

INDUSTRIAL RESOURCES AND

POTENTIALS OF THE

SOUTHEAST RIVER BASINS

by

LAMAR WHITE

and others,

Vol. 1

Project No. A - 455

Prepared for the  
United States Study Commission  
Southeast River Basins

Atlanta  
Industrial Development Division  
Engineering Experiment Station  
Georgia Institute of Technology  
1959 - 60

## CONTENTS

Industrial Resources and Potentials of the Southeast River Basins.

Preliminary Report on Southeast River Basins Study. August 1959.

A. Richter, Thera H.

Land Use Patterns and Planning Activity. June 1960.

B. Husted, John E.

Mineral Resources Review. June 1960.

C. Ingolls, Robert S.

Water Resources. June 1960.

D. Fulmer, John L.

Population and Labor Force. June 1960.

E. Dudley, Lee A., Fulmer, John L., Kennon, Walter and White, Lamar.

Employment. June 1960.

F. Fulmer, John L.

Personal Income. June 1960.

G. Kennon, Walter and Dudley, Lee.

Disposable Income, Consumption, and Savings. June 1960.

and the paper imperfect volumes delay return of binding. Thanks.

BOUND BY THE NATIONAL LIBRARY BINDERY CO. OF GA.





Project A-455

PRELIMINARY REPORT ON  
SOUTHEAST RIVER BASINS STUDY



Industrial Development Branch  
Engineering Experiment Station  
Georgia Institute of Technology  
August 1959

## CONTENTS

### Section

- A Detailed Outline of Study
- B Notes on Approach and Methodology
- C Proposed Phases of Study; Timing
- D Initial List of Suggested Original Studies

DETAILED OUTLINE OF STUDY

I. Nonagricultural Natural Resources

A. Supplies and uses of rural nonfarm land

1. Mining and quarrying
  - a. Nonmetallic minerals
  - b. Other
2. Manufacturing and processing
3. Recreational
4. Conservational uses
5. Other categories, including land in process of transition to suburban (general discussion only)
6. Leading trends in the use of rural nonfarm land (general discussion only)

B. Supplies and uses of urban and urban fringe land

1. Definition
2. Extent and location, by major types of land use
  - a. Industrial
  - b. Commercial
  - c. Residential
  - d. Other
3. Leading trends in urban land use

C. Fresh water

1. Present supplies and uses
  - a. By sub-area
  - b. By type of use
    - (1) Manufacturing and processing
    - (2) Electric power
    - (3) Municipal uses
    - (4) Navigation
      - (a) Extent, location, and use of improved waterways
      - (b) The relationship of waterways in study area to resources of other areas (e.g., Brunswick and imported gypsum rock; Bainbridge and crude petroleum products from Gulf Coast.)
    - (5) Recreation; fish and wildlife
  - c. Interrelationships among water uses, and between water use and other resource uses
2. Leading trends in fresh water usage

## I. D. Mineral resources

1. Relationship between water resources and minerals resources
2. Predominance of nonmetallic minerals in development to date, in total area under study
3. Varying stages of development of minerals in study area--a summary
  - a. "Minerals with a past" (e.g., gold?)
  - b. Mineral resources now being developed on a substantial scale (e.g., crushed granite)
  - c. "Mineral resources with a future" (Minerals, as yet relatively undeveloped, which now appear to offer much promise for the future)
4. Evaluation of available data, by commodity
  - a. Metallic minerals, considered individually
    - (1) Time of publication
    - (2) Orientation of authors' work (economic; geological; etc.)
    - (3) Completeness of work
      - (a) Substances covered
      - (b) Geological areas covered
      - (c) Other criteria
  - b. Petroleum and natural gas
    - (1) Time of publication
    - (2) Orientation of authors' work (economic; geological; etc.)
    - (3) Completeness of work
      - (a) Substances covered
      - (b) Geological areas covered
      - (c) Other criteria
  - c. Nonmetallic minerals
    - (1) Time of publication
    - (2) Orientation of authors' work (economic; geological; etc.)
    - (3) Completeness of work
      - (a) Substances covered
      - (b) Geological areas covered
      - (c) Other criteria
5. Locational summary, mineral resources
  - a. Developed and proven mineral resources
  - b. Potentially significant mineral resources
6. Trends in mineral resource development
7. Suggested primary investigations and studies

## II. Human Resources

- A. Present population and labor force
  - 1. 1950 Census rural-urban distribution of population
  - 2. 1950 distributions by age group, sex, occupation, and educational level
  - 3. Benchmark data on the labor force
  - 4. Pertinent data updating any portions of the 1950 Census for detailed characteristics of the population and labor force
- B. Trends: Analysis of population change, by selected groups of counties (including rates of change)
- C. Population and labor force projections, based on trends
- D. Suggested original studies

## III. Survey of Available Data on Capital Resources

- A. Private nonagricultural facilities for production and profit
  - 1. Manufacturing and processing
  - 2. Transportation
    - a. Railroads
    - b. Oil pipelines
    - c. Intercity trucking
    - d. Port facilities and shipping
    - e. Other
  - 3. Communication
    - a. Newspapers and periodicals
    - b. Telephone and telegraph
    - c. Radio
    - d. Television
    - e. Other
  - 4. Mining and quarrying
  - 5. Utilities
    - a. Electric energy
    - b. Gas
  - 6. Trade and commerce
  - 7. Construction
- B. Developmental works
  - 1. Highways

- III. B. 2. Capital improvements in water resources development, by purpose, ownership, and control
  - a. Electric energy (
  - b. Water supply (
  - c. Flood control ( Locations; age; capacity;
  - d. Navigation ( adequacy; replacement cost of
  - e. Multi-purpose, and other ( existing capital improvements
- 3. Sewage disposal systems
- 4. Other developmental works
- C. Capital resources devoted to educational, religious, recreational, and welfare ends
  - 1. Schools and colleges
  - 2. Churches
  - 3. Recreational facilities, libraries
  - 4. Housing
  - 5. Medical and public health facilities
- D. Capital funds (savings and investment)
- IV. Employment, Production, and Income
  - A. Nonagricultural employment
    - 1. By place of residence (data based on the Federal censuses)
    - 2. By place of work (data from State agencies)
    - 3. Commuting patterns in selected areas
  - B. Scale of production or transactions, by principal nonagricultural categories (available indicators, including employment, of the volume of economic activity)
    - 1. Manufacturing and processing
    - 2. Mining and quarrying
    - 3. Construction
    - 4. Wholesale trade
    - 5. Retail trade
    - 6. Service trades
    - 7. Electric energy production
    - 8. Transportation
    - 9. Banking, finance, insurance, real estate
    - 10. Foreign trade
    - 11. Other, including certain government services
  - C. Total and per capita personal income, by source
    - 1. Wages and salaries
    - 2. Proprietors' income

- IV. C. 3. Property income
  - 4. Transfer payments and other income
- D. Major trends in employment, production and income
- E. Suggested original studies
- V. Main Problems and Potentials in Nonagricultural Resource Development and Use
  - A. Economic development in rural areas
    - 1. Factors behind the present decline of economic activity in rural areas
    - 2. The needs for the adjustment of these factors and for new economic activity.
    - 3. Determination of whether existing natural and human resources can be adapted to new developments in manufacturing and processing
    - 4. Determination of whether water resources can be combined with other existing natural resources and with available human resources to effect new economic activity
      - a. Water resources and water-or transportation-oriented industries
      - b. Tourism and water resources; recreation
  - B. Urbanization
    - 1. Rate of urbanization in particular areas
    - 2. Major forms of competition for space
    - 3. Centralization versus decentralization (city core versus suburban fringe areas)
    - 4. Water supply and urbanization
      - a. Water needs, by urban area
      - b. Extent, location of flood damage in urban areas
      - c. Trends in flood plain occupancy and regulations (zoning, construction permits, building regulations, etc.)
      - d. Pollution problems
    - 5. Relationship of urbanization to other economic problems in the study area, such as highway planning and the changing needs of agriculture
  - C. Water resources
    - 1. Potential supplies and uses (by area and type of use)
    - 2. Identification of actual or impending water shortages; possible means of relieving such shortages
  - D. Mineral development potentials (projections) and underlying assumptions

## V. E. Human resources

1. Extent and incidence of underemployment
  2. Aptitudes for training and re-training
  3. Vocational training assets, needs, and prospects
  4. Development of entrepreneurial and managerial talents
- F. Projections of population, personal income, employment, and retail sales, based on stated economic development assumptions
- G. Specific research needs (consolidated list of suggested studies which could point up valuable economic potentials)



Notes on  
APPROACH AND METHODOLOGY

Phase I

Drawing of the detailed outline starts with the major study aims as sketched in the project contract and elaborated to some extent in initial conferences between representatives of the Contractor and the Contracting Officer (sponsoring organization). It proceeds from a quantitative appraisal of the several categories of basic resources (lands, other natural resources, people, capital) to consideration of various aspects of resources-at-work (employment, production, income), to measurements of relative and absolute changes in the economy (trends), and to economic potentials and prospects of their realization (projections).

Phase II

Requests for relevant data, particularly for published and unpublished data from government agencies, are to be made through the U. S. Study Commission, which includes in its membership representatives of such agencies. Various additional data are expected to be available from other organizations concerned with water resources and other subjects covered by the study.

Phases II and III

Organization, study, and analysis of collected data is to be accomplished by division of effort, according to specialized subjects, among participating staff members.

Methods of analysis necessarily will take into account the diversity of subjects and the techniques appropriate to each. Such methods will also be influenced by such factors as geographic sub-area choices for the present study and for companion studies on the agricultural side; and the need for a measure of synthesis implicit in certain main divisions of the working outline.

Land (rural nonfarm and urban)

Assuming that adequate data will be found available for the major general breakdowns of land use, and for at least some of the more specialized use categories of nonfarm land, tabulations will be made by type of use and by river basin, for the most recent period available. Trends will be computed by standard statistical methods from a series of tabulations covering available time periods. The possibility of making similar tabulations for trade area segments of each river basin will be considered in the light of the required time and cost.

Water

Similar methods will be applied to tabulating and ascertaining trends in supplies and uses of ground water and surface water, by river basin and by type of use. It is anticipated that extensive consultations with qualified water experts will be essential. The complexities of hydrology and water use interrelationships, for example, are readily apparent and need no belaboring.

## Minerals

In general, the approach to each of the mineral topics is to first assess their present position. The present position, or present state of information, is the result of current and past research and exploitation--to state it briefly.

This assessment will be achieved by interviews with well-informed persons and systematic coverage of the literature. Once an evaluation of the present position is known, recommendations for solving current and foreseeable problems can be made. These will be made on the basis of new techniques, changing technology (e.g., new uses of metals; new metals and alloys), and predictable future developments. They will be made in terms of individual commodities.

## Human Resources

Population figures by county by decades are available from Census reports, as are recent estimates by States. Population estimates by county for 1956 and/or 1957 are also published or otherwise available for States represented in the study area.

Some indication of trends in population and labor force distribution may be obtained from insured employment by county, by type of industry. Corrections will need to be introduced for changes in female employment and for trends in farm population and employment. Some indication of the latter may be obtained from the 1954 Census of Agriculture.

The 1950 Census of Population includes data on educational level and types of industrial occupations of the labor force. Statistical extrapolation will give a fair indication of the current level of education of the population of different counties. To show this characteristic to date for groups of counties will require much statistical analysis, as educational level is given only in terms of median years of schooling of the adult population.

Little can be done to update the 1950 data on skills. Where data are available on special surveys or labor market analyses of selected areas, this information can be introduced by comparative analysis, perhaps, or digested for a general indication of progress in the area.

Data on facilities for training skilled workers (which may also be treated under "Capital Resources"), and on how the apprentices completing the apprenticeship training program have grown in number over the years, are available from the Georgia State Department of Education. Data for counties of other States in the study area are understood to be available also.

The analysis to ascertain population trends will consist of assembling a series of population data for groups of counties in the study area over a period of years. The computed rate of trend by standard statistical methods will be compared to trends for various types of insured employment. Trends in the number of farms and types of farming enterprises will also be considered. Special factors which have given rise to employment, such as the AEC plant near Augusta, Georgia would be singled out for analysis. Any factors covering shrinkage in employment and therefore exodus of population will also enter into the analysis.

### Capital Resources

Separate tabulations will be made of particular types of capital resources within the river basin areas, using available measures of magnitude for each. A broad array of facilities will be included--manufacturing plants, railway and other transportation facilities, radio and television stations, power plants, highways and other developmental public works, to name some of the types. The available measures of magnitude will necessarily be diverse. In each instance the analysis will aim to show a particular small area's resources in terms of regional and national norms, taking into account the relative proportions of population and land area.

### Employment and Production

Methods of tabulating and analyzing employment data are expected to be substantially the same as those for population and labor force data (see "Human Resources," above). Information on employment for manufacturing establishments and for other industrial establishments will also serve as indicators of production volume.

The term "production" as employed in this heading actually implies much more than the measurement of physical units of goods manufactured, processed, or mined. "Volume of economic activity" perhaps comes closer to expressing the full meaning of the concept in mind. A comprehensive and well-knit method of measuring and properly relating "output" of manufacturing, mining, construction, trade, finance, and other economic activities calls for procedures and techniques of analysis which have barely begun to be developed for regional analysis, and particularly for portions of states. About the most that can be predicted at this juncture concerning methodology is that consideration will be given to all procedures and techniques which appear to be useful.

### Personal Income

Available published studies contain most of the needed data on personal income by major source and by county, for a recent year (1956 or 1957). Since similar data are also available for 1939 and 1947, trends may be calculated by standard statistical methods. Interpretation of the trends will be aided by analysis of major sources of income in particular local areas. Such comparisons should shed light on weaknesses in the industrial structure of the different areas, and give an indication of potentials for possible development.

It is anticipated that additional tabulations and trend calculations for trade area segments of the river basins will be worthwhile and perhaps essential.

### Main Problems and Potentials in Resource Development and Use

The main aim in this, the final major division of the study is to interpret the trends brought out in earlier sections, to synthesize the earlier findings, to point up the major problems in resource use and development existing in the study area, and to make projections of economic activity and economic development based on explicit assumptions.

The making of population projections follows logically from the establishment of trend and the yearly ratio of gains or losses. Statistical techniques are applied by one of two methods, namely: (1) the calculated rate of change is applied directly to the number of years, or (2) ratio is established to some larger population increase already estimated by official government agencies--for example, the population of Georgia for 1970. The ratio is projected, then converted to original values. These projected values by either method will then be adjusted up or down, depending on assumptions as to expected development activities which expand employment opportunities and sustain or accelerate population growth.

Labor force projections will be derived from population estimates by ratios of employment in the different areas. It may be that correlation analysis will also need to be used to determine statistical relationships between population and labor force.

The conclusions from the above analysis may be checked as to consistency by building population projections on the expected growth in insured employment. A difficulty of this method is the lack of information on farm employment and nonagricultural employment and on the small uninsured businesses and professional enterprises.

Projections of total personal income, to be presented in one of the later reports, will depend upon combining the population projections and the per capita income estimates. The latter may be derived from statistical projections of rates of change in real per capita income from 1939 to 1956, or by ratio relationships to trends in State per capita incomes over the same period. A reconciliation of projections by the two methods will be undertaken. The results will then be adjusted up or down depending upon assumptions as to the effect of changes in the factors (such as educational level) influencing the level of living. The final step will be multiplication of per capita incomes by years for each area by the corresponding population estimates previously derived. The result will be the projected total personal income in dollars of 1956 (or 1957) purchasing power for the different segments of the Southeast River Basins area.

#### Phase IV

Results of the foregoing analysis will be summarized and presented in a series of reports, by major outline division. It is anticipated that voluminous statistical tabulations and the like will be organized into suitable appendices.

## PROPOSED PHASES OF STUDY; TIMING

- Notes:
- Throughout the period of the study the Contractor will make suggestions concerning original studies which could point up valuable economic potentials.
  - It is contemplated that a joint review with representatives of the U. S. Study Commission, Southeast River Basins, will be conducted at the conclusion of each phase of the study.
  - Time estimates, particularly as regards Phases II and III, and project cost estimates are dependent on the availability and usefulness of information from various Federal and State agencies and other organizations which collect data on subjects covered by the study.

### Phase I

- (A) Preparation of preliminary report, as called for in Section 4 of the contract of 17 June 1959.
- (B) Consultations with representatives of organizations conducting research of a similar nature for other sections of the country, and with those studying the agricultural resources of the Southeast River Basins area. Following such consultations, any additional needed modifications will be made in the proposed outline, approach, methodology, and timing of the present study.

ESTIMATED COMPLETION DATES: (A) Up to August 17, 1959  
(B) September 30, 1959

### Phase II

Collection and organization of pertinent information and data on the utilization and development of nonagricultural resources in the entire geographic area delineated in Exhibit A of the contract of 17 June 1959. (Determination of precise area and sub-area boundaries is subject to joint review.) Special attention will be devoted to putting the data in such form that they can be used later for subsequent studies.

ESTIMATED COMPLETION DATES: Minerals, October 15, 1959  
Other items, December 15, 1959

### Phase III

Analysis and study of the data assembled and organized in Phase II, supplemented if necessary by additional information required (and available without

major expenditure of time and funds) for proper interpretation of the main body of data.

ESTIMATED COMPLETION DATE: Up to March 31, 1960

#### Phase IV

Preparation of reports based on the compilation and analysis of data for the various topics included in the study outline. Such reports will be especially concerned with evaluating the uses and limitations of available data for benefit-cost studies. Significant gaps in needed information will be identified, and earlier lists of suggested original studies will be consolidated.

#### ESTIMATED COMPLETION DATES:

- (I) Nonagricultural Natural Resources--(in two or more sections)--Up to April 8, 1960
- (II) Human Resources--April 15, 1960
- (III) Capital Resources--April 22, 1960
- (IV) Employment, Production, and Income--May 6, 1960
- (V) Main Problems and Potentials in Resources Development and Use--May 20, 1960



## INITIAL LIST OF SUGGESTED ORIGINAL STUDIES

The proposed studies listed below, not necessarily in the order of importance, are suggested on the basis that they could point up valuable economic potentials in the mineral resources field.

1. GRAPHITE:

This project should be directed primarily at beneficiation to extract graphite from its host rock by a method or methods that may have economic applications. Some associated field work for the gathering of samples would be necessary.

2. TALC (Pyrophyllite):

This study should be directed toward extending knowledge concerning a pyrophyllite zone that is known to exist in North Carolina. This is primarily a field problem.

3. GLASS SANDS:

The Southeast River Basins area, except for portions covered in available recent studies, should be studied for additional deposits of glass sand. This is primarily a field problem.

4. REFRACTORY MATERIALS:

This project should be primarily concerned with ceramic testing in the laboratory in order to establish criteria concerning known refractory materials within the study area, and to evaluate such materials. Very little field work would be involved; it would be confined to collecting samples.

5. LIMESTONES:

The limestone project should include mapping and evaluation of limestone deposits within the area under study, with permission of land owners, for the purpose of establishing the quality and grades of this material for lime and cement. This is primarily a field problem.

6. DECORATIVE STONE:

This project should be directed toward finding stone which may be used for either interior or exterior decorative purposes. The stone might be finished or unfinished, polished or unpolished. The main purpose would be to determine new sources of decorative stone outside of conventional and known materials. This would be a field-and-laboratory project.

7. ROOFING MATERIALS:

A study of materials from which roofing granules could be made should be carried out in the crystalline and metamorphic areas under consideration.

The increased incidence of asphalt and roofing companies in Savannah and other areas should make this a valuable resource. This would be a field-and-laboratory project.

8. GEOPHYSICAL WORK: IN SOUTHWEST AND SOUTHEAST GEORGIA:

Conventional geophysical methods with magnetometer, gravity meter, and seismograph should be used, both on shore and off to delineate possible oil and/or gas traps. This would be primarily a field study.

9. GEOCHEMICAL AND GEOPHYSICAL SULFIDE STUDIES:

Earth resistivity geophysical methods, geochemical, and possibly geobotanical methods should be employed to determine sources of sulfide ores such as copper. This would be a laboratory-and-field study.

10. LIGHT-WEIGHT AGGREGATE:

A broad study of materials that will retain structural strength after bloating should be made in order to evaluate shales, slates, granites and some clays within the area under study. This would be a field-and-laboratory study.

11. LOW-GRADE BERYLLIUM SOURCES:

Area reconnaissance, coupled with spectrographic and chemical analyses, should be made in the Crystalline and Piedmont areas to determine if there are sources of beryllium other than the beryl of pegmatites. This would be a field-and-laboratory study.

12. TOPOGRAPHIC MAPS

Topographic maps on 7 1/2 minute quadrangles should be made for the entire area. Funds should be made available in excess of present cooperative program funds.

13. GEOLOGIC MAPS

Geologic mapping should follow the topographic mapping, using selected areas in order to better utilize existing funds.



INDUSTRIAL RESOURCES AND POTENTIALS  
OF THE SOUTHEAST RIVER BASINS

---

Land Use Patterns and Planning Activity

by

Thera H. Richter

---

Mineral Resources Review

by

John E. Husted

Prepared for the administrative use only of the  
United States Study Commission, Southeast River Basins

---

Lamar White, Project Director

---

Industrial Development Branch  
Engineering Experiment Station  
Georgia Institute of Technology  
June 1960

# INDUSTRIAL RESOURCES AND POTENTIALS OF THE SOUTHEAST RIVER BASINS

## Sections of the Final Report and Their Designations

<u>Title</u>	<u>Section</u>
Land Use Patterns and Planning Activity	A
Mineral Resources Review	B
Water Resources	C
Population and Labor Force	D
Employment	E
Personal Income	F
Disposable Income, Consumption, and Savings	G
Economic Indicators for Major Functional Segments of the Economy	H
Summary of Recent Trends in Economic Growth and Development	I
Economic-Statistical Projections	J
Mathematical-Economic Projections	K
Economic Development Potentials by River Basin	L

## Table of Contents

### Section A

	<u>Page</u>
Land Use Patterns and Planning Activity	
Planning Activity	A-1
Urban Land	A-12
Industrial Land Use	A-12
APPENDIX I	A-19
APPENDIX II	A-23

### Tables

1. Current Planning Activity in Cities of 10,000 Population and Over in the Southeast River Basins Area	A-3
2. Current Planning Activity in Cities of 5,000 to 9,999 Population in the Southeast River Basins Area	A-5
3. Current Planning Activity in Cities of Less Than 5,000 Population in the Southeast River Basins Area	A-7
4. Current Planning Activity by Counties of the Southeast River Basins Area	A-10
5. Joint City-County Planning Commissions in Georgia	A-11
6. Breakdown in Square Miles of Urban Areas and Incorporated Towns by States	A-12
7. Industrial Land Use Compared to Total Land Area	A-13
8. Per Cent of Area by Major Land Use	A-15

## Table of Contents

### Section B

	<u>Page</u>
Mineral Resources Review	
Acknowledgments	B-1
Summary and Recommendations	B-3
Introduction	B-7
Metals	B-43
Bauxite	B-43
Beryllium	B-44
Gold	B-46
Iron Ore	B-46
Manganese	B-49
Thorium	B-49
Titanium	B-49
Zirconium	B-51
Petroleum and Natural Gas	B-54
Nonmetallic Minerals	B-56
Asbestos	B-56
Brick Clays	B-56
Clays-Kaolin	B-57
Cement	B-58
Corundum	B-61
Feldspar	B-61
Fuller's Earth	B-61
Gemstones	B-63
Magnesia	B-63
Mica	B-63
Peat	B-65
Phosphate Rock	B-65
Quartz	B-65
Quartzite	B-66
Sand and Gravel	B-66
Shale	B-67
Shells	B-67
Stone-Crushed	B-67
Stone-Dimension	B-70
Talc	B-70
Titanium Pigments	B-70
Minerals Reported but not Produced within the Study Area	B-75

## Table of Contents (Contd.)

### Section B

<u>Tables</u>	<u>Page</u>
I. Reported Mineral Production in the Southeast River Basins Area by State, County, and Commodity, 1952-1958	B-9
II. Volume and Value of Kaolin Production in Georgia, 1920-1959	B-59
III. Dimension Granite Sold or Used by Producers, by Counties	B-71
IV. Granite (Dimension Stone) Sold or Used by Producers in the United States in 1958, by States	B-72
V. Minerals Found or Produced in Southeast River Basins Area, by Major Drainage Basins	B-76

<u>Figures</u>	
1. Georgia Kaolin Output, 1920-1959	B-60
2. Georgia Crushed Granite Production, 1952-1958	B-68

## LAND USE PATTERNS AND PLANNING ACTIVITY\*

### Planning Activity

Many types of basic data are needed to aid in the formulation of a regional planning program. The city and county planning commissions that have active planning programs are storehouses of much valuable basic data. Therefore, the purpose of this study was to determine the extent of current planning activity in cities and/or counties in the Southeast River Basins area. This survey shows which cities and counties in the area have active planning programs as well as the specific type of planning activity each has undertaken.

It should be noted that no attempt has been made to appraise the quality of any of the planning programs. Also, current planning activity as used in this study is defined as any action that has been undertaken or completed since 1955 or is scheduled to be completed by the early part of 1961.

A check sheet containing five major categories and 35 specific items was prepared. These check sheets were mailed to state agencies, consultants, and other individuals having first-hand knowledge of planning activity in the area. They were asked to list the cities and/or counties having planning programs and to check the items that pertained to each city or county program. This was considered to be the most promising approach for obtaining the needed information on the numerous individual communities.

Those contributing information for the survey were the Georgia Power Company's community development representatives; planning consultants; and the Atlanta office of the Housing and Home Finance Agency. In the Atlanta Metropolitan Area the information was secured directly from the local planning agencies. For information pertaining to cities and counties in Florida, Alabama, and South Carolina, the respective state planning agencies or departments were contacted.

The North Carolina cities and counties in the River Basins area were not included in the survey because all North Carolina towns are under 1,000 in population and only three are incorporated.

---

\*By Thera H. Richter, Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Georgia.

There are 739 incorporated cities and towns in the Southeast River Basins area. Thirty-two have populations of 10,000 or more,<sup>1/</sup> 37 have populations ranging from 5,000 to 9,999 and 670 are under 5,000 in population. The range of planning activities in these three population groups are shown in Tables 1-3. County planning activities are shown in Table 4.

Almost all of the cities of 10,000 population and over have active planning commissions and they generally have comprehensive programs. Of the 32 major cities in the area only Anderson and Greenwood, South Carolina, are without organized planning programs.

Nearly 60 per cent of the 37 cities in the River Basins area within the population range of 5,000 to 9,999 have active planning commissions, but only 35 per cent have comprehensive planning programs. Forty-one per cent of the cities in this population range have no organized planning programs.

There are 670 incorporated towns and cities in the area whose population is under 5,000. Sixty-three of these have established planning programs, less than 10 per cent of the cities in this population class. However, there are more small cities actually engaged in planning than cities of larger populations.

A limited number of counties are also actively engaged in planning. A few of these are joint city-county endeavors. Alabama and South Carolina do not have any county planning and Florida has only three counties in the area with active planning programs.

All of the study area's joint city-county planning commissions are located in Georgia. A list of these joint commissions is presented in Table 5. Of the joint commissions only two, Savannah-Chatham County and Atlanta-Fulton County, have comprehensive planning in both the city and county. The other commissions have active programs in either the city or the county, and are listed in the area where they are active.

If the analysis of planning activity is broken down by state areas, Georgia leads the other three states. Georgia has a total of 78 cities and six counties engaged in planning, ranging from limited activity to comprehensive programs. Alabama is second with 30 cities and Florida third with 20 cities and three counties. There is virtually no planning activity in South Carolina to date. Aiken is the only city in the area with a planning program.

---

<sup>1/</sup> Population estimates are from the Rand-McNally Commercial Atlas and Marketing Guide, 1958 edition.

TABLE 1  
CURRENT PLANNING ACTIVITY IN CITIES OF 10,000 POPULATION AND OVER IN THE SOUTHEAST RIVER BASINS AREA

NAME OF CITY	GENERAL				MAPS			STUDIES AND SURVEYS										CODES AND ORDINANCES						PLANS AND PROGRAMS										
	Year Commission Organized	Commission Meets Regularly (once a month)	Has Paid Staff * (Director, etc.)	Uses Services of Consultant	Base Map	Aerial Photographs or Mosaic Map	Existing Land Use Map	Future Land Use Plan and Maps	Population and Economic Study	Traffic and Transportation Study	School, Park, and Recreation Study	Water Supply and Sewage System Study	Central Business District Study	Industrial Areas Study	Housing Survey	Neighborhood Studies or Analysis	Annexation Study	Zoning Ordinance and Map	Subdivision Regulations	Housing Code	Plumbing Code	Building Code	Fire Code	Electrical Code	Gas Code	Major Street Plan	Parking Plan	Community Facilities Plan	Public Utilities Plan	Urban Renewal Program	Water Front Plan	Comprehensive Plan	Capital Improvements Program	Capital Budget
Alabama: Dothan					X		X	X										X										X	X		X	X		
Opelika					X		X	X										X	X															
Phenix City					X		X	X										X		X						X	X			X		X		
Florida: Panama City		X			X													X			X	X	X	X	X									
Pensacola	1952	X	X		X	X	X	X	X			X				X	X	X	X	X	X	X	X	X	X	X				X				
Tallahassee		X	X		X																													
Warrington					X	X	X																							X				
West Pensacola	1952	X	X		X	X	X		X			X				X		X	X		X	X	X	X	X					X				
Georgia: Albany	1959	X		X	X		X	X	X							X		X	X	X	X	X	X	X	X	X	X	X			X	X		
Americus	1958	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Athens	1958	X			X	X	X	X		X		X			X			X																
Atlanta		X	X		X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X		
Augusta	1952	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brunswick		X	X	X	X		X	X	X	X	X			X	X			X	X		X	X	X	X		X		X		X	X			
College Park		X		X	X		X	X		X					X	X		X	X	X	X	X	X	X	X	X	X		X			X	X	
Columbus		X	X		X	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X	X	X	X	X		X		X	X	X	
Decatur		X		X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Dublin		X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X									
East Point		X		X	X		X	X	X	X								X	X	X	X	X	X	X	X	X		X		X		X	X	
Gainesville	1955	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Griffin		X		X	X	X	X					X					X	X	X		X	X	X	X	X									
LaGrange					X	X	X	X		X	X		X			X		X			X	X	X		X		X							

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs.

NOTES: 1. Atlanta, Georgia has Conducted Special Area Studies in Addition to Other Work.  
2. Augusta, Georgia has Conducted a Railroad Survey.



A-4

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs.

TABLE 2  
CURRENT PLANNING ACTIVITY IN CITIES OF 5,000 TO 9,999 POPULATION IN THE SOUTHEAST RIVER BASINS AREA

NAME OF CITY	GENERAL				MAPS			STUDIES AND SURVEYS										CODES AND ORDINANCES						PLANS AND PROGRAMS											
	Year Commission Organized	Commission Meets Regularly (once a month)	Has Paid Staff * (Director, etc.)	Uses Services of Consultant	Base Map	Aerial Photographs or Mosaic Map	Existing Land Use Map	Future Land Use Plan and Maps	Population and Economic Study	Traffic and Transportation Study	School, Park, and Recreation Study	Water Supply and Sewage System Study	Central Business District Study	Industrial Areas Study	Housing Survey	Neighborhood Studies or Analysis	Annexation Study	Zoning Ordinance and Map	Subdivision Regulations	Housing Code	Plumbing Code	Building Code	Fire Code	Electrical Code	Gas Code	Major Street Plan	Parking Plan	Community Facilities Plan	Public Utilities Plan	Urban Renewal Program	Water Front Plan	Comprehensive Plan	Capital Improvements Program	Capital Budget	
Alabama: Andalusia		X			X		X	X										X	X							X		X					X		
Atmore																																			
Brewton		X			X		X	X										X	X									X	X				X		
Enterprise		X			X		X	X	X									X	X							X		X	X				X		
Eufaula		X			X		X	X										X	X							X		X	X		X		X		
Greenville																																			
Lanett		X			X		X	X										X	X	X	X	X	X	X	X	X		X				X	X		
Opp		X			X													X	X																
Ozark		X			X		X	X	X									X	X							X		X					X		
Roanoke		X			X		X	X	X									X	X																
Troy		X			X		X	X										X	X																
Florida: Crestview		X			X																														
Lake City		X			X		X	X	X	X			X			X	X	X	X	X	X	X	X	X	X	X	X	X				X	X		
Marianna		X			X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X	X	X	X	X	X			X	X		
Perry																																			
Quincy																																			
Georgia: Bainbridge		X																			X	X		X											
Cairo																		X	X		X	X		X											
Carrollton		X		X	X		X	X	X			X						X	X		X	X	X	X	X	X	X								
Cordele		X		X	X		X	X																		X									
Covington	1956			X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	
Douglas		X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs.

NOTES: 1. Marianna, Florida has Conducted Special Area Studies and Prepared Plans for these Areas.

2. Covington, Georgia has Revised its System of Street Naming and Numbering.

9-A

[illegible]

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs

TABLE 3  
CURRENT PLANNING ACTIVITY IN CITIES OF LESS THAN 5,000 POPULATION IN THE SOUTHEAST RIVER BASINS AREA

NAME OF CITY	GENERAL				MAPS			STUDIES AND SURVEYS								CODES AND ORDINANCES						PLANS AND PROGRAMS													
	Year Commission Organized	Commission Meets Regularly (once a month)	Has Paid Staff * (Director, etc.)	Uses Services of Consultant	Base Map	Aerial Photographs or Mosaic Map	Existing Land Use Map	Future Land Use Plan and Maps	Population and Economic Study	Traffic and Transportation Study	School, Park, and Recreation Study	Water Supply and Sewage System Study	Central Business District Study	Industrial Areas Study	Housing Survey	Neighborhood Studies or Analysis	Annexation Study	Zoning Ordinance and Map	Subdivision Regulations	Housing Code	Plumbing Code	Building Code	Fire Code	Electrical Code	Gas Code	Major Street Plan	Parking Plan	Community Facilities Plan	Public Utilities Plan	Urban Renewal Program	Water Front Plan	Comprehensive Plan	Capital Improvements Program	Capital Budget	
Alabama: Abbeville		X			X		X	X	X									X	X							X		X					X		
Ashford		X			X													X	X																
Brundidge		X			X		X	X	X									X	X							X		X					X		
Columbia		X			X		X	X	X									X	X							X		X				X	X		
East Brewton		X			X		X	X										X								X		X							
Elba		X			X		X	X	X									X	X	X						X		X					X		
Foley		X			X		X	X	X									X	X																
Geneva		X			X		X	X	X									X	X							X			X				X		
Georgiana		X			X		X	X	X									X	X																
Headland		X			X		X	X	X									X	X																
La Fayette		X			X		X	X										X	X																
Luverne		X			X		X	X	X									X	X							X		X					X		
Midland City		X			X		X	X	X									X	X							X		X					X		
Newton		X			X		X	X	X									X	X	X		X	X	X	X	X	X		X			X	X		
Sampson		X			X		X	X	X									X	X							X		X					X		
Slocomb		X			X		X	X	X									X	X	X		X	X	X	X	X	X		X			X	X		
Florida: Bristol		X			X		X	X	X	X	X		X			X		X	X		X	X	X	X	X	X		X	X			X	X		
Chipley		X			X		X	X	X	X			X	X		X		X	X		X	X	X	X	X	X	X	X				X	X		
Cottontdale		X			X		X	X	X	X			X					X	X		X	X	X	X	X	X	X	X				X	X		
Cross City		X			X	X	X	X	X		X	X	X				X	X	X		X	X	X	X	X	X							X		
De Funiak Springs		X			X	X	X	X	X		X	X	X			X	X	X	X		X	X	X	X	X	X	X						X		
Fernandia Beach		X			X	X	X	X	X	X			X	X		X		X	X		X	X	X	X	X	X	X	X			X	X			

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs.

TABLE 3 (Continued)  
CURRENT PLANNING ACTIVITY IN CITIES OF LESS THAN 5,000 POPULATION IN THE SOUTHEAST RIVER BASINS AREA

NAME OF CITY		GENERAL				MAPS			STUDIES AND SURVEYS										CODES AND ORDINANCES						PLANS AND PROGRAMS											
		Year Commission Organized	Commission Meets Regularly (once a month)	Has Paid Staff * (Director, etc.)	Uses Services of Consultant	Base Map	Aerial Photographs or Mosaic Map	Existing Land Use Map	Future Land Use Plan and Maps	Population and Economic Study	Traffic and Transportation Study	School, Park, and Recreation Study	Water Supply and Sewage System Study	Central Business District Study	Industrial Areas Study	Housing Survey	Neighborhood Studies or Analysis	Annexation Study	Zoning Ordinance and Map	Subdivision Regulations	Housing Code	Plumbing Code	Building Code	Fire Code	Electrical Code	Gas Code	Major Street Plan	Parking Plan	Community Facilities Plan	Public Utilities Plan	Urban Renewal Program	Water Front Plan	Comprehensive Plan	Capital Improvements Program	Capital Budget	
Florida:	Fort Walton Beach		X			X		X	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X		
	Jasper	1958	X		X	X	X	X	X			X	X	X	X	X			X	X	X	X	X	X	X	X		X	X				X	X		
	Live Oak		X			X												X	X			X														
	MacClenny		X			X	X	X	X	X			X			X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X		
	Madison		X			X		X	X	X		X	X	X			X		X	X		X	X	X	X	X	X									
Georgia:	Milton	1960	X			X		X	X	X		X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X				X	X		
	Alamo		X			X		X	X	X	X		X		X			X	X	X		X	X	X	X	X	X	X	X		X		X	X		
	Barnesville		X			X		X	X	X					X							X	X	X		X	X	X								
	Buena Vista	1957	X			X		X	X			X	X		X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
	Butler	1959	X			X														X		X	X	X												
	Camilla	1957	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X		X	X		
	Clarkesville	1958	X		X	X		X		X	X		X	X	X				X	X		X	X	X	X	X		X	X	X						
	Cleveland	1956	X		X	X		X	X					X	X	X				X		X	X	X	X											
	Conyers	1958			X	X		X	X												X		X	X	X											
	Cornelia	1959	X		X					Contract for Comprehensive Plan Started March 1, 1960.											X	X	X	X												
	Cuthbert	1959	X			X		X													X		X	X	X											
	Dahlonega	1956	X			X	X	X	X										X		X		X	X	X	X	X	X								
	Eastman	1958	X		X	X		X		X	X								X	X	X		X	X	X	X	X	X	X							
	Fitzgerald	1958	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	Hahira	1957	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	Hartwell	1958	X		X	X	X	X	X	X	X	X	X	X			X		X	X			X	X	X	X	X	X	X	X						
	Jackson					X		X	X	X		X	X			X	X		X	X			X	X	X		X		X					X	X	

\*The State Planning Agencies in Alabama and Florida Provide Technical Planning Assistance to the Cities not Employing Paid Staffs.

TABLE 3 (Continued)  
CURRENT PLANNING ACTIVITY IN CITIES OF LESS THAN 5,000 POPULATION IN THE SOUTHEAST RIVER BASINS AREA

NAME OF CITY	GENERAL				MAPS				STUDIES AND SURVEYS										CODES AND ORDINANCES								PLANS AND PROGRAMS							
	Year Commission Organized	Commission Meets Regularly (once a month)	Has Paid Staff (Director, etc.)	Uses Services of Consultant	Base Map	Aerial Photographs or Mosaic Map	Existing Land Use Map	Future Land Use Plan and Maps	Population and Economic Study	Traffic and Transportation Study	School, Park, and Recreation Study	Water Supply and Sewage System Study	Central Business District Study	Industrial Areas Study	Housing Survey	Neighborhood Studies or Analysis	Annexation Study	Zoning Ordinance and Map	Subdivision Regulations	Housing Code	Plumbing Code	Building Code	Fire Code	Electrical Code	Gas Code	Major Street Plan	Parking Plan	Community Facilities Plan	Public Utilities Plan	Urban Renewal Program	Water Front Plan	Comprehensive Plan	Capital Improvements Program	Capital Budget
Georgia: Jesup	1958	X																X																
Lawrenceville	1955	X		X	X	X	X	X	X									X	X	X	X	X	X	X	X	X								
Madison	1959	X		X	X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								
Manchester					X	X	X	X	X									X	X	X	X	X	X	X	X	X								
Metter					X	X	X	X	X			X						X	X	X	X	X	X	X	X	X								
Monroe	1956			X	X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								
Montezuma	1958	X			X	X	X	X										X	X	X	X	X	X	X	X	X								
Nashville	1958	X		X	X	X	X	X	X				X	X	X	X		X	X	X	X	X	X	X	X	X								
Ocala	1959	X			X	X	X	X	X																									
Oxford	1958	X		X	X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								
Reynolds	1959	X			X	X	X	X																										
Richland	1959	X			X	X	X	X																										
Rutledge					X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								
Shelburn	1959	X			X	X	X	X	X																									
Thomson	1958			X	X	X	X	X	X				X					X	X	X														
Union City					X	X	X	X	X									X	X	X														
Union Point	1956				X	X	X	X	X																									
Winder	1959	X		X	X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								
Wrightsville					X	X	X	X	X				X					X	X	X	X	X	X	X	X	X								



A-10

[illegible]

Table 5

JOINT CITY-COUNTY PLANNING COMMISSIONS  
IN GEORGIA

Alamo-Wheeler County  
Albany-Dougherty County  
Americus-Sumter County  
Ashburn-Sycamore-Rebecca-Turner County  
Athens-Clarke County  
Atlanta-Fulton County  
Augusta-Richmond County  
Buena Vista-Marion County  
Brunswick-Glynn County  
Carrollton-Carroll County  
Columbus-Muscogee County  
Conyers-Rockdale County  
Cordele-Crisp County  
Cumming-Forsyth County  
Douglas-Coffee County  
Douglasville-Douglas County  
Dublin-Laurens County  
Eastman-Dodge County  
Eatonton-Putnam County  
Fayetteville-Fayette County  
Fitzgerald-Ben Hill County  
Gainesville-Hall County  
Griffin-Spalding County  
Hartwell-Hart County  
Jackson-Butts County  
Jesup-Wayne County  
Macon-Bibb County  
McDonough-Hampton-Stockbridge-Henry County  
Moultrie-Colquitt County  
Newnan-Coweta County  
Ocilla-Irwin County  
Paulding County Municipal (Dallas and Hiram)  
Savannah-Chatham County  
Thomaston-Upson County  
Tifton-Tift County  
Toccoa-Stephens County  
Valdosta-Lowndes County  
Waycross-Ware County  
Wrightsville-Johnson County



If the activity by state is placed on a percentage basis, however, Alabama leads with 39.5 per cent of the cities in the area having planning programs. Florida has 26.3 per cent of its cities engaged in planning but Georgia has only 14.9 per cent.

#### Urban Land

Of the total Southeast River Basins area, 1,476.7 square miles are found to be urban. This follows the Bureau of the Census definition of urban places. An additional 899.3 square miles in the area are contained in incorporated towns, by Census definition classified as rural non-farm.

The additional 899.3 square miles have been included in the tabulation of urban land because these areas require those services and facilities that are urban in nature. Also, the incorporated areas have recognized legal status.

The following tabulation shows the breakdown in square miles by states:

Table 6

<u>Study Area by State Segments</u>	<u>Total Land Area</u>	<u>Areas Requiring Urban Services and Facilities</u>		
		<u>Total</u>	<u>Urban</u>	<u>Non-urban Incorp. Towns</u>
Alabama	11,155	282.9	177.4	105.5
Florida	19,241	319.3	232.8	86.5
Georgia	51,513	1,577.1	947.8	629.3
North Carolina	175	5.5	0	5.5
South Carolina	<u>4,459</u>	<u>191.2</u>	<u>118.7</u>	<u>72.5</u>
Total Study Area	86,543	2,376.0	1,476.7	899.3

#### Industrial Land Use

An estimated 141 square miles of the urban area are devoted to industrial use and railroad rights-of-way. The basis for this estimate is the average ratio of industrial land (including railroad rights-of-way) to total land area in eleven cities and five urban areas in the Southeast River Basins area. The average per cent of land devoted to industrial use in the eleven cities is 5.03 and in the five urban areas is 6.51. (See Table 7.)

Table 7

INDUSTRIAL LAND USE COMPARED TO TOTAL LAND AREA  
(acres)

Eleven Cities			Five Urban Cities		
<u>City</u>	<u>Total Area</u>	<u>Industrial Land (Includes Railroad Rights-of-Way)</u>	<u>Urban Area</u>	<u>Total Area</u>	<u>Industrial Land (Includes Railroad Rights-of-Way)</u>
Augusta, Ga.	6,107.0	257.1	Augusta, Ga.	45,171.3	814.8
Camilla, Ga.	2,009.6	165.8	Bainbridge, Ga.	5,373.1	350.6
Carrollton, Ga.	6,114.0	245.8	Camilla, Ga.	2,071.3	170.2
Cordele, Ga.	1,988.0	127.0	Macon, Ga.	16,693.0	1,579.0
Decatur, Ga.	2,662.7	38.4	Savannah, Ga.	<u>32,836.5</u>	<u>3,738.1</u>
Dublin, Ga.	5,400.0	78.0	Total	102,145.2	6,652.7
East Point, Ga.	5,819.1	744.7	Industrial land as a per cent of total urban area		
Fitzgerald, Ga.	1,680.7	71.3			6.51
Lake City, Fla.	2,320.1	69.0			
Lithonia, Ga.	504.2	19.2			
Marietta, Ga.	<u>4,159.2</u>	<u>134.9</u>			
Total	38,794.6	1,951.2			
Industrial land as a per cent of total area		5.03			

Source: Data compiled from land use surveys of individual cities, from files of the Housing and Home Finance Agency Regional Office, Atlanta, Georgia.

