eight basin appendixes to this Report contain the supporting data for the following basin plan summaries.



Figure 4.3 *Rainbow Falls—The Upper Savannah Basin Contains Many Natural Beauty Spots.*

resources of the Blue Ridge Mountain area. Projects located on the lower Savannah River would provide for pollution abatement and navigation to Augusta. Upstream watershed projects would provide for flood control and drainage, and water-access areas scattered throughout the basin would permit more extensive use of the

surface water resources. Also included in the plan are more general or basinwide developments for water supplies, irrigation, drainage, soil conservation, forest conservation, recreation, and pollution abatement and public health so that the projected needs of the people in the basin can be satisfied to year 2000.

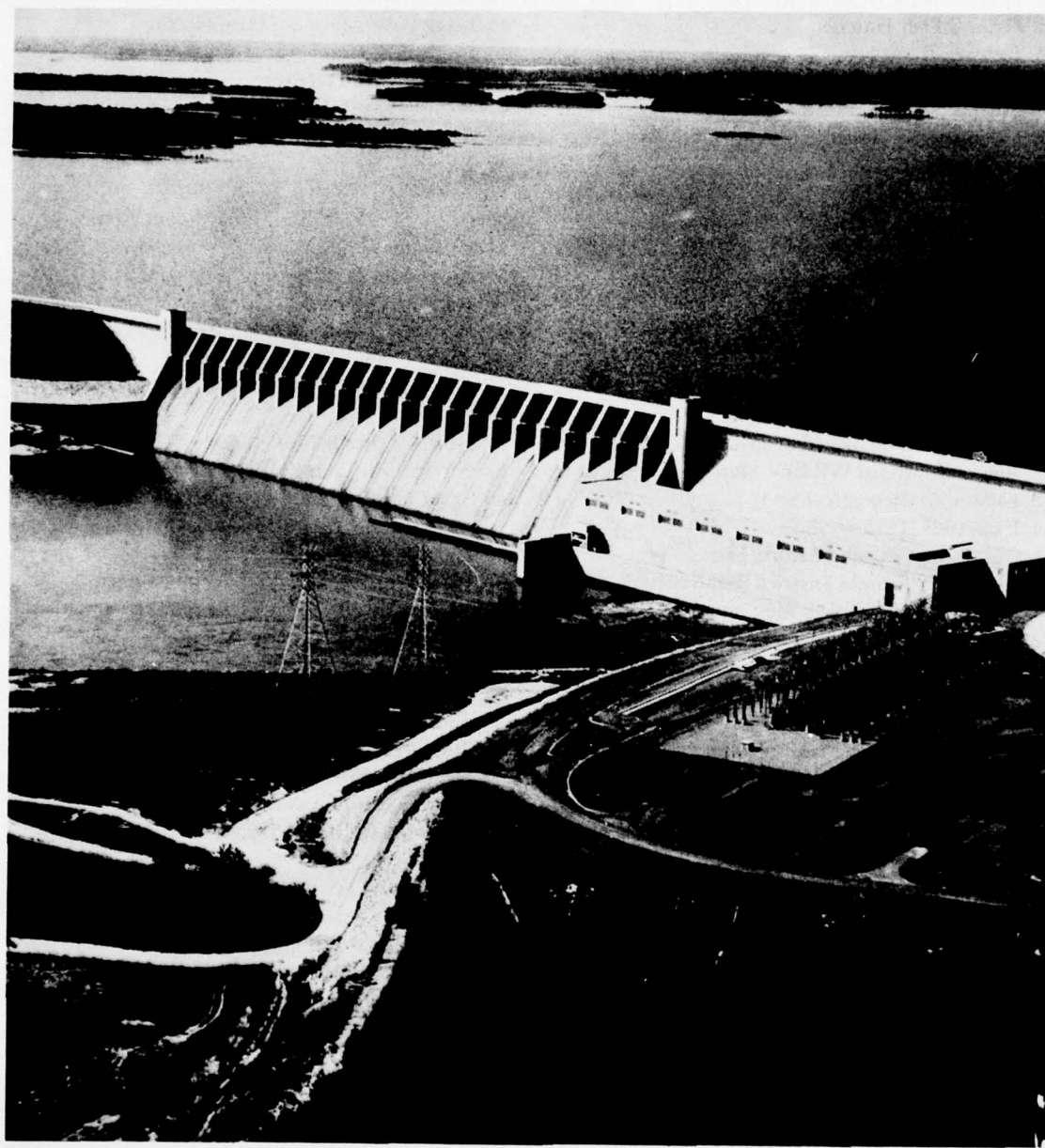


Figure 4.4 Clark Hill Dam and Reservoir, a Federal Project on the Savannah River in Georgia and South Carolina, Provides Space for Storing Floodwaters and Water for Navigation, Power, and Recreation.

SAVANNAH BASIN PLAN FEATURES

(key to numbers on Figure 4.5)

- Highlands Project Area
- 1 Blue Ridge Parkway
- 2 Horsepasture Reservoir
- 3 New Fish Hatchery
- 4 War Woman Wildlife Refuge
- 5 Federal Fish Hatchery
- 6 Jocassee Reservoir
- 7 War Woman Reservoir¹
- 8 Burrels Ford Wildlife Management Area
- 9 Lake Burton Wildlife Management Area
- 10 State Fish Hatchery
- 11 New Fish Hatchery
- 12 Sand Bottom Reservoir¹
- 13 Rogues Ford Reservoir¹
- 14 Blue Ridge Wildlife Management Area
- 15 Old Pickens Reservoir
- 16 Keowee Archeological Site
- 17 Camp Creek Reservoir¹
- 18 Chauga Game Management Area
- 19 Newry Reservoir
- 20 Clemson Game Management Area
- 21 Black Mountain Wildlife Management Area
- 22 Estatoe Archeological Site
- 23 Hopewell Historic Site
- 24 Old Stone Church Historic Site
- 25 Chattooga Ranger District Recreation Area
- 26 Lake Russell Wildlife Management Area
- 27 Stephens County Recreation Area
- 28 Anderson County Recreation Area
- 29 Franklin County Recreation Area
- 30 Hartwell Lake Recreation Area
- 31 Banks County Recreation Area
- 32 Wynn Mountain Wildlife Management Area
- 33 Victoria Bryant State Park Recreation Area
- 34 Rocky River Wildlife Management Area
- 35 Broad River Wildlife Management Area
- 36 Tallow Hill Reservoir
- 37 Abbeville County Recreation Area
- 38 Sumter National Forest (Long Cane Division)
- 39 Parsons Mountain Game Management Area
- 40 Nancy Hart State Park Recreation Area
- 41 Anthony Shoals Reservoir
- 42 Trotters Shoals Reservoir
- 43 Burt Mansion Historic Site
- 44 Long Cave Massacre Historic Site
- 45 Clark Hill Game Management Area
- 46 Federal Fish Hatchery
- 47 Fishing Creek Wildlife Management Area
- 48 Key Bridge Game Management Area
- 49 Elijah Clark Memorial State Park Recreation Area
- 50 Clark Hill Wildlife Management Area
- 51 Williams Creek Wildlife Management Area
- 52 Alexander H. Stephens Memorial State Park Recreation Area
- 53 Warren County Recreation Area
- 54 Forks Game Management Area
- 55 Fort Gordon Wildlife Management Area
- 56 Augusta Port
- 57 New Savannah Bluff Lock and Dam
- 58 Navigation Channel Improvement
- 59 Savannah River Defense and Game Management Area
- 60 Burtons Landing Reservoir²
- 61 Hampton Wildlife Management Area
- 62 Belmont Game Management Area
- 63 Stokes Bluff Reservoir²
- 64 Gaffney Lock and Dam²
- 65 Savannah River National Wildlife Refuge and Recreation Area
- 66 State Fish Hatchery
- 67 Savannah Port Improvement
- 68 Tybee National Wildlife Refuge
- 69 Tybee National Wildlife Refuge Recreation Area
- 70 Fort Pulaski National Monument
- 71 Savannah Beach Recreation Area
- 72 Commercial Fisheries
- 73 Atlantic Intracoastal Waterway

NOTES: ¹ Included in Chattooga project.

² Included in Lower Savannah project.

SAVANNAH BASIN PLAN

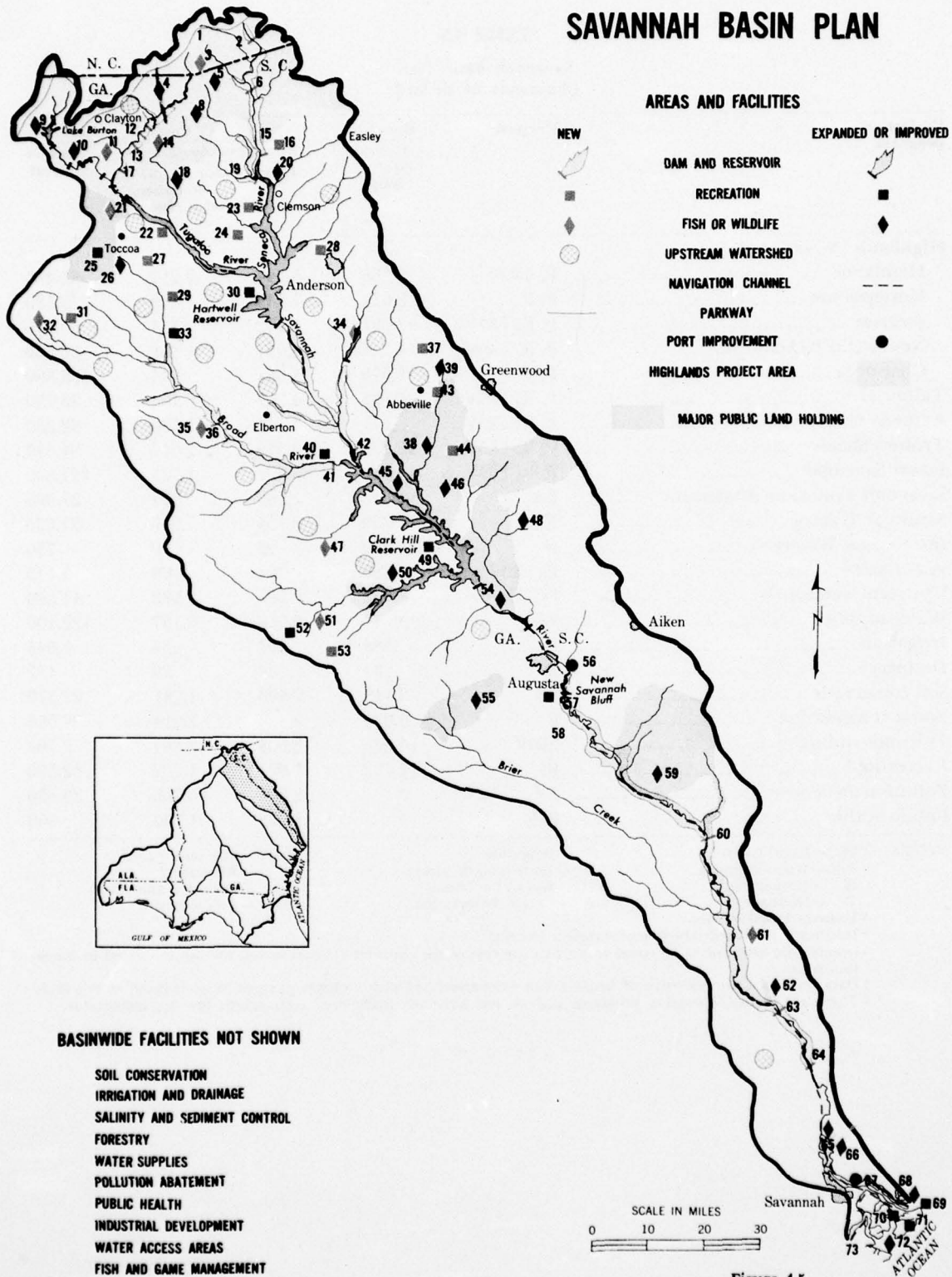


Figure 4.5

TABLE 4.5
Savannah Basin Plan
(thousands of dollars)

Project or program	Purpose ¹	Benefits Annual equivalent ²	Costs		Investment
			Total Annual equivalent	Operation, maintenance, and replacements	
Highlands Project Area					
Highlands	R, F&W	6,365	3,594	2,217	52,400
Horsepasture	P, R	2,614	1,748	319	25,330
Jocassee	P, R, F&W	3,881	3,742	354	59,440
Newry-Old Pickens	P, R, F&W	4,224	3,787	368	60,530
Chattooga	P, R	9,576	8,961	944	138,300
Tallow Hill	P, R, F&W	4,827	4,567	408	78,750
Anthony Shoals	P, R, F&W	3,111	2,644	350	42,330
Trotters Shoals	P, R, F&W	12,980	6,919	1,014	94,630
Lower Savannah	P, R, F&W, N	14,140	8,291	1,725	197,800
Savannah Pollution Abatement	PA	³	1,286	314	27,000
Savannah Harbor	N	11,730	8,735	7,300	31,650
Intracoastal Waterway	N	50	45	20	730
Water-access areas	R, F&W	886	292	168	3,440
Upstream watersheds	FC, D	3,062	2,183	582	44,300
Water supplies	WS	⁴	8,969	6,157	122,100
Irrigation	I	588	504	434	1,945
Drainage ⁵	D	284	44	29	417
Soil conservation	SC	3,148	2,590	1,781	22,370
Forest conservation	F	5,039	3,438	1,214	92,080
Fish and wildlife ⁵	F&W	4,635	2,908	2,867	2,100
Recreation ⁵	R	7,703	1,971	1,202	32,530
Pollution abatement ⁵	PA	³	2,563	766	83,680
Public health ⁶	PH	³	1,608	1,596	460

NOTES: 1 FC — Flood control I — Irrigation F&W — Fish and wildlife
 WS — Water supplies P — Hydroelectric power R — Recreation
 N — Navigation SC — Soil conservation PA — Pollution abatement
 D — Drainage F — Forest conservation PH — Public health

² Primary tangible only.

³ Justification is based largely on intangible benefits.

⁴ Benefits are assumed to be equal at least to the cost of the cheapest alternative but are not evaluated in monetary terms.

⁵ Data presented are exclusive of benefits and costs associated with multiple-purpose projects listed in this table.

⁶ These are annual operation programs and do not have any investment costs except for one incinerator.

TABLE 4.6
Savannah Basin Plan Investments — Early Action and Total by States
(thousands of dollars)

Project or program	Early action portion	Total by States		
		Georgia	South Carolina	North Carolina
Highlands Project Area				
Highlands ¹	27,900	² 52,400	² 52,400	² 52,400
Horsepasture	24,240	---	---	25,330
Jocassee	---	---	59,440	---
Newry-Old Pickens	---	---	60,530	---
Chattooga	---	² 138,300	² 138,300	---
Tallow Hill	---	78,750	---	---
Anthony Shoals	---	42,330	---	---
Trotters Shoals	88,850	² 94,630	² 94,630	---
Lower Savannah	111,300	² 197,800	² 197,800	---
Savannah Pollution Abatement	27,000	27,000	---	---
Savannah Harbor	---	² 31,650	² 31,650	---
Intracoastal Waterway	---	² 730	² 730	---
Water-access areas	1,614	1,631	1,809	---
Upstream watersheds	28,600	32,690	11,610	---
Water supplies	51,250	87,620	33,980	500
Irrigation	845	1,048	889	8
Drainage ³	154	229	185	3
Soil conservation	8,950	13,620	8,619	131
Forest conservation	52,450	53,910	36,060	2,110
Fish and wildlife ³	1,085	² 755	² 1,345	---
Recreation ³	10,170	² 30,430	² 17,930	---
Pollution abatement ³	37,610	51,010	32,670	---
Public health	460	---	460	---

NOTES: ¹ Includes costs in both Savannah and Apalachicola-Chattahoochee-Flint basins.
² The project or a program feature would be located in more than one State. Costs of the involved project or program feature are posted under each State and are nonadditive.
³ Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

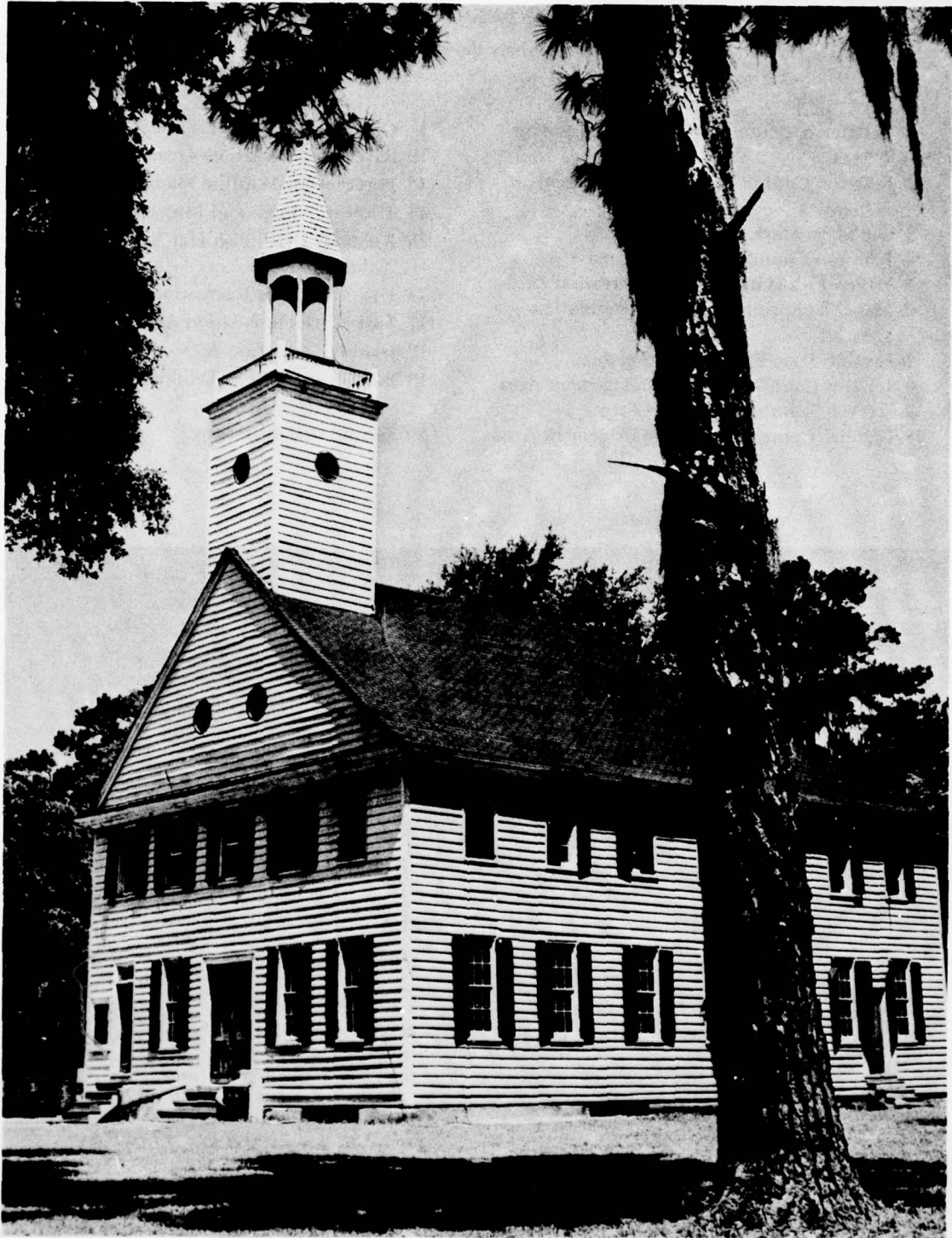


Figure 4.6 Midway Church Was Established in the 1750's. Among the Early Pastors of the Congregation Were Abiel Holmes, Father of Oliver Wendell Holmes, and Jedediah Morse, Father of Samuel F. B. Morse.

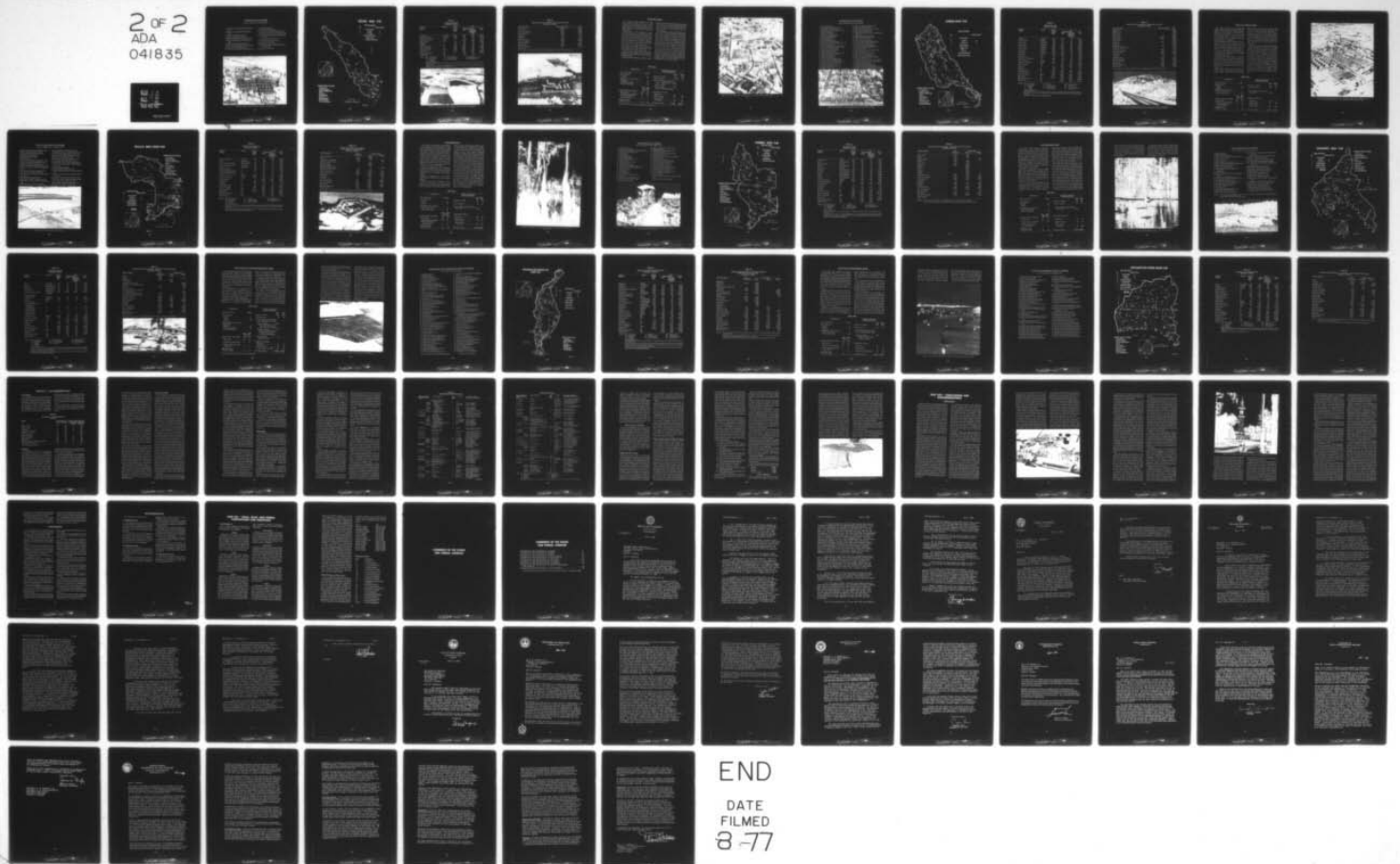
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UNITED STATES STUDY COMMISSION SOUTHEAST RIVER BASINS--ETC F/G 8/6
PLAN FOR DEVELOPMENT OF THE LAND AND WATER RESOURCES OF THE SOU--ETC(U)
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OGEECHEE BASIN PLAN FEATURES

(key to numbers shown on Figure 4.8)

- | | |
|---|--|
| 1 Taliaferro County Wildlife Management Area | 11 Groveland Reservoir |
| 2 Jefferson County Wildlife Management Area | 12 Riverside Recreation Area |
| 3 Old Slave Market Historic Site | 13 Fort Stewart Wildlife Management Area |
| 4 Jefferson County Recreation Area | 14 Midway Church and Museum Historic Site |
| 5 Millen Fish Hatchery and Recreation Area | 15 Richmond Hill Fish Hatchery and Recreation Area |
| 6 Magnolia Springs State Park Recreation Area | 16 Fort McAllister Recreation Area |
| 7 Lincoln State Park Recreation Area | 17 Fort Morris Recreation Area |
| 8 Jenkins County Wildlife Management Area | 18 Islands Recreation Area |
| 9 Screven County Recreation Area | 19 Blackbeard Island Wildlife Refuge and Recreation Area |
| 10 Candler County Wildlife Management Area | 20 Intracoastal Waterway |



Figure 4.7 Sawmills in the Area Provide Increased Payrolls and Income.

