SOIL SURVEY

Ben Hill and Irwin Counties

Georgia

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

Issued April 1969

Major fieldwork for this soil survey was done in the period 1963–64. Soil names and descriptions were approved in 1965. Unless otherwise indicated, statements in the publication refer to conditions in Ben Hill and Irwin Counties in 1965. 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 offered to the Middle South Georgia Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Ben Hill and Irwin Counties contains information that can be applied in managing farms and woodland; in selecting sites for roads, ponds, buildings, or other structures; and in appraising the suitability of tracts of land for agriculture, industry, or recreation.

Locating Soils

All of the soils in Ben Hill and Irwin Counties are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the two counties in alphabetic order by map symbol. It shows the page where each kind of soil is described and also the page for the capability unit, woodland suitability group, and wildlife suitability group in which the soil has been placed.

Interpretations not included in the text can be developed by using the soil map and information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils in the descriptions of the soils and in the discussions of the capability units.

Foresters and others can refer to the subsection "Use of the Soils as Woodland," where the soils of the two counties are grouped according to their suitability for trees.

Game managers, sportsmen, and others concerned with wildlife will find information about soils and wildlife in the subsection "Use of Soils for Wildlife and Fish."

Community planners and others concerned with major nonfarm uses of soils can read about the soil properties that affect the choice of homesites, industrial sites, schools, and parks in the subsection "Major Nonfarm Uses of Soils."

Engineers and builders will find under "Engineering Uses of Soils" tables that give engineering properties of the soils in the two counties and that name soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation, Morphology, and Classification of Soils."

Newcomers in Ben Hill and Irwin Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the Area," which gives additional information about the two counties.

***Cover picture.*—Corn and peanuts on contoured and terraced class II land. Soil is Tifton loamy sand, 2 to 5 percent slopes.**

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

Contents

Issued April 1969

SOIL SURVEY OF BEN HILL AND IRWIN COUNTIES, GEORGIA

REPORT BY JOHN W. CALHOUN AND GARNET J. WOOD, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY JOHN W. CALHOUN, JOE G. STEVENS, AND WINFIELD S. CARSON, SOIL CONSERVATION SERVICE[1]

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

BEN HILL AND IRWIN COUNTIES, in the south-central part of Georgia (fig. 1), have a total land area of about 627 square miles, or 401,280 acres. The area of Ben Hill County is about 255 square miles, or 163,200 acres, and that of Irwin County is about 372 square miles, or 238,080 acres.

The Ocmulgee River forms the northeastern boundary of Ben Hill County. The Alapaha River forms the western boundary of Ben Hill County and the northwestern and southwestern boundaries of Irwin County. The Willacoochee and Satilla Rivers originate in the central part of Ben Hill County and flow southeastward through the southern part of that county and the eastern part of Irwin County.

In most of the acreage in the two counties, the soils are level or very gently sloping and occur on uplands that are cut by many small, shallow streams. Almost one-half of the survey area consists of well-drained soils that are well suited to and are used extensively for corn, peanuts, cotton, tobacco, and truck crops. In the northern and northeastern parts of Ben Hill County, the soils are hilly and are more clayey and more eroded than are the soils in other parts of the survey area. Much of this eroded acreage was formerly cultivated, but it is now in pasture or is planted to slash pine.

Most of the farms in the county are of the general type, though livestock farms and field crop farms are numerous. A considerable acreage is in pasture. More than one-third of the farm income is from the sale of livestock and livestock products. Another important source of income is the extensive pine forest that produces lumber, pulpwood, turpentine, and poles. Most of the acreage in the county is owned by individuals, but the pulp and paper companies are increasing their acreage.

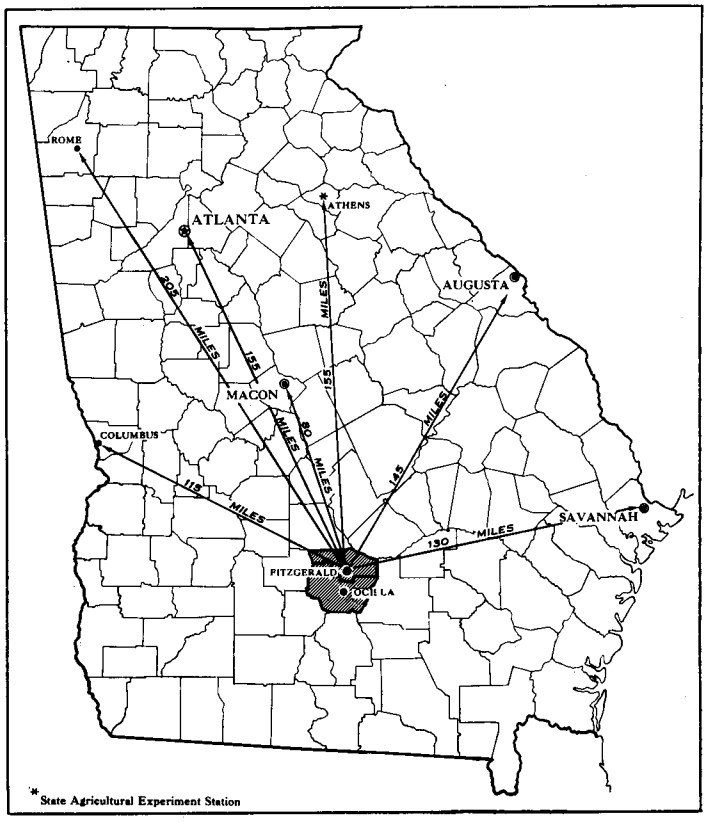

Figure 1.—**Location of Ben Hill and Irwin Counties in Georgia.**

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Ben Hill and Irwin Counties, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose 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 that has not been changed much by leaching or by roots of plants.

[1] Assisting with the fieldwork were RICHARD H. GILBERT and RUSSELL O. NEAL, Soil Conservation Service.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Carnegie and Tifton, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can differ somewhat in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Carnegie sandy loam and Carnegie sandy clay loam are two soil types in the Carnegie series. The difference in texture of their surface layer is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number, and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management. For example, Tifton loamy sand, 2 to 5 percent slopes, is one of several phases of Tifton loamy sand, a soil type that ranges from level or nearly level to gently sloping.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodland, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this soil survey was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size that it is not practical to show them separately on the map. Therefore, they show this mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major kinds of soil in it, for example, Osier-Bibb complex. In some places two or more similar soils are mapped as a single unit, called an undifferentiated soil group, if the differences between the soils are too small to justify separate mapping. An example in these two counties is Leaf and Chastain soils. Most surveys include areas where the soil material is so rocky, so shallow, or so frequently worked by wind and water that it cannot be classified by soil series. These areas are shown on the map like other mapping units, but are given descriptive names, such as Swamp, and are called land types.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil surveys. On the basis of the yield and practice tables and other data, the soil scientists set up trial groups, and then test them by further study and by consultation with farmers, agronomists, engineers, and others. The scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in colors, the soil associations in Ben Hill and Irwin Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, or other characteristics that affect management. Thus, the general soil map shows, not the kind of soil at any particular place, but patterns of soils, in each of which there are several different kinds of soils.

The ten soil associations in Ben Hill and Irwin Counties shown on the general soil map are described in the following pages.

1. Tifton-Carnegie-Fuquay Association

Well-drained, gently sloping and sloping soils on dissected upland ridges

This association is made up mainly of gently sloping and sloping, eroded ridges that are dissected by small inter-

mittent streams. Slopes range from 3 to 12 percent. Most of this association is in sloping areas adjacent to and west of the flood plains of the Alapaha, Willacoochee, and Satilla Rivers. The association covers about 4 percent of Ben Hill and Irwin Counties.

The Tifton soils occupy about 50 percent of this association; the Carnegie soils, 20 percent; and the Fuquay soils, 15 percent. Alapaha, Cowarts, and Sunsweet soils make up the rest.

The Tifton and Carnegie soils occur together on the ridges, where the Carnegie soils are generally on the steeper slopes. Both kinds of soils are well drained. The Tifton soils have a sandy surface layer over a friable, yellowish-brown sandy clay loam subsoil. The Carnegie soils have a sandy loam surface layer over a friable sandy clay loam subsoil that is slightly redder and slightly finer textured than the subsoil of the Tifton soils. Also, the subsoil of the Carnegie soils is mottled and contains plinthite at a depth of 18 to 26 inches. The Fuquay soils occupy ridges and gentle slopes. These soils have a sandy surface layer that is about 20 to 40 inches thick over a friable, light yellowish-brown sandy clay loam subsoil. Because of the thick, sandy surface layer, Fuquay soils are slightly droughty.

Of the minor soils, the Alapaha are on low flats and in small drainageways and are poorly drained. The Cowarts and Sunsweet soils occupy ridges and slopes along with the Carnegie soils. The Sunsweet soils are the steepest soils in the association and have a shallow root zone.

This association is used mostly as woodland, chiefly pine. Strong slopes and erosion limit use for cultivated crops and pasture to a moderately small acreage. Corn is the principal crop.

The dominant soils in this association are considered to have only slight limitations to use as sites for residences and light industry served by public or community sewerage systems, and slight to moderate limitations to use for those served by septic tank filter fields. These soils have slight to moderate limitations to use for recreational facilities such as campsites, intensive play areas, picnic grounds, and trafficways. Some of the minor soils have moderate or severe limitations for many nonfarm uses because the water table is seasonally high, flooding is likely, slopes are strong, or the shrink-swell potential is high.

2. Swamp-Osier-Bibb Association

Swampy areas and very poorly drained and poorly drained, nearly level soils of the flood plains

This association is made up of nearly level flood plains along the Alapaha River and its major tributaries. Slopes are not more than 2 percent. The flood plains generally receive a thin deposit of fresh soil material each time they are flooded. Water covers parts of this association for long periods. The association occupies about 4 percent of the two counties.

Swamp makes up about 44 percent of this association, and the closely intermingled Osier and Bibb soils make up 40 percent. The rest of the association consists of Rains, Ardilla, and Albany soils.

Swamp is very poorly drained, and its soil material is highly variable in texture. It is along the Alapaha River in both counties and is covered with water more than half of the time (fig. 2). The Osier soils are coarse textured and very poorly drained or poorly drained. They are along the major tributaries of the Alapaha River. The Bibb soils are gray. They are intermingled with Osier soils and are in similar positions. Bibb soils have more silt and clay in their profile than have the Osier soils but are similar in drainage. All of these soils were derived mostly from recent alluvium, but there are a few areas of old alluvium.

Of the minor soils, the poorly drained Rains and the somewhat poorly drained Albany are adjacent to the flood plain of the Alapaha River and are subject to flooding a few times each year. The Ardilla soils are on stream terraces and are somewhat poorly drained.

About 95 percent of this association is wooded. Hardwoods are dominant, but there are some pines. The dominant soils generally are not cultivated, because they are subject to flooding several times each year.

The major soils of this association are considered to have severe limitations to use as sites for residences and light industry. They also have severe limitations to use for campsites, intensive play areas, picnic areas, and other recreational facilities because the water table is seasonally high and flooding is likely.

3. Tifton-Alapaha-Carnegie Association

Well-drained and poorly drained, very gently sloping and gently sloping soils on dissected divides

This association consists mainly of very gently sloping and gently sloping divides that are dissected by numerous small, shallow streams that originated within the boundaries of the association. Slopes range from 3 to 8 percent. Some broken areas also occur. This association covers about 22 percent of Ben Hill and Irwin Counties.

The Tifton soils occupy about 50 percent of this association; the Alapaha soils, 20 percent; and the Carnegie

***Figure 2.*—A typical area of Swamp in soil association 2.**

soils, 10 percent. The Dothan, Fuquay, and Cowarts soils make up the rest.

The Tifton and Carnegie soils occur together on uplands, where the Carnegie soils are generally on the steeper slopes. Both kinds of soils are well drained. The Tifton soils have a sandy surface layer and a friable, yellowish-brown sandy clay loam subsoil. The Carnegie soils have a sandy loam surface layer. Their subsoil is friable, strong-brown or yellowish-brown sandy clay loam that is mottled and contains plinthite at a depth of 18 to 26 inches. The Alapaha soils are poorly drained; they occur around the heads of drainageways and intermittently ponded areas. Alapaha soils have a sandy surface layer that is 20 to 40 inches thick and is underlain by a gray sandy clay loam subsoil that is mottled with shades of yellow and red.

Of the minor soils, the Dothan and Fuquay occur with the Tifton and Carnegie soils in the uplands. The Cowarts soils occur with the Tifton and Dothan soils in broken areas and gently sloping areas.

A considerable amount of the cultivated acreage in the two counties is within this association. Corn, cotton, and peanuts are the main row crops. A considerable acreage is in pasture. Farms in this association average about 190 acres in size and are of the general type. Nearly all of the farms are privately owned and are operated by their owners.

The Tifton and Carnegie soils in this association are considered to have only slight limitations to use as sites for residences and light industry that have public or community sewerage systems. Their limitations to use as septic tank filter fields are moderate. These soils have only slight limitations to use for recreational facilities, such as campsites, intensive play areas, picnic grounds, and trafficways. The Alapaha soils, however, have severe limitations to all these nonfarm uses because the soils are wet and are likely to be flooded.

***Figure 3.*—An area in soil association 4. Troup sand, 0 to 5 percent slopes, surrounds a pond on Plummer sand, 0 to 3 percent slopes.**

4. Troup-Kershaw-Plummer Association

Excessively drained, very gently sloping, sandy soils on broad upland ridges, and poorly drained, sandy soils on low flats and in drainageways

This association consists mainly of broad, very gently sloping ridges that have slopes mostly less than 5 percent. It is adjacent to and east of the flood plain of the Alapaha River and is on the north and south slopes of the flood plain of Little House Creek. Flats are numerous (fig. 3). A number of streams have originated within this association. The association covers 7 percent of the two counties.

The Troup soils occupy about 50 percent of this association; the Kershaw soils, 24 percent; and the Plummer soils, 10 percent. The Albany and Ocilla soils occupy the rest.

In almost all of this association, sand extends from the surface to a considerable depth, and available moisture capacity is low to very low. Sand generally extends to a depth of 40 to 60 inches in the Troup soils and to a depth of 6 to 10 feet in the Kershaw soils. Both soils are excessively drained. The Troup and Kershaw soils are on ridgetops and side slopes. The Plummer soils are on low flats, around the heads of streams, and along drainageways. They have poor drainage.

The minor Albany and Ocilla soils are somewhat poorly drained. They generally occur in narrow, nearly level areas between areas of Troup and Plummer soils. Sand in the Albany soils extends from the surface to a depth of 40 to 60 inches.

The Troup soils support a fairly thick growth of scrub oaks, a few scattered pines, and a sparse understory of wiregrass and shrubs. The excessively drained Kershaw soils support a very sparse growth consisting mostly of scrub oaks and a few pines. In some areas of Kershaw soils adjacent to the Alapaha River, the vegetation is rather dense for a soil in which sand extends so deep in the profile. Fairly large live oak, hickory, magnolia, and holly trees grow in these areas. On the Plummer soils are a thick stand of hardwoods and pines and a vigorous growth of shrubs and grasses that tolerate wetness. On the Albany and Ocilla soils, pines are dominant and oak, gum, dogwood, and other hardwoods are widely scattered.

Most of this association is wooded because most of the soils are excessively drained and droughty. A small acreage of Albany and Ocilla soils is used for row crops, especially tobacco, corn, and truck crops. Most of the acreage that was formerly cultivated has been planted to slash pine, or trees have reforested naturally. Most of the acreage is privately owned. A large paper company owns a considerable acreage in Irwin County, and all of this is used to produce trees, mostly pines.

The Troup soils are considered to have only slight limitations to use as septic tank filter fields and as sites for residences and light industry served by public and community sewerage systems. The Kershaw soils are moderately limited for these uses because they are sandy and unstable. The sandy nature of the Troup and Kershaw soils also causes moderate limitations to use of these soils for campsites, intensive play areas, and picnic grounds. The Plummer soils have severe limitations for all these nonfarm uses because these soils are wet and are likely to be flooded.

5. Ocilla-Plummer-Alapaha Association

Somewhat poorly drained and poorly drained, sandy, nearly level soils on broad flats

This association consists of broad, nearly level areas in which slopes are generally less than 2 percent. Intermittent ponds are numerous and widely distributed, and a few branches head in the outer parts of the association. The association covers about 10 percent of the two counties and is located on broad flats east of Fitzgerald and northwest of Ocilla.

The Ocilla soils occupy 35 percent of this association; Plummer soils, 30 percent; and Alapaha soils, 25 percent. The rest consists of Fuquay, Leefield, Ona, and Irvington soils.

The Ocilla soils are somewhat poorly drained, and the Plummer and Alapaha soils are poorly drained. The Ocilla soils have a sandy surface layer and a subsoil that is mottled yellowish brown or brownish yellow and gray at a depth of 20 to 40 inches. The Plummer and Alapaha soils are gray and wet, but the Plummer soils lack the sandy clay loam subsoil that occurs in the Alapaha soils at a depth of 20 to 40 inches. The Alapaha soils commonly occupy intermittently ponded areas and the heads of intermittent streams. The Plummer soils are on broad flats and in small drainageways.

Of the minor soils, the Fuquay are well drained, the Leefield and Ona are somewhat poorly drained, and the Irvington are moderately well drained. The Fuquay soils are in the highest areas of the association. The Irvington soils are slightly lower than the Fuquay soils and in many places are in low areas adjacent to streams. The Leefield soils are on flats and in low areas near intermittent ponds or streams. Ona soils are in a few areas near intermittent ponds.

A small to moderate part of this association is in cultivated crops. The Ocilla, Fuquay, Leefield, and Irvington soils are cultivated. Corn, tobacco, and peanuts are commonly grown. Alapaha and Plummer soils are used mostly as woodland, but some areas are used for pasture. Farms in this association average about 200 acres in size, but several are much larger. General farming dominates, and most of the farms are operated by their owners.

The major soils in this association are considered to have moderate to severe limitations for many nonfarm uses because they have a seasonally high water table or are flooded. The Ocilla soils have moderate limitations to use as sites for residences and light industry or for campsites, intensive play areas, picnic grounds, trafficways, and other recreational facilities. They have severe limitations to use for septic tank filter fields because the water table is seasonally high and the risk of contamination to nearby water supplies is severe. Plummer and Alapaha soils have severe limitations for these nonfarm uses because of the seasonally high water table and the hazard of flooding.

6. Tifton-Alapaha-Fuquay Association

Well-drained and poorly drained, nearly level and very gently sloping soils on broad divides, on flats, and in drainageways

This association is in level to very gently sloping areas on broad divides, on flats, and in drainageways. Slopes do not exceed 4 percent. The divides are cut by many small, shallow streams that originate within the boundaries of the association. The association covers about 20 percent of the two counties.

The Tifton soils occupy about 55 percent of the association, the Alapaha, soils, 20 percent; and the Fuquay soils, 15 percent. The rest is occupied by Grady, Irvington, Stilson, and Dothan soils.

The Tifton and Fuquay soils are on uplands. Both kinds of soils are well drained. They have a sandy surface layer and a yellowish-brown, friable sandy clay loam subsoil. The sandy surface layer is much thinner in the Tifton soils than in the Fuquay, and iron pebbles in the surface layer and subsoil of the Tifton soils are more numerous. The Alapaha soils are around the heads of drainageways and intermittently ponded areas. They are poorly drained and have a sandy surface layer 20 to 40 inches thick and a dominantly gray subsoil that is mottled with yellowish brown and red.

Of the minor soils, the Grady occur in ponded areas among the Tifton and Dothan soils. The Irvington and Stilson soils are a little lower on the landscape than the Tifton, Dothan, and Fuquay soils.

A large part of the cultivated acreage in the two counties is in this soil association. Corn, cotton, peanuts, and tobacco are the main crops. A considerable acreage is in pasture. Farms on this association average about 150 acres in size, and are all of the general type. Nearly all of the farms are privately owned and are operated by their owners.

The Tifton and Fuquay soils are considered to have only slight limitations to use as it is for residences and light industries served by public or community sewerage systems, and to use as campsites, intensive play areas, picnic grounds, and trafficways. The Tifton soils, however, have moderate limitations to use as septic tank filter fields because of the moderately slow percolation rate in the substratum. The Alapaha soils have severe limitations for many nonfarm uses because these soils are wet and are likely to be flooded.

7. Carnegie-Cowarts-Alapaha Association

Well-drained, gently sloping and sloping, eroded soils on choppy ridges, and poorly drained soils in drainageways

This association consists mainly of gently sloping and sloping ridges that are cut by many small, narrow drainageways. Slopes range from 3 to 12 percent. The landscape is choppy and, in most places, is eroded. This association is mainly along the sharp breaks adjacent to and east of the flood plains along the Satilla River and Hunters Creek and adjacent to and south of the flood plains along Randall Creek and Reedy Creek. The most prominent is the area of sharp breaks about a mile north of Fitzgerald. This association covers about 4 percent of the two counties.

The Carnegie soils occupy about 30 percent of this association; the Cowarts soils, 27 percent; and the Alapaha soils, 23 percent. The rest is occupied by the Tifton, Fuquay, and Sunsweet soils.

Carnegie and Cowarts soils are along ridges on strong slopes. Both kinds of soils are well drained. The Carnegie soils have a sandy loam surface layer over a friable, strong-brown or yellowish-brown sandy clay loam subsoil. These

soils contain numerous iron pebbles in the profile. The Cowarts soils have a coarser textured surface layer than the Carnegie soils and a friable, yellowish-brown subsoil that contains many grains of coarse sand. Iron pebbles, however, are not nearly so numerous in the Cowarts soils as in the Carnegie. Both kinds of soils are mottled at a depth of about 18 to 26 inches. The Alapaha soils occur around the heads of streams and extend for a short distance along the drainageways. These soils are poorly drained; they are gray mottled with brown and red.

Of the minor soils, the Tifton and Fuquay are among the Carnegie and Cowarts soils on very gently sloping and gently sloping ridges. The Sunsweet soils are on sharp breaks and have slopes as steep as 12 percent.

Most of this association is woodland, mainly pines. Pines occupy many fields that were formerly cultivated. Because of the slope, erosion, and shallow root zone, only a small part of the association is cultivated. Corn is the main crop. A moderate acreage is in pasture.

The Carnegie and Cowarts soils are considered to have only slight limitations to use for picnic grounds and as sites for residences and light industries served by public or community sewerage systems. They, however, have moderate limitations to use for septic tank filter fields, campsites, and intensive play areas. These limitations are caused by slope and slow percolation. The Alapaha soils have severe limitations for all these nonfarm uses because of wetness and flooding.

8. Osier-Bibb-Leaf-Chastain Association

Very poorly drained to somewhat poorly drained, nearly level soils on flood plains

Nearly level flood plains along rivers and creeks make up this association. Slopes generally do not exceed 1 percent. The flood plains receive a thin deposit of fresh soil material the many times each year they are flooded. Most of the alluvium is recent, but there are a few areas of old alluvium that normally are flooded only a few times each year. This association covers about 6 percent of the two counties.

The Osier and Bibb soils are closely intermingled, and together they make up about 70 percent of this association. The Leaf and Chastain soils occupy about 10 percent, and the rest of the association consists of Rains, Albany, Ardilla, and Plummer soils.

The closely intermingled Osier and Bibb soils occur on the flood plains of the Satilla and Willacoochee Rivers and their main tributaries. These soils also occur along the large branches and creeks that empty into the Ocmulgee River in Ben Hill County. The Osier soils are coarse textured and poorly drained to very poorly drained. The Bibb soils are gray and are medium textured to moderately fine textured. Bibb soils are similar to the Osier soils in drainage but have more silt and clay in their profile. The Leaf and Chastain soils are along the Ocmulgee River in the extreme northeastern part of Ben Hill County. They are flooded only a few times each year. These soils have a silty clay loam surface layer and a silty clay to clay subsoil. Leaf soils are poorly drained, and Chastain soils are somewhat poorly drained.

Of the minor soils, the Rains are poorly drained; they are on flats and in depressions on the river terraces and are slightly higher than the flood plains. The Albany and Ardilla soils are somewhat poorly drained; they are also on river terraces but are slightly higher than the Rains soils. The Rains, Albany, and Ardilla soils are likely to be flooded a few times each year. The poorly drained Plummer soils are at the outer edges of this association in many places.

About 96 percent of this association is wooded. Hardwoods are the dominant trees, but there are some pines. Only a small acreage is used for pasture. A few fields of the Albany and Ardilla soils are cultivated. Nearly all of the acreage in this association is privately owned.

Nearly all of the soils are considered to have severe limitations for many nonfarm uses. All of the major soils have severe limitations for use as sites for residences and light industry, and for use as campsites, intensive play areas, picnic grounds, trafficways, and other recreational facilities. These limitations are caused by wetness and flooding.

9. Esto-Cowarts-Plummer Association

Moderately well drained and well drained, very gently sloping to sloping soils on choppy ridges, and poorly drained soils along drainageways

This association consists of short, narrow, very gently sloping ridgetops, gently sloping and sloping side slopes, and numerous small drainageways and narrow breaks along the drainageways. Slopes range from 3 to 12 percent. This association is in the northern and northeastern parts of Ben Hill County and occupies 8 percent of the two counties.

The Esto soils make up about 45 percent of this association; the Cowarts soils, 25 percent; and the Plummer soils, 20 percent. The Troup, Susquehanna, and Alapaha soils make up the rest.

The Esto and Cowarts soils are on ridgetops and the upper parts of side slopes. The Esto soils are moderately well drained. They have a loamy coarse sand surface layer over a mottled strong-brown or yellowish-red sandy clay or clay subsoil. The Cowarts soils are well drained. They have a coarse-textured surface layer over a yellowish-brown clay loam subsoil that is mottled with gray and red at a depth of about 19 to 26 inches. The Plummer soils are poorly drained. They are gray soils that are sandy from the surface to a depth of 40 to 60 inches.

Of the minor soils, the Troup are excessively drained and occupy the less sloping ridgetops and side slopes. Troup soils are sandy from the surface to a depth of 40 to 60 inches. The somewhat poorly drained Susquehanna soils are commonly on breaks between ridgetops and drainageways. The Alapaha soils are poorly drained and occur around the heads of streams and along the upper parts of drainageways.

Most of the acreage of this association is in trees used for the production of pulpwood, lumber, and gum turpentine (fig. 4). Some of the Cowarts and Troup soils on the milder slopes and in noneroded areas are cultivated. Corn is the principal crop. A few areas are in pasture. Many fields that were formerly cultivated are now planted to slash pines. Most of this association is privately owned. Large paper companies own a considerable acreage, and all of it is used for wood crops. Farms average about 200 acres in size.

Figure 4.—**Typical landscape in soil association 9. The major soils in this association are the Esto, Cowarts, and Plummer.**

The Esto soils are considered to have severe limitations to use for septic tank filter fields and for trafficways. They have moderate limitations to use as sites for residences and light industries served by public or community sewerage systems, and to use as campsites, intensive play areas, picnic grounds, and other recreational facilities. Limitations to use of the Esto soils are caused by moderate to high shrink-swell characteristics and a slow percolation rate. The Cowarts soils have slight to moderate limitations to these nonfarm uses. Because of wetness and flooding, the Plummer soils have severe limitations.

10. Fuquay-Cowarts-Plummer Association

Well-drained, gently sloping and sloping soils on narrow ridges and knobs, and poorly drained, sandy soils on flats and in drainageways

This association consists of narrow ridges and knobs that have gently sloping to sloping side slopes and of numerous small drainageways, most of which originated in the association. Slopes range from 3 to 12 percent. Most of the intermittent streams flow northeastward across this association. Many areas are rough, choppy, and eroded. This association is in the northern and northeastern parts of Ben Hill County and includes a small area along the northern border of Irwin County. It occupies about 15 percent of the two counties.

The Fuquay soils make up about 35 percent of this association; the Cowarts soils, 20 percent; and the Plummer soils, 18 percent. The Troup, Dothan, and Alapaha soils make up the rest.

The Fuquay soils occur on the broader ridges and side slopes. They are sandy to a depth of 20 to 40 inches and have a light yellowish-brown sandy clay loam subsoil. The Cowarts soils occur on narrow ridges, in broken areas, and on the steeper side slopes. They have a loamy sand surface layer over a yellowish-brown sandy clay loam subsoil that is mottled at a depth of 19 to 26 inches. The Fuquay and Cowarts soils are well drained. The Plummer soils occur in low areas and are poorly drained. They are gray and are sandy to a depth of 40 to 60 inches.

Of the minor soils, the Troup are excessively drained and occur on very gently sloping to gently sloping ridgetops and side slopes. The Dothan soils are generally on the gently sloping ridgetops. The Alapaha soils occur around the heads of intermittent streams and along some drainageways.

285-798—68——2

Most of this association is in trees used for the production of pulpwood, lumber, and gum turpentine. Large paper companies own a considerable acreage, all of which is in trees, mostly pines. Many fields in this association that were formerly cultivated are now planted to slash pine. The Fuquay, Cowarts, and Dothan soils are commonly cultivated in their less sloping areas. The cultivated acreage is small. Corn, cotton, and peanuts are the chief crops. A moderate acreage is in pasture. Most of the land in this association is privately owned. Farms average about 200 acres in size.

The dominant soils in this association are considered to have slight to moderate limitations to many nonfarm uses. The Cowarts soils have slight limitations to use as sites for residences served by public or community sewerage systems, and to use for picnic grounds and trafficways. Cowarts soils have moderate limitations to use for septic tank filter fields, campsites, intensive play areas, and foundations for light industry. The Fuquay soils have only slight limitations to all these uses, but the Plummer soils have severe limitations because of wetness and flooding.

Descriptions of the Soils

This section describes the soil series and mapping units in Ben Hill and Irwin Counties. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

The procedure in this section is first to describe the soil series and then the mapping units in the series. Thus, to get full information on any one mapping unit, it is necessary to read the description of that unit and also the description of the soil series to which it belongs.

An essential part of each soil series is the description of the soil profile, the sequence of layers beginning at the surface and continuing downward to the depths beyond which roots of most plants do not penetrate. Each soil series contains both a brief nontechnical and a detailed technical description of the soil profile. The nontechnical description will be useful to most readers. The detailed technical description is included for soil scientists, engineers, and others who need to make thorough and precise studies of soils.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed map. Listed at the end of each description of a mapping unit is the capability unit, woodland suitability group, and wildlife suitability group in which the mapping unit has been placed. The pages on which each capability unit and woodland and wildlife group is described can be found by referring to the "Guide to Mapping Units" at the back of this survey.

Many terms used in the soil descriptions and other sections are defined in the Glossary at the back of this survey and in the "Soil Survey Manual" (*7*).[2]

Alapaha Series

The Alapaha series consists of poorly drained, nearly level to very gently sloping soils in drainageways and low flat areas. These soils developed over beds of sandy clay loam and sandy loam. They are widespread in Ben Hill and Irwin Counties and have a large total acreage. The native vegetation consists of mixed hardwoods and pines and an understory of gallberry and waxmyrtle.

In a typical profile, loamy sand extends from the surface to a depth of about 33 inches. This layer is black and dark gray in the upper part and is gray in the lower part. It is underlain by sandy clay loam that is light gray and gray in the upper part and is light gray mottled with shades of brown and red between depths of 48 and 60 inches.

The Alapaha soils are very strongly acid, are low in natural fertility, and contain little organic matter. Infiltration and permeability are rapid to moderate, and available water capacity is low to moderate. The root zone is deep, and tilth generally is excellent.

The Alapaha soils generally are not used for cultivated crops, but drained areas are suitable for corn and truck crops. Most of the acreage is in pines and hardwoods, for which these soils are well suited. A small acreage is in pasture. These soils are only fairly well suited to pasture, and drainage, heavy fertilization, and adequate lime are needed for high yields of forage.

Representative profile of Alapaha loamy sand, 0 to 3 percent slopes:

A1—0 to 5 inches, black (10YR 2/1) loamy sand; weak, medium, granular structure; very friable when moist, nonsticky when wet; many roots, some clean grains of sand; very strongly acid; clear, wavy boundary.

A21g—5 to 11 inches, dark-gray (N 4/0) loamy sand with some pockets of very dark gray (N 3/0); single grained; loose when moist, nonsticky when wet; roots are common; numerous clean grains of sand; very strongly acid; clear, wavy boundary.

A22g—11 to 33 inches, gray (10YR 5/1) loamy sand; single grained; loose when moist, nonsticky when wet; few roots; common grains of clean sand; very strongly acid; gradual, irregular boundary.

B21tg—33 to 48 inches, light-gray (2.5Y 7/2) and gray (10YR 5/1) sandy clay loam with pockets of sandy loam; weak, medium, subangular blocky structure to massive; very friable; very strongly acid; tongues extend into B22tg horizon; irregular boundary.

B22tg—48 to 60 inches +, light-gray (10YR 6/1) sandy clay loam with many, coarse, prominent mottles of yellowish brown (10YR 5/8), yellowish red (5YR 5/8), and red (2.5YR 5/6) and a few mottles of weak red (2.5YR 5/2); red mottles increase with depth; friable when moist, slightly sticky when wet, and slightly hard when dry; 10 to 35 percent of volume is plinthite; very strongly acid.

The A1 horizon ranges from dark gray to black in color and from 3 to 6 inches in thickness. The A horizon ranges from 20 to 40 inches in thickness. The plinthite part of the profile is prominently mottled with yellow through red, though the matrix color is commonly gray or light gray. Plinthite occurs in the Bt horizon, not in a continuous layer. Each layer of plinthite is at least 6 inches thick. The texture of the Bt horizon ranges from sandy clay loam to sandy loam.

The Alapaha soils commonly occur with the Leefield, Stilson, and Plummer soils. They occupy lower positions and are wetter than the Leefield and Stilson soils. Alapaha soils are in positions similar to those of the Plummer soils and, like them, are poorly drained, but the sandy loam or sandy clay loam subsoil is nearer the surface in the Alapaha soils than in the Plummer.

Alapaha loamy sand, 0 to 3 percent slopes (AtA).—This poorly drained soil is on low flats. It is also at the upper parts of drainageways. The profile of this soil is the one described as typical of the Alapaha series.

[2] Italic numbers in parentheses refer to Literature Cited, p. 62.

TABLE 1.—*Approximate acreage and proportionate extent of soils mapped*

Soil	Ben Hill County		Irwin County		Total acreage
	Acres	Percent	Acres	Percent	
Alapaha loamy sand, 0 to 3 percent slopes	19,741	12.1	40,279	16.9	60,020
Albany loamy fine sand, 0 to 2 percent slopes	73	(1)	376	.2	449
Albany sand	637	.4	1,444	.6	2,081
Ardilla loamy sand, 0 to 2 percent slopes	190	.1	436	.2	626
Carnegie sandy loam, 2 to 5 percent slopes, eroded	1,082	.7	3,683	1.6	4,765
Carnegie sandy loam, 5 to 8 percent slopes	191	.1	316	.1	507
Carnegie sandy loam, 5 to 8 percent slopes, eroded	4,120	2.5	7,227	3.0	11,347
Carnegie sandy clay loam, 5 to 8 percent slopes, severely eroded	50	(1)	385	.2	435
Carnegie sandy loam, 8 to 12 percent slopes, eroded	263	.2	659	.3	922
Cowarts loamy sand, 2 to 5 percent slopes	3,996	2.4	753	.3	4,749
Cowarts loamy sand, 2 to 5 percent slopes, eroded	1,402	.9	4,959	2.1	6,361
Cowarts loamy sand, 5 to 8 percent slopes	2,276	1.4	271	.1	2,547
Cowarts loamy sand, 5 to 8 percent slopes, eroded	11,304	6.9	1,173	.5	12,477
Dothan loamy sand, 0 to 2 percent slopes	307	.2	468	.2	775
Dothan loamy sand, 2 to 5 percent slopes	3,058	1.9	1,293	.5	4,351
Esto loamy coarse sand, 2 to 5 percent slopes	2,590	1.6	54	(1)	2,644
Esto loamy coarse sand, 2 to 5 percent slopes, eroded	1,523	.9	13	(1)	1,536
Esto loamy coarse sand, 5 to 8 percent slopes, eroded	10,424	6.4	88	(1)	10,512
Esto loamy coarse sand, 8 to 12 percent slopes, eroded	1,123	.7	152	(1)	1,275
Fuquay loamy sand, 0 to 2 percent slopes	2,326	1.4	3,391	1.4	5,717
Fuquay loamy sand, 2 to 5 percent slopes	15,341	9.4	9,345	3.9	24,686
Fuquay loamy sand, 5 to 8 percent slopes	2,322	1.4	821	.3	3,143
Fuquay loamy coarse sand, 2 to 5 percent slopes	2,371	1.5	676	.3	3,047
Fuquay loamy coarse sand, 5 to 8 percent slopes	2,808	1.7	714	.3	3,522
Grady sandy loam	486	.3	1,597	.7	2,083
Irvington loamy sand, 0 to 3 percent slopes	1,100	.7	2,539	1.1	3,639
Kershaw coarse sand, 2 to 8 percent slopes	580	.4	6,383	2.7	6,963
Leaf and Chastain soils	2,435	1.5	0	----------	2,435
Leefield loamy sand, 0 to 3 percent slopes	2,729	1.7	7,178	3.0	9,907
Ocilla loamy sand, 0 to 3 percent slopes	5,576	3.4	13,121	5.5	18,697
Ona sand	381	.2	713	.3	1,094
Osier-Bibb complex	5,630	3.4	19,019	8.0	24,649
Plummer sand, 0 to 3 percent slopes	14,683	9.0	18,117	7.6	32,800
Rains loamy fine sand	383	.2	1,083	.5	1,466
Stilson loamy sand, 0 to 3 percent slopes	2,016	1.2	3,151	1.3	5,167
Sunsweet sandy loam, 5 to 8 percent slopes, eroded	31	(1)	267	.1	298
Sunsweet sandy loam, 8 to 12 percent slopes, eroded	180	.1	348	.1	528
Susquehanna sandy loam, 2 to 5 percent slopes	1,491	1.0	100	(1)	1,591
Susquehanna sandy loam, 5 to 8 percent slopes, eroded	1,869	1.1	36	(1)	1,905
Swamp	458	.3	6,551	2.8	7,009
Tifton loamy sand, 0 to 2 percent slopes	2,820	1.7	9,579	4.0	12,399
Tifton loamy sand, 2 to 5 percent slopes	16,205	9.9	41,204	17.3	57,409
Tifton loamy sand, 2 to 5 percent slopes, eroded	4,818	2.9	14,822	6.2	19,640
Tifton loamy sand, 5 to 8 percent slopes	320	.3	664	.3	984
Tifton loamy sand, 5 to 8 percent slopes, eroded	1,809	1.1	4,210	1.8	6,019
Troup sand, 0 to 5 percent slopes	5,584	3.4	7,732	3.2	13,316
Troup sand, 5 to 8 percent slopes	2,098	1.3	690	.3	2,788
Total	163,200	100.0	238,080	100.0	401,280

[1] Less than 0.1 percent.

