United States Department of Agriculture

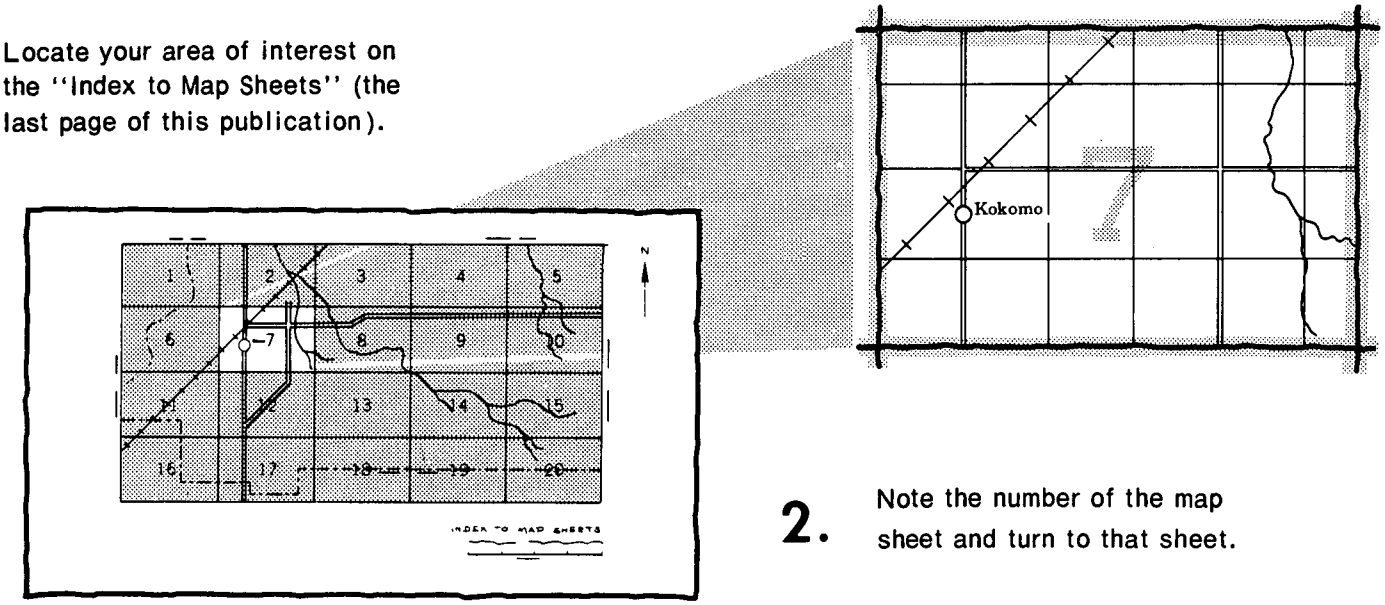
Soil Conservation Service

in cooperation with University of Georgia College of Agriculture Agricultural Experiment Stations

Soil Survey of Liberty and Long Counties, Georgia

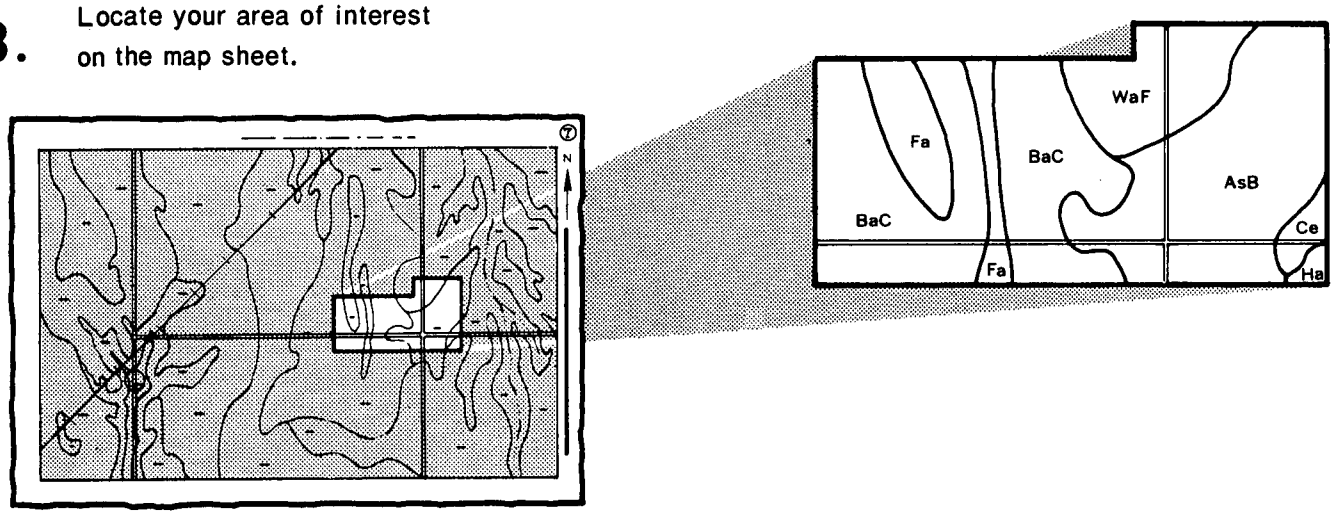
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

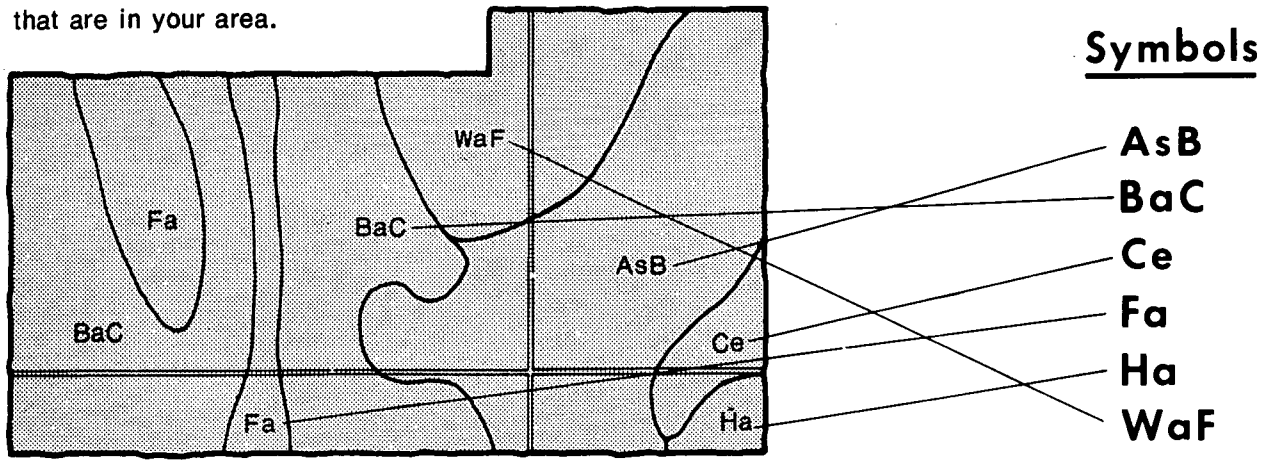


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

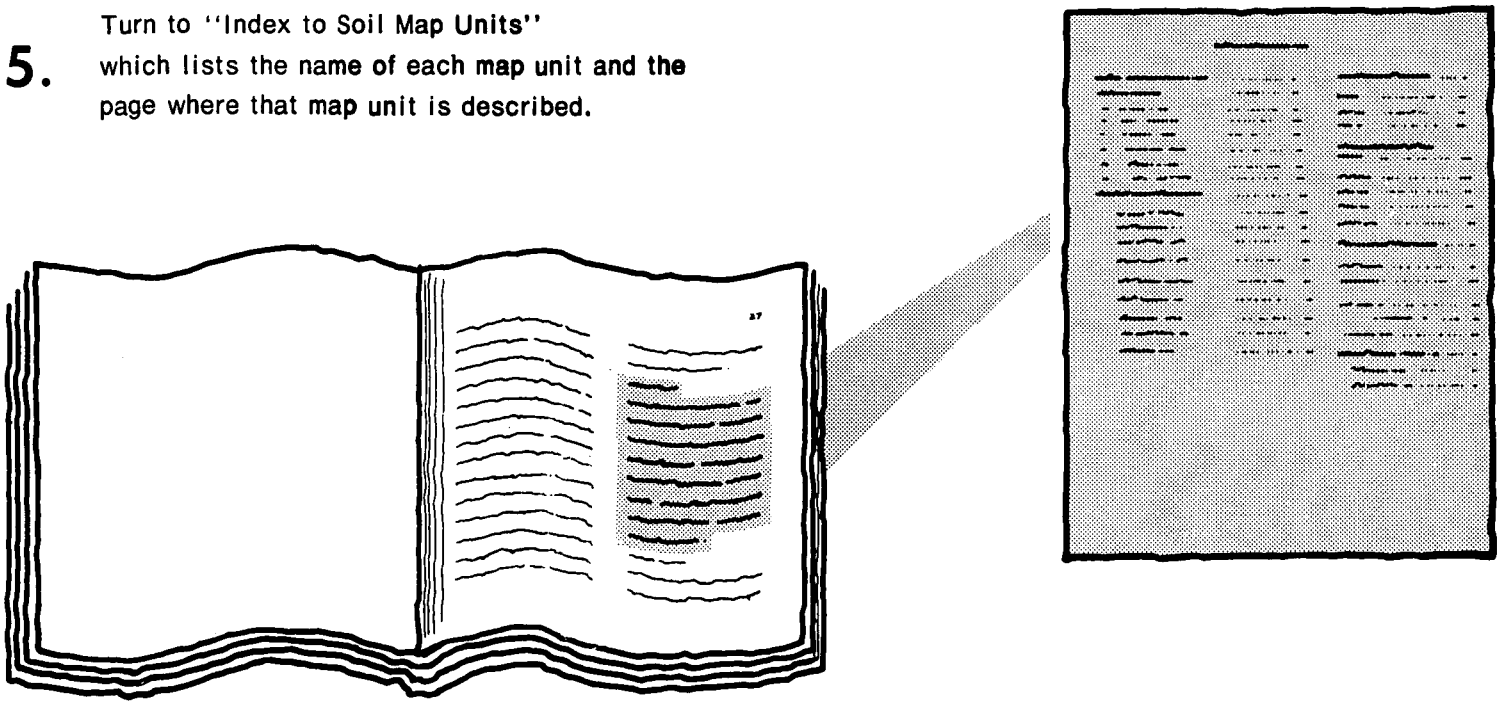


4. List the map unit symbols that are in your area.

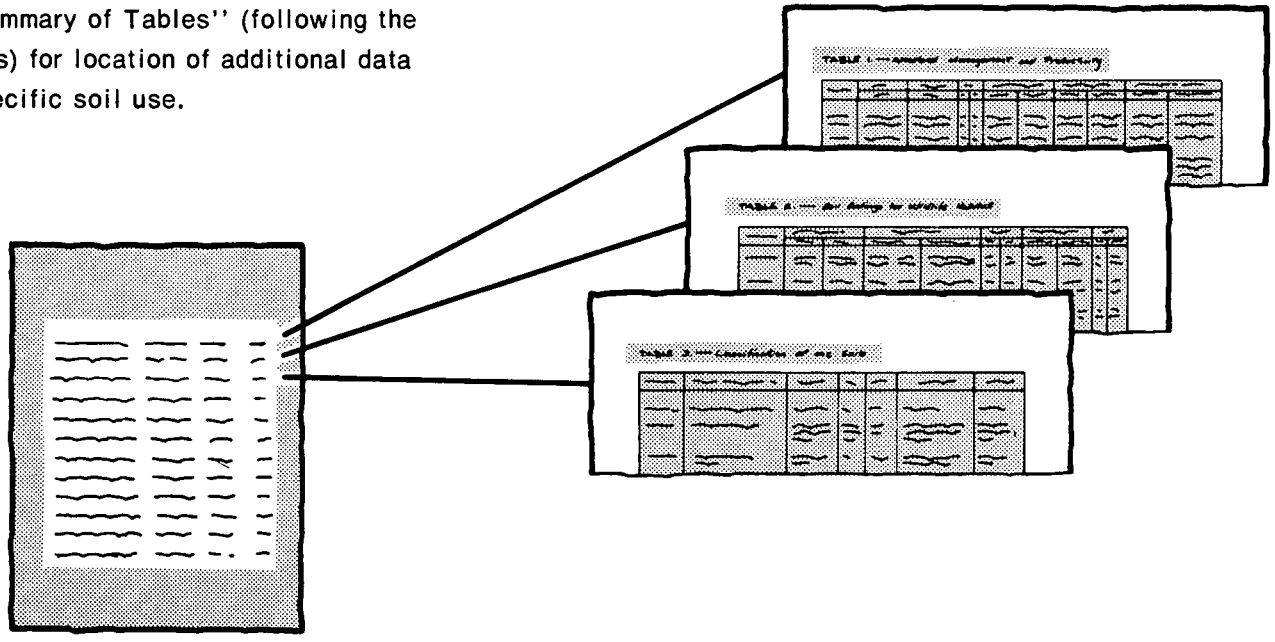


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1976-79. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Coastal Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Woodland and the associated understory in an area of Bladen fine sandy loam. Woodland is the major land use in much of the survey area.

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Issued October 1982

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foreword

This soil survey contains information that can be used in land-planning programs in Liberty and Long Counties, Georgia. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Dwight M. Treadway

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State Conservationist
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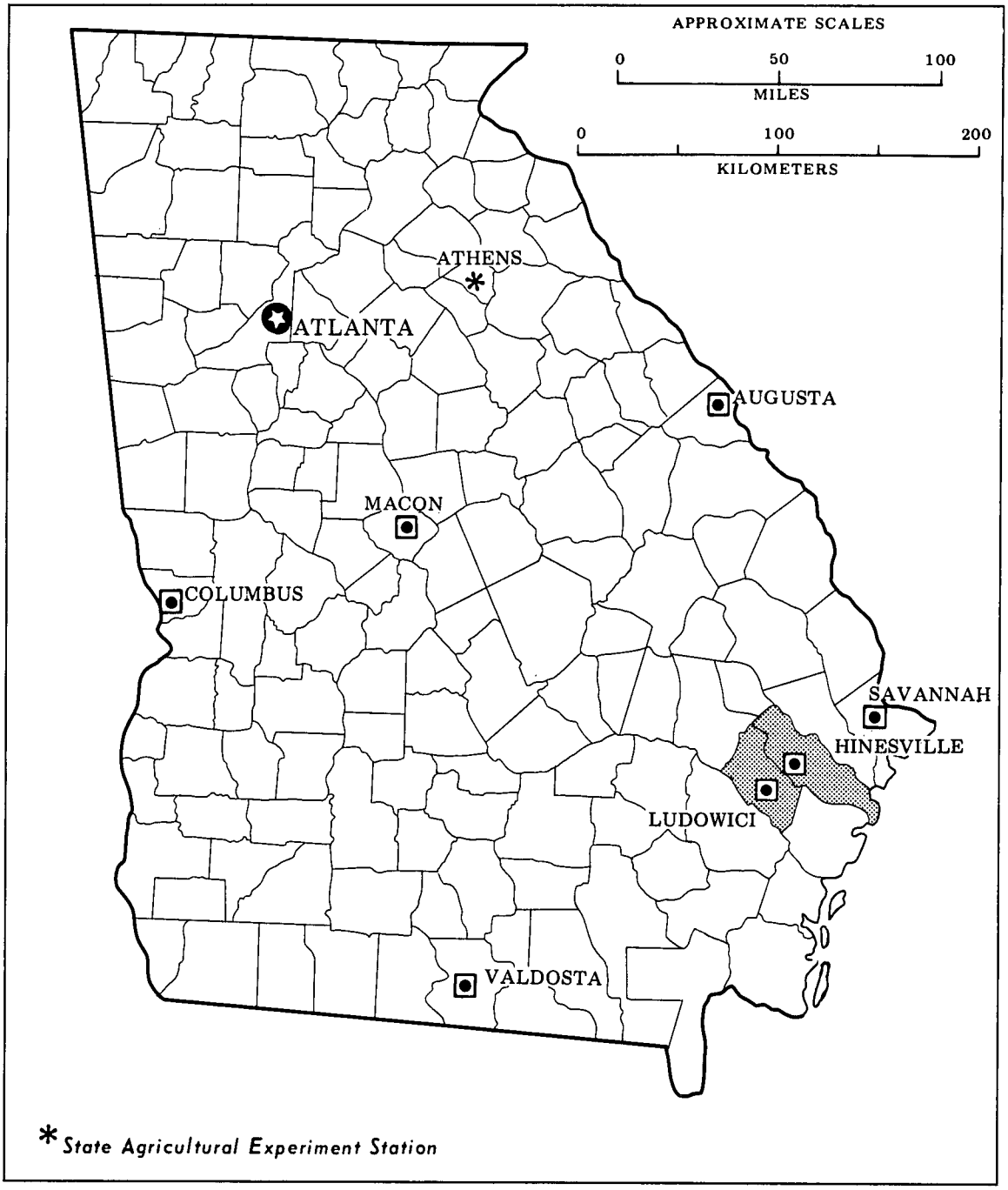

Location of Liberty and Long Counties in Georgia.

soil survey of
Liberty and Long Counties, Georgia

By Edward E. Looper, Soil Conservation Service

Fieldwork by Edward E. Looper, Gary Bill, Mack Thomas, Jr. and
Robert L. Wilkes, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with
University of Georgia, College of Agriculture, Agricultural Experiment Stations

LIBERTY AND LONG COUNTIES are in the southeastern part of Georgia near the Atlantic Ocean. Together, they cover an area of 585,984 acres, or 916 square miles. In 1978, they had a total population of about 45,000. Liberty County occupies 328,768 acres, or about 514 square miles. Hinesville is the county seat. Long County occupies 257,216 acres, or about 402 square miles. Ludowici is the county seat.

Liberty and Long Counties are mainly in the Atlantic Coast Flatwoods major land resource area. They are drained mainly by the Canoochee River to the north and the Altamaha River to the south.

Much of the survey area is nearly level. It is mainly characterized by moderately well drained and somewhat poorly drained soils on ridges, and by poorly drained and very poorly drained soils on flood plains and in broad low areas, depressions, marshes, and drainageways. In most of the eastern part of Liberty County, level, very poorly drained Bohicket and Capers soils cover wide areas of saltwater marshes and estuaries. These soils extend inland along creeks and rivers. The excessively drained Fripp soils occupy nearly level to moderately steep undulating to rolling dunes on St. Catherines Island.

The soils on ridges mainly are sandy throughout, or they are sandy to a depth of 20 to 40 inches and loamy or clayey below this to a depth of 60 inches or more. Examples are the Blanton, Echaw, Centenary, Chipley, Foxworth, Leefield, Mandarin, and Ocilla soils. The soils on flood plains and in broad, low areas, depressions, marshes, and drainageways are sandy to clayey throughout, or they are sandy or loamy to a depth of less than 40 inches and loamy or clayey below this to a depth of 60 inches or more. Examples are the Bayboro, Bibb, Bladen, Bohicket, Capers, Cape Fear, Chastain, Duckston, Ellabelle, Johnston, Mascotte, Osier, Pelham, Pooler, Riceboro, Rutlege, and Tawcaw soils and Hydraquents.

About 85 percent of the total land area in Liberty and Long Counties is forest land and less than 0.5 percent is farmland. The rest is mainly marshland, Urban land, beaches, and water. Wildlife habitat is abundant throughout the survey area. The large acreage of forest land and the availability of water attract many kinds of wildlife.

general nature of the survey area

Robert L. Wilkes, soil correlator, Soil Conservation Service, helped to prepare this section.

This section gives general information concerning the counties. It discusses climate, settlement, natural resources, and geology.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Liberty and Long Counties are hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool, with occasional brief cold spells.

Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all crops commonly grown in the area.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Fort Stewart in the period 1951 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 53 degrees F, and the average daily minimum temperature is 41 degrees. The lowest temperature on record, which occurred at Fort Stewart on December 13, 1962, is 10 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, 105 degrees, occurred on June 27, 1952.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation 31 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 26 inches. The heaviest 1-day rainfall during the period of record was 7.07 inches at Fort Stewart on September 26, 1953. Thunderstorms occur on about 70 days each year, and most occur in summer.

Average seasonal snowfall is a trace. The greatest snow depth at any one time during the period of record was 2 inches. There seldom is a day with 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring. Every few years a hurricane crosses the survey area.

settlement

In the middle part of the sixteenth century, Spain established a mission on St. Catherines Island. It was abandoned about a century later. Under the treaty of May 20, 1733, the British acquired the land from the Creek Indians, and in 1734 General Oglethorp settled the area. The area was first organized in 1758 as the Parishes of St. John, St Andrew, and St. James.

On February 5, 1777, Liberty County was established by the State Constitution. It was sixth in order of organization of Georgia's 159 counties. At the time Liberty County was established, it included what is now McIntosh County and a part of Bryan County. The County was named to commemorate the patriotism of the Midway settlers who became uncompromising champions of liberty. Hinesville, the county seat, was named for the distinguished Hines family.

On August 14, 1920, Long County was established from a part of Liberty County by an act of the General Assembly of Georgia. It was 157th in order of organization of Georgia's 159 counties. Long County was named for Dr. Crawford W. Long, a noted surgeon. Ludowici is the county seat. The origin of the name, Ludowici, is unauthenticated, but it is likely taken from the language of the Creek Indians.

Early English settlers were Puritans from Dorchester, South Carolina. They founded a seaport on the Midway River at Sunbury and marketed tobacco, cotton, rice, and lumber.

The natural wetness of many of the soils was not conducive to large scale farming. However, forest products, urban and industrial growth, and recreation development have added to the economy since the establishment of Liberty County more than 200 years ago.

In April, 1956, Fort Stewart U.S. Army Flight Training Center became a permanent facility. It occupies a large part of the survey area. Establishment of this military base has played an important role in the settlement and organization of the two counties.

natural resources

Soil is the most important resource in Liberty and Long Counties. Well managed soils produce abundant wood crops, and many of the soils in these counties have high potential for forestry. Extensive areas of forest are cooperatively and privately owned and produce pulpwood, sawlogs, and poles. In addition, much of the 125,000 acres in the Fort Stewart U.S. Army Flight Training Center is managed for wood products.

Water from deep wells is plentiful because of an underlying aquifer. The aquifer is at a depth of about 400 feet in porous limestone. In addition, annual rainfall, which is nearly 50 inches, contributes to the water supply. The Altamaha and Canoochee Rivers are permanent streams that also provide water. Several thousand acres of salty tidal water produces abundant seafood; this, in turn, provides an important recreation resource.

geology

Liberty and Long Counties were greatly influenced by the raising and lowering of the sea during the Pleistocene and Holocene Epochs of the Quaternary Period. Glaciers repeatedly advanced and retreated in the northern part of the United States and, although the great ice sheets did not reach Georgia, the melted ice

influenced the ocean levels that generated a series of marine terraces (Shoreline Complexes).

These terraces were deposited as the sea was at different levels in response to changes in climate, and each one is at a higher elevation landward. From the ocean westward, the landscape is characterized by sandy soils on ridges that extend to an escarpment and by nearly level, wet or seasonally wet soils that extend to the next terrace formation.

Eight marine terraces (Shoreline Complexes) have been identified in the survey area. The youngest is the lowest on the landscape. Conversely, the oldest is the highest on the landscape (*4*).

The Holocene is the youngest and most seaward marine terrace. The present shoreline and recent sand dune deposits on St. Catherines Island and the intercoastal flats and salt marshes are examples of this terrace. This marine terrace has probably formed in the past 4,000 to 5,000 years. Parts of the offshore islands formed in recent times. More recent deposits, however, are on the flood plains of the major streams. These flood plain deposits are of Coastal Plain origin, except for those deposits along the Altamaha River that have sediment mixed with Coastal Plain and Piedmont materials.

The Silver Bluff marine terrace is about 5 feet above sea level, the Princess Anne 15 feet, and the Pamlico 25 feet. The Talbot marine terrace is about 40 feet above sea level, the Penholoway 75 feet, and the Wicomico 100 feet.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each unit on the general soil map is a unique natural landscape. Typically, a unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area differ in suitability for major land uses. In this section, the major land uses for each unit on the general soil map are given, the main concerns of management are pointed out, and soil properties that can limit use are indicated. The main cultivated crops are corn, soybeans, and tobacco and some small grains. Improved bermudagrasses and bahiagrass are the chief pasture. Woodland produces native trees or introduced species. Nonfarm uses include residential, commercial, and industrial developments. Areas mainly used for intensive recreation are campsites, picnic areas, and ballfields.

Liberty County

Eleven map units are shown on the general soil map of Liberty County. The soils in these units are mainly grouped according to slope, drainage, and position on the landscape.

predominantly moderately well drained soils not subject to flooding

The soils in these two units are nearly level or very gently sloping. They predominantly are moderately well drained. These soils are on ridges. They are sandy throughout or are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more.

1. Echaw-Foxworth-Centenary

Nearly level and very gently sloping, moderately well drained soils that are sandy throughout

This map unit consists of soils on slight ridges and small knolls. Areas of this unit are in the south-central part of Liberty County from Hinesville to the Long County line, along the coast, and on St. Catherines Island.

This unit makes up about 5 percent of the county. It is about 50 percent Echaw soils, 24 percent Foxworth soils, 24 percent Centenary soils, and 2 percent soils of minor extent.

Echaw soils are nearly level. They have a weakly cemented subsoil at a depth of about 30 to 50 inches. Typically, these soils are fine sand throughout. The surface layer is very dark gray and about 5 inches thick. The subsurface layer extends to a depth of 47 inches. The upper part is brownish yellow, the middle part is very pale brown, and the lower part is light gray and has pale brown mottles. The subsoil is weakly cemented by organic material to a depth of 70 inches or more. The upper part is dark reddish gray, and the lower part is dark reddish brown.

Foxworth soils are nearly level and very gently sloping. Typically, these soils are loose fine sand throughout. The surface layer is very dark gray and about 7 inches thick. Below this to a depth of 90 inches or more, the upper part is brownish yellow, the middle part is mainly yellowish brown and has light gray and reddish yellow mottles as depth increases, and the lower part is predominantly light gray and has brownish yellow mottles.

Centenary soils are nearly level. They have a slightly brittle subsoil at a depth of about 50 to 80 inches. Typically, the surface layer is dark gray fine sand 5 inches thick. The subsurface layer is fine sand to a depth of 61 inches. The upper part is light yellowish brown, the middle part is pale brown, and the lower part is light gray and has yellowish brown mottles. The subsoil is loamy sand. The upper part is dark brown, and the lower part is very dark brown and slightly brittle.

Of minor extent in this unit are the somewhat poorly drained Mandarin soils and moderately well drained Blanton soils on ridges. The very poorly drained Rutlege and Johnston soils and the poorly drained Bibb soils are in depressions and drainageways.

The natural vegetation is loblolly pine, longleaf pine, live oak, and turkey oak. Some areas have an understory of waxmyrtle and yaupon. Because of the low available water capacity, most of the soils in this unit are moderately suited to pine woodland and to use as farmland.

The soils in this unit are limited for urban use because of seasonal wetness. Recreation development is limited because the soils are too sandy.

2. Stilson-Pelham-Fuquay

Nearly level and very gently sloping, moderately well drained, poorly drained, and well drained soils that are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of nearly level, moderately well drained soils in broad, smooth areas; poorly drained soils in depressions and drainageways; and nearly level and very gently sloping, well drained soils on smooth, convex ridgetops. Areas of this unit are well distributed throughout the western part of Liberty County.

This unit makes up about 7 percent of the county. It is about 28 percent Stilson soils, 25 percent Pelham soils, 17 percent Fuquay soils, and 30 percent soils of minor extent.

Stilson soils are nearly level and moderately well drained. Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsurface layer is pale yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 72 inches or more. The upper part is brownish yellow and is mottled strong brown, the middle part is brownish yellow and is mottled reddish, brownish, yellowish, and grayish, and the lower part is mottled brownish, reddish, yellowish, and grayish. Plinthite makes up 5 to 10 percent of the middle and lower parts of the subsoil.

Pelham soils are nearly level and poorly drained. Typically, the surface layer is black loamy sand about 6 inches thick. The subsurface layer is loamy sand about 19 inches thick. The upper part is grayish brown, and the lower part is gray. The subsoil extends to a depth of 63 inches or more. The upper part is gray sandy loam and has strong brown mottles, the middle part is gray sandy clay loam and has brownish yellow and light yellowish brown mottles, and the lower part is gray sandy clay loam and has brownish yellow and yellowish red mottles.

Fuquay soils are nearly level and very gently sloping and well drained. Typically, the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsurface layer is brownish yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 76 inches or more. The upper part is brownish yellow and has strong brown and yellowish red mottles, and the lower part is mottled yellow, brown, gray, and red. Plinthite content is 5 to 12 percent below a depth of 41 inches. Nodules of ironstone are throughout most of the subsoil.

Of minor extent in this unit are mainly the nearly level, somewhat poorly drained Leefield soils and the poorly drained Mascotte soils in smooth areas. The very poorly drained Ellabelle soils are in depressions and drainageways.

The natural vegetation consists of second growth loblolly pine and an understory of waxmyrtle, gallberry, and sawpalmetto. Most of the soils in this unit are moderately suited to pine woodland. Many areas are used for cultivated crops or pasture. Because of wetness, soils on the slightly higher lying positions are moderately suited to cultivated crops, and the soils in depressions and drainageways are poorly suited.

The soils on broad, smooth areas and in depressions and drainageways are limited for urban use and recreation development because of wetness. However, soil features on ridgetops are favorable for these uses.

predominantly somewhat poorly drained and poorly drained soils generally not subject to flooding

The soils in these four units are nearly level. They are predominantly somewhat poorly drained on low ridges and are poorly drained on broad, low areas and in depressions and drainageways. The somewhat poorly drained soils are sandy throughout, or they are sandy to a depth of 20 to 40 inches and loamy below that to a depth of 60 inches or more. The poorly drained soils are mainly sandy to a depth of less than 40 inches and loamy or clayey below that to a depth of 60 inches or more.

3. Mandarin-Rutlege

Nearly level, somewhat poorly drained and very poorly drained soils that are sandy throughout

This map unit consists of somewhat poorly drained soils on broad ridges interspersed with very poorly drained soils in shallow depressions and bays. Medium to large areas of this unit are in the central and eastern parts of Liberty County.

This unit makes up about 4 percent of the county. It is 68 percent Mandarin soils, 25 percent Rutlege soils, and 7 percent soils of minor extent.

Mandarin soils are somewhat poorly drained. Typically, they are fine sand throughout. The surface layer is dark gray and about 7 inches thick. The subsurface layer is gray and light brownish gray to a depth of 12 inches. Below this, to a depth of about 20 inches, are very dark brown and very dark grayish brown layers that are weakly cemented by organic matter; to a depth of 45 inches, are brown, light brownish gray, and light gray layers; and to a depth 70 inches or more is a dark brown, weakly cemented, organically stained layer.

Rutlege soils are very poorly drained. Typically, the surface layer is fine sand about 21 inches thick. The

upper part is black, and the lower part is very dark brown. Below this, to a depth of 63 inches or more, is light brownish gray loamy fine sand that is mottled yellowish brown.

Of minor extent in this unit are the moderately well drained Echaw and Centenary soils on ridges. The very poorly drained Johnston soils and poorly drained Bibb soils are on flood plains.

Many areas of this unit are in pine plantations; some areas are used for urban development. The natural vegetation on the broad ridges consists of sawpalmetto, gallberry, waxmyrtle, and longleaf pine. In the depressions and bays, natural vegetation generally consists of blackgum, cypress, sweetgum, pond pine, and water oak. Because of wetness, most of the soils in this unit are moderately suited to pine woodland and are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness. However, the soils on broad ridges commonly can be modified to provide favorable sites for these uses.

4. Mascotte-Pelham-Leefield

Nearly level, somewhat poorly drained and poorly drained soils that are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of somewhat poorly drained soils on low lying ridges and poorly drained soils in broad areas and in depressions and drainageways. Areas of this unit are mainly in the western part of Liberty County.

This unit makes up about 20 percent of the county. It is about 35 percent Mascotte soils, 20 percent Pelham soils, 15 percent Leefield soils, and 30 percent soils of minor extent.

Mascotte soils are mainly on broad ridges and are poorly drained. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is light gray and light brownish gray fine sand to a depth of 14 inches. Below this, to a depth of 18 inches, is a firm, very dark brown and dark reddish brown layer; to a depth of 32 inches, is pale brown and light gray fine sand that is mottled brown; and to a depth of 70 inches or more, is mainly light gray sandy clay loam that is mottled brown and red.

Pelham soils are mainly in depressions and drainageways and are poorly drained. Typically, the surface layer is black loamy sand about 6 inches thick. The subsurface layer is loamy sand about 19 inches thick. The upper part is grayish brown, and the lower part is gray. The subsoil extends to a depth of 63 inches or more. The upper part is gray sandy loam and has strong brown mottles, the middle part is gray sandy clay loam and has brownish yellow and light yellowish brown mottles, and the lower part is gray sandy clay loam and has brownish yellow and yellowish red mottles.

Leefield soils are on low lying ridges and are somewhat poorly drained. Typically, the surface layer is very dark gray loamy sand about 11 inches thick. The subsurface layer is light yellowish brown loamy sand about 11 inches thick. It is mottled yellowish brown. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is light yellowish brown and has gray, brown, and red mottles, the middle part is light gray and has brown and red mottles, and the lower part is mottled gray, brown, and red. Plinthite makes up 5 percent or more of the lower part of the subsoil.

Of minor extent in this unit are the moderately well drained Stilson soils on smooth uplands and the very poorly drained Ellabelle soils in depressions, bays, and large drainageways.

Most areas of this unit are in pine plantations; however, some areas have been cleared and are used for pasture or cultivated crops. Natural vegetation consists of slash pine and longleaf pine with an understory of gallberry, waxmyrtle, and sawpalmetto. Because of wetness, most of the soils in this unit are moderately suited to pine woodland and pasture and are poorly suited to cultivated crops.

The soils in this unit are limited for urban use and recreation development because of wetness. However, those soils on low lying upland ridges commonly can be modified to provide favorable sites for these uses.

5. Ocilla-Riceboro-Pooler

Nearly level, somewhat poorly drained and poorly drained soils that predominantly are sandy to a depth of 20 to 40 inches and loamy or clayey to a depth of 60 inches or more

This map unit consists of somewhat poorly drained soils on low ridges and poorly drained soils in broad, low areas and slight depressions. Areas of this unit are in the central part of Liberty County.

This unit makes up about 21 percent of the county. It is about 31 percent Ocilla soils, 15 percent Riceboro soils, 10 percent Pooler soils, and 44 percent soils of minor extent.

Ocilla soils are on low ridges and are somewhat poorly drained. Typically, the surface layer is dark grayish brown loamy fine sand about 6 inches thick. The subsurface layer extends to a depth of 34 inches. The upper part is pale brown loamy fine sand, and the lower part is pale brown loamy sand and has yellowish brown mottles. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is yellowish brown mottled with pale brown and light brownish gray, and the lower part is predominantly mottled light gray, yellowish brown, and yellowish red.

Riceboro soils are in broad areas and depressions and are poorly drained. Typically, the surface layer is very dark gray loamy fine sand about 8 inches thick. The subsurface layer is loamy fine sand to a depth of 25

inches. The upper part is dark grayish brown, the middle part is light brownish gray, and the lower part is light gray and has yellowish brown mottles. The subsoil extends to a depth of 70 inches or more. The upper part is light brownish gray sandy clay loam and has strong brown mottles, the middle part is light brownish gray sandy clay and has red and strong brown mottles, and the lower part is mottled grayish brown, strong brown, and red sandy clay.

Pooler soils are in broad, low areas and are poorly drained. Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay and has strong brown, yellowish red, and yellowish brown mottles, the middle part is gray clay and has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam and has yellowish brown mottles.

Of minor extent in this unit are the moderately well drained Eulonia soils and somewhat poorly drained Albany soils on low ridges. The very poorly drained Cape Fear and Bayboro soils are in depressions and drainageways.

The natural vegetation is slash pine, loblolly pine, and sweetgum, with an understory of waxmyrtle and gallberry. Most of the soils in this unit are moderately suited to pine woodland because of wetness. Also because of wetness, the soils on low ridges are moderately suited to use as farmland, and the soils in broad areas and depressions are poorly suited.

The soils in this unit are limited for urban use and recreation development because of wetness. However, those soils on low ridges commonly can be modified to provide favorable sites for these uses.

6. Bladen-Pooler-Riceboro

Nearly level, poorly drained soils that predominantly are loamy to a depth of less than 20 inches and clayey to a depth of 60 inches or more

This map unit consists of poorly drained soils in broad, low areas and slight depressions. Most areas of this unit are in the central part of Liberty County.

This unit makes up about 7 percent of the county. It is about 40 percent Bladen soils, 28 percent Pooler soils, 16 percent Riceboro soils, and 16 percent soils of minor extent.

Bladen soils are in broad, low areas. Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 9 inches thick. The gray subsoil, to a depth of 72 inches or more, is predominantly mottled red and brown. It is clay except in the extreme lower part, which is sandy clay loam.

Pooler soils are in broad, low areas. Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay and has strong brown, yellowish red, and yellowish brown mottles, the middle part is gray clay and has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam and has yellowish brown mottles.

Riceboro soils are in broad areas and slight depressions. Typically, the surface layer is very dark gray loamy fine sand about 8 inches thick. The subsurface layer is loamy fine sand to a depth of 25 inches. The upper part is dark grayish brown, the middle part is light brownish gray, and the lower part is light gray and has yellowish brown mottles. The subsoil extends to a depth of 70 inches or more. The upper part is light brownish gray sandy clay loam and has strong brown mottles, the middle part is light brownish gray sandy clay and has red and strong brown mottles, and the lower part is mottled grayish brown, strong brown, and red sandy clay.

Of minor extent in this unit are mainly the moderately well drained Eulonia soils on low ridges and the very poorly drained Bayboro and Cape Fear soils in depressions and drainageways.

The natural vegetation is loblolly pine, sweetgum, and water oak with an understory of wiregrass and waxmyrtle. Most of the soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness.

predominantly poorly drained and very poorly drained soils subject to flooding

The soils in these five units are predominantly nearly level and poorly drained and very poorly drained. These soils mainly are in depressions, marshes, and drainageways and on flood plains. They are sandy or loamy throughout, sandy to a depth of 20 to 40 inches and loamy below that to a depth of 60 inches or more, or loamy to a depth of less than 20 inches and clayey below that to a depth of 50 inches or more.

