SOIL SURVEY OF

Montgomery, Toombs, and Wheeler Counties, Georgia

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

Issued December 1973

Major fieldwork for this soil survey was done in the period 1963 to 1968. Soil names and descriptions were approved in 1970. Unless otherwise indicated, statements in this publication refer to conditions in these counties in 1969. This survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Ohoopee River Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY.

THIS SOIL SURVEY of Montgomery, Toombs, and Wheeler Counties contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Montgomery, Toombs, and Wheeler Counties are shown on the detailed soil map at the back of this survey. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with numbers 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 the soils of the three counties in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and gives the woodland suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay on 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 from the soil descriptions.

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

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife Habitat."

Community planners and others can read about soil properties that affect the choice of sites for nonindustrial buildings and for recreation areas in the section "Use of the Soils for Town and Country Planning."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

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

Newcomers in Montgomery, Toombs, and Wheeler 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 information about the counties given at the beginning of the publication and in the section, "Additional Facts About the Counties."

Cover: Peanuts and corn cultivated on the contour. The soil is Dothan loamy sand, 1 to 5 percent slopes.

U.S. GOVERNMENT PRINTING OFFICE: 1973

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

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BY HERSCHEL L. PAULK, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY ERWIN E. ISELEY, GARNET J. WOOD, AND DANIEL D. MONTS, SOIL CONSERVATION SERVICE

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

MONTGOMERY, TOOMBS, AND WHEELER COUNTIES, in the southeastern part of Georgia (fig. 1), have a total land area of 910 square miles, or 582,400 acres. The area of Montgomery County is 235 square miles or 150,400 acres; Toombs County, 369 square miles or 236,160 acres; and that of Wheeler County, 306 square miles or 195,840 acres.

The Little Ocmulgee River forms the western boundary of Wheeler County. The Oconee River forms the boundary line between Wheeler and Montgomery Counties. The Ohoopee River forms the northeastern boundary of Toombs County.

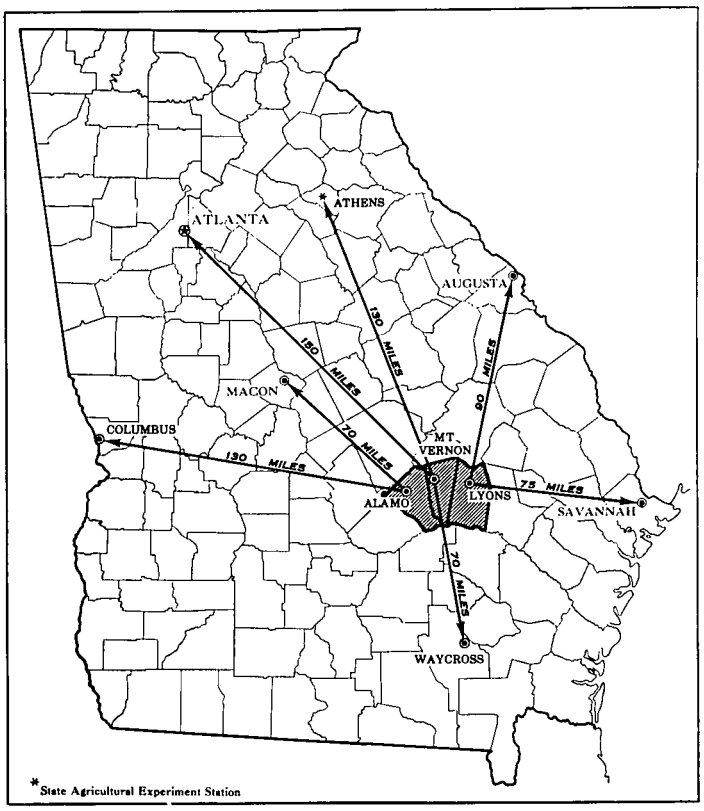

Figure 1.—Location of Montgomery, Toombs, and Wheeler Counties in Georgia.

All three counties are within the Southern Coastal Plains major land resource area. The climate is warm and humid, and rainfall is abundant and generally well distributed. In most of the acreage, the soils are nearly level or very gently sloping and occur on well-drained uplands that are cut by many small, shallow streams; however, the slopes are more strongly sloping where the uplands adjoin the bottom lands and terraces of the rivers and creeks. Level, poorly drained soils on bottom lands of the rivers and creeks make up about 7 percent of the acreage in these counties.

Most of the farms in Montgomery, Toombs, and Wheeler Counties are of the general type, though livestock and field crop farms are numerous.

About 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, naval stores, and poles. Most of the acreage in these three counties is owned by individuals.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Montgomery, Toombs, and Wheeler Counties, where they are located, and how they can be used.

The soil scientists went into these counties knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the 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 the action of plant roots.

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. The soil series and the soil phase are the categories of soil classification most used in a local survey (*6*).[1]

Soils that have profiles almost alike make up a soil series.

[1] Italic numbers in parentheses refer to Literature Cited, page 61.

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. Ailey and Cowarts, 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 affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is 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 within the Tifton series.

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 woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. 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 phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit is shown on the soil map of Montgomery, Toombs, and Wheeler Counties as an undifferentiated soil group.

An undifferentiated soil group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, but generally is made up of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Wagram and Troup soils, 8 to 17 percent slopes, is an example.

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 soil 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 soil. 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 such a way as to be readily useful to different groups of users, among them farmers, managers of woodland and wildlife habitat, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they 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 Montgomery, Toombs, and Wheeler 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 the counties, who want to compare different parts of the counties, 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 or for choosing the site for a building or other structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

Soil associations and delineations on the general soil map in this soil survey do not fully agree with those of the general soil maps in adjacent counties published at a different date. Differences in the maps are the result of improvements in the classification of soils, particularly in the modifications or refinements in soil series concepts. In addition, more precise and detailed maps are needed because the uses of the general soil maps have expanded in recent years. The more modern maps meet this need. Still another difference is caused by the range in slope that is permitted within associations in different surveys.

The six soil associations in Montgomery, Toombs, and Wheeler Counties are described in the following pages.

1. Osier-Bibb-Coxville association

Very poorly drained to poorly drained soils that have sandy to clayey underlying layers; mostly on flood plains; 0 to 2 percent slopes

This association consists of nearly level soils along rivers, creeks, and branches. Slopes generally do not exceed 2 percent. These soils receive a thin deposit of fresh alluvial material many times each year as they are flooded. Most of the alluvium is recent, but there are a few areas of old alluvium at slightly higher elevations that generally are flooded only a few times each year. This association covers about 11 percent of the three counties.

The Osier and Bibb soils make up about 45 percent of this association; the Coxville soils, about 15 percent; and minor soils, the remaining 40 percent.

The Osier and Bibb soils are on the lowest parts of the flood plains of the rivers and their main tributaries.

The Osier soils are poorly drained to very poorly drained. In a typical profile, the surface layer is dark-gray fine sandy loam about 4 inches thick. The underlying layer, to a depth of 24 inches, is white sand. This white

sand is underlain by about 6 inches of gray loamy fine sand that contains a few medium pockets of sandy loam and has a few mottles of yellowish brown. Below this, from a depth of 30 inches to a depth of 60 inches, is light-gray coarse sand.

The Bibb soils are poorly drained. In a typical profile, the surface layer is very dark gray loam about 6 inches thick. The underlying layer, to a depth of 24 inches, is mainly gray loamy sand that is stratified with lenses of sandy loam. Below this, from a depth of 24 inches to a depth of 62 inches, is sandy loam that is stratified with lenses of loamy sand and sandy clay loam. It is light gray and has mottles of brownish yellow and strong brown.

The Coxville soils are poorly drained and are flooded several times each year. These soils have a dark-brown silt loam surface layer about 4 inches thick, and they have a gray clay subsoil that is mottled with yellowish brown to a depth of about 60 inches.

Minor soils in this association are the moderately well drained Duplin soils and the somewhat poorly drained Wahee and Ocilla soils.

Most of this association is wooded. Hardwoods are the dominant trees, but there are some pines. A small acreage is used for pasture. A few areas of the Wahee and Ocilla soils are in cultivation. Most of this association is privately owned. Large paper companies own a considerable acreage that is used for wood crops.

The major soils have severe limitations for use as sites for residences and light industry and for use as campsites, intensive play areas, trafficways, and other recreational facilities. These limitations are caused by wetness and flooding.

2. *Pelham-Ardilla-Ocilla association*

Poorly drained and somewhat poorly drained soils that have a loamy subsoil; mostly on terraces and broad plains adjacent to bottom lands; 0 to 2 percent slopes

This association consists of broad, nearly level areas on stream terraces and broad plains adjoining bottom lands of the large creeks and rivers. These areas are at slightly higher elevations than the bottom lands. The better drained soils are generally not subject to flooding more than once in 5 to 20 years, but the poorly drained soils are flooded more than once each year. This association covers about 7 percent of the three counties.

The Pelham soils make up about 41 percent of this association; the Ardilla soils, about 28 percent; the Ocilla soils, about 20 percent; and minor soils, the remaining 11 percent.

The Pelham soils are poorly drained and are in the low areas or slight depressions. In a typical profile, loamy sand extends from the surface to a depth of 30 inches. This layer is dark gray in the upper 4 inches, and below this, it is gray and has a few mottles of brownish yellow. It is underlain to a depth of 38 inches by gray sandy loam mottled with yellowish brown. Below this, to a depth of 62 inches, is gray sandy clay loam mottled with light yellowish brown, yellowish brown, and red.

The Ardilla and Ocilla soils are at slightly higher elevations and are somewhat poorly drained. In a typical profile of Ardilla soils, the surface layer, to a depth of 6 inches, is dark-gray loamy sand that is underlain by grayish-brown loamy sand about 8 inches thick. The subsoil, to a depth of 21 inches, is a pale-brown very friable sandy loam, and below that, to a depth of about 64 inches, is a friable light yellowish-brown sandy clay loam mottled with light gray, strong brown, and red.

In a typical profile of the Ocilla soils, the surface layer is about 7 inches of very dark gray loamy sand below the surface layer is pale-brown loamy sand about 16 inches thick. The subsoil, to a depth of 50 inches, is light yellowish-brown sandy loam mottled with yellowish brown and light brownish gray. Below this, to a depth of 62 inches, is sandy clay loam mottled with yellowish brown, light brownish gray, and light yellowish brown.

Minor soils in this association are the well drained Fuquay and Maxton soils at the higher elevations and the somewhat poorly drained Wahee soils at the lower elevations.

Nearly all of this association is wooded, and most of it is privately owned. The dominant kind of trees are pines, scattered oaks, and gum. The undergrowth consists chiefly of gallberry and myrtle. This association is important for the production of lumber, pulp, and gum for turpentine. A small acreage of the Ardilla and Ocilla soils is in cultivated crops and pasture.

The major soils have moderate to severe limitations for many nonfarm uses because they have a seasonally high water table or are flooded. Pelham soils have severe limitations for use as sites for residences and light industry or for campsites, intensive play areas, trafficways, and other recreational facilities. The Ardilla and Ocilla soils have only moderate limitations for these nonfarm uses, but because of wetness they have severe limitations as sites for septic tank filter fields and residences.

3. *Tifton-Fuquay-Pelham association*

Well-drained and poorly drained soils that have a loamy subsoil; on broad ridges and in drainageways; 0 to 7 percent slopes

This association consists of nearly level and gently sloping ridges and drainageways that dissect the ridges. The ridges are about one-fourth mile to a mile wide, and the drainageways are about 50 to 250 feet wide. Slopes do not exceed 7 percent. This association covers about 34 percent of the three counties.

The Tifton soils make up about 45 percent of the association; the Fuquay soils, about 24 percent; the Pelham soils, about 15 percent; and the minor soils, the remaining 16 percent.

The Tifton and Fuquay soils are on the ridges, and both are well drained. The Pelham soils are in drainageways and are poorly drained.

In a typical profile of the Tifton soils, the surface layer is very dark grayish-brown loamy sand about 10 inches thick. The subsoil, to a depth of 65 inches, is friable sandy clay loam. It is yellowish brown to a depth of 37 inches, and below this it is mottled with brownish yellow, yellowish brown, red, and pale yellow. Small, rounded iron concretions are on the surface and throughout the profile.

In a typical profile of the Fuquay soils, the surface layer is dark-gray loamy sand about 5 inches thick. Below the surface layer, to a depth of 26 inches, is light yellowish-brown loamy sand. The subsoil extends to a depth of more than 60 inches. It is yellowish-brown sandy loam in the uppermost 4 inches and brownish-yellow sandy clay loam

below. Mottles of red begin at a depth of 30 inches in this sandy loam.

In a typical profile of Pelham soil, loamy sand extends from the surface to a depth of about 30 inches. This layer is dark gray in the upper 4 inches, and below this, it is gray with a few mottles of brownish yellow. This layer is underlain to a depth of 38 inches by gray sandy loam mottled with yellowish brown. Below this and down to a depth of 62 inches is gray sandy clay loam mottled with light yellowish brown, yellowish brown, and red.

Minor soils are the well-drained Dothan soils that make up about 7 percent of the association, the well-drained Carnegie soils, and the moderately well drained Irvington and Stilson soils.

A large part of the cultivated acreage in the three counties is in this soil association. Corn, cotton, peanuts, and tobacco are the main crops (fig. 2). A considerable acreage is in pasture. Farms on this association average about 150 acres in size, and all are of the general type. Nearly all of the farms are privately owned and are operated by their owners.

The Tifton and Fuquay soils have mainly slight to moderate limitations for many uses, such as sites for residences, septic tank filter fields, structures for light industries, trafficways, and recreational uses such as campsites, picnic areas, and intensive play areas. The Pelham soils, however, have severe limitations for these uses because the soils are wet and are likely to be flooded.

4. Cowarts-Lakeland-Wagram association

Well-drained and excessively drained soils that have a loamy to sandy subsoil or underlying layers; on narrow ridgetops and short, irregular side slopes; mostly 5 to 17 percent slopes

This association consists of short, narrow, gently sloping ridgetops, gently sloping and strongly sloping side slopes, and abrupt breaks adjacent to the creeks and small rivers, Slopes range mostly from 5 to 17 percent. This association covers about 8 percent of the three counties.

The Cowarts soils make up about 30 percent of this association; the Lakeland soils, about 15 percent; the Wagram soils, 8 percent; and minor soils, the remaining 47 percent.

The Cowarts and Lakeland soils are gently sloping and occur on ridgetops, and side slopes. Wagram soils are on side slopes and abrupt breaks along streams.

The Cowarts soils are well drained. In a typical profile, the surface layer is very dark gray loamy sand about 5 inches thick. It is underlain by light olive-brown loamy sand about 7 inches thick. The subsoil is sandy clay loam to a depth of 18 inches. Below that, it is strong brown to brownish yellow mottled with shades of red, dark red, and light gray. More than 5 percent plinthite occurs at a depth of 18 inches.

The Lakeland soils are excessively drained. In a typical profile, sand extends to a depth of more than 80 inches. It is very dark gray in the upper 3 inches, yellow or light

Figure 2.—Corn and cotton in an area of association 3. The soil is Tifton loamy sand, 2 to 5 percent slopes.

yellowish brown to a depth of 54 inches, and very pale brown at a depth below 54 inches.

The Wagram soils are well drained. In a typical profile, the surface layer is grayish-brown loamy sand about 11 inches thick. Below the surface layer is light yellowish-brown loamy sand about 13 inches thick. The subsoil, to a depth of 62 inches, is sandy clay loam. It is brownish yellow in the upper part, yellowish brown mottled with yellowish red and brownish yellow in the middle, and yellowish brown mottled with light gray and red in the lower part.

Minor soils in this association are the well drained Carnegie and Troup soils, the moderately well drained Duplin soils, and the poorly drained Pelham soils that are in the small drainageways.

Most of this association is in trees used for the production of pulpwood, lumber, and naval stores. Some areas of Cowarts, Wagram, and Duplin soils on the lesser slopes are cultivated. Corn is the principal crop. A few areas are in pasture. Most of this association is privately owned. Large paper companies own a considerable acreage, and all of it is used for wood crops.

The major soils have chiefly slight to moderate limitations for use as sites for residences, septic tank filter fields, light industries, and recreational uses, such as campsites, picnic areas, and trafficways. Where the Wagram soils are steeper than 15 percent they are considered to have severe limitations for many uses. Sites for septic tank filter fields also have severe limitations in Cowarts soils.

5. *Lakeland-Kershaw-Troup association*

Excessively drained and well-drained soils that have chiefly sandy underlying layers; mainly on broad ridges; 0 to 8 percent slopes

This association consists chiefly of broad ridges of sand that are dissected by a few narrow drainageways. It is mainly adjacent to the flood plains on the east side of Little Ocmulgee River, Alligator Creek, and Pendleton Creek. Slopes range from 0 to 8 percent. This association occupies about 7 percent of the three counties.

The Lakeland and Troup soils together make up about 45 percent of this association; the Kershaw soils, about 21 percent; and minor soils, the remaining 34 percent.

The Lakeland and Troup soils are on ridges adjacent to the higher elevated ridges of the Kershaw soils.

In a typical profile of Lakeland soils, sand extends to a depth of more than 80 inches. It is very dark gray in the upper 3 inches, yellow or light yellowish brown to a depth of 54 inches, and very pale brown below 54 inches.

The Kershaw soils are mostly on the higher parts of the landscape adjacent to the flood plains of streams. In a typical profile, the surface layer is dark grayish brown about 2 inches thick. Below this, to a depth of about 80 inches, is sand that is yellowish brown in the upper part and pale brown in the lower part.

In a typical profile of the Troup soils, sand extends to a depth of 52 inches. The surface layer is grayish brown in the upper 6 inches. Below this surface layer is yellowish brown to a depth of 12 inches, and light yellowish brown to a depth of 52 inches. Below this, to a depth of 62 inches, is yellowish-brown sandy loam mottled with light yellowish brown and strong brown. Below 62 inches and down to a depth of more than 74 inches, is brownish-yellow sandy clay loam mottled with strong brown, yellowish red, and light gray.

Minor soils in this association are the excessively drained Paola soils, the well-drained Fuquay soils, the somewhat poorly drained Ocilla soils, and the poorly drained Pelham soils.

Most of this association is wooded because the major soils are very droughty. Except in a few areas that have been cleared and planted to slash pine, the trees are turkey oak, bluejack oak (fig. 3), scrub oak, and a few scattered longleaf pines.

In areas of the minor soil, Paola, the vegetation is rather dense for such a sandy soil. Fairly large live oak, hickory, magnolia, and holly trees grow in these areas.

Figure 3.—**Typical small oak vegetation in an area of Lakeland-Kershaw-Troup association.**

Only a small acreage of this soil association is cultivated. Most of it is owned by farmers, but pulpwood companies own a few large tracts.