Included with this soil in the mapping were many pockets of sandy loam. Also included were areas of Plummer and Leefield soils.

Some areas of this soil are flooded more than once each year for periods of less than 2 days. The water table is at a depth of less than 15 inches for periods of more than 6 months each year.

This soil is not used for cultivated crops in Ben Hill and Irwin Counties, but it can be cultivated if management is good and includes drainage, adequate liming, and heavy fertilization. (Capability unit IVw–4; woodland suitability group 4; wildlife suitability group 5)

Albany Series

The Albany series consists of deep, somewhat poorly drained sandy soils on upland flats and stream terraces. These soils developed from thick beds of sand and loamy sand. Slopes range from 0 to 2 percent but are less than 1 percent in most places. The Albany soils occupy a small total acreage that is widely distributed in the two counties. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry, waxmyrtle, and wiregrass.

In a typical profile, the surface layer, to a depth of about 6 inches, is gray and light brownish-gray sand. Beneath

this, and extending to a depth of about 54 inches, is light yellowish-brown sand that is mottled with light brownish gray and pale yellow in the upper part and with strong brown and light gray in the lower part. Below a depth of 54 inches is pale-yellow sandy loam mottled with shades of brown, gray, and yellow.

Most of the acreage is wooded; slash pine and longleaf pine are the dominant trees. Some small areas on upland flats are used for corn, soybeans, tobacco, truck crops, and pasture, for which these soils are well suited. The stream terraces are mostly wooded, but a few areas are in pasture. Because these soils generally have a high water table, drainage is required in cultivated areas. These soils are often droughty in summer because they are sandy and their water table falls sharply late in spring.

Representative profile of Albany sand (0 to 2 percent slopes):

A11—0 to 3 inches, gray (10YR 5/1) sand; structureless; loose; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 3 to 6 inches in thickness.

A12—3 to 6 inches, light brownish-gray (2.5Y 6/2) sand with few, fine, faint mottles of grayish brown (2.5Y 5/2); structureless; loose; fine roots common; very strongly acid; clear, smooth boundary; layer ranges from 3 to 6 inches in thickness.

A21—6 to 18 inches, light yellowish-brown (2.5Y 6/4) sand with few, fine, faint mottles of light brownish gray (2.5Y 6/2) and pale yellow (5Y 7/3); structureless; loose; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 20 inches in thickness.

A22—18 to 54 inches, light yellowish-brown (2.5Y 6/4) sand with few, fine, distinct and faint mottles of strong brown (7.5YR 5/8) and light gray (2.5Y 7/2); structureless; loose; very strongly acid; gradual, wavy boundary; layer ranges from 28 to 45 inches in thickness.

Bt—54 to 66 inches, pale-yellow (5Y 7/3) sandy loam with many, medium, distinct mottles of strong brown (7.5YR 5/8), light gray (2.5Y 7/2), and olive yellow (2.5Y 6/6); weak, fine, granular structure; very friable, slightly sticky; very strongly acid.

The surface layer ranges from sand to loamy fine sand. It is grayish brown to dark grayish brown in cultivated areas. Below the surface layer the amount of yellow and gray mottles varies greatly. The Bt horizon is at a depth of 40 inches or more and ranges from sandy loam to sandy clay loam.

Albany soils commonly occur among the Plummer, Leefield, Alapaha, and Troup soils on upland flats and with the Ardilla and Rains soils on stream terraces. Albany soils occupy higher positions and are better drained than the Plummer and Alapaha soils, which are grayer in the lower horizons. The sandy loam or sandy clay loam Bt horizon of the Albany soils is below a depth of 40 inches, whereas the sandy clay loam or sandy loam subsoil of the Alapaha soils is within a depth of 40 inches. The Albany soils occupy lower positions and are wetter than the Troup soils. The lower horizons of the Albany soils are coarser textured to a depth of 40 inches than those of the Leefield soils. The Albany soils are sandier to a greater depth than are the Ardilla and Rains soils. Albany soils are better drained and are in slightly higher positions than the Rains soils. They are similar to the Ardilla soils in drainage but are much coarser textured to a depth of 40 inches.

Albany loamy fine sand, 0 to 2 percent slopes (AsA).—This sandy soil is on stream terraces. Its profile has a finer textured surface layer than the profile described as typical of the series, and sandy clay loam occurs at a depth of 40 to 50 inches.

Included with this soil in the mapping were a few areas that have a fine sand or sand surface layer. Also included were small areas of Ardilla and Rains soils that are too small to be mapped separately.

This soil is flooded more than once each year for periods of less than 2 days. The water table is within 15 to 30 inches of the surface for periods of 2 to 6 months each year.

Almost all of the acreage in the two counties is woodland. If adequately drained and protected from flooding, this soil could be used for cultivated crops. It is well suited to pine trees. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 3)

Albany sand (0 to 2 percent slopes) (AdA).—This soil is sandy to a depth of 42 inches or more. It generally is in moderately small areas next to ponds and drainageways in the areas called flatwoods in Ben Hill and Irwin Counties. The profile of the soil is the one described as typical of the Albany series, but in cultivated areas the surface layer is grayish brown to dark grayish brown, and the amount of yellowish and grayish mottles in the subsoil varies greatly.

Included with this soil in the mapping were small areas that have a fine sand surface layer. Also included were small areas of Ocilla, Troup, and Plummer soils. These included areas are too small to be mapped separately.

Because the water table fluctuates in Albany sand, this soil is wet in rainy periods and is slightly droughty in dry periods. The water table is at a depth of 15 to 30 inches for 1 or 2 months each year.

A small to moderate part of this soil is cultivated. Corn and tobacco are the chief crops and are well suited. Cultivated areas need some drainage most years. The largest acreage is in pine trees, a good use. A moderately small acreage is in pasture. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 3)

Ardilla Series

The Ardilla series consists of somewhat poorly drained soils on stream terraces. Slopes range from 0 to 2 percent. These soils developed from thin beds of sandy alluvium that are underlain by finer textured alluvium. They are not extensive in Ben Hill and Irwin Counties and occur chiefly on the stream terraces along the Alapaha, Satilla, and Willacoochee Rivers and their main tributaries. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

In a typical profile, the surface layer is loamy sand 12 inches thick. This layer is very dark gray in the upper part and dark grayish brown in the lower part. It is underlain by a subsoil that is light olive-brown, very friable heavy fine sandy loam to a depth of 18 inches, and below that depth is friable, yellowish-brown sandy clay loam mottled with light gray, strong brown, and red.

These soils are very strongly acid and are low in natural fertility and in content of organic matter. Available water capacity is moderate. Infiltration and permeability are moderate in the upper part of the profile and moderately slow in the lower part. The root zone is deep, and tilth generally is good.

Almost all of the acreage in the two counties is woodland. Slash pine is dominant. Because flooding is a hazard, only a few areas are cultivated. Corn is the chief crop. These soils are well suited to pasture.

Representative profile of Ardilla loamy sand, 0 to 2 percent slopes, in a wooded area:

A1—0 to 3 inches, very dark gray (N 3/0) loamy sand; weak, fine, granular structure; very friable; many fine and medium roots; very strongly acid; clear, smooth boundary; layer ranges from 2 to 5 inches in thickness.

A2—3 to 12 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; fine and medium roots common; very strongly acid; clear, smooth boundary; layer ranges from 7 to 11 inches in thickness.

B1t—12 to 18 inches, light olive-brown (2.5Y 5/4) heavy fine sandy loam with common, medium, distinct mottles of yellowish brown (10YR 5/6) and dark grayish brown (2.5Y 4/2); weak, fine, granular structure; very friable; very strongly acid; gradual, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21tg—18 to 30 inches, yellowish-brown (10YR 5/6) sandy clay loam with common, medium, distinct mottles of light gray (N 7/0) and strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable when moist, sticky when wet; very strongly acid; gradual, smooth boundary; layer ranges from 10 to 15 inches in thickness.

B22tg—30 to 36 inches, yellowish-brown (10YR 5/6) sandy clay loam with many, coarse, distinct and prominent mottles of light gray (N 7/0) and red (2.5YR 4/8); moderate, medium, subangular blocky structure; friable when moist, sticky when wet; very strongly acid; gradual, smooth boundary; layer ranges from 5 to 10 inches in thickness.

B23t—36 to 50 inches +, yellowish-brown (10YR 5/8) sandy clay loam with many, medium, distinct mottles of light gray (N 7/0), strong brown (7.5YR 5/8), and red (2.5YR 4/8); moderate, medium, subangular blocky structure; friable to firm when moist, sticky when wet; plinthite; very strongly acid.

The surface layer varies from very dark gray to dark gray. It is loamy fine sand in some areas.

The Ardilla soils occur among the Albany and Rains soils. The profile of Ardilla soils is more strongly developed and much finer textured than that of the Albany soils. Ardilla soils are in higher positions and are better drained than the Rains soils.

Ardilla loamy sand, 0 to 2 percent slopes (AqA).—This soil occurs on stream terraces. Its profile is the one described as typical of the Ardilla series, though depth to mottling ranges from 12 to 24 inches.

Included with this soil in the mapping were a few small areas that have a loamy fine sand surface layer. Also included were small areas of Albany and Rains soils that are too small to be mapped separately.

This Ardilla soil is flooded frequently for periods that last less than 2 days. The water table is at a depth of 15 to 30 inches for periods of 1 or 2 months each year.

Because flooding is a hazard, only a small part of this soil is cultivated. Corn is the main crop. Most of the acreage is in slash pine and longleaf pine trees, for which this soil is well suited. Only a small part is used for pasture, but the soil is well suited to that use. (Capability unit IIw-2; woodland suitability group 2; wildlife suitability group 3)

Bibb Series

The Bibb series consists of poorly drained, nearly level soils that are on bottom lands and are subject to flooding and deposition of sediments. These soils developed in recent alluvium. They occur throughout Ben Hill and Irwin Counties on first bottoms along rivers, creeks, and branches. The native vegetation is chiefly hardwoods that include water oak, cypress, poplar, gums, and bay, and there are a few slash pines.

In a typical profile, the surface layer is dark-gray loamy sand stratified with lenses of gray sand. This layer is about 6 inches thick and is underlain by gray sandy loam that has lenses of light-gray sand in the upper part and pockets of sandy clay loam in the lower part. The gray sandy loam extends to a depth of about 22 inches and is underlain by gray sandy clay loam mottled with shades of brown and gray to a depth of 60 inches or more.

These soils are low to moderate in natural fertility and are very strongly acid. They contain a small to moderate amount of organic matter. Available moisture capacity is moderate. Infiltration and permeability are moderate to moderately slow. The root zone is deep, and tilth generally is fair.

Because flooding is a hazard, these soils are not suitable for cultivation. Almost all the acreage in the two counties is woodland, and these soils are well suited to trees.

In Ben Hill and Irwin Counties, Bibb soils are mapped only in a complex with the Osier soils.

Representative profile of a Bibb soil, in a wooded area:

A1—0 to 6 inches, dark-gray (10YR 4/1) loamy sand stratified with lenses of gray sand; weak, fine, granular structure; very friable when moist, nonsticky when wet; matted roots; very strongly acid; abrupt, wavy boundary; layer ranges from 4 to 8 inches in thickness.

C1g—6 to 14 inches, gray (10YR 5/1) sandy loam stratified with lenses of light-gray sand; few, fine, faint mottles of yellowish brown (10 YR 5/6); moderate, fine, granular structure; very friable when moist, slightly sticky when wet; many medium and large roots; very strongly acid; clear, wavy boundary; layer ranges from 4 to 10 inches in thickness.

C2g—14 to 22 inches, gray (10YR 5/1) sandy loam with pockets of sandy clay loam; structureless; very friable when moist, slightly sticky when wet; common medium and large roots; very strongly acid; gradual, wavy boundary; layer ranges from 8 to 14 inches in thickness.

C3g—22 to 42 inches, gray (10YR 5/1) sandy clay loam with common, medium, distinct mottles of yellowish brown (10YR 5/6); structureless; few large roots; very strongly acid; gradual, wavy boundary; layer ranges from 18 to 24 inches in thickness.

C4g—42 to 60 inches, gray (10YR 5/1) sandy clay loam with common medium mottles of yellowish brown (10YR 5/6) and light gray (10YR 7/2); structureless; very strongly acid.

The A1 horizon ranges from gray to very dark gray in color and from loamy sand to silt loam in texture. The degree of stratification is variable.

The Bibb soils occur among the Osier soils and Swamp. They are similar to the Osier soils in drainage, but their profile contains more silt and clay. Where Bibb soils adjoin Swamp, they are in slightly higher positions and are covered with water for shorter periods.

Carnegie Series

The Carnegie series consists of well-drained, pebbly soils that developed over thick beds of sandy clay loam. Slopes range from 2 to 12 percent. These soils are moderately extensive in Ben Hill and Irwin Counties. The native vegetation consists of mixed hardwoods and pines that have an understory of wiregrass.

In a typical profile, the surface layer is brown sandy loam about 6 inches thick. It is underlain by sandy clay loam that extends to a depth of 50 inches or more. This sandy clay loam is strong brown in the upper part and is yellowish brown mottled with shades of yellow, red, and

gray in the lower part. Small, hard pebbles of iron are on the surface and throughout the profile.

Carnegie soils are low to moderate in natural fertility, low in organic-matter content, and very strongly acid. Infiltration is moderate, and permeability is moderate to moderately slow. Available moisture capacity is moderate. Tilth generally is good in uneroded areas. Crops respond well to good management that includes adequate liming and fertilization.

These soils are suited to most crops grown locally, and they are used for corn, cotton, peanuts, and forage crops. They are well suited to pasture and pines, and most of the acreage is in pines. Because of the moderate to severe hazard of erosion on slopes, practices are needed for controlling erosion in cultivated areas.

Representative profile of Carnegie sandy loam, 2 to 5 percent slopes, eroded:

Apcn—0 to 6 inches, brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; many, small, hard iron pebbles ⅛ to ¾ inch in diameter; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21tcn—6 to 17 inches, strong-brown (7.5YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; hard when dry, firm when moist, sticky when wet, common iron pebbles; very strongly acid; gradual, smooth boundary; layer ranges from 10 to 16 inches in thickness.

B22tcn—17 to 26 inches, strong-brown (7.5YR 5/8) sandy clay loam; plinthite; common, medium, distinct mottles of red (2.5YR 4/8) and yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; slightly hard when dry, firm when moist, slightly sticky when wet; few iron pebbles; very strongly acid; gradual, smooth boundary; layer ranges from 6 to 12 inches in thickness.

B23t—26 to 50 inches +, yellowish-brown (10YR 5/8) sandy clay loam with many, coarse, prominent mottles of olive yellow (2.5Y 6/6), dark red (2.5YR 3/8), and light gray (2.5Y 7/2); moderate, medium, subangular blocky structure; slightly hard when dry, firm when moist, slightly sticky when wet; 10 to 35 percent, by volume, is plinthite; very strongly acid.

The surface layer ranges from brown to dark grayish brown in color. In severely eroded areas the surface layer is yellowish-brown sandy clay loam. The iron pebbles on the surface and throughout the solum range from common to many. The B horizon ranges from sandy clay loam to clay loam.

The Carnegie soils commonly occur with the Sunsweet and Tifton soils. The Carnegie soils are similar to the Sunsweet soils in color but have less clay in the B2 horizons and have plinthite deeper in the profile. The surface layer and subsoil of Carnegie soils are slightly redder than those layers in Tifton soils, and plinthite is at a shallower depth in the Carnegie soils.

Carnegie sandy loam, 2 to 5 percent slopes, eroded (CoB2).—This is a well-drained, pebbly soil of the uplands. It occurs in only a few places in areas that are more than 10 acres in size. The profile of this soil is the one described as typical of the series. In some places the material from the subsoil is exposed at the surface, and there are a few shallow gullies.

Included with this soil in the mapping were small areas of Tifton and Sunsweet soils that are too small to be mapped separately.

In this Carnegie soil, the root zone is deep, and tilth is good except in severely eroded spots.

This soil is suited to and extensively used for cotton, corn, and peanuts, though erosion is a moderate hazard. Erosion can be controlled by using moderately intensive practices. This soil is also well suited to pasture and pines. (Capability unit IIe–4; woodland suitability group 1; wildlife suitability group 1)

Carnegie sandy loam, 5 to 8 percent slopes (CoC).—This pebbly soil occurs on ridges and short side slopes near drainageways and streams. Its surface layer is thicker than that in the profile described as typical of the Carnegie series.

Included with this soil in the mapping were small areas of Tifton, Cowarts, and Fuquay soils that are too small to be mapped separately.

This Carnegie soil is generally in good tilth, but erosion is a moderate hazard in cultivated areas.

Most of this soil is in pasture and pines, and a small acreage is in cotton and corn. This soil is well suited to pasture and pines, and it is suited to cotton and corn. Practices of erosion control are needed in cultivated areas. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Carnegie sandy loam, 5 to 8 percent slopes, eroded (CoC2).—In many places this pebbly soil is a narrow band between ridges and drainageways. Its profile is similar to the one described as typical of the Carnegie series, but in some places the subsoil is exposed at the surface. A few shallow gullies have formed in many areas.

Included with this soil in the mapping were areas of Sunsweet, Esto, and Cowarts soils that are too small to be mapped separately.

This Carnegie soil has low natural fertility. Tilth is generally good except in places where the subsoil is exposed at the surface.

Most of this soil is in pasture and pines, and the soil is well suited to those uses. A small acreage is used for cotton and corn. Practices of erosion control are needed in cultivated areas. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Carnegie sandy clay loam, 5 to 8 percent slopes, severely eroded (CkC3).—This severely eroded, pebbly soil occurs on short, broken side slopes along drainageways and streams. The surface layer is yellowish-brown, friable sandy clay loam 4 to 6 inches thick. It is a mixture of the original surface soil and the upper part of the subsoil. Below the surface layer is strong-brown, friable sandy clay loam that is distinctly mottled with red and yellow at a depth of 14 to 18 inches. These mottles extend to a depth of 24 to 28 inches. The underlying material is prominently mottled strong-brown, red, yellow, and gray, friable to firm sandy clay loam. Small hard pebbles of iron are common on the surface and throughout the profile.

Included with this soil in the mapping were spots that are less eroded than normal. Also included were small areas of Sunsweet, Esto, and other soils.

Almost all of this soil is woodland. The trees are mostly pines. Only a small acreage is in pasture, and the soil is not well suited to that use. Because of the slope and the hazard of erosion, this soil is not cultivated. Fertility is low. (Capability unit IVe–4; woodland suitability group 1; wildlife suitability group 4)

Carnegie sandy loam, 8 to 12 percent slopes, eroded (CoD2).—This pebbly soil is on short slopes near streams. Its profile is similar to the one described as typical of the Carnegie series, but the subsoil is exposed at the surface

in places. Shallow gullies, rills, and galled spots have formed.

Included with this soil in the mapping were small areas of Sunsweet and Esto soils.

This Carnegie soil is low in natural fertility. Tilth is generally good except in areas where the subsoil is exposed.

Most of this soil is in pine trees, and the soil is well suited to that use. A small acreage is in pasture, for which the soil is only fairly well suited. Cultivated crops are not grown. (Capability unit IVe-2; woodland suitability group 1; wildlife suitability group 4)

Chastain Series

The Chastain series consists of somewhat poorly drained soils on stream terraces. Slopes range from 0 to 2 percent. These soils developed in fine silty material over clayey alluvial deposits that washed mostly from the Coastal Plain but partly from the Piedmont Plateau. Chastain soils occur only along the Ocmulgee River in the extreme northeastern part of Ben Hill County. The native vegetation consists chiefly of hardwoods, but there are a few pines.

In a typical profile, the surface layer is dark-brown silty clay loam about 10 inches thick. This layer is mostly overwash. It is underlain by about 12 inches of brown silty clay loam that is faintly mottled with pale brown. Silty clay is at a depth of 22 inches and extends to a depth of 56 inches. It is pale brown mottled with brownish and grayish mottles in the upper part and is yellowish brown mottled with reddish and grayish mottles in the lower part.

These soils are low to moderate in natural fertility and are very strongly acid. The content of organic matter is low to medium. Available water capacity is moderate. Infiltration is moderate, and permeability is moderately slow to slow. Tilth is generally fair because the surface layer is moderately fine textured. The effective root zone is deep.

All of the acreage is woodland and is well suited to that use. Because flooding is a hazard, these soils are not well suited to cultivated crops.

Chastain soils are mapped only in Ben Hill County in an undifferentiated soil group with the Leaf soils.

Representative profile of a Chastain soil, in a wooded area:

A—0 to 10 inches, overwash of dark-brown (7.5YR 4/2) silty clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; many fine and medium roots; very strongly acid; clear, smooth boundary; layer ranges from 5 to 10 inches in thickness.

B1—10 to 22 inches, brown (10YR 5/3) silty clay loam with few, fine, faint mottles of pale brown (10YR 6/3); moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; few, small, soft and hard iron pebbles; very strongly acid; clear, wavy boundary; layer ranges from 12 to 16 inches in thickness.

B21tg—22 to 34 inches, pale-brown (10YR 6/3) silty clay with common, medium, distinct mottles of light brownish gray (2.5Y 6/2) and brown or dark brown (7.5YR 4/4); moderate, medium, angular blocky structure; hard when dry, firm when moist, sticky when wet; few soft and hard iron pebbles; very strongly acid; layer ranges from 8 to 14 inches in thickness.

B22tg—34 to 56 inches, yellowish-brown (10YR 5/6) silty clay with many, coarse, distinct mottles of light gray (N 7/0) and yellowish red (5YR 4/6); moderate, medium, angular blocky structure; hard when dry, firm when moist, sticky when wet; very strongly acid.

The surface layer ranges from dark brown to grayish brown in color and from silty clay loam to clay loam in texture.

Chastain soils occur with the Leaf soils but occupy higher positions than those soils and are better drained. The subsoil of Chastain soils contains less clay than that of Leaf soils.

Cowarts Series

The Cowarts series consists of well-drained, undulating to rolling soils of the uplands. Slopes range from 2 to 8 percent. These soils developed in thick beds of mottled sandy clay loam. They are moderately extensive and occur in both counties, but the largest acreage is in the northern part of Ben Hill County. The native vegetation is chiefly pines, but there are a few hardwoods.

In a typical profile, the surface layer is grayish-brown loamy sand about 6 inches thick. The subsoil is yellowish brown to a depth of more than 50 inches and is sandy loam in the upper 6 inches and sandy clay loam below. Mottling in shades of gray and red begins at a depth of about 19 inches. The red mottles increase with depth. In many places coarse grains of sand, some quartz pebbles, and a few iron pebbles are on the surface and throughout the profile.

These soils are low in natural fertility, low in organic-matter content, and very strongly acid. Infiltration is rapid, and permeability is moderate to moderately slow. Available water capacity is moderate. Tilth generally is excellent in uneroded areas, but crop response to management is only fair to good.

Most of the acreage in the two counties is woodland, which is a good use. Many small fields are cultivated, but these soils are only fairly well suited to cultivated crops. Corn and cotton are the chief crops. A small acreage is in pasture.

Representative profile of Cowarts loamy sand, 2 to 5 percent slopes:

Ap—0 to 6 inches, grayish-brown (2.5Y 5/2) loamy sand; weak, fine, granular structure; very friable; few, small, white quartz and iron pebbles 1/16 to 3/8 inch in diameter; some fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 4 to 12 inches in thickness.

B1t—6 to 12 inches, yellowish-brown (10YR 5/6) sandy loam; weak, fine, granular structure; very friable; some coarse grains of sand; very strongly acid; clear, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21t—12 to 19 inches, yellowish-brown (10YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; some coarse grains of sand; very strongly acid; clear, smooth boundary; layer ranges from 6 to 10 inches in thickness.

B22t—19 to 26 inches, yellowish-brown (10YR 5/8) sandy clay loam with common, medium, distinct and prominent mottles of light gray (10YR 7/2) and red (2.5YR 4/8); moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; some coarse grains of sand; more than 10 percent of volume is plinthite; very strongly acid; gradual, smooth boundary; layer ranges from 6 to 12 inches in thickness.

B23t—26 to 50 inches +, yellowish-brown (10YR 5/8) sandy clay loam with many, coarse, distinct and prominent mottles of red (10R 4/8), light gray (10YR 7/1), dark red (10R 3/8), and strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; plinthite; very strongly acid.

The surface layer ranges from grayish brown to light brownish gray in color. The content of quartz and iron pebbles and coarse grains of sand is variable. The subsoil ranges from strong brown to yellow in color and from heavy sandy loam to heavy sandy clay loam in texture. Lenses or pockets of coarser textured material are common in the subsoil.

The Cowarts soils occur among the Dothan, Esto, and Troup soils. They are similar to the Dothan soils but, unlike them, have pebbles of quartz and of iron on the surface. The sandy loam or sandy clay loam subsoil is nearer the surface in the Cowarts soils than in the Dothan. Cowarts soils are better drained and are coarser textured in the subsoil than Esto soils, and they have a more developed profile. They are finer textured than Troup soils, which lack a clay enriched horizon.

Cowarts loamy sand, 2 to 5 percent slopes (CqB).—This soil of the uplands occurs in fairly large areas. Some areas on ridgetops are as much as 25 acres in size. The profile of this soil is the one described as typical of the Cowarts series.

Included with this soil in the mapping were small areas of Dothan and Fuquay soils.

The root zone is moderately deep, and tilth generally is excellent. Erosion is a moderate hazard, but it can be controlled with good management.

This soil is mostly in pine trees and pasture and is well suited to those uses. It is only fairly well suited to cultivated crops but is used for corn, cotton, and peanuts in some places. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Cowarts loamy sand, 2 to 5 percent slopes, eroded (CqB2).—This eroded soil of the uplands is generally on ridgetops in areas ranging from 5 to 15 acres in size. Its profile is similar to the one described as typical of the Cowarts series, but the surface layer has been thinned by erosion. The plow layer normally extends into the upper subsoil, and a few shallow gullies and rills have formed in many places.

This soil is mostly in pine trees and pasture, and it is well suited to those uses. Erosion is a moderate hazard, and intensive practices are needed for its control in cultivated areas. A small acreage is used for corn and cotton, but this soil is not well suited to those or other cultivated crops. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Cowarts loamy sand, 5 to 8 percent slopes (CqC).—This sloping soil of the uplands occurs in narrow bands or on short slopes between the ridgetops and the drainageways. The profile of this soil is similar to the one described as typical of the Cowarts series.

Included with this soil in the mapping were areas of Esto and Fuquay soils that are too small to be mapped separately.

This soil is mostly in pine trees and pasture, and it is well suited to those uses. Erosion is a moderate hazard, and intensive practices are needed for control in cultivated areas. A small acreage, however, is used for corn and cotton. Tilth is generally good. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Cowarts loamy sand, 5 to 8 percent slopes, eroded (CqC2).—This sloping, eroded soil of the uplands generally occurs on short slopes between the less sloping ridgetops and drainageways. Its profile is similar to the one described as typical of the Cowarts series, but the surface layer has been thinned by erosion. The plow layer normally extends into the subsoil, and there are patches where the subsoil is exposed at the surface. A few rills and shallow gullies have formed in most places. Tilth is good except where the subsoil is exposed. Further erosion is likely.

Included with this soil in the mapping were areas of Esto and Sunsweet soils that are too small to be mapped separately.

This soil is mostly in pine trees and pasture, and it is well suited to those uses. It is not well suited to cultivated crops, but a small acreage is used for corn and cotton. Even when management is intensive, cultivated crops do not grow well. (Capability unit IVe–4; woodland suitability group 1; wildlife suitability group 1)

Dothan Series

The Dothan series consists of well-drained soils of the uplands. Slopes range from 0 to 5 percent. These soils developed in beds of sandy clay loam and sandy loam. They occur throughout Ben Hill and Irwin Counties but have a small total acreage. The largest acreage is in the northern part of Ben Hill County. The native vegetation consists chiefly of mixed pines and hardwoods and an understory of native grasses, mostly wiregrass.

In a typical profile, the surface layer, to a depth of 10 inches, is loamy sand. It is olive in the upper 6 inches and light olive brown below. The subsoil extends to a depth of more than 54 inches. It is yellowish-brown sandy loam in the upper part and brownish-yellow sandy clay loam mottled with red and yellow in the lower part. The red mottles begin at 30 inches and increase with depth. Soft iron pebbles and soft plinthite are at a depth of 42 inches.

These soils are low to moderate in natural fertility and are very strongly acid. The content of organic matter is low. Available water capacity is moderate. Water moves into and through these soils at a moderate rate. Tilth generally is excellent, and response to fertilization is good.

These soils are among the best soils in the two counties for farming. They are well suited to most crops grown locally, and crops on them respond well to good management that includes heavy fertilization. Most of the acreage is cultivated or pastured, but a moderate acreage is in pine trees, a good use.

Representative profile of Dothan loamy sand, 2 to 5 percent slopes, in a wooded area:

Ap—0 to 6 inches, olive (5Y 5/3) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 6 to 12 inches in thickness.

A3—6 to 10 inches, light olive-brown (2.5Y 5/6) loamy sand; weak, medium, granular structure; very friable; very strongly acid; clear, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B1t—10 to 14 inches, yellowish-brown (10YR 5/6) sandy loam; weak, medium, granular structure; very friable; very strongly acid; clear, wavy boundary; layer ranges from 3 to 7 inches in thickness.

B21t—14 to 30 inches, yellowish-brown (10YR 5/6) sandy clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when dry; very strongly acid; clear, wavy boundary; layer ranges from 16 to 20 inches in thickness.

B22t—30 to 42 inches, brownish-yellow (10YR 6/6) sandy clay loam with few, fine and medium, prominent mottles of red (2.5YR 4/8) and strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 15 inches in thickness.

B23t—42 to 52 inches +, brownish-yellow (10YR 6/6) sandy clay loam with many, coarse, prominent mottles of red (2.5YR 4/8) and yellow (2.5Y 7/6); moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; soft iron pebbles common; plinthite; very strongly acid.

The surface layer ranges from olive to dark grayish brown in color. In some places a few iron pebbles are on the surface and in the profile. The subsoil ranges from brownish yellow to yellowish brown in color. In most places the profile is thicker than 50 inches.

The Dothan soils occur with the Tifton, Stilson, and Fuquay soils. The Dothan soils closely resemble the Tifton soils, but they contain fewer iron pebbles and have a less brown, slightly coarser textured subsoil. They occupy higher positions and are better drained than Stilson soils. Dothan soils have a thinner A horizon than the Fuquay and Stilson soils.

Dothan loamy sand, 0 to 2 percent slopes (DoA).—This nearly level soil of the uplands has a profile that is similar to the one described as typical of the Dothan series.

Included with this soil in the mapping were small areas of Tifton and Fuquay soils.

This soil is cultivated extensively and is well suited to most crops grown locally. Crops respond well to good management that includes heavy fertilization. This soil is also well suited to pasture and to pine trees. (Capability unit IIs-1; woodland suitability group 1; wildlife suitability group 1)

Dothan loamy sand, 2 to 5 percent slopes (DoB).—This soil generally occurs in moderately small areas on ridgetops. Its profile is the one described as typical of the Dothan series.

Included with this soil in the mapping were areas of Tifton, Fuquay, and Cowarts soils that are too small to be mapped separately.

This soil responds well to management and is one of the better soils in the two counties for farming. It is well suited to most locally grown crops and is extensively used for corn, cotton, peanuts, tobacco, and truck crops. It is also well suited to pasture and to pine trees. (Capability unit IIe-1; woodland suitability group 1; wildlife suitability group 1)

Esto Series

The Esto series consists of moderately well drained, undulating to rolling soils of the uplands. Slopes range from 2 to 12 percent. These soils developed in beds of clay, sandy clay, and stratified clayey and sandy material. They occur in both Ben Hill and Irwin Counties, but the largest acreage is in the northern and northeastern parts of Ben Hill County. The native vegetation consists chiefly of mixed pines and hardwoods.

In a typical profile, the surface layer, to a depth of 9 inches, is loamy coarse sand. It is very dark gray in the upper 3 inches and dark grayish brown below. The subsoil is yellowish-red sandy clay loam in the upper part and light-gray clay in the lower part. At a depth of 28 to more than 54 inches is light-gray sandy clay loam and coarse sandy clay loam prominently mottled with weak red, red, and strong brown. Coarse grains of sand begin at a depth of 18 inches.

These soils are low in natural fertility, low in organic-matter content, and very strongly acid. Infiltration is moderate, and permeability is slow. Because the subsoil is fine textured, the root zone is moderately shallow. Tilth generally is good in uneroded areas, but it is only fair in eroded areas.

Most of the acreage in the two counties is in pine trees and is well suited to that use. A small acreage is cultivated, mainly to corn and peanuts. A small acreage is in pasture, but these soils are only fairly well suited to pasture.

Representative profile of Esto loamy coarse sand, 5 to 8 percent slopes, eroded, in a wooded area:

A1—0 to 3 inches, very dark gray (10YR 3/1) loamy coarse sand; single grain; loose; matted roots; very strongly acid, abrupt, smooth boundary; layer ranges from 2 to 5 inches in thickness.

A3—3 to 9 inches; dark grayish-brown (10YR 4/2) loamy coarse sand; single grain; loose; numerous fine and medium roots; very strongly acid; clear, smooth boundary; layer ranges from 4 to 6 inches in thickness.

B1t—9 to 12 inches, yellowish-red (5YR 4/6) sandy clay loam; weak, medium, subangular blocky structure; friable; fine roots common; very strongly acid; clear, wavy boundary; layer ranges from 3 to 6 inches in thickness.

B2tg—12 to 18 inches, light-gray (5Y 6/1) clay; clay films continuous on ped faces; ped interiors are light gray (10YR 7/1) and dark red (7.5R 3/6); moderate, coarse, angular blocky structure; very firm when moist; numerous coarse grains of sand; many fine roots between peds; very strongly acid; clear, wavy boundary, layer ranges from 4 to 8 inches in thickness.

B3tg—18 to 28 inches, light-gray (5Y 6/1) clay; patchy clay films on ped faces; ped interiors are light gray (10YR 7/1) and dark red (10R 3/6); weak, coarse, angular blocky structure; very firm; common coarse grains of sand; very strongly acid; gradual, wavy boundary; layer ranges from 8 to 12 inches in thickness.

C1g—28 to 50 inches, light-gray (10YR 7/1) sandy clay loam and thin beds of sandy loam; common, medium, prominent mottles of weak red (10R 4/4); massive; hard when dry, firm when moist, slightly plastic when wet; common, coarse, white grains of sand; very strongly acid; layer ranges from 15 to 25 inches in thickness.