While this sample is admittedly small, the derived ratios are substantiated by a study of land uses<sup>1/</sup> published in 1955. Fifty-three cities were included in this study. The average proportion of land used for industrial purposes and railroad rights-of-way for all cities was 6.31 per cent. For cities under 50,000 population (28 cities) the per cent of industrial land use was 5.33.

---

<sup>1/</sup> Bartholomew, Harland, Land Uses in American Cities, University Press, Cambridge, 1955. In the study area sample, the computation shows:

1,476.7 sq.mi., total urban land	at 6.51% = 96.1 sq.mi.
899.3 sq.mi., incorporated (not urban)	at 5.03% = <u>45.2 sq.mi.</u>
	141.3 sq.mi. or
	90,432 acres

For comparison, the Bartholomew study calculated:

1,476.7 sq.mi., total urban land	at 6.31% = 93.2 sq.mi.
899.3 sq.mi., incorporated (not urban)	at 5.33% = <u>47.9 sq.mi.</u>
	141.1 sq.mi. or
	90,304 acres

Table 8

## PER CENT OF AREA BY MAJOR LAND USE

## Eleven Cities

Name of City	City Limits Total Area (acres)	Residential	Commercial	Industrial and Railroad R/W	Public and Semi-Public	Streets and Vacant Land
Augusta, Ga.	6,107.0	35.1%	5.7%	4.2%	18.8%	36.2%
Camilla, Ga.	2,009.6	16.4	1.3	8.3	5.3	68.8
Carrollton, Ga.	6,144.0	22.0	1.0	4.0	6.0	67.0
Cordele, Ga.	1,988.0	25.0	2.0	6.0	9.0	58.0
Decatur, Ga.	2,662.7	57.4	3.0	1.4	11.9	26.1
Dublin, Ga.	5,400.0	15.6	2.3	1.4	8.6	72.1
East Point, Ga.	5,819.1	35.9	1.7	12.8	4.4	45.2
Fitzgerald, Ga.	1,680.7	25.5	2.2	4.2	4.5	63.6
Lake City, Fla.	2,320.1	15.0	2.6	3.0	3.7	75.8
Lithonia, Ga.	504.2	39.3	4.4	3.8	8.6	43.9
Marietta, Ga.	4,159.2	40.1	3.8	3.2	8.0	44.9

## Five Urban Areas

Augusta, Ga.	45,171.3	9.4%	1.7%	1.8%	4.8%	82.3%
Bainbridge, Ga.	5,373.1	14.5	1.1	6.5	3.3	74.6
Camilla, Ga.	2,071.3	16.0	1.9	8.2	7.2	66.7
Macon, Ga.	16,693.0	28.6	1.4	9.5	4.7	55.8
Savannah, Ga.	32,836.5	36.4	2.7	11.4	34.4	15.1

Source: Data compiled from land use surveys of individual cities, from files of the Housing and Home Finance Agency Regional Office, Atlanta, Georgia.

· APPENDICES ( SECTION A )

# Appendix I

## URBAN AREAS IN THE SOUTHEAST RIVER BASINS AREA<sup>1/</sup>

<u>ALABAMA</u>	<u>Area Sq.Mi.</u>	<u>FLORIDA</u>	<u>Area Sq.Mi.</u>
Abbeville, Henry	4.8	Apalachicola, Franklin	2.2
Andalusia, Covington	18.8	Bonifay, Holmes	2.5
Atmore, Escambia	6.8	Chattahoochee, Gadsden	3.0
Bay Minette, Baldwin	4.4	Chipley, Washington	2.8
Brewton, Escambia	9.6	Crestview, Okaloosa	4.1
Brundidge, Pike	4.0	DeFuniak Springs, Walton	5.8
Dothan, Houston	14.2	Fernandina Beach, Nassau	8.5
Elba, Coffee	3.8	Fort Walton Beach, Okaloosa	16.0
Enterprise, Coffee	9.0	Jasper, Hamilton	2.2
Eufaula, Barbour	2.8	Lake City, Columbia	8.1
Evergreen, Conecuh	5.0	Live Oak, Suwannee	6.9
Florala, Covington	3.0	Lynn Haven, Bay	3.9
Foley, Baldwin	6.3	Madison, Madison	2.3
Geneva, Geneva	3.4	Marianna, Jackson	4.6
Greenville, Butler	4.8	Monticello, Jefferson	4.9
Lafayette, Chambers	4.0	Niceville, Okaloosa	16.4
Lanett, Chambers	4.8	Panama City, Bay	40.0
Luverne, Crenshaw	3.1	Pensacola, Escambia	35.0
Opelika, Lee	10.5	Perry, Taylor	9.3
Opp, Covington	9.4	Port Saint Joe, Gulf	3.2
Ozark, Dale	4.6	Quincy, Gadsden	5.8
Phenix City, Russell	20.0	Starke, Bradford	5.4
Roanoke, Randolph	5.0	Tallahassee, Leon	28.3
Samson, Geneva	7.1	Milton, Santa Rosa	11.6
Troy, Pike	6.7		
Union Springs, Bullock	1.5		

<sup>1/</sup> Urban areas are listed by the central city and the county or counties into which urban development extends. This follows the U. S. Bureau of Census definition of Urban Places. Area data were compiled by the Industrial Development Branch.

URBAN AREAS

<u>GEORGIA</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Adel, Cook	1.8	Elberton, Elbert	3.1
Albany, Dougherty	15.0	Fitzgerald, Ben Hill	2.6
Alma, Bacon	3.1	Forsyth, Monroe	1.8
Americus, Sumter	6.0	Fort Valley, Peach	4.9
Ashburn, Turner	3.0	Gainesville, Hall	9.7
Athens, Clark	13.5	Glennville, Tattnall	1.8
Atlanta, Clayton, Cobb, DeKalb, Fulton, and Gwinnett counties	398.0	Greensboro, Green	3.1
Augusta, Richmond	26.0	Griffin, Spalding	6.5
Bainbridge, Decatur	8.4	Hartwell, Hart	3.1
Barnesville, Lamar	3.1	Hawkinsville, Pulaski	1.8
Baxley, Appling	3.1	Hazelhurst, Jeff Davis	3.1
Blackshear, Pierce	3.1	Hogansville, Troup	2.5
Blakely, Early	4.0	Jesup, Wayne	6.0
Brunswick, Glynn	11.1	La Grange, Troup	13.6
Buford, Gwinnett	3.0	Louisville, Jefferson	1.8
Cairo, Grady	5.3	Lyons, Toombs	3.2
Camilla, Mitchell	3.1	Macon, Bibb	26.1
Carrollton, Carroll	9.6	Madison, Morgan	3.1
Cochran, Bleckley	3.1	Manchester, Meriwether, and Talbot	2.3
Columbus, Muscogee	39.4	Milledgeville, Baldwin	7.0
Commerce, Jackson	1.8	Millen, Jenkins	3.1
Cordele, Crisp	4.3	Monroe, Walton	9.6
Cornelia, Habersham	1.8	Montezuma, Macon	4.5
Covington, Newton	9.1	Moultrie, Colquitt	5.4
Cuthbert, Randolph	3.1	Nashville, Berrien	3.1
Dawson, Terrell	3.1	Newnan, Coweta	7.1
Donalsonville, Seminole	4.0	Ocilla, Irwin	1.9
Douglas, Coffee	5.0	Pelham, Mitchell	4.0
Douglasville, Douglas	4.3	Perry, Houston	9.6
Dublin, Laurens	7.5	Porterdale, Newton	1.6
Eastman, Dodge	3.1	Quitman, Brooks	3.1
Eatonton, Putnam	3.1	Sandersville, Washington	7.1
		Savannah, Chatham	51.3

URBAN AREAS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>SOUTH CAROLINA (Continued)</u>	<u>Area Sq. Mi.</u>
Silvertown, Upson	1.2	Honea Path, Abbeville and Anderson	3.1
Statesboro, Bulloch	3.1	Jackson, Aiken	3.1
Swainsboro, Emanuel	3.1	Liberty, Pickens	2.2
Sylvania, Screven	3.1	New Ellenton, Aiken	3.1
Sylvester, Worth	1.9	North Augusta, Aiken	14.4
Thomaston, Upson	4.9	Seneca, Oconee	5.5
Thomasville, Thomas	4.3	Walhalla, Oconee	4.7
Thomson, McDuffie	1.8	Westminister, Oconee	2.7
Tifton, Tift	15.0	Williamston, Anderson	3.1
Toccoa, Stephens	3.1	Williston, Barnwell	9.0
Valdosta, Lowndes	15.5	Clemson College, Oconee*	3.0
Vidalia, Toombs	7.0	Ware Shoals, Greenwood*	2.0
Vienna, Dooly	3.1		
Warner Robins, Houston	7.9	Total	1,476.7
Washington, Wilkes	9.0		
Waycross, Ware	8.6		
Waynesboro, Burke	18.0		
West Point, Troup	3.1		
Winder, Barrow	2.7		
<u>NORTH CAROLINA</u>			
No urban area			
<u>SOUTH CAROLINA</u>			
Abbeville, Abbeville	5.3		
Aiken, Aiken	8.2		
Allendale, Allendale	3.1		
Anderson, Anderson	17.0		
Belton, Anderson	3.1		
Calhoun Falls, Abbeville	3.1		
Easley, Pickens	6.0		
Edgefield, Edgefield	4.0		
Greenwood, Greenwood	13.0		

\*Unincorporated





## Appendix II

### INCORPORATED CITIES AND TOWNS IN THE SOUTHEAST RIVER BASINS AREA

<u>ALABAMA</u>	<u>Area Sq.Mi.</u>	<u>ALABAMA (Continued)</u>	<u>Area Sq.Mi.</u>
Abbeville, Henry	4.8	Flomaton, Escambia	3.3
Andalusia, Covington	18.8	Floralala, Covington	3.0
Ariton, Dale	3.1	Foley, Baldwin	6.3
Ashford, Houston	3.2	Frisco City, Monroe	4.4
Atmore, Escambia	6.8	Geneva, Geneva	3.4
Banks, Pike	1.0	Georgiana, Butler	5.0
Bay Minette, Baldwin	4.4	Glenwood, Crenshaw	1.0
Bellwood, Geneva	0.8	Gordon, Houston	1.2
Black, Geneva	3.6	Goshen, Pike	1.1
Blue Springs, Barbour	1.2	Greenville, Butler	4.8
Brantley, Crenshaw	5.1	Hartford, Geneva	1.8
Brewton, Escambia	6.8	Headland, Henry	4.0
Brundidge, Pike	4.0	Hurtsboro, Russell	1.0
Castleberry, Conecuh	1.9	Kinston, Coffee	0.8
Chapman, Butler	2.8	Lafayette, Chambers	4.0
Clayton, Barbour	4.0	Lanett, Chambers	2.4
Clio, Barbour	2.4	Lockhart, Covington	1.2
Columbia, Houston	3.6	Louisville, Barbour	4.0
Cottonwood, Houston	4.0	Luverne, Crenshaw	3.1
Dothan, Houston	14.2	Madrid, Houston	1.0
Coffee Spring, Geneva	0.8	Malvern, Geneva	1.8
Dozier, Crenshaw	1.1	McKenzie, Butler	1.0
East Brewton, Escambia	2.8	Midland City, Dale	4.0
Elba, Coffee	3.8	Midway, Bullock	1.5
Elberta, Baldwin	1.0	New Brockton, Coffee	1.0
Enterprise, Coffee	9.0	Newton, Dale	3.9
Eufaula, Barbour	2.8	Newville, Henry	4.0
Evergreen, Conecuh	5.0	Opelika, Lee	10.5
Excel, Monroe	0.5	Opp, Covington	9.4

---

1/ Area estimates were compiled by the Industrial Development Branch.  
 List of incorporated cities was taken from: Rand McNally Commercial Atlas and Marketing Guide, Eighty-ninth Edition, 1958.

# INCORPORATED CITIES AND TOWNS

<u>ALABAMA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>FLORIDA (Continued)</u>	<u>Area Sq.Mi.</u>
Petrey, Crenshaw	0.5	Chipley, Washington	2.8
Phenix City, Russell	20.0	Compass Lake, Jackson	1.0
Pinckard, Dale	2.0	Cottondale, Jackson	1.6
Pollard, Escambia	0.4	Crestview, Okaloosa	4.1
Red Level, Covington	1.7	Cross City, Dixie	1.1
Repton, Conecuh	1.0	Cypress, Jackson	2.3
Roanoke, Randolph	5.0	De Funiak Springs, Walton	5.8
Robertsdale, Baldwin	1.0	Esto, Holmes	0.8
Rutledge, Crenshaw	1.0	Fernandina Beach, Nassau	8.5
Samson, Geneva	7.1	Fort Walton Beach, Okaloosa	3.0
Seale, Russell	1.0	Fort White, Columbia	2.3
Slocumb, Geneva	2.3	Glen Saint Mary, Baker	1.0
Summerdale, Baldwin	3.5	Graceville, Jackson	4.2
Troy, Pike	6.7	Grand Ridge, Jackson	0.8
Union Springs, Bullock	1.5	Greensboro, Gadsden	1.0
Vredenburgh, Monroe	1.0	Greenville, Madison	1.2
Webb, Houston	4.0	Greenwood, Jackson	4.0
<u>FLORIDA</u>		Gretna, Gadsden	1.0
Alachua, Alachua	1.4	Hampton, Bradford	1.0
Alford, Jackson	1.1	Havana, Gadsden	2.1
Altha, Calhoun	1.3	High Springs, Alachua	2.7
Apalachicola, Franklin	2.2	Hilliard, Nassau	1.5
Bell, Gilchrist	1.0	Jasper, Hamilton	1.2
Blountstown, Calhoun	2.6	Jay, Santa Rosa	1.7
Bonifay, Holmes	2.5	Jennings, Hamilton	1.2
Branford, Suwannee	0.8	LaCrosse, Alachua	1.9
Brooker, Bradford	0.5	Lake Butler, Union	1.5
Callahan, Nassau	1.2	Lake City, Columbia	4.0
Campbellton, Jackson	1.5	Laurel Hill, Okaloosa	1.5
Carrabelle, Franklin	2.2	Lawtey, Bradford	1.2
Caryville, Washington	1.0	Live Oak, Suwannee	6.9
Chattahoochee, Gadsden	3.0	Lynn Haven, Bay	3.9
Chiefland, Levy	0.8	Macclenny, Baker	2.4

# INCORPORATED CITIES AND TOWNS

<u>FLORIDA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Madison, Madison	2.3	Aikenton, Jasper	0.8
Malone, Jackson	1.6	Ailey, Montgomery	2.0
Marianna, Jackson	4.6	Alamo, Wheeler	0.8
Mary Esther, Okaloosa	2.0	Alapaha, Berrien	0.8
Mayo, Lafayette	0.9	Albany, Dougherty	15.0
Milton, Santa Rosa	1.5	Aldora, Lamar	0.5
Monticello, Jefferson	4.9	Alma, Bacon	3.1
Newberry, Alachua	1.0	Alpharetta, Fulton	1.8
Niceville, Okaloosa	11.0	Alston, Montgomery	0.8
Panama City, Bay	15.0	Alto, Habersham, and Banks	0.8
Panama City Beach, Bay	0.4	Alvaton, Meriwether	0.4
Paxton, Walton	0.8	Americus, Sumter	6.0
Pensacola, Escambia	17.0	Andersonville, Sumter	1.2
Perry, Taylor	9.3	Apalachee, Morgan	3.1
Port Saint Joe, Gulf	3.2	Appling, Columbia	0.8
Quincy, Gadsden	4.3	Arabic, Crisp	3.1
Saint Marks, Wakulla	0.8	Arcade, Jackson	0.8
Shalimar, Okaloosa	2.0	Argyle, Clinch	1.8
Sneads, Jackson	4.0	Arlington, Calhoun, and Early	4.0
Springfield, Bay	1.2	Ashburn, Turner	3.0
Starke, Bradford	5.4	Athens, Clark	13.5
Tallahassee, Leon	18.0	Atlanta, Fulton, and DeKalb	117.9
Trenton, Gilchrist	1.4	Attapulcus, Decatur	0.8
Valparaiso, Okaloosa	5.4	Auburn, Barrow	0.8
Vernon, Washington	4.5	Augusta, Richmond	9.5
Wewahitchka, Gulf	6.5	Austell, Cobb	0.8
White Springs, Hamilton	1.5	Avalon, Stephens	1.8
Williston, Levy	2.7	Avera, Jefferson	0.8
<u>GEORGIA</u>		Avondale Estates, DeKalb	0.5
Abbeville, Wilcox	3.1	Baconton, Mitchell	1.3
Adel, Cook	1.8	Bainbridge, Decatur	8.4
Adrian, Emanuel, and Johnson	3.1	Baldwin, Brooks, and Habersham	1.8

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Barnesville, Lamar	3.1	Broxton, Coffee	3.1
Barney, Brooks	0.8	Brunswick, Glynn	11.1
Bartow, Jefferson	1.1	Buena Vista, Marion	3.1
Barwick, Brooks, and Thomas	2.2	Buford, Gwinnett	3.0
Baxley, Appling	3.1	Butler, Taylor	3.1
Beach, Ware	0.8	Byromville, Dooly	0.8
Bellton, Hall, and Banks	0.8	Byron, Peach	3.1
Benevolence, Randolph	1.6	Cadwell, Laurens	1.3
Berlin, Colquitt	0.8	Cairo, Grady	3.1
Bethlehem, Barrow	0.8	Camilla, Mitchell	3.1
Between, Walton	0.8	Campton, Walton	0.8
Bibb City, Muscogee	1.0	Canon, Franklin, and Hart	3.1
Bishop, Oconee	0.8	Canoochee, Emanuel	0.8
Blackshear, Pierce	3.1	Carl, Barrow	0.8
Blairsville, Union	0.8	Carlton (Berkeley), Madison	0.8
Blakely, Early	4.0	Carnesville, Franklin	0.8
Bluffton, Clay	1.6	Carrollton, Carroll	9.6
Blythe, Richmond	0.8	Cecil, Cook	0.8
Bogart, Oconee, and Clark	2.6	Center, Jackson	0.6
Bolingbrake, Monroe	0.8	Centralhatchee, Heard	0.8
Boston, Thomas q	2.3	Chalyheate Springs, Meriwether	0.8
Bostwick, Morgan	3.1	Chamblee, DeKalb	6.0
Bowdon, Carroll	3.1	Charles, Toombs	0.8
Bowersville, Hart	3.1	Chauncey, Dodge	1.8
Bowman, Elbert	3.1	Chester, Dodge	0.8
Boykin, Miller	0.8	Chiple, Harris	1.0
Braselton, Jackson	0.5	Clarksville, Habersham	1.9
Brewton, Laurens	0.8	Clarkston, DeKalb	0.8
Brinson, Decatur	2.1	Claxton, Evans	1.7
Bristol, Pierce	3.1	Clayton, Rabun	3.1
Bronwood, Terrell	0.8	Clermont, Hall	0.8
Brooklet, Bulloch	0.8	Cleveland, White	0.8
Brooks, Fayette	0.8	Climax, Decatur	0.8

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Cobbtown, Tattnall	0.4	Danielsville, Madison	0.8
Cochran, Bleckley	3.1	Danville, Twiggs, and Wilkinson	0.8
Colbert, Madison	0.8	Darien, McIntosh	1.9
Coleman, Randolph	0.8	Davisboro, Washington	1.4
College Park, Fulton, and Clayton	4.0	Dawson, Terrell	3.1
Collins, Tattnall	1.0	Dawsonville, Dawson	1.0
Colquitt, Miller	1.8	Dearing, McDuffie	0.8
Columbus, Muscogee	39.4	Decatur, DeKalb	4.2
Comer, Madison	3.1	Demorest, Habersham	1.7
Commerce, Jackson	1.8	Denton, Jeff Davis	0.8
Concord, Pike	0.8	DeSoto, Sumter	0.8
Conyers, Rockdale	3.1	Dexter, Laurens	0.8
Collidge, Thomas	0.8	Dickey, Calhoun	3.1
Cordele, Crisp	4.3	Dillard, Rabun	1.8
Corinth, Heard	0.8	Dixie, Brooks	0.8
Cornelia, Habersham	1.8	Doerun, Colquitt	0.8
Cotton, Mitchell	0.8	Donalsonville, Seminole	4.0
Covena, Emanuel	0.8	Doraville, DeKalb	1.8
Covington, Newton	9.1	Douglas, Coffee	5.0
Covington Mills, Newton	0.8	Douglasville, Douglas	4.3
Crawford, Oglethorp	1.1	Dublin, Laurens	7.5
Crawfordville, Taliaferro	3.1	Ducktown, Forsyth	0.2
Crosland, Colquitt	0.8	Dudley, Laurens	1.0
Culloden, Monroe	0.8	Duluth, Gwinnett	1.8
Cumming, Forsyth	3.1	Du Pont, Clinch	0.8
Cusseta, Chattahoochee	1.5	Durand, Meriwether	2.1
Cuthbert, Randolph	3.1	East Dublin, Laurens	3.0
Dacula, Gwinnett	0.8	East Ellijay, Gilmer	0.8
Dahlonega, Lumpkin	3.1	East Juliette, Jones	0.8
Daisy, Evans	0.8	Eastman, Dodge	3.1
Dallas, Paulding	1.7	East Point, Fulton	9.1
Damascus, Early	1.8	East Thomaston, Upson	1.8
Danburg, Wilkes	3.1	Eastville, Oconee	0.8

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Eatonton, Putnam	3.1	Gibson, Glascock	0.8
Edison, Calhoun	2.4	Gill, Meriwether	0.8
Elberton, Elbert	3.1	Gillsville, Hall, and Banks	0.5
Elks, Houston	0.8	Girard, Burke	3.2
Ellaville, Schley	0.8	Glennville, Tattnall	1.8
Ellenton, Colquitt	0.8	Glenwood, Wheeler	0.8
Ellijay, Gilmer	1.8	Godfrey, Morgan	0.8
Empire, Dodge	0.8	Good Hope, Walton	1.8
Enigma, Berrien	3.8	Gordon, Wilkinson	2.7
Fairburn, Fulton	3.1	Graham, Appling	0.8
Farmington, Oconee	1.0	Grantville, Coweta	1.8
Farrar, Jasper	0.8	Gratis, Walton	0.8
Fayetteville, Fayette	3.1	Gray, Jones	2.3
Finleyson, Pulaski	0.3	Grayson, Gwinnett	0.8
Fitzgerald, Ben Hill	2.6	Greensboro, Greene	3.1
Flemington, Liberty	3.1	Greenville, Meriwether	0.6
Flovilla, Butts	1.5	Griffin, Spalding	6.5
Flowery Branch, Hall	0.8	Grayton, Effingham	0.8
Folkston, Charlton	2.8	Hagan, Evans	2.5
Forest Park, Clayton	5.4	Hahira, Lowndes	1.4
Forsyth, Monroe	3.1	Hamilton, Harris	0.7
Fort Gaines, Clay	1.8	Hampton, Henry	0.8
Fort Valley, Peach	4.9	Hapeville, Fulton	2.2
Franklin, Heard	3.1	Haralson, Coweta	0.4
Franklin Springs, Franklin	2.0	Harlem, Columbia	1.8
Fullerville, Carroll	0.8	Harrison, Washington	0.8
Funston, Colquitt	0.8	Hartwell, Hart	3.1
Gainesville, Hall	7.9	Hawkinsville, Pulaski	1.8
Garden City, Chatham	4.0	Hazelhurst, Jeff Davis	3.1
Garfield, Emanuel	0.8	Hepzibah, Richmond	3.1
Gay, Meriwether	0.8	Herod, Terrell	1.8
Geneva, Talbot	0.8	Hickox, Brantley	0.9
Georgetown, Quitman	3.9	Higgston, Montgomery	0.9

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
High Shoals, Morgan, and Oconee	0.8	Lake Tara, Clayton	0.8
Hilltonia, Screven	1.8	Lavonia, Franklin	3.1
Hinesville, Liberty	3.1	Lawrenceville, Gwinnett	3.3
Hiram, Paulding	0.9	Leary, Calhoun	1.8
Hoboken, Brantley	3.2	Leesburg, Lee	1.8
Hogansville, Troup	2.5	Lenox, Cook	0.8
Homeland, Charlton	0.8	Leslie, Sumter	1.8
Homer, Banks	1.8	Lexington, Oglethorpe	0.8
Homerville, Clinch	1.8	Lilly, Dooly	0.8
Hoschton, Jackson	1.4	Lincolnton, Lincoln	3.1
Howell, Echols	1.0	Lithonia, DeKalb	3.8
Hull, Madison	0.3	Locust Grove, Henry	0.8
Ideal, Macon	1.0	Loganville, Walton, and Gwinnett	3.1
Ila, Madison	0.7	Lollie (Minter), Laurens	0.8
Iron City, Seminole	0.8	Lone Oak, Meriwether	0.6
Irwinton, Wilkinson	3.1	Louisville, Jefferson	1.8
Ivey, Wilkinson	1.8	Lovejoy, Clayton	1.8
Jackson, Butts	1.3	Lovett, Laurens	0.8
Jakin, Early	1.2	Ludowici, Long	1.8
Jasper, Pickens	1.8	Lulu, Hall	1.0
Jefferson, Jackson	1.8	Lumber City, Telfair	2.3
Jeffersonville, Twiggs	3.1	Lumpkin, Stewart	1.0
Jenkinsburg, Butts	0.8	Luthersville, Meriwether	0.8
Jersey, Walton	0.8	Lyons, Toombs	3.2
Jesup, Wayne	6.0	McDonough, Henry	1.8
Jonesboro, Clayton	2.0	McIntyre, Wilkinson	0.8
Junction City, Talbot	3.1	McRae, Telfair	1.3
Keysville, Burke	0.8	Macon, Bibb	26.1
Kingsland, Camden	3.1	Madison, Morgan	3.1
Kite, Johnson	1.1	Manassas, Tattnall	0.8
La Grange, Troup	13.6	Manchester, Meriwether and Talbot	2.3
Lakeland, Lanier	3.0	Mansfield, Newton	1.0
Lake Park, Lowndes	0.8		



INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Marietta, Cobb	6.5	Mountain Park, Fulton	0.4
Marshallville, Macon	3.1	Mount Airy, Habersham	1.8
Martin, Stephens	0.8	Mount Vernon, Montgomery	2.5
Matthews, Jefferson	0.8	Mountville, Troup	0.6
Maxeys, Oglethorpe	2.4	Mount Zion, Carroll	3.1
Maysville, Banks, and Jackson	1.8	Mystic, Irwin	0.9
Meansville, Pike	1.8	Nahunta, Brantley	3.8
Meigs, Thomas, and Mitchell	1.8	Nashville, Berrien	3.1
Merrillville, Thomas	0.8	Naylor, Lowndes	0.9
Metasville, Wilkes	3.1	Newborn, Newton	1.8
Metcalf, Thomas	0.8	Newington, Screven	0.8
Metter, Candler	1.8	Newnan, Coweta	7.1
Middleton, Elbert	3.1	Newton, Baker	3.0
Midville, Burke	1.9	Nicholls, Coffee	1.5
Midway, Liberty	3.1	Norcross, Gwinnett	1.8
Milan, Dodge, and Telfair	0.8	Norman Park, Colquitt	3.1
Milledgeville, Baldwin	7.0	Normantown, Toombs	0.8
Millen, Jenkins	3.1	North Atlanta, DeKalb	7.5
Milner, Lamar	0.8	North High Shoals, Oconee	0.3
Mitchell, Glascock	1.5	Norwood, Warren	0.8
Modoc, Emanuel	1.8	Nunez, Emanuel	0.8
Molena, Pike	1.8	Oakfield, Worth	0.8
Monroe, Walton	9.6	Oak Park, Emanuel	0.8
Montezuma, Macon	4.5	Oakwood, Hall	0.3
Monticello, Jasper	1.8	Ochlochnee, Thomas	0.8
Montrose, Laurens	1.5	Ocilla, Irwin	1.9
Moreland, Coweta	0.8	Odessadale, Meriwether	0.3
Morgan, Calhoun	1.3	Odum, Wayne	2.2
Morrow, Clayton	2.0	Oglethorpe, Macon	1.8
Morven, Brooks	1.8	Ohoopee, Toombs	0.8
Moultrie, Colquitt	5.4	Oliver, Screven	0.8
Mountain City, Rabun	1.8	Omaha, Stewart	2.3
		Omega, Tift	0.8

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Orchard Hill, Spalding	0.2	Rebecca, Turner	0.8
Osierfield, Irwin	0.8	Reidsville, Tattnall	2.3
Oxford, Newton	1.8	Reno, Grady	0.8
Palmetto, Fulton, and Coweta	0.6	Rentz, Laurens	0.8
Parrott, Terrell	0.8	Rest Haven, Gwinnett	0.8
Patterson, Pierce	2.3	Reynolds, Taylor	1.3
Pavo, Thomas, and Brooks	1.8	Rhine, Dodge	0.8
Pearson, Atkinson	3.1	Riceboro, Liberty	3.1
Pelham, Mitchell	4.0	Richland, Stewart	1.2
Pembroke, Bryan	3.1	Riddleville, Washington	0.8
Pendergrass, Jackson	0.8	Rincon, Effingham	4.9
Penfield, Greene	3.1	Riverdale, Clayton	1.5
Pepperton, Butts	0.3	Roberta, Crawford	1.0
Perry, Houston	9.6	Rochelle, Wilcox	2.3
Piedmont, Lamar	3.1	Rocky Ford, Screven	1.2
Pinehurst, Dooly	1.0	Rocky Mount, Meriwether	0.3
Pine Lake, DeKalb	0.2	Roperville, Carroll	0.8
Pine Park, Grady	1.4	Roswell, Fulton	3.2
Pineview, Wilcox	1.2	Royston, Franklin	3.2
Pitts, Wilcox	0.8	Ruckersville, Elbert	0.8
Plainfield, Dodge	1.0	Russell, Barrow	0.8
Plains, Sumter	0.8	Rutledge, Morgan	3.1
Pocotalago, Madison	0.8	Saint Marks, Meriwether	0.2
Pooler, Chatham	0.8	Saint Marys, Camden	7.5
Portal, Bulloch	0.8	Sale City, Mitchell	1.8
Porterdale, Newton	1.6	Sandersville, Washington	7.1
Poulan, Worth	1.0	Sardis, Burke	0.5
Powder Springs, Cobb	0.5	Sasser, Terrell	0.8
Preston, Webster	2.1	Savannah, Chatham	14.6
Primrose, Meriwether	0.3	Savannah Beach, Chatham	14.6
Pulaski, Candler	0.8	Scotland, Telfair, and Wheeler	1.6
Quitman, Brooks	3.1	Screven, Wayne	0.8
Ray City, Berrien	1.8	Senoia, Coweta	1.8

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>
Seville, Wilcox	0.8	Sylvester, Worth	1.9
Shady Dale, Jasper	0.8	Talbotton, Talbot	3.1
Sharon, Taliaferro	0.8	Tallulah Falls, Rabun, and Habersham	3.1
Sharpsburg, Coweta	0.4	Talmo, Jackson	0.6
Shellman, Randolph	2.3	Tarrytown, Montgomery	0.8
Siloam, Green	1.2	Temple, Carroll	1.8
Silvertown, Upson	1.2	Tennille, Washington	1.3
Smithonia, Oglethorpe	3.0	The Rock, Upson	0.8
Smithville, Lee, and Sumter	2.1	Thomaston, Upson	3.1
Smyrna, Cobb	3.5	Thomasville, Thomas	4.3
Snellville, Gwinnett	3.1	Thomson, McDuffie	1.8
Social Circle, Walton	0.2	Thunderbolt, Chatham	4.0
Soperton, Treutlen	3.1	Tifton, Tift	15.0
Sparks, Cook	3.1	Tiger, Rabun	0.8
Sparta, Hancock	1.7	Tignall, Wilkes	3.1
Springfield, Effingham	1.1	Toccoa, Stephens	3.1
Springvale, Randolph	0.8	Toombsboro, Wilkinson	1.5
Stapleton, Jefferson	1.8	Turin, Coweta	0.8
Statesboro, Bulloch	3.2	Twin City, Emanuel	3.1
Statham, Barrow	3.1	Tyrone, Fayette	0.3
Stellaville, Jefferson	0.8	Ty Ty, Tift	0.8
Stillmore, Emanuel	3.1	Unadilla, Dooly	4.0
Stockbridge, Henry	1.8	Union City, Fulton	3.6
Stone Mountain, DeKalb	1.1	Union Point, Green	1.8
Sugar Hill, Gwinnett	1.8	Uvalda, Montgomery	1.8
Summertown, Emanuel	0.8	Valdosta, Lowndes	15.5
Sumner, Worth	1.0	Vanna, Hart	0.8
Sunny Side, Spalding	0.2	Vidalia, Toombs	7.0
Surrency, Appling	0.8	Vidette, Burke	0.8
Suwanee, Gwinnett	3.1	Vienna, Dooly	3.1
Swainsboro, Emanuel	3.1	Villa Rica, Carroll, and Douglas	7.1
Sycamore, Turner	1.0	Wadley, Jefferson	4.2
Sylvania, Screven	3.1		

# INCORPORATED CITIES AND TOWNS

<u>GEORGIA (Continued)</u>	<u>Area Sq.Mi.</u>	<u>NORTH CAROLINA</u>	<u>Area Sq.Mi.</u>
Walnut Grove, Walton	0.8	Cashiers, Jackson	2.9
Warm Springs, Meriwether	0.7	Highlands, Macon	2.3
Warner Robins, Houston	7.9	Rosman, Transylvania	0.3
Warrenton, Warren	1.8		
Warwick, Worth	0.8	<u>SOUTH CAROLINA</u>	
Washington, Wilkes	9.0	Abbeville, Abbeville	5.3
Watkinsville, Oconee	3.1	Aiken, Aiken	8.2
Waverly Hall, Harris	3.1	Allendale, Allendale	3.1
Waycross, Ware	8.6	Anderson, Anderson	17.0
Waynesboro, Burke	18.0	Appleton, Allendale	0.8
Wesley, Emanuel	0.8	Barnwell, Barnwell	7.1
Weston, Webster	4.1	Belton, Anderson	3.1
West Point, Troup	3.1	Brunson, Hampton	1.1
Whigham, Grady	1.0	Calhoun Falls, Abbeville	3.1
White Hall, Clark	1.8	Central, Pickens	2.0
White Plains, Green	2.4	Clemson, Pickens	2.4
White Sulphur Springs, Meriwether	0.6	Donalds, Abbeville	0.8
Willacoochee, Atkinson	3.1	Due West, Abbeville	1.7
Williamson, Pike	0.6	Easley, Pickens	6.0
Winder, Barrow	3.1	Edgefield, Edgefield	4.0
Winston, Douglas	0.5	Elko, Barnwell	1.0
Winterville, Clark	2.5	Estill, Hampton	3.2
Woodbine, Camden	1.7	Fairfax, Allendale	3.1
Woodbury, Meriwether	1.8	Furman, Hampton	3.1
Woodland, Talbot	0.8	Greenwood, Greenwood	13.0
Woodville, Green	4.9	Hardeeville, Jasper	3.5
Woolsey, Fayette	0.6	Hodges, Greenwood	0.8
Wrens, Jefferson	2.6	Honea Path, Abbeville and Anderson	3.1
Wrightsville, Johnson	1.8	Iva, Anderson	1.7
Yatesville, Upson	0.8	Jackson, Aiken	3.1
Zebulon, Pike	0.8	Johnston, Edgefield	1.0
		Kline, Barnwell	3.1
		Liberty, Pickens	2.2

# INCORPORATED CITIES AND TOWNS

<u>SOUTH CAROLINA (Continued)</u>	<u>Area Sq.Mi.</u>
Lowndesville, Abbeville	0.8
Luray, Hampton	0.8
McCormick, McCormick	3.2
Mount Carmel, McCormick	1.8
New Ellenton, Aiken	3.1
Ninety Six, Greenwood	1.6
Norris, Pickens	1.8
North Augusta, Aiken	6.2
Parksville, McCormick	0.8
Pelzer, Anderson	0.8
Pendleton, Anderson	3.1
Pickens, Pickens	3.1
Plum Branch, McCormick	0.3
Ridgeland, Jasper	2.0
Salem, Oconee	1.2
Scotia, Hampton	3.2
Seigling, Allendale	1.0
Seneca, Oconee	5.5
Six Mile, Pickens	0.8
Snelling, Hampton	0.3
Starr, Anderson	1.8
Sycamore, Allendale	3.1
Trenton, Edgefield	1.0
Troy, Greenwood	0.5
Ulmers, Allendale	0.8
Walhalla, Oconee	3.7
Westminster, Oconee	2.7
West Pelzer, Anderson	2.3
West Union, Oconee	1.0
Williamston, Anderson	3.1
Williston, Barnwell	9.0

Section B

Mineral Resources Review

### Acknowledgments

The writer wishes to acknowledge the help extended by the various agencies of both State and Federal governments. Statistics quoted in this report were obtained from publications of the U. S. Bureau of Mines. Through 1958, these were from the Minerals Yearbook. The summary chapter for each state in the Yearbook is written in cooperation with the respective state agencies which are responsible for mineral and geological information.

Each of the states furnished pertinent publications and information necessary for background. Georgia Institute of Technology is obviously more familiar with the resources of Georgia than of the other states. Prior to this report, Georgia Institute of Technology had indexed by county and commodity a bibliography of the geological literature for the State of Georgia, prepared by Dr. James Lester and Dr. A. T. Allen, Jr., of Emory University, who have reserved publication rights to the bibliography. The index of the literature has been particularly helpful in furnishing background for the State of Georgia. The various issues of The Georgia Mineral Newsletter and the Directory of Georgia Mineral Producers, both published by the Georgia Department of Mines, Mining and Geology, have also been of considerable help, both for obtaining background knowledge and for pinpointing specific mineral producing industries.

Dr. Walter Jones of the Alabama Geological Survey, Dr. Robert O. Vernon of the Florida Geological Survey, Dr. Jasper Stuckey of the North Carolina Geological Survey, and Dr. Henry S. Johnson, Jr. of the South Carolina Development Board, furnished helpful information.

The U. S. Bureau of Mines has been most cooperative in furnishing compilations of statistics and other useful information as requested. The U. S. Geological Survey has furnished lists of its open-file reports and other information as requested.



## MINERAL RESOURCES REVIEW<sup>\*</sup>

### Summary and Recommendations

Information is available on the general geology of the study area and on a number of its mineral resources. The detailed specific data, however, required for full exploration and utilization of the area's mineral resources are not available. One of the major difficulties is the lack of published detailed geological maps. A prime reason is the absence of recent topographic maps on which to base geological mapping, water studies, and industrial feasibility studies.

The first major recommendation is that emphasis be placed on making as complete, modern, and large scale topographic maps as possible for the study area. It was estimated in 1959 that it would cost approximately \$5,000,000 for the State of Georgia to complete its topographic mapping with 7.5-minute quadrangles. Half of this cost, however, would be borne by the Federal government if matching State funds are furnished. The study area in Alabama is almost totally devoid of recent topographic maps. The area in Florida lacks topographic maps in its middle section, but is better off than any other state within the study area. South Carolina has a few maps near the coast, but needs others. The smaller area covered in North Carolina would not be difficult to secure.

It would be part of this recommendation that the U. S. Study Commission and the leaders of Georgia support with vigor the efforts of the State Department of Mines, Mining and Geology to secure proper topographic coverage of the State of Georgia, which is in poor condition with respect

---

<sup>\*</sup> By John E. Husted, Georgia Institute of Technology, Engineering Experiment Station.

to this type of mapping. Alabama is equally deficient, but the area covered by the Study Commission is not nearly as great. Strong public support and the support of the Commission should be given Alabama, as well as the rest of the areas, to secure total topographic coverage.

The second recommendation is that, following the topographic coverage, both the public and the Commission should continue with vigorous support of the state geologic agencies in order that detailed mapping and publishing of the geology and mineral resources be accomplished. If the above two things can be done, the mineral economy of the study area should flourish and be in position to help raise the total economy.

The history of the appropriations for geological and mineral work by the state governments, with the possible exception of Florida, is one of too little and too late. Each of the state agencies currently and in the past has had able and intelligent leadership but has had its hands tied by lack of funds. Until this hindering effect is understood in relation to each state's economy, it is probable that little will be done about increasing appropriations for geologic activities.

Until the basic information concerning the minerals of the study area is supplied, the proper coordination and long-term recommendations and predictions cannot be made except in the broadest of terms. Present knowledge, however, dictates that the mineral economy be planned around the non-metallic resources.

Recommendations concerning specific commodities and their ultimate utilization are as follows:

(1) Kaolin. The dollar value of kaolin is probably the largest of any commodity in the study area. In addition, in terms of its national significance within the framework of the commodity classification, it ranges

higher than any other material, being in excess of 75 per cent of total national production. Despite this, uses of kaolin in the ceramics industry are not found in the study area. The Georgia Institute of Technology's Industrial Development Branch has made a market study which points up the feasibility of a sanitary ware plant in Georgia. Reports such as these should be followed up in order that manufacturers of products which find their principal suppliers of raw material in the Southeast may include the Southeast in any future expansion plans. Of the mineral products produced in the Southeast, kaolin is the principal one enjoying a national market.

(2) Crushed Stone. The largest tonnage volume of any material produced in the area is crushed stone. The market for crushed stone, however, is essentially local and, at best, regional. As discussed under crushed granite, a more nearly regional market is enjoyed by this material because of its absence in south Georgia and Florida. As construction (including highway, airport, bridge and industrial) increases, the need for crushed stone will also increase. As the network of national highways is built and extended, an enormous amount of crushed stone will be necessary. This has not escaped the attention of crushed stone operators. To recommend crushed stone expansion, therefore, puts one in the difficult position of trailing the highly competitive efforts of those already in the field. A word of caution concerning over-expansion may be necessary.

(3) Limestone. Limestone in southwest Georgia is being studied. Additional studies may be projected for other parts of the Coastal Plain in the study area. As the area expands industrially and as requirements for new highways grow, there will also be need for new cement or concrete products plants. The results of such studies as are now being made should

be publicized in relation to the present and potential markets for such material. This may be a potentially expanding industry for the area. Lime, another product of limestone, uses only a very high-grade or nearly pure limestone. Generally, this is not known to be available in the study area. Some lime is being made from seashells. Lime of high purity, however, may be discovered through current and projected field work. There also exists the possibility of a high grade limestone being brought to a port within the study area where it can be made into lime. Current markets for lime in the study area have been slowly decreasing because one of the major users, paper plants, have been recovering lime from their operations in sufficient quantities to reduce drastically their purchases. The possibility of using lime in combination with other materials in highway soil and base stabilization is a projected use in the study area that could consume very large amounts of lime. This certainly should be considered in the future economy of the area.

(4) Iron Ore. Iron ore has been sufficiently discussed and is not looked upon as being greatly important in the future of the economy because of the relatively limited amount of ore.

(5) Petroleum. Petroleum may add significantly to the economy of the area, provided that (a) it is discovered and (b) refineries are introduced in the study area.

(6) Sand and Gravel. Sand and gravel, although produced in 41 counties in the study area, are essentially local products and probably will continue to be so.

## Introduction

The study area has two distinct geologic provinces, separated by the Fall Line. North of the Fall Line are found crystalline rocks, both metamorphic and igneous. Among the igneous rocks are granites, pegmatites, and diabases. The metamorphic rocks consist of a variety of gneisses, schists, phyllites, meta-sediments, and meta-volcanics.

South of the Fall Line, rocks composed of Cretaceous age sediments or younger are found at the surface. Included are clays, limestones, sandstones, and shales.

Both in terms of dollars and tonnage reserves the non-metallic or industrial minerals far exceed the metallic production or potential of the study area. It will be noted that sources of exotic metals and materials, such as beryllium metal, and titanium metal, are known to exist within the area. Nevertheless, prosaic and common materials, such as clay, stone, and cement, rule the mineral economy.

Petroleum is produced in Escambia County, Alabama. At the time of this writing there is considerable activity in leasing and exploration in Georgia and South Carolina, but only two new-well sites have been announced. Oil may be present in other parts of the Coastal Plain of the study area, but until produced it can only be treated as a potential.

The discussion which follows on the different commodities will be a broad statement of the commodity, including its current production status and the factors which may affect its growth and the growth of the area. The contribution that these mineral resources may make to the economy and to industrial expansion will be pointed out. The commodities will be discussed in alphabetical order, first by metals and then by non-metallic minerals

for those materials currently being produced and for which statistics may be obtained. A listing of materials not being produced follows.

A summary table of mineral commodities produced in the study area, showing available production data by counties, is presented in Table 1.

TABLE I\*

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

ALABAMA					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
1	Baldwin (Area 8)	Clays	1958	--	6,000
			1957	4,000	4,400
			1956	--	5,200
			1955	--	5,591
			1954	--	#
			1953	--	#
			1952	--	#
		Sand & Gravel	1958	--	--
			1957	--	--
			1956	--	9,700
			1955	--	9,720
			1954	--	--
			1953	--	--
			1952	--	--
2	Barbour (Areas 7-8)	Bauxite	1958	--	#
		Iron Ore	1958	102,098	24,170
			1957	--	#
			1956	--	63,840
			1955	--	--
			1954	--	--
			1953	--	--
3	Bullock (Areas 7-8)	Sand & Gravel	1952	625	1,250

\*

## KEY TO SYMBOLS

-- No information available for this period

# Commodity being produced, but tonnage data not available.

Source: U. S. Bureau of Mines, Minerals Yearbook, 1952-59.