This association has chiefly slight to moderate limitations as a location for residential and industrial development, trafficways, campsites, and picnic areas. The Kershaw soils, however, are considered to have severe limitations if used as sites for septic tank filter fields or sanitary land fills, because the filtering action is poor and nearby shallow water supplies may be contaminated. Kershaw soils have severe limitations for campsites, intensive play areas, and picnic areas because they are sandy and loose.

6. *Cowarts-Lakeland-Pelham association*

Excessively drained to poorly drained soils that have a loamy to sandy subsoil or underlying layers; on narrow ridgetops and short side slopes adjacent to drainageways; 0 to 8 percent slopes

This association consists of narrow, very gently sloping ridgetops, gently sloping side slopes, numerous small wet drainageways, and narrow breaks along the drainageways. Slopes range mostly from 0 to 8 percent. This association covers about 33 percent of the three counties.

The Cowarts soils make up about 29 percent of this association, the Lakeland soils about 18 percent, the Pelham soils about 18 percent, and minor soils the remaining 35 percent.

The Cowarts and Lakeland soils are on the ridgetops and side slopes. Pelham soils are in the drainageways.

The Cowarts soils are well drained. In a typical profile, the surface layer is very dark gray loamy sand about 5 inches thick. It is underlain by light olive-brown loamy sand about 7 inches thick. The subsoil is sandy clay loam to a depth of more than 65 inches. This sandy clay loam is yellowish brown to a depth of 18 inches, and below that depth it is strong brown to brownish yellow mottled with shades of red, dark red, and light gray. At a depth of 18 inches, more than 5 percent of the soil material is plinthite.

The Lakeland soils are excessively drained. In a typical profile, sand extends from the surface to a depth of more than 80 inches. It is very dark gray in the upper 3 inches, yellow or light yellowish brown to a depth of 54 inches, and very pale brown below a depth of 54 inches.

The Pelham soils are poorly drained. In a typical profile, loamy sand extends from the surface to a depth of about 30 inches. This layer is dark gray in the upper 4 inches, and below this it is gray and has a few mottles of brownish yellow. It is underlain by light-gray sandy loam mottled with yellowish brown to a depth of 38 inches. Below this, to a depth of 62 inches, is gray sandy clay loam mottled with light yellowish brown, yellowish brown, and red.

Minor soils in this association are the Ailey and Troup soils that are well drained and sandy to a depth of 30 inches or more, and the Carnegie and Tifton soils that have mainly loamy profiles and are well drained. The Ailey and Troup soils together make up about 20 percent of the association.

About one-third of this association is cultivated or in pasture, and the rest is in woodland. The Cowarts soils are fairly well suited to cultivated crops. Corn, cotton, and soybeans are the chief crops. The Lakeland soils are very droughty; their suitability for cultivated crops is limited. The Pelham soils are mostly in woodland and are particularly suited to this use.

The farms in this association average about 250 acres in size, and most of them are operated by the owners. Most of the farming is of the general type, and woodland produces a sizable part of the income on most farms. Large paper companies own a considerable acreage, all of which is used for wood crops.

Most of this association has slight to moderate limitations as a site for residences, light industries, trafficways, or as a location for campsites, intensive play areas, and picnic areas. Because of wetness and flooding, the Pelham soils have severe limitations for most nonfarm uses.

Descriptions of the Soils [2]

This section describes the soil series and mapping units in Montgomery, Toombs, and Wheeler Counties. The approximate acreage and proportionate extent of mapping units are given in table 1. Their location is shown on the soil map at the back of this survey.

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. The description of the soil series mentions features that apply to all the soils in a series. Differences among the soils of one series are pointed out in the description of the individual soils or are indicated in the soil name.

A profile typical for each series is described in two ways. Many will prefer to read the short description in narrative form. It is the second paragraph in the series description. The technical description of the profile is mainly for soil scientists, engineers, and others who need to make a thorough and precise study of soils. Unless otherwise stated, the profile described is that of a moist soil.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group in which the mapping unit has been placed.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with soil maps in adjacent counties published at a different date. Differences are the result of better knowledge of soils, modifications in series concepts and of intensity of mapping, and the extent of soils within the survey. In some places it is more feasible to combine small acreages of similar soils that respond to use and management in much the same way than it is to separate these soils and give them names.

Ailey Series

The Ailey series consists of well-drained upland soils that have a fragipan. These soils formed in sandy and loamy marine sediments. Slopes range from 2 to 8 percent.

[2] J. N. NASH, agronomist, Soil Conservation Service, supplied information concerning management of the soils for crops and pasture.

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

Soil	Montgomery County		Toombs County		Wheeler County		Total	Percentage of survey area
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Ailey loamy coarse sand, 2 to 8 percent slopes	6,485	4.3	13,100	5.6	3,680	1.9	23,265	4.0
Ardilla loamy sand	3,415	2.3	4,790	2.0	5,070	2.6	13,275	2.3
Carnegie loamy sand, 2 to 5 percent slopes	1,700	1.1	6,190	2.6	3,270	1.7	11,160	1.9
Carnegie sandy loam, 5 to 8 percent slopes, eroded	2,190	1.5	8,460	3.6	2,050	1.0	12,700	2.2
Cowarts loamy sand, 2 to 5 percent slopes	10,000	6.7	13,935	5.9	9,335	4.8	33,270	5.7
Cowarts loamy sand, 5 to 8 percent slopes	11,650	7.8	15,075	6.4	10,280	5.2	37,005	6.3
Coxville and Duplin soils	3,845	2.6	4,830	2.1	10,740	5.5	19,415	3.3
Craven soils, 2 to 8 percent slopes	1,085	.7	860	.4	910	.5	2,855	.5
Dothan loamy sand, 1 to 5 percent slopes	4,720	3.1	6,955	2.9	3,770	1.9	15,445	2.6
Fuquay loamy sand, 1 to 5 percent slopes	12,995	8.6	18,970	8.0	20,355	10.4	52,320	9.0
Grady soils	200	.1	895	.4	190	.1	1,285	.2
Irvington loamy sand	685	.5	2,225	.9	985	.5	3,895	.7
Kershaw sand, 2 to 8 percent slopes	145	.1	1,940	.8	6,980	3.6	9,065	1.6
Lakeland and Troup soils, 0 to 8 percent slopes	25,520	17.0	36,420	15.4	29,445	15.0	91,385	15.7
Mascotte sand	205	.1	0	0	720	.4	925	.2
Maxton soils	175	.1	600	.3	555	.3	1,330	.2
Ocilla loamy sand	2,100	1.4	3,305	1.4	6,060	3.1	11,465	2.0
Osier and Bibb soils	12,480	8.3	14,465	6.1	14,110	7.2	41,055	7.0
Paola sand, cool variant, 5 to 12 percent slopes	0	0	1,095	.5	730	.4	1,825	.3
Pelham loamy sand	21,630	14.4	32,190	13.6	27,680	14.1	81,500	14.0
Stilson loamy sand	895	.6	1,965	.8	1,620	.8	4,480	.8
Sunsweet sandy loam, 5 to 12 percent slopes, eroded	395	.3	1,590	.8	400	.2	2,385	.4
Tifton loamy sand, 0 to 2 percent slopes	1,550	1.0	7,605	3.2	2,355	1.2	11,510	2.0
Tifton loamy sand, 2 to 5 percent slopes	20,600	13.7	31,820	13.5	26,385	13.5	78,805	13.5
Tifton sandy loam, 5 to 8 percent slopes, eroded	1,135	.7	2,950	1.2	2,445	1.2	6,530	1.1
Wagram and Duplin soils, 2 to 8 percent slopes	2,160	1.4	1,775	.7	3,490	1.8	7,425	1.3
Wagram and Troup soils, 8 to 17 percent slopes	1,070	.7	980	.4	825	.4	2,875	.5
Wahee soils	1,370	.9	1,175	.5	1,405	.7	3,950	.7
Total	150,400	100.0	236,160	100.0	195,840	100.0	582,400	100.0

In a typical profile, the surface layer is dark grayish-brown loamy coarse sand about 6 inches thick. Below this is light yellowish-brown loamy coarse sand about 24 inches thick. The subsoil, to a depth of 72 inches, is mainly sandy clay loam. It is strong brown mottled with yellowish red in the upper part, yellowish brown mottled with strong brown and red in the middle part, and mottled brownish yellow, pale brown, light gray, and red in the lower part. The layers are firm, cemented, and brittle at depths between 36 and 72 inches, and they respond as a fragipan.

These soils are low in natural fertility and organic-matter content, and they are strongly acid to very strongly acid throughout. Permeability is rapid in the sandy surface layer, but it is slow in the fragipan. The available water capacity is low. The root zone is moderately deep, and tilth is good.

A small acreage is in cultivation or in pasture, but most of the acreage is in woodland. A considerable acreage has been planted to slash pine. The native vegetation consists chiefly of turkey oak and longleaf pine.

Representative profile of Ailey loamy coarse sand, 2 to 8 percent slopes, in a wooded area 0.7 mile northeast of railroad crossing in Kibbee, on paved county road, 40 feet east of road, Montgomery County:

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) loamy coarse sand; weak, fine, granular structure; very friable; 10 percent quartz gravel; many fine roots; very strongly acid; clear, smooth boundary.

A2—6 to 30 inches, light yellowish-brown (10YR 6/4) loamy coarse sand; single grain; loose; 10 percent quartz gravel; few small roots; very strongly acid; clear, wavy boundary.

B2t—30 to 36 inches, strong-brown (7.5YR 5/8) sandy clay loam; few, fine, distinct, yellowish-red mottles; weak, medium, subangular blocky structure; friable; few clay films on ped surfaces; 5 percent quartz gravel; few fine roots; very strongly acid; gradual, wavy boundary.

Bx1—36 to 44 inches, yellowish-brown (10YR 5/) sandy clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6) and few, medium, prominent mottles of red (2.5YR 4/8); moderate, coarse, angular blocky structure parting to moderate, medium, subangular blocky; firm, compact, and brittle, slightly cemented; few clay films on ped surfaces; few quartz pebbles; strongly acid; gradual, wavy boundary.

Bx2—44 to 72 inches, mottled brownish-yellow (10YR 6/8), pale-brown (10YR 6/3), light-gray (10YR 7/1), and red (10R 4/6) sandy clay loam; weak, medium, subangular blocky structure; firm, compact, and brittle; slightly cemented; few quartz pebbles; strongly acid.

The A1 horizon ranges from very dark grayish brown to very dark gray. The combined thickness of the A1 and A2 horizons ranges from 22 to 32 inches. The depth to the fragipan ranges from 26 to 42 inches.

Ailey soils commonly occur with Cowarts, Fuquay, Lakeland, and Troup soils. Ailey soils contain a fragipan, and they lack the 5 percent or more of plinthite in the B horizon that is common in Cowarts and Fuquay soils. They are less sandy to a depth of 40 inches or more than Lakeland and Troup soils.

Ailey loamy coarse sand, 2 to 8 percent slopes (AfC).—This soil is on upland side slopes and narrow ridges.

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Included with this soil in mapping were small areas of Cowarts and Fuquay soils. Also included were areas where the surface layer is sand or coarse gravelly sand.

The suitability of this soil for plants is limited by sandiness and droughtiness. Corn is better suited than most other crops commonly grown in these counties. Among the better suited pasture and hay plants are Pensacola bahiagrass and Coastal bermudagrass. Even where management is good, the organic materials are rapidly depleted. Frequent applications of fertilizer are required for best plant response.

Because infiltration and permeability are rapid in the surface layer, erosion generally is not a hazard. Large amounts of organic materials, frequently applied, are needed to improve the available water capacity and productivity of this soil. An example of a good cropping system is 1 to 2 successive years of corn followed by 2 to 4 years of perennial grass. Irrigation is not practical, because the productivity is low. (Capability unit IVs–1; woodland and suitability group 4s2)

Ardilla Series

The Ardilla series consists of somewhat poorly drained soils on stream terraces and upland flats. These soils formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is dark-gray loamy sand 6 inches thick. Below this is grayish-brown loamy sand about 8 inches thick. The subsoil to a depth of 21 inches is pale-brown very friable sandy loam. To a depth of 40 inches it is light yellowish-brown sandy clay loam mottled with shades of gray, brown, and red. Mottled brownish-yellow, light-gray, light-red, and red sandy clay loam reaches to a depth of 64 inches.

These soils are very strongly acid throughout, are low in natural fertility, and are low in organic-matter content. The available water capacity is medium. Permeability is moderately rapid to rapid in the upper part of the profile and moderately slow in the lower part. The root zone is mainly moderately deep, and tilth generally is good.

Most of the acreage is woodland, dominantly slash pine. Because flooding and the high water table are hazards, only a few areas are cultivated. Corn is the chief crop. These soils are well suited to pasture. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

Representative profile of Ardilla loamy sand in a wooded area 6 miles south of U.S. Highway No. 280 in Glenwood, Ga., along State Route 19; 1.75 miles southeast on county road, and 200 yards east of road, Wheeler County:

A1—0 to 6 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; very strongly acid; abrupt, smooth boundary.

A2—6 to 14 inches, grayish-brown (10YR 5/2) loamy sand; weak, fine, granular structure; very friable; very strongly acid; gradual, wavy boundary.

B1—14 to 21 inches, pale brown (10YR 6/3) sandy loam; few mottles of brownish yellow (10YR 6/6); weak, fine, subangular blocky structure; very friable; very strongly acid; gradual, wavy boundary.

B21t—21 to 30 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/8), light brownish gray (2.5Y 6/2), and red (2.5YR 4/8); weak, medium, subangular blocky structure; friable; about 8 percent plinthite; very strongly acid; gradual, wavy boundary.

B22t—30 to 40 inches, light yellowish-brown (2.5Y 6/4) sandy clay loam; common, fine to medium, distinct mottles of strong brown (7.5YR 5/8), light gray (2.5Y 7/2), and red (2.5YR 4/8); strong, medium, subangular blocky structure; friable; common clay films on ped surfaces; about 20 percent plinthite; very strongly acid; gradual, wavy boundary.

B23t—40 to 64 inches, mottled brownish-yellow (10YR 6/8), light-gray (N 7/0), light-red (2.5YR 6/6), and red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; few hard peds; common clay films on ped surfaces; about 4 percent plinthite; very strongly acid.

The A1 and Ap horizons range from 4 to 10 inches in thickness, and from dark gray to very dark grayish brown. The total thickness of the A horizon ranges from 11 to 13 inches. Plinthite is at a depth of 21 to 48 inches. The A horizon in some profiles is 19 inches thick, which is slightly thicker than the defined range for the Ardilla series, but this difference does not alter the usefulness and behavior of these soils.

The Ardilla soils occur with the Ocilla, Pelham, and Wahee soils. These soils are similar to the Ocilla soils in drainage, but lack the thick A horizon and are 5 percent or more plinthite in some layers in the B horizon. Ardilla soils are on higher positions and are better drained than the Pelham soils. They contain less clay in the B horizon than the Wahee soils.

Ardilla loamy sand (Aq).—This soil is on stream terraces and on upland flats. Slopes range from 0 to 2 percent.

Included with this soil in mapping were a few small areas where the surface layer is fine sandy loam or sandy loam. Also included were small areas of Ocilla and Wahee soils that were too small to be mapped separately.

Most of the acreage is wooded, but a moderate part is in cultivation and pasture. Excess water is the main problem. To insure maximum efficiency, some drainage may be needed, but water management depends on the crop to be grown. If drainage is needed, a system of main and lateral ditches can be designed and installed. These are of two types: open ditches or covered tile drains.

If this soil is drained, any suitable crop can be grown on it continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and disease and makes more efficient use of fertilizer.

This soil is suited to irrigation. (Capability unit IIw–2; woodland suitability group 2w8)

Bibb Series

The Bibb series consists of poorly drained, nearly level soils on bottom lands. They are subject to very frequent flooding that lasts from several days to 2 weeks and to deposition of sediments.

In a typical profile, the surface layer is very dark gray loam about 6 inches thick. Below the surface layer, to a depth of 24 inches, is mainly gray loamy sand stratified with lenses of sandy loam. This layer also has few mottles of strong brown and light yellowish brown and a few shades of gray. Below this, to a depth of 62 inches, is sandy loam stratified with lenses of loamy sand and sandy clay loam. This sandy loam is gray and has mottles of brownish yellow and strong brown.

These soils are low to moderate in natural fertility and organic-matter content, and they are strongly acid to very strongly acid throughout. The available water capacity is medium, and permeability is moderate. The root zone is deep, and tilth is generally fair.

Because flooding is a hazard, these soils are not suitable for cultivation. All the acreage is in woodland, and these soils are well suited to trees. The native vegetation is chiefly such hardwoods as water oak, cypress, yellow-poplar, gums, and bay, and a few slash and loblolly pines.

The Bibb soils were mapped only in an undifferentiated group with the Osier soils.

Representative profile of Bibb loam in an area of Osier and Bibb soils 1.6 miles east of Pendleton Creek along State Route 152; 75 feet south of road, Toombs County:

A—0 to 6 inches, very dark gray (10YR 3/1) loam; weak, fine, granular structure; friable; many fine decaying roots; strongly acid; clear, wavy boundary.

C1g—6 to 24 inches, gray (10YR 5/1) loamy sand; few, medium, faint mottles of light gray (10YR 7/1) and dark gray (10YR 4/1), and few, medium, distinct, strong-brown (7.5YR 5/6) and light yellowish-brown (2.5Y 6/4) mottles; single grain; loose; few thin strata of sandy loam; strongly acid; gradual, wavy boundary.

C2g—24 to 62 inches, gray (N 6/0) sandy loam; common, fine and medium, distinct mottles of brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6); massive; slightly sticky; contains strata of loamy sand and sandy clay loam about ½ inch to 1 inch thick; very strongly acid.

The A horizon ranges from dark gray to very dark gray and from silt loam to loamy sand. The C1g and C2g horizons range from light gray to gray or dark gray; there are few to common mottles in shades of brown and yellow. The degree of stratification is variable, and the texture of strata ranges from loamy sand to sandy clay loam.

The Bibb soils occur with the Osier and Pelham soils. They are similar to the Osier soils in drainage, but their profiles contain more silt and clay. The Bibb soils are flooded longer and more frequently than the Pelham soils; consequently, their profile is more stratified and more recent in origin.

Carnegie Series

The Carnegie series consists of well-drained soils on short, irregular slopes of broad upland ridges. These soils formed in thick beds of sandy clay loam. Slopes range from 2 to 8 percent.

In a typical profile, the surface layer is brown sandy loam about 6 inches thick. The subsoil is sandy clay loam to a depth of 62 inches or more. It is yellowish brown in the upper part and yellowish brown mottled with shades of yellow, brown, red, and gray in the lower part. Small, hard iron concretions are on the surface and in the surface layer and the upper part of the subsoil. Plinthite occurs at a depth of about 19 inches.

These soils are low in natural fertility and in organic-matter content, and they are strongly acid to very strongly acid throughout. The subsoil is moderately permeable in the upper part and slowly permeable in the lower part. Plinthite in the lower part slightly restricts water and roots. The available water capacity is medium. The root zone is chiefly moderately deep, and tilth is fair to good.