C2g—50 to 54 inches +, light-gray (10YR 7/1) coarse sandy clay loam with many, coarse, prominent mottles of strong brown (7.5YR 5/8) and red (10R 4/6); massive; hard when dry, firm when moist; common, coarse, white grains of sand; very strongly acid.

The surface layer ranges from very dark gray to grayish brown. The B1 horizon is yellowish red to strong brown, and if mottles are present, they are faint. The B2 horizon has a matrix color of gray or light gray with strong-brown or yellowish-red ped interiors. In some places, however, the B2 horizon has a matrix color of yellowish brown, strong brown, or yellowish red and many mottles of gray or light gray. In most places the B2 horizon is a sandy clay.

The Esto soils occur among the Susquehanna, Cowarts, and Sunsweet soils. Compared with Susquehanna soils, Esto soils are better drained, have a better developed profile, are less sticky and plastic, and are underlain by stratified clayey and sandy material instead of thick beds of heavy clay. The Esto soils are finer textured and redder than the Cowart soils and lack the plinthite that occurs in the lower B horizons of those soils. Esto soils are finer textured and contain fewer iron pebbles than the Sunsweet soils.

Esto loamy coarse sand, 2 to 5 percent slopes (EnB).—This soil of the uplands generally occurs on ridgetops in areas ranging from 10 to 20 acres in size. The profile of this soil is similar to the one described as typical of the

Esto series. A few iron pebbles and white quartz pebbles are on the surface in some areas.

Included with this soil in the mapping were areas of Cowarts and Fuquay soils that are too small to be mapped separately.

Because of the hazard of erosion, the slope, and the fine-textured subsoil, this soil is only fairly well suited to cultivated crops and pasture. A few small areas are in corn, and a small acreage is in pasture. Almost all of the acreage is in pine trees, for which this soil is well suited. (Capability unit IVe–3; woodland suitability group 3; wildlife suitability group 1)

Esto loamy coarse sand, 2 to 5 percent slopes, eroded (EnB2).—This eroded soil has a profile similar to the one described as typical of the Esto series, but the surface layer is thinner and in places the subsoil is exposed. A few shallow gullies and rills have formed in many places. A few small, white pebbles of quartz and a few iron pebbles are on the surface in some areas.

Included in the mapping were small areas of Susquehanna and Cowarts soils that are too small to be mapped separately.

This soil is only fairly well suited to cultivated crops and pasture. A small acreage is in corn, and a small acreage is pastured. This soil is almost entirely in pine trees, and it is well suited to them. (Capability unit IVe–3; woodland suitability group 3; wildlife suitability group 1)

Esto loamy coarse sand, 5 to 8 percent slopes, eroded (EnC2).—This sloping soil of the uplands generally occurs as narrow bands between the ridgetops and the drainageways. The profile of this soil is the one described as typical of the series, but in places the subsoil is exposed and shallow gullies and rills are common. Small, white pebbles of quartz and a few iron pebbles are on the surface layer in some areas. In some places a few large boulders are on the surface and throughout the profile.

Included with this soil in the mapping were small areas of Susquehanna and Cowarts soils that are too small to be mapped separately.

This soil is not suitable for cultivation, because it is too sloping, erosion is a hazard, and the subsoil is fine textured. It is fairly well suited to pasture, and a small acreage is pastured. This soil is well suited to pine trees, and almost all of it is in pines. (Capability unit VIe–2; woodland suitability group 3; wildlife suitability group 4)

Esto loamy coarse sand, 8 to 12 percent slopes, eroded (EnD2).—This eroded soil of the uplands occurs mostly in sloping areas, but they are also on very steep, broken bluffs along the sides of entrenched streams. The subsoil is exposed in some places, and a few shallow gullies and rills have formed in many places. In some places a few iron pebbles are on the surface, and cherty limestone boulders are on the surface and throughout the profile.

Included with this soil in the mapping were a few small, uneroded areas. Also included were areas of Cowarts and Susquehanna soils that are too small to be mapped separately.

Because of the slope and the fine-textured subsoil, this soil is not suitable for cultivation. A very small acreage is in pasture, for which the soil is only fairly well suited. Almost all of the acreage is in pine trees, a good use. (Capability unit VIIe–2; woodland suitability group 3; wildlife suitability group 4)

Fuquay Series

The Fuquay series consists of deep, well-drained, sandy, nearly level to gently sloping soils of the uplands. Fuquay soils occur throughout Ben Hill and Irwin Counties and have a moderate total acreage. The native vegetation consists of mixed hardwoods and pines and an understory of wiregrass and native grasses.

In a typical profile, the surface layer, to a depth of 23 inches, is loamy sand. It is dark grayish brown in the upper 9 inches and pale olive below. The subsoil extends to a depth of more than 60 inches. It is light yellowish-brown sandy loam in the uppermost 4 to 6 inches and light yellowish-brown and yellowish-brown sandy clay loam below. Distinct mottles of strong brown, red, and white begin at a depth of 41 inches. As depth increases, the red mottles increase in size and number. A few medium and small iron pebbles are at a depth of 41 inches, and plinthite occurs at 52 inches.

The Fuquay soils are low in natural fertility and very strongly acid. They contain a small amount of organic matter. Infiltration is rapid. Permeability is rapid in the upper horizons and is moderate to moderately slow in the subsoil. Available water capacity is low to moderate. The root zone is deep, and tilth generally is excellent.

These soils are generally well suited to most crops grown locally, and crops on them respond well to good management. Much of the acreage is cultivated or pastured. A considerable acreage is in pines, which is a good use.

Representative profile of Fuquay loamy sand, 0 to 2 percent slopes, in a cultivated field:

Ap—0 to 9 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; clear, smooth boundary; layer ranges from 6 to 10 inches in thickness.

A2—9 to 23 inches, pale-olive (5Y 6/3) loamy sand; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 15 inches in thickness.

B1t—23 to 27 inches, light yellowish-brown (2.5Y 6/4) sandy loam, weak, medium, granular structure; very friable; very strongly acid; gradual, wavy boundary; layer ranges from 4 to 6 inches in thickness.

B21t—27 to 41 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 12 to 18 inches in thickness.

B22tcn—41 to 52 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam with few, medium, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet; few small and medium iron pebbles; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 15 inches in thickness.

B23t—52 to 60 inches +, yellowish-brown (10YR 5/8) sandy clay loam with many, medium, distinct and prominent mottles of strong brown (7.5YR 5/8), red (2.5YR 4/8), and white (2.5Y 8/2); massive; friable, slightly sticky when wet; plinthite; very strongly acid.

The A horizon ranges from loamy sand to loamy coarse sand in texture and from 20 to 40 inches in thickness. Small rounded pebbles of quartz and iron occur on the surface and in the plow layer in many places. In some places the plow layer is grayish brown. The B horizon ranges from heavy sandy loam to heavy sandy clay loam. In some places it is mottled at a depth of about 26 inches. Coarse grains of sand are prominent in the profile in some areas.

Fuquay soils commonly occur with the Dothan, Troup, and Stilson soils. The Fuquay soils have thicker, slightly coarser

textured sandy horizons immediately below the surface than those of the Dothan soils and have plinthite deeper in the profile. Fuquay soils are not so sandy as the Troup soils, in which sand extends from the surface to a depth of more than 40 inches. The Fuquay soils are better drained than the Stilson soils and generally occupy higher positions.

Fuquay loamy sand, 0 to 2 percent slopes (FsA).—This sandy soil of the uplands generally occurs in fairly large areas on ridgetops. Some areas are as much as 50 acres in size. The profile of this soil is the one described as typical of the Fuquay series.

Included with this soil in the mapping were areas of Troup and Dothan soils that are too small to be mapped separately.

This Fuquay soil is well suited to most crops commonly grown in the area. It is used extensively for corn, peanuts, tobacco, oats, and cotton. This soil is also well suited to pine trees. (Capability unit IIs–1; woodland suitability group 1; wildlife suitability group 1)

Fuquay loamy sand, 2 to 5 percent slopes (FsB).—This sandy soil is commonly on ridgetops in areas as much as 40 acres in size. It has a profile similar to the one described as typical of the Fuquay series. Because the surface layer is thick and sandy, this soil is slightly droughty.

Included with this soil in the mapping were small areas of Dothan, Troup, and other soils.

This Fuquay soil is extensively cultivated, for it is well suited to corn, peanuts, tobacco, and other crops commonly grown in the two counties. Crops respond well to good management that provides adequate lime and large amounts of fertilizer. This soil is also suited to pasture plants and pine trees, and it is used for them in a moderate acreage. (Capability unit IIs–1; woodland suitability group 1; wildlife suitability group 1)

Fuquay loamy sand, 5 to 8 percent slopes (FsC).—This soil occupies short slopes near drainageways and generally is in long, narrow areas as much as 20 acres in size. It has a profile similar to the one described as typical of the Fuquay series. Because the surface layer is thick and sandy, this soil is slightly droughty.

Included with this soil in mapping were small areas of Troup and Cowarts soils.

This Fuquay soil is well suited to corn, peanuts, and forage crops. Crops respond well to heavy fertilization. Because of the slope, erosion is a moderate hazard, and practices are needed for controlling erosion in cultivated areas. Most areas, however, are in pine trees and pasture, and the soil is well suited to those uses. (Capability unit IIIe–5; woodland suitability group 1; wildlife suitability group 1)

Fuquay loamy coarse sand, 2 to 5 percent slopes (FqB).—This sandy soil of the uplands commonly occurs on or adjacent to ridgetops in areas ranging from 10 to 20 acres in size. This soil contains more coarse sand in the surface layer and subsoil than does the soil described as typical of the Fuquay series. Also, it has a slightly finer textured subsoil.

Included with this soil in the mapping were small areas of Cowarts and Esto soils that are too small to be mapped separately.

A moderate part of this soil is cultivated and in pasture. Corn, peanuts, cotton, and tobacco are suited if applications of lime and fertilizer are liberal. This soil is fairly well suited to pasture, but almost all of the acreage is in pine trees. The soil is well suited to pines. (Capability unit IIs–4; woodland suitability group 1; wildlife suitability group 1)

Fuquay loamy coarse sand, 5 to 8 percent slopes (FqC).—This sandy soil of the uplands is on short, rough slopes between the ridgetops and the drainageways. It generally occurs in long, narrow areas that average 10 to 20 acres in size. This soil contains more coarse sand in the surface layer and subsoil than does the soil described as typical of the Fuquay series. Also, this soil has a slightly finer textured subsoil. The subsoil of this soil is free of mottles in its upper 2 to 6 inches. In some places a few iron pebbles occur in the upper 20 inches of the profile.

Included with this soil in the mapping were small areas of Cowarts, Troup, and Esto soils.

Erosion is a moderate hazard on this soil because of the slope. Only a small part of the soil is cultivated. Corn and peanuts are the chief crops. Heavy applications of lime and fertilizer are required for cultivated crops. Crop response to good management is only moderate. A small part of this soil is used for pasture, for which the soil is only fairly well suited. Most of the acreage is in pine trees, a good use. (Capability unit IIIe–4; woodland suitability group 1; wildlife suitability group 1)

Grady Series

The Grady series consists of poorly drained, dark-colored, level soils in depressions. These soils developed from beds of sandy clay and clay. They are in small areas scattered throughout the southern part of Ben Hill County and the central part of Irwin County. The total acreage in these counties is small. The native vegetation consists of cypress, blackgum, and tupelo-gum and an understory of gallberry, myrtle, and sedge.

In a typical profile, the surface layer is very dark gray sandy loam about 6 inches thick. Below this to a depth of 12 to 14 inches is light-gray sandy clay loam. This layer is underlain by gray and light-gray sandy clay. Distinct mottles of yellowish brown begin at a depth of about 6 inches.

These soils are low in natural fertility and very strongly acid. They are low to moderate in organic-matter content. Infiltration and permeability are slow, and available water capacity is moderate. The root zone is deep, and tilth generally is good.

Almost all of the acreage in the two counties is woodland, mainly cypress trees. Water stands on the surface for several months each year. Drainage is required before these soils are used for crops or pasture.

Representative profile of Grady sandy loam, in a wooded area:

A—0 to 6 inches, very dark gray (N 3/0) sandy loam; weak, fine, granular structure; very friable; numerous medium and fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 5 to 7 inches in thickness.

B1tg—6 to 14 inches, light-gray (N 6/0) sandy clay loam with common, medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; friable; very strongly acid; gradual, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21tg—14 to 26 inches, gray (N 5/0) sandy clay with common, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm when moist, sticky when wet; very strongly acid; gradual, smooth boundary; layer ranges from 10 to 18 inches in thickness.

B22tg—26 to 50 inches +, light-gray (N 6/0) sandy clay with common, coarse, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, angular blocky structure; firm when moist, sticky when wet; very strongly acid.

The surface layer ranges from very dark gray to gray or grayish brown in color. The B2 horizon is dominantly sandy clay, but is clay loam in a few areas.

The Grady soils commonly occur among the Tifton, Dothan, Irvington, Leefield, Alapaha, and Plummer soils. They are more clayey in the subsoil and more poorly drained than the Tifton, Dothan, Irvington, and Leefield soils. Grady soils are similar to the Alapaha and Plummer soils in drainage but are finer textured throughout the profile.

Grady sandy loam (0 to 1 percent slopes) (Gra).—This poorly drained soil generally occurs in depressions in areas ranging from 1 to 8 acres in size. The profile of this soil is the one described as typical of the Grady series.

Included with this soil in the mapping were areas of Alapaha and Irvington soils that are too small to be mapped separately.

This soil is flooded more than once each year for periods of 1 to 6 months. The water table is at a depth of less than 15 inches for more than 6 months each year.

Drainage is required before this soil can be cultivated or pastured. Although it is not now used for cultivated crops in either of the two counties, it can be safely cultivated if adequately drained and properly managed. In a few drained areas, good pasture is produced if adequate lime and fertilizer are added. This soil is well suited as woodland, and almost all of it is in trees, mainly cypress. Drained areas are excellent for pine trees. (Capability unit IIIw-2; woodland suitability group 4; wildlife suitability group 5)

Irvington Series

The Irvington series consists of moderately well drained soils that have a fragipan. Slopes range from 0 to 3 percent. These soils developed in thick beds of sandy clay loam. The Irvington soils occur in small areas throughout Irwin County and in the lower two-thirds of Ben Hill County. They have a small total acreage. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

In a typical profile, the surface layer is dark-gray loamy sand about 8 inches thick. The subsoil, to a depth of 14 inches, is light yellowish-brown sandy loam that is underlain by 9 inches of olive-yellow sandy clay loam mottled with strong brown. The fragipan begins at a depth of 23 inches and is about 15 inches thick. It consists of iron crusts or of stratified, compact sandy clay loam that is weakly cemented with iron. At a depth of 38 inches is strong-brown sandy clay loam distinctly mottled with red and light gray. Small, rounded iron pebbles are on the surface and throughout the profile.

These soils are low in natural fertility, contain little organic matter, and are very strongly acid. Infiltration and permeability are moderate, and available water capacity is moderate. The root zone is deep, and tilth generally is good.

Many areas of these soils are in corn, soybeans, tobacco, and truck crops, for which the soils are well suited. Drainage generally is needed if cultivated crops are grown. This soil is also well suited to pasture and to pine trees, and most of the acreage is in pines.

Representative profile of Irvington loamy sand, 0 to 3 percent slopes, in a cultivated field:

Apcn—0 to 8 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; many fine roots; few iron pebbles; very strongly acid; abrupt, smooth boundary; layer ranges from 6 to 9 inches in thickness.

Bltcn—8 to 14 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, fine, granular structure; very friable; fine roots common in upper part; few iron pebbles; very strongly acid; clear, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21tcn—14 to 23 inches, olive-yellow (2.5Y 6/6) sandy clay loam with few, fine, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet; many iron pebbles; very strongly acid; clear, smooth boundary; layer ranges from 8 to 16 inches in thickness.

B22t—23 to 38 inches, strong-brown (7.5YR 5/8) sandy clay loam with many, medium, distinct mottles of light brownish gray (2.5Y 6/2) and red (2.5YR 4/8); massive; hard when dry, friable when moist, sticky when wet; many small and medium iron pebbles; very strongly acid; gradual, wavy boundary; layer ranges from 6 to 16 inches in thickness.

B23t—38 to 50 inches +, strong-brown (7.5YR 5/8) sandy clay loam with many, coarse, distinct mottles of red (2.5YR 4/8) and light gray (10YR 7/1); moderate, medium, subangular blocky structure; friable when moist, sticky when wet; plinthite; very strongly acid.

A very dark gray, thin A1 horizon is common in wooded areas. Pebbles range from few to many in the surface soil and the upper subsoil. Depth to the fragipan ranges from 20 to 34 inches or more.

The Irvington soils occur among the Tifton, Leefield, and Alapaha soils. They are better drained than the Leefield soils, which do not have a fragipan. Irvington soils occupy higher positions and are better drained than the Alapaha soils. They are less well drained and have more mottles in the subsoil than the Tifton soils.

Irvington loamy sand, 0 to 3 percent slopes (IjA).—This soil of the uplands has a fragipan. Generally this soil is in areas 4 to 8 acres in size that are adjacent to but slightly higher than ponded areas and the drainageways. The profile of this soil is the one described as typical of the Irvington series. The water table is at a depth of 15 to 30 inches for periods of 1 or 2 months each year.

Included with this soil in the mapping were some small areas of Leefield and Stilson soils.

A moderate acreage of this soil is cultivated or pastured. Corn and tobacco are the chief crops. Crops respond well to lime and to heavy fertilization. Drainage generally is needed in cultivated areas. This soil is well suited to pasture and pine trees. Most of the acreage is in slash pine and longleaf pine. (Capability unit IIw–2; woodland suitability group 2; wildlife suitability group 3)

Kershaw Series

The Kershaw series consists of deep, excessively drained soils of the uplands. Slopes range from 2 to 8 percent. These soils developed from thick beds of sand. They occupy a moderately small acreage in Ben Hill and Irwin Counties. They occur chiefly as deep sandy ridges adjacent and parallel to the Alapaha River in the two counties and are adjacent to the bottom lands along House Creek in the northern part of Ben Hill County. The native vegetation consists of scrub oak, turkey oak, blackjack oak, a few scattered longleaf pines, and a sparse understory of wire-

grass and native weeds. In a few areas the vegetation is thicker than is normal on sandy soils.

In a typical profile, the surface layer is dark-gray and yellowish-brown coarse sand about 18 inches thick. Below this, to a depth of about 70 inches, is yellowish-brown and brownish-yellow coarse sand.

These soils are very strongly acid, very low in natural fertility, and contain little organic matter. Available water capacity is very low. Infiltration and permeability are very rapid. The root zone is deep, and tilth generally is excellent. These soils are the droughtiest, and crop yields are the lowest, of any of the soils in the two counties.

Because these soils are the droughtiest soils in Ben Hill and Irwin Counties, only a very small acreage is cultivated. Almost all of the acreage is in scrub oaks and scattered pines, but trees do not grow well.

Representative profile of Kershaw coarse sand, 2 to 8 percent slopes, in a wooded area:

A1—0 to 3 inches, dark-gray (10YR 4/1) coarse sand; structureless; loose; a few fine roots; very strongly acid; clear, smooth boundary; layer ranges from 2 to 4 inches in thickness.

AC—3 to 18 inches, yellowish-brown (10YR 5/6) coarse sand with few, medium, faint mottles of yellowish brown (10YR 5/4); structureless; loose; very strongly acid; gradual, smooth boundary; layer ranges from 15 to 20 inches in thickness.

C1—18 to 48 inches, yellowish-brown (10YR 5/6) coarse sand; structureless; loose; very strongly acid; gradual, smooth boundary; layer ranges from 30 to 36 inches in thickness.

C2—48 to 70 inches, brownish-yellow (10YR 6/6) coarse sand; structureless; loose; very strongly acid.

The surface layer generally is coarse sand, but in a few small areas it is sand. It ranges from dark gray to dark grayish brown in color. Depth to fine material ranges from 6 to 10 feet or more. Moss and lichen are on the surface in many places.

The Kershaw soils occur among the Troup, Albany, and Plummer soils. Kershaw are more undulating and dunelike than Troup soils and are coarser textured and more excessively drained. The Kershaw soils occupy higher positions and are better drained than the Albany and Plummer soils.

Kershaw coarse sand, 2 to 8 percent slopes (KkC).—This coarse sandy soil is on ridges and strong slopes adjacent and parallel to the bottom lands of the Alapaha River and House Creek. It generally occurs in long, narrow areas that are as much as 50 to 60 acres in size. The profile of this soil is the one described as typical of the Kershaw series. In some places, however, the surface layer is underlain by a light brownish-gray layer 4 to 6 inches thick.

Included with this soil in the mapping were areas of Troup soils that are too small to be mapped separately.

Because this soil is one of the droughtiest soils in the two counties, it is not used for cultivated crops. Almost all of the acreage is in scrub oaks and scattered pines (fig. 5), but some areas are being cleared and planted to slash pine. (Capability unit VIIs–1; woodland suitability group 7; wildlife suitability group 4)

Leaf Series

The Leaf series consists of poorly drained soils on stream terraces that are subject to flooding several times each year. Slopes range from 0 to 2 percent. These soils developed from fine-textured, old alluvium that washed mostly from the Coastal Plain but partly from the Piedmont Plateau.

Figure 5.—**Typical vegetation on Kershaw coarse sand, 2 to 8 percent slopes.**

The Leaf soils occur only along the Ocmulgee River in the extreme northeastern part of Ben Hill County. The native vegetation consists chiefly of hardwoods, but there are a few pines.

In a typical profile, the surface layer is dark-brown silty clay loam 6 inches thick. This layer is mostly overwash. The subsoil is light-gray clay mottled with strong brown, yellowish red, and red. Below a depth of about 46 inches is light-gray silty clay loam mottled with yellowish red.

These soils are low to moderate in natural fertility, low to medium in organic-matter content, and very strongly acid. Infiltration and permeability are slow. Available water capacity is moderate. Tilth generally is poor because the surface layer is moderately fine textured.

Because drainage is poor and flooding is a hazard, these soils are not well suited to cultivation. All of the acreage is woodland and is well suited to that use.

Leaf soils are mapped only in Ben Hill County in an undifferentiated soil group with the Chastain soils.

Representative profile of a Leaf soil, in a wooded area:

A—0 to 6 inches, outwash of dark-brown (7.5YR 4/2) silty clay loam with few, fine, distinct mottles of brown (10YR 5/3); moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; many fine and medium roots; very strongly acid; abrupt, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B2tg—6 to 22 inches, light-gray (N 7/0) clay with many, medium, distinct mottles of strong brown (7.5YR 5/8) and yellowish red (5YR 5/6); strong, medium, angular blocky structure; very hard when dry, firm when moist, very sticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 12 to 18 inches in thickness.

B3tg—22 to 46 inches, light-gray (N 7/0) clay with many, medium, prominent mottles of strong brown (7.5YR 5/8) and red (2.5YR 4/8); strong, medium, angular blocky structure; very hard when dry, firm when moist, very sticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 4 to 10 inches in thickness.

Cg—46 to 60 inches, light-gray (N 7/0) silty clay loam with common, medium, prominent mottles of yellowish red (5YR 4/6); massive; slightly hard when dry, friable when moist, slightly sticky when wet; very strongly acid.

The surface layer ranges from very dark gray to dark brown in color. In places red mottles do not occur in the subsoil.

The Leaf soils occur closely with the Chastain soils but are more poorly drained and occupy slightly lower positions than

those soils. Leaf soils commonly have a finer textured subsoil than Chastain soils.

Leaf and Chastain soils (0 to 2 percent slopes) (Lid).—This mapping unit is on bottom lands along the Ocmulgee River in the northeastern part of Ben Hill County. Flooding occurs more than once each year and lasts from 2 days to about 1 month. Mapping Leaf and Chastain soils separately would serve no useful purpose, because all areas have similar limitations to use.

The poorly drained Leaf soil makes up about 60 percent of this mapping unit. Its profile is the one described as typical of the Leaf series. Depth to the water table fluctuates but is at a depth of less than 15 inches for 2 to 6 months of the year.

The Chastain soil makes up about 30 percent of this mapping unit in most areas. The profile of this soil is the one described as typical of the Chastain series. This soil is somewhat poorly drained. Its water table fluctuates but is at a depth of 15 to 30 inches for periods of 1 or 2 months each year.

Included with these Leaf and Chastain soils in mapping were small areas of Swamp and of Osier and Bibb soils that are too small to be mapped separately. These included areas make up about 10 percent of this mapping unit.

The soils in this mapping unit are very strongly acid and are low to moderate in natural fertility and organic-matter content. Infiltration is moderate, permeability is moderately slow to slow, and available water capacity is moderate. These soils generally are in poor tilth and can be worked only within a narrow range of moisture content.

Because flooding is a hazard, these soils are not cultivated or pastured. They could be cultivated if adequately drained and protected from flooding. All of the acreage is woodland, mainly hardwoods and scattered pines. These soils are well suited to timber. (Capability unit IVw–2; woodland suitability group 4; wildlife suitability group 5)

Leefield Series

The Leefield series consists of somewhat poorly drained soils that developed in thick beds of sandy clay loam and sandy loam. Slopes range from 0 to 3 percent. The Leefield soils are widely distributed throughout Ben Hill and Irwin Counties, but they have a moderately small total acreage. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

In a typical profile, the plow layer is dark grayish-brown loamy sand 7 inches thick. It is underlain by light-gray loamy sand faintly mottled with olive yellow and pale yellow. The subsoil begins at a depth of 24 inches and extends to a depth of more than 50 inches. It is mottled sandy clay loam that is dominantly light yellowish brown in the upper part and light gray in the lower part.

Leefield soils are low in natural fertility, contain little organic matter, and are very strongly acid. Infiltration and permeability are moderately rapid to moderate. The effective root zone is deep, and tilth generally is excellent. Crop response to management, including heavy fertilization, is good.

These soils are well suited to corn, tobacco, and truck crops, and many small areas are used for these crops. Drainage generally is needed in cultivated areas. A moderate acreage is used for pasture, which also is a good use.

Representative profile of Leefield loamy sand, 0 to 3 percent slopes, in a cultivated field:

Ap—0 to 7 inches, dark grayish-brown (2.5Y 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 6 to 9 inches in thickness.

A2g—7 to 24 inches, light-gray (2.5Y 7/2) loamy sand with few, fine, faint mottles of olive yellow and pale yellow; weak, fine, granular structure; very friable when moist; very strongly acid; gradual, smooth boundary; layer ranges from 15 to 20 inches in thickness.

B1tg—24 to 30 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam with common, medium, distinct mottles of light gray (2.5Y 7/2) and yellowish brown (10YR 5/8); weak, fine, granular structure; very friable when moist; very strongly acid; gradual, smooth boundary; layer ranges from 4 to 6 inches in thickness.

B21tg—30 to 44 inches, light-gray (2.5Y 7/2) sandy clay loam with many, coarse, distinct mottles of yellowish brown (10YR 5/6) and yellowish red (5YR 4/8); moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet; a few soft and slightly hard iron pebbles; very strongly acid; gradual, smooth boundary; layer ranges from 10 to 15 inches in thickness.

B22tg—44 to 50 inches +, mottled light-gray (N 7/0), red (2.5YR 4/8), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; friable or firm when moist, slightly sticky when wet; plinthite; very strongly acid.

In a few small areas the surface layer is sand and loamy coarse sand. The B horizon is dominantly sandy clay loam, but it is sandy loam in a few small areas. The layer in which plinthite occurs is strongly gleyed and is at a depth of 3 or 4 feet.

Leefield soils occur among the Dothan, Stilson, and Alapaha soils. They occupy lower positions and are wetter than the Dothan and Stilson soils. Their thick sandy surface layer distinguishes them from the Dothan soils. Leefield soils occupy higher positions and are not so wet as the Alapaha soils.

Leefield loamy sand, 0 to 3 percent slopes (LsA).—This soil commonly is in long narrow areas that range from 3 to 10 acres in size and are adjacent to but slightly higher than ponds and drainageways. The profile of this soil is the one described as typical of the Leefield series. The water table fluctuates but is at a depth of 15 to 30 inches for periods of 2 to 6 months each year.

Included with this soil in the mapping were sizable areas that contain many iron concretions in the profile. Also included were small areas of Irvington, Stilson, and Alapaha soils that are too small to be mapped separately.

A moderate part of this soil is cultivated, mainly to tobacco, corn, and truck crops. Crop response to heavy fertilization is good. Drainage generally is needed in cultivated areas. This soil is well suited to pasture, and a moderate acreage is in pasture. This soil is well suited as woodland, and most of it is used for that purpose. (Capability unit IIw–2; woodland suitability group 2; wildlife suitability group 3)

Ocilla Series

The Ocilla series consists of deep, somewhat poorly drained soils. Slopes range from 0 to 3 percent. These soils developed from thick beds of sandy loam and sandy clay loam. They are widely distributed throughout Ben

Hill and Irwin Counties and have a moderate total acreage. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry, myrtle, and wiregrass.

In a typical profile, the surface layer is loamy sand 28 inches thick. This layer is very dark gray in the upper 4 inches and is light brownish gray and pale brown below. Faint mottles of brownish yellow are at a depth of about 15 inches. The uppermost 21 inches of the subsoil is brownish-yellow sandy loam that contains pockets of sandy clay loam and is distinctly mottled with light gray. Below this, to a depth of about 80 inches, is brownish-yellow, strong-brown, yellowish-red, yellowish-brown, and light-gray sandy clay loam that contains pockets of sandy loam. Below a depth of 80 inches is mottled dark-red and very pale brown sandy clay or clay that contains pockets of strong-brown loamy material.

Ocilla soils are low in natural fertility, contain little organic matter, and are very strongly acid. Infiltration and permeability are moderate to moderately rapid, and available water capacity is low to moderate. The effective root zone is deep, and tilth generally is excellent. These soils can be cultivated throughout a wide range of moisture content.

A considerable acreage of these soils is cultivated and pastured. Corn, soybeans, and truck crops are the chief crops. Crops and pasture respond well to good management that includes heavy fertilization. If crops are grown, drainage is needed because the water table is high. Most of the acreage is woodland, mainly slash pine and longleaf pine.

Representative profile of Ocilla loamy sand, 0 to 3 percent slopes, in a wooded area:

A1—0 to 4 inches, very dark gray (10YR 3/1) loamy sand; weak, medium, granular structure; very friable; numerous grass and tree roots; strongly acid; clear, wavy boundary; layer ranges from 2 to 6 inches in thickness.

A2—4 to 15 inches, light brownish-gray (2.5Y 6/2) loamy sand; weak, medium, granular structure; very friable; common grass and tree root channels filled with material from the A1 horizon; common, clean, medium grains of sand; strongly acid; clear, irregular boundary; layer ranges from 8 to 14 inches in thickness.

A3—15 to 28 inches, pale-brown (10YR 6/3) loamy sand with many, medium, faint mottles of brownish yellow (10YR 6/6); massive in place but breaks to weak, medium, subangular blocky structure; very friable; coated grains of sand; few roots; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 14 inches in thickness.

B1tg—28 to 49 inches, brownish-yellow (10YR 6/6) sandy loam and pockets of sandy clay loam; common, medium, distinct mottles of light gray (10YR 7/1); weak, medium, subangular blocky structure; very friable; coated and bridged grains of sand; very strongly acid; gradual, wavy boundary; layer ranges from 6 to 24 inches in thickness.

B21tg—49 to 59 inches, brownish-yellow (10YR 6/6) sandy clay loam and large pockets of light-gray (10YR 7/1) sandy loam; common, distinct, mottles of yellowish red (5YR 4/8); weak, medium, subangular blocky structure; friable; coated grains of sand; very strongly acid; gradual, irregular boundary; layer ranges from 4 to 16 inches in thickness.

B22tg—59 to 67 inches, strong-brown (7.5YR 5/6) and yellowish-red (5YR 4/8) sandy clay loam and pockets of light-gray (10YR 7/1) sandy loam; many, coarse, prominent mottles; weak, coarse, angular blocky structure; firm; few slightly hard lumps or soft concretions; very strongly acid; gradual, wavy boundary; layer ranges from 2 to 12 inches in thickness.

B23tg—67 to 80 inches, yellowish-brown (10YR 5/8), yellowish-red (5YR 4/8), and light-gray (10YR 7/1) sandy clay loam and pockets of sandy loam; common, medium, distinct mottles; weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary; layer ranges from 8 to 16 inches in thickness.

B3tg—80 to 90 inches, mottled dark-red (10R 3/6) and very pale brown (10YR 7/4) sandy clay or clay and pockets of strong-brown (7.5YR 5/6) loamy material; many, coarse, distinct mottles; massive; plastic when wet, firm when moist; very strongly acid.

In cultivated areas the surface layer is very dark grayish brown to dark grayish brown. The depth to the B horizon ranges from 20 to 40 inches but is between 28 and 36 inches in most places.

The Ocilla soils occur among the Plummer, Alapaha, Stilson, and Troup soils. They occupy higher positions and are not so wet as the Plummer and Alapaha soils but are lower and wetter than the Troup soils. The sandy loam or sandy clay loam subsoil is nearer the surface in the Ocilla soils than in the Troup. The Ocilla soils are wetter than the Stilson soils and, unlike them, lack the plinthite in the lower B horizon.

Ocilla loamy sand, 0 to 3 percent slopes (OhA).—This soil occurs in the two counties in areas called the Flatwoods. Areas are generally moderately large, and some of them are as much as 30 acres in size. Most areas are on broad flats adjacent to ponds. The profile of this soil is the one described as typical of the Ocilla series. In some places the profile contains a few iron pebbles.

Included with this soil in the mapping were areas of Leefield, Stilson, and Albany soils that are too small to be mapped separately.

Because the water table in Ocilla loamy sand fluctuates, this soil is wet in rainy periods and slightly droughty in dry periods. The water table is at a depth of 15 to 30 inches for 2 to 6 months each year.

A considerable acreage of this soil is cultivated, but some drainage generally is needed in cultivated areas. If adequately drained, this soil is well suited to pasture and to corn, tobacco, soybeans, and other crops grown locally. It is especially well suited to tobacco. The largest acreage is pine woodland, which is a good use. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 3)

Ona Series

The Ona series consists of deep, somewhat poorly drained soils that developed in thick beds of marine sand and loamy sand. Slopes range from 0 to 2 percent. These soils are in small areas in the north-central part of Irwin County and the southeastern part of Ben Hill County. The native vegetation consists of mixed pines and hardwoods and an understory of palmettos, gallberry, waxmyrtle, and wiregrass.

In a typical profile the surface layer is very dark gray sand about 6 inches thick. The subsoil extends to a depth of more than 38 inches. It is very dark grayish-brown sand weakly cemented by organic matter in the upper part and is dark-brown to grayish-brown sand mottled with light brownish gray and light olive brown in the lower part. Below a depth of 38 inches or more is light yellowish-brown sandy loam distinctly mottled with yellowish brown, light gray, and yellowish red.

These soils are very strongly acid, low in natural fertility, and contain little organic matter. Infiltration and

permeability are rapid to moderately rapid, and available water capacity is low to moderate. These soils generally have very good tilth and a deep root zone.

Most of the acreage of these soils is in slash pine and longleaf pine, which is a good use. Some areas are in corn and tobacco. These crops respond well to good management that includes heavy fertilization and some drainage. A moderately small acreage is in pasture.

Representative profile of Ona sand, in a wooded area:

A1—0 to 6 inches, very dark gray (10YR 3/1) sand; structureless; loose; numerous small roots; very strongly acid; clear, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B2h—6 to 12 inches, very dark grayish-brown (10YR 3/2) sand; structureless; weakly cemented by organic matter; very strongly acid; clear, smooth boundary; layer ranges from 4 to 7 inches in thickness.

B31—12 to 16 inches, brown or dark-brown (10YR 4/3) sand with common, medium, distinct mottles of light brownish gray (2.5Y 6/2); structureless; loose; very strongly acid; clear, wavy boundary; layer ranges from 4 to 9 inches in thickness.

B32—16 to 38 inches, grayish-brown (2.5Y 5/2) sand with common, medium, faint mottles of light olive brown (2.5Y 5/6); structureless; loose when moist, nonsticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 14 to 24 inches in thickness.

C—38 to 65 inches, light yellowish-brown (2.5Y 6/4) sandy loam with common, medium, distinct mottles of yellowish brown (10YR 5/8) and light gray (10YR 7/1), and a few mottles of yellowish red (5YR 5/8); weak, fine, granular structure; very friable when moist, slightly sticky when wet; very strongly acid.

The surface layer ranges in color from very dark gray in wooded areas to gray in cultivated fields. In a few areas the surface layer is fine sand. Loamy material is at a depth of 36 to 48 inches.