OGEECHEE BASIN PLAN

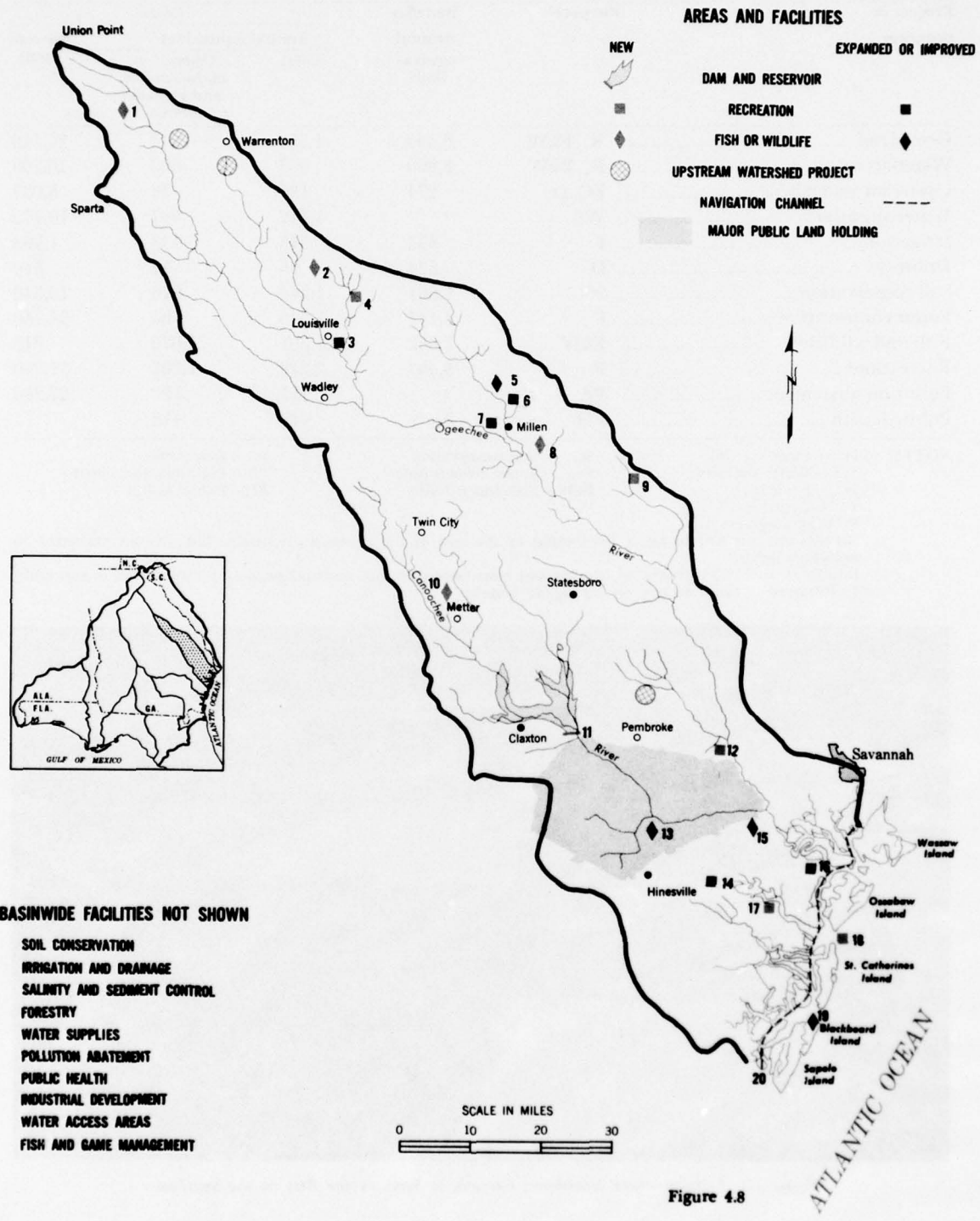


TABLE 4.7
Ogeechee Basin Plan
 (thousands of dollars)

Project or program	Purpose ¹	Benefits Annual equivalent ²	Costs		
			Total	Operation, maintenance, and replacements	Investment
Groveland	R, F&W	5,140	1,553	643	26,710
Water-access areas	R, F&W	3,860	997	628	10,200
Upstream watersheds	FC, D	274	136	26	3,037
Water supplies	WS	³	1,410	987	16,770
Irrigation	I	893	513	443	1,953
Drainage ⁴	D	874	65	42	619
Soil conservation	SC	1,661	1,244	870	10,340
Forest conservation	F	3,182	1,526	706	34,730
Fish and wildlife ⁴	F&W	1,802	1,091	1,070	813
Recreation ⁴	R	3,407	2,272	1,303	30,700
Pollution abatement	PA	⁵	757	120	27,250
Public health	PH	⁵	412	412	---

NOTES: ¹ FC — Flood control SC — Soil conservation R — Recreation
 WS — Water supplies F — Forest conservation PA — Pollution abatement
 D — Drainage F&W — Fish and wildlife PH — Public health
 I — Irrigation

² Primary tangible only.
³ Benefits are assumed to be at least equal to the cost of the cheapest alternative but are not evaluated in monetary terms.
⁴ Data presented are exclusive of benefits and costs associated with multiple-purpose projects listed in this table.
⁵ Justification is based largely on intangible benefits.



Figure 4.9 Farmland near Statesboro, Georgia, Is Some of the Best in the Southeast.

TABLE 4.8
Ogeechee Basin Plan Investments — Early Action and Total
 (thousands of dollars)

Project or program	Early action portion	Total
Groveland	22,460	26,710
Water-access areas	5,080	10,200
Upstream watersheds	3,037	3,037
Water supplies	10,090	16,770
Irrigation	753	1,953
Drainage*	275	619
Soil conservation	3,900	10,340
Forest conservation	16,220	34,730
Fish and wildlife*	503	813
Recreation*	17,150	30,700
Pollution abatement	12,170	27,250
Public health	---	---

*Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

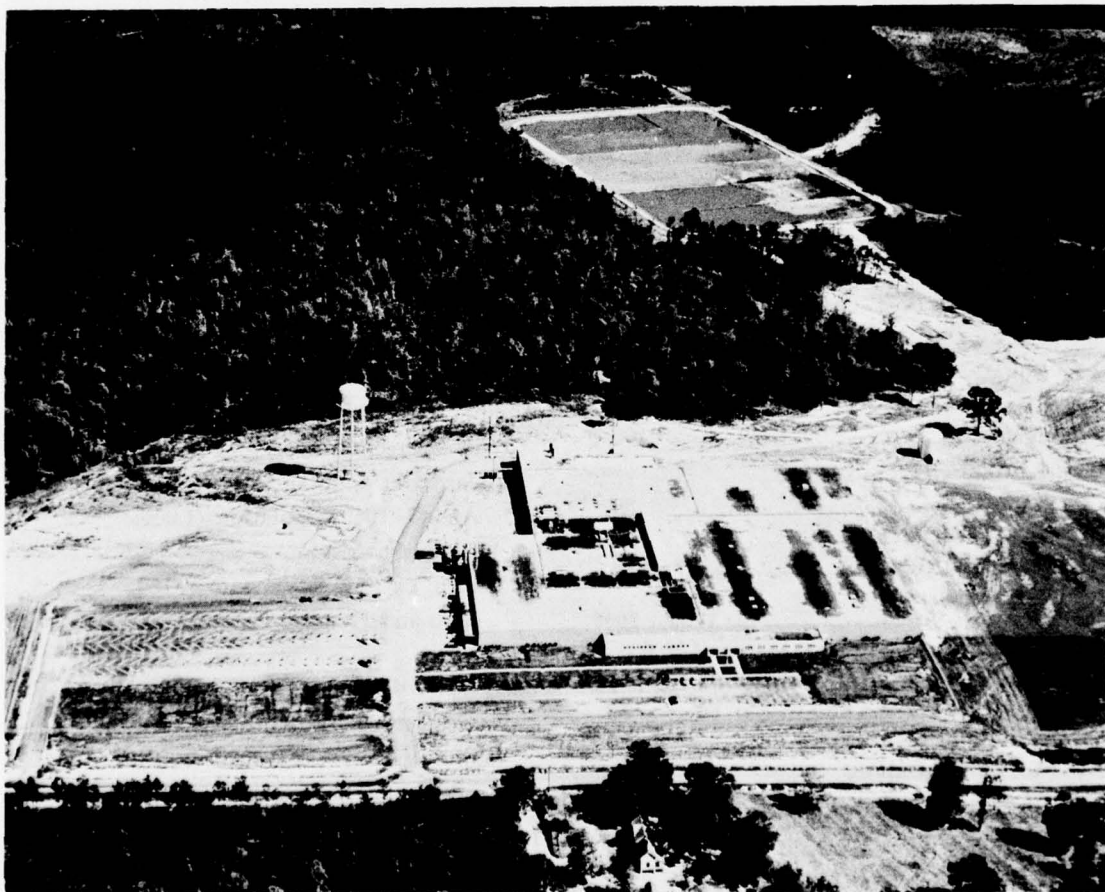


Figure 4.10 *New Industrial Plant near Statesboro.*



Figure 4.11 *University of Georgia, Athens—The First State University Chartered in the United States.*

ALTAMAHA BASIN PLAN FEATURES

(key to numbers shown on Figure 4.13)

- | | | | |
|----|---|----|--|
| 1 | Curry Creek Reservoir | 31 | Rum Creek Wildlife Management Area |
| 2 | Fort Yargo State Park Recreation Area | 32 | Bibb County Recreation Area |
| 3 | DeKalb County Recreation Area | 33 | Ocmulgee National Monument Historic Site |
| 4 | Stone Mountain Memorial Recreation Area | 34 | Browns Mountain Historic Site |
| 5 | New Bethel Reservoir | 35 | Twiggs County Recreation Area |
| 6 | Big Flat Creek Reservoir | 36 | Buffalo Creek-Oconee River Fish and Wildlife Management Area |
| 7 | Walton County Recreation Area | 37 | Washington County Recreation Area |
| 8 | High Shoals Recreation Area | 38 | Wilkinson County Recreation Area |
| 9 | Lake Spivey Recreation Area | 39 | Peach County Recreation Area |
| 10 | Peachstone Reservoir | 40 | Houston County Recreation Area |
| 11 | Porterdale Recreation Area | 41 | Big Indian Creek Wildlife Management Area |
| 12 | Walton County State Fish Hatchery | 42 | Dry Creek Wildlife Management Area |
| 13 | Hard Labor Creek State Park Recreation Area | 43 | Laurens County Recreation Area |
| 14 | Barrett Recreation Area | 44 | Yam Grande State Park Recreation Area |
| 15 | Oconee National Forest Recreation Areas | 45 | Cedar Creek Wildlife Management Area |
| 16 | Greene County Wildlife Management Area | 46 | Abbeville Reservoir |
| 17 | Henry County Recreation Area | 47 | Little Ocmulgee State Park Recreation Area |
| 18 | Newton County Recreation Area | 48 | Coopers Ferry Reservoir |
| 19 | High Falls Recreation Area | 49 | Bells Ferry Wildlife Management Area |
| 20 | Indian Springs State Park Recreation Area | 50 | Bowen Mill State Fish Hatchery |
| 21 | Jackson Lake Recreation Area | 51 | Reidsville State Park Recreation Area |
| 22 | Laurens Shoals Reservoir | 52 | Goose Creek-Ohoopsee Reservoirs and Canal |
| 23 | Shoulderbone Historic Site | 53 | Fort Stewart Wildlife Area |
| 24 | Piedmont Wildlife Management Area | 54 | Navigation Project, Altamaha Sound to Doctortown |
| 25 | Piedmont National Wildlife Refuge | 55 | Townsend Drainage and Flood Control Project |
| 26 | Piedmont National Wildlife Recreation Area | 56 | Fort King George Historic Site |
| 27 | Oconee National Forest Wildlife Area | 57 | Altamaha Wildlife Management Area |
| 28 | Lake Sinclair Recreation Area | 58 | Wolf Island National Wildlife Refuge |
| 29 | Hitchiti Experimental Forest Station | 59 | Wolf Island National Wildlife Refuge Recreation Area |
| 30 | Shinholser Historic Site | | |



Figure 4.12 Macon—One of Three Metropolitan Cities on the Fall Line in Georgia.

ALTAMAHA BASIN PLAN

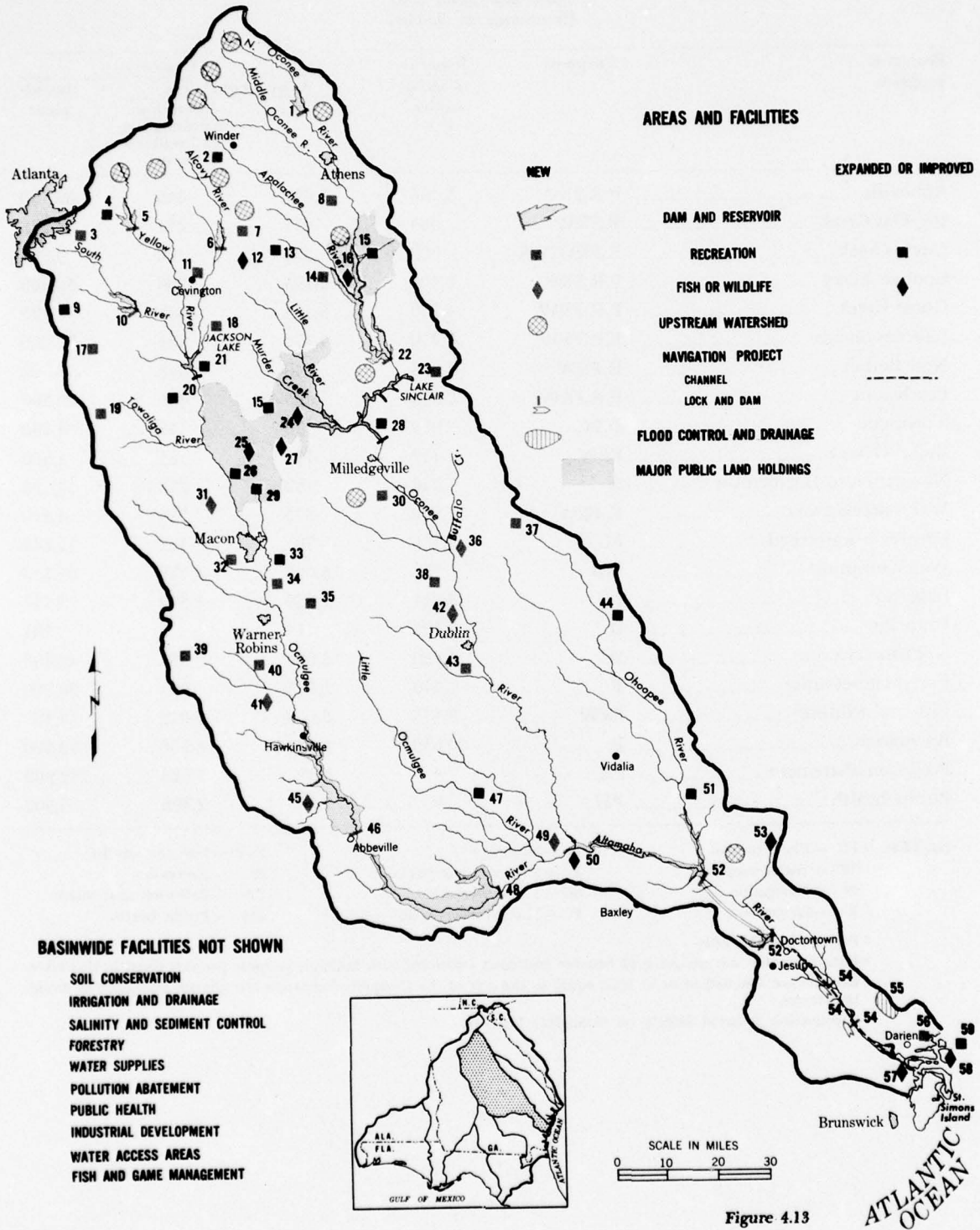


TABLE 4.10
Altamaha Basin Plan Investments — Early Action and Total
(thousands of dollars)

Project or program	Early action portion	Total
Abbeville	---	50,760
Big Flat Creek	---	6,573
Curry Creek	---	9,987
Coopers Ferry	---	40,900
Goose Creek	97,780	98,120
Laurens Shoals	65,970	72,260
New Bethel	---	8,300
Peachstone	19,150	22,200
Townsend	---	5,790
Buffalo Creek	2,500	2,500
Navigation to Doctortown	---	18,130
Water-access areas	3,400	4,110
Upstream watersheds	9,820	15,840
Water supplies*	35,370	64,150
Irrigation	2,377	6,113
Drainage*	53	131
Soil conservation	16,150	42,490
Forest conservation	35,000	90,300
Fish and wildlife*	991	1,380
Recreation*	35,360	73,960
Pollution abatement	79,530	152,900
Public health	2,800	5,900

*Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

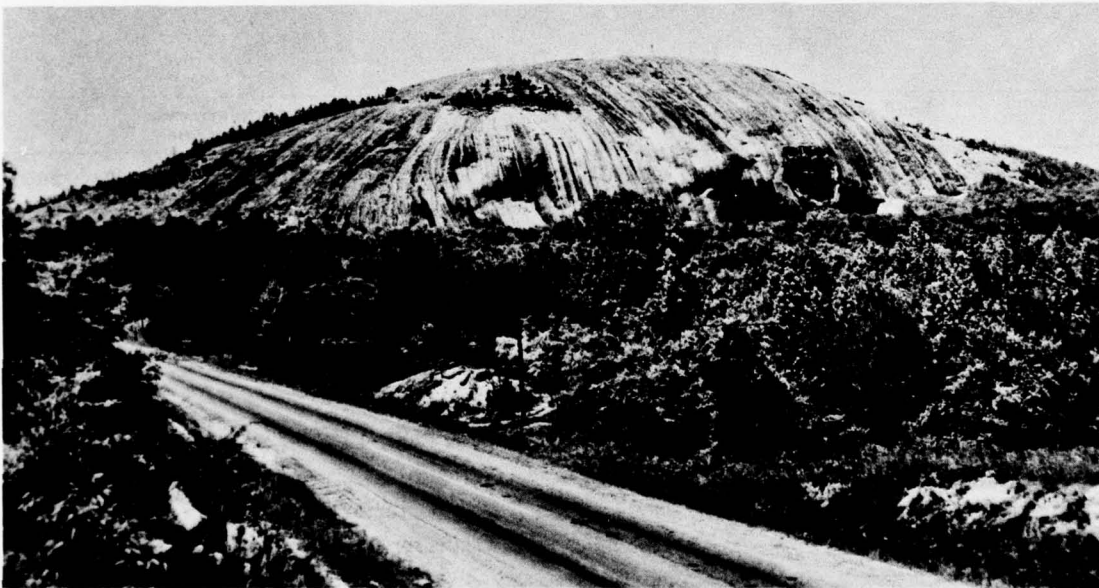


Figure 4.14 Stone Mountain, a Massive Exposure of Granite near Atlanta, Is a Major Recreation Attraction That Is Being Developed as the Focal Point of a Georgia State Park.

SATILLA-ST. MARYS BASINS

The Satilla-St. Marys basins comprise the smallest of the Southeast River Basins planning segments in terms of both area and population. There are no metropolitan areas in the basin; but Jacksonville, Florida, is close to the southern boundary. All but 1 percent of the area is Lower Coastal Plain in Georgia and Florida, and four-fifths of it, woodland.

Although there are few large cities, the population is one-half urban. Centers with over 10,000 people in 1960 are Brunswick on the coast and Waycross inland—the 21st and 22d cities in size in the Southeast River Basins.

In total employment, manufacturing substantially exceeds agriculture. Over 43 percent of manufacturing employment is in lumber, wood, and pulp and paper.

Brunswick's port, with traffic of over 787,000 tons in 1960, was the second Atlantic Ocean port in terms of tonnage handled in the Southeast River Basins. Some of the outstanding shore recreation areas of the Southeast, of which Sea Island and Jekyll Island are best known, are in this area.

The Satilla-St. Marys basins are fronted by offshore islands having important recreational potential. Forest resources will continue to hold

high production potential. Two projects, Big Satilla Creek and Nassau River Embayment, are set out for special cost sharing. Big Satilla is a demonstration project for recreation. Nassau River Embayment is a research and experimental project to demonstrate, if possible, a practical means of utilizing large areas of undeveloped saline marsh for fish and wildlife. There are about 500,000 acres of similar marsh in the study area.

Improvements for soil conservation, irrigation and drainage, forest management, water supply facilities, and pollution abatement and public health improvements proposed in the comprehensive plan would be basinwide in the Satilla-St. Marys basins. In addition, the plan for these basins is comprised of some 36 specific developments. These include five dam and reservoir projects, including the experimental fresh- and salt-water fish and wildlife development in the Nassau River Embayment; a number of upstream watershed developments for flood control and drainage; and site improvements for recreation, and fish and wildlife. Several proposals are included for development of the unique coastal area of these basins for public use.

Basins Data

Land and water	Population, employment, and per capita income		
Area (square mile)	5,520		
States (percent):			
Georgia	79		
Florida	21		
Physiographic areas (percent):			
Upper Coastal Plain	1		
Lower Coastal Plain	99		
	1960	2000	
	(percent)		
Land and small water bodies ...	98.3	97.0	
Forest land	78	74	
Cropland and pastureland	11	14	
Urban, transportation, and other land	11	12	
Impounded water, 40 acres or more	1.7	3.0	
			1960
			2000
Population (1,000)	166	317	
Urban (percent)	50.5	80	
Standard Metropolitan Statistical Areas—1960	None		
Employment (percent):			
Agriculture	18	5	
Manufacturing	22	26	
Trade, services, and other	60	69	
Per capita income	\$1,380	\$3,180	

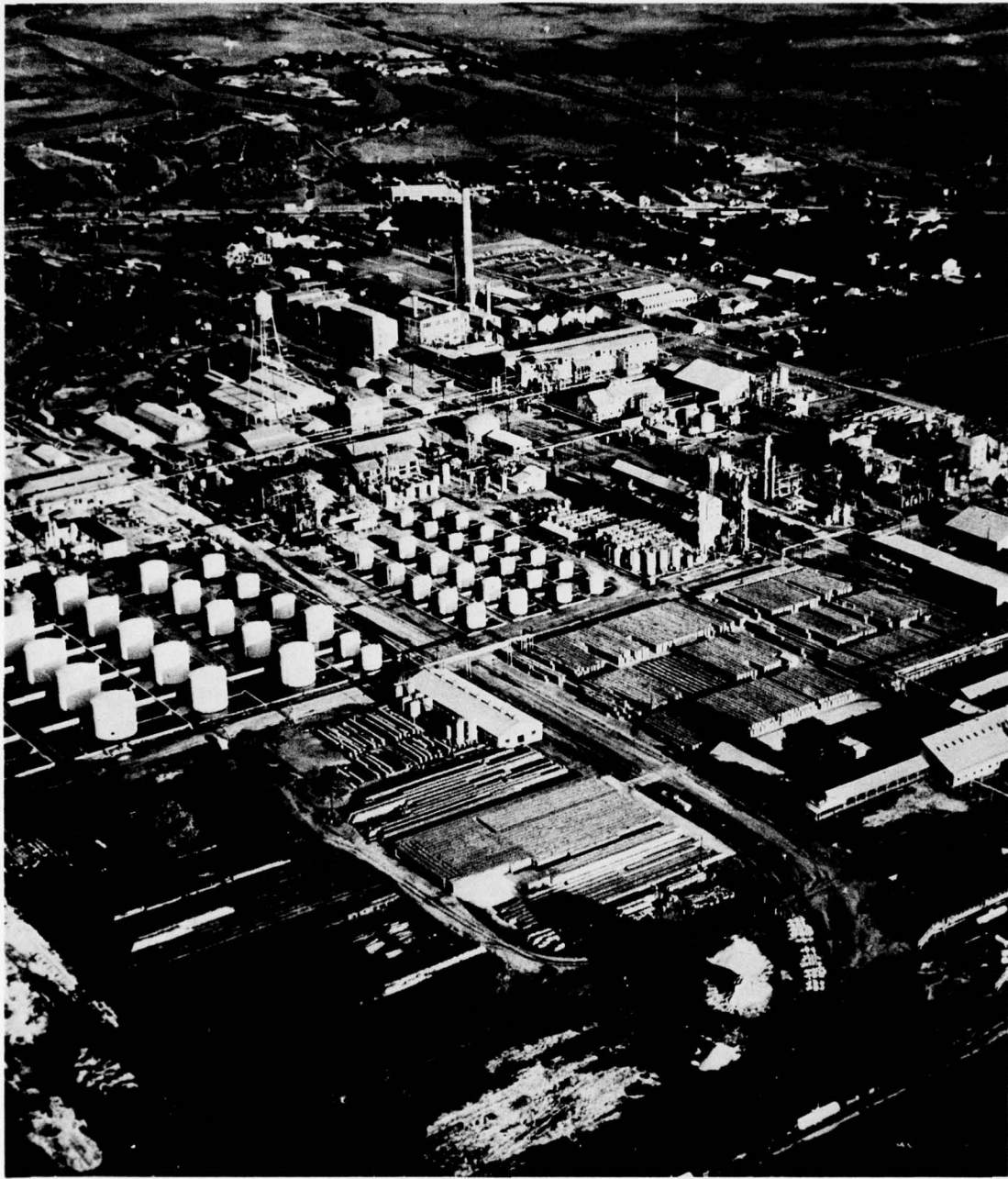


Figure 4.15 *Tidewater Locations near Water Transportation Offer Many Advantages to Industries Requiring Large Volumes of Raw Materials and Producing Bulk Products.*

SATILLA-ST. MARYS BASINS PLAN FEATURES

(key to numbers shown in Figure 4.17)

- | | |
|---|---|
| 1 Towns Creek Wildlife Management Area | 19 Cumberland Island Recreation Area |
| 2 Upper Hurricane Creek Reservoir | 20 Crooked Creek State Park Recreation Area |
| 3 Surrency Wildlife Management Area | 21 Tabby Sugar House Ruins Historic Site |
| 4 Broxton Creek Reservoir | 22 Kings Ferry Wildlife Management Area |
| 5 Big Satilla Creek Reservoir | 23 St. Marys Town Historic Site |
| 6 Axson Reservoir | 24 Fort Clinch State Park Recreation Area |
| 7 Brushy Creek Wildlife Management Area | 25 Fernandina Beach Recreation Area |
| 8 Arabia Bay Wildlife Management Area | 26 Fernandina Beach Harbor Improvement |
| 9 Nahunta Wildlife Management Area | 27 Nassau River Embayment Wildlife Management Area |
| 10 Laura S. Walker State Park Recreation Area | 28 Nassau River Embayment |
| 11 Waycross State Forest Wildlife Management Area | 29 Amelia Island Recreation Area |
| 12 Waycross State Forest Recreation Area | 30 Little Talbot Island State Park Recreation Area |
| 13 Fort Frederica National Monument | 31 Osceola National Forest Wildlife Management Area |
| 14 Sea and St. Simons Islands Beaches Recreation Area | 32 Osceola National Forest Recreation Area |
| 15 Brunswick Harbor Improvement | 33 Cary State Forest Wildlife Management Area |
| 16 Jekyll Island State Park Recreation Area | 34 Cary State Forest Recreation Area |
| 17 Satilla River Marshes Wildlife Management Area | 35 Lake Butler Wildlife Management Area |
| 18 Umbrella Creek Channel Improvement | 36 Bartram's Ixia Park Cultural Area |



Figure 4.16 *Productive Farmland near Baxley, Georgia.*

TABLE 4.11
Satilla-St. Marys Basins Plan
 (thousands of dollars)

Project or program	Purpose ¹	Benefits Annual equivalent ²	Costs		Investment
			Total	Annual equivalent Operation, maintenance, and replacements	
Big Satilla Creek	R,F&W,I	978	430	139	8,440
Axson	R,F&W,PA,I	714	269	82	5,290
Nassau River Embayment	R,F&W,FC,PH	890	226	85	3,900
Upper Hurricane Creek	R,F&W,PA,I	421	255	64	5,270
Broxton Creek	R,F&W,PA	363	128	40	2,430
Brunswick Harbor	N	683	858	474	8,910
Fernandina Beach Harbor	N	375	324	236	1,830
Umbrella Creek Channel	N	8	6	1	150
Water-access areas	R,F&W	3,999	1,031	647	10,630
Upstream watersheds	FC,D	2,894	702	167	14,780
Water supplies	WS	⁴	3,265	2,592	22,500
Irrigation ³	I	1,968	1,045	873	4,780
Drainage ³	D	580	29	20	256
Soil conservation	SC	920	672	357	8,715
Forest conservation	F	4,051	1,989	880	46,650
Fish and wildlife ³	F&W	2,428	1,567	1,478	3,270
Recreation ³	R	16,180	3,898	2,204	58,940
Pollution abatement ³	PA	⁵	673	186	20,900
Public health ³	PH	⁵	509	501	400

NOTES: ¹ FC — Flood control I — Irrigation R — Recreation
 WS — Water supplies SC — Soil conservation PA — Pollution abatement
 N — Navigation F — Forest conservation PH — Public health
 D — Drainage F&W — Fish and wildlife

² Primary tangible only.