7. Fripp-Beaches-Duckston

Nearly level to moderately steep, excessively drained or poorly drained soils that are sandy throughout

This map unit consists of excessively drained soils on dunes and on beaches flooded by tides. It also consists of poorly drained soils between dunes or between dunes and marshes. Areas of this unit are on St. Catherines Island (fig. 1).

This unit makes up about 1 percent of Liberty County. It is about 28 percent Fripp soils, 16 percent Beaches, 7 percent Duckston soils, and 49 percent soils of minor extent.

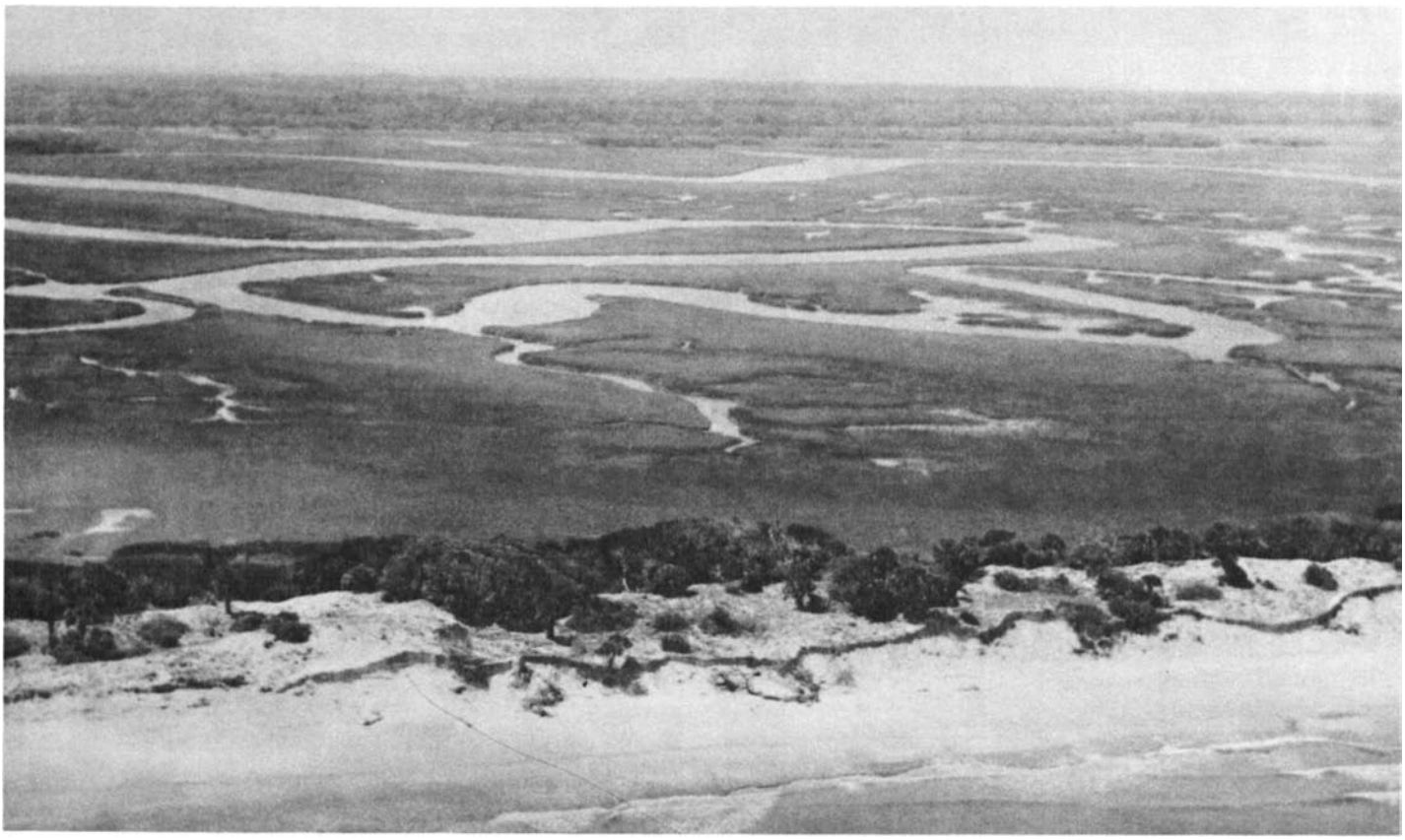

Figure 1.—Areas of soils in the Fripp-Beaches-Duckston and Bohicket-Capers map units, units 7 and 10 respectively, on the general soil map of Liberty County. Beaches are in the foreground, Fripp soils are on the dunes, and the Bohicket and Capers soils are on tidal marshes in the background.

Fripp soils are nearly level to moderately steep and excessively drained. They are on ridges and the sides of dunes. Typically, these soils are fine sand throughout. The surface layer is dark grayish brown and about 7 inches thick. Below this, to a depth of 99 inches or more, the upper part is mainly brownish, and the lower part is white.

Beaches are the seaward, level areas that are covered twice each day by tides. Typically, beaches are made up of fine sand and small shell fragments.

Duckston soils are nearly level and poorly drained. They are between the dunes or between the dunes and tidal marshes. Typically, these soils are sand throughout. The surface layer is very dark grayish brown and about 5 inches thick, the next 10 inches is grayish brown and gray, and below this, to a depth of 72 inches or more, is greenish gray.

Of minor extent in this unit are the very poorly drained Bohicket and Capers soils. These soils are in the adjacent marshes.

The natural vegetation on the dunes is sea-oats and cabbage palm. Beaches are void of vegetation. Other vegetation is mainly waxmyrtle. The soils in this unit are poorly suited to use as farmland or woodland.

The soils in this unit are limited for urban use and recreation development. The soils on dunes are subject to seepage if used for sanitary facilities. The sandy texture limits recreation development. Soils in the lower lying positions commonly are wet throughout the year and are subject to frequent flooding.

8. Ellabelle-Johnston-Bibb

Nearly level, very poorly drained and poorly drained soils that predominantly are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of very poorly drained soils in depressions, bays, and large drainageways and very poorly drained and poorly drained soils on flood plains. Areas of this unit are mainly in the western part of Liberty County.

This unit makes up about 9 percent of the county. It is about 66 percent Ellabelle soils, 10 percent Johnston soils, 7 percent Bibb soils, and 17 percent soils of minor extent.

Ellabelle soils are in depressions, bays, and drainageways and are very poorly drained. Typically, the surface layer is black loamy sand about 23 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark gray sandy loam, the middle part is gray sandy clay loam and has yellowish brown and strong brown mottles, and the lower part is mottled brownish yellow, strong brown, and gray sandy clay loam.

Johnston soils are on flood plains and are very poorly drained. Typically, the surface layer is black mucky loam about 43 inches thick. Below this, to a depth of 60 inches or more, is light brownish gray sandy loam.

Bibb soils are on flood plains and are poorly drained. Typically, the surface layer is sandy loam about 13 inches thick. The upper part is very dark gray, and the lower part is dark grayish brown. Below this, to a depth of 65 inches or more, is gray sandy loam that has a few yellowish brown mottles in the lower part.

Of minor extent in this unit are the poorly drained Osier soils on flood plains. The poorly drained Pelham soils and very poorly drained Rutlege soils are in depressions, bays, and drainageways.

The natural vegetation consists of cypress, blackgum, sweetgum, and pond pine with an understory of waxmyrtle and gallberry. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of ponding or flooding.

9. Bayboro-Cape Fear

Nearly level, very poorly drained soils that are loamy to a depth of less than 20 inches and clayey to a depth of 50 inches or more

This map unit consists of very poorly drained soils in depressions and drainageways. Areas of this unit are in the central part of Liberty County.

This unit makes up about 8 percent of the county. It is about 76 percent Bayboro soils, 14 percent Cape Fear soils, and 10 percent soils of minor extent.

Bayboro soils are in depressions and drainageways. Typically, the surface layer is very dark grayish brown loam about 11 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part is very dark grayish brown clay loam, the middle part is dark gray and gray clay and has brown and red mottles, and the lower part is gray sandy clay and has dark brown mottles.

Cape Fear soils are along drainageways. Typically, the surface layer is black and is about 16 inches thick. The upper part is fine sandy loam and the lower part is loam. The subsoil extends to a depth of 51 inches. The upper part is very dark gray clay loam, the middle part is mainly gray sandy clay, and the lower part is light brownish gray sandy clay loam. The underlying material is light brownish gray sand.

Of minor extent in this unit are the poorly drained Bladen and Pooler soils in broad, low areas.

The natural vegetation consists of cypress, blackgum, water oak, and tupelo. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness.

10. Bohicket-Capers

Nearly level, very poorly drained soils that predominantly are loamy to a depth of less than 20 inches and clayey to a depth of 60 inches or more

This map unit consists of very poorly drained soils in tidal marshes (see fig. 1). These soils are flooded frequently by tides. In Liberty County, areas of this unit are near the Atlantic Ocean and extend inland several miles along creeks and rivers.

This unit makes up about 14 percent of the county. It is about 73 percent Bohicket soils, 22 percent Capers soils, and 5 percent soils of minor extent.

Bohicket soils are near the ocean and are flooded twice each day by tides. Typically, the surface and subsurface layers are dark gray silty clay loam to a depth of about 14 inches. The substratum is very dark gray to a depth of 60 inches or more. The upper part is silty clay, and the lower part is clay. Fibrous roots are throughout.

Capers soils extend inland several miles along the creeks and rivers and are flooded frequently by the tides. Typically, the surface layer is very dark gray silty clay loam about 16 inches thick. Below this, is sticky, dark gray silty clay to a depth of 36 inches and sticky, very dark gray clay to a depth of 60 inches or more. Fine grass roots are throughout.

Of minor extent in this unit are the poorly drained Riceboro soils on small islands or hammocks and the very poorly drained Bayboro and Cape Fear soils along the tributaries entering the marsh.

Natural vegetation is needlegrass, rush, and sand cordgrass. The soils in this unit are used primarily by wetland wildlife. They are poorly suited to most other uses. A few scattered areas near the edge of the unit are in pasture. Flooding and wetness are the main concerns for use and management. Also, the natural sulfur in these soils causes an unpleasant odor if exposed to air. This odor further limits the use of the soils.

11. Johnston-Bibb-Osier

Nearly level, very poorly drained and poorly drained soils that predominantly are loamy throughout

This map unit consists of very poorly drained and poorly drained soils mainly on the flood plain along the Canoochee River.

This unit makes up about 4 percent of Liberty County. It is about 38 percent Johnston soils, 23 percent Bibb soils, 17 percent Osier soils, and 22 percent soils of minor extent.

Johnston soils are loamy and very poorly drained. Typically, the surface layer is black mucky loam about 43 inches thick. Below this, to a depth of 60 inches or more, is light brownish gray sandy loam.

Bibb soils are loamy throughout and poorly drained. Typically, the surface layer is sandy loam about 13 inches thick. The upper part is very dark gray, and the lower part is dark grayish brown. Below this, to a depth of 65 inches or more, is gray sandy loam that has a few yellowish brown mottles in the lower part.

Osier soils are sandy throughout and poorly drained. Typically, the surface layer is loamy sand about 11 inches thick. The upper part is dark grayish brown, and the lower part is very dark grayish brown. Below this, to a depth of 65 inches or more, is light brownish gray loamy sand over light gray sand.

Of minor extent in this unit are the very poorly drained Ellabelle soils and poorly drained Pelham soils in depressions and drainageways.

The natural vegetation is blackgum, water oak, tupelo, and cypress. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of ponding or flooding.

Long County

Thirteen map units are shown on the general soil map of Long County. The soils in these units are mainly grouped according to slope, drainage, and position on the landscape.

predominantly moderately well drained soils not subject to flooding

The soils in these four units are mainly nearly level and very gently sloping. They are predominantly moderately well drained. These soils are on upland ridges. They are sandy throughout, sandy to a depth of about 20 to 40 inches and loamy below that to a depth of 60 inches or more, or sandy to a depth of 60 inches and loamy below that to a depth of 80 inches.

1. Blanton-Fuquay-Foxworth

Nearly level and very gently sloping, moderately well drained and well drained soils that are sandy to a depth of 20 to 60 inches or more and loamy to a depth of 80 inches or more, or that are sandy throughout

This map unit consists of soils on broad ridges. Areas of this unit are in the western part of Long County along and parallel to Beards Creek.

This unit makes up about 5 percent of the county. It is about 53 percent Blanton soils, 21 percent Fuquay soils, 13 percent Foxworth soils, and 13 percent soils of minor extent.

Blanton soils are sandy to a depth of 40 to 60 inches or more and are moderately well drained. Typically, the surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer is sand to a depth of about 46 inches. The upper part is yellowish brown, and the lower part is yellowish brown and has pale brown and brownish yellow mottles. The subsoil extends to a depth of 79 inches or more. The upper part is light yellowish brown sandy loam, the middle part is strong brown sandy clay loam and has red mottles, and the lower part is mottled brownish yellow, brown, light gray, and yellowish red sandy clay loam.

Fuquay soils are sandy to a depth of 20 to 40 inches and are well drained. Typically, the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsurface layer is brownish yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 76 inches or more. The upper part is brownish yellow and has strong brown and yellowish red mottles, and the lower part is mottled yellow, brown, gray, and red. Plinthite content is 5 to 12 percent below a depth of 41 inches. Nodules of ironstone are throughout most of the subsoil.

Foxworth soils are sandy throughout and are moderately well drained. Typically, the surface layer is very dark gray and is about 7 inches thick. Below this, to a depth of 90 inches or more, the upper part is brownish yellow, the middle part is mainly yellowish brown and has light gray and reddish yellow mottles as depth increases, and the lower part is predominantly light gray and has brownish yellow mottles.

Of minor extent in this unit are the well drained Lucy soils, the somewhat poorly drained Albany soils, and the moderately well drained Stilson soils that are on the long ridges with the major soils.

The natural vegetation is mostly live oak, turkey oak, loblolly pine, and longleaf pine with an understory of waxmyrtle in some areas. Some areas of this unit are being used for cultivated crops and pasture. The soils in this unit are moderately suited to use as pine woodland and farmland because of the low available water capacity.

Soil features are favorable for most urban uses. Seepage, however, commonly limits sanitary facilities, and the sandy texture limits recreation development.

2. Echaw-Chipley-Centenary

Nearly level and very gently sloping, moderately well drained soils that are sandy throughout

This map unit consists of soils on slight ridges and small knolls. Areas of this unit are in the eastern part of

Long County, extending southward from the Liberty County line.

This unit makes up about 4 percent of the county. It is about 23 percent Echaw soils, 23 percent Chipley soils, 13 percent Centenary soils, and 41 percent soils of minor extent.

Echaw soils are nearly level. They have a weakly cemented subsoil at a depth of 30 to 50 inches. Typically, these soils are fine sand throughout. The surface layer is very dark gray and about 5 inches thick. The subsurface layer extends to a depth of 47 inches. The upper part is brownish yellow, the middle part is very pale brown, and the lower part is light gray and has pale brown mottles. The subsoil is weakly cemented by organic materials to a depth of 70 inches or more. The upper part is dark reddish gray, and the lower part is dark reddish brown.

Chipley soils are nearly level and very gently sloping. Typically, they are loose sand throughout. The surface layer is dark gray and about 6 inches thick. Below this, to a depth of 84 inches or more, the upper part is pale yellow, the middle part is light yellowish brown and has light gray and yellowish brown mottles, and the lower part is light gray and has strong brown mottles.

Centenary soils are nearly level. They have a weakly cemented subsoil at a depth of about 50 to 80 inches. Typically, the surface layer is dark gray fine sand 5 inches thick. The subsurface layer is fine sand to a depth of 61 inches. The upper part is light yellowish brown, the middle part is very pale brown, and the lower part is light gray and has yellowish brown mottles. The subsoil is loamy sand that is weakly cemented by organic materials and other compounds. The upper part is dark brown, and the lower part is very dark brown.

Of minor extent in this unit are the somewhat poorly drained Mandarin soils on lower lying, broad ridges. The very poorly drained Rutlege and Johnson soils and the poorly drained Bibb soils are in depressions and drainageways.

The natural vegetation is loblolly pine, longleaf pine, and live oak commonly with an understory of waxmyrtle. Because of low available water capacity, the soils in this unit are moderately suited to use as pine woodland and farmland.

The soils in this unit are limited for urban use because of seasonal wetness. Recreation development is limited because the soils are too sandy.

3. Kershaw-Rutlege

Nearly level to strongly sloping, excessively drained and very poorly drained soils that are sandy throughout

This map unit consists of very gently sloping to strongly sloping, excessively drained soils on ridges and nearly level, very poorly drained soils in shallow depressions and bays. Areas of this unit in Long County are near and parallel to the Altamaha River.

This unit makes up about 6 percent of the county. It is about 74 percent Kershaw soils, 19 percent Rutlege soils, and 7 percent soils of minor extent.

Kershaw soils are excessively drained. Typically, these soils are sand throughout. The surface layer is grayish brown and about 3 inches thick. Below this is stratified material to a depth of 99 inches or more. The upper part is mainly brownish yellow, the middle part is yellow, and the lower part is brownish yellow.

Rutlege soils are very poorly drained. Typically, the surface layer is fine sand about 21 inches thick. The upper part is black, and the lower part is very dark brown. Below this, to a depth of 63 inches or more, is light brownish gray loamy fine sand that is mottled yellowish brown.

Of minor extent in this unit are the somewhat poorly drained Mandarin soils on broad ridges, the somewhat poorly drained Tawcaw soils and the poorly drained Chastain soils on flood plains, and the poorly drained and very poorly drained Hydraquents in ponded, backswamp areas.

The natural vegetation is turkey oak, blackjack oak, and longleaf pine commonly with an understory of cactus. The soils on ridges in this unit are well suited to sand pine; other pines are not well suited because of the low available water capacity. The soils in depressions and bays are well suited to pine woodland. The soils in this unit are poorly suited to use as farmland.

The soils on ridges have favorable features for most urban uses. However, seepage limits sanitary facilities, and the sandy texture limits recreation development. The soils in depressions and bays are limited for urban use and recreation development because of wetness.

4. Stilson-Pelham-Fuquay

Nearly level and very gently sloping, well drained, moderately well drained, and poorly drained soils that are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of nearly level, moderately well drained soils in broad, smooth areas; poorly drained soils in depressions and drainageways; and nearly level and very gently sloping, well drained soils on smooth and convex ridgetops. Areas of this unit are distributed throughout most of Long County.

This unit makes up about 11 percent of the county. It is about 37 percent Stilson soils, 36 percent Pelham soils, 20 percent Fuquay soils, and 7 percent soils of minor extent.

Stilson soils are nearly level and moderately well drained. Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsurface layer is pale yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 72 inches or more. The upper part is brownish yellow and mottled strong brown, the middle part is brownish

yellow and mottled reddish, brownish, yellowish, and grayish, and the lower part is mottled brownish, reddish, yellowish, and grayish. Plinthite makes up 5 to 10 percent of the middle and lower parts of the subsoil.

Pelham soils are nearly level and poorly drained. Typically, the surface layer is black loamy sand about 6 inches thick. The subsurface layer is loamy sand about 19 inches thick. The upper part is grayish brown, and the lower part is gray. The subsoil extends to a depth of 63 inches or more. The upper part is gray sandy loam and has strong brown mottles, the middle part is gray sandy clay loam and has brownish yellow and light yellowish brown mottles, and the lower part is gray sandy clay loam and has brownish yellow and yellowish red mottles.

Fuquay soils are nearly level and very gently sloping and well drained. Typically, the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsurface layer is brownish yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 76 inches or more. The upper part is brownish yellow and has strong brown and yellowish red mottles, and the lower part is mottled yellow, brown, gray, and red. Plinthite content is 5 to 12 percent below a depth of 41 inches. Nodules of ironstone are throughout most of the subsoil.

Of minor extent in this unit are the well drained Dothan soils on ridgetops. The somewhat poorly drained Leefield and Albany soils and poorly drained Mascotte soils are in smooth areas.

Natural vegetation consists of longleaf pine, loblolly pine, live oak, and post oak with an understory of waxmyrtle in many areas. Most of the soils in this unit are well suited to pine woodland. Because of wetness, soils on the slightly higher lying areas are moderately suited to farming, and the soils in depressions and drainageways are poorly suited.

The soils in broad, smooth areas and in depressions and drainageways are limited for urban use and recreation development because of wetness; however, the soils on ridgetops have favorable features for these uses.

predominantly somewhat poorly drained and poorly drained soils generally not subject to flooding

The soils in these four units are nearly level and predominantly somewhat poorly drained on low ridges and poorly drained in broad, low areas, depressions, and drainageways. The somewhat poorly drained and very poorly drained soils are sandy throughout, or they are sandy to a depth of 20 to 40 inches and loamy below this to a depth of 60 inches or more. The poorly drained soils are mainly sandy to a depth of less than 40 inches and loamy or clayey below this to a depth of 60 inches or more.

5. Leefield-Pelham-Mascotte

Nearly level, somewhat poorly drained and poorly drained soils that are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of somewhat poorly drained soils on low lying ridges and poorly drained soils in broad areas and in depressions and drainageways. Areas of this unit are mainly distributed throughout the western part of Long County.

This unit makes up about 22 percent of the county. It is about 35 percent Leefield soils, 25 percent Pelham soils, 21 percent Mascotte soils, and 19 percent soils of minor extent.

Leefield soils are on low lying ridges and are somewhat poorly drained. Typically, the surface layer is very dark gray loamy sand about 11 inches thick. The subsurface layer is light yellowish brown loamy sand about 11 inches thick. It is mottled yellowish brown. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is light yellowish brown and has gray, brown, and red mottles, the middle part is light gray and has brown and red mottles, and the lower part is mottled gray, brown, and red. Plinthite makes up 5 percent or more of the lower part of the subsoil.

Pelham soils are mainly in depressions and drainageways and are poorly drained. Typically, the surface layer is black loamy sand about 6 inches thick. The subsurface layer is loamy sand about 19 inches thick. The upper part is grayish brown, and the lower part is gray. The subsoil extends to a depth of 63 inches or more. The upper part is gray sandy loam and has strong brown mottles, the middle part is gray sandy clay loam and has brownish yellow and light yellowish brown mottles, and the lower part is gray sandy clay loam and has brownish yellow and yellowish red mottles.

Mascotte soils are mainly on broad ridges and are poorly drained. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is light gray and light brownish gray fine sand to a depth of 14 inches. Below this, to a depth of 18 inches, is a very dark brown and dark reddish brown, weakly cemented layer; to a depth of 32 inches, is pale brown and light gray fine sand that is mottled brown; and to a depth of 70 inches or more, is mainly light gray sandy clay loam that is mottled brown and red.

Of minor extent in this unit are the moderately well drained Stilson soils on smooth uplands, the somewhat poorly drained Albany soils on low ridges, and the very poorly drained Ellabelle soils in depressions, bays, and large drainageways.

Natural vegetation consists of longleaf pine, loblolly pine, sweetgum, and water oak with an understory of waxmyrtle, gallberry, and palmetto. Because of wetness, most of the soils in this unit are moderately suited to pine woodland and pasture and poorly suited to cultivated crops.

The soils in this unit are limited for urban use and recreation development because of wetness. However, those soils on low lying upland ridges commonly can be modified to provide favorable sites for these uses.

6. Ocilla-Riceboro-Pooler

Nearly level, somewhat poorly drained and poorly drained soils that predominantly are sandy to a depth of 20 to 40 inches and loamy or clayey to a depth of 60 inches or more

This map unit consists of somewhat poorly drained soils on low ridges and poorly drained soils in broad, low areas and in slight depressions. Areas of this unit are mainly in the southern part of Long County.

This unit makes up about 4 percent of the county. It is about 32 percent Ocilla soils, 21 percent Riceboro soils, 18 percent Pooler soils, and 29 percent soils of minor extent.

Ocilla soils are on low ridges and are somewhat poorly drained. Typically, the surface layer is dark grayish brown loamy fine sand about 6 inches thick. The subsurface layer extends to a depth of 34 inches. The upper part is pale brown loamy fine sand, and the lower part is pale brown loamy sand and has yellowish brown mottles. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is yellowish brown mottled with pale brown and light brownish gray, and the lower part is predominantly mottled light gray, yellowish brown, and yellowish red.

Riceboro soils are in broad areas and depressions and are poorly drained. Typically, the surface layer is very dark gray loamy fine sand about 8 inches thick. The subsurface layer is loamy fine sand to a depth of about 25 inches. The upper part is dark grayish brown, the middle part is light brownish gray, and the lower part is light gray and has yellowish brown mottles. The subsoil extends to a depth of 70 inches or more. The upper part is light brownish gray sandy clay loam and has strong brown mottles, the middle part is light brownish gray sandy clay and has red and strong brown mottles, and the lower part is mottled grayish brown, strong brown, and red sandy clay.

Pooler soils are in broad, low areas and are poorly drained. Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay and has strong brown, yellowish red, and yellowish brown mottles, the middle part is gray clay and has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam and has yellowish brown mottles.

Of minor extent in this unit are the somewhat poorly drained Albany soils on low ridges, the somewhat poorly drained Wahee soils on stream terraces, the poorly drained Bladen soils in broad, low areas, and the very poorly drained Bayboro soils in depressions and drainageways.

The natural vegetation consists of longleaf pine, loblolly pine, water oak, and sweetgum with an understory of waxmyrtle and gallberry. Most of the soils in this unit are moderately suited to pine woodland because of wetness. Because of wetness, the soils on low ridges are moderately suited to use as farmland and the soils in broad areas and depressions are poorly suited.

The soils in this unit are limited for urban use and recreation development because of wetness. However, those soils on low ridges commonly can be modified to provide favorable sites for these uses.

7. Rutlege-Mandarin

Nearly level, very poorly drained and somewhat poorly drained soils that are sandy throughout

This map unit consists of somewhat poorly drained soils on broad ridges interspersed with very poorly drained soils in shallow depressions and bays. Areas of this unit are mainly in the eastern part of Long County.

This unit makes up about 8 percent of the county. It is about 54 percent Rutlege soils, 19 percent Mandarin soils, and 27 percent soils of minor extent.

Rutlege soils are very poorly drained. Typically, the surface layer is fine sand about 21 inches thick. The upper part is black, and the lower part is very dark brown. Below this, to a depth of 63 inches or more, is light brownish gray loamy fine sand that is mottled yellowish brown.

Mandarin soils are somewhat poorly drained. Typically, they are fine sand throughout. The surface layer is dark gray about 7 inches thick. The subsurface layer is gray and light brownish gray to a depth of 12 inches. Below this, to a depth of 20 inches, is very dark brown and very dark grayish brown layers that are weakly cemented by organic matter; to a depth of 45 inches, are brown, light brownish gray, and light gray layers; and to a depth of 70 inches or more, is a dark brown, weakly cemented, organically stained layer.

Of minor extent in this unit are the moderately well drained Echaw and Centenary soils on ridges. The very poorly drained Johnston soils and poorly drained Bibb soils are on flood plains.

Natural vegetation consists of longleaf pine, live oak, post oak, and water oak with a thick understory of palmetto and waxmyrtle. In the bays and depressions, blackgum, cypress, and pond pine are common. Because of wetness, most of the soils in this unit are moderately suited to pine woodland and are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness. However, those soils on broad ridges commonly can be modified to provide favorable sites for these uses.

8. Pooler-Bladen

Nearly level, poorly drained soils that are loamy to a depth of less than 20 inches and clayey to a depth of 60 inches or more

This map unit consists of poorly drained soils in broad, low areas. Areas of this unit are in the eastern and southwestern parts of Long County.

This unit makes up about 12 percent of the county. It is about 51 percent Pooler soils, 15 percent Bladen soils, and 34 percent soils of minor extent.

Pooler soils are in broad, low areas. Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay and has strong brown, yellowish red, and yellowish brown mottles, the middle part is gray sandy clay and has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam and has yellowish brown mottles.

Bladen soils are in broad, low areas. Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 9 inches thick. The gray subsoil to a depth of 72 inches or more is predominantly mottled red and brown. It is clay, except in the extreme lower part, which is sandy clay loam.

Of minor extent in this unit are the somewhat poorly drained Wahee soils on stream terraces, the poorly drained Riceboro soils in broad areas and in depressions, and the very poorly drained Cape Fear and Bayboro soils in depressions and drainageways.

Natural vegetation consists of sweetgum, longleaf pine, loblolly pine, and water oak. Most of the soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness.

predominantly poorly drained and very poorly drained soils subject to flooding

The soils in these five units are nearly level and poorly drained and very poorly drained. They are in backswamps, bays, depressions, and drainageways and on flood plains. These soils are sandy to mostly clayey throughout, sandy to a depth of 20 to 40 inches and loamy below this to a depth of 60 inches or more, or loamy to a depth of less than 20 inches and mainly clayey below this to a depth of 60 inches or more.

9. Hydraquents

Nearly level, very poorly drained soils that mainly are clayey to a depth of 50 inches or more

This map unit consists of very poorly drained soils in ponded backswamps. Areas of this unit are near the Altamaha River. These soils are separated from the soils on the flood plain of the river by the soils on the large, sandy ridges that are parallel to the river.

This unit makes up about 7 percent of Long County. It is about 80 percent Hydraquents and 20 percent soils of minor extent.

Typically, Hydraquents, clayey, have a black mucky clay loam surface layer about 10 inches thick. Below this, to a depth of 50 inches or more, is dark gray and gray clay that is soft and sticky and contains large amounts of matted roots.

Of minor extent in this unit are the excessively drained Kershaw soils on ridges and the very poorly drained Bayboro and Cape Fear soils in depressions and drainageways.

Natural vegetation is mainly cypress, water tupelo, sweetbay, swamp maple, and green ash with an understory of many water-tolerant shrubs and aquatic plants. Because of ponding, the soils in this unit are poorly suited to use as farmland and woodland and are limited for urban use and recreation development. They are well suited to wetland plants and to shallow water developments for wetland wildlife.

10. Ellabelle-Johnston

Nearly level, very poorly drained soils that predominantly are sandy to a depth of 20 to 40 inches and loamy to a depth of 60 inches or more

This map unit consists of very poorly drained soils in bays, depressions, and drainageways and on flood plains. Areas of this unit are throughout Long County.

This unit makes up about 8 percent of the county. It is about 61 percent Ellabelle soils, 16 percent Johnston soils, and 23 percent soils of minor extent.

Ellabelle soils are in bays, depressions, and drainageways and are very poorly drained. Typically, the surface layer is black loamy sand about 23 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark gray sandy loam, the middle part is gray sandy clay loam and has yellowish brown and strong brown mottles, and the lower part is mottled brownish yellow, strong brown, and gray sandy clay loam.

Johnston soils are on flood plains and are very poorly drained. Typically, the surface layer is black mucky loam about 43 inches thick. Below this, to a depth of 60 inches or more, is light brownish gray sandy loam.

Of minor extent in this unit are the poorly drained Mascotte soils on broad ridges, Pelham soils in depressions and drainageways, and Bibb soils on flood plains.

Natural vegetation consists of cypress, blackgum, sweetgum, water oak, and pond pine. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of ponding or flooding.

11. Bayboro

Nearly level, very poorly drained soils that are loamy to a depth of less than 20 inches and clayey to a depth of 60 inches or more

This map unit consists of very poorly drained soils in depressions and drainageways. Areas of this unit are in the eastern part of Long county.

This unit makes up about 3 percent of the county. It is about 85 percent Bayboro soils and 15 percent soils of minor extent.

Typically, the surface layer of Bayboro soils is very dark grayish brown loam about 11 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part is very dark grayish brown clay loam, the middle part is dark gray and gray clay and has brown and red mottles, and the lower part is gray sandy clay and has dark brown mottles.

Of minor extent in this unit are the poorly drained Bladen and Pooler soils in broad, low areas and the very poorly drained Cape Fear soils in drainageways.

Natural vegetation is mostly cypress, tupelo, sweetgum, and water oak. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of wetness.

12. Tawcaw-Chastain

Nearly level, somewhat poorly drained and poorly drained soils that predominantly are clayey throughout

This map unit consists of soils on flood plains. The somewhat poorly drained soils are on the slightly higher lying positions, and the adjacent, poorly drained soils are in sloughs and low lying positions. Areas of this unit are along the Altamaha River.

This unit makes up about 9 percent of the county. It is about 47 percent Tawcaw soils, 25 percent Chastain soils, and 28 percent soils of minor extent.

Tawcaw soils are somewhat poorly drained. Typically, the surface layer is brown clay about 6 inches thick. The subsoil extends to a depth of 56 inches. The upper part is brown clay and has light brownish gray mottles, the middle part is light brownish gray and gray clay and has strong brown mottles, and the lower part is gray clay loam and has strong brown and yellowish brown mottles. Below this, to a depth of 65 inches or more, is mottled, stratified, light brownish gray, yellowish brown, and gray loamy sand and sandy loam.

Chastain soils are poorly drained. Typically, the surface layer is brown clay loam about 4 inches thick. The subsoil extends to a depth of 52 inches. The upper part is grayish brown clay loam and has strong brown mottles, the middle part is grayish brown silty clay and has yellowish brown mottles, and the lower part is dark gray clay and has yellowish brown mottles. Below this to a depth of 60 inches or more, is mottled dark gray, light brownish gray, and yellowish brown clay loam stratified with sandy loam.

Of minor extent in this unit are the excessively drained Kershaw soils on ridges.

Natural vegetation consists of hickory, water oak, overcup oak, and sweetgum. Cypress and blackgum are common in the lower lying areas. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland. However, soils on the slightly higher lying part of the flood plain are suited to farming if drained, protected from flooding, and properly managed.

The soils in this unit are limited for urban use and recreation development because of wetness and flooding.

13. Osier-Bibb

Nearly level, poorly drained soils that predominantly are sandy throughout.

This map unit consists of poorly drained soils on the flood plain of Beards Creek. Areas of this unit are in the western part of Long County.

This unit makes up about 1 percent of the county. It is about 47 percent Osier soils, 23 percent Bibb soils, and 30 percent soils of minor extent.

Osier soils are sandy throughout. Typically, the surface layer is loamy sand about 11 inches thick. The upper part is dark grayish brown, and the lower part is very dark grayish brown. Below this, to a depth of 65 inches or more, is light brownish gray loamy sand over light gray sand.

Bibb soils are loamy throughout. Typically, the surface layer is sandy loam about 13 inches thick. The upper part is very dark gray, and the lower part is dark grayish brown. Below this, to a depth of 65 inches or more, is gray sandy loam that has a few yellowish brown mottles in the lower part.

Of minor extent in this unit are the very poorly drained Ellabelle soils and poorly drained Pelham soils in depressions and drainageways. The very poorly drained Johnston soils are on flood plains.

The natural vegetation consists of sweetgum, water oak, blackgum, and in some areas loblolly pine. The soils in this unit are well suited to pine woodland. Because of wetness, they are poorly suited to use as farmland.

The soils in this unit are limited for urban use and recreation development because of flooding.

broad land use considerations

Most of the survey area is being used as woodland. The general soil map is helpful for general planning, but it should not be used for the selection of sites for specific structures. The data in this survey about specific soils, however, can be helpful in planning future land use patterns. The following broad land use considerations refer to the survey area as a whole.

Most of the survey area is not well suited to urban development. The Bohicket-Capers and Fripp-Beaches-Duckston units are subject to tidal flooding; the Bayboro-Cape Fear, Ellabelle-Johnston-Bibb, Ellabelle-Johnston, Johnston-Bibb-Osier, Hydraquents, Osier-Bibb, and Tawcaw-Chastain units are subject to stream flooding. Soils in the Bladen-Pooler-Riceboro, Leefield-Pelham-Mascotte, Mandarin-Rutlege, Mascotte-Pelham-Leefield, Ocilla-Riceboro-Pooler, and Pooler-Bladen units are poorly suited to urban development because of wetness.

The soils in some areas can be used as farmland or can be developed for urban uses at lower costs. These include soils in the Blanton-Fuquay-Foxworth, Echaw-Chipley-Centenary, Echaw-Foxworth-Centenary, Kershaw-Rutlege, and Stilson-Pelham-Fuquay units. Most of the soils in these units have a water table at a greater depth than is common in the other soils in the survey area.

Most of the soils are well suited or moderately suited to woodland. However, trees do not grow on soils in the Bohicket-Capers unit because of tidal flooding and high salt content. Commercially valuable trees are not common and do not grow well on the wetter soils in the Hydraquents unit.

The Blanton-Fuquay-Foxworth, Echaw-Chipley-Centenary, Echaw-Foxworth-Centenary, Kershaw-Rutlege, and Stilson-Pelham-Fuquay units are generally well suited to parks and recreation areas. Marshes and swamps in the Bohicket-Capers and Hydraquents units are good for nature study areas. All of these units provide excellent habitat for many important species of wildlife.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. A soil is well suited if it has properties that are favorable. A soil is moderately suited if it has properties that require special planning and management to obtain satisfactory performance. A soil is poorly suited if it has properties that are unfavorable. The map unit descriptions also can be used to plan the management needed for specific uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, salinity, wetness, and other characteristics that affect their use.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Pooler-Bladen complex is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Tawcaw-Chastain association is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Echaw and Centenary fine sands is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

As—Albany loamy fine sand, 0 to 2 percent slopes. This somewhat poorly drained, nearly level soil is on low ridges and knolls in the Atlantic Coast Flatwoods. Areas are 10 to 75 acres.

Typically, the surface layer is very dark gray loamy fine sand 8 inches thick. The subsurface layer is fine sand to a depth of 49 inches. The upper part is light brownish gray, and the lower part is brownish yellow and has light brownish gray mottles. The subsoil extends to a depth of 84 inches. The upper part is yellowish brown sandy loam and has light gray and olive yellow mottles, and the lower part is mottled yellowish brown, brownish yellow, light brownish gray, olive yellow, and yellowish red sandy clay loam.

This Albany soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Available water capacity is low. Tilth is good. This soil can be worked throughout a

wide range of moisture content. Although the root zone is deep, a seasonal high water table commonly fluctuates between depths of 1.0 foot and 2.5 feet in winter and early in spring and somewhat limits plant growth.

Included with this soil in mapping are small areas of Blanton and Ocilla soils. Also included are a few areas of soils that have more clay in the subsoil than is common to Albany soils and a few areas of very gently sloping soils.