These soils are moderately well suited to most crops grown locally. They are used for corn, cotton, soybeans, and forage crops. They are well suited to pasture and pines, and most of the acreage is in pines. The native vegetation consists of mixed pines and hardwoods that have an understory of wiregrass.

Representative profile of Carnegie sandy loam, 5 to 8 percent slopes, eroded, in a cultivated field 1.9 miles south of intersection of U.S. Highway No. 1 and State Route 29, on U.S. Highway No. 1, 1.6 miles east on dirt road; 100 yards east of road in field, Toombs County:

Apcn—0 to 6 inches, brown (10YR 4/3) sandy loam mixed with yellowish-brown sandy clay loam; weak, fine and medium, granular structure; very friable; about 10 percent iron concretions ½ to ¾ inch in diameter; strongly acid; abrupt, wavy boundary.

B21tcn—6 to 19 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; about 5 percent iron concretions; strongly acid; gradual, wavy boundary.

B22t—19 to 36 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, prominent, red (2.5YR 4/6) mottles and common, medium, faint, light yellowish-brown (2.5Y 6/4) mottles; moderate, medium, subangular blocky structure; friable; about 3 percent iron concretions; about 10 percent plinthite; strongly acid; gradual, wavy boundary.

B23t—36 to 44 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, prominent, red (2.5YR 4/8) mottles and common, medium, faint, brownish-yellow (10YR 6/6) and light yellowish-brown (10YR 6/4) mottles; weak to moderate, medium, subangular blocky structure; friable; about 3 percent plinthite; strongly acid; gradual, wavy boundary.

B24t—44 to 62 inches, yellowish-brown (10YR 5/8) sandy clay loam; many, coarse, prominent mottles of gray (10YR 6/1) and red (2.5YR 4/8) and common, medium, faint mottles of brownish yellow (10YR 6/6); weak, medium, subangular blocky structure; friable; 3 percent plinthite; very strongly acid.

The Ap horizon ranges from brown to very dark grayish brown or dark yellowish brown. The B21t horizon ranges from yellowish brown to brown or yellowish red. The B horizons range from sandy clay loam to clay loam. The depth to 5 percent or more of plinthite ranges from 16 to 24 inches.

The Carnegie soils commonly occur with the Sunsweet and Tifton soils. The Carnegie soils are similar to the Sunsweet soils in color, but they have less clay in the B2t horizon and are deeper to plinthite than those soils. They have plinthite closer to the surface than the Tifton soils.

Carnegie loamy sand, 2 to 5 percent slopes (CnB).—This is a well-drained soil on uplands. It occurs in only a few places in areas that are more than 10 acres in size. Its profile is similar to the one described as typical of the series, but it differs in that the surface layer is about 4 inches thicker and the texture is loamy sand.

Included with this soil in mapping were small areas of Sunsweet and Tifton soils. Also included were small eroded areas.

This soil is fairly well suited to cultivated crops and well suited to pasture and trees. Some of the important crops are corn, peanuts, soybeans, and cotton.

Because runoff is medium, erosion is a moderate hazard in cultivated areas. Erosion control practices generally used include cultivating in straight rows across slope, contour farming with or without terraces, or stripcropping.

The erosion control practices used, or the steepness and length of slopes, determine the cropping system needed to control erosion. An example of a suitable cropping system in areas where the slopes are 400 feet long and the gradient is 3 percent is 2 years of corn followed by 4 years or more of a perennial grass or legume. This system can be applied safely using straight rows that run across the slope.

This soil is suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. (Capability unit IIe–4; woodland suitability group 2o1)

Carnegie sandy loam, 5 to 8 percent slopes, eroded (CoC2).—This soil is well drained and is on short slopes adjoining ridges of Tifton soils in many places. It has the profile described as representative of the series.

Included with this soil in mapping were small areas of Tifton soils. Also included were small areas that are only slightly eroded.

Because of the slope and the severe hazard of erosion, this soil is better suited to trees or pasture than to row crops. It can be cultivated, however, if it is managed so that runoff is reduced and erosion is held within allowable limits. Contour farming, terraces, and vegetated outlets are needed. Among the suited crops are cotton, corn, soybeans, and small grain. 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 the soil is cultivated on the contour, an example of a suitable cropping system is 2 years of corn or a similar row crop, followed by 4 years of bahiagrass or a similar close-growing crop.

This soil is not well suited to irrigation. (Capability unit IVe–4; woodland suitability group 2o1)

Cowarts Series

The Cowarts series consists of well-drained, gently undulating to rolling soils of the uplands. These soils formed in thick beds of mottled loamy materials. Slopes range from 2 to 8 percent.

In a typical profile, the surface layer is very dark gray loamy sand 5 inches thick. Below this is light olive-brown loamy sand about 7 inches thick. The subsoil is sandy clay loam that extends to a depth of 65 inches or more. This sandy clay loam is yellowish brown to a depth of 18 inches. Below this, it is strong brown to brownish yellow mottled with shades of red, dark red, and light gray. More than 5 percent plinthite occurs at a depth of about 18 inches.

These soils are low in natural fertility, low in organic-matter content, and strongly acid throughout. Permeability is moderate in the upper part of the profile but slow through the plinthic layer. The available water capacity is medium. Tilth is good, but crop response to management is only fair to good. The root zone is mainly moderately deep.

Most of the acreage is in woods, which is a good use. Many small fields are in cultivation, but these soils are only fairly well suited to cultivated crops. Corn, cotton, and soybeans are the chief crops. A small acreage is in pasture. The native vegetation is chiefly pines, but there are a few hardwoods.

Representative profile of Cowarts loamy sand, 5 to 8 percent slopes, in wooded area 0.5 mile north of Inman Creek on State Route 107, 3.4 miles southeast on paved road, and 0.8 mile west on a dirt road, Toombs County:

A1—0 to 5 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; very friable; few quartz fragments and iron-cemented pebbles; strongly acid; clear, smooth boundary.

A2—5 to 12 inches, light-olive brown (2.5Y 5/4) loamy sand; few, fine, distinct mottles of grayish brown; weak, medium, granular structure; very friable; about 5 percent gravel; strongly acid; clear, smooth boundary.

B21t—12 to 18 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, medium, prominent, red (2.5YR 4/8) mottles: weak, medium, subangular blocky structure; friable; 3 percent gravel; strongly acid; clear, wavy boundary.

B22t—18 to 23 inches, strong-brown (7.5YR 5/6) sandy clay loam; common, medium, prominent mottles of red (2.5YR 4/8) and few, medium, prominent mottles of dark red (10R 3/6); moderate, medium, subangular blocky structure; friable; common clay films on ped surfaces; about 7 percent plinthite; strongly acid; gradual, wavy boundary.

B23t—23 to 37 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, prominent mottles of red (2.5YR 5/8), dark red (10R 3/6), and light gray (10YR 7/1) in the lower part of the horizon; moderate, medium, subangular and angular blocky structure; firm; common clay films on ped surfaces; about 15 percent plinthite; the light gray areas are clean sand grains; strongly acid; gradual, wavy boundary.

B24t—37 to 65 inches, coarsely mottled red (10R 4/8), yellowish-brown (10YR 5/8), dark-red (10R 3/6), and light-gray (10YR 7/1) sandy clay loam; weak, medium, subangular blocky structure; firm; few clay films on ped surfaces; 4 percent plinthite; strongly acid.

The A1 horizon ranges from very dark gray to grayish brown. The clay content of the B2t horizon ranges from 18 to 25 percent. The plinthite content ranges from 5 to 15 percent, and the depth to it ranges from 16 to 24 inches.

The Cowarts soils occur with the Dothan, Fuquay, Wagram, and Duplin soils. They are similar to the Dothan soils but are shallower to plinthite. The Cowarts soils lack the thick sandy A horizon that is characteristic of the Fuquay and Wagram soils. The Cowarts B horizon is coarser textured and contains more plinthite than that of Duplin soils.

Cowarts loamy sand, 2 to 5 percent slopes (CqB).—This soil of the uplands is 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 representative of the series.

Included with this soil in mapping were small areas that are eroded. In these areas the yellowish-brown subsoil is exposed. Also included were small areas of the Dothan and Duplin soils in some delineations.

This soil is fairly well suited to cultivated crops and suited to pasture and pine trees. Some of the more important crops are corn, cotton, and soybeans.

Erosion is a moderate hazard in cultivated areas. If this soil is in cultivation, generally the farmer has a choice of four erosion control practices. He can cultivate in straight rows across slopes, on the contour with or without terraces, or with stripcropping. The choice depends on the crops grown and the extent of the soil limitations.

This soil should be managed in such a manner as to control erosion. The steepness and length of slopes or the erosion control practices installed govern the cropping system needed to accomplish this. An example of a suitable cropping system in areas where the slope is 400 feet long and the gradient is 3 percent is 2 years of corn followed by 4 years or more of a perennial grass or legume. This system can be practiced safely using straight rows across the slope.

This soil is suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. (Capability unit IIe–4; woodland suitability group 2o1)

Cowarts loamy sand, 5 to 8 percent slopes (CqC).—This sloping upland soil generally is on short to medium slopes between the less sloping ridgetops and the drainageways. It has the profile described as representative for the series.

In a few places, the surface is eroded, but a greater percentage of the total acreage is not eroded. Included with

this soil in mapping were small areas of Tifton, Carnegie, and Duplin soils.

Because of slope, runoff is rapid and the hazard of erosion is severe. This soil is better suited to trees or pasture than row crops. It can be cultivated, if it is managed so that runoff is reduced and erosion is held within allowable limits. Contour farming, terraces, and grassed outlets are needed. Among the suited crops are cotton, corn, soybeans, and small grain. 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 the soil is cultivated on the contour, an example of a suitable cropping system is 2 years of cotton or a similar row crop followed by 4 years of bahiagrass or a similar close-growing crop.

This soil is not well suited to irrigation. (Capability unit IVe–4; woodland suitability group 2o1)

Coxville Series

The Coxville series consists of poorly drained soils mainly along major streams that are subject to flooding several times each year. These soils formed in fine-textured, old alluvium that washed mostly from the Coastal Plain and partly from the Piedmont Plateau. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is dark-brown silt loam 4 inches thick. This layer is mostly overwash. The subsoil, to a depth of 60 inches or more, is gray clay having mottles of yellowish brown.

These soils are low to moderate in natural fertility, low to medium in organic-matter content, and very strongly acid throughout. Permeability is moderately slow. The available water capacity is medium. Tilth generally is poor, and the root zone is determined by the depth to the water table during the growing season.

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. The native vegetation consists chiefly of hardwoods, but there are a few loblolly and spruce pines.

Coxville soils were mapped only in an undifferentiated soil group with the Duplin soils.

Representative profile of Coxville silt loam in an area of Coxville and Duplin soils, in a wooded area 5 miles south of Uvalda, Georgia, on U.S. Highway No. 221, and 300 yards southeast of river bridge, Montgomery County:

A—0 to 4 inches, dark brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; sticky; many fine roots; very strongly acid; abrupt, smooth boundary.

B21tg—4 to 40 inches, gray (5Y 6/1) clay; many, fine and medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; very sticky; common clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22tg—40 to 60 inches, gray (5Y 6/1) clay; few, fine and medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; very sticky; common clay films on ped surfaces; very strongly acid.

The A horizon ranges from silt loam to loam or fine sandy loam in texture, from dark brown to very dark gray in color, and from 2 to 12 inches in thickness. The Bg horizon ranges from sandy clay to clay, and from light gray to dark gray. It has a few to many mottles in shades of yellow to brown.

The Coxville soils occur closely with the Duplin and Wahee soils but are more poorly drained and occupy slightly lower positions than those soils.

Coxville and Duplin soils (Cod).—This mapping unit is mostly along the Oconee, Ocmulgee, and Altamaha Rivers. Flooding occurs more than once each year and lasts from 2 days to about 1 month. Slopes range from 0 to 2 percent.

Each of the major soils does not occur in every mapped area in a repeating pattern, but at least one of the major components is in each delineation. Generally, for the total mapping unit, the proportion of soils is about 48 percent Coxville soils and 32 percent Duplin soils. Mapping Coxville and Duplin soils separately would serve no useful purpose, because all areas have similar limitations to use.

The poorly drained Coxville soil has the profile described as representative for the series. Depth to the water table fluctuates, but it is at a depth of less than 15 inches for 2 to 6 months of the year.

The Duplin soil has a profile very similar to the one described as representative for the series. This soil is moderately well drained. Its water table fluctuates but is at a depth of about 15 to 30 inches for periods of 1 to 2 months each year. The surface layer of these Coxville and Duplin soils ranges from silt loam to loamy sand.

Included with these soils in mapping were small areas of Wahee soils and recent alluvial areas that contain shallow sloughs and remnants of old stream channels. These areas make up about 20 percent of this mapping unit.

Because flooding is a hazard, these soils are not in cultivation or pasture. The entire acreage is in trees, mostly hardwoods and scattered pines. 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 the permeability is moderately slow to slow. 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; woodland suitability group 2w9).

Craven Series

The Craven series consists of moderately well drained soils formed in beds of clay. They are on the lower parts of side slopes near drainageways and on narrow ridge crests. Slopes range from 2 to 8 percent.

In a typical profile, the surface layer is very dark gray loamy sand about 4 inches thick. Below the surface layer is yellowish-brown loamy sand about 8 inches thick. The upper 4 inches of the subsoil is chiefly yellowish-brown sandy clay loam. Below this is mottled light-gray, strong-brown, and dark-red plastic clay. At a depth of 36 inches, the subsoil is light-gray, firm sandy clay mottled with brownish yellow and pale red. Below a depth of 50 inches is light-gray, soft, weathered sandstone having pockets and veins of sandy clay.

These soils are low in natural fertility, low in organic-matter content, and strongly acid to very strongly acid throughout. Permeability is slow, and the available water

capacity is medium. The root zone is shallow, but tilth generally is good.

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

Representative profile of Craven loamy sand, in an area of Craven soils, 2 to 8 percent slopes, in planted pine forest, 3.3 miles northwest of railroad crossing in Glenwood, Georgia, along paved county road, 0.8 mile north of paved road on dirt road, 25 feet west, Wheeler County:

A1—0 to 4 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; very friable; common clean sand grains; few pebbles; common fine roots; strongly acid; clear, smooth boundary.

A2—4 to 12 inches, yellowish-brown (10YR 5/4) loamy sand; weak, fine, granular structure; very friable; common worm castings; strongly acid; clear, wavy boundary.

B1t—12 to 16 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, faint, strong-brown mottles; weak, medium, subangular blocky structure; friable; common worm castings; sand grains coated and bridged with clay; very strongly acid; clear, wavy boundary.

B2t—16 to 36 inches, mottled light-gray (10YR 7/1), strong-brown (7.5YR 5/6), and dark-red (10R 3/6) clay; 40 percent of soil mass is light gray; strong, medium, angular blocky structure; plastic; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B3tg—36 to 50 inches, light-gray (10YR 7/1) sandy clay; common, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, medium, prominent, pale-red (10R 6/3) mottles; weak, medium, subangular blocky structure; firm; clay films on some ped surfaces, very strongly acid; gradual, wavy boundary.

C—50 to 54 inches, light-gray (5Y 7/1), soft, weathered sandstone having pockets and veins of sandy clay; with difficulty, sandstone can be cut with hand auger.

The A1 horizon ranges from 7 to 12 inches in thickness, from grayish brown to very dark gray in color, and from loamy sand to sandy loam in texture. The B1 horizon is absent in some places. The depth to soft sandstone ranges from 40 to 60 inches, and the depth to intermittently hard sandstone rock ranges from about 48 to 84 inches.

The Craven soils occur with the Wagram and Duplin soils. Craven soils are much shallower to the C horizon and have a more clayey B2t horizon than the Wagram soils. They are similar to the Duplin soils but are shallower to the C horizon.

Craven soils, 2 to 8 percent slopes (CxC).—This mapping unit is mostly on the lower parts of side slopes and on narrow ridge crests. It is an undifferentiated group of Craven soils that has a surface layer that ranges from loamy sand to sandy loam. Soil makeup varies from one delineation to the other, but the Craven soil is dominant. Several other soils occur within most areas, but in minor percentages. Mapping these other soils separately would serve no useful purpose, because all of them have similar limitations for use and they occupy a small total acreage.

Included with these soils in mapping were small areas of sandstone rock outcrop.

Soils of this mapping unit have good tilth in the surface layer; however, the depth of the root zone and slow permeability limit their usefulness for cultivated crops. Only a small acreage is in cultivation or pasture. Some suited crops are corn, soybeans, and small grain. Among the suited pasture and hay plants are Coastal bermudagrass, bahiagrass, sorghum, and millet. In cultivated areas erosion is a severe hazard and intensive management is needed for protection from erosion and for increasing the intake of water. 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 in areas where the slopes are 100 feet long and the gradient is 5 percent, an example of a suitable cropping system is 2 years of corn, soybeans, or a similar row crop, followed by 3 years or more of bahiagrass or a similar close-growing crop. Irrigation is not practical, because the productivity of these soils is low. (Capability unit IIIe–3; woodland suitability group 3w2)

Dothan Series

The Dothan series consists of well-drained soils of the uplands. These soils formed in beds of loamy materials. Slopes range from 1 to 5 percent.

In a typical profile, the surface layer is grayish-brown loamy sand about 9 inches thick. Below this is light yellowish-brown loamy sand about 3 inches thick. The subsoil is brownish-yellow, very friable sandy loam to a depth of 17 inches. Below this, to a depth of 41 inches, is yellowish-brown friable sandy clay loam. Below this, to a depth of 70 inches, the subsoil is yellowish brown prominently mottled with red, light gray, and yellowish red. Plinthite occurs at a depth of 41 inches.

These soils are low to moderate in natural fertility, are very strongly acid throughout, and are low in organic-matter content. The available water capacity is medium, and permeability is moderately slow. Tilth generally is good, and the root zone is mainly deep.

These soils are better suited to farming than to other uses. They are well suited to most locally grown crops. Crops on them respond well to good management that includes heavy fertilization. Most of the acreage is in cultivation or pasture. The native vegetation consists chiefly of mixed pines and scattered hardwoods and an understory of native grasses, mostly wiregrass.

Representative profile of Dothan loamy sand, 1 to 5 percent slopes, in a cultivated field 0.1 mile west of Cobb Creek along State Route 56; 0.8 mile north on dirt county road, 1.8 miles northeast along another dirt road; 400 yards east of road, Toombs County:

Ap—0 to 9 inches, grayish-brown (10YR 5/2) loamy sand; weak, fine, granular structure; very friable; very strongly acid; abrupt, smooth boundary.

A2—9 to 12 inches, light yellowish-brown (2.5Y 6/4) loamy sand; common, medium, distinct mottles of grayish brown (10 YR 5/2); weak, fine, granular structure; very friable; very strongly acid; clear, smooth boundary.