The Ona soils commonly occur among the Plummer, Alapaha, and Albany soils. Unlike the Albany soils, the Ona soils contain a layer of sand that is slightly cemented by organic matter. This layer generally is just below the surface layer and in some places is within plow depth. The Ona soils are not so poorly drained as the Plummer and Alapaha soils. They lack the clay enriched B horizon that is common in the Alapaha soils.

Ona sand (0 to 2 percent slopes) (ObA).—This soil commonly occurs on broad flats in small areas near ponds. Its profile is the one described as typical of the Ona Series. In this soil the water table fluctuates but is within 15 inches of the surface for periods of 1 or 2 months each year.

Included with this soil in the mapping were areas of Ona sand that have a light-gray A2 horizon. This is underlain by dark reddish-brown sand that, at a depth of 15 to 20 inches, is weakly cemented. Also included were small areas of Albany, Ocilla, and Plummer soils that are too small to be mapped separately.

Only a small part of this soil is cultivated. Drainage generally is needed in cultivated areas. Corn and tobacco are the chief crops. Crops respond well to fertilization. A part of this soil is in pasture, which is a good use. Pine trees grow well on this soil, and most of the acreage is in pines. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 3)

Osier Series

The Osier series consists of sandy, poorly drained to very poorly drained, nearly level soils that are subject to flooding and deposition of sediments. The floods are frequent and last for several days to 2 weeks. These soils occur throughout Ben Hill and Irwin Counties on first bottoms along rivers, creeks, and branches. The native vegetation is chiefly sweetgum, blackgum, water oak, red maple, swamp holly, and bay, but there are a few slash pines.

In a typical profile, the upper 8 inches of these soils is very dark grayish-brown, dark-gray, or grayish-brown loamy fine sand stratified with lenses of sand. Below this is dark-gray loamy sand stratified with sand. Sand begins at a depth of 16 inches and extends to coarse sand at a depth of 48 inches. This layer is gray or light brownish gray and is mottled. The coarse sand is gray or light gray and extends to a depth of 75 inches.

These soils are low in natural fertility and very strongly acid. They contain a small to moderate amount of organic matter. Infiltration and permeability are rapid, and available water capacity is low. These soils have a deep root zone and generally are in good tilth.

Because flooding is a hazard, these soils are not suitable for cultivation. Almost all of the acreage in the two counties is woodland and is well suited to that use.

Representative profile of an Osier soil, in a wooded area:

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) loamy fine sand; weak, fine, granular structure; very friable when moist, slightly sticky when wet; matted roots; very strongly acid; abrupt, wavy boundary; layer ranges from 2 to 5 inches in thickness.

A&C—3 to 8 inches, dark-gray (10YR 4/1) and grayish-brown (2.5Y 5/2) loamy fine sand stratified with lenses of sand; weak, medium, granular structure; very friable when moist, nonsticky when wet; large and small roots common; very strongly acid; clear, wavy boundary; layer ranges from 1 to 10 inches in thickness.

C1g—8 to 16 inches, dark-gray (10YR 4/1) loamy sand stratified with lenses of gray and light-gray (2.5Y 6/1) sand; weak, fine, granular structure; very friable to loose when moist, nonsticky when wet; roots common; very strongly acid; gradual, wavy boundary; layer ranges from 4 to 20 inches in thickness.

C2g—16 to 36 inches, gray (10YR 6/1) sand with few, fine, faint mottles of yellowish brown (10YR 5/6); single grain; loose when moist, nonsticky when wet; few roots; very strongly acid; gradual, wavy boundary; layer ranges from 10 to 30 inches in thickness.

C3g—36 to 48 inches, light brownish-gray (2.5Y 6/2) sand with common, coarse, distinct mottles of brownish yellow (10YR 6/6); single grain; loose when moist, nonsticky when wet; few roots; very strongly acid; gradual, wavy boundary; layer ranges from 3 to 15 inches in thickness.

C4g—48 to 60 inches, light-gray (2.5Y 7/2) coarse sand with common, medium, distinct mottles of light brownish gray (10YR 6/2) and few, fine, distinct mottles of yellowish brown (10YR 5/8); single grain; loose when moist, nonsticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 0 to 18 inches in thickness.

C5g—60 to 75 inches, gray (10YR 5/1) coarse sand with many, coarse, faint mottles of light brownish gray (10YR 6/2); single grain; loose when moist, nonsticky when wet; very strongly acid.

The A1 horizon is absent in areas where the alluvium is very fresh. Where present, the A1 horizon ranges from very dark grayish brown to black in color and from sand through loamy sand to sandy loam in texture. The profile is normally loamy sand or sand to a depth of more than 40 inches, and it ranges from coarse sand to sandy clay loam below that depth. The lower horizons are dominantly gray mottled with brownish and yellowish colors.

The Osier soils occur among the Bibb soils and Swamp. They are similar to the Bibb soils in drainage but are coarser textured throughout the profile. Osier soils adjoin Swamp in places but are in slightly higher positions and are covered with water for a shorter period.

Osier-Bibb complex (Obs).—This mapping unit is on bottom lands along branches and creeks throughout Ben Hill and Irwin Counties. Flooding is frequent and lasts for 1 day to 2 weeks. Slopes are less than 2 percent. The Osier and the Bibb soils are so intricately intermingled that it is not practical to map them separately.

The poorly drained to very poorly drained Osier soils make up about 60 percent of the mapping unit. Their profile is the one described as typical of the Osier series. The water table fluctuates but in most places is less than 15 inches below the surface for 3 to 6 months of the year.

The poorly drained Bibb soils make up about 30 percent of this mapping unit. Their profile is the one described as typical of the Bibb series. The water table fluctuates but is less than 15 inches below the surface for 2 to 6 months of the year.

Included with these Osier and Bibb soils in the mapping were small areas of Swamp and of Plummer soils that are too small to be mapped separately. These included areas make up about 10 percent of this complex.

Osier-Bibb complex is very strongly acid and low to moderate in natural fertility and in content of organic matter. Infiltration is rapid to moderate, permeability is rapid to moderately slow, and available moisture capacity is low to moderate. The root zone is deep, and tilth generally is good.

These soils are not cultivated, and only a small acreage is in pasture. Flooding and the poor or very poor drainage are hazards. These soils are almost entirely in woodland, mainly hardwoods, and are well suited to that use. (Capability unit Vw-2; woodland suitability group 4; wildlife suitability group 5)

Plummer Series

The Plummer series consists of deep, poorly drained, sandy soils. Slopes range from 0 to 3 percent. These soils developed from thick beds of sand that, at a depth of 3½ feet or more, are underlain by finer textured sediments. The Plummer soils are widely distributed throughout Ben Hill and Irwin Counties and have a moderate total acreage. The native vegetation consists of mixed hardwoods and pines.

In a typical profile, the surface layer is sand about 44 inches thick. It is very dark gray in the upper 5 inches and is dark gray faintly mottled with grayish brown below. The subsoil is gray sandy loam distinctly mottled with yellowish brown and strong brown.

These soils are very strongly acid, are low in natural fertility, and contain little organic matter. Infiltration and permeability are rapid. Tilth generally is very good, and the effective root zone is deep.

A very few areas of these wet soils are cultivated, mainly to corn and truck crops. A small part is in pasture, for which the soils are only fairly well suited. Drainage is needed in areas used for cultivated crops or pasture. Pine, gum, and cypress trees grow well and most of the acreage is used for these trees.

Representative profile of Plummer sand, 0 to 3 percent slopes, in a wooded area:

A1—0 to 5 inches, very dark gray (N 3/0) sand; structureless; loose; many fine and a few medium roots; very strongly acid; clear, smooth boundary; layer ranges from 4 to 6 inches in thickness.

A2—5 to 44 inches, dark-gray (10YR 4/1) sand with few, fine, faint mottles of grayish brown; structureless; loose; fine roots common in upper part; very strongly acid; gradual, smooth boundary; layer ranges from 38 to 46 inches in thickness.

Btg—44 to 54 inches +, gray (10YR 5/1) sandy loam with many, coarse, distinct mottles of yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8); weak, fine, granular structure; very friable; very strongly acid.

Plummer soils occur among the Albany, Alapaha, and Ona soils. They occupy lower positions and are more poorly drained than the Albany soils. Plummer soils occupy positions similar to those of the Alapaha soils and have about the same drainage but do not have a sandy loam or sandy clay loam B horizon at a depth of less than 40 inches. Also, Plummer soils lack the significant amount of plinthite that is common in the lower B horizons of the Alapaha soils. Plummer soils are more poorly drained than the Ona soils and do not have a dark-colored, weakly cemented B horizon.

Plummer sand, 0 to 3 percent slopes (PeA).—This sandy soil occurs in drainageways and low flat areas. Its profile is the one described as typical of the Plummer series.

Included with this soil in the mapping were small areas of Albany, Alapaha, and Ona soils that are too small to be mapped separately.

This soil is flooded for periods of 1 or 2 months. The water table is at a depth of less than 15 inches for periods of more than 6 months each year.

This soil is not suited to row crops, but if adequately drained and heavily fertilized, it is fairly well suited to pasture. A very small acreage is in corn and truck crops, and a small acreage is in pasture. Most of the acreage is woodland. Pines and hardwoods grow well. (Capability unit Vw–2; woodland suitability group 4; wildlife suitability group 5)

Rains Series

The Rains series consists of poorly drained soils on stream terraces. These soils developed in old alluvium washed from medium-textured soils. The Rains soils have only a small acreage in Ben Hill and Irwin Counties. They occur in moderately small areas on stream terraces along the Alapaha, Satilla, and Willacoochee Rivers and their main tributaries. Slopes range from 0 to 2 percent. The native vegetation consists of mixed hardwoods and pines and an understory of gallberry and waxmyrtle.

In a typical profile, the surface layer is light-gray loamy fine sand about 13 inches thick. This layer is distinctly mottled with yellowish brown between depths of 5 and 13 inches. The subsoil, to a depth of 30 inches, is gray, friable sandy clay loam distinctly mottled with strong brown. Below this the subsoil is yellowish-brown, firm fine sandy clay loam mottled with gray and red.

Rains soils are low in natural fertility and organic-matter content and are very strongly acid. Available water capacity is moderate. The effective root zone is deep, and tilth generally is good.

Because of wetness and the hazard of flooding, these soils are not suited to cultivated crops. Most of the acreage is woodland, but a few areas have been drained and are in pasture. Blackgum, water oak, sweetgum, slash pine, cypress, and similar species are suitable trees.

Representative profile of Rains loamy fine sand:

A1g—0 to 5 inches, light-gray (N 7/0) loamy fine sand with few, fine, faint mottles of gray; weak, fine, granular structure; very friable; many fine and medium roots; very strongly acid; clear, smooth boundary; layer ranges from 3 to 6 inches in thickness.

A2g—5 to 13 inches, light-gray (N 6/0) loamy fine sand with few, fine, distinct mottles of yellowish brown (10YR 5/8); weak, fine, granular structure; very friable; fine and medium roots common; very strongly acid; clear, smooth boundary; layer ranges from 5 to 9 inches in thickness.

B21tg—13 to 30 inches, gray (N 5/0) sandy clay loam with common, medium, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable when moist, sticky when wet; very strongly acid; gradual, smooth boundary; layer ranges from 15 to 20 inches in thickness.

B22tg—30 to 50 inches +, yellowish-brown (10YR 5/8) fine sandy clay loam with many, coarse, distinct and prominent mottles of gray (N 6/0) and red (2.5YR 5/8); moderate, medium, subangular blocky structure; firm when moist, sticky when wet; very strongly acid.

The surface layer ranges from dark gray to light gray. The B22tg horizon ranges from heavy sandy loam to sandy clay loam.

The Rains soils occur among the Albany and Ardilla soils, but they are more poorly drained than those soils. Rains soils are finer textured in the subsoil than Albany soils, and they occupy lower positions on the stream terraces than the Ardilla soils.

Rains loamy fine sand (0 to 2 percent slopes) (RfA).—This soil generally occurs in moderate to small areas along stream terraces of the Alapaha, Satilla, and Willacoochee Rivers. The profile of this soil is the one described as typical of the Rains series.

Included with this soil in the mapping were small areas of Ardilla and Albany soils that are too small to be mapped separately.

The water table fluctuates and is at a depth of less than 15 inches for more than 6 months each year. Flooding occurs more than once each year for periods of 2 to 7 days.

Because this soil is wet and is subject to flooding, cultivated crops are not grown on it in Ben Hill and Irwin Counties. The soil is almost entirely woodland, but a small acreage is in pasture. Pasture is a good use if adequate drainage and fertilization are provided. (Capability unit IVw-4; woodland suitability group 4; wildlife suitability group 5)

Stilson Series

The Stilson series consists of deep, moderately well drained soils that developed in thick beds of sandy clay loam and sandy loam. Slopes range from 0 to 3 percent. These soils are widely distributed throughout Ben Hill and Irwin Counties, but the total acreage is moderately small. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

In a typical profile, the surface layer is loamy sand about 24 inches thick. It is dark gray in the upper part and light yellowish brown in the lower part. The subsoil extends to a depth of more than 50 inches. It is light yellowish-brown sandy loam mottled with brownish yellow in the upper 6 inches. At a depth of more than 30 inches from the surface, the subsoil is olive-yellow, light yellowish-brown, and light brownish-gray light sandy clay loam mottled with yellowish brown, strong brown, light brownish gray, and red. The red mottles begin at a depth of 42 inches.

These soils are very strongly acid , are low to moderate in natural fertility, and contain little organic matter. Infiltration and permeability are rapid to moderate, and available water capacity is low to moderate. These soils generally have good tilth and a deep root zone. Response to fertilization is good.

A moderate acreage of these soils is cultivated, but most of the acreage is in pine trees and pasture. Soybeans, tobacco, and truck crops are well suited, as are pine trees and pasture.

Representative profile of Stilson loamy sand, 0 to 3 percent slopes, in a cultivated field:

Ap—0 to 10 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 6 to 12 inches in thickness.

A2—10 to 24 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, fine, granular structure; very friable; very strongly acid; clear, smooth boundary; layer ranges from 10 to 18 inches in thickness.

B1t—24 to 30 inches, light yellowish-brown (2.5Y 6/4) sandy loam with common fine mottles of brownish yellow (10YR 6/6); weak, fine, granular structure; very friable; very strongly acid; clear, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21t—30 to 36 inches, olive-yellow (2.5Y 6/6) light sandy clay loam with common, medium, distinct mottles of yellowish brown (10YR 5/8), strong brown (7.5YR 5/8), and light brownish gray (2.5Y 6/2); weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary; layer ranges from 5 to 8 inches in thickness.

B22t—36 to 42 inches, light yellowish-brown (2.5Y 6/4) light sandy clay loam with many, coarse, distinct mottles of yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; friable; very strongly acid; gradual, smooth boundary; layer ranges from 5 to 10 inches in thickness.

B23t—42 to 50 inches +, light brownish-gray (2.5Y 6/2) light sandy clay loam with many, coarse, distinct and prominent mottles of yellowish brown (10YR 5/8), strong brown (7. 5YR 5/8), and red (10R 4/8); weak, medium, subangular blocky structure; friable; plinthite, 10 to 30 percent by volume; very strongly acid.

In forested areas the A1 horizon ranges from very dark gray to dark gray.

The Stilson soils occur among the Dothan, Leefield, and Alapaha soils. They occupy higher positions and are better drained than the Leefield and Alapaha soils. In color, Stilson soils are similar to the Dothan and Leefield soils in the upper part of the subsoil but in the lower part are light brownish gray.

Stilson loamy sand, 0 to 3 percent slopes (SeA).—This soil commonly occurs in moderately small areas adjacent to but higher than the drainageways. The profile of this soil is the one described as typical of the Stilson series. The water table fluctuates but is within 30 to 60 inches of the surface for periods of 1 or 2 months.

Included with this soil in the mapping were areas of Ocilla, Leefield, and Fuquay soils that are too small to be mapped separately.

A considerable acreage of this soil is cultivated. Corn, tobacco, peanuts, and soybeans are the chief crops and are well suited if drainage and heavy fertilization are provided. The largest acreage is in pine trees and pasture, and this soil is well suited to those uses. (Capability unit

IIw–2; woodland suitability group 2; wildlife suitability group 3)

Sunsweet Series

The Sunsweet series consists of well-drained, pebbly soils of the uplands. These soils developed from sandy clay marine sediments. Slopes range from 5 to 12 percent and in most areas are more than 8 percent. Sunsweet soils are not extensive in Ben Hill and Irwin Counties. The largest acreages are in Irwin County northeast of Waterloo and along the steep slope break 1 mile north of Fitzgerald in Ben Hill County. The native vegetation consists of mixed pines and hardwoods and an understory of wiregrass.

In a typical profile, the surface layer is dark-brown sandy loam about 4 inches thick. The subsoil, to a depth of more than 60 inches, is sandy clay. It is yellowish red or yellowish brown to a depth of 17 inches and is mottled white, dusky red, strong brown, and yellowish brown to a depth of 60 inches. Iron pebbles are on the surface and in the upper 11 inches of the profile. Soft plinthite occurs at depths of 11 inches.

These soils are low in natural fertility and in organic-matter content. They are very strongly acid. Infiltration is moderate, permeability is slow, and available water capacity is moderate. The root zone is shallow, and tilth generally is good except in eroded spots.

These soils are not suitable for cultivation. They are well suited to pine trees, and these trees grow on almost all of the acreage in the two counties. A small acreage is in pasture, for which the soil is fairly well suited.

Representative profile of Sunsweet sandy loam, 8 to 12 percent slopes, eroded, in a pasture:

Apcn—0 to 4 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; numerous hard iron pebbles ⅛ to 1 inch in diameter, coarse sandy fragments; strongly acid; abrupt, smooth boundary; layer ranges from 3 to 8 inches in thickness.

B21tcn—4 to 8 inches, yellowish-red (5YR 4/8) sandy clay; moderate, medium, subangular blocky structure; very hard when dry, firm when moist, sticky when wet; many iron pebbles and some coarse sandy fragments; very strongly acid; clear, smooth boundary; layer ranges from 0 to 8 inches in thickness.

B22t—8 to 11 inches, yellowish-red (5YR 5/8) sandy clay with common, medium, distinct mottles of red (10R 4/8) and yellowish brown (10YR 5/8); moderate, medium, angular blocky structure; very hard when dry, firm when moist, sticky when wet; few soft and hard iron pebbles; more than 10 percent of soil mass is plinthite; very strongly acid; clear, wavy boundary; layer ranges from 2 to 5 inches in thickness.

B23t—11 to 17 inches, yellowish-brown (10YR 5/8) sandy clay with many, medium, prominent mottles of red (2.5YR 4/8) and light gray (10YR 7/2); moderate, medium, angular and subangular blocky structure; very hard when dry, firm when moist, sticky when wet; more than 10 percent of soil mass is plinthite; very strongly acid; diffuse, irregular boundary; layer ranges from 5 to 10 inches in thickness.

B24t—17 to 60 inches +, reticulately mottled white (10YR 8/2), dusky-red (10R 3/4), strong-brown (7.5YR 5/8), and yellowish-brown (10YR 5/8) sandy clay; many, coarse, prominent mottles; moderate, medium, angular and subangular blocky structure; very hard when dry, firm when moist, sticky when wet; plinthite; very strongly acid.

Iron pebbles range from common to many on the surface and in the surface layer and the upper subsoil.

The Sunsweet soils commonly occur with the Tifton, Carnegie, and Esto soils. They resemble the Carnegie and Tifton soils in color but are more strongly mottled and more clayey in the subsoil. The Sunsweet soils have many more pebbles in the surface layer and upper subsoil than do the Esto soils, but less clay in the subsoil.

Sunsweet sandy loam, 5 to 8 percent slopes, eroded (ShC2).—This soil is pebbly, and it occurs on abrupt breaks and short slopes in the uplands. The profile of this soil is similar to the one described as typical of the Sunsweet series, but patches of subsoil are exposed, and a few shallow gullies and rills have formed in many places.

Included with this soil in the mapping were small areas of Carnegie, Tifton, and Esto soils that are too small to be mapped separately. These included areas make up about 18 percent of the mapping unit.

This soil is not cultivated, but a few areas are used for pasture, for which the soil is fairly well suited. Almost all of the acreage is in pine woodland, which is a good use. (Capability unit VIe–2; woodland suitability group 3; wildlife suitability group 4)

Sunsweet sandy loam, 8 to 12 percent slopes, eroded (ShD2).—This pebbly soil is on short, steep slopes. It commonly occurs as narrow areas on ridges and bluffs. The profile of this soil is the one described as typical of the Sunsweet series. In some places the subsoil is exposed and shallow gullies and rills are common.

Included with this soil in the mapping were areas of Carnegie, Tifton, and Esto soils that are too small to be mapped separately. These included areas make up about 18 percent of the mapping unit.

This soil is not suitable for cultivation, and only a moderate acreage is in pasture. Because of the steep slopes, abrupt breaks, and hazard of erosion, almost all of this soil is in pine trees, for which the soil is suited. (Capability unit VIe–2; woodland suitability group 3; wildlife suitability group 4)

Susquehanna Series

The Susquehanna series consists of somewhat poorly drained soils that developed in beds of acid heavy clay. Slopes range from 2 to 8 percent. These soils are not extensive in Ben Hill and Irwin Counties. Almost all of the acreage is in the northern and northeastern parts of Ben Hill County. The native vegetation consists of mixed pines and hardwoods and an understory that is mostly wiregrass.

In a typical profile, the surface layer is dark grayish-brown, very friable sandy loam about 5 inches thick. The subsoil is extremely firm clay to a depth of more than 50 inches. It is red mottled with light brownish gray in the upper 11 inches and is light greenish gray mottled mostly with dark red in the lower part.

These soils are moderate in natural fertility, low in organic-matter content, and very strongly acid. Infiltration is moderate, and permeability is very slow. Available water capacity is moderate to high. The root zone is shallow, but except in the eroded spots, tilth generally is good.

Because of the very high content of clay in the subsoil, these soils are not well suited to cultivated crops, and only a very small acreage is cultivated. Corn is the main crop. A small acreage is in pasture, for which the soils are fairly well suited. Almost all of the acreage is in pine trees.

Representative profile of Susquehanna sandy loam, 2 to 5 percent slopes:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 4 to 8 inches in thickness.

B21t—5 to 15 inches, red (2.5YR 4/6) clay with many, coarse, prominent mottles of light brownish gray (2.5Y 6/2) and light greenish gray (5GY 7/1); strong, medium, angular blocky structure; clay films on ped faces; extremely hard when dry, extremely firm when moist, very plastic when wet; very strongly acid; gradual, smooth boundary; layer ranges from 8 to 15 inches in thickness.

B22tg—15 to 27 inches, light greenish-gray (5GY 7/1) clay with many, medium, prominent mottles of dark red (7.5R 3/8) and a few mottles of strong brown (7.5YR 5/8); strong, medium, angular blocky structure; clay films on ped faces; extremely hard when dry, extremely firm when moist, very plastic when wet; very strongly acid; gradual, smooth boundary; layer ranges from 10 to 15 inches in thickness.

B23tg—27 to 50 inches +, light greenish-gray (5GY 7/1) clay with many, medium, prominent mottles of dark red (7.5R 3/8) and strong brown (7.5YR 5/8); strong, medium, angular blocky structure; extremely hard when dry, extremely firm when moist, very plastic when wet; very strongly acid.

The surface layer ranges from brown to dark grayish brown in color. The proportion of gray and red mottles is variable in the upper B horizon.

The Susquehanna soils commonly occur with the Esto and Cowarts soils. They are more poorly drained than Esto soils and have a more plastic, sticky subsoil and substratum. Susquehanna soils have a much finer textured subsoil than Cowarts soils and, unlike them, are mottled in the upper B horizon.

Susquehanna sandy loam, 2 to 5 percent slopes (SiB).—This soil commonly occurs in moderately small areas between the ridgetops and the drainageways in the northern part of Ben Hill County. It has a fine-textured subsoil. Cherty limestone rocks and boulders are on the surface and in the profile in some places. The profile of this soil is the one described as typical of the Susquehanna series.

Included with this soil in the mapping were small areas of Esto and Cowarts soils that are too small to be mapped separately. The Esto soils make up as much as 20 percent of the areas mapped, and the Cowarts soils as much as 5 percent.

The water table fluctuates in this soil but is at a depth of 30 to 60 inches for periods of 1 or 2 months.

Because of the fine-textured subsoil, this soil is seldom used for cultivated crops. Corn is the main crop. Some areas are in pasture, for which the soil is only fairly well suited. Pine trees grow well and are on about 90 percent of the acreage. (Capability unit IVe–3; woodland suitability group 3; wildlife suitability group 4)

Susquehanna sandy loam, 5 to 8 percent slopes, eroded (SiC2).—This eroded soil of the uplands generally occurs in moderately small areas on breaks between the ridgetops and the drainageways in the northern part of Ben Hill County. The profile of this soil is similar to the one described as typical of the Susquehanna series, but patches of the subsoil are exposed. Also, a few shallow gullies and rills have formed.

Included with this soil in the mapping were areas of Esto and Cowarts soils that are too small to be mapped separately. The Esto soils make up as much as 23 percent of a mapped area, and the Cowarts soils as much as 3 percent. In some places a few large boulders are on the surface and in the profile.

Almost all of this soil is pine woodland, which is a good use. Pasture is only fairly well suited, and only a few small areas are pastured. (Capability unit VIe–2; woodland suitability group 3; wildlife suitability group 4)

Swamp

Swamp (Swa) consists of very poorly drained, alluvial soil material of mixed origin. This land type is not extensive in Ben Hill and Irwin Counties. Almost all of the acreage is along the Alapaha River in the western part of both counties. The vegetation consists mainly of cypress, blackgum, bay, sweetgum, and juniper, but there are a few scattered pines. The understory is vines, ferns, bamboo, and other water-tolerant plants.

The surface layer is mostly very dark gray to black silty clay loam to fine sandy loam, but in a few areas it is loamy sand or sand. Peaty muck occurs in some areas. In many areas the surface layer contains partly decomposed leaves, twigs, logs, and numerous roots. Below the surface layer, the soil material is variable in color and texture and generally is stratified or interbedded; the layers are commonly sand or coarse sand stratified with sandy clay loam or sandy loam. Where the peaty muck occurs, it extends to a depth of 26 to 44 inches and generally is underlain by coarse sand.

Swamp is very strongly acid and low in natural fertility. The content of organic matter is higher than that in any other soil in the two counties.

Swamp generally adjoins areas of Osier and Bibb soils but is in slightly lower positions and is more poorly drained. Water stands on Swamp for long periods.

This land type is well suited as a habitat for wildlife. (Capability unit VIIw–1; woodland group not assigned; wildlife suitability group 5)

Tifton Series

The Tifton series consists of well-drained, nearly level to gently sloping, pebbly soils on uplands. These soils developed in thick beds of reticulately mottled sandy clay loam and sandy clay. Tifton soils are extensive in the two counties. The largest areas are in Irwin County and in the southern part of Ben Hill County. The native vegetation consists chiefly of mixed pines and hardwoods and an understory of grasses, mainly wiregrass.

In a typical profile, the surface layer is dark grayish-brown loamy sand about 7 inches thick. The upper 3 inches of the subsoil is yellowish-brown sandy loam. Below this is yellowish-brown sandy clay loam or heavy sandy clay loam. At a depth of about 32 inches the subsoil is prominently mottled with red and light yellowish brown. Many small, rounded iron pebbles are in the surface layer and to a depth of 40 inches (fig. 6). Plinthite occurs at a depth of 32 inches.

Tifton soils are low to moderate in natural fertility and very strongly acid. They contain a small amount of organic matter. Available water capacity, infiltration, and permeability are moderate. The root zone is deep, and tilth generally is very good. Response to fertilization is excellent.

These soils are among the best soils in the two counties for farming. They are well suited to most crops grown

locally, and crops on them respond well to good management. Most of the acreage is cultivated or pastured.

Representative profile of Tifton loamy sand, 0 to 2 percent slopes, in a cultivated field:

Apcn—0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many, small, hard iron pebbles ⅛ to ¾ inch in diameter; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 6 to 10 inches in thickness.

B1tcn—7 to 10 inches, yellowish-brown (10YR 5/4) sandy loam; weak, medium, granular structure; very friable; many iron pebbles; some fine roots; very strongly acid; clear, wavy boundary; layer ranges from 3 to 10 inches in thickness.

B21tcn—10 to 15 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; many iron pebbles; very strongly acid; clear smooth boundary; layer ranges from 4 to 8 inches in thickness.

B22tcn—15 to 32 inches, yellowish-brown (10YR 5/8) heavy sandy clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky when wet; many iron pebbles; very strongly acid; gradual, smooth boundary; layer ranges from 12 to 18 inches in thickness.

B23t—32 to 40 inches, yellowish-brown (10YR 5/8) heavy sandy clay loam with common, medium, prominent mottles of red (2.5YR 4/8) and light yellowish brown (2.5Y 6/4); moderate, medium, subangular blocky structure; hard when dry, firm when moist, sticky when wet; few soft iron pebbles; plinthite; very strongly acid; gradual, smooth boundary; layer ranges from 6 to 10 inches in thickness.

B24t—40 to 50 inches +, reticulately mottled, yellowish-brown, light yellowish-brown, red, and strong-brown heavy sandy clay loam; many, coarse, prominent mottles; strong, coarse, subangular blocky structure; hard when dry, firm when moist, sticky when wet; plinthite; very strongly acid.

The A horizon ranges from 6 to 18 inches in thickness and from grayish brown to very dark grayish brown in color. The subsoil ranges from yellowish brown to strong brown. Common to many iron pebbles are on the surface and throughout the solum.

The Tifton soils commonly occur with the Dothan, Carnegie, and Irvington soils. They closely resemble the Dothan soils but contain many more iron pebbles throughout their profile and have a finer textured subsoil. Tifton soils occur on less rolling topography and have a thicker surface layer and Bt horizon than Carnegie soils. Unlike Carnegie soils, Tifton soils are free of mottles in the Bt horizon. Tifton soils are better drained than the Irvington soils and lack the distinct fragipan that occurs in those soils.

Tifton loamy sand, 0 to 2 percent slopes (TqA).—This pebbly soil generally occurs in large areas on ridgetops. Some areas are as much as 40 acres in size. The profile of this soil is the one described as typical of the Tifton series.

Included with this soil in the mapping were areas of Dothan and Fuquay soils that are too small to be mapped separately.

This soil is among the best in the two counties for farming. It is well suited to most crops grown locally, and crops on it respond well to good management. The main crops are cotton, corn, peanuts, tobacco, truck crops, and oats. This soil is also well suited to pasture and pine trees. (Capability unit I–2; woodland suitability group 1; wildlife suitability group 1)

Tifton loamy sand, 2 to 5 percent slopes (TqB).—This soil has the largest acreage of any of the Tifton soils in the two counties. Some areas are as much as 60 to 80 acres in size. This soil has a slightly thinner surface layer than the soil described as typical of the Tifton series.

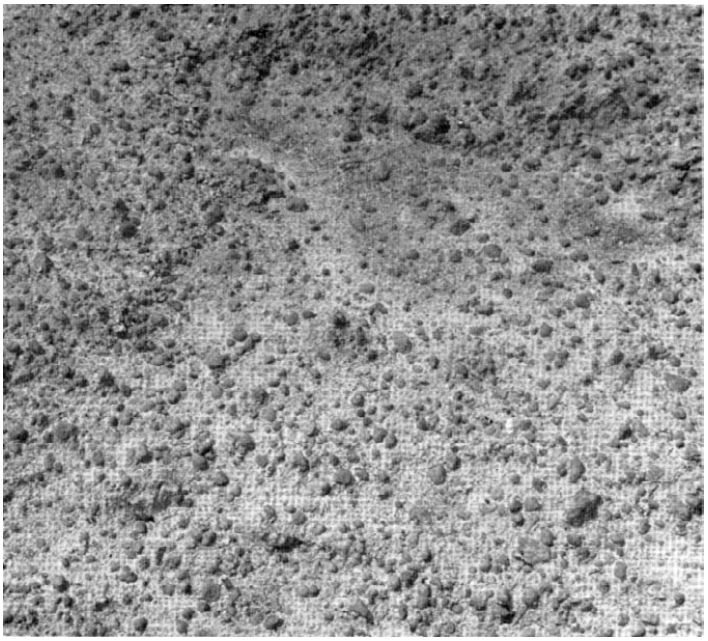

Figure 6.—**An area of Tifton loamy sand, 0 to 2 percent slopes. Numerous iron pebbles commonly are on the surface of soils of the Tifton series.**

Included in mapping were small areas of Dothan, Fuquay, and Cowarts soils that are too small to be mapped separately.

This soil is cultivated extensively, for it is well suited to most crops grown locally. It can be cultivated throughout a wide range of moisture content, and crops on it respond well to good management that includes heavy fertilization. Because of the slope, erosion is a hazard. This soil is well suited to pasture and pine trees. (Capability unit IIe–2; woodland suitability group 1; wildlife suitability group 1)

Tifton loamy sand, 2 to 5 percent slopes, eroded (TqB2).—This eroded, pebbly soil of the uplands has long slopes. Its profile is similar to the one described as typical of the Tifton series, but the surface layer has been thinned by erosion. The plow layer extends into the upper subsoil in many places, and there are patches where the sandy clay loam subsoil is exposed. A few shallow gullies and rills have formed in many areas.

Included with this soil in the mapping were some uneroded areas. Also included were small areas of Carnegie, Dothan, and Cowarts soils that are too small to be mapped separately.

This soil is extensively cultivated, for it is well suited to most crops grown locally. Except in places where the subsoil is exposed, tilth generally is good. Because of the slope and runoff, erosion is a moderate hazard. Pasture plants and trees, especially pines, grow well. (Capability unit IIe–2; woodland suitability group 1; wildlife suitability group 1)

Tifton loamy sand, 5 to 8 percent slopes (TqC).—This pebbly soil is on ridges and short side slopes near drainage-

ways. The profile of this soil has a thinner surface layer than the profile described as typical of the series.

Included with this soil in the mapping were small areas of Carnegie, Cowarts, Fuquay, and other soils.

This soil is well suited to most locally grown crops. Because of the slope, erosion is a moderate to severe hazard and intensive management is needed. A considerable acreage is in improved pasture and pines, for which this soil is also well suited. (Capability unit IIIe–2, woodland suitability group 1; wildlife suitability group 1)

Tifton loamy sand, 5 to 8 percent slopes, eroded (TqC2).—This pebbly soil occupies a narrow band on slopes between the ridgetops and the drainageways. Because of erosion, the surface layer of this soil is thinner than the one described in the profile typical of the Tifton series. Normally the plow layer extends into the upper subsoil, and in other places the subsoil is exposed. A few shallow gullies and rills have formed in many areas.

Included with this soil in the mapping were small areas of Carnegie, Sunsweet, and Cowarts soils. Also included were uneroded areas of Tifton soil.

This soil is low in natural fertility. Except in the more severely eroded spots, tilth generally is good. Infiltration is slightly lower in this soil than in the uneroded Tifton soils.

This soil is suited to most crops grown locally, and some of it is cultivated. Erosion is a moderate hazard in cultivated areas. Most of the acreage is in pasture and pine trees, and this soil is well suited to those uses. (Capability unit IIIe–2; woodland suitability group 1; wildlife suitability group 1)

Troup Series

The Troup series consists of deep, excessively drained soils that developed in thick beds of sand. Slopes range from 0 to 8 percent. Troup soils are widely distributed throughout Ben Hill and Irwin Counties and have a moderate total acreage. The native vegetation consists chiefly of turkey oak, scrub oak, and blackjack oak, and there are a few scattered longleaf pines and sparse understory of wiregrass and common weeds.

In a typical profile, sand extends from the surface to a depth of 62 inches. The profile is dark grayish brown in the upper 8 inches, light olive brown faintly mottled with yellowish brown to a depth of 58 inches, and light yellowish brown faintly mottled with pale yellow between depths of 58 and 62 inches. From 62 inches to more than 75 inches is light yellowish-brown sandy loam distinctly mottled with shades of yellow and red.

Troup soils are very strongly acid and very low in natural fertility. They contain a small amount of organic matter. Infiltration and permeability are rapid, and available water capacity is low. These soils have a deep root zone and generally are in excellent tilth. Except in irrigated areas, the response to fertilization is fair to poor.

Only a few areas of these soils are cultivated in the two counties. A small part is in pasture, but almost all of the acreage is woodland. A considerable acreage has been planted to slash pine.

Representative profile of Troup sand, 0 to 5 percent slopes:

Ap—0 to 8 inches, dark grayish-brown (2.5Y 4/2) sand; single-grain; loose; many fine roots; very strongly acid; abrupt, smooth boundary; layer ranges from 5 to 8 inches in thickness.