This soil is moderately suited to row crops, small grains, and hay and pasture because of the seasonal wetness and low available water capacity. Commonly, bedding in conjunction with open ditches or buried drains helps to overcome the wetness.

Loblolly pine and slash pine are well suited to this soil; however, wetness commonly causes equipment limitations and seedling mortality. This limitation can be reduced by the use of a water control system.

Because of wetness, this Albany soil is poorly suited to septic tank absorption fields and small commercial buildings. It is moderately suited to dwellings without basements, local roads and streets, and recreation development. A properly installed water control system helps to lower the water table and provide a favorable site for these uses.

This soil is in capability subclass IIIw and woodland suitability subclass 2w.

Ba—Bayboro loam. This very poorly drained, nearly level soil is in depressions and drainageways in the Atlantic Coast Flatwoods. Areas are 10 to 250 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown loam about 11 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part is very dark grayish brown clay loam, the middle part is dark gray and gray clay and has brown and red mottles, and the lower part is gray sandy clay and has dark brown mottles.

This Bayboro soil is low in natural fertility and medium in content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is slow, and available water capacity is high. Tilth is fair. This soil can be worked more easily during the drier season. Although the root zone is deep, the water table commonly is at a depth of less than 0.5 foot in winter to late in spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are small areas of Bladen, Cape Fear, and Ellabelle soils.

Loblolly pine and slash pine are well suited to this soil, however, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive drainage.

This soil is in capability subclass VIw and woodland suitability subclass 2w.

Bc—Beaches. This map unit consists of beaches on the ocean side of St. Catherines Island in Liberty County. The beaches are made up of white fine sand and varying amounts of small, shell fragments.

Beaches are covered each day by tides, and the sandy shores are constantly washed and rewashed by waves. Since the prevailing currents of the ocean move southward parallel to the beaches, the areas are continually changing in extent and shape. Because of the current and the action of breakers, the northern end of the island is eroding and the southern end is increasing in size as the sand is shifted by wind and water. Beaches are poorly suited to most uses; however, they are well suited to sea associated activities.

This map unit is not placed in a capability subclass or woodland suitability subclass.

Bd—Bladen fine sandy loam. This poorly drained, nearly level soil is in broad, low areas in the Atlantic Coast Flatwoods. Areas are 10 to 200 acres. Slope is less than 2 percent.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 9 inches thick. The gray subsoil extends to a depth of 72 inches or more and is predominantly mottled red and brown. The subsoil is mainly clay, but the extreme lower part is sandy clay loam.

This soil is low in natural fertility and content of organic matter. It is strongly acid to extremely acid throughout, except for the surface layer in limed areas. Permeability is slow, and available water capacity is high. Tilth is fair or good. Although the root zone is deep, the water table commonly is at a depth of less than 1.0 foot in winter and spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are small areas of Bayboro, Pooler, and Wahee soils.

Loblolly pine and slash pine are well suited to this soil, however, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive drainage. In addition to wetness, slow permeability in the subsoil is a limitation for septic tank absorption fields.

This soil is in capability subclass VIw and woodland suitability subclass 2w.

Bn—Blanton sand, 0 to 3 percent slopes. This moderately well drained, nearly level and very gently sloping soil is on narrow to broad ridges in the Atlantic Coast Flatwoods. Areas are 10 to 100 acres. Slopes are smooth and mainly convex.

Typically, the surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer is sand to a depth of about 46 inches. The upper part is yellowish brown, and the lower part is yellowish brown and has pale brown and brownish yellow mottles. The subsoil extends to a depth of 79 inches or more. The upper part is light yellowish brown sandy loam, the middle part is strong brown sandy clay loam and has red mottles, and the lower part is mottled brownish yellow, light gray, and yellowish red sandy clay loam.

This soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid in the surface and subsurface layers, except in areas that have been limed, and is very strongly acid in the subsoil. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Available water capacity is low. Tilth is good. This soil can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by roots.

Included with this soil in mapping are a few intermingled areas of Albany, Chipley, and Foxworth soils. Also included are soils that are similar to this Blanton soil but have slopes of as much as 8 percent.

This soil is moderately suited to row crops, small grains, and hay and pasture because of the low available water capacity. Improved bermudagrass and bahiagrass produce good yields if this soil is fertilized and limed.

Loblolly pine and slash pine are moderately suited to this soil. Equipment limitations and seedling mortality are management concerns. Seedlings need to be planted in winter or early in spring because soil moisture commonly is highest during this period. Also, this higher moisture content helps support equipment, and operations can more successfully be performed.

This Blanton soil is poorly suited to septic tank absorption fields and recreation development, because the surface and subsurface layers are sandy. It is well suited to dwellings without basements, small commercial buildings, and local roads and streets. Because this soil is droughty, irrigation is needed to maintain lawns during dry periods.

This soil is in capability subclass IIIs and woodland suitability subclass 3s.

BO—Bohicket-Capers association. This association consists of very poorly drained soils on the level, tidal salt marshes that border the Atlantic Ocean and extend a few miles inland along the creeks and rivers. The Bohicket soils are in broad marshes that border the Atlantic Ocean, and the Capers soils are in narrow marshes that interfinger the mainland and in narrow floodways of inland creeks and rivers. These soils are in a regular, repeating pattern. They formed in silty and clayey marine sediment. Areas commonly are 200 acres or more. Slope is less than 1 percent.

Bohicket soil makes up 80 percent of a mapped area. Typically, the surface and subsurface layers are dark gray silty clay loam to a depth of about 14 inches. The substratum is very dark gray to a depth of 60 inches or more. The upper part is silty clay, and the lower part is clay. Fibrous grass roots are throughout the soil.

The Bohicket soil is slightly acid to moderately alkaline. Permeability is very slow. Available water for native plants is readily accessible because the soil is constantly wet. A strong odor of hydrogen sulfide is noticeable if the soil is disturbed. The Bohicket soil is flooded by sea water twice each day.

Capers soil makes up about 15 percent of a mapped area. Typically, the surface layer is very dark gray silty clay loam about 16 inches thick. Below this is sticky, dark gray silty clay to a depth of 36 inches and sticky, very dark gray clay to a depth of 60 inches or more. Fine grass roots are throughout the soil.

The Capers soil is neutral or mildly alkaline throughout. Permeability is very slow. Available water is constant because the soil is continually saturated, unless drained. An odor of hydrogen sulfide is noticeable if the soil is disturbed. The Capers soil is flooded by spring tides and in some low places by daily tides.

Included with these soils in mapping are a few small areas of Mandarin and Riceboro soils. Also included are spoil areas from dredging.

Most areas of this association are used as wetland wildlife habitat and are well suited to this use. This association is poorly suited to most other uses. A few scattered places near the edge of mapped areas are in pasture. Tidal flooding and salinity prevent establishment of trees. Frequent flooding is the main limitation and is extremely difficult to overcome. In addition, the very slow permeability, low strength, and high shrink-swell potential are limitations for community development.

These soils are in capability subclass VIIIw. They are not assigned to a woodland suitability subclass.

Ca—Cape Fear fine sandy loam. This very poorly drained, nearly level soil is along drainageways in the lower lying parts of the Atlantic Coast Flatwoods. It rarely is flooded. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, the surface layer is black and about 16 inches thick. The upper part is fine sandy loam, and the lower part is loam. The subsoil extends to a depth of 51 inches. The upper part is very dark gray clay loam, the middle part is mainly gray sandy clay, and the lower part is light brownish gray sandy clay loam. The underlying material is light brownish gray sand.

This Cape Fear soil is low in natural fertility and medium in content of organic matter. It is medium acid to very strongly acid throughout, except for the surface

layer in limed areas. Permeability is slow, and available water capacity is medium. Tilth is fair. This soil can be worked more easily during drier seasons. Although the root zone is deep, the water table is at or near the surface in winter to the middle of spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are areas of Bayboro, Bladen, and Pooler soils.

Loblolly pine, slash pine, and sweetgum are well suited to this soil, however, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Open ditches help to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness and flooding. These limitations can be overcome by extensive flood control and drainage.

This soil is in capability subclass VIw and woodland suitability subclass 1w.

Ce—Capers silty clay. This very poorly drained, nearly level soil is in tidal salt marshes that interfinger into the mainland and in floodways that extend inland from the ocean. This soil is flooded by tides in spring, and in some places it is flooded daily by tides. Areas are 5 to 500 acres.

Typically, the surface layer is sticky silty clay about 16 inches thick. The upper part is very dark gray, and the lower part is very dark grayish brown. The underlying material, to a depth of 60 inches or more, is sticky, dark gray clay. Grass roots are throughout the soil.

This Capers soil is high in natural fertility and content of organic matter. It is neutral or mildly alkaline throughout. Permeability is very slow. The water table is continually near or above the surface and restricts plant growth, except for water- and salinity-tolerant species. The sulfur content is 1 to 3 percent, and the odor of hydrogen sulfide is noticeable if the soil is disturbed.

Included with this soil in mapping are a few small areas of Bayboro and Bohicket soils. Also included are small areas of soils that are predominantly sandy in part or throughout.

Most areas of this soil are used as wetland wildlife habitat. They are well suited to this use. Shore birds and waterfowl use the areas extensively. Many areas are in native grasses, and a few small areas are used for range and pasture. This soil is poorly suited to most other uses. Tidal flooding and salinity prevent establishment of trees. Frequent flooding is the main limitation and is extremely difficult to overcome. In addition, very slow permeability, low strength, high sulfur content, and high shrink-swell potential are limitations for community development.

This soil is in capability subclass VIIIw. It is not assigned to a woodland suitability subclass.

Ch—Chipley sand, 0 to 4 percent slopes. This moderately well drained, nearly level and very gently sloping soil is in broad areas in the Atlantic Coast Flatwoods. Areas are 5 to 75 acres. Slopes are smooth and mainly convex.

Typically, this soil is sand throughout. The surface layer is dark gray and about 6 inches thick. The underlying material extends to a depth of 84 inches or more. The upper part is pale yellow, the middle part is light yellowish brown and has light gray and yellowish brown mottles, and the lower part is light gray and has strong brown mottles (fig. 2).

This Chipley soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is rapid, and available water capacity is low. Tilth is good. This soil can be worked throughout a wide range of moisture content. Although the root zone is deep, a high water table commonly fluctuates between depths of 2.0 and 3.0 feet in winter and early in spring and somewhat limits plant growth. However, in dry seasons the soil is droughty.

Included with this soil in mapping are small areas of Albany, Blanton, Echaw, and Centenary soils.

This soil is poorly suited to row crops. It is moderately suited to improved bermudagrasses and bahiagrass. If limed and fertilized, these grasses produce good ground cover and forage.

Slash pine and loblolly pine are well suited to this soil. However, the sandy texture limits the use of equipment. This limitation can be overcome if operations are performed at the optimum soil moisture content, which commonly is late in spring and early in summer.

This soil is poorly suited to septic tank absorption fields and moderately suited to dwellings, small commercial buildings, and local roads and streets because of wetness. A properly installed water control system helps to lower the water table and provide favorable sites for these uses. Because of the sandy texture, this soil is poorly suited to recreation development. Because of droughtiness, irrigation is needed to maintain lawns during dry periods.

This soil is in capability subclass IIIs and woodland suitability subclass 2s.

Da—Dothan loamy sand, 0 to 2 percent slopes. This well drained, nearly level soil is on ridgetops and small knolls in the Southern Coastal Plain. Areas are 10 to 50 acres.

Typically, the surface layer is dark grayish brown loamy sand about 8 inches thick. The subsurface layer is light yellowish brown loamy fine sand to a depth of 14 inches. The subsoil is dominantly sandy clay loam to a depth of 60 inches or more. The upper few inches are brownish yellow, the middle part is predominantly

Figure 2.—Chipley sand, 0 to 4 percent slopes, in a cutbank.

yellowish brown, and the lower part is mottled yellowish brown, light brownish gray, and red. Plinthite is in the middle and lower parts of the subsoil. Nodules of ironstone are in the surface layer and in the upper part of the subsoil.

This Dothan soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Available water capacity is medium. Tilth is good. This soil can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by roots.

Included with this soil in mapping are a few small areas of Fuquay and Stilson soils. Also included are soils that are similar to this Dothan soil but do not have plinthite in the subsoil.

This soil is well suited to row crops, hay, and pasture. During dry seasons, it responds to irrigation and high yields can be obtained. Conservation tillage and the use of cover crops, including grasses and legumes in the cropping system, help maintain the organic matter content. Improved bermudagrasses and bahiagrass produce good yields if this soil is fertilized and limed.

Slash pine and loblolly pine are well suited to this soil. There are no significant limitations for woodland use or management.

This Dothan soil is moderately suited to septic tank absorption fields because of slow permeability in the lower part of the subsoil. In most places, this limitation can be overcome by increasing the size of the absorption field. Dothan soils are well suited to dwellings without basements, small commercial buildings, local roads and streets, lawns, and recreational development.

This soil is in capability class I and woodland suitability subclass 2o.

Ea—Echaw-Urban land complex. This complex consists of areas of moderately well drained Echaw soils and areas of Urban land so intermingled or so small that they could not be mapped separately at the scale selected. This complex is on broad ridges in the Atlantic Coast Flatwoods. Most areas are 10 to 100 acres. Slope is 0 to 2 percent.

Echaw fine sand makes up about 55 percent of each mapped area. Typically, this soil is fine sand throughout. The surface layer is very dark gray and about 5 inches thick. The subsurface layer extends to a depth of 47 inches. The upper part is brownish yellow, the middle part is very pale brown, and the lower part is light gray and has pale brown mottles. The subsoil is weakly cemented by organic material to a depth of 70 inches or more. The upper part is dark reddish gray, and the lower part is dark reddish brown.

This Echaw soil is low in natural fertility and content of organic matter. It is very strongly acid throughout, except for the surface layer in limed areas. Permeability is rapid, and available water capacity is low. This soil has good tilth. It can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. A seasonal high water table commonly fluctuates between depths of 2.5 and 5.0 feet in winter to early in spring.

Urban land makes up about 40 percent of each mapped area. Most Urban land is occupied by private dwellings, industries, parking lots, streets, shopping

centers, commercial buildings, schools, and churches. The soils have been altered by grading, cutting, filling, shaping, and smoothing.

Included with this Echaw soil in mapping are small areas of Mandarin, Chipley, and Rutlege soils. The soils in this complex are used primarily for urban purposes, including gardens, shrubs, shade trees, and lawns. Although wetness is a limitation, these soils commonly can be altered by drainage, filling, or by other suitable measures. Because of the seasonal high water table, water-tolerant plants are better suited to landscaping and vegetable gardens than other kinds of plants.

This complex is not assigned to a capability subclass or a woodland suitability subclass.

EC—Echaw and Centenary fine sands. This undifferentiated group consists mainly of moderately well drained, nearly level Echaw and Centenary soils on ridges in the Atlantic Coast Flatwoods. These soils are closely associated but are in an irregular pattern. Most areas contain both soils, but a few areas contain only one. Because of present and predicted use, these soils were not separated in mapping. A typical area is about 50 percent Echaw soils, 30 percent Centenary soils, and 20 percent Chipley, Mandarin, and Rutlege soils; however, the proportion of each soil can vary from area to area. The moderately well drained Chipley soils are in broad areas, the somewhat poorly drained Mandarin soils are on lower lying, broad ridges, and the very poorly drained Rutlege soils are in depressions and bays. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, the Echaw soil is fine sand throughout. The surface layer is very dark gray and about 5 inches thick. The subsurface layer extends to a depth of 47 inches. The upper part is brownish yellow, the middle part is very pale brown, and the lower part is light gray and has pale brown mottles. The subsoil is weakly cemented by organic materials and other compounds and extends to a depth of 70 inches or more. The upper part is dark reddish gray, and the lower part is dark reddish brown.

Typically, the Centenary soil has a surface layer of dark gray fine sand about 5 inches thick. The subsurface layer is fine sand to a depth of 61 inches. The upper part is light yellowish brown, the middle part is very pale brown, and the lower part is light gray and has yellowish brown mottles. The subsoil is loamy sand. The upper part is dark brown, and the lower part is very dark brown and slightly brittle.

These Echaw and Centenary soils are low in natural fertility and content of organic matter. They are medium acid to very strongly acid throughout. Permeability is rapid, and available water capacity is low. Tilth is good. These soils can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. In winter and early in spring, the water table in Echaw soil fluctuates between depths of 2.5 and 5.0 feet and in Centenary soil fluctuates between depths of 3.5 and 5.0 feet. In dry seasons these soils are droughty.

The natural vegetation is loblolly pine, longleaf pine, live oak, and turkey oak. Some areas have an understory of waxmyrtle and yaupon.

These soils are moderately suited to use as farmland. However, if limed and fertilized, improved bermudagrasses and bahiagrass produce good ground cover and forage.

Loblolly pine and slash pine are moderately suited to these soils. The sandy texture is a common limitation to use of equipment. This limitation can be overcome if operations are performed at the optimum soil moisture content, which commonly is late in spring and early in summer.

These Echaw and Centenary soils are moderately suited to septic tank absorption fields because of wetness. However, installing a water control system helps to lower the water table and provide a favorable site for the absorption field. Soils in this association are well suited to dwellings without basements, small commercial buildings, and local roads and streets. They are poorly suited to recreation development because they are sandy. Because these soils are droughty, irrigation and fertilization are needed to maintain lawns during dry periods.

The Echaw soil is in capability subclass IIIw and woodland suitability subclass 3s. The Centenary soil is in capability subclass IIIs and woodland suitability subclass 2w.

Ee—Ellabelle loamy sand. This very poorly drained, nearly level soil is in depressions, bays, and large drainageways in the Atlantic Coast Flatwoods. It frequently is ponded from late in fall to the middle of spring. Areas are 10 to 250 acres. Slope is 0 to 2 percent.

Tyically, the surface layer is black loamy sand about 23 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark gray sandy loam, the middle part is gray sandy clay loam and has yellowish brown and strong brown mottles, and the lower part is mottled brownish yellow, strong brown, and gray sandy clay loam.

This soil is low in natural fertility and medium to high in content of organic matter. It is very strongly acid or strongly acid throughout. Permeability is moderate, and available water capacity is medium. This soil has good tilth, but it can be worked more easily during drier seasons. Although the root zone is deep, the soil is ponded or the water table commonly is at a depth of less than 0.5 foot from late in fall to the middle of spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are a few small areas of Leefield, Mascotte, and Pelham soils.

Pond pine, baldcypress, and water oak are common. Ponding is the main limitation to equipment use and to seedling survival for other than the common water-tolerant trees. If this soil is drained, it is well suited to loblolly pine and slash pine.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive flood control and water systems.

This soil is in capability subclass Vw and woodland suitability subclass 4w.

Eu—Eulonia fine sandy loam. This moderately well drained, nearly level soil is on low ridges in the Atlantic Coast Flatwoods. Areas are 5 to 75 acres. Slope is 0 to 2 percent.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 10 inches thick. The subsoil extends to a depth of 61 inches. The upper part is strong brown sandy clay loam and has red and brown mottles, the middle part is light yellowish brown clay and has red, grayish, and yellowish mottles, and the lower part is light gray sandy clay and sandy clay loam and has reddish and yellowish mottles. The underlying material, to a depth of 75 inches or more, is yellowish red sandy loam that has grayish, yellowish, and red mottles.

This Eulonia soil is low in natural fertility and content of organic matter. It is very strongly acid to medium acid throughout, except for the surface layer in limed areas. Permeability is moderately slow, and available water capacity is medium. Tilth is good. Although the root zone is deep, a high water table fluctuates between depths of 1.5 and 3.5 feet in winter to late in spring and somewhat limits root penetration.

Included with this soil in mapping are small areas of Bladen, Pooler, Ocilla, and Wahee soils.

This soil is well suited to pasture and truck crops. A water control system helps overcome common wetness early in the growing season. Improved bermudagrasses and bahiagrass grow well if the soil is fertilized and limed and grazing is controlled.

Slash pine and loblolly pine are well suited to this soil, however, wetness commonly causes equipment limitations and seedling mortality. Wetness can be reduced in most places by a water control system.

Because of wetness, this Eulonia soil is poorly suited to septic tank absorption fields and moderately suited to dwellings without basements, small commercial buildings, local roads and streets, and recreation development. A properly installed water control system helps to provide a favorable site for these uses.

This Eulonia soil is in capability subclass IIw and woodland suitability subclass 2w.

Fo—Foxworth fine sand, 0 to 3 percent slopes. This moderately well drained, nearly level and very gently sloping soil is on broad ridges and small knolls in the Atlantic Coast Flatwoods. Areas are 15 to 150 acres.

Typically, this soil is fine sand throughout. The surface layer is very dark gray about 7 inches thick. The underlying material extends to a depth of 90 inches or more. The upper part is brownish yellow, the middle part is mainly yellowish brown and has light gray and reddish yellow mottles as depth increases, and the lower part is predominantly light gray and has brownish yellow mottles.

This Foxworth soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is very rapid, and available water capacity is low. Tilth is good. The soil can be worked throughout a wide range of moisture content. Although the root zone is deep, a high water table commonly fluctuates between depths of 3.5 and 6.0 feet in winter and spring.

Included with this soil in mapping are small areas of Blanton, Centenary, and Echaw soils; areas of a soil that is higher in reaction than is common for Foxworth soils; and areas of a soil similar to this Foxworth soil but has slope of as much as 10 percent.

This soil is poorly suited to row crops; however, it is moderately suited to pasture. Improved bermudagrasses and bahiagrass grow satisfactorily if this soil is fertilized and limed and grazing is controlled.

Slash pine is moderately suited to this soil. The sandy texture somewhat limits the use of equipment. This limitation can be overcome if operations are performed at the optimum soil moisture content, which commonly is in winter and spring.

This Foxworth soil is poorly suited to septic tank absorption fields because of wetness, and to recreation development because the soil is sandy. It is well suited to dwellings without basements, small commercial buildings, and local roads and streets. Because this soil is droughty, irrigation and fertilization are needed to maintain lawns during dry periods.

This soil is in capability subclass IIIs and woodland suitability subclass 3s.

FrD—Fripp-Duckston complex, 1 to 20 percent slopes. This complex consists of small areas of Fripp soils on undulating and rolling dunes and Duckston soils in shallow depressions between dunes and on flats between dunes and marshes. Areas of these soils are so intermingled or so small that they could not be mapped separately at the scale selected. The Duckston soils are frequently flooded for brief periods throughout the year. Areas are 25 to 100 acres.

Fripp fine sand makes up about 75 percent of each mapped area. Typically, it is fine sand throughout. The surface layer is dark grayish brown and about 7 inches thick. The underlying material to a depth of 99 inches or

more is mainly brownish, except it is white in the lower part.

This Fripp soil is very low in natural fertility and content of organic matter. It is medium acid throughout. Permeability is rapid, and available water capacity is very low.

Duckston sand makes up about 20 percent of each mapped area. Typically, it is sand throughout. The surface layer is very dark grayish brown about 5 inches thick. It overlies about 10 inches of grayish brown and gray. Below this, to a depth of 72 inches or more, is greenish gray.

This Duckston soil is very low in natural fertility and content of organic matter. It is medium acid in the A horizon and neutral in the C horizon. Permeability is very rapid, and available water capacity is very low.

Included with these soils in mapping are a few small areas of Capers soils.

Most areas of this unit are wooded. Vegetation is mainly live oak, brush, and grasses. Most areas, however, are poorly suited to vegetation.

The Fripp soil is subject to seepage if used for sanitary facilities. The lower lying Duckston soil commonly is wet throughout the year and is subject to frequent flooding.

This complex is in capability subclass VIIs. The Fripp soil is in woodland suitability subclass 4s, and the Duckston soil is not assigned to a woodland suitability subclass.

FsB—Fuquay loamy sand, 0 to 5 percent slopes. This well drained, nearly level and very gently sloping soil is on ridgetops in the Southern Coastal Plain. Areas are 5 to 80 acres. Slopes are mainly smooth and convex.

Typically, the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsurface layer is brownish yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 76 inches or more. The upper part is brownish yellow and has strong brown and yellowish red mottles, and the lower part is mottled yellow, brown, gray, and red. Plinthite content below a depth of 41 inches is 5 to 12 percent (fig. 3). Nodules of ironstone are throughout most of the subsoil.

This Fuquay soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is low. Tilth is good. This soil can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Dothan and Stilson soils. Some areas of soils have 5 to 15 percent nodules of ironstone in the upper part.

Figure 3.—Plinthite in the subsoil of a Fuquay soil. The darkened part of the profile is the plinthite.

This soil is moderately suited to row crops, small grains, hay, and pasture because of low available water capacity and low fertility. Returning crop residue to the soil helps to increase available water capacity and decrease leaching of plant nutrients. During dry seasons, this soil responds to irrigation, and high yields can be obtained.

Slash pine and longleaf pine are moderately suited to this soil. Equipment limitations and seedling mortality are management concerns.

This soil is well suited to dwellings without basements, small commercial buildings, and local roads and streets. It is moderately suited to septic tank absorption fields because of slow permeability in the subsoil, and to recreation development because the surface and subsurface layers are too sandy.

This soil is in capability subclass IIs and woodland suitability subclass 3s.

HO—Hydraquents, clayey. These very poorly drained, nearly level soils are in ponded, backswamp areas near the Altamaha River in the Atlantic Coast Flatwoods. Areas are irregular in shape and range from about 50 to 700 acres. These soils are flooded, or water is ponded to a depth of 1.0 foot or more in most areas for long periods throughout the year. Slope is less than 1 percent.

Typically, Hydraquents, clayey, have a surface layer of black mucky clay loam about 10 inches thick. Underlying this, to a depth of 50 inches or more, is dark gray and gray clay. The clay is soft and sticky and contains large amounts of matted roots.

Included with this soil in mapping are small areas of Bayboro, Cape Fear, and Kershaw soils and a soil that is similar to Hydraquents but is poorly drained.

Hydraquents are mainly wooded with cypress, water tupelo, sweetbay, swamp maple, and green ash. Also, many water-tolerant shrubs and aquatic plants are present as understory.

These soils are poorly suited to most uses because of flooding, wetness, and low strength. These limitations can be overcome by extensive flood control and drainage.

These soils are well suited to wetland plants and to shallow water areas for wetland wildlife. Ducks, alligators, and crayfish are common wildlife in these areas.

This soil is in capability subclass VIIw.

JB—Johnston and Bibb soils. This undifferentiated group consists mainly of very poorly drained and poorly drained, nearly level Johnston and Bibb soils on flood plains near streams in the Atlantic Coast Flatwoods. These soils are closely associated but in an irregular pattern. They are ponded or flooded for periods, mainly in winter and spring. Most areas contain both soils, but a few areas contain only one. Because of present and predicted use, these soils were not separated in mapping.

Typically, areas are about 60 percent Johnston soils, 30 percent Bibb soils, and 10 percent Ellabelle, Rutlege, and Pelham soils, and soils that are similar to these but have overwash on the surface. However, the proportion of each soil can vary from area to area. The very poorly drained Ellabelle and Rutlege soils are in low lying bays and depressions near the streams. The poorly drained Pelham soils are in broad, low lying areas. Areas are 25 to 1,000 acres. Slope is 0 to 2 percent.

Typically, the Johnston soil has a surface layer of black mucky loam about 43 inches thick. Below this, to a depth of 60 inches or more, is light brownish gray sandy loam.

This Johnston soil is low in natural fertility and medium in content of organic matter. It is very strongly acid or strongly acid throughout. Permeability is moderately rapid in the thick surface layer and rapid in the underlying layer. Available water capacity is medium. Although the root zone is deep, the soil is ponded or the water table commonly is at a depth of less than 1.5 feet in winter and spring.

Typically, the Bibb soil has a sandy loam surface layer 13 inches thick. The upper part is very dark gray, and the lower part is dark grayish brown. Underlying this, to a depth of 65 inches or more, is gray sandy loam that has a few yellowish brown mottles in the lower part.

This Bibb soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout. Permeability is moderate, and available water capacity is medium. Although the root zone is deep, a high water table commonly fluctuates between depths of 0.5 foot and 1.5 feet in winter and spring, which limits the growth of plants that are not tolerant of water.

Most areas of this map unit are wooded. The soils are well suited to loblolly pine, slash pine, sweetgum, and water tupelo. Wetness is the main limitation to equipment use in managing and harvesting tree crops. However, operations commonly can be performed during the drier seasons.

These soils are poorly suited to use as farmland and to urban and recreation development because of wetness and flooding. These limitations can be overcome by extensive flood control and drainage.

The Johnston soil is in capability subclass VIIw and woodland suitability subclass 1w. The Bibb soil is in capability subclass Vw and woodland suitability subclass 2w.

KeC—Kershaw sand, 2 to 10 percent slopes. This excessively drained, very gently sloping to strongly sloping soil is on ridges in the Atlantic Coast Flatwoods near the Altamaha River. Areas are 10 to 200 acres. Slopes are irregular and convex.

Typically, this soil is sand throughout. The surface layer is grayish brown and about 3 inches thick. Underlying this is stratified material to a depth of 99 inches or more. The upper part is mainly brownish yellow, the middle part is yellow, and the lower part is brownish yellow.

This Kershaw soil is very low in natural fertility and content of organic matter. It is very strongly acid or

strongly acid throughout, except for the surface layer in limed areas. Permeability is very rapid, and available water capacity is low. Tilth is good. The root zone is deep and easily penetrated by roots.

Included with this soil in mapping are small areas of Mandarin soils.

This soil is poorly suited to row crops, small grains, and pasture because of low available water capacity.

Pines, other than sand pine, are not well suited to this soil because of low available water capacity. Seedling mortality and equipment limitations are management concerns (fig. 4).

This soil is well suited to most urban uses; however, seepage is a concern if sanitary facilities are installed. Because of the sandy texture, the soil is poorly suited to recreation developments.

This soil is in capability subclass VIIs and woodland suitability subclass 5s.

Le—Leefield loamy sand. This somewhat poorly drained, nearly level soil is in low lying areas in the Southern Coastal Plain. Areas are 10 to 150 acres. Slope is 0 to 2 percent.

Typically, the surface layer is very dark gray loamy sand about 11 inches thick. The subsurface layer, to a depth of 22 inches, is light yellowish brown loamy sand and is mottled yellowish brown. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is light yellowish brown and has gray, brown, and red mottles, the middle part is light gray and has brown and red mottles, and the lower part is mottled gray, brown, and red. Plinthite makes up 5 percent or more of the lower part of the subsoil.

This Leefield soil is low in natural fertility and content of organic matter. It is very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate in the upper part of the subsoil and

Figure 4.—Native vegetation on Kershaw sand, 2 to 10 percent slopes. The stunted live oaks, broomsedge, and sawpalmetto are common on the sandy Kershaw soils.

moderately slow in the lower part. Available water capacity is low. Tilth is good. This soil can be worked throughout a wide range of moisture content. Although the root zone is deep, a high water table commonly fluctuates between depths of 1.5 and 2.5 feet in winter and early in spring, which somewhat limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are a few small areas of Fuquay and Stilson soils.

This soil is moderately suited to corn, soybeans, tobacco, and truck crops. It is well suited to pasture. Open ditches or buried drains can help overcome the wetness that is common in the early part of the growing season.

Slash pine and loblolly pine are moderately suited to this soil. Wetness commonly causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding helps to overcome wetness and reduce seedling mortality.

Because of wetness, this Leefield soil is poorly suited to septic tank absorption fields and moderately suited to dwellings without basements, small commercial buildings, local roads and streets, and recreation development. A properly installed water control system helps to provide a favorable site for these uses.

This soil is in capability subclass IIw and woodland suitability subclass 3w.

LWC—Lucy loamy sand, 2 to 12 percent slopes. This map unit consists of well drained Lucy soils and soils that are similar to and closely associated with Lucy soils. These soils are on ridgetops and hillsides in the Southern Coastal Plain. The soils on ridgetops are very gently sloping, and slopes are smooth and convex. The soils on hillsides are mainly gently sloping and sloping, and slopes are short and choppy. These soils are in an irregular pattern. Most areas contain all of the soils, but some areas contain only one or a few. Typically, areas are about 50 percent Lucy soils, 35 percent soils that are similar to Lucy soils but have a clayey subsoil, and 15 percent other similar soils. The proportion of each soil, however, can vary from area to area.

Typically, the Lucy soil has a very dark grayish brown loamy sand surface layer about 4 inches thick. The subsurface layer is loamy sand to a depth of 24 inches. The upper part is light yellowish brown, and the lower part is yellowish brown. The subsoil is mainly sandy clay loam to a depth of 75 inches or more. The upper part is yellowish red, the middle part is yellowish red and has brownish mottles, and the lower part is yellowish red and has brownish and red mottles. Commonly, soils similar to Lucy soil except that they have a mottled, yellowish brown sandy clay subsoil are a part of each map unit.

These soils are low in natural fertility and content of organic matter. They are very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate or slow in the subsoil, and the available water capacity is low. These soils can be worked throughout a wide range of moisture content. Tilth is good. The root zone is deep and easily penetrated by roots.

A few small areas are cleared for farming. It is moderately suited to row crops, small grains, hay, and pasture because of the low available water capacity and low fertility. Areas on most hillsides are short and choppy, and slope commonly is a concern.

Loblolly pine is moderately suited to this soil. Equipment limitation and seedling mortality are management concerns.

The soils in this map unit are well suited to most nonfarm uses. However, in places, permeability in the subsoil is slow and limits septic tank absorption fields. Also, because the surface and subsurface layers are sandy and permeability of the subsoil is slow in places, soils in this map unit are limited for recreation development.

These soils are in capability subclass IIIs and woodland suitability subclass 3s.

Ma—Mandarin fine sand. This somewhat poorly drained, nearly level soil is on broad ridges in the Atlantic Coast Flatwoods. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, this soil is fine sand throughout. The surface layer is dark gray and about 7 inches thick. The subsurface layer is gray and light brownish gray to a depth of 12 inches. Underlying this, to a depth of 20 inches, are very dark brown and very dark grayish brown layers that are weakly cemented by organic matter. To a depth of 45 inches, are brown, light brownish gray, and light gray layers; and to a depth of 70 inches or more, is a dark brown, weakly cemented, organically stained layer (fig. 5).

This Mandarin soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate in the weakly cemented layers and rapid in other parts of the soil. Available water capacity is low. Tilth is good, but the soil can be worked more easily during the drier seasons. The weakly cemented layers somewhat restrict root penetration. In addition, a high water table commonly fluctuates between depths of 1.5 and 3.5 feet in summer and winter.

Included with this soil in mapping are a few small areas of Centenary and Echaw soils. Also included are areas of poorly drained soils that do not have a second weakly cemented layer.

This soil is poorly suited to row crops, small grains, and pasture because of the low available water capacity.

Loblolly pine and slash pine are moderately suited to this soil. Wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding helps to

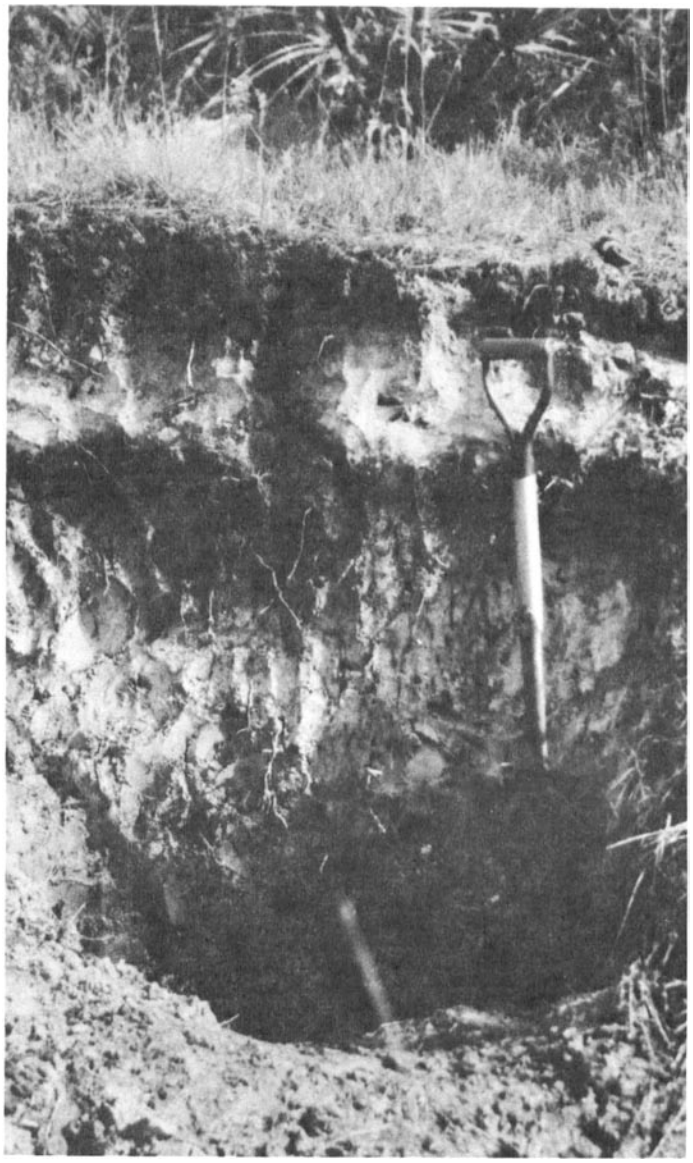

Figure 5.—Mandarin fine sand in a cutbank. The two weakly cemented, organically stained layers below the surface layer are distinctive of Mandarin soils.

overcome the wetness and reduce seedling mortality.

Because of wetness, this Mandarin soil is poorly suited to septic tank absorption fields and moderately suited to dwellings without basements, small commercial buildings, and local roads and streets. A properly installed water control system commonly helps to lower the water table and provide a favorable site for these uses. This soil is poorly suited to recreation development because of the sandy texture.

This soil is in capability subclass VIs and woodland suitability subclass 4s.

Md—Mandarin-Urban land complex. This complex consists of areas of somewhat poorly drained, nearly level Mandarin soils and areas of Urban land so intermingled or so small that they could not be mapped separately at the scale selected. This complex is on broad ridges in the Atlantic Coast Flatwoods. Most areas are 10 to 100 acres. Slope is 0 to 2 percent.

Mandarin fine sand makes up about 55 percent of each mapped area. Typically, this soil is fine sand throughout. The surface layer is very dark gray about 6 inches thick. The subsurface layer is light gray and light brownish gray to a depth of 14 inches. The underlying material is a black layer that is weakly cemented by organic compounds to a depth of 20 inches; next are brown, light brownish gray, and light gray layers to a depth of 54 inches; and below this is a black, weakly cemented layer to a depth of 72 inches or more.