B1t—12 to 17 inches, brownish-yellow (10YR 6/8) sandy loam; few fine and medium splotches of grayish-brown (10YR 5/2) loamy sand from the A horizon; weak, medium, subangular blocky structure; very friable; common fine root pores; very strongly acid; gradual, wavy boundary.

B21t—17 to 41 inches, yellowish-brown (10YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; few clay films on ped surfaces; few medium-size iron concretions; common fine root pores in upper 15 inches; very strongly acid; gradual, wavy boundary.

B22t—41 to 58 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, fine and medium, prominent, red (2.5YR 4/8) and yellowish-red 5(YR 5/8) mottles and few, fine, distinct, light-gray mottles; moderate,

medium, subangular blocky structure; friable; about 10 percent plinthite; few clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—58 to 70 inches, mottled yellowish-brown (10YR 5/8), red (10R 4/6), yellowish-red (5YR 4/8), and light-gray (10YR 7/1) sandy clay loam; moderate, medium, subangular blocky structure; friable to firm; about 5 percent plinthite; few clay films on ped surfaces; very strongly acid.

The Ap horizon ranges from 7 to 12 inches in thickness and from grayish brown to very dark grayish brown. The A2 horizon ranges from 2 to 10 inches in thickness. The clay content of the B horizon ranges from 20 to 30 percent. Depth to plinthite is between 32 and 56 inches, and the estimated content ranges from 5 to 10 percent.

The Dothan soils occur with the Tifton, Stilson, and Fuquay soils. The Dothan soils closely resemble the Tifton soils, but they contain fewer iron concretions and have a slightly coarser textured B2t horizon. 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, 1 to 5 percent slopes (DaB).—This soil generally is in moderately small areas on ridgetops and side slopes.

Included with this soil in mapping were a few areas that are eroded and a few small areas where the slopes range to 8 percent.

This is one of the better soils for farming. It is well suited to most locally grown crops, and it is extensively used for corn, cotton, tobacco, soybeans, and truck crops. It is also well suited to pasture plants and to pine trees. Some of the well-suited pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, lupines, millet, sericea lespedeza, and vetch. Nursery crops, peaches, pecans, and other orchard crops also grow well.

Erosion is a moderate hazard in cultivated areas. If this soil is cultivated, generally the farmer has a choice of four erosion control practices. He can cultivate (1) in straight rows across slope; (2) on the contour without terraces; (3) on the contour with terraces; or (4) with stripcropping. The choice depends on the crops grown and the extent of the soil limitations.

The soil should be managed in such a manner as to control erosion. The steepness and length of slopes or the erosion control practices installed govern the minimum cropping system needed to accomplish this. An example of a suitable cropping system in areas where the slopes are 400 feet long and the gradient is 3 percent is 2 years of corn followed by 4 years or more of a perennial grass or legume. This system can be used safely using straight rows across the slope.

This soil is well suited to irrigation. Row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. (Capability unit IIe–1; woodland suitability group 2o1)

Duplin Series

The Duplin series consists of moderately well drained soils on the uplands and stream terraces. These soils formed in clayey marine sediments. Slopes range from 0 to 8 percent.

In a typical profile, the surface layer is grayish-brown loamy sand about 7 inches thick. Below this is light brownish-gray loamy sand about 7 inches thick. The subsoil is yellowish-brown, friable, sandy clay loam to a depth of 18 inches. Below this, to a depth of 52 inches, is mottled red, light-gray, and strong-brown, friable or firm sandy clay. The next layer, to a depth of about 62 inches, is light-gray, friable sandy clay mottled with strong brown and weak red.

These soils are low in natural fertility, low in organic-matter content, and very strongly acid throughout. Permeability is slow, and the available water capacity is medium. The tilth is good, and the root zone is mainly moderately deep.

Most of the acreage is in pine trees and it is well suited to that use. A small acreage is in pasture and in cultivation. Corn and soybeans are the main cultivated crops grown. The native vegetation consists chiefly of mixed pines and hardwoods.

Duplin soils were mapped in two undifferentiated soil groups with Coxville and Wagram soils.

Representative profile of Duplin loamy sand, in an area of Wagram and Duplin soils, 2 to 8 percent slopes, in a wooded area 3.7 miles northwest of Stuckey on paved county road and 0.3 mile northeast on dirt road, Wheeler County:

A1—0 to 7 inches, grayish-brown (10YR 5/2) loamy sand; weak, fine, granular structure; very friable; very strongly acid; gradual, smooth boundary.

A2—7 to 14 inches, light brownish-gray (2.5Y 6/2) loamy sand; weak, medium, granular structure; very friable; very strongly acid; gradual, smooth boundary.

B1t—14 to 18 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, medium, distinct mottles of yellowish red (5YR 5/8); weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

B21t—18 to 40 inches, mottled red (10R 4/6), light-gray (5Y 7/1), and strong-brown (7.5YR 5/8) sandy clay; moderate, fine, angular blocky structure; firm; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—40 to 52 inches, mottled strong-brown (7.5YR 5/8), red (2.5YR 4/8), and light-gray (5Y 7/1) sandy clay; moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—52 to 62 inches, light-gray (5Y 6/1) sandy clay; common, medium, distinct mottles of strong brown (7.5YR 5/8) and weak red (10R 5/4); moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; very strongly acid.

The A1 horizon ranges from grayish brown to dark grayish brown and from loamy sand to fine sandy loam. The total thickness of the A horizon ranges from 6 to 14 inches. The B1t horizon ranges from yellow to strong brown and from sandy clay loam to sandy clay. The B2t horizon ranges from sandy clay to clay.

The Duplin soils occur with the Coxville, Wagram, Cowarts, and Craven soils. They are better drained and occupy higher positions on the landscape than the Coxville soils. The Duplin soils contain more clay in the B horizon than the Cowarts soils and lack the plinthite that occurs in the B horizon of those soils. The Duplin soils lack the thick A horizon common to the Wagram soils and have more clay in the B horizon. They are similar to the Craven soils but are much deeper to the C horizon.

Fuquay Series

The Fuquay series consists of well-drained, nearly level to very gently sloping soils on uplands. These soils formed in marine sand and sandy clay loam materials. Slopes range from 1 to about 5 percent.

In a typical profile, the surface layer is dark-gray loamy sand about 5 inches thick. Below the surface layer, to a depth of 26 inches, is light yellowish-brown loamy sand. The subsoil extends to a depth of more than 60 inches. It is yellowish-brown sandy loam in the uppermost 4 inches and chiefly brownish-yellow sandy clay loam below. Prominent mottles of red begin at a depth of 30 inches. As depth increases, the red mottles increase and light-gray mottles begin at a depth of about 41 inches. Plinthite also occurs at a depth of about 41 inches.

The Fuquay soils are low in natural fertility, low in organic-matter content, and very strongly acid throughout. Permeability is rapid in the upper horizons and slow in the subsoil. The available water capacity is low to medium. The root zone is deep, and tilth generally is good.

These soils are generally well suited to most locally grown crops, and they respond well to good management. Much of the acreage is cultivated or in pasture. A considerable acreage is in pines, which is a good use. The native vegetation consists of mixed hardwoods and pines and an understory of wiregrass and native grasses.

Representative profile of Fuquay loamy sand, 1 to 5 percent slopes, in a wooded area 1.2 miles west of Snow Hill Church, along paved county road, 25 feet north of road, Wheeler County:

A1—0 to 5 inches, dark-gray (10YR 4/1) loamy sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, smooth boundary.

A2—5 to 26 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, medium, granular structure; very friable; few fine and medium root pores; very strongly acid; clear, smooth boundary.

B1t—26 to 30 inches, yellowish-brown (10YR 5/6) sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; very strongly acid; clear, smooth boundary.

B21t—30 to 41 inches, brownish-yellow (10YR 6/8) sandy clay loam; few, medium, prominent, red (10R 4/8) mottles; moderate, medium, subangular blocky structure; friable; few clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—41 to 57 inches, brownish-yellow (10YR 6/8) sandy clay loam; common, medium, prominent mottles of red (2.5YR 4/8); common, medium, distinct, light-gray (10YR 7/1) mottles; moderate, medium, subangular blocky structure; firm; about 8 percent plinthite; clay films on some ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—57 to 80 inches, coarsely mottled yellowish-brown (10YR 5/8), light-gray (10 YR 7/1), red (10R 4/6), and weak-red (10R 4/3) sandy clay loam; weak and moderate, medium, subangular blocky structure; firm; clay films on some ped surfaces; very strongly acid.

The A1 horizon ranges from dark gray to grayish brown, and the A2 horizon ranges from light yellowish brown to pale brown. The combined thickness of the A1 and A2 horizons ranges from 20 to 36 inches. The clay content of the B horizon ranges from 20 to 30 percent. The depth to 5 percent or more of plinthite ranges from 36 to 58 inches.

Fuquay soils commonly occur with the Dothan, Lakeland, Troup, and Stilson soils. These soils have a thicker sandy A horizon than the Dothan soils. They are not so sandy as the Lakeland and Troup soils, in which sand extends from the surface to a depth of more than 40 inches. These Fuquay soils are better drained than the Stilson soils and generally occupy higher positions.

Fuquay loamy sand, 1 to 5 percent slopes (FsB).—This sandy soil of the uplands generally is in fairly large areas on broad ridgetops. Some areas are as much as 50 acres in size. Because the surface layer is thick and sandy, this soil is slightly droughty.

Included with this soil in mapping were a few small areas where slopes range to 8 percent.

This Fuquay soil is extensively cultivated and is suited to most locally grown crops, but plant growth may be impaired by shortage of water during extended dry periods and by leaching of fertilizer in wet seasons. Crops respond well to good management that provides adequate lime and large amounts of fertilizer. Among the suitable crops are corn, cotton, soybeans, and other row crops. Oats, rye, and other small grain also grow well if management is good. Lupines, beggarweed, and velvetbeans are suited; legumes, Coastal bermudagrass, and bahiagrass are suitable grasses. This soil is also suited to pecans (fig. 4), to many truck crops and nursery crops, and to pine trees.

In large open fields this soil is subject to soil blowing. 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 a hazard, but it can be reduced by using contour tillage, terraces, vegetated waterways, and stripcropping. Also, a fertilized, close-growing crop is needed in the cropping system. An example of a suitable cropping system where farming is in straight rows is 2 years of a suitable row crop and 2 years or more of a perennial sod crop. Such a system provides large amounts of organic matter and increases the available water capacity.

This soil is well suited to irrigation. Both row crops and pasture plants respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. (Capability unit IIs–1; woodland suitability group 3s2)

Grady Series

The Grady series consists of poorly drained, dark-colored, level soils in depressions. These soils formed in beds of sandy clay and clay.

In a typical profile, the surface layer is very dark brown loam about 5 inches thick. The subsoil, to a depth of 10 inches, is light-gray clay loam, and it is underlain by light-gray mottled clay to a depth of 43 inches. Below this, to a depth of more than 65 inches, is light-gray sandy clay. Prominent mottles of brownish yellow and red begin at a depth of about 10 inches.

These soils are low in natural fertility, are very strongly acid throughout, and are low to moderate in organic-matter content. Permeability is slow, and available water capacity is medium. Tilth is only fair to good. The depth to which roots generally penetrate is determined by the depth to the water table during growing season.

Almost all the acreage is in 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. The native vegetation consists dominantly of cypress, a few blackgum, tupelo-gum, and an understory of gallberry and swamp holly.

Representative profile of Grady loam from an area of Grady soils in a cultivated field, 0.25 mile east of intersection of State Routes 147 and 107, along State Route 147, 200 yards south of highway, Toombs County:

Ap—0 to 5 inches, very dark brown (10YR 2/2) loam; weak, fine, granular structure; friable; many medium and fine roots; very strongly acid; abrupt, smooth boundary.

Figure 4.—**Well-managed pecan orchard and bahiagrass on Fuquay loamy sand, 1 to 5 percent slopes.**

B1tg—5 to 10 inches, light-gray (10YR 7/2) clay loam; few, fine, prominent mottles of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; sticky; clay films on ped surfaces; very strongly acid; clear, wavy, boundary.

B21tg—10 to 20 inches, light-gray (10YR 7/2) clay; common, medium, prominent mottles of brownish yellow (10YR 6/6) and red (10R 4/6); strong, medium, angular blocky structure; plastic; common clay films on ped surfaces; very strongly acid; clear, wavy boundary.

B22tg—20 to 43 inches, light-gray (10YR 7/2) clay; few, fine, distinct mottles of brownish yellow; strong, medium, angular blocky structure; plastic; common clay films on ped surfaces; very strongly acid; clear, wavy boundary.

IIB23tg—43 to 65 inches, light-gray (10YR 7/1) sandy clay; common, coarse, prominent mottles of red (2.5YR 5/8) and strong brown (7.5YR 5/8); strong, coarse, angular blocky structure; firm; very strongly acid.

The A horizon ranges from very dark brown to dark gray or very dark gray. The B21tg horizon is dominantly clay, but it is sandy clay in a few areas. The B horizon ranges from light gray to dark gray and has few to many mottles in shades of brown, yellow, and red.

The Grady soils commonly occur with the Tifton, Dothan, Irvington, Ardilla, and Pelham soils. These soils are more clayey in the subsoil and more poorly drained than the Tifton, Dothan, Irvington, and Ardilla soils. They are similar to the Pelham soils in drainage but are finer textured throughout the profile.

Grady soils (GrD).—These poorly drained soils are in depressions and sinks about 3 to 15 acres in size. Slopes range from 0 to 2 percent. The surface layer commonly is fine sandy loam, sandy loam, or loam. Generally, the soil with the finer textured surface layer is in the lower position near the center of depressions. These areas also may have 3 or 4 inches of organic material on the surface.

The soils are 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.

Excess water limits the suitability of these soils, 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.

These soils are well suited to trees, but drainage is needed to encourage natural reproduction and to insure the maximum growth of planted trees. (Capability unit Vw-1; woodland suitability group 2w9)

Irvington Series

The Irvington series consists of moderately well drained soils on low uplands that have a fragipan. These soils formed in beds of sandy clay loam materials. Slopes range from 0 to 3 percent.

In a typical profile, the surface layer is dark grayish-brown loamy sand about 7 inches thick. The subsoil, to a depth of 60 inches, is sandy clay loam. It is yellowish brown in the upper part and light yellowish brown, mottled with strong brown and gray, in the middle part. The fragipan begins at a depth of 26 inches and extends to more than 60 inches. It consists of coarsely mottled strong-brown, light-gray, very pale brown, and red, firm and brittle sandy clay loam that is weakly cemented with iron. Small, rounded iron concretions are on the surface and throughout the profile.

These soils are low to moderate in natural fertility, low in organic-matter content, and very strongly acid to strongly acid throughout. Permeability is slow, and avail-

able water capacity is medium. The root zone is generally moderately deep, and tilth generally is good.

Much of the acreage is in corn, soybeans, tobacco, and truck crops, for which the soil is well suited. Drainage generally is needed if cultivated crops are grown. These soils are also well suited to pasture and to pine trees, and most of the acreage is in pines. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry and wiregrass.

Representative profile of Irvington loamy sand in a cultivated field 0.5 mile east of junction of State Routes 147 and 107, along State Route 147, 200 feet south of highway, Toombs County:

Apcn—0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; 5 percent iron concretions; strongly acid; abrupt, smooth boundary.

B1cn—7 to 19 inches, yellowish-brown (10YR 5/4) sandy clay loam; few, fine, faint mottles of dark brown; weak, fine, subangular blocky structure; friable; 5 percent iron concretions; common fine roots; very strongly acid; clear, wavy boundary.

B2cn—19 to 26 inches, light yellowish-brown (10YR 6/4) sandy clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/8); few, fine, prominent gray mottles in the lower 3 inches; weak, medium, subangular blocky structure; friable; 10 percent iron concretions; 3 percent plinthite; clay films on some ped surfaces; very strongly acid; clear, wavy boundary.

Bx1—26 to 48 inches, coarsely mottled strong brown (7.5YR 5/8), light gray (10YR 7/1), very pale brown (10 YR 7/3), and red (2.5YR 5/8) sandy clay loam; moderate, medium, angular blocky structure; firm, brittle; few iron concretions; 8 percent plinthite; very strongly acid; gradual, wavy boundary.

Bx2—48 to 60 inches, coarsely mottled yellowish-brown (10YR 5/8), strong-brown (7.5YR 5/8), light-gray (10YR 7/1), and reddish-yellow (5YR 6/6) sandy clay loam; weak, fine, subangular blocky structure; firm, brittle; 3 percent plinthite; strongly acid.

The A horizon is dark grayish brown or dark gray and ranges from 7 to 16 inches in thickness. The B1cn and B2cn horizons range from light yellowish brown to yellowish brown. The size of iron concretions in the Ap, B1cn, and B2cn horizons ranges from ⅛ to 1 inch and from 5 percent to 15 percent. The Bx1 horizon also has about 2 to 10 percent iron concretions. The amount of plinthite in the Bx1 ranges from 5 to 15 percent, and from 2 to 8 percent in the Bx2. The depth to the fragipan and plinthic layer ranges from 25 to 32 inches.

The Irvington soils occur with the Stilson, Tifton, Ardilla, and Pelham soils. They are similar to the Stilson soils in drainage, but the Stilson soils have a thicker A horizon and lack a fragipan in the subsoil. The Irvington soils are better drained than the Ardilla soils, which do not have a fragipan. Irvington soils occupy higher positions and are better drained than the Pelham soils. They are less well drained and have more mottles in the subsoil than the Tifton soils.

Irvington loamy sand (Ir).—This soil of the low uplands has a fragipan. Generally this soil is in areas 4 to 10 acres in size that are adjacent to but slightly higher than ponded areas and the drainageways. Slopes range from 0 to 3 percent. The water table is at a depth of about 15 to 30 inches for periods of 1 or 2 months each year.

Included with this soil in mapping were small areas of Ardilla and Stilson soils.

A moderate acreage of this soil is in cultivation or pasture. Corn and tobacco are the chief crops. Crops respond well to liming and heavy fertilization. Use for row crops is somewhat limited by excess water, but corn, tobacco, sorghum, soybeans, and truck crops grown in the summer are well suited. Suitable pasture and hay plants are Pensacola bahiagrass, Coastal bermudagrass, lespedeza, white clover, and millet.

Because this soil is in low-lying areas and has a high water table, drainage is generally needed if cultivated crops are planted, but water management will depend on the crop to be grown. If drainage is needed, a system of main and lateral ditches can be designed and installed. Either open ditches or covered tile drains can be used.

On this soil 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. A planned sequence of crops aids in the control of weeds, insects, disease, and makes more efficient use of fertilizer.