A21—8 to 58 inches, light olive-brown (2.5Y 5/4) sand with few, fine, faint mottles of yellowish brown in lower part; single grain; loose; very strongly acid; gradual, wavy boundary; layer ranges from 46 to 59 inches in thickness.

A22—58 to 62 inches, light yellowish-brown (2.5Y 6/4) sand with few, fine, faint mottles of pale yellow; single grain; loose when moist, nonsticky when wet; very strongly acid; gradual, wavy boundary; layer ranges from 4 to 6 inches in thickness.

Bt—62 to 75 inches +, light yellowish-brown (2.5Y 6/4) sandy loam with common, coarse, distinct mottles of yellowish brown (10YR 5/8), light gray (10YR 7/1), and yellowish red (5YR 4/8); weak, fine, granular structure; very friable when moist, slightly sticky when wet; very strongly acid.

The Ap horizon ranges from very dark gray to dark grayish brown. Sandy loam occurs at a depth of 42 to 72 inches in many places.

The Troup soils occur among the Kershaw, Albany, Fuquay, and Plummer soils. They are not so coarse textured and are less excessively drained than Kershaw soils. Troup soils are coarser textured in the lower horizons and are more excessively drained than the Fuquay soils. They occupy higher positions and are better drained than the Albany and Plummer soils.

Troup sand, 0 to 5 percent slopes (TpB).—This sandy soil generally occurs in large, gently sloping areas. Some areas are as much as 50 acres in size. The profile of this soil is the one described as typical of the Troup series.

Included with this soil in the mapping were areas of Kershaw and Fuquay soils that are too small to be mapped separately.

Because this soil is low in fertility and is droughty, only a small acreage is cultivated or is in pasture. Trees grow fairly well, and almost all of this soil is woodland. (Capability unit IVs–1; woodland suitability group 5; wildlife suitability group 2)

Troup sand, 5 to 8 percent slopes (TpC).—This is a gently sloping, sandy soil on uplands. It generally occurs as small, narrow bands between the ridgetops and the drainageways. The profile of this soil is slightly thinner than the one described as typical of the Troup series.

Included with this soil in the mapping were small areas of Kershaw soils.

Only a small acreage of this soil is cultivated and pastured because of its slope, droughtiness, and low fertility. Almost all of the acreage is woodland, for which the soil is fairly well suited. (Capability unit IVs–1; woodland suitability group 5; wildlife suitability group 2)

Use and Management of Soils

The soils of Ben Hill and Irwin Counties are used extensively for crops and pasture. This section explains how the soils can be managed for these main purposes and also as woodland, for wildlife, in the building of highways, farm ponds, and other engineering structures, and for major nonfarm uses. Also given are the estimated yields of the principal crops and pasture grasses.

In presenting information about the use of soils for crops and pasture, as woodland, and for wildlife habitat, the procedure is to describe the groups that are made up of similar soils that are suitable for those purposes and to suggest use and management for those groups. To deter-

mine the soils in each of these groups, refer to the "Guide to Mapping Units" at the back of this survey. In the subsection on engineering, the soils are not grouped but are placed in tables so that properties significant to engineering work can be readily given. In the subsection on major nonfarm uses of soils, the soils are rated according to their limitations for residential, industrial, recreational, and related uses.

Management for Crops and Pasture

In this subsection, general practices of management are discussed, the system of capability classification is described, and a table lists estimated yields of principal crops and pasture plants under improved management.

General practices of management

Management is needed on the soils in Ben Hill and Irwin Counties mainly to control erosion, dispose of excess water, and maintain good tilth and productivity.

Many of the soils in the two counties are susceptible to erosion. The degree of susceptibility depends on (1) the erodibility of the soil, (2) the frequency and intensity of rainfall, (3) the steepness of slopes, and (4) the length of slopes. These properties determine whether the farmer uses straight rows, contour cultivation with or without terraces, or stripcropping. The more gently sloping soils may need only contour cultivation and a cropping system that provides medium to large amounts of crop residue. Steep soils or soils on long slopes may need a combination of straight-row farming, contour farming without terraces, or stripcropping, and a cropping system that includes annual close-growing crops, high residue producing crops, or perennial crops. Regardless of the practice used, a grassed waterway or outlet is essential.

The main need of some of the soils, especially the sandy ones, is the return of large amounts of crop residue, which should be managed well. Cropping sequences that include perennial grasses or legumes are beneficial. Stripcropping and contour cultivation are also important on sandy soils.

Excess water is the main limitation on the soils in some areas. The drainage needed depends on the amount of water in the soil and the kinds of crops grown. After the water is controlled, only practices that help to maintain productivity and good tilth are needed. Some of these practices are applying lime and fertilizer regularly and in amounts indicated by soil tests, managing crop residue efficiently, and using a suitable cropping system. These practices also help to reduce erosion.

Other practices that are beneficial to the soils in the two counties are (1) growing perennial grasses at the edges of fields so that erosion and the growth of weeds are reduced; (2) locating farm roads or fences on the crests of slopes, on divides of watersheds, or on the contour; (3) arranging crop rows so that they do not hinder efficient farm operations; and (4) locating fences in or adjacent to natural waterways where practical.

Capability groups of soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on the limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops, or to rice and other crops that have their special requirements. The soils are classified according to degree and kind of permanent limitations, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all kinds of soils are grouped at three levels, the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest grouping, 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 some limitations that reduce the choice of plants or require moderate conservation practices.

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

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

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife food and cover.

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

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

Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. No class VIII soils were mapped in Ben Hill and Irwin Counties.

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example. IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in some parts of the United States but not in Ben Hill and Irwin Counties, shows that the chief limitation is climate that is too cold or too dry.

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

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be

suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2 or IIIe–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation, and the small letter indicates the subclass, or kind of limitation. The Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units [3]

The soils in Ben Hill and Irwin Counties have been placed in 23 capability units. The soils in each unit have about the same limitations and are subject to similar risks of damage, need about the same kind of management, and respond to management in about the same way. In the following pages each capability unit is described and management suited to the soils in each unit is suggested. The mention of the soil series in the description of each capability unit does not mean that all the soils of the series mapped in the county are in the unit. To determine the soils in a capability unit, refer to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT I–2

Only one soil, Tifton loamy sand, 0 to 2 percent slopes, is in this capability unit. This is a deep, well-drained soil on uplands. The surface layer is very friable, pebbly loamy sand 6 to 10 inches thick. The subsoil is thick and consists of friable sandy clay loam that is readily penetrated by roots. Many small, hard, rounded concretions of iron the size of pebbles are on the surface and in the upper part of the profile. The concretions are softer in the lower part of the subsoil.

This soil has a thick root zone and is generally in good tilth. Water moves into and through this soil at a moderate rate. Natural fertility is low to moderate, the content of organic matter is low, and acidity is very strong.

About 90 percent of this soil is cultivated, and the rest is pastured or wooded. This soil is suited to all locally grown crops, and it is especially well suited to cotton, corn, and small grain. Important crops are corn, peanuts, cotton, tobacco (fig. 7), and vegetables and other truck crops. Where row crops are grown, the crop rows should be placed so that they assist in the disposal of excess water. In areas where peanuts are grown, small iron concretions are troublesome because they are mixed with the harvested peanuts. Suitable pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, sorghum, sericea lespedeza, millet, and crimson clover. Nursery crops and peaches, pecans, and other orchard crops also grow well.

In one example of a suitable cropping system, cotton is grown for 2 years and is followed by a reseeding winter legume that is allowed to mature the third year and is then followed by grain sorghum or soybeans.

CAPABILITY UNIT IIe–1

Only one soil, Dothan loamy sand, 2 to 5 percent slopes, is in this capability unit. This is a deep, well-drained, very gently sloping soil on uplands. The subsoil, a friable, yellowish-brown sandy clay loam, is readily penetrated by plant roots.

This soil is low to moderate in natural fertility, contains small amounts of organic matter, and is very strongly acid. Water moves into and through this soil at a moderate rate, and available water capacity is moderate. The root zone is thick, and tilth is generally good. This soil can be

Figure 7.—**Tifton loamy sand, 0 to 2 percent slopes, is in capability unit I–2 and is used for all locally grown crops. Tobacco on this soil in upper photograph and cotton in lower.**

[3] JAMES N. NASH, agronomist, Soil Conservation Service, assisted in writing this subsection.

cultivated throughout a wide range of moisture content. Crops respond well to fertilization.

About 80 percent of this soil is cultivated, and the rest is pastured or wooded. Among the well-suited row crops are corn, peanuts, cotton, tobacco, soybeans, and truck crops. Peanuts and tobacco are especially well suited. Some of the well-suited pasture plants and hay plants are Coastal bermudagrass, Pensacola bahiagrass, lupines, millet, sericea lespedeza, and vetch. Nursery crops and peaches, pecans, and other orchard crops also grow well.

Erosion is the chief hazard in cultivated areas, but it can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping. Also needed is a cropping system that, part of the time, provides an adequately fertilized close-growing crop.

Both steepness and length of slope influence the choice of a cropping system for controlling erosion. Where slopes are 3 percent and 350 feet long, mulch-planted corn grown year after year is an example of a suitable cropping system, if the soil is cultivated on the contour but not terraced, and the crop residue is mowed or chopped and left undisturbed during winter.

CAPABILITY UNIT IIe–2

This capability unit consists of deep, well-drained, very gently sloping soils on uplands. These soils are in the Tifton series. They are moderately eroded in many places. The surface layer is very friable loamy sand 4 to 12 inches thick. The subsoil is friable, yellowish-brown sandy clay loam. Numerous hard iron concretions are on the surface and throughout the profile. In many places erosion has removed from 2 to 4 inches of the original surface layer.

These soils are low to medium in natural fertility, contain small amounts of organic matter, and are very strongly acid. Water moves into and through these soils at a moderate rate, and available water capacity is moderate. The root zone is thick, and tilth generally is good in uneroded areas but is only fair in the eroded areas. Surface runoff is moderate and the erosion hazard is moderate. Crops respond well to fertilization.

About 75 percent of the acreage is cultivated, and the rest is pastured or wooded. The soils in this unit are suited to all locally grown crops, and are especially well suited to corn, cotton, small grain, and crimson clover. Important crops are corn, cotton, tobacco, peanuts, and small grain. Some of the well-suited pasture and hay plants are Coastal bermudagrass, bahiagrass, lupines, vetch, sericea lespedeza, and crimson clover. These soils are also well suited to peaches and pecans and are somewhat better suited to these crops than is the soil in capability unit IIe-1.

These soils can be used and managed in about the same way as the soil in capability unit IIe–1, but they contain more iron concretions, have a slightly finer textured subsoil, and are not leached of plant nutrients as readily as that soil.

The soils in this unit should be managed so that soil losses from erosion are held within allowable limits. Erosion can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping. Also needed is a cropping system that, part of the time, provides an adequately fertilized close-growing crop. Both the steepness and length of slope influence the cropping system needed to control erosion. An example of a suitable cropping system in a terraced field that is cultivated on the contour is 1 year of cotton, or a similar row crop, 1 year of mulch-planted corn, and 1 year of a small grain followed by mulch-planted soybeans.

285–798—68——3

CAPABILITY UNIT IIe–4

Only one soil, Carnegie sandy loam, 2 to 5 percent slopes, eroded, is in this capability unit. This well-drained, gently sloping, pebbly soil is on uplands. The surface layer is friable sandy loam 4 to 8 inches thick. The subsoil is sandy clay loam. Small, hard pebbles of iron are on the surface and throughout the profile.

This soil is low to moderate in natural ferility, contains little organic matter, and is very strongly acid. Water moves into and through the surface layer at a moderate rate, but it moves through the subsoil at a moderate or moderately slow rate. Available water capacity is moderate. The root zone is deep, and tilth generally is good. Erosion is a moderate hazard. Crop response to fertilization is good.

The soil in this unit is suited to cultivated crops, pasture, and pine trees. Some of the more important crops are corn, cotton, and peanuts.

Erosion is a hazard in cultivated areas, but it can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping, and by including adequately fertilized, close-growing crops in the cropping system. Both steepness and length of slope affect the cropping system needed to control erosion. Where slopes are 3 percent and 200 feet long, 2 years of corn followed by 4 years of Coastal bermudagrass is an example of a suitable cropping system, if terraces are not used, farming is in straight rows, and vegetated waterways are used.

CAPABILITY UNIT IIw–2

This capability unit consists of deep, moderately well drained to somewhat poorly drained soils. These nearly level soils are in low areas at the foot of uplands, on flats adjacent to ponds and natural drainageways, and on stream terraces. The soils in this unit are in the Ardilla, Irvington, Leefield, and Stilson series. The surface layer is very friable loamy sand 8 to 24 inches thick. The subsoil is friable, yellow and mottled yellow and gray sandy clay loam.

These soils are low to moderate in natural fertility, low in organic matter, and very strongly acid. Water moves into and through these soils at a moderate rate. The root zone is moderate to thick, and available water capacity is low to moderate. Tilth generally is good. These soils can be cultivated throughout a wide range of moisture content. Crops respond well to good management, especially to additions of fertilizer.

The soils in this unit make up only a small acreage in the two counties. Most of this acreage is wooded, but a moderate part is cultivated and pastured. Use for row crops is somewhat limited by excess water, but corn, tobacco, sorghum, soybeans, and truck crops grown in summer are well suited. Suitable pasture and hay plants are Pensacola bahiagrass, Coastal bermudagrass, lespedeza, white clover, and millet.

Because these soils are in low-lying areas and have a high water table, drainage is generally needed if cultivated crops are planted. In addition, protection from overflow is needed on the Ardilla soils. Crop rows properly arranged, or ditches, can be used to remove the excess water. Another

helpful practice is plowing in narrow beds so that furrows or shallow ditches are left between the beds to carry off the excess water.

On these soils a cropping system that adds organic matter is needed. Corn or a similar row crop grown year after year is satisfactory if the crop residue is left on the soil and shredded. Erosion is not a hazard.

CAPABILITY UNIT IIs–1

This capability unit consists of deep, well-drained, nearly level and very gently sloping soils on uplands. These soils are in the Fuquay and Dothan series. The surface layer is very friable loamy sand 10 to 40 inches thick. The subsoil is friable sandy clay loam.

These soils have a thick root zone and are generally in good tilth. They can be cultivated throughout a wide range of moisture content. In short, dry periods, plants are likely to be damaged. Water moves into and through these soils at a moderately rapid rate, and available water capacity is low to moderate. Acidity is very strong, and natural fertility and the content of organic matter are low. Crops respond well to good management that includes fertilization. These soils are suitable for sprinkler irrigation.

Most of the acreage of these soils is cultivated, and the rest is in pasture or trees. Among the suitable crops are corn, peanuts, cotton, and other row crops. Oats, rye, and other small grain also grow well if management is good. Lupines, beggarweed, and velvetbeans are well-suited legumes, and Coastal bermudagrass and bahiagrass are well-suited grasses. Pecans and many truck crops and nursery crops are also well suited.

In large open fields the soils in this unit are subject to soil blowing, but this can be reduced by planting close-growing crops and clean-tilled crops in alternate strips that extend at right angles to prevailing winds. Water erosion is also a hazard, but it can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping. Also needed is a fertilized, close-growing crop in the cropping system.

An example of a suitable cropping system where farming is in straight rows is 2 years of row crops and 2 years or more of perennial sod crops. Such a system provides large amounts of organic matter and improves the water-holding capacity.

CAPABILITY UNIT IIs–4

Only one soil, Fuquay loamy coarse sand, 2 to 5 percent slopes, is in this capability unit. This soil is deep and well drained. The surface layer is loamy coarse sand about 20 to 35 inches thick, and the subsoil is sandy clay loam.

This soil generally has good tilth, and it can be cultivated throughout a wide range of moisture content. Because available water capacity is low in the upper 20 to 40 inches, plants are likely to be damaged in dry periods. Crops on this soil respond well to good management that provides large amounts of fertilizer.

Most of this soil is used for pine trees, but a moderate part is cultivated or pastured. Corn, peanuts, and cotton are suitable if liberal amounts of fertilizer are added. Coastal bermudagrass and bahiagrass are suitable grasses.

Although water erosion generally is not a hazard, soil blowing is likely in the larger cultivated fields. Soil blowing can be controlled by planting close-growing crops and clean-tilled crops in alternate strips that are at right angles to prevailing winds. Cropping systems that return large amounts of plant residue are preferred. One such system is 2 years of row crops followed by 2 years or more of perennial sod crops.

CAPABILITY UNIT IIIe–2

This capability unit consists of deep, well-drained, pebbly soils on uplands. These soils are gently sloping. Most of the acreage has been cultivated and is moderately eroded. These soils are in the Tifton series. The surface layer is pebbly, very friable loamy sand 5 to 12 inches thick. The subsoil is friable sandy clay loam. Many pebbles or hard iron concretions are on the surface, in the surface layer, and in the upper part of the subsoil. Soft iron concretions are in the lower part of the subsoil.

Water moves into and through these soils at a moderate rate, and available water capacity is moderate. Except in small eroded areas where the subsoil is exposed, the root zone is deep and tilth is generally good. These soils can be cultivated throughout a wide range of moisture content. They are very strongly acid, are low in natural fertility, and contain a small amount of organic matter. Crops respond well to fertilization.

The soils in this capability unit occupy only a small part of the two counties and are mostly pastured and wooded. Only a moderate acreage is cultivated. Some of the most important crops are cotton, corn, small grain, peanuts, and soybeans, but all crops grown locally are suited. Suitable pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Pecans and other orchard crops grow well.

Erosion is the chief hazard in cultivated areas, but it can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping. Also needed is a cropping system in which adequately fertilized close-growing crops are grown part of the time. The steepness and length of slopes influence the cropping system used for controlling erosion. Where slopes are 7 percent and 200 feet long, 2 years of cotton, peanuts, or a similar row crop followed by 3 years of bahiagrass or a similar close-growing crop is an example of a suitable cropping system, if the soil is terraced and cultivated on the contour.

CAPABILITY UNIT IIIe–4

This capability unit consists of well-drained, very gently sloping and gently sloping soils on ridgetops and side slopes in the uplands. These soils are slightly eroded to moderately eroded. They are in the Carnegie, Cowarts, and Fuquay series.

These soils have a friable sandy loam, loamy sand, or loamy coarse sand surface layer about 4 to 25 inches thick. The subsoil is sandy clay loam that is friable in the upper part and firm in the lower part.

Water moves into these soils at a moderate to moderately rapid rate and moves through them at a moderate to moderately slow rate. Tilth is generally good in uneroded areas, but it is only fair in the eroded areas. These soils are low in natural fertility and in content of organic matter and are very strongly acid. The effective root zone is moderately deep to deep. Crops respond fairly well to fertilization.

The soils in this capability unit occupy only a small part of the two counties, and most of this is wooded. A small

acreage is cultivated or pastured. These soils are suited to many kinds of locally grown crops. Some important crops are corn, cotton, peanuts, and small grain. Among the well-suited pasture and hay plants are Coastal bermudagrass, bahiagrass, sorghum, and millet.

In cultivated areas erosion is a serious hazard and intensive practices are needed for protection from erosion and for increasing the intake of water. These soils are more susceptible to erosion than the soils in capability unit IIIe–2, and their effective root zone is not so deep. Erosion can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping, and by including an adequately fertilized close-growing crop in the cropping system. The steepness and length of slope determine the cropping system needed. In a terraced field that is cultivated on the contour and has slopes of 5 percent that are 100 feet long, an example of a suitable cropping system is 2 years of cotton, peanuts, or a similar row crop followed by 3 years or more of bahiagrass or a similar close-growing crop.

CAPABILITY UNIT IIIe–5

The only soil in this capability unit is Fuquay loamy sand, 5 to 8 percent slopes. This gently sloping soil occurs on uplands and is deep and well drained or somewhat excessively drained. The surface layer is very friable to loose loamy sand 20 to 40 inches thick. The subsoil is yellowish-brown friable sandy clay loam.

Water moves into and through this soil at a moderate to moderately rapid rate. Tilth generally is good, and this soil can be tilled throughout a wide range of moisture content. The effective root zone is deep, but available water capacity is moderately low. Acidity is very strong, and natural fertility and the content of organic matter are low. Because this soil is somewhat droughty, crops on it do not respond well to fertilization.

The soil in this unit makes up only a very small part of the two counties and is mostly wooded. A moderately small part is cultivated and pastured.

The suitability of this soil for farming is somewhat limited by the thick sandy surface layer and the erosion hazard. Among the suitable row crops are peanuts, corn, cotton, and soybeans. Also suitable are small grain, sweetpotatoes, watermelons, and truck crops that mature early. Plants suitable for pasture and hay are Pensacola bahiagrass, Coastal bermudagrass, sorghum, sericea lespedeza, Starr millet, and browntop millet. Pecan trees grow fairly well.

Because this soil is leached rapidly, is somewhat droughty, is subject to erosion, and is rapidly depleted of organic matter, it should be managed so that soil losses from erosion are held within allowable limits and the organic-matter content is maintained. Some good practices are contour tillage, terraces, stripcropping, and planting close-growing crops or crops that produce large amounts of residue. Where slopes are 6 percent and 300 feet long, and contour tillage but not terracing is used, an example of a suitable cropping system is 1 year of mulch-planted corn, 1 year of cotton or peanuts, and 4 years of bahiagrass or a similar close-growing crop.

CAPABILITY UNIT IIIw–1

This capability unit consists of nearly level, deep, somewhat poorly drained, sandy soils that occur on low flats, at the foot of very gently sloping uplands, and adjacent to lower soils that formed in alluvium along streams. The soils in this unit are in the Albany, Ocilla, and Ona series.

The surface layer is very friable to loose loamy fine sand, loamy sand, or sand. In some places this material extends from the surface to a depth of 40 inches. Below the surface layer is friable sandy loam or sandy clay loam material.

These soils are very strongly acid, are low in natural fertility, and contain little organic material. Water moves into and through these soils at a moderately rapid rate. The soils generally have good tilth, and they can be cultivated throughout a wide range of moisture content. The root zone is deep, and available water capacity is low to moderate. Crops on these soils respond well to good management, especially if fertilizer is applied frequently, organic materials are added, and drainage is provided. In addition, protection from overflow is needed on the Albany soils.

The soils in this unit occupy a moderate part of the two counties and are mostly wooded. A moderate part of the Ocilla soils is cultivated. If the soils in this unit are adequately drained, they are well suited to tobacco, corn, grain sorghum, soybeans, and truck crops. Some of the well-suited pasture and hay plants are bahiagrass, Coastal bermudagrass, white clover, lespedeza, and small grain.

Row crops can be grown on these soils year after year, but it is more desirable to grow them in a short-term rotation. If row crops are grown, organic material can be added and tilth improved by turning under crop residue and green-manure crops.

Planting is sometimes delayed on these soils because of wetness, and yields are reduced in wet years. Where these soils are cultivated, they can be bedded by plowing. Shallow ditches around the boundaries of the field provide a place for excess water to collect. In some areas drainage is improved by land leveling and shaping so as to eliminate depressions. These soils are not subject to erosion, but it is advisable to use a cropping system that leaves crop residue on or near the surface. One such system is 1 year of corn, 1 year of a small grain followed by weeds, and 1 year of tobacco. Crop rotations should be used to combat nematodes and plant diseases.

CAPABILITY UNIT IIIw–2

Grady sandy loam is the only soil in this capability unit. It occurs in sinks or saucerlike depressions and is deep and poorly drained. The surface layer is very friable sandy loam 5 to 7 inches thick, and the subsoil is firm sandy clay.

This soil is low in natural fertility, contains a moderate to moderately low amount of organic matter, and is very strongly acid. Water moves into and through this soil at a slow rate. Available water capacity is moderate. The effective root zone is deep, and tilth generally is good in the surface layer. During wet periods water stands on the surface for weeks at a time.

The soil in this unit occupies a very small part of the two counties. Except for a few areas in pasture, almost all of the acreage is woodland.

Excess water limits the suitability of this soil, and drainage is needed before pasture plants or cultivated crops are grown. In drained areas corn is fairly well suited. If drainage is adequate and management is good, bahiagrass, fescue, dallisgrass, white clover, ladino clover and other pasture and hay plants can be grown.

Because this soil generally occurs in low areas surrounded by higher land, drainage is difficult and expensive in many places. A large main ditch is generally needed. In places this ditch must be cut for a considerable distance to reach an outlet. Because water moves slowly through the subsoil, drainage through tile is not effective.

This soil is not subject to erosion, but cropping systems that leave crop residue on or near the surface are needed. In one such system corn is grown year after year.

CAPABILITY UNIT IVe-2

The only soil in this capability unit is Carnegie sandy loam, 8 to 12 percent slopes, eroded. This sloping soil is in small areas adjacent to streams. The surface layer is sandy loam about 6 inches thick, and the subsoil is firm sandy clay loam. A few shallow gullies, rills, and galled spots have formed in most areas.

This soil is low in natural fertility and very strongly acid. Runoff is rapid in bare areas but is moderate in areas that have a good plant cover. Because of the plinthite in the lower subsoil, permeability is moderate to moderately slow. Available water capacity is moderate.

This soil is better suited to grasses and trees than to row crops, but row crops can be grown if management is intensive. An example of a suitable cropping system where cultivation is on the contour is 2 years of corn or a similar row crop followed by 4 years of grass.

CAPABILITY UNIT IVe-3

This capability unit consists of moderately well drained and somewhat poorly drained, very gently sloping, clayey soils on uplands. Erosion is slight to moderate. These soils are in the Esto and Susquehanna series. The surface layer is very friable loamy coarse sand and sandy loam 4 to 7 inches thick. To a depth of several feet, the subsoil is clay that is very firm when dry and plastic when wet.

Figure 8.—**Roadside erosion on Susquehanna sandy loam, 2 to 5 percent slopes. This clayey soil has high shrink-swell potential.**

The soils in this capability unit are low in natural fertility, contain small amounts of organic matter, and are very strongly acid. Water moves into these soils at a moderate rate in uneroded areas and at a somewhat slow rate in eroded areas. The movement of water through the underlying dense clay is very slow, and available water capacity is moderate. Because of this clay, the root zone is shallow. Tilth is generally good in uneroded areas, but it is very poor in the eroded areas. Runoff is rapid in the eroded areas. These soils can be cultivated within only a narrow range of moisture content. Crop response to fertilization is only fairly good. Because of the nature of the clay and the high content of this clay, the Susquehanna soil in this unit shrinks and cracks when wet and swells when dry. Consequently, this soil is poorly suited for roadbeds unless extensive preparations are made to overcome shrinking and swelling (fig. 8). Also, the Susquehanna soil is poorly suited to most other engineering uses.

The soils in this capability unit occupy only a small part of the two counties. Most of the acreage is woodland, but cultivated crops can be grown under good management. Among the better suited crops are corn, cotton, and small grain. Pasture and hay plants that are fairly well suited are Pensacola bahiagrass, Coastal bermudagrass, and lespedeza.

Surface runoff and erosion are serious hazards in cultivated areas. If these soils are cultivated, they should be managed so that runoff is reduced and soil losses are held within allowable limits. Contour farming, terraces, vegetated outlets, and other practices are needed. Where the slopes are 3½ percent and 150 feet long, an example of a suitable cropping system is 3 years of Coastal bermudagrass or another close-growing crop and 1 year of corn or another row crop. These areas are cultivated in straight rows and are not terraced, and excess water is removed by vegetated waterways.

CAPABILITY UNIT IVe-4

This capability unit consists of well-drained, gently sloping, eroded soils on ridges and side slopes. These soils are in the Carnegie and Cowarts series. The surface layer is very friable, pebbly sandy loam or friable to loose loamy sand. It is 4 to 8 inches thick. The subsoil is friable to firm sandy clay loam. Iron pebbles are common in the subsoil of the Carnegie soils.

Water moves into these soils at a moderate to moderately rapid rate, but it moves through them at a moderate to moderately slow rate. Tilth is generally good in the less eroded areas, but it is only fair in the more eroded areas. The effective root zone is moderately deep, and available water capacity is low to moderate. These soils are very strongly acid, are low in natural fertility, and contain little organic matter. Crops respond only fairly well to fertilization.

Because of the slope and the hazard of erosion, the soils in this capability unit are better suited to trees or pasture than to row crops. They can be cultivated, however, if they are managed so that runoff is reduced and erosion is held within allowable limits. Contour farming, terraces, and vegetative outlets are needed. Among the suited crops are cotton, corn, small grain, and peanuts. Some of the suitable pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, millet, and sericea lespedeza. Where the slopes are 6 percent and 100 feet long and these soils

are cultivated on the contour, an example of a suitable cropping system is 2 years of cotton, peanuts, or a similar row crop followed by 4 years of bahiagrass or a similar close-growing crop.

CAPABILITY UNIT IVw-2

Only one mapping unit, Leaf and Chastain soils, is in this capability unit. These deep, somewhat poorly drained and poorly drained, clayey soils are on low terraces along the Ocmulgee River. They are flooded for short periods two or three times each year. The surface layer is generally friable silty clay loam 4 to 8 inches thick. The subsoil is firm silty clay to very firm or slightly plastic clay.

These soils are low to moderate in natural fertility, contain small or medium amounts of organic matter, and are very strongly acid. Water moves into and through these soils at a slow to very slow rate, and available water capacity is moderate. The effective root zone is moderately deep or deep, but tilth generally is poor.

The soils in this capability unit occupy a very small part of the two counties, and the entire acreage is in trees, mostly hardwoods. Trees are better suited than crops or pasture, but selected crops can be grown if these soils are protected from floods. Open ditches are suitable for drainage, but tile is not, because the subsoil is clayey and slowly permeable. Suitable pasture plants are Pensacola bahiagrass, dallisgrass, fescue, sorghum, and browntop millet. Corn can be grown in adequately drained, fertilized fields. An example of a suitable cropping system is 2 years of corn or a similar row crop followed by 2 years of bahiagrass or a similar close-growing crop.

CAPABILITY UNIT IVw-4

This capability unit consists of nearly level, poorly drained soils that occur in ponded areas, along upland drainageways, and on stream terraces. Flooding is likely in spring and early in summer. These soils are in the Alapaha and Rains series. The surface layer is very friable loamy sand or loamy fine sand, and the subsoil is friable sandy clay loam.

These soils are very strongly acid and are low in natural fertility. They contain medium amounts of organic matter in the upper few inches of the surface layer and small amounts in the rest of the profile. The water table generally is high, for these soils receive water from the surrounding uplands. The effective root zone is deep, and tilth generally is good. Where the water table is shallow, water moves into and through these soils at a moderate rate. Available water capacity is moderate.

The soils in this capability unit occupy a moderately large part of the two counties. Nearly all of the acreage is woodland. Hardwoods are well suited, and pines grow well under good management that includes drainage. Drainage is needed if cultivated crops or pasture plants are grown. Among the suitable pasture plants are Coastal bermudagrass, bahiagrass, dallisgrass, tall fescue, and white clover (fig. 9). A suitable cropping system is corn or a similar row crop grown year after year, provided crop residue is left on the surface through the winter.

CAPABILITY UNIT IVs-1

This capability unit consists of very gently sloping and gently sloping, excessively drained, sandy soils on upland ridges and side slopes. These soils are in the Troup series. Water moves rapidly into and through these soils. In these soils, loose sand extends from the surface to a depth of 40 to 72 inches. It is underlain by friable sandy loam or sandy clay loam.

Figure 9.—**Pasture of Coastal bermudagrass and a farm pond. The soil is Alapaha loamy sand, 0 to 3 percent slopes.**

The soils can be cultivated throughout a wide range of moisture content. The root zone is very thick, but available water capacity is low to very low. Acidity is strong, and natural fertility and the content of organic matter are very low. Crop response to fertilization is only fair.

Because these soils are sandy and very droughty, their suitability for plants is limited. Corn and peanuts are better suited than other crops commonly grown in the two counties. Among the better suited pasture and hay plants are Pensacola bahiagrass, Coastal bermudagrass, and Suwannee bermudagrass. Even where management is good, the organic materials are rapidly depleted. Frequent applications of fertilizer are required for best yields.

Because infiltration and permeability are rapid, erosion generally is not a hazard. Large additions of organic materials are needed to increase available water capacity and productivity. Where farming is in straight rows, corn can be grown year after year if it is mulch planted, and if its residue is left on the surface as winter cover.

CAPABILITY UNIT Vw-2

This capability unit consists of deep, poorly drained soils that occur in depressions and along small and large drainageways and are frequently flooded for short to moderately long periods. These soils are in the Osier, Bibb, and Plummer series.

The surface layer of the Osier and Bibb soils is highly variable but commonly ranges from sand to fine sandy loam. The underlying material is also highly variable and ranges from sandy clay loam to coarse sand. The Plummer soil has a surface layer of dark-gray loose sand 4 to 8 inches thick. This layer is underlain by gray sand that extends to a depth of 40 inches or more. Friable sandy loam or sandy clay loam begins between depths of 40 and 65 inches. The Plummer soil is covered by water many

285-798—69——4

times each year, and the water table generally is at or near the surface late in winter and in spring.

When the water table is not a factor, water moves into and through these soils at a moderate to rapid rate. Available water capacity is low. These soils are low in natural fertility and are very strongly acid. Except in the dark-colored upper surface layer, the content of organic material is low. The effective root zone is deep.

The soils in this unit occupy a moderately large part of the two counties, and all of the acreage is wooded. Pines and hardwoods grow well. Because these soils are in low areas and are poorly drained and subject to flooding, they are not suited to cultivated crops, though Pensacola bahiagrass can be grown in adequately drained areas that are protected from flooding.

CAPABILITY UNIT VIe-2

This capability unit consists of well drained, moderately well drained, and somewhat poorly drained, clayey soils that have short, choppy, irregular slopes. These soils of the uplands are eroded. In most places numerous, small, hard pebbles of iron are on the surface and in the upper layers of the profile. These soils are in the Esto, Sunsweet, and Susquehanna series.

The surface layer is very friable sandy loam or loose loamy coarse sand 4 to 6 inches thick. The subsoil ranges from friable to firm sandy clay loam to extremely firm clay.

The soils in this unit are low in natural fertility, contain small amounts of organic matter and are very strongly acid. Water moves into and through the soils at a moderately slow to slow rate, and available water capacity is low to moderate. Runoff is rapid. The root zone is shallow to moderately deep. Because of the kind and high content of clays the Susquehanna soil shrinks and cracks when dry and swells when wet. For this reason, the Susquehanna soil is poorly suited as foundation material for roads, airports, buildings, and other structures.

Because the soils in this unit are sloping and moderately sloping, clayey, and highly susceptible to erosion, they are not suited to cultivated crops. Under careful management, they can be used for pasture. Plants suitable for pasture are Coastal bermudagrass, Pensacola bahiagrass, sericea lespedeza, and kudzu. These soils are well suited to pines (fig. 10).

CAPABILITY UNIT VIIe-2

This capability unit consists of moderately well drained soils that have short, irregular slopes. These soils are in the

Figure 10.—Stand of slash pine that was replanted on Sunsweet sandy loam, 8 to 12 percent slopes, eroded.

Esto series. The surface layer is thin sandy loam and loamy coarse sand. The subsoil is sandy clay to clay.

These soils are low in natural fertility, low in organic-matter content, and very strongly acid. Available water capacity is moderate. Infiltration is moderate, but permeability is slow in the subsoil. Surface runoff is rapid in bare areas.

The soils in this unit are not suited to cultivated crops or improved pasture. It is not practical to seed, lime, and fertilize pasture. These soils can be used as woodland and as wildlife habitat. Pine trees grow well.

CAPABILITY UNIT VIIw-1

Only Swamp is in this capability unit. This land type is on flood plains of the Alapaha and Willacoochee Rivers. It is very poorly drained and is frequently flooded for long periods. Little profile development can be seen, because small amounts of soil material are deposited with each flood. The soil material ranges from fine sandy loam to coarse sand. It varies widely in color and thickness.

Swamp, all of it woodland, occupies areas that have a small total acreage in the two counties. Hardwoods, mainly cypress, grow in these areas. These hardwoods are harvested late in summer and in fall when flooding is least likely. Because Swamp is wet and difficult to drain, it is not suited to cultivated crops or pasture.

CAPABILITY UNIT VIIs-1

Only one soil, Kershaw coarse sand, 2 to 8 percent slopes, is in this capability unit. It is a gently sloping, excessively drained, sandy soil on upland ridges that resemble sand dunes. This soil is on the eastern side of the Alapaha River and the southern edge of the bottom lands along House Creek. In this soil loose coarse sand extends from the surface to a depth of 6 to 10 feet or more.

This soil is very low in natural fertility and organic-matter content. It is very strongly acid. Infiltration and permeability are very rapid, and available water capacity is very low.

The soil in this unit occupies a very small part of the two counties, and all of the acreage is in trees. Because available water capacity is very low, vegetation is sparse and consists chiefly of scattered scrub oaks and a few longleaf pines. Some areas are being cleared and planted to slash pine. This soil is not suited to cultivated crops or pasture.