This Mandarin soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is rapid, but it is moderate in the weakly cemented layer. Available water capacity is low. Tilth is good, but the soil can be worked more easily during the drier seasons. The weakly cemented layers restrict root penetration. In addition, a high water table commonly fluctuates between depths of 1.5 and 3.5 feet in summer and winter.

Urban land makes up about 40 percent of each mapped area. Most Urban land is used for private dwellings, industries, parking lots, streets, shopping centers, commercial buildings, schools, and churches. The soils have been altered by grading, cutting, filling, shaping, and smoothing.

Included with this Mandarin soil in mapping are small areas of Centenary and Echaw soils.

The soils in this complex are used primarily for urban purposes, including gardens, shrubs, shade trees, and lawns. Although wetness is a limitation, these soils commonly can be altered by drainage, filling, or by other suitable measures. Because of the seasonal high water table, water-tolerant plants are better suited to landscaping and vegetable gardens than most other kinds of plants.

This complex is not assigned to a capability subclass or a woodland suitability subclass.

Me—Mascotte fine sand. This poorly drained, nearly level soil is on broad ridges adjacent to depressions, drainageways, and bays in the Atlantic Coast Flatwoods. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is light gray and light brownish gray fine sand to a depth of 14 inches. Below this, to a depth of 18 inches, is a very dark brown and dark reddish brown layer that is weakly cemented by organic compounds. To a depth of 32 inches, are pale brown and light gray fine sand layers

that are mottled brown; and to a depth of 70 inches or more, is mainly light gray sandy clay loam that is mottled brown and red.

This Mascotte soil is low in natural fertility and content of organic matter. It is extremely acid to strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is low. Tilth is good, but the soil can be worked more easily during the drier seasons. The weakly cemented layer restricts root penetration. In addition, a high water table commonly is at a depth of less than 1.0 foot in summer and winter.

Included with this soil in mapping are a few small areas of Leefield, Pelham, and Riceboro soils. Also included are areas of a soil that has a higher clay content in the subsoil than is common to Mascotte soils.

This soil is poorly suited to row crops and small grains and moderately suited to pasture. Wetness and low available water capacity are the main limitations.

Loblolly pine and slash pine are moderately suited to this soil. Wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to most urban uses and recreation development because of wetness. Commonly, this soil can be satisfactorily drained if the drainage system is properly designed and carefully installed.

This soil is in capability subclass IVw and woodland suitability subclass 3w.

Ms—Mascotte-Urban land complex. This complex consists of areas of poorly drained Mascotte soils and areas of Urban land so intermingled or so small that they could not be mapped separately at the scale selected. This complex is on broad ridges next to depressions and drainageways in the Atlantic Coast Flatwoods. Most areas are 10 to 100 acres. Slope is 0 to 2 percent.

Mascotte fine sand makes up about 50 percent of each mapped area. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is light gray and light brownish gray fine sand to a depth of 14 inches. Underlying this, to a depth of 18 inches, is a weakly cemented, very dark brown and dark reddish brown layer. To a depth of 32 inches, are mottled, pale brown and light gray fine sand layers; and to a depth of 70 inches or more, is mainly light gray sandy clay loam that is mottled brown and red.

This soil is low in natural fertility and content of organic matter. It is very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is low. Tilth is good, but the soil can be worked more easily during the drier seasons. The weakly cemented layer restricts root penetration. In addition, a seasonal high water table commonly is at a depth of less than 1.0 foot in summer and winter.

Urban land makes up about 45 percent of each mapped area. Most Urban land is used for private dwellings, industries, parking lots, streets, shopping centers, commercial buildings, schools, and churches. The soils have been altered by grading, cutting, filling, shaping, and smoothing.

Included with this Mascotte soil in mapping are a few small areas of Pelham and Riceboro soils.

The soils in this complex are used primarily for urban purposes, including gardens, shrubs, shade trees, and lawns. Although wetness is a limitation, these soils commonly can be modified by drainage, filling, or by employing other suitable measures. Because of the seasonal high water table, water-tolerant plants are better suited to landscaping and vegetable gardens than most other kinds of plants.

This complex is not assigned to a capability subclass or a woodland suitability subclass.

Mt—Meggett fine sandy loam. This poorly drained, nearly level soil is in drainageways in broad areas in the Atlantic Coast Flatwoods. Areas are 50 to 300 acres. Slope is 0 to 2 percent.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsoil is sandy clay to a depth of about 65 inches. The upper part is gray and has strong brown mottles, the middle part is mottled light olive brown, yellowish brown, gray, and yellowish brown, and the lower part is light olive gray and has olive yellow and greenish gray mottles. Concretions of calcium carbonate are in the middle and lower parts of the subsoil.

This Meggett soil is high in natural fertility and content of organic matter. It is strongly acid to slightly acid in the surface layer and medium acid to moderately alkaline in the subsoil. Permeability is slow, and available water capacity is medium. Tilth is fair. Although the root zone is deep, a high water table is at a depth of less than 1.0 foot from late in fall to the middle part of spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are a few small areas of Bladen and Pooler soils. Also included are areas of soils that are similar to this Meggett soil but have less clay in the lower part of the subsoil.

Loblolly pine and slash pine are well suited to this soil. However, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive drainage. In addition, the slow permeability of the subsoil is a limitation for septic tank absorption fields.

This soil is in capability subclass IVw and woodland suitability subclass 1w.

Oc—Ocilla loamy fine sand. This somewhat poorly drained, nearly level soil is on low ridges in the Atlantic Coast Flatwoods. Areas are 5 to 200 acres. Slope is 0 to 2 percent.

Typically, the surface layer is dark grayish brown loamy fine sand about 6 inches thick. The subsurface layer extends to a depth of 34 inches. The upper part is pale brown loamy fine sand, and the lower part is pale brown loamy sand and has yellowish brown mottles. The subsoil is dominantly sandy clay loam to a depth of 72 inches or more. The upper part is yellowish brown mottled with pale brown and light brownish gray, and the lower part is predominantly mottled light gray, yellowish brown, and yellowish red.

This Ocilla soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium. Tilth is good. This soil can be worked throughout a wide range moisture content. Although the root zone is deep, a high water table commonly fluctuates between depths of 1.0 foot and 2.5 feet in winter to the middle of spring, which somewhat limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are a few small areas of Albany and Riceboro soils. Also included are areas of soils that have more clay in the subsoil than is common to Ocilla soils.

This soil is moderately suited to row crops and pasture because of seasonal wetness. A water control system helps to overcome wetness that is common in the early part of the growing season.

Slash pine and loblolly pine are moderately suited to this soil. Wetness commonly causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding helps to overcome the wetness and reduce seedling mortality.

Because of wetness, this Ocilla soil is poorly suited to septic tank absorption fields and small commercial buildings and moderately suited to dwellings without basements, local roads and streets, and recreation development. A properly installed water control system helps to lower the water table and provide a favorable site for these uses.

This soil is in capability subclass IIIw and woodland suitability subclass 3w.

Os—Osier and Bibb soils. This undifferentiated group consists of poorly drained, nearly level Osier and Bibb soils on flood plains near streams in the Atlantic Coast Flatwoods. These soils formed in alluvium. They commonly are flooded for brief periods, mainly in winter and spring. These soils are closely associated but are in an irregular pattern. Most areas contain both soils, but a few areas contain only one. Individual areas of each soil are large enough to map separately, but because of present and predicted use, they were not separated in mapping. Areas are 25 to 1,000 acres. Slope is 0 to 2 percent.

Typically, areas are about 60 percent Osier soils, 30 percent Bibb soils, and 10 percent Ellabelle, Johnston, and Pelham soils. The very poorly drained Ellabelle soils are in low lying bays and depressions near the streams. The very poorly drained Johnston soils are in drainageways, and the poorly drained Pelham soils are in broad, low lying areas.

Typically, the Osier soil has a loamy sand surface layer about 11 inches thick. The upper part is dark grayish brown, and the lower part is very dark grayish brown. The underlying material extends to a depth of 65 inches or more. The upper part is light brownish gray loamy sand, and the lower part is light gray sand.

The Osier soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout. Permeability is rapid, and available water capacity is low. Although the root zone is deep, the water table commonly is at a depth of less than 1.0 foot from late in fall to early in spring, which limits the growth of plants that are not tolerant of water.

Typically, the Bibb soil has a sandy loam surface layer 13 inches thick. The upper part is very dark gray, and the lower part is dark grayish brown. Underlying this, to a depth of 65 inches or more, is mainly gray sandy loam.

The Bibb soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout. Permeability is moderate, and available water capacity is medium. Although the root zone is deep, a high water table commonly fluctuates between depths of 0.5 foot and 1.5 feet in winter to the middle of spring, which limits the growth of plants that are not tolerant of water.

Most areas of this map unit are wooded. They are well suited to loblolly pine, slash pine, sweetgum, and water tupelo. Wetness is the main limitation to equipment use in managing and harvesting tree crops. However, operations commonly can be performed during the drier seasons.

These soils are poorly suited to use as farmland and to urban and recreation development because of wetness and flooding. These limitations can be overcome by extensive flood control and drainage.

These soils are in capability subclass Vw. The Osier soil is in woodland suitability subclass 3w, and the Bibb soil is in woodland suitability subclass 2w.

Pe—Pelham loamy sand. This poorly drained, nearly level soil is in broad areas, depressions, and slight drainageways in the Atlantic Coast Flatwoods. It commonly is flooded for brief periods in winter. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, the surface layer is black loamy sand about 6 inches thick. The subsurface layer is loamy sand about 19 inches thick. The upper part is grayish brown, and the lower part is gray. The subsoil extends to a depth of 63

inches or more. The upper part is gray sandy loam and has strong brown mottles, the middle part is gray sandy clay loam and has brownish yellow and light yellowish brown mottles, and the lower part is gray sandy clay loam and has brownish yellow and yellowish red mottles.

This Pelham soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. Tilth is good. This soil can be worked most easily during the drier seasons. Although the root zone is deep, a high water table commonly fluctuates between depths of 0.5 foot and 1.5 feet in winter to the middle of spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are a few areas of soil that have less clay in the lower part of the subsoil than is common to Pelham soils. Also included are a few intermingled areas of Ellabelle and Mascotte soils.

This soil is poorly suited to use as farmland because of wetness and flooding. However, it is moderately suited to improved pasture if the excess water is removed during wet periods.

Loblolly pine and slash pine are well suited to this soil. However, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome wetness and reduce seedling mortality.

This soil is poorly suited to urban and recreation development because of wetness or flooding. These limitations can be overcome by extensive flood control and drainage.

This soil is in capability subclass Vw and woodland suitability subclass 2w.

Pk—Pits. This map unit consists of pits or open excavations from which soil and soil parent materials have been removed. The pits range from about 5 feet to 10 feet in depth. They support few or no plants unless reclaimed. Many areas of this map unit are ponded intermittently but become dry during parts of the year. Areas that contain permanent water are designated as such on the soil maps. Pits have little or no value as farmland or woodland.

This map unit is not assigned to a capability subclass or woodland suitability subclass.

Pn—Ponzer muck. This very poorly drained, nearly level soil is in large, shallow depressions in the Atlantic Coast Flatwoods. It frequently is flooded for very long periods in winter and spring. Areas range from 50 to 900 acres.

Typically, the surface layer is black muck about 10 inches thick. The underlying organic material extends to a depth of 46 inches. It is mostly decomposed and is dark brown. Below this, to a depth of 72 inches or more, is dark gray fine sandy loam.

This Ponzer soil is higher in nitrogen content than most other soils in the survey area, but it is low in other plant nutrients. The content of organic matter is very high. Permeability is slow, and available water capacity is high. Although the root zone is deep, penetration by plant roots depends on depth to the water table during the growing season.

Included with this soil in mapping are small areas of Mandarin and Rutlege soils.

This soil is well suited to use as wetland wildlife habitat and poorly suited to most other uses. Sweetgum, cypress, and waxmyrtle are the common natural vegetation. Wetness and flooding are the main limitations and are extremely difficult to overcome. In addition, low strength is a limitation for building site development.

This soil is in capability subclass VIIw and woodland suitability subclass 4w.

Po—Pooler fine sandy loam. This poorly drained, nearly level soil is in broad, low areas in the Atlantic Coast Flatwoods. Areas are 10 to 100 acres. Slope is less than 2 percent.

Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay and has strong brown, yellowish red, and yellowish brown mottles, the middle part is gray clay and has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam and has yellowish brown mottles.

This Pooler soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is low, and available water capacity is high. This soil has good tilth. Although the root zone is deep, this soil is ponded or the water table is at a depth of less than 1.0 foot in winter and spring.

Included with this soil in mapping are areas of Bladen soils.

Slash pine, loblolly pine, and sweetgum are moderately suited to this soil. Wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness (fig. 6). This limitation can be overcome by extensive drainage. In addition, the slow permeability in the subsoil is a limitation for septic tank absorption fields. The slow permeability and the internal drainage limitations are difficult to overcome.

Figure 6.—Pines along a roadway in an area of Pooler fine sandy loam. This seasonally wet soil is not well suited to most uses.

This soil is in capability subclass Vlw and woodland suitability subclass 3w.

Pr—Pooler-Bladen complex. This complex consists of poorly drained, nearly level Pooler and Bladen soils on broad, low areas in the Atlantic Coast Flatwoods. Areas of these soils are so intermingled or so small that they could not be mapped separately at the scale selected. These soils commonly are ponded in winter and spring. Areas are 25 to 500 acres. Slope is less than 2 percent.

Pooler fine sandy loam makes up about 50 percent of each mapped area. Typically, the surface layer is very dark gray fine sandy loam about 5 inches thick. The subsoil extends to a depth of 86 inches or more. The upper part is grayish brown sandy clay loam and sandy clay that has yellowish brown, strong brown, and yellowish red mottles, the middle part is gray clay that has strong brown and yellowish brown mottles, and the lower part is light brownish gray sandy clay loam that has yellowish brown mottles.

Bladen fine sandy loam makes up about 35 percent of each mapped area. Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light brownish gray fine sandy loam about 9 inches thick. The gray subsoil extends to a depth of 72 inches or more and is predominantly mottled red and brown. The subsoil is mostly clay, but the extreme lower part is sandy clay loam.

Pooler and Bladen soils are low in natural fertility and organic matter content. Except for the surface layer in limed areas, Pooler soils are strongly acid or very strongly acid, and Bladen soils are strongly acid to extremely acid. Permeability of these soils is slow, and the available water capacity is high. Tilth is good. Although the root zone is deep, the water table is at a depth of less than 1.0 foot in winter and spring, which limits the growth of plants that are not tolerant of water.

Included with these soils in mapping are small areas of Bayboro, Meggett, Riceboro, and Wahee soils.

Slash pine, loblolly pine, and sweetgum are well suited to these soils. However, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduces seedling mortality.

These soils are poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive drainage. In addition, the slow permeability in the subsoil is a limitation for septic tank absorption fields.

This complex is in capability subclass Vlw. The Pooler soil is in woodland suitability subclass 3w, and the Bladen soil is in woodland suitability subclass 2w.

Rb—Riceboro loamy fine sand. This poorly drained, nearly level soil is in broad areas and slight depressions in the Atlantic Coast Flatwoods. It frequently is flooded for very brief periods in winter to the middle of spring. Areas are 10 to 200 acres. Slope is 0 to 2 percent.

Typically, the surface layer is very dark gray loamy fine sand about 8 inches thick. The subsurface layer is loamy fine sand to a depth of about 25 inches. The upper part is dark grayish brown, the middle part is light brownish gray, and the lower part is light gray and has yellowish brown mottles. The subsoil extends to a depth of 70 inches or more. The upper part is light brownish gray sandy clay loam and has strong brown and red mottles, the middle part is light brownish gray sandy clay and has red and strong brown mottles, and the lower part is mottled grayish brown, strong brown, and red sandy clay.

This Riceboro soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. Available water capacity is medium. Tilth is fair. This soil can be worked most easily during the drier seasons. Although the root zone is deep, a high water table commonly is at a depth of less than 1.0 foot during winter and spring, which limits the depth of root penetration of plants that are not tolerant of water.

Included with this soil in mapping are a few intermingled areas of Bladen, Mascotte, and Ocilla soils.

This soil is poorly suited to use as farmland because of wetness. However, it is moderately suited to improved bermudagrasses and bahiagrass if the excess water is removed during wet periods.

Loblolly pine and slash pine are well suited to this soil. However, wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with a water control system commonly helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to urban use and recreation development because of wetness. In some places, a properly installed water control system helps to lower the water table and provide a favorable site for urban development.

This soil is in capability subclass Vw and woodland suitability subclass 2w.

Ru—Rutlege fine sand. This very poorly drained, nearly level soil is in shallow depressions and bays in the Atlantic Coast Flatwoods. It commonly is flooded or ponded for brief periods during winter and spring. Areas are 5 to 300 acres. Slope is 0 to 2 percent.

Typically, the surface layer is fine sand about 21 inches thick. The upper part is black, and the lower part is very dark brown. Underlying this, to a depth of 63 inches or more, is light brownish gray loamy fine sand that is mottled yellowish brown.

This Rutlege soil has high or very high content of organic matter in the surface layer. It is low in natural fertility and extremely acid or very strongly acid throughout. Permeability is rapid, and available water capacity is low. Tilth is fair. Although the root zone is deep, a high water table commonly is at a depth of less than 1.0 foot in winter and spring, which limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are soils that have a surface layer more than 24 inches thick. Also included are a few intermingled areas of Mandarin and Ponzer soils.

Loblolly pine, slash pine, and sweetgum are well suited to this soil. Wetness causes equipment limitations and seedling mortality. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

This soil is poorly suited to use as farmland and to urban and recreation development because of wetness. This limitation can be overcome by extensive drainage.

This soil is in capability subclass Vlw and woodland suitability subclass 2w.

St—Stilson loamy sand. This moderately well drained, nearly level and very gently sloping soil is on smooth uplands in the Southern Coastal Plain. Areas are 5 to 40 acres. Slope is 0 to 2 percent.

Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsurface layer is pale yellow loamy sand to a depth of 29 inches. The subsoil is predominantly sandy clay loam to a depth of 72 inches or more. The upper part is brownish yellow and is mottled strong brown, the middle part is brownish yellow and is mottled reddish, brownish, yellowish, and grayish, and the lower part is mottled brownish, reddish, yellowish, and grayish. Plinthite makes up 5 to 10 percent of the middle and lower parts of the subsoil.

This Stilson soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate, and available water capacity is low. Tilth is good. This soil can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. A perched water table commonly is at a depth of about 2.5 feet in winter to the middle of spring.

Included with this soil in mapping are a few small areas of Fuquay and Leefield soils.

This soil is moderately suited to corn, tobacco, peanuts, soybeans, truck crops, hay, and pasture because of wetness. If needed, open ditches or subsurface drains help to overcome wetness that is common in the early part of the growing season. Conservation tillage and the use of cover crops, including grasses and legumes in the cropping system, help increase the content of organic matter.

Slash pine and loblolly pine are moderately suited to this soil. Wetness is the main limitation to equipment use in managing and harvesting tree crops. However, operations can be performed successfully if equipment is used during the drier seasons.

Because of the wetness, this Stilson soil is poorly suited to septic tank absorption fields. A properly installed water control system, however, helps to provide a favorable site for this use. This soil is well suited to dwellings without basements, small commercial buildings, and local roads and streets. It is moderately suited to recreation development because of the sandy texture of the surface and subsurface layers.

This soil is in capability subclass IIw and woodland suitability subclass 2w.

TC—Tawcaw-Chastain association. This association consists of nearly level Tawcaw and Chastain soils on flood plains of the Altamaha River. The somewhat poorly drained Tawcaw soils are in the slightly higher lying positions, and the poorly drained Chastain soils are mainly in sloughs and in the lower lying positions. These soils are in a regular repeating pattern. They formed in clayey sediment. They commonly are flooded from late in fall to the middle of spring. Mainly, areas are long and are 50 to 700 acres. Slopes are 0 to 2 percent.

The somewhat poorly drained Tawcaw soil makes up about 55 percent of a mapped area. Typically, the surface layer is brown clay about 6 inches thick. The subsoil extends to a depth of 56 inches. The upper part is brown clay and has light brownish gray mottles, the middle part is light brownish gray and gray clay and has strong brown mottles, and the lower part is gray clay loam and has strong brown and yellowish brown mottles. Below this, to a depth of 65 inches or more, is stratified, mottled, light brownish gray, yellowish brown, and gray loamy sand and sandy loam.

The Tawcaw soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is slow, and available water capacity is high. Tilth is fair. The root zone is deep, but a high water table commonly fluctuates between depths of 1.5 and 2.5 feet from late in fall to the middle of spring.

The poorly drained Chastain soil makes up about 30 percent of a mapped area. Typically, the surface layer is brown clay loam about 4 inches thick. The subsoil extends to a depth of 52 inches. The upper part is grayish brown clay loam and has strong brown mottles, the middle part is grayish brown silty clay and has yellowish brown mottles, and the lower part is dark gray clay and has yellowish brown mottles. Below this, to a depth of 60 inches or more, is stratified, mottled, dark gray, light brownish gray, and yellowish brown clay loam and sandy loam.

The Chastain soil is low in natural fertility and content of organic matter. It is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is slow, and available water capacity is high. Tilth is fair. The root zone is deep, but a seasonal high water table commonly fluctuates between the surface and a depth of less than 1.0 foot from late in fall to late in spring.

Included with these soils in mapping are small areas of moderately well drained sandy soils that are on natural levees next to the Altamaha River.

The soils in this unit are poorly suited to use as farmland because flooding is common during the planting season. If the soils on the slightly higher lying part of the flood plain are drained, protected from flooding, and properly managed, they can be used for crop production.

Slash pine, loblolly pine, yellow-poplar, and sweetgum are well suited to these soils. However, wetness and flooding cause seedling mortality and limit equipment use. Operations can be successfully performed during the drier seasons. Bedding in conjunction with open ditches helps to overcome the wetness and reduce seedling mortality.

These soils are poorly suited to urban and recreation development because of wetness and flooding. These limitations can be overcome by extensive flood control and drainage.

These soils are in capability subclass VIw. The Tawcaw soil is in woodland suitability subclass 1w, and the Chastain soil is in woodland suitability subclass 2w.

Ud—Udorthents, sandy and clayey. This map unit consists of piles of sandy and clayey soil material resulting from dredging operations during the construction of Interstate 95 and the development and maintenance of inland waterways. Areas are in the Atlantic Coast Flatwoods and are 15 to 200 acres. Slopes are 0 to 5 percent and are choppy and irregular.

Typically, these soils have a surface layer of white or light gray coarse sand that is 1 to 3 feet thick and have clods of silty clay and clay throughout. The underlying material is greenish gray to gray silty clay and clay that contains pockets or layers of coarse sand. In some areas, shell or rock fragments are throughout the sandy material.

The water table is at a depth of less than 1 foot in some areas. In other areas, it ranges to as much as 3 feet in depth. The overall permeability is variable but generally is very rapid in the sandy part and very slow in the clayey part. Natural fertility is low, and content of organic matter is high.

These soils are predominantly barren. They are limited for use as septic tank absorption fields, dwellings, local roads and streets, and lawns because of wetness. Also, uneven settlement is a concern if this unit is used for building sites. A properly installed water control system helps to provide a favorable site for many uses.

This map unit is not assigned to a capability subclass or woodland suitability subclass.

Wa—Wahee sandy loam. This somewhat poorly drained, nearly level soil is on terraces of larger streams in the Atlantic Coast Flatwoods. It commonly is flooded for brief periods in winter to the middle of spring. Areas are 5 to 75 acres. Slope is 0 to 2 percent.

Typically, the surface layer is very dark gray sandy loam about 8 inches thick. The subsurface layer is predominantly light brownish gray sandy loam to a depth of 14 inches. The subsoil extends to a depth of 75 inches or more. The upper part is yellowish brown sandy clay loam and has red and light brownish gray mottles, the middle part is light brownish gray and gray clay and has red and yellowish brown mottles, and the lower part is mottled, gray, red, and yellowish brown sandy clay loam.

This Wahee soil is low in natural fertility and content of organic matter. It is very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Permeability is slow, and available water capacity is medium. A high water table commonly fluctuates between depths of 0.5 to 1.0 foot in winter and early in spring, which somewhat limits the growth of plants that are not tolerant of water.

Included with this soil in mapping are small areas of Bladen, Eulonia, and Pooler soils.

This soil is poorly suited to cultivated crops because of wetness and flooding. It is moderately suited to hay and pasture. If this soil is drained, protected against flooding, and properly managed, good yields can be obtained.

Slash pine, loblolly pine, and sweetgum are well suited to this soil. Wetness and flooding cause equipment limitations and seedling mortality. However, operations can be successfully performed during the drier seasons. Bedding helps to overcome the wetness and reduces seedling mortality.

This soil is poorly suited to most urban and recreation development because of wetness and flooding. These limitations can be overcome to some extent by flood control and drainage.

This soil is in capability subclass IVw and woodland suitability subclass 2w.

prime farmland

Prime farmland is one of three kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops. If it is properly treated and high level management and acceptable farming methods are used, prime farmland produces the highest yields with minimal inputs of energy and economic resources. Its use results in the least damage to the environment.

Prime farmland in the survey area can now be in cropland, pastureland, woodland, or other land uses, but not in Urban land, built-up land, or uses that would preclude the soils later use as farmland. It must either be used for producing food or fiber or be available for these uses.

Prime farmland generally has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges from 0 to 2 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 24,400 acres, or 4 percent of the survey area, meets the soil requirements for prime farmland. Most areas of prime farmland are in general soil map units 2 and 5 in Liberty County and in unit 4 in Long County.

Trends in land use in parts of the survey area have been the loss of prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on other cropland of statewide importance. In the survey area, other cropland makes up about 124,500 acres. It consists of soils that are important to the agricultural resource base, but fails to meet the requirements of prime farmland because the soils commonly are droughty, seasonally wet, difficult to cultivate, and generally less productive. Slope is 12 percent or less.

Soil map units that make up prime farmland and their extent and additional farmland of statewide importance in the survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and suitabilities of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; for woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the suitabilities and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Robert L. Wilkes, soil correlator, Soil Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Soil erosion is not a major soil problem in Liberty and Long Counties. However, soil blowing can be a hazard on the sandy soils. It can damage these soils in a few hours if winds are strong and the soils are dry and bare of vegetation and surface mulch. Maintaining vegetative cover, surface mulch, or rough surfaces through proper tillage can minimize soil blowing on these soils.

Erosion caused by tidal action is a problem on the banks of some estuaries. This is a concern if permanent structures are near these banks. This erosion is difficult to control and results in extensive loss of land. Although the use of vegetation has not been successful in controlling this erosion, structural measures have reduced erosion in some places. Information about erosion on banks of estuaries and possible methods of control for specific sites can be obtained from the U.S. Army, Corps of Engineers.

Soil drainage is the major management need on much of the acreage used for crops and pasture in the survey area. Many soils are so naturally wet that the production of crops common to the area is generally not possible. These are the very poorly drained Bayboro, Cape Fear, Ellabelle, Johnston, and Rutlege soils and Hydraquents and the poorly drained Bibb, Bladen, Chastain, Duckston, Mascotte, Meggett, Osier, Pelham, Pooler, and Riceboro soils. Also in this category are organic soils, such as Ponzer, and tidal marsh soils, such as Bohicket and Capers.

Unless artificially drained, the somewhat poorly drained soils are so wet that crops are damaged during most years. In this category are the Albany, Leefield, Mandarin, Ocilla, Tawcaw, and Wahee soils.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in many areas of the seasonally wet soils. Drains have to be more closely spaced in slowly permeable soils than in the more permeable soils. Tile drainage is mainly slow in the poorly drained Bladen, Chastain, Meggett, Pooler,

and Riceboro soils and the somewhat poorly drained Tawcaw and Wahee soils. Locating adequate outlets for tile drainage systems is difficult on most of the soils that have a wetness limitation.

Organic soils, such as Ponzer muck, oxidize and subside when the pore space is filled with air. To reduce this, special drainage systems are needed to control the depth and the period of drainage. Keeping the water table at the level required by crops during the growing season and raising it to the surface during other parts of the year minimizes the oxidation and subsidence of organic soils. Information on drainage design for each kind of soil can be found in the Technical Guide, available in local offices of the Soil Conservation Service.

Most of the soils in the survey area are very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Soil fertility and the content of organic matter are naturally low in the soils on ridges and somewhat lower lying and commonly broad areas. Soil fertility and the content of organic matter commonly are higher in soils in depressions and drainageways than in most other soils in the survey area. Those soils near the ocean that are in marshes range from slightly acid to moderately alkaline and have very high salinity. In addition, a strong odor of hydrogen sulfide is noticeable if the soil is disturbed.

If the soils have never been limed, most of them require applications of ground limestone to raise the pH level sufficiently for good growth of the common crops. Available phosphorus and potash levels are naturally low in most of the soils. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and the infiltration of water into the soil. Soils that have good tilth are granular and porous.

Most soils that are used as cropland in the survey area have a sandy surface layer that is light in color and low in content of organic matter. These soils have good tilth and can be worked throughout a wide range of moisture content. Workability is a problem on soils that stay wet until late in spring. If they are wet when plowed, a good seedbed is difficult to prepare. Fall plowing is generally not a good practice because the soils are left unprotected and subject to wind erosion.

Field crops suited to the soils and climate of the survey area are corn, soybeans, tobacco, and cotton. Oats is the common close-growing crop. Improved bermudagrasses and bahiagrass are common pasture grasses.

Specialty crops grown commercially in the survey area are cabbage, squash, lettuce, sweet corn, tomatoes, peppers, other vegetables, and small fruits. In addition, some areas can be adapted to other specialty crops, such as blueberries, and to many vegetables. Rice is not grown in the survey area, but many of the soils and the climate are suited to it.

Soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. In the survey area, these are the Dothan, Fuquay, and Lucy soils. Crops can generally be planted and harvested earlier on these soils than on the other soils in the survey area.

The excessively drained Fripp and Kershaw soils are not suitable for orchards and nursery plants. Many of the soils in the survey area are in low areas where air drainage is poor and frost is frequent. Commonly, this causes the soils to be poorly suited to early vegetables, small fruits, and orchards.

Latest information and suggestions for growing specialty crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss. Fertilizer needs of specific crops on specified soils can be determined by soil tests. General fertilizer recommendations for field crops are available (*3*).

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils in this survey are generally grouped at two levels: capability class and subclass. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *w* or *s* to the class numeral, for example, IIw. The letter *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage) and *s* shows that the soil is limited mainly because it is droughty.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Gary L. Tyre, forester, Soil Conservation Service, helped to prepare this section.

Liberty and Long Counties are in the most productive timber-growing area of the State. Present land use in these counties reflects this productivity in that 77 percent of Liberty County and 94 percent of Long County are in forest land.

Existing forest types are significant examples of the virgin forests that originally covered most of these two counties (*7*). About 37 percent of the present forest land is in the longleaf-slash pine type. Extensive acreage is in the loblolly-shortleaf type. About half of the commercial forest land is in hardwood types—much of it is in species commonly associated with wet sites, such as oak, gum, ash, baldcypress, and cottonwood.

Ownership patterns in these counties are typical compared with other areas of the State. In Liberty County, more than 105,000 acres of commercial forest land makes up a large part of Fort Stewart and is federally owned. In addition, more than 56,000 acres in Liberty County and 112,000 acres in Long County are owned by the forest industry. Significant acreage is also held by farmers and other private owners. It is on this land that potential benefits resulting from improved management are greatest.

Only a few areas do not have significant limitations for woodland use and management. These areas are mainly in Dothan loamy sand, 0 to 2 percent slopes.

Many of the forest soils of Long and Liberty Counties have severe limitations because of excessive moisture. These are Bayboro, Bibb, Bladen, Cape Fear, Johnston, Meggett, Pelham, Riceboro, Rutlege, and Chastain soils. Most of these soils are highly productive or very highly productive and are associated with site indices ranging near 100 for pine and even higher for some hardwoods. They are capable of supporting a variety of forests ranging from pure pine stands to mixed pine and hardwoods to pure hardwood stands consisting of species such as water oak, tupelos, and baldcypress. In many cases, intensive management measures such as drainage, disking, and bedding are required to reduce the excessive moisture and maintain vigorous pure pine stands.

In addition to the seasonally wet soils in these counties, other soils are typified by sandiness and have low available water capacity. These are the Blanton, Chipley, Echaw, Foxworth, Fuquay, Kershaw, Lucy, Mandarin, and Stilson soils. For the most part, these soils are moderately productive, and limitations because

of low available water capacity commonly are no more than moderate.

In Liberty County, some of the sandy soils near the coast in Beaches and in the Fripp-Duckston complex have poor productivity if used as forest land.

In Long County, productive soils are on extensive flood plains near the Altamaha River, mainly in the Tawcaw-Chastain association. Extensive areas of Hydraquents are parallel to the flood plain in ponded backswamps. All of these soils are suitable for southern baldcypress and hardwood species, such as tupelo.

This woodland section explains soil-tree growth relationships in Liberty and Long Counties. If used carefully, it can provide a useful tool in planning conservation efforts and arriving at investment and management decisions.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil and *s* indicates sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w and s.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. It was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary

facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Jesse Mercer, Jr., biologist, and Robert L. Wilkes, soil correlator, Soil Conservation Service, helped to prepare this section.

Liberty and Long Counties are largely rural environments with clean, pleasant scenery and good wildlife habitat in predominantly woodland and coastal settings. Fish and wildlife are important for recreation and contribute substantially to the local economy.

About 85 percent of the survey area is forested with nearly 9 percent in coastal marshland. Forests in these counties are about 50 percent hardwoods and 40 percent or more pine. Hardwoods are mainly oaks, blackgum, sweetgum, and redbay.

Major plant species of importance to terrestrial wildlife include greenbrier, bush and annual lespedezas, panicgrass, partridgepea, paspalum, tickclover, and sumac. Overstory and understory species of importance are blackgum, pine, oaks, hollies, blackberry, elderberry, sawpalmetto, maple, and waxmyrtle. Domestic species of importance to wildlife include corn, soybeans, bahiagrass, carpetgrass, and bermudagrass.

The abundance of pine plantations interspersed with hardwood forests provide plentiful habitat for white-tailed deer, raccoons, opossums, fox, and other wildlife. Bobwhite quail populations are low.

Unmanaged pasture, old fields, young pine plantations, and managed woodlands produce numerous native woody and herbaceous plants important as food and cover for white-tailed deer, rabbits, and other species, as well as quail. Selective burning in some areas could greatly improve wildlife habitat.

Wetland habitats support a variety of furbearers, including otter, beaver, mink, and raccoon.

Aquatic habitats are abundant in the survey area. Liberty County contains about 49,000 acres of marshland and about 17,000 acres of tidal water in the coastal section. Wooded swamps provide additional habitat. Liberty and Long Counties contain about 200 small ponds and about 63 miles of streams. Important fresh water sport fish in these counties include largemouth bass, crappie, blue catfish, channel catfish, bluegill, and redear sunfish. Saltwater habitat is confined to Liberty County. Important saltwater sport fish, include speckled trout, red drum, black drum, croaker, whiting, and flounder. Anadromous sport fish species are striped bass, mullet, and shad. Important shellfish are oyster, crab, and shrimp.

Because of the fragile habitat requirements of shellfish, special efforts are needed to restrict and retard both point and non-point sources of water pollution in these counties.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places.

Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, and rye.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are improved bermudagrasses, bahiagrass, and clover.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, and beggarweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, mink, and beaver.

engineering

Joe A. Stevens, Jr., conservation engineer, Soil Conservation Service, helped to prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were

not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by a very firm dense layer; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features

are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low

embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 or a high shrink-swell potential. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material. Acidity and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope and a water table.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, and soils that have only 20 to 40 inches of suitable material. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5

feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones, organic matter, or salt. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, or restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, or restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18. Data of soil properties important to this survey, but not shown in this publication, can be found at the Soil Conservation Service, State Office, Athens, Georgia. These include analyses of Chastain, Foxworth, and Tawcaw soils by the National Soil Survey Laboratory; data on the Albany, Bladen, and Fuquay soils in Research Bulletin 59, University of Georgia, College of Agriculture, Agricultural Experiment Stations; and data of soils similar to the Bladen soils in Soil Survey Investigations Report Number 16.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in McIntosh County. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined

mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 17 shows the expected initial subsidence, which usually is a result of drainage, and annual subsidence, which usually is a result of oxidation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

engineering index test data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the Office of Materials and Research, Georgia Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM); Volume change (Abercrombie)—Georgia Highway Standard.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 19, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plains, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, kaolinitic, acid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*6*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Albany series

The Albany series consists of somewhat poorly drained soils that are rapidly permeable in the surface and subsurface layers and moderately permeable in the subsoil. These soils formed in sandy and loamy marine sediment and are on low ridges and knolls in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 1.0 foot and 2.5 feet in winter and early in spring. Slope is 0 to 2 percent.

Albany soils are on the same landscape as Blanton, Mascotte, Ocilla, and Riceboro soils. Poorly drained Mascotte soils have a spodic horizon. Somewhat poorly

drained Ocilla soils and poorly drained Riceboro soils are arenic. Moderately well drained Blanton soils are grossarenic.

Typical pedon of Albany loamy fine sand, 0 to 2 percent slopes, in a wooded area; 0.75 mile north of Midway on U.S. Highway 17, 0.33 mile west on dirt road, 50 feet south of the road; Liberty County:

A1—0 to 8 inches; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; very friable; many very fine and fine roots; very strongly acid; clear wavy boundary.

A21—8 to 26 inches; light brownish gray (2.5Y 6/2) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

A22—26 to 49 inches; brownish yellow (10YR 6/6) fine sand; common medium distinct light brownish gray (2.5Y 6/2) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

B1—49 to 54 inches; yellowish brown (10YR 5/6) sandy loam; many medium distinct light gray (10YR 6/1) and olive yellow (2.5Y 6/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B21t—54 to 62 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 6/1), olive yellow (2.5Y 6/6), and yellowish red (5YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B22t—62 to 84 inches; mottled light brownish gray (10YR 6/2), brownish yellow (10YR 6/6), and yellowish red (5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; very strongly acid.

The solum thickness is 60 to 80 inches or more. The soil is very strongly acid or strongly acid, except for the surface layer in limed areas.

The A horizon is 44 to 60 inches thick. The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4, 6, or 8. It commonly has few or common, fine and medium, yellow and gray mottles.