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

ALABAMA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)*	Weight (Short Tons)
4	Butler (Area 7)	Iron Ore	1958	453,771	83,171
			1957	1,370,310	247,000
			1956	253,677	41,861
			1955	--	#
			1954	409,006	66,530
			1953	404,000	71,700
			1952	15,065	2,719
5	Conecuh (Area 8)	Cement	1958	--	#
		Iron Ore	1958	--	#
			1957	--	#
6	Covington (Area 8)	Sand & Gravel	1958	--	--
			1957	5,500	11,000
			1956	67,500	121,000
			1955	--	--
			1954	15,000	40,000
			1953	18,300	32,200
			1952	--	--
7	Crenshaw (Area 8)	Iron Ore	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	New Plant
			1953	--	--
			1952	--	--
8	Dale (Area 8)	Sand & Gravel	1952	23,200	54,000
9	Escambia (Area 8)	Clays	1958	--	20,800
			1957	--	11,500
			1956	--	800
			1955	--	12,000
			1954	11,400	11,500
			1953	--	#
			1952	--	#



TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

ALABAMA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
9	Escambia (Area 8) (Cont'd)	Sand & Gravel	1958	--	#
			1957	--	55,000
			1956	--	--
			1955	--	128,000
			1954	--	--
			1953	--	--
			1952	--	--
10	Henry (Areas 7-8)	Lime- stone Cement	1958	24,000	--
		Sand & Gravel	1958	--	--
			1957	--	--
			1956	63,024	54,000
11	Houston (Areas 7-8)	Sand & Gravel	1958	--	#
		Brick Clay	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	--	--
			1953	--	#
			1952	--	#
12	Macon (Area 8)	Sand & Gravel	1958	69,566	#
			1957	59,601	47,000
			1956	56,348	50,000
			1955	104,718	103,000
			1954	106,669	107,800
			1953	--	#
			1952	--	#
13	Monroe (Area 8)	Sand & Gravel	1958	17,000	#
			1957	13,145	14,200
			1956	4,930	6,000

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

ALABAMA (Continued)					
13	Monroe (Area 8) (Cont'd)	Sand & Gravel (Cont'd)	1955 1954 1953 1952	5,450 -- -- --	5,800 # -- --
14	Montgomery (Area 8)	Clays	1958 1957 1956 1955 1954 1953 1952	-- -- -- -- 151,200 -- --	# # # # 152,700 # #
		Sand & Gravel	1958 1957 1956 1955 1954 1953 1952	-- -- -- -- -- -- --	# # # # # # #
15	Pike (Area 8)	Iron Ore	1958 1957 1956 1955 1954 1953 1952	1,115,545 749,341 552,041 402,725 574,800 52,000 --	# # # 96,200 117,800 10,700 --
		Sand & Gravel	1958 1957 1956 1955 1954 1953 1952	-- -- -- -- -- -- --	-- -- 54,000 -- -- -- --
16	Randolph (Area 7)	Mica	1958 1957 1956 1955 1954 1953 1952	-- -- -- -- -- -- --	# # # # # # #

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

ALABAMA (Concluded)					
<u>County No.</u>	<u>Counties in Study Area</u>	<u>Mineral</u>	<u>Year</u>	<u>Value (Dollars)</u>	<u>Weight (Short Tons)</u>
17	Russell (Area 7)	Clays	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	263,000
			1954	--	#
			1953	186,300	171,500
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

FLORIDA					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
1	Alachua (Area 5)	Lime- stone	1958	676,999	#
			1957	--	#
			1956	682,276	696,000
			1955	--	#
			1954	369,000	376,000
			1953	297,500	266,300
			1952	538,211	490,332
2	Bay (Area 7 - 8)	Sand & Gravel	1958	84,468	#
			1957	39,319	73,000
			1956	--	#
			1955	26,139	#
			1954	--	#
			1953	8,250	14,520
			1952	--	#
3	Columbia (Area 5)	Phosphate	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
4	Duval (Area 4)	Oyster Shell	1958	511,000	41,000
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
5	Escambia (Area 8)	Sand & Gravel	1958	303,351	#
			1957	265,944	131,000
			1956	282,500	--
			1955	--	--
			1954	300,000	--
			1953	262,000	289,000
			1952	171,820	180,870

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

FLORIDA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
5	Escambia (Area 8) (Cont'd)	Clays	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	22,000	24,000
			1953	--	--
			1952	--	--
6	Gadsden (Area 7)	Clays	1958	--	#
			1957	--	--
			1956	--	8,700
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Sand & Gravel	1958	--	#
			1957	--	--
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	#
		Fuller's Earth	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
7	Gilchrist (Area 5)	Phosphate	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

FLORIDA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
8	Jackson (Area 7 - 8)	Lime-stone	1958	--	#
			1957	--	#
			1956	7,256	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
9	Layfayette (Areas 5 - 6)	Sand & Gravel	1958	20,307	25,000
			1957	25,869	37,000
			1956	--	27,000
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Lime-stone	1958	59,000	59,000
			1957	169,000	170,000
			1956	--	172,000
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
10	Leon (Area 6)	Sand & Gravel	1958	--	#
			1957	52,209	#
			1956	58,918	60,000
			1955	--	#
			1954	33,000	#
			1953	--	--
			1952	--	--
11	Levy (Area 5)	Lime-stone	1958	1,156,346	1,091,004
			1957	1,305,721	1,054,541
			1956	1,218,820	947,521
			1955	958,230	756,964
			1954	--	#
			1953	651,311	320,415
			1952	684,073	400,453

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

FLORIDA (Concluded)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
12	Suwannee	Lime- stone	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	143,628	#
			1953	--	#
			1952	--	#
13	Walton (Area 8)	Clays	1954	--	#
		Lime- stone	1958	--	#
14	Washington (Areas 7 - 8)	Sand & Gravel	1958	--	--
			1957	6,267	10,100
			1956	26,000	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
		Peat	1958	--	--
			1957	--	#
			1956		
			1955		
			1954		
			1953		
			1952		

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
1	Atkinson (Areas 4 - 5)	Sand & Gravel	1954	--	#
2	Baldwin (Area 3)	Kaolin	1958	--	--
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
3	Bibb (Area 3)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	175,000	155,000
			1953	75,000	128,000
			1952	--	#
		Clay	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Fuller's Earth	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	--	--
			1953	--	#
			1952	--	#



TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
4	Brooks (Areas 5 - 6)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	38,190	#
			1955	61,750	#
			1954	--	--
			1953	--	--
			1952	--	--
5	Butts (Area 3)	Mica (Type Unknown)	1957	--	#
6	Charlton (Areas 4 - 5)	Peat	1957	--	475 #
			1956	--	
7	Chatham (Areas 1 - 2)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Gypsum	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
8	Clayton (Areas 2 & 7)	Granite	1958	--	#
		Sand & Gravel	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	--	--
			1953	16,200	8,700
			1952	17,475	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
9	Cobb (Area 7)	Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Sand & Gravel	1958	--	--
			1957	--	--
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	#
10	Colquitt (Areas 5 - 6)	Sand & Gravel	1958	--	--
			1957	24,000	#
			1956	20,000	#
			1955	--	--
			1954	--	--
			1953	--	#
			1952	--	#
11	Columbia (Area 5)	Clay	1958	--	#
			1957	--	--
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	--
		Shale	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	--	--
			1953	--	#
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTIONS IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
12	Crawford (Areas 3 & 7)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	448,600
			1952	--	#
		Clay	1958	--	--
			1957	--	--
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Mica (Type Unknown)	Mined in 1958 - no figures available		
13	Dawson (Area 7)	Sand & Gravel	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--
14	Decatur (Areas 6 - 7)	Fuller's Earth	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTIONS IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
15	DeKalb (Areas 3 & 7)	Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	3,839,858	#
			1954	3,981,078	#
			1953	3,199,583	#
			1952	3,100,140	#
16	Dougherty (Area 7)	Sand & Gravel	1958	--	#
			1957	88,645	#
			1956	122,019	#
			1955	123,268	#
			1954	119,000	#
			1953	--	#
			1952	--	#
17	Douglas (Area 7)	Sand & Gravel	1958	--	#
		Granite	1958	--	#
			1957	--	#
18	Effingham (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	236,926	#
			1954	--	#
			1953	--	#
			1952	--	#
19	Elbert (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	--
			1953	--	--
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
19	Elbert (Area 1) (Cont'd)	Granite	1958	#	#
			1957	1,500,000	54,000
			1956	1,400,000	40,000
			1955	1,400,000	38,000
			1954	1,600,000	43,000
			1953	1,279,720	39,200
			1952	1,281,468	44,844
		Mica (Both Types)	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--
20	Evans (Area 2)	Sand & Gravel	1958	4,434	#
			1957	10,194	#
			1956	6,370	#
			1955	3,850	#
			1954	--	#
			1953	--	--
			1952	--	--
21	Fayette (Area 7)	Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
22	Franklin (Area 1)	Sheet	1954	--	#
		Mica	1953	--	#
			1952	--	#
		Sand & Gravel	1954	--	--
			1953	--	--
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
23	Fulton (Areas 3 & 7)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Clay	1958	--	#
			1957	--	--
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
24	Glasscock (Areas 1 & 2)	Kaolin	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	#
			1953	--	#
			1952	--	#
25	Glynn (Areas 3 & 4)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	--
			1953	--	--
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
26	Grady (Areas 6 & 7)	Fuller's Earth	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
27	Greene (Areas 1, 2 & 3)	Mica (Scrap)	1955	--	--
			1954	--	#
		Feldspar	1955	--	--
			1954	--	#
28	Gwinnett (Areas 3 & 7)	Granite	1958	--	#
			1957	--	#
			1956	197,093	#
			1955	134,750	108,000
			1954	134,083	107,000
			1953	122,500	102,000
			1952	500	#
29	Hall (Areas 1, 3 & 7)	Granite	1954	--	--
			1953	--	#
			1952	--	#
		Mica (Sheet)	1954	--	#
			1953	--	#
			1952	--	#
30	Hancock (Areas 2 & 3)	Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	266,586	191,000
			1953	369,321	#
			1952	314,189	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
31	Hart (Area 1)	Mica (Sheet & Scrap)	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
32	Henry (Area 1)	Granite	1958	--	#
			1957	--	#
			1956	1,445,443	#
			1955	--	#
			1954	--	#
			1953	1,216,984	#
			1952	1,115,265	#
33	Houston (Areas 3 & 7)	Cement Lime- stone	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
34	Jasper (Area 3)	Beryl	1955	--	#
		Quartz	1957	--	#
			1956	--	#
		Mica (Sheet & Scrap)	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	#
		Sandstone	1958	--	#



TABLE I (Continued)

REPORTED MINERAL PRODUCTIONS IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
34	Jasper (Area 3) (Cont'd)	Feldspar	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--
35	Jefferson (Areas 1 & 2)	Fuller's Earth	1958	246,791	#
			1957	136,800	#
			1956	19,475	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
36	Jones (Area 3)	Granite	1958	--	#
			1957	--	--
			1956	--	--
			1955	--	#( $\frac{1}{2}$ yr.)
			1954	23,000	11,500
			1953	--	--
			1952	--	--
37	Lamar (Areas 3 & 7)	Mica (Sheet)	1955	--	#
			1954	--	#
			1953	--	#
38	Long (Areas 2 & 3)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
39	Lowndes (Area 5)	Peat	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTIONS IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
40	Macon (Area 7)	Bauxite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Mica (Sheet)	1958		
			1957	--	#
			1956		
			1955		
			1954		
			1953		
			1952		
41	Madison (Areas 1 & 3)	Granite	1958	--	#
			1957	449,994	#
			1956	479,049	#
			1955	413,337	#
			1954	345,900	#
			1953	--	#
			1952	--	#
		Mica (Sheet & Scrap)	1958		
			1957		
			1956		
			1955		
			1954		
			1953		
			1952	--	#
42	Meriwether (Area 7)	Asbestos	1952	--	#
43	Mitchell (Areas 6 & 7)	Lime- stone	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	--
			1954	17,544	10,000
			1953	--	--
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
44	Monroe (Areas 3 & 7)	Mica (Sheet)	1958	--	#
			1957	3,402	#
			1956	--	#
			1955	--	#
			1954	21,640	#
			1953	--	#
			1952	--	#
45	Montgomery (Area 3)	Sand & Gravel	1958	--	#
			1957	--	--
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--
46	Muscogee (Area 7)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
47	Oconee (Area 3)	Mica (Sheet)	1958	--	--
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	#
			1953	1,900	.09
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
48	Oglethorpe (Areas 1 & 3)	Granite	1958	557,544	22,792
			1957	608,192	23,695
			1956	630,121	22,266
			1955	558,627	23,300
			1954	766,392	22,000
			1953	533,385	22,500
			1952	368,655	17,265
49	Pike (Area 7)	Mica (Sheet & Scrap)	1958	29	#
			1957	--	#
			1956	2,421	#
			1955	--	#
			1954	--	--
			1953	--	--
			1952	--	--
50	Quitman (Area 7)	Iron Ore	1954	--	#
51	Rabun (Area 1)	Sand & Gravel	1958	--	--
			1957	3,750	#
			1956	--	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
		Asbestos	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	--
			1954	--	#
			1953	--	#
			1952	--	#
52	Randolph (Area 7)	Lime- stone	1952	12,250	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
53	Richmond (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Kaolin	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	519,000	842,000
			1952	--	#
		Clay	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Granite	1953	1,505,000	961,900
			1952	--	#
		Quartzite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--
54	Screven (Areas 1 & 2)	Peat	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
55	Spalding (Areas 3 & 7)	Sand & Gravel	1958	--	#
		Mica (Sheet)	1958	--	#
			1954	--	#
56	Stephens (Area 1)	Granite	1955	51,869	#
			1954	78,831	43,000
			1953	--	#
57	Stewart (Area 7)	Iron Ore	1958	--	#
			1957	--	#
			1956	277,427	55,000
58	Sumter (Area 7)	Sand & Gravel	1955	35,000	70,000
			Bauxite		
			1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
59	Talbot (Area 7)	Sand & Gravel	1958	--	#
			1957	224,245	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
60	Taylor (Area 7)	Sand & Gravel	1958	77,937	#
			1957	60,750	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTIONS IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
60	Taylor (Area 7) (Cont'd)	Kaolin	1958		
			1957		
			1956		
			1955		
			1954		
			1953		
			1952	--	#
61	Telfair (Area 3)	Sand & Gravel	1956	--	#
			1955	--	#
			1954	--	#
62	Thomas (Areas 5 & 6)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	17,650	1,765
		Clay	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Fuller's Earth	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	--
63	Tombs (Area 3)	Sand & Gravel	1955	2,250	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
64	Towns (Areas 1 & 7)	Corundum	1958	100	#
			1957	10	#
			1956	50	#
65	Troup (Area 7)	Beryl	1958	--	--
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	--
			1953	--	--
			1952	--	#
		Quartz	1958		
			1957		
			1956	--	#
			1955		
			1954		
			1953		
			1952		
66	Turner (Areas 5 & 7)	Sand & Gravel	1953	--	#
67	Twiggs	Clay	1958	--	#
			1957	17,213,584	916,772
			1956	16,365,323	926,931
			1955	14,331,993	848,565
			1954	12,543,077	750,411
			1953	--	476,051
			1952	7,487,877	521,077
		Fuller's Earth	1958	--	#
			1957		
			1956		
			1955		
			1954		
			1953		
			1952		



TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
68	Upson (Area 7)	Mica (Sheet & Scrap)	1958	8,710	#
			1957	133,316	#
			1956	134,515	#
			1955	--	#
			1954	77,495	#
			1953	37,900	#
			1952	--	#
69	Ware (Areas 5 & 4)	Sand & Gravel	1958	--	#
			1957	41,341	#
			1956	22,324	#
			1955	26,074	#
			1954	--	#
			1953	--	--
			1952	--	--
70	Warren (Areas 1 & 2)	Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
71	Washington (Areas 2 & 3)	Clay	1958	7,148,097	#
			1957	4,739,856	258,153
			1956	5,344,238	316,296
			1955	4,543,775	282,411
			1954	3,162,386	264,195
			1953	3,717,204	265,532
			1952	4,069,357	259,977
72	Wayne (Areas 3 & 4)	Sand & Gravel	1955	--	#
73	Webster (Area 7)	Iron Ore	1958	134,112	#
			1957	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

GEORGIA (Concluded)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
74	White (Area 7)	Sand & Gravel	1952	--	#
75	Wilkinson (Area 3)	Clay	1958	4,575,024	#
			1957	5,620,704	344,089
			1956	4,525,537	310,528
			1955	4,235,741	290,520
			1954	3,692,143	241,198
			1953	3,717,204	269,129
			1952	6,639,300	435,528

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

NORTH CAROLINA					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
1	Clay (Area 1)	Sand & Gravel	1958	24,500	24,000
			1954	--	41,500
2	Jackson (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	#
			1954	--	143,000
			1953	62,500	125,000
			1952	--	--
		Olivine	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Stone	1955	--	#
		Feldspar	1953	--	#
		Mica (Sheet)	1958	--	#
			1957	--	#
			1956	--	151
			1955	--	--
			1954	--	#
			1953	51,645	10
			1952	38,711	0.6
		Mica (Scrap)	1954	--	#
		Granite	1958	--	#
			1957		
			1956		
			1955		
			1954		
			1953		
			1952		

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

NORTH CAROLINA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
3	Macon (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	3,400
			1955	242,800	244,500
			1954	--	100,000
			1953	--	--
			1952	--	--
		Granite	1958	--	#
			1957	--	#
			1956	--	9.2
			1955	377,000	9
			1954	279,600	40.2
			1953	--	#
			1952	--	#
		Mica (Sheet)	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	325
			1954	--	#
			1953	--	#
			1952	--	#
		Mica (Scrap)	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	325
			1954	--	#
			1953	--	#
			1952	--	#
4	Transylvania (Area 1)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	#
			1954	--	--
			1953	--	--
			1952	--	--
		Mica (Sheet)	1958	--	#
			1957	--	#
			1956	170	.01
			1955	816	.03
			1954	--	#
			1953	--	--
			1952	--	#

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

NORTH CAROLINA (Concluded)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
4	Transylvania (Area 1) (Cont'd)	Granite	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	--
			1954	--	10,000
			1953	27,750	18,500
			1952	--	--
		Asbestos	1958	--	#
			1957	--	#
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

SOUTH CAROLINA					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
1	Abbeville (Area 1)	Mica (Sheet)	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
2	Aiken (Area 1)	Sand & Gravel	1958	--	--
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Clay	1958	--	--
			1957	--	--
			1956	--	--
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
		Shale	1956	--	#
		Kaolin	1958	4,582,000	344,000
			1957	4,573,232	346,925
			1956	4,667,001	370,858
			1955	4,575,877	356,911
			1954	4,000,576	339,490
			1953	4,213,431	327,594
			1952	4,034,048	311,512
3	Anderson (Area 1)	Mica (Sheet)	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	--
			1952	--	--

TABLE I (Continued)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

SOUTH CAROLINA (Continued)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
3	Anderson (Area 1) (Cont'd)	Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	7,095
			1953	552	5,520
			1952	--	--
4	Greenwood (Area 1)	Clay	1958	--	#
			1957	83,000	83,000
			1956	27,186	101,000
			1955	27,000	100,000
			1954	84,000	63,000
			1953	49,662	65,000
			1952	52,956	69,275
		Sand & Gravel	1954	6,750	5,000
		Shale	1958	--	#
			1957		
			1956		
			1955		
			1954		
			1953		
			1952	--	#
5	Jasper (Area 1)	Sand & Gravel	1958	--	--
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	--

TABLE I (Concluded)

REPORTED MINERAL PRODUCTION IN THE SOUTHEAST RIVER BASINS AREA  
BY STATE, COUNTY, AND COMMODITY, 1952 - 1958

SOUTH CAROLINA (Concluded)					
County No.	Counties in Study Area	Mineral	Year	Value (Dollars)	Weight (Short Tons)
6	Oconee (Area 1)	Mica (Sheet)	1958	--	#
			1957	--	#
			1956	--	#
			1955	1,067	.043
			1954	--	#
			1953	--	--
			1952	--	--
		Granite	1958	--	#
		Sand & Gravel	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	--
			1954	--	9,000
			1953	500	4,956
			1952	--	--
7	Pickens (Area 1)	Sand & Gravel	1957	--	#
			1953	129	858
		Mica (Sheet)	1957	--	#
		Granite	1958	--	#
			1957	--	#
			1956	--	#
			1955	--	#
			1954	--	#
			1953	--	#
			1952	--	#
8	Saluda (Area 1)	Mica (Scrap)	1956	--	#
			1955	--	#



## Metals

Metals, with the exception of iron, are sparse in the study area. Sources of some of the rarer and sometimes exotic metals have been found, but there is no commercial production. Competition from much higher grade sources in other areas reduce the possibility of their use.

The few metals summarized below, although occupying a minor position in the overall economy, could assume significance under proper circumstances. Where statistics are available, they have been used, but unfortunately, reserve figures are practically nonexistent for all the metals in the study area. The discussion of both metals and nonmetals is arranged alphabetically by subject.

### Bauxite

Bauxite, an ore of aluminum, is found scattered along the Coastal Plain of Alabama, Georgia and South Carolina, being for the most part not too distant from the Fall Line. Many of the clays in this area are between a kaolin and a bauxite, i.e., high-alumina clays. Production in 1958, as listed by the U. S. Bureau of Mines, was from Barbour county, Alabama and Macon and Sumter counties, Georgia. No amounts or values were given because of the limited number of operations. Most of this production is in the drainage system of the Chattahoochee River. The process of lateritization which causes the bauxite to be formed may also account in part for the production of some iron ores in similar stratigraphic positions in the southeast. It does not preclude the possibility of finding bauxite in the Cretaceous or Eocene rocks northeast of the area of production. Reserve figures are not

available.<sup>1/</sup> It is questionable, however, if sufficient bauxite will be found to support an aluminum producing plant by currently used methods. In addition, the electric power rates are not conducive to the establishment of an aluminum producing plant. Methods of direct reduction of aluminum clays have been rumored and the production of  $Al_2O_3$  from clays is being done; however, it is not considered economic at present for this area because of the cost of electricity.

### Beryllium

Most beryllium is found naturally in the form of the mineral beryl. Beryl is found in pegmatites and hence in crystalline rocks. Historically and currently beryl has been produced principally by hand-cobbing. This is both expensive and time-consuming and does not lend itself to large tonnages. Further, the number of beryl-containing pegmatites with economic concentrations is relatively low. Georgia produced beryl in 1958, but the amount and value are not available. A very excellent and detailed listing of beryl occurrences in Georgia has recently been published by Dr. A. S. Furcron.<sup>2/</sup>

The emphasis on beryllium as a metal is recent. This interest lies in the combination of light weight with high-strength. Unfortunately, two technical difficulties have obstructed its progress: a high toxicity that requires special working conditions to prevent the poisoning of workers;

---

<sup>1/</sup> Estimates made in 1941 by J. R. Thonen and E. E. Burckard (Bauxite Resources of the United States) placed reserves in Georgia at over 1,000,000 long tons in Quitman, Randolph, Stewart, Schley, Macon, Sumter, Wilkinson, Baldwin, Twiggs and Washington counties. Floyl County, Georgia is the site of the initial discovery of bauxite in this country. A small deposit was worked in Pine Mt. in Meriwether County in 1915-17.

<sup>2/</sup> Furcron, A. S., "Beryl in Georgia." Georgia Mineral Newsletter, Winter 1959, v. XII, no. 3, p. 91-95.

and the brittleness of the metal. The first of these conditions is being met by extensive safety precautions, which, unfortunately, raise the cost of producing objects from this light-weight metal. The second of these objections is being attacked by research to produce alloys that will reduce brittleness. The success of these attempts is classified information, as the chief interest in the metal has been expressed by the military services. Historically and currently beryllium or its compounds have been used in alloys with copper and other metals where beryllium is in minor amounts, in X-ray windows and as a deoxidizing agent with some molten metals.

As indicated above, another problem in the production of beryllium metal is finding adequate and economically producible raw materials. The recently invented beryllometer<sup>1/</sup>, which utilizes radiation, could be an excellent means of prospecting for beryl except for the limitations of the equipment which include:

- (1) The instrument is too heavy and bulky to be carried along at all times on routine reconnaissance.
- (2) "The effective depth of rock penetration is less than 2 inches and effective terrance clearance, in ordinary use, is less than 1 inch, so that tests must be made directly on exposures with little or no overburden, and static tests must be made instead of continuous scanning."

Of the objections, the latter is the more serious. With the perfection of this and possibly other means of prospecting for beryllium materials, the crystalline areas of Georgia may well be a source of the metal in the future. It is also suggested that, since the pegmatites of the crystallines

---

<sup>1/</sup>The Gamma Ray-Neutron Beryllium Detector as a Reconnaissance Tool, 1960. Louis and Pauline Moyd, Preprint, A.I.M.E. National Meeting, New York City, 1960.

contain beryl, a study of the sediments (clays, etc.) derived from these crystallines should be made with such an instrument as the berylometer.

Caution should be expressed that since the demand for beryllium metal is currently a military demand, changes in specifications could eliminate such a demand in a very short period of time as has been the case with titanium.

### Gold

Historically, the center of the gold area in Georgia has been in Lumpkin County near Dahlonega. Gold still exists in this area, evidenced by the production of a sufficient amount to cover the capitol dome of the Georgia State Capitol in 1959. Millions of dollars worth of gold have been mined from the area but the concentration of gold in the area and its fixed price have combined to close the operations. It should be noted that whereas the price of gold in the United States has not changed since 1933, this cannot be said of any other commodity. The costs of wages, machinery, and transportation have risen sharply in this span of history. The chief attraction of gold in the area now is for tourists, and panning gold has been made a tourist attraction. A small amount of gold was produced in 1953 from Gwinnett County, Georgia.

### Iron Ore

Iron ore in the study area is of importance in Alabama, in Butler, Pike and Crenshaw counties and less so in Barbour and Conecuh counties. Most of this production is in the Escambia-Conecuh River basins. Butler and Pike counties are by far the most important in terms of production. The iron ore produced in these counties is socalled "brown" iron ore or

limonite<sup>1/</sup>. Pallister is quoted as follows: "The analyses of iron ore from many of these deposits showed metallic iron from 50 to 57 percent... Real interest in south Alabama brown iron ores began to develop in 1953 when several small operators came into the district. As a result of a favorable market for a high quality product, seven or eight log washing plants have been erected... Although these south Alabama brown iron ore deposits do not represent a large tonnage when compared with other deposits in the state, the high quality of the shipping ores are of value when required and the total tonnage from the area will probably exceed the estimates of the Geological Survey of Alabama."

In the Chattahoochee River basin, iron ore of a similar nature is mined in Stewart and Webster counties, Georgia. Iron has been reported elsewhere, but not in commercial amounts. Amounts of reserves are unknown.

The trend in the production of iron ore for blast furnace feed is towards pelletization. Pelletization is presently concentrated in the Great Lakes region and grew out of the necessity of sintering the beneficiated taconite from the Lake Superior region. Pellets from that region have an iron content of between 60 and 65 per cent. Because of the uniformity of composition and of size, they make an ideal blast furnace feed. Further, it is reported that the cost of producing from iron in the blast furnace may be reduced by as much as 20 per cent. Another trend in pelletization is in the use of the self-fluxing pellet. The iron ore is sintered with the proper amount of limestone to flux.

The penetration of the pelletized ore in the domestic market is increasing and may well result in the eventual necessity of pelletizing all blast furnace feeds, particularly if it results in a lower cost of

---

<sup>1/</sup>Pallister, Hugh D., Brown Ore in South Alabama, Alabama Acad. Sci., Journal, December 1954, v. 26, p. 33-34.

product. If this trend should continue in the Birmingham area, it will of necessity require a different handling of the brown ores. At the same time, it may allow the utilization of some ores not currently used and the discarding of others. This would depend upon their ability to form a suitable pellet under economical conditions or to be used by other methods.

Engineering firms and steel companies are progressing in the development of economical methods for the direct reduction of iron ore. Direct reduction eliminates the need of the blast furnace and, generally speaking, requires less capital investment. Production to date by direct reduction has not been entered into commercially with Southeastern and other domestic ores. Direct reduction, using the Kellogg process, has been used successfully on very high-grade hematites in Mexico. The R-N process, developed jointly by Republic Steel Corporation and the National Lead Corporation, has been reported on favorably for use with southeastern brown ores, but this process has not been carried beyond the pilot stage in Birmingham, Alabama. Other processes have been described in the literature. Improvement of these and, perhaps, additional new ideas may result in an economical direct reduction of Southeastern ores. This would bypass the blast furnace and eliminate the need for pelletization. The nature of most direct reduction processes would lend them to operating individual units. Further, it may be possible to place these individual units in closer proximity to the ore. The reduced product could then be shipped to open hearth or oxygen furnaces for the making of steel products.

Reserves, although not known in predictable amount, are known to be of an order-of-magnitude that would preclude the establishment of a new iron and steel producing center such as Birmingham. If an integrated steel mill should be established, based on foreign ores, then the brown ore could

supplement such production, as it supplements the ore used in Birmingham. New methods, such as direct reduction, may possibly allow the use of ores that are currently considered inferior.

#### Manganese

No manganese ore has been produced within the study area. Immediately northwest of the study area in Georgia manganese has been produced periodically for a number of years.

#### Thorium

Monazite, the chief mineral source of thorium, is usually a by-product in heavy-mineral operations. The Aiken, South Carolina, operation, however, mention by Mertie<sup>1/</sup> in the quotation below has been the chief monazite producer in the southeast with other minerals being by-products. This is not in current production. Mertie is quoted as follows: "A fluvial deposit of heavy minerals is on Horse Creek, about 13 miles S. 62° W. of Aiken, in Aiken County, S. C. This deposit, owned by the Crane Company, the Vitro Corporation of America, and the Pechiney organization of France, is being dredged by the Heavy Minerals Company, a subsidiary of the Crane Company. The tenor in heavy minerals is about 1-1/2 percent, and the tenor in zircon of the heavy minerals is about 16 percent. Mining is made possible by an unusually high content of monazite and xenotime, which constitute between 10 and 12 percent of the heavy minerals. The ratio of monazite to xenotime is variable but is reported to average 15:1."

#### Titanium

The titanium mineral used for the production of titanium metal

---

<sup>1/</sup>Mertie, John B., Jr., Zirconium and Hafnium in the Southeastern Atlantic States. U. S. Geol. Surv., 1958, Bull., 1082-A, p. 13.

is rutile. The other commercial titanium mineral, ilmenite, is used principally in producing titanium pigments. Both occur in heavy mineral sands found in the Coastal Plain of the study area. This material has been mined at Aiken, South Carolina. Starke, Florida is the headquarters for one of the chief titanium-producing areas in Florida. Most of the actual mining takes place just east of the study area in Clay County.

Concentrations of titanium-bearing sands are found along the entire coast of Georgia, both in the Sea Islands and in terraces inland from the coast. Reference is made to the quotations from Mertie under the discussion of zirconium.

It should be noted that the chief competition for domestic rutile is from the east coast of Australia. Along the Australia eastern coast rutile-bearing sands may be as high as 40 to 50% rutile. Rutile-bearing sands in the southeastern part of the study area are closer to 4 percent. When ocean freight is not excessive for rutile, the Australia ores have been more than successful in competing with the American ores. The future for rutile-bearing sands and the production of titanium metal depend largely on two factors (1) a demand for titanium metal; and (2) the economics of producing rutile in competition with the world market. It has been noted in the press and various journals that in the spring of 1957 the demand for titanium metal by the military was drastically reduced. Production of titanium sponge fell from 17,249 tons in 1957 to 4,585 tons in 1958.

The use of titanium metal in industry is showing moderate upswing. About 500 pounds of the metal goes into each DC-8 Jet Airliner and lesser amounts are used in other commercial jet aircraft. Titanium metal has an especially high corrosion resistance and, consequently, is having an increased market in the corrosive chemical field.



The outlook for titanium metal is not altogether bad; neither is the wild enthusiasm of its early days justified. The possibility of a titanium metal-producing plant in the Southeast River Basins area is rather unlikely, but possible. It will be noted that such a plant had been scheduled for Wilmington, North Carolina prior to the military cut back of titanium. If the demand for titanium metal should increase sufficiently, there is always the possibility of the tie-in of such production with that of a heavy chemicals installation along the coast of Georgia.

### Zirconium

The chief source of zirconium is zircon. This mineral has been found in various sediments of the Coastal Plain. The heavy minerals discussion taken from Mertie<sup>1/</sup>, is equally applicable to all of the heavy minerals previously discussed:

"The heavy and semiheavy minerals that have been found in the commercial littoral deposits include ilmenite, leucoxene, zircon, rutile, staurolite, garnet, epidote, magnetite, monazite, sillimanite, kyanite, andalusite, xenotime, green spinel, corundum, hematite, brookite, hornblende, and tourmaline. The principal minerals, and those ordinarily recovered, are ilmenite, leucoxene, zircon, and rutile, though monazite and staurolite are recovered at some plants. The proportions of these minerals are variable, but generally zircon constitutes from 10 to 15 percent of the heavy minerals. Along the east coast of Florida, the range is from 13 to 15 percent. Commercial alluvial deposits of heavy minerals are required to have a tenor of 4 percent unless some mineral of higher value, such as monazite, is present in notable quantity. It therefore follows that such deposits have tenors in zircon from 0.4 to 0.6 percent of the sands.

---

<sup>1/</sup>Ibid., p. 7, 8, 11, 12.

"The samples from Georgia came from Glynn, Brantley, Camden, and Charlton counties, between the mouths of the Altamaha and St. Marys River... The tenor in heavy minerals of the samples from Georgia ranged from 0.08 to 0.96 percent, with a mean value of 0.37 percent. The percentage of zircon in the concentrates ranged from 24 to 50 percent, with a mean value of 33 percent. Therefore, the average tenor in zircon of the sands was 0.12 percent. Considerable prospecting has been done along the Gulf coast of Florida. Stephen H. Rogers, of Tampa, acquired before 1943 an option from the State of Florida to lease the sand deposits along the north shore of Santa Rosa Sound and along three bays east and northeast of Pensacola. These beach deposits were sampled by W. C. Hudson..., of the U. S. Bureau of Mines, and were found not to contain a large volume of heavy minerals. In recent years, the Heavy Minerals Co., a subsidiary of the Crane Co., has prospected the beach sands from 15 to 50 miles west of Panama City, particularly in Walton County between Phillips Inlet and Santa Rosa Sound. One sample of the concentrates from these sands showed a tenor of 12 percent in zircon. The weighted average of the tenors in zircon found in the concentrates near Pensacola by Hudson ... was 9.7 percent, but large variations from this mean value were recorded. Little or no prospecting appears to have been done on the higher ground inland from the Gulf of Mexico.... The National Lead Co. has acquired a large block of ground in Duval County, north of Highland and east of Macclenny.

"Panning by the writer in 1948... in Brantley County, Ga., between Nahunta and Waycross, revealed surficial tenors near Hoboken of about 1 percent of heavy minerals. This suggested that sands of higher grade might lie below the surface and indicated that the paystreak of Trail Ridge might extend northward into Georgia, east of the Okefenokee Swamp. Subsequently, a large block of ground was prospected and acquired by E. I. duPont de

Nemours Co., in Charlton County, Ga. This deposit appears to be an extension of the pay-streak of Trail Ridge, either within the Okefenokee or Sunderland terraces.

"Another favorable locality for heavy minerals in Georgia is Cumberland Island, off the east coast of Camden County. This island has been privately owned and used as a winter resort for many years, but recently has been in litigation resulting from the settlement of several estates. Several large companies have cooperated in prospecting on this island, and some of the ore-bearing sands have been found to be minable. Prospecting has also been done on St. Simons Island and inland in the vicinity of Darien."

Extensive prospecting will be necessary to locate and then delineate areas in which economic production may take place. None of the heavy mineral deposits can be mined without a consideration of all of the heavy minerals present. Zircon, thus, as mentioned by Mertie<sup>1/</sup>, is commonly a by-product in the operation of such deposits for titanium or monazite. This will probably be equally true in the future. The future production of zircon will therefore be dependent upon the demand for other mineral materials in these sands.

---

<sup>1/</sup>Ibid., p. 13.

## Petroleum and Natural Gas

The Pollard Field in Escambia County, Alabama has the only oil within the study area. According to the Bureau of Mines Mineral Yearbook pre-print, 1958, Escambia County had 36 producing wells totaling 761,523 barrels of oil. This compares with 793,469 barrels of oil in 1957. The Pollard Field was discovered in January, 1953, by the Humble Oil and Refining Company. The discovery well was the Humble No. 1, A. W. Moye 18-1n9e. The maximum depth of production was at 5,949 feet from the upper Cretaceous. Oil from this field is transported by highway tank trucks to the Port of Mobile by the purchaser, Humble Oil and Refining Company, and delivered to Esso-Standard Oil Company. Three companies produce in this field as follows: Humble Oil and Refining Company, Gulf Oil Company, and Pan-American Oil Company.

It will be noted from the above that the oil produced in the study area is not refined in this area. Presumably, it is refined on the Atlantic Seaboard but not necessarily so. This is pointed out to show that the production of oil in an area does not always lead to a refinery and a subsequent petrochemicals industry. On the other hand, studies by the Industrial Development Branch of Georgia Institute of Technology have shown that Brunswick, Georgia would make an excellent site for a refinery because of its fine port facilities and its position in relation to the gasoline and oil markets of Florida and other Atlantic Seaboard states. Another factor favoring Brunswick is its excellent rail transportation.

If oil should be discovered in quantity in Georgia, north Florida, or South Carolina, the possibilities of a refinery being situated along

the coast of the study area is somewhat higher than it has been for the Pollard Field.

The Oil and Gas Journal for March 28, 1960 on page 101, and April 4, 1960 on page 151, summarizes the current exploration efforts and leasing activity in Georgia. Briefly it may be quoted as follows:

"Humble Oil and Refining Company has acquired a half-million acres, mostly in the coastal area and has drilled some 200 shallow core holes... To date, however, Humble has taken out no drilling permit from the Georgia Department of Mines and Mining.

"Roderick A. Stamey, Houston geologist and consultant, is acting for a group of Houston investors in acquiring acreage. So far the group has about 20,000 acres under lease and expects to get several times that amount. The target spudding date, at least for now, is July.

"Most of the leases are in Bryan, Chatham, and Effingham counties near Savannah and the southern tip of South Carolina.

"In southwestern Georgia two drilling operations are about to start.

"Ernest Hill, Houston independent, expects to spud this week a well about 8 miles northwest of Americus (OGJ, Feb. 1, p. 67). Hill and his associates hold about 10,000 acres in four blocks in the area.

"J. R. (Bob) Sealey, Cottonwood, Ala., has taken out a permit to drill his fifth Georgia well in the southwestern tip of the state next to Florida and Alabama. He has tried twice in Decatur County and twice in Seminole County.

"The new well will be located 18 miles west of Bainbridge in Seminole County."

## Nonmetallic Minerals

The greatest mineral wealth in the area under consideration is in the nonmetallic or industrial minerals. Materials currently being produced are discussed in alphabetical order. Following these are those known to exist but only as (a) mineral specimens or (b) with qualities which will not meet current specifications and which cannot be beneficiated economically.

### Asbestos

Asbestos is being mined in Transylvania County, North Carolina and recently in Rabun County, Georgia. Asbestos has been reported from Troup, Coweta, Meriwether, Habersham, White, Lumpkin, Stephens, Barrow, Hall, Jackson, Walton, Morgan, Fulton, DeKalb, Clayton and Harris Counties. The commercial possibilities of asbestos in these other counties are not known. The asbestos being mined is amphibole asbestos. No production or reserve figures are available.

### Brick Clays

Plastic clays suitable for the manufacture of building brick and some grades of fire brick are found in the alluvial plains of the various streams as they leave the crystalline belt and enter into the Coastal Plain. Brick plants are located at Augusta, Macon, and Columbus, Georgia. All of these plants serve not only the State of Georgia and the immediate community but have a large portion of their production shipped into Florida. Neither reserve figures for these clays nor accurate total production figures are available. Present producers, however, are of the opinion that reserves are adequate. No brick clays of the same quality are found very far south of the Fall Line.

## Clays-Kaolin

More than 75 percent of the United States kaolin is produced in the study area. Most of this production is concentrated between Macon and Sandersville, Georgia with smaller output from Aiken County, South Carolina. The kaolin industry is and has been one in which each company jealously guards any information it has. In consequence, it is difficult to secure the broad-scope predictions desired. It has been stated that the technology of clay processing is in transition, approaching the scientific phase and in the process of leaving the "arts" stage. This transition may account, in large measure, for the secrecy surrounding the industry.

The reserves of kaolin are variously estimated by the different companies as between 20 and 40 years with 30 years seeming to be a reasonably accurate mean. In estimating total tonnage on this basis we find that there is in excess of 100 million tons of kaolin in reserve. This is based on clays of grades currently being used and which have been discovered. If one extends the potential clay areas southwest from the current producing counties it is highly probably that additional large reserves may be discovered. This is also true, perhaps, to the northeast. In addition to the clays being mined, there are others within the pits of existing operations, which under present circumstances are off-grade, but which may in the future be beneficiated into useable products by the removal of detrimental color, etc. In other parts of the Coastal Plain there have been found mixtures of discrete grains of clays and sand. This is true of Brooks and Lowndes counties, for example. If beneficiation means are devised to efficiently and economically separate these products, we should in the future greatly extend our reserves of both high-grade sand and kaolin.

The uses of kaolin are traditionally in ceramics and as a filler, particularly for the paper and rubber industries. The use with paper and rubber should continue to expand with the years. Technological improvements and new processes such as treating clays with radioactive materials may change the characteristics and open entirely new fields for kaolin. Considerable new work is being done in the surface chemistry and physics of the clay particle. All of this may lead to improvements and market expansions.

Table II shows the production in tons and dollars of the clay industry in Georgia since 1920. Figure 1 shows the growth of the clay industry plotted from Table II.

### Cement

The one cement plant in the study area is at Clinchfield, Houston County, Georgia and is owned and operated by the Penn-Dixie Cement Corporation. Production figures are not published. The capacity of the plant, however, is listed in the company's 1959 report as 1,222,000 barrels.

A cement-market report in December 1958 estimated that territories in south Georgia, southeast Alabama, and north Florida now distant from a cement mill can support a new plant as early as 1960<sup>1/</sup>. Penn-Dixie has subsequently announced an expansion of the Clinchfield plant, where a new kiln will add 1,150,000 barrels of cement capacity early in 1961.

Recent studies in southwest Georgia indicate there may be several places where limestone of cement grade may be found. Most of this limestone is in the Chattahoochee and Flint drainage basins.

---

<sup>1/</sup>White, Lamar and Vivian Conklin, An Analysis of the Cement Market in and Near Georgia; a report to the Georgia Department of Commerce by the Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology. 1958.