During dry periods in summer, the supply of moisture may not be adequate for cultivated crops and pasture plants. Crops respond well if supplemental water is applied at this time. This soil is suited to irrigation. (Capability unit IIw–2; woodland suitability group 2o7)

Kershaw Series

The Kershaw series consists of excessively drained, dunelike soils of the uplands. These soils formed in thick beds of sand. Slopes range from 2 to 8 percent.

In a typical profile, the surface layer is dark grayish-brown sand about 2 inches thick. Below this, to a depth of about 80 inches, is sand that is yellowish brown in the upper part and pale brown in the lower part.

These soils are very strongly acid throughout, are very low in natural fertility, and are low in organic-matter content. The available water capacity is very low, and permeability is rapid. The root zone is deep, and tilth generally is good. These soils are some of the droughtiest of any of the soils in these three counties.

Because these soils are droughty, only a small acreage is in cultivation. Almost all the acreage is in scrub oaks and scattered pines, but trees do not grow well. The native vegetation consists of turkey oak, bluejack oak, a few scattered longleaf pines, and a sparse understory of wiregrass and native weeds. Mosses and lichens are on the surface in many areas.

Representative profile of Kershaw sand, 2 to 8 percent slopes, in a wooded area 0.5 mile northeast of the Little Ocmulgee River, along State Route 19; 50 feet west, Wheeler County:

A—0 to 2 inches, dark grayish-brown (10YR 4/2) sand; single grain; loose; many fine and medium roots; most sand grains coated with organic matter; very strongly acid; abrupt, smooth boundary.

C1—2 to 48 inches, yellowish-brown (10YR 5/4) sand; single grain; loose; few, medium roots; very strongly acid; gradual, wavy boundary.

C2—48 to 80 inches, pale-brown (10YR 6/3) sand; single grain; loose; few medium roots; very strongly acid.

The A horizon ranges from dark grayish brown to dark gray. The C1 horizon ranges from pale yellow to yellowish brown.

The Kershaw soils occur with the Paola, Lakeland, and Troup soils. The Kershaw soils lack the layer stained with organic matter that is in the B horizon of the Paola soils. These Kershaw soils contain less clay and silt and are more undulating and dunelike than the Lakeland and Troup soils.

Kershaw sand, 2 to 8 percent slopes (KdC).—This sandy soil is on ridges and hillsides near the bottom lands of the major streams. It generally is in long, fairly broad areas that are as much as 50 to 60 acres in size.

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

Because this soil is one of the droughtiest in these three counties, and because its available water capacity and natural fertility are very low, it is not generally used for cultivated crops. Almost all the acreage is in scrub oaks and scattered pines. Some areas are being cleared and planted to pines or Coastal bermudagrass. (Capability unit VIIs-1; woodland suitability group 5s3)

Lakeland Series

The Lakeland series consists of excessively drained soils that formed in thick beds of sand. Slopes range from 0 to 8 percent.

In a typical profile, sand extends from the surface to a depth of 80 inches or more. It is very dark gray in the upper 3 inches, yellow or light yellowish brown to a depth of 54 inches, and very pale brown below 54 inches to a depth of 80 inches.

Lakeland soils are strongly acid throughout and very low in natural fertility. They are low in organic-matter content. Permeability is rapid, and the available water capacity is very low. These soils have a deep root zone and generally are in good tilth. Except in irrigated areas, the response to fertilization is fair.

Only a small acreage of these soils is in cultivation. A small part is in pasture. Most of the acreage is woodland. A considerable acreage has been planted to slash pine. The native vegetation consists chiefly of turkey oak, scrub oak, and bluejack oak. There are a few scattered longleaf pines and a sparse understory of wiregrass and common weeds.

Lakeland soils were mapped only in an undifferentiated soil group with the Troup soils.

Representative profile of Lakeland sand, in an area of Lakeland and Troup soils, 0 to 8 percent slopes, in a wooded area about 2 miles south of Vidalia, 50 yards north of Poplar Springs Church, Toombs County:

A—0 to 3 inches, very dark gray (10YR 3/1) sand; single grain; loose; strongly acid; clear, wavy boundary.

C1—3 to 26 inches, yellow (10YR 7/6) sand; single grain; loose; strongly acid; gradual, wavy boundary.

C2—26 to 54 inches, light yellowish-brown (10YR 6/4) sand; single grain; loose; strongly acid; gradual, wavy boundary.

C3—54 to 80 inches, very pale brown (10YR 7/4) sand splotched with few, fine, faint mottles of light yellowish brown; single grain; loose; strongly acid.

The A horizon ranges from very dark gray to brown. The C1 and C2 horizons range from pale yellow to yellowish brown. Sand grains in C horizon are coated with silt and clay. The content of silt and clay ranges between 5 and 10 percent in the C horizon.

The Lakeland soils occur with the Troup, Fuquay, and Kershaw soils. Lakeland soils are coarser textured in the lower horizons than the Troup and Fuquay soils. They are less droughty than the Kershaw soils and contain slightly more silt and clay.

Lakeland and Troup soils, 0 to 8 percent slopes (LTC).—This mapping unit is on large areas, and some areas are as much as 60 acres in size. The surface texture is variable ranging from sand to loamy fine sand.

Each of the major soils does not occur in every mapped area in a repeating pattern, but at least one of the major components is in each delineation. Generally, for the total mapping unit the proportion of soils is about 60 percent Lakeland soils and 30 percent Troup soils. Mapping Lakeland and Troup soils separately would serve no useful purpose, because all areas have similar limitations to use.

The excessively drained Lakeland soil has the profile described as representative of the series.

The well-drained Troup soil has the profile described as representative of the series.

Only a small acreage of these soils are in cultivation. A small part is in pasture, but most of the acreage is in woodland.

Because these soils are sandy and droughty, their suitability for plants is limited. Corn and soybeans are better suited than most other crops commonly grown in these counties.

Among the better suited pasture and hay plants are Pensacola bahiagrass, Coastal bermudagrass (fig. 5), and Suwannee bermudagrass. Even where management is good, the organic materials are rapidly depleted. Frequent applications of fertilizer are required for best crop response.

Because infiltration and permeability are chiefly rapid, erosion generally is not a hazard. Large additions of organic materials are needed to increase available water capacity and productivity. If cultivated in straight rows, corn can be grown year after year if a mulch is used and the crop residue is left on the surface as winter cover. (Capability unit VIs–1; woodland suitability group 4s2)

Mascotte Series

The Mascotte series consists of poorly drained soils that have an organically cemented underlying layer. These soils formed in moderately thick beds of sandy and loamy materials. They are on nearly level lowlands. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is very dark gray sand about 8 inches thick. Below this, to a depth of 16 inches, is light-gray sand. Below 16 inches, and to a depth of 21 inches, is sand that is weakly cemented with organic matter. It is dark reddish brown in the upper part and mottled brown and dark reddish brown in the lower part, and it responds as a hardpan. This layer is underlain by light-gray, loose loamy sand to a depth of 38 inches. Below this, to a depth of 65 inches, is mottled yellowish-brown and light-gray friable sandy clay loam.

Mascotte soils are low in natural fertility, low in organic-matter content, and strongly acid to very strongly acid throughout. The available water capacity is low, and permeability is moderate. These soils tend to be extremely wet in wet seasons and slightly droughty in dry seasons. The organically cemented layer limits the depth of growth of most plant roots; therefore, these soils have mainly a shallow root zone. Tilth is fair to good.

These soils are only fairly well suited to cultivated crops after drainage. All of the acreage is woodland. The native vegetation consists of a sparse stand of stunted pines and an undergrowth of saw palmetto, gallberry, huckleberry, runner oak, and wiregrass.

Figure 5.—**Coastal bermudagrass cut for hay on Lakeland and Troup soils, 0 to 8 percent slopes.**

Representative profile of Mascotte sand in a wooded area 3.5 miles east of junction of State Route 19 on Bells Ferry Landing road, 200 yards north and 50 feet east of woods road, Wheeler County:

A1—0 to 8 inches, very dark gray (10YR 3/1) sand; weak, fine, granular structure; very friable; strongly acid; clear, wavy boundary.

A2—8 to 16 inches, light-gray (10YR 7/1) sand; single grain; loose; few small and medium roots; sand grains uncoated; very strongly acid; abrupt, wavy boundary.

Bh1—16 to 18 inches, dark reddish-brown (5YR 3/2) sand; many, medium, faint mottles of dark brown (7.5YR 3/2); massive to weak, medium, subangular blocky structure; friable, slightly brittle; tongues of A2; weakly cemented with organic matter; very strongly acid; clear, irregular boundary.

Bh2—18 to 21 inches, coarsely mottled brown (10YR 5/3) and dark reddish-brown (5YR 3/2) sand; massive to weak, medium, subangular blocky structure; friable; weakly cemented with organic matter; very strongly acid; clear, irregular boundary.

A'2—21 to 38 inches, gray (10YR 6/1) loamy sand; single grain; loose; very strongly acid; clear, wavy boundary.

B'tg—38 to 65 inches, mottled yellowish-brown (10YR 5/8) and light-gray (10YR 7/1) sandy clay loam; few medium pockets of sandy loam; weak, medium, subangular blocky structure; friable; few clay films on ped surfaces; strongly acid.

The A1 horizon ranges from 4 to 8 inches in thickness, and from dark gray to very dark gray. The A2 horizon ranges from 8 to 14 inches in thickness, and from light gray to gray. The depth from the surface to the Bh layer ranges from 12 to 22 inches. The depth to the B'tg horizon ranges from 28 to 38 inches.

The Mascotte soils occur with the Ocilla and Pelham soils. The Mascotte soils differ from these soils in having a highly leached layer underlain by a definite Bh layer.

Mascotte sand (Mn).—This poorly drained soil is on lowlands. Slopes range from 0 to 2 percent.

Included with this soil in mapping were small areas of the Ocilla and Pelham soils.

Because the water table fluctuates, this soil is wet in rainy periods and slightly droughty in dry periods. The water table is at a depth of about 15 to 30 inches for 2 to 6 months each year. Permeability is somewhat inhibited by the organically cemented layer.

Because of the high water table and chiefly shallow root zone, this soil is only fairly well suited to cultivated crops after drainage. The more common truck crops, such as beans, turnips, and potatoes, are fairly well suited and can be grown year after year under good management. Permanent pasture is fairly well suited if management is good. Pine trees are suited, but the rate of growth is not so great as on some of the associated soils. All of the acreage is wooded. (Capability unit IIIw–4; woodland suitability group 3w2)

Maxton Series

The Maxton series consists of well-drained soils on stream terraces. They formed in thin beds of old loamy alluvium that are underlain by sandy alluvium. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is brown loamy sand about 4 inches thick. The subsoil is chiefly red friable sandy clay loam to a depth of 22 inches, and below that, to a depth of about 36 inches, is friable yellowish-red sandy loam. Below this and to a depth of 60 inches is

friable to loose yellowish-red, loamy coarse sand or loamy sand.

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

Most of the acreage is woodland. Because of their remote location, only a few areas are in cultivation. Corn and soybeans are the chief crops. These soils are well suited to pasture. The native vegetation is mainly mixed pines, water oak, sweetgum, and an understory of sparkleberry and wiregrass.

Representative profile of Maxton loamy sand, in an area of Maxton soils, in a wooded area 2.8 miles northwest of Bells Ferry Landing bridge, along the Oconee River, 100 feet southwest of river, Wheeler County:

Ap—0 to 4 inches, brown (7.5YR 4/4) loamy sand; weak, fine, granular structure; very friable; very strongly acid; abrupt, smooth boundary.

B1t—4 to 6 inches, brown (7.5YR 4/4) sand loam; few, fine, distinct mottles of red; weak, medium, subangular blocky structure; very friable; very strongly acid; clear, smooth boundary.

B21t—6 to 22 inches, red (2.5YR 4/6) sandy clay loam; few, fine, distinct mottles of dark yellowish brown; moderate, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid; gradual, wavy boundary.

B22t—22 to 36 inches, yellowish-red (5YR 4/6) sandy loam; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid; gradual, wavy boundary.

C1—36 to 48 inches, yellowish-red (5YR 4/6) loamy sand; common, medium, distinct mottles of light yellowish-brown (10YR 6/4); weak, fine, granular structure; very friable; very strongly acid; clear, wavy boundary.

C2—48 to 60 inches, yellowish-red (5YR 4/8) loamy coarse sand; single grain; loose; about 10 percent gravel; very strongly acid.

The Ap horizon ranges from brown to reddish brown or dark gray and from loam to loamy sand. The C horizon ranges from yellowish red to brown or brownish yellow. Depth to the C horizon ranges from 26 to 38 inches.

The Maxton soils occur with the Ardilla and Wahee soils. They are better drained and have a redder B2t horizon than the Ardilla and Wahee soils. The Maxton soils also have a coarser textured B2t horizon than the Wahee soils.

Maxton soils (MK).—These well-drained soils occur on stream terraces. Slopes range from 0 to 2 percent. The texture of the surface layer is variable and ranges from loamy sand to loam.

Included with this soil in mapping were small areas of a soil that has a clay content greater than 35 percent in the subsoil. Also included were small areas of Wahee soils that were too small to be mapped separately.

This soil is well suited to all kinds of commonly grown crops. Important crops are corn, cotton, soybeans, tobacco, vegetables, and other truck crops. Suitable pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, sorghum, sericea lespedeza, millet, and crimson clover. Nursery crops and orchard crops also grow well.

This soil can be cultivated intensively, and row crops can be grown year after year. An example of a suitable cropping system is cotton grown year after year and a winter legume grown in alternate years. Crop residue and green-manure crops should be turned under to help maintain the organic-matter content and to keep the soils in good tilth.

This soil is well suited to irrigation. (Capability unit I–1; woodland suitability group 207)

Ocilla Series

The Ocilla series consists of somewhat poorly drained soils that formed in thick beds of sandy loam and sandy clay loam materials. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is very dark gray loamy sand about 7 inches thick. Below the surface layer is pale-brown loamy sand about 16 inches thick. The subsoil, to a depth of 50 inches, is light yellowish-brown sandy loam mottled with yellowish brown and light brownish gray. Below this, to a depth of 62 inches, is mottled yellowish-brown, light brownish-gray, and light yellowish-brown sandy clay loam.

Ocilla soils are low in natural fertility, are low in organic-matter content, and are strongly acid to very strongly acid throughout. Permeability is rapid in the upper horizons and is moderate in the subsoil. The available water capacity is chiefly medium. The effective root zone is deep, and tilth is good.

A considerable acreage is in cultivation and pasture. Corn, soybeans, and truck crops are the chief crops. If crops are grown, drainage is needed because the water table is high. Most of the acreage is woodland. A considerable acreage has been planted to slash pine and longleaf pine.

Representative profile of Ocilla loamy sand, in a cultivated field 0.2 mile west of the Oconee River, along U.S. Highway No. 280, 1 mile northwest on paved county road, 100 feet southwest of road, Wheeler County:

Ap—0 to 7 inches, very dark gray (10YR 3/1) loamy sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—7 to 23 inches, pale-brown (10YR 6/3) loamy sand; weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

B1t—23 to 28 inches, light yellowish-brown (10YR 6/4) sandy loam; common, medium, faint mottles of yellowish brown (10YR 5/8) and light brownish gray (2.5Y 6/2); weak, fine, granular structure; very friable; few firm iron concretions; strongly acid; gradual, smooth boundary.

B21t—28 to 50 inches, light yellowish-brown (2.5Y 6/4) sandy loam; many, medium, distinct mottles of yellowish brown (10YR 5/8) and light brownish gray (2.5Y 6/2); weak, medium, subangular blocky structure; friable; few iron concretions; about 3 percent plinthite; very strongly acid, gradual, wavy boundary.

B22t—50 to 62 inches, coarsely mottled yellowish-brown (10YR 5/8), light brownish-gray (2.5Y 6/2), and light yellowish-brown (2.5Y 6/4) sandy clay loam; weak, medium, subangular blocky structure; friable; few slightly hard peds of plinthite; very strongly acid.

The Ap horizon ranges from dark gray to very dark gray and from 6 to 9 inches thick. The combined thickness of the A horizons ranges from 22 to 34 inches. The B1t horizon ranges from pale yellow to brownish yellow. Depth to gray mottles in the B horizon ranges from 18 to 22 inches.

The Ocilla soils occur with the Ardilla, Pelham, and Stilson soils. They are similar to Ardilla soils in drainage, although the Ocilla soils have an A horizon thicker than 22 inches. Also these soils lack 5 percent or more plinthite in the lower B horizon that is characteristic of Ardilla soils. The Ocilla soils occupy higher positions and are not so wet as the Pelham soils. They are wetter than the Stilson soils and lack 5 percent or more plinthite in the lower B horizons.

Ocilla loamy sand (Oh).—This soil occurs as narrow strips along gently flowing streams and as broad, low flats. The slopes are mainly less than 2 percent.

Included with this soil in mapping were a few areas where the profile is sandy to depths of more than 36 inches. Also included were small areas of Stilson, Pelham, and Ardilla soils.

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

A considerable acreage of this soil is in cultivation. If adequately drained, this soil is well suited to corn, tobacco, soybeans, grain sorghum, and truck crops. Some of the well-suited pasture and hay plants are bahiagrass, 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 maintained by turning under crop residue and green-manure crops.

Planting is sometimes delayed on these soils in wet years. To insure maximum efficiency, some drainage is needed. Water management depends on the crop to be grown. If drainage is needed, a system of main and lateral ditches can be designed and installed. Either open ditches or covered tile drains can be used.

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. An example of such a system is 1 year of corn, 1 year of small grain followed by weeds, and 1 year of tobacco. Crop rotations should be used to combat nematodes and plant diseases.

This soil is suited to irrigation. (Capability unit IIIw–1; woodland suitability group 3w2)

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. Flooding is very frequent and lasts from several days to 2 weeks.

In a typical profile, the surface layer is dark-gray fine sandy loam about 4 inches thick. Below this, to a depth of 24 inches, is white sand. This layer is underlain by about 6 inches of gray loamy fine sand that contains a few medium pockets of sandy loam and few mottles of yellowish brown. Below this, to a depth of 60 inches, is light-gray coarse sand.

These soils are low in natural fertility and very strongly acid throughout. They have low to moderate organic-matter content. Permeability is rapid, and the available water capacity is low. These soils have a deep root zone and generally are in good tilth if drained.

Because flooding is a hazard, these soils are not suitable for cultivation. All the acreage is woodland and is well suited to that use. The native vegetation is chiefly sweetgum, blackgum, water oak, red maple, swamp holly, and bay. There are a few slash and loblolly pines.

Representative profile of Osier fine sandy loam, in an area of Osier and Bibb soils, in a wooded area 1 mile northeast of Alston, Georgia, along county road, 100 yards southeast of county road on north side of Oconee Creek; 50 feet west of creek, Montgomery County:

A—0 to 4 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; very strongly acid; clear, wavy, boundary.

C1g—4 to 24 inches, white (10YR 8/1) sand; single grain; very friable; very strongly acid; clear, wavy boundary.