The B1 horizon, if present, has hue of 10YR and 2.5Y, value of 5 to 8, and chroma of 4 and 6. It has few to many, fine and medium, brown, yellow, and gray mottles.

The B2t horizon is mottled in hue of 5YR or 10YR, value of 5 to 8, and chroma of 1 to 4 and 6, or has hue of 7.5YR or 2.5YR, value of 5 to 8, and chroma of 2, 4, or 6. Also, the matrix has hue of 10YR, value 5 to 8, and chroma of 1 to 4 or 6, or it has hue of 2.5Y, value of 5 to 8, and chroma of 2, 4, or 6 with common or many, medium or coarse, gray and red mottles.

Bayboro series

The Bayboro series consists of very poorly drained, slowly permeable soils that formed mainly in clayey marine sediment. These soils are in depressions and drainageways in the Atlantic Coast Flatwoods. The water table is at a depth of less than 0.5 foot in winter to late in spring. Slope is less than 1 percent.

Bayboro soils are on the same landscape as Bladen, Cape Fear, Meggett, and Wahee soils. Bladen, Meggett, and Wahee soils do not have an umbric epipedon. In addition, Bladen soils have an abrupt textural change between the A and B horizons, Meggett soils are less acid than Bayboro soils, and Wahee soils are better drained and have more than 20 percent decrease in clay content from the maximum within a depth of 60 inches. Cape Fear soils have a thinner solum, and the C horizon is sandy.

Typical pedon of Bayboro loam in a wooded swamp; 1.0 mile north of the intersection of U.S. Highway 17 and Georgia Highway 38 in Midway, 300 feet east of U.S. Highway 17; Liberty County:

A1—0 to 11 inches; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; friable; many fine medium and coarse roots; very strongly acid; clear wavy boundary.

B1g—11 to 21 inches; very dark grayish brown (10YR 3/2) clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; very strongly acid; clear smooth boundary.

B21tg—21 to 33 inches; dark gray (10YR 4/1) clay; few fine distinct strong brown mottles and common fine distinct dark brown mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common fine and few medium roots; discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22tg—33 to 45 inches; dark gray (10YR 4/1) clay; common fine distinct strong brown, dark brown, and yellowish brown mottles; weak medium subangular blocky structure; very firm, very plastic and very sticky; few fine roots; discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23tg—45 to 62 inches; gray (10YR 5/1) clay; common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) mottles and common fine prominent yellowish red mottles; weak medium subangular blocky structure; very firm, very plastic and very sticky; few fine roots; discontinuous clay films on faces of peds; few grayish brown (10YR 5/2) pockets of sandy loam; very strongly acid; clear smooth boundary.

B24tg—62 to 70 inches; gray (10YR 5/1) sandy clay; few fine distinct dark brown mottles; weak fine subangular blocky structure; firm, slightly sticky; few fine roots; few grayish brown (10YR 5/2) pockets of sandy loam and sandy clay loam; very strongly acid.

The solum thickness is 60 to 80 inches. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 10 to 18 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or has hue of 2.5Y, value of 3, and chroma of 2.

The B1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is sandy clay loam or clay loam.

The Bt horizon has hue of 10YR, value of 3 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 3 to 7, and chroma of 2. It is sandy clay or clay.

Bibb series

The Bibb series consists of poorly drained, moderately permeable soils that formed in loamy fluvial sediment. These soils are in drainageways in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 0.5 foot and 1.5 feet in winter to the middle of spring. Slope is 0 to 2 percent.

Bibb soils are on the same landscape as Johnston, Osier, and Ellabelle soils. Very poorly drained Johnston soils have an umbric epipedon. Osier soils are sandy throughout. Ellabelle soils have an arenic umbric epipedon and an argillic horizon.

Typical pedon of Bibb sandy loam in an area of Johnston and Bibb soils, in a streambank; 3.0 miles north of Ludowici on State Route 1887, 0.3 mile northwest toward Elam Church on paved road, 100 feet north of road; Long County:

A11—0 to 5 inches; very dark gray (10YR 3/1) sandy loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; abrupt wavy boundary.

A12g—5 to 13 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; friable; few medium and large roots; strongly acid; clear wavy boundary.

C1g—13 to 43 inches; gray (10YR 5/1) sandy loam; massive; very friable; strongly acid; clear wavy boundary.

C2g—43 to 65 inches; gray (10YR 5/1) sandy loam; common pockets of sandy clay loam; few fine faint yellowish brown mottles; massive; friable; strongly acid.

Thickness of the sediment ranges from 65 to 70 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 13 to 17 inches thick. The A11 horizon has hue of 10YR, value of 3, and chroma of 1 or 2. The A12g horizon has hue of 10YR, value of 4 to 6, and chroma of 2.

The Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is sandy loam or stratified sandy loam, loamy sand, and sand and has few or common brown mottles.

Bladen series

The Bladen series consists of poorly drained, slowly permeable soils that formed mainly in thick deposits of clayey marine sediment. These soils are in broad, low areas in the Atlantic Coast Flatwoods. The water table is at a depth of less than 1.0 foot in winter and spring. Slope is less than 2 percent.

Bladen soils are on the same landscape as Riceboro, Pooler, and Wahee soils. Riceboro soils are arenic. Pooler soils have a transition zone between the A horizon and the argillic horizon. Wahee soils are better drained than Bladen soils. In addition, Pooler and Wahee soils have a decrease in clay of 20 percent or more within a depth of 60 inches.

Typical pedon of Bladen fine sandy loam, in cutbank of a northeast to southwest canal ditch; 0.5 mile west of the intersection of State Highway 196 and U.S. Highway 17; 0.4 mile south of Highway 196; Liberty County:

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—4 to 13 inches; light brownish gray (2.5Y 6/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt wavy boundary.

B21tg—13 to 26 inches; gray (10YR 5/1) clay; common medium prominent red (2.5YR 4/8) mottles and common fine distinct strong brown mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; common, medium roots; very strongly acid; gradual wavy boundary.

B22tg—26 to 38 inches; gray (10YR 5/1) clay; many medium prominent red (2.5YR 4/8) and strong brown (7.5YR 5/8) mottles and many fine distinct yellowish red mottles; moderate medium angular blocky structure; very firm; discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—38 to 62 inches; gray (10YR 6/1) clay; many coarse prominent dark red (2.5YR 3/6) mottles, common medium prominent strong brown (7.5YR 5/8) mottles, and few fine distinct brownish yellow mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3g—62 to 72 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct red (2.5YR 5/8) mottles and few fine prominent yellowish red mottles; moderate medium subangular blocky structure; firm; very strongly acid.

The solum thickness is 60 to 72 inches. The soil is strongly acid to extremely acid throughout, except for the surface layer in limed areas.

The A1 horizon or Ap horizon is 4 or 5 inches thick. It has hue of 10YR or 5Y, value of 2 to 4, and chroma of 1 or 2, or has hue of 2.5Y, value of 2 to 4, and chroma of 2. The A2 horizon, if present, is 6 to 9 inches thick. It has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 to 7, and chroma of 2.

The Bt horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1, or it is neutral. This horizon is clay or sandy clay and has common or many red, yellow, and brown mottles throughout.

The B3g horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 to 7, and chroma of 2. This horizon is sandy clay, sandy clay loam, or clay loam and has common or many red, brown, and yellow mottles throughout.

Blanton series

The Blanton series consists of moderately well drained soils that are rapidly permeable in the surface and subsurface layers and moderately permeable in the subsoil. These soils formed in sandy and loamy marine sediment. They are on narrow to broad ridges in the Atlantic Coast Flatwoods. A perched water table fluctuates between depths of 5.0 and 6.0 feet in winter to the middle part of spring. Slope is 0 to 3 percent.

Blanton soils are on the same landscape as Albany, Chipley, Foxworth, and Fuquay soils. Albany soils are somewhat poorly drained. Chipley and Foxworth soils do not have a Bt horizon. Well drained Fuquay soils contain plinthite in the loamy subsoil.

Typical pedon of Blanton sand, 0 to 3 percent slopes, in a pine plantation; 0.8 mile east of a bridge on Georgia Highway 196 at Beards Creek, 0.3 mile north under power line right-of-way and 50 feet east; Long County:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; many fine roots; strongly acid; gradual wavy boundary.

A21—8 to 32 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

A22—32 to 46 inches; yellowish brown (10YR 5/6) sand; few fine faint brownish yellow and pale brown mottles; single grained; loose; few fine and medium roots; common pockets of uncoated sand grains; strongly acid; gradual wavy boundary.

B21t—46 to 51 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

B22t—51 to 66 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable; continuous clay films on faces of peds; about 3 percent plinthite; very strongly acid; gradual wavy boundary.

B23t—66 to 79 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 7/2), and yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid.

The solum thickness is 72 to 90 inches or more. The A horizon is strongly acid or very strongly acid, except in areas that have been limed. The B2t horizon is very strongly acid.

The A horizon is 46 to 68 inches thick. The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A21 and A22 horizons have hue of 10YR, value of 5, and chroma of 4 or 6, or have value of 6 or 7, and chroma of 3, 4, or 6. The A23 horizon, if present, has the same colors as the A21 and A22 horizons, and also includes hue of 10YR, value of 8, and chroma of 1. The A23 horizon has brown or yellow mottles and has pockets of uncoated sand grains.

The B21t horizon has hue of 10YR, value of 5, and chroma of 6 or 8, or has value of 6 and chroma of 4. In some pedons, it has common brown mottles. The B22t horizon has hue of 10YR, value of 5, and chroma of 6 or 8, or has value of 6 and chroma of 4 or 6. This horizon can also have hue of 7.5YR, value of 5, and chroma of 6. It has common red or brown mottles. The B23t horizon is mottled mainly red, brown, and yellow. In some pedons, it has gray mottles below a depth of 60 inches. The content of plinthite is less than 5 percent at a depth of 50 to 80 inches.

Bohicket series

The Bohicket series consists of very poorly drained, very slowly permeable soils that formed in thick, clayey marine sediment. These soils border the Atlantic Ocean and are on broad tidal marshes. Bohicket soils are flooded by seawater twice each day. Slope is less than 1 percent.

Bohicket soils are on the same landscape as Bayboro and Capers soils. Bayboro soils have an umbric epipedon and an argillic horizon. Capers soils are slightly higher lying and have an "n" value of 1.0 or less; in addition, Capers soils are not flooded daily by the tide.

Typical pedon of Bohicket silty clay loam, in an area of Bohicket-Capers association, in a tidal marsh; 450 feet east of Yellow Bluff Fish Camp at end of Georgia Highway 38; Liberty County:

A11g—0 to 9 inches; dark gray (10YR 4/1) silty clay loam; massive; very sticky; many coarse fibrous roots; squeezed soil flows easily between fingers and leaves small residue; neutral; gradual wavy boundary.

A12g—9 to 14 inches; dark gray (N 4/0) silty clay loam; massive; very sticky; common coarse fibrous roots; squeezed soil flows easily between fingers and leaves no residue; neutral; gradual wavy boundary.

C1g—14 to 36 inches; very dark gray (5Y 3/1) silty clay; massive; very sticky; many fine and medium roots; squeezed soil flows easily between fingers and leaves no residue; neutral; gradual wavy boundary.

C2g—36 to 60 inches; very dark gray (5Y 3/1) clay; massive; very sticky; few fine roots; mildly alkaline.

Bohicket soils are neutral or mildly alkaline, and the salinity is very high. The "n" value of the soil within the 10- to 40-inch control section is 1.0 or more.

The A horizon is 8 to 24 inches thick. The A11g horizon has hue of 10YR, value of 4, and chroma of 1, or has hue of 5Y, value of 3, and chroma of 1. The A12g horizon, if present, is neutral with value of 4.

The Cg horizon has hue of 5Y, value of 3, and chroma of 1, or has hue of 5GY, value of 4, and chroma of 1. This horizon is silty clay or clay.

Cape Fear series

The Cape Fear series consists of very poorly drained, slowly permeable soils that formed in loamy and clayey marine sediment. These soils are along drainageways on the Pamlico Shoreline Complex in the Atlantic Coast Flatwoods. The water table is at or near the surface in winter to the middle of spring. Slope is 0 to 2 percent.

Cape Fear soils are on the same landscape as Bayboro soils. Bayboro soils have a clayey Bt horizon to a depth of more than 60 inches. In addition, Bayboro soils are on slightly higher lying positions than Cape Fear soils.

Typical pedon of Cape Fear fine sandy loam; 1.5 miles south of Walthourville Church on Walthourville-Tibet road, 2.0 miles northeast on unpaved road, 100 feet west of road and south of bridge; Long County:

A11—0 to 9 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots and few large roots; strongly acid; gradual wavy boundary.

A12—9 to 16 inches; black (10YR 2/1) loam; weak medium granular structure; friable; common medium roots; strongly acid; clear wavy boundary.

B1g—16 to 21 inches; very dark gray (10YR 3/1) clay loam; weak medium subangular blocky structure; firm; few medium roots; strongly acid; clear wavy boundary.

B21tg—21 to 37 inches; dark gray (10YR 4/1) sandy clay; moderate medium subangular blocky structure; very firm; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B22tg—37 to 44 inches; gray (10YR 5/1) sandy clay; moderate medium subangular blocky structure; very firm; patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B3g—44 to 51 inches; light brownish gray (2.5Y 6/2) sandy clay loam; weak medium subangular blocky structure; friable; common coarse sand lenses; strongly acid; gradual smooth boundary.

IICg—51 to 65 inches; light brownish gray (2.5Y 6/2) sand; single grained; loose; strongly acid.

The solum thickness is 50 to 60 inches or more. The soil is very strongly acid to medium acid throughout, except for the surface layer in limed areas.

The A horizon is 10 to 20 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1.

The B1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1. It is sandy clay loam or clay loam. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 1. It is clay or sandy clay. The B3g horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 or 6, and chroma of 2. It is sandy clay loam or sandy loam.

The IICg horizon has hue of 10YR, value of 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 6, and chroma of 2.

Capers series

The Capers series consists of very poorly drained, very slowly permeable soils that formed in thick, clayey marine sediment. These soils are in narrow, tidal saltwater marshes that interfinger the mainland and in narrow floodways of tidal inland creeks. They are on the Silver Bluff Shoreline Complex in the Atlantic Coast Flatwoods. Capers soils are flooded by spring tides; in places, they are flooded by daily tides. Slope is less than 1 percent.

Capers soils are on the same landscape as Bayboro and Bohicket soils. Bayboro soils have an umbric epipedon and an argillic horizon. Bohicket soils have an "n" value of 1.0 or more throughout the 10- to 40-inch control section; in addition, Bohicket soils are flooded by seawater twice each day.

Typical pedon of Capers silty clay in a brackish tidal marsh; 1.0 mile north of the intersection of U.S. Highway 17 and the railroad track in Riceboro, 75 feet west of Highway 17, 100 feet south of Riceboro Creek; Liberty County:

A11—0 to 10 inches; very dark gray (10YR 3/1) silty clay; massive; sticky; squeezed soil flows with some difficulty between the fingers and some soil remains in hand; "n" value 1.0 to 0.7; sulphide gas odor apparent; about 30 percent coarse and fine grass roots; mildly alkaline; gradual wavy boundary.

A12—10 to 16 inches; very dark grayish brown (2.5Y 3/2) silty clay; massive; sticky; squeezed soil flows with some difficulty between the fingers and some soil remains in hand; "n" value 1.0 to 0.7; about 10 percent coarse and fine grass roots; mildly alkaline; clear wavy boundary.

C1g—16 to 24 inches; dark gray (10YR 4/1) clay; massive; very sticky; squeezed soil flows with difficulty between the fingers and most soil remains in hand; "n" value less than 0.7; common fine dead roots; neutral; gradual wavy boundary.

C2g—24 to 60 inches; dark gray (N 4/0) clay; massive; very sticky; squeezed soil flows with difficulty between the fingers and most soil remains in hand; "n" value is less than 0.7; few fine dead grass roots; neutral.

Capers soils are neutral or mildly alkaline and have very high salinity. The "n" value of the soil within the 10- to 40-inch control section is less than 1.0.

The A horizon is 7 to 20 inches thick. It has hue of 10YR, value of 2 to 4, and chroma of 1, or has hue of 2.5Y, value of 3, and chroma of 2. The A horizon is silty clay or silty clay loam.

The C1g horizon has hue of 10YR and 5GY, value of 4, and chroma of 1, or is neutral and has value of 3 or 4. The C2g horizon has hue of 10YR or 5GY, value of 4 or 5, and chroma of 1, or is neutral and has value of 3 to 5. The Cg horizon is silty clay or clay. The clay content of the 10- to 40-inch control section is 36 to 70 percent.

Centenary series

The Centenary series consists of moderately well drained, rapidly permeable soils that formed in thick, sandy marine sediment. These soils are on ridges in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 3.5 to 5.0 feet in winter and early in spring. Slope is 0 to 2 percent.

Centenary soils are on the same landscape as Echaw and Mandarin soils. Echaw soils have a Bh horizon within a depth of 50 inches. Somewhat poorly drained Mandarin soils have a Bh horizon at a depth of less than 24 inches and a B'h horizon at a depth of 45 to 80 inches.

Typical pedon of Centenary fine sand in an area of Echaw and Centenary fine sands; 0.3 mile west of Baconton Church on Walthourville-Riceboro road, 0.1 mile south on unpaved road, 50 feet west of road; Liberty County:

A1—0 to 5 inches; dark gray (10YR 4/1) fine sand; single grained; loose many fine and medium roots; strongly acid; gradual wavy boundary.

A21—5 to 25 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine and medium roots; strongly acid; gradual smooth boundary.

A22—25 to 42 inches; very pale brown (10YR 7/3) fine sand; few fine faint light gray mottles in lower part; single grained; loose; few medium roots; strongly acid; gradual smooth boundary.

A23—42 to 61 inches; light gray (10YR 7/1) fine sand; few fine faint yellowish brown mottles; single grained; loose; strongly acid; gradual wavy boundary.

B1h—61 to 72 inches; dark brown (7.5YR 3/2) loamy sand; single grained; loose; strongly acid; gradual smooth boundary.

B2h—72 to 80 inches; very dark brown (10YR 2/2) loamy sand; weak fine granular structure; very friable; slightly brittle; organic coatings on sand grains; strongly acid.

The solum thickness is 60 to 80 inches or more. The soil is medium acid to very strongly acid throughout, except for the surface layer in limed areas. Depth to the Bh horizon is 55 to 65 inches.

The A horizon is 55 to 64 inches thick. The A1 horizon or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A21 horizon has hue of 10YR, value of 5, and chroma of 4, or has value of 6 or 7 and chroma of 3 or 4. The A22 horizon has the same matrix colors as the A21 horizon and is mottled brown, yellow, or gray within a depth of 40 inches. The A23 horizon has hue of 10YR, value of 5 to 7, and chroma of 1, or has value of 7 or 8 and chroma of 2.

The Bh horizon has hue of 5YR, value of 3, and chroma of 1; hue of 10YR, value of 2, and chroma of 1 or 2; or hue of 7.5YR, value of 3, and chroma of 2.

Chastain series

The Chastain series consists of poorly drained, slowly permeable alluvial soils that formed in clayey sediment in the Atlantic Coast Flatwoods. These soils are on flood plains near the larger rivers that drain from the Southern Piedmont and the Southern Coastal Plain. A high water table commonly fluctuates between the surface and a depth of 1.0 foot from late in fall to late in spring. Slope is less than 2 percent.

Chastain soils are on the same landscape as Tawcaw soils. Tawcaw soils are somewhat poorly drained and are on slightly higher lying positions than Chastain soils.

Typical pedon of Chastain clay loam in an area of Tawcaw-Chastain association, in woodland; 600 feet west of U.S. Highway 301 at bridge and 1,500 feet north of Altamaha River; Long County:

A1—0 to 4 inches; brown (7.5YR 4/2) clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; very strongly acid; abrupt smooth boundary.
B1g—4 to 15 inches; grayish brown (2.5Y 5/2) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; very strongly acid; clear smooth boundary.
B21g—15 to 32 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; few medium roots; common fine flakes of mica; very strongly acid; clear smooth boundary.
B22g—32 to 52 inches; dark gray (10YR 4/1) clay; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; common fine flakes of mica; very strongly acid; gradual smooth boundary.
Cg—52 to 60 inches; mottled dark gray (10YR 4/1), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/8) clay loam stratified with sandy loam; massive; friable; very strongly acid.

The solum thickness is 40 to 65 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 4 to 10 inches thick. It has hue of 7.5YR, value of 4 or 5, and chroma of 2 or 4, or has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bg horizon has hue of 5Y or 10YR, value of 4 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 to 7, and chroma of 2. It is silty clay loam, silty clay, or clay. In some pedons, the Bg horizon has few to many brown, strong brown, pale brown, and yellowish brown mottles. Flakes of mica and small black concretions are few or common and fine or medium.

The Cg horizon has colors similar to those of the B horizon. It is clay loam or sandy clay loam that commonly is stratified with sandy loam or loamy sand.

Chipley series

The Chipley series consists of moderately well drained, rapidly permeable soils that formed in sandy marine sediment. These soils are in broad areas of the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 2.0 and 3.0 feet in winter and early in spring. Slope is 0 to 4 percent.

Chipley soils are on the same landscape as somewhat poorly drained Albany soils and moderately well drained Blanton, Centenary, and Echaw soils. Albany and Blanton soils have an argillic horizon, and Centenary and Echaw soils have a Bh horizon.

Typical pedon of Chipley sand, 0 to 4 percent slopes, in a pine plantation; 6.4 miles south of Walthourville Church on State Road 1888, 1.2 miles east on unpaved road, 1.0 mile north on narrow woods road; Long County:

A1—0 to 6 inches; dark gray (10YR 4/1) sand; single grained; loose; many fine roots; strongly acid; gradual smooth boundary.
C1—6 to 16 inches; pale yellow (2.5Y 7/4) sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.
C2—16 to 45 inches; light yellowish brown (2.5Y 6/4) sand; few fine faint yellowish brown and light gray mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.
C3g—45 to 64 inches; light gray (10YR 7/2) sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grained; loose; strongly acid; gradual wavy boundary.
C4g—64 to 84 inches; light gray (10YR 7/1) sand; few fine distinct strong brown (7.5YR 5/8) mottles; single grained; loose; strongly acid.

Thickness of the sand is 80 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 6 to 9 inches thick. The A1 horizon or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4, 6, or 8; hue of 10YR, value of 7, and chroma of 1; or hue of 2.5Y, value of 6 to 8, and chroma of 4. The C horizon has few or common, fine or medium, strong brown, light yellowish brown, yellowish brown, brownish yellow, gray, light gray, and pale brown mottles. In some pedons, the C2 and C3g horizons have pockets of clean, white sand grains.

Dothan series

The Dothan series consists of well drained soils. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. These soils formed in dominantly loamy marine sediment on uplands of the Southern Coastal Plain. Slope is 0 to 2 percent.

Dothan soils are on the same landscape as Fuquay, Leefield, and Stilson soils. These associated soils are arenic. In addition, Leefield and Stilson soils are somewhat lower lying than Dothan soils and are not so well drained.

Typical pedon of Dothan loamy sand, 0 to 2 percent slopes, in a cultivated field; 1.5 miles east of Rye Patch on dirt road, 1.0 mile north on dirt road, 50 feet east of road; Long County:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine roots; few fine nodules of ironstone; medium acid; clear wavy boundary.

A2—8 to 14 inches; light yellowish brown (2.5Y 6/4) loamy fine sand; weak fine granular structure; very friable; common fine roots; few fine nodules of ironstone; strongly acid; gradual wavy boundary.

B1—14 to 20 inches; brownish yellow (10YR 6/6) sandy loam; weak fine subangular blocky structure; friable; few fine roots; few fine nodules of ironstone; strongly acid; gradual wavy boundary.

B21t—20 to 39 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few fine nodules of ironstone; 2 to 3 percent plinthite in lower part; clay bridging of sand grains; very strongly acid; gradual wavy boundary.

B22t—39 to 52 inches; yellowish brown (10YR 5/6) sandy clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm; clay films on faces of some peds; 8 percent nodular plinthite; strongly acid; gradual wavy boundary.

B23t—52 to 60 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; firm; clay films on faces of some peds; 10 percent nodular plinthite; strongly acid.

The solum thickness is 60 to 72 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Depth to horizons that have a plinthite content of 5 to 15 percent ranges from 27 to 44 inches.

The A horizon is 5 to 15 inches thick. The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3, or has hue of 2.5Y, value of 4, and chroma of 2. The A2 horizon, if present, has hue of 10YR, value of 4 to 6, and chroma of 2 to 4, or has hue of 2.5Y, value of 4 to 6, and chroma of 2 or 4. It has nodules of ironstone that range from 1 to 4 percent, by volume.

The B1 horizon has hue of 10YR, value of 5 or 6, and chroma of 3, 4, 6, or 8. It is sandy loam or sandy clay loam.

The B21t and B22t horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 6 or 8. The B22t horizon has few or common, medium and coarse, brown and red mottles. Nodules of ironstone make up less than 5 percent of the B22t horizon, and the content of plinthite ranges from 5 to 10 percent.

The B23t and B24t horizons are mottled in hue of 10YR to 2.5YR, value of 5 to 7, and chroma of 4, 6, or 8. Common or many red, brown, or gray mottles are present. These horizons are sandy clay loam, sandy loam, or sandy clay. Content of plinthite ranges from about 5 to 15 percent.

Duckston series

The Duckston series consists of poorly drained, very rapidly permeable soils that formed in thick, sandy sediment. These soils are adjacent to beaches and waterways along the Atlantic Coast. They are in shallow depressions between dunes and on flats between the dunes and marshes. Duckston soils are frequently flooded by seawater. Slope is 1 to 2 percent.

Duckston soils are closely associated with Bohicket, Capers, and Fripp soils. Very poorly drained Bohicket and Capers soils have a higher content of clay throughout than Duckston soils and are subject to tidal flooding. Excessively drained Fripp soils are on higher lying positions.

Typical pedon of Duckston sand in an area of Fripp-Duckston complex, 1 to 20 percent slopes; 100 feet south of Beach Hammock between the dunes and upland; Liberty County:

A11—0 to 5 inches; very dark grayish brown (10YR 3/2) sand; single grained, loose; many fine roots; medium acid; clear smooth boundary.

A12—5 to 9 inches; grayish brown (10YR 5/2) sand; common medium distinct brownish yellow mottles or stains; single grained; loose; few fine roots; medium acid; clear smooth boundary.

A13—9 to 15 inches; gray (10YR 5/1) sand; common medium distinct brownish yellow (10YR 6/6) mottles or stains; single grained; loose; few fine roots; few dark minerals; medium acid; clear smooth boundary.

Cg—15 to 72 inches; greenish gray (5GY 5/1) sand; single grained; loose; uncoated; few black sand grains; neutral.

Combined thickness of the A and Cg horizons is more than 72 inches. The soil ranges from medium acid to mildly alkaline. Few to many fine dark, white, and pink minerals and a few shells are in most pedons.

The A horizon is 9 to 17 inches thick. It has hue of 10YR or 5Y, value of 3 to 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 to 6, and chroma of 2.

The Cg horizon is more than 60 inches thick. It has hue of 2.5Y, value of 5 to 8, and chroma of 2; hue of 5Y, value of 5 to 8, and chroma of 1 or 2; or hue of 5GY, value of 5 or 6, and chroma of 1.

Echaw series

The Echaw series consists of moderately well drained, rapidly permeable soils that formed in thick, sandy marine sediment. These soils are on ridges in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 2.5 to 5.0 feet in winter and early in spring. Slope is 0 to 2 percent.

Echaw soils are on the same landscape as Centenary and Mandarin soils and Urban land. Centenary soils have a Bh horizon at a depth of more than 50 inches.

Somewhat poorly drained Mandarin soils have a Bh horizon at a depth of less than 24 inches and a B'h horizon at a depth of 45 to 80 inches. In addition, Centenary soils are slightly higher lying than Echaw soils, and Mandarin soils are somewhat lower lying. Urban land is predominantly areas of Echaw soils that have been altered for urban development.

Typical pedon of Echaw fine sand in an area of Echaw and Centenary fine sands, in an oak stand; 0.1 mile east on Allenhurst-Baconton Church road from the intersection with U.S. Highway 82, 0.1 mile north on dirt road, 0.1 mile east on dirt road, 30 feet north of road; Liberty County:

A1—0 to 5 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; common fine medium and large roots; very strongly acid; clear smooth boundary.
A21—5 to 15 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few fine and medium roots; very strongly acid; gradual smooth boundary.
A22—15 to 36 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; few fine roots; very strongly acid; clear smooth boundary.
A23—36 to 47 inches; light gray (10YR 7/2) fine sand; common medium faint pale brown (10YR 6/3) mottles in lower part; single grained; loose; very strongly acid; clear smooth boundary.
B21h—47 to 55 inches; dark reddish gray (5YR 4/2) fine sand; weak fine subangular blocky structure; friable; weakly cemented; very strongly acid; clear smooth boundary.
B22h—55 to 70 inches; dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; very friable; weakly cemented; very strongly acid.

The solum thickness is 60 to 70 inches or more. The soil is medium acid to very strongly acid throughout, except for the surface layer in limed areas. Depth to the Bh horizon is 40 to 50 inches.

The A horizon is 44 to 48 inches thick. The A1 horizon or Ap horizon is 5 or 6 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The upper part of the A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 3, 4, or 6. The lower part of the A2 horizon has the same colors as the upper part, except it has a few gray mottles, has hue of 10YR, value of 6 or 7, and chroma of 2 and 3, or has hue of 2.5Y, value of 5 to 7, and chroma of 2.

The Bh horizon has hue of 5YR, value of 3 or 4, and chroma of 2 or 3; hue of 7.5YR, value of 3 or 4, and chroma of 2; or hue of 10YR, value of 2, and chroma of 1.

Ellabelle series

The Ellabelle series consists of very poorly drained, moderately permeable soils that formed in sandy and loamy sediment. These soils are in depressions, bays, and large drainageways in the Atlantic Coast Flatwoods. The soil commonly is ponded in wet seasons, or the water table is at a depth of less than 0.5 foot from late in fall to the middle of spring. Slope is 0 to 2 percent.

Ellabelle soils are on the same landscape with Mascotte, Leefield, and Pelham soils. Poorly drained Mascotte soils have a spodic horizon and are somewhat higher lying than Ellabelle soils. Leefield and Pelham soils do not have an umbric epipedon; in addition, Leefield soils are better drained.

Typical pedon of Ellabelle loamy sand, in a large bay; 2.6 miles north of Ludowici on U.S. Highway 301, 0.9 mile north on unpaved road, 0.3 mile east of road in Boggs Bay; Long County:

A1—0 to 23 inches; black (10YR 2/1) loamy sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
B1g—23 to 31 inches; dark gray (10YR 4/1) sandy loam; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
B21tg—31 to 53 inches; gray (10YR 5/1) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
B22tg—53 to 72 inches; mottled gray (10YR 5/1), brownish yellow (10YR 6/6), and strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; very strongly acid.

The solum thickness is 70 to 75 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A1 horizon is 23 to 25 inches thick. It has hue of 10YR, value of 2, and chroma of 1, or is neutral and has value of 2. The A2 horizon, if present, is 10 to 16 inches thick. It has hue of 10YR, value of 4 to 5, and chroma of 1.

The B1g horizon has hue of 10YR, value of 4 to 7, and chroma of 1. The B21tg horizon has the same matrix color as the B1g horizon. It is mottled in hue of 7.5YR, value of 5, and chroma of 4, 6, or 8, or in hue of 10YR, value of 5 to 7, and chroma of 6 or 8. The B22tg horizon is mottled in hue of 7.5YR, value of 5, and chroma of 2, 4, or 6, or in hue of 10YR, value of 5 or 6, and chroma of 1, or value of 5 to 7 and chroma of 6 or 8.

Eulonia series

The Eulonia series consists of moderately well drained soils that formed mainly in clayey sediment. Permeability is moderately slow. These soils are on low ridges in the Atlantic Coast Flatwoods. A high water table fluctuates

between depths of 1.5 and 3.5 feet in winter to late in spring. Slope is 0 to 2 percent.

Eulonia soils are on the same landscape as Mascotte and Ocilla soils. Mascotte and Ocilla soils are not so well drained as Eulonia soils; in addition, Mascotte soils have a spodic horizon. Ocilla soils are arenic.

Typical pedon of Eulonia fine sandy loam, in a wooded area; 0.62 mile south from the intersection of U.S. Highway 17 and State Highway 196, 175 feet east of U.S. Highway 17; Liberty County:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine medium and coarse roots; very strongly acid; clear smooth boundary.

A2—4 to 14 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak fine granular structure; very friable; many fine medium and coarse roots; very strongly acid; clear smooth boundary.

B1—14 to 18 inches; strong brown (7.5YR 5/8) sandy clay loam; few fine faint yellowish red and very pale brown mottles; weak fine subangular blocky structure; very friable; many fine medium and coarse roots; very strongly acid; abrupt smooth boundary.

B21t—18 to 25 inches; light yellowish brown (10YR 6/4) clay; many medium prominent red (2.5YR 4/8) mottles and few fine faint light brownish gray mottles; moderate fine subangular blocky structure; firm; patchy clay films on faces of peds; few medium roots; very strongly acid; gradual smooth boundary.

B22t—25 to 33 inches; light yellowish brown (10YR 6/4) clay; many medium distinct light brownish gray (10YR 6/2) and red (2.5YR 4/8) mottles and few fine faint brownish yellow mottles; strong medium angular blocky structure; firm; continuous clay films on faces of peds; few medium roots; very strongly acid; gradual smooth boundary.

B23tg—33 to 42 inches; light gray (10YR 6/1) sandy clay; many coarse prominent red (2.5YR 4/8) and dark red (2.5YR 3/6) mottles and few fine faint brownish yellow mottles; moderate medium angular blocky structure; firm; continuous clay films on faces of peds; few medium roots; few pockets of sandy loam; very strongly acid; gradual smooth boundary.

B3—42 to 61 inches; mottled yellowish red (5YR 5/8), light gray (10YR 7/2), dark red (2.5YR 3/6), and brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; friable; patchy clay films on faces of peds; few pockets of sandy loam; very strongly acid; gradual smooth boundary.

C—61 to 75 inches; yellowish red (5YR 5/8) sandy loam; common medium prominent light gray (10YR 7/2) and brownish yellow (10YR 6/6) mottles, and few fine prominent red mottles; massive; friable; common pockets of sandy clay; very strongly acid.

The solum thickness is 50 to 80 inches. The soil is medium acid to very strongly acid throughout, except for the surface layer in limed areas.

The A1 horizon is 4 to 6 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2, or has hue of 2.5Y, value of 3 or 4, and chroma of 2. The A2 horizon is 5 to 12 inches thick. It has hue of 10YR, value of 6 or 7, and chroma of 1 to 4, or hue of 2.5Y, value of 6 or 7, and chroma of 2 or 4.

The B1 horizon, if present, has hue of 5YR to 10YR, value of 5 and 6, and chroma of 4, 6, or 8, or value of 4 and chroma of 4 and 6; hue of 2.5Y, value of 4 to 6, and chroma of 4, or value of 6 and chroma of 6 or 8; or hue of 2.5Y, value of 5, and chroma of 6. Mottles are few or common, fine and medium, yellowish red or brown. The B1 horizon is sandy clay loam or fine sandy loam.

The B21t and B22t horizons have hue of 2.5YR, value of 4 to 6, and chroma of 4, 6, or 8, or hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 or 6, or value of 4 and chroma of 4 or 6. Mottles are few to many and are dark grayish, reddish, brownish, and yellowish. These horizons are sandy clay or clay.

The B23tg horizon is mottled red, brown, yellow, or gray or is dominantly gray and mottled red, yellow, or brown. It is sandy clay, clay loam, or sandy clay loam.

The B3 horizon has colors similar to those of the B23tg horizon and is sandy clay loam or sandy loam.

The C horizon has hue of 5YR or 7.5YR. It has value of 5 and chroma of 6 or 8 or has value of 4, chroma of 6, and has gray and yellow mottles; or it is gray and has red or brown mottles, or mottles are red, brown, and gray. The C horizon is sandy clay loam or sandy loam.

Foxworth series

The Foxworth series consists of moderately well drained, very rapidly permeable soils that formed in sandy marine sediment. These soils are on broad ridges and small knolls in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 3.5 to 6.0 feet in winter and spring. Slope is 0 to 3 percent.

Foxworth soils are on landscapes similar to those of Blanton, Centenary, and Echaw soils. Blanton soils have a Bt horizon. Centenary and Echaw soils have a Bh horizon and are on somewhat lower lying ridges than Foxworth soils.

Typical pedon of Foxworth fine sand, 0 to 3 percent slopes, in a pine plantation; 2.2 miles east of Interstate 95 on Georgia Highway 38, 0.4 mile north on unpaved road near cemetery, 50 feet east; Liberty County:

A1—0 to 7 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; many fine roots; very strongly acid; clear smooth boundary.

C1—7 to 25 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; many fine roots; strongly acid; gradual wavy boundary.

C2—25 to 48 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.
C3—48 to 60 inches; yellowish brown (10YR 5/6) fine sand; common medium distinct light gray (10YR 7/2) mottles; single grained; loose; strongly acid; gradual wavy boundary.
C4—60 to 74 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct light gray (10YR 7/2) and reddish yellow (7.5YR 6/8) mottles; single grained; loose; strongly acid; gradual wavy boundary.
C5—74 to 90 inches; light gray (10YR 7/1) fine sand; few fine distinct brownish yellow mottles; single grained; loose; strongly acid.

Thickness of the fine sand is 86 to 90 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A1 horizon is 5 to 9 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 1 to 3, or has hue of 2.5Y, value of 4 or 5, and chroma of 2.

The C1 and C2 horizons have hue of 10YR, value of 5 to 7, and chroma of 3 or 4 or 6 or 8.

The C3, C4, and C5 horizons have hue of 10YR, value of 5 to 8, and chroma of 1 to 4. Mottles are brown, yellow, gray, and red. Few to many uncoated sand grains are in these horizons.

Fripp series

The Fripp series consists of excessively drained, rapidly permeable soils that formed in thick sandy sediment. These undulating and rolling soils are on dunes adjacent to beaches and waterways along the Atlantic Coast. Fripp soils are rarely flooded by seawater. Slope is 1 to 20 percent.