Estimated yields

In table 2 are estimated average yields of principal crops and pasture grasses grown on each soil in the two counties. The yields listed are those that can be expected under improved management that does not include irrigation. These estimates are based chiefly on observations made during the survey, on interviews with farmers, on information obtained from other agricultural workers who are familiar with the soils and crops of the counties, and if available, on records of crop yields.

The farmer can obtain the yields listed in table 2 if he (1) carefully chooses the kind of crop grown on a particular soil and the cropping system used, (2) prepares a good seedbed, (3) uses proper methods of planting and seeding, (4) inoculates legumes, (5) plants high-yielding crop varieties and hybrids, (6) seeds at recommended rates and at proper times, (7) controls weeds, insects, and diseases, (8) controls excess water by drainage, (9) provides vegetated waterways, (10) tills on the contour or builds terraces where needed, (11) adds liberal amounts of lime and fertilizer where needed, and (12) effectively controls diseases and insects.

The yields in table 2 are estimated average yields for both counties, not for any particular farm or tract. They indicate the response that can be expected when reasonably intensive management is practiced.

The following paragraphs give the rates of fertilization and seeding, and other practices that are required if the yields in table 2 are to be obtained.

Corn.—The soils used for corn receive, per acre, 60 to 80 pounds of nitrogen (N), of phosphoric acid (P_2O_5), and of potash (K_2O). The crop is seeded at a rate that provides 9,000 to 10,000 plants per acre. All crop residue is returned to the soil, and winter cover crops are turned under.

Tobacco.—The soils used for tobacco receive, per acre, 30 to 50 pounds of nitrogen and 75 to 150 pounds of phosphoric acid and of potash. The fertilizer is applied in split applications. Planting is at a rate that provides 7,000 to 8,000 plants per acre. A suitable crop rotation is used, and insects and diseases are controlled.

Peanuts.—The soils used for peanuts receive, per acre, 12 to 25 pounds of nitrogen and 36 to 60 pounds of phosphoric acid and of potash. A side dressing of 400 to 500 pounds of gypsum is also applied. The planting rate is 50 to 60 pounds of treated, shelled seed per acre.

Cotton.—At planting time the soils used for cotton receive, per acre, 50 to 80 pounds of nitrogen, of phosphoric acid, and of potash. Planting is at a rate that provides 15,000 to 25,000 plants per acre. Insects and diseases are controlled effectively.

Oats.—At planting time the soils used for oats receive, per acre, 15 to 25 pounds of nitrogen and 50 to 75 pounds of phosphoric acid and of nitrogen. An additional 30 to 65 pounds of nitrogen is applied late in winter. The planting rate is 2 bushels of drilled seed per acre or 3 bushels of broadcast seed.

Coastal Bermudagrass.—Early in spring the soils used for Coastal bermudagrass grown for hay or pasture receive, per acre, 25 to 50 pounds of nitrogen and 60 to 100 pounds of phosphoric acid and of potash. An additional 50 to 100 pounds of nitrogen is applied early in summer. Every 3 to 5 years, 1 ton of lime is added, or lime is applied according to the need indicated by soil tests. The planting rate is 14,000 sprigs per acre. At regular intervals the grass is grazed or mowed for hay so that excessive growth is controlled.

Bahiagrass.—Late in winter the soils used for bahiagrass grown for hay or pasture receive, per acre, 25 to 50 pounds of nitrogen and 60 to 100 pounds of phosphoric acid and of potash. An additional 50 to 75 pounds of nitrogen is applied early in summer. By using more fertilizer, some farmers obtain higher yields than those given in table 2. Every 3 to 5 years, 1 ton of lime is added per acre; or lime is applied according to the needs indicated by soil tests. The planting rate is 15 pounds of broadcast seed per acre. At regular intervals the grass is grazed or mowed for hay so that excessive growth is controlled.

TABLE 2.—*Estimated average acre yields of the principal crops*

[Yields listed are average yields expected under improved management that does not include irrigation. Absence of yield indicates crop is not commonly grown on the soil or is not suited to it]

Soil	Corn	Tobacco (flue cured)	Peanuts (runner)	Cotton (lint)	Oats	Pasture		
						Coastal bermudagrass for—		Bahiagrass for—
						Hay	Pasture	Pasture
	Bu.	*Lb.*	*Lb.*	*Lb.*	*Bu.*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Alapaha loamy sand, 0 to 3 percent slopes	40							230
Albany loamy fine sand, 0 to 2 percent slopes	45	1,540	1,400	250	50	4.0	200	230
Albany sand	50	2,000	1,600	300	35	4.0	200	165
Ardilla loamy sand, 0 to 2 percent slopes	65	1,800	1,400	500	60	5.4	270	250
Carnegie sandy loam, 2 to 5 percent slopes, eroded	60	1,700	1,760	700	65	4.7	240	200
Carnegie sandy loam, 5 to 8 percent slopes	60	1,500	1,650	650	55	4.0	210	190
Carnegie sandy loam, 5 to 8 percent slopes, eroded	55	1,200	1,500	600	50	3.8	200	170
Carnegie sandy clay loam, 5 to 8 percent slopes, severely eroded						2.5	125	125
Carnegie sandy loam, 8 to 12 percent slopes, eroded						3.7	195	180
Cowarts loamy sand, 2 to 5 percent slopes	70	1,700	1,600	500	60	4.0	210	165
Cowarts loamy sand, 2 to 5 percent slopes, eroded	55	1,500	1,500	400	50	3.5	190	150
Cowarts loamy sand, 5 to 8 percent slopes	50	1,200	1,500	350	50	3.3	170	125
Cowarts loamy sand, 5 to 8 percent slopes, eroded	45	1,000	1,300	350	45	3.2	160	115
Dothan loamy sand, 0 to 2 percent slopes	80	2,300	2,200	675	75	6.0	300	250
Dothan loamy sand, 2 to 5 percent slopes	70	2,000	1,900	625	60	5.6	280	230
Esto loamy coarse sand, 2 to 5 percent slopes	45	1,100	1,400	325	35	4.6	230	175
Esto loamy coarse sand, 2 to 5 percent slopes, eroded	45			300	35	4.4	220	170
Esto loamy coarse sand, 5 to 8 percent slopes, eroded						3.0	205	165
Esto loamy coarse sand, 8 to 12 percent slopes, eroded						3.7	185	150
Fuquay loamy sand, 0 to 2 percent slopes	75	2,200	1,800	550	60	5.5	270	230
Fuquay loamy sand, 2 to 5 percent slopes	65	1,900	1,600	500	55	5.0	250	210
Fuquay loamy sand, 5 to 8 percent slopes	55	1,800	1,400	450	50	4.4	225	205
Fuquay loamy coarse sand, 2 to 5 percent slopes	50	1,650	1,400	400	45	4.4	225	200
Fuquay loamy coarse sand, 5 to 8 percent slopes	45	1,400	1,100	350	40	4.2	210	190
Grady sandy loam	40				35			150
Irvington loamy sand, 0 to 3 percent slopes	70	2,200	2,000	450	75	5.8	300	270
Kershaw coarse sand, 2 to 8 percent slopes						2.0	100	100
Leaf and Chastain soils								170
Leefield loamy sand, 0 to 3 percent slopes	70	2,200	1,200	625	60	5.3	265	230
Ocilla loamy sand, 0 to 3 percent slopes	55	2,400	1,500	300	40	4.6	230	220
Ona sand	50	2,000	1,200		30	4.0	220	210
Osier-Bibb complex								200
Plummer sand, 0 to 3 percent slopes								195
Rains loamy fine sand	25							200
Stilson loamy sand, 0 to 3 percent slopes	75	2,200	1,800	500	60	5.9	295	285
Sunsweet sandy loam, 5 to 8 percent slopes, eroded						2.7	135	110
Sunsweet sandy loam, 8 to 12 percent slopes, eroded							120	100
Susquehanna sandy loam, 2 to 5 percent slopes	40				30	2.5	170	170
Susquehanna sandy loam, 5 to 8 percent slopes, eroded						2.4	165	165
Swamp								
Tifton loamy sand, 0 to 2 percent slopes	90	2,400	1,980	880	75	6.3	315	250
Tifton loamy sand, 2 to 5 percent slopes	80	2,300	1,800	800	70	6.0	300	240
Tifton loamy sand, 2 to 5 percent slopes, eroded	70	2,200	1,700	750	65	5.5	280	230
Tifton loamy sand, 5 to 8 percent slopes	65		1,600	750	60	5.5	280	220
Tifton loamy sand, 5 to 8 percent slopes, eroded	60		1,300	625	50	5.4	270	200
Troup sand, 0 to 5 percent slopes	30	1,200	1,000	275	30	3.0	150	150
Troup sand, 5 to 8 percent slopes	25		900		25	2.9	145	140

[1] Cow-acre-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by the number of days the pasture is grazed during the year without injury to the sod. An acre of pasture that provides 30 days of grazing for two cows, for example, has a carrying capacity of 60 cow-acre-days.

Figure 11.—Stand of slash pine about 25 years old that no longer produces naval stores. The soil is Cowarts loamy sand, 2 to 5 percent slopes, eroded.

Use of the Soils as Woodland [4]

Slightly more than half of the acreage in Ben Hill and Irwin Counties is woodland, most of which is owned and operated by farmers. The principal commercial trees are longleaf pine on the dry ridges; slash pine and loblolly pine on the moist, sandy flats; and gum, pine, and yellow-poplar on the smaller, somewhat poorly drained and poorly drained bottoms.

Both slash pine and longleaf pine are important as sources of turpentine, resin, and other naval stores. The sale of naval stores accounts for a significant part of most farmers' income. Local markets are available for the sale of pulpwood and sawtimber, including trees that no longer produce naval stores (fig. 11).

Woodland suitability groups

Management of woodland can be planned effectively if soils are grouped according to those characteristics that affect the growth of trees and the management of stands. The soils of Ben Hill and Irwin Counties have been placed in seven woodland suitability groups. Each group consists of soils that have about the same suitability for wood crops, require about the same management, and have about the same potential productivity.

The woodland suitability groups are described in this subsection. The soils in each group can be identified by referring to the "Guide to Mapping Units" at the back of this survey. More detailed information about the soils is given in the section "Descriptions of the Soils." Some of the terms used in the descriptions of the woodland suitability groups require explanation.

Potential productivity is expressed as site index and as average yearly growth. A site index for a given soil is the height, in feet, that a specified kind of tree growing on that soil will reach in 50 years. The site indexes given for the woodland suitability groups are averages for all the soils in the group. These indexes are based on measurement of trees.

The average yearly growth, expressed in board feet per acre (Scribner rule), is calculated from the average site index. The values for average yearly growth of the southern pines were interpolated from tables 56, 88, and 152 in USDA Miscellaneous Publication 50 (*8*). These values are annual averages to 50 years of age for pines 8 inches

[4] NORMAN E. SANDS, forester, Soil Conservation Service, assisted in writing this subsection.

or more in diameter growing in even-aged, fully stocked stands. The values for average yearly growth of the hardwoods were adapted from table 7 in USDA Agricultural Handbook No. 181 (*5*). These values are also annual averages to 50 years of age for trees in even-aged, fully stocked stands, but the hardwoods are 12 inches or more in diameter.

Plant competition refers to the rate of invasion by undesirable trees, shrubs, and vines when openings are made in the canopy. Competition is *slight* if it does not prevent adequate natural regeneration and early growth, or does not interfere with the normal growth of planted seedlings. It is *moderate* if undesirable plants delay but do not prevent the establishment of a normal fully stocked stand, either naturally occurring or planted. Competition is *severe* if undesirable plants prevent adequate natural or artificial restocking. Where competition is severe, the undesirable plants should be controlled by weeding, burning, spraying with chemicals, or girding, and the site should be carefully prepared for planting.

Equipment limitation caused by unfavorable soil characteristics and topographic features may restrict or prohibit the use of conventional equipment for planting and harvesting wood crops, for constructing roads, for controlling unwanted vegetation, and for controlling fires. The limitation is *slight* if there is little or no restriction on the type of equipment or on the time of year that the equipment can be used. It is *moderate* if the use of equipment is restricted by one or more unfavorable characteristics, such as slope, stones or other obstructions, seasonal wetness, or instability. The limitation is *severe* if special equipment is needed for normal management.

Seedling mortality refers to the expected loss of seedlings that is a result of unfavorable soil characteristics or topographic features, but not a result of plant competition. Mortality is *slight* if not more than 25 percent of the seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places replanting to fill open places is necessary. Mortality is *severe* if more than 50 percent of the planted seedlings die, or if trees ordinarily do not reseed naturally in places where there are enough seed. If mortality is severe, it is necessary to plant seedlings where seeds do not grow, to prepare special seedbeds, and to use superior planting methods.

In the following pages the seven woodland suitability groups in Ben Hill and Irwin Counties are described. Swamp, a land type, was not placed in a woodland suitability group. It is not suited to ponds, and no data were available for the hardwoods on this land type.

WOODLAND SUITABILITY GROUP 1

This woodland group consists of moderately deep and deep, well-drained, nearly level to sloping soils that have a loamy or sandy surface layer. Permeability is moderate in the subsoil.

The soils in this group are used mostly for cultivated crops and pasture. On these soils, sites are good for slash pine and loblolly pine and are fair for longleaf pine. Slash pine and longleaf pine are predominant in the existing stands, and they should be favored in management because they are valuable as sources of naval stores. The longleaf pine commonly grows near the tops of slopes.

For loblolly pine, the average site index of these soils is 88 and the average yearly growth is 490 board feet per acre. For slash pine, the average site index is 85 and the average yearly growth is 470 board feet per acre. For longleaf pine, the average site index is 73 and the average yearly growth is 270 board feet per acre.

Competition for unwanted trees, shrubs, and vines is moderate. At least one weeding is essential when an opening is made in the canopy.

Equipment limitation is moderate. Although conventional logging equipment can be used on the soils in this group for the entire year, some damage to tree roots and soil structure can be expected in wet periods that total about 2 months.

Seedling mortality is slight where slopes are 8 percent or less and is moderate where slopes are more than 8 percent.

WOODLAND SUITABILITY GROUP 2

This woodland group consists of deep, moderately well drained and somewhat poorly drained soils. Permeability is moderate to moderately slow in the subsoil.

The soils of this group are used mainly for trees, though cultivated crops and pasture are grown in some areas. These soils are very good for growing slash pine, loblolly pine, water oak, and sweetgum. Sites for longleaf pine are fairly good. Longleaf pine is favored in the management of existing stands because it is an important source of naval stores. Slash pine is favored for planting.

For slash pine, the average site index of these soils is 91 and the average yearly growth is 530 board feet per acre. For loblolly pine, the average site index is 90 and the average yearly growth is 560 board feet per acre. For longleaf pine, the average site index is 75 and the average yearly growth is 290 board feet per acre. For sweetgum, the average site index is 90 and the average yearly growth is 350 board feet per acre. For water oak, the average site index is 90 and the average yearly growth is 300 board feet per acre.

Competition from unwanted trees, shrubs, and vines is moderate. At least one weeding is essential when an opening is made in the canopy.

Equipment limitations are moderate. Although conventional equipment can be used on the soils in this group for the entire year, moderate damage to soil structure and to tree roots can be expected in wet periods that total 2 months or more each year. Seedling mortality is slight.

WOODLAND SUITABILITY GROUP 3

This woodland group consists of well drained, moderately well drained, and somewhat poorly drained soils. Permeability is slow to very slow in the subsoil.

Slash pine, longleaf pine, and loblolly pine are favored in the management of existing stands. Slash pine is favored for planting. Loblolly pine has a higher site index and higher yearly growth than either slash pine or longleaf pine, but it is of little value for naval stores.

For loblolly pine, the average site index is 89 and the average yearly growth is 550 board feet per acre. For slash pine, the average site index is 85 and the average yearly growth is 470 board feet per acre. For longleaf pine, the average site index is 76 and the average yearly growth is 300 board feet per acre.

Competition from unwanted trees, shrubs, and vines is moderate. At least one weeding is essential when an opening is made in the canopy.

The equipment limitation is slight. Conventional equipment can be used for the entire year without damaging soil structure or tree roots.

Seedling mortality is slight in the relatively flat areas and is moderate where slopes are more than 8 percent. More than 25 percent of the planted seedlings die in periods of drought.

WOODLAND SUITABILITY GROUP 4

This woodland group consists of poorly drained soils that have a subsoil ranging from sand to clay. Much of the acreage is subject to flooding.

The soils of this group are used mostly for trees and pasture. Their potential for producing loblolly pine, slash pine, sweetgum, and yellow-poplar is excellent. Longleaf pine grows fairly well at the edge of ponded areas. Ponded areas are excellent sites for tupelo-gum and bald cypress. Because water is excessive on these soils, surface drainage is needed where pines and yellow-poplar are grown. Slash pine, loblolly pine, and yellow-poplar are favored for planting, but bedding is generally required before these trees are planted.

For loblolly pine, the average site index of these soils is 89 and the average yearly growth is 550 board feet per acre. For slash pine, the average site index is 85 and the average yearly growth is 470 board feet per acre. For longleaf pine, the average site index is 76 and the average yearly growth is 300 board feet per acre. For yellow-poplar, the average site index is 107 and the average yearly growth is 560 board feet per acre. For sweetgum, the average site index is 93 and the average yearly growth is 400 board feet per acre. For red oak, the average site index is 90 and the average yearly growth is 300 board feet per acre.

Competition from unwanted water-tolerant trees, shrubs, and vines is severe. When an opening is made in the canopy, several weedings are needed for releasing seedlings and permitting them to grow.

On these wet soils, conventional logging equipment can be used only during periods of drought. Drainage is needed if access roads are built. Seedling mortality is severe.

WOODLAND SUITABILITY GROUP 5

This woodland group consists of deep, excessively drained, sandy soils that are rapidly permeable.

On these soils productivity is moderately high for slash pine and loblolly pine and is moderate for longleaf pine. Slash pine and longleaf pine are more suitable for planting than loblolly pine.

For slash pine, the average site index of these soils is 78 and the average yearly growth is 380 board feet per acre. For loblolly pine, the average site index is 75 and the average yearly growth is 370 board feet per acre. For longleaf pine, the average site index is 63 and the average yearly growth is 150 broad feet per acre. For sand pine, the average site index is 70 and the average yearly growth is 350 board feet per acre.

Competition from unwanted trees, shrubs, and vines is slight, but seedling mortality is severe because these soils are droughty.

The limitation on the use of equipment is slight on the soils of this group. Conventional equipment can be used at all times.

WOODLAND SUITABILITY GROUP 6

This woodland group consists of moderately well drained and somewhat poorly drained soils. These soils have moderately rapid to rapid permeability, and they are slightly droughty in midsummer.

The soils of this group are good sites for slash pine and loblolly pine and are fair sites for longleaf pine. Slash pine and loblolly pine are suitable for planting.

For slash pine, the average site index of these soils is 90 and the average yearly growth is 520 board feet per acre. For loblolly pine, the average site index is 73 and the average yearly growth is 340 board feet per acre. For longleaf pine, the average site index is 67 and the average yearly growth is 211 board feet per acre.

Plant competition is moderate on the moderately well drained soils and is severe on the somewhat poorly drained soils. At least one weeding is essential when an opening is made in the canopy.

The equipment limitation is moderate. For periods that total 2 months each year, these soils are so wet that soil structure and tree roots are damaged if conventional logging equipment is used without restriction.

Seedling mortality is slight or moderate, depending on the severity of drought in midsummer.

WOODLAND SUITABILITY GROUP 7

This woodland group consists of only Kershaw coarse sand, 2 to 8 percent slopes. This soil is very deep, very excessively drained, and rapidly permeable.

Because the soil in this group has low available water capacity, it generally is not suited to commercial wood crops. Soil moisture is favorable for the growth of trees on only a small acreage and for only short periods.

The site index of this soil is below 50 for longleaf pine. Other data on potential productivity were not available. Some areas have been planted to slash pine by large companies that use wood.

Use of Soils for Wildlife and Fish [5]

The soils of Ben Hill and Irwin Counties produce food and cover for many kinds of wildlife. Bobwhite and dove are numerous in the large cultivated areas in the central, southeastern, and western parts of the two counties. Species common throughout the survey area are rabbit, squirrel, fox, opossum, raccoon, skunk, and many kinds of nongame birds. Deer and wild turkeys find suitable habitat in the wooded areas along the Ocmulgee and Alapaha Rivers and in other large wooded tracts in the two counties. Wild ducks, mink, and otter live throughout the survey area but are most plentiful along the Ocmulgee and Alapaha Rivers.

Fish are plentiful in the Ocmulgee and Alapaha Rivers.

Food and cover needed by wildlife

The feeding habits of wildlife differ. Some animals and birds eat insects and other animal foods, some eat only vegetative foods; and others eat a combination of the two.

[5] PAUL D. SCHUMACHER, biologist, Soil Conservation Service, assisted in writing this subsection.

Following is a brief summary of the food and habitat needed by the more important animals and fish in Ben Hill and Irwin Counties.

BEAVER.—Beavers eat only vegetation, mainly bark, roots, and green plants. Their principal tree foods are from ash, birch, cottonwood, hornbean, maple, pine, sweetgum, willow, and the tender bark of alder. Beavers also eat honeysuckle, grasses, corn, weeds, acorns, and the tender shoots of elder. The chief feeding areas are within 150 feet of water.

BOBWHITE.—Choice foods for bobwhite are acorns, blackberries, browntop millet, bullgrass, wild black cherries, corn, cowpeas, dewberries, Florida beggarweed, flowering dogwood, annual lespedeza, bicolor lespedeza, peanuts, oats, pecans, pine seeds, common ragweed, soybeans, rye, sweetgum, and tickclover. Bobwhite also eat many insects. The food must be close to vegetation that provides shade and protection from predators and from adverse weather.

DEER.—Choice foods for deer are acorns, bahiagrass, clovers, chufa, corn, cowpeas, greenbrier, annual lespedeza, bicolor lespedeza, oats, soybeans, and rye, and saw-palmetto and yaupon. A woodland tract of 500 acres or more generally provides enough cover for deer.

DOVE, MOURNING.—Choice foods for mourning doves are browntop millet, bullgrass, corn, Japanese millet, pine seed, common ragweed, and sweetgum seed. Doves do not eat insects, green leaves, or fruit. They drink water daily.

DUCK.—Choice foods for ducks are acorns, browntop millet, chufa, corn, Japanese millet, and smartweed seed. These foods must be covered with water to be readily available to ducks. Ducks occasionally eat acorns and corn on dry land.

RABBIT.—Cover, such as a blackberry or plum thicket, is a prime requirement in a rabbit habitat. Choice foods are clover, winter grasses, and other succulent plants.

SQUIRREL.—Choice foods for squirrels are acorns, blackgum, black cherries, chinkapins, chufa, corn, flowering dogwood, magnolia, peanuts, pecans, pine seeds, cypress seeds, and tupelo fruit.

TURKEY, WILD.—Turkeys survive only in large areas, generally those that are 2,000 acres or more in size. They need a daily supply of drinking water and often roost in large trees over or near water. Choice foods are insects, acorns, bahiagrass seed, bullgrass blackberries, dewberries, browntop millet, chufa, clover leaves, corn, cowpeas, peanuts, flowering dogwood, gallberry, wild grapes, oats, pecans, pine seed, ryegrass forage, and soybeans.

NONGAME BIRDS.—The foods of the many kinds of nongame birds in the county vary greatly. Several species eat only insects; a few eat insects and fruits; and several others eat insects, fruit, nuts, and acorns.

FISH.—The principal fish in the two counties are bluegill, bass, and channel catfish. The bluegill's choice foods are aquatic worms, insects, and insect larvae. Bass feed chiefly on smaller fish and insects. The supply of food depends on the fertility of the water, on the nature of soils in the watershed, and to some extent, on the characteristics of the soils at the bottom of the pond. Because most of the soils in the two counties are low in fertility and are acid, fertilizer and lime are needed in most ponds so that enough green microscopic algae is produced to feed worms that are food for fish.

Wildlife suitability groups

The soils in Ben Hill and Irwin Counties have been placed in five wildlife suitability groups on the basis of the suitability of soils as habitat for specified kinds of wildlife. The soils in each group are somewhat similar and generally produce about the same kinds of food plants and protective cover for wildlife. The wildlife suitability groups in these counties are described in the following pages. To find the soils in each group, refer to the "Guide to Mapping Units" at the back of this survey.

Additional information can be obtained from the local technicians of the Soil Conservation Service. These technicians maintain up-to-date technical guides for each important kind of wildlife and fish, and for each significant plant that provides food or cover for wildlife. A landowner will find this information valuable in establishing or improving suitable food plants and habitat for the kinds of wildlife or fish he wishes to favor.

WILDLIFE SUITABILITY GROUP 1

This wildlife group consists of well drained or moderately well drained, strongly acid soils of the uplands. Slopes range from 0 to 8 percent. The surface layer of these soils is sandy loam or loamy sand 4 to 40 inches thick. The subsoil ranges from sandy clay loam to clay and is moderate to slow in permeability. Tilth is generally good, and these soils can be cultivated throughout a wide range of moisture content.

The soils of this group occupy a large part of the two counties and are mostly cultivated. These soils are suited to many kinds of plants that provide choice food for several kinds of wildlife. Among the well-suited plants are bahiagrass, blackberry, corn, cowpeas, lespedeza, oats, peanuts, and sorghum. Cherry, pine, and pecan trees also provide choice food. Bobwhite, dove, rabbit, and squirrel feed on these plants and are common on the soils of this group. Cover for wildlife is plentiful. These soils are not suited to flooding for duck fields. Many intermittent streams provide favorable sites for ponds.

WILDLIFE SUITABILITY GROUP 2

This wildlife group consists of excessively drained, sandy soils of the uplands. Slopes range from 0 to 8 percent. These soils have a sand surface layer that is underlain by sandy loam at a depth of 42 inches or more. Available water capacity is low, and permeability is rapid.

Most of the acreage of these soils is woodland. The suitability for plants is limited by the low available water capacity, but some plants that provide choice foods for wildlife are suited. Among these plants are bahiagrass, peanuts, and common ragweed. Flowering dogwood and pine trees also provide choice food. Bobwhite, dove, rabbit, squirrel, and wild turkey obtain some of their food from plants on the soils of this group, but supplemental food can be produced more economically on the adjacent soils in other wildlife groups. Because the soils in this group are sandy, they generally do not provide sites suitable for ponds and they cannot be flooded for duck fields. Also, drinking water for wildlife normally must be provided on nearby soils in other wildlife groups.

WILDLIFE SUITABILITY GROUP 3

This wildlife group consists of moderately well drained and somewhat poorly drained soils. These soils are on low flats between streams on low slopes around the heads of streams, and in areas adjacent to drainageways and flood plains. Slopes range from 0 to 3 percent. The surface layer of these soils is loamy fine sand, loamy sand, or sand and is 12 to more than 40 inches thick. Some areas are subject to occasional flooding.

The soils of this group are well suited to plants that provide choice food for several kinds of wildlife. Among these plants are bahiagrass, blackberry, annual lespedeza, ryegrass, browntop millet, sweetgum, and smartweed. Cover for wildlife is plentiful. Large wooded areas provide food for deer and turkey. Some areas of these soils can be flooded for duck fields. Water can be impounded on these soils, or waterholes can be dug.

WILDLIFE SUITABILITY GROUP 4

This wildlife group consists of excessively drained sands, well drained sandy loams, moderately well drained loamy coarse sands, and somewhat poorly drained sandy loams. The subsoil of these soils is coarse sand, sandy clay loam, and clay. Permeability ranges from very slow to very rapid, and available water capacity ranges from very low to moderate.

The soils of this group occupy a small part of the two counties. Almost all of the acreage is woodland, but a few areas are in pasture. Because these soils are sandy and droughty or are susceptible to erosion, they generally are not suited to cultivated crops. These soils are suited to only a limited number of trees and other plants that provide choice food for several kinds of wildlife. Chinkapin, pines, common ragweed, and blackberry are fairly well suited. Supplemental food can be produced on the adjacent soils in other wildlife groups. Some areas provide sites suitable for farm ponds, but sites should be thoroughly investigated before one is selected. Cover for wildlife is generally adequate.

WILDLIFE SUITABILITY GROUP 5

This wildlife group consists of poorly drained and very poorly drained soils that occur on bottom lands, around the heads of drainageways, along drainageways, and on wet flats. Some areas of the poorly drained soils are in depressions. The bottom lands are flooded for only a few days each year. The surface layer of these soils is sand, loamy fine sand, loamy sand, and sandy loam 8 to 40 inches thick. It is underlain by gray sand to sandy clay or clay. Slopes range from 0 to 3 percent.

These soils occupy a moderate part of the two counties and are mostly wooded. Excess surface water limits use to water-tolerant plants, and cultivated crops generally are not suited. Among the trees that furnish choice food for wildlife are blackgum, bald cypress, oaks, sweetbay, and tupelo. Japanese millet and smartweed are also choice food. In most areas low dikes can be constructed so as to impound water and provide flooded areas for ducks. Large tracts of these soils are suitable for deer and turkey, but waterholes are needed in some places to supply drinking water for these animals and for squirrels. Cover for wildlife is plentiful. Many sites are suitable for ponds.

285-798—69——5

Engineering Uses of Soils [6]

Soil engineering is a part of structural engineering and deals with soils used as foundation material on which structures are built and with soils used as structural material. To engineers, soil is a natural material that occurs in great variety over the earth and that may have widely different engineering properties within the space covered by a single project. Generally, soil is used in the locality and in the condition in which it occurs. A large part of soil engineering concerns the locating of various soils, determining their engineering properties, correlating these properties with the requirements of the job, and selecting the best soil material or site for each job.

The soil survey of Ben Hill and Irwin Counties contains information useful in highway, agricultural, and sanitary engineering. It also contains information about the development of communities, including recreation facilities. The information can be used to—

1. Make studies of soil and land use that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the soil properties that are important in planning agricultural drainage systems, farm ponds, irrigation systems, terraces, and diversions.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at the selected locations.
4. Locate probable sources of sand, gravel, and other construction materials.
5. Supplement the information from other published maps and reports and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
6. Evaluate the limitation of soils used for foundations for houses, septic tank filter fields, campsites, intensive play areas, picnic areas, structures for light industries, trafficways, and gardens.

With the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be emphasized, however, that the interpretations may not eliminate the need for sampling and testing at the site of specific engineering works where loads are heavy and where the excavations are deeper than here reported. Even in these situations, however, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Some of the terms used by soil scientists may not be familiar to the engineer, and some terms may have a special meaning in soil science. Several of these terms are defined in the Glossary at the back of this survey.

Much of the information in this subsection is given in tables 3, 4, 5, and 6, but additional information useful to engineers can be found in other sections of the soil survey, particularly the sections "Descriptions of the Soils" and "Formation, Morphology, and Classification of Soils."

[6] By SHELBY R. LASTINGER, agricultural engineer, Soil Conservation Service.

TABLE 3.—*Engineering*

Soil name and location	Parent material	Georgia report No.	Depth	Horizon	Moisture-density [2]		Volume change [3]		
					Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches		*Lb. per cu. ft.*	*Percent*	*Percent*	*Percent*	*Percent*
Carnegie sandy loam:									
Irwin County: 2 miles south of Ocilla and 1.5 miles east of U.S. Highway No. 129 (modal).	Beds of marine sand and clay.	S59Ga-77-5-1	0-9	Ap	124	8	0.8	3.4	4.2
		S59Ga-77-5-2	9-19	B21t	116	14	4.0	3.0	7.0
		S59Ga-77-5-4	28-56	B23t	116	14	3.3	1.9	5.2
Irwin County: 2 miles south of Ocilla and 300 yards east of U.S. Highway No. 129 (finer textured).	Beds of marine sand and clay.	S59Ga-77-4-1	0-11	Ap	123	9	.9	1.3	2.2
		S59Ga-77-4-3	15-21	B21t	99	22	4.5	5.4	9.9
		S59Ga-77-4-4	21-56	B22t	106	19	4.5	6.6	11.1
Irwin County: 1 mile northeast of Waterloo on State Route 125 (coarser textured).	Beds of marine sand and clay.	S59Ga-77-6-1	0-8	Ap	130	9	.8	12.2	13.0
		S59Ga-77-6-3	12-20	B21t	114	14	2.8	1.2	4.0
		S59Ga-77-6-4	20-60	B22t	106	18	3.6	2.2	5.8
Cowarts loamy sand:									
Ben Hill County: 100 yards west and 1.4 miles north of Lynnwood School on State Route 90 (modal).	Coastal Plain sediments (clay).	S59Ga-9-3-1	0-7	Ap	115	7	.7	1.5	2.2
		S59Ga-9-3-3	13-25	B21t	119	13	3.4	3.1	6.5
		S59Ga-9-3-5	38-59	B23t	114	15	3.9	3.8	6.7
Ben Hill County: 4 miles north of Fitzgerald on U.S. Highway No. 129 (finer textured).	Coastal Plain sediments (clay).	S59Ga-9-4-1	0-9	Ap	119	8	.8	2.5	3.3
		S59Ga-9-4-2	9-12	B2t	109	16	4.0	2.6	6.6
		S59Ga-9-4-4	19-55	B3t	121	11	1.0	2.2	3.2
Ben Hill County: 200 yards east and 1 mile south of Bowens Mill on U.S. Highway No. 129 (coarser textured).	Coastal Plain sediments (clay).	S59Ga-9-5-1	0-6	Ap	116	10	.8	3.8	4.6
		S59Ga-9-5-4	20-27	B21t	115	14	2.4	2.0	4.4
		S59Ga-9-5-5	27-60	B22t	120	12	1.5	1.5	3.0
Dothan loamy sand:									
Irwin County: 2 miles southeast of Old Valley Grove Church (modal).	Unconsolidated sand and clay.	S59Ga-77-1-1	0-9	Ap	112	9	.5	1.9	2.4
		S59Ga-77-1-3	18-29	B2	123	10	1.4	1.1	2.5
		S59Ga-77-1-5	35-53	B23	115	13	2.1	.8	2.9
Irwin County: 1 mile southeast of Old Valley Grove Church (finer textured).	Unconsolidated sand and clay.	S59Ga-77-2-1	0-11	Ap	114	11	1.2	7.8	9.0
		S59Ga-77-2-3	16-34	B21t	123	12	2.7	2.3	5.0
		S59Ga-77-2-5	34-49	B23t	120	12	1.3	2.4	3.7
Irwin County: 2 miles south of Old Valley Grove Church (coarser textured).	Unconsolidated sand and clay.	S59Ga-77-3-1	0-7	Al	114	10	.9	3.5	4.4
		S59Ga-77-3-5	23-37	B21t	120	11	1.5	1.1	2.6
		S59Ga-77-3-7	45-62	B23t	114	13	3.1	3.1	6.2
Tifton loamy sand:									
Ben Hill County: 3 miles south of Fitzgerald on county road (modal).	Coastal Plain sediments.	S59Ga-9-2-1	0-7	Ap	123	9	1.2	.1	1.3
		S59Ga-9-2-4	20-32	B21t	119	11	2.3	1.1	3.4
		S59Ga-9-2-7	45-55	B24t	107	18	2.8	3.8	6.6
Ben Hill County: 0.5 mile northwest and 0.25 mile west of Mount Olive Church on U.S. Highway No. 129 (finer textured).	Coastal Plain sediments.	S59Ga-9-6-1	0-9	Ap	132	8	1.0	.8	1.8
		S59Ga-9-6-3	15-25	B21t	115	14	4.1	3.8	7.9
		S59Ga-9-6-5	33-55	B23t	111	16	2.3	2.5	4.8
Ben Hill County: 5 miles southeast of Ashton School on State Route 206 (coarser textured).	Coastal Plain sediments.	S59Ga-9-1-1	0-6	Ap	124	9	1.0	1.8	2.8
		S59Ga-9-1-3	15-41	B21t	123	11	2.5	.4	2.9
		S59Ga-9-1-4	41-60	B22t	110	16	2.1	5.2	7.3

[1] Tests performed by the State Highway Department of Georgia, in cooperation with the U.S. Department of Commerce, Bureau of Public Roads (BPR). The tests, except those for volume change (see footnote 3), were performed in accordance with standard test procedures of the American Association of State Highway Officials (AASHO) (*2*).

[2] Based on AASHO Designation: T 99-57, methods A and C (*2*). (Method A was used for samples containing less than 5 percent of the particles retained on the No. 4 sieve, and method C was used for the other samples.)

[3] Based on "A System of Soil Classification" by W. F. Abercrombie (*1*).