C2g—24 to 30 inches, gray (10YR 5/1) loamy fine sand; few, fine, distinct yellowish-brown (10YR 5/6) mottles; single grain; very friable; few medium pockets of sandy loam; very strongly acid; gradual, wavy boundary.

C3g—30 to 60 inches, light-gray (10YR 7/1) coarse sand; single grain; very friable; very strongly acid.

The A horizon ranges from dark gray to very dark gray and from fine sandy loam to sand. The C1g horizon ranges from white to dark gray and is sand, fine sand, or loamy fine sand. The C2g horizon ranges from light gray to dark gray and from loamy fine sand to sand.

The Osier soils occur with the Bibb and Pelham soils. They are similar to the Bibb soils in drainage but are coarser textured throughout the profile. The Osier soils do not have the B horizon within 60 inches of the surface, which is common to the Pelham soils.

Osier and Bibb soils (Obs).—This mapping unit is on bottom lands along branches, creeks, and rivers. Flooding is very frequent and lasts from about 1 day to 2 weeks. Slopes are less than 2 percent. Mapping Osier and Bibb soils separately would serve no useful purpose, because all areas have similar limitations to use.

Both of the major soils do not occur in each mapped area since this unit lacks the repeating pattern of component soils. At least one of the major soils is in each mapped area. Generally the unit is made up of 40 percent Osier and 30 percent Bibb soils.

The poorly drained to very poorly drained Osier soil has the profile described as representative for the series. Depth to the seasonally high water table fluctuates, but it is at a depth of less than 15 inches for 3 to 6 months of the year.

The Bibb soil has the profile described as representative for the series. This soil is poorly drained. The seasonally high water table is within 15 inches of the surface for 3 to 6 months of the year. The texture of the surface layers ranges from silt loam to sand.

Included with these Osier and Bibb soils in the mapping were small areas of poorly drained and somewhat poorly drained soils that have a clay subsoil.

The soils in this mapping unit occupy a large part of the counties, and all the acreage is woodland. Pines and hardwoods grow well. Because these soils are in low areas and are wet 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 Vw–2; woodland suitability group 3w3)

Paola Series, Cool Variant

The Paola series, cool variant, consists of excessively drained sandy soils that formed in thick beds of sand. These soils are on narrow dunelike landscapes between the Kershaw soils and the bottom lands of the small rivers and large creeks. Slopes range from 5 to 12 percent.

In a typical profile, the surface is covered with about 1 inch of organic matter in various stages of decomposition. The surface layer is very dark gray, very friable sand about 2 inches thick. Below this, to a depth of 28 inches,

is gray or light-gray loose sand. Beneath this, to a depth of 45 inches, is dark-brown friable sand that has mottles of reddish brown and light yellowish brown in the upper part. The reddish-brown areas are slightly cemented and brittle. Below this, to a depth of more than 80 inches, is light yellowish-brown loose sand.

Paola soils are low in natural fertility and organic-matter content. They are very strongly acid to strongly acid throughout. Permeability is rapid, and the available water capacity is very low. The root zone is deep, and tilth generally is good. These soils and the Kershaw soils are the droughtiest soils in the counties.

Because these soils are droughty, none of the acreage is in cultivation. All of the acreage is wooded. The native vegetation consists of a thick stand of evergreen trees and shrubs, such as live oak, magnolia, holly, and scrub oak, along with scattered hickory, turkey oak, bluejack oak, elm, and sand pine. Much of the surface is covered with cacti, mosses, and lichens.

Representative profile of Paola sand, cool variant, 5 to 12 percent slopes, in a wooded area 0.75 mile west of Normantown, along paved county road, 50 yards east of Pendleton Creek bridge and 50 feet south of road, Toombs County:

O2—1 inch to 0, black (10YR 2/1) organic matter that contains some clean sand grains; very strongly acid.

A11—0 to 2 inches, very dark gray (10YR 3/1) sand; weak, fine, granular structure; very friable; many fine and medium roots; very strongly acid; abrupt, wavy boundary.

A12—2 to 5 inches, gray (10YR 5/1) sand; weak, fine, granular structure; loose; many fine and medium roots; very strongly acid; clear, wavy boundary.

A2—5 to 28 inches, light-gray (10YR 7/1) sand; single grain; loose; many fine and medium roots; strongly acid; abrupt, wavy boundary.

B—28 to 45 inches, brown (7.5YR 4/4) sand; common, medium, distinct mottles of reddish brown (5YR 4/3) in the upper part and light yellowish brown (10YR 6/4) in the lower part; single grain; friable; reddish-brown peds slightly cemented and brittle; very strongly acid; gradual, smooth boundary.

C—45 to 80 inches, light yellowish-brown (2.5Y 6/4) sand; single grain; loose; strongly acid; gradual, smooth boundary.

The A1 horizon ranges from gray to very dark gray and from 1 to 6 inches thick. The A2 horizon ranges to light brownish gray or pale brown, and from 12 to 36 inches thick. The B horizon ranges from brownish yellow to dark brown and has reddish-brown peds that are slightly cemented with organic matter.

The mean annual temperature of these soils is a few degrees cooler than the defined range for the series, but this difference does not alter their usefulness and behavior.

The Paola soils occur with the Kershaw, Lakeland, and Troup soils. They differ from the Kershaw, Lakeland, and Troup soils in having a layer stained with organic matter beneath the surface layer.

Paola sand, cool variant, 5 to 12 percent slopes (PoD).—This sandy soil is on ridges and hillsides adjacent and parallel to the bottom land of the Little Ocmulgee River, Alligator Creek, and Pendleton Creek.

Because this soil is droughty, it is not used for cultivated crops. Almost all the acreage is dense woodland. In areas where a lake or river is close by, this soil is sometimes used for picnics and camping.

This soil is not suited to cultivated crops or pasture. (Capability unit VIIs-1; woodland suitability group 5s3)

Pelham Series

The Pelham series consists of poorly drained soils in drainageways, low flat areas, and depressions. These soils formed in beds of sandy clay loam and sandy loam materials. Slopes range from 0 to 3 percent.

In a typical profile, loamy sand extends to a depth of about 30 inches. This layer is dark gray in the upper 4 inches, and below this it is gray with a few mottles of brownish yellow. It is underlain by gray sandy loam, mottled with yellowish brown, that extends to a depth of 38 inches. Below this, to a depth of 62 inches, is sandy clay loam mottled with light yellowish brown, yellowish brown, and red.

The Pelham soils are low in natural fertility, low in organic-matter content, and very strongly acid throughout. Permeability is rapid in the upper horizons and moderate in the lower horizons. The available water capacity is mainly low. The root zone is deep, and tilth generally is good.

The Pelham 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 in their natural condition are only fairly well suited to pasture. Drainage, fertilizer, and adequate lime are needed for forage crops.

The native vegetation consists of mixed pines and hardwoods and an understory of gallberry, myrtle, and wiregrass.

Representative profile of Pelham loamy sand, in a wooded area 0.6 mile west of U.S. Highway No. 221, along Bells Ferry Landing road, 50 feet north of Highway, Montgomery County:

A1—0 to 4 inches, dark-gray (10YR 4/1) loamy sand; common, medium, faint mottles of gray (10YR 6/1); weak, fine, granular structure; very friable; many small roots; very strongly acid; clear, smooth boundary.

A2—4 to 30 inches, gray (10YR 5/1) loamy sand; common, medium, faint mottles of light gray (10YR 7/1) and few, fine, distinct mottles of brownish yellow; single grain; very friable; very strongly acid; clear, wavy boundary.

B1tg—30 to 38 inches, gray (10YR 6/1) sandy loam; common, medium, distinct mottles of light yellowish brown (10YR 6/4) and few, medium, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable; common medium pockets of loamy sand; very strongly acid; gradual, wavy boundary.

B21tg—38 to 56 inches, gray (10YR 6/1) sandy clay loam; many, coarse, distinct mottles of yellowish brown (10YR 5/8); common, fine, distinct mottles of light yellowish brown and few, medium, prominent mottles of red (2.5YR 4/8); weak, medium, subangular blocky structure; friable; common medium pockets of sandy loam; very strongly acid; gradual, wavy boundary.

B22tg—56 to 62 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8) and few, fine, prominent mottles of red; weak, medium, subangular blocky structure; friable; clay films on some ped surfaces; few medium pockets of sandy loam; very strongly acid.

The A1 horizon ranges from gray to dark gray or very dark gray and is 4 to 13 inches thick. The A2 horizon ranges from gray to light gray or light brownish gray and in many areas is 20 to 34 inches thick. The Btg horizon ranges from sandy loam to sandy clay loam.

The Pelham soils occur with the Ardilla, Ocilla, and Stilson soils. The Pelham soils occupy lower positions and are wetter than any of these soils.

Pelham loamy sand (Pl).—This poorly drained soil is on low flats and depressions and at the upper parts of drainageways. Slopes range from 0 to 3 percent.

Included with this soil in mapping were small areas where the profile is loamy sand to a depth of about 58 inches and other small areas where the lower subsoil is sandy clay.

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

Nearly all of the acreage is woodland (fig. 6). 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 bahiagrass, dallisgrass, tall fescue, and white clover. An example of 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 IVw-4; woodland suitability group 2w3)

Stilson Series

The Stilson series consists of moderately well drained soils that formed in thick beds of sandy clay loam and sandy loam materials. Slopes range from 0 to 3 percent.

In a typical profile, loamy sand extends to a depth of about 24 inches. This layer is dark grayish brown in the upper 8 inches, grayish brown in the middle part, and light yellowish brown in the lower part. The subsoil, to a depth of 28 inches, is yellowish-brown sandy loam. Below this, to a depth of 66 inches, is friable, sandy clay loam. This sandy clay loam is brownish yellow mottled with strong brown and light olive brown in the upper part. The layer below a depth of 36 inches is 5 percent or more plinthite.

These soils are low to moderate in natural fertility, are low in organic-matter content, and are very strongly acid throughout. Permeability is rapid in the upper horizon and is moderate in the subsoil. The available water capacity is low. These soils have good tilth and a deep root zone.

A moderate acreage is in cultivation, 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. The native vegetation consists of mixed pines, hardwoods, and an understory of gallberry and wiregrass.

Representative profile of Stilson loamy sand, in a pine plantation, 0.5 mile west of Ohoopee, Georgia, along Seaboard Railroad, 1.2 miles south along dirt road, 0.25 mile east of road in planted pines, Toombs County:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; common fine roots; very strongly acid; clear, smooth boundary.

A21—8 to 18 inches, grayish-brown (2.5Y 5/2) loamy sand; few, fine, faint mottles of dark grayish brown; weak, medium, granular structure; very friable; few gravel and iron concretions; very strongly acid; clear, smooth boundary.

A22—18 to 24 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, medium, granular structure; very friable; very strongly acid; gradual, wavy boundary.

B1t—24 to 28 inches, yellowish-brown (10YR 5/6) sandy loam, weak, medium, subangular blocky structure; very friable; common fine root pores; very strongly acid; gradual, wavy boundary.

Figure 6.—**Well-managed woodland on Pelham loamy sand.**

B21t—28 to 36 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles and few, fine, distinct, light olive-brown mottles; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; about 3 percent plinthite; very strongly acid; gradual, wavy boundary.

B22t—36 to 54 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles; few, fine, prominent, red mottles, and common, fine, medium, distinct, light-gray mottles; moderate, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; about 6 percent plinthite; very strongly acid; gradual, wavy boundary.

B23t—54 to 66 inches, coarsely mottled red (2.5YR 4/8), light-gray (10YR 7/1), and brownish-yellow (10YR 6/8) sandy clay loam; moderate, medium, subangular blocky structure; firm to friable; sand grains coated and bridged with clay; horizon is about 10 percent plinthite; very strongly acid; gradual, wavy boundary.

The A1 or Ap horizon ranges from 3 to 13 inches in thickness and from very dark grayish brown to dark grayish brown or very dark gray in color. The combined thickness of the A horizons ranges from 20 inches to about 30 inches. Plinthite in amounts of 6 to 10 percent occurs below depths ranging from 30 to 40 inches.

The Stilson soils occur with the Ardilla, Ocilla, and Fuquay

soils. They occupy higher positions and are better drained than the Ardilla and Ocilla soils. Stilson soils are similar to Fuquay soils in color but are not so well drained and occupy slightly lower positions in the landscape.

Stilson loamy sand (Se).—This soil commonly occurs in moderately small areas adjacent to but higher than the drainageways. The slopes range from 0 to 3 percent. The water table fluctuates but is within 30 to 60 inches of the surface for periods of 1 to 2 months.

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

Most of this soil is wooded, but a moderate part is in cultivation and pasture. Use for row crows 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 this soil is in low-lying areas and has a moderately high seasonal water table during wet periods, some drainage is generally needed if cultivated crops are to be grown.

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

This soil is well suited to irrigation. (Capability unit IIw–2; woodland suitability group 3s2)

Sunsweet Series

The Sunsweet series consists of well-drained soils of the uplands. These soils formed in sandy clay marine sediments. Slopes range from 5 to 12 percent and in most areas are more than 8 percent.

In a typical profile, the surface layer is brown sandy loam about 6 inches thick. The surface layer also contains about 38 percent iron concretions. The subsoil, to a depth of 72 inches, is sandy clay and clay. To a depth of 12 inches, it is strong brown mottled with red, and to a depth of 26 inches yellowish brown mottled with yellowish red, red, and light gray. Below 26 inches, and to a depth of 56 inches, the subsoil is chiefly mottled red, light gray, dark red, and yellowish brown. Between depths of 56 and 72 inches the subsoil is gray mottled with very dusky red and strong brown.

These soils are low in natural fertility, low in organic-matter content, and very strongly acid throughout. Permeability is moderately slow, and the available water capacity is medium. The root zone is shallow to moderately deep, 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 the acreage in the counties. A small acreage is in pasture, for which these soils are fairly well suited. The native vegetation consists of mixed pines, hardwoods, and an understory of wiregrass.

Representative profile of Sunsweet sandy loam, 5 to 12 percent slopes, eroded, in a wooded area 0.75 mile south of State Route 56 at Johnson Corner crossroads, along paved county road, 25 feet west of road, Toombs County:

Apen—0 to 6 inches, brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; about 38 percent iron concretions; very strongly acid; abrupt, smooth boundary.

B21t—6 to 12 inches, strong-brown (7.5YR 5/6) sandy clay; few, fine, prominent, red mottles; moderate, medium, subangular blocky structure; firm; clay films on some ped surfaces; very strongly acid; clear, wavy boundary.

B22t—12 to 26 inches, yellowish-brown (10YR 5/8) sandy clay; common, medium, prominent mottles of yellowish red (5YR 4/8) and red (10YR 4/8); few, fine, distinct, light-gray mottles; moderate, medium, angular blocky and subangular blocky structure; firm; clay films on some ped surfaces; 8 percent plinthite; very strongly acid; gradual, wavy boundary.

B23t—26 to 56 inches, mottled red (2.5YR 4/8), light-gray (10YR 7/1), dark-red (7.5YR 3/6), and yellowish-brown (10YR 5/8) sandy clay; moderate, medium, angular blocky and subangular blocky structure; firm; clay films on some ped surfaces; 5 percent plinthite; very strongly acid; gradual, irregular boundary.

B24t—56 to 72 inches, gray (N 5/0) clay; many, medium, prominent mottles of very dusky red (7.5R 2/4) and strong brown (7.5YR 5/8); strong, medium, angular blocky and subangular blocky structure; firm; clay films on ped surfaces; very strongly acid.

The A horizon ranges from brown to dark grayish brown and is 2 to 6 inches thick. Iron concretions range from 5 to 40 percent in amount and from ¼ to 2 inches in diameter. The matrix color of the B21t and B22t horizons ranges from yellowish brown to yellowish red, and the amount of plinthite ranges from 6 to 15 percent. The B21t, B22t, and B23t horizons range from sandy clay to clay.

The Sunsweet soils occur with the Carnegie, Tifton, and Cowarts 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 more iron concretions in the surface layer and more clay in the subsoil than the Cowarts soils.

Sunsweet sandy loam, 5 to 12 percent slopes, eroded (ShD2).—This soil has many iron concretions in the surface layer and is on short slopes. It commonly occurs as narrow areas on ridges and bluffs. In some places erosion has exposed the subsoil and shallow gullies and rills are common.

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

Because this soil is strongly sloping and eroded, it is not suited to cultivated crops. Under careful management, it can be used for pasture. Plants suitable for pasture are Coastal bermudagrass, Pensacola bahiagrass, sericea lespedeza, and kudzu. This soil is suited to pines. (Capability unit VIe–2; woodland suitability group 3c2)

Tifton Series

The Tifton series consists of well-drained, pebbly soils of the uplands. These soils formed in thick beds of sandy loam and sandy clay loam materials. Slopes range from 0 to 8 percent.

In a typical profile, the surface layer is very dark grayish-brown loamy sand about 10 inches thick. The subsoil, to a depth of 65 inches, is friable sandy clay loam. It is yellowish brown to a depth of 37 inches, and below this it is mottled brownish yellow, yellowish brown, red, and pale yellow. Small rounded iron concretions are on the surface and throughout the profile.

Tifton soils are low to moderate in natural fertility, are low in organic-matter content, and are strongly acid throughout. Permeability is moderate, and the available

water capacity is medium. The root zone is deep, and tilth generally is good.

These soils are the best soils in the counties for farming. They are well suited to most locally grown crops and crops on them respond well to good management. Most of the acreage is cultivated or in pasture. The native vegetation is mainly mixed pines, widely scattered hardwoods, and an understory of wiregrass.

Representative profile of Tifton loamy sand, 2 to 5 percent slopes, in a cultivated field 1.3 miles east of intersection of State Routes 147 and 107, on State Route 147, 200 feet south of highway, Toombs County:

Apcn—0 to 10 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; about 5 percent iron concretions; strongly acid; abrupt, smooth boundary.

B1tcn—10 to 20 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; common fine roots; about 10 percent iron concretions; strongly acid; clear, smooth boundary.

B21tcn—20 to 37 inches, yellowish-brown (10YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; about 5 percent iron concretions; strongly acid; clear, wavy boundary.

B22t—37 to 54 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, faint mottles of yellow (10YR 7/6), common, medium, prominent mottles of red (2.5YR 4/8), and common, medium, distinct mottles of pale yellow (2.5Y 7/4); moderate, medium, subangular blocky structure; friable; about 10 percent plinthite; about 3 percent iron concretions; strongly acid; clear, wavy boundary.

B23t—54 to 65 inches, mottled yellowish-brown (10YR 5/8), red (2.5YR 4/8), and pale-yellow (2.5Y 7/4) sandy clay loam; moderate, medium, subangular and angular blocky structure; friable; about 20 percent plinthite; mottles are coarse and prominent; strongly acid.