Fripp soils are closely associated with Bohicket, Capers, and Duckston soils. Very poorly drained Bohicket and Capers soils have a higher content of clay throughout and are subject to daily tidal flooding. Poorly drained Duckston soils are in shallow depressions between dunes and on flats between the dunes and marshes. Duckston soils are frequently flooded by seawater.

Typical pedon of Fripp fine sand in an area of Fripp-Duckston complex, 1 to 20 percent slopes; 1,000 feet south of Beach Hammock, east side of St. Catherines Island; Liberty County:

A1—0 to 7 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; common fine and medium roots; few black and dark brown sand grains; medium acid; clear wavy boundary.
C1—7 to 32 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common medium roots; few black and dark brown sand grains; medium acid; gradual smooth boundary.
C2—32 to 61 inches; pale brown (10YR 6/3) fine sand; single grained; loose; thinly banded; few medium roots; few black and dark brown sand grains; common medium pockets of light brownish gray (2.5Y 6/2) clean sand grains; medium acid; gradual smooth boundary.
C3—61 to 99 inches; white (10YR 8/1) fine sand; single grained; loose; common brown (7.5YR 4/4) streaks of sand; medium acid.

Combined thickness of the sandy A and C horizons is more than 80 inches. Few to many, fine dark minerals and a few shell fragments are in most pedons. The soil is strongly acid to mildly alkaline in the A horizon and medium acid to mildly alkaline in the C horizon.

The A1 horizon is 4 to 8 inches thick. It has hue of 10YR and 5Y, value of 4 to 7, and chroma of 1 or 2.

The upper part of the C horizon has hue of 10YR, value of 5 to 8, and chroma of 3, 4, 6, or 8, or has hue of 2.5Y, value of 5 to 8, and chroma of 4, 6, or 8. The lower part of the C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 8, or has hue of 2.5Y, value of 6 to 8, and chroma of 2, 4, 6, or 8. Streaks or pockets of light gray and dark brown sand are common in the lower part of most pedons.

Fuquay series

The Fuquay series consists of well drained soils that are moderately permeable in the upper part of the subsoil and slowly permeable in the lower part. These soils formed in sandy and loamy marine sediment on uplands of the Southern Coastal Plain. Slope is 0 to 5 percent.

Fuquay soils are on the same landscape as Dothan, Leefield, and Stilson soils. Dothan soils have an A horizon less than 20 inches thick. Leefield soils are somewhat poorly drained, and Stilson soils are moderately well drained. Leefield and Stilson soils commonly are on the lower lying parts of the landscape.

Typical pedon of Fuquay loamy sand, 0 to 5 percent slopes, in a field; 0.5 mile southeast of a bridge on Georgia Highway 99 at Doctors Creek, 1.0 mile north and 0.1 mile east on unpaved road, 100 feet north; Long County:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.
A2—9 to 29 inches; brownish yellow (10YR 6/6) loamy sand; weak fine granular structure; very friable; few medium roots; very strongly acid; gradual wavy boundary.

B1—29 to 33 inches; brownish yellow (10YR 6/6) sandy loam; few medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

B21t—33 to 41 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few medium roots; patchy clay films on faces of peds; few nodules of ironstone; 3 percent plinthite; very strongly acid; gradual wavy boundary.

B22t—41 to 46 inches; mottled brownish yellow (10YR 6/6), strong brown (7.5YR 5/6), and red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; patchy clay films on faces of peds; few nodules of ironstone; 7 percent nodular plinthite; very strongly acid; gradual wavy boundary.

B23t—46 to 76 inches; mottled strong brown (7.5YR 5/6), light brownish gray (10YR 6/2), and red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; few nodules of ironstone; 7 percent nodular plinthite in the upper part; very strongly acid.

The solum thickness is 62 to 80 inches. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 28 to 37 inches thick. The Ap horizon or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 or 6. If present, nodules of ironstone are few. Light gray bodies of clean sand grains are in some pedons. The A2 horizon is loamy sand or loamy fine sand.

The B1 horizon has hue of 10YR, value of 5, and chroma of 4, 6, or 8, or has hue of 10YR and value and chroma of 6. It is sandy loam or sandy clay loam.

The upper part of the Bt horizon has hue of 10YR, value of 5, and chroma of 4, 6, or 8; hue of 10YR and value and chroma of 6; or hue of 7.5YR, value of 5, and chroma of 4, 6, or 8. High chroma are present in some pedons. Nodules of ironstone are few or common. The lower part of the Bt horizon is dominantly mottled brown, red, and gray. Content of plinthite ranges from 5 to 12 percent in the lower part of the Bt horizon. Depth to horizons having 5 percent or more plinthite ranges from 40 to 45 inches.

Johnston series

The Johnston series consists of very poorly drained soils that formed in loamy marine sediment in drainageways in the Atlantic Coast Flatwoods. Permeability is moderately rapid in the surface layer and rapid in the underlying layers. These soils commonly are ponded, or the water table is at a depth of less than 1.5 feet from late in fall to early in summer. Slope is 0 to 2 percent.

Johnston soils are on the same landscape as Bibb, Mandarin, Osier, and Rutlege soils. Poorly drained Bibb soils do not have an umbric epipedon. Somewhat poorly drained Mandarin soils have a spodic horizon, do not have an umbric epipedon, and are on adjacent low ridges and in broad smooth areas. Poorly drained Osier soils are sandy throughout and do not have an umbric epipedon. Rutlege soils are in shallow depressions and bays in the upper part of drainageways.

Typical pedon of Johnston mucky loam in an area of Johnston and Bibb soils, in a drainageway; 2.3 miles south of the Liberty County line on State Route 1888, 2.2 miles west on unpaved road, 150 feet north of road; Long County:

A1—0 to 43 inches; black (10YR 2/1) mucky loam; massive; friable; many fine medium and coarse roots; strongly acid; clear wavy boundary.

Cg—43 to 60 inches; light brownish gray (10YR 6/2) sandy loam; massive; friable; few fine and medium roots; strongly acid.

Thickness of the loamy sediment is 60 inches or more. The soil is strongly acid or very strongly acid, except for the surface layer in limed areas.

The A horizon is 32 to 46 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The AC horizon, if present, has hue of 10YR, value of 4, and chroma of 1 or 2. It is sandy loam or loamy sand.

The Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is sandy loam, loamy sand, or sandy clay loam.

Kershaw series

The Kershaw series consists of excessively drained, very rapidly permeable soils that formed in sandy marine sediment. These soils are on ridges in the Atlantic Coast Flatwoods. Slope is 2 to 10 percent.

Kershaw soils are on the same landscape as Mandarin soils. Somewhat poorly drained Mandarin soils commonly are on lower lying, broad ridges and have a double spodic horizon.

Typical pedon of Kershaw sand, 2 to 10 percent slopes; 2.2 miles south of Ludowici on U.S. Highway 301, 50 feet east of highway; Long County:

A1—0 to 3 inches; grayish brown (10YR 5/2) sand; single grained; loose; many fine and medium roots; strongly acid; abrupt smooth boundary.

C&A—3 to 7 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; common fine roots; some sand grains stained; strongly acid; gradual smooth boundary.

C1—7 to 66 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

C2—66 to 94 inches; yellow (10YR 7/6) sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

C3—94 to 99 inches; brownish yellow (10YR 6/8) sand; single grained; loose; very strongly acid.

Thickness of the sand is 80 to 99 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 2 to 4 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 3, 4, 6, or 8, or has hue of 2.5Y, value of 5 to 8, and chroma of 4 or 6. Some pedons have white, yellow, or brown pockets of sand below a depth of 60 inches.

Leefield series

The Leefield series consists of somewhat poorly drained soils that formed in sandy and loamy marine sediment, mainly on uplands in the Southern Coastal Plain. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. A high water table fluctuates between depths of 1.5 and 2.5 feet in winter and early in spring. Slope is 0 to 2 percent.

Leefield soils are on the same landscape as Fuquay and Stilson soils. Well drained Fuquay soils and moderately well drained Stilson soils are on somewhat higher lying uplands.

Typical pedon of Leefield loamy sand, in natural pine woodland; 8.0 miles northwest of Ludowici on U.S. Highway 301, 100 feet north of road; Long County:

A1—0 to 11 inches; very dark gray (10YR 3/1) loamy sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.

A2—11 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; common fine faint yellowish brown mottles; weak fine granular structure; very friable; common fine and medium roots; few fine root holes filled with material from A1 horizon; very strongly acid; clear wavy boundary.

B1—22 to 27 inches; light yellowish brown (10YR 6/4) sandy loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottles and common fine faint light gray mottles; weak fine subangular blocky structure; friable; few medium roots; 2 percent plinthite in the lower part; very strongly acid; clear smooth boundary.

B21t—27 to 38 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/6), light gray (10YR 7/2), and strong brown (7.5YR 5/8) mottles, and few fine prominent yellowish red mottles; moderate medium subangular blocky structure; friable; clay bridging between sand grains; 4 percent plinthite; very strongly acid; gradual smooth boundary.

B22tg—38 to 58 inches; light gray (10YR 7/1) sandy clay loam; common coarse distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottles and few fine prominent yellowish red mottles; moderate medium subangular blocky structure; friable; clay bridging between sand grains; few small pockets of sandy loam; 10 percent platy plinthite; very strongly acid; gradual smooth boundary.

B23t—58 to 72 inches; mottled light gray (10YR 7/1), strong brown (7.5YR 5/8), red (2.5YR 5/6), and yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm; clay bridging between sand grains; few small pockets of sandy loam; 15 percent platy plinthite in the upper part; very strongly acid.

The solum thickness is 60 to 72 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Depth to horizons with more than 5 percent plinthite is 30 to 48 inches.

The Ap horizon or A1 horizon is 7 to 11 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The A2 horizon is 11 to 18 inches thick. It has hue of 10YR, value of 6 or 7, and chroma of 2 to 4, or has hue of 2.5Y, value of 6 or 7, and chroma of 2 or 4. Brown or yellow mottles are few or common.

The B1 horizon, if present, has hue of 10YR, value of 6 or 7, and chroma of 3, 4, 6, or 8, or has hue of 2.5Y, value of 6 or 7, and chroma of 4, 6, or 8. Few or common, fine and medium, brown, yellow, or gray mottles are throughout the horizon.

The B21t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4, 6, or 8. Mottles are few or common, medium, red, brown, yellow, and gray. Content of plinthite ranges from 3 to 5 percent.

The B22tg and B23t horizons commonly are reticulately mottled red, brown, yellow, and gray. In some pedons, these horizons have hue of 10YR, value of 6 to 8, and chroma of 1 or 2, or have hue of 2.5Y, value of 6 to 8, and chroma of 2 with common or many red, brown, yellow, and gray mottles. Content of plinthite ranges from 5 to 15 percent. If present, nodules of ironstone are few. The Bt horizon is sandy loam or sandy clay loam.

Lucy series

The Lucy series consists of well drained soils that are rapidly permeable in the surface and subsurface layers

and moderately permeable in the subsoil. These soils formed in sandy and loamy marine sediment on uplands of the Southern Coastal Plain. Slope is 2 to 12 percent.

Lucy soils are on the same landscape as Fuquay soils. Fuquay soils have a loamy Bt horizon and contain plinthite.

Typical pedon of Lucy loamy sand, 2 to 12 percent slopes, under a powerline right-of-way; 1.1 miles east of a bridge on Georgia Highway 196 at Beards Creek, 0.5 mile north of highway; Long County:

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A21—4 to 11 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; gradual wavy boundary.

A22—11 to 24 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common medium roots; strongly acid; gradual smooth boundary.

B1—24 to 29 inches; yellowish red (5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; strongly acid; gradual smooth boundary.

B21t—29 to 36 inches; yellowish red (5YR 5/6) sandy clay loam; few fine faint light yellowish brown mottles; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

B22t—36 to 51 inches; yellowish red (5YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

B23t—51 to 75 inches; yellowish red (5YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles and common fine distinct red (10R 4/6) mottles; weak medium subangular blocky structure; friable strongly acid.

The solum thickness is 70 to 75 inches or more. The soil is very strongly acid or strongly acid, except for the surface layer in limed areas.

The A horizon is 24 to 32 inches thick. The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 4 to 6, and chroma of 4 or 6.

The B1 horizon, if present, has hue of 5YR or 7.5YR, value of 5, and chroma of 6 or 8.

The B2t horizon has hue of 5YR, value of 4 or 5, and chroma of 6, or has hue of 5YR, value of 5, and chroma of 8. Few or common brownish and reddish mottles are present.

Mandarin series

The Mandarin series consists of somewhat poorly drained, moderately permeable soils that formed in thick, sandy marine sediment. These soils are on broad ridges adjacent to depressions and drainageways in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 1.5 and 3.5 feet in summer and winter. Slope is 0 to 2 percent.

Mandarin soils are on the same landscape as Centenary, Echaw, and Foxworth soils. Moderately well drained Centenary and Echaw soils are on higher lying parts of the landscapes and have a spodic horizon at a depth of 30 inches or more. Foxworth soils are moderately well drained and do not have a Bh horizon.

Typical pedon of Mandarin fine sand, in a pine plantation; 1.2 miles north of Georgia Highway 99 on Tibet Road, 0.2 mile west on unpaved road, 50 feet south; Long County:

A1—0 to 7 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

A21—7 to 9 inches; gray (10YR 6/1) fine sand; single grained; loose; common medium and large roots; very strongly acid; clear wavy boundary.

A22—9 to 12 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.

B21h—12 to 16 inches; very dark brown (10YR 2/2) fine sand; weak medium subangular blocky structure; friable; few fine roots; weakly cemented by organic compounds; very strongly acid; gradual wavy boundary.

B22h—16 to 20 inches; very dark grayish brown (10YR 3/2) fine sand; weak medium subangular blocky structure; friable; weakly cemented by organic compounds; very strongly acid; gradual wavy boundary.

B3—20 to 24 inches; brown (10YR 5/3) fine sand; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

A'21—24 to 36 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grained; very friable; very strongly acid; gradual wavy boundary.

A'22—36 to 45 inches; light gray (10YR 7/2) fine sand; common medium distinct yellow (10YR 7/6) mottles; single grained; very friable; very strongly acid; gradual wavy boundary.

B'2h—45 to 72 inches; dark brown (7.5YR 3/2) fine sand; common medium distinct black (10YR 2/1) mottles; weak fine subangular blocky structure; friable; weakly cemented; very strongly acid.

The solum thickness is 70 inches or more. The soil is strongly acid or very strongly acid throughout, except for

the surface layer in limed areas. Depth to the weakly cemented Bh horizon is 12 to 24 inches. Depth to the weakly cemented B'h horizon is 45 to 80 inches.

The A1 horizon is 2 to 7 inches thick. It has hue of 10YR, value of 2 to 6, and chroma of 1, or it is neutral and has value of 3 to 5. The A2 horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The B2h horizon has hue of 5YR, value of 2.5 or 3, and chroma of 1 to 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2 or 3, and chroma of 1 to 3.

The B3 horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4; hue of 7.5YR, value of 4, and chroma of 2 or 4; or hue of 7.5YR, value of 5, and chroma of 4.

The A'2 horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The B'h horizon has the same color range as the Bh horizon.

This soil is a taxadjunct to the Mandarin series because the reaction of the B3, A'2, and B'2h horizons is very strongly acid; however, the use and management of the soil is not significantly different from Mandarin soils in other places.

Mascotte series

The Mascotte series consists of poorly drained, moderately permeable soils that formed in sandy and loamy sediment. These soils are on broad ridges and areas adjacent to depressions, drainageways, and bays in the Atlantic Coast Flatwoods. A high water table ranges between the surface and a depth of less than 1.0 foot in summer and winter. Slope is 0 to 2 percent.

Mascotte soils are on the same landscape as Ellabelle, Leefield, Ocilla, Riceboro, and Pelham soils. The associated soils do not have a spodic horizon. Very poorly drained Ellabelle soils have an umbric epipedon and are in drainageways, bays, and depressions; Leefield soils have 5 percent or more plinthite at a depth of 30 inches or more. Pelham and Riceboro soils are arenic and have an argillic horizon.

Typical pedon of Mascotte fine sand in a wooded area; 1.5 miles northeast of Ludowici on Ludowici-Elim road, 25 feet west of road; Long County:

A1—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many fine roots; common clean sand grains; very strongly acid; clear wavy boundary.

A2—6 to 14 inches; light gray (10YR 7/1) and light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.

B2h—14 to 18 inches; very dark brown (10YR 2/2) fine sand in upper part and dark reddish brown (5YR 3/2) fine sand in lower part; weak medium subangular blocky structure; firm; common medium roots in upper part; very strongly acid; clear wavy boundary.

B3—18 to 21 inches; pale brown (10YR 6/3) fine sand; common medium distinct dark brown (10YR 3/3) mottles; weak fine granular structure; friable; very strongly acid; gradual wavy boundary.

A'2—21 to 32 inches; light gray (2.5Y 7/2) fine sand; common coarse distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

B'21tg—32 to 48 inches; light gray (10YR 7/1) sandy clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles and few medium prominent red (2.5YR 4/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B'22t—48 to 70 inches; mottled light gray (10YR 7/1), yellowish brown (10YR 5/8), and red (2.5YR 4/6) sandy clay loam; weak fine subangular blocky structure; firm; very strongly acid.

The solum thickness is 70 to 90 inches. The soil is extremely acid to strongly acid throughout, except for the surface layer in limed areas. Depth to the weakly cemented Bh horizon is 10 to 22 inches. Depth to the B'2tg horizon is 30 to 40 inches.

The thickness of the A1 horizon is 6 inches or less. It has hue of 10YR, value of 2 to 4, and chroma of 1. The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 to 7, and chroma of 2; or is neutral and has value of 6 or 7.

The Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 1 to 3; hue of 7.5YR, value of 3 or 4, and chroma of 2 or 4; or hue of 10YR, value of 2, and chroma of 1 or 2. It is fine sand, sand, loamy fine sand, or loamy sand. The B3 horizon has hue of 10YR, value of 3 to 6, and chroma of 3.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4, or has hue of 2.5Y, value of 5 to 7, and chroma of 2. If present, mottles are few or common, brown and gray.

The B'2tg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 or 6, and chroma of 2. This horizon has few to many yellow, brown, and red mottles throughout. It is fine sandy loam, sandy loam, or sandy clay loam.

Meggett series

The Meggett series consists of poorly drained, slowly permeable soils that formed in clayey marine sediment. These soils are in drainageways on broad areas of the Atlantic Coast Flatwoods. A high water table fluctuates

between the surface and a depth of 1.0 foot from late in fall to the middle of spring. Slope is 0 to 2 percent.

Meggett soils are on the same landscape as Bayboro, Bladen, and Pooler soils. Bayboro and Pooler soils do not have an abrupt textural change between the A and B horizons. In addition, Bayboro soils have an umbric epipedon. Bladen and Pooler soils have less than 35 percent base saturation in the argillic horizon.

Typical pedon of Meggett loamy sand, in a pine plantation; 2.0 miles east of Baconton Church on Riceboro-Walthourville road, 50 feet south of road; Liberty County:

A1—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.

B21tg—6 to 14 inches; gray (10YR 5/1) sandy clay; many fine and medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm; common fine roots; few patchy clay films on faces of peds; slightly acid; gradual wavy boundary.

B22tg—14 to 25 inches; mottled light olive brown (2.5Y 5/6) and gray (5Y 6/1) sandy clay; moderate medium angular blocky and strong fine angular blocky structure; very firm, sticky; few fine roots; few concretions of calcium carbonate; patchy clay films on faces of peds; mildly alkaline; gradual wavy boundary.

B23tg—25 to 46 inches; gray (10YR 6/1) sandy clay; common fine and medium distinct yellowish brown (10YR 5/8) mottles and common fine distinct olive yellow mottles; moderate medium subangular blocky structure; very firm, very sticky; common concretions of calcium carbonate; thin patchy clay films on faces of peds; mildly alkaline; gradual wavy boundary.

B3g—46 to 65 inches; light olive gray (5Y 6/2) sandy clay; common medium distinct olive yellow (2.5Y 6/8) and greenish gray (5G 5/1) mottles; weak medium subangular blocky structure; very firm, sticky; common concretions of calcium carbonate; mildly alkaline.

The solum thickness is 40 to 72 inches. The A horizon is slightly acid to strongly acid. The B horizon is medium acid to moderately alkaline in the upper part and slightly acid to moderately alkaline in the lower part.

The A horizon is 3 to 6 inches thick. It has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The Btg horizon has hue of 10YR and 5Y, value of 4 to 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 to 6, and chroma of 2. This horizon has few to many brown, yellow, and gray mottles throughout. It is clay, sandy clay, or clay loam. Concretions of calcium carbonate are few or common in the B22tg and B23tg horizons.

The B3g horizon has colors similar to those of the Btg horizon, or has hue of 5G, value of 5, and chroma of 1. Shell fragments and concretions of calcium carbonate are few or common. This horizon is sandy clay or sandy clay loam.

Ocilla series

The Ocilla series consists of somewhat poorly drained, moderately permeable soils that formed in sandy and loamy marine sediment. These soils are on low ridges in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 1.0 foot and 2.5 feet in winter to the middle part of spring. Slope is 0 to 2 percent.

Ocilla soils are on the same landscape as Albany and Riceboro soils. Albany soils are grossarenic. Poorly drained Riceboro soils are in somewhat lower lying positions than Ocilla soils.

Typical pedon of Ocilla loamy fine sand, in a wooded area; 1.0 mile west of U.S. Highway 17 on Bill Carter Road, 0.3 mile southwest along unpaved road, 75 feet south of road; Liberty County:

A1—0 to 6 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

A21—6 to 21 inches; pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; few medium roots; very strongly acid; clear wavy boundary.

A22—21 to 34 inches; pale brown (10YR 6/3) loamy sand; few fine faint yellowish brown mottles; weak medium granular structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

B1—34 to 38 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

B21t—38 to 50 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct light gray (10YR 7/2) mottles and few medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—50 to 72 inches; mottled light gray (10YR 7/2), yellowish brown (10YR 5/6), and yellowish red (5YR 4/8) sandy clay loam; weak coarse subangular blocky structure; firm; patchy clay films on some faces of peds; very strongly acid.

The solum thickness is 72 to 80 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The Ap or A1 horizon is 4 to 6 inches thick. It has hue of 10YR, value of 4, and chroma of 1 or 2, or has hue of 10YR, value of 3, and chroma of 1. The A2 horizon is 19 to 30 inches thick. It has hue of 10YR, value of 6, and chroma of 3 or 4; hue of 2.5Y, value of 5 or 6, and chroma of 2 or value of 6 or 7 and chroma of 4; or hue of 5Y, value of 6, and chroma of 3. Gray and brown mottles are few or common in the A22 horizon.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 or 6. Gray, yellow, or brown mottles are few or common. This horizon is sandy loam or sandy clay loam.

The B21t horizon has hue of 10YR, value of 5 to 7, and chroma of 6 or 8. Gray, brown, and red mottles are few or common.

The B22t and B23t horizons are mottled gray, brown, yellow, and red, or have matrix hue of 10YR, value of 5 to 7, and chroma of 1. These horizons have common or many gray, brown, or red mottles.

Osier series

The Osier series consists of poorly drained, rapidly permeable soils that formed in sandy alluvial sediment. These soils are on flood plains in the Atlantic Coast Flatwoods. A high water table is at a depth of less than 1.0 foot from late in fall to early in spring. Slope is 0 to 2 percent.

Osier soils are on the same landscape as Bibb and Johnston soils. Bibb and Johnston soils are less sandy. In addition, Johnston soils have an umbric epipedon.

Typical pedon of Osier fine sandy loam in an area of Osier and Bibb soils, in a wooded area; 200 feet north of east end of a bridge on Georgia Highway 196 at Beards Creek; Long County:

A11—0 to 5 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; gradual wavy boundary.

A12—5 to 11 inches; very dark grayish brown (10YR 3/2) loamy sand; single grained; loose; common fine and few medium roots; few pockets of sand; strongly acid; clear smooth boundary.

C1g—11 to 36 inches; light brownish gray (10YR 6/2) loamy sand; single grained; loose; common fine roots; few pockets of sand and coarse sand; strongly acid; gradual wavy boundary.

C2g—36 to 50 inches; light gray (10YR 7/2) sand; single grained; loose; few pockets of coarse sand; strongly acid; gradual wavy boundary.

C3g—50 to 65 inches; light gray (10YR 7/2) sand; single grained; loose; strongly acid.

Thickness of the sandy layers is 32 to 65 inches or more. The soil is very strongly acid or strongly acid throughout. Thin strata ranging from coarse sand to fine sandy loam are within most horizons.

The A horizon is 3 to 12 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or has hue of 10YR, value of 4, and chroma of 1. It is coarse sand, sand, or loamy sand. In some pedons, this horizon has few or common gray, yellow or brown mottles.

Pelham series

The Pelham series consists of poorly drained, moderately permeable soils that formed in sandy and loamy marine sediment. These soils are in broad areas, shallow depressions, and slight drainageways in the Atlantic Coast Flatwoods. A high water table commonly fluctuates between depths of 0.5 foot and 1.5 feet in winter to the middle of spring. Slope is 0 to 2 percent.

Pelham soils are on the same landscape as Ellabelle and Mascotte soils. Ellabelle soils are very poorly drained and have an umbric epipedon. Mascotte soils have a spodic horizon above the Bt horizon.

Typical pedon of Pelham loamy sand, in an area of cutover pines; 0.5 mile southeast of a bridge on Georgia Highway 99 at Doctors Creek, 0.25 mile north on unpaved road, 100 feet east of road; Long County:

A1—0 to 6 inches; black (10YR 2/1) loamy sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

A21—6 to 16 inches; grayish brown (10YR 5/2) loamy sand; single grained; loose; few medium and coarse roots; very strongly acid; gradual smooth boundary.

A22—16 to 25 inches; gray (10YR 6/1) loamy sand; single grained; loose; few medium roots; very strongly acid; gradual wavy boundary.

B1g—25 to 33 inches; gray (10YR 6/1) sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B21tg—33 to 48 inches; gray (10YR 5/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) and light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B22tg—48 to 63 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles and few fine distinct yellowish red mottles; moderate medium subangular blocky structure; friable; small pockets of sandy loam and sandy clay; very strongly acid.

The solum thickness is 61 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A1 horizon is 6 to 8 inches thick. It has hue of 10YR or 5Y, value of 2 to 4, and chroma of 1. The A2 horizon is 13 to 22 inches thick. It has hue of 10YR or

5Y, value of 4 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 to 7, and chroma of 2. Mottles, if present, are brownish yellow, yellowish brown, and strong brown and are few or common.

The B1 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 to 7, and chroma of 2. Mottles, if present, are brownish yellow, strong brown, and yellowish brown and are few or common.

The B21t horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 to 7, and chroma of 2. Few to many, fine or medium, yellow, brown, and red mottles are throughout this horizon.

The B22t and B23t horizons have colors similar to those of the B21t horizon. Mottles, if present, are medium or coarse, yellow, brown, and red and range from few to many. These horizons are sandy clay loam or sandy clay.

Ponzer series

The Ponzer series consists of very poorly drained, slowly permeable soils that formed in beds of hydrophytic plant remains and the underlying mineral sediment. These soils are in depressions in the Atlantic Coast Flatwoods. The water table is at a depth of less than 10 inches throughout most of the year, or it is above the surface for about 6 months each year. Slope is 0 to 1 percent.

Ponzer soils are associated with Rutlege and Mandarin soils. The associated soils formed entirely in mineral sediment. Rutlege soils commonly are on the same landscape, but somewhat poorly drained Mandarin soils are on adjacent low ridges and in broad, smooth areas.

Typical pedon of Ponzer muck, in a depressional area; 0.5 mile south of Sladen Road on U.S. Highway 82, 50 feet west of road; Liberty County:

Oi—0 to 2 inches; spongy layer of partially decomposed and undecomposed moss, roots, leaves, and twigs; extremely acid; abrupt smooth boundary.

Oa1—2 to 10 inches; black (N 2/0), broken face and rubbed muck; about 5 percent fiber unrubbed, less than 1 percent rubbed; weak fine subangular blocky structure; very friable; extremely acid; gradual smooth boundary.

Oa2—10 to 28 inches; dark brown (7.5YR 3/2), broken face and rubbed muck; about 5 percent fiber unrubbed, less than 1 percent rubbed; weak medium subangular blocky structure; friable; extremely acid; gradual smooth boundary.

Oa3—28 to 46 inches; dark brown (7.5YR 3/2), broken face and rubbed muck; about 20 percent fiber unrubbed, less than 5 percent rubbed; massive; friable; extremely acid; clear smooth boundary.

IICg—46 to 72 inches; dark gray (10YR 4/1) fine sandy loam; massive; firm; extremely acid.

Thickness of the organic material ranges from 38 to 46 inches or more.

The Oi horizon is 0 to 4 inches thick. The Oa horizon is 38 to 46 inches thick. The upper part of the Oa horizon has hue of 10YR, or is neutral, value of 2, and chroma of 2 or less. The lower part has hue of 5YR and 10YR, value of 2 or 3, and chroma of 1 or 2, or has hue of 7.5YR, value of 2 or 3, and chroma of 2. Fiber content is 5 to 20 percent, unrubbed, and less than 5 percent, rubbed. The organic material is extremely acid unless limed.

The IICg horizon has hue of 10YR, or is neutral, value of 4 or 5, and chroma of 2 or less. It is sandy loam, fine sandy loam, or clay loam. This horizon is extremely acid or very strongly acid.

Pooler series

The Pooler series consists of poorly drained, slowly permeable soils that formed mainly in clayey marine sediment. These soils are on broad, low positions commonly below an elevation of 45 feet in the Atlantic Coast Flatwoods. The water table is at a depth of less than 1.0 foot in winter and spring. Slope is less than 2 percent.

Pooler soils are on the same landscape as Bladen soils. Bladen soils have an abrupt textural change between the A horizon and B horizon.

Typical pedon of Pooler fine sandy loam, in a pine plantation; 1.3 miles south of Liberty County line on County Line Road, 3.0 miles northwest of a pine plantation road, 300 feet south; Long County:

A1—0 to 5 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; gradual smooth boundary.

B1g—5 to 11 inches; grayish brown (2.5Y 5/2) sandy clay loam; common fine distinct strong brown mottles; weak medium subangular blocky structure; friable; many fine roots; strongly acid; gradual wavy boundary.

B21tg—11 to 25 inches; grayish brown (10YR 5/2) sandy clay; common medium distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22tg—25 to 56 inches; gray (10YR 6/1) clay; common medium distinct strong brown (7.5YR 5/8) mottles and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3g—56 to 86 inches; light brownish gray (2.5Y 6/2) sandy clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The solum thickness is 60 to 86 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 5 or 6 inches thick. The A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The A2 horizon, if present, has hue of 10YR, value of 4 or 5, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 or 6, and chroma of 2.

The B1 and B2tg horizons have hue of 10YR, value of 5 or 6, and chroma of 1 or 2, or have hue of 2.5Y, value of 5 or 6, and chroma of 2. They contain few or common yellow, red, and brown mottles. The B1 horizon is sandy clay loam or sandy loam. The B2tg horizon is sandy clay or clay. The B3g horizon is mottled gray, brown, and yellow, or it has matrix hue of 2.5Y or 10YR, value of 6, and chroma of 2 and is mottled brown, yellow, and gray. It is sandy clay loam, clay loam, or sandy loam.

Riceboro series

The Riceboro series consists of poorly drained, slowly permeable soils that formed in sandy and clayey sediment. These soils are in broad areas and slight depressions in the Atlantic Coast Flatwoods. A high water table commonly fluctuates between depths of 0.5 to 1 foot in winter and early in spring. Slope is 0 to 2 percent.

Riceboro soils are on the same landscape as Mascotte and Ocilla soils. Mascotte soils have a spodic horizon above the Bt horizon and have a loamy Bt horizon. Somewhat poorly drained Ocilla soils are on higher lying positions than Riceboro soils.

Typical pedon of Riceboro loamy fine sand, in a pine plantation; 1.5 miles north of a bridge on U.S. Highway 17 at Riceboro Creek, 0.2 mile south of Bill Carter Road on Midway-Jones road, 100 feet west; Liberty County:

A1—0 to 8 inches; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

A2—8 to 12 inches; dark grayish brown (10YR 4/2) loamy fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

A22—12 to 17 inches; light brownish gray (2.5Y 6/2) loamy fine sand; single grained; loose; few fine and medium roots; very strongly acid; clear wavy boundary.

A23—17 to 25 inches; light gray (10YR 7/2) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; single grained; very friable; very strongly acid; clear wavy boundary.

B1g—25 to 29 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual smooth boundary.

B21tg—29 to 36 inches; light brownish gray (2.5Y 6/2) sandy clay; common medium distinct strong brown (7.5YR 5/8) mottles and few medium distinct red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22tg—36 to 48 inches; light brownish gray (10YR 6/2) sandy clay; many medium prominent red (2.5YR 4/6) mottles and common medium distinct strong brown (7.5YR 5/6) mottles; strong coarse angular blocky structure; very firm; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—48 to 70 inches; mottled grayish brown (2.5Y 5/2), strong brown (7.5YR 5/8), and red (2.5YR 4/8) sandy clay; weak coarse subangular blocky structure; firm; discontinuous clay films on faces of peds; few lenses of gray (N 6/0) fine sand; very strongly acid.

The solum thickness is 65 inches or more. The soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The A1 horizon is 4 to 9 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2, or is neutral and has value of 3. The A2 horizon is 14 to 32 inches thick. It has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 4 to 7, and chroma of 2. Mottles, if present, commonly are yellowish brown or strong brown and are few or common.

The B1 horizon has hue of 10YR or 5Y, value of 5 or 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 or 6, and chroma of 2. It has few to common brownish, reddish, and yellowish mottles. This horizon is sandy clay loam or clay loam.

The B21t horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 or 6, and chroma of 2. Few to many, fine or medium, yellowish, brownish, and reddish mottles are throughout this horizon.

The B22t and B23t horizons have colors similar to those of the B21t horizon. In some pedons, the lower part of the B2t horizon is mottled grayish, brownish, yellowish, and reddish. Few or common lenses of loamy sand and sand are present. The B2t horizon is sandy clay or clay.

Rutlege series

The Rutlege series consists of very poorly drained, rapidly permeable soils that formed in sandy marine sediment. These soils are in bays and shallow depressions in the Atlantic Coast Flatwoods. The water table is at a depth of less than 1.0 foot in winter and spring. Slope is 0 to 2 percent.

Rutlege soils are on the same landscape as Mandarin and Ponzer soils. Mandarin soils have a spodic horizon, are somewhat poorly drained, and do not have an umbric epipedon. In addition, they are on adjacent low ridges and broad, smooth positions. Very poorly drained Ponzer soils are histosols.

Typical pedon of Rutlege fine sand, in a bay; 3.0 miles west of Hinesville on Georgia Highway 196, 600 feet south in Terrell Mill pond; Liberty County:

A11—0 to 11 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; many fine, medium, and coarse roots; about 10 percent organic matter; very strongly acid; gradual smooth boundary.

A12—11 to 21 inches; very dark brown (10YR 2/2) fine sand; weak fine granular structure; very friable; common medium and coarse roots; very strongly acid; gradual wavy boundary.

Cg—21 to 63 inches; light brownish gray (10YR 6/2) loamy fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grained; loose; very strongly acid.

Thickness of the sandy material is 63 inches or more. The soil is extremely acid to very strongly acid, except for the surface layer in limed areas.

The A horizon is 16 to 24 inches thick. It has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It also has hue of 2.5Y, value of 4 to 7, and chroma of 2 and has mottles in hue of 10YR, value of 5 to 8, and chroma of 2 to 4 or 6.

Stilson series

The Stilson series consists of moderately well drained, moderately permeable soils that formed in sandy and loamy marine sediment. These soils are on uplands in the Southern Coastal Plain. A perched water table fluctuates between depths of 2.5 and 3.0 feet in winter to the middle of spring. Slope is 0 to 2 percent.

Stilson soils are on the same landscape as Dothan, Fuquay, and Leefield soils. Dothan and Fuquay soils are on somewhat higher lying positions than Stilson soils and are well drained. In addition, Dothan soils have an A horizon less than 20 inches thick. Leefield soils are on slightly lower lying positions and are somewhat poorly drained.

Typical pedon of Stilson loamy sand, in a pine plantation; 1.75 miles north of Ludowici on U.S. Highway 301, 0.25 mile east on dirt road near Continental Woodland Division Building, 30 feet west of road; Long County:

A1—0 to 6 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

A2—6 to 29 inches; pale yellow (2.5Y 7/4) loamy sand; weak fine granular structure; very friable; common fine and medium roots; few fine root holes filled with material from A1 horizon; very strongly acid; clear smooth boundary.

B1—29 to 35 inches; brownish yellow (10YR 6/6) sandy loam; few fine faint strong brown mottles; weak fine subangular blocky structure; friable; few medium roots; few nodules of ironstone; very strongly acid; clear smooth boundary.

B21t—35 to 43 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8), red (2.5YR 4/8), light gray (10YR 7/2), and yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; friable; clay bridging between sand grains; 5 percent soft plinthite in lower part of the horizon; very strongly acid; gradual smooth boundary.

B22t—43 to 61 inches; reticulately mottled brownish yellow (10YR 6/6), light gray (10YR 7/2), strong brown (7.5YR 5/8), and red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; clay bridging between sand grains; 5 percent nodular plinthite; very strongly acid; clear smooth boundary.

B23tg—61 to 66 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles and few fine faint red mottles; moderate medium subangular blocky structure; firm; 5 percent nodular plinthite; very strongly acid; clear smooth boundary.

B24tg—66 to 72 inches; reticulately mottled light gray (10YR 7/1), red (10R 5/8), and strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; firm; 10 percent nodular plinthite; very strongly acid.

The solum thickness is 60 to 70 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas. Commonly, a few nodules of ironstone are throughout the soil.

The A horizon is 20 to 40 inches thick. The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 6, and chroma of 2; hue of 2.5Y, value of 6, and chroma of 4, 6, or 8; or hue of 2.5Y, value of 7, and chroma of 4.

The B1 horizon has hue of 10YR, value of 5 or 6, and chroma of 6 or 8. The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6 or 8. At a depth of 30 to

43 inches, it has few or common red, brown, gray, and yellow mottles. The lower part of the Bt horizon has distinct or prominent gray, yellow, brown, and red mottles. The Bt horizon commonly is sandy clay loam but includes sandy loam. Content of plinthite ranges from 5 to 10 percent at a depth of 30 to 50 inches.