³ Data presented are exclusive of benefits and costs associated with multiple-purpose projects listed in this table.

⁴ Benefits are assumed to be at least equal to the cost of the cheapest alternative but are not evaluated in monetary terms.

⁵ Justification is based largely on intangible benefits except for pollution abatement resulting from dilution water provided by multiple-purpose developments.

TABLE 4.12
Satilla-St. Marys Basins Plan Investments
Early Action and Total by States
(thousands of dollars)

Project or program	Early action portion	Total by States	
		Georgia	Florida
Big Satilla Creek	7,394	8,440	---
Axson	5,015	5,290	---
Nassau River Embayment	3,900	---	3,900
Upper Hurricane Creek	---	5,270	---
Broxton Creek	---	2,430	---
Brunswick Harbor	---	8,910	---
Fernandina Beach Harbor	---	---	1,830
Umbrella Creek Channel	150	150	---
Water-access areas	6,407	8,180	2,450
Upstream watersheds	13,000	6,620	8,160
Water supplies	11,840	20,100	2,400
Irrigation*	1,700	4,247	533
Drainage*	1,100	223	33
Soil conservation	3,312	7,160	1,555
Forest conservation	22,570	35,690	10,960
Fish and wildlife*	2,454	2,540	730
Recreation*	31,920	44,230	14,710
Pollution abatement*	9,310	16,360	4,540
Public health*	400	400	---

*Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

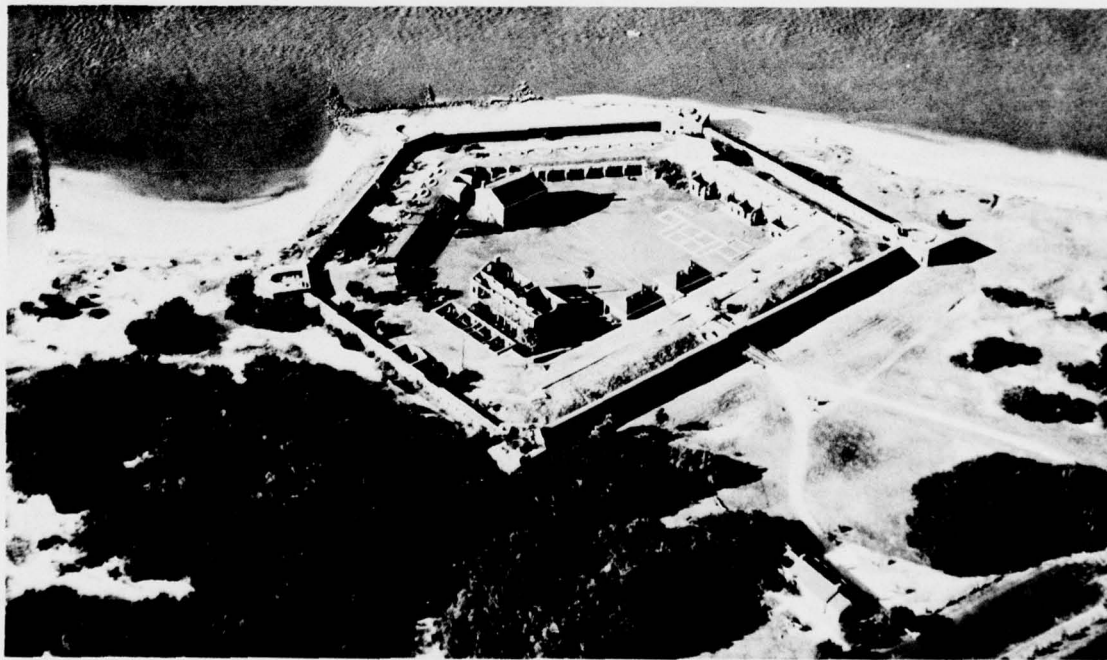


Figure 4.18 Fort Clinch Is a Historic Landmark and Nucleus of a Florida State Park.

SUWANNEE BASIN

Of the larger basin segments, the Suwannee is least urbanized. In total population, it ranks fifth. The population centers in both Georgia and Florida are located in the Upper Coastal Plain which extends in a general northwest to southeast direction across the basin. Valdosta, Georgia, 14th in Southeast River Basins, is by far the largest city. Moultrie, Georgia, was the only other city in the basin with over 10,000 people in 1960. This basin contains most of the Okefenokee Swamp, which is one of the most unusual of the many outstanding natural features in the Southeast River Basins.

Agricultural employment is over 50 percent greater than that in manufacturing. Lumber and wood products and, to a lesser extent, apparel manufacturers are the principal manufacturing employers.

Resources development has been accomplished largely through forest and agricultural programs.

Little has been done to change the rural character of the basin, and its streams are perhaps the least disturbed in the Southeast. Herein lies an important recreational potential. The

Franks Creek and Mud Swamp projects are set out for demonstration purposes in the plan.

The Suwannee basin plan includes basinwide programs for soil conservation, irrigation and drainage, forestry, water supplies, pollution abatement and public health, and fish and wildlife. Water-access areas are included for installation throughout the basin to make the many streams and lakes more accessible to the public. Eleven new multiple-purpose reservoirs are included in the plan to meet needs for flood control, recreation, fish and wildlife, pollution abatement, and irrigation. An integrated system for low-flow augmentation is a basic feature of the proposed water storage system. Development of a series of historic and scenic recreation areas along the Suwannee River, interconnected by a recreation road, is a part of the plan. Upstream watershed developments are proposed throughout the basin for flood control, drainage, soil conservation, recreation, and other purposes. One of the reservoirs is designed primarily as a game-management and fishing facility, and another is particularly attractive for waterfowl protection and management.

Basin Data

Land and water	Population, employment, and per capita income		
Area (square mile)	11,020		
States (percent) :		1960	2000
Georgia	53	Population (1,000)	287 408
Florida	47	Urban (percent)	40 57
Physiographic areas (percent) :		Standard Metropolitan Statistical Areas—1960	None
Upper Coastal Plain	54		
Lower Coastal Plain	46		
	1960 2000		
	(percent)	Employment (percent) :	
Land and small water bodies	99.2 98.4	Agriculture	28 11
Forest land	67 64	Manufacturing	16 21
Cropland and pastureland	22 25	Trade, services, and other	56 68
Urban, transportation, and other land	11 11	Per capita income	\$1,240 \$2,900
Impounded water, 40 acres or more	0.8 1.6		



Figure 4.19 *Okefenokee Swamp in Southeastern Georgia Is a Unique and Enchanting Area of Flora and Fauna.*

SUWANNEE BASIN PLAN FEATURES
(key to numbers shown on Figure 4.21)

- | | |
|---|--|
| 1 Ashburn Reservoir | 24 Stephen C. Foster State Park Recreation Area |
| 2 Crystal Lake Recreation Area | 25 Mud Swamp Reservoir |
| 3 Jefferson Davis Memorial State Park Recreation Area | 26 Withlacoochee Wildlife Management Area |
| 4 Alapaha Wildlife Management Area | 27 Hixtown Marsh Reservoir |
| 5 Tifton Reservoir | 28 Suwannee River State Park Recreation Area |
| 6 Alapaha Reservoir | 29 Stephen Foster Memorial |
| 7 Worth Wildlife Refuge | 30 Oscola National Forest Recreation and Wildlife Management Areas |
| 8 Colquitt Wildlife Refuge | 31 Olustee Battlefield Memorial |
| 9 Stillbay Wildlife Management Area | 32 Suwannee River Recreation Development |
| 10 Moultrie Reservoir | 33 Lake Butler Wildlife Management Area |
| 11 Cook-Colquitt Recreation Area | 34 Ichetucknee Spring Recreation Area |
| 12 Nashville Reservoir | 35 O'Leno State Park Recreation Area |
| 13 Arabia Bay Wildlife Refuge | 36 Camp Blanding Wildlife Management Area |
| 14 Waycross State Forest Wildlife Management Area | 37 Steinhatchee Wildlife Management Area |
| 15 Okefenokee Swamp Park Recreation Area | 38 Hart Spring Park Recreation Area |
| 16 Okapilco Reservoir* | 39 Manatee Spring State Park Recreation Area |
| 17 Quitman Reservoir* | 40 Suwannee Gulf Recreation Area |
| 18 Shiloh Reservoir | 41 West Gap Channel |
| 19 Franks Creek Reservoir | 42 Gulf Coast Improvement Project (Ochlocknee Basin Plan) |
| 20 Moody Air Force Base Wildlife Refuge | 43 Cedar Keys National Wildlife Refuge |
| 21 Banks Lake | |
| 22 Suwanoochee Wildlife Management Area | |
| 23 Okefenokee National Wildlife Refuge | |
- * Included in Quitman project.



Figure 4.20 *Tobacco Harvesting Machine in Operation Exemplifies Trend Toward Mechanization in Agriculture in the Southeast.*

SUWANNEE BASIN PLAN

AREAS AND FACILITIES

- | | |
|-----|----------------------|
| NEW | EXPANDED OR IMPROVED |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
- DAM AND RESERVOIR
 RECREATION
 FISH OR WILDLIFE
 UPSTREAM WATERSHED
 SCENIC ROAD
 NAVIGATION CHANNEL
 MAJOR PUBLIC LAND HOLDING

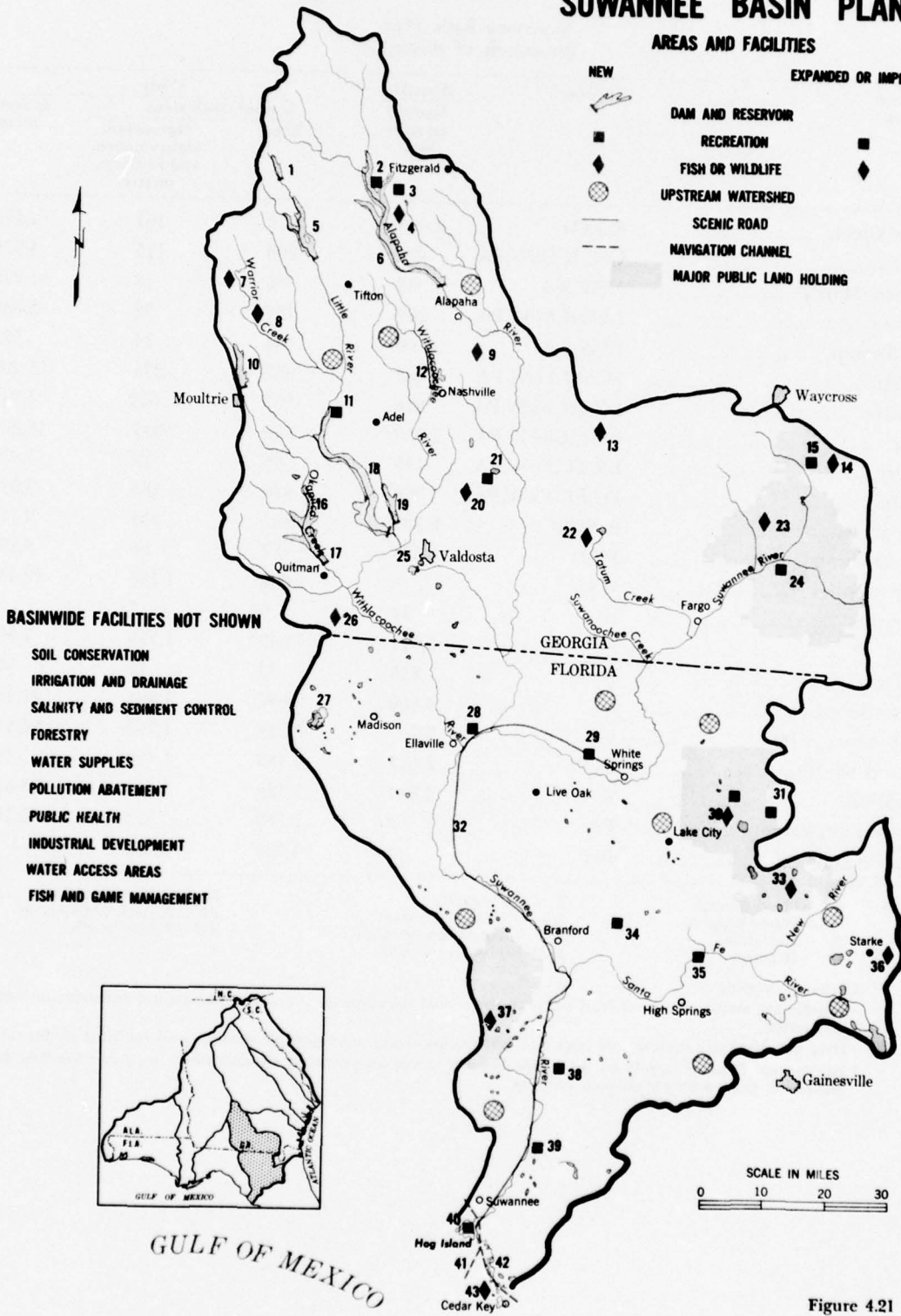


Figure 4.21

TABLE 4.14

Suwannee Basin Plan Investments — Early Action and Total by States
(thousands of dollars)

Project or program	Early action portion	Total by States	
		Georgia	Florida
Franks Creek ¹	4,208	4,470	---
Tifton ¹	4,570	4,570	---
Hixtown Marsh	1,255	---	1,270
Moultrie ¹	2,712	2,860	---
Mud Swamp	525	525	---
Quitman ¹	14,640	15,900	---
Nashville ¹	---	4,949	---
Shiloh ¹	---	16,200	---
Ashburn	---	1,090	---
Alapaha ¹	---	9,640	---
Water-access areas	6,300	2,195	7,525
Upstream watersheds	3,410	1,433	7,547
Water supplies	12,850	15,210	7,230
Navigation	70	---	70
Irrigation ²	4,281	5,178	2,382
Drainage ²	181	341	193
Soil conservation	9,431	13,120	8,800
Forest conservation	45,820	40,450	46,390
Fish and wildlife ²	148	---	418
Recreation ²	12,620	4,610	19,000
Pollution abatement ²	24,490	26,940	13,160
Public health ²	---	---	---

NOTES: ¹ Reservoirs located in Georgia, but an unidentified part of the benefits will accrue to Florida.

² Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

OCHLOCKONEE BASIN

The deeply embayed shoreline of the Ochlockonee basin is nearly one-half of the Southeast River Basins frontage on the Gulf of Mexico. Its area, all Coastal Plain in Georgia and Florida, is sixth in size in the Southeast River Basins. Likewise, its 1960 population is sixth in magnitude. The two largest cities in the basin are Tallahassee, Florida, with a population of 48,200, the 8th largest in the study area, and Thomasville, Georgia, the 24th, with a population of 12,700. These are the only cities with 1960 population of over 10,000.

Agricultural employment is only slightly higher than manufacturing employment. The basin stands out in terms of employment in other than agriculture and manufacturing, a reflection of capital city functions in Tallahassee. In the makeup of its manufacturing, the food and lumber groups provide the most opportunities for employment.

The St. Marks National Wildlife Refuge occupies the head of Apalachee Bay east of the Ochlockonee River. Lake Talquin on the Ochlockonee River west of Tallahassee is operated for hydroelectric power. The installed capacity of

the existing powerplant is about 9,000 kilowatts.

The reach of shallow waters between Apalachee Bay and the Suwannee River is one of the major unprotected sections for waterway traffic on the Gulf coast. With the construction of the authorized Cross Florida Canal, there will be increasing pressure for development of this reach. The basin also has potential for increased shore and inland recreation.

The Ochlockonee basin plan includes 11 projects and the continuation or expansion of general or basinwide programs. The projects include four small multiple-purpose reservoirs, of which two would be on the Ochlockonee River, one on Tired Creek, and one on a branch of Quincy Creek; a multiple-purpose project consisting principally of a combined highway and an in-shore navigation channel extending southeast of St. Marks, Florida, that would serve many purposes and provide ready access to this relatively undeveloped portion of the coastal area along the Gulf of Mexico; three navigation projects that would consist of an extension of the Intracoastal Waterway from Carrabelle, Florida, to Apalachee Bay, improvement of the St. Marks

Basin Data

Land and water	Population, employment, and per capita income		
Area (square mile)	6,329	1960	2000
States (percent):		Population (1,000)	208 348
Georgia	23	Urban (percent)	46 79
Florida	77	Standard Metropolitan Statistical	
Physiographic areas (percent):		Areas—1960	None
Upper Coastal Plain	56		
Lower Coastal Plain	44		
	1960 2000		
	(percent)		
Land and small water bodies	98.0	Employment (percent):	
Forest land	77	Agriculture	13 4
Cropland and pastureland	17	Manufacturing	12 13
Urban, transportation,		Trade, services,	
and other land	6	and other	75 83
Impounded water,		Per capita income	\$1,440 \$3,360
40 acres or more	2.0 2.2		

River to St. Marks, Florida, and provision of a small boat channel to Panacea Harbor; development of the Wacissa River for recreation and fish and game management; a multiple-purpose channel improvement project for the Steinhatchee River; and a flood control levee for St. Marks, Florida.

General basinwide programs proposed include developments for water supplies, irrigation and drainage, soil conservation, forest conservation, fish and wildlife, recreation, pollution abatement and public health, upstream watershed protection, and public access to the numerous water bodies in the basin.

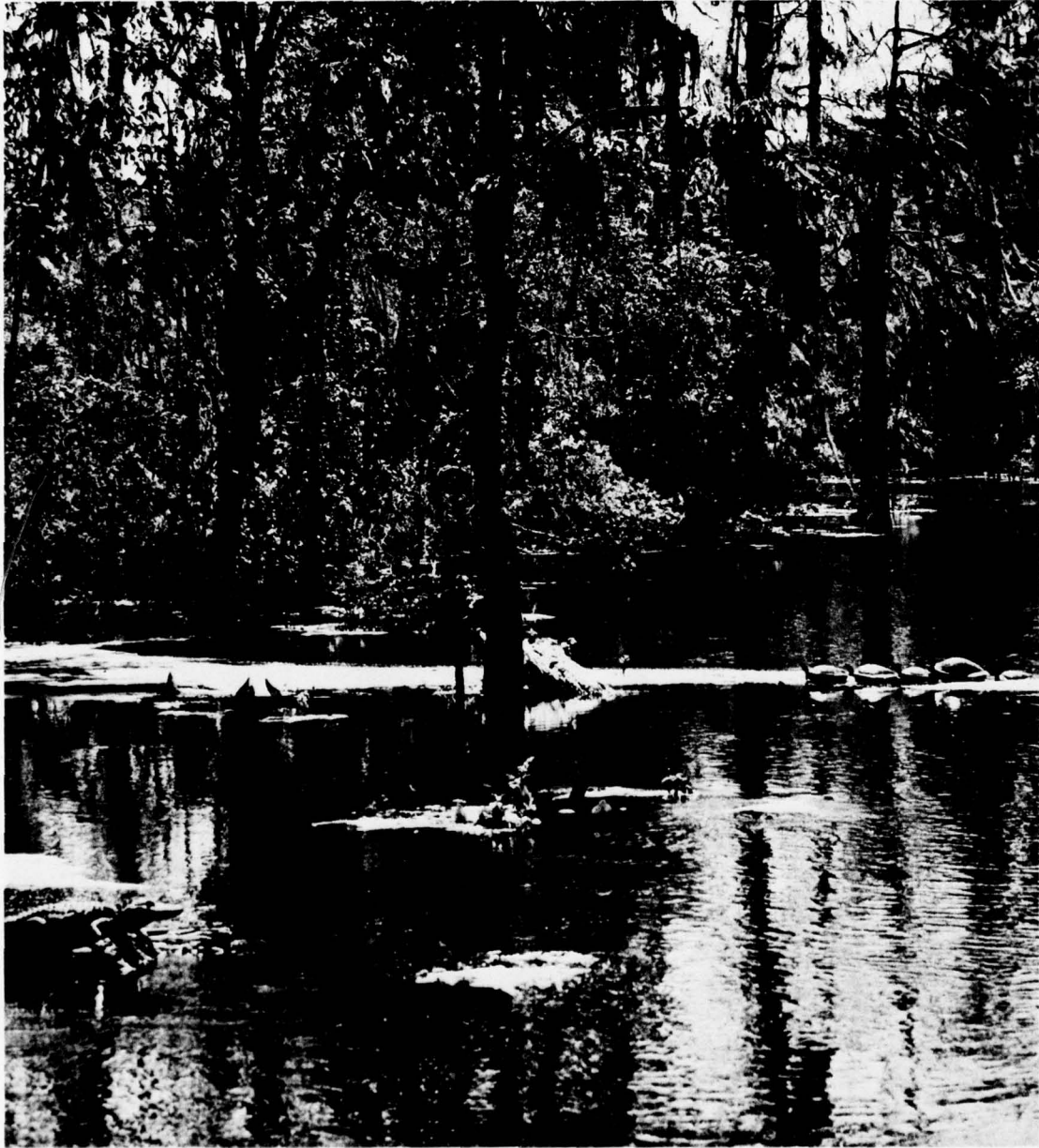


Figure 4.22 *Wakulla Spring near Tallahassee, Florida, Is One of the Outstanding Natural Attractions Made Accessible in Northern Florida.*

OCHLOCKONEE BASIN PLAN FEATURES

(key to numbers shown on Figure 4.24)

- | | |
|---|---|
| 1 Doerun Reservoir | 23 Carrabelle to Alligator Point Beach Recreation Areas |
| 2 Tired Creek Reservoir | 24 Alligator Point Fisheries Research Station |
| 3 Grady County Wildlife Management Area | 25 Improved Seafood Cultivation |
| 4 Thomasville Reservoir | 26 Panacea Channel Improvement Project |
| 5 Quincy Reservoir | 27 St. Marks Channel Improvement Project |
| 6 Lake Talquin Recreation Area | 28 St. Marks National Wildlife Refuge Recreation Area |
| 7 Lake Jackson Indian Mounds Historic Site | 29 Econfina River Recreation Area ¹ |
| 8 Killearn Gardens State Park | 30 Gulf Coast Improvement Project |
| 9 Fort San Luis Historic Site | 31 Fenholloway Beach Recreation Area ² |
| 10 Natural Bridge Battlefield Historical Memorial | 32 Spring Warrior Recreation Area ¹ |
| 11 Wacissa Project | 33 Keaton Beach Recreation Area |
| 12 Apalachicola National Forest Recreation Area | 34 Hagens Cove Recreation Area ¹ |
| 13 Liberty Wildlife Management Area | 35 Dallus Creek Recreation Area ² |
| 14 Leon-Wakulla Wildlife Management Area | 36 Steinhatchee River Channel Improvement Project |
| 15 Bird Hammock Historic Site | 37 Steinhatchee Wildlife Management Area |
| 16 St. Marks Wildlife Management Area | 38 Steinhatchee Beach Recreation Area ¹ |
| 17 Wakulla Spring Recreation Area | 39 Rocky Creek Recreation Area ² |
| 18 Fort St. Marks Historic Site | 40 Pepperfish Keys Recreation Area ² |
| 19 St. Marks Levee | 41 Horseshoe Point Recreation Area ¹ |
| 20 Aucilla Wildlife Management Area | 42 Shired and Big Pine Islands Recreation Area ¹ |
| 21 Dog Island Recreation Area | |
| 22 Intracoastal Waterway Extension | |

NOTES: ¹ Early action phase development considered as part of recreation program; subsequent development included as part of Gulf Coast Improvement project.
² Included in the Gulf Coast Improvement project.



Figure 4.23 A Tripling of Beef Production in the Study Area Is Expected by the Year 2000.