The A horizon ranges from 6 to 14 inches in thickness. It is dominantly very dark grayish brown, but it ranges to dark grayish brown and grayish brown. A light yellowish-brown or yellowish-brown A2 horizon is present in some places. Iron concretions ranging between ⅛ and ¾ inch in diameter are common in the Ap horizon and upper part of the Bt horizon. The B2t horizon ranges from yellowish brown to brownish yellow and is mottled with shades of red, yellow, and brown in the lower part. The B2t horizon is sandy clay loam but in some places ranges to sandy clay in the lower part. The estimated clay content is 25 to 35 percent. Plinthite occurs in the B horizon, mainly at a depth of 37 inches but at depths ranging from 31 to 40 inches. The estimated content of plinthite is 10 to 25 percent.

In mapping unit Tifton loamy sand, 2 to 5 percent slopes, some areas have an A horizon 2 to 4 inches thicker than the defined range for the series, but this does not alter the usefulness or behavior of the mapping unit.

The Tifton soils occur with the Dothan, Carnegie, Irvington, and Fuquay soils. They closely resemble the Dothan soils but have many more iron concretions throughout their profile and have slightly more clay in the B2t horizon. Tifton soils have 5 percent or more plinthite, which is at greater depth than in the Carnegie soils. Tifton soils are better drained than the Irvington soils and lack the distinct fragipan of those soils. The A horizon in Tifton soils is 14 inches thick, or less, whereas the A horizon in Fuquay soils is 20 or more inches thick.

Tifton loamy sand, 0 to 2 percent slopes (TqA).—This soil is along broad ridgetops that are nearly level. Its profile is very similar to the one described as representative for the series.

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

This soil is among the best in the counties for farming. Nearly all of the acreage is in cultivation (fig. 7). A small

Figure 7.—**Soybeans on Tifton loamy sand, 0 to 2 percent slopes.**

acreage is in pasture or trees. This soil is suited to all locally grown crops and is especially well suited to cotton, corn, tobacco, peanuts, truck crops, and small grain. Where row crops are grown, the rows should be placed so that they assist in the disposal of excess water. Suitable pasture and hay plants are Coastal bermudagrass, Pensacola bahiagrass, soghum, sericea lespedeza, millet, and crimson clover. Nursery crops, peaches, pecans, and other orchard crops also grow well.

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

This soil is well suited to sprinkler irrigation. Row crops and pasture grasses respond if supplemental water is applied during dry periods. Tobacco responds especially well to irrigation. (Capability unit I–2; woodland suitability group 2o1)

Tifton loamy sand, 2 to 5 percent slopes (TqB).—This soil generally is in large areas on broad ridgetops. Some areas are as much as 50 to 70 acres in size. The profile of this soil is the one described as representative of the series.

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

This soil is cultivated extensively. It is well suited to most locally grown crops. Important crops are corn, cotton, tobacco (fig. 8), peanuts, and small grain. It is also well suited to pasture or trees. Suitable pasture and hay plants are Coastal bermudagrass, bahiagrass, lupines, vetch, sericea lespedeza, and crimson clover. This soil is also well suited to peaches, pecans, and other orchard crops.

Because of slope, erosion is a hazard. If this soil is cultivated, the farmer generally has a choice of four erosion control practices. He can cultivate (1) in straight rows, across slope, (2) on the contour without terraces (fig. 9), (3) with terraces, or (4) with stripcropping.

The soil should be managed in such a manner as to control erosion. The steepness and length of slopes or the erosion control practices installed govern the minimum cropping system needed to accomplish this. An example of a suitable cropping system in areas where the slopes are 400 feet long and the gradient is 3 percent is 2 years of corn followed by 4 years or more of a perennial grass or legume. This system can be used safely by using straight rows running across the slope.

This soil is well suited to irrigation. Row crops and pasture grasses respond if supplemental water is applied during prolonged dry periods. Tobacco responds especially well to irrigation. (Capability unit IIe–2; woodland suitability group 2o1)

Tifton sandy loam, 5 to 8 percent slopes, eroded (TuC2).—This soil is on ridges and short side slopes near drainageways. The profile of this soil has a thinner surface layer than the profile described as representative of the series.

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

Because of slope, erosion is severe hazard and intensive management is needed. Except in places where the subsoil is exposed, tilth generally is good.

This soil is well suited to most locally grown crops. Important crops are cotton, corn, soybeans, and small

Figure 8.—Tobacco on Tifton loamy sand, 2 to 5 percent slopes.

Figure 9.—Soybeans on the contour on Tifton loamy sand, 2 to 5 percent slopes.

grain. Pasture plants and trees, especially pines, grow well. Suitable pasture and hay plants are Coastal bermudagrass, bahiagrass, crimson clover, sericea lespedeza, sorghum, Starr millet, and browntop millet. Pecans and other orchard crops grow well.

Erosion is a severe 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 the slopes are 200 feet long and the gradient is 7 percent, 2 years of cotton, soybeans, or a similar row crop followed by 3 years of bahiagrass, or similar close-growing crop is an example of a suitable cropping system, if the soil is terraced and cultivated on the contour.

This soil is not well suited to irrigation. (Capability unit IIIe–2; woodland suitability group 2o1)

Troup Series

The Troup series consists of well-drained sandy soils of the uplands. These soils formed mainly in thick beds of sand and sandy clay loam materials. Slopes range from 0 to 8 percent.

In a typical profile, sand extends to a depth of 52 inches. The surface layer is grayish-brown sand and is about 6 inches thick. Below the surface layer it is yellowish brown to a depth of 12 inches, and light yellowish brown to a depth of 52 inches. Below 52 inches, to a depth of 62 inches, is yellowish-brown sandy loam mottled with light yellowish brown and strong brown. Below 62 inches, to a depth of about 74 inches, is brownish-yellow sandy clay loam mottled with strong brown, yellowish red, and light gray.

Troup soils are strongly acid throughout, are very low in natural fertility, and are low in organic-matter content. Permeability is moderate to moderately rapid, and the available water capacity is low. These soils have a deep root zone and generally are in good tilth. Except in irrigated areas, the response to fertilizer is only fair.

Only a small acreage is in cultivation. A small acreage is in pasture, but most is in woodland. A considerable acreage has been planted to slash pine. The native vegetation consists chiefly of turkey oak, scrub oak, and bluejack oak. There are a few scattered longleaf pines and a sparse understory of wiregrass and weeds.

Troup soils were mapped only in undifferentiated soil groups with the Lakeland and Wagram soils.

Representative profile of Troup sand in an area of Lakeland and Troup soils, 0 to 8 percent slopes, in a wooded area 1.4 miles northeast of Pendleton Creek on State Route 152, 0.5 mile northwest on dirt road, Toombs County:

A1—0 to 6 inches, grayish-brown (2.5Y 5/2) sand; weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

A21—6 to 12 inches, yellowish-brown (10YR 5/4) sand; single grain; loose; strongly acid; gradual, wavy boundary.

A22—12 to 52 inches, light yellowish-brown (2.5Y 6/4) sand; single grain; loose; fine lenses of uncoated sand; strongly acid; clear, wavy boundary.

B1t—52 to 62 inches, yellowish-brown (10YR 5/8) sandy loam; common, medium, distinct mottles of light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; very friable; strongly acid; gradual, wavy boundary.

B2t—62 to 74 inches, brownish-yellow (10YR 6/8) sandy clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles and few, fine and medium, distinct, yellowish-red (5YR 4/8) and light-gray (10YR 7/1) mottles; weak, medium, subangular blocky structure; friable; strongly acid.

The A1 horizon ranges from dark gray to dark grayish brown in color, from 3 to 9 inches in thickness, and from sand to loamy fine sand in texture. The A2 horizon ranges from pale yellow to pale brown or light yellowish brown. The combined thickness of the A1 and A2 horizons ranges from 42 to 59 inches. The B horizon ranges from yellow to yellowish brown in color and from sandy loam to sandy clay loam in texture. Mottles are few to common in this horizon.

The Troup soils occur with the Lakeland, Kershaw, and Fuquay soils. The Troup soils have a B horizon between 40 and 60 inches from the surface, but the Lakeland and Kershaw soils do not have a B horizon.

Troup soils contain more silt and clay than the Kershaw soils. They have a B horizon at a depth of more than 40 inches, whereas the B horizon in Fuquay soils is 20 to 40 inches from the surface and contains some layers that are plinthitic.

Wagram Series

The Wagram series consists of well-drained, undulating to rolling soils of the uplands. They formed in thick beds of medium-textured marine deposits. Slopes range from 2 to 17 percent.

In a typical profile, the surface layer is grayish-brown loamy sand about 11 inches thick. Below the surface layer is light yellowish-brown loamy sand about 13 inches thick. The subsoil, to a depth of 62 inches, is sandy clay loam. It is brownish yellow in the upper part, yellowish brown mottled with yellowish red and brownish yellow in the middle part, and yellowish brown mottled with light gray and red in the lower part.

The Wagram soils are low in natural fertility and are very strongly acid throughout. They are low in organic-matter content. Permeability is rapid in the upper horizons, and is moderately rapid in the lower horizons. The available water capacity is low to medium. The root zone is deep, and tilth generally is good.

These soils are only fairly well suited to most locally grown crops. Only a small acreage is in cultivation or pasture. Most of the acreage is in pine trees and is well suited to that use. The native vegetation consists of mixed hard-

woods and pines and an understory of wiregrass and native grasses.

The Wagram soils were mapped in two undifferentiated soil groups with the Duplin and Troup soils.

Representative profile of Wagram loamy sand, in an area of Wagram and Duplin soils, 2 to 8 percent slopes, in a cultivated field 0.5 mile south of Tarrytown, along paved county road, 50 yards west, Montgomery County:

Ap—0 to 11 inches, grayish-brown (10YR 5/) loamy sand; weak, medium, granular structure; very friable; very strongly acid; gradual, smooth boundary.

A2—11 to 24 inches, light yellowish-brown (2.5Y 6/4) loamy sand; single grain; loose; very strongly acid; clear, smooth boundary.

B21t—24 to 36 inches, brownish-yellow (10YR 6/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

B22t—36 to 53 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct mottles of yellowish red (5YR 5/8); few, medium, faint, brownish-yellow (10YR 6/6) mottles; moderate, medium, subangular blocky structure; friable; few clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—53 to 62 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct mottles of light gray (10YR 7/1) and red (10R 4/8); weak, medium, subangular blocky structure; friable; very strongly acid.

The A1 horzon ranges from grayish brown to gray or dark grayish brown. The combined thickness of the A horizon ranges from 20 to 38 inches. The B21t horizon ranges from brownish yellow to yellowish brown and from sandy clay loam to sandy loam. The matrix color of the B22t ranges from brownish yellow to strong brown.

The Wagram soils occur with the Troup, Duplin, and Cowarts soils. Wagram soils are not as sandy as the Troup soils, in which sand extends from the surface to a depth of more than 40 inches. The Wagram soils have a thicker sandy horizon immediately below the surface layer than the Duplin and Cowarts soils. They also have less clay in the B horizon than the Duplin soils.

Wagram and Duplin soils, 2 to 8 percent slopes (WxC).—This mapping unit is on ridges and side slopes, in areas about 10 to 40 acres in size. Mapping Wagram and Duplin soils separately would serve no useful purpose, because use and management of the two are similar.

Both of the major soils do not occur in every mapped area, but the unit generally is made up of 40 percent Wagram and 30 percent Duplin soils.

Wagram and Duplin soils have the profile described as representative of their respective series, except their surface layer ranges from loamy sand to fine sandy loam.

Included with these Wagram and Duplin soils in mapping were small areas of several loamy soils and the Troup soils. These included soils make up about 30 percent of this mapping unit.

The suitability of this mapping unit for farming is somewhat limited by droughtiness and severe erosion hazard. Among the suitable row crops are corn, cotton, and soybeans. Also suitable are small grain, sweet potatoes, 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 mapping unit is somewhat droughtly, subject to erosion, and rapidly depleted of organic matter, it should be managed to control erosion and to maintain organic-matter content. 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 or less and about 300 feet long, and contour tillage is used but terraces are not, a suitable cropping system is 1 year of mulch-planted corn, 1 year of cotton or soybeans, and 4 years of bahiagrass or a similar close-growing crop.

This mapping unit is not well suited to irrigation. (Capability unit IIIe–3; woodland suitability group 3s2)

Wagram and Troup soils, 8 to 17 percent slopes (WwE).—This mapping unit consists of soils on broken bluffs along the sides of small drainageways and creek flood plains. Individual areas range from 5 to 25 acres in size. Mapping the soils that occur in this unit separately would serve no useful purpose, because use and management are similar.

Both the Wagram and Troup soils do not occur in every mapped area, but at least one of the major soils occurs in each mapped area. Generally, the major soils make up about 55 percent of this unit. Their profiles are similar to the ones described as representative of the Wagram series and Troup series, except the surface layers range from sand to loamy fine sand. These soils are droughty.

Included with these Wagram and Troup soils in mapping were small areas of loamy soils and clayey soils. In a few areas, shallow gullies have formed. These included soils make up about 40 percent of this mapping unit. Also included in the mapping were small areas of sandstone rock outcrops.

Because the soils in this mapping unit are highly susceptible to erosion and are droughty, 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. This mapping unit is fairly well suited to pines.

Almost all the acreage is wooded. (Capability unit VIs–1; woodland suitability group 3s2)

Wahee Series

The Wahee series consists of somewhat poorly drained soils on low stream terraces. These soils formed in thin beds of clayey old alluvium that are underlain by loamy alluvium. Slopes range from 0 to 2 percent.

In a typical profile, the surface layer is dark-gray fine sandy loam about 4 inches thick. Below the surface layer is light yellowish-brown fine sandy loam about 4 inches thick. The subsoil, to a depth of 14 inches, is yellowish-brown sandy clay mottled with light brownish gray and red. The next layer is gray, firm clay mottled with strong brown and dark red. Below a depth of 35 inches and to a depth of 60 inches is gray, friable sandy clay loam mottled with brownish yellow and strong brown. This layer is underlain by gray, very friable sandy loam mottled with light yellowish brown and strong brown to a depth of 65 inches or more.

These soils are low to moderate in natural fertility, are low in organic-matter content, and are very strongly acid throughout. Permeability is slow, and the available water capacity is medium. Because of the seasonally high water table, the upper subsoil is fine textured and the root zone is chiefly moderately deep. Tilth generally is fair to good.

Because these soils are somewhat poorly drained and subject to flooding, their suitability for cultivated crops is

limited. They are well suited to trees and pasture. Almost all of the acreage is in pines and hardwoods. The native vegetation consists of mixed pines and hardwoods and an understory of gallberry, briers, and wiregrass.

Representative profile of Wahee fine sandy loam in an area of Wahee soils, in a wooded area 0.4 mile west of the Ohoopee River along State Route 292, 50 feet south of road, Toombs County:

A1—0 to 4 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; very strongly acid; clear, smooth boundary.

A2—4 to 8 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam; weak, fine, granular structure; very friable; very strongly acid; clear, smooth boundary.

B21t—8 to 14 inches, yellowish-brown (10YR 5/4) sandy clay; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and common, fine, prominent, red (10R 4/8) mottles; moderate, fine, subangular and angular blocky structure; friable; clay films on some ped surfaces; very strongly acid; gradual, wavy boundary.

B22tg—14 to 35 inches, gray (10YR 6/1) clay; common, medium, prominent mottles of strong brown (7.5YR 5/6) and dark red (10R 3/6); strong, medium, subangular angular blocky structure; firm; clay films on some ped surfaces; very strongly acid; gradual, wavy boundary.

B31tg—35 to 60 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct mottles of brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; friable; very strongly acid; gradual, wavy boundary.

B32tg—60 to 65 inches, gray (10YR 6/1) sandy loam; common, medium, distinct mottles of light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6); weak, medium, granular structure; very friable; very strongly acid.

The A horizon ranges from sandy loam through silt loam in texture and from about 7 to 14 inches in thickness. The A1 horizon ranges from very dark grayish brown to light brownish gray. The A2 horizon is absent in some profiles. The matrix color of the B21t horizon ranges from brownish yellow to yellowish red, and the texture from sandy clay to clay. The gray color in the B horizon becomes dominant about 14 to 26 inches below the surface.

The silt content of these soils is slightly less than is within the defined range for the Wahee series, but these soils are enough like the Wahee soils in morphology, composition, and behavior that a new series is not warranted.

The Wahee soils occur with the Duplin, Ardilla, Maxton, and Coxville soils. They are coarser textured in the lower B3tg horizons than the Duplin soils. These soils are more clayey, and do not have plinthite in the lower B horizon that is common to the Ardilla soils. They occupy higher positions in the landscape and are better drained than the Coxville soils. They are wetter than Maxton soils.

Wahee soils (Wy).—These soils are on low stream terraces, and the slopes are mainly less than 2 percent. The surface layer ranges from sandy loam to silt loam. Flooding occurs about once in 5 to 20 years, and the water table is at a depth of about 15 to 30 inches for periods of 2 to 6 months each year.

Included with this soil in mapping were areas of Duplin, Maxton, and Coxville soils that were too small to be mapped separately.

Excess water limits the suitability of these soils, and drainage is needed before pasture plants or cultivated crops are grown. Because water moves slowly through the subsoil, tile drainage is not effective, but a system of main and lateral ditches can be designed and installed.

After drainage some suitable crops are corn, soybeans, grain sorghum, or truck crops. Suitable pasture and hay plants are bahiagrass, fescue, dallisgrass, white clover, and ladino clover.

Any suitable crop can be grown continuously if enough plant residue is returned to the soils to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and diseases, and makes more efficient use of fertilizer. (Capability unit IIIw–2; woodland suitability group 2w8)

Use and Management of the Soils

This section describes behavior and management of soils in Montgomery, Toombs, and Wheeler Counties under specified conditions. Management of soils is discussed for crops and pasture, for woodland, for wildlife, and for soil engineering. Also explained is the system of capability classification used by the Soil Conservation Service. The capability classification of each soil mapped in the counties can be learned by referring to the "Guide to Mapping Units." Information about its management is given in the section "Descriptions of the Soils."

Good reasoning must be used in the application of these interpretations because new technology, improved techniques, and economic changes influence alternative use and management of soils. Changes in the behavior of soils under new and different management techniques are not unusual and should be anticipated.

Since many soil series concepts have undergone changes in the last ten to twenty years, it is recommended that present interpretations and predictions about a particular soil be carefully studied before applying them to the soils of the same name in older published surveys.

General Practices of Management

In this section, general practices of management are discussed and the system of capability classification is described. Plant suitability and suitable cropping systems are discussed in each mapping unit.

Management is needed on the soils in Montgomery, Toombs, and Wheeler Counties mainly to control erosion, dispose of excess water, and maintain good tilth and productivity.