Tawcaw series

The Tawcaw series consists of somewhat poorly drained, slowly permeable soils that formed in clayey sediment in the Atlantic Coast Flatwoods. These soils are on flood plains of the Altamaha River that drains from the Southern Piedmont and the Southern Coastal Plain. A high water table commonly fluctuates between depths of 1.5 and 2.5 feet from late in fall to the middle of spring. Slope is less than 2 percent.

Tawcaw soils are on the same landscape as Chastain soils. Chastain soils are poorly drained and are on slightly lower lying positions than Tawcaw soils.

Typical pedon of Tawcaw clay in an area of Tawcaw-Chastain association, in woodland; 900 feet east of U.S. Highway 201 at bridge, 1,200 feet north of Altamaha River; Long County:

A1—0 to 6 inches; brown (7.5YR 5/4) clay; weak medium subangular blocky structure; friable; common fine and medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

B21—6 to 17 inches; brown (7.5YR 4/4) clay; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine flakes of mica; very strongly acid; clear wavy boundary.

B22g—17 to 24 inches; light brownish gray (2.5Y 6/2) clay; common fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few medium roots; few fine flakes of mica; very strongly acid; clear wavy boundary.

B23g—24 to 38 inches; gray (10YR 6/1) clay; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common flakes of mica; very strongly acid; gradual smooth boundary.

B3g—38 to 56 inches; gray (5Y 5/1) clay loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine flakes of mica; very strongly acid; clear wavy boundary.

IIC—56 to 65 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and gray (5Y 6/1) stratified sandy loam and loamy sand; massive; friable; very strongly acid.

The solum thickness is 60 to 65 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 3 to 10 inches thick. It has hue of 7.5YR, value of 4 or 5, and chroma of 4.

The B21 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4, or has hue of 7.5YR and value and chroma of 4. Mottles that have chroma of 2 or less are within a depth of 24 inches.

The B22 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 and has brown, yellow, or red mottles.

The B23 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2, or has hue of 2.5Y, value of 6 or 7, and chroma of 2 and has brown mottles or is mottled brown and gray. The B2 horizon is clay or clay loam.

The B3 horizon has hue of 2.5Y, value of 5 or 6, and chroma of 2, or has hue of 5Y, value of 5 or 6, and chroma of 1 or 2 and has brown mottles.

The IIC horizon is mottled brownish, yellowish, and grayish. It is loamy sand, sandy loam, or sandy clay loam.

Wahee series

The Wahee series consists of somewhat poorly drained, slowly permeable soils that formed in clayey sediment. These soils are on terraces of the larger streams in the Atlantic Coast Flatwoods. A high water table fluctuates between depths of 0.5 foot and 1.5 feet in winter and early in spring. Slope is 0 to 2 percent.

Wahee soils are on the same landscape as Bladen, Eulonia, and Pooler soils. Poorly drained Bladen soils are clayey throughout the subsoil. Eulonia soils are moderately well drained. Pooler soils are on somewhat lower lying positions than Wahee soils and are poorly drained.

Typical pedon of Wahee sandy loam, in a pine plantation; 1.3 miles north of Midway on U.S. Highway 17, 1.3 miles west on unpaved road, 50 feet south; Liberty County:

A1—0 to 8 inches; very dark gray (10YR 3/1) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

A2—8 to 14 inches; light brownish gray (2.5Y 6/2) sandy loam; few fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few fine and medium roots; strongly acid; clear wavy boundary.

B1—14 to 24 inches; yellowish brown (10YR 5/8) sandy clay loam; common fine distinct red mottles; few fine distinct light brownish gray mottles; moderate medium subangular blocky structure; firm; few fine roots; patchy clay films on faces of peds; strongly acid; clear wavy boundary.

B21tg—24 to 45 inches; light brownish gray (10YR 6/2) clay; common medium distinct red (2.5YR 4/8) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very firm; few fine roots; continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22tg—45 to 54 inches; gray (10YR 5/1) clay; common medium distinct red (2.5YR 4/8) and yellowish brown (10YR 5/8) mottles; moderate medium angular blocky structure; very firm; discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B3g—54 to 75 inches; mottled gray (10YR 5/1), red (2.5YR 4/8), and yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; firm; strongly acid.

The solum thickness is 60 to 75 inches or more. The soil is very strongly acid or strongly acid throughout, except for the surface layer in limed areas.

The A horizon is 3 to 16 inches thick. The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A2 horizon, if present, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4, or hue of 2.5Y, value of 5 or 6, and chroma of 2 or 4.

The B1 horizon, if present, has hue of 10YR, value of 5, and chroma of 4 or 6.

The B21t horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4, 6, or 8 and has red, brown, yellow, or gray mottles. The B22tg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2, or has hue of 2.5Y, value of 5 to 7, and chroma of 2 and has common to many yellow, brown, and red mottles. The Bt horizon is silty clay, sandy clay, or clay.

The B3g horizon is mottled gray, brown, or red, or it has hue of 10YR, value of 5, and chroma of 1 and has few or common brown or red mottles.

The Cg horizon, if present, has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is loamy sand, coarse sandy loam, or sandy clay loam.

formation of the soils

Robert L. Wilkes, soil correlator, Soil Conservation Service, helped to prepare this section.

This section describes the factors of soil formation, relates them to soils in the survey area, and explains the processes of soil formation.

Soil characteristics are determined by the physical and mineral composition of the parent material; the climate under which the parent material accumulated and has existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material (*5*). All of these factors influence the present characteristics of every soil, but the significance of each factor varies from one place to another. In one area one factor may dominate soil formation; in another area a different factor may be most important.

The interrelationship among these five factors is complex, and the effects or magnitude of any one factor cannot be isolated and completely evaluated. It is convenient to discuss each factor separately, however, and to indicate the probable effects of each.

parent material

Parent material is the unconsolidated mass in which soil forms. It is largely responsible for the chemical and mineral composition of a soil. The parent material in Liberty and Long Counties was deposited during the Holocene and late Pleistocene Epochs and consists of fluvial and marine sediment (*4*).

In the survey area, rock is not recognized as parent material. Rather, parent material is related to various geomorphic surfaces or terraces. These landscape features are identified and described in "General nature of the survey area."

The youngest sediment is stream alluvium, mainly along the Altamaha River, and deposits are added each year. Chastain and Tawcaw soils formed in these young deposits. The Holocene is the youngest marine terrace. It is composed of clayey sediment in marshland that is flooded twice each day and in the sandy dune deposits. The very poorly drained Bohicket and Capers soils formed in marshes, and the excessively drained Fripp soils formed on dunes. The Silver Bluff Formation is about 5 feet above sea level, and the Princess Anne is about 15 feet. The moderately well drained Centenary, Echaw, and Foxworth soils and the somewhat poorly drained Mandarin soils formed in sandy deposits on these terraces. The Pamlico Formation is about 25 feet above sea level, and the Talbot is about 40 feet. The poorly drained Bladen, Pooler, and Riceboro soils formed in clayey deposits on these terraces. The Penholoway Formation is about 75 feet above sea level, and the Wicomico is about 100 feet. The well drained Fuquay soils, moderately well drained Stilson soils, somewhat poorly drained Leefield soils, and poorly drained Ellabelle, Johnston, Mascotte, and Pelham soils formed in sandy and loamy deposits on these terraces.

plants and animals

The role of plants, animals, and other organisms is significant in soil development. Plant and animal life can increase the contents of organic matter and nitrogen, increase or decrease plant nutrients, and change tilth and porosity.

Plants recycle plant nutrients, accumulate organic matter, and provide food and cover for animal life. They stabilize the surface layer so that soil-forming processes can continue. Vegetation also provides a more stable environment for soil-forming processes by protecting the soils from extremes in temperature.

The soils of Liberty and Long Counties formed under a succession of plants. This succession is still evident in the smooth cordgrass, black rush, and salt bermudagrass in the marshlands; the big cordgrass and giant cutgrass in brackish water areas; the hardwood trees and cypress in very poorly drained areas; and the pine trees in the moderately well drained and poorly drained areas.

Animals rearrange soil materials by roughening the soil surface, forming and filling channels, and shaping the peds and voids. The soil is mixed by ants, wasps, worms, and spiders that make channels and by crustacea, such as crabs and crayfish, together with turtles and other reptiles that make burrows. Bacteria, fungi, and other micro-organisms hasten decomposition of organic matter and increase the release of minerals for additional plant growth. Humans affect the soil-forming process by tilling the soil, removing natural vegetation and establishing different plants, and reducing or increasing soil fertility.

The net gains and losses caused by plants and animals in the soil-forming process are important in Liberty and Long Counties. The fiddler crab and other

crustacea continuously burrow and rework the upper horizons of Bohicket and Capers soils. Plant residue provides most of the organic matter for the formation of the umbric epipedon in Bayboro and Rutlege soils. Plants recycle the calcium in Meggett soils and provide the stability necessary for the formation of the ochric epipedon.

climate

The climate of Liberty and Long Counties is humid, warm, and moist and is thought to be similar to the climate that existed as the soils formed. The relatively high rainfall and warm temperature contribute to rapid soil formation and are the two most important features of the climate that relate to soil properties.

Water is essential in the formation of soil. Water dissolves soluble materials and is used by plants and animals. It transports material from one part of the soil to another part, or from one area to another area. The rate of chemical reactions and other processes in the soil are dependent to some extent on temperature. In addition, temperature affects the type and quantity of vegetation, the amount and kind of organic matter, and the decomposition rate of organic matter. Soils in Liberty and Long Counties formed under a thermic temperature regime. The average annual air temperature is about 67 degrees F, and the soil temperature at a depth of 20 inches is generally 2 degrees higher.

relief

Relief implies relative elevation and is defined as the elevation or inequalities of a land surface considered collectively. The relationship of relief to soil properties is not well expressed in Liberty and Long Counties. This is because the survey area is flat except for the somewhat sloping terrace interfaces. Features commonly related to relief are color of the soil, wetness, thickness and content of organic matter of the A horizon, and plant cover.

In Liberty and Long Counties the obvious effects of relief are color of the soil and wetness. Dothan and Fuquay soils have a brownish or yellowish matrix in the upper part of the B horizon, whereas Bladen and Pooler soils have a mainly gray matrix throughout the B horizon. This color difference is attributed to a difference in elevation and a corresponding difference in internal drainage. The Dothan and Fuquay soils are at a higher elevation and are better drained than Bladen and Pooler soils. These differences in elevation and drainage result in better oxidization in Dothan and Fuquay soils and in yellow and brown colors in the upper part of the subsoil.

The movement of water across the soil surface and through the soil profile is controlled to a large extent by relief. Thus, the degree of wetness is affected. In Liberty and Long Counties, however, tidal action is also a factor. Bayboro soils have an umbric epipedon. These soils are in depressions and drainageways, and internal drainage is very poor. Fripp soils have an ochric epipedon. They are on undulating and rolling landscapes, and the internal drainage is excessive. Ponzer soils are an example of soils that formed in a saturated state. The wet condition has contributed to the accumulation of a large amount of organic matter.

time

The length of time the soil-forming factors act on the parent material determines to a large degree the characteristics of the soil. Determination of when soil formation began in the survey area is not exact, but the soils in Liberty and Long Counties are considered some of the youngest in the state. Geologists have dated these young soils as Pleistocene or later.

Although these soils are young geologically, many are mature. Young soils do not have pedogenic horizons but do have an irregular decrease in content of carbon with an increase in depth. A mature soil is in equilibrium with the environment. It has readily recognizable pedogenic horizons and a regular decrease in content of carbon with an increase in depth.

Bibb, Bohicket, Capers, Duckston, Johnston, Osier, Ponzer, and Rutlege soils receive sediment daily or annually from floodwater. These young soils are commonly stratified and are not old enough to have a zone of illuviation. Dothan and Fuquay soils represent soils on broad, stable landscapes where the soil-forming processes have been active for thousands of years. These mature soils have a thick solum and well expressed zones of elluviation and illuviation. They are on the oldest marine terraces in the survey area and are about 75 to 100 feet above sea level. Long exposure to weathering has produced pebbles of ironstone and plinthite. Soils on the lower lying, younger terraces do not contain plinthite.

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glossary

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. Only the tillage essential to crop production and prevention of soil damage.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow

represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Root zone. The part of the soil that can be penetrated by plant roots.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-77 at Fort Stewart]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	62.9	39.5	51.2	81	16	178	3.10	1.33	4.53	6	.0
February	66.2	41.6	53.9	82	22	169	3.37	1.85	4.61	6	.1
March	72.4	47.6	60.0	88	26	328	4.10	1.71	6.03	7	.0
April	79.6	54.3	67.0	92	36	510	2.92	1.41	4.13	5	.0
May	85.8	61.7	73.8	99	46	738	4.93	1.86	7.39	7	.0
June	89.8	67.7	78.8	101	56	864	5.56	3.00	7.65	8	.0
July	92.0	70.6	81.3	100	63	970	7.09	3.99	9.61	11	.0
August	91.1	70.6	80.9	99	62	958	5.80	3.54	7.81	10	.0
September	86.3	67.2	76.8	96	53	804	4.84	2.20	6.98	7	.0
October	78.9	56.6	67.8	93	35	552	1.99	.41	3.22	4	.0
November	70.6	46.6	58.6	85	26	264	1.93	.61	2.98	4	.0
December	64.4	40.9	52.7	81	20	167	3.01	1.56	4.19	6	.0
Yearly:											
Average	78.3	55.4	66.9	---	---	---	---	---	---	---	---
Extreme	---	---	---	102	16	---	---	---	---	---	---
Total	---	---	---	---	---	6,502	48.64	40.61	56.30	81	.1

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-77 at Fort Stewart]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 4	March 19	March 29
2 years in 10 later than--	February 22	March 12	March 23
5 years in 10 later than--	February 1	February 25	March 11
First freezing temperature in fall:			
1 year in 10 earlier than--	November 21	November 9	October 31
2 years in 10 earlier than--	December 2	November 16	November 5
5 years in 10 earlier than--	December 23	November 30	November 16

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-77 at Fort Stewart]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	291	245	228
8 years in 10	302	256	235
5 years in 10	324	277	250
2 years in 10	355	299	264
1 year in 10	>365	310	271

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Liberty County	Long County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
As	Albany loamy fine sand, 0 to 2 percent slopes	6,455	3,713	10,168	1.7
Ba	Bayboro loam	28,784	8,555	37,339	6.4
Bc	Beaches	541	0	541	0.1
Bd	Bladen fine sandy loam	14,846	5,030	19,876	3.4
Bn	Blanton sand, 0 to 3 percent slopes	2,454	7,080	9,534	1.6
BO	Bohicket-Capers association	43,654	0	43,654	7.4
Ca	Cape Fear fine sandy loam	4,830	2,467	7,297	1.2
Ce	Capers silty clay	5,225	0	5,225	0.9
Ch	Chipley sand, 0 to 4 percent slopes	1,705	3,555	5,260	0.9
Da	Dothan loamy sand, 0 to 2 percent slopes	261	1,626	1,887	0.3
Ea	Echaw-Urban land complex	765	0	765	0.1
EC	Echaw and Centenary fine sands	17,275	6,212	23,487	4.0
Ee	Ellabelle loamy sand	22,153	15,291	37,444	6.4
Eu	Eulonia fine sandy loam	2,344	1,008	3,352	0.6
Fo	Foxworth fine sand, 0 to 3 percent slopes	5,017	1,772	6,789	1.2
FrD	Fripp-Duckston complex, 1 to 20 percent slopes	1,255	0	1,255	0.2
FsB	Fuquay loamy sand, 0 to 5 percent slopes	4,307	8,925	13,232	2.3
HO	Hydraquents, clayey	0	15,322	15,322	2.6
JB	Johnston and Bibb soils	13,253	8,482	21,735	3.7
KeC	Kershaw sand, 2 to 10 percent slopes	0	12,303	12,303	2.1
Le	Leefield loamy sand	11,495	20,216	31,711	5.4
LWC	Lucy loamy sand, 2 to 12 percent slopes	0	894	894	0.2
Ma	Mandarin fine sand	12,982	4,073	17,055	2.9
Md	Mandarin-Urban land complex	1,961	0	1,961	0.3
Me	Mascotte fine sand	25,769	16,028	41,797	7.1
Ms	Mascotte-Urban land complex	462	0	462	0.1
Mt	Meggett fine sandy loam	4,259	837	5,096	0.9
Oc	Ocilla loamy fine sand	22,323	5,791	28,114	4.8
Os	Osier and Bibb soils	3,756	2,089	5,845	1.0
Pe	Pelham loamy sand	20,864	26,280	47,144	8.0
Pk	Pits	615	206	821	0.1
Pn	Ponzer muck	1,216	711	1,927	0.3
Po	Pooler fine sandy loam	12,350	15,325	27,675	4.7
Pr	Pooler-Bladen complex	2,459	8,440	10,899	1.9
Rb	Riceboro loamy fine sand	14,117	4,050	18,167	3.1
Ru	Rutlege fine sand	8,035	14,085	22,120	3.8
St	Stilson loamy sand	6,937	12,209	19,146	3.3
TC	Tawcaw-Chastain association	0	23,247	23,247	4.0
Ud	Udorthents, sandy and clayey	950	0	950	0.2
Wa	Wahee sandy loam	3,094	1,394	4,488	0.8
	Total	328,768	257,216	585,984	100.0

TABLE 5.--IMPORTANT FARMLANDS

[Acreage is according to date field work was completed. Soils not listed do not qualify as prime farmland or additional land of statewide importance]

Soil name and map symbol	Prime farmland	Additional land of statewide importance
	Acres	Acres
As---- Albany	---	10,168
Bn---- Blanton	---	9,534
Ch---- Chipley	---	5,260
Da---- Dothan	1,887	---
EC*:		
Echaw----	---	11,743
Centenary----	---	7,046
Eu---- Eulonia	3,352	---
Fo---- Foxworth	---	6,789
FsB---- Fuquay	---	13,232
Le---- Leefield	---	31,711
LWC---- Lucy	---	894
Oc---- Ocilla	---	28,114
St---- Stilson	19,146	---
Total----	24,385	124,491

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Tobacco	Improved bermudagrass	Bahiagrass
	Bu	Bu	Lb	AUM*	AUM*
As---------- Albany	65	25	2,100	7.0	6.5
Ba---------- Bayboro	---	---	---	---	---
Bc**. Beaches					
Bd---------- Bladen	---	---	---	---	---
Bn---------- Blanton	60	25	2,000	8.0	6.5
BO**: Bohicket----------	---	---	---	---	---
Capers----------	---	---	---	---	---
Ca. Cape Fear					
Ce---------- Capers	---	---	---	---	---
Ch---------- Chipley	50	20	2,000	8.0	7.5
Da---------- Dothan	120	40	3,500	10.5	9.0
Ea---------- Echaw-Urban land	---	---	---	---	---
EC---------- Echaw and Centenary	69	27	2,000	7.6	7.6
Ee---------- Ellabelle	---	---	---	---	---
Eu---------- Eulonia	100	40	3,500	9.5	9.5
Fo---------- Foxworth	---	---	---	7.5	7.5
FrD---------- Fripp-Duckston	---	---	---	---	---
FsB---------- Fuquay	80	30	3,300	7.5	7.5
HO**. Hydraquents					
JB---------- Johnston and Bibb	---	---	---	---	---
KeC---------- Kershaw	---	---	---	3.5	3.5
Le---------- Leefield	85	45	2,300	8.7	8.0

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Tobacco	Improved bermudagrass	Bahiagrass
	Bu	Bu	Lb	AUM*	AUM*
LWC---------- Lucy	70	25	3,000	7.5	8.5
Ma---------- Mandarin	---	---	---	---	6.0
Md---------- Mandarin-Urban land	---	---	---	---	---
Me---------- Mascotte	50	20	---	---	8.0
Ms---------- Mascotte-Urban land	---	---	---	---	---
Mt---------- Meggett	75	40	---	---	10.0
Oc---------- Ocilla	75	35	2,600	8.5	7.5
Os---------- Osier and Bibb	---	---	---	---	---
Pe---------- Pelham	---	---	---	---	---
Pk**. Pits					
Pn---------- Ponzer	---	---	---	---	---
Po---------- Pooler	---	---	---	---	---
Pr---------- Pooler-Bladen	---	---	---	---	---
Rb---------- Riceboro	---	---	---	---	---
Ru---------- Rutlege	---	---	---	---	---
St---------- Stilson	80	35	2,600	10.0	7.5
TC**: Tawcaw----------	---	---	---	---	---
Chastain----------	---	---	---	---	---
Ud**. Udorthents					
Wa---------- Wahee	90	40	---	---	8.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Dashes indicate no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I:				
Liberty County	261	---	---	---
Long County	1,626	---	---	---
II:				
Liberty County	25,083	---	20,776	4,307
Long County	42,358	---	33,433	8,925
III:				
Liberty County	51,773	---	37,415	14,358
Long County	27,774	---	12,610	15,164
IV:				
Liberty County	33,122	---	33,122	---
Long County	18,259	---	18,259	---
V:				
Liberty County	64,865	---	64,865	---
Long County	50,254	---	50,254	---
VI:				
Liberty County	84,286	---	71,304	12,982
Long County	81,222	---	77,149	4,073
VII:				
Liberty County	10,422	---	9,167	1,255
Long County	33,425	---	21,122	12,303
VIII:				
Liberty County	48,879	---	48,879	---
Long County	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
As---------- Albany	2w	Slight	Moderate	Moderate	Loblolly pine----------	95	Loblolly pine, slash pine.
					Slash pine----------	85	
					Longleaf pine----------	80	
Ba---------- Bayboro	2w	Slight	Severe	Severe	Loblolly pine----------	95	Slash pine, loblolly pine, sweetgum, water tupelo.
					Sweetgum----------	94	
					Slash pine----------	95	
					Yellow-poplar----------	---	
					Southern red oak--------	---	
					White oak----------	---	
Bd---------- Bladen	2w	Slight	Severe	Severe	Loblolly pine----------	94	Loblolly pine, slash pine, American sycamore, water oak.
					Slash pine----------	91	
					Sweetgum----------	90	
Bn---------- Blanton	3s	Slight	Moderate	Moderate	Slash pine----------	85	Slash pine.
					Loblolly pine----------	80	
					Longleaf pine----------	73	
Ca---------- Cape Fear	1w	Slight	Severe	Severe	Sweetgum----------	---	Loblolly pine, water tupelo, American sycamore, sweetgum, slash pine.
					Loblolly pine----------	100	
					Water oak----------	---	
					Water tupelo----------	---	
					Baldcypress----------	---	
Ch---------- Chipley	2s	Slight	Moderate	Slight	Slash pine----------	90	Slash pine, loblolly pine.
					Loblolly pine----------	90	
					Longleaf pine----------	70	
Da---------- Dothan	2o	Slight	Slight	Slight	Slash pine----------	89	Slash pine, loblolly pine, longleaf pine.
					Longleaf pine----------	73	
					Loblolly pine----------	85	
EC*:							
Echaw----------	3s	Slight	Moderate	Slight	Longleaf pine----------	68	Longleaf pine, loblolly pine, slash pine, shortleaf pine.
					Loblolly pine----------	85	
					Slash pine----------	80	
Centenary---------	2w	Slight	Moderate	Moderate	Slash pine----------	85	Slash pine, loblolly pine.
					Loblolly pine----------	85	
					Longleaf pine----------	72	
Ee---------- Ellabelle	4w	Slight	Severe	Severe	Pond pine----------	60	
					Baldcypress----------	---	
					Water oak----------	---	
Eu---------- Eulonia	2w	Slight	Moderate	Moderate	Loblolly pine----------	90	Loblolly pine, slash pine, American sycamore, sweetgum, yellow-poplar.
					Slash pine----------	88	
					Water oak----------	90	
					Sweetgum----------	90	
					Blackgum----------	---	
					Southern red oak--------	---	
Fo---------- Foxworth	3s	Slight	Moderate	Moderate	Slash pine----------	80	Slash pine.
					Longleaf pine----------	65	
FrD*:							
Fripp----------	4s	Slight	Moderate	Moderate	Slash pine----------	70	Slash pine, longleaf pine, loblolly pine, sand pine.
					Longleaf pine----------	60	
					Loblolly pine----------	70	
					Sand pine----------	---	
					Live oak----------	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
FrD*: Duckston.							
FsB---------- Fuquay	3s	Slight	Moderate	Moderate	Loblolly pine----------	83	Slash pine, longleaf pine.
					Slash pine----------	85	
					Longleaf pine----------	72	
JB*:							
Johnston----------	1w	Slight	Severe	Severe	Loblolly pine----------	97	Loblolly pine, slash pine, baldcypress, yellow-poplar, sweetgum, green ash, water tupelo.
					Sweetgum----------	111	
					Water oak----------	103	
Bibb----------	2w	Slight	Severe	Severe	Loblolly pine----------	95	Eastern cottonwood, loblolly pine, sweetgum, yellow-poplar.
					Sweetgum----------	90	
					Water oak----------	90	
KeC---------- Kershaw	5s	Slight	Moderate	Severe	Slash pine----------	65	Sand pine, slash pine, longleaf pine.
					Longleaf pine----------	58	
Le---------- Leefield	3w	Slight	Moderate	Moderate	Loblolly pine----------	87	Loblolly pine, slash pine.
					Slash pine----------	84	
					Longleaf pine----------	70	
LWC---------- Lucy	3s	Slight	Moderate	Moderate	Slash pine----------	85	Slash pine, longleaf pine, loblolly pine.
					Longleaf pine----------	74	
					Loblolly pine----------	86	
Ma---------- Mandarin	4s	Slight	Moderate	Severe	Slash pine----------	70	Slash pine, sand pine.
					Longleaf pine----------	60	
Me---------- Mascotte	3w	Slight	Moderate	Moderate	Slash pine----------	85	Slash pine, loblolly pine.
					Loblolly pine----------	80	
					Longleaf pine----------	70	
Mt---------- Meggett	1w	Slight	Severe	Severe	Slash pine----------	100	Slash pine, loblolly pine.
					Loblolly pine----------	100	
					Pond pine----------	75	
Oc---------- Ocilla	3w	Slight	Moderate	Moderate	Loblolly pine----------	85	Loblolly pine, slash pine.
					Slash pine----------	90	
					Longleaf pine----------	77	
Os*:							
Osier----------	3w	Slight	Severe	Severe	Slash pine----------	85	Slash pine, loblolly pine.
					Loblolly pine----------	87	
					Longleaf pine----------	69	
Bibb----------	2w	Slight	Severe	Severe	Loblolly pine----------	95	Eastern cottonwood, loblolly pine, sweetgum, yellow-poplar.
					Sweetgum----------	90	
					Water oak----------	90	
Pe---------- Pelham	2w	Slight	Severe	Severe	Slash pine----------	90	Slash pine, loblolly pine.
					Loblolly pine----------	90	
					Longleaf pine----------	80	
					Sweetgum----------	80	
					Blackgum----------	80	
					Water oak----------	80	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
Pn---------- Ponzer	4w	Slight	Severe	Severe	Pond pine----------	60	Loblolly pine, slash pine.
					Water tupelo----------	60	
					Baldcypress----------	---	
					Loblolly pine----------	70	
					Sweetgum----------	---	
					Swamp tupelo----------	---	
					Sweetbay----------	---	
					Redbay----------	---	
Po---------- Pooler	3w	Slight	Severe	Severe	Loblolly pine----------	80	
					Water oak----------	85	
					Slash pine----------	80	
					Sweetgum----------	80	
Pr*:							
Pooler----------	3w	Slight	Severe	Severe	Loblolly pine----------	80	
					Water oak----------	85	
					Slash pine----------	80	
					Sweetgum----------	80	
Bladen----------	2w	Slight	Severe	Severe	Loblolly pine----------	94	Loblolly pine, slash pine, American sycamore, water oak.
					Slash pine----------	91	
					Sweetgum----------	90	
Rb---------- Riceboro	2w	Slight	Severe	Severe	Loblolly pine----------	95	Slash pine, loblolly pine, sweetgum.
					Slash pine----------	95	
					Sweetgum----------	90	
Ru---------- Rutlege	2w	Slight	Severe	Severe	Loblolly pine----------	90	Loblolly pine, baldcypress.
					Sweetgum----------	90	
					Pin oak----------	85	
St---------- Stilson	2w	Slight	Moderate	Slight	Loblolly pine----------	95	Slash pine, loblolly pine, longleaf pine.
					Slash pine----------	95	
					Longleaf pine----------	80	
					Sweetgum----------	---	
TC*:							
Tawcaw----------	1w	Slight	Moderate	Moderate	Loblolly pine----------	100	Loblolly pine, eastern cottonwood, American sycamore, sweetgum, water oak, cherrybark oak.
					Sweetgum----------	100	
					Water oak----------	90	
					Water tupelo----------	---	
Chastain----------	2w	Slight	Severe	Severe	Sweetgum----------	94	Loblolly pine, American sycamore, sweetgum, cherrybark oak.
					Water oak----------	89	
					Eastern cottonwood-----	90	
					Green ash----------	88	
					Loblolly pine----------	90	
					Water tupelo----------	---	
					White oak----------	---	
					Southern red oak--------	---	
					Baldcypress----------	---	
Wa---------- Wahee	2w	Slight	Moderate	Moderate	Loblolly pine----------	91	Loblolly pine, slash pine, sweetgum, American sycamore, water oak.
					Slash pine----------	86	
					Sweetgum----------	90	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
As---------- Albany	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Ba---------- Bayboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Bc*. Beaches					
Bd---------- Bladen	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Bn---------- Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
BO*: Bohicket----------	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess salt.	Severe: ponding, flooding.	Severe: ponding.	Severe: excess salt, excess sulfur, ponding.
Capers----------	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess salt.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: excess salt, excess sulfur, ponding.
Ca---------- Cape Fear	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ce---------- Capers	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess salt.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: excess salt, excess sulfur, ponding.
Ch---------- Chipley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Da---------- Dothan	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Ea*: Echaw----------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Urban land.					
EC*: Echaw----------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Centenary----------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Ee---------- Ellabelle	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Eu---------- Eulonia	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Fo Foxworth	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
FrD*: Fripp	Severe: flooding, too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Duckston	Severe: flooding, wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness, flooding.	Severe: too sandy.	Severe: droughty, flooding.
FsB Fuquay	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
HO*. Hydraquents					
JB*: Johnston	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding.
Bibb	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
KeC Kershaw	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Le Leefield	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
LWC Lucy	Moderate: too sandy.	Moderate: too sandy.	Severe: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Ma Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Md*: Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Urban land.					
Me Mascotte	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
Ms*: Mascotte	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
Mt Meggett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Oc Ocilla	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Os*: Osier	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, droughty, flooding.
Bibb	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Pe Pelham	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Pk*. Pits					
Pn Ponzer	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Po Pooler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pr*: Pooler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Bladen	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rb Riceboro	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ru Rutlege	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.
St Stilson	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
TC*: Tawcaw	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey, flooding.	Severe: too clayey.	Severe: flooding.
Chastain	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ud*. Udorthents					
Wa Wahee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
As---------- Albany	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor.
Ba---------- Bayboro	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Bc*. Beaches										
Bd---------- Bladen	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Bn---------- Blanton	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BO*: Bohicket----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Capers----------	---	---	---	---	---	Good	Good	---	---	Good.
Ca---------- Cape Fear	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ce---------- Capers	---	---	---	---	---	Good	Good	---	---	Good.
Ch---------- Chipley	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Da---------- Dothan	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ea*: Echaw----------	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Urban land.										
EC*: Echaw----------	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Centenary---------	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ee---------- Ellabelle	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Eu---------- Eulonia	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Fo---------- Foxworth	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
FrD*: Fripp----------	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Duckston----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
FsB---- Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
HO*. Hydraquents										
JB*: Johnston----	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Bibb----	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
KeC---- Kershaw	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Le---- Leefield	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
LWC---- Lucy	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ma---- Mandarin	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Md*: Mandarin----	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.										
Me---- Mascotte	Poor	Fair	Fair	Poor	Fair	Poor	Fair	Fair	Fair	Poor.
Ms*: Mascotte----	Poor	Fair	Fair	Poor	Fair	Poor	Fair	Fair	Fair	Poor.
Urban land.										
Mt---- Meggett	Poor	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.
Oc---- Ocilla	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
Os*: Osier----	Very poor.	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
Bibb----	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Pe---- Pelham	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
Pk*. Pits										
Pn---- Ponzer	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Po---- Pooler	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Pr*: Pooler----	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Bladen----	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Rb---------- Riceboro	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Ru---------- Rutlege	Very poor.	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
St---------- Stilson	Fair	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Poor.
TC*:										
Tawcaw----------	Very poor.	Poor	Poor	Good	Fair	Fair	Fair	Poor	Fair	Fair.
Chastain----------	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good.
Ud*. Udorthents										
Wa---------- Wahee	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
As---- Albany	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
Ba---- Bayboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Bc*. Beaches						
Bd---- Bladen	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Bn---- Blanton	Severe: cutbanks cave.	Slight----	Moderate: wetness.	Slight----	Slight----	Severe: droughty.
BO*: Bohicket----	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
Capers----	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
Ca---- Cape Fear	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Ce---- Capers	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
Ch---- Chipley	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Da---- Dothan	Moderate: wetness.	Slight----	Moderate: wetness.	Slight----	Slight----	Slight.
Ea*: Echaw----	Severe: cutbanks cave.	Slight----	Moderate: wetness.	Slight----	Slight----	Moderate: droughty.
Urban land.						
Ec*: Echaw----	Severe: cutbanks cave.	Slight----	Moderate: wetness.	Slight----	Slight----	Moderate: droughty.
Centenary----	Severe: cutbanks cave.	Slight----	Moderate: wetness.	Slight----	Slight----	Severe: droughty.
Ee---- Ellabelle	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.
Eu---- Eulonia	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Fo Foxworth	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
FrD*:						
Fripp	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.	Severe: droughty.
Duckston	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: droughty, flooding.
FsB Fuquay	Moderate: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
HO*. Hydraquents						
JB*:						
Johnston	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding.
Bibb	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
KeC Kershaw	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Le Leefield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
LwC Lucy	Moderate: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Ma Mandarin	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
Md*:						
Mandarin	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
Urban land.						
Me Mascotte	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ms*:						
Mascotte	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
Mt Meggett	Severe: wetness, too clayey.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, wetness.	Severe: wetness.
Oc Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Os*: Osier	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
Bibb	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Pe Pelham	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Pk*. Pits						
Pn Ponzer	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, excess humus.
Po Pooler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Pr*: Pooler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Bladen	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Rb Riceboro	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Ru Rutlege	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
St Stilson	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
TC*: Tawcaw	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Chastain	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ud*. Udorthents						
Wa Wahee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
As---------- Albany	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
Ba---------- Bayboro	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Bc*. Beaches					
Bd---------- Bladen	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Bn---------- Blanton	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy, seepage.
BO*: Bohicket----------	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Capers----------	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Ca---------- Cape Fear	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
Ce---------- Capers	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Ch---------- Chipley	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Da---------- Dothan	Moderate: wetness, percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Good.
Ea*: Echaw----------	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
Urban land.					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EC*:					
Echaw	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
Centenary	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Ee Ellabelle	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
Eu Eulonia	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
Fo Foxworth	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
FrD*:					
Fripp	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Duckston	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
FsB Fuquay	Moderate: percs slowly.	Moderate: slope.	Slight	Slight	Fair: too sandy.
HO*. Hydraquents					
JB*:					
Johnston	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
KeC Kershaw	Severe: poor filter.	Severe: seepage.	Severe: too sandy, seepage.	Severe: seepage.	Poor: seepage, too sandy.
Le Leefield	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
LWC Lucy	Slight	Severe: seepage, slope.	Slight	Slight	Good.
Ma Mandarin	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Md*:					
Mandarin	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.
Urban land.					
Me--- Mascotte	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
Ms*:					
Mascotte	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
Urban land.					
Mt--- Meggett	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Oc--- Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Os*:					
Osier	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Pe--- Pelham	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
Pk*. Pits					
Pn--- Ponzer	Severe: wetness, percs slowly.	Severe: flooding, excess humus, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Po--- Pooler	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Pr*:					
Pooler	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Bladen	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Rb---------- Riceboro	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ru---------- Rutlege	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
St---------- Stilson	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Severe: seepage.	Fair: wetness.
TC*: Tawcaw----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, hard to pack, wetness.
Chastain----------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ud*. Udorthents					
Wa---------- Wahee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
As Albany	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Ba Bayboro	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Bc*. Beaches				
Bd Bladen	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Bn Blanton	Good	Probable	Improbable: too sandy.	Poor: too sandy.
BO*: Bohicket	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
Capers	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt, wetness.
Ca Cape Fear	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Ce Capers	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt, wetness.
Ch Chipley	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Da Dothan	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Ea*: Echaw	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
EC*: Echaw	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Centenary	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Ee Ellabelle	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Eu Eulonia	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Fo Foxworth	Good	Probable	Improbable: too sandy.	Poor: too sandy.
FrD*: Fripp	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Duckston	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
FsB Fuquay	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
HO*. Hydraquents				
JB*: Johnston	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
KeC Kershaw	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Le Leefield	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
LWC Lucy	Good	Improbable: excess fines, thin layer.	Improbable: excess fines.	Fair: too sandy.
Ma Mandarin	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Md*: Mandarin	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
Me Mascotte	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Ms*: Mascotte	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Urban land.				
Mt Meggett	Poor: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Oc Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Os*: Osier	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pe---------- Pelham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pk*. Pits				
Pn---------- Ponzer	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Po---------- Pooler	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Pr*: Pooler----------	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Bladen----------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Rb---------- Riceboro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ru---------- Rutlege	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy, wetness.
St---------- Stilson	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
TC*: Tawcaw----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Chastain----------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Ud*. Udorthents				
Wa---------- Wahee	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
As---------- Albany	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
Ba---------- Bayboro	Slight---------	Severe: wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Bc*. Beaches						
Bd---------- Bladen	Slight---------	Severe: wetness, hard to pack.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Bn---------- Blanton	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-------	Too sandy------	Droughty.
BO*: Bohicket---------	Slight---------	Severe: hard to pack, ponding, excess salt.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
Capers----------	Slight---------	Severe: hard to pack, ponding, excess salt.	Ponding, percs slowly, flooding.	Ponding, flooding, excess salt.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
Ca---------- Cape Fear	Slight---------	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ce---------- Capers	Slight---------	Severe: hard to pack, ponding, excess salt.	Ponding, percs slowly, flooding.	Ponding, flooding, excess salt.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
Ch---------- Chipley	Severe: seepage.	Severe: seepage.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.	Droughty.
Da---------- Dothan	Moderate: seepage.	Slight---------	Deep to water	Favorable------	Favorable------	Favorable.
Ea*: Echaw----------	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave	Droughty-------	Too sandy------	Droughty.
Urban land.						
EC*: Echaw----------	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave	Droughty-------	Too sandy------	Droughty.
Centenary--------	Severe: seepage.	Severe: seepage.	Cutbanks cave	Droughty-------	Too sandy------	Droughty.
Ee---------- Ellabelle	Severe: seepage.	Severe: wetness.	Ponding, flooding.	Ponding, droughty.	Ponding--------	Wetness.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Eu---------- Eulonia	Moderate: seepage.	Moderate: wetness.	Favorable------	Wetness--------	Wetness--------	Favorable.
Fo---------- Foxworth	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-------	Too sandy------	Droughty.
FrD*: Fripp----------	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, slope.	Slope, too sandy.	Slope, droughty.
Duckston---------	Severe: seepage.	Severe: seepage, wetness.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
FsB---------- Fuquay	Moderate: seepage.	Slight---------	Deep to water	Droughty-------	Too sandy------	Droughty.
HO*. Hydraquents						
JB*: Johnston---------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, cutbanks cave.	Ponding, flooding.	Ponding--------	Wetness.
Bibb----------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
KeC---------- Kershaw	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, slope.	Too sandy------	Droughty.
Le---------- Leefield	Moderate: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty.	Wetness--------	Droughty.
LWC---------- Lucy	Moderate: seepage.	Slight---------	Deep to water	Droughty, slope.	Too sandy------	Droughty.
Ma---------- Mandarin	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.	Droughty.
Md*: Mandarin---------	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.	Droughty.
Urban land.						
Me---------- Mascotte	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
Ms*: Mascotte---------	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
Urban land.						
Mt---------- Meggett	Moderate: seepage.	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Oc---------- Ocilla	Severe: seepage.	Severe: piping, wetness.	Favorable------	Wetness, droughty.	Wetness--------	Droughty.
Os*: Osier----------	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty, flooding.	Wetness, too sandy.	Wetness, droughty.
Bibb----------	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
Pe---------- Pelham	Severe: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, droughty, flooding.	Wetness--------	Wetness, droughty.
Pk*. Pits						
Pn---------- Ponzer	Moderate: seepage.	Severe: wetness.	Percs slowly, subsides.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Po---------- Pooler	Slight---------	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Pr*: Pooler----------	Slight---------	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Bladen----------	Slight---------	Severe: wetness, hard to pack.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Rb---------- Riceboro	Severe: seepage.	Severe: wetness.	Flooding, cutbanks cave.	Wetness, droughty, flooding.	Wetness--------	Wetness.
Ru---------- Rutlege	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
St---------- Stilson	Moderate: seepage.	Severe: piping.	Favorable------	Wetness, droughty.	Wetness--------	Droughty.
TC*: Tawcaw----------	Slight---------	Severe: wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Percs slowly.
Chastain----------	Slight---------	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ud*. Udorthents						
Wa---------- Wahee	Slight---------	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
As----------	0-49	Loamy fine sand	SM	A-2	0	100	100	75-90	12-23	---	NP
Albany	49-54	Sandy loam-------	SM	A-2	0	100	100	75-92	22-30	---	NP
	54-84	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	97-100	95-100	70-100	25-50	<40	NP-17
Ba----------	0-11	Loam----------	CL, ML, CL-ML	A-6, A-7	0	100	100	85-100	60-80	25-42	4-20
Bayboro	11-70	Clay loam, sandy clay, clay.	CL, CH	A-7	0	100	100	85-100	55-95	40-70	20-40
Bc*. Beaches											
Bd----------	0-13	Fine sandy loam	SM	A-2, A-4	0	100	97-100	60-85	20-50	---	NP
Bladen	13-62	Clay, sandy clay	CL, CH	A-7	0	100	99-100	75-100	55-85	45-67	23-45
	62-72	Clay, sandy clay, clay loam.	CL, CH, SC	A-4, A-6, A-7	0	100	89-99	75-95	45-75	25-60	8-35
Bn----------	0-46	Sand----------	SP-SM	A-3, A-2-4	0	100	100	65-100	5-12	---	NP
Blanton	46-66	Sandy loam, loamy sand, loamy coarse sand.	SM	A-2-4	0	100	100	65-95	13-30	---	NP
	66-79	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6	0	100	100	69-95	25-50	12-37	3-20
BO*:											
Bohicket--------	0-14	Silty clay loam	CH	A-7	0	100	99-100	98-100	90-100	60-100	30-60
	14-60	Silty clay, clay, sandy clay.	CH, MH	A-7	0	100	99-100	90-100	70-95	50-100	19-60
Capers----------	0-16	Silty clay-------	MH	A-7-5	0	100	100	80-100	70-100	50-80	15-40
	16-60	Clay, silty clay	MH	A-7-5	0	100	100	85-100	75-100	57-80	18-40
Ca----------	0-16	Fine sandy loam	SM, SC, SM-SC	A-4	0	100	95-100	70-85	36-50	<25	NP-10
Cape Fear	16-51	Clay loam, clay, silty clay.	ML, CL, MH, CH	A-7	0	100	95-100	90-100	60-85	41-65	15-35
	51-65	Variable---------	---	---	---	---	---	---	---	---	---
Ce----------	0-16	Silty clay-------	MH	A-7-5	0	100	100	80-100	70-100	50-80	15-40
Capers	16-60	Clay, silty clay	MH	A-7-5	0	100	100	85-100	75-100	57-80	18-40
Ch----------	0-6	Sand----------	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
Chipley	6-84	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	6-12	---	NP
Da----------	0-14	Loamy sand-------	SM	A-2	0	95-100	92-100	60-80	13-30	---	NP
Dothan	14-39	Sandy clay loam, sandy loam.	SM-SC, SC, SM	A-2, A-4, A-6	0	95-100	92-100	68-90	23-45	<40	NP-15
	39-60	Sandy clay loam, sandy clay.	SM-SC, SC, SM	A-2, A-4, A-6, A-7	0	95-100	92-100	70-95	30-50	25-45	4-21
Ea*:											
Echaw----------	0-5	Fine sand--------	SP, SP-SM	A-3	0	100	100	50-80	4-10	---	NP
	5-47	Loamy sand, fine sand, sand.	SM	A-2, A-3	0	100	100	50-75	5-30	---	NP
	47-70	Fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-70	5-20	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ea*:											
Urban land.											
EC*:											
Echaw	0-5	Fine sand	SP, SP-SM	A-3	0	100	100	50-80	4-10	---	NP
	5-47	Loamy sand, fine sand, sand.	SM	A-2, A-3	0	100	100	50-75	5-30	---	NP
	47-70	Fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-70	5-20	---	NP
Centenary	0-5	Fine sand	SP, SP-SM	A-3	0	100	100	60-90	4-10	---	NP
	5-61	Sand, fine sand, loamy sand.	SP-SM, SP, SM	A-3, A-2-4	0	100	100	65-90	4-20	---	NP
	61-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	60-90	3-20	---	NP
Ee	0-23	Loamy sand	SM, SP-SM	A-2, A-1	0	100	95-100	48-75	11-26	---	NP
Ellabelle	23-72	Sandy clay loam, sandy clay.	SC, CL	A-6, A-7	0	100	95-100	65-90	36-52	32-46	15-25
Eu	0-14	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	100	95-100	60-98	30-50	<30	NP-10
Eulonia	14-61	Sandy clay, clay, clay loam.	SC, CL	A-6, A-7, A-4	0	100	95-100	70-99	45-80	25-45	8-20
	61-75	Sandy clay loam, sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	100	90-100	60-100	18-50	15-35	3-15
Fo	0-74	Fine sand	SP-SM	A-3, A-2-4	0	100	100	60-100	5-12	---	NP
Foxworth											
FrD*:											
Fripp	0-7	Fine sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
	7-99	Fine sand, sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
Ducksston	0-72	Sand	SP-SM, SP	A-3	0	100	95-100	60-75	3-10	---	NP
FsB	0-29	Loamy sand	SP-SM, SM	A-2, A-3	0	95-100	90-100	50-83	5-35	---	NP
Fuquay	29-41	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	85-100	85-100	70-90	23-45	<25	NP-13
	41-76	Sandy clay loam	SC	A-2, A-4, A-6	0	95-100	90-100	60-93	28-49	20-49	8-25
HO*.											
Hydraquents											
JB*:											
Johnston	0-43	Mucky loam	OL, ML, CL-ML	A-8, A-4, A-5	0	100	100	90-100	51-75	20-45	2-10
	43-60	Stratified fine sandy loam to sandy loam.	SM	A-2, A-4	0	100	100	50-100	25-49	<35	NP-10
Bibb	0-65	Sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0-5	95-100	90-100	60-90	30-60	<25	NP-7
KeC	0-99	Sand	SP, SP-SM, SW	A-2, A-3	0	98-100	98-100	50-80	1-7	---	NP
Kershaw											
Le	0-22	Loamy sand	SM, SW-SM, SP-SM	A-2	0	98-100	95-100	65-95	10-20	---	NP
Leefield	22-38	Sandy loam, sandy clay loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	95-100	93-100	65-95	20-40	<40	NP-16
	38-72	Sandy loam, sandy clay loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	95-100	95-100	65-90	20-40	<40	NP-20