OCHLOCKONEE BASIN PLAN

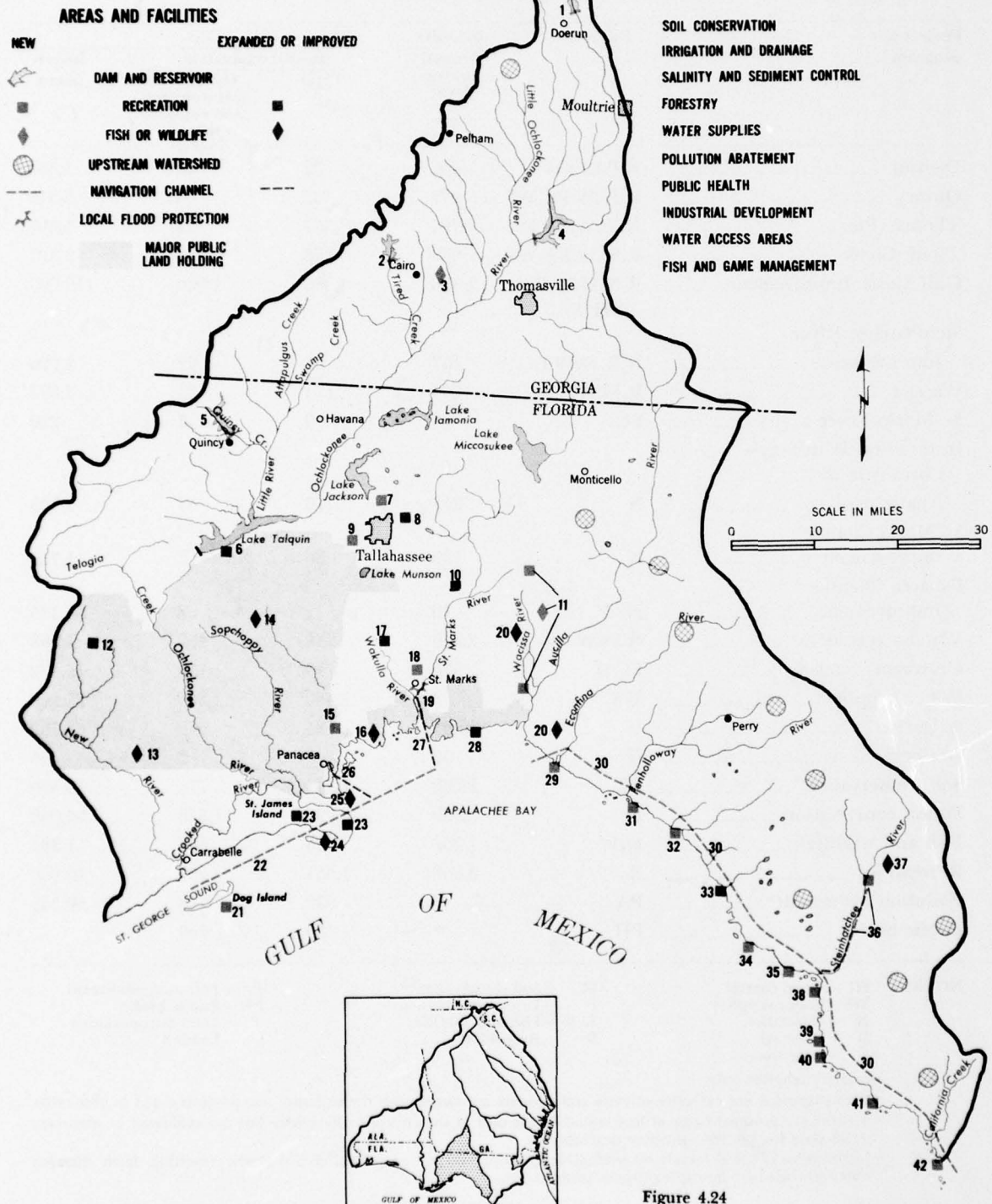


TABLE 4.15
Ochlockonee Basin Plan
(thousands of dollars)

Project or program	Purpose ¹	Benefits Annual equivalent ²	Costs		Investment
			Annual equivalent Total	Operation, maintenance, and replacements	
Doerun	R,PA,F&W	406	72	22	1,368
Quincy	R,F&W,PA,WS	277	152	64	2,519
Thomasville	R,F&W,PA,FC	704	351	151	5,695
Tired Creek	R,F&W,PA,WS	468	206	83	3,397
Gulf Coast Improvement	R,N,F&W,D, PH,T,L	7,336	4,986	1,020	110,200
Steinhatchee River					
Improvement	N,R,F&W,L	157	91	22	1,920
Wacissa	R,F&W	266	174	93	2,392
St. Marks Levee	FC	13	9	1	220
Intracoastal Waterway—					
Carrabelle to					
Apalachee Bay	N	243	170	34	3,785
St. Marks Channel					
Improvement	N	139	66	2	1,780
Panacea Channel					
Improvement	N	19	12	8	135
Water-access areas	R,F&W	2,849	758	469	7,998
Upstream watersheds	FC,D	976	713	155	15,470
Water supplies ³	WS	4	2,460	1,806	27,200
Irrigation	I	1,455	685	570	3,160
Drainage ³	D	52	5	3	50
Soil conservation	SC	2,062	1,144	770	10,360
Forest conservation	F	3,839	2,922	1,315	64,940
Fish and wildlife ³	F&W	1,267	695	667	1,265
Recreation ³	R	3,869	1,361	797	19,890
Pollution abatement ³	PA	5	932	219	30,550
Public health	PH	5	450	450	---

NOTES: 1 FC — Flood control SC — Soil conservation PA — Pollution abatement
 WS — Water supplies F — Forest conservation PH — Public health
 N — Navigation F&W — Fish and wildlife T — Land transportation
 D — Drainage R — Recreation L — Landfill
 I — Irrigation

² Primary tangible only.

³ Data presented are exclusive of costs and benefits associated with multiple-purpose projects listed in this table.

⁴ Benefits are assumed to be at least equal to the cost of the cheapest alternative but are evaluated in monetary terms only for multiple-purpose development.

⁵ Justification is based largely on intangible benefits except for pollution abatement resulting from dilution water provided by multiple-purpose projects.

TABLE 4.16
Ochlockonee Basin Plan Investments — Early Action and Total by States
 (thousands of dollars)

Project or program	Early action portion	Total by States	
		Georgia	Florida
Doerun	1,368	1,368	---
Quincy	2,260	---	2,519
Thomasville	5,275	5,695	---
Tired Creek	---	3,397	---
Gulf Coast Improvement	---	---	110,200
Steinhatchee River Improvement	---	---	1,920
Wacissa	2,392	---	2,392
St. Marks Levee	---	---	220
Intracoastal Waterway—Carrabelle to Apalachee Bay	---	---	3,785
St. Marks Channel Improvement	1,780	---	1,780
Panacea Channel Improvement	135	---	135
Water-access areas	3,804	1,654	6,344
Upstream watersheds	8,000	600	14,870
Water supplies*	13,740	7,300	19,900
Irrigation	2,065	2,120	1,040
Drainage*	18	29	21
Soil conservation	3,900	6,098	4,262
Forest conservation	39,780	7,980	56,960
Fish and wildlife*	470	---	1,265
Recreation*	10,510	---	19,890
Pollution abatement*	13,560	9,410	21,140
Public health	---	---	---

*Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

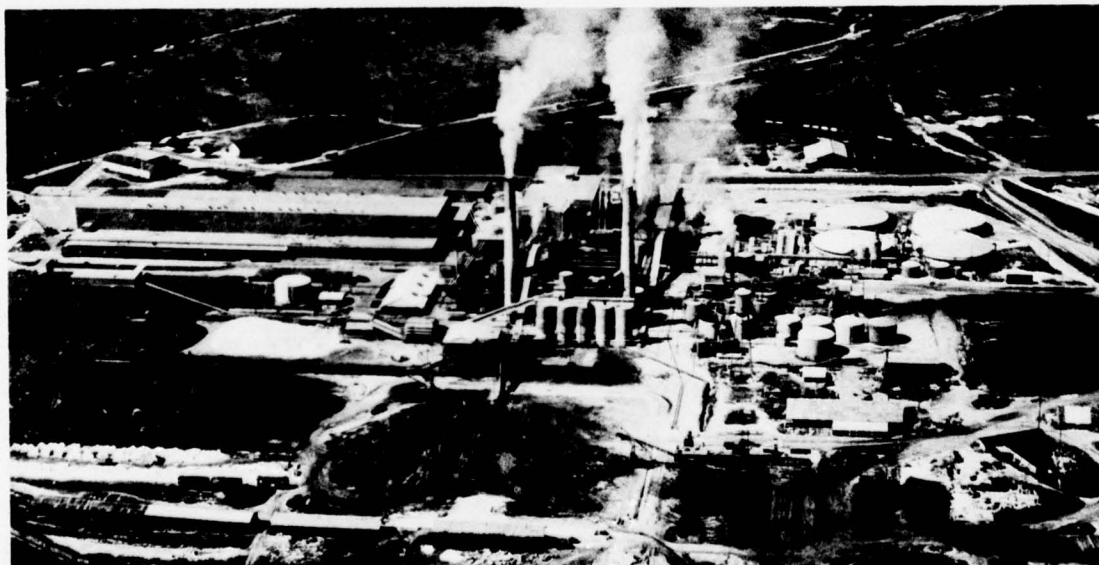


Figure 4.25 Pulpmill near Perry, Florida—The Study Area Furnishes Vast Quantities of Pulpwood.

with the storage projects. Cedar Creek reservoir is set out as a demonstration project for recreation and fish and wildlife.

The plan for the Apalachicola-Chattahoochee-Flint basins includes almost 100 single- and multiple-purpose developments in addition to continuing programs of a general or basinwide nature for water supplies, irrigation and drainage, soil conservation, forest conservation, fish and wildlife, recreation, and pollution abatement and public health. Fourteen new multiple-purpose reservoirs, with capacities varying from 9,000 to 553,000 acre-feet, are a part of the plan. Power is an integral part of the water-control plan, and navigation on the Flint River to Albany is planned for about 1980. Extension of navigation on the Chattahoochee to Atlanta is expected to be developed by the year 2000. An expanded pollution abatement program for metropolitan Atlanta is a major item in the plan. Protection

of flood plain areas for industrial development along the navigation channel at Columbus is proposed, and levees are provided for eight other areas subject to extensive flood damage. Upstream watershed protection is planned for tributary streams that drain about 1.9 million acres. An oyster development project is planned for Apalachicola Bay, at the mouth of the basins river system, and other fish and wildlife developments are provided in areas where the natural environment warrants expanded programs. The Highlands project, in the Georgia mountains, includes recreational and fish and wildlife enhancement programs in conjunction with similar developments in the adjoining Savannah basin. Other recreational developments include archeological, historical, and cultural areas and involve expansion of existing recreational areas and establishment of new areas at sites scattered throughout the basins.

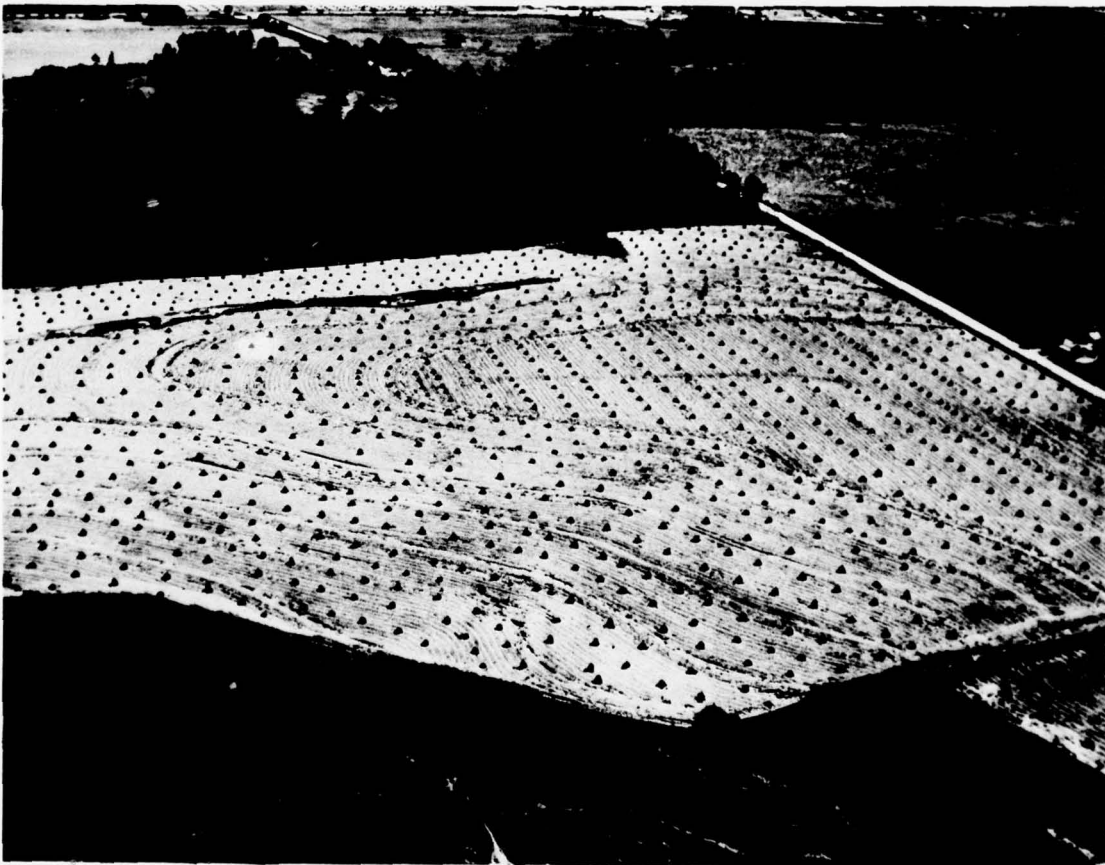


Figure 4.26 *Peanut Farms Are Major Agricultural Enterprises in the Southeast.*

APALACHICOLA-CHATTAHOOCHEE-FLINT BASINS PLAN FEATURES

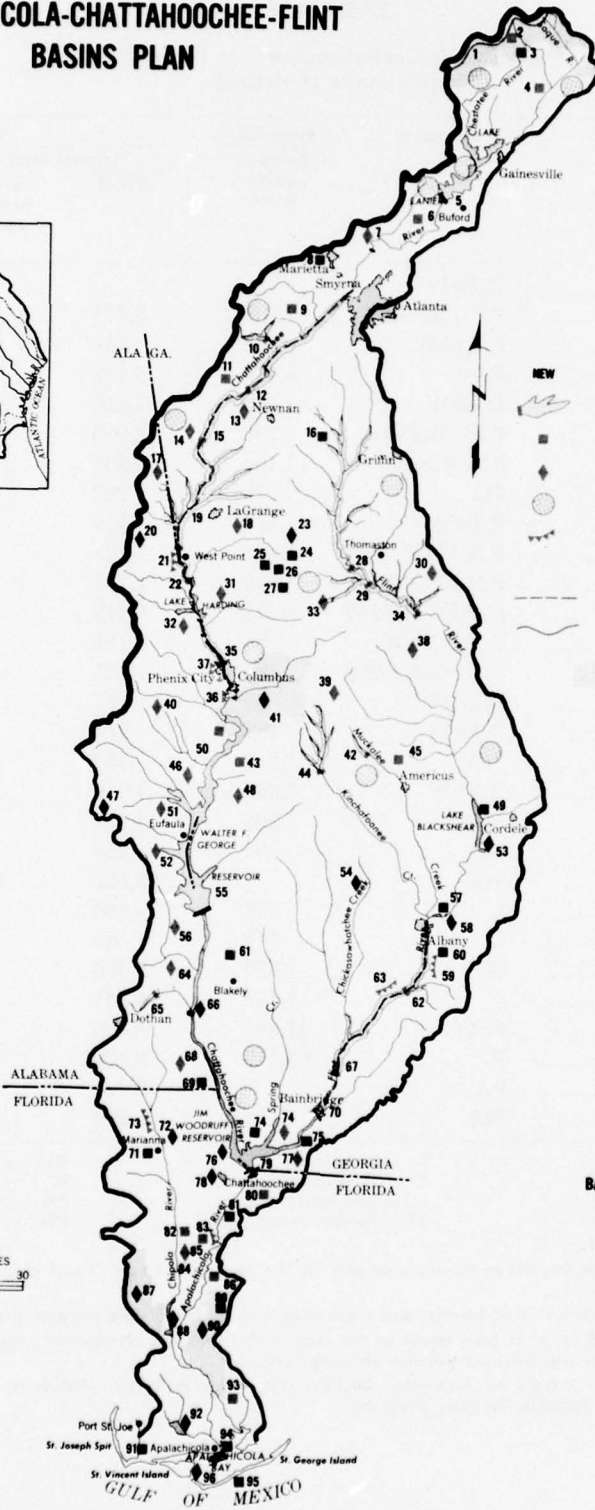
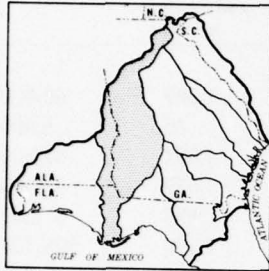
(key to numbers shown on Figure 4.27)

- | | |
|---|--|
| <ul style="list-style-type: none"> — Highlands Project Area 1 Blue Ridge Parkway 2 Gold Museum Historic Site 3 Unicoi State Park Recreation Area 4 Nacoochee Archeological Site 5 Lake Sidney Lanier 6 Roswell Mill and Town Historic Site 7 Morgan Falls Wildlife Management Area 8 Kennesaw Mountain National Battlefield Park 9 Soap Creek Mill Historic Site 10 Dog River Reservoir and Anneewakee Recreation Area 11 Ruff Creek Mill Historic Site 12 Cedar Creek Reservoir 13 Coweta County Wildlife Management Area 14 Heard County Wildlife Management Area 15 Franklin Reservoir¹ 16 Senoia State Park Recreation Area 17 Randolph County Wildlife Management Area 18 Troup County Wildlife Management Area 19 West Point Reservoir 20 Chambers County Fishing Lake 21 West Point Levees 22 New Riverview Reservoir¹ 23 } Warm Springs National Fish Hatchery and 24 } Recreation Area 25 Callaway Gardens 26 Franklin D. Roosevelt State Park Recreation Area 27 Little White House Historic Site 28 Spewrell Bluff Reservoir 29 Lazer Creek Reservoir 30 Crawford-Upson County Wildlife Management Area 31 Harris County Wildlife Management Area 32 Lee County Wildlife Management Area 33 Talbot County Wildlife Management Area 34 Lower Auchumpkee Creek Reservoir 35 Columbus Reservoir¹ 36 Columbus-Phenix City Project 37 Phenix City Levees 38 Taylor County Wildlife Management Area 39 Marion County Wildlife Management Area 40 Russell County Wildlife Management Area 41 Fort Benning Wildlife Management Area 42 Muckalee Creek Reservoir 43 Providence Canyon Recreation Area 44 Kinchafoonee Reservoir 45 Neisler Archeological Site 46 Eufaula State Wildlife Management Area 47 Barbour County Fishing Lake 48 Stewart County Wildlife Management Area | <ul style="list-style-type: none"> 49 Georgia Veterans Memorial State Park Recreation Area 50 Fort Apalachicola Historic Site 51 Eufaula National Wildlife Management Area 52 Barbour County Wildlife Management Area 53 Lake Blackshear Public Fishing Area 54 Steve Cocke Fish Hatchery 55 Walter F. George Reservoir 56 Henry County Wildlife Management Area 57 Chehaw State Park Recreation Area 58 Lake Worth Public Fishing Area 59 Radium Springs Levees 60 Radium Springs Recreation Area 61 Kolomoki Mounds State Park Recreation Area 62 Raccoon Creek Reservoir² 63 Newton Levees 64 South Henry County Wildlife Management Area 65 Omussee Reservoir 66 Columbia Reservoir 67 Lower Vada Reservoir² 68 Houston County Wildlife Management Area 69 Chattahoochee State Park Recreation Area 70 Bainbridge Levees 71 Florida Caverns State Park Recreation Area 72 Merritts Mill Pond Public Fishing Area 73 Marianna Levees 74 Jim Woodruff Reservoir (Lake Seminole) Recreation and Waterfowl and Fish Management Areas 75 Bainbridge State Park Recreation Area 76 Apalachee Wildlife Management Area 77 Decatur County Wildlife Management Area 78 Ocheeese Pond Public Fishing Area 79 River Junction Levees 80 Aspallaga Archeological Site 81 Torreya State Park Recreation Area 82 Chipola River Recreation Area 83 Blountstown Levees 84 Chipola River Wildlife Management Area 85 Cayson Archeological Site 86 Fort Gadsden Historic Site 87 Roy S. Gaskin Wildlife Management Area 88 Dead Lake Public Fishing Area 89 Apalachicola National Forest Recreation Area 90 Liberty Wildlife Management Area 91 Constitution Convention Historic Memorial 92 Lake Wimico Public Fishing Area 93 Pierce Archeological Site 94 John Gorrie Historic Memorial 95 Florida Beaches—Recreation Areas 96 Apalachicola Bay Oyster Development |
|---|--|

NOTES: ¹ Included in Middle Chattahoochee project.

² Included in Lower Flint project.

APALACHICOLA-CHATTAHOOCHEE-FLINT BASINS PLAN



- AREAS AND FACILITIES**
- NEW
 - DAM AND RESERVOIR
 - RECREATION
 - FISH OR WILDLIFE
 - UPSTREAM WATERSHED
 - LOCAL FLOOD PROTECTION
 - HIGHLANDS PROJECT AREA
 - NAVIGATION CHANNEL
 - PARKWAY EXTENSION
 - MAJOR PUBLIC LAND HOLDING
 - EXPANDED OR IMPROVED

BASINWIDE FACILITIES NOT SHOWN

- SOIL CONSERVATION
- IRRIGATION AND DRAINAGE
- SALINITY AND SEDIMENT CONTROL
- FORESTRY
- WATER SUPPLIES
- POLLUTION ABATEMENT
- PUBLIC HEALTH
- INDUSTRIAL DEVELOPMENT
- WATER ACCESS AREAS
- FISH AND GAME MANAGEMENT

Figure 4.27

TABLE 4.18

Apalachicola-Chattahoochee-Flint Basins Plan Investments
Early Action and Total by States
(thousands of dollars)

Project or program	Early action portion	Total by States		
		Georgia	Florida	Alabama
Highlands ¹	---	---	---	---
Cedar Creek	51,800	60,000	---	---
Dog River	---	5,000	---	---
Atlanta Pollution Abatement	---	67,800	---	---
Anneewakee	8,500	17,500	---	---
West Point	53,000	² 55,800	---	² 55,800
Middle Chattahoochee	---	² 308,700	---	² 308,700
Columbus-Phenix City	5,000	² 4,500	---	² 2,700
Omussee	---	---	---	2,250
Spewrell Bluff	66,000	67,500	---	---
Lazer Creek	43,500	44,900	---	---
Lower Auchumpkee	49,500	50,200	---	---
Lower Flint	---	66,800	---	---
Muckalee	---	3,400	---	---
Kinchafoonee	---	1,500	---	---
Chipola	1,800	---	3,100	---
Apalachicola Bay	430	---	430	---
Water-access areas	9,900	10,950	5,520	3,530
Upstream watersheds	25,000	30,400	---	---
Flood control levees	1,000	4,210	650	340
Water supplies ³	126,900	336,100	6,020	20,480
Irrigation	1,500	1,760	205	385
Drainage ³	219	442	50	108
Soil conservation	28,050	50,500	2,500	6,900
Forest conservation	56,520	90,840	20,860	16,100
Fish and wildlife ³	3,843	33,642	556	1,602
Recreation ³	27,200	² 58,470	² 53,320	² 15,770
Pollution abatement ³	147,400	369,800	6,000	19,400
Public health	5,000	9,150	---	250

NOTES: ¹ The project would be located in these basins and in the Savannah basin. Total benefits and costs are shown in Savannah basin.

² The project or a program feature would be located in more than one State. Costs of the involved project or program feature are posted under each State and are nonadditive.

³ Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

CHOCTAWHATCHEE-PERDIDO BASINS

The several basins identified as Choctawhatchee-Perdido comprise the second largest planning area in the Southeast River Basins. They include all the area, largely in the Upper Coastal Plain, in Alabama and Florida between the Apalachicola-Chattahoochee-Flint basins and the western margin of the Southeast River Basins area. Nearly 4 percent of the area is in large water bodies, notably the bays and lagoons behind the extensive Gulf beaches which front the area.

Population of this area, fourth in the Southeast River Basins, is less than half urban. Major population concentrations are on the coast. They include the Pensacola metropolitan area and Panama City, Florida, which are 6th and 10th in size, respectively, in the Southeast River Basins. Four other cities in the area, three in Alabama and one in Florida, had over 10,000 people in 1960. The largest of these four was 34th in size in the study area.

Employment in manufacturing exceeds that in agriculture. Apparel and chemical manufacturers are the principal manufacturing employers. Employment in wood and pulp and

paper manufacturing is also significant. The high percentage of nonagricultural-nonmanufacturing employment is a reflection of important Armed Forces and tourist activities in the area.

This area has three of the six deep-draft ports in the Southeast River Basins. Port St. Joe, in 1960, handled 1,620,000 tons; Panama City, 1,069,000 tons; and Pensacola, 792,000 tons. Although individually these ports stand well behind Savannah in total traffic, collectively, they are nearly equal to it.

This area, particularly its Gulf shoreline, has outstanding recreational potential. Beaches are excellent and are being increasingly used. Also, an inland feature, the Deadening Lakes project, is set out as a demonstration project for recreation and fish and wildlife. The plan formulated for the Choctawhatchee-Perdido basins includes areawide programs for soil conservation, irrigation and drainage, forestry, water supplies, pollution abatement and public health, and fish and game management. Water-access areas are included to permit better use of the streams and other water bodies in the basins. Industrial

Basins Data

Land and water	Population, employment, and per capita income		
Area (square mile)	14,742		
States (percent) :			
Florida	43		
Alabama	57		
Physiographic areas (percent) :			
Upper Coastal Plain	87		
Lower Coastal Plain	13		
	1960	2000	
	(percent)		
Land and small water bodies ...	96.4	95.8	
Forest land	73	65	
Cropland and pastureland ...	20	24	
Urban, transportation, and other land	7	11	
Impounded water, 40 acres or more	3.6	4.2	
			1960
			2000
Population (1,000)	692	1,518	
Urban (percent)	46	61	
Standard Metropolitan Statistical Areas—1960 population (1,000)			
Pensacola, Florida	203		
Escambia and Santa Rosa Counties, Florida			
Employment (percent) :			
Agriculture	13	3	
Manufacturing	17	17	
Trade, services, and other ...	70	80	
Per capita income	\$1,540	\$4,290	

development needs are recognized in all aspects of the plan. Three new multiple-purpose reservoirs are included in the plan. All three would provide facilities for recreation and fish and wildlife, one would include flood control storage, and one would have facilities for hydroelectric power development. The part of the plan

for recreation includes major improvements at beach areas along the Gulf coast. Wildlife management areas would be provided throughout the basins. Flood control levees would be provided for one area subject to serious flood damage. The plan includes harbor and port improvements at Panama City, Pensacola, and Port St. Joe.