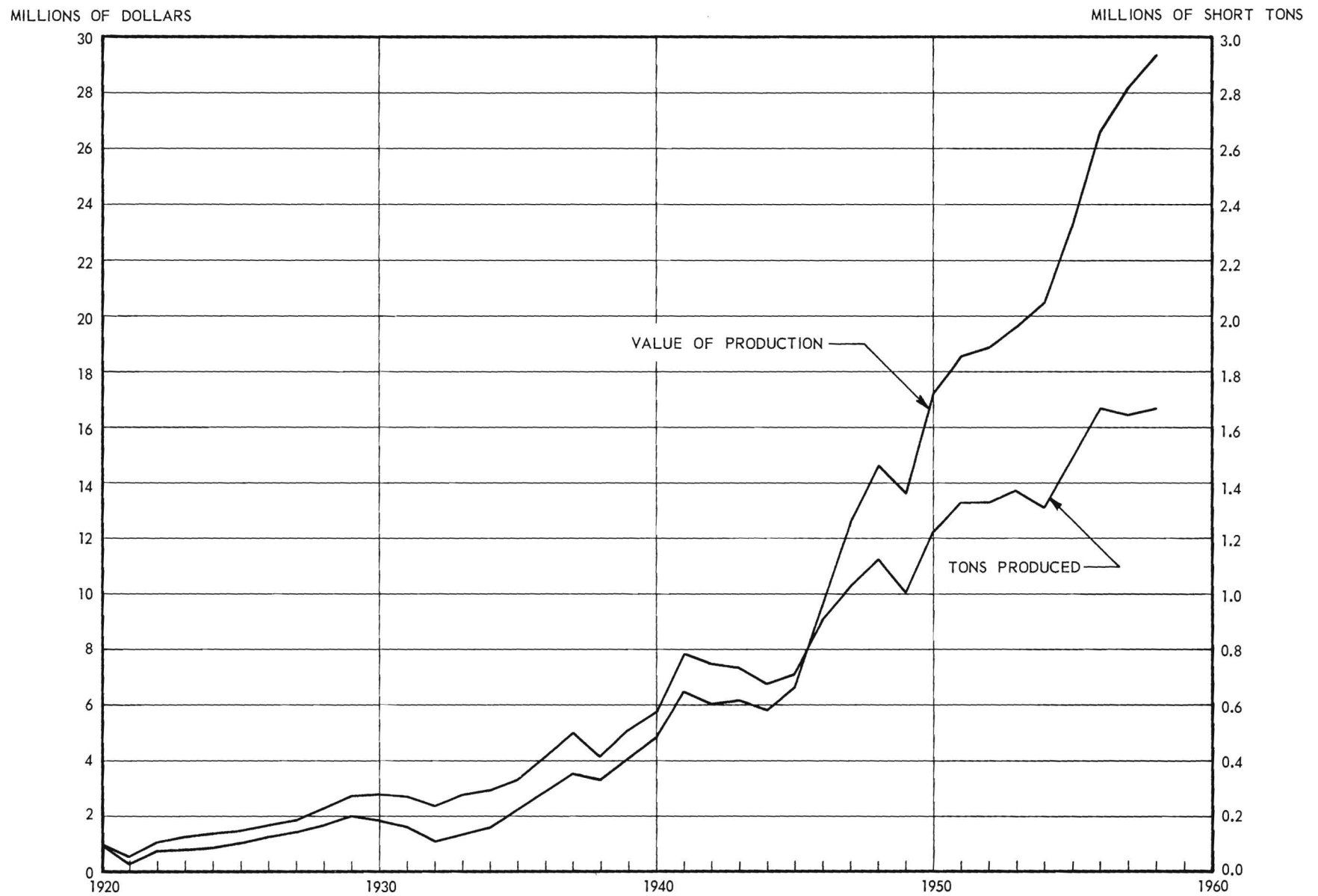


TABLE II

## VOLUME AND VALUE OF KAOLIN PRODUCTION IN GEORGIA, 1920 - 1959

Year	Volume (Short Tons)	Value in Dollars	
		Total	Per Ton
1959			
1958	1,696,698	29,348,261	1,730
1957	1,658,694	28,219,707	1,701
1956	1,663,707	26,604,891	1,599
1955	1,492,983	23,375,768	1,566
1954	1,304,865	20,525,906	1,573
1953	1,341,725	19,659,625	1,465
1952	1,328,255	18,802,193	1,416
1951	1,323,810	18,699,735	1,413
1950	1,220,655	17,340,528	1,421
1949	1,003,391	13,806,336	1,376
1948	1,135,440	14,642,698	1,290
1947	1,032,013	12,756,041	1,236
1946	917,752	9,671,049	1,054
1945	702,388	6,684,527	952
1944	674,400	5,823,424	863
1943	732,590	6,232,572	851
1942	744,408	6,136,231	824
1941	787,013	6,573,605	835
1940	570,010	4,834,826	848
1939	512,214	4,135,727	807
1938	412,632	3,314,918	803
1937	503,732	3,546,059	704
1936	419,395	2,895,878	690
1935	339,658	2,346,977	691
1934	284,556	1,535,046	570
1933	280,038	1,342,512	506
1932	234,244	1,148,000	511
1931	277,802	1,602,248	596
1930	289,880	1,977,457	711
1929	274,825	2,084,219	826
1928	234,028	1,668,125	824
1927	193,151	1,492,857	839
1926	175,230	1,357,923	873
1925	141,956	1,040,064	877
1924	135,504	975,422	895
1923	123,894	869,808	869
1922	100,668	709,745	851
1921	52,500	388,480	970
1920	116,420	1,025,819	1,068

FIGURE 1  
GEORGIA KAOLIN OUTPUT, 1920-59



### Corundum

Corundum is a naturally crystalline form of aluminum oxide. Among minerals, corundum is next to diamond in hardness. It is also very tough and makes an excellent abrasive. Gem varieties of corundum are ruby and sapphire.

Corundum has been listed from Towns County, Georgia and possibly occurs in other parts of the crystalline areas of Georgia, North Carolina, and South Carolina. The corundum produced in Towns County is listed under gems by the U. S. Bureau of Mines, without value or amount. The literature lists a large number of counties from which corundum has been reported. They are: Rabun, Cobb, Habersham, Towns, Upson, Fulton, Cherokee, Carroll, Douglas, Hall, Heard, Lumpkin, Paulding, Troup, Union, Ware, Walton, Fannin, Dawson, White, Forsyth, and Morgan.

### Feldspar

Feldspars are usually produced from either pegmatites or coarse-grained granite or granite-type rocks. The only commercial production of feldspar in this area is from near Monticello, Jasper County, Georgia. The feldspar produced there is of the potassium variety and is beneficiated through flotation, with mica and quartz as by-products. Feldspar is used chiefly in the ceramic industry for glass, enamel, and glazes. Production in Georgia has declined since 1956. The presence of a new glass plant in Atlanta may stimulate a search for new feldspar sources in Georgia.

### Fuller's Earth

The term fuller's earth originated with its use by fullers in the removal of grease from wool and similar products. Thus, the fuller was the original dry cleaner. Modern usage of the term fuller's earth is

ambiguous in that fuller's earth may refer to clays used for bleaching purposes, as well as clays used for their absorptive qualities. The bleaching power of these clays is a property of certain complex characteristics of the surface of the clay particle or crystal and involves ion exchange.

In the study area, the two principal clays designated as fuller's earth contain principally montmorillonite and attapulgite. Fuller's earth found in the vicinity of the Fall Line is usually primarily montmorillonite. Fuller's earths found in Decatur, Grady, and Thomas counties, Georgia and Gadsden County, Florida contain principally attapulgite. The market for both of these clays, as used for a bleaching agent, has steadily declined during the past few years. This has resulted from the lower net cost of bleaching with activated bentonite and its progressive replacement of montmorillonite and attapulgite for this purpose. The remaining market for these clays arises from their absorptive qualities. Their uses for this purpose are as a filler in dust type insecticides, sweeping compounds, etc. In this market attapulgite enjoys a slight advantage over montmorillonite but not sufficient to completely offset differences in freight occasioned by their geographical positions. Some attapulgite is used in drilling muds.

The outlook for fuller's earth in the study area indicates that it will decline a little more but will eventually level off considerably below the market it would enjoy if it were used principally for bleaching. If new techniques can economically increase the bleaching qualities of these clays in the same relative amounts that acid treating changes bentonite, then a resurgence of this market should result.

### Gemstones

Gemstones in Georgia and South Carolina are found usually in the crystalline areas. Beryl, garnet, topaz, some forms of quartz, corundum and sillimanite are among the minerals of the area which are sometimes found in gem quality. In 1958 corundum was sold from Towns County, Georgia and sillimanite from Oconee County, South Carolina.

### Magnesia

The Michigan Chemical Company is producing magnesia from sea water at Port St. Joe, Gulf County Florida. The lime produced for this operation uses sea shells as a raw material. The production of lime at this location is for the magnesia plant. It is not known yet if there will be excess lime for sale. The magnesia is being sold to the refractory industries.

### Mica

Mica (muscovite) is found in the pegmatites and other acid igneous rocks of the crystalline areas of Alabama, Georgia, North Carolina and South Carolina. In the study area, scrap mica has been mined in Randolph County, Alabama; Crawford, Elbert, Greene, Hart, Jasper, Madison, Pike, Upson and Butts counties, Georgia; Jackson and Macon counties, North Carolina; and Saluda County, South Carolina. Sheet mica has been mined in Randolph County, Alabama; Elbert, Franklin, Hall, Hart, Jasper, Lamar, Macon, Madison, Monroe, Oconee, Pike, Spalding and Upson counties in Georgia; Jackson, Macon, and Transylvania counties in North Carolina; and Abbeville, Anderson, Oconee and Pickens counties in South Carolina.

Mica is sold in two distinct forms. One is ground mica (scrap) and the other is sheet mica. Scrap mica may be produced from weathered, acid,

igneous rock of the granite family, in which the mica is disseminated throughout the rock. Mining for scrap mica alone usually occurs in the weathered remains of such a rock and is done hydraulically. Ground mica is also a by-product in the flotation of feldspar. Its chief uses are in roofing and as a lubricant and filler.

Sheet mica occurs in pegmatites and generally is mined through hard-rock mining. The prediction of sheet mica reserves is one of the most difficult in the field of geological sciences. There are areas where mica may be mined and predicted, but by and large, mica mining is a frustrating experience. Much of the mica produced and sold in the past twenty years has been subsidized by the Federal government under one or more of the defense acts.

The color and quality of sheet mica are extremely important, as they determine its end use. "Ruby" mica is generally regarded as superior to "green" mica. The important characteristics of a mica are its dielectric properties. No suitable substitute or synthetic sheet micas have been produced to date in large sheets. The dielectric qualities of mica make it extremely valuable in the manufacture of electric equipment where heat and/or electric resistance is needed. Such domestic items as televisions, etc., as well as electric irons, must compete for mica against such items as the electronic systems of missiles, radar and other military uses.

The southeastern states are the largest producers of mica in the United States. Mitchell, Avery and Yancey counties, North Carolina (outside the study area) are usually considered the heart of the mica industry. The North Carolina counties along Georgia's northern border have also produced their share of sheet mica, but the producing sites are also outside the study area.

The only prediction concerning sheet mica is that it will continue to be discovered, but on an emergency basis may not meet the demand. With the continued peacetime emphasis on electronic equipment, it should enjoy a substantial market for years to come.

#### Peat

Peat is a product of the semi-swamp areas of South Carolina, Georgia, Alabama and Florida. It probably should not be considered under the minerals since the peat produced in these areas is not used for fuel but rather for agricultural and horticultural purposes. In the study area, peat is produced in Lowndes and Screven counties, Georgia. No details or statistics are available.

#### Phosphate Rock

The major phosphate deposits of Florida are south of the study area in the vicinity of Lakeland, Florida. Phosphate from this area is referred to as land-pebble phosphate. In the study area, which is about 100 plus miles north of the chief phosphate deposits, only soft-rock phosphate is found. The two study area counties that have produced soft-rock phosphate are Columbia and Gilchrist, Florida.<sup>1/</sup> The chief uses of soft-rock phosphate are in stock and poultry feed and direct application to the soil.

Reserve figures are not available but the study area is not considered to have a potentially good future for a phosphate industry. All of the phosphate is reported from Florida.

#### Quartz

The only high purity quartz produced in the study area, is a by-product in the beneficiation of feldspar in Jasper County, Georgia. Quartz produced

---

<sup>1/</sup>Florida Geological Survey, Thirteenth Biennial Report.

in this manner is usually a 20-mesh product and finds its chief market in the production of glass.

#### Quartzite

Quartzite is reported as being produced as crushed stone from Richmond County, Georgia. Other information is not available. High purity quartzite is used in some areas for the manufacture of ferrosilicon, but not in the study area.

#### Sand and Gravel

Sand and gravel are relatively abundant throughout the Coastal Plain and are produced from 37 counties in the study area. There are still many other sand and gravel areas which are not presently producing. Sand and gravel have their greatest use in construction. Other uses are blast filter, glass, and railroad ballast sand, as well as minor use for grinding and engine sands. Gravel is used as aggregate in various types of construction, including highway construction. In Georgia, 21 counties reported sand production to the U. S. Bureau of Mines. Most of this was from the study area south of the Fall Line. Six counties in Alabama, seven in Florida, and three in South Carolina supplied sand and gravel on a commercial scale, during 1958. Counties not in the Coastal Plain that supplied sand and gravel were those along the major streams, such as the Savannah. The growth of the sand and gravel business is largely dependent on industry growth, which would include highway and road construction, building construction, and the growth of those industries requiring sand as a part of their raw material. The center of the study area, namely, Wilcox County, Georgia and vicinity, does not have a large output of minerals, but this entire area of the Coastal Plain should be investigated for future supplies of sand and gravel.



Sand used for ceramics, particularly the glass industry, must be of very high purity. The iron content generally must be less than .05 per cent. In addition, refractory minerals such as kyanite, should be absent. The only glass-sand supplier in the entire area is in Thomas County, Georgia and it supplies material to Atlanta. In the vicinity of Savannah and lower Effingham County another deposit is reported of high enough purity to be mined for glass use. Other glass-sand deposits have been found scattered along the Coastal Plain near the Fall Line<sup>1/</sup>. Additional work is needed to determine if such sand exists in other areas.

As mentioned previously, the growth of the sand and gravel industry is largely contingent upon the industrial growth of the area and the ability of the sand to meet construction or other specifications. Transportation costs are also an important factor.

#### Shale

Shale has been produced in Columbia County, Georgia, and in Aiken and Greenwood counties, South Carolina. Its use is principally in the manufacture of fire brick.

#### Shells

Shells have been used commercially in Duval County, Florida and in the production of lime in Gulf County, Florida. When shells are used as a source of calcium carbonate in the production of lime, impurities such as sand sometimes cause difficulties.

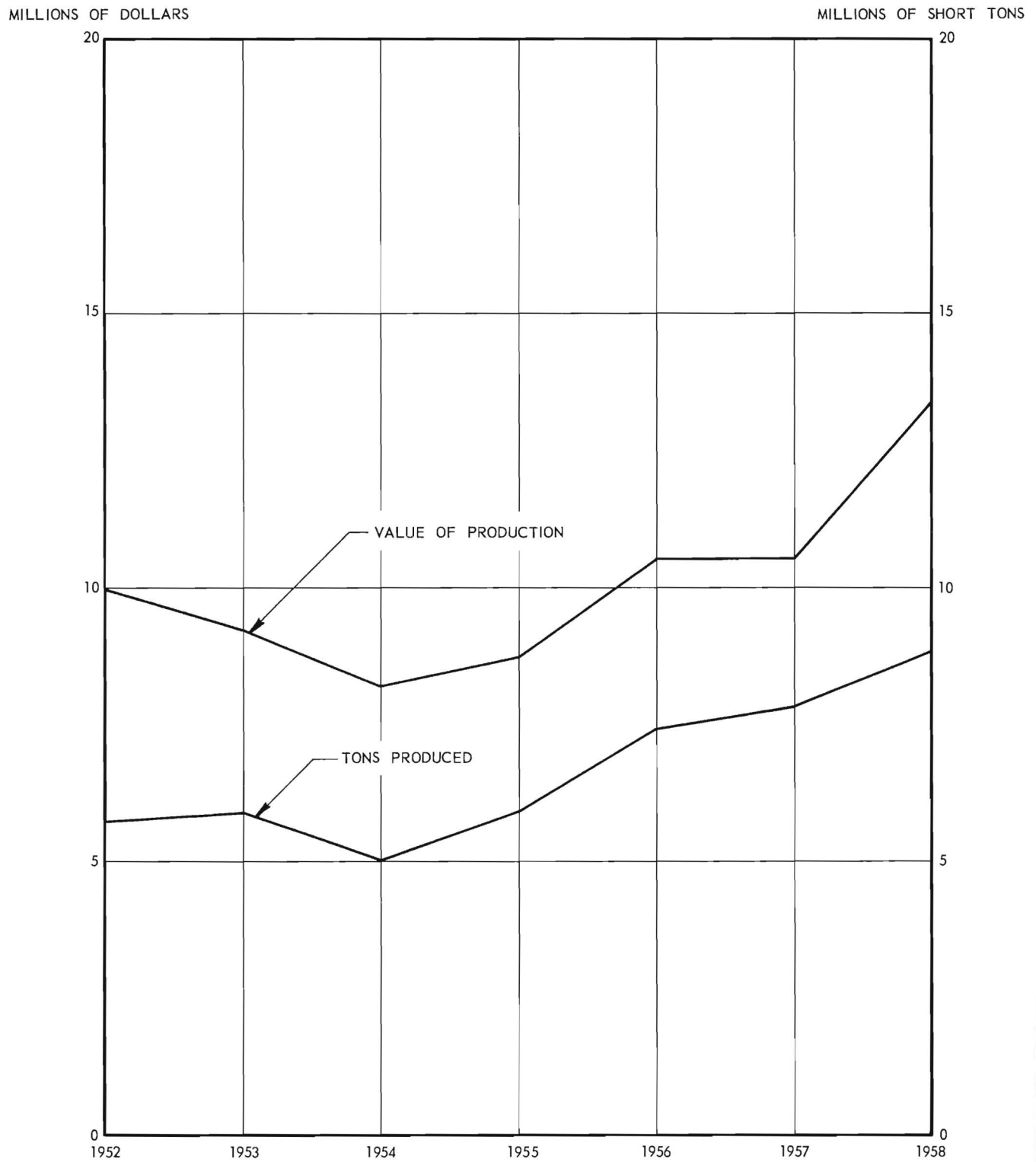
#### Stone-Crushed

Crushed stone or man-made aggregates are very important in the construction business. It is interesting to note that in the period

---

<sup>1/</sup>Fortson, C. W., Unpublished report, Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology.

FIGURE 2  
GEORGIA CRUSHED GRANITE PRODUCTION, 1952-58



September, 1958 to September, 1959 approximately 30 per cent or more new capacity was added to the crushed-stone industry of Georgia. This consisted of four new quarries, two of which are in Jones County, one on the Lamar-Monroe County border (close to Upson County) and one in Muscogee County. It will be noted that each of these new installations is close to the Fall Line. The reason for this is that south of the Fall Line sources of stone suitable for crushing are limited. Most of the stone south of the Fall Line will not meet toughness and strength tests that the crushed granite will. In consequence, the stone crushing operations in the crystalline Piedmont area have, and expect to hold, a very large market in the Coastal Plain of the study-basin states.

Crushed limestones are produced in Florida and from the Coastal Plain of some of the other states but most Coastal Plain limestones cannot meet the physical specifications of granite.

Crushed stone is also produced in Oconee and Pickens counties, South Carolina and Transylvania County, Macon County and Jackson County in North Carolina. In Georgia the crushed stone industry is found in the following counties: Bibb, Clayton, DeKalb, Douglas, Elbert, Fayette, Fulton, Gwinnett, Hall, Hancock, Henry, Jones, Muscogee, Oglethorpe, Walton and Warren.

Table III and Figure 2 indicate the amounts and values of crushed stone output insofar as they are obtainable. It should be reiterated, however, that figures obtained by the U. S. Bureau of Mines cannot be released for publication when they can reveal the operation of any individual organization.

### Stone - Dimension

Dimension stone was produced in Georgia in 1958, but not elsewhere in the study area. Dimension stone decreased 6 per cent in tonnage and 4 per cent in value from 1957 levels for the State of Georgia. Table III<sup>1/</sup> shows the Georgia production of dimension stone. It will be noted that three of the four counties listed as producing dimension stone are in the Savannah River basin, and the other is in the Chattahoochee and Altamaha basins.

Of the national total of 539,186 short tons of dimension granite, valued at \$26,442,192, Georgia in 1957 produced 126,346 short tons, valued at \$3,321,421. The greater proportion of this was for monumental use and sold in rough form, in which Georgia led the nation. All of Georgia's production was in the study area. Table IV shows production by states.<sup>2/</sup>

### Talc

Production of talc and soapstone in 1957 was entirely outside of the study area. Some materials classified as semi-soapstone may exist in the study area, but are not being produced at present.

### Titanium Pigments

The chief source of titanium for pigment purposes is ilmenite, which is an iron-titanium oxide, found in the sands of the Coastal Plain. This material has been mined in Aiken County, South Carolina. It is currently mined just outside the study area in Clay County, Florida, and production has been planned in the vicinity of Gulf and Franklin counties, Florida. Ilmenite exists in varied concentrations in these sands, reportedly as

---

<sup>1/</sup>From Table 9, U. S. Bureau of Mines, Mineral Yearbook 1958, v. III, p. 279.

<sup>2/</sup>From Table 6, U. S. Bureau of Mines, Mineral Yearbook 1958, v. I, p.972.

Table III

## DIMENSION GRANITE SOLD OR USED BY PRODUCERS, BY COUNTIES

<u>County</u>	<u>1957</u>			<u>1958</u>		
	<u>Cubic Feet</u>	<u>Short Tons (Equiva- lent)</u>	<u>Value</u>	<u>Cubic Feet</u>	<u>Short Tons (Equiva- lent)</u>	<u>Value</u>
DeKalb	525,427	43,632	\$ 799,043	703,476	58,366	\$ 787,248
Elbert	553,185 <sup>1/</sup>	46,569	1,464,192	537,181	45,536	1,470,605
Madison	149,998	12,450	449,994	132,000	11,000	396,000
Oglethorpe	285,565 <sup>1/</sup>	23,695	608,192	273,350	22,792	557,544
Total	1,514,175	126,346	\$3,321,421	1,646,007	137,694	\$3,211,397

1/ Revised figure.

Source: 1958 Minerals Yearbook, U. S. Bureau of Mines.

Table IV

GRANITE (DIMENSION STONE) SOLD OR USED BY PRODUCERS  
IN THE UNITED STATES IN 1958, BY STATES

<u>State</u>	<u>Active Plants</u>	<u>Short Tons</u>	<u>Value</u>
California	9	6,405	\$ 455,029
Colorado	6	1,537	63,160
Georgia	26	137,694	3,211,397
Minnesota	24	34,555	3,473,042
Missouri	1	3,165	258,765
Montana	1	8	210
New Jersey	1	140	175
Oklahoma	6	6,419	549,178
Oregon	1	10	1,875
Pennsylvania	2	4,982	39,159
South Carolina	3	11,925	343,854
South Dakota	10	18,696	2,097,262
Texas	4	113,202	1,157,369
Washington	6	1,313	22,767
Wisconsin	8	7,629	1,362,686
Other States <sup>1/</sup>	<u>43</u>	<u>272,857</u>	<u>11,022,763</u>
Total	151	620,537	\$24,058,691

<sup>1/</sup> Includes Connecticut and Maine, 5 plants each; Maryland, 4 plants; Massachusetts, 7 plants; New Hampshire, 1 plant; North Carolina, 15 plants; and Vermont, 6 plants.

Source: 1958 Minerals Yearbook, U. S. Bureau of Mines.

high as 12 per cent, but averaging closer to 4 per cent. Starke, Bradford County, Florida is the post office address for several of the Florida operations, but the actual mining takes place outside of the study area. Several of the Sea Islands in the study area have been under option or leased for their titanium and other heavy-mineral content. Among them, Cumberland Island has had wide mention in the press.

The chief competition for the study-area titanium is, first, from the Sorel slag produced at Sorel, Canada. In Canada there is a deposit containing an intimate mixture of ilmenite and magnetite. These two minerals are so intergrown that they cannot be separated by crushing. Consequently this material is melted and from it is obtained a very high-grade semi-steel pig, and a slag containing up to 90 per cent  $TiO_2$ . The slag is a by-product in the production of the iron and can be sold cheaply. To some extent the sale of slag is conditioned by the sale of the iron but the reverse also holds true.

The other sources of competition for the ilmenite of this area are foreign ores, two areas of which are world-famed. The west coast of India is historically the chief source of ilmenite. Sands here range up to 65 or 70 per cent ilmenite. Western Australia has ilmenite sands containing equally high percentages, and some reports indicate that the western Australia sands may even be higher than those of India. Ilmenite produced with the rutile of eastern Australia contains deleterious materials which do not make it as suitable for pigment. It is easy to see that in dealing with an ore containing about 70 per cent of the useable product, when compared with one containing an average 4 per cent, the latter has a poor competitive position except on a high ocean-freight market.

In addition to the western Australia and Indian ilmenite deposits, there are other excellent deposits of ilmenite scattered throughout the world. Most of these also have heavy concentrations of the mineral product. In some areas, the ilmenite grains have a coating of the mineral leucoxens, which is the weather product of ilmenite. Leucoxen's composition is  $TiO_2$  and it obviously enhances the  $TiO_2$  values of such ores. In the trade such grains coated with leucoxen are referred to as "blonde rutile."

For the future development of the ilmenite sands, sometimes called "black sands" and sometimes "heavy sands," in the study area, it will be necessary that all of the by-products such as monazite, zircon, rutile, and magnetite, be recovered and that the operation be highly efficient. In times of high ocean-freight rates the domestic materials will then have some advantage.

Titanium pigments are made in Savannah, Georgia by the American Cyanamid Company. Its current capacity is 72,000 tons annually of titanium dioxide.



Minerals Reported but not Produced  
within the Study Area

Within the study area there are very few reported minerals which could not have been produced at one time or another, provided they were in sufficient quality and quantity to have economical application. Some materials, although of excellent quality and in economic concentrations, may not have been produced because of the absence of a sufficient market. In this category one might class some kyanite, sillimanite, and similar materials.

Other materials may have been found only as mineral specimens and the concentration has not been sufficient to warrant additional study. Still other mineral specimens, because of a depressed market, may not have excited sufficient interest to result in an exploration. For any of these reasons, certain of the sulfide minerals containing copper, etc., have not been produced. In Table V are listed by river basins within the study area, all minerals and/or commodities reported in the literature. An asterisk indicates that production has been recorded for the mineral or commodity. Those materials not marked with an asterisk may, in some instances, find commercial application. The major exception is the nearly isolated finding of diamond. These minerals in Table V are included for the purpose of stimulating additional work.

TABLE V

Minerals Found or Produced in Southeast River Basins Area,  
By Major Drainage Basins

(\* Production Recorded)

<u>Area 1</u>			
Alum	Ghanite	Magnesium	Rutile
Amethyst	Gold	Maganese	*Sand
*Asbestos	*Granite	Marble	Sap Brown
Beryl	Granitic	*Mica	Sapphire
Chalcedony	Graphite	Monazite	Sericite
Chromite	*Gravel	Nickel	Serpentine
*Clay	*Gypsum	Novaculite	*Shale
Copper	Halite	Oil (Test well)	Siderite
*Corundum	*Heavy minerals	*Olivine	Silica gel
Diamond	Hornblende	Opal	Sillimanite
Diaspore	Ilmenite	Pagodite	Silver
Dolomite	Iron	*Peat	Soapstone
Emery	Itacolumite	Pyrite	*Stone
Epidote	*Kaolin	Pyromorphite	Talc
*Feldspar	Kyanite	Pyrophyllite	Tourmaline
Fossilized wood	Lazulite	Pyrrhotite	Tungsten
*Fuller's earth	Lead	Quartz	Uranium Min.
Garnet	Lignite	*Quartzite	Vermiculite
Geodes	Limestone	Rhodochrositeq	Zircon
		Ruby	Zinc
<u>Area 2</u>			
Bauxite	Gold	Limestone	Peat
Chalcedony	*Granite	Manganese	Rutile
*Clay	*Gypsum	*Mica	*Sand and gravel
*Feldspar	Iron	Monazite	Sap Brown
*Fuller's earth	*Kaolin	Oil (test well)	Sericite
Geodes	Lignite	Opal	Soapstone
			Uranium Minus
<u>Area 3</u>			
Agate	Chrysocolla	*Feldspar	Heavy Minerals
Amethyst	*Clays	Flagstone	Heavy sand
Andalusite	Copper	Flourite	Hyalite
Apatite	Cordierite	*Fuller's earth	Ilmenite
Aquamarine	Corundum	Gold	Iron-Lodestone
Asbestos	Crushed rock	*Granite	*Kaolin
Bauxite	Diamond	Graphite	Kyanite
*Beryl	Epidote	*Gravel and sand	Lead

TABLE V (Continued)

Minerals Found or Produced in Southeast River Basins Area,  
By Major Drainage Basins

(\* Production Recorded)

Area 3 (Continued)

*Limestone	Novaculite	*Quartz	Stilbite
Limonite	Oil (test well)	Rutile	Thulite
Manganese	Opal	Siderite	Tourmaline
*Mica	Phosphate	Soapstone	Uranium
Molybdenite	Pseudo Meionite	Spinel	Uranophane
Monazite	Pyrite	Stavrolite	White ware
			Zoisite

Area 4

Clay	Ilmenite	*Peat	*Sand & gravel
Glass sand	Limestone	Perlite	*Shell
Gypsum	Monazite	Phosphate	Vermiculite
Heavy sand	Oil (test well)	Rutile	Zircon

Area 5

Agate	Glass sand	Oil (test well)	Rutile
*Clay	Ilmenite	Opal	*Sand & gravel
Dolomite	*Limestone	*Peat	*Shale
Fuller's earth	Moss	*Phosphate	Staurolite
			*Zircon

Area 6

Agate	*Fuller's earth	Oil (test well)	Phosphate sand
*Clay	Glass sand	Opal	*Sand & gravel
Dolomite	*Limestone	Phosphate	

Area 7

Actinolite	Barite	Brookite	Chert
Amphibolite	*Bauxite	*Brown iron ore	Chlorite
Ankerite	Bentonite	Calcite	Chrysocola
Arsenopyrite	*Beryl	Cassiterite	*Clay
*Asbestos	Biotite	Chalcanthite	Columbite
Aturite	Bornite	Chalcopyrite	Copper

TABLE V (Continued)

Minerals Found or Produced in Southeast River Basins Area,  
By Major Drainage Basins

(\* Production Recorded)

Area 7 (Continued)

Cordierite	Gossan	Magnetite	Silica sand
*Corundum	Gypsum	Marble	Soapstone
Crushed rock	*Granite	Marcasite	Soil
Cuprite	Graphite	*Mica	Sphalerite
Diabase	Greensand	Molybdenite	Staurolite
Diamond	Halloysite	Muscovite	Stilbite
Diorite	Heavy minerals	Novaculite	Sulfur
Dolomite	Hornblende	Ocher	Talc
Feldspar	Hyalite	Opal	Tetrademite
Flagstone	Ilmenite	*Peat	Thulite
Flourite	Itacolumite	Phosphatic Lime	Tin
Fossilized wood	Kaolin	Pyrite	Topaz
*Fuller's earth	Kyanite	Pyrrhotite	Tourmaline
Galena	Lead	*Quartz	Tungsten
Garnet	Lignite	Quartzite	Uranium
Glass sand	*Limestone	Radioactive H <sub>2</sub> O	Uranophane
Gneiss	Malachite	Rutile	Vermiculite
Gold	Manganese	*Sand & gravel	Zinc
		Sapphire	Zoisite

Area 8

Aluminum	*Crushed stone	*Iron Ore	Ocher
Bentonite	Dolomite	Lignite	*Oil & gas
Buhrstone	*Fuller's earth	*Limestone	*Peat
Chalk	Glaucinite	Marcasite	Phosphatic Lime
Chert	Gorcexite	Marl	*Sand & gravel
*Clay	Greensand	Moss	Sandstone
			Siderite

INDUSTRIAL RESOURCES AND POTENTIALS  
OF THE SOUTHEAST RIVER BASINS

---

Water Resources  
by  
Robert S. Ingolls

Prepared for the administrative use only of the  
United States Study Commission, Southeast River Basins

---

Lamar White, Project Director

---

Industrial Development Branch  
Engineering Experiment Station  
Georgia Institute of Technology  
June 1960

## INDUSTRIAL RESOURCES AND POTENTIALS OF THE SOUTHEAST RIVER BASINS

### Sections of the Final Report and Their Designations

<u>Title</u>	<u>Section</u>
Land Use Patterns and Planning Activity	A
Mineral Resources Review	B
Water Resources	C
Population and Labor Force	D
Employment	E
Personal Income	F
Disposable Income, Consumption, and Savings	G
Economic Indicators for Major Functional Segments of the Economy	H
Summary of Recent Trends in Economic Growth and Development	I
Economic-Statistical Projections	J
Mathematical-Economic Projections	K
Economic Development Potentials by River Basin	L

## Table of Contents

	<u>Page</u>
Surface Water	1
Use and Consumption	1
Geological Zones	2
South Carolina Zones	3
S-1, Piedmont	3
S-2, Coastal Plain	3
Georgia Zones	5
G-1, Piedmont	5
G-2, Coastal Plain	7
Florida Zones 1-5, Coastal Plain	9
Alabama Zones	10
A-1, Piedmont	10
A-2, Coastal Plain	10
A-3, Coastal Plain	10
Problems of Waste Disposal and Water Pollution	11
General	11
Comments on the Major River Basins	12

Map Showing Zones Used in Water Resources Discussion

## WATER RESOURCES\*

### Surface Water

The surface water resources of the Southeast River Basins include the major rivers, the Altamaha, Apalachicola, and the Savannah, along with their major branches and several smaller rivers in the study area. These water resources are well developed in many ways. Hydroelectric power is obtained from large dams in several of the river basins. Water for large cities is obtained from the rivers of the basin. Industries in the area use water for processing, cooling, and waste disposal. The rivers are only slightly developed for agricultural use, although there are many small farm ponds in Georgia, South Carolina, Alabama, and Florida.

These small ponds occur to the extent of one per square mile. In the aggregate they amount to a large area of lake water. Many of the ponds are on the tributaries of the larger rivers. Though water may not be taken from them for the purpose of irrigation, the ponds do serve to maintain a higher water table in their general area. Some of the water is withdrawn and not returned. More is lost by evaporation, especially during dry periods. Where it is used for irrigation, the water is generally absorbed into the soil. It does not return to the flowing stream directly, but it may go into the underground water and from there into the stream again; the net loss is difficult to evaluate.

### Use and Consumption

The water that is used by the large cities is in large part returned to a water course, though not necessarily the same one. Because of the location of cities within the basins, there are instances in which water is taken from one water course and diverted to another, though the total surface water runoff may remain constant. Thus, in Atlanta the water is taken from the Chattahoochee River and the major volume is returned to it through two of the five sewage plants. A third sewage plant discharges into the headwaters of the Flint River, which joins the Chattahoochee River at the southwestern tip of Georgia to form the Apalachicola. Two other major sewage plants (receiving 25 per cent of the sewage flow) discharge a large volume of water daily into the South River, which is part of the Altamaha River Basin.

---

\*By Robert S. Ingolls, Georgia Institute of Technology.



Industries make various uses of the water. Georgia Power Company has several large steam power generating stations which remove very large volumes of water from the Altamaha and the Chattahoochee but return most of it. Where the water is used for cooling condensers, the temperature is raised a few degrees but is returned with the chemical quality virtually unchanged. However, some of the water is used in evaporative coolers and for generating steam in the large boilers; this portion is not returned to the river. On the other hand, many industries use water for processing and return it all to the river with its chemical quality degraded. Paper mills use water in this way. In some areas near the Atlantic or the Gulf, very large volumes of water are withdrawn from the underground supply and discharged to the rivers. Thus, at Jesup, Georgia some 40 million gallons of water per day are withdrawn from underground aquifers and transferred after industrial use to the Altamaha River.

The term "water consumption" involves the removal of water from a river with failure to return water to the river in any quantity or quality. Water consumption generally amounts to only a fraction of the water removed for all purposes. In dry weather, cities frequently return up to 90 per cent of the water that is taken from the river. There is, therefore, a 10 per cent water consumption which fits this concept of failure to return water to the river. Sometimes, however, rain water from the surface area of the city and sewer infiltration from ground water are returned to the river through the sewage treatment plant. The volume of storm flow through the sewage treatment plant will more than equal (within a short period of time) the total water loss that occurs during dry weather. Thus, there is a problem in evaluating the amount of water consumed by domestic and industrial use.

#### Geological Zones

There are two basic geological zones, or physiographic provinces, in the Southeast River Basins area under study. The Piedmont Province has a deep cover of weathered granite with solid granite base, in either or both of which there is relatively little ground water. Many communities in the Piedmont have had to go a considerable distance to a major river to obtain the necessary amount of water. Thus, Hapeville, and Forest Park, Georgia are 15 miles from the Chattahoochee River but are dependent upon its water obtained through the water treatment facilities provided by Atlanta.

DeKalb County has developed a water supply system which serves a large area lying many miles from the Chattahoochee River. Griffin does not obtain any water from wells, but goes to the nearest surface water in the Flint River which is about fifteen miles away. This is a fairly typical pattern for many of the large cities of Georgia which are located on ridges. Originally, people found the ridges to be the best location for long distance transportation by roads and railroads, as well as the most pleasant areas for living, though the major volumes of water are in the valleys at some distance.

The ground water resources of the Coastal Plain Province are abundant and are well developed in spots. Practically all of the towns below the Fall Line in Georgia obtain their potable and industrial water supplies from wells. The converse is generally true throughout the Piedmont.

The summary which follows discusses the adequacy of water supplies by zones in the various river basins, shown on the accompanying map:

#### South Carolina

##### Zone S-1, Piedmont

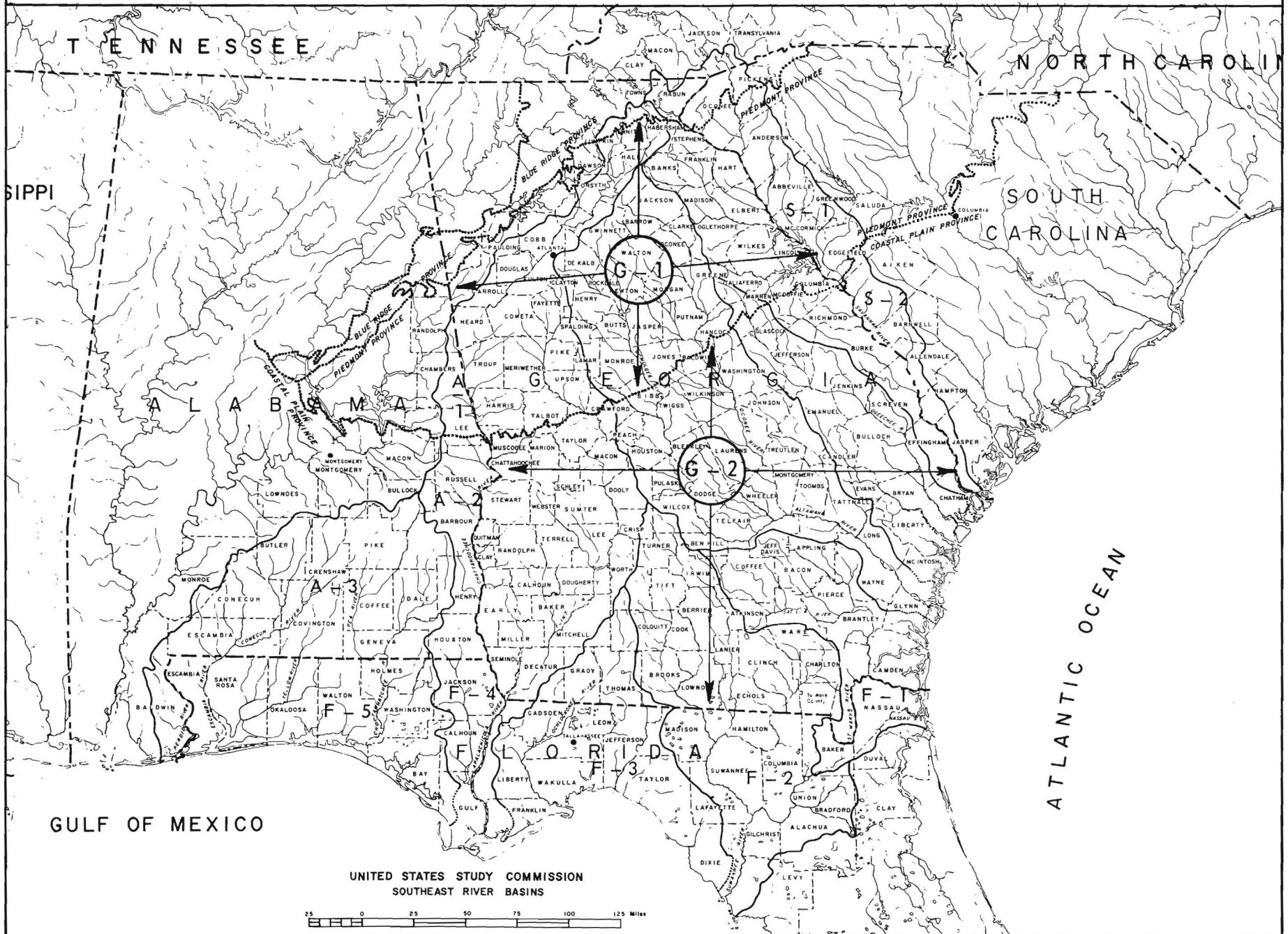
The upper reaches of the Savannah River Basin in South Carolina are predominantly in the Piedmont Province. The mountainous area above and in the Piedmont has a very high rainfall, but there is comparatively little ground water for industry or city use during dry weather because of the thin cover of soil (weathered granite) over the rock. At one border of the zone are two major lakes, one impounded by the Hartwell Dam in the upper area and the second by the Clark Hill Dam near Augusta. An industry which needs a large source of water can develop one quite readily by locating near the Savannah River or one of its lakes in this zone. This South Carolina area is similar to Georgia communities in the Piedmont in that many of the larger towns are located on the ridges, while the rivers are in the valleys. This means that an industry may have to locate at some distance from a town if it must have large volumes of water available for processing use.

##### Zone S-2, Coastal Plain

There is one very interesting situation below the Fall Line in South Carolina. The Atomic Energy Commission has used most of Aiken County, South Carolina, for the development of hydrogen fusion under management of the Du Pont Company. In this plant, water used is from the Savannah

# IDENTIFICATION OF ZONES SELECTED FOR WATER RESOURCES DISCUSSION

CORRECTED PAGE  
4  
OF SECTION C



UNITED STATES STUDY COMMISSION  
SOUTHEAST RIVER BASINS

River and large volumes are returned to this stream. Some of the water from the plant is extensively treated, while other portions of it are returned after use simply for cooling purposes.

The other counties in South Carolina in the lower portion of the Savannah River Basin are too small to be considered for extensive industrial development. The area is extremely swampy and is not likely to attract much development for industrial or domestic use.

## Georgia

### Zone G-1, Piedmont

In the Piedmont area of the Savannah River Basin in Georgia are a number of large towns and industries which derive their water from surface supplies. There are three or four towns, however, that derive their water from wells; these towns in general have a small (1,000 or under) population. There is an abundance of good water available for development in this zone except that it is used for fishing.

Those portions of Hancock and Warren Counties on the Fall Line and within the Ogeechee River Basin are virtually undeveloped.

The Piedmont area of the Altamaha River Basin is one of the most extensively developed areas within the State of Georgia. Here lie the University of Georgia at Athens and parts of the Atlanta Standard Metropolitan Area. Development of the Ocmulgee and Oconee Rivers is somewhat greater than for most of the other river basins in the Piedmont. In general, water plants are developed for use of surface water which requires filtration and chlorination, as at Athens, Monroe, Madison, Covington, Stone Mountain, Lithonia, Jefferson, Commerce, Winder, Eatonton, Monticello, Milledgeville, and Forsyth. Most of the towns with surface water supplies are mill towns including Monticello, Milledgeville, Eatonton, Madison, Monroe, Conyers, Jefferson, and Covington. Athens has a large variety of industries, and its water plant serves a water district including that city and several surrounding towns. Besides several metalworking industries in Athens, there is an extremely large chicken processing plant which sends its by-products to a pet food plant. On both the Oconee and Ocmulgee branches of the Altamaha River, there are large impoundments. The dam on the Oconee is located very near the Fall Line; the Ocmulgee has a large dam near Jackson, somewhat higher in the Piedmont.

In the upper area of the Oconee Basin, some towns have had a scarcity of water in dry weather. In the lower portion of the basin, the rivers are large and can be developed for industrial use, if the water quality of the waste is adequate to prevent excessive damage.

The counties in the Piedmont portion of the Chattahoochee and Flint drainage basins are highly developed, yet contain some of the best recreational areas of Georgia. Counties in the upland reaches of the Chattahoochee River have excellent recreation areas which converge on Lake Lanier. Despite the recreational use of Lake Lanier, Gainesville derives its water therefrom for both its domestic and industrial community. Several small mill ponds have been developed for the water supply of smaller communities and industries in the Gainesville area. Chicken producing and processing are well developed as an integrated industry within this area. There are eight major chicken processing plants within Gainesville itself, all of which derive most of their water from the city's new water treatment plant. Three of these processing plants use wells to augment the city supply. The volume of water available for industrial development in this area exceeds the present use of water from Lake Lanier. In the lower Piedmont counties bordering the Chattahoochee River, West Point is located close to the river and draws its water from it. Newnan is a well developed town which lies on the ridge between the Flint River and the Chattahoochee River. It draws its water from a small tributary stream of the Chattahoochee, discharging into both the Flint and Chattahoochee River tributaries. Newnan has expanded its water storage capacity three times lately by building two new reservoirs. It will be a continual struggle for this community to keep up with its water quantity requirements.

In the five counties of the Atlanta Standard Metropolitan Area are three large water systems plus a smaller system in Gwinnett County, all obtaining raw water from the Chattahoochee River. Each of the large water systems has expanded its treatment facilities within the last two or three years. There is also a rapid expansion of the distribution network in each system. The present maximum water uptake by the three major systems amounts to approximately one-third of the minimum dry weather flow at Atlanta. There is room for a reasonable expansion in water consumption. The Flint River rises in Atlanta, and during its flow out of the city it receives domestic and industrial wastes. Therefore, the quality of Flint

River water is not desirable for immediate development as a potable supply within the Atlanta area.

#### Zone G-2, Coastal Plain

In the upper two counties on the Coastal Plain bordering the Savannah River, several cities obtain their water supply from surface sources, but most obtain their water from wells. There is abundant surface water.

In the counties on the Fall Line there are also several towns that derive their water supply from wells, but the largest city, Augusta, derives its water from the Savannah River. This area has plenty of surface water for further development near the Savannah River.

In the lower counties in the Coastal Plain are several large cities. Among these, Savannah has developed a supply from the Savannah River because the ground water table was dropping too rapidly. Waynesboro, on a branch of the Savannah River, also uses surface water.

The Ogeechee River, lying entirely within the Coastal Plain, has its headwaters just above the Fall Line. The cities within its basin derive most of their water from wells. The flow of the Ogeechee River during the drought of 1954 approached 131 cubic feet per second. This is a rather sizable flow for the area's population, but at the moment it is used primarily for recreation rather than for industry.

There are several large industries drawing large volumes of water from underground aquifers in the Altamaha River Basin below the Fall Line. Jesup draws a half million gallons of water a day from its wells, but the large chemical cellulose manufacturing plant near Jesup derives 40 million gallons of water daily from wells. Other towns in this basin are not well developed industrially, so there is a large amount of water in the Altamaha River not presently used for industrial purposes. There is some commercial fishing on this river.