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LWC---------- Lucy	0-24	Loamy sand-------	SM, SP-SM	A-2	0	98-100	95-100	50-87	10-30	---	NP
	24-75	Sandy loam, sandy clay loam, clay loam.	SC, SM-SC, SM	A-2, A-6, A-4	0	100	95-100	60-95	20-50	20-40	3-20
Ma---------- Mandarin	0-12	Fine sand--------	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-10	---	NP
	12-20	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	20-45	Fine sand, sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-7	---	NP
	45-72	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
Md*:											
Mandarin--------	0-12	Fine sand--------	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-10	---	NP
	12-20	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	20-45	Fine sand, sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-7	---	NP
	45-72	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
Urban land.											
Me---------- Mascotte	0-14	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	14-18	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	18-32	Fine sand, sand, loamy fine sand.	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	32-70	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	85-100	19-45	<38	NP-15
Ms*:											
Mascotte--------	0-14	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	14-18	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	18-32	Fine sand, sand, loamy fine sand.	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	32-70	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	85-100	19-45	<38	NP-15
Urban land.											
Mt---------- Meggett	0-6	Fine sandy loam	SM	A-2, A-4	0	100	90-100	85-100	13-41	---	NP
	6-14	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	85-100	51-90	30-60	20-30
	14-46	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	85-100	51-90	30-60	20-30
	46-65	Sandy clay, clay loam, sandy clay loam.	CL, SC, SM	A-4, A-6	0	90-100	65-100	50-100	40-60	<40	NP-25
Oc---------- Ocilla	0-34	Loamy fine sand	SM, SP-SM	A-2, A-3	0	100	95-100	75-100	8-35	---	NP
	34-72	Sandy loam, sandy clay loam.	SM, CL, SC	A-2, A-4, A-6	0	100	95-100	80-100	30-55	<40	NP-18

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Os*:											
Osier	0-11	Loamy sand	SP-SM	A-2, A-3	0	100	98-100	60-85	5-12	---	NP
	11-36	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	65-90	5-20	---	NP
	36-65	Coarse sand, sand, fine sand.	SP, SP-SM	A-1, A-3	0	100	90-100	40-60	2-10	---	NP
Bibb	0-65	Sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0-5	95-100	90-100	60-90	30-60	<25	NP-7
Pe	0-25	Loamy sand	SM	A-2	0	100	95-100	75-90	15-30	---	NP
Pelham	25-48	Sandy clay loam, sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-90	30-50	15-30	2-12
	48-63	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC, ML, CL	A-2, A-4, A-6, A-7	0	100	95-100	65-90	30-65	15-45	5-20
Pk*. Pits											
Pn	0-46	Muck	Pt	---	---	---	---	---	---	---	---
Ponzer	46-72	Loam, sandy clay loam, silt loam.	SM, ML, SC, CL	A-2, A-4, A-6	0	100	100	60-95	30-95	<40	NP-20
Po	0-5	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4, A-6	0	100	95-100	51-98	20-75	<40	NP-20
Pooler	5-11	Sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2, A-4	0	100	95-100	55-95	25-50	20-35	4-10
	11-56	Clay, sandy clay	CH, CL, MH	A-7	0	100	95-100	70-100	50-95	45-65	20-40
	56-86	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-6, A-7	0	100	85-100	60-80	25-75	30-50	11-25
Pr*:											
Pooler	0-5	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4, A-6	0	100	95-100	51-98	20-75	<40	NP-20
	5-11	Sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2, A-4	0	100	95-100	55-95	25-50	20-35	4-10
	11-56	Clay, sandy clay	CH, CL, MH	A-7	0	100	95-100	70-100	50-95	45-65	20-40
	56-86	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-6, A-7	0	100	85-100	60-80	25-75	30-50	11-25
Bladen	0-13	Fine sandy loam	SM	A-2, A-4	0	100	97-100	60-85	20-50	---	NP
	13-62	Clay, sandy clay	CL, CH	A-7	0	100	99-100	75-100	55-85	45-67	23-45
	62-72	Clay, sandy clay, clay loam.	CL, CH, SC	A-4, A-6, A-7	0	100	89-99	75-95	45-75	25-60	8-35
Rb	0-25	Loamy fine sand	SM	A-2	0	100	95-100	75-90	15-30	---	NP
Riceboro	25-29	Sandy clay loam, clay loam.	SC, CL	A-6	0	100	95-100	65-85	40-55	32-40	16-23
	29-70	Sandy clay, clay	CL, CH, MH	A-7, A-6	0	100	95-100	70-100	50-75	38-65	20-40
Ru	0-21	Fine sand	SM, SP-SM	A-2, A-3	0	95-100	95-100	50-80	5-35	<25	NP
Rutlege	21-63	Sand, loamy sand, loamy fine sand.	SP-SM, SP, SM	A-2, A-3	0	95-100	95-100	50-80	2-25	<20	NP
St	0-29	Loamy sand	SM	A-2	0	94-100	94-100	74-92	15-24	---	NP
Stilson	29-35	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-6, A-4	0	89-100	86-100	77-94	28-41	<29	NP-13
	35-72	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-6, A-4	0	96-100	95-100	70-99	30-50	<40	NP-20

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
TC*:											
Tawcaw	0-6	Clay	CL, MH, CH, ML	A-7	0	100	100	90-100	75-98	40-75	16-40
	6-56	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	90-100	51-98	30-65	11-33
	56-65	Variable	---	---	---	---	---	---	---	---	---
Chastain	0-15	Clay loam	ML, CL, MH, CH	A-6, A-7	0	100	100	90-100	75-98	35-75	12-40
	15-52	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0	100	100	95-100	85-98	35-75	12-40
	52-60	Silty clay loam, silty clay, sandy clay loam.	CL, CH, ML, MH	A-6, A-7	0	100	100	90-100	51-90	30-78	11-42
Ud*. Udorthents											
Wa	0-14	Sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	50-98	30-50	<28	NP-7
Wahee	14-54	Clay, clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	85-100	51-90	38-70	18-42
	54-75	Variable	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm³	In/hr	In/in	pH	Mmhos/cm				Pct
As----------	0-49	5-10	---	6.0-20	0.02-0.04	3.6-6.5	<2	Low----------	0.17	5	1-2
Albany	49-54	10-20	---	2.0-6.0	0.08-0.10	4.5-6.0	<2	Low----------	0.20		
	54-84	15-35	---	0.6-2.0	0.10-0.16	4.5-6.0	<2	Low----------	0.24		
Ba----------	0-11	10-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-5.5	<2	Low----------	0.17	---	4-15
Bayboro	11-70	35-60	1.20-1.40	0.06-0.2	0.14-0.18	4.5-5.5	<2	Moderate----	0.32		
Bc*.											
Beaches											
Bd----------	0-13	10-20	---	0.6-2.0	0.10-0.13	3.6-5.5	<2	Low----------	0.10	5	1-3
Bladen	13-62	35-55	---	0.06-0.2	0.12-0.16	3.6-5.5	<2	Moderate----	----		
	62-72	35-70	---	0.06-0.2	0.12-0.16	3.6-5.5	<2	Moderate----	----		
Bn----------	0-46	2-7	1.35-1.60	6.0-20	0.03-0.07	4.5-6.0	<2	Very low----	0.17	5	.5-1
Blanton	46-66	10-18	1.53-1.65	2.0-6.0	0.10-0.15	4.5-5.5	<2	Low----------	0.24		
	66-79	12-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.32		
BO*:											
Bohicket--------	0-14	30-60	1.2-1.4	0.06-0.2	0.14-0.18	6.1-8.4	>8	High---------	0.32	5	---
	14-60	35-60	1.3-1.6	<0.06	0.12-0.16	6.1-8.4	>8	High---------	0.24		
Capers----------	0-16	35-50	---	0.06-0.2	0.01-0.03	6.6-7.8	>16	High---------	----	---	---
	16-60	40-70	---	<0.06	0.01-0.03	6.6-8.4	>16	High---------	----		
Ca----------	0-16	5-15	1.40-1.60	2.0-6.0	0.11-0.15	4.5-6.5	<2	Low----------	0.17	5	5-15
Cape Fear	16-51	35-60	1.25-1.40	0.06-0.2	0.12-0.22	4.5-6.0	<2	Moderate----	0.32		
	51-65	5-30	1.40-1.70	---	---	---	<2	----------	----		
Ce----------	0-16	35-50	---	0.06-0.2	0.01-0.03	6.6-7.8	>16	High---------	----	---	---
Capers	16-60	40-70	---	<0.06	0.01-0.03	6.6-8.4	>16	High---------	----		
Ch----------	0-6	1-5	1.35-1.45	6.0-20	0.05-0.10	3.6-6.0	<2	Very low----	0.17	5	2-5
Chipley	6-84	1-7	1.45-1.60	6.0-20	0.03-0.08	4.5-6.5	<2	Very low----	0.17		
Da----------	0-14	5-15	---	2.0-6.0	0.06-0.10	4.5-5.5	<2	Very low----	0.20	4	<.5
Dothan	14-39	18-35	---	0.6-2.0	0.12-0.16	4.5-5.5	<2	Low----------	0.28		
	39-60	18-40	---	0.2-0.6	0.08-0.12	4.5-5.5	<2	Low----------	0.28		
Ea*:											
Echaw----------	0-5	1-8	1.40-1.60	2.0-20	0.03-0.08	4.5-6.0	<2	Low----------	0.10	5	<1
	5-47	2-10	1.40-1.60	6.0-20	0.05-0.10	4.5-6.0	<2	Low----------	0.10		
	47-70	2-10	1.50-1.70	2.0-20	0.03-0.08	4.5-6.0	<2	Low----------	0.10		
Urban land.											
EC*:											
Echaw----------	0-5	1-8	1.40-1.60	2.0-20	0.03-0.08	4.5-6.0	<2	Low----------	0.10	5	<1
	5-47	2-10	1.40-1.60	6.0-20	0.05-0.10	4.5-6.0	<2	Low----------	0.10		
	47-70	2-10	1.50-1.70	2.0-20	0.03-0.08	4.5-6.0	<2	Low----------	0.10		
Centenary-------	0-5	1-8	1.40-1.60	6.0-20	0.03-0.08	4.5-6.5	<2	Low----------	0.10	5	<1
	5-61	2-8	1.40-1.60	6.0-20	0.03-0.05	4.5-6.0	<2	Low----------	0.10		
	61-80	2-10	1.50-1.70	2.0-6.0	0.03-0.08	4.5-6.0	<2	Low----------	0.10		
Ee----------	0-23	5-10	---	2.0-6.0	0.05-0.08	4.5-5.5	<2	Very low----	0.10	5	---
Ellabelle	23-72	18-40	---	0.6-2.0	0.12-0.18	4.5-5.5	<2	Low----------	0.15		
Eu----------	0-14	5-20	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.5	<2	Low----------	0.28	5	.5-2
Eulonia	14-61	35-45	1.50-1.70	0.2-0.6	0.12-0.16	4.5-6.5	<2	Low----------	0.24		
	61-75	15-35	1.50-1.70	0.6-2.0	0.10-0.14	4.5-6.0	<2	Low----------	0.20		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm				Pct
Fo----------	0-74	2-8	1.35-1.55	>20	0.05-0.10	4.5-6.0	<2	Low----------	0.17	5	>1
Foxworth											
FrD*:											
Fripp----------	0-7	<5	1.3-1.7	6.0-20	0.02-0.08	5.1-7.8	<2	Low----------	0.10	5	<1
	7-99	<5	1.3-1.7	6.0-20	0.02-0.06	5.6-7.8	<2	Low----------	0.10		
Duckston--------	0-72	0-4	1.60-1.70	>20	0.02-0.05	5.6-8.4	<2	Low----------	0.10	5	.5-1
FsB----------	0-29	2-10	1.60-1.70	>6.0	0.04-0.09	4.5-6.0	<2	Low----------	0.15	5	.5-2
Fuquay	29-41	10-35	1.40-1.60	0.6-2.0	0.12-0.15	4.5-6.0	<2	Low----------	0.20		
	41-76	20-35	1.40-1.60	0.06-0.2	0.10-0.13	4.5-6.0	<2	Low----------	0.20		
HO*.											
Hydraquents											
JB*:											
Johnston--------	0-43	7-18	1.25-1.45	2.0-6.0	0.20-0.26	4.5-5.5	<2	Low----------	0.17	5	8-18
	43-60	5-20	1.45-1.65	6.0-20	0.06-0.12	4.5-5.5	<2	Low----------	0.17		
Bibb----------	0-65	2-18	---	0.6-2.0	0.12-0.18	4.5-5.5	<2	Low----------	0.20	5	.5-2
KeC----------	0-99	---	---	>20	0.02-0.05	4.5-6.0	<2	Very low-----	0.15	5	---
Kershaw											
Le----------	0-22	5-10	---	6.0-20	0.04-0.07	4.5-6.0	<2	Low----------	0.10	5	1-2
Leefield	22-38	15-25	---	0.6-2.0	0.10-0.13	4.5-5.5	<2	Low----------	0.15		
	38-72	15-30	---	0.2-0.6	0.08-0.12	4.5-5.5	<2	Low----------	0.10		
LWC----------	0-24	1-12	---	6.0-20	0.06-0.10	5.1-5.5	<2	Low----------	0.20	5	.5-1
Lucy	24-75	20-35	---	0.6-2.0	0.12-0.14	4.5-5.5	<2	Low----------	0.28		
Ma----------	0-12	<3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	<2	Low----------	0.15	5	<3
Mandarin	12-20	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low----------	0.20		
	20-45	<3	1.35-1.45	6.0-20	0.03-0.07	5.6-7.3	<2	Low----------	0.15		
	45-72	2-9	1.45-1.60	0.6-2.0	0.10-0.15	5.6-7.3	<2	Low----------	0.15		
Md*:											
Mandarin--------	0-12	<3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	<2	Low----------	0.15	5	<3
	12-20	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low----------	0.20		
	20-45	<3	1.35-1.45	6.0-20	0.03-0.07	5.6-7.3	<2	Low----------	0.15		
	45-72	2-9	1.45-1.60	0.6-2.0	0.10-0.15	5.6-7.3	<2	Low----------	0.15		
Urban land.											
Me----------	0-14	1-8	1.20-1.45	6.0-20	0.03-0.08	3.6-5.5	<2	Very low-----	0.20	5	3-11
Mascotte	14-18	5-12	1.35-1.50	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low-----	0.20		
	18-32	2-8	1.35-1.50	6.0-20	0.03-0.08	3.6-5.5	<2	Very low-----	0.20		
	32-70	14-35	1.45-1.65	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.32		
Ms*:											
Mascotte--------	0-14	1-8	1.20-1.45	6.0-20	0.03-0.08	3.6-5.5	<2	Very low-----	0.20	5	3-11
	14-18	5-12	1.35-1.50	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low-----	0.20		
	18-32	2-8	1.35-1.50	6.0-20	0.03-0.08	3.6-5.5	<2	Very low-----	0.20		
	32-70	14-35	1.45-1.65	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.32		
Urban land.											
Mt----------	0-6	5-20	---	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low----------	0.24	4	2-8
Meggett	6-14	40-60	---	0.06-0.2	0.13-0.18	5.1-8.4	<2	High---------	0.32		
	14-46	40-60	---	0.06-0.2	0.13-0.18	6.1-8.4	<2	High---------	0.32		
	46-65	25-50	---	0.2-2.0	0.12-0.16	6.1-8.4	<2	Moderate-----	0.28		
Oc----------	0-34	4-10	---	2.0-20	0.05-0.08	4.5-5.5	<2	Low----------	0.17	5	1-2
Ocilla	34-72	15-35	---	0.6-2.0	0.09-0.12	4.5-5.5	<2	Low----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm				Pct
Os*:											
Osier	0-11	5-10	---	6.0-20	0.03-0.10	4.5-6.0	<2	Low	0.10	5	---
	11-36	5-10	---	6.0-20	0.03-0.10	4.5-6.0	<2	Low	0.10		
	36-65	2-5	---	>20	0.02-0.05	4.5-6.0	<2	Low	0.05		
Bibb	0-65	2-18	---	0.6-2.0	0.12-0.18	4.5-5.5	<2	Low	0.20	5	.5-2
Pe	0-25	5-10	---	6.0-20	0.05-0.08	4.5-5.5	<2	Very low	0.10	5	1-2
Pelham	25-48	15-30	---	0.6-2.0	0.10-0.13	4.5-5.5	<2	Low	0.24		
	48-63	15-40	---	0.6-2.0	0.10-0.16	4.5-5.5	<2	Low	0.24		
Pk*.											
Pits											
Pn	0-46	---	0.40-0.65	0.06-2.0	0.35-0.45	3.6-4.4	<2	Low	----	---	25-60
Ponzer	46-72	5-25	1.30-1.60	0.06-2.0	0.10-0.24	3.6-6.5	<2	Low	0.24		
Po	0-5	8-30	---	0.6-2.0	0.10-0.16	3.6-5.5	<2	Low	0.10	5	2-3
Pooler	5-11	8-30	---	0.6-2.0	0.11-0.17	3.6-5.5	<2	Low	0.10		
	11-56	35-50	---	0.06-0.2	0.12-0.18	3.6-5.5	<2	Moderate	0.10		
	56-86	15-30	---	0.2-0.6	0.12-0.16	3.6-5.5	<2	Low	----		
Pr*:											
Pooler	0-5	8-30	---	0.6-2.0	0.10-0.16	3.6-5.5	<2	Low	0.10	5	2-3
	5-11	8-30	---	0.6-2.0	0.11-0.17	3.6-5.5	<2	Low	0.10		
	11-56	35-50	---	0.06-0.2	0.12-0.18	3.6-5.5	<2	Moderate	0.10		
	56-86	15-30	---	0.2-0.6	0.12-0.16	3.6-5.5	<2	Low	----		
Bladen	0-13	10-20	---	0.6-2.0	0.10-0.13	3.6-5.5	<2	Low	0.10	5	1-3
	13-62	35-55	---	0.06-0.2	0.12-0.16	3.6-5.5	<2	Moderate	----		
	62-72	35-70	---	0.06-0.2	0.12-0.16	3.6-5.5	<2	Moderate	----		
Rb	0-25	5-10	---	6.0-20	0.05-0.08	4.5-5.5	<2	Low	0.10	5	1-2
Riceboro	25-29	25-40	---	0.2-0.6	0.08-0.14	4.5-5.5	<2	Moderate	0.20		
	29-70	35-60	---	0.06-0.2	0.12-0.16	4.5-5.5	<2	Moderate	0.24		
Ru	0-21	<10	---	6.0-20	0.04-0.10	3.6-5.0	<2	Low	0.17	5	3-15
Rutlege	21-63	<10	---	6.0-20	0.04-0.08	3.6-5.0	<2	Low	0.17		
St	0-29	3-8	---	6.0-20	0.06-0.09	4.5-5.5	<2	Low	0.17	5	.5-1
Stilson	29-35	15-30	---	0.6-2.0	0.09-0.12	4.5-5.5	<2	Low	0.24		
	35-72	18-35	---	0.6-2.0	0.08-0.10	4.5-5.5	<2	Low	0.17		
TC*:											
Tawcaw	0-6	40-60	1.30-1.60	0.06-0.2	0.12-0.18	4.5-6.5	<2	Moderate	0.32	5	2-5
	6-56	35-70	1.30-1.60	0.06-0.2	0.12-0.16	4.5-6.5	<2	Moderate	0.37		
	56-65	---	---	---	---	---	---	---	----		
Chastain	0-15	27-50	1.20-1.40	0.06-0.2	0.12-0.16	4.5-6.0	<2	Moderate	0.32	5	2-6
	15-52	35-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	<2	Moderate	0.37		
	52-60	30-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	<2	Moderate	0.37		
Ud*.											
Udorthents											
Wa	0-14	5-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low	0.28	5	.5-5
Wahee	14-54	35-55	1.40-1.60	0.06-0.2	0.12-0.20	3.6-5.5	<2	Moderate	0.28		
	54-75	---	---	0.2-0.6	0.12-0.20	3.6-5.5	<2	Moderate	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
As---------- Albany	C	None--------	---	---	1.0-2.5	Apparent	Dec-Mar	---	---	High-----	High.
Ba---------- Bayboro	D	None--------	---	---	0-1.0	Apparent	Dec-May	---	---	High-----	High.
Bc*. Beaches											
Bd---------- Bladen	D	None--------	---	---	0-1.0	Apparent	Dec-May	---	---	High-----	High.
Bn---------- Blanton	A	None--------	---	---	5.0-6.0	Perched	Jan-Apr	---	---	High-----	High.
BO*:											
Bohicket----------	D	Frequent----	Very brief	Jan-Dec	+3-0	Apparent	Jan-Dec	3-6	6-12	High-----	High.
Capers----------	D	Frequent----	Very brief	Jan-Dec	+1-1.0	Apparent	Jan-Dec	3-6	4-8	High-----	High.
Ca---------- Cape Fear	D	Rare--------	---	---	0-1.5	Apparent	Dec-Apr	---	---	High-----	High.
Ce---------- Capers	D	Frequent----	Very brief	Jan-Dec	+1-1.0	Apparent	Jan-Dec	3-6	4-8	High-----	High.
Ch---------- Chipley	C	None--------	---	---	2.0-3.0	Apparent	Dec-Mar	---	---	Low------	High.
Da---------- Dothan	B	None--------	---	---	3.0-5.0	Perched	Jan-Apr	---	---	Moderate	Moderate.
Ea*:											
Echaw----------	B	None--------	---	---	2.5-5.0	Apparent	Nov-Apr	---	---	Low------	High.
Urban land.											
EC*:											
Echaw----------	B	None--------	---	---	2.5-5.0	Apparent	Nov-Apr	---	---	Low------	High.
Centenary--------	B	None--------	---	---	3.5-5.0	Apparent	Dec-Mar	---	---	Moderate	High.
Ee---------- Ellabelle	D	Frequent----	Very long	Nov-Apr	+1-0.5	Apparent	Nov-Apr	---	---	High-----	High.
Eu---------- Eulonia	C	None--------	---	---	1.5-3.5	Apparent	Dec-May	---	---	Moderate	High.
Fo---------- Foxworth	A	None--------	---	---	3.5-6.0	Apparent	Dec-Apr	---	---	Low------	High.
FrD*:											
Fripp----------	A	Rare--------	---	---	>6.0	---	---	---	---	Low------	Low.
Duckston---------	D	Frequent----	Brief-----	Jan-Dec	1.0-2.0	Apparent	Jan-Dec	---	---	Low------	Low.
FsB---------- Fuquay	B	None--------	---	---	4.0-6.0	Perched	Jan-Mar	---	---	Low------	High.
HO*. Hydraquents											

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
JB*: Johnston	D	Frequent	Brief to long.	Nov-Jul	+1-1.5	Apparent	Nov-Jun	---	---	High	High.
Bibb	C	Frequent	Brief	Dec-May	0.5-1.5	Apparent	Dec-Apr	---	---	High	Moderate.
KeC--Kershaw	A	None	---	---	>6.0	---	---	---	---	Low	High.
Le--Leefield	C	None	---	---	1.5-2.5	Apparent	Dec-Mar	---	---	Moderate	High.
LWC--Lucy	A	None	---	---	>6.0	---	---	---	---	Low	High.
Ma--Mandarin	C	None	---	---	1.5-3.5	Apparent	Jun-Dec	---	---	Moderate	High.
Md*: Mandarin	C	None	---	---	1.5-3.5	Apparent	Jun-Dec	---	---	Moderate	High.
Urban land.											
Me--Mascotte	B/D	None	---	---	0-1.0	Apparent	Jun-Sep	---	---	High	High.
Ms*: Mascotte	B/D	None	---	---	0-1.0	Apparent	Jun-Sep	---	---	High	High.
Urban land.											
Mt--Meggett	D	None	---	---	0-1.0	Apparent	Nov-Apr	---	---	High	Moderate.
Oc--Ocilla	C	None	---	---	1.0-2.5	Apparent	Dec-Apr	---	---	High	Moderate.
Os*: Osier	D	Frequent	Brief	Dec-Apr	0-1.0	Apparent	Nov-Mar	---	---	High	High.
Bibb	C	Frequent	Brief	Dec-May	0.5-1.5	Apparent	Dec-Apr	---	---	High	Moderate.
Pe--Pelham	B/D	Frequent	Brief	Dec-Mar	0.5-1.5	Apparent	Jan-Apr	---	---	High	High.
Pk*. Pits											
Pn--Ponzer	D	Frequent	Very long	Dec-Apr	0-1.0	Apparent	Dec-May	<12	18-24	High	High.
Po--Pooler	D	None	---	---	0-1.0	Apparent	Dec-May	---	---	High	High.
Pr*: Pooler	D	None	---	---	0-1.0	Apparent	Dec-May	---	---	High	High.
Bladen	D	None	---	---	0-1.0	Apparent	Dec-May	---	---	High	High.
Rb--Riceboro	B/D	Frequent	Very brief	Dec-Apr	0.5-1.0	Apparent	Jan-May	---	---	High	High.
Ru--Rutlege	D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	---	---	High	High.
St--Stilson	B	None	---	---	2.5-3.0	Perched	Dec-Apr	---	---	Moderate	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
TC*:											
Tawcaw	C	Frequent	Long	Dec-Apr	1.5-2.5	Apparent	Nov-Apr	---	---	High	High.
Chastain	D	Frequent	Very long	Dec-Apr	0-1.0	Apparent	Nov-May	---	---	High	High.
Ud*.											
Udorthents											
Wa	D	Frequent	Brief	Dec-Apr	0.5-1.5	Apparent	Dec-Mar	---	---	High	High.
Wahee											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution							Liquid limit	Plasticity index	Moisture density		Percentage volume change		
			Percentage passing sieve--				Percentage smaller than--									
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	Total	Swell	Shrink
										Pct		Lb/ft^3	Pct	Pct	Pct	Pct
Eulonia fine sandy loam:* (S77GA-179-002)																
A2----------4-14	A-4(00)	SM	100	100	98	43	28	14	10	--	NP	115	12	15.2	13.9	1.3
B22t--------25-33	A-7-6 (13)	CL	100	99	99	70	62	56	52	45	19	97	22	28.7	11.8	16.9
C----------61-75	A-4(00)	SC	100	100	100	38	35	32	31	30	9	105	15	17.1	9.7	7.4
Stilson loamy sand:** (S77GA-183-001)																
A2----------6-29	A-2-4 (00)	SM	100	100	91	21	14	10	8	--	NP	115	12	8.8	6.8	2.0
B22t--------43-61	A-2-4 (00)	SM	100	100	94	35	30	25	22	--	NP	115	13	11.2	6.7	4.5
B24tg-------66-72	A-6(05)	SC	100	100	91	47	39	36	35	39	18	103	15	11.2	4.5	6.7

* Eulonia fine sandy loam: In a wooded area 0.62 mile south from the intersection of U.S. Highway 17 and State Highway 196; 175 feet east of U.S. Highway 17; Liberty County.

** Stilson loamy sand: In a pine plantation 1.75 miles north of Ludowici on U.S. Highway 301; 0.25 mile mile east on dirt road and 30 feet west of road; Long County.

TABLE 19.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Albany	Loamy, siliceous, thermic Grossarenic Paleudults
Bayboro	Clayey, mixed, thermic Umbric Paleaquults
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Bladen	Clayey, mixed, thermic Typic Albaquults
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Bohicket	Fine, mixed, nonacid, thermic Typic Sulfaquents
Cape Fear	Clayey, mixed, thermic Typic Umbraquults
Capers	Fine, mixed, nonacid, thermic Typic Sulfaquents
Centenary	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
Chastain	Fine, kaolinitic, acid, thermic Typic Fluvaquents
Chipley	Thermic, coated Aquic Quartzipsamments
Dothan	Fine-loamy, siliceous, thermic Plinthic Paleudults
Duckston	Siliceous, thermic Typic Psammaquents
Echaw	Sandy, siliceous, thermic Entic Haplohumods
Ellabelle	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Eulonia	Clayey, mixed, thermic Aquic Hapludults
Foxworth	Thermic, coated Typic Quartzipsamments
Fripp	Thermic, uncoated Typic Quartzipsamments
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Johnston	Coarse-loamy, siliceous, acid, thermic Cumulic Humaquepts
Kershaw	Thermic, uncoated Typic Quartzipsamments
Leefield	Loamy, siliceous, thermic Arenic Plinthaquic Paleudults
Lucy	Loamy, siliceous, thermic Arenic Paleudults
*Mandarin	Sandy, siliceous, thermic Typic Haplohumods
Mascotte	Sandy, siliceous, thermic Ultic Haplaquods
Meggett	Fine, mixed, thermic Typic Albaqualfs
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Osier	Siliceous, thermic Typic Psammaquents
Pelham	Loamy, siliceous, thermic Arenic Paleaquults
Ponzer	Loamy, mixed, dysic, thermic Terric Medisaprists
Pooler	Clayey, mixed, thermic Typic Ochraquults
Riceboro	Clayey, mixed, thermic Arenic Paleaquults
Rutlege	Sandy, siliceous, thermic Typic Humaquepts
Stilson	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Tawcaw	Fine, kaolinitic, thermic Fluvaquentic Dystrochrepts
Wahee	Clayey, mixed, thermic Aeric Ochraquults

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