Figure 4.28 *Pensacola Beach, Florida, Is One of Many Fine Beaches Along the Gulf of Mexico.*

CHOCTAWHATCHEE-PERDIDO BASINS PLAN FEATURES

(key to numbers shown on Figure 4.29)

- | | |
|--|---|
| 1 Crenshaw County Recreation Area | 35 Crestview Reservoir |
| 2 Pike County Public Lake | 36 Morrison Springs Recreation Area |
| 3 Butler County Wildlife Management Area | 37 Falling Waters Recreation Area |
| 4 Crenshaw County Public Lake | 38 Eglin Air Force Base Wildlife Management Area |
| 5 Pike County Public Lake | 39 Fort Walton Archeological Site |
| 6 Pike County Recreation Area | 40 Econfina Creek Reservoir—Deadening Lakes Project |
| 7 Ariton Reservoir | 41 Pine Log State Forest Wildlife Management Area |
| 8 Coffee County Public Lake | 42 Pine Log State Forest Recreation Area |
| 9 Dale County Public Lake | 43 Bear Point Archeological Site |
| 10 Fort Rucker Wildlife Management Area | 44 Pensacola Bay Forts |
| 11 Conecuh County Public Lake | 45 Pensacola Harbor and Port Improvement |
| 12 Conecuh County Recreation Area | 46 Naval Live Oak Recreation Area |
| 13 Mitchell Archeological Site | 47 Point Washington Wildlife Management Area |
| 14 Covington County Recreation Area | 48 Roy S. Gaskin Wildlife Management Area |
| 15 Geneva State Forest Recreation Area | 49 Panama City Harbor and Port Improvement |
| 16 Geneva County Public Lake | 50 Tyndall Air Force Base Wildlife Management Area |
| 17 Escambia County Recreation Areas (2) | 51 Gulf County Canal Improvement |
| 18 Brewton Levee | 52 Alabama Beaches Recreation Areas |
| 19 Blue Springs Wildlife Management Area | 53 Perdido Pass Channel Improvement |
| 20 Covington County Wildlife Management Area | 54 Gulf Beach Recreation Area |
| 21 Geneva County Public Lake | 55 Fort Pickens State Park Recreation Area |
| 22 Flomaton Levee | 56 Pensacola Beach Recreation Area |
| 23 Conecuh National Forest Recreation Area | 57 Santa Rosa Island Beach Recreation Area |
| 24 Geneva State Forest Wildlife Management Area | 58 Okaloosa County Beach Recreation Area |
| 25 Geneva County Recreation Area | 59 John C. Beasley State Park Recreation Area |
| 26 Blackwater River State Forest Recreation Area | 60 Walton County Beaches Recreation Areas |
| 27 Shoal River Wildlife Management Area | 61 West Bay County Beaches Recreation Areas |
| 28 Perdido River Wildlife Management Area | 62 St. Andrew State Park Recreation Area |
| 29 Walton County Recreation Area | 63 East Bay County Beaches Recreation Areas |
| 30 Holmes County Recreation Area | 64 Gulf County Beaches Recreation Areas |
| 31 Baldwin County Recreation Area | 65 Port St. Joe Harbor and Port Improvement |
| 32 Escambia River Wildlife Management Area | |
| 33 Santa Rosa County Recreation Area | |
| 34 Blackwater Wildlife Management Area | |

CHOCTAWHATCHEE-PERDIDO BASINS PLAN

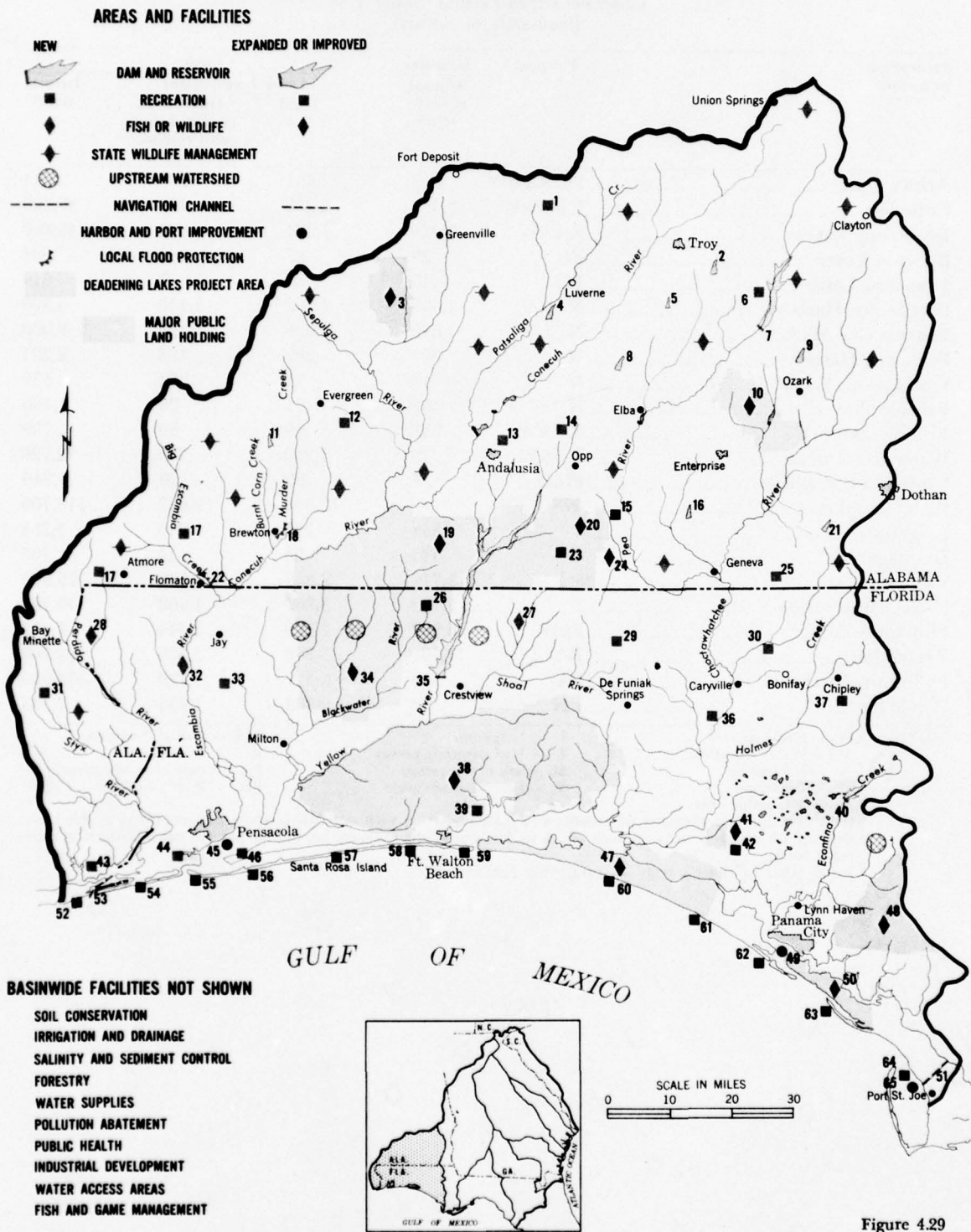


TABLE 4.20
Choctawhatchee-Perdido Basins Plan Investments — Early Action and Total by States
 (thousands of dollars)

Project or program	Early action portion	Total by States	
		Alabama	Florida
Ariton	9,396	9,644	---
Crestview	38,190	139,520	139,520
Deadening Lakes	8,550	---	15,660
Brewton Levee	---	684	---
Flomaton Levee	619	619	---
Port St. Joe Harbor	2,338	---	6,300
Panama City Harbor	2,214	---	6,030
Pensacola Harbor	424	---	2,221
Gulf County Canal	539	---	539
Perdido Pass	1,400	1,400	---
Fishing lakes	474	759	---
Water-access areas	5,432	2,962	9,758
Upstream watersheds	1,949	---	1,949
Water supplies	43,620	26,570	92,130
Irrigation	603	1,035	223
Drainage ²	73	143	45
Soil conservation	9,800	20,010	5,890
Forest conservation	42,330	53,850	46,250
Fish and wildlife ²	2,500	515	6,497
Recreation ²	30,310	27,100	75,600
Pollution abatement	78,390	29,300	146,600
Public health	400	---	2,300

NOTES: ¹ The reservoir would be located in both States. Costs of the involved project or program feature are posted under each State and are nonadditive.

² Data presented are exclusive of costs associated with multiple-purpose projects listed in this table.

SECTION III – PLAN IMPLEMENTATION

Cost Sharing

Cost sharing indicates who will ultimately pay for a plan feature. It is closely tied to cost allocations among plan purposes because resource development beneficiaries and responsibilities vary according to purpose. A large part of the plan would be local in its impacts and would be implemented at the local level; therefore, the non-Federal portion of costs is much greater than the Federal share. Because most of the

plan features are subject to additional detailed analysis before they are implemented, the cost allocations and, therefore, cost-sharing data shown are only suggestive. Further analysis may result in different costs and cost-sharing arrangements.

The non-Federal share of investment costs is estimated to amount to 76 percent, and of operation, maintenance, and replacements costs, 91 percent.

TABLE 4.21
Cost Sharing — Comprehensive Plan
(percent)

Purpose	Investment costs		Operation, maintenance, and replacements at year 2000	
	Federal	Non-Federal	Federal	Non-Federal
Flood control	60	40	9	91
Water supplies	---	100	---	100
Navigation	77	23	63	37
Irrigation and drainage	25	75	*	100
Hydroelectric power	---	100	---	100
Soil conservation	29	71	---	100
Forest conservation	35	65	30	70
Fish and wildlife	39	61	14	86
Recreation	23	77	14	86
Pollution abatement and public health	28	72	1	99
Other beneficial purposes	33	67	---	100

* Less than one-half of 1 percent.

Financing

The Federal share of the cost of the projects and programs included in the comprehensive plan would be provided in accordance with laws and regulations applicable at the time of financing. Non-Federal costs would be borne by State and local governments and private sources. Funds for financing and appropriate reimbursement of the non-Federal share would come from such sources as outright grants from government and private sources, revenue bonds, taxes received by government and development authorities and improvement districts, fees charged for project use, and revenues from the sale of resource products such as electric power and water. Where Federal financing is needed

for projects, reimbursement to the Federal Government would be made by non-Federal interests in the conventional manner.

For projects and programs in the comprehensive plan having reimbursable costs, repayment and payout schedules would be developed at the time detailed planning and design of the projects and programs are completed. Funds for repayment of the reimbursable costs would be derived from power revenues, use charges, and other sources and would be evaluated with the detailed planning and design. Prospective returns from the facilities for those purposes of which the cost would be reimbursable indicate that the repayment can be accomplished.

Power from non-Federal installations would be sold at rates in accordance with regulatory

laws in effect at the time of marketing. Power produced at Federal installations would be marketed at rates determined at the time the power becomes available. These rates would be set within the Federal public power policy and the rate structure then in existence so as to repay the capital investment with interest and at the same time encourage widespread use.

The burden of financing, in terms of initial capital outlay by non-Federal interests, is considerably less than that indicated by the cost sharing presented. For example, the cost of hydroelectric power facilities is shown to be 100 percent non-Federal in the cost sharing, even though most of the initial investment may be Federal. This is so because the Federal Treasury is reimbursed for its investment through the sale of electricity.

In 1960, Federal, State, county, local, and private expenditures for land and water resource development in the Southeast River Basins totaled about \$217 million. This is equivalent to about 2.8 percent of the area total 1960 personal income of \$7.8 billion. An estimated 15 percent of this expenditure was for training, technical aid, and other items assumed to be continued but not included as specific features in the comprehensive plan. Thus, in 1960 the equivalent of about 2.4 percent of the total personal income was invested in types of endeavor similar to those in the plan.

The projects and programs covered by this Report involve some private expenditures and some items of public expenditures which have been made since January 1, 1960, the starting date used for the evaluation. If the current relationship between expenditures for resource development and total personal income persists, an average of about \$400 million would be expended annually during the 40-year study period for resource development. This indicates that the same average percentage rate of expenditure would be adequate to accomplish the plan.

During the first 10 to 15 years of plan implementation, there will be need for financing at a rate higher than that prevailing in 1960 and earlier in order to develop facilities already needed and to provide for an adequate level of improvements consistent with the needs and opportunities expected to prevail during the 1960-2000 period.

Early Action Phase

To meet immediate requirements for development of resources and to help stimulate growth in the economic structures, certain projects and programs contained in the comprehensive plan should be initiated as quickly as detailed plans can be prepared for them and the necessary authorization, financing, and other arrangements can be made. The more urgent projects and programs have been included in the early action phase of the plan. A part of each of the continuing programs will have been accomplished prior to completion of this Report. Other parts of the plan, however, involve physical and institutional problems that will cause some delay in their detailed planning, construction, or development. If a balanced development program is carried out, some delay can be tolerated, and it would not seriously affect the benefits expected from this plan. The early action phase as used here is that part of the plan designed to meet existing and projected needs for the 1960-75 period. However, if the program is delayed, there will be associated delays in the economic growth of the area; and the projected needs and goals for the early action phase will not be met until sometime after 1975.

The comparatively high investments shown for the early action phase of the plan in relation to the total plan are a reflection of two conditions. First, there are existing unsatisfied needs as well as rapidly growing needs. Second, the levels of investment toward the later part of the period are responsive to needs only as projected to the year 2000. They do not provide for satisfaction of increased needs after 2000 even though in practice some investments toward meeting these increased needs would be made during the planning period. Therefore, the magnitude of total plan investments is relatively lower in relation to early action phase investment levels than it would be if projections were extended further into the future. Many of the plan features can be adapted at little additional investment to meet needs greater than those projected for 2000. Reviews of the plan will indicate the proper timing and sizing of these adjustments to the plan.

The systems of water control projects will not be complete until near the end of the planning period. Some of the benefits will be realized

almost as soon as each individual project is complete; others will not begin to accrue until the entire system is complete. The plan features identified for early action should be installed during the next several years. Total investments are shown for early action projects except for certain deferred facilities which would be added after 1975.

Six proposals in the early action phase have been designated as having special value for demonstrating new approaches to resource development. Included in this category are the Nassau River Embayment project and the Big Satilla Creek project in the Satilla-St. Marys basins, Cedar Creek-Anneewakee development in the Apalachicola-Chattahoochee-Flint basins, the Deadening Lakes project in the Choctawhatchee-Perdido basins, the Groveland project in the Ogeechee basin, and the Franks Creek-Mud Swamp development in the Suwannee basin.

These demonstration proposals are all related to the need for greatly expanded fish and wildlife and recreational development in the Southeast River Basins. Nassau River Embayment project is planned primarily as a research and experimental project for management of saline marsh habitat for fish and wildlife. The Big Satilla Creek project and the Franks Creek-Mud Swamp development are proposed principally to demonstrate the recreational potential of these locations. The Cedar Creek-Anneewakee development and the Groveland and Deadening Lakes projects are used to demonstrate local and regional advantages of both fish and wildlife and recreation.

The Groveland and the Big Satilla Creek projects will serve to demonstrate the impact of major reservoir developments for recreation in areas which are now largely undeveloped and which are a considerable distance from major cities but convenient to interstate routes, particularly north-south routes. The Deadening Lakes project and the Franks Creek-Mud Swamp development offer opportunities to show how local scenic areas may be developed to serve a much broader range of recreation and fish and wildlife needs, including a large potential tourist trade, and to serve a much larger area.

Projects designated as demonstrations would receive substantial Federal support for both construction and operation and maintenance. The

level of Federal support recommended for a demonstration project is 25 to 50 percent greater than for similar projects which do not have, for reasons of character or location, the same possibilities for use as demonstrations.

While the utilization of soil resources will be largely controlled by current requirements, all reasonable effort should be expended to apply adequate soil conservation practices as quickly as possible on all land not now protected. All possible permanent conservation measures remaining to be applied should be installed in the early action phase.

To protect and conserve forests for future use, all of the fire, insect, and disease control facilities should be installed during the early action phase, as should woodland drainage.

An important consideration of development groups, States, and Federal agencies should be for the early acquisition of land in beach areas and in potential reservoir areas before the pressures of growth make acquisition economically prohibitive.

Responsibility

The responsibility for initiating the plan basically must rest with the State and local interests. Even in those fields where a Federal agency is normally the organization which actually performs the detailed planning and construction, the impetus for the planning study must originate with those whom the programs and facilities will benefit.

The comprehensive plan for the Southeast River Basins is a combination of projects and programs formulated to meet the needs of the people for land and water resource development. In many cases, the Commission studies have not been carried beyond the reconnaissance level, and thus additional detailed planning is required prior to implementation of the plan. The authorizing Act specifically provides that the Commission plan shall not include final project designs and estimates.

The proposed assignment of responsibility for initiating the developments is made in the knowledge that timely and active interest on the part of the State and local leadership are required.

The designations included in Table 4.22 are made in accordance with following criteria.

(1) If an existing project or program is to be expanded by the addition of facilities or acceleration of activity, then the assignment of major responsibility for planning, construction and/or development, and operation is to the agency already having jurisdiction over the existing project or program. For example, if additional recreation facilities are to be provided at a project such as Hartwell which is a Federal project under the administrative supervision of the Corps of Engineers, then this agency would be given major responsibility for planning and construction even though the work might be actually done by other Federal or non-Federal entities.

(2) Where additional facilities are proposed at a project already under non-Federal jurisdiction, then the non-Federal interest is assigned the major responsibility. Exception may be made in the case of installation of navigation locks in non-Federal dams which would be worked out by joint agreement between the non-Federal entity and the Department of the Army.

(3) Non-Federal programs such as forestry, soil conservation, recreation, fish and wildlife, reclamation, drainage, irrigation, public health, and pollution abatement would continue under non-Federal sponsorship except where such programs apply to national forests, military reservations, and other Federal holdings. Where a clear-cut conclusion is not readily apparent, then selection is to be made on a case-by-case basis, giving due weight to the pertinent circumstances.

(4) New projects or programs are assigned to Federal agencies for planning, construction, and operation where there is a substantial involvement of hydroelectric power and navigation since this is the general historical pattern. Exceptions are made in the application of this general rule for hydroelectric power facilities where it was found desirable that such facilities be constructed by non-Federal interests either in their entirety or by contractual agreement with Federal interests. Exception is also made in the case of navigation improvements where the major portion of benefits are other than commercial navigation.

(5) Historical patterns are also observed in the case of flood control. If the project involved the provision of local protection works on the

main stream, then the Federal interests would be responsible for construction and non-Federal would be responsible for operation and maintenance. In the case of flood plain management and small reservoir developments located in headwater areas to serve flood control purposes, planning, construction, and operation are designated as non-Federal, although local groups may call upon Federal agencies for assistance in planning.

(6) In the application of the general rule and the cited exceptions, the incidence of benefits is considered in determining appropriate responsibility. Where benefits are of national significance, Federal responsibility is indicated; where they are local, non-Federal responsibility is indicated. Where these benefits are of regional significance, the matter is decided on a case-by-case basis, considering all of the related circumstances.

(7) In the designation of a non-Federal and/or Federal interest for the major responsibility, there is no intention that such selection would ignore the other interests that may be concerned in planning the details of the proposed program or project. This applies also to construction and operation.

The designation of Federal agencies to have major responsibility for projects and programs generally is made on the basis of the agency usually associated with the purpose having the largest portion of the total allocated costs, except for projects involving hydroelectric power and substantial mainstem flood control which are assigned to the Corps of Engineers.

Where projects and facilities have been historically constructed by Federal agencies and turned over to local groups for operation and maintenance, it is intended that this practice be continued. An example of this is a local flood protection levee on a principal stream.

The non-Federal or Federal interests with the major responsibility for accomplishment, including coordinating the preauthorization planning, obtaining final approval or authorization of specific works or facilities, budgeting for appropriations or other funding, design of structures, administration of construction or installation, and other matters pertinent to planning and construction are indicated in Table 4.22. The designation of Federal and non-Federal is not

TABLE 4.22
Responsibility for Implementing Projects

Major responsibility for implementing designated projects		Basins and projects	Early action phase ¹	Purpose ¹	Federal agency with major responsibility for Federal aspects
SAVANNAH BASIN					
Highlands Project Area					
--	Federal	Horsepasture.....	E	P, R	Corps of Engineers
--	Federal	Jocassee.....	--	P, R, F&W	Corps of Engineers
--	Federal	Newry-Old Pickens.....	--	P, R, F&W	Corps of Engineers
Chattooga					
--	Federal	War Woman.....	--	P, R	Corps of Engineers
--	Federal	Sand Bottom.....	--	P, R	Corps of Engineers
--	Federal	Rogues Ford.....	--	P, R	Corps of Engineers
Non-Federal	--	Camp Creek.....	--	P, R	Federal Power Commission
--	Federal	Highlands (FS lands).....	E	R, F&W	Forest Service
Non-Federal	--	Highlands (other).....	E	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Tallow Hill.....	--	P, R, F&W	Federal Power Commission
Non-Federal	--	Anthony Shoals.....	--	P, R, F&W	Federal Power Commission
--	Federal	Trotters Shoals.....	E	P, R, F&W	Corps of Engineers
Lower Savannah					
--	Federal	Burtons Landing.....	E	N, P, R, F&W	Corps of Engineers
--	Federal	Stokes Bluff.....	--	N, P, R, F&W	Corps of Engineers
--	Federal	Gaffney Landing.....	--	N, R, F&W	Corps of Engineers
Non-Federal	--	Savannah Pollution Abatement.....	E	PA	Public Health Service
--	Federal	Intracoastal Waterway.....	--	N	Corps of Engineers
--	Federal	Savannah Harbor.....	--	N	Corps of Engineers
OGEECHEE BASIN					
Non-Federal	--	Groveland.....	E	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
ALTAMAHA BASIN					
Non-Federal	--	Curry Creek.....	--	F&W, R, WS	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Big Flat Creek.....	--	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	New Bethel.....	--	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Laurens Shoals.....	E	P, R, F&W	Federal Power Commission
--	Federal	Peachstone.....	E	P, R, F&W	Corps of Engineers
--	Federal	Goose Creek.....	E	P, R, F&W	Corps of Engineers
--	Federal	Abbeville.....	--	P, R, F&W	Corps of Engineers
--	Federal	Coopers Ferry.....	--	P, R, F&W	Corps of Engineers
Non-Federal	--	Townsend.....	--	FC, D	Soil Conservation Service
Non-Federal	--	Buffalo Creek.....	E	F&W	Bureau of Sport Fisheries and Wildlife
--	Federal	Navigation to Doctortown.....	--	N	Corps of Engineers
SATILLA-ST. MARYS BASINS					
Non-Federal	--	Big Satilla Creek.....	E	F&W, R, I	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Axson.....	E	F&W, R, PA, I	Bureau of Outdoor Recreation, National Park Service ²
--	Federal	Nassau River Embayment.....	E	F&W, R, FC, PH	Bureau of Sport Fisheries and Wildlife
Non-Federal	--	Upper Hurricane Creek.....	--	F&W, R, PA, I	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Broxton Creek.....	--	PA, F&W, R	Public Health Service
Non-Federal	--	Umbrella Creek Channel.....	E	N	Corps of Engineers
--	Federal	Brunswick Harbor.....	--	N	Corps of Engineers
--	Federal	Fernandina Beach Harbor.....	--	N	Corps of Engineers
SUWANNEE BASIN					
--	Federal	Shiloh.....	--	FC, PA, I, R, F&W	Corps of Engineers
Non-Federal	--	Franks Creek.....	E	F&W, R	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Tifton.....	E	PA, R, I, FC, F&W	Bureau of Outdoor Recreation, National Park Service ²
--	Federal	Hixtown Marsh.....	E	F&W, R, I	Bureau of Sport Fisheries and Wildlife
Non-Federal	--	Moultrie.....	E	PA, R, F&W, FC, I	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	--	Mud Swamp.....	E	R, F&W, I	Bureau of Sport Fisheries and Wildlife

(continued)

TABLE 4.22—Continued

Major responsibility for implementing designated projects	Basins and projects	Early action phase ¹	Purpose ¹	Federal agency with major responsibility for Federal aspects
Non-Federal	Quitman	E	R, I, F&W, FC, PA	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	Nashville		PA, R, F&W, FC, I	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	Ashburn		PA, R, F&W, FC, I	Public Health Service
Non-Federal	Alapaha		PA, R, F&W, FC, I	Bureau of Outdoor Recreation, National Park Service ²
OCHLOCKONEE BASIN				
Non-Federal	Doerun	E	PA, R, F&W	Public Health Service
Non-Federal	Quincy	E	WS, R, F&W, PA	Public Health Service
Non-Federal	Thomasville	E	R, F&W, PA, FC	Public Health Service
Non-Federal	Tired Creek		R, F&W, PA, WS	Public Health Service
Non-Federal	Gulf Coast Improvement		R, N, F&W, D, PH, T, L	Corps of Engineers
and Federal	St. Marks Channel	E	N	Corps of Engineers
Federal	Panacea Channel Improvement	E	N	Corps of Engineers
Federal	Intracoastal Waterway (Carrabelle to Apalachee Bay)		N	Corps of Engineers
Non-Federal	Steinhatchee River Improvement		N, R, F&W, L	Corps of Engineers
Federal	St. Marks Levee		FC	Corps of Engineers
Non-Federal	Wacissa River Development	E	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
APALACHICOLA-CHATTAHOOCHEE-FLINT BASINS				
Non-Federal	Cedar Creek	E	P, FC, R, F&W	Corps of Engineers
Non-Federal	Dog River		PA, F&W	Public Health Service
Non-Federal	Atlanta Pollution Abatement		PA, P	Public Health Service
Non-Federal	Anneewakee	E	R, F&W	Bureau of Outdoor Recreation, National Park Service ²
Federal	West Point	E	P, FC, R, F&W	Corps of Engineers
Federal	Middle Chattahoochee		N, P, R, F&W	Corps of Engineers
Federal	Columbus-Phenix City	E	FC	Corps of Engineers
Non-Federal	Omussee		R, F&W	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	Spewrell Bluff	E	P, FC, N, R, F&W	Federal Power Commission and Corps of Engineers
and Federal	Lazer Creek	E	P, FC, N, R, F&W	Federal Power Commission and Corps of Engineers
and Federal	Lower Auchumpkee	E	P, FC, N, R, F&W	Federal Power Commission and Corps of Engineers
and Federal	Lower Flint		N, P, R, F&W	Corps of Engineers
Federal	Muckalee		FC, WS, R, F&W	Corps of Engineers
Federal	Kinchafoonee		FC, F&W	Corps of Engineers
Non-Federal	Chipola	E	R, F&W	Bureau of Sport Fisheries and Wildlife
Non-Federal	Apalachicola Bay	E	F&W	Bureau of Commercial Fisheries
Federal	Flood Control Levees	E	FC	Corps of Engineers
CHOCTAWHATCHEE-PERDIDO BASINS				
Non-Federal	Crestview	E	P, R, F&W	Federal Power Commission
Federal	Ariton	E	FC, R, F&W	Corps of Engineers
Non-Federal	Deadening Lakes	E	F&W, R	Bureau of Outdoor Recreation, National Park Service ²
Non-Federal	Fishing Lakes	E	F&W, R	Bureau of Sport Fisheries and Wildlife
Federal	Brewton Levee		FC	Corps of Engineers
Federal	Flomaton Levee	E	FC	Corps of Engineers
Federal	Gulf County Canal and Perdido Pass	E	N	Corps of Engineers
Federal	Pensacola Harbor	E	N	Corps of Engineers
Federal	Panama City Harbor	E	N	Corps of Engineers
Federal	Port St. Joe Harbor	E	N	Corps of Engineers

NOTES ¹ E—Early action phase development
 FC—Flood control
 WS—Water supplies
 N—Navigation
 I—Irrigation
 D—Drainage
 P—Hydroelectric power

F&W—Fish and wildlife
 R—Recreation
 PA—Pollution abatement
 PH—Public health
 T—Transportation
 L—Landfill

² Designated agency depends on the established division of responsibility between the Bureau of Outdoor Recreation and National Park Service.

intended to prejudice joint non-Federal and Federal development of power and perhaps other features when and if such a proposal is presented to Congress for final resolution.