The city of Macon straddles both the Fall Line and the Ocmulgee River. Parts of Macon lie on each side of the Ocmulgee, and one can observe the Coastal Plain from prominent places within the city. Macon draws its water from the Ocmulgee River, as does a large paperboard mill just south of town. Other industries, including a naval stores plant and a large linoleum plant, also derive their water from the Ocmulgee River. In this particular situation, the development of the Macon area will not be limited by the volume of water available for use as processing water, but by the poor quality of



water remaining for accepting more industrial wastes into the Ocmulgee during extremely low flow. From this area southward or coastward, the Ocmulgee, Oconee, and Altamaha are surrounded by an extremely large flood plain, a swampy morass on which it is extremely difficult to develop large structures. The Macon paper mill is three miles from the river on somewhat higher ground because this is the closest it could be located near the river without encroaching on the swamp.

Brunswick, in the Satilla River Basin, derives most of its water from wells, though there is a certain amount of brackish water in the estuaries which can be used for cooling towers. The Satilla River has only a small fresh water volume, but has a rather large total volume of water because of the depth of the tidal estuary. Each of the other small cities within the Satilla River Basin is supplied by wells.

In the Suwannee River Basin are a surprising number of large industrial developments. A large paperboard mill of Owens-Illinois Glass Company near Valdosta draws all of its water from underground sources. Other public water supplies in the area draw their water from wells because, in general, the surface water is swampy and contains color from tannins. Swamp water is difficult to treat, so the well water is definitely preferred.

The Georgia portion of the Ochlockonee River Basin is also well developed. Thomasville has several industries which draw their water supply from wells. The industries include a slaughter house and cotton mill. Moultrie also has a large slaughter house and a large population dependent on well water. In general, the area is used for agricultural purposes or for supplying wood pulp to the paper mills in the vicinity. In this sub-basin, raw water is not a limitation for new industry, but the cost of waste treatment may be.

Apart from Columbus, the larger Coastal Plain cities in Georgia within the Flint and Chattahoochee River Basins are located either on the Flint or at some distance from these rivers. Albany, on the Flint, has several large industries within the city, as well as other large industries located outside the city limits. Bainbridge is another industrial city on the Flint. Most of the towns in these river basins are small and derive their water supplies primarily from wells. The Flint River in the southern portion of this area is extremely large, with a minimum flow in excess of a thousand cubic feet per second where it passes Bainbridge. This amount of

water presents the possibility of a large industrial potential even without consideration of the ground water which is also available.

Columbus, like Macon, lies on the Fall Line. Its interstate metropolitan area straddles the Chattahoochee River. Each of the communities and industries here obtains its water needs from the Chattahoochee and discharges wastes back into the stream. The potential supply of surface water here is very large, even at minimum flow.

## Florida

### Zones F-1-5, Coastal Plain

In Florida, the St. Mary's and Nassau River Basins are more heavily developed industrially than might be anticipated from a knowledge of the swampy character of the coast line. On the Georgia-Florida coastal strip there is a large pulp and paper mill on the St. Mary's, a container board mill, and a chemical cellulose plant. The raw process water is obtained from the large underground supplies. The rest of the area in these basins is not developed industrially.

The importance of the Suwannee River Basin lies primarily in its sentimental value as a tourist resort. It is covered with agricultural or forest land with no large cities.

Tallahassee, the State Capital of Florida, is located in the Ochlockonee River Basin, but not on the river. It is amply supplied with well water. Small creeks in this area generally have a color similar to that of tea from the tannins extracted from the decomposing vegetation.

The Apalachicola River has a very large flow from its source at the confluence of the Flint and Chattahoochee rivers across the southern area of Florida through Apalachicola, where it discharges into the Gulf of Mexico. This area is mainly wild, largely swamp, and very slightly developed. The river is extremely wide at its discharge into the Gulf. It is rather heavily colored with tannic acid, and at times there is much suspended material. However, this area would provide a rather ideal location for the development of industry if ground high enough to prevent flood damage could be found.

In the western zone of Florida are several well developed urban areas. Each of them is developed partly for recreation and partly for industry. Pensacola is located in the westernmost part of the area, with a good port and a considerable amount of industry. Panama City is developed primarily



as a port for inland traffic and for fishing, and as a recreational center. Both cities have large military installations nearby. The greater part of west Florida is relatively undeveloped; it is essentially a pine forest which provides much of the raw material for paper production at plants in Alabama, Georgia, and Florida. There is a large paper mill at Port St. Joe, on the coast, which obtains its water from underground supplies.

The small rivers, such as the Choctawhatchee, Perdido, and the Escambia, arise fully within the Coastal Plain of Alabama and flow through Florida. Though not large, they can supply adequate raw water for industrial development or for carrying away the treated wastes. There are also large volumes of underground water which may be tapped for the area as required.

## Alabama

### Zone A-1, Piedmont

The eastern edge of the Piedmont is marked by the Chattahoochee River where there are several large industries in the mill towns. These Alabama towns belong to the same metropolitan area as the neighboring Georgia cities. Lanett and neighboring Alabama communities form one urbanized area with West Point, Georgia. The Chattahoochee River is used for process water by the industries in these towns. This is also true for heavily industrialized Phenix City, which is part of the Columbus Standard Metropolitan Area.

### Zone A-2, Coastal Plain

The Coastal Plain section of Alabama is largely undeveloped. There is a large volume of water available from the Chattahoochee River on the eastern border of this zone. This is a large new power dam, recently closed, near Fort Gaines. Water will back up to the Fall Line at Columbus and Phenix City, creating a large volume of water available for industry and recreation. Eufaula and Abbeville have a few light industries, but are mainly market centers for farming areas. This area is primarily agricultural, and has large pine forests. However, port facilities are being developed at Phenix City and Columbia. The latter is 18 miles from Dothan, a city of almost 30,000 people.

### Zone A-3, Coastal Plain

This Coastal Plain area on the headwaters of flowing Zone F-5 in Florida has no major cities other than Dothan, which is astride the ridge line.

Underground sources have adequate water for industrial process water, while the small rivers would provide a means for the disposal of treated industrial wastes.

### Problems of Waste Disposal and Water Pollution

#### General

Downgrading of water quality by industrial use is largely a question of degree. It is not possible to use stream water in an industrial process and return it to the stream without some degenerative changes in the quality of that water. The extent of this change will depend on such factors as the ratio of the volume used and the concentration of pollutants to the stream flow. The degree of change after industrial use can be so slight as to be of no practical significance for other water requirements downstream.

The concept of water or river pollution varies from state to state in the Southeast River Basins. In South Carolina and Alabama, pollution can result only from the addition of some material to the river. The concept adopted by the Florida Water Resources Commission is " . . . the addition of any substance to water that interferes with beneficial uses or is detrimental or potentially detrimental to animal, plant, or aquatic life . . ." In Georgia, pollution is defined as a degradation in water quality that results from use that gives benefit to man. Thus, hydroelectric power generation can be included in the concept of water pollution within the terms of the law in Georgia, because the water downstream from a dam may be seriously degraded. But this is not true for the poor water quality from power dams in other states. Although hydroelectric power generation does produce water pollution by law in Georgia, there is not continuous degradation of the quality of water from hydroelectric power dams for most industrial or domestic uses. Because of the lowered dissolved oxygen, the discharge is a poor quality of water for accepting industrial and domestic waste, especially during the summer and fall.

Development of water and power resources, and the location of additional water-using industries, are very likely to entail some damage to the water quality of rivers. When such development occurs in areas of limited waste-disposal capacity, an agreed arrangement between industry and community is essential to the maintenance of harmony if not of public health. There must be some agreed provision for assuring adequate waste treatment facilities. "Tolerance limits" on the downgrading of river water by industry should be left to the determination of professionally trained sanitary engineers.

In the Piedmont portions of the study area, surface streams must supply most water needs and remove the waste. A city's location with respect to a major river is particularly important; nearness is a crucial advantage. Coastal Plain areas have ample ground water supplies of good quality; but special measures to assure adequate waste disposal are necessary if industry and community are to get along well together. A good example of a favorable solution to this problem is provided at Valdosta, where an effective lagoon system was worked out. Although expensive, it provides a high-quality discharge to the Suwannee River.

The effects of impoundments on stream water quality call for further close study, and a reexamination of some states' water quality laws. In some states, an industry locating downstream from an impoundment bears the onus of conditions created by the combination of water degradation at the impoundment and the organic matter which it adds. The crucial factor could have been the lowering of the stream's tolerance limits by the impoundment, but the law does not take this into account. In places where impoundment causes a marked reduction in velocity of stream flow near a point where pollution is added, critical problems can be expected. In such situations, a high degree of engineering skill is required to develop a proper scheme of waste treatment. This is a definite future possibility at Columbus, Georgia.

For some industries, there is inadequate knowledge of proper methods of industrial waste treatment. In such cases, it is advisable for the plant to be located near a large river, or near a large city having adequate sewage treatment facilities.

#### Comments on the Major River Basins

The writer's specific comments on certain individual river basins are those of an observer who is professionally trained in the concepts of water supply and sewage disposal, but is not directly concerned with the control of pollution.

On the upper reaches of the Savannah River, Hartwell Dam is at a sufficient distance upstream from Clark Hill Reservoir to permit recovery of water quality after impoundment. Farther downstream, there is also ample opportunity for quality recovery from the pollution effects from Augusta sewage and the wastes from the huge Atomic Energy Commission installations in South Carolina. Near Savannah the stream is slow and sluggish, with

considerable tidal effect. Many of the industries of the Savannah area are supplied river water via that city's water treatment plant. The degree of pollution from municipal and industrial wastes has been sufficient to call for improved waste treatment by the Georgia pollution control agency.

The Ogeechee drainage basin is comparatively undeveloped industrially. This is a relatively pure stream, with excellent fishing. The lower portion is a slow coastal stream with considerable tidal effect.

The Altamaha River and its tributaries have pollution in a number of places, with varying results. Pollution in the upper reaches of several tributary streams is overcome by self-purification before those streams empty into Jackson Lake. Macon provides only partial treatment for heavy municipal and industrial waste loads. More waste flows from Warner Robins, though it is diminished by self-purification of the connecting stream. The Oconee is polluted by industrial and municipal wastes at Athens and Milledgeville, but from there to its confluence with the Ocmulgee it is not further burdened. Pollution damage on the Altamaha is minimized by a rapid rate of self-purification, except during the winter when an unusual set of conditions is adverse to shad fishing.

The Satilla, St. Mary's, and Suwannee are comparatively small rivers with limited pollution-load-bearing capabilities. These streams, and the Ochlockonee River to the west, are heavily colored by tannins in the swamps.

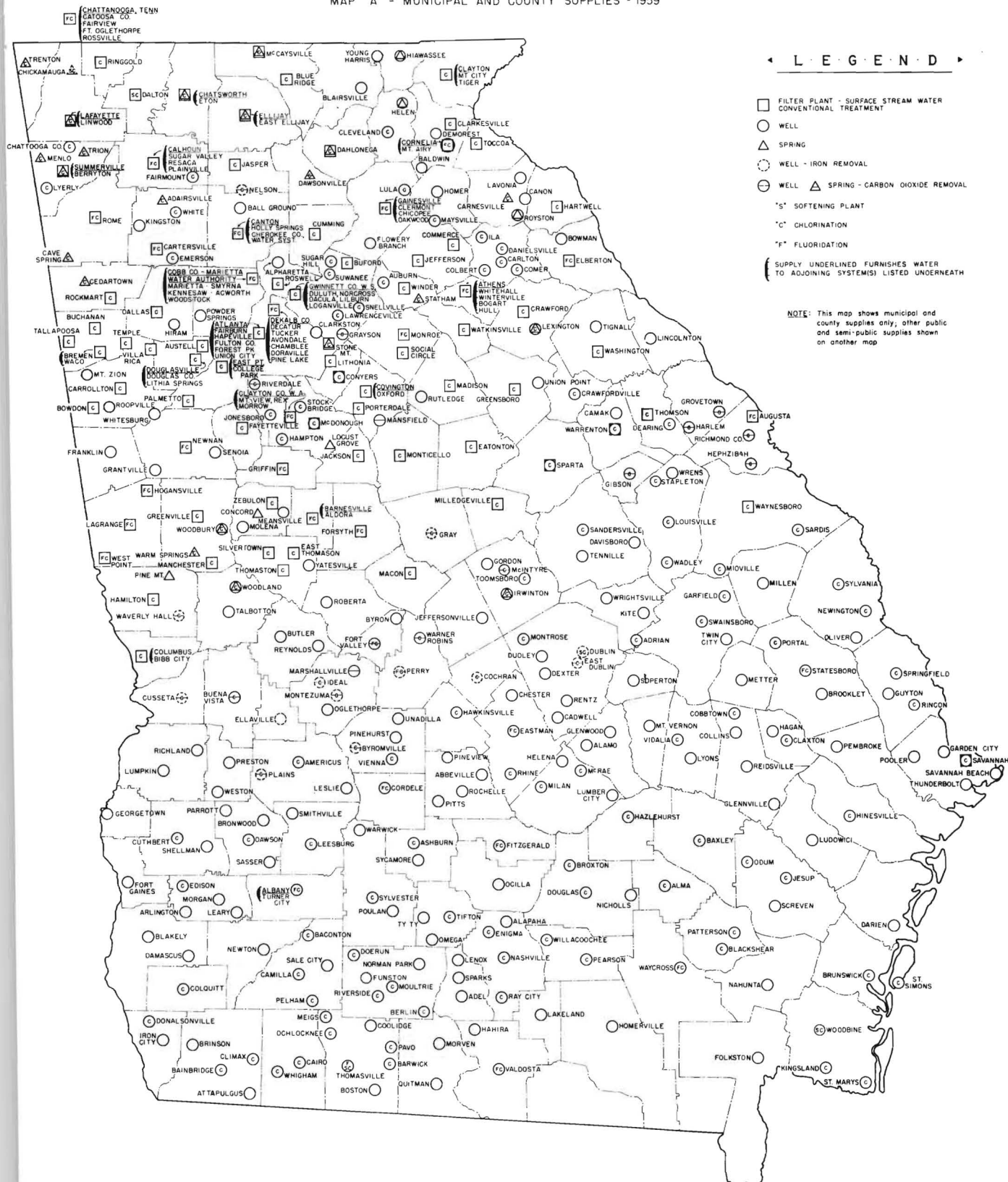
The rivers forming the Apalachicola are severely polluted in spots. Wastes from Gainesville pollute one arm of Lake Lanier before it flows into the Chattahoochee. This river receives further pollution from Roswell, Atlanta, Marietta, Smyrna, Newnan, LaGrange, and from both banks in the general vicinity of West Point. At Columbus the heavy pollution can be expected to become more serious when the flow is retarded by the lake to be formed upstream from Fort Gaines Dam. Complete treatment will be expensive as well as technically difficult.

# GEORGIA WATER SUPPLIES

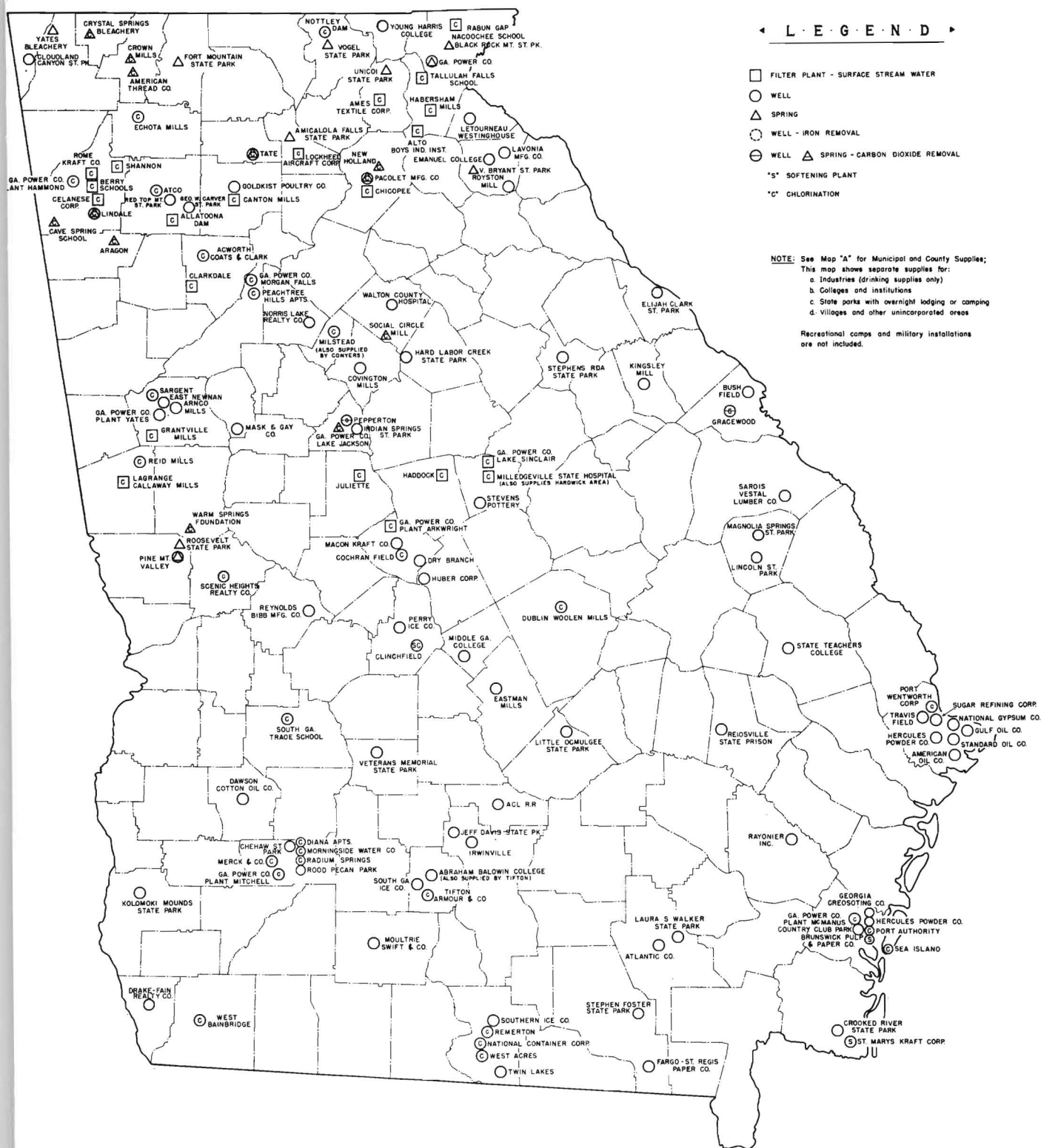
GEORGIA DEPARTMENT OF PUBLIC HEALTH

WATER QUALITY DIVISION

MAP "A" - MUNICIPAL AND COUNTY SUPPLIES - 1959



## MAP "B" - SUPPLIES OTHER THAN MUNICIPAL AND COUNTY - 1959



# GEORGIA SEWAGE AND INDUSTRIAL WASTE WORKS

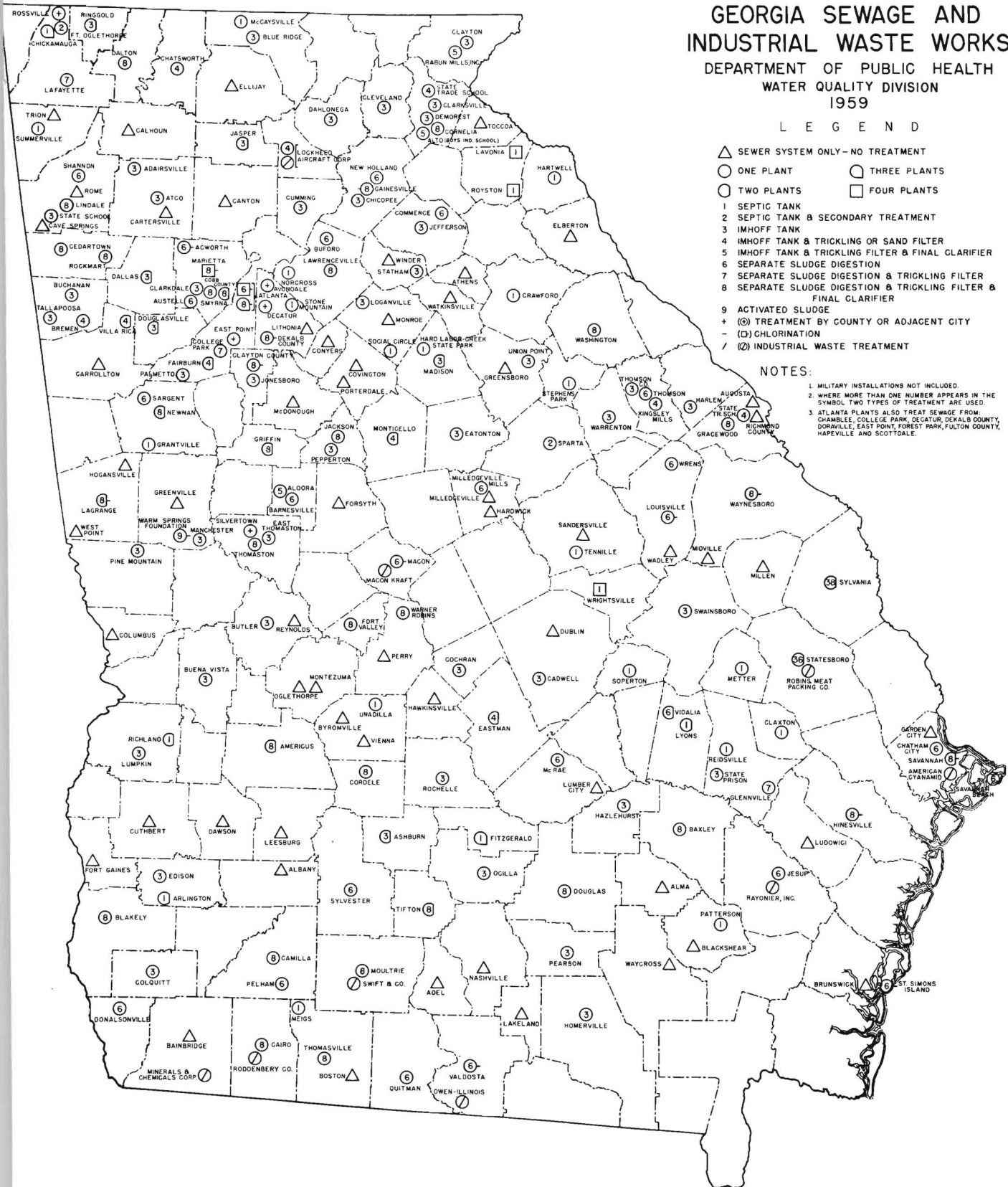
DEPARTMENT OF PUBLIC HEALTH  
WATER QUALITY DIVISION  
1959

## LEGEND

- △ SEWER SYSTEM ONLY - NO TREATMENT
- ONE PLANT
- TWO PLANTS
- THREE PLANTS
- FOUR PLANTS
- 1 SEPTIC TANK
- 2 SEPTIC TANK & SECONDARY TREATMENT
- 3 IMHOFF TANK
- 4 IMHOFF TANK & TRICKLING OR SAND FILTER
- 5 IMHOFF TANK & TRICKLING FILTER & FINAL CLARIFIER
- 6 SEPARATE SLUDGE DIGESTION
- 7 SEPARATE SLUDGE DIGESTION & TRICKLING FILTER
- 8 SEPARATE SLUDGE DIGESTION & TRICKLING FILTER & FINAL CLARIFIER
- 9 ACTIVATED SLUDGE
- + (3) TREATMENT BY COUNTY OR ADJACENT CITY
- (3) CHLORINATION
- / (2) INDUSTRIAL WASTE TREATMENT

## NOTES:

1. MILITARY INSTALLATIONS NOT INCLUDED.
2. WHERE MORE THAN ONE NUMBER APPEARS IN THE SYMBOL, TWO TYPES OF TREATMENT ARE USED.
3. ATLANTA PLANTS ALSO TREAT SEWAGE FROM: CHAMBLEE, COLLEGE PARK, DECATUR, DEKALB COUNTY, DORAVILLE, EAST POINT, FOREST PARK, FULTON COUNTY, HAPEVILLE AND SCOTSDALE.





INDUSTRIAL RESOURCES AND POTENTIALS  
OF THE SOUTHEAST RIVER BASINS

---

Population and Labor Force

by

John L. Fulmer

---

Employment

by

Lee A. Dudley  
John L. Fulmer  
Walter Kennon  
Lamar White

Prepared for the administrative use only of the  
United States Study Commission, Southeast River Basins

---

Lamar White, Project Director

---

Industrial Development Branch  
Engineering Experiment Station  
Georgia Institute of Technology  
June 1960



## INDUSTRIAL RESOURCES AND POTENTIALS OF THE SOUTHEAST RIVER BASINS

### Sections of the Final Report and Their Designations

<u>Title</u>	<u>Section</u>
Land Use Patterns and Planning Activity	A
Mineral Resources Review	B
Water Resources	C
Population and Labor Force	D
Employment	E
Personal Income	F
Disposable Income, Consumption, and Savings	G
Economic Indicators for Major Functional Segments of the Economy	H
Summary of Recent Trends in Economic Growth and Development	I
Economic-Statistical Projections	J
Mathematical-Economic Projections	K
Economic Development Potentials by River Basin	L

## Table of Contents

### Section D

	<u>Page</u>
Population	D-1
Study Area States Relative to the Nation, 1930-1950	D-1
Study Area Portions of States Relative to State Totals, 1930-1950	D-2
Trends in River Basins and State Sub-basins, 1930-1950	D-3
Factors Influencing Population Changes in Georgia and Neighboring Areas	D-5
Labor Force	D-6
Factors Influencing Participation in the Labor Force	D-6
Participation Rates in Study Area States and the Nation, 1950	D-7
Labor Force in the Study Area, by State Segments, 1950	D-7
Labor Force by River Basins and State Sub-basins, 1940 and 1950	D-8
<u>Tables</u>	
I. Trends in Population by River Basin and Sub-basin, 1930, 1940, and 1950 with Per Cent Change, 1930-50	D-4
II. Trend in Labor Force by Basins and Sub-basins, 1940 and 1950	D-10

# POPULATION AND LABOR FORCE\*

## Population

### Study Area States Relative to the Nation, 1930-1950

Two of the five study area states had growth rates above the national average from 1930 to 1950, as did the five states combined. Increases in the three other states studied were less than the 22.7 per cent rise for the nation. The five-state total heavily influenced by the high rates of increase in Florida and North Carolina, rose from 9.72 per cent of the national population total in 1930 to 10.26 per cent in 1950.

The relationship of population in the study area states to United States population for 1930, 1940, and 1950 is shown by the following tabulation.

State	Population in Thousands			Percentage <sup>1/</sup> of National Total			Per Cent Increase 1930-1950
	1930	1940	1950	1930	1940	1950	
Alabama	2646.2	2833.0	3061.7	2.16	2.15	2.03	15.7
Florida	1468.2	1897.4	2771.3	1.20	1.44	1.84	88.8
Georgia	2908.5	3123.7	3444.6	2.37	2.37	2.29	18.4
North Carolina	3170.3	3571.6	4061.9	2.58	2.71	2.70	28.1
South Carolina	1738.8	1899.8	2117.0	1.42	1.44	1.40	21.8
Five-State Total	11932.0	13325.5	15456.5	9.72	10.12	10.26	29.5
United States	122775.0	131669.3	150697.4	--	--	--	22.7

Source: U. S. Bureau of the Census, 1950 Census of Population

\* By John L. Fulmer, Georgia Institute of Technology

<sup>1/</sup> The percentages will not necessarily add to totals, due to rounding.

# Study Area Portions of States Relative to State Totals, 1930-1950

Each study area portion of the four principal states represented in the Southeast River Basins area grew less rapidly than its respective whole state from 1930 to 1950. The relatively small part of Georgia outside the study area embraces Rome, Dalton, a portion of Chattanooga's suburban area, and other textile centers which have been growing rapidly. Future growth will probably not depend as much on the textile industry, so the trend beyond 1960 is expected to be different. In Alabama, Florida, and South Carolina the study area segments' lower rates of gain are due to the fact that the larger, more aggressively growing population centers lie outside the study area boundaries. Although the tiny North Carolina segment grew somewhat faster than the State total on a percentage basis, the actual gain was from 5,100 people to 6,600. Absolute and percentage changes in the study area segments relative to their respective state totals are shown in the table below.

State	Population in Thousands			Percentage of Total			Per Cent Popu- lation Increase 1930-1950	
	1930	1940	1950	1930	1940	1950		
Alabama	a	2646.2	2833.0	3061.7	22.2	21.3	19.8	15.7
	b	481.9	490.6	482.9	13.1	12.5	11.2	0.2
Florida	a	1468.2	1897.4	2771.3	12.3	14.2	17.9	88.8
	b	378.2	439.0	537.4	10.3	11.2	12.5	42.1
Georgia	a	2908.5	3123.7	3444.6	24.4	23.4	22.3	18.4
	b	2591.7	2760.9	3042.0	70.7	70.4	70.7	17.4
North								
Carolina	a	3170.3	3571.6	4061.9	26.5	26.8	26.3	28.1
	b	5.1	6.0	6.6	0.1	0.2	0.2	29.4
South								
Carolina	a	1738.8	1899.8	2117.0	14.6	14.3	13.7	21.8
	b	213.9	223.2	231.2	5.8	5.7	5.4	8.1
Five								
States	a	11932.0	13325.5	15456.5	100.0	100.0	100.0	29.5
	b	3670.8	3919.7	4300.1	100.0	100.0	100.0	17.1
	c	--	--	--	30.8	29.4	27.8	--

a=State totals; b=Total, study area segments; c=Ratio of total "b" to total "a"  
Source: U. S. Bureau of the Census, 1950 Census of Population; and estimates derived therefrom.

Population in the entire study area increased only 17.1 per cent from 1930 to 1950, it will be noted, compared with 29.5 per cent for the five states combined. Thus the study area's proportion of the five-state total declined from 30.8 per cent in 1930 to 27.8 per cent in 1950.

The study area's 1950 population composition by states is shown below. Georgia led with over 70 per cent of the total.

<u>State</u>	<u>1950 Population In Study Area</u>	<u>Per Cent Total</u>
Alabama	482.9	11.2
Florida	537.4	12.5
Georgia	3042.0	70.7
North Carolina	6.6	0.2
South Carolina	<u>231.2</u>	<u>5.4</u>
Total	4300.1	100.0

Source: 1950 Census of Population.

#### Trends in River Basins and State Sub-basins, 1930-1950

Table I presents population data for the study area by major river basins and state sub-basins for 1930, 1940, and 1950. The original county data were allocated to county segments in each basin by allocating all farm population for states except Georgia according to the proportion of cropland in each sub-basin. In Georgia, the allocation was on the basis of total land area.<sup>2/</sup> Nonfarm population was allocated on a basis proportionate to urban population.

The data show that the Apalachicola basin (number VII) ranks as the most populous of the eight major basins in the study area. In 1950 it contained some 35 per cent of the study area total, followed by the Altamaha basin (over 18 per cent), the Savannah basin (over 16 per cent) and the Perdido-Escambia basin (over 13 per cent). These four leading

---

<sup>2/</sup>Rural farm population data for Alabama, Florida, North Carolina, and South Carolina, were provided by the Department of Agricultural Economics in each state.

TABLE I

Trends in Population by River Basin and Sub-basin,  
1930, 1940, and 1950 With Per Cent Change, 1930-50

(In Thousands)					
BASIN AND STATE SUB-BASIN	1930	1940	1950	Ratio to Total 1950	Per Cent Increase 1930-50
BASIN 1					
Georgia	375.3	405.2	453.4	10.5	20.8
North Carolina	5.1	6.0	6.6	0.2	29.4
South Carolina	213.9	223.2	231.2	5.4	8.1
Total	594.3	634.4	691.2	16.1	16.3
BASIN 2					
Georgia	161.6	154.2	140.2	3.3	-13.2
BASIN 3					
Georgia	700.9	715.8	787.6	18.3	12.4
BASIN 4					
Florida	17.9	20.9	24.3	0.6	35.8
Georgia	95.4	100.4	104.3	2.4	9.3
Total	113.3	121.3	128.6	3.0	13.5
BASIN 5					
Florida	82.5	89.2	90.2	2.1	9.3
Georgia	187.4	196.1	199.3	4.6	6.4
Total	269.9	285.3	289.5	6.7	7.3
BASIN 6					
Florida	87.7	95.8	111.2	2.6	26.8
Georgia	70.0	68.8	70.2	1.6	0.3
Total	157.7	164.6	181.4	4.2	15.0
BASIN 7					
Alabama	148.2	151.6	161.7	3.8	9.1
Florida	52.7	55.3	57.5	1.3	9.1
Georgia	1001.1	1120.4	1287.0	29.9	28.6
Total	1202.0	1327.3	1506.2	35.0	25.3
BASIN 8					
Alabama	333.7	339.0	321.2	7.5	-3.7
Florida	137.4	177.8	254.2	5.9	85.0
Total	471.1	516.8	575.4	13.4	22.1
SUMMARY:					
Alabama	481.9	490.6	482.9	11.2	0.2
Florida	378.2	439.0	537.4	12.5	42.1
Georgia	2591.7	2760.9	3042.0	70.7	17.4
North Carolina	5.1	6.0	6.6	0.2	29.4
South Carolina	213.9	223.2	231.2	5.4	8.1
Total	3670.8	3919.7	4300.1	100.0	17.1

basins taken together represent well over 80 per cent of the total.

The Apalachicola had by far the largest rate of increase, also. The table indicates that its relative importance and its rapidity of growth are due almost entirely to Georgia Sub-basin VII.

Among the various state sub-basins, the Georgia portion of Basin VII leads with almost 30 per cent of the study area total in 1950. Second is the all-Georgia Basin III (Altamaha) with over 18 per cent. Other relatively populous sub-basins are the Georgia portion of I (Savannah), 10.5 per cent; and the Alabama part of VIII (Perdido-Escambia), 7.5 per cent. Those with the most rapid percentage rates of growth from 1930 to 1950 include the Florida portions of VIII (85.0 per cent) and IV (35.8 per cent), the North Carolina portion of I (29.4 per cent), the Georgia portion of VII (28.6 per cent), and the Florida part of VI (26.8 per cent). All of the Florida sub-basins, except V, had a more rapid rate of growth than the study area composite. Georgia Sub-basin VII had the largest absolute increase by far of any of the sub-basins.

#### Factors Influencing Population Changes in Georgia and Neighboring Areas

The urban component of the total population has been increasing steadily for the past several decades. The urbanization pace has quickened since 1940. The corresponding decline in rural population has been much sharper for nonwhites than for whites.

The area's rate of natural increase is much higher than the national rate. Crude birth rates, at least in Georgia, have been highest among the rural nonwhites and death rates have been highest among the urban nonwhites.

In the period from 1930 to 1958, net out-migration from Georgia occurred in all but five years. From 1950 to 1958 there was an aggregate drain of 41 per cent of the natural increase, which was less drastic than the 48 per cent drain from 1940 to 1950.

A more detailed discussion of these factors governing changes in an area's population is included in the chapter, "Economic-Statistical Projections."

### Labor Force

#### Factors Influencing Participation in the Labor Force

The major forces determining the percentage of the population in the labor force are age distribution, sex distribution, and location of residence. Population data show a direct relationship between median age and the percentage of the total population in the labor force. This relationship, though not particularly strong, serves as a measuring device. A relatively low median age for a given area can be attributed to a high rate of natural increase, a heavy out-migration of workers in the mature age groups, or both. Both factors have operated in the study area states, except Florida, during recent decades. Strong economic development forces can be expected to arrest and reverse the out-migration trend in the study area as a whole.

The proportion of males, 14 years of age and over, in the labor force has been relatively stable and about 79 per cent. The ratio of females in the labor force has been increasing. One factor is the big rise in trade and services employment, which offer many openings to women. Other influences tending to increase female participation in the labor force include urbanization and rising educational levels.

The influence of place of residence on labor force participation is very strong among females. In the nation and in the study area the participation rate is highest by far in urban areas, followed by rural nonfarm and rural farm areas. Among males, the rural farm ratio is highest and rural nonfarm is the lowest. However, much of the rural farm margin is accounted for by unpaid farm family workers. Continuing urbanization can



be expected to increase the size of the study area's labor force relative to its total population.

#### Participation Rates in Study Area States and the Nation, 1950

All of the study area states had a somewhat lower proportion of total population in the labor force in 1950 than did the United States as a whole. Florida, with 39.6 per cent, came closest to the national average of 39.9 per cent. Georgia had 38.8 per cent, followed by North Carolina, South Carolina, and Alabama, in the order named. Florida's high proportion may be attributed to the heavy influx of adult workers and to the presence of many semi-retired and retired persons who nevertheless are counted as available for employment. The low ratio in Alabama is due to a much lower proportion of females in both the rural farm and the rural nonfarm portions of the labor force.

The following table compares labor force participation rates in study area states with the national rate in 1950.

<u>State</u>	<u>Population In Thousands</u>	<u>Labor Force In Thousands</u>	<u>Per Cent Population In Labor Force</u>
Alabama	3061.7	1085.2	35.4
Florida	2771.3	1098.8	39.6
Georgia	3444.6	1336.9	38.8
North Carolina	4061.9	1554.9	38.3
South Carolina	2117.0	798.2	37.7
Total	15456.5	5874.0	38.0
United States	150697.4	60054.0	39.9

Source: U. S. Bureau of the Census, 1950 Census of Population

#### Labor Force in the Study Area, by State Segments, 1950

The 1950 distribution of the study area's labor force by state is shown in the following tabulation.

<u>State</u>	<u>Labor Force (Thousands)</u>	<u>Per Cent Total</u>
Alabama	172.1	10.5
Florida	193.5	11.8
Georgia	1189.4	72.3
North Carolina	2.0	0.1
South Carolina	<u>87.7</u>	<u>5.3</u>
Total	1644.7	100.0

The Georgia portion of the study area accounted for 72.3 per cent of the area's labor force, as against 70.7 per cent of its total population. This differential may be explained by the higher levels of employment in the several large Georgia cities, and the migration of job-seekers to these urban centers.

#### Labor Force by River Basins and State Sub-basins, 1940 and 1950

As with population, labor force data are not directly available by sub-basins in the different states. Conceptually, the gainfully employed series provided in the Census of 1930 is not at all comparable with the labor force concept for 1940 and 1950. "Labor Force," as used in 1940 and 1950, is precisely defined and tied to a specific week during the enumeration period. On the other hand, the concept of "Gainfully Employed" is vaguely defined to coincide with a "calling" or profession, whether or not one was working at it during the enumeration. Persons in institutions were also included, and the age limit began at 10 years rather than "14 years or older," as in 1940 and 1950. (See 1950 Census of Population, Volume III, page 44.) There are numerous other differences between the two concepts which have never been satisfactorily reconciled, even at the national level.

In the preparation of estimates for basin sub-divisions, the county labor force was broken into segments and credited directly to

the applicable river basin in each case. The labor force total for each county was allocated on the basis of total population in the different segments of the counties in the study area.

Table II shows the trend in the area's labor force from 1940 to 1950, and the percentage of the total in each basin and sub-basin. The study area's total labor force increased by some 128,500 workers in the decade; thus, the annual rate of increase averaged 12,850.

The basins contributing the largest absolute gains were VII (Apalachicola), III (Altamaha), VIII (Perdido-Escambia), and I (Savannah), in the order listed. Basins showing the most rapid percentage gains in the ten-year period were VI (Ochlockonee), VIII, VII, III, and I.

In 1950, Basin VII accounted for 36.9 per cent of the study area's total labor force, compared with 35.0 per cent of its population. The next ranking basins are III, I, and VIII. Together with Basin VII, they accounted for 83.4 per cent of the study area's total labor force in 1950.

TABLE II

Trend in Labor Force by Basins  
and Sub-basins, 1940 and 1950

(In Thousands)			
BASIN AND STATE SUB-BASIN	1940	1950	1950 Per Cent of Total
BASIN 1			
Georgia	162.5	180.0	11.0
North Carolina	2.0	2.0	0.1
South Carolina	86.0	87.7	5.3
Total	250.5	269.7	16.4
BASIN 2			
Georgia	54.9	49.2	3.0
BASIN 3			
Georgia	272.1	297.4	18.1
BASIN 4			
Florida	7.6	8.3	0.5
Georgia	35.7	37.0	2.3
Total	43.3	45.3	2.8
BASIN 5			
Florida	29.8	30.5	1.9
Georgia	70.0	71.4	4.3
Total	99.8	101.9	6.2
BASIN 6			
Florida	35.6	43.5	2.7
Georgia	25.3	26.6	1.6
Total	60.9	70.1	4.3
BASIN 7			
Alabama	61.0	60.8	3.7
Florida	18.0	19.0	1.2
Georgia	473.7	527.8	32.0
Total	552.7	607.6	36.9
BASIN 8			
Alabama	118.1	111.3	6.8
Florida	63.9	92.2	5.6
Total	182.0	203.5	12.4
SUMMARY:			
Alabama	179.1	172.1	10.5
Florida	154.9	193.5	11.8
Georgia	1094.2	1189.4	72.3
North Carolina	2.0	2.0	0.1
South Carolina	86.0	87.7	5.3
Total	1516.2	1644.7	100.0

## Table of Contents

### Section E

	<u>Page</u>
Total Employment, 1940-1950	E-1
Nonagricultural Employment	E-1
States of the Study Area	E-2
Trends in Study Area Portions of Four States	E-3
Manufacturing	E-3
Trade	E-4
Government	E-4
Services	E-4
Other Industry Divisions	E-5

### Tables

I. Trends in Labor Force, Unemployment, and Employment, by River Basins and Sub-basins, 1940-1950	E-6
II. Employment in Nonagricultural Establishments, U. S. and Selected States, 1939-1957	E-7
III. Index of Employment in Nonagricultural Establishments, U. S. and Selected States, 1939-1957	E-8
IV. Index of Employment in Alabama Nonagricultural Establishments, by Industry Division, 1939-1957	E-9
V. Index of Employment in Florida Nonagricultural Establishments, by Industry Division, 1939-1957	E-10
VI. Index of Employment in Georgia Nonagricultural Establishments, by Industry Division, 1939-1957	E-11
VII. Index of Employment in South Carolina Nonagricultural Establishments, by Industry Division, 1939-1957	E-12
VIII. Covered Nonagricultural Employment in Selected States of the Southeast, by Industry Division, 1957	E-13
IX. Covered Nonagricultural Employment in the Southeast River Basins Area, by Industry Division, 1957	E-14
X. Estimated Employment in Nonagricultural Establishments, Southeast River Basins Area, by Industry Division, 1957	E-15
XI. Index of Estimated Employment in Nonagricultural Establishments, Southeast River Basins Area, by Industry	E-16

## EMPLOYMENT<sup>\*</sup>

### Total Employment, 1940-1950

Estimates of total employment in the study area are derived by subtracting estimates of the unemployed from labor force estimates. All are based on Census of Population data by counties. Estimating procedures were used in order to obtain breakdowns of counties to arrive at basin and sub-basin figures, and to establish relationships useful for projections of labor force and employment.

Total employment in the study area rose from 1,437,700 in 1940 to 1,593,200 in 1950. This increase was accompanied by a drop in unemployment, as it exceeded the rise in the area's labor force during the decade of the '40's.

The largest increments in number of jobs occurred in the Apalachicola, Altamaha, Perdido-Escambia, and Savannah basins, in the order named. The combination of these four major river basins accounted for well over 90 per cent of the total net gain in employment throughout the study area from 1940 to 1950. Table 1 shows trends in labor force, unemployment, and employment, by basins and state sub-basins.

### Nonagricultural Employment

Full reconciliation of statistics on nonagricultural employment as published in the decennial Census of Population with those published monthly and annually by the Bureau of Labor Statistics is impracticable. There are important differences in concept and coverage. The BLS series, supplemented by available data for areas within states, is chosen for the

---

\* Aggregate employment analysis by John L. Fulmer, Georgia Institute of Technology. Compilation, collation, and analysis of data for major categories of nonagricultural employment by Lee A. Dudley, Walter Kennon, and Lamar White, Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology.

analysis. These data provide a less complete coverage of total employment, but they are available on a continuous basis.

#### States of the Study Area

For the five states represented in the study area, total nonagricultural employment increased more rapidly from 1939 to 1957 than in the country as a whole. The rise was most pronounced in Florida (385,300 to 1,132,700). Georgia's increase was second in magnitude, followed by that of Alabama, North Carolina, and South Carolina in the order listed. Table 2 shows the trend in total nonagricultural employment from 1939 to 1957, and Table 3 shows, by the use of index numbers, the comparative rates of increase to the 1957 level for the five states and the nation.

Florida's biggest absolute gains by industry division were in trade, services, and government, listed in descending order of importance. In percentage terms, its pace setter was construction. Next came finance, insurance, and real estate; services; government; and trade.

Georgia's greatest percentage rises from 1939 to 1957 occurred in finance, insurance, and real estate; government; and trade. In absolute terms, manufacturing, trade, and government furnished most of Georgia's additional jobs. The same three industry divisions accounted for most of Alabama's increase of 342,000 jobs and South Carolina's 234,400.

No detailed analysis of North Carolina's employment patterns and trends is undertaken. The small bits of four counties included in the study area are generally rural and mountainous in character, thinly populated, and have a relatively small proportion of their people employed in nonfarm occupations. This fragment of North Carolina represents 0.36 per cent of the State's total land area and, according to estimates for 1956, 0.16 per cent of its population and only 0.11 per cent of its personal income.

Tables 4, 5, 6, and 7 show employment trends by industry division for Alabama, Florida, Georgia, and South Carolina, respectively, from 1939 to 1957.