[4] Based on the AASHO Designation: T 88-57 (*2*). Results by this procedure frequently may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in

test data [1]

Mechanical analysis [4]										Liquid limit	Plasticity index	Classification	
Percentage passing sieve—						Percentage smaller than—						AASHO [5]	Unified [6]
2 in.	¾ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.0002 mm.				
----	100	82	75	51	13	9	6	4	3	[7] NP	[7] NP	A–2–4–(0)	SM
----	100	94	85	69	31	30	27	25	24	28	15	A–2–6(1)	SC
----	100	98	91	86	47	39	35	32	32	31	14	A–6(4)	SC
----	100	81	58	47	13	10	7	4	3	NP	NP	A–1–b(0)	SM
----	100	81	78	69	48	47	45	42	39	42	23	A–7–6(7)	SC
----	-----	100	93	80	53	51	50	47	43	48	24	A–7–6(10)	CL
100	85	60	48	36	14	11	9	5	3	20	NP	A–1–b(0)	SM
100	98	81	71	47	28	27	24	21	19	29	14	A–2–6(0)	SC
----	100	91	81	52	31	27	24	20	18	41	NP	A–2–5(0)	SM
----	100	97	94	62	12	7	5	3	1	NP	NP	A–2–4(0)	SP–SM
----	100	98	90	71	32	29	27	23	22	28	14	A–2–6(1)	SC
----	-----	100	96	81	43	38	36	33	32	30	13	A–6(2)	SC
----	100	99	95	64	16	9	6	4	3	NP	NP	A–2–4(0)	SM
----	-----	100	95	79	43	37	35	31	29	35	16	A–6(3)	SC
----	-----	100	97	82	34	29	25	24	23	24	9	A–2–4(0)	SC
----	100	98	95	78	16	10	7	3	2	NP	NP	A–2–4(0)	SM
----	100	98	91	73	33	30	27	24	23	32	9	A–2–4(0)	SM–SC
----	100	93	84	69	31	28	26	23	22	26	13	A–2–6(1)	SC
----	100	98	97	86	16	11	8	3	2	NP	NP	A–2–4(0)	SM
----	100	90	87	78	29	25	22	18	14	22	9	A–2–4(0)	SC
----	100	89	81	72	31	27	25	22	21	32	14	A–2–6(1)	SC
----	100	98	90	85	22	14	9	5	3	NP	NP	A–2–4(0)	SM
----	100	93	89	84	33	26	22	17	15	20	7	A–2–4(0)	SM–SC
100	99	75	71	67	28	22	20	16	15	26	10	A–2–4(0)	SC
----	100	99	95	80	28	13	9	4	1	NP	NP	A–2–4(0)	SM
----	100	94	87	71	29	25	22	18	16	25	10	A–2–4(0)	SC
----	100	98	93	79	33	28	25	22	20	29	11	A–2–6(0)	SC
100	99	82	77	63	15	10	8	4	3	NP	NP	A–2–4(0)	SM
100	99	75	65	55	30	27	26	22	20	36	20	A–2–6(2)	SC
----	100	95	89	75	40	37	33	30	28	35	11	A–6(1)	SM–SC
----	100	63	56	44	11	6	4	3	2	NP	NP	A–1–b(0)	SP–SM
----	100	96	87	77	38	33	32	29	26	30	11	A–6(1)	SC
----	100	99	93	71	36	36	34	32	31	42	20	A–7–6(2)	SC
100	98	91	86	66	22	16	13	8	6	NP	NP	A–2–4(0)	SM
100	95	73	68	52	22	18	16	13	12	22	7	A–2–4(0)	SM–SC
----	100	97	90	70	39	36	33	30	27	36	17	A–6(2)	SC

diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses data used in this table are not suitable for use in naming textural classes for soil.

[5] Based on AASHO Designation: M 145–49 (*2*).

[6] Based on the Unified Soil Classification System, Technical Memorandum No. 3–357, v. 1, Corps of Engineers (*9*). SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of the A-line are to be given a borderline classification. An example of a borderline classification obtained by this use is SM–SC.

[7] Nonplastic.

TABLE 4.—*Estimated engineering*

Soil series and map symbol	Depth to seasonally high water table	Depth from surface	Classification: Dominant USDA texture
		Inches	
Alapaha (AtA)	0 to 15 inches for more than 6 months each year.[1]	0–33	Loamy sand
		33–60	Sandy clay loam
Albany (AsA)	15 to 30 inches for 2 to 6 months each year.[2]	0–40	Loamy fine sand
		40–68	Sandy clay loam to sandy loam
Albany (AdA)	15 to 30 inches for 1 or 2 months each year.	0–54	Sand
		54–66	Sandy loam
Ardilla (AqA)	15 to 30 inches for periods of 1 to 2 months each year.	0–12	Loamy sand
		12–30	Sandy loam to sandy clay loam
		30–50	Sandy clay loam
Bibb	Less than 15 inches for 2 to 6 months each year.[3]	0–6	Loamy sand
		6–22	Sandy loam
		22–60	Sandy clay loam
Carnegie (CoB2, CoC, CoC2, CkC3, CoD2)	More than 5 feet	0–6	Sandy loam
		6–26	Sandy clay loam
		26–50	Sandy clay loam
Chastain	15 to 30 inches for periods of 1 or 2 months each year.[6]	0–22	Silty clay loam
		22–56	Silty clay
Cowarts (CqB, CqB2, CqC, CqC2)	More than 5 feet	0–7	Loamy sand
		7–26	Sandy clay loam
		26–50	Sandy clay loam
Dothan (DaA, DaB)	More than 4 feet	0–10	Loamy sand
		10–14	Sandy loam
		14–52	Sandy clay loam
Esto (EnB, EnB2, EnC2, EnD2)	More than 3 feet	0–9	Loamy coarse sand
		9–28	Clay to sandy clay
		28–54	Sandy clay loam to coarse sandy clay loam.
Fuquay (FsA, FsB, FsC)	Variable: 4 to 6 feet or more	0–23	Loamy sand
		23–41	Sandy loam to sandy clay loam
		41–60	Sandy clay loam
Fuquay (FqB, FqC)	More than 4 feet	0–22	Loamy coarse sand
		22–32	Coarse sandy loam to coarse sandy clay loam.
		32–60	Coarse sandy clay
Grady (Gra)	Less than 15 inches for more than 6 months each year.[9]	0–6	Sandy loam
		6–14	Sandy clay loam
		14–50	Sandy clay
Irvington (IjA)	15 to 30 inches for 1 to 2 months each year.	0–8	Loamy sand
		8–14	Sandy loam
		14–50	Sandy clay loam
Kershaw (KkC)	More than 9 feet	0–70	Coarse sand
Leaf (Lid) (For properties of the Chastain soil in this mapping unit, refer to the Chastain series.)	Less than 15 inches for periods of 2 to 6 months each year.[6]	0–6	Silty clay loam
		6–46	Clay
		46–60	Silty clay loam
Leefield (LsA)	15 to 30 inches for 2 to 6 months each year.	0–24	Loamy sand
		24–50	Sandy clay loam
Ocilla (OhA)	15 to 30 inches for 2 months or more each year.	0–28	Loamy sand
		28–60	Sandy clay loam

See footnotes at end of table.

properties of the soils

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
					Inches per hour	*Inches per inch of soil*	
SM	A-2	100	100	15–25	2. 0–6. 3	0. 08	Low.
SC	A-2, A-4	100	100	25–45	0. 63–2. 0	. 14	Low.
SM, SP-SM	A-2	100	100	10–20	2. 0–6. 3	. 08	Low.
SM, SC	A-2, A-4	100	100	20–45	0. 63–2. 0	. 14	Low.
SP, SP-SM	A-2	100	100	5–15	>6. 3	. 05	Low.
SM	A-2	100	100	15–25	2. 0–6. 3	. 12	Low.
SM	A-2	100	100	12–25	2. 0–6. 3	. 09	Low.
SM, ML	A-2, A-4	100	100	25–55	0. 63–2. 0	. 13	Low.
SC, CL	A-4, A-6	100	100	45–65	0. 20–0. 63	. 14	Moderate.
SM	A-2	100	100	10–25	2. 0–6. 3	. 08	Low.
SM	A-2	100	100	25–35	0. 63–2. 0	. 14	Low.
SC, CL	A-4, A-6	100	100	45–55	0. 63–2. 0	. 16	Low.
SM	A-2	[4] 70–100	[5] 60–90	12–35	2. 0–6. 3	. 12	Low.
SC, CL	A-2, A-7	70–100	60–90	28–65	0. 63–2. 0	. 16	Moderate.
SC, CL, SM	A-2, A-7	70–100	60–90	30–60	0. 63–2. 0	. 14	Moderate.
CL	A-6	100	100	70–90	0. 20–0. 63	. 14	Moderate.
CH-MH	A-7	100	100	85–100	<0. 20	. 15	High.
SM, SP-SM	A-2	95–100	90–100	10–20	2. 0–6. 3	. 09	Low.
SC	A-2, A-6	95–100	90–100	30–50	0. 63–2. 0	. 12	Low.
SC	A-2, A-6	90–100	80–100	30–50	0. 63–2. 0	. 14	Moderate.
SM	A-2	95–100	90–100	15–30	2. 0–6. 3	. 08	Low.
SC, SM-SC	A-2, A-4	95–100	90–100	25–45	2. 0–6. 3	. 12	Low.
SC	A-4, A-2	75–95	70–95	25–40	0. 63–2. 0	. 14	Low.
SM	A-2	[7] 90–100	[8] 90–100	15–25	2. 0–6. 3	. 08	Low.
CL, CH	A-6, A-7	90–100	90–100	60–80	<0. 20	. 15	High.
SC, CL	A-4, A-6	100	100	40–60	0. 20–0. 63	. 13	Moderate.
SM	A-2	95–100	90–100	15–25	2. 0–6. 3	. 07	Low.
SC, SM	A-2, A-4	95–100	90–100	25–45	2. 0–6. 3	. 13	Low.
SC, CL	A-4, A-6	75–95	70–95	35–55	0. 63–2. 0	. 14	Low.
SM, SP-SM	A-2	95–100	90–100	5–15	2. 0–6. 3	. 09	Low.
SC	A-2, A-4	95–100	90–100	30–50	0. 63–2. 0	. 12	Low.
SC, CL	A-4, A-6	90–100	80–100	45–65	0. 63–2. 0	. 13	Moderate.
SM	A-4	100	100	35–45	0. 63–2. 0	. 10	Low.
SC	A-4, A-6	100	100	35–50	0. 20–0. 63	. 14	Moderate.
CL, CH	A-6	100	100	50–75	<0. 20	. 15	Moderate to high.
SM	A-2	[4] 85–95	[5] 95–100	15–25	2. 0 –6. 3	. 10	Low.
SM	A-2, A-4	85–95	95–100	25–45	2. 0 –6. 3	. 12	Low.
SC, CL	A-4, A-6	85–95	95–100	45–65	0. 2 –0. 63	. 14	Low.
SP	A-3	100	90–100	0–5	>6. 3	. 03	Low.
CL, ML	A-4, A-6	100	100	70–90	0. 20–0. 63	. 14	Moderate.
CH, MH	A-7	100	100	85–100	<0. 20	. 15	High.
CL, ML	A-6	100	100	70–90	0. 20–0. 63	. 14	Moderate.
SM	A-2	100	100	15–25	2. 0 –6. 3	. 08	Low.
SC, CL	A-4, A-6	100	100	45–65	0. 63–2. 0	. 12	Low.
SP, SP-SM	A-2, A-3	100	100	5–15	2. 0 –6. 3	. 08	Low.
SM, SC	A-2, A-4	100	100	35–50	0. 63–2. 0	. 12	Low.

TABLE 4.—*Estimated engineering*

Soil series and map symbol	Depth to seasonally high water table	Depth from surface	Classification: Dominant USDA texture
		Inches	
Ona (ObA)	Less than 15 inches for 1 to 2 months of each year.	0–38	Sand
		38–65	Sandy loam
Osier (Obs) (For properties of the Bibb soil in this mapping unit, refer to the Bibb series.)	Less than 15 inches for 3 to 6 months of each year.[3]	0–16	Loamy sand
		16–48	Sand
		48–75	Coarse sand
Plummer (PeA)	Less than 15 inches for more than 6 months.[10]	0–44	Sand
		44–54	Sandy loam
Rains (RfA)	Less than 15 inches for periods of more than 6 months.[11]	0–12	Loamy fine sand
		12–30	Sandy clay loam
		30–50	Heavy sandy clay loam
Stilson (SeA)	30 to 60 inches for 1 to 2 months	0–24	Loamy sand
		24–30	Sandy loam
		30–50	Sandy clay loam
Sunsweet (ShC2, ShD2)	More than 4 feet	0–4	Sandy loam
		4–50	Sandy clay
Susquehanna (SiB, SiC2)	30 to 60 inches for periods of 1 to 2 months each year.	0–5	Sandy loam
		5–50	Clay
Swamp (Swa) (Most properties are so variable that they were not estimated.)	(12)		
Tifton (TqA, TqB, TqB2, TqC, TqC2)	30 to 60 inches	0–7	Loamy sand
		7–10	Sandy loam
		10–50	Sandy clay loam
Troup (TpB, TpC)	More than 4 feet	0–62	Sand
		62–75	Sandy loam

[1] Most areas flooded once in 1 to 5 years for periods of 7 days to 1 month.
[2] Flooded more than once a year for periods of less than 2 days.
[3] Flooded frequently for periods of 1 day to 2 weeks.
[4] Iron pebbles retained on No. 4 sieve.
[5] Iron pebbles retained on No. 10 sieve.
[6] Most areas are flooded more than once each year, but may be flooded as much as a month.

TABLE 5.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features adversely affecting—	
	Topsoil [1]	Road fill	Highway location	Farm Ponds: Reservoir area
Alapaha (AtA)	Fair	Fair	Seasonal high water table; subject to flooding.	No adverse features
Albany (AdA, AsA)	Poor	Fair	Seasonal high water table; unstable slopes; susceptibility to flooding.	Moderately rapid or rapid permeability; moderately rapid or rapid seepage.
Ardilla (AqA)	Fair	Fair	Susceptibility to flooding; seasonal high water table.	No adverse features

See footnotes at end of table.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)			
					Inches per hour	*Inches per inch of soil*	
SP-SM, SM	A-2	100	100	10–15	>6. 3	0. 05	Low.
SP-SM, SM	A-2	100	100	10–15	2. 0 –6. 3	. 12	Low.
SM	A-2	100	100	10–25	2. 0 –6. 3	. 08	Low.
SW	A-2 or A-3	100	100	7–12	>6. 3	. 04	Low.
SP	A-3	100	100	5–10	>6. 3	. 04	Low.
SP, SM	A-2, A-3	100	100	5–15	>6. 3	. 05	Low.
SM, SC	A-2	100	100	15–25	0. 63–2. 0	. 12	Low.
SM	A-2	100	100	20–35	0. 63–2. 0	. 09	Low.
SC, CL	A-4, A-6	100	100	45–55	0. 20–0. 63	. 12	Moderate.
CL	A-6	100	100	60–80	<0. 20	. 14	Moderate.
SM	A-2	100	100	15–25	2. 0 –6. 3	. 08	Low.
SM	A-2, A-4	100	100	25–45	2. 0 –6. 3	. 10	Low.
SC, CL	A-4, A-6	100	100	35–60	0. 63–2. 0	. 14	Low.
SM	A-2	[4] 95–100	[5] 85–95	25–35	2. 0 –6. 3	. 08	Low.
SC, CL, CH	A-4, A-6, A-7	95–100	95–100	40–65	0. 20–0. 63	. 13	Moderate to high.
SM	A-2	[7] 90–100	[8] 90–100	20–35	0. 63–2. 0	. 10	Low.
MH, CH	A-7	90–100	90–100	65–85	<0. 20	. 15	High.
SM, SP-SM	A-2, A-1	[4] 60–95	50–85	10–25	2. 0 –6. 3	. 08	Low.
SM-SC, SC	A-2, A-6	70–100	65–95	20–45	2. 0 –6. 3	. 12	Low.
SC, SM-SC, CL	A-6, A-7	70–100	65–95	35–60	0. 63–2. 0	. 15	Low.
SP, SP-SM	A-2, A-3	100	100	5–15	>6. 3	. 05	Low.
SM	A-2, A-3	100	100	5–15	2. 0 –6. 3	. 12	Low.

[7] Rock fragments retained on No. 4 sieve.
[8] Rock fragments retained on No. 10 sieve.
[9] Flooded more than once each year for periods of 1 to 6 months.
[10] Flooded more than once a year for periods of 1 to 2 months.
[11] Most areas flooded more than once a year for periods of 2 to 7 days.
[12] Flooded very frequently for long periods of time.

interpretations of soils

Soil features adversely affecting—Continued				
Farm Ponds—Continued	Agriculture drainage	Sprinkler irrigation	Pits excavated for irrigation water [2]	Terraces and diversions
Embankment				
Low strength and stability above a depth of less than 2 feet.	Seasonal high water table; few adequate outlets.	No adverse features	No adverse features	Not needed.
Low to moderate strength and low stability; rapid and moderately rapid permeability.	Seasonal high water table; few adequate outlets; susceptibility to flooding; unstable in some areas.	Rapid intake rate; low water-holding capacity.	Susceptibility to flooding; fairly unstable slopes.	Not needed.
No adverse features	Moderate to slow permeability; susceptibility to flooding.	No adverse features	Susceptibility to flooding	Not needed.

TABLE 5.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features adversely affecting—	
	Topsoil [1]	Road fill	Highway location	Farm Ponds: Reservoir area
Bibb	Poor	Poor	Susceptibility to flooding; high water table.	Variable soil features
Carnegie (CoB2, CoC, CoC2, CkC3, CoD2)	Fair	Fair	No adverse features	No adverse features
Chastain	Poor	Poor	Susceptibility to flooding; seasonal high water table; plastic clay near surface.	No adverse features
Cowarts (CqB, CqB2, CqC, CqC2)	Fair	Good	No adverse features	No adverse features
Dothan (DaA, DaB)	Good	Good	No adverse features	No adverse features
Esto (EnB, EnB2, EnC2, EnD2)	Poor	Poor	Rock fragments at a depth of less than 2 feet; seepage in some areas; plastic clay near surface.	Sand lenses in subsoil
Fuquay (FsA, FsB, FsC, FqB, FqC)	Fair to good	Good	No adverse features	Sand lenses in subsoil in some areas.
Grady (Gra)	Fair	Poor	Susceptibility to flooding; high water table; sandy clay at a depth of 1 foot.	Sand lenses below subsoil
Irvington (IjA)	Good	Fair	Seasonal high water table	No adverse features
Kershaw (KkC)	Poor	Fair	Unstable slopes	Rapid permeability; rapid seepage.
Leaf (Lid) (For interpretations of the Chastain soil in this mapping unit, refer to the Chastain series.)	Poor	Poor	Susceptibility to flooding; seasonal high water table; plastic clay near surface.	No adverse features
Leefield (LsA)	Good	Good	Seasonal high water table	No adverse features
Ocilla (OhA)	Good	Good	Seasonal high water table; unstable slopes.	Moderately rapid permeability; moderately rapid seepage.
Ona (ObA)	Poor	Fair	Seasonal high water table; unstable slopes.	Rapid permeability; rapid seepage.
Osier (Obs) (For interpretations of the Bibb soil in this mapping unit, refer to the Bibb series.)	Poor	Poor	Susceptibility to flooding; high water table.	Variable soil features
Plummer (PeA)	Poor	Fair	Unstable slopes; seasonal high water table.	Moderately rapid permeability; moderately rapid seepage.
Rains (RfA)	Fair	Fair	Susceptibility to flooding; seasonal high water table.	No adverse features
Stilson (SeA)	Good	Good	Seasonal high water table	No adverse features
Sunsweet (ShC2, ShD2)	Poor	Fair	Slightly unstable slopes	No adverse features
Susquehanna (SiB, SiC2)	Poor	Poor	Rock fragments at a depth of less than 2 feet; plastic clay near surface; seasonal high water table.	No adverse features
Swamp (Swa)	Poor	Poor	Very frequent flooding for long periods.	Susceptibility to flooding
Tifton (TqA, TqB, TqB2, TqC, TqC2)	Good	Good	No adverse features	No adverse features
Troup (TpB, TpC)	Poor	Fair	Unstable slopes	Rapid permeability; rapid seepage.

[1] Rating for surface layer only.

interpretations of soils—Continued

Soil features adversely affecting—Continued				
Farm Ponds—Continued	Agriculture drainage	Sprinkler irrigation	Pits excavated for irrigation water [2]	Terraces and diversions
Embankment				
Low strength and stability	Very frequent flooding; high water table.	Not needed	Very frequent flooding	Not needed.
No adverse features	Not needed	No adverse features	No adverse features	No adverse features.
High shrink-swell potential; low strength and stability.	Very slow permeability; subject to flooding; few adequate outlets.	Not needed	Frequent flooding	Not needed.
No adverse features	Not needed	No adverse features	No adverse features	No adverse features.
No adverse features	Not needed	No adverse features	No adverse features	No adverse features.
Low strength and stability; high shrink-swell potential in subsoil.	Not needed	Slow intake rate	Unstable slopes; rock fragments.	Rock fragments.
No adverse features	Not needed	No adverse features	No adverse features	No adverse features.
Low to moderate strength and stability; moderate to high shrink-swell potential.	Very slow permeability; few adequate outlets.	Slow intake rate	Low recharge properties	Not needed.
No adverse features	Seasonal high water table	No adverse features	No adverse features	Not needed.
Seepage; coarse texture	Not needed	Low water-holding capacity; low productivity.	Unstable slopes; very rapid permeability.	Very rapid intake rate.
High shrink-swell potential; low strength and stability.	Very slow permeability; susceptibility to flooding; few adequate outlets.	Not needed	Frequent flooding	Not needed.
No adverse features	Seasonal high water table; unstable material.	Low water-holding capacity; rapid intake rate.	No adverse features	Not needed.
Low to moderate strength and low stability; moderately rapid permeability.	Seasonal high water table; unstable material.	Low water-holding capacity; rapid intake rate.	No adverse features	Not needed.
Low to moderate strength and low stability; rapid permeability.	Seasonal high water table; unstable material.	Low water-holding capacity; rapid intake rate.	Unstable slopes; rapid permeability.	Not needed.
Low strength and stability	Very frequent flooding; high water table.	Not needed	Very frequent flooding	Not needed.
Low to moderate strength and low stability; moderately rapid permeability.	Seasonal high water table; moderately rapid permeability; unstable material.	Low water-holding capacity; rapid intake rate.	Unstable slopes; rapid permeability.	Not needed.
Low strength and stability at a depth of less than 1 foot.	Seasonal high water table; slow permeability; susceptibility to flooding.	Not needed	No adverse features	Not needed.
No adverse features	Seasonal high water table.	No adverse features	No adverse features	Not needed.
Low to moderate strength and stability; moderate to high shrink-swell potential.	Not needed	Low water-holding capacity; slow intake rate.	Low recharge properties	Steep slopes.
Low strength and stability; high shrink-swell potential.	Not needed	Low to moderate water-holding capacity; very slow intake rate.	Low recharge properties	Rock fragments.
Susceptibility to flooding	Very frequent flooding for long periods.	Not needed	Very frequent flooding	Not needed.
No adverse features	Not needed	No adverse features	No adverse features	No adverse features.
Moderate strength and low stability; rapid permeability.	Not needed	Low water-holding capacity; rapid intake rate.	Unstable slopes; rapid permeability.	Not needed; rapid intake rate.

[2] Excavated open pits to intercept and store ground water.

TABLE 6.—*Limitations of soils for residential, industrial, recreational, and related uses*

Soils and map symbols	Foundations for houses	Septic tank filter fields	Campsites, intensive play areas, and picnic areas	Structures for light industries	Trafficways	Gardens
Alapaha (AtA)	Severe: Seasonal high water table; flooding.	Severe: Seasonal high water table; flooding.	Severe: Poor trafficability.	Severe: Seasonal high water table; flooding; high corrosion potential.	Severe: Seasonal high water table; flooding.	Severe: Seasonal high water table; flooding.
Albany: Sand (AdA).	Moderate: Seasonal high water table flooding.	Moderate: Seasonal high water table; nearby water supply may be contaminated.	Moderate: Fair trafficability.	Moderate: Moderate corrosion potential; seasonal high water table.	Moderate: Seasonal high water table; erodible slopes.	Moderate: Seasonal high water table; low water-holding capacity.
Loamy fine sand (AsA)	Moderate: Seasonal high water table.	Severe: Seasonal high water table; flooding.	Moderate: Fair trafficability.	Moderate: Seasonal high water table; moderate corrosion potential; annual flooding.	Moderate: Seasonal high water table; fair traffic-supporting capacity; annual flooding.	Severe: Seasonal high water table; low productivity; annual flooding.
Ardilla (AqA)	Severe: Seasonal high water table; annual flooding.	Severe: Seasonal high water table; annual flooding.	Severe: Poor trafficability.	Severe: Seasonal high water table; annual flooding; moderate corrosion potential.	Severe: Seasonal high water table; annual flooding.	Severe: Seasonal high water table; annual flooding.
Carnegie (CoB2, CoC, CoC2, CkC3, CoD2).	Slight	Moderate: Percolation rate is 45 to 75 minutes per inch.	Slight or moderate: Slight for campsites and intensive play areas where slopes are less than 5 percent, and moderate where slopes are 5 percent or more; numerous pebbles on surface. Slight for picnic areas.	Moderate: Moderate shrink-swell potential; 2 to 12 percent slopes.	Slight	Moderate: Erodibility.
Cowarts (CqB, CqB2, CqC, CqC2).	Slight	Moderate: Percolation rate is 45 to 75 minutes per inch.	Slight or moderate: Slight for campsites and intensive play areas where slopes are less than 5 percent, and moderate where slopes are 5 percent or more; numerous pebbles on surface. Slight for picnic areas.	Moderate: Moderate shrink-swell potential; 2 to 8 percent slopes.	Slight	Moderate: Erodibility.
Dothan (DaA, DaB).	Slight	Slight or moderate: Percolation rate is 45 to 75 minutes per inch.	Slight	Slight	Slight	Slight.
Esto (EnB, EnB2, EnC2, EnD2).	Moderate: High shrink-swell potential; some rock fragments.	Severe: Percolation rate is slower than 75 minutes per inch.	Moderate: 2 to 12 percent slopes; some rock fragments.	Severe: High shrink-swell potential; 2 to 12 percent slopes.	Severe: Poor traffic-supporting capacity.	Severe: Erodibility; some rock fragments; plastic, clayey subsoil.

TABLE 6.—*Limitations of soils for residential, industrial, recreational, and related uses*—Continued

Soils and map symbols	Foundations for houses	Septic tank filter fields	Campsites, intensive play areas, and picnic areas	Structures for light industries	Trafficways	Gardens
Fuquay: Loamy sand (FsA, FsB, FsC).	Slight	Slight	Slight or moderate: Slight for campsites and intensive play areas where slopes are less than 5 percent and moderate where slopes are 5 percent or more. Slight for picnic areas.	Slight	Slight	Slight.
Loamy coarse sand (FqB, FqC).	Slight	Slight	Slight or moderate: Slight for campsites and intensive play areas where slopes are less than 5 percent and moderate where slopes are 5 percent or more. Slight for picnic areas.	Moderate: Moderate shrink-swell potential; 2 to 8 percent slopes.	Moderate: Fair traffic-supporting capacity.	Slight.
Grady (Gra)	Severe: Seasonal high water table; flooding.	Severe: Flooding; percolation rate is slower than 75 minutes per inch.	Severe; Poor trafficability.	Severe: Seasonal high water table; high corrosion potential.	Severe: Seasonal high water table; flooding.	Severe: Seasona high water table; flooding.
Irvington (IjA)	Slight	Severe: Seasonal high water table; percolation rate is slower than 75 minutes per inch.	Slight	Moderate: Seasonal high water table; moderate corrosion potential.	Moderate: Seasonal high water table; fair traffic-supporting capacity.	Slight.
Kershaw (KkC)	Moderate: Unstable material.	Moderate: Poor filtering action; nearby water supply may be contaminated.	Moderate: Unstable material; 2 to 8 percent slopes.	Moderate: Unstable material; 2 to 8 percent slopes.	Severe: Unstable material; fair traffic-supporting capacity.	Severe: Very low productivity; low water-holding capacity.
Leaf and Chastain (Lid).	Severe: Seasonal high water table; flooding; high shrink-swell potential.	Severe: Seasonal high water table; flooding.	Severe: Poor trafficability.	Severe: Seasonal high water table; flooding; high shrink-swell potential.	Severe: Seasonal high water table; flooding; poor traffic-supporting capacity.	Severe: Seasonal high water table; flooding.
Leefield (LsA)	Moderate: Seasonal high water table.	Moderate: Seasonal high water table.	Moderate: Fair trafficability.	Moderate: Seasonal high water table.	Moderate: Seasonal high water table.	Moderate: Seasonal high water table.
Ocilla (OhA)	Moderate: Seasonal high water table.	Severe: Seasonal high water table; nearby water supply may be contaminated.	Moderate: Fair trafficability.	Moderate: Seasonal high water table; moderate corrosion potential.	Moderate: Seasonal high water table; fair traffic-supporting capacity.	Severe: Seasonal high water table; low water-holding capacity.
Ona (ObA)	Moderate: Seasonal high water table.	Severe: Seasonal high water table; nearby water supply may be contaminated.	Moderate: Fair trafficability.	Moderate: Seasonal high water table; moderate corrosion potential.	Moderate: Seasonal high water table; fair traffic-supporting capacity.	Severe: Seasonal high water table; low water-holding capacity.
Osier-Bibb (Obs)	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding.

TABLE 6.—*Limitations of soils for residential, industrial, recreational, and related uses*—Continued

Soils and map symbols	Foundations for houses	Septic tank filter fields	Campsites, intensive play areas, and picnic areas	Structures for light industries	Trafficways	Gardens
Plummer (PeA)	Severe: Seasonal high water table.	Severe: Seasonal high water table.	Severe: Poor trafficability.	Severe: Seasonal high water table; high corrosion potential.	Severe: Seasonal high water table.	Severe: Seasonal high water table.
Rains (RfA)	Severe: Seasonal high water table; flooding.	Severe: Flooding; percolation rate is slower than 75 minutes per inch.	Severe: Poor trafficability.	Severe: Flooding; high corrosion potential.	Severe: Flooding; poor traffic-supporting capacity.	Severe: Flooding.
Stilson (SeA)	Slight	Moderate: Seasonal high water table.	Slight	Moderate: Seasonal high water table; moderate corrosion potential.	Moderate: Seasonal high water table; fair traffic-supporting capacity.	Slight.
Sunsweet (ShC2, ShD2).	Moderate: Moderate to high shrink-swell potential.	Severe: Percolation rate is slower than 75 minutes per inch.	Moderate: Fair trafficability.	Moderate: Moderate to high shrink-swell potential.	Moderate: Fair traffic-supporting capacity.	Moderate: Erodibility.
Susquehanna (SiB, SiC2).	Moderate: High shrink-swell potential; some rock fragments.	Severe: Percolation rate is slower than 75 minutes per inch.	Moderate: Fair trafficability; 2 to 8 percent slopes.	Severe: High shrink-swell potential; 2 to 8 percent slopes.	Severe: Poor traffic-supporting capacity.	Severe: Erodibility; some rock fragments; plastic, clayey subsoil.
Swamp (Swa)	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding.	Severe: Very frequent flooding; high corrosion potential.	Severe: Very frequent flooding.	Severe: Very frequent flooding.
Tifton (TqA, TqB, TqB2, TqC, TqC2).	Slight	Moderate: Percolation rate is 45 to 75 minutes per inch.	Slight or moderate: Slight for campsites and intensive play areas where slopes are less than 5 percent and moderate where slopes are 5 percent or more; numerous pebbles. Slight for picnic areas.	Slight	Slight	Slight.
Troup (TpB, TpC)	Slight	Slight: Nearby water supply may be contaminated.	Moderate: Fair trafficability; 2 to 8 percent slopes.	Slight or moderate: Moderate for slopes of 5 to 8 percent.	Slight or moderate: Moderate for slopes of 5 to 8 percent.	Severe: Low productivity; low water-holding capacity.

Engineering classification systems

In this soil survey, the soils are classified according to the systems used by the American Association of State Highway Officials (AASHO) (*2*), the Corps of Engineers, U.S. Army (Unified) (*9*), and the U.S. Department of Agriculture (USDA) (*7*).

Most highway engineers classify soil material according to the AASHO system. In this system the soil material is classified in seven principal groups. Groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil subgroup symbol, for example, A–6 (7).

Some engineers prefer the Unified system. In this system soil materials are classified according to their texture and plasticity and are grouped according to their performance as engineering construction material. Soil material is identified as coarse grained (eight classes), fine grained (six classes), or highly organic (one class).

The USDA system of classifying soil texture is used mainly by agricultural scientists, but it is also useful to engineers. In this system, the textural class of a soil is estimated on the basis of proportions of sand, silt, and clay. 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 "very fine," "fine," "coarse," or "very coarse".

Soil test data

Soil samples from the principal soil types of three extensive soil series that were recognized in Ben Hill and Irwin Counties were tested in accordance with standard procedures so that the soil material could be evaluated for engineering purposes. The results of these tests are reported in table 3. Each soil series was sampled at three locations so that an approximation of the range of characteristics for the series could be obtained. The modal profiles are typical, and the coarser textured and finer textured profiles show significant variations. These variations, however, probably are not the maximum variations for the series. Because the samples were obtained at a depth of 6 feet or less, the test data may not be adequate for estimating the characteristics of soil material in deep cuts.

In the moisture-density test, soil material was compacted in a mold several times with a constant compaction effort, each time at a successively higher moisture content. The density, or unit weight, of the soil material increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed maximum dry density. Data showing moisture density are important in earthwork for, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum content.

The data on volume change indicate the amount of shrinking and swelling that is obtained from samples prepared at optimum moisture content and then subjected to drying and wetting. The total change that can occur in a specified soil is the sum of the values given for shrinking and for swelling.

The test for liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid state to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Engineering properties of soils

Table 4 gives soil characteristics that are significant to engineering. These estimates are for a typical profile, which is divided into layers significant to engineering. Estimates were based on test data for those soils tested in the two counties. For the soils not tested in these counties, estimates were based on test data obtained from similar soils in other counties and on past experience in engineering construction.

Depth to a seasonally high water table is based on field observations. Soils that have a high water table are limited in their use for highways and other construction.

Permeability of the soil layers, in inches of water percolation per hour, was estimated for the soil in place. These estimates were based on the texture, structure, and porosity of the soils and on field observations.

Available water capacity, in inches per inch of soil depth, is the approximate amount of water in a soil that is wet to field capacity, minus the amount at the permanent wilting point of plants. When the soil is air dry, this amount of water will wet the soil material to a depth of 1 inch without deeper percolation.

Shrink-swell potential is rated according to the expected volume change of the soil material when its moisture content changes. It is estimated primarily on the basis of the amount and type of clay in the soil layers and is rated as *low*, *moderate*, and *high* in table 4. In general, soils classified CH and A–7 have a high shrink-swell potential. Clean sands and gravels (single grain) and soils containing a small amount of nonplastic to slightly plastic soil material have a low shrink-swell potential.

Engineering interpretations of soils

Engineering interpretations of the soils in Ben Hill and Irwin Counties are given in table 5. This table rates the suitability of soils as a source for highway construction materials. It also lists features that adversely affect the location of highways and the construction of farm ponds, drainage systems, sprinkler irrigation systems, excavated irrigation pits, and terraces and diversions. These interpretations are made on the basis of estimates given in table 4, on test data shown in table 3, and on observations of soils in the field.

A rating of *good*, *fair*, or *poor* is given to show suitability of soil material as a source of topsoil and road fill. Topsoil is soil material that is suitable for topdressing slopes, road shoulders, and other earth structures that require a plant cover for protection. In table 5, the ratings are only for the surface soil. The suitability of a soil for road fill depends largely on its texture, moisture content, and location. Normally wet, plastic clay is rated poor for road fill, and sand is rated poor or fair, depending on its location. Sand is difficult to compact and needs close control of moisture during compaction.

The suitability of the soils in these two counties as a source of sand is not given in table 5, though several of the soils are classified as sand. These soils have poor gradation and contain material that is not suitable for use in concrete structures or as filter material. Some of these soils, however, are suitable as a source of material that can be used in subbase of pavements. An engineer can determine the suitability of the soils as a source of sand for subbase material by referring to tables 3 and 4.

The selection of highway locations is affected by susceptibility to seepage and flooding, a seasonally high water table, depth to bedrock, and other factors that affect construction.

The reservoir areas of farm ponds are adversely affected by rapid permeability, seepage, and flooding. Material that has low strength and stability and high shrink-swell potential is not well suited for use in embankment.

Soil features affecting agricultural drainage are a seasonally high water table, permeability, susceptibility to flooding, and availability of outlets.