Designation is made also of the Federal agency having the major responsibility for the Federal aspects of each project, regardless of the magnitude of these Federal aspects. In projects involving hydroelectric power where the major responsibility is Federal, the Corps of Engineers would have the major responsibility; and where the major responsibility is non-Federal, the Federal Power Commission would have the major responsibility. Designation of a single agency is not intended to reflect any lack of interest by other Federal agencies in a project; in fact, most of the Federal land and water agencies have some interest in each of the projects.

General Programs and Projects

In the general programs and projects, other than those specifically mentioned in Table 4.22, the division between non-Federal and Federal principal responsibility is made on the basis of ownership of the land or area involved. For example, wildlife or soil conservation programs on non-Federal lands are the principal responsibility of non-Federal entities; forestry programs on a military reservation or national forest are a principal Federal responsibility; and recreation programs on a Federal multiple-purpose reservoir project, which envisions Federal acquisition of the general reservoir area, are a principal Federal responsibility.

Keeping the Plan Current

During the existence of the U. S. Study Commission, Southeast River Basins, there developed a very high degree of understanding and respect among the members of the Commission for the many related problems associated with land and water resources development. Each Commissioner ably presented the viewpoint of his agency or State, yet at the same time was cognizant of related effects on other agency and State developments. The Commission has been an effective organization for resolving these differences—not by edicts, but by objective analysis and discussions of common problems in a deliberate attempt to reach a mutually satisfactory solution. In many cases, this required some compromise

and subordination of strong individual views to come within a consensus of the group—all within the basic common denominator of what is best for the overall development of the entire study area.

There is an urgent need to continue the coordination that has been engendered by the Study Commission so that the projects and programs recommended in the comprehensive plan can be consummated in the same atmosphere. There also is a need to provide a continuing basis by which the requirements for resources developments can be compared with the actual accomplishments and the two maintained in satisfactory balance for the public good. In addition, it is expected that many new proposals for resources development, initiated by both public and private agencies, will need to be coordinated with those in the plan. Periodically, the long-range plan should be updated in the light of current requirements and, where necessary, revised to reflect changing conditions. It is desirable that an organization such as the proposed Resources Advisory Board, Southeast River Basins, be created to carry on the coordination that has been established.

Resources Advisory Board, Southeast River Basins

The proposed Resources Advisory Board, Southeast River Basins, is similar to the U. S. Study Commission, Southeast River Basins, with several significant changes. Its principal functions would be to receive and maintain records and data of the U. S. Study Commission, Southeast River Basins; to encourage continued coordination among the Federal and State Governments in the field of land and water resources; to review programs and projects needed in the near and distant future; and to encourage the proper development of programs and facilities to obtain the desired results. The Board would be composed of one member from each of the States of Alabama, Florida, Georgia, and South Carolina, selected by the respective Governors and appointed by the President for terms coinciding with those of the respective Governors, one member from each of the Federal agencies on the present Study Commission and a Chairman from the area at large, also appointed by the President. The location of the principal office of the Advisory Board and the frequency of the scheduled meetings would be determined

by the Board. Expenses of the representatives of the Federal agencies would be paid by the Federal agencies out of their regular appropriations and the expenses of the representatives from the States would be borne by the respective States. The expenses of the Chairman, the salary and expenses of the staff, and the expenses of the Board office would be borne by the budget of the Resources Advisory Board, which would be prorated among the four States. Proportioned amounts to be contributed by each of the States would be based on a formula which recognizes population, area, and per capita income of the respective States in the area covered by the Board.

The principal duties and responsibilities of the Board, generally acting through the Executive Director and staff, would be to encourage and review the development and implementation of the comprehensive plan for land and water resources development. To the extent practicable, it would obtain proposed plans for projects and facilities in the area which affect water and land resources and would offer advice and comments on projects and facilities having a substantial effect on the area land and water resources proposed by State or Federal agencies and by private and local interests. Its area of interest would include:

- (1) Flood control and prevention;
- (2) domestic and municipal water supplies;
- (3) the improvement and safeguarding of navigation;
- (4) the reclamation and irrigation of land, including drainage;
- (5) possibilities of hydroelectric power and industrial development and utilization;
- (6) soil conservation and utilization;
- (7) forest conservation and utilization;
- (8) preservation, protection, and enhancement of fish and wildlife resources;
- (9) the development of recreation;
- (10) salinity and sediment control;
- (11) pollution abatement and the protection of public health; and
- (12) other beneficial and useful purposes not specifically enumerated.

The Board would cooperate in resources development management with the local, State, and Federal agencies.

The Board could also function as a nucleus organization which could periodically expand its staff for review studies, with a view to making substantial modifications and updating of the plan.

The budgeting and financing of such expanded studies would be in accordance with conditions then prevailing. Financing of such studies might be provided by Federal funds appropriated specifically for that purpose.

The major task of making general revisions of the plan would be undertaken at periodic intervals, using appropriations from the Congress and contributions from the States which would be provided especially for this program.

The work of the Resources Advisory Board would usually be done by appropriate committees with representation from State, Federal, and nongovernmental entities. These committees would be established to do a particular job. The Executive Director would usually serve as chairman of each committee.

The participating States and Federal agencies would perform from time to time reviews and make special reports as suggested by the Resources Advisory Board, using their regular staff and as part of their normal planning work and without charge to the Advisory Board.

The duties of the staff of the Advisory Board would be principally in the fields of administration, coordination, and professional advice and would generally not involve the performance of detailed studies and investigations.

The staff of the Resources Advisory Board, Southeast River Basins, would consist of an Executive Director, an Assistant Executive Director, and other professional and clerical-administrative personnel.

The Executive Director and the Assistant Executive Director, during their employment with the Board, would not be employees of any State or Federal agency.

The initial annual budget is estimated to be \$60,000, distributed approximately as follows:

Alabama	\$10,000
Florida	15,000
Georgia	25,000
South Carolina	10,000

Interim Organization

The establishment of the Resources Advisory Board, Southeast River Basins, discussed above,

would require State and Federal legislation. Since this legislation will require some time, provision should be made for an interim organization until such time as the Resources Advisory Board is formally established. Such a temporary organization should be established immediately by administrative directives of the Governors of the States concerned and the heads of the Federal agencies. It could be organized and operated similarly to the various Interagency Basin Committees which currently operate under the general cognizance of the Federal Interagency Committee on Water Resources with appropriate participation by the States involved. Details of the interim organization would be included in the administrative directives establishing it. The organization could provide for one member from each of the States of Alabama, Florida, Georgia, and South Carolina, as selected by the respective Governors; a member selected by the Secretary of each of the Federal Departments of Army; Commerce; Agriculture; Health, Education, and Welfare; Interior; and by the Chairman of the Federal Power Commission; and a member from the area selected by the State members in order to comprise an 11-man board.

The 11 members would select a Chairman and Vice Chairman from among themselves with the provision that one be a Federal member and the other a non-Federal member. The Advisory Board would select an Executive Director. The Executive Director, with the concurrence of the Chairman, would select the other staff members. The salaries and expenses of the Federal members would be paid from appropriations to the respective Federal agencies, and the salaries and expenses of the State members would be paid from appropriations to the respective State agencies. The expenses of the Chairman, the salaries and expenses of the staff members, and the Board's office expenses would be paid out of funds available to the Interim Board by contributions from the participating States.

The interim organization would be charged with facilitating and coordinating the implementation of the plan and doing the other functions of the continuing board in the interim period to the extent practicable.

The duties and responsibilities of the Interim Resources Advisory Board would be similar to those proposed for the continuing Resources Advisory Board to the extent practicable.



Figure 4.30 *Farmland near Andalusia, Alabama—Land Treatment and Cropping Practices Wisely Employed Are Playing a Greater Part in Southeastern Agriculture.*

PART FIVE - CONCLUSIONS AND RECOMMENDATIONS

DISCUSSION

Land and water resources development is an important facet of the overall physical improvement and economic and social progress required to attain the levels of growth projected for the area as part of a highly competitive national economy. Successful development of land and water resources depends largely on two types of determinations. One determination rests on studies and analyses by engineers, economists, and other professional planners of the physical practicability and economic feasibility of projects and programs, and of the consequence of alternative decisions regarding resources development. The other is supported by political, financial, and other institutional considerations relating to project and program attractiveness and permissibility from local, regional, and national standpoints. Both determinations are important.

The Southeast River Basins area has the potential for continued population and personal income growth through the year 2000. The rate of growth is projected so that it almost parallels that of the Nation, being somewhat slower for population and somewhat higher for personal income. Realization of the projected levels of income depends upon a continuing rise in the productivity of the area workers as well as a large increase in the numbers employed. Urbanization, a trend well established, will be a major influence on future use of land and water resources. With this shift, which is part of a national trend, will come readjustments of political influences. There will be increased emphasis on industrial development and problems connected with urbanization and less emphasis on sustaining inefficient or uneconomic rural enterprises by means of institutional support. Thus, it is important that the residents understand that raising educational levels of the labor force and other institutional adjustments are needed to promote increased productivity and to permit desirable shifts to envisioned employment opportunities.

It is unrealistic to expect or to seek immediate and drastic changes which would severely disrupt the existing economy. It is also unrealistic for area residents not to prepare to assume their most advantageous roles in the rapidly evolving new economy. Perhaps most important is that the people of the area appraise their overall opportunities and limitations, learn how their economic lot can be further improved, and seek the optimum use of their abundant resources. This should be started immediately on a step-by-step basis to assure accomplishment of the desired long-range objectives. A comprehensive plan for the conservation and development of the area land and water resources is presented in Part Four.

The plan recognizes the rights and major responsibilities of the States and local interests in the development of the area land and water resources. It provides that the major portion of the new resource development programs and facilities be initiated, developed, and maintained by non-Federal entities.

The plan is designed to meet projected needs to the year 2000 through efficient development and utilization of the area land and water resources. To be effective, the plan, as a joint local, State, and Federal effort, must be implemented in the form of actual programs and projects. In most instances, more detailed analyses and evaluations will be necessary before programs and projects are started. Because the plan is based on long-range assumptions and projections, it will need frequent reviews and periodic revisions to insure that it is properly responsive to changing times and conditions.

Study area lands, with presently known management and technological factors, can produce food and fiber at several times the present rate and are more than adequate to meet the needs of the study area and its projected share of national and world requirements for the year 2000. The nonagricultural requirements for land will cause no serious restriction on agricultural pro-

duction, and there is adequate land for the projected growth of urban areas with the accompanying industrial and service activities. Water, generally, is distributed favorably in relation to development possibilities and seasonal demands. If properly developed, sufficient water is available to meet all foreseeable requirements for human comfort and health and for needed expansion of industry, recreation, agriculture and forestry, and for fish and wildlife.

Flood damages are locally significant both on major rivers and on tributary streams; however, for the area as a whole, flood damages are not a major problem. Expansion of activities in flood plains could lead to serious flood problems if preventive measures are not taken. Projects and programs in the comprehensive plan would alleviate the major flood problems existing or likely to develop. Flood problems can be kept from arising in many areas by proper flood plain management. Flood plain management would

be particularly desirable and most readily accomplished where pressure for building on flood plains has not yet developed. Also, there is a need for continuation and expansion of stream-flow forecasting and flood warning systems.

There are no major water supply deficiencies in the area as a whole. Substantial quantities of ground water are available in the Coastal Plain. In the Piedmont and Blue Ridge provinces, where subsurface formations with little capacity for ground water storage limit the ground water supply, there are numerous opportunities for storage of surface runoff. Water quality is generally suitable for most uses, and waters are amenable to treatment for the other uses.

The traffic in deep-water ports and on intra-coastal and inland waterways is important to the area economy. Additional inland waterways and waterway extensions are needed to meet expected commodity movement. Careful consideration of possible inland waterway development

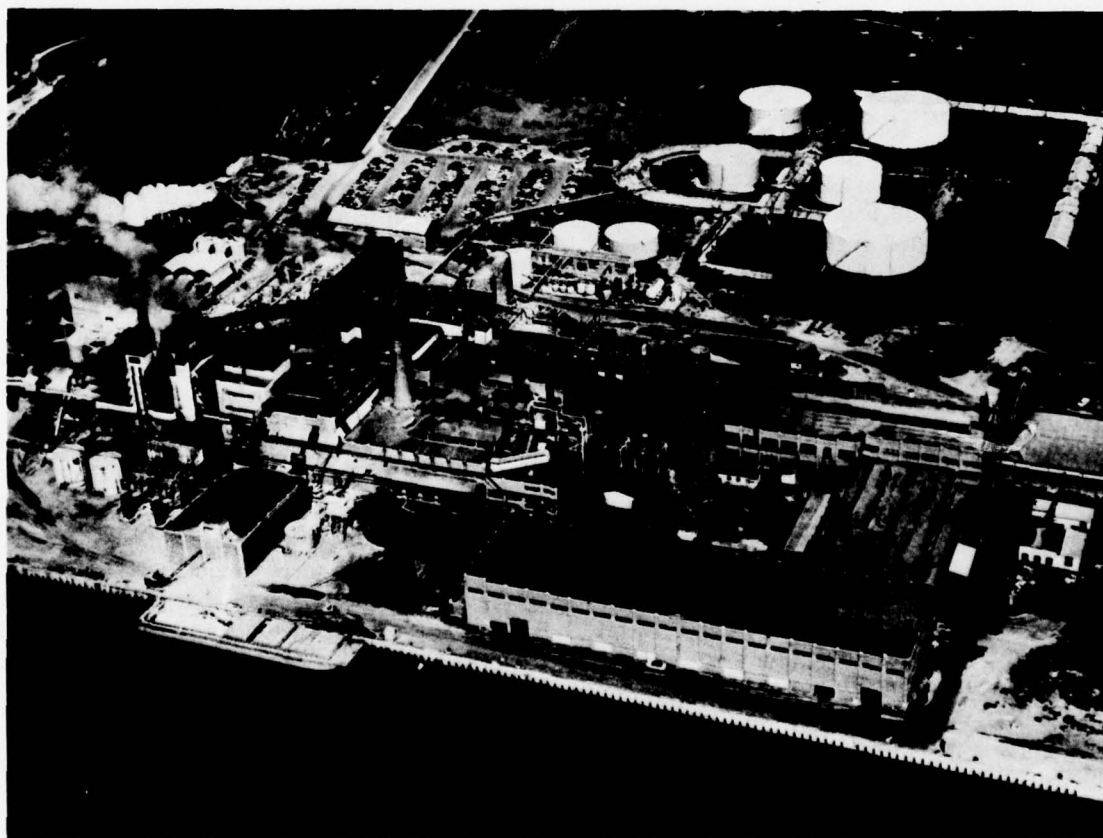


Figure 5.1 Pulp and Paper Plant at Port St. Joe, a Deep-Water Port in Northwestern Florida.

in the future will be required in the light of changing technology and increasing efficiencies, not only of water transportation but also of alternative modes of bulk shipment.

Projected requirements for food and fiber can be met through a continuation and acceleration of current practices and programs and with some land-use changes. Individual operators are expected to install drainage and irrigation facilities for efficiency, increased yields, and improved uniformity in agricultural products. Marginal lands now in crop production would then be put in pastureland, woodland, or other uses.

The hydroelectric power development proposals included in the plan, although significant, would fall far short of meeting the area demand for electric power. Possibilities exist for development of pump storage projects alone and in combination with conventional installations. Pump storage would be an important adjunct to the hydroelectric supply in future years. Its development would supplement the hydroelectric power proposals included in the plan. Low-cost fuel for thermal-electric energy production can be obtained and transported to the area. Electricity generated in nearby low-cost fuel areas can be imported. Adequate quantities of cooling water for large steam powerplants would be available with the control facilities provided in the plan and in tidewater areas. Additional system integration and transmission interconnections are essential. Remaining sites with good long-range potential for hydroelectric power developments should be protected from preemption.

Industrial expansion is a key factor in supporting the projected income growth in the area. The levels of industrial growth reflected by projections are practicable of attainment with a concerted effort by community leaders to establish a suitable legal, institutional, social, and political environment with conditions favorable for financing, education, and training. Much has been done to obtain these conditions in recent years. Much more remains to be done.

Conservation treatment has been applied to about half of the cropland, pastureland, and rangeland of the area. However, soil erosion remains a problem. The application of erosion control and other conservation treatment measures would conserve soil and water resources

and contribute to increased efficiency in production.

Although annual merchantable wood growth now exceeds the annual harvest and mortality, projected levels of production can be met by the year 2000 only if accelerated protective and management programs are carried out. Goals for sawtimber were set substantially below levels which would have been expected on the basis of past performance and the inherent sawtimber production capabilities of the area. Projected levels recognize that the area timber has been cut excessively in the past and that a buildup of growing stock must be accomplished before efficient sawtimber production can be maintained. Western sections of the country now have large sawtimber reserves which can be advantageously marketed throughout the Nation during the next 40 years. The marketing advantages of the West will dissipate, however, as its mature timber is harvested, and both regions enter a period of sustained yield production.

Despite the natural productivity of the seas, it will become increasingly difficult to harvest the wild fish crops at costs permitting commercial fishing industries to compete with imports and the mass production and marketing methods of related food industries. New programs are required to demonstrate the feasibility of producing certain fishes for food and industrial purposes in waters where the environment can be regulated.

The projected user-days of hunting and fishing can be accommodated by the available resources with development of plan elements. These programs include more intensive management of existing habitat, development and management of new fish and wildlife areas, and reservoirs. Some changes in sportsmen's choice as to type of hunting and fishing are anticipated. Stocks of certain species are expected to be increased more by elements of the plan than stocks of other species.

Demands for outdoor recreation are rapidly exceeding the capacity of developed facilities in the area, particularly in the vicinity of major urban centers and adjacent to the principal north-south transportation routes. Lack of public access to water looms as a major problem. The area has the natural advantages necessary to attract more of the growing tourist business and



Figure 5.2 *The Stephen Foster Memorial Attracts Many Tourists to the Suwannee River.*

to meet the needs of the resident population for varied recreational opportunities. The development of the projected interstate highways will shorten travel time from other sections of the country, particularly the populous eastern and midwestern states, thereby increasing accessibility to the area recreational resources.

Soil salinity is generally not a problem in the area. Salt-water intrusion of fresh-water aquifers, while a threat in some coastal areas of heavy ground water withdrawals, can be obviated by judicious withdrawals, by shifts to alternative sources, or by a combination of those measures. Sedimentation problems are not serious. Satis-

factory sediment control can be achieved largely through conservation practices.

Although waste water from some sources is adequately treated, much raw or inadequately treated sewage and industrial waste is still discharged directly into streams and lakes. As population grows and industry expands, the pollution problems will intensify unless adequate waste treatment can be provided and waste loadings reduced to assure stream water quality suitable for reuse. If maximum benefits are to be obtained from the water resource, disposal of treated liquid wastes from municipal and industrial sources will have to be regulated to con-

form to the assimilative capacity of the receiving stream. Assimilative capacity of some streams can be increased by low-flow augmentation.

All water-oriented phases of recreation require suitable surface water quality. Many of these activities contribute to water pollution. This is particularly true in the more popular public use areas. Adequate safe water supplies and waste disposal facilities are included in the planning of recreational use of surface waters. At some existing developments water quality problems occur that must be solved if use is to continue and to expand. Both Federal and State agencies can assist, but the responsibility of maintaining an effective control program must be local.

Beach erosion and hurricane damage are problems in coastal reaches. Additional studies are required to evaluate these problems and to find solutions.

The future development and conservation of the area land and water resources will be largely a product of non-Federal initiative, financing, and follow-through; but cooperation between Federal and non-Federal entities is required for implementation of the comprehensive plan. Cooperation among the States and among intra-state agencies in resource developments of mutual interest also is essential.

The non-Federal costs of plan implementation, operation, maintenance, and replacements are within the financial capabilities of the study area, but outside assistance in financing will be required for the early action phase in some areas. An increased rate of expenditures for resource development and conservation in the area will be required during the early phase because this phase is intended to satisfy an immediate demand for facilities not now developed, as well as to meet future needs.

Initial Federal assistance in normally non-Federal projects, such as those for recreation and fish and wildlife, is desirable in some instances as an incentive for their earlier development and use to demonstrate how non-Federal cost can be financed and repaid from project benefits. Special cost-sharing procedures are proposed in connection with demonstration projects.

Existing cost-sharing policies and practices have been used for many of the purposes studied. In addition, some new standards have been de-

veloped to provide greater equity and uniformity in application among purposes. In practice, cost sharing for projects and programs in the area should not differ greatly from policies effective generally throughout the Nation.

Private enterprise is the cornerstone of our political and economic system. Accordingly, development of the land and water resources should recognize local initiative, local ability, and local willingness as significant factors in designating Federal or non-Federal entities to implement the plan. Designations in this Report should not be viewed as prejudicial to joint development of features of the plan by a combination of non-Federal and Federal entities.

There are several important considerations which would facilitate the implementation of the comprehensive plan and provide for its orderly review and adjustment. Basic data and interpretations of basic data are now insufficient for many detailed planning purposes. Notably lacking are suitable topographic and geologic maps. Data on geology, runoff, ground water, water quality, and water use are wanting. Only meager information is available on economic, physical, social, and environmental responses to land and water resource development.

In the course of implementing the comprehensive plan and keeping it responsive to changing conditions, recognition should be given to the existing water laws in relation to the development contemplated in the plan. The riparian doctrine is the basis for current water laws throughout the study area. The doctrine has been variously interpreted by legislative action and court decision reflecting, among other things, the reasonable use concept. Conflicts over surface and ground water use have not been widespread in the past because of the relative abundance of water. As water uses increase, there will be more competition for the available supplies. Optimum water development will sometimes require the storage of surplus flows for use at points considerable distances downstream, sometimes in a State other than that in which the flows are stored. Some agreement among the interested groups—local, State, and Federal—will be needed to insure that the distribution of stored water will conform to the planned uses. It appears that this arrangement can be made within the framework of the exist-

ing water laws, but continuing consideration should be given to changes in the State water laws which ultimately may be desired.

If the comprehensive plan is to be of lasting value to the area and to the Nation, an organization is required for facilitating and coordinating plan implementation and review. The plan calls

for such a successor body by the title—Resources Advisory Board, Southeast River Basins. This would be a joint State-Federal board established on a continuing basis. Also, provision is made in the plan for an interim State-Federal organization to act until such time as the Resources Advisory Board is ready to function.

CONCLUSIONS

1. The availability of land and water will not be a limiting factor in meeting projected needs for resources development through the year 2000 under the comprehensive plan.

2. The long-range needs related to land and water resources of the area can be met by the elements of the comprehensive plan through appropriate non-Federal and Federal cooperative action.

3. All elements of the plan need not be developed at once, but early action in (a) new construction, (b) reservation of land and water for needed later development, and (c) acceleration of going programs, as outlined in the plan, is important to the future of the area.

4. Flood damages are locally identifiable problems throughout the area.

5. Ground and surface waters developed or proposed for development in the comprehensive plan are generally of good quality and fully adequate for all foreseeable uses.

6. Expansion and extension of waterway facilities can be accomplished to accommodate the projected increases in waterway traffic.