Many of the soils, such as Tifton and Carnegie, in the three counties are susceptible to erosion. The degree of susceptibility depends on: (1) the erodibility of the soil (fig. 10), (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 need only contour cultivation and a cropping system that provides medium to large amounts of crop residue. Steep soils or soils that have slopes may need a combination of straight-row farming, contour farming without terraces, or stripcropping, and as well, a cropping system that includes annual close-growing crops, crops producing large quantities of residue, 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, and managing this residue. Cropping sequences that include

Figure 10.—An eroded area of Carnegie loamy sand, 2 to 5 percent slopes.

perennial grasses or legumes are beneficial. Stripcropping and contour cultivation are also important on sandy soils.

Excess water is the main limitation on several soils such as the Ardilla and Ocilla. 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.

Several management practices (fig. 11) contribute to maintenance of soil productivity and good tilth and help control soil loss. Among these are (1) regular applications of lime and fertilizer according to plant needs, as indicated by soil testing; (2) good management of crop residue, usually by shredding and leaving the residue on the surface between seasons of crop production; and (3) use of suitable cropping systems.

Figure 11.—Field border of Coastal bermudagrass used to control erosion at the edge of a field. This soil is Dothan loamy sand, 1 to 5 percent slopes.

Complementary practices are:

1. Grassed waterways or outlets. These are essential for the disposal of runoff water from straight-row farming, contour farming, terracing, or stripcropping.
2. A field border of perennial grass is needed to control erosion at some locations along the edge of fields and to reduce weed growth. Such a border is attractive and allows more efficient operation of farm equipment.
3. Farm roads and fences should be located on the crest of the slopes where the watershed divides or on the contour. These should permit field and row arrangement that will facilitate efficient farming operations. Fences may be located in or adjacent to natural waterways.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are

used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or engineering.

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

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

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 *c* 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 only some parts of the United States, 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 the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, 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–4 or IIIe–3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

The eight classes in the capability system and the subclasses and units in Montgomery, Toombs, and Wheeler Counties are described in the list that follows:

Class I soils have few limitations that restrict their use.
- Unit I–1. Nearly level, well-drained soils that have a sandy or loamy surface layer and loamy subsoil; on stream terraces.
- Unit I–2. Nearly level, well-drained, pebbly soils that have a sandy surface layer and loamy subsoil; on uplands.

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe. Soils subject to moderate erosion if they are not protected.
  - Unit IIe–1. Very gently sloping, well-drained soils that have a sandy surface layer and loamy subsoil; on uplands.
  - Unit IIe–2. Very gently sloping, well-drained, pebbly soils that have a sandy surface layer and loamy subsoil; on uplands.
  - Unit IIe–4. Very gently sloping, well-drained soils that have a sandy surface layer and loamy subsoil that has a plinthitic layer at a depth of about 18 inches; on uplands.
- Subclass IIw. Soils that have moderate limitations because of excess water.
  - Unit IIw–2. Nearly level, moderately well drained and somewhat poorly drained soils that have a sandy surface layer and loamy subsoil; on uplands and stream terraces.
- Subclass IIs. Soils that have moderate limitations because of water capacity.
  - Unit IIs–1. Nearly level to very gently sloping soils that are sandy to a depth of about 26 inches and the subsoil is loamy; on uplands.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe–2. Gently sloping, well-drained, eroded soils that are loamy throughout; on uplands.
  - Unit IIIe–3. Gently sloping soils that have a sandy or loamy surface layer and loamy or clayey layer in the subsoil; on uplands.
- Subclass IIIw. Soils that have severe limitations because of excess wetness.
  - Unit IIIw–1. Nearly level, somewhat poorly drained soils that are sandy to a depth of about 23 inches and the subsoil is loamy; on broad flats and stream terraces.
  - Unit IIIw–2. Nearly level, somewhat poorly drained soils, that have a loamy surface layer and chiefly a clayey subsoil; on stream terraces.
  - Unit IIIw–4. Poorly drained, nearly level soils that have an organically cemented layer below the surface layer; on lowlands.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
- Subclass IVe. Soils subject to very severe erosion if they are cultivated and not protected.
  - Unit IVe–4. Gently sloping, well-drained soils that have a sandy or loamy surface layer and loamy subsoil that has a plinthitic layer at a depth of about 18 inches; on uplands.
- Subclass IVw. Soils that have very severe limitations because of excess water.
  - Unit IVw–4. Poorly drained to moderately well-drained soils that have a loamy or sandy surface layer and loamy or clayey layers in the subsoil; in smal drainageways, on broad flats, and on flood plains.

Subclass IVs. Soils that have very severe limitations because of water capacity.

Unit IVs–1. Gently sloping, droughty soils that are sandy to a depth of about 30 inches and are loamy in the subsoil; on uplands.

Class V soils are not likely to erode, but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.

Unit Vw–1. Poorly drained soils that have a loamy surface layer and clayey subsoil; in depressions and ponded areas.

Unit Vw–2. Poorly drained and very poorly drained soils that are chiefly sandy or loamy; on flood plains.

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

Subclass VIe. Soils that are severely limited, chiefly because of risk of erosion unless protective cover is maintained.

Unit VIe–2. Strongly sloping, eroded soils that have a loamy surface layer and clayey subsoil; on uplands.

Subclass VIs. Soils generally unsuitable for cultivation and limited for other uses by their low to very low available water capacity or by other physical characteristics.

Unit VIs–1. Chiefly gently sloping to strongly sloping, well-drained and excessively drained soils that have a sandy to loamy surface layer and subsoil or underlying layers; on uplands.

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

Subclass VIIs. Soils unsuitable for cultivation and very limited for other uses by their very low available water capacity.

Unit VIIs–1. Gently sloping and strongly sloping, droughty, sandy soils; on uplands.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or esthetic purposes. (There are no Class VIII soils in Montgomery, Toombs, and Wheeler Counties.)

Estimated Yields

In table 2 are estimated average yields of principal crops and pasture grasses grown on each soil in the three 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, and (11) adds liberal amounts of lime and fertilizer where needed.

The yields in table 2 are estimated average yields for these 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, 100 to 160 pounds of nitrogen, 50 to 70 pounds of phosphoric acid, and 75 to 105 pounds of potash. The crop is seeded at a rate that produces 10,000 to 12,000 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, 50 to 60 pounds of nitrogen, 100 to 120 pounds of phosphoric acid, and 140 to 180 pounds 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.

Cotton.—At planting time the soils used for cotton receive, per acre, 60 to 120 pounds of nitrogen, 50 to 80 pounds of phosphoric acid, and 75 to 120 pounds of potash. Planting is at a rate that provides 15,000 to 25,000 plants per acre. Insects and diseases are effectively controlled.

Peanuts.—The soils used for peanuts receive, per acre, 12 to 20 pounds of nitrogen, 40 to 50 pounds of phosphoric acid, and 60 to 75 pounds 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.

Soybeans.—The soils used for soybeans receive, per acre, 0 to 20 pounds of nitrogen, 20 to 50 pounds of phosphoric acid, and 60 to 100 pounds of potash. The planting rate is 1 bushel per acre. Planting is done between May 10 and 20, or planting of late-maturing varieties may follow harvest of small grain.

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, 50 to 70 pounds of phosphoric acid, and 80 to 120 pounds of potash. An additional 75 to 150 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, 50 to 70 pounds of phosphoric acid, and 60 to 90 pounds of potash. An additional 50 to 90 pounds of nitrogen is applied early in summer. 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.

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

[Yields are average yields to be expected under improved management that does not include irrigation. Dashes indicate the crop is not commonly grown on the soil or is not suited to it]

Soil	Corn	Tobacco (flue-cured)	Cotton (lint)	Peanuts (runner)	Soybeans	Pasture		
						Coastal bermudagrass for—		Bahiagrass for pasture
						Hay	Pasture	
	Bu.	*Lb.*	*Lb.*	*Lb.*	*Bu.*	*Tons*	*A. U. M.*[1]	*A. U. M.*[1]
Ailey loamy coarse sand, 2 to 8 percent slopes	50				20	2. 0	4. 0	4. 5
Ardilla loamy sand	85	2, 500	500	1, 500	35	5. 4	9. 0	7. 0
Carnegie loamy sand, 2 to 5 percent slopes	70	1, 700	650	2, 500	30	5. 0	8. 0	7. 0
Carnegie sandy loam, 5 to 8 percent slopes, eroded	55	1, 300	400	2, 000	20	3. 5	6. 0	6. 0
Cowarts loamy sand, 2 to 5 percent slopes	65	1, 600	600	2, 300	25	5. 0	8. 0	6. 5
Cowarts loamy sand, 5 to 8 percent slopes	55	1, 300	500	1, 700	20	4. 0	7. 0	7. 0
Coxville and Duplin soils								
Craven soils, 2 to 8 percent slopes			400			3. 0	5. 5	5. 0
Dothan loamy sand, 1 to 5 percent slopes	80	2, 300	800	2, 400	35	5. 0	10. 0	8. 5
Fuquay loamy sand, 1 to 5 percent slopes	75	2, 100	600	2, 500	20	4. 4	8. 5	7. 5
Grady soils								4. 5
Irvington loamy sand	85	2, 500	650	2, 100	40	5. 5	10. 5	10. 0
Kershaw sand, 2 to 8 percent slopes						2. 0	4. 0	4. 0
Lakeland and Troup soils, 0 to 8 percent slopes	35					3. 0	5. 5	6. 0
Mascotte sand	50					4. 5	8. 0	7. 0
Maxton soils	90	2, 000	800	2, 100	30	5. 5	10. 0	8. 5
Ocilla loamy sand	70	2, 400	600	1, 700	30	4. 5	8. 5	7. 5
Osier and Bibb soils								
Paola sand, cool variant, 5 to 12 percent slopes								
Pelham loamy sand								6. 0
Stilson loamy sand	80	2, 500	650	2, 100	35	5. 5	10. 0	8. 5
Sunsweet sandy loam, 5 to 12 percent slopes, eroded						3. 0	5. 0	4. 0
Tifton loamy sand, 0 to 2 percent slopes	90	2, 500	850	2, 800	35	6. 0	11. 0	9. 0
Tifton loamy sand, 2 to 5 percent slopes	85	2, 300	800	2, 600	35	5. 5	10. 5	8. 5
Tifton sandy loam, 5 to 8 percent slopes, eroded	75	2, 100	650	2, 300	30	5. 0	10. 0	8. 0
Wagram and Duplin soils, 2 to 8 percent slopes	60	1, 800	400	1, 600	20	4. 0	8. 5	8. 5
Wagram and Troup soils, 8 to 17 percent slopes						3. 0	5. 5	6. 0
Wahee soils	55				25	3. 8	6. 0	7. 0

[1] A.U.M. stands for animal-unit-month. This is a term used to express the number of months that one animal unit can graze one acre without injury to the pasture. An animal unit is one cow, one steer, one horse, five hogs, or seven sheep.

Use of the Soils for Woodland [3]

This section contains information concerning the relationship between soils and trees. It is the woodland interpretations of the soil survey of Montgomery, Toombs, and Wheeler Counties. It makes the survey more useful to woodland owners and operators in developing and carrying out plans for establishing and harvesting forest resources.

About 65 percent of the total land area in Montgomery, Toombs, and Wheeler Counties is in woodland, most of which is farmer owned and operated for production of wood crops.

The principal commercial tree species are slash pine, longleaf pine, and loblolly pine on the well-drained ridges; and slash pine, loblolly pine, sweetgum, yellow-poplar, and sycamore on the moist flats and poorly drained depressions and drainageways.

Both slash and longleaf pines are important to the naval stores industry as sources of turpentine and resin. After the extraction of crude gum (fig. 12), the trees are still marketable for other forest products.

In table 3, the soils of Montgomery, Toombs, and Wheeler Counties have been rated on the basis of their performance when used to produce wood crops. The ratings are based on pertinent research, measurements by foresters and soil scientists, and experience by forest land managers. They are a means of expressing information useful in managing wood crops according to kinds of soils. Items rated that are important to woodland use and management are discussed in the following paragraphs.

Potential productivity is expressed as site class for a given species of trees. This is the average height in feet of dominant or codominant trees, at age 35 years for sycamore, and at age 50 for pines (fig. 13), sweetgum, yellow-poplar, and all other species.

Species suitability is shown by listing the principal commercial species that should be favored in existing stands, and by denoting the species that are suitable for planting. The selection of preferred species is influenced by their

[3] W. P. THOMPSON, forester, Soil Conservation Service, assisted in the preparation of this section. Field information was gathered by teams of foresters and soils scientists. Representatives of Federal and State agencies, the wood-using industry, and others cooperated in gathering field data.

Figure 12.—Slash pine on Cowarts loamy sand, 2 to 5 percent slopes. The trees have been tapped for gum to produce naval stores.

Figure 13.—Slash pine on Wagram and Duplin soils, 2 to 8 percent slopes. The stand has been recently thinned.

growth rate, and by the quality, value, and general marketability of the products obtained from each species (fig. 14).

Erosion hazard on stronger slopes requires some attention, particularly care in locating, preparing, and maintaining fire lanes, roads, and skid trails.

Equipment limitations caused by unfavorable soil characteristics and topographic features can restrict or prohibit the use of conventional equipment for planting and harvesting wood crops, for constructing roads and fire lanes, 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 the equipment is restricted by one or more unfavorable characteristics, such as slopes, stones, or other obstructions, seasonal wetness, or instability caused by unfavorable soil texture. The limitation is *severe* if special equipment is needed for normal management. Slope is not a factor in Montgomery, Toombs, and Wheeler Counties.

Figure 14.—Pulpwood cut from managed stand of slash pine on Wagram and Duplin soils, 2 to 8 percent slopes.

TABLE 3.—*Suitability of the soils for woodland*

Woodland suitability group and map symbols	Potential productivity		Species suitable for planting
	Species	Site class	
2o1. Soils that have a sandy or loamy surface layer and a loamy subsoil; high potential productivity; no serious management problem; best suited to southern pines. (CnB, CoC2, CqB, CqC, DaB, TqA, TqB, TuC2)	Loblolly pine Longleaf pine Slash pine	90 70 90	Slash pine. Loblolly pine. Longleaf pine.
2o7. Soils that have a sandy or loamy surface layer and a loamy subsoil; high potential productivity; no serious management problem; suitable for southern pines and hardwoods. (Ij, MK)	Loblolly pine Longleaf pine Slash pine Yellow-poplar Sweetgum	90 70 90 100 90	Slash pine. Loblolly pine. Yellow-poplar. Sweetgum. Sycamore. Cherrybark oak. Black walnut.
2w3. Excessively wet soils that have sandy layers to a depth of about 30 inches and a loamy subsoil; high potential productivity; severe equipment limitations and seedling mortality without adequate drainage; best suited to southern pines. (Pl)	Loblolly pine Slash pine Longleaf pine	90 90 70	Slash pine. Loblolly pine.
2w8. Seasonally wet soils that have a sandy or loamy surface layer and loamy or clayey layers in the subsoil; high potential productivity; moderate equipment limitations and slight to moderate seedling mortality; suitable for southern pines and hardwoods. (Aq, Wy)	Loblolly pine Slash pine Longleaf pine Sweetgum	90 90 70 90	Slash pine. Loblolly pine. Sweetgum. Yellow-poplar. Sycamore. Cherrybark oak.
2w9. Chiefly excessively wet soils that have a loamy to sandy surface layer and clayey subsoil; high potential productivity; severe equipment limitations and seedling mortality in areas without adequate surface drainage; suitable for southern pines and hardwoods. (Cod, GrD)	Loblolly pine Slash pine Longleaf pine Sweetgum	90 90 70 90	Loblolly pine.[1] Slash pine.[1] Sweetgum.[1] Sycamore.[1]
3s2. Soils that have a sandy surface layer and chiefly loamy subsoil; moderately high potential productivity; moderate equipment limitations and seedling mortality; best suited to southern pines. (FsB, Se, WwE, WxC)	Loblolly pine Slash pine Longleaf pine	80 80 70	Slash pine. Loblolly pine.
3c2. Soils that have a loamy surface layer and clayey subsoil; moderately high potential productivity; moderate equipment limitations and seedling mortality; best suited to southern pines. (ShD2)	Slash pine Loblolly pine Longleaf pine	80 80 70	Slash pine. Loblolly pine.
3w2. Seasonally wet soils that have a loamy or sandy surface layer and loamy to clayey subsoil; moderately high potential productivity; moderate equipment limitations and slight to moderate seedling mortality; best suited to southern pines. (CxC, Mn, Oh)	Loblolly pine Slash pine Longleaf pine	80 80 70	Slash pine. Loblolly pine.
3w3. Excessively wet sandy to loamy soils; moderately high potential productivity; severe equipment limitations and seedling mortality without adequate surface drainage; best suited to southern pines. (Obs)	Loblolly pine Slash pine Longleaf pine	80 80 70	Slash pine.[1] Loblolly pine.[1]
4s2. Soils that have a sandy surface layer and sandy or loamy subsoil or underlying layers; moderate productivity; moderate equipment limitations and seedling mortality; best suited to southern pines. (AfC, LTC).	Slash pine Loblolly pine Longleaf pine	70 70 60	Slash pine. Loblolly pine.
5s3. Droughty, sandy soils that have low productivity; moderate equipment limitations and severe seedling mortality; best suited to southern pines. (KdC, PoD).	Slash pine Longleaf pine	60 50	Slash pine. Longleaf pine. Sand pine.

[1] Tree planting is feasible only if drainage is adequate.

Seedling mortality ratings refer to the expected degree of mortality of naturally occurring or planted tree seedlings as influenced by the kinds of soils when plant competition is not a factor. The rating is *slight* where seedling survival ordinarily is 75 percent and natural regeneration is suitable or an original planting may be expected to produce a satisfactory stand. Mortality is *moderate* where seedling survival is between 50 and 75 percent. It is *severe* where the seedling survival is less than 50 percent and adequate restocking is not expected without additional management. For instance, superior planting techniques, superior planting stock, and replanting all may be required to assure adequate stands.

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 Montgomery, Toombs, and Wheeler Counties have been placed in 11 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.

Each symbol for a woodland suitability group has three elements. The first element in a symbol is an arabic number that indicates relative potential productivity of the soils in the group for growing wood crops. This number expresses the site quality and is based on the site index of one or more important forest types or tree species. Number 1 indicates a woodland suitability group having very high potential productivity; 2 indicates high; 3 indicates moderately high; 4 indicates moderate; and 5 indicates low potential productivity.

The second element in the symbol for a woodland suitability group is a letter that indicates the soil characteristics that are the primary cause of hazards, limitations, or restrictions affecting use and management of the woodland group.

In this system, *w* indicates excessive wetness; *c* indicates clayey soils; *s* indicates thick sandy soils; and *o* indicates no significant soil-related limitation that affects use and management.

The third element in the symbol for a woodland group is an Arabic number. This number indicates the general suitability of the soils for different kinds of trees as follows:

1. Soils have no limitations that significantly affect management and are best suited to needleleaf trees.
2. Soils have one or more moderate limitations and are best suited to needleleaf trees.
3. Soils have one or more severe limitations and are best suited to needleleaf trees.
4. Soils have no significant limitations and are best suited to broadleaf trees.