Some of the features considered in evaluating a soil for irrigation purposes are rate of water intake, water-holding capacity, and productivity.

Slope, susceptibility to flooding, and permeability are some of the features that affect the suitability of a soil

for excavation for open pits used to intercept and store ground water.

Slope, depth to rock, and rate of water intake are considered when determining the suitability of a soil for terraces and diversions.

Major nonfarm uses of soils

In table 6, the soils of Ben Hill and Irwin Counties are given a rating of slight, moderate, or severe according to the degree of their limitations when used as foundations for houses; septic tank filter fields; campsites, intensive play areas, and picnic areas; sites for light industries; trafficways; and gardens. If the rating is moderate or severe, the main limitation or limitations are given. The ratings can be helpful in selecting sites and in planning community developments if they are used with the soil map at the back of this survey. Also helpful are engineering tables 4 and 5. None of the tables, however, eliminate the need for an investigation at the site of the planned development. The community facilities and their limitations are described in the following paragraphs.

FOUNDATIONS FOR HOUSES.—In Ben Hill and Irwin Counties, the main features that limit the use of soils as foundations for houses are a high water table, flooding, and shrink-swell potential. The ratings in table 6 are for houses of three stories or less.

SEPTIC TANK FILTER FIELDS.—In these counties, the major features that limit the use of soils for septic tank filter fields are a high water table, flooding, and a slow rate of percolation.

CAMPSITES, INTENSIVE PLAY AREAS, AND PICNIC AREAS.—Without much site preparation, campsites should be suitable for tents and for outdoor living for a period of at least one week. Intensive play areas are subject to much foot traffic and generally require a nearly level, firm surface and good drainage. Also, they should be free of rock and rock outcrop. Examples are playgrounds, baseball diamonds, and tennis courts. Slope, trafficability, and erodibility are considered in rating limitations of soils used for campsites, intensive play areas, and picnic areas. Trafficability refers to the difficulty or ease with which people can move about on foot, on horseback, or in a small vehicle such as a golfcart. In intensive play areas, rock fragments and the depth to hard rock are important.

STRUCTURES FOR LIGHT INDUSTRY.—These are structures not more than three stories high. They are used for stores, offices, and small buildings in areas where facilities for disposing of sewage are available. The properties considered in rating limitations are slope, depth to water table, hazard of flooding, shrink-swell potential, and corrosion potential.

TRAFFICWAYS.—This term refers to low cost roads and streets that can be built without much cutting, filling, and preparation of subgrade. The properties important in rating the limitations of the soils if used as trafficways are slope, depth to the water table, hazard of flooding, erodibility, and traffic-supporting capacity. Traffic-supporting capacity is the ability of an undisturbed soil to support moving loads.

GARDENS.—Gardens include vegetable and flower gardens around the home. Features that limit use of soils for gardens are productivity, depth to the water table, likelihood of flooding, erodibility, droughtiness, tilth, and presence of rock fragments.

Formation, Morphology, and Classification of Soils

This section lists the factors of soil formation and discusses the effect these factors have had on the soils of Ben Hill and Irwin Counties. It also explains the current system of soil classification and places the soil series in higher categories. The soil series in the two counties, including a profile representative of the series, are described in the section "Descriptions of the Soils."

Formation and Morphology of Soils

Soils are formed by processes of the environment acting upon soil materials that are deposited or accumulated by geologic agencies. The characteristics of a soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material accumulated and has existed since it accumulated; (3) the relief or lay of the land, which influences drainage; (4) the plants and animals in and on the soil; and (5) the length of time these processes have acted on the soil material. All of these factors have influenced the formation of each soil in Ben Hill and Irwin Counties and throughout the world.

The relative importance of each factor differs from place to place. In some areas one factor may be more important than the other and in a few places one factor may dominate in the formation of a soil and determine most of its properties, as is common when the parent material consists of pure quartz sand. Quartz sand is highly resistant to weathering, and the soils formed in it generally have faint horizons. Even in quartz sand, however, a distinct profile can form under certain kinds of vegetation if the topography is low and flat and the water table is high.

Parent material

Parent material is the unconsolidated mass from which soils develop. It is largely responsible for the chemical and mineralogical composition of the soils. In Ben Hill and Irwin Counties the parent material of most soils is sedimentary and consists of unconsolidated, fragmentary rock material that has been deposited by water. The texture of the material ranges from coarse sand to fine clay.

The Kershaw, Troup, and Plummer soils formed in thick beds of sand. Because the Troup and Kershaw soils consist mostly of highly resistant quartz sand, they do not have clay-enriched horizons. The Tifton, Dothan, Irvington, Cowarts, Stilson, Leefield, and Alapaha soils developed in beds of sandy clay loam that contain plinthite. All of these soils have well-developed, clay-enriched horizons.

The Esto, Susquehanna, and Sunsweet soils developed in deposits of sandy clay and clay. The Esto and Susquehanna soils have a subsoil of clay, sandy clay, or sandy clay loam that does not permit much movement of water and air through it. This small movement of air and water slows the soil-forming processes in these soils and they have slow permeability and a B horizon that is highly mottled except for a thin layer just below the surface.

The Ardilla and Rains soils formed on stream terraces of the Central Coastal Plain in deposits of sandy clay loam, and the Albany soils formed on similar terraces in deposits of sand and loamy sand. The material from which

the Ardilla, Rains, and Albany soils formed is chiefly of Coastal Plain origin. Most of it washed from sandy clays and clays of the uplands, but some washed from soils having a more sandy texture.

The Ona soils formed in moderately thick deposits of sand in areas where the water table is relatively high. The organic horizon below the surface layer is an important characteristic of these soils.

The Leaf and Chastain soils are on the flood plains of the Ocmulgee River. Their parent material is alluvium that consists mostly of fine sediments that were carried in suspension and then deposited by the high floodwaters of the river. This alluvium came chiefly from soils of the Piedmont Plateau.

Climate

Climate, primarily through the influence of rainfall and temperature, affects the physical and chemical weathering and the biological forces that work on the soil material. The climate in Ben Hill and Irwin Counties is warm and humid. The average annual temperature is about 65° F., and the average annual rainfall is about 46 inches per year. Winters are mild, and only occasionally are the soils frozen to a depth of as much as 2 or 3 inches. Because of the generally warm, moist climate, chemical and biological reactions are rapid. The soils are highly leached by the water from the abundant rainfall and are low in organic-matter content. Because calcium, magnesium, and other basic elements are replaced by hydrogen, the soils are acid. Hydrogen is the dominant cation in the soils of the two counties. Because of the translocation of bases and other soluble material and of colloidal matter and other less soluble material, the soils of the two counties have a more sandy surface layer and are less fertile than they formerly were.

Relief

Relief is the intrenchment of the drainage pattern into the land surface. The other soil-forming processes are affected by relief through its affect on drainage, runoff, erosion, and percolation of water through the soils.

Relief affects the amount of moisture and air in the soils. Water tends to run off the moderately steep soils faster than it penetrates them, and these soils generally are well drained to excessively drained. They are wet only during and immediately after rains.

Runoff water collects in low areas and reduces the biotic activity in the soils. On many gently sloping, bare soils that have a large amount of runoff, the soil material is removed faster than it is deposited, and the soils are shallow or poorly developed. The degree of profile development that takes place within a given time, in a given parent material, and under the same kind of vegetation seems to depend largely on the amount of water that passes through the soils (*3*).

In Ben Hill and Irwin Counties the soils range from nearly level to strongly sloping. The influence of relief on some of the soils is reflected in their degree of development. For example, the Susquehanna, Esto, and Sunsweet soils have slopes ranging from 2 to 12 percent, and they have a slowly permeable subsoil that restricts the movement of water and slows the growth of plants. Much of the rainfall runs off of the more strongly sloping areas, and in these areas geologic erosion removes the soil material almost as fast as it forms.

Plant and animal life

Plants, micro-organisms, earthworms, insects, and other forms of life that live on and in the soil are active in the soil-forming processes. Plants and animals return organic matter to the soils and are responsible for supplying most of the organic matter. They transfer plant nutrients and soil material from one horizon to another. Gains and losses in organic nitrogen and plant nutrients and the changes in porosity and structure may be the result of the activities of plants and animals. Although the general effects are well known, the specific influence of various species or groups of related species in the formation of any one soil is not known. Animals act on plant remains and help to convert them into organic matter.

Most of the soils of Ben Hill and Irwin Counties are sandy and contain little organic matter. In wooded areas, however, the soils have a thin cover of leaf mold and a small amount of organic matter in the uppermost 1 to 3 inches of mineral soil. The dark-gray color of the uppermost few inches of soil material is chiefly caused by stains of organic matter on the sand grains rather than by appreciable amounts of organic matter.

Generally, the kind of soil in an area varies according to the kind of vegetation. In these two counties the soils formed under three broad types of vegetation: (1) longleaf pine and scattered hardwoods, and an understory of wiregrass; (2) cypress-swamp hardwood forest in which there were scattered pines and an understory of gallberry, other shrubs, and grasses that tolerate water; and (3) scrub oaks and scattered longleaf pine.

The poorly drained, mineral soils formed under a cypress-swamp hardwood forest in which there were scattered pines and an understory of gallberry and other water-tolerant shrubs and grasses. These soils have a dark-gray or black surface layer, and the organic-matter content of the upper 3 inches of soil material is 3 to 6 percent.

The native vegetation on the well-drained soils consisted mainly of longleaf pine mixed with some hardwoods. The understory was wiregrass. This kind of vegetation slowed runoff. As a result, little water ran off, and much of it penetrated the relatively permeable parent material.

Man has changed the direction and rate of development of soils by clearing the forests, cultivating the soils, and introducing new kinds of plants. Few results of these activities can be seen, but studies show that the organic matter in soils is sharply reduced after fields are cultivated for a few months. In most of the sloping areas under cultivation, the somewhat coarse textured, eluviated layer is lost through accelerated erosion. Although some results probably will not be evident for many centuries, the complex of living organisms affecting the formation of soils in Ben Hill and Irwin Counties has been drastically changed as a result of man's activity.

Time

The length of time required for a well-developed profile to form in a soil depends on the degree that the other factors affect soil formation. Less time is generally required for a profile to develop in a warm, humid climate than is required in a cold, dry climate because moisture and a warm temperature accelerate the chemical and biological

activity in the soil material. Also, less time is required for the formation of a distinct profile in moderately permeable soil material than in slowly permeable material. If time is sufficient, the soil is modified so that genetic horizons of an A, B, C sequence are formed.

In Ben Hill and Irwin Counties the soils that formed in alluvium along the first bottoms of streams lack well-defined, genetically related horizons because the soil material has not been in place long enough for a well-defined profile to form. The Bibb and Osier are examples of soils formed on the first bottoms along streams. The Susquehanna, Esto, and Sunsweet soils have been in place long enough for the development of a well-defined profile, but their profile is not so well developed as some other soils in the county. Profile development is somewhat retarded by slowly permeable parent material and lack of much movement of water in the profile. The Tifton and Dothan soils, on the other hand, have a well-developed profile. They have been in place a long time, and their subsoil is moderately permeable. Because water easily reaches the parent material, a well-developed profile has formed. The Tifton and Dothan soils are about the same age.

Classification of Soils

Classification consists of an orderly grouping of defined kinds of soils into classes in a system designed to make it easier to remember soils and their characteristics and interrelationships. Classification also helps to organize and apply the results of experience and research to areas ranging in size from plots of several acres to large bodies of millions of square miles. The defined kinds of soils are placed in narrow classes for use in detailed soil surveys and for application of knowledge within farms and fields. The large number of narrow classes are then grouped in progressively fewer and broader classes in higher categories so that information can be applied to large areas, such as countries and continents.

The current system of classifying soils was adopted for general use by the National Cooperative Soil Survey in 1965. This system is under continual study. Therefore, readers interested in developments of this system should search the latest literature available (*4, 6*).

New soil series must be established and concepts of some established series, especially older ones that have been used little in recent years, must be revised in the course of the soil survey program across the country. A proposed new series has tentative status until review of the series concept at National, State, and regional level of responsibility for soil classification results in a judgment that the new series should be established. Most of the soil series described in this publication have been established earlier. Eight of the soil series used in this survey had tentative status when the survey was sent to the printer. They are the Albany, Ardilla, Cowarts, Dothan, Leefield, Osier, Stilson, and Troup series.

In table 7, the soil series of Ben Hill and Irwin Counties are placed into some of the classes of the current system.

The classes in the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic grouping of soils. Two exceptions are Entisols and Histosols, which occur in many different climates.

Table 7 shows the five soil orders recognized in Ben Hill and Irwin Counties. They are Entisols, Inceptisols, Spodosols, Alfisols, and Ultisols. Entisols are recent mineral

TABLE 7.—*Soil series classified according to the current system of classification* [1]

Series	Family	Subgroup	Order
Alapaha	Loamy, siliceous, thermic	Arenic Plinthic Ochraquults	Ultisols.
Albany	Loamy, siliceous, thermic	Aquic Grossarenic Paleudults	Ultisols.
Ardilla	Fine-loamy, siliceous, thermic	Plinthaquic Paleudults	Ultisols.
Bibb	Coarse-loamy, siliceous, acid, thermic	Typic Haplaquents	Entisols.
Carnegie	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Chastain	Fine, mixed, acid, thermic	Fluventic Haplaquepts	Inceptisols.
Cowarts	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Dothan	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Esto	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.
Fuquay	Loamy, siliceous, thermic	Arenic Plinthic Paleudults	Ultisols.
Grady	Clayey, kaolinitic, thermic	Typic Ochraquults	Ultisols.
Irvington	Fine-loamy, siliceous, thermic	Plinthic Ochreptic Fragiudults	Utlisols.
Kershaw	Siliceous, thermic, uncoated	Typic Quartzipsamments	Entisols.
Leaf	Clayey, mixed, thermic	Typic Ochraquults	Ultisols.
Leefield	Loamy, siliceous, thermic	Arenic Plinthaquic Paleudults	Ultisols.
Ocilla	Loamy, siliceous, thermic	Aquic Arenic Paleudults	Ultisols.
Ona	Sandy, siliceous, hyperthermic	Aeric Haplaquods	Spodosols.
Osier	Siliceous, thermic	Typic Psammaquents	Entisols.
Plummer	Loamy, siliceous, thermic	Grossarenic Ochraquults	Ultisols.
Rains	Fine-loamy, siliceous, thermic	Typic Ochraquults	Ultisols.
Stilson	Loamy, siliceous, thermic	Arenic Plinthic Paleudults	Ultisols.
Sunsweet	Clayey, kaolinitic, thermic	Plinthic Paleudults	Ultisols.
Susquehanna	Fine, montmorillonitic, thermic	Vertic Paleudalfs	Alfisols.
Tifton	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Troup	Loamy, siliceous, thermic	Grossarenic Paleudults	Ultisols.

[1] Placement of some series in the current system of classification, particularly in families, may change as more precise information becomes available.

soils that do not have genetic diagnostic horizons or have only the beginning of such horizons. Inceptisols are mineral soils in which genetic horizons have started to develop. They generally form on young but not recent land surfaces. Spodosols are mineral soils that have a spodic horizon, or that have a thin horizon cemented by iron that overlies a fragipan and that meets all requirements of a spodic horizon except thickness.

Alfisols are mineral soils that have an illuvial horizon in which significant amounts of clay minerals have accumulated and in which base saturation is more than 35 percent at a depth of 50 inches below the top of the clay enriched horizon.

Ultisols are mineral soils that have a clay-enriched B horizon that has a base saturation of less than 35 percent at a depth of 50 inches below the top of the clay-enriched horizon. Mineral soils are also Ultisols if they have a fragipan in a clay-enriched horizon that has a base saturation of less than 35 percent at a depth of 30 inches below the top of the pan.

SUBORDER: Each order is subdivided into suborders, primarily on the basis of those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation.

GREAT GROUP: Soil suborders are separated into great groups according to the presence or absence of genetic horizons and the arrangement of these horizons. The horizons used to make separations are those in which clay, iron, or humus have accumulated or those that have pans that interfere with the growth of roots or the movement of water. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like. The great group is not shown separately in table 7, because it is the last word in the name of the subgroup.

SUBGROUP: Great groups are subdivided into subgroups, one representing the central (typic) segment of a group, and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Psammaquents.

FAMILY: Families are separated within a subgroup primarily on the basis of properties important to the growth of plants or to the behavior of soils where used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. An example is the fine-loamy, siliceous, thermic family.

General Nature of the Area

This section describes the social and industrial development, the climate, and the agriculture of Ben Hill and Irwin Counties. The figures for population and the statistics on agriculture are from reports of the U.S. Bureau of the Census.

Social and Industrial Development

Irwin County, originally much larger than it is today, took its present form in the period 1850–1906, when parts or all of 22 counties were created from it. The county was part of the territory originally occupied by the Creek Indians. The first settlers came mainly from North Carolina, South Carolina, and Virginia; a few came from older settlements in Georgia.

Ben Hill County was created from parts of Irwin and Wilcox Counties in 1906. Most of the early settlers came from Michigan, Indiana, Illinois, and Ohio.

The population of Irwin County was 10,464 in 1910, and 9,211 in 1960. Ocilla, the county seat, had a population of 3,217 in 1960. The population of Ben Hill County increased from 11,865 in 1910 to 13,633 in 1960. Fitzgerald, the county seat, had a population of 8,781 in 1960.

In Ben Hill and Irwin Counties, most of the water for domestic, industrial, and farm use is obtained from drilled wells 30 to 60 feet deep and from drilled artesian wells 400 to 750 feet deep. There are a few free-flowing artesian wells along the Ocmulgee River in Ben Hill County. Many streams and drainageways occur throughout both counties, but in most of them, water flows only in wet weather. More than 500 farm ponds furnish water for irrigation, livestock, and fishing.

Ben Hill and Irwin Counties have high schools and elementary schools. Schoolbuses transport the children to and from school. Hospitals and public libraries are in Fitzgerald and Ocilla. Many churches are in the towns and scattered throughout the two counties.

Recreational facilities are available at Lake Beatrice, Crystal Lake, and Red Bluff. The many farm ponds and the Ocmulgee, Alapaha, Willacoochee, and Satilla Rivers provide fishing, boating, and swimming.

Although Ben Hill and Irwin Counties are chiefly agricultural, industries at Fitzgerald and Ocilla employ many people. Many people who live on farms work in industries part time. Among the industries in the two counties are a textile mill, five garment factories, three feed mills, several cotton gins, two peanut-processing plants, two fertilizer plants, a steel company, and two trailer plants. In addition, four large lumber mills and several portable sawmills operate in the counties. In addition to supplying lumber, pine poles are treated at these mills and are used for fence posts. Raw gum and pulpwood are shipped out of the counties so that they can be converted into finished products.

Major highways serving Ben Hill and Irwin Counties are U.S. Highways, Nos. 129 and 319, and State Routes 32, 90, 107, 125, 158, 182, 206, 215, and 233. Many hard-surfaced roads connect farms with markets in the counties. The two counties are served by several railroad lines.

Markets are available in Fitzgerald and Ocilla for corn, cotton, peanuts, small grain, and livestock. Tobacco and vegetables and other truck crops are sold to local markets and the markets in adjoining counties.

Climate [7]

The climate of Ben Hill and Irwin Counties is determined mainly by latitude and the nearness of the Gulf of Mexico and the Atlantic Ocean. Data on temperature and precipitation for the two counties are given in table 8. Tables 9, 10, and 11 provide additional data on the amount and distribution of rainfall. The probabilities of the last freezing temperatures in spring and the first in fall are given in table 12.

In the two counties, summers are hot and humid and winters are mild and generally short. During most years, rainfall is adequate for the growth of crops. Rainfall is greatest in midsummer and lowest in fall, but it is fairly well distributed throughout the rest of the year.

A temperature of 90° F. or higher can be expected on 95 days during a normal summer. About three-fourths of these days are in June, July, and August. The temperature rises to 100° or higher in two summers out of three. Nights are usually comfortable in summer, for after sundown the temperature drops to the low seventies or below. Through June, July, and August, the average minimum temperature is between 70 and 71° and the mean temperature is slightly more than 80°.

Winters are usually mild in the two counties. Freezing weather occurs on only 23 days in an average winter, and temperatures of 20° or below can be expected on only about two or three mornings. Spells of cold weather usually last for only a few days. The minimum average temperature for the coldest month is above 40°. During the day temperature is generally well above freezing, even in the coldest periods. The average maximum temperature for the three coldest months is above 63°. Low temperatures prevent normal outside activities in only a few days.

Spring and fall are usually mild and short. Spring is slightly cooler and much wetter than fall. Abrupt changes in the weather and stormy periods can be expected in spring, but fall customarily has long periods of mild, sunny weather.

[7] By HORACE S. CARTER, State climatologist, U.S. Weather Bureau, Athens, Ga.

TABLE 8.—*Temperature and precipitation data for Ben Hill and Irwin Counties*

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	2 years in 10 will have at least 4 days with—		Average	1 year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	°F.	°F.	°F.	°F.	Inches	Inches	Inches
January	63.2	40.9	77	25	3.32	1.2	5.4
February	65.5	43.0	79	28	3.90	1.2	7.2
March	71.9	48.2	84	33	4.54	1.9	8.7
April	79.1	55.0	88	41	4.34	1.0	6.8
May	87.1	63.0	96	53	3.22	1.0	5.6
June	91.9	69.3	99	63	3.70	1.9	6.7
July	92.5	71.1	99	68	5.53	1.9	8.1
August	92.2	70.9	98	66	5.16	3.0	8.1
September	87.5	66.5	95	57	3.97	1.3	6.8
October	79.7	55.6	89	42	2.14	.1	5.3
November	70.2	46.2	82	31	2.32	.6	5.6
December	62.2	40.3	75	26	3.70	1.4	7.0
Year	78.6	55.8	[1] 100	[1] 22	45.84	37.1	58.9

[1] The extreme temperature that will be equaled or exceeded on at least 4 days in 2 years out of 10.

TABLE 9.—*Average number of days per year (by months) with rainfall equal to or greater than the stated amounts*

[Period of record, 1955 through 1964]

Rainfall equal to or greater than—	Average number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Inches													
0.10	7	7	7	5	6	7	9	8	5	4	4	5	74
0.25	5	5	5	4	4	5	6	4	4	3	2	4	51
0.50	3	3	3	3	2	3	4	3	2	2	1	2	31

TABLE 10.—*Total number of days (by months), in 10-year period, with rainfall equal to or greater than the stated amounts*

[Period of record 1955 through 1964]

Rainfall equal to or greater than—	Total number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Inches													
1.00	11	12	8	16	7	12	13	15	14	7	5	5	125
2.00	3	5	2	4	2	3	4	4	6	1	0	2	36
3.00	0	1	1	2	0	1	1	2	3	0	0	1	12
4.00	0	0	0	0	0	0	0	0	1	0	0	0	1

TABLE 11.—*Total number of 2-week, 4-week, and 6-week periods in 10 years with no day having 0.25 inch*[1] *or more of precipitation*

Periods equal to or greater than—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	10-year period
2 weeks	1	4	5	7	7	5	4	5	10	10	9	6	73
4 weeks	1	0	1	1	3	0	0	0	1	2	5	1	15
6 weeks	1	0	0	0	1	0	0	0	0	1	1	0	4

[1] Dry periods are counted in the months having the most days in the period.

TABLE 12.—*Probabilities of the last freezing temperatures in spring and the first in fall*

Probability	Dates for given probability at temperatures of—		
	24° F.	28° F.	32° F.
Spring:			
1 year in 10 later than	March 3	March 5	April 1
2 years in 10 later than	February 26	March 1	March 20
5 years in 10 later than	January 22	February 13	February 28
Fall:			
1 year in 10 earlier than	November 21	November 15	October 30
2 years in 10 earlier than	November 30	November 24	November 4
5 years in 10 earlier than	December 16	December 2	November 20

In Ben Hill and Irwin Counties the growing season, or frost-free period, is about 260 days. The last temperature of 32° in spring usually occurs late in February or early in March, and the first temperature of 32° usually occurs about November 20. The last freeze in spring has occurred as early as January 20 and as late as April 16. Dates of the first freeze in fall range from October 21 to December 15.

Because the growing season in the two counties lasts a long time, corn, cotton, peanuts, tobacco, and truck crops can be planted late and still have plenty of time to mature. Because winters are mild, oats, rye, and other small grain can be sown in fall. If a small grain is seeded early, it provides grazing during winter, but the grain usually grows slowly from December through February.

Average annual precipitation is between 45 and 46 inches, but variations in precipitation are considerable from year to year. Annual precipitation was only 23.87 inches in 1954, but it was 68.52 in 1947. About half of the years have between 40 and 50 inches of rain.

Summer is the wettest season, and fall is the driest. July and August each have an average of more than 5 inches of rainfall. Average rainfall for October and November is slightly more than 2 inches. Most of the rainfall in summer comes in local showers. These showers are mostly in the afternoon. They are short, though at times very intense. The heaviest showers cause considerable erosion, especially early in summer when cultivated fields have little plant cover. Storms that originate in the Gulf of Mexico move northeastward over the two counties and are accompanied by rain that covers large areas and lasts for several hours.

Thunderstorms occur on about 60 days each year. In some of the more intense storms, wind and hail damage

small areas. Only six tornadoes have been reported in the two counties. Measurable snowfall is infrequent.

The average relative humidity is between 83 and 90 percent in the morning and between 50 and 60 percent early in the afternoon. Generally, humidity is lowest in spring and highest in summer and fall. Variations in the speed of wind are considerable, but monthly averages are between 5 and 10 miles per hour. Generally, windspeed is highest in spring and lowest late in summer and early in fall.

Agriculture

Most of the soils of Ben Hill and Irwin Counties are well suited to farming. In 1964, 71.5 percent, or 116,631 acres, of Ben Hill County was farmland, and 74.3 percent, or 176,795 acres, of Irwin County was farmland.

In both Ben Hill and Irwin Counties, the number of farm units has decreased, but the average size of farms has increased. The census of agriculture shows that in 1954, there were 654 farms in Ben Hill County and that the average size was 222.5 acres. The number of farms had decreased to 534 in 1964, but the average size had increased to 218.4 acres. In 1954, there were 1,308 farms in Irwin County, and they averaged 145.1 acres in size. The number of farms had decreased to 756 in 1964, but the average size had increased to 233.9 acres.

In Irwin County farms are mostly of the general type. In Ben Hill County farms used for crops, other than vegetables, fruits, and nuts, are more numerous than are general farms. Common in both counties are tobacco farms and livestock farms other than poultry farms or dairy farms.

In 1964, corn was the most extensive crop in Ben Hill and Irwin Counties. In both counties, the total area in corn was 45,550 acres. From 1954 to 1964, the area in corn decreased from 34,655 to 33,887 acres in Irwin County and from 13,971 to 11,663 acres in Ben Hill County. In the same period, the area planted to oats decreased from 950 to 51 acres in Ben Hill County and from 1,425 to 128 acres in Irwin County. From 1954 to 1964, the area planted to vegetables harvested for sale decreased from 3,116 to 524 acres in Irwin County and from 491 to 63 acres in Ben Hill County. In Irwin County, improved pecan trees of bearing age totaled 9,018 in 1954 and 10,222 in 1964, and peach trees totaled 326 in 1954 and 1,492 in 1964. In Ben Hill County from 1954 to 1964, the number of peach trees of bearing age increased from 168 to 5,422, and improved pecan trees of bearing age decreased from 12,293 to 10,927.

In both counties, cropland and woodland used for pasture decreased in the period 1954–64. The acreage in improved pasture consisting of Coastal bermudagrass and bahiagrass has increased in both counties. Pasture that was not cropland or woodland amounted to 11,307 acres in 1954 and to 14,361 acres in 1964. Many of the soils in the two counties are well suited to sprinkler irrigation. The area under irrigation has increased from 350 acres in 1954 to 2,089 acres in 1964. Most of the irrigated land is used for growing tobacco.

Literature Cited

(1) ABERCROMBIE, W. F.
1954. A SYSTEM OF SOIL CLASSIFICATION. Highway Res. Bd. Proc. Pub. 324, pp. 504–514, illus.

(2) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus. Washington, D.C.

(3) BALDWIN, MARK, KELLOGG, CHARLES E., and THORP, JAMES.
1938. SOIL CLASSIFICATION. U.S. Dept. of Agr. Ybk.: 978–1001, illus.

(4) SIMONSON, ROY W.
1962. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(5) UNITED STATES DEPARTMENT OF AGRICULTURE.
1960. MANAGEMENT AND INVENTORY OF SOUTHERN HARDWOODS. U.S. Dept. of Agr. Handb. No. 181, 102 pp., illus.

(6) ———
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH. APPROXIMATION. 265 pp., illus. [Supplement issued in March 1967]

(7) ———
1951. SOIL SURVEY MANUAL. U.S. Dept. of Agr. Handb. No. 18, 503 pp., illus.

(8) ———
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Publ. 50, 202 pp. Washington, D.C. [Now out of print.]

(9) WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS.
1953. UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. 3–357, 2 v. and app., illus.

Glossary

Acidity, soil. See Reaction, soil.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The capacity of a soil to hold water in a form available to plants. The difference between the amount of water held in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

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; soil does not hold together in a mass.

Friable.—When moist, soil crushes easily under gentle pressure between thumb and forefinger, and can be pressed together into a lump.

Firm.—When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, soil is 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, soil adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, soil is moderately resistant to pressure and is difficult to break between the thumb and forefinger.

Soft.—When dry, soil breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; soil is little affected by moistening.

Drainage, soil. The rapidity and extent of the removal of water from the soil, in relation to additions, especially by surface runoff, or by flow through the soil to underground spaces, or by a combination of both processes.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A dense, brittle, subsurface horizon that is very low in organic matter and clay but rich in silt or very fine sand. The layer seems to be cemented when it is dry, is hard or very hard, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottles caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active, and it is therefore marked by the accumulations of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon; the B horizon also has (1) distinctive characteristics caused by accumulation of clay, sesquioxides, humus, or some combination of these; (2) prismatic or blocky structure; (3) redder or stronger colors than the A horizon; or (4) some combination of these. The combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter, C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B 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 materials from soils or other material by percolating water.

Morphology, soil. The makeup of the soil, including the texture, structure, consistence, color, and other physical, mineralogical, and biological properties of the various horizons of the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of 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 these: *Fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 designates a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material, soil. The disintegrated and partly weathered rock from which soil has formed.

Percolation. The downward movement of water through the soil. The rate of percolation is expressed in minutes per inch of soil.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other dilutents that commonly shows as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to a hardpan or to irregular aggregates on repeated wetting and drying, or it is the hardened relicts of the soft, red mottles. It is a form of the material that has been called laterite.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values and in words as follows:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. The water that flows off the land surface.

Sand. As a soil separate, individual rock or mineral fragments 0.05 to 2.0 millimeters in diameter. Most sand grains consist of quartz, but they may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Silt. As a soil separate, individual mineral particles in a soil 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 textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Solum, soil. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes 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 other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of unequal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *angular blocky* (prisms with sharp corners), *subangular blocky* (prisms with mostly rounded corners), *granular* (granules relatively nonporous), and *crumb* (similar to granular but very porous). *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; commonly that part of the profile below plow depth.

Substratum. Any layer beneath the solum, or true soil; the C or R horizon.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportions 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."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

[For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs.

[See table 1, page 9, for approximate acreage and proportionate extent of the soils and table 2, page 38, for estimated productivity ratings of each soil. For information significant to engineering see subsection beginning on page 43]

Map symbol	Mapping unit	Page	Capability unit		Woodland suitability group		Wildlife suitability group	
			Symbol	Page	Number	Page	Number	Page
AdA	Albany sand	10	IIIw-1	33	6	41	3	43
AqA	Ardilla loamy sand, 0 to 2 percent slopes	11	IIw-2	31	2	40	3	43
AsA	Albany loamy fine sand, 0 to 2 percent slopes	10	IIIw-1	33	6	41	3	43
AtA	Alapaha loamy sand, 0 to 3 percent slopes	8	IVw-4	35	4	41	5	43
CkC3	Carnegie sandy clay loam, 5 to 8 percent slopes, severely eroded	12	IVe-4	34	1	40	4	43
CoB2	Carnegie sandy loam, 2 to 5 percent slopes, eroded	12	IIe-4	31	1	40	1	42
CoC	Carnegie sandy loam, 5 to 8 percent slopes	12	IIIe-4	32	1	40	1	42
CoC2	Carnegie sandy loam, 5 to 8 percent slopes, eroded	12	IIIe-4	32	1	40	1	42
CoD2	Carnegie sandy loam, 8 to 12 percent slopes, eroded	12	IVe-2	34	1	40	4	43
CqB	Cowarts loamy sand, 2 to 5 percent slopes	14	IIIe-4	32	1	40	1	42
CqB2	Cowarts loamy sand, 2 to 5 percent slopes, eroded	14	IIIe-4	32	1	40	1	42
CqC	Cowarts loamy sand, 5 to 8 percent slopes	14	IIIe-4	32	1	40	1	42
CqC2	Cowarts loamy sand, 5 to 8 percent slopes, eroded	14	IVe-4	34	1	40	1	42
DaA	Dothan loamy sand, 0 to 2 percent slopes	15	IIs-1	32	1	40	1	42
DaB	Dothan loamy sand, 2 to 5 percent slopes	15	IIe-1	30	1	40	1	42
EnB	Esto loamy coarse sand, 2 to 5 percent slopes	15	IVe-3	34	3	40	1	42
EnB2	Esto loamy coarse sand, 2 to 5 percent slopes, eroded	16	IVe-3	34	3	40	1	42
EnC2	Esto loamy coarse sand, 5 to 8 percent slopes, eroded	16	VIe-2	36	3	40	4	43
EnD2	Esto loamy coarse sand, 8 to 12 percent slopes, eroded	16	VIIe-2	36	3	40	4	43
FqB	Fuquay loamy coarse sand, 2 to 5 percent slopes	17	IIs-4	32	1	40	1	42
FqC	Fuquay loamy coarse sand, 5 to 8 percent slopes	17	IIIe-4	32	1	40	1	42
FsA	Fuquay loamy sand, 0 to 2 percent slopes	17	IIs-1	32	1	40	1	42
FsB	Fuquay loamy sand, 2 to 5 percent slopes	17	IIs-1	32	1	40	1	42
FsC	Fuquay loamy sand, 5 to 8 percent slopes	17	IIIe-5	33	1	40	1	42
Gra	Grady sandy loam	18	IIIw-2	33	4	41	5	43
IjA	Irvington loamy sand, 0 to 3 percent slopes	18	IIw-2	31	2	40	3	43
KkC	Kershaw coarse sand, 2 to 8 percent slopes	19	VIIs-1	37	7	41	4	43
Lid	Leaf and Chastain soils	20	IVw-2	35	4	41	5	43
LsA	Leefield loamy sand, 0 to 3 percent slopes	20	IIw-2	31	2	40	3	43
ObA	Ona sand	22	IIIw-1	33	6	41	3	43
Obs	Osier-Bibb complex	23	Vw-2	35	4	41	5	43
OhA	Ocilla loamy sand, 0 to 3 percent slopes	21	IIIw-1	33	6	41	3	43
PeA	Plummer sand, 0 to 3 percent slopes	23	Vw-2	35	4	41	5	43
RfA	Rains loamy fine sand	24	IVw-4	35	4	41	5	43
SeA	Stilson loamy sand, 0 to 3 percent slopes	24	IIw-2	31	2	40	3	43
ShC2	Sunsweet sandy loam, 5 to 8 percent slopes, eroded	25	VIe-2	36	3	40	4	43
ShD2	Sunsweet sandy loam, 8 to 12 percent slopes, eroded	25	VIe-2	36	3	40	4	43
SiB	Susquehanna sandy loam, 2 to 5 percent slopes	26	IVe-3	34	3	40	4	43
SiC2	Susquehanna sandy loam, 5 to 8 percent slopes, eroded	26	VIe-2	36	3	40	4	43
Swa	Swamp	26	VIIw-1	37	-	--	5	43
TpB	Troup sand, 0 to 5 percent slopes	28	IVs-1	35	5	41	2	42
TpC	Troup sand, 5 to 8 percent slopes	28	IVs-1	35	5	41	2	42
TqA	Tifton loamy sand, 0 to 2 percent slopes	27	I-2	30	1	40	1	42
TqB	Tifton loamy sand, 2 to 5 percent slopes	27	IIe-2	31	1	40	1	42
TqB2	Tifton loamy sand, 2 to 5 percent slopes, eroded	27	IIe-2	31	1	40	1	42
TqC	Tifton loamy sand, 5 to 8 percent slopes	27	IIIe-2	32	1	40	1	42
TqC2	Tifton loamy sand, 5 to 8 percent slopes, eroded	28	IIIe-2	32	1	40	1	42

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.