#### Trends in Study Area Portions of Four States

Data on so-called "covered" employment make possible a comparison of employment trends in the state segments of the study area with those in the respective whole states. These data also frequently serve as the best available allocators for use with BLS data by state to estimate nonagricultural employment in the fractions of states composing the Southeast River Basins Area. "Covered" employment data for 1957 are presented in Tables 8 and 9.

In general, the study area portions of states other than Georgia are less populous and less prosperous than those states as a whole. The Georgia portion is representative of the whole State, though somewhat more prosperous, and may conveniently be regarded as "nine-tenths of Georgia" in many respects. One exception is mining, most employment in which occurs in the one-tenth of the State outside the study area.

Statistics and estimates for the study area and its parts indicate, in Tables 9-11, that manufacturing, trade, government, and services provide the bulk of nonagricultural employment. Nondurable goods -- chiefly textiles, apparel, food, and pulp and paper -- account for most manufacturing employment. Lumber and wood products and transportation equipment are the leading lines of durable manufactures.

#### Manufacturing

Growth in manufacturing employment has been lagging in the Alabama and Florida portions relative to their state totals, but has been comparatively rapid in the Georgia and South Carolina segments.



## Trade

Wholesale and retail trade jobs have been increasing faster in the Alabama, Florida, and South Carolina study areas than in the whole states. In Georgia, the growth rate has been slightly higher outside the study area.

## Government

Government employment in the study area totaled some 202,900 in 1957, the only recent year for which data from the Census of Governments and other sources afford reasonably satisfactory estimates. This industry division ranks third in the study area as a whole, behind manufacturing (375,800) and trade (262,000) but well ahead of services (110,500). In some of the state segments, government ranks even higher among industry divisions -- second in Alabama and South Carolina, and first in Florida. Trends in government employment in the four principal states represented in the study area show a rate of growth from 1939 to 1957 which is much higher than the national average. The four-state area's 1957 employment was 245 per cent of its 1939 level, as compared to an index of 191 for the nation. Analysis of the individual states' growth rates from 1939 to 1957, and of the "mix" of these states' shares of the estimated total for the study area in 1957, suggests a growth rate in the study area only slightly less than that of the four-state total.

## Services

Employment in services has been increasing more rapidly in the study area segments of Alabama, Florida, and South Carolina, and just as fast in the Georgia portion, as in the whole states. This category of nonagricultural employment represented 9.6 per cent of the total for the study area in 1957. This proportion is somewhat lower than that for

the United States (12.1 per cent) the State of Florida (15.6 per cent), and the State of Georgia (10.0 per cent). It is somewhat higher than the proportions for Alabama and South Carolina totals.

#### Other Industry Divisions

Each of the other industry divisions accounts for relatively small (less than 8 per cent) shares of total nonfarm jobs. Transportation, communications, and public utilities -- combined by the BLS into one industry division -- represent about 7 per cent of the total. This is somewhat lower than this division's proportion in the nation (8 per cent) in 1957. The covered employment data are particularly deficient for this industry division, making trend study for intrastate areas impracticable. However, the BLS statistics by state indicate steady growth in Florida and Georgia from 1939 to 1957 (though Georgia's peaked in 1956). There was a rise in Alabama from 1939 to 1944, followed by a considerable decline from 1944 to 1956 and a slight upturn in 1957. South Carolina experienced increases from 1939 to 1952, with dips in the 1947-1950 period, and a declining trend since 1952.

Contract construction is strongest in the Florida segment (almost 10 per cent), and weakest in the Alabama (4 per cent) and South Carolina (3 per cent) segments. The trend is distorted by the boom volume of construction in the South Carolina and Florida portions in 1953, when a summit was reached in those areas. Finance, insurance, and real estate jobs are estimated to have almost tripled from 1939 to 1957, but this division still represents a smaller proportion of the total than in the nation generally. Mining employment in the study area is negligible, except in Alabama, and has not shown sustained growth since 1939.

TABLE I

Trends in Labor Force, Unemployment, and Employment,  
by River Basins and Sub-basins, 1940-1950

Basin and Sub-basin	(In Thousands)					
	Labor Force		Unemployment		Employment	
	1940	1950	1940	1950	1940	1950
BASIN I						
Georgia	162.5	180.0	11.7	8.4	150.8	171.6
North Carolina	2.0	2.0	0.1	0.1	1.9	1.9
South Carolina	86.0	87.7	3.1	2.5	82.9	85.2
Total	250.5	269.7	14.9	11.0	235.6	258.7
BASIN II						
Georgia	54.9	49.2	1.6	1.2	53.3	48.0
BASIN III						
Georgia	272.1	297.4	12.1	8.4	260.0	289.1
BASIN IV						
Florida	7.6	8.3	0.3	0.2	7.3	8.1
Georgia	35.7	37.0	1.3	0.8	34.4	36.2
Total	43.3	45.3	1.6	1.0	41.7	44.3
BASIN V						
Florida	29.8	30.5	1.2	0.7	28.6	29.8
Georgia	70.0	71.4	1.8	2.0	68.2	69.4
Total	99.8	101.9	3.0	2.7	96.8	99.2
BASIN VI						
Florida	35.6	43.5	1.7	1.0	33.9	42.5
Georgia	25.3	26.6	0.9	0.7	24.4	25.9
Total	60.9	70.1	2.6	1.7	58.3	68.4
BASIN VII						
Alabama	61.0	60.8	2.1	1.5	58.9	59.3
Florida	18.0	19.0	1.0	0.6	17.0	18.4
Georgia	473.7	527.8	28.6	16.6	445.1	511.2
Total	552.7	607.6	31.7	18.7	521.0	588.9
BASIN VIII						
Alabama	118.1	111.3	5.9	3.1	112.2	108.2
Florida	63.9	92.2	5.1	3.8	58.8	88.4
Total	182.0	203.5	11.0	6.9	171.0	196.6
SUMMARY:						
Alabama	179.1	172.1	8.0	4.6	171.1	167.5
Florida	154.9	193.5	9.3	6.3	145.6	187.2
Georgia	1094.2	1189.4	58.0	38.1	1036.2	1151.4
North Carolina	2.0	2.0	0.1	0.1	1.9	1.9
South Carolina	86.0	87.7	3.1	2.5	82.9	85.2
Total	1516.2	1644.7	78.5	51.6	1437.7	1593.2

TABLE II  
Employment in Nonagricultural Establishments,  
U. S. and Selected States, 1939-1957

(In Thousands)						
<u>Year</u>	<u>U. S. Total</u>	<u>Alabama</u>	<u>Florida</u>	<u>Georgia</u>	<u>North Carolina</u>	<u>South Carolina</u>
1939	30,311.0	397.5	385.3	512.2	612.3	302.3
1940	32,058.0	419.4	419.0	538.4	642.7	320.2
1941	36,220.0	491.9	468.7	620.8	724.5	378.2
1942	39,779.0	598.8	509.8	683.8	771.4	406.1
1943	42,106.0	623.2	574.4	741.3	800.2	417.5
1944	41,534.0	609.0	573.7	735.2	767.1	397.7
1945	40,037.0	569.5	553.7	707.0	746.9	385.6
1946	41,287.0	531.1	585.0	713.3	813.3	401.4
1947	43,462.0	599.0	631.8	740.0	863.6	426.1
1948	44,448.0	617.4	648.7	759.6	878.7	446.2
1949	43,315.0	593.0	645.8	749.7	852.1	433.0
1950	44,738.0	607.9	693.1	786.6	911.4	451.2
1951	47,347.0	650.3	747.9	849.7	970.8	494.3
1952	48,303.0	668.6	796.1	881.4	992.1	532.4
1953	49,681.1	679.9	835.7	906.2	1,012.0	532.5
1954	48,431.0	665.5	868.9	891.3	1,001.8	509.8
1955	50,056.0	690.8	951.0	936.7	1,049.1	524.7
1956	51,766.0	723.0	1,045.6	968.6	1,089.5	535.2
1957	52,162.0	739.5	1,132.7	966.4	1,090.3	536.7

Source: U. S. Bureau of Labor Statistics

TABLE III

Index of Employment in Nonagricultural Establishments,  
U. S. and Selected States, 1939-1957

(1957 = 100)						
<u>Year</u>	<u>U. S. Total</u>	<u>Alabama</u>	<u>Florida</u>	<u>Georgia</u>	<u>North Carolina</u>	<u>South Carolina</u>
1939	58.1	53.8	34.0	53.0	56.2	56.3
1940	61.5	56.7	37.0	55.7	58.9	59.7
1941	69.4	66.5	41.4	64.2	66.4	70.5
1942	76.3	81.0	45.0	70.8	70.8	75.7
1943	80.7	84.3	50.7	76.7	73.4	77.8
1944	79.6	82.4	50.6	76.1	70.4	74.1
1945	76.8	77.0	48.9	73.2	68.5	71.8
1946	79.2	71.8	51.6	73.8	74.6	74.8
1947	83.3	81.0	55.8	76.6	79.2	79.4
1948	85.2	83.5	57.3	78.6	80.6	83.1
1949	83.0	80.2	57.0	77.6	78.2	80.7
1950	85.8	82.2	61.2	81.4	83.6	84.1
1951	90.8	87.9	66.0	87.9	89.0	92.1
1952	92.6	90.4	70.3	91.2	91.0	99.2
1953	95.2	91.9	73.8	93.8	92.8	99.2
1954	92.8	90.0	76.7	92.2	91.9	95.0
1955	96.0	93.4	83.6	96.9	96.2	97.8
1956	99.2	97.8	92.3	100.2	99.9	99.7
1957	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of Labor Statistics

TABLE IV  
Index of Employment in Alabama Nonagricultural Establishments,  
by Industry Division, 1939-1957

(1957 = 100)								
Year	Mining	Contract Construction	Manufacturing	Transportation and Public Utilities	Wholesale and Retail Trade	Finance, Insurance Real Estate	Services and Miscellaneous	Government
1939	172.5	42.2	58.3	72.7	44.3	34.2	52.9	44.2
1940	207.8	44.5	59.8	75.7	48.4	38.2	55.4	44.9
1941	220.9	76.3	75.3	81.1	53.3	41.5	58.7	49.2
1942	256.2	117.1	98.4	91.2	54.1	39.6	64.9	62.2
1943	235.9	62.6	106.1	114.5	55.6	39.3	65.2	75.1
1944	212.4	28.9	103.3	129.1	56.3	38.9	64.9	76.8
1945	187.6	32.0	91.7	118.1	56.3	41.1	65.8	73.6
1946	179.7	45.0	83.5	101.8	61.8	47.3	71.8	67.0
1947	210.5	57.1	92.0	113.3	68.6	52.4	76.2	64.8
1948	211.1	60.9	93.1	111.6	75.0	54.9	77.5	67.2
1949	177.1	64.0	84.7	102.6	75.7	58.2	76.5	69.5
1950	157.5	66.8	88.7	101.0	77.9	64.4	76.8	71.2
1951	141.2	82.5	92.4	107.8	83.0	68.0	81.5	81.2
1952	121.6	90.0	92.9	105.2	87.8	71.3	83.0	87.7
1953	119.6	77.0	96.4	105.0	90.0	74.9	85.0	89.8
1954	100.7	73.7	92.9	98.8	88.9	81.1	87.4	89.8
1955	98.0	80.1	96.6	96.2	93.1	91.3	91.9	91.8
1956	96.7	95.0	99.0	99.0	98.0	98.2	96.3	96.5
1957	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of Labor Statistics.

TABLE V

Index of Employment in Florida Nonagricultural Establishments,  
by Industry Division, 1939-1957

(1957 = 100)

Year	Mining	Contract Construction	Manufacturing	Transportation and Public Utilities	Wholesale and Retail Trade	Finance, Insurance Real Estate	Services and Miscellaneous	Government
1939	40.2	22.8	43.3	53.8	33.2	24.2	28.9	32.4
1940	45.1	33.2	46.0	57.1	35.5	25.7	30.1	34.1
1941	62.2	42.7	51.8	62.0	38.2	28.0	31.7	39.5
1942	57.3	51.7	61.4	61.4	36.1	25.4	33.8	51.3
1943	53.7	40.9	84.3	67.5	37.9	25.7	37.7	63.5
1944	45.1	24.6	84.1	65.8	41.1	27.4	40.0	66.3
1945	43.9	23.9	66.9	67.4	41.6	29.9	40.3	68.3
1946	54.9	36.2	55.7	74.0	49.6	35.8	46.8	60.4
1947	65.9	46.4	57.5	74.0	54.7	40.6	53.9	59.5
1948	65.9	49.2	58.8	73.2	57.4	45.4	54.2	59.3
1949	68.3	44.5	56.3	71.3	57.5	45.6	54.8	63.1
1950	75.6	56.9	60.6	71.3	61.2	50.4	58.1	65.3
1951	81.7	62.3	67.4	75.5	66.1	54.9	63.2	68.1
1952	84.1	63.9	71.3	78.9	71.2	59.5	66.3	74.4
1953	86.6	68.9	75.9	81.6	74.8	64.0	70.0	75.5
1954	89.0	71.4	79.4	83.2	76.7	71.5	72.8	79.5
1955	80.5	82.9	85.9	87.8	84.0	81.1	79.7	86.3
1956	96.3	92.9	92.0	95.9	92.3	90.0	89.1	94.1
1957	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of Labor Statistics.

TABLE VI

Index of Employment in Georgia Nonagricultural Establishments,  
by Industry Division, 1939-1957

(1957 = 100)

Year	Mining	Contract Construction	Manufacturing	Transportation and Public Utilities	Wholesale and Retail Trade	Finance, Insurance Real Estate	Services and Miscellaneous	Government
1939	78.4	54.3	57.8	63.2	48.2	38.0	59.4	43.4
1940	88.2	66.1	59.1	66.6	51.1	40.1	61.8	45.8
1941	90.2	101.4	71.1	73.5	55.2	42.6	67.0	49.4
1942	94.1	114.7	80.0	80.0	54.1	41.3	68.9	64.6
1943	80.4	85.1	92.9	87.3	54.6	42.6	65.8	82.2
1944	70.6	48.7	94.4	93.6	56.7	41.8	60.1	84.8
1945	62.7	43.2	84.8	95.1	59.1	43.6	62.8	82.4
1946	74.5	61.8	80.8	95.5	66.5	50.1	70.1	71.5
1947	82.4	72.7	83.9	97.1	72.1	53.1	73.0	67.1
1948	88.2	72.7	85.8	96.0	75.4	58.9	74.1	69.1
1949	86.3	70.3	80.8	90.8	76.7	59.9	75.6	73.5
1950	82.4	81.4	87.2	91.8	78.5	63.5	76.7	75.9
1951	90.2	93.7	93.3	98.1	82.7	67.8	81.8	86.2
1952	90.2	94.5	94.5	98.4	87.5	76.1	86.9	91.7
1953	88.2	101.2	97.5	98.8	91.1	81.4	87.3	92.3
1954	90.2	95.2	94.9	94.1	91.0	83.1	89.2	90.8
1955	92.2	103.0	101.7	96.3	94.1	89.7	93.0	93.8
1956	98.0	106.3	102.7	100.4	99.2	97.7	97.5	96.9
1957	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of Labor Statistics



TABLE VII

Index of Employment in South Carolina Nonagricultural Establishments,  
by Industry Division, 1939-1957

(1957 = 100)

Year	Mining	Contract Construction	Manufacturing	Transportation and Public Utilities	Wholesale and Retail Trade	Finance, Insurance Real Estate	Services and Miscellaneous	Government
1939	123.1	51.3	63.3	68.8	46.3	21.4	66.1	48.6
1940	100.0	62.3	64.9	69.2	49.4	27.0	67.0	56.7
1941	107.7	119.6	73.6	76.0	54.4	31.4	72.7	70.9
1942	100.0	110.2	78.9	82.9	55.6	31.4	73.8	87.9
1943	84.6	64.5	83.9	89.0	54.3	30.2	75.2	101.6
1944	69.2	36.6	78.9	92.8	54.9	30.8	76.5	97.9
1945	61.5	32.1	76.3	94.7	56.5	32.7	74.0	90.8
1946	76.9	61.9	82.8	99.6	64.1	37.7	77.9	68.6
1947	76.9	84.9	88.4	96.2	69.8	41.5	80.9	66.7
1948	84.6	97.4	91.9	98.9	73.7	47.8	81.8	69.8
1949	84.6	81.9	87.3	95.4	74.7	48.4	80.2	71.7
1950	92.3	91.7	91.6	98.5	77.4	55.3	82.0	72.0
1951	92.3	143.0	95.6	103.8	84.4	64.8	86.8	81.0
1952	92.3	222.6	96.3	104.9	91.1	71.7	90.4	86.9
1953	92.3	188.7	98.8	104.2	93.3	75.5	92.0	86.9
1954	84.6	137.7	95.7	97.0	91.4	80.5	90.9	88.8
1955	92.3	110.9	100.6	96.2	96.7	87.4	93.4	92.4
1956	92.3	106.0	101.5	99.2	99.4	96.9	98.2	95.0
1957	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of Labor Statistics

TABLE VIII

Covered\* Nonagricultural Employment in Selected States  
of the Southeast, by Industry Division, 1957

<u>Industry Division</u>	<u>Alabama</u>	<u>Florida</u>	<u>Georgia</u>	<u>South Carolina</u>
Mining	14,642	7,965	5,681	1,324
Construction	41,730	104,050	44,167	26,335
Manufacturing	241,254	157,941	327,076	227,183
Transportation and Utilities	34,357	72,350	48,999	18,439
Wholesale and Retail Trade	129,255	290,945	189,431	85,134
Finance, Insurance, and Real Estate	23,305	49,989	33,821	12,605
Services	41,492	133,256	54,955	22,303

\* Covered employment is the employment reported by state employment security agencies for firms with four or more employees. This count differs from the Bureau of Labor Statistics data. The BLS uses a sample as adjusted for certain benchmark years when a more complete count is taken. Generally the BLS data are more complete.

Source: Employment security agencies in Alabama, Florida, Georgia, and South Carolina

TABLE IX

Covered\* Nonagricultural Employment in the Southeast River  
Basins Area, by Industry Division, 1957

Industry Division	Total	State Segments			
		Alabama	Florida	Georgia	South Carolina
Mining	5,154	408	112	4,253	381
Construction	58,276	3,013	10,604	42,524	2,135
Manufacturing	375,686	31,815	21,966	280,772	41,133
Transportation & Utilities	55,194	2,287	4,000 <sup>(1)</sup>	47,290	1,617
Wholesale and Retail Trade	222,642	10,833	24,164	180,472	7,173
Finance, Insur- ance, and Real Estate	37,298	1,507	2,577	32,544	670
Services	64,716	4,711	7,906	50,488	1,611

(1) Estimated.

\* Covered employment is the employment reported by state employment security agencies for firms with four or more employees. This count differs from the Bureau of Labor Statistics data. The BLS uses a sample as adjusted for certain benchmark years when a more complete count is taken. Generally the BLS data are more complete.

Source: Employment security agencies in Alabama, Florida, Georgia, and South Carolina

TABLE X

Estimated Employment in Nonagricultural Establishments,  
Southeast River Basins Area, by Industry Division, 1957

Industry Div Division	Total	(In Thousands)			
		State Segments			
		Alabama	Florida	Georgia	South Carolina
Total Nonagri- cultural Employment	1,146.3	76.9	121.0	879.8	68.6
Mining	4.7	0.4	0.1	3.8	0.4
Construction	64.8	3.0	12.0	47.7	2.1
Manufacturing	375.8	32.2	22.4	279.8	41.4
Transportation and Public Utilities	81.7	3.3	5.5	70.6	2.3
Wholesale and Retail Trade	262.0	13.0	28.0	211.9	9.1
Finance, Insurance, and Real Estate	43.9	1.8	3.1	38.2	0.8
Services	110.5	7.8	10.4	89.1	3.2
Government	202.9	15.4	39.5	138.7	9.3

Source: BLS statistics by state and industry division were allocated by means of county data from state employment security agencies, 1957 Census of Governments, and other available sources. For Florida estimates, allocating ratios were derived principally from statistics of personal income by industrial and governmental sources in Florida counties, 1957, by the Bureau of Economic and Business Research, University of Florida. For estimating government employment in Georgia, John L. Fulmer's county income estimates were used as allocators.

TABLE XI

Index of Estimated Employment in Nonagricultural Establishments,  
Southeast River Basins Area, by Industry Division,  
for Selected Years, 1939-1957

(1957 = 100)					
Industry Division and Year	Total	State Segments			
		Alabama	Florida	Georgia	South Carolina
Total Nonagricultural Employment					
1939	48	48	32	50	55
1950	78	77	62	80	75
1956	99	98	94	100	95
1957	100	100	100	100	100
Mining					
1939	77	25	100	84	50
1950	96	25	300	95	125
1956	100	75	100	100	125
1957	100	100	100	100	100
Construction					
1939	47	33	28	53	24
1950	73	63	47	82	48
1956	102	87	92	106	86
1957	100	100	100	100	100
Manufacturing					
1939	56	62	33	56	64
1950	85	95	73	85	81
1956	101	104	95	102	96
1957	100	100	100	100	100
Transportation and Public Utilities					
1939	17	14	(1)	18	100
1950	80	57		82	200
1956	99	86		100	100
1957	100	100	100	100	100
Wholesale and Retail Trade					
1939	45	32	30	48	40
1950	76	62	59	79	70
1956	98	95	96	99	91
1957	100	100	100	100	100
Finance, Insurance, and Real Estate					
1939	36	17	23	38	12
1950	62	50	48	64	50
1956	97	94	94	98	75
1957	100	100	100	100	100

(1) Not available.

TABLE XI (Continued)

Index of Estimated Employment in Nonagricultural Establishments,  
Southeast River Basins Area, by Industry Division,  
for Selected Years, 1939-1957

(1957 = 100)					
Industry Division and Year	Total	State Segments			
		Alabama	Florida	Georgia	South Carolina
Services					
1939	58	46	37	61	81
1950	73	68	53	76	75
1956	96	94	94	97	84
1957	100	100	100	100	100
Government					
1939	48	44	32	53	49
1950	73	71	65	76	72
1956	96	97	94	97	95
1957	100	100	100	100	100

Source: Estimates for 1957 were derived as explained in source note to Table 10. Estimates for earlier years from which the index numbers were computed were derived from BLS data by state and industry division, by a variety of methods. The usual method was to use the ratio of county covered employment in that industry division.

For 1939 estimates, Census data for counties were employed as allocating ratios for industry divisions other than government.

Government employment in Georgia for 1939, 1950, and 1956 was estimated by using the ratio of study area personal income (John L. Fulmer's estimates) to State of Georgia personal income for each of those years. Government employment in the other intra-state areas was estimated by applying to each area's 1957 estimate the appropriate index number from Tables 4, 5, and 7.

INDUSTRIAL RESOURCES AND POTENTIALS  
OF THE SOUTHEAST RIVER BASINS

---

Personal Income  
by  
John L. Fulmer

---

Disposable Income, Consumption, and Savings  
by  
Walter Kennon  
and  
Lee Dudley

Prepared for the administrative use only of the  
United States Study Commission, Southeast River Basins

---

Lamar White, Project Director

---

Industrial Development Branch  
Engineering Experiment Station  
Georgia Institute of Technology  
June 1960

## INDUSTRIAL RESOURCES AND POTENTIALS OF THE SOUTHEAST RIVER BASINS

### Sections of the Final Report and Their Designations

<u>Title</u>	<u>Section</u>
Land Use Patterns and Planning Activity	A
Mineral Resources Review	B
Water Resources	C
Population and Labor Force	D
Employment	E
Personal Income	F
Disposable Income, Consumption, and Savings	G
Economic Indicators for Major Functional Segments of the Economy	H
Summary of Recent Trends in Economic Growth and Development	I
Economic-Statistical Projections	J
Mathematical-Economic Projections	K
Economic Development Potentials by River Basin	L



## Table of Contents

### Section F Personal Income

	<u>Page</u>
Per Capita Income	F-2
Trends in the South and Southeast	F-2
Trends in the Study Area	F-4
Total Personal Income	F-7
Study Area States	F-7
Relation of State Segments to the Study Area Total	F-8
River Basins and State Sub-basins	F-8
Major Components of Personal Income	F-10
Farm and Nonfarm Sources of Income by Basins and Sub-basins, 1956	F-10
Composition by Primary Classes in Study Area States and Segments	F-13
Factors Affecting Future Income Trends	F-18

### Tables

1. Per Capita Income Trends by River Basins and Sub-basins, 1939, 1950, and 1956	F-5
2. Income Trends by River Basins and Sub-basins, 1939, 1950, and 1956	F-9
3. Components of Personal Income for 1956, by River Basins and Sub-basins	F-11
4. Percentage Distribution of Total Personal Income in 1956, by River Basins and Sub-basins	F-12

## PERSONAL INCOME\*

The basic factor which dominates an area's income is the continuously rising productivity of the working labor force. Over a period of years, the rise in productivity for the nation has averaged better than two per cent yearly compounded.<sup>1/</sup> In preparing the DELAWARE STUDY, the U. S. Department of Commerce derived an annual increase in real per capita income of 1.69 per cent compounded from an annual three per cent growth rate in G.N.P. It is believed that this rate of increase is more in line with expectations for the future than some projections which have been made assuming two per cent and above. The biggest gains in productivity apparently have been associated with manufacturing, where gains from technological advances have been greatest. At this point there is no reason to believe that these gains will not continue, but their impact on society will grow progressively less due to the almost certain increase in trade, where the gains from productivity have been comparatively less. Large future employment gains in the relative importance of services and government must be assumed also. Yet both areas are characterized by little if any gains in productivity. It is seen, therefore, that contributions to productivity in manufacturing could be more than offset by the expected gains in the importance of trade, services, and government--employment areas with much lower potentials for productivity.

---

\*By John L. Fulmer, Georgia Institute of Technology.

<sup>1/</sup> Frederick C. Mills, Productivity and Economic Progress, Occasional Paper 38, National Bureau of Economic Research, 1952, pp. 1-5.

## Per Capita Income

### Trends in the South and Southeast

Since 1929, as far back as estimates of personal income payments by states are available, the Southern states as a rule have been gaining relatively on U. S. per capita income. The pace of gain, however, has slowed down since World War II, and especially since the Korean War. Hanna<sup>1/</sup> has shown that since about 1945, while the South is closing the per capita income gap in percentage terms, its gain in actual dollars of per capita income yearly has not kept pace with the nation's.

The big cause of the rise in per capita income of the South relative to the nation has been the shift from agricultural occupations to nonagricultural employment, where hourly returns in most of the South are more than double the earnings reported in agriculture. Rise in the educational level has contributed to the skills and productivity of the Southern working population. The growth of cities has produced certain economies associated with city life, and a progressive growth of the types of manufacturing which in many cases provide better pay than textiles, apparel, and some other types of manufacturing long traditional in the South. A comparison of trends from 1948 in per capita incomes of states in the study area is given below (in current dollars):

<u>Year</u>	<u>Per Capita Income</u>					
	<u>U.S.</u>	<u>Ala.</u>	<u>Fla.</u>	<u>Ga.</u>	<u>N.C.</u>	<u>S.C.</u>
1948	1420	856	1184	948	943	879
1949	1382	810	1203	932	919	838
1950	1491	876	1288	1016	1009	881
1951	1649	989	1380	1145	1114	1043
1952	1727	1045	1466	1208	1149	1111
1953	1788	1081	1556	1246	1165	1132
1954	1770	1072	1531	1222	1196	1071
1955	1860	1204	1655	1350	1280	1134
1956	1975	1263	1773	1423	1341	1166
1957	2043	1329	1837	1443	1331	1188

---

<sup>1/</sup> Frank A. Hanna, State Income Differentials, Duke University Press, 1959.

<u>Year</u>	<u>Ratio to U. S. Per Capita Income</u>				
	<u>Ala.</u>	<u>Fla.</u>	<u>Ga.</u>	<u>N.C.</u>	<u>S.C.</u>
1948	60.3	83.4	66.8	66.4	61.9
1949	58.6	87.0	67.4	66.5	60.6
1950	58.1	86.4	68.2	67.1	59.1
1951	60.0	83.7	69.5	67.6	63.3
1952	60.5	84.9	70.0	66.5	64.3
1953	60.5	87.0	70.0	65.2	63.3
1954	60.6	86.5	69.0	67.6	60.5
1955	64.7	89.0	72.6	68.8	61.0
1956	63.9	89.8	72.1	67.9	59.0
1957	65.1	89.9	70.6	65.1	58.2

---

Sources: U. S. Department of Commerce, Survey of Current Business, August, 1959; and 1956 Supplement to Survey of Current Business.

The data show that all five states gained relative to national per capita income, but the rates of gain were quite variable. From 1948 to 1957 as limits, Alabama gained five points, Florida, six; Georgia, four; North Carolina lost almost one point, and South Carolina declined also. Gains have been fairly consistent for Florida and Georgia throughout the period. But North Carolina and South Carolina have fluctuated about the 1948 ratio with more tendency to decline. Alabama has shown an irregular tendency to rise. The textile industry looms large in all of these states except Florida. Presumably inflated demands for textiles during the Korean War moved the industry to a new level which has remained fairly stable. There is a trend toward automation and mechanization in the textile industry which has also contributed to maintaining the gains occurring during the Korean War. Yet this trend, along with increased competition from synthetics and imports, foreshadows a relative decline in employment.

The more rapid rise of per capita income in Georgia compared with the nation has been due primarily to the rapid increase of nonagricultural employment, both absolutely and in relation to agricultural employment. From 1940 to 1955, the ratio of total employment in agriculture in Georgia declined from 35.9 per cent to 16.9 per cent. Not only has the loss of employment in agriculture been replaced by employment in manufacturing and other

nonagricultural occupations, but relative wage levels are substantially higher in all nonagricultural enterprises than in agriculture. The hourly earnings in manufacturing in Georgia are two and a half times hourly wages for farm workers.<sup>1/</sup> Yet the differential tends to become larger, for the manufacturing mix itself has changed in the direction of higher wage industries. Nothing shows this better than the fact that the percentage of Georgia's workers in manufacturing employed in textile mill products declined from 44 per cent in 1940 to 30 per cent in December, 1959.

Other factors which have contributed to raising the per capita income level in Georgia compared with that in the nation are a rising educational level, a relative decline in the Negro population, and growth in urbanization.<sup>2/</sup> The Census reports of 1940 showed that the median educational level in Georgia was 7.1 years of schooling; the percentage of the population Negro, 34.7 per cent; and the proportion of the population urban, 34.4 per cent. By 1950 the Census reports showed that the median years of schooling had improved 0.7 of a year and represented 7.8 years of schooling; the percentage of the population Negro had declined to 30.8 per cent; and the proportion of the population urban had increased to 45.3.

#### Trends in the Study Area

Estimates for the eight major river basins and the state sub-basins show that in the total study area per capita income rose from \$512 in 1939 to \$1160 in 1950 and \$1403 in 1956; these data are expressed in constant (1957) dollars and presented in Table 1. As a ratio of United States per capita income, this represented a rise from 45.5 per cent in 1939 to 66.5 per cent in 1950 and 58.7 per cent in 1956.

None of the individual basins or state sub-basins equalled or exceeded the national average in any of the three periods. However, the analysis by basin and sub-basin reveals degrees of income deficiency. Among the major basins, the Apalachicola River Basin had the highest income level by far in all years measured. The Ogeechee River Basin was lowest in each year. The absolute rise in 1957 dollars for the basins composite was \$891 from 1939 to

---

<sup>1/</sup> Georgia Employment and Earnings, 1958, Georgia Department of Labor, March 1959, p. 17; and Farm Labor, U. S. Department of Agriculture, January 9, 1959, p. 13.

<sup>2/</sup> For a more complete discussion of the income impact on these factors, see John L. Fulmer, "Factors Influencing State Per Capita Income Differentials," Southern Economic Journal, vol. XVI (Jan. 1950), pp. 259-278.

Table 1

PER CAPITA INCOME TRENDS BY RIVER BASINS AND SUB-BASINS  
1939, 1950, AND 1956

(In 1957 dollars)

<u>Basin and State Sub-Basin</u>	<u>1939</u>	<u>1950</u>	<u>1956</u>
<u>Basin I</u>			
Georgia	558	1185	1408
South Carolina	420	1149	1189
North Carolina	<u>338</u>	<u>717</u>	<u>851</u>
Total	514	1169	1328
<u>Basin II</u>			
Georgia	341	741	952
<u>Basin III</u>			
Georgia	438	889	1070
<u>Basin IV</u>			
Florida	671	1332	1421
Georgia	<u>364</u>	<u>767</u>	<u>984</u>
Total	416	871	1078
<u>Basin V</u>			
Florida	502	834	1070
Georgia	<u>482</u>	<u>775</u>	<u>1177</u>
Total	488	794	1145
<u>Basin VI</u>			
Florida	431	1235	1340
Georgia	<u>408</u>	<u>956</u>	<u>951</u>
Total	421	1127	1180
<u>Basin VII</u>			
Alabama	326	678	878
Florida	441	936	1123
Georgia	<u>709</u>	<u>1566</u>	<u>1935</u>
Total	654	1447	1810
<u>Basin VIII</u>			
Alabama	187	833	913
Florida	<u>674</u>	<u>1504</u>	<u>1635</u>
Total	361	1129	1263
<u>Summary:</u>			
Alabama	232	781	902
Florida	556	1267	1440
Georgia	560	1202	1489
North Carolina	338	717	851
South Carolina	<u>420</u>	<u>1149</u>	<u>1189</u>
Total	512	1160	1403

1956. Sub-basins exceeding this average were the Florida part of Basin VI (\$909); the Florida portion of Basin VIII (\$961); and the Georgia portion of Basin VII (\$1226). The smallest gains were in the Florida part of Basin V (\$568); the Alabama portion of Basin VII (\$552), which was also one of the lowest sub-basins in 1939; the Georgia part of Basin VI (\$543); and the tiny North Carolina segment of Basin I, where the increase from 1939 to 1956 was only \$513 per capita.

It is noteworthy that the constant dollar gap widened between the leading and the lowest sub-basin, from \$522 in 1939 to \$1084 in 1956.

## Total Personal Income

### Study Area States

Personal income payments reflect both per capita income and population growth. While per capita income has gained relative to the nation in Alabama, Georgia, North Carolina, and South Carolina, these states' population growth has lagged behind U. S. population growth. At the same time, Florida's rate of growth has been more than double the national rate.<sup>1/</sup>

A comparison of personal income in the five states with that in the nation is made in the tabulation below for selected years.

Billions of Dollars Personal Income							
<u>Year</u>	<u>U.S.</u>	<u>Ala.</u>	<u>Fla.</u>	<u>Ga.</u>	<u>N.C.</u>	<u>S.C.</u>	<u>Area Total</u>
1948	207.4	2.54	3.05	3.09	3.62	1.76	14.06
1950	225.5	2.66	3.63	3.51	4.11	1.87	15.78
1953	283.1	3.34	5.04	4.46	4.88	2.54	20.26
1955	306.6	3.71	6.09	4.92	5.54	2.60	22.86
1957	347.9	4.20	7.73	5.44	5.95	2.87	26.13

Ratio to the U. S.						
<u>Year</u>	<u>Ala.</u>	<u>Fla.</u>	<u>Ga.</u>	<u>N.C.</u>	<u>S.C.</u>	<u>Area Total</u>
1948	1.22	1.47	1.49	1.75	0.85	6.78
1950	1.18	1.61	1.57	1.82	0.83	7.00
1953	1.18	1.78	1.58	1.72	0.90	7.16
1955	1.21	1.99	1.60	1.81	0.85	7.46
1957	1.21	2.22	1.56	1.71	0.81	7.51

The ratio for the study area states showed a significant rise during the period. Only Florida, however, has made a significant gain in the ratio of total personal income. It gained 51 per cent in relative position. None of the other four states had a firm gain, though each of them, with the possible exception of South Carolina, definitely held constant. This means that the relatively more rapid gain in per capita income in most of the five states was offset by the less rapid gain in population growth. The conclusion is

<sup>1/</sup> Bureau of the Census, Current Population Reports: Population Estimates, Series P-25, No. 186, p. 8.



that all states in the study area except Florida are holding fairly stable positions in total personal income payments. Florida is gaining strongly relative to national total personal income payments.

#### Relation of State Segments to the Study Area Total

Total personal income payments for state segments in the study area are given below for 1956, in millions of dollars:

<u>State</u>	<u>1956</u>		<u>Per Cent of Total</u>
	<u>State Income</u>	<u>Segment Income</u>	
Alabama	3932	443	11.3
Florida	6979	894	12.8
Georgia	5274	4887	92.7
North Carolina	5902	6	0.1
South Carolina	2711	318	11.7

The 1956 data on personal income show that 92.7 per cent of Georgia's economy is in the study area; Alabama has 11.3 per cent; South Carolina, about 11.7 per cent; and Florida, almost 13 per cent. Only an insignificant proportion of North Carolina's economy, as measured by total personal income payments, is in the study area.

#### River Basins and State Sub-basins

The trends in personal income payments and the relative importance of each basin and sub-basin in the Southeast River Basins total area in 1956 are shown in Table 2. The area's total income, in 1957 dollars, increased 229 per cent from 1939 to 1956. Basin VII, which accounted for 44.5 per cent of the area's income in 1956, had an increase of 237 per cent. The proportion of total personal income payments in other basins in order are number I, with 15.9 per cent; Basin III, 13.8 per cent; and Basin VIII with 12.9 per cent.

Sub-basins looming especially important in the area's total personal income payments are: Georgia VII, with 41.5 per cent of the area's personal income in 1956; Georgia III, 13.8 per cent; Georgia I, 10.9 per cent; and Florida VIII, with 8.1 per cent. Sub-basins VII, III, and I in Georgia, however, accounted for 66.2 per cent of the total of all basins.

Table 2

INCOME TRENDS BY RIVER BASINS AND SUB-BASINS  
1939, 1950, AND 1956

(In millions of 1957 dollars)

<u>Basin and State Sub-Basin</u>	<u>1939</u>	<u>1950</u>	<u>1956</u>	<u>Per Cent 1956 Total</u>
<u>Basin I</u>				
Georgia	225.9	540.5	714.4	10.9
South Carolina	93.3	265.7	318.3	4.9
North Carolina	4.0	4.7	5.9	0.1
Total	<u>323.2</u>	<u>810.9</u>	<u>1038.6</u>	<u>15.9</u>
<u>Basin II</u>				
Georgia	53.2	103.9	124.2	1.9
<u>Basin III</u>				
Georgia	314.8	700.9	902.9	13.8
<u>Basin IV</u>				
Florida	13.8	32.4	42.2	0.7
Georgia	36.6	82.2	106.1	1.6
Total	<u>50.4</u>	<u>114.6</u>	<u>148.3</u>	<u>2.3</u>
<u>Basin V</u>				
Florida	44.7	75.2	92.5	1.4
Georgia	93.1	152.3	235.4	3.6
Total	<u>137.8</u>	<u>227.5</u>	<u>327.9</u>	<u>5.0</u>
<u>Basin VI</u>				
Florida	40.9	137.3	164.2	2.5
Georgia	28.3	67.1	81.2	1.2
Total	<u>69.2</u>	<u>204.4</u>	<u>245.4</u>	<u>3.7</u>
<u>Basin VII</u>				
Alabama	50.0	109.7	128.9	2.0
Florida	24.3	53.8	65.7	1.0
Georgia	790.5	2015.2	2722.6	41.5
Total	<u>864.8</u>	<u>2178.7</u>	<u>2917.2</u>	<u>44.5</u>
<u>Basin VIII</u>				
Alabama	58.5	267.6	313.7	4.8
Florida	117.2	382.3	530.0	8.1
Total	<u>175.7</u>	<u>649.9</u>	<u>843.7</u>	<u>12.9</u>
<u>Summary:</u>				
Alabama	108.5	377.3	442.6	6.8
Florida	240.9	681.1	894.6	13.7
Georgia	1542.4	3662.1	4886.8	74.5
North Carolina	4.0	4.7	5.9	0.1
South Carolina	93.3	265.6	318.3	4.9
Total	<u>1989.1</u>	<u>4990.8</u>	<u>6548.2</u>	<u>100.0</u>

## Major Components of Personal Income

### Farm and Nonfarm Sources of Income by Basins and Sub-basins, 1956

An analysis was made of 1956 personal income estimates for pertinent intrastate areas to show the composition by principal farm and nonfarm sources, for basins and sub-basins of the study area. Nonfarm wages and salaries were allocated to county segments and then tabulated to basin totals by the ratio of urban and rural nonfarm population. Nonfarm proprietors' income was allocated on the same basis as nonfarm wages and salaries. Farm wages and farm proprietors' income were allocated by the ratio of farm population. Property income allocations to small intrastate areas employed the ratio of total personal income payments. Transfer payments and all other minor categories of personal income payments were allocated on the basis of population.

Tables 3 and 4 show the magnitudes of the five major income sources in absolute and percentage terms, by basins, sub-basins, and state segments. Nonfarm wages and salaries constituted the dominant income source throughout the basins and sub-basins. For the study area as a whole, this source accounted for almost two-thirds of the total. It was above this level in the Apalachicola Basin and the Savannah Basin, and lowest in the Suwannee Basin and the Ogeechee Basin (less than 50 per cent). The Satilla-St. Marys and the Ochlockonee Basins were also well below the study area average in this respect, while the Altamaha and the Perdido-Escambia Basins were moderately sub-average. Among the state sub-basins of the study area, nonfarm wages and salaries contribute above-average proportions of the total in the Georgia portions of Basins VII and I, and in the Florida portion of Basin VIII. This income source is proportionately lowest in the Florida parts of Basins V and VII, and in the Georgia parts of Basins VI and II. The below-average sub-basins in Georgia are greatly influenced by agriculture. Those in Florida are influenced by the relatively greater importance of property income and nonfarm proprietors' income, both closely associated with the tourist business and the influx of the retired.

Second in importance to nonfarm wages and salaries in the study area was nonfarm proprietors' income (about 10 per cent), followed closely by property income. Farm wages and farm proprietors' income accounted for about 7 per cent of the total, while transfer payments and other income represented about

Table 3

COMPONENTS OF PERSONAL INCOME FOR 1956,  
BY RIVER BASINS AND SUB-BASINS  
(In Millions of 1957 Dollars)

<u>Basin &amp; State Sub-Basin</u>	<u>Nonagricul- tural Wages and Salaries</u>	<u>Nonfarm Proprietors' Income</u>	<u>Agricultural Income*</u>	<u>Property Income</u>	<u>Other Income &amp; Transfers</u>	<u>Total</u>
<u>Basin I</u>						
Georgia	486.5	72.2	27.1	64.3	64.3	714.4
North Carolina	2.9	0.5	1.1	0.5	0.9	5.9
South Carolina	191.3	38.8	32.8	29.9	25.5	318.3
Total	680.7	111.5	61.0	94.7	90.7	1,038.6
<u>Basin II</u>						
Georgia	60.3	13.7	23.5	10.7	16.0	124.2
<u>Basin III</u>						
Georgia	556.1	81.3	81.3	79.5	104.7	902.9
<u>Basin IV</u>						
Florida	24.1	4.4	4.5	5.4	3.8	42.2
Georgia	52.8	11.7	19.8	9.1	12.7	106.1
Total	76.9	16.1	24.3	14.5	16.5	148.3
<u>Basin V</u>						
Florida	36.7	17.9	12.1	13.2	12.6	92.5
Georgia	121.0	24.0	44.7	20.7	25.0	235.4
Total	157.7	41.9	56.8	33.9	37.6	327.9
<u>Basin VI</u>						
Florida	92.9	18.4	13.3	22.7	16.9	164.2
Georgia	37.6	7.9	17.5	7.2	11.0	81.2
Total	130.5	26.3	30.8	29.9	27.9	245.4
<u>Basin VII</u>						
Alabama	80.1	10.4	14.6	9.7	14.1	128.9
Florida	30.7	12.2	6.0	8.7	8.1	65.7
Georgia	1,922.1	277.7	92.6	247.8	182.4	2,722.6
Total	2,032.9	300.3	113.2	266.2	204.6	2,917.2
<u>Basin VIII</u>						
Alabama	169.4	34.2	42.3	26.4	41.4	313.7
Florida	364.2	32.3	16.4	72.6	44.5	530.0
Total	533.6	66.5	58.7	99.0	85.9	843.7
<u>SUMMARY</u>						
Alabama	249.5	44.6	56.9	36.1	55.5	442.6
Florida	548.6	85.2	52.3	122.6	85.9	894.6
Georgia	3,236.4	488.5	306.5	439.3	416.1	4,886.8
North Carolina	2.9	0.5	1.1	0.5	0.9	5.9
South Carolina	191.3	38.8	32.8	29.9	25.5	318.3
Total	4,228.7	657.6	499.6	628.4	583.9	6,548.2

\*Includes farm proprietors' income and farm wages.