7. A substantial increase over 1960 levels in the acreage for drainage and irrigation can be expected to increase farm efficiencies and farmer income.

8. The hydroelectric facilities included in the plan would meet only a small part of the demand for electric capacity and energy. The remainder can be generated by thermal plants in the area or can be imported.

9. Industrial development and utilization are key factors in supporting the projected income growth in the area; they will be facilitated by power and other resource developments embodied in the plan.

10. Soil conservation and utilization programs included in the plan would provide conservation treatment on about 75 percent of cropland, pas-

tureland, and rangeland needing treatment by the year 2000.

11. Accelerated forestry programs will make possible the levels of production projected to the year 2000.

12. With some changes in the sportsmen's choice as to types of hunting and fishing, the projected user-days of hunting and fishing can be accommodated by elements of the plan. Production of commercial fish can be increased through improvements in harvesting, use, management, and marketing of the fishery resources.

13. Expansion of existing areas and development of new recreational areas can meet the greatly increased demands projected for outdoor recreational opportunities.

14. Sediment would be largely controlled at its source by conservation measures of the comprehensive plan. Soil salinity is generally not a problem in the area.

15. Facilities for treating all wastes prior to discharge and programs to prevent overloading of receiving streams need to be provided to protect stream water quality for reuse and to maintain public health standards.

16. Beach erosion and hurricane damage potentials are sufficiently serious to warrant further study.

17. Certain projects in the early action phase, selected to demonstrate the impacts of fish and wildlife and recreation and the opportunities of financing and repayment, are of sufficient importance to warrant the application of special cost sharing by the Federal Government.

18. Additional basic data and basic data analyses are needed for many detailed planning purposes.

19. A Resources Advisory Board is needed to facilitate and coordinate the implementation and updating of the comprehensive plan.

RECOMMENDATIONS

The Commission recommends that:

To Establish the Plan

1. The comprehensive plan, described in Part Four of this Report, be approved by the Congress as a general guide to Federal agencies for the conservation, use, and development of the land and water resources of the Southeast River Basins area.

2. The plan, after action by the Congress as to the Federal aspects, be sent to the Governors and legislatures of the States in the Southeast River Basins recommending its approval by them as a general guide to non-Federal interests in land and water resource development.

To Implement the Plan

3. The Governors and legislatures of the study area States be encouraged to consider public and private proposals for land and water resources development in their States in relation to the plan.

4. Individuals, private businesses, local development groups, States, and Federal agencies be encouraged to take timely steps, to the degree

permitted under current and future laws, to implement the early action phase.

5. Federal agencies include in their detailed resource planning an analysis and comparison of their proposals with appropriate elements of the approved plan.

6. Federal agencies preparing planning reports leading to authorization or appropriations for specific land and water resource development proposals report findings as to the compatibility or conflict of their proposals with appropriate elements of the approved plan.

7. A Resources Advisory Board be established to facilitate and coordinate land and water resource development.

8. An annual report to the President, the Congress, and the Governors be prepared by the Resources Advisory Board covering land and water resource developments during the year and pointing out their impacts and influence on the plan.

To Keep the Plan Current

9. The Resources Advisory Board keep the plan up to date, making such revisions and modifications as necessary, with a review in detail at appropriate intervals.

PART SIX - LOCAL, STATE, AND FEDERAL PARTICIPATION AND ASSISTANCE

Acknowledgements

The U. S. Study Commission, Southeast River Basins, gratefully acknowledges the assistance and cooperation of the following:

Alabama

Department of Agriculture; Auburn University; Department of Conservation; State Docks Department; Extension Service; Division of Forestry; Geological Survey; Department of Public Health; Highway Department; State Planning and Industrial Development Board; Department of Labor; Pilotage Commission; Public Service Commission; River Development Board; Soil Conservation Committee; Soil Conservation Districts; and Water Improvement Commission.

Florida

Department of Agriculture; Board of Conservation; Development Commission; Extension Service; Florida State University; University of Florida; Forest Service; Game and Fresh Water Fish Commission; State Board of Health; Industrial Commission; Inland Navigation District; Board of State Parks and Historical Monuments; Railroad and Public Utilities Commission; Road Department; Soil Conservation Board; Soil Conservation Districts; and Suwannee River Water Conservation Authority.

Georgia

Department of Agriculture; Bainbridge Port Authority; Brunswick Port Authority; Extension Service; Forestry Commission; Game and Fish Commission; University of Georgia; Georgia Institute of Technology; Georgia State College; Georgia Southern College; Department of Public Health; Highway Department; Department of Industry and Trade; Jekyll Island State Park Authority; Department of Labor; Department of Mines, Mining, and Geology; Department of State Parks; Georgia Ports Authority; Public Service Commission; Savannah District Authority; Soil and Water Conservation Committee; Soil and Water Conservation Districts; Tide-

water Commission; Waterways Commission; Water Quality Council; and Water Resources Commission.

North Carolina

Extension Service; State Board of Conservation and Development; Highway Department; North Carolina State College; Western North Carolina Regional Planning Commission; Soil Conservation Committee; Department of Water Resources; Soil Conservation Districts; and Wildlife Resources Commission.

South Carolina

Department of Agriculture; Clemson College; Development Board; Extension Service; Forestry Commission; State Board of Health; Department of Labor; Congaree Navigational Study Committee; Parks Commission; Ports Authority; Public Service Authority; Public Service Commission; Soil Conservation Committee; Committee for Water Development; Soil Conservation Districts; Water Pollution Control Authority; and Wildlife Resources Department.

General

Altamaha Development Association; Middle Chattahoochee Development Association; Upper Chattahoochee Development Association; Choctawhatchee-Pea Development Association; Council of State Governments; Southern Regional Education Board; Southeastern Power Committee of Electric Membership Cooperatives of Nine Southeastern States; and Three Rivers Development Association.

Federal

U. S. Department of Agriculture—Agricultural Marketing Service, Agricultural Research Service, Agricultural Stabilization and Conservation Service, Economic Research Service, Farmers Home Administration, Forest Service, and Soil Conservation Service; U. S. Department of the Army—Beach Erosion Board, Board of Engineers for Rivers and Harbors, Corps of Engineers, and Military Posts; Atomic Energy Commission;

Atlanta Federal Reserve Bank; U. S. Civil Service Commission; U. S. Department of Commerce—Area Redevelopment Administration, Business and Defense Services Administration, Bureau of the Census, Office of Business Economics, Bureau of Public Roads, Small Business Administration, and Weather Bureau; Federal Power Commission; General Services Administration; U. S. Department of Health, Education, and Welfare—Public Health Service; Housing and Home Finance Agency; U. S. Department of the Interior—Bureau of Commercial Fisheries, Geological Survey, Bureau of Mines, National Park Service, Bureau of Reclamation, Bureau of Outdoor Recreation, Southeastern Power Administration, and Bureau of Sport Fisheries and Wildlife; U. S. Department of Labor—Bureau of Labor Statistics; U. S. Department of the Navy—Sixth Marine Corps Reserve and Recruitment District; Executive Office of the President—Bureau of the Budget, and Public Works Planning; Outdoor Recreation Resources Review Commission; Advisory Commission on Intergovernmental Relations; Select Committee on National Water Resources, U. S. Senate, 86th Congress; Smithsonian Institution; U. S. Study Commission—Texas; and Tennessee Valley Authority.

In addition, the Commission gratefully acknowledges assistance received from numerous county and municipal governments, planning commissions, development commissions, chambers of commerce, corporations, trade associations, interested individuals, press, radio, television, and professional societies.

Public Hearings and Presentations

A series of public hearings were held early in the investigation to secure the views and desires of various interests, organizations, and individuals. These hearings were held at Tallahassee, Florida, on November 16, 1959; at Dothan, Alabama, on November 17, 1959; at Macon, Georgia, on November 18, 1959; and at Anderson, South Carolina, on November 19, 1959.

During the latter stage of the studies, a series of public presentations were held to acquaint the public with the proposed plan of the Commission for development of the land and water resources of the Southeast River Basins; to inform Federal, State, local, and private interests of their responsibility in implementing the de-

velopments proposed; and to solicit views and opinions on the proposals under active consideration. These presentations were held as follows:

Place	Date
Statesboro, Georgia	March 20, 1962
Waycross, Georgia	March 23, 1962
Tallahassee, Florida	May 15, 1962
White Springs, Florida	May 17, 1962
Valdosta, Georgia	May 18, 1962
Geneva, Alabama	June 19, 1962
Pensacola, Florida	June 20, 1962
Savannah, Georgia	July 16, 1962
Clemson, South Carolina	July 17, 1962
Atlanta, Georgia	August 13, 1962
Columbus, Georgia	August 14, 1962
Albany, Georgia	August 14, 1962
Baxley, Georgia	August 15, 1962
Macon, Georgia	August 16, 1962
Athens, Georgia	August 17, 1962

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1.7	U. S. Forest Service
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2.9	U. S. Soil Conservation Service
2.10	U. S. Soil Conservation Service
2.14	U. S. Soil Conservation Service
2.15	U. S. Soil Conservation Service
2.16	Georgia Forestry Commission
2.18	Georgia Forestry Commission
2.21	Florida Game and Fresh Water Fish Commission
2.23	Florida State News Bureau
2.25	U. S. Soil Conservation Service
2.27	Georgia Department of Public Health
3.1	Georgia Forestry Commission
4.4	U. S. Corps of Engineers
4.6	Georgia Department of Commerce
4.19	U. S. Fish and Wildlife Service
4.22	Florida State News Bureau
4.23	U. S. Soil Conservation Service
5.2	Florida State News Bureau
All other	U. S. Study Commission Staff

**COMMENTS OF THE STATES
AND FEDERAL AGENCIES**

COMMENTS OF THE STATES AND FEDERAL AGENCIES

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(No comments had been received from the State of South Carolina as of August 15, 1963.)



STATE OF ALABAMA

GOVERNOR'S OFFICE

MONTGOMERY

GEORGE C. WALLACE
GOVERNOR

June 7, 1963

Honorable James W. Woodruff, Jr.
Chairman, United States Study Commission
Southeast River Basins
Box 953
Atlanta 1, Georgia

Dear Mr. Woodruff:

As set forth in Public Law 85-850, which created the United States Study Commission-Southeast River Basins, and in accordance with the following provision of said law which stipulates, "Within 90 days from the date of receipt by each... governor of such proposed report, the written views, comments, and recommendations of such...governor shall be submitted to the Commission," I am therefore pleased to make the following comments relating to the proposed report as submitted to me by said Commission on the date of February 21, 1963.

My comments and recommendations follow:

(1) At the onset, I should like to commend the authors of the bill who recognized the inherent rights of the states themselves in regards to the making of this report. I refer, of course, to the fact that of the 10 members of the Commission, excluding the chairman, four were state commissioners, while six were commissioners representing various departments of the federal government--and yet the authors provided that a quorum of the four state members had to be present in order to transact official business. To me, this represents a very fine example of how the federal government should work more closely with the various state governments, even when the total expenditures are derived from federal funds, as in the case of the Study Commission.

Honorable Woodruff, Jr.

June 7, 1963

(2) I should like to voice my very hearty approval of this type of Study Commission as a means of making a long-range and thoroughly all-inclusive study of the general resources of a particular region of the nation in order to come up with long-range projections. It seems to me that it is just such study commissions that perhaps can most fruitfully establish the real and conclusive guide-lines for the basis of future legislation, not only by the Congress, but by state legislatures as well.

(3) I should like to add how pleased I am that so much of the material is presented in such detail and specific information that will, in the future, be profitable and useful on local levels of government, particularly to the counties and municipalities. I can readily foresee your report being highly beneficial to such local governments during the next 40 years in which you make your over-all projections.

And now to be more specific as to your proposed report relating directly to Alabama, I should like to comment as follows:

(1) Being a native of the region and being vitally interested in the project, I regret very much that your Commission could not make a more favorable finding as to the feasibility of navigation opening up the Choctawhatchee River from Geneva, Alabama, to the Gulf of Mexico at Choctawhatchee Bay. From 1898 until 1934, this river was navigable for three-foot barge traffic, and it would, I think, have remained available for such barge traffic had not the great depression of the early thirties slowed commerce to such a low ebb in the region, as indeed it did elsewhere across the nation.

In general, I note that your proposed report for the Choctawhatchee-Pea River Basin forecasts a steady and very healthy rate of economic growth for this region, especially along the Florida and Alabama coastal areas, with such prosperity stemming from (a) an influx of new population, and (b) a rapidly growing variety of recreation facilities that are abundantly available. Thus I find myself prone to argue that when recreational areas begin to build rapidly, small, or even large, industry is inclined to move in--Dade County, Florida, being a case in point. Once its attractions were almost totally contained and limited to recreation, but now a great variety of new industries, from aircraft to furniture, from boats to wearing apparel, is making it one of the fastest growing industrial locations in the nation. I could foresee a similar situation in this Panama City-Pensacola-Fort Walton area. Such growth, I feel, will have its impetus felt upstream, not just on the coastal stretches.

Honorable Woodruff, Jr.

June 7, 1963

To be more pointed, I have the feeling that there should be heavier credence given to proposed growth and opportunities for industrial advancement up and down the Choctawhatchee River, and not just largely weigh the decision on hard facts as is now the case. For instance, plans were completed only last week for the Geological Survey Department of the State of Alabama to being borings and testings in the seven county area from which the Choctawhatchee drains in order to come up with specific information in regard to the iron ore deposits in this region--deposits which other geologists anticipate will be at least 100,000,000 tons. Should these findings be anywhere near such an estimate, then a whole new opportunity for heavy industry would come into existence--industry which would tremendously enhance the feasibility for navigation on the Choctawhatchee. This survey by the Alabama Geological Survey will be completed within a few months, and I should hope that its findings as to the potential iron ore deposits could be added as a postscript, or in some other manner, to your study commission report as it is sent along to the Congress.

And there are other factors which, although without hard facts to back them up, should have more significant consideration--for instance, tonnage potentially available from crushed oyster shells. As late as April 12, 1963, R. M. Ingle, Director of Research for the Florida Board of Conservation, stated that "Between 100,000 and 500,000 tons" of such dredged shells would be hauled on the Choctawhatchee system the first year it was opened to navigation, and "perhaps a 10 per cent increase each year thereafter."

My point is: I think more consideration should be given to the potential opportunities that would make navigation on the Choctawhatchee River economically feasible. And I believe the 10 per cent degree of feasibility which your Study Commission report proposes is an understatement.

(2) Your report states, "The most practicable method of improving the Choctawhatchee River for navigation to Geneva, Alabama, would consist of canalization by construction of four locks and dams, each of about 16-foot lift...". I would like to point out that the Choctawhatchee-Pea River Improvement Association, working with qualified engineers, strongly feels that two dams could just as adequately provide navigation as the four which your Study Commission proposes, and that the two such dams could be constructed with far less expenditures than could the four which you propose.

(3) As to flood control, I do not feel that your proposed

Honorable Woodruff, Jr.

June 7, 1963

report gives sufficient emphasis on the flood control factor which these proposed dams on the Choctawhatchee River would provide. Historic statistics confirm the fact that this area is highly susceptible to floodings, and that adequate control of flood stage water regulations could greatly reduce the threat of future floods on the Choctawhatchee and the Pea Rivers. I invite your further attention to this project.

(4) I am pleased to note the various projects you propose for Alabama, particularly the Ariton dam project and the Perdido Pass improvement project.

(5) In regards to wildlife, I heartily concur in your proposal for the establishment and development of 19 additional wildlife management areas in Alabama - areas which would bring 475,000 additional acres of wildlife management under supervised management and control.

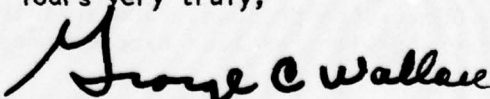
(6) The many projects, both small and large, that you propose for Alabama are such that will greatly accelerate the general improvement and progress of the area under consideration. I commend you on this very thorough report, which I am sure will be found useful and beneficial for many years to come.

I realize that the Study Commission ceases to function after a period of 90 days following the final report to the President.

As I stated to you before becoming Governor, I am in agreement to your proposal to the creation of a Resources Advisory Board in order to keep the information up to date and to make useful this information and material developed by the Study Commission. Since becoming Governor, however, I found that Alabama's General Fund is such that drastic economic measures have been issued in order to carry on the necessary state affairs and will, therefore, be impossible for Alabama to participate in any financial support for the proposed Resources Advisory Board at this time.

Again, I commend you on the very thorough analyses and findings as made by the United States Study Commission in regard to these Alabama river basins which comprise approximately one-third of the state's geographic area.

Yours very truly,


GEORGE C. WALLACE
Governor of Alabama



STATE OF FLORIDA

OFFICE OF THE GOVERNOR

TALLAHASSEE

FARRIS BRYANT
GOVERNOR

May 14, 1963

Mr. J. W. Woodruff, Jr., Chairman
U. S. Study Commission
Southeast River Basins
P. O. Box 953
Atlanta, Georgia

Dear Jim:

I have reviewed the report of the U. S. Study Commission, Southeast River Basins, pertaining to Florida. The report is comprehensive and well prepared and on behalf of the State of Florida, I would like to congratulate the Commission and its staff for a job well done.

New data has been advanced by the Choctawhatchee-Pea River Association in a desire to effect the economic justification of developing inland navigation on that river system. The report does not presently consider as economically feasible such a development. The Association states that two electrical power companies seek to locate generating plants on the Choctawhatchee River and will collectively require 482,500 tons of coal annually. Nearly one million tons of iron ore annually near Geneva, Alabama, and upward of one thousand tons of sand and gravel annually would be available to barge traffic on that river system. Navigation and flood control devices in conjunction with the suggested navigation project would aid in silt control, thereby enhancing shrimp and oyster production in Choctawhatchee Bay.

I am pleased that the Deadening Lakes and the Nassau Embayment projects have been included in this report. Florida will cooperate in developing these projects when they are authorized by Congress.

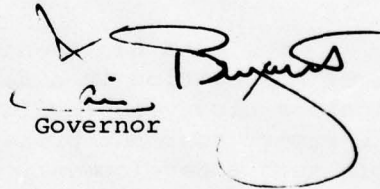
Mr. J. W. Woodruff, Jr.
May 14, 1963

My State is moving legislatively to participate in the suggested Resources Advisory Board, Southeast River Basins. A bill has been introduced which will authorize Florida's participation with an appropriation of \$15,000 annually. The bill has been reported favorably out of the Senate Appropriations Committee and House action is pending.

The Legislature, also complementing portions of the Study Commission reports, recently created an outdoor recreational development council and established a trust fund for purchasing and developing recreational sites and facilities and for purchasing land for resources developments. This is a move to satisfy what appears to be a principal need in implementing many of the projects considered feasible and proposed in the Study Commission reports.

Please accept my appreciation for this valuable study on behalf of the State of Florida.

Sincerely,


Governor

FB/kr

cc: Honorable Tom Adams
Honorable Randolph Hodges



Executive Department
Atlanta

Carl E. Sanders
GOVERNOR

Henry G. Neal
COUNSEL TO GOVERNOR

May 8, 1963

Honorable J. W. Woodruff, Jr.
Chairman, U. S. Study Commission
P. O. Box 270
Columbus, Georgia

Dear Mr. Woodruff:

I refer to your letter of February 15 transmitting the proposed report of the U. S. Study Commission, Southeast River Basins as contemplated by Section 9, Public Law 85-850 dated August 28, 1958. This letter forwards to you my comments on your proposed report.

As you know, the State of Georgia was represented on the Commission by Mr. Lester L. Moody of Augusta. It is to be expected, in view of Mr. Moody's extensive experience in water resources development activities, that the views of the State and its agencies have been given every consideration. I understand also that in preparation of the report the Staff of the Commission has been in close touch with the State agencies, the University of Georgia, The Georgia Institute of Technology, and many local public and private groups. The two universities mentioned have assisted the Commission by making studies in depth of projected agricultural and industrial development. Under these conditions I expect that your report reflects the best thinking of the officials and people of Georgia.

Consideration of the report indicates that the Commission has approached its assignment of making a plan for the water and associated land resource development of the study area in a realistic, painstaking, detailed, and honest way. For these reasons, I feel that regardless of the eventual disposition of some individual projects, the report presents an over-all plan that will be valuable not

only to the State but to many local agencies. The appendices presenting basin plans as well as those concerned with economics, hydrology, engineering and costs, and planning contain a great deal of data and statistics never before assembled. The mere availability of this material in some publication will be of large value to planners, area developers, local governmental agencies, and businesses.

In this connection, I am pleased to note that the report is entirely favorable to business and private enterprise. It keeps in mind the interests of local governmental units and business. It leaves the door open for developments that the State and local interests can undertake. This, I think, is very important. After all, our system of Government is based on the greatest possible exercise of individual and local initiative and responsibility.

Two important elements of the Commission's comprehensive plan for the development of the Apalachicola, Chattahoochee, and Flint basins are the extension of nine foot navigation to Albany on the Flint River by about 1980 and to Atlanta on the Chattahoochee by about 2000.

The Corps of Engineers' plan for the development of the Flint Basin, which includes the Albany extension is presently being considered by Congress. I have recommended to Congress that the entire plan including the extension be authorized without delay. The total estimated cost of the development is \$217 million. The work on the navigation extension would follow construction of the headwaters reservoirs and thus your 1980 date may be a realistic one.

The stand taken by the Commission that it will not be practicable to extend navigation to Atlanta within the next 30 years is a disappointment. The benefits to be derived from such a channel in transportation savings and stimulation of industry and trade in the whole northwestern area of the State are tremendous. In candor, however, I recognize that this is an especially large undertaking. It involves construction of locks in four existing power dams and in the authorized flood control dam at West Point, replacement of four existing low head power dams with two locks and dams, and construction of two locks and dams at

Franklin and Cedar Creek, upstream from the West Point dam, as well as much incidental work such as dredging and rock excavation. You estimate that the total cost of all necessary work would be about \$424 million, which includes costs allocated to power production, flood control, and other purposes, as well as navigation; the navigation feature would bear allocated costs of about \$234 million. Thus this project has roughly twice the magnitude of the Flint Basins project. Considering these facts, I can understand the conservative position the Commission has taken. The State will, however, press for optimum progress on the West Point project, authorization at the earliest practicable date of the Cedar Creek project (which the Commission recommended be constructed before 1975), and early examination by the Corps of Engineers of the Economic justification of the navigation extension as a whole.

I note that the Georgia Public Service Commission has been able to set very low standard rates for electric power. For instance the residential average rate in Georgia is about 22% below the National average. It is my hope that this desirable situation be maintained; I believe that your report will be of assistance in this respect. The consideration that you have accorded to non-Federal interests in the construction of or participation in projects that will develop hydroelectric power coincides with my views. For instance, I have already recommended to the Congress that private power interests be authorized to construct, own, and operate the hydroelectric generating plants which may be authorized in connection with the proposed Federal development of the Flint River Basin. I think that the general statement in the report that--"...the allocation of projects to Federal or non-Federal is not intended to be prejudicial to joint Federal and non-Federal development of power.", is an excellent point. I would go even further in the interest of flexibility and local participation. I submit that none of your allocations should be prejudicial to either Federal or non-Federal development of projects and also that local interests should be favored in such allocations, when practicable, in order to promote Federal economy, local control, and tax revenues.

Looking at the whole subject of the development and operation of electric services in Georgia, I believe we have been particularly fortunate, through the cooperation and good sense of all concerned, in having been able to avoid the type of duplication of generating plants and transmission lines and the destructive competition of individual customers that is occurring in some areas of the United States. Such conditions constitute a financial and economic waste as well as a threat to existing electric rate structures. Though not mentioned in your report, the manner in which Federal power is marketed in the State is a key factor. Private power interests, under contract with the Southeastern Power Administration, firm and wheel the power from Corps of Engineers' projects to cooperatives and municipalities having their own distribution systems and furnish additional power needed by these agencies at low wholesale rates. The avoidance of duplication of electric facilities thus made possible should by all means be continued.

Generally the economic justifications of projects recommended in the report are based on Circular No. A-47, Bureau of the Budget, dated December 31, 1952, and the publication Proposed Practices for Economic Analysis of River Basin Projects prepared by the Sub-committee on Evaluation Standards of the Inter-Agency Committee on Water Resources, dated May, 1958, rather than on the memorandum that the President approved on May 15, 1962, entitled Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans of Use and Development of Water and Related Land Resources. You have used a 50 year life for amortization of projects. Federal interest costs are based on a rate of $2 \frac{5}{8}$ per cent. You have included taxes foregone in costs. No doubt the President's memorandum came out too late to be utilized. However, I am glad that you have worked on conservative criteria. These appear to be realistic and have been subjected to the test of time.

It is good to know that land and water will not be

Honorable J. W. Woodruff, Jr.

5-8-63

a limiting factor in meeting projected needs for resources development through the year 2000 under your plan. This is probably not true in many areas of the United States. I feel that the State of Georgia is due for more rapid development than most Georgians realize. This will require much more intensive utilization of resources than is now the practice.

I agree with the stress you place on the subject of stream pollution. Use of water surfaces for recreation, consumption in cities and municipalities, and public health all require effective action in this area. The specific measures you have pinpointed should be a material aid.

I note that the Commission recommends that a Resources Advisory Board, Southeast River Basins, be created to receive and maintain records and data of the Commission, encourage coordination between the Federal and concerned State Governments, review programs and projects, and follow through on recommended development programs. The membership of this Board would be the same as of the present Commission, one member for each state and Federal agency presently represented plus a chairman. The expenses of the commissioners would be borne by the respective States and agencies, while those of the Chairman and the Staff would be pro-rated between the States. The initial annual budget would be \$60,000. As creation of such an organization would require Federal and State legislation, it was recommended that an interim organization be established by administrative directive and state contribution. I believe that such an organization merits study and I will consider this activity, if the other States, and the Federal agencies agree.

The State of Georgia appreciates the great effort that the Commission and staff have made on this report. I shall direct the State agencies to utilize it as an important point of reference and to give the views of the Commission and the plan proposed all due consideration in the implementation of projects therein and in meeting the requirements of our expanding population, agriculture, and industry.