Table 4

PERCENTAGE DISTRIBUTION OF TOTAL PERSONAL INCOME  
IN 1956, BY RIVER BASINS AND SUB-BASINS

<u>Basin &amp; State Sub-Basin</u>	<u>Nonagricul- tural Wages and Salaries</u>	<u>Nonfarm Proprietors' Income</u>	<u>Agricultural Income*</u>	<u>Property Income</u>	<u>Other Income &amp; Transfers</u>	<u>Total</u>
<u>Basin I</u>						
Georgia	68.1	10.1	3.8	9.0	9.0	100.0
North Carolina	48.8	8.9	17.8	8.5	16.0	100.0
South Carolina	60.1	12.2	10.3	9.4	8.0	100.0
Total	65.6	10.7	5.9	9.1	8.7	100.0
<u>Basin II</u>						
Georgia	48.6	11.0	18.9	8.6	12.9	100.0
<u>Basin III</u>						
Georgia	61.6	9.0	9.0	8.8	11.6	100.0
<u>Basin IV</u>						
Florida	56.9	10.5	10.7	12.8	9.1	100.0
Georgia	49.7	11.0	18.7	8.6	12.0	100.0
Total	51.8	10.9	16.4	9.8	11.1	100.0
<u>Basin V</u>						
Florida	39.7	19.3	13.1	14.3	13.6	100.0
Georgia	51.4	10.2	19.0	8.8	10.6	100.0
Total	48.1	12.8	17.3	10.3	11.5	100.0
<u>Basin VI</u>						
Florida	56.6	11.2	8.1	13.8	10.3	100.0
Georgia	46.3	9.7	21.6	8.9	13.5	100.0
Total	53.1	10.7	12.6	12.2	11.4	100.0
<u>Basin VII</u>						
Alabama	62.2	8.1	11.3	7.5	10.9	100.0
Florida	46.6	18.6	9.1	13.3	12.4	100.0
Georgia	70.6	10.2	3.4	9.1	6.7	100.0
Total	69.7	10.3	3.9	9.1	7.0	100.0
<u>Basin VIII</u>						
Alabama	54.0	10.9	13.5	8.4	13.2	100.0
Florida	68.7	6.1	3.1	13.7	8.4	100.0
Total	63.2	7.9	7.0	11.7	10.2	100.0
<u>SUMMARY</u>						
Alabama	56.3	10.1	12.9	8.2	12.5	100.0
Florida	61.4	9.5	5.8	13.7	9.6	100.0
Georgia	66.2	10.0	6.3	9.0	8.5	100.0
North Carolina	49.1	8.5	18.6	8.5	15.3	100.0
South Carolina	60.1	12.2	10.3	9.4	8.0	100.0
Total	64.6	10.0	6.9	9.6	8.9	100.0

\*Includes farm proprietors' income and farm wages.

9 per cent. There were rather wide divergencies from this composite pattern among the basins and sub-basins. Nonfarm proprietors' income was above-average in Basin V and far above average in its Florida sub-basin and in Florida Sub-basin VII. By contrast, this source of income accounted for much smaller percentages of the total in Florida Sub-basin VIII and in Alabama Sub-basin VII. Farm income was more than three times the study area average proportion in Georgia Sub-basin VI, and was substantially above the average level in all-Georgia Basin II, in Georgia and Florida portions of Basins IV and V, in North Carolina Sub-basin I, and in the two Alabama sub-basins. Farm income was proportionately lowest in Florida Sub-basin VIII and in the Georgia portions of Basins I and VII. For property income, the major deviations from the study area pattern were in all the Florida sub-basins, where the percentages were far above that for the study area as a whole.

#### Composition by Primary Classes in Study Area States and Segments<sup>1/</sup>

Alabama's personal income by primary classes of income shows some similarities and some sharp divergencies from the national pattern. In 1957, the most recent year widely used as a benchmark, wages and salaries represented over 67 per cent of total income (including social insurance contributions). This compares closely with the United States ratio, 66.5; Alabama's index number in terms of the national average was 101. For the other primary classes, Alabama's index was 100 for "other labor income" (pension funds, workmen's compensation, and the like); 142 for farm proprietors' income; 108 for nonfarm proprietors' income; only 67 for property income; and 123 for transfer payments. The latter include social insurance, military benefits, public assistance, and private business transfers.

Wage and salary disbursements thus accounted for more than two-thirds of Alabama's total. This 1957 ratio was appreciably higher than it had been

---

<sup>1/</sup> Data on personal income by primary class of income are primarily from publications of the Office of Business Economics, U. S. Department of Commerce. Estimates for Alabama counties, used for comparing income composition in the study area with that in the State, are from a study by Marion H. Hawley, Bureau of Business Research, University of Alabama (Income and Population in Alabama, Printed Series No. 27, 1960). Similar estimates for Florida counties are from Statistics of Personal Income, Construction, Retail Sales, and Population for Florida Counties, State Economic Studies No. 11, 1959, published by the Bureau of Economic and Business Research, University of Florida.

in most earlier years--62.0 per cent in 1939, 59.9 per cent in 1947, 60.9 per cent in 1950, and 66.9 per cent in 1956. The second-ranking class, nonfarm proprietors' income, represented 9.9 per cent of the total in 1957 as compared with 10.1 and 10.6 per cent in 1939 and 1940, respectively. Property income also declined over the 18-year period, in relative terms, from 10.3 per cent in 1939 to 8.3 per cent in 1957. Transfer payments accounted for almost 7.6 per cent in 1957, after rising from 3.5 per cent in 1939 to 9.1 per cent in 1950. Farm proprietors' income contributed about 4.7 per cent in 1957, reflecting a sharp relative decline from more than 13 per cent in 1939 and 1947. "Other labor income" rose to about 2.6 per cent of the total in 1957 from less than one per cent in 1939 and in the '40's.

The study area portion of Alabama is an area of low per capita income relative to the State average. In 1956, for example, it was only 74 per cent. Among the 17 counties lying wholly or mainly within the study area, only one (Dale) exceeded the State's per capita income average of \$1,329 in 1957. One (Bullock County) was in the State's poorest group, comprising six counties, where per capita income was less than half of the State's average. Four were in the \$1,000-to-\$1,299 bracket, while the remaining 11 fell in the modal group of Alabama counties (\$700-to-\$999 per capita). In 1957 this modal group comprised 38 of the State's 67 counties.

The Alabama study area's income pattern by primary classes shows certain significant divergencies from the State's pattern. Wages and salaries are appreciably lower--59.00 per cent of the total in 1957, as against 67.1 per cent in the whole State. The nonfarm proprietors' proportion is somewhat higher (10.6 versus 9.9 per cent), and the farm proprietors' proportion much higher (10.4 versus 4.7 per cent) than in the entire State. Transfer payments are relatively more important than in the whole State (9.8 versus 7.5 per cent in 1957); moreover, this class is more important within the study area segment than property income, while the reverse is true in Alabama as a whole.

A comparison of patterns in the study area's high-income county (Dale), its lowest (Bullock), and in the State of Alabama indicates interesting relationships for certain income classes:

<u>Relative Rank in Area of:</u>			
<u>Per Capita Income, 1957</u>	<u>Area</u>	<u>Nonfarm Proprietors' Income</u>	<u>Property Income</u>
\$1,511	Dale County	2	4
1,329	State of Ala.	2	3
656	Bullock County	4	5

Dale County's relatively high level is due primarily to the reactivation of Fort Rucker and its impact on the county's economy.

A significant feature of Alabama's income pattern is that the State's seven top-ranking counties account for about 60 per cent of the total. Apart from a minor portion of Montgomery County, all seven of these leading counties lie outside the study area.

The personal income pattern for the State of Florida is characterized by a low proportion of wages and salaries, relative to its neighboring states and to the national average. Similarly, "other labor income" is relatively low. By contrast, property income constitutes almost 16 per cent of total personal income; this is about 129 per cent of the national proportion, and far above the sub-average proportions of the three other southeastern states analyzed. Nonfarm proprietors' income is also proportionately highest in Florida among the four states, and some 126 per cent of the national norm. Farm proprietors' income is relatively more important than in the United States, but much less so than in Alabama, Georgia, and South Carolina. Transfer payments represent some 121 per cent of the national proportion, as compared with 123 for Alabama, 108 for Georgia, and 105 for South Carolina.

Over the span of years from 1939 to 1957, Florida's wages and salaries have risen in relative importance, as in the other states analyzed, and now represent about 60 per cent of the total. Other primary classes increasing in relative standing are "other labor income" and transfer payments--the former from less than one per cent to 1.5 per cent, and transfer payments from 3.8 per cent to some 7.4 per cent. Property income declined proportionately from 22.7 per cent to 15.9 per cent, a decline sharper than that in the nation. Nonfarm proprietors' income went from 12.3 to 14.1 per cent of the total, 1939 to 1940, and has since fallen to about 11.6 per cent in 1957. Since 1950, however, its rate of descent has been much gentler than in the country as a whole. The trend in farm proprietors' income has been erratic in terms of its percentage of the State's total income, and in relation to the national trend.



Thus, in the six years for which observations were made, its 5.8 per cent of Florida total personal income in 1939 was a little less than the national average for this primary class. It subsequently fell much lower in terms of the national average (in 1940 and 1947), then rose to as high as 131 per cent of it (in 1956). 1950 was a peak year for farm proprietors' income (7.1 per cent), and 1957 a low point (3.8 per cent), in terms of its relative contribution to the State's total.

The Florida study area has a much lower income per capita than the State. Moreover, there are significant differences in composition by primary class of income between the poorest counties of the study area, the State pattern, and the pattern in the richer counties of Florida. A ranking of Florida's 67 counties according to 1957 per capita income shows that only three study area counties equal or exceed the State average, while ten of them are in the poorest group--less than half of the State average. A comparison of income composition by primary class for the poorest ten, the State average, and a group of high-income counties which includes the three in the study area, reveals certain clear distinctions. Without exception, the lowest-income counties had a low proportion of property income and a high proportion of transfer payments relative to the State pattern. Ten of the eleven high-income counties had a low proportion of transfer payments. However, only six of these affluent counties had a high proportion of property income, and the other five had a much lower proportion than the State average. Nine of the ten lowest counties had sub-average proportions of wage and salary disbursements and high proportions of proprietors' income. Seven of the high-income counties had high proportions of wages and salaries and low proportions of proprietors' income. The poorest counties tended to have a slightly lower proportion of "other labor income" than the State, though three were above-average. The affluent counties exhibited a similar pattern; only three were above-average.

The Georgia study area, unlike that in Florida, is portrayed reasonably well by the State's income composition. Wages and salaries constituted 67.7 per cent of the total personal income (including social insurance contributions) in 1957; this put Georgia's wages and salaries at 102 (the U. S. proportion being 100). Nonfarm proprietors' income accounted for some 9.9 per cent of the total, with an index of 108. Property income was next in importance, with 9.5 per cent, index 77. Transfer payments represented almost 6.6 per cent, index 108. Farm proprietors' income was 4.2 per cent, with an index of 127, and other labor income represented about 2.0 per cent and an index of 77.

In terms of relative importance in Georgia's income structure from pre-war years, wages and salaries advanced from about 60 per cent to well over two-thirds. Transfer payments and other labor income also gained in importance over the period 1939-1957, while property income and proprietors' income declined. The proportionate drop of farm proprietors' income was sharp, as in Alabama, from 12.9 per cent to 4.2 per cent.

The pattern of South Carolina's income by primary class is similar to Georgia's. Total proprietors' income represents about the same aggregate percentage of each state's total, but farm proprietors' income is proportionately higher and nonfarm proprietors' is lower in South Carolina than in Georgia. In both states, nonfarm proprietors' income accounts for a larger share of the total than does farm proprietors'. The trends from 1939 to 1957 are also quite similar to those observed in Georgia, except that the decline in property income as a percentage of total income has been much milder in South Carolina, from 9.7 to 9.3 per cent.

The South Carolina study area is relatively less populous and less prosperous than the State, and its share of the State's population and income has decreased from 1950 to 1956. The disparities can not be accurately measured or identified, since the requisite data by county are not available. Such sparse information as can be pieced together indicates that manufacturing income per worker is low relative to the State average in recent years among seven of the eight counties which are entirely or mainly inside the study area lines. Only Aiken County is above-average by this standard, though Greenwood, Abbeville, and Anderson are not seriously sub-average. When final results are known from recent Census surveys, they may confirm that industrial growth in Anderson and Greenwood counties has advanced their standings. Figures on income per farm show that six of the aforementioned counties were above the State average in 1939, but only Aiken and Edgefield occupied this status in 1957. Two additional counties with minor land areas in the study area, Allendale and Barnwell, had relatively high incomes per farm in 1957.

### Factors Affecting Future Income Trends

Income projections to the year 2000 for the study area and its eight major river basins are presented in a separate section, "Economic-Statistical Projections." Factors which are expected to continue pushing up income and economic growth in Georgia and neighboring states include further shifts in employment from farming to manufacturing and other nonagricultural occupations; continuing rises in educational levels and proportionate declines in the Negro population; the development of more extensive and intricate metropolitan webs around city cores; and the impact of the National Highway Program. The area's potentials for additional development of commerce and the tourist trade are fully as great as for further industrial development.

## Table of Contents

### Section G

	<u>Page</u>
Disposable Income, Consumption, and Savings	G-1
I. Economic Framework	G-2
A. Income (Y)	G-2
B. Consumption (C)	G-2
C. Savings (S)	G-2
D. Investments (I)	G-2
E. Savings Equal Investments ( $S = I$ )	G-3
F. Sectors	G-3
G. The Economic Model	G-4
II. Economic Analysis, Southeast River Basins Area	G-7
A. Income (Y)	G-7
B. Consumption (C)	G-10
C. Savings (S)	G-10
D. Monetary Savings	G-19
E. Investments (I)	G-30
III. Summary	G-31

### Tables

1. Disposable Income in the U. S. and Selected Southeastern States, and Estimates for Study Area, 1940-1958, with Forecasts for Study Area, 1960, 1975, and 2000	G-8
2. Personal Consumption Expenditures in the U. S. and Selected Southeastern States, and Estimates for the Study Area, 1940-1958, with Forecasts for the Study Area, 1960, 1975, and 2000	G-11
3. Personal Consumption Expenditures for Goods and Services in the U. S., and Estimates for Study Area, 1940-1958, with Forecasts for Study Area, 1960, 1975, and 2000	G-13
4. Personal Consumption Expenditures as a Per Cent of Disposable Income, U. S. and Study Area	G-16
5. Personal Savings in the U. S. and Selected Southeastern States, and Estimates for the Study Area, 1940-1958, with Forecasts for the Study Area, 1960, 1975, and 2000	G-17
6. Estimates of Cumulative Monetary Savings by Individuals in the U. S. and the Study Area, 1940-1958, with Forecasts to 1960, 1975, and 2000	G-20

Tables (Contd.)Page

- |  |      |
|--|------|
| 7. Estimates of Cumulative Monetary Savings of Individuals in Study Area, by Type of Savings Institution, 1940-1958  | G-23 |
| 8. Estimates of Cumulative Monetary Savings of Individuals in the U. S., by Type of Savings Institution, 1940-1958   | G-24 |
| 9. Disposable Income, Personal Consumption Expenditures, and Personal Savings in the U. S. and Selected South-eastern States, and Estimates for Study Area, 1940-1958, with Forecasts for the Study Area | G-32 |

Charts

- |  |      |
|--|------|
| 1. An Economic Model of Income, Consumption, Savings, and Investment         | G-5  |
| 2. Disposable Income in Selected Areas                                       | G-9  |
| 3. Consumption in Selected Areas   | G-12 |
| 4. Consumption--Study Area   | G-14 |
| 5. Consumption--U. S. Total  | G-15 |
| 6. Personal Savings in Selected Areas  | G-18 |
| 7. Total Cumulative Monetary Savings in Study Area and U. S.                 | G-21 |
| 8. Cumulative Bank Deposits in Study Area and U. S.                          | G-25 |
| 9. Cumulative Life Insurance Reserves in Study Area and U. S.                | G-26 |
| 10. Cumulative Savings and Loan Association Deposits in Study Area and U. S. | G-27 |
| 11. Cumulative Credit Union Deposits in Study Area and U. S.                 | G-28 |
| 12. Cumulative Postal Savings in Study Area and U. S.                        | G-29 |
| 13. Disposable Income--Consumption--Savings in Selected Areas                | G-33 |

## DISPOSABLE INCOME, CONSUMPTION, AND SAVINGS\*

The economic analysis of a region requires a theoretical framework in order to analyze various interrelationships and to forecast certain economic aggregates. In this study the relationships among income, consumption, savings, and investments are analyzed. After the theoretical framework is explained, economic data are put into the framework. Comparisons are made of certain aspects of the economy of the study area with the United States and with four southeastern states (Alabama, Florida, Georgia, and South Carolina). Forecasts, based on post-war trends, are made to the year 2000.

Any economic analysis of this type must depend upon available data. In some cases data are not directly available, but can be derived from various relationships. Different sources of economic data were examined and compared. In every case the most reliable information or estimates on a consistent basis were used. Absolute validity of the results cannot be guaranteed. Any forecast to the year 2000 is especially suspect. Any major change in population, income distribution, tax structure, or technology can result in economic conditions different from those forecast. However, certain comparisons and trends are evident and can be relied upon.

---

\*By Walter Kennon and Lee Dudley, Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology.

## I. ECONOMIC FRAMEWORK

### A. Income (Y)

Aggregate income for a region is a special concept of income with a particular method for measurement. Personal income includes wages and salaries, income from proprietorships and partnerships, rental income, dividends and interest, and transfer payments (mainly governmental payments for social insurance and military benefits). This is the income to individuals. It does not include the income retained and not paid as dividends by corporations.

Disposable income is defined as personal income less taxes. This is the amount available to individuals for spending or saving.

### B. Consumption (C)

Consumption is the amount spent by individuals for living expenses. It ordinarily includes retail sales and the amounts paid for services. It includes an imputed rent for those persons owning their homes.

### C. Savings (S)

Savings are here defined as disposable income less consumption ( $Y - C = S$ .) They are periodic changes, not accumulated balances. There are many forms that savings can take. They are classified into monetary and non-monetary savings.

Monetary savings are those deposited with financial institutions. They include bank accounts, savings and loan association deposits, life insurance reserves, stocks, and bonds.

Non-monetary savings are those directly invested in a business or real estate. The purchase of private residence is considered saving because it has more aspects of a long-term investment than of current consumption.

### D. Investments (I)

Investments are here defined as increases in capital goods. They are buildings, public works, equipment, and inventories. They are increases and not the accumulated totals of such goods. This means that construction of buildings, increases in capital goods, and in inventories are investments.

Stocks and bonds are not investments for the region. The original capital issue represents an increase in capital goods and therefore an investment by the corporation. Exchanges of stocks and bonds are transfers among owners with no real change in investments for the region as a whole. The same is true for real estate. Purchases and sales are not investments for the region. The exception is for transactions among regions. The purchase of a security by someone in the study area from someone outside the area is an investment for the study area in a "foreign" region. A foreign sector account in the system of regional accounting is used for these transfers among regions.

#### E. Savings Equal Investments ( $S = I$ )

In this analysis savings equal investments. The amount of income not spent for current consumption of necessity must be spent for capital goods. This is easily understood when the relationship is direct with non-monetary savings. A business or professional man who does not consume business income must reinvest it in the business with an increase in inventories or equipment.

The relationship is more difficult with monetary savings because it is an indirect relationship. In this case the savings of one person forces investments by someone else. Thus if a cash wage income is saved, there is a forced investment by business. The cash income is the result of production. Yet the cash is not used to purchase goods and services. If there is no price change, of necessity there is an increase in inventories. If business does not want to increase inventories, prices can be reduced in order to sell. In this case business income is reduced with a corresponding reduction in business retained earnings, which are savings. This reduction in business savings must equal the increase in personal savings. Likewise, in all cases, savings must equal investments.

#### F. Sectors

In the economic analysis of a region there are household, business, government, and foreign sectors. Each sector represents a separate entity. Transactions among sectors are accounted for. Households receive salary, dividends, rent, and interest income. Savings are in bank accounts, stocks, bonds, and real estate.



The business sector produces and sells for income. Savings are reinvested earnings in the business.

The government sector taxes for its income and then spends for goods and services--its consumption. The remainder of income is saved. Savings may be directly invested in capital improvements. Monetary savings or dissavings are surpluses or deficits. Surpluses represent savings invested in other sectors. Deficits represent investments financed by savings in other sectors.

The foreign sector represents transactions with areas outside the economic region being analyzed. For our purposes the foreign sector includes areas outside the Southeast River Basins area.

In this study the household sector only is analyzed. This is the most important sector. Regional data on other sectors are not available. For example, the business sector is dominated by large national corporations that do not publish information on the regional breakdown of operations.

#### G. The Economic Model

With these simple relationships an economic model can be developed. To summarize, there are the following relationships:

Y - Income

C - Consumption

S - Savings (both monetary and non-monetary)

I - Investments

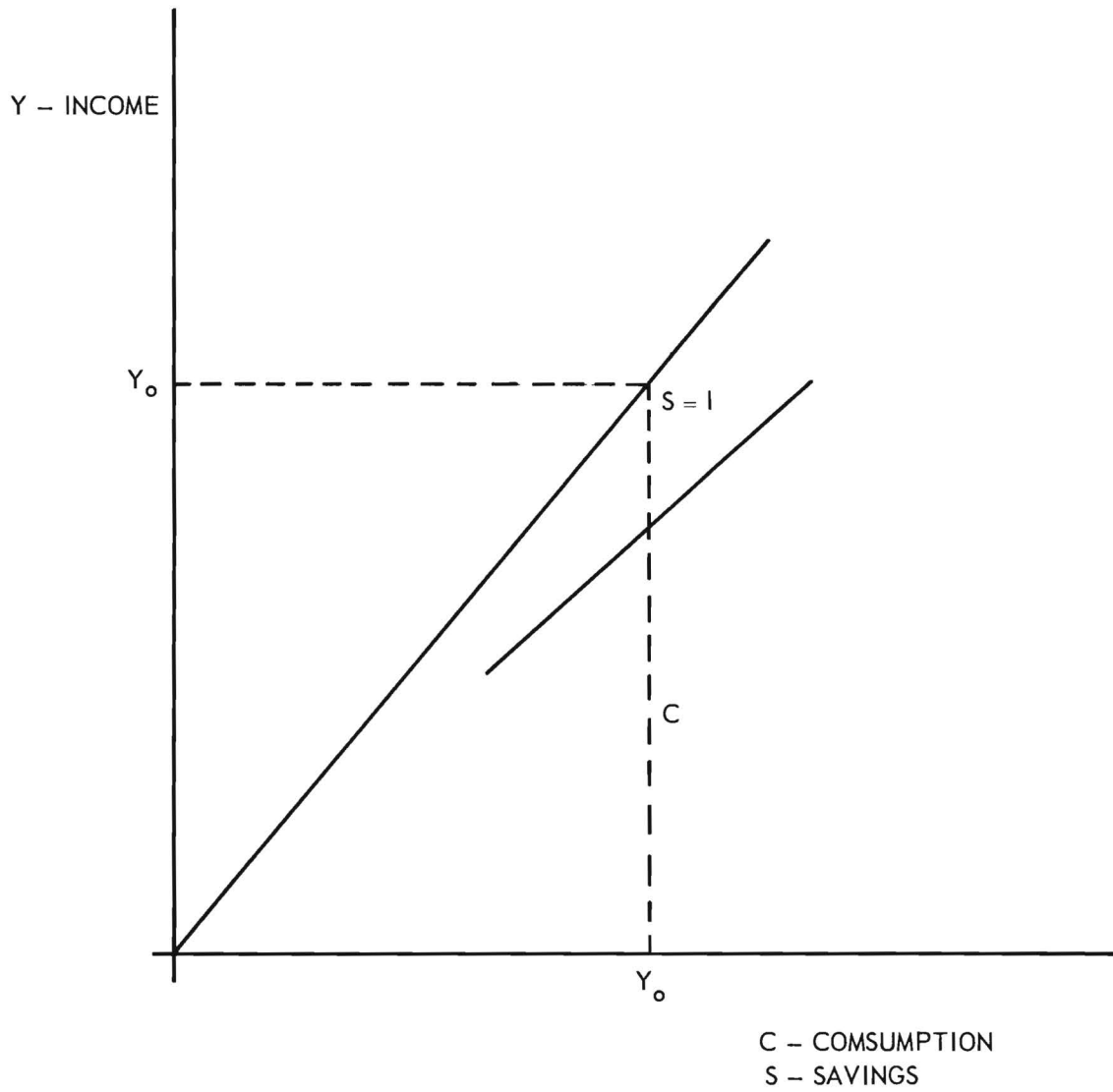
$$Y = C + S$$

$$S = I$$

In terms of a diagram, the model is illustrated in Chart 1. Because  $Y = C + S$  there is a  $45^\circ$  line from the origin. A line to the right represents a division of income between consumption and savings. For any particular level of income, say  $Y_0$ , there is some particular division between consumption and savings.

Investment is the major determinant of income with  $S = I$  the critical relationship. If business does not plan to invest as much as total savings from all sectors, the business sector is forced to invest more in inventories which are unsold. Business is discouraged from making further expansion. Of

CHART 1  
AN ECONOMIC MODEL OF INCOME, CONSUMPTION,  
SAVINGS, INVESTMENT



course there may be compensating investments by other sectors, particularly government. In this case business expansion may not be discouraged.

Or prices may be reduced to sell the same physical volume. In this case business profits are less. Again business is discouraged and will produce less in the following period. Employment and income decrease.

On the other hand, if business plans to invest more than is saved, capital goods must be rationed with an increase in prices. Consumers find that they cannot spend as much as planned but must save. In their attempt to spend, the prices of consumer goods increase. Furthermore, the increase in investment results in more employment and more income. An increase in investment causes an increase in income more than the amount of the investment. This is the multiplier effect. Thus investment, particularly by business and government, is the major determinant of income.

## II. ECONOMIC ANALYSIS

### SOUTHEAST RIVER BASINS AREA

Data are now fitted into the theoretical framework for analysis. The period covered is 1940-58. However, in establishing trends and comparisons the war years, 1943-46, are omitted. They were distorted by government spending, high income, and high savings forced by a shortage of consumer goods. These were not normal conditions. Therefore, projections omit these years from consideration.

All data have been deflated to the 1947-49 price level by the Consumer Price Index of the Bureau of Labor Statistics. Thus all effects of price level changes have been eliminated to make data comparable.

The study area will be compared with the Southeast and the United States. The Southeast, for the purpose of this analysis, includes the states of Alabama, Florida, Georgia, and South Carolina.

#### A. Income (Y)

Disposable income in the study area as compared with the Southeast and the U. S. total is presented in Table 1 and Chart 2.

All regions experienced a sharp increase in income during the war years, with some decline in 1945-46. After 1946, income has continued to increase in the Southeast and the study area. The U. S. shows a tendency to level out since 1953. The Southeast and the study area show no such tendency.

The average annual rate of increase for the post-war years, 1947-58, is as follows:

River Basins Area	4.6%
Southeast	5.1
U. S. Total	3.6

The rapid growth of income in the study area is primarily due to its industrialization. The United States has reached a mature stage of development and is experiencing a leveling-off in income. Until the study area reaches a mature stage of industrialization, its real income can increase at a relatively rapid rate. When its economy reaches maturity, it may also experience a less rapid rate of growth.

Table 1

DISPOSABLE INCOME IN THE U. S. AND SELECTED SOUTHEASTERN STATES,  
AND ESTIMATES FOR STUDY AREA, 1940-1958, WITH FORECASTS  
FOR STUDY AREA, 1960, 1975, AND 2000

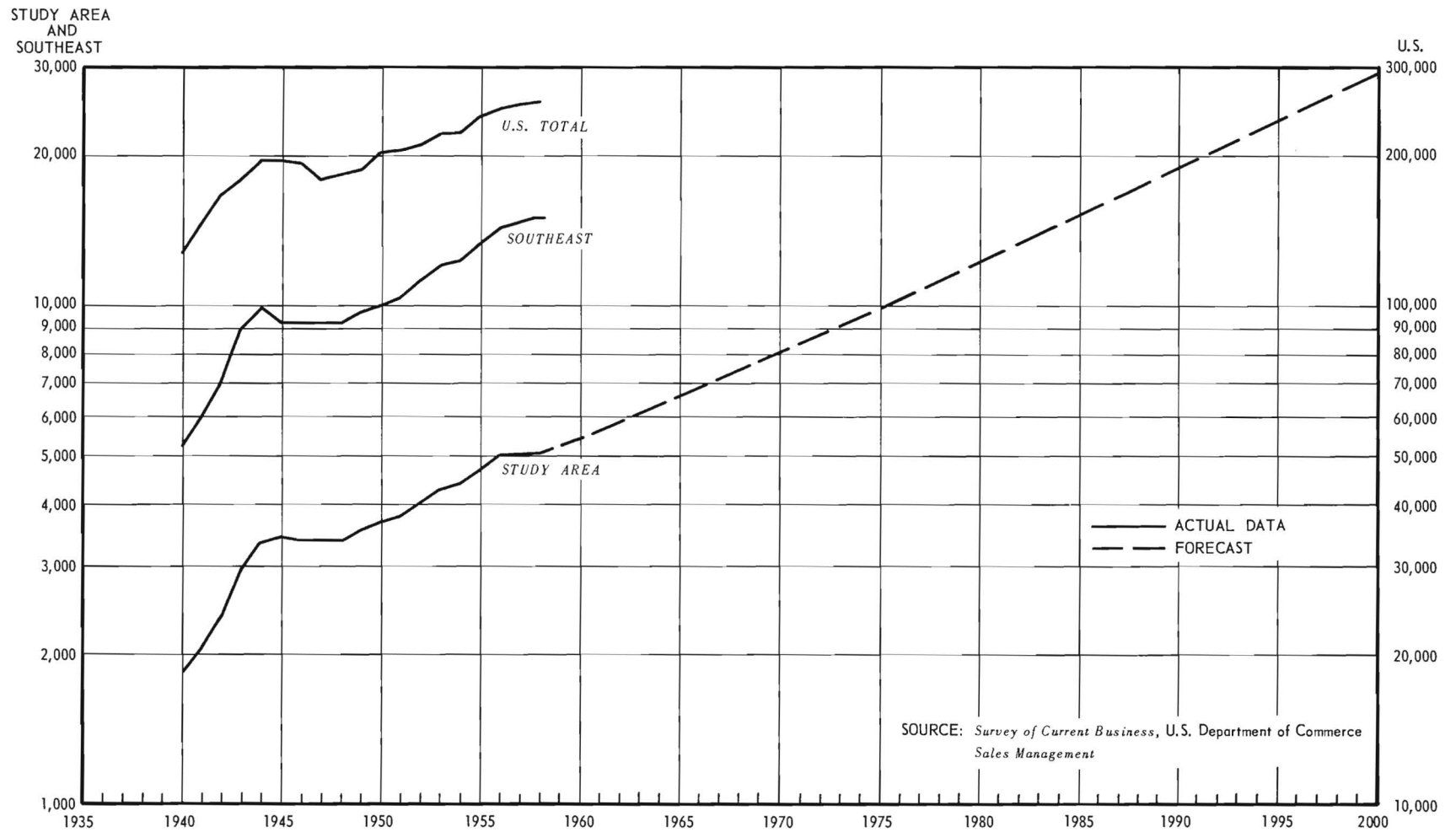
(Millions of 1947-49 dollars)

<u>Year</u>	<u>Study Area</u>	<u>Southeast</u> <sup>1/</sup>	<u>U. S. Total</u>
1940	\$1,813	\$ 5,210	\$127,005
1941	2,056	6,017	147,825
1942	2,268	7,036	168,603
1943	2,963	9,082	180,469
1944	3,320	9,872	195,161
1945	3,414	9,222	195,520
1946	3,372	9,231	192,529
1947	3,367	9,226	178,129
1948	3,348	9,224	184,144
1949	3,514	9,777	186,301
1950	3,674	10,054	201,999
1951	3,796	10,395	204,938
1952	4,018	11,226	210,321
1953	4,247	12,011	220,694
1954	4,394	12,417	223,767
1955	4,675	13,275	239,693
1956	5,046	14,322	249,960
1957	5,059	14,693	253,868
1958	5,082	14,965	256,275
<u>Forecast</u>			
1960	5,419		
1975	9,851		
2000	29,045		

<sup>1/</sup> States of Alabama, Florida, Georgia, and South Carolina.

Sources: Survey of Current Business, U. S. Department of Commerce  
Sales Management

CHART 2  
DISPOSABLE INCOME IN SELECTED AREAS  
(In Millions of 1947-49 Dollars)



### B. Consumption (C)

Consumption in the study area as compared with the Southeast and the United States in the period 1940 to 1958 is shown in Table 2 and Chart 3.

The rates of annual increase are as follows:

	<u>1940-58</u>	<u>1950-58</u>
River Basins Area	5.5%	3.5%
Southeast	5.7	4.4
United States	3.7	2.5

The consumption pattern shows that the three areas increase rapidly in the period 1942-47, then increase at a slower rate.

The effect of World War II on the consumption pattern in the three areas was to curtail consumption, especially of durable goods. 1946 found consumers with both a great demand for these goods and the money to buy them. By 1948 this short-term demand for consumer goods had subsided and the more normal pattern returned.

Services make up a higher proportion of total consumption in the United States than in the study area. Conversely, consumer goods purchases make up a higher percentage of total consumption in the study area than in the United States. Table 3 and Charts 4 and 5 illustrate these relationships.

The Southeast River Basins area is one of high consumption in relation to disposable income, as shown in Table 4. In all years except 1945, consumption has been a larger part of disposable income for the study area than for the U. S. total. The broad implication is that less of the consumer's dollar is available for savings, hence investments.

### C. Savings (S)

Total and monetary savings are analyzed and forecast. Since total savings are low and monetary savings are high, relative to disposable income, it follows that non-monetary savings are very low. Non-monetary savings are not analyzed because data are insufficient.

Savings in the study area, the Southeast, and the United States are compared in Table 5 and Chart 6. The trend for all areas is about the same. During the war, savings were high because consumer goods were not available. In 1947 savings were unusually low because this was the first year when post-

Table 2

PERSONAL CONSUMPTION EXPENDITURES IN THE U. S.  
AND SELECTED SOUTHEASTERN STATES, AND ESTIMATES  
FOR THE STUDY AREA, 1940-1958, WITH FORECASTS  
FOR THE STUDY AREA, 1960, 1975, AND 2000

(Millions of 1947-49 dollars)

<u>Year</u>	<u>Study Area</u>	<u>Southeast</u> <sup>1/</sup>	<u>U. S. Total</u>
1940	\$1,740	\$ 5,002	\$120,002
1941	1,892	5,536	130,167
1942	1,814	5,629	128,764
1943	2,282	6,993	135,866
1944	2,523	7,503	146,055
1945	2,663	7,193	158,256
1946	3,069	8,400	176,390
1947	3,300	9,041	173,203
1948	3,214	8,855	173,456
1949	3,373	9,386	177,955
1950	3,527	9,652	189,701
1951	3,606	9,875	189,014
1952	3,817	10,665	193,634
1953	3,992	11,290	203,364
1954	4,130	11,672	207,338
1955	4,488	12,744	224,402
1956	4,794	13,696	231,841
1957	4,857	14,105	236,641
1958	4,828	14,217	237,247
<u>Forecast</u>			
1960	5,197		
1975	9,567		
2000	28,491		

<sup>1/</sup> States of Alabama, Florida, Georgia, and South Carolina

Sources: Sales Management  
Survey of Current Business, U. S. Department of Commerce  
Industrial Development Branch Estimates



CHART 3  
CONSUMPTION IN SELECTED AREAS  
(In Millions of 1947-49 Dollars)

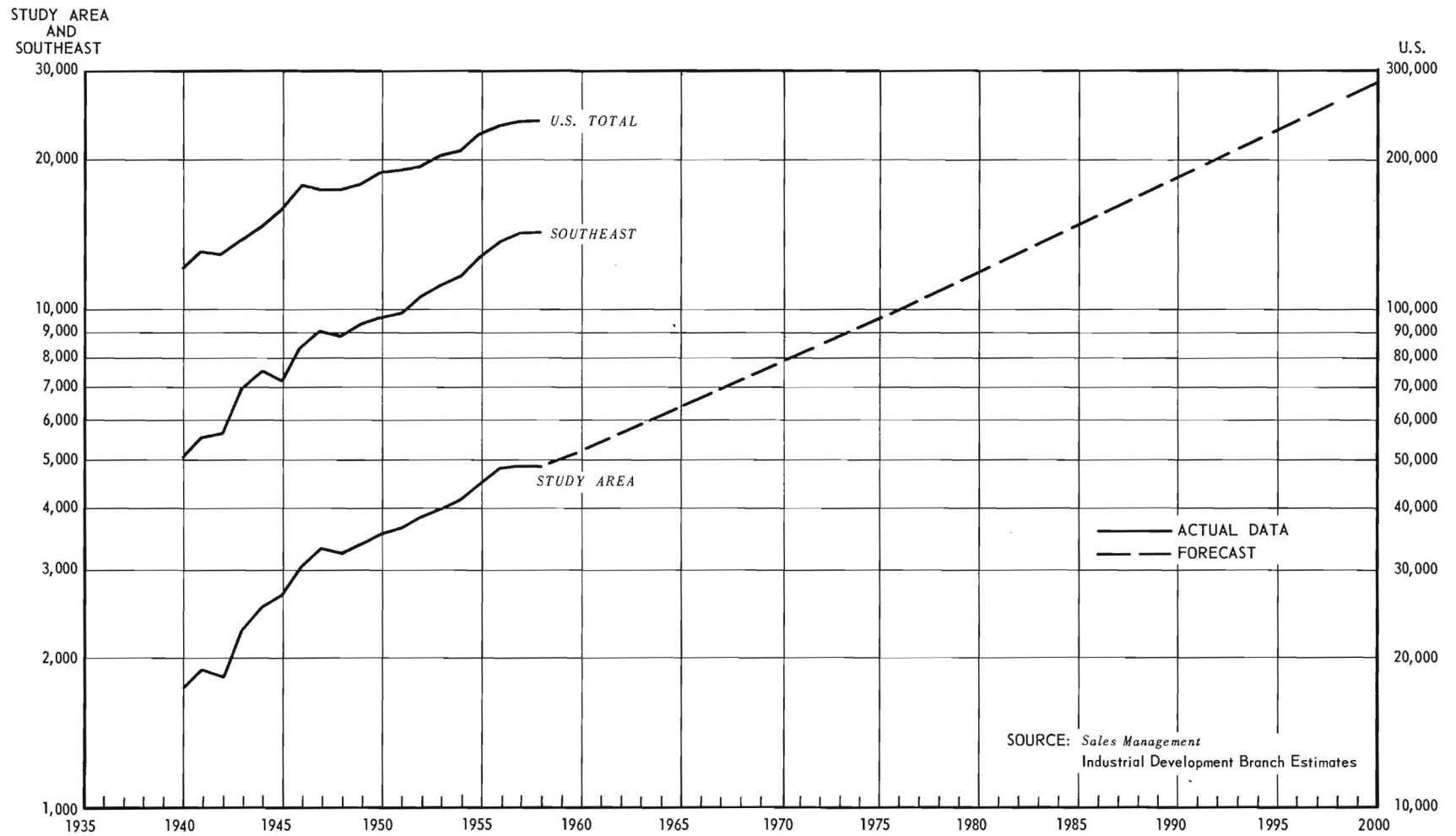


Table 3

PERSONAL CONSUMPTION EXPENDITURES FOR GOODS AND SERVICES  
IN THE U. S., AND ESTIMATES FOR STUDY AREA, 1940-1958,  
WITH FORECASTS FOR STUDY AREA, 1960, 1975, 2000  
(Millions of 1947-49 dollars)

Year	Study Area <sup>1/</sup>			U. S. Total <sup>2/</sup>		
	Total	Consumer Goods	Services	Total	Consumer Goods	Services
1940	\$1,740	\$1,328	\$ 412	\$120,002	\$ 75,102	\$44,900
1941	1,892	1,541	351	130,167	84,049	46,118
1942	1,814	1,417	397	128,764	83,633	45,131
1943	2,282	1,565	717	135,866	89,005	46,861
1944	2,523	1,695	828	146,055	95,921	50,134
1945	2,663	1,794	869	158,256	105,757	52,499
1946	3,069	2,106	963	176,390	120,736	55,654
1947	3,300	2,448	852	173,203	119,346	53,857
1948	3,214	2,468	746	173,456	118,152	55,304
1949	3,373	2,436	937	177,955	119,048	58,907
1950	3,527	2,732	795	189,701	126,607	63,094
1951	3,606	2,728	878	189,014	125,771	63,243
1952	3,817	2,888	929	193,634	127,048	66,586
1953	3,992	2,964	1,028	203,364	131,850	71,514
1954	4,130	2,886	1,244	207,338	132,166	75,172
1955	4,488	3,548	940	224,402	143,576	80,826
1956	4,794	3,716	1,078	231,841	146,085	85,756
1957	4,857	3,749	1,108	236,641	148,001	88,640
1958	4,828	3,738	1,090	237,247	145,344	91,903
<u>Forecast</u>						
1960	5,197	4,002	1,195			
1975	9,567	7,367	2,200			
2000	28,491	21,938	6,553			

<sup>1/</sup> Sales Management  
Industrial Development Branch Estimates

<sup>2/</sup> Survey of Current Business, U. S. Department of Commerce

CHART 4  
CONSUMPTION - STUDY AREA  
(In Millions of 1947-49 Dollars)

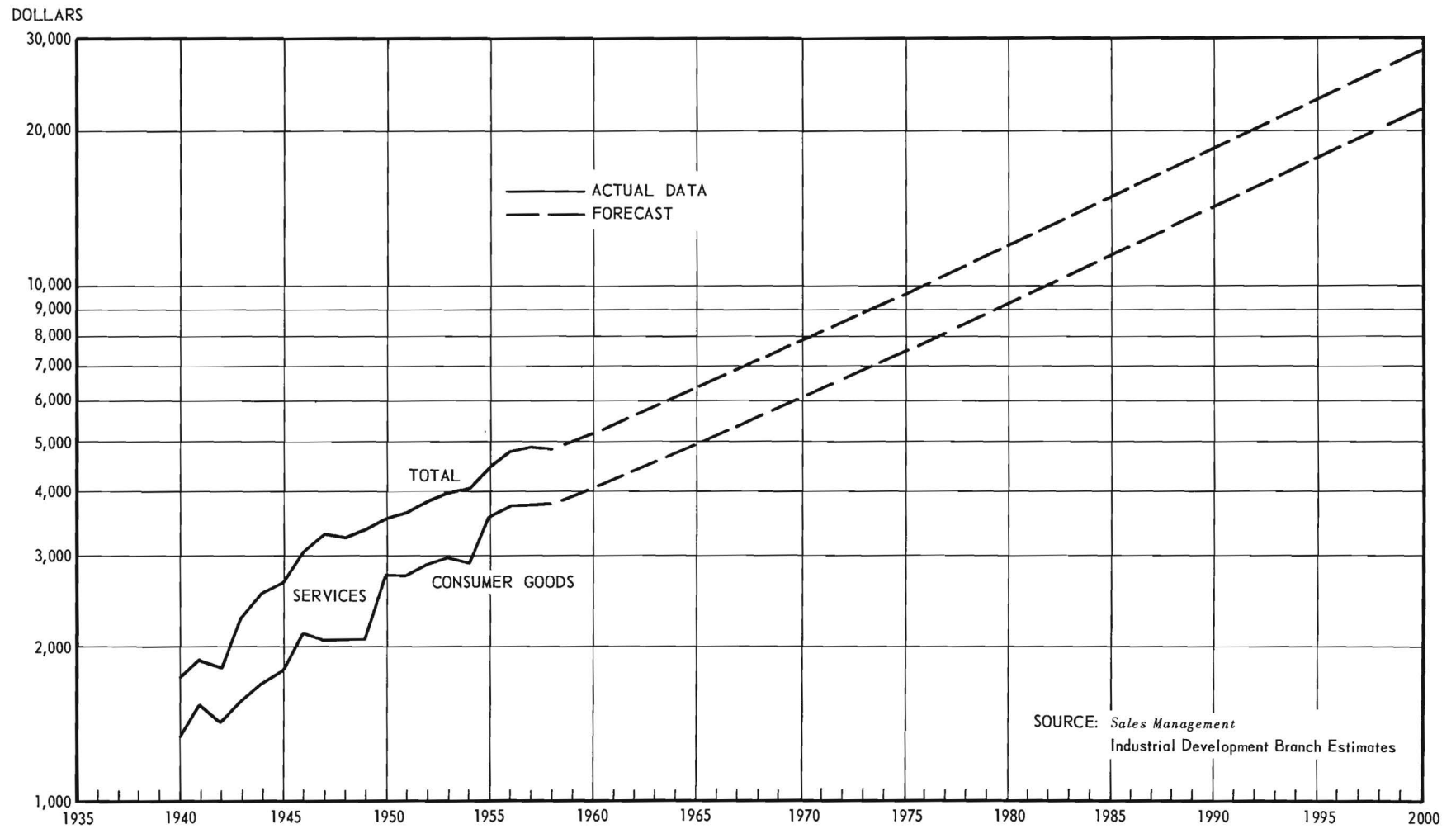


CHART 5  
CONSUMPTION - U.S. TOTAL  
(In Millions of 1947-49 Dollars)

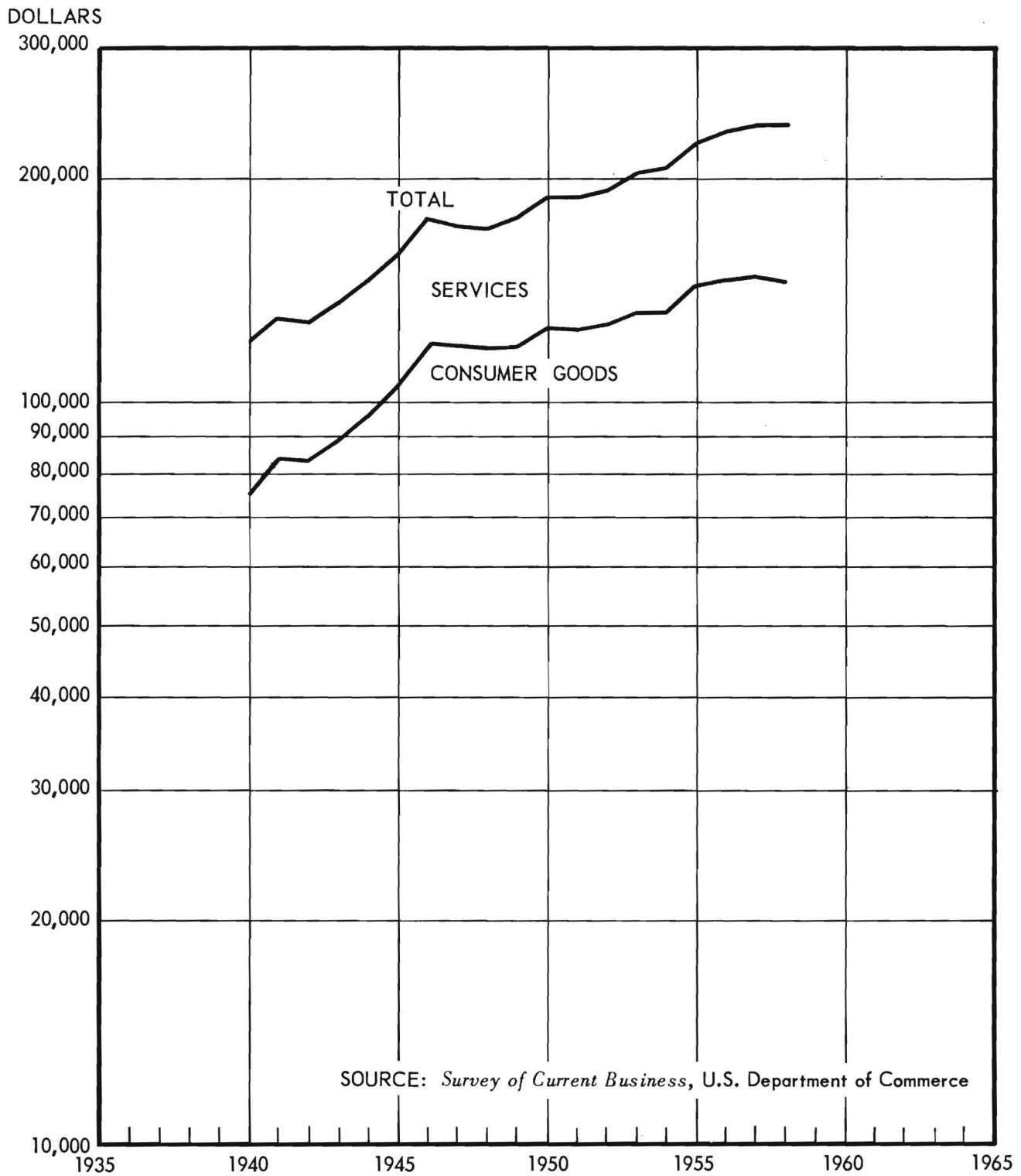


Table 4

PERSONAL CONSUMPTION EXPENDITURES AS A PER CENT  
OF DISPOSABLE INCOME, U. S. AND STUDY AREA

<u>Year</u>	<u>Per Cent of Disposable Income</u>	
	<u>Study Area</u>	<u>United States</u>
1940	96	95
1941	92	88
1942	80	76
1943	77	75
1944	76	75
1945	78	81
1946	91	92
1947	98	97
1948	96	94
1949	96	96
1950	96	94
1951	95	92
1952	95	92
1953	94	92
1954	94	93
1955	96	94
1956	95	93
1957	96	93
1958	95	93

Sources: Sales Management  
Survey of Current Business, U. S.  
 Department of Commerce  
 Industrial Development Branch  
 Estimates

Table 5

PERSONAL SAVINGS IN THE U. S. AND SELECTED SOUTHEASTERN STATES,  
AND ESTIMATES FOR THE STUDY AREA, 1940-1958, WITH FORECASTS  
FOR THE STUDY AREA, 1960, 1975, AND 2000

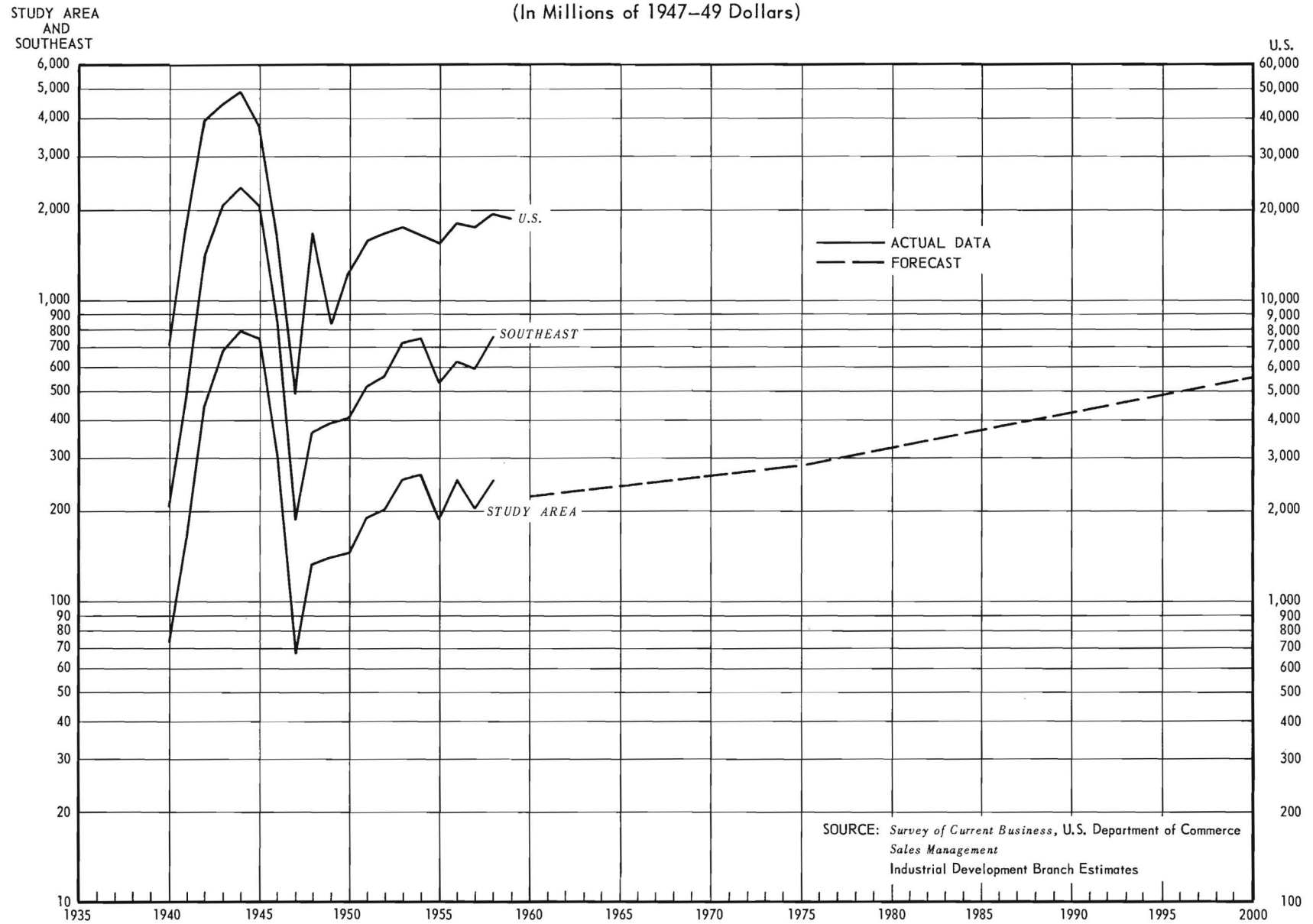
(Millions of 1947-49 dollars)

<u>Year</u>	<u>Study Area</u>	<u>Southeast</u> <sup>1/</sup>	<u>U. S. Total</u>
1940	\$ 73	\$ 208	\$ 7,003
1941	164	481	17,658
1942	454	1,407	39,839
1943	681	2,089	44,603
1944	797	2,369	49,106
1945	751	2,029	37,264
1946	303	831	16,139
1947	67	185	4,926
1948	134	369	10,688
1949	141	391	8,346
1950	147	402	12,298
1951	190	520	15,924
1952	201	561	16,687
1953	255	721	17,330
1954	264	745	16,429
1955	187	531	15,291
1956	252	626	18,119
1957	202	588	17,227
1958	254	748	19,028
<u>Forecast</u>			
1960	222		
1975	284		
2000	554		

<sup>1/</sup> States of Alabama, Florida, Georgia, and South Carolina

Sources: Sales Management  
Survey of Current Business, U. S. Department of Commerce  
Industrial Development Branch Estimates

CHART 6  
PERSONAL SAVINGS IN SELECTED AREAS  
(In Millions of 1947-49 Dollars)



war consumer goods production was in full force to satisfy the pent-up demand. 1947 was a year of high production and consumption.

Forecasts of savings in the study area are reasonable in relation to the increasing income of the region and the consumption-savings pattern that seems firmly established. The study area is a region with a low savings-to-income ratio in comparison with the United States. A change in the consumption-savings pattern for the region to be in line with the United States would mean an increase in savings and an upward revision in the savings forecast.

#### D. Monetary Savings

Monetary savings are those made through financial institutions. These are savings in bank accounts, life insurance reserves, savings and loan association deposits, credit union deposits, and postal savings. The total accumulated balances, not annual increases, are presented in Table 6 and Chart 7.

Monetary savings in the Southeast River Basins are increasing at a much higher rate than for the United States. For the period 1948-58 the average rate was 5.6 per cent for the study area, but was 4.9 per cent for the U. S. total. With this larger rate of increase in monetary savings, it is doubtful that all monetary savings are returned by the savings institutions as investments in the region. Although data are not available for analysis, it appears that monetary savings are resulting in investments outside the region, i.e., in the foreign sector of our regional accounting. This assumption is suggested by indirect evidence. For example, the Southeast does not have its per capita share of employment and income from finance, or of financial institutions' assets.

Such a strong growth in monetary savings means that financial institutions will become more powerful forces in the future. This is especially true in the study area. Banks will control business expansions by lending to selected industries and firms. Life insurance companies will control by investing in the securities of certain firms. Mutual funds will become strong management voices by exercising their proxies, perhaps to elect board members and officers. Legal restrictions and conservative financial policies will probably mean that monetary savings will not flow into risk capital investments. There will be an even greater shortage of risk capital. Old established firms will become even more firmly entrenched. It will be more difficult to organize a new firm.



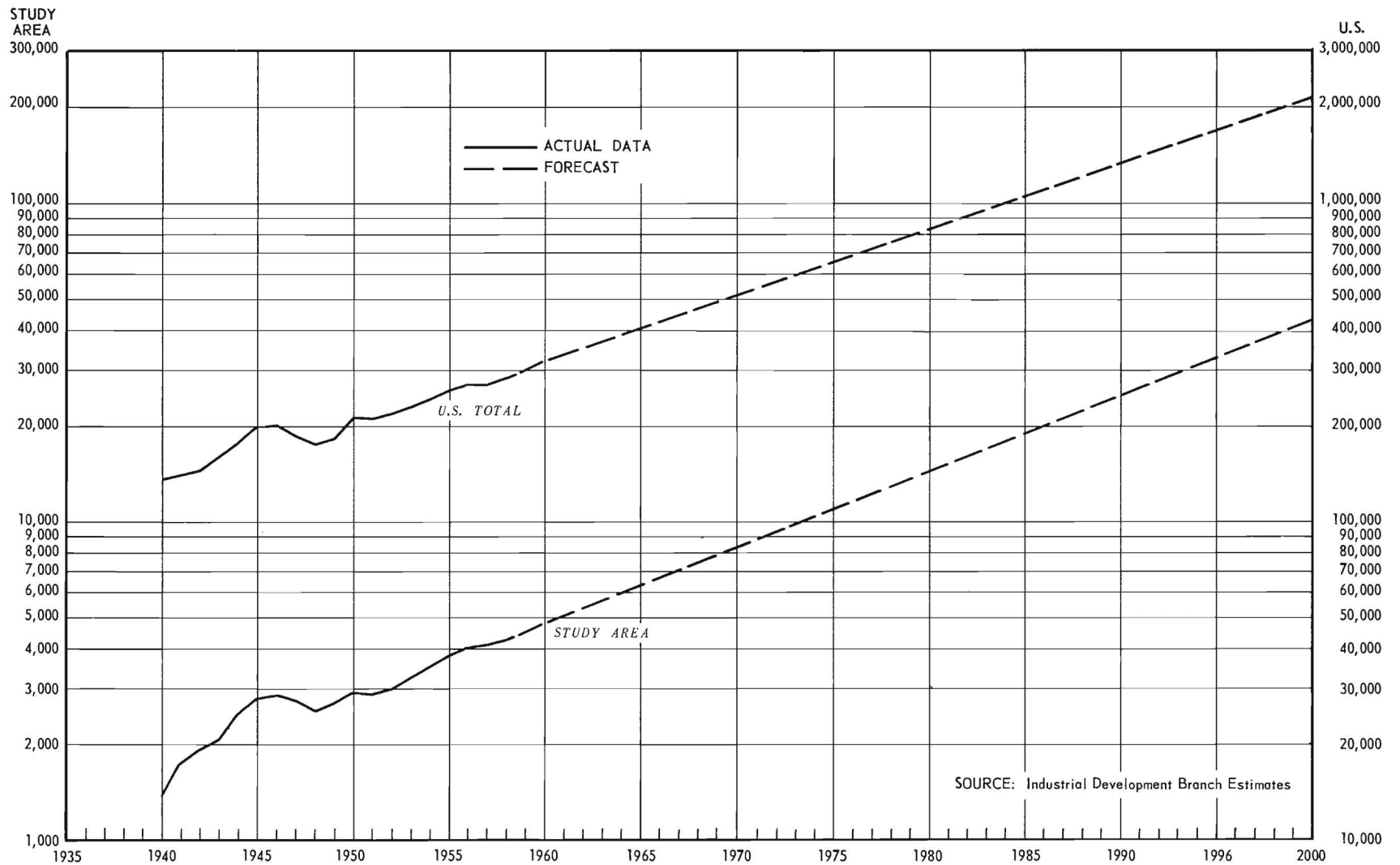
Table 6

ESTIMATES OF CUMULATIVE MONETARY SAVINGS BY INDIVIDUALS  
IN THE U. S. AND THE STUDY AREA, 1940-1958,  
WITH FORECASTS TO 1960, 1975, AND 2000

(Millions of 1947-49 dollars)

<u>Year</u>	<u>Study Area</u>	<u>United States</u>
1940	\$1,381	\$135,956
1941	1,725	139,937
1942	1,924	145,447
1943	2,174	160,864
1944	2,509	177,050
1945	2,784	199,753
1946	2,869	202,397
1947	2,748	187,305
1948	2,542	176,316
1949	2,706	183,656
1950	2,936	215,776
1951	2,901	212,242
1952	3,050	220,428
1953	3,251	229,740
1954	3,509	243,829
1955	3,811	261,144
1956	4,025	270,732
1957	4,142	273,571
1958	4,326	286,998
<u>Forecast</u>		
1960	4,878	322,600
1975	11,040	658,200
2000	43,110	2,159,000

CHART 7  
TOTAL CUMULATIVE MONETARY SAVINGS IN THE STUDY AREA AND THE U.S.  
(In Millions of 1947-49 Dollars)



Of course, control by financial institutions is not necessarily undesirable. If it can be assumed that the judgment of financial institutions is an informed professional business judgment, direction of investment will result in a greater benefit to the region than if control were exercised directly by individuals. Certainly, financial institutions are controlled by the individuals holding voting capital securities. That is, individuals control the financial institutions, which in turn control investments. Thus individuals have an indirect control over investments.

For 1958, the latest year with available data, the composition of monetary savings is as follows:

	<u>Per Cent of Monetary Savings, 1958</u>	
	<u>River Basins Area</u>	<u>United States</u>
Bank Deposits	43.7%	60.1%
Life Insurance Reserves	38.6	25.0
Savings and Loan Assn. Deposits	16.1	13.5
Credit Union Deposits	1.2	1.1
Postal Savings	<u>0.4</u>	<u>0.3</u>
Total	100.0%	100.0%

The trend in the composition of monetary savings since 1940 is presented in the following tables and charts.

Bank deposits in both the study area and the United States are the largest form of monetary savings. However, they are not growing at as rapid a rate as other forms of savings. Life insurance reserves are an important and rapidly growing form of monetary savings. Savings and loan associations are less important but have a strong rate of growth. Credit unions are small but growing. Postal savings are declining and are of little importance.

The implication is that most of the capital funds for investment in the future will probably come from bank deposits and insurance reserves. These sources deserve more detailed analysis of their structure and investment policies. However, in projecting to the year 2000, it is quite likely that new savings institutions will develop. Certainly, mutual funds are becoming more important financial forces in the current decade. Data on a regional basis are not available for these funds. With such a strong likelihood of institutional changes, no projections are made for individual forms of monetary savings in the study area. As new institutional forms are developed,

Table 7

ESTIMATES OF CUMULATIVE MONETARY SAVINGS OF INDIVIDUALS IN STUDY AREA,  
BY TYPE OF SAVINGS INSTITUTION, 1940-1958

(Thousands of current dollars)

<u>Year</u>	<u>Bank Deposits</u>	<u>Life Insurance Reserves</u>	<u>Savings and Loan Deposits</u>	<u>Credit Union Deposits</u>	<u>Postal Savings</u>	<u>Total Savings</u>
1940	\$ 301,602	\$ 462,072	\$ 36,027	\$ 1,668	\$25,663	\$ 827,032
1941	521,875	491,138	44,158	2,123	25,876	1,085,170
1942	742,148	522,385	48,268	2,241	26,102	1,341,144
1943	958,541	560,564	55,654	2,340	31,301	1,608,400
1944	1,171,528	603,452	69,367	2,390	40,361	1,887,098
1945	1,304,826	689,288	91,323	2,809	52,770	2,141,016
1946	1,438,124	774,226	115,331	3,352	62,020	2,393,053
1947	1,571,423	838,265	145,846	3,932	65,300	2,624,766
1948	1,480,911	895,323	168,763	4,772	63,062	2,612,831
1949	1,498,083	997,833	193,602	5,439	59,420	2,754,377
1950	1,622,938	1,100,387	232,814	6,628	55,132	3,017,899
1951	1,692,182	1,194,146	275,750	7,973	49,559	3,219,610
1952	1,753,347	1,307,184	342,812	10,069	47,991	3,461,403
1953	1,806,435	1,427,475	420,810	19,055	45,904	3,719,679
1954	1,892,631	1,558,566	507,981	27,644	41,945	4,028,767
1955	2,011,933	1,681,418	593,933	38,886	37,523	4,363,693
1956	2,123,909	1,802,235	669,932	47,549	33,418	4,677,043
1957	2,228,563	1,911,519	754,116	57,342	27,305	4,978,845
1958	2,333,217	2,062,453	859,289	64,759	22,455	5,342,173

Table 8

ESTIMATES OF CUMULATIVE MONETARY SAVINGS OF INDIVIDUALS IN THE U. S.,  
BY TYPE OF SAVINGS INSTITUTION, 1940-1958

(Thousands of current dollars)

<u>Year</u>	<u>Bank Deposits</u>	<u>Life Insurance Reserves</u>	<u>Savings and Loan Deposits</u>	<u>Credit Union Deposits</u>	<u>Postal Savings</u>	<u>Total Savings</u>
1940	\$ 48,374,365	\$27,238,000	\$ 4,300,000	\$ 231,728	\$1,293,409	\$ 81,437,502
1941	52,775,906	28,945,000	4,700,000	295,277	1,304,153	88,020,336
1942	64,052,405	30,797,000	4,900,000	311,839	1,315,523	101,376,767
1943	78,587,442	33,049,000	5,500,000	325,511	1,577,526	119,039,479
1944	88,866,298	35,577,000	6,300,000	364,305	2,034,137	133,141,740
1945	104,485,741	38,667,000	7,400,000	397,803	2,659,575	153,610,119
1946	115,024,528	41,702,000	8,500,000	453,288	3,119,656	168,799,472
1947	120,260,311	44,882,000	9,800,000	541,042	3,392,773	178,876,126
1948	118,073,459	48,158,000	11,000,000	642,029	3,379,130	181,252,618
1949	118,929,218	51,498,000	12,500,000	757,012	3,277,402	186,961,632
1950	148,854,511	54,946,000	14,000,000	919,850	3,097,316	221,817,677
1951	157,056,829	58,547,000	16,100,000	1,096,797	2,788,199	235,588,825
1952	164,401,805	62,579,000	19,200,000	1,387,663	2,617,564	250,186,032
1953	169,147,226	66,683,000	22,800,000	1,734,540	2,457,548	262,822,314
1954	177,434,631	70,903,000	27,300,000	2,026,590	2,251,419	279,915,640
1955	187,088,256	75,359,000	32,200,000	2,354,914	2,007,996	299,010,166
1956	193,029,552	79,738,000	37,100,000	2,957,873	1,765,470	314,590,895
1957	198,302,422	84,075,000	41,900,000	3,092,498	1,462,268	328,832,188
1958	212,770,643	88,604,000	47,926,000	3,927,669	1,213,608	354,441,920

CHART 8  
CUMULATIVE BANK DEPOSITS IN THE STUDY AREA AND THE U.S.  
(In Millions of 1947-49 Dollars)

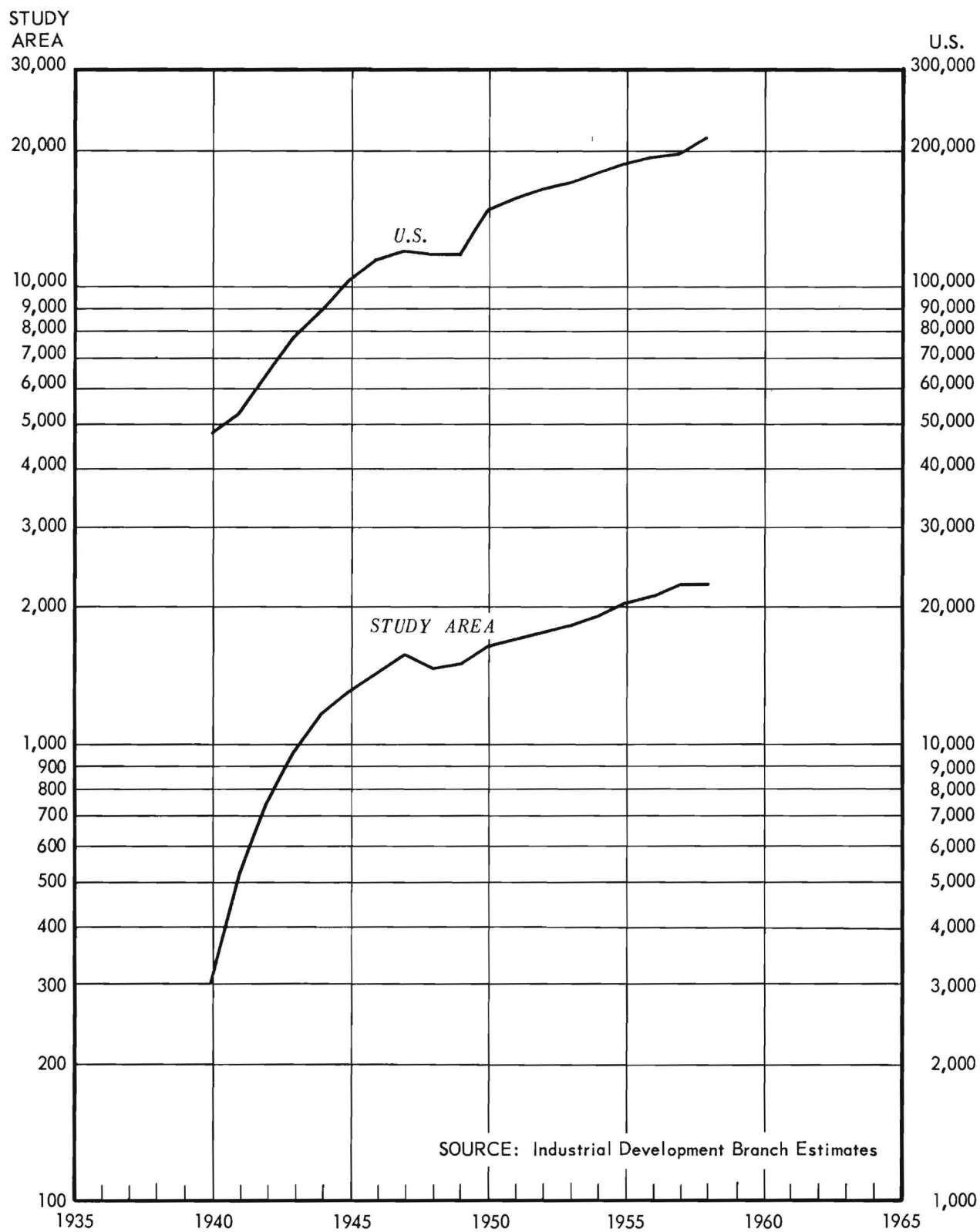


CHART 9  
CUMULATIVE LIFE INSURANCE RESERVES IN THE STUDY AREA AND THE U.S.  
(In Millions of 1947-49 Dollars)

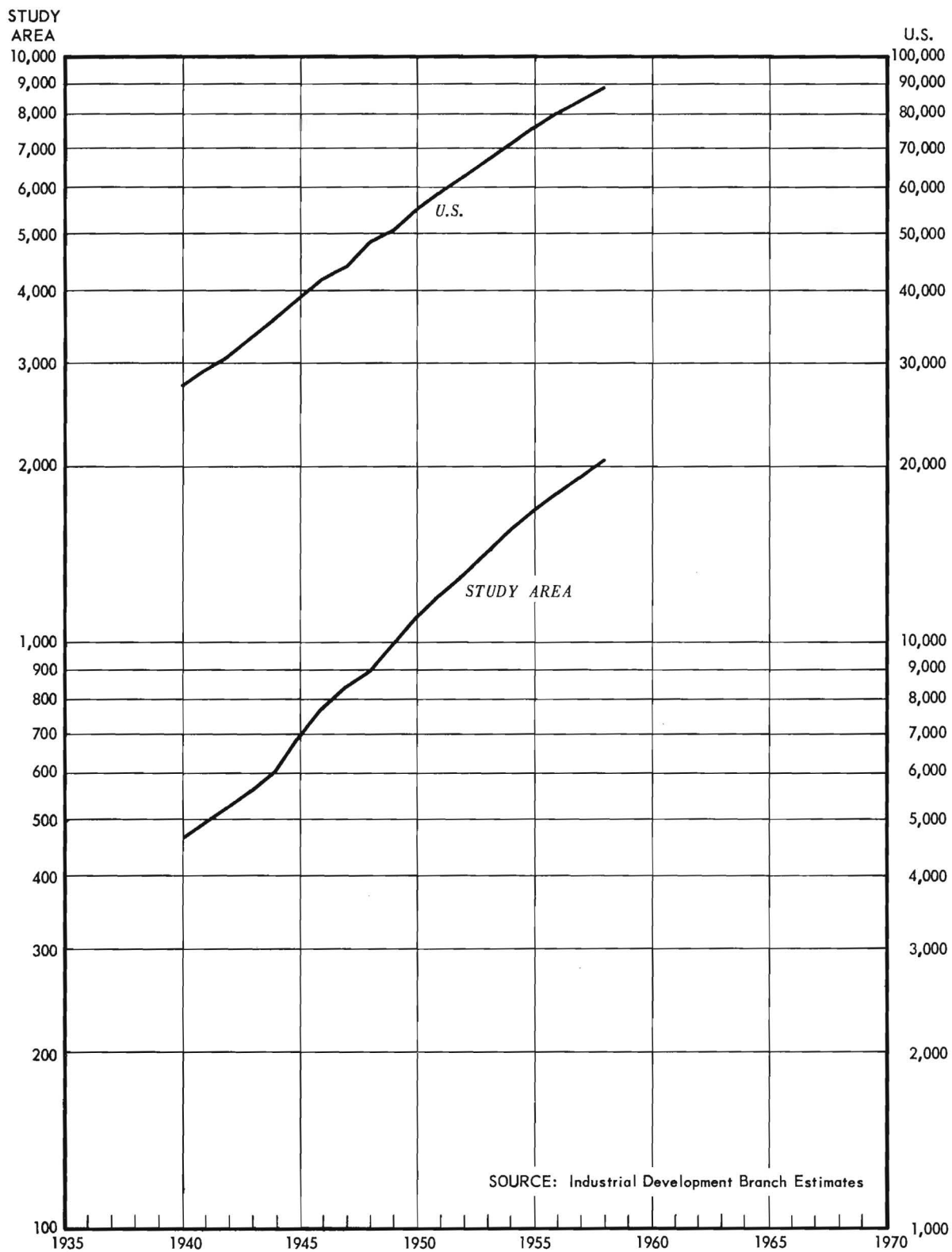


CHART 10  
CUMULATIVE SAVINGS AND LOAN ASSOCIATION DEPOSITS, STUDY AREA AND U.S.  
(In Millions of 1947-49 Dollars)

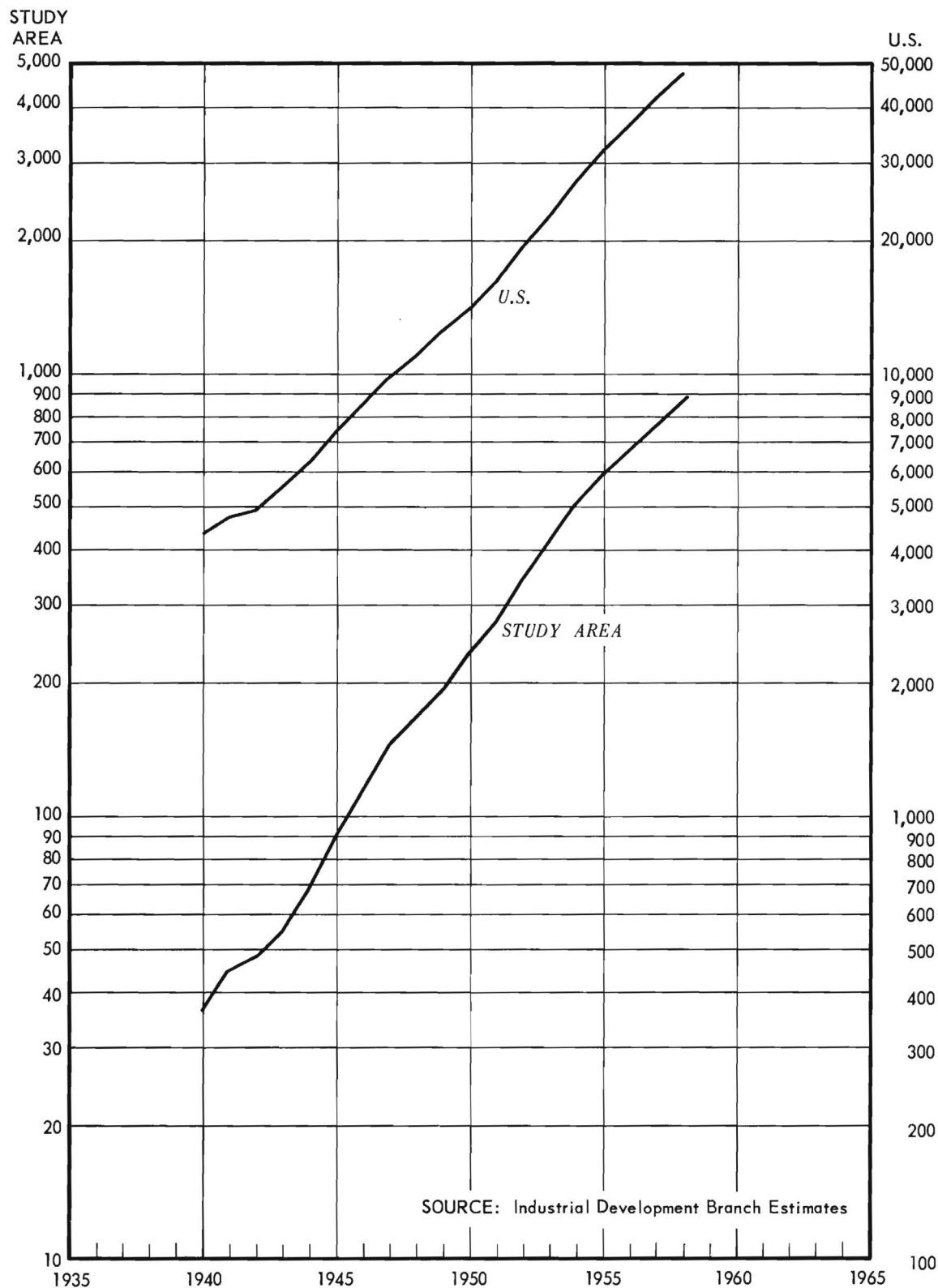




CHART 11  
CUMULATIVE CREDIT UNION DEPOSITS IN THE STUDY AREA AND THE U.S.  
(In Millions of 1947-49 Dollars)

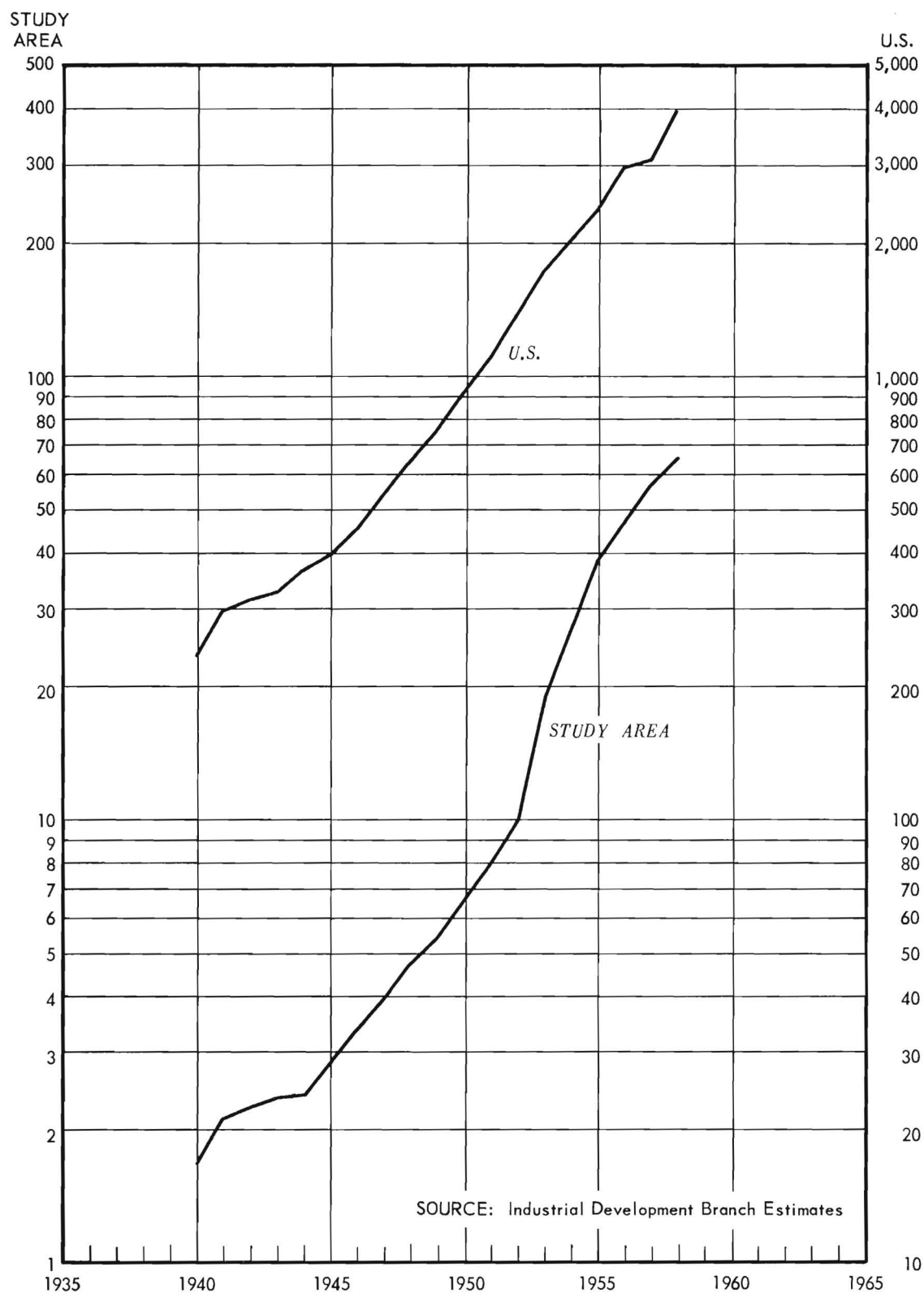
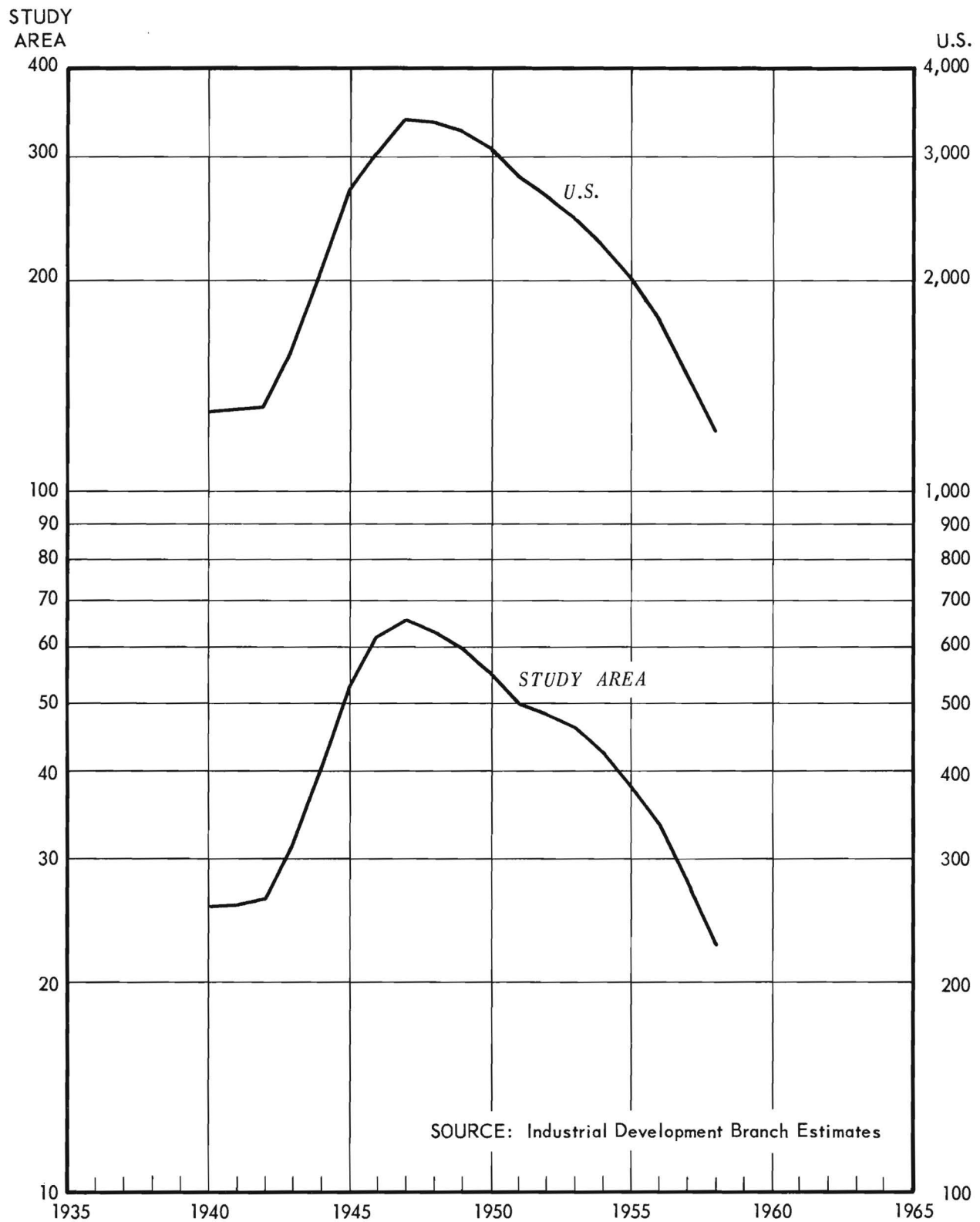


CHART 12  
CUMULATIVE POSTAL SAVINGS IN THE STUDY AREA AND THE U.S.  
(In Millions of 1947-49 Dollars)



savers will probably transfer from one form to another. The total amount saved should be the same. The total projection should therefore be reliable.

#### E. Investments (I)

Investments include construction plus increases in the region's equipment and inventories. Data on these investments in the Southeast River Basins area are not available. Because most savings in the study area are monetary, they are controlled by financial institutions and probably result in investments outside the region, i.e., in the foreign sector. A leakage of savings for investment outside the area is assumed. Unfortunately, the lack of data prevents confirmation and measurement of this leakage. This subject deserves separate investigation in an intensive original study.

A certain increase in investment causes a greater increase in income. This is the investment multiplier effect. This multiplier for the study area is significantly greater than for the United States because a larger proportion of income is consumed.

Thus investments and government spending in the study area result in a much greater increase in income than for the same investment in the Nation as a whole.

### III. SUMMARY

Disposable income, consumption, and savings (investments) for the Southeast River Basins and the United States are summarized in Table 9 and Chart 13. Forecasts for the study area were made by statistical techniques and modified by subjective judgment.

From this analysis the following relationships and trends are apparent:

1. Disposable income is increasing at a faster rate in the study area than in the United States. It is 4.6 per cent in the region and 3.6 per cent in the United States.

2. Consumption is increasing at a faster rate in the study area than in the United States. It is 3.5 per cent per annum in the region and 2.5 per cent in the United States.

3. Consumption is a larger proportion of disposable income in the study area than in the United States. It is 95 per cent in the region and 93 per cent in the United States.

4. Savings are a smaller percentage of disposable income in the study area than in the United States. They total 5 per cent in the region and 7 per cent in the United States.

5. Monetary savings are increasing at a faster rate in the study area than in the United States. In the region they are increasing at the annual rate of 5.6 per cent; in the United States at 4.9 per cent.

6. Indirect evidence suggests that a large proportion of monetary savings in the study area results in investments outside the region. To the extent that this is so, the region does not receive the full benefit from its savings. This subject calls for an intensive original study.

7. Large increases in monetary savings mean that financial institutions become powerful forces through control of capital investment.

8. The investment multiplier is larger in the study area than in the United States.

Table 9

DISPOSABLE INCOME, PERSONAL CONSUMPTION EXPENDITURES, AND PERSONAL SAVINGS  
IN THE U. S. AND SELECTED SOUTHEASTERN STATES, AND ESTIMATES  
FOR STUDY AREA, 1940-1958, WITH FORECASTS FOR THE STUDY AREA  
TO 1960, 1975, AND 2000  
(Millions of 1947-49 dollars)

Year	Study Area			Southeast <sup>1/</sup>			United States		
	Disposable Income	Consumption	Savings	Disposable Income	Consumption	Savings	Disposable Income	Consumption	Savings
1940	\$1,813	\$1,740	\$ 73	\$5,210	\$5,002	\$ 208	\$127,005	\$120,002	\$ 7,003
1941	2,056	1,892	164	6,017	5,536	481	147,825	130,167	17,658
1942	2,268	1,814	454	7,036	5,629	1,407	168,603	128,764	39,839
1943	2,963	2,282	681	9,082	6,993	2,089	180,469	135,866	44,603
1944	3,320	2,523	797	9,872	7,503	2,369	195,161	146,055	49,106
1945	3,414	2,663	751	9,222	7,193	2,029	195,520	158,256	37,264
1946	3,372	3,069	303	9,231	8,400	831	192,529	176,390	16,139
1947	3,367	3,300	67	9,226	9,041	185	178,129	173,203	4,926
1948	3,348	3,214	134	9,224	8,855	369	184,144	173,456	10,688
1949	3,514	3,373	141	9,777	9,386	391	186,301	177,955	8,346
1950	3,674	3,527	147	10,054	9,652	402	201,999	189,701	12,298
1951	3,796	3,606	190	10,395	9,875	520	204,938	189,014	15,924
1952	4,018	3,817	201	11,226	10,665	561	210,321	193,634	16,687
1953	4,247	3,992	255	12,011	11,290	721	220,694	203,364	17,330
1954	4,394	4,130	264	12,417	11,672	745	223,767	207,338	16,429
1955	4,675	4,488	187	13,275	12,744	531	239,693	224,402	15,291
1956	5,046	4,794	252	14,322	13,696	626	249,960	231,841	18,119
1957	5,059	4,857	202	14,693	14,105	588	253,868	236,641	17,227
1958	5,082	4,828	254	14,965	14,217	748	256,275	237,247	19,028
<u>Forecast</u>									
1960	5,419	5,197	222						
1975	9,851	9,567	284						
2000	29,045	28,491	554						

<sup>1/</sup> States of Alabama, Florida, Georgia, and South Carolina

Sources: Sales Management, Survey of Current Business; U. S. Department of Commerce; Industrial Development Branch Estimates

CHART 13  
DISPOSABLE INCOME - CONSUMPTION - SAVINGS IN SELECTED AREAS  
(In Millions of 1947-49 Dollars)