Honorable J. W. Woodruff, Jr.

5-8-63

I am With kindest personal regards and best wishes,

Cordially,

Governor

CES/fwp



STATE OF NORTH CAROLINA
GOVERNOR'S OFFICE
RALEIGH

June 11, 1963

TERRY SANFORD
GOVERNOR

Mr. George E. Tomlinson
Executive Director
U. S. Study Commission
Southeast River Basins
800 Walton Building
P. O. Box 953
Atlanta 1, Georgia

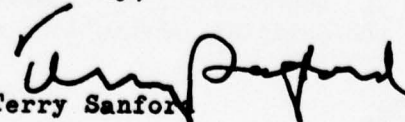
Dear Mr. Tomlinson:

The proposed report "Plan for Development of Land and Water Resources of the Southeast River Basin" submitted with your letter of February 15, 1963, in accordance with the provisions of P. L. 85-850, has been reviewed.

It is recognized that since only a small portion of the area covered by the report, the upper headwaters of the Savannah River Basin, lies within our boundaries, this State does not have a major interest in the plan of overall development. However, one important feature - the Horsepasture project for hydroelectric power and recreation in Transylvania County - is of major concern to North Carolina. Our review indicates that development of this site as proposed will be of great value to the region and to the entire State.

I am pleased to inform you that the proposed report as written is fully concurred in by the State of North Carolina.

Sincerely,


Terry Sanford



DEPARTMENT OF AGRICULTURE
WASHINGTON 25, D.C.

May 31 1963

Mr. J. W. Woodruff, Jr.,
Chairman, U. S. Study Commission -
Southeast River Basins
P. O. Box 953
Atlanta 1, Georgia

Dear Mr. Woodruff:

This is in reply to your letter of February 15, 1963, transmitting for our review and comment a copy of the proposed report of the U. S. Study Commission - Southeast River Basins on a Plan for Development of the Land and Water Resources of the Southeast River Basins.

The report gives consideration to the water and land resources within all parts of the study area. It presents information, among other things, on the future needs of the area and how the water and land resources may be developed, used, conserved and protected to contribute to meeting these and the Nation's needs for goods and services, including needs for agricultural and forest products. It sets forth various improvements now visualized as needed within the next twelve years and in broader terms proposes the kinds of additional improvements that probably will be needed by the year 2000.

The Department of Agriculture concerns itself in comprehensive river basin plans primarily with their upstream aspects and with the coordination of the upstream and main stem improvements. This is in keeping with its responsibilities for assisting local organizations in planning and installing works of improvement in upstream watersheds and for furthering economic development in rural areas. Therefore, we consider that comprehensive river basin plans should provide for all feasible opportunities to reduce upstream flood-water and sediment damages and to use and manage water and land resources in upstream watersheds.

The Department feels that the plan as prepared within the limits of the policies, assumptions and procedures established for the study



provides useful information bearing on future resource development in the Southeast River Basins area.

While the report briefly mentions the problems peculiar to rural areas, it does not, in our opinion, adequately cover: the social or welfare problems associated with declining opportunities in the rural areas; the rapid out-migration of the population from rural areas; the need to strengthen family farms and improve their general economic status; the need to promote feasible rural economic growth and development; the need to promote productive and alternative uses of farmlands; the opportunities available to make new jobs and train rural people to fill them; the availability of such new concepts as renewal of seriously depressed rural areas; the planning of resource developments in a rural-urban context; and the promotion of adapted, privately-owned profit-producing recreational enterprises. If the report is to be fully effective and adapted to changing times, there is need to consider the project proposals and their evaluations and other development proposals, in light of the new authorizations contained in the Food and Agriculture Act of 1962.

The plan also fails to adequately provide for upstream watershed development, especially related land-use adjustments and the needs and opportunities for recreation, fish and wildlife, municipal and industrial water supply, and water quality control in the upstream watersheds. For example, it appears that recreational opportunities available at upstream watershed developments would be, at least, equal to those opportunities to be provided by the proposed construction of the large, multiple-purpose downstream structures.

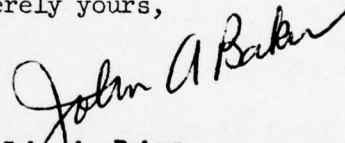
The Rural Electrification Administration, an agency within this Department, is interested in the power aspects of this report on behalf of the numerous electric cooperative systems located in and adjacent to the area of the report. These systems under existing law have preference rights in the power developed by Federal agencies. These electric cooperatives have repeatedly indicated their interest in and have consistently supported the full development of our Nation's water resources and the inclusion of power as a feature of multiple-purpose development whenever it is economically justified. Although the report indicates that the principles of economic evaluation, as set forth in Senate Document 97, 87th Congress, 2nd Session, were considered, they do not appear to have been applied by the Commission in two very important respects. The report uses 50 years as the upper limit of the period of analysis; S. Doc. 97 prescribes 100 years. The report includes taxes foregone in the estimates of annual costs; S. Doc. 97 specifically excludes them except as required by law. If the report is to serve as a meaningful guide in resource development, there is need for reevaluation of all projects considered by the Commission, applying the principles of S. Doc. 97.

Although the plan gives adequate attention and emphasis to the timber resources of the area, the other resources and values of forest lands--aesthetic appeal, recreation opportunity, watershed protection and maintenance, and wildlife habitat--are given much more cursory treatment and we believe too little consideration in the determination of program proposals. This is particularly evidenced in the proposal for the Highlands Project Area. Development of the projects proposed for this area would destroy irreplaceable natural resources, including highly productive trout streams and areas of great scenic beauty unique in the Southeast River Basins region. Much of the Project Area falls within established National Forests where development of the recreation potential has already taken place or is planned for the future and where recreation use is already heavy. The proposed projects would substitute for the existing and planned unique recreational opportunity the questionable recreation potential associated with reservoirs to be constructed and operated in this area.

We believe, therefore, that much more intensive study and comparison of alternative methods and values should be undertaken before final recommendations are presented for development of projects and programs proposed in the plan.

We appreciate your courtesy in making the proposed report available to us for review.

Sincerely yours,



John A. Baker
Assistant Secretary



IN REPLY REFER TO:

DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C.

JUN 19 1963

Honorable J. W. Woodruff, Jr.
Chairman, U. S. Study Commission
Southeast River Basins
800 Walton Building
Atlanta 1, Georgia

Dear Mr. Chairman:

Your letter of 15 February 1963 requested the views and recommendations of the Department of the Army on the proposed report of the Commission entitled Plan for Development of the Land and Water Resources of the Southeast River Basins.

The Southeast River Basins report presents a comprehensive plan for conservation, use, and development of the land and water resources of the area. Improvements with an aggregate cost in excess of \$5.5 billion are proposed for implementation over a forty year period (1960-2000), including initial period (1960-1975) installations with a cost of more than \$2.3 billion. The report recommends approval of the plan by the Congress and by the Governors and Legislatures of the States of which these Basins are a part as a general guide to Federal agencies and non-Federal interests in carrying out the recommended programs. The Department of the Army concurs in this recommendation.

The comprehensive plan is considered to provide a sound general basis for detailed planning and implementation of Federal and non-Federal action programs for conservation, use, and development of the area's land and water resources. The Department of the Army concurs in the recommendations in the report that Federal agencies include in their detailed resource planning an analysis and comparison of their proposals with appropriate elements of the approved plan and that reports of the agencies leading to authorizations or appropriations for specific land and water resource developments indicate the compatibility or conflict of their proposals with appropriate elements of the plan.

The report indicates the views of the Study Commission concerning non-Federal and Federal responsibilities for accomplishment of specific elements of the plan. These include coordinating the

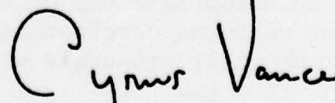
preauthorization planning, obtaining final approval or authorization of specific works or facilities, budgeting for appropriations or other funding, design of structures, administration of construction, and other matters pertinent to planning and construction. Designation of primary responsibilities for specific projects and elements of the plan is made mainly on a functional basis taking into account established patterns of Federal and non-Federal activity. On this basis the Corps of Engineers is assigned a major interest in ultimate implementation of many elements of the plan. Although the suggested assignment of responsibility is generally in accordance with water and related land resource conservation and development missions assigned by the Congress, acceptance by the Corps of Engineers of responsibility in specific cases would be dependent upon further authorization by the Congress.

The report recommends procedures for keeping the plan updated, including establishment of a Resources Advisory Board. The report states that it would be the Board's responsibility to facilitate and coordinate land and water resource development and to review the plan in detail, at appropriate intervals, making such revisions and modifications as necessary. I agree that arrangements for updating and coordination of plans are desirable. The President has recommended and the Congress is considering S. 1111 which would authorize the President to establish river basin water resource commissions nation-wide. Pending action by the Congress, the Department of the Army believes that an interagency committee patterned along the lines of the Committees in the Missouri Basin and the Columbia Basin could best provide the needed coordination on an interim basis.

I note that the proposed Federal share of the cost of a few selected demonstration projects would be greater than for similar projects which were not selected for demonstration purposes. Pending further development of national policy on cost-sharing, the Department of the Army withholds comment on this proposal.

I believe that this report will be of great value to all concerned with the development of the water resources of the Southeast River Basins. The Department of the Army was pleased to have representatives who participated in the work of the Commission.

Sincerely yours,



Cyrus R. Vance
Secretary of the Army



**THE SECRETARY OF COMMERCE
WASHINGTON 25, D.C.**

JUNE 13, 1963

**Mr. J. W. Woodruff, Jr.
Chairman, U.S. Study Commission
Southeast River Basins
P. O. Box 953
Atlanta 1, Georgia**

Dear Mr. Woodruff:

The report of the U. S. Study Commission, Southeast River Basins has been reviewed by the interested agencies in the Department of Commerce. The report should be an excellent guide for the development of the land and water resources of the Southeast.

Detailed comments by Business and Defense Services Administration, Maritime Administration, Bureau of Public Roads and the Weather Bureau have been provided through Commissioner William E. Hiatt, the Department of Commerce representative on the Commission. Your consideration of these comments will be appreciated.

The Department is anxious to assist in promoting economic growth in every way possible and will cooperate with any continuing organization that may be established for aiding in the implementation of the plan.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Luther H. Hodges".

**Luther H. Hodges
Secretary of Commerce**

FEDERAL POWER COMMISSION
WASHINGTON 25

Mr. J. W. Woodruff, Jr.
Chairman, U. S. Study Commission -
Southeast River Basins
800 Walton Building
Atlanta 1, Georgia

MAY 13 1963

Dear Mr. Woodruff:

This is in reply to your letter of February 15, 1963, inviting comments by the Federal Power Commission on the report of your Commission entitled Plan for Development of the Land and Water Resources of the Southeast River Basins.

The report presents a large amount of economic and other information relating to the 88,000-square mile area of the Southeast River Basins. It proposes a comprehensive plan of land and water resources developments to meet the needs of the area to the year 2000. The programs and projects in this long-range plan have an estimated investment cost of about \$5.5 billion. The estimated investment cost of the features proposed for early action to meet the needs to about 1975 is approximately \$2.3 billion. The report recommends that the comprehensive plan be approved as a general guide to both federal agencies and non-federal interests in land and water resources development of the area. It also recommends the establishment of a Resources Advisory Board, with membership similar to that of the present Study Commission, to facilitate and coordinate land and water resources development and to keep the plan current.

The comprehensive plan includes features for such purposes as flood control, water supplies, navigation, irrigation and drainage, hydroelectric power development, soil and forest conservation, fish and wildlife, recreation, pollution abatement, and public health. It appears that the proposed plan is somewhat broader in its coverage than many river basin plans heretofore developed. For example, the present plan includes facilities needed to provide municipal water supply and sanitary sewerage systems for all communities expected to have populations of 800 or more by the year 2000. Extensive improvements are included also for fish and wildlife and recreational purposes. Substantially less than one-half of the cost of the long-range plans apparently is for multiple-purpose reservoir projects.

Mr. J. W. Woodruff, Jr.

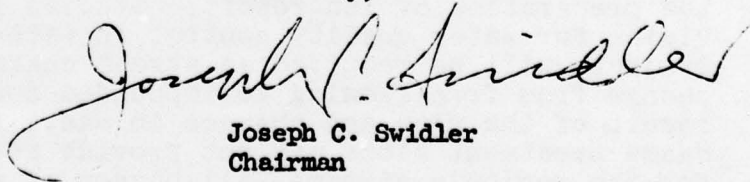
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Twenty-seven reservoir projects would include hydroelectric power facilities, with total installed capacity of 2.5 million kilowatts and estimated annual generation of 3.6 billion kilowatt-hours. The installed capacity in 12 projects in the Savannah basin would total 1,466,000 kilowatts; in 5 projects in the Altamaha basin 388,000 kilowatts; in 9 projects in the Apalachicola-Chattahoochee-Flint basins, 600,000 kilowatts; and in one project in the Choctawhatchee-Perdido basins, 47,000 kilowatts. Power installations at 11 additional projects aggregating about 375,000 kilowatts of capacity were studied but found not to be economically justified at this time. Although not included in the comprehensive plan, the report recognizes that there are possibilities for many pumped storage developments in the area.

This Commission's Regional Engineer in Atlanta served as a member of the Study Commission and the staff of the Atlanta Regional Office took part in certain of the studies necessary in the preparation of the report. On the basis of that participation and subsequent review of the report, the Federal Power Commission staff reports that the extensive background information assembled for the study area and the long-range comprehensive plan proposed should be very useful in further planning and development of the land and water resources of the area. The staff notes that many of the studies for the report have not been carried beyond the reconnaissance level and that additional detailed planning would be required prior to implementation of the plan.

Based on its consideration of the Study Commission's report and the studies of its own staff, the Federal Power Commission concludes that the proposed comprehensive plan should provide a useful general guide to federal and non-federal interests for the conservation, use, and development of the land and water resources of the Southeast River Basins area. It is in agreement with the objective of providing some formal means to facilitate implementation of the plan and to keep it up-to-date.

Sincerely,



Joseph C. Swidler
Chairman

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
WASHINGTON

JUN 7 1963

Dear Mr. Chairman:

This is in further reply to your request of February 15, 1963, for review of the Southeast River Basins report.

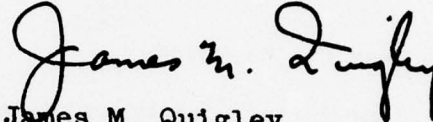
The Commission is to be complimented on the completion of a report setting forth the ground work for a comprehensive plan for the development of land and water resources in the Southeast. It contains a wealth of data and information and is well presented and documented. Without question, it is basic to planning for optimum use of the land and water resources of the Southeast.

Before a design for water quality management essential to the optimum development of the region can be successfully prepared and implemented, refinement of plans will be necessary. Under Section 2(a) of P. L. 660 this Department has been given the responsibility of preparing or developing comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary condition of surface and underground waters. Such a program would require a more detailed examination of conditions and forecasts than has been possible in the relatively short time available to the Commission for the preparation of its report. Studies regarding provision for water quality control in water resource projects will be required as stream characteristics change from free-flowing to impounded conditions as a result of the plan and changes in waste treatment methods. Waste treatment alone may not provide adequate protection for the region's streams--all phases of water resource management must be brought to bear to achieve the desired goal of quality protection and maintenance of all the streams of the Southeast to make possible their maximum reuse. Items such as the operation of impoundments in which water quality storage is provided and the location of industries with significant waste discharges will need more detailed considerations.

Since development and implementation of the plan will occur at a more deliberate pace, time will be available for detailed studies of projects which now appear in the Commission's report.

Thank you for the opportunity of reviewing the Commission's proposed report. Please be assured that we stand ready to provide any further consultation requested.

Sincerely yours,



James M. Quigley
Assistant Secretary

Honorable J. W. Woodruff, Jr.
Chairman, U. S. Study Commission
Southeast River Basins
800 Walton Building
Atlanta 1, Georgia



UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON 25, D. C.

JUN 18 1963

Dear Mr. Woodruff:

Your letter of February 15 transmitted, in 13 volumes, a "Plan for Development of the Land and Water Resources of the Southeast River Basins," prepared by the U. S. Study Commission--Southeast River Basins, and requested the views and recommendations of the Department of the Interior. This letter transmits our views.

The Department is pleased to have had the opportunity to participate in the Commission's undertaking to the extent of having one of its members, Mr. Walter A. Gresh, Regional Director of the Bureau of Sport Fisheries and Wildlife at Atlanta, serve as one of the 10 Commissioners, and having Mr. George E. Tomlinson, serve as the Commission's Director. The Department, too, is gratified that all of its bureaus that are active in the area were able to provide the Commission with information necessary for its deliberations. The U. S. Study Commissions for the Southeast River Basins and for Texas have served as prototypes for integrated analysis of a complex of water and related land problems through river basin commissions, as generally envisioned by the President's proposed Water Resources Planning Act.

The U. S. Study Commission--Southeast River Basins has had its problems simplified to some degree by reason of the fact that, being in a region of abundant rainfall, its area of study is not one, such as in our arid West, where the overall water supply is the limiting factor in economic growth and development. The Commission properly has recognized this fact and has centered its attention on maximizing the benefits to be obtained from public and private development to provide water supplies of usable quality in the needed amounts and needed places at the proper times. It has recommended substantial investments in soil and moisture conservation, forest conservation, recreational development, and pollution abatement, as well as the more traditional water-development investments, such as for power, navigation, flood control, irrigation, and municipal water supplies.

The Commission has endeavored to gear its recommended program of water and related land development over a 40-year period to its projections of economic growth of the study area up to the year 2000. These projections are based on general assumptions with respect to

national and regional population growth and economic development which appear reasonable, and are fortified with a wide range of special economic studies of the area. The assumption that the gap between the level of economic development in the study area and that of the Nation as a whole will be closed in considerable measure by the year 2000 seems realistic, if recent trends continue.

To meet the projected needs of the study area by the year 2000, the Commission recommends a program of water and related land resources development calling for an initial investment estimated at approximately \$5.5 billion, or an average of about \$137 million annually; and total costs, including interest on investment, operation and maintenance, and replacement, of about \$310 million annually. This is about 40 percent more than the \$217 million annually which the Commission estimates is now being spent in the study area for water and related land resources development by Federal, State and local governments and private interests. The Commission contemplates that about three-fourths of the total costs would be paid eventually by non-Federal interests, but it appears that as much as half of the original investments might be financed by the Federal government. Total costs of the recommended program do not seem out of line with existing costs as adjusted to the projected economic growth of the area, but the projected expenditures for recreational development, as noted below, do appear to be too optimistic.

Criteria used in benefit-cost evaluations of the projects proposed by the Commission appear to be generally within the limits set by the "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources," adopted by the President on May 15, 1962. As noted later in this letter, however, we suggest standards for the measurement of costs and benefits for certain projects and programs which differ from those used by the Commission.

With respect to specific segments of the Commission's recommended plan in which the Department of the Interior has particular interest, we would make the following comments:

Hydroelectric Power. While the comprehensive plan as proposed recognizes that the power requirements of the area will of necessity be met largely from non-hydroelectric sources, some 2.4 million kilowatts of capacity not already under construction would be developed to help meet load and peaking requirements. The power installations actually recommended in the report include only conventional units, and although the potential development of pumped storage projects is

recognized in the report, no such projects are included in the comprehensive plan. We believe that by omitting pumped storage projects, the report substantially understates the peaking potential of hydroelectric power in the study area.

It should be noted that in the economic evaluation of the proposed projects, the time period of analysis is limited to a maximum of 50 years, and taxes foregone are included as an economic cost. The standards approved by the President on May 15, 1962, referred to above, provide for a period of analysis not to exceed 100 years, and for exclusion of taxes foregone in project economic costs.

With respect to the Commission's assignment of Federal and non-Federal responsibility for certain multipurpose projects including hydroelectric power, the Department of the Interior reserves its privilege of differing from these assignments in the interest of integrated power development, when such projects are being considered for specific authorization by the Congress or approval by the Federal Power Commission.

Fish and Wildlife. We are pleased to note that a large portion of the Commission report is devoted to fish and wildlife resources, and we are impressed with the concepts used in the report for developing estimates of both supply of and demand for hunting and fishing. We believe this represents a major step forward in long-range planning for recreational opportunities at water resources development projects.

We are concerned, however, that the Commission has recommended a heavy grouping of reservoir projects with fishing as a major purpose in areas relatively remote from population centers. We believe that a better balance from a fishery standpoint could have been achieved through more single-purpose fishery projects in the vicinity of population centers, which might provide both lake and stream fishing.

We question the calculation of monetary values of hunting and sport fishing on the basis of the highest values established under the interim schedule of values established by the Subcommittee on Evaluation Standards of the Interagency Committee on Water Resources. The Commission should have used the full range of such values. This is particularly true with respect to the measurement of benefits from low flow augmentation to provide greater stream fishing use, where \$1.50 per user day has been used to evaluate "without-the-project" fishing and \$3.00 per user day, the "with-the-project" fishing; and in the evaluation of sport-fishing benefits from the proposed Nassau Embayment Project.

In place of the proposed Highlands Project and the proposed hydroelectric projects in the Highlands area of the Savannah Basin, we recommend that the Commission reconsider an alternate development plan for the Highlands area developed by the Bureau of Sport Fisheries and Wildlife and the National Park Service, with the assistance of the Forest Service. This plan involves only one impoundment on the Horsepasture River and stresses the importance of retaining the flowing streams in the area for their high scenic, recreational, and trout fishery values, which the proposed power impoundments would inundate. The alternate development might, of course, reduce the pumped storage potential noted above under the hydroelectric power heading.

Emphasis in the Commission's report properly is on multi-purpose development of water resources. In some instances, however, two uses of the same water resource are incompatible. This is the situation in some of the estuarine areas, where land development and industrialization are incompatible with fish and wildlife resources preservation. It has been suggested by the two interstate fishery commissions on the east coast that thought should be given to zoning areas for specific purposes such as fish and wildlife, land development, industry, etc. Eventually, multiple-use developments in such areas might be possible as we acquire knowledge of the effect of various water use schemes on water quality and the aquatic environment. More research in this field is urgently needed.

Recreation. Since the Commission's comprehensive plan provides detailed information on the river basins within the study area, it will serve as a continuing source of needed background against which recreational potentials for specific proposals can be considered and evaluated. We call attention, however, to the proposal in the plan for an allocation of almost \$1 billion to recreation. An investment of this magnitude within this region appears to be out of line with probable national investment in public recreation development, according to any estimates that have been advanced or that might appear feasible.

The plan also contemplates annual costs of \$63 million for public recreation in the study area, about three-fourths of which would be paid from non-Federal sources. The practicability of this proposal, too, should be reconsidered in the light of the fact that the total expenditure in the area by all State park and recreational agencies is estimated to have been about \$2 to \$2-1/2 million in 1961.

The large investment which would be required by both the Federal government and by State governments for recreation at reservoirs in

particular should be considered in relation to the proportionate share of total recreational demand that would be anticipated at these sites. Even considering the current popularity of reservoirs as recreational facilities, we believe that more reservoirs are being planned than will be needed for the type of recreation which reservoirs provide.

In addition to the evaluation standards approved by the President, the messages of the President on conservation of natural resources and the findings, conclusions, and recommendations of the Outdoor Recreation Resources Review Commission have reflected the evolution of policy as to the role of the Federal government in planning, development, and expenditure at Federal and Federally assisted water projects; and point to the need to consider recreation development at such projects in relation to overall State, regional, and nationwide recreation planning.

We believe therefore that the report should call attention to the interim character of the plans for providing reservoir recreation opportunities and the methods used for determining recreation benefits, as well as the proposals for investment in, cost allocations to, and cost sharing and reimbursement by, recreation. The experimental methods used in the report for evaluation of recreational benefits and for proposed Federal, State, and local investment in recreation will need to be reconsidered in the light of policies, standards, and procedures which are to be considered in the Executive Branch by both the Recreation Advisory Council and the Cabinet officers who would comprise the Federal Water Resources Council under the President's proposed Water Resources Planning Act, as well as by the Congress.

Ground Water Resources. Although the coastal plain portions of the report deal with large ground water resources, discussion of the problems inherent in the development and management of these resources is rather casual. We believe much more needs to be known about the complex occurrences of sub-surface water in order that intelligent and effective development may proceed. Experience with salt-water intrusion in coastal areas illustrates this point. While the report recognizes that "proper management" of ground water in coastal areas is needed to safeguard the resource, the problem would appear to be dismissed too lightly.

Minerals. Although development of mineral resources was not mentioned specifically in the act establishing the Study Commission, its inclusion in the study could have been implied from the term in the Act "...such other beneficial and useful purposes not herein enumerated..." We therefore are disappointed that minerals were not given greater

consideration in the report. Throughout the report, references to minerals are brief and general. It is gratifying to note, however, that considerable growth of mineral industries is projected, even though we were unable to find much documentation of that feature in the report.

We suggest that in the early planning stages looking to authorization of reservoir projects included in the report, complete investigation of the mineral aspects be made in order to obtain optimum development of all the resources involved in such projects.

Basic Data. We agree with the several references in the report to insufficiencies in existing basic data, especially of geologic and topographic maps. The generally rural character of the study area and the inability of the States to contribute to cooperative mapping programs explain in large part the lack of such maps. We anticipate, however, that geologic and topographic maps will become generally available as our long-range plans for those programs are carried out.

In spite of the above criticisms of specific features of the Commission's report, we believe the Commission has carried out to an excellent degree the task of long-range planning of water and related land resources assigned to it by the Congress. We are especially pleased that the Commission's projected program has given a prominent place to pollution abatement, which will improve fishing habitat and recreational opportunities, in which we are directly interested, as well as industrial enterprises and the general health. We note that, properly, the Commission does not propose to submit its report as an authorizing document, but contemplates that further investigation must precede initiation of either the projects included in the report or any projects substituted for them. Naturally, many changes will need to be made in details of a plan extending over a 40-year period, as new situations and new techniques for dealing with them develop.

We appreciate the opportunity of reviewing the report of the U. S. Study Commission--Southeast River Basins.

Sincerely yours,



Secretary of the Interior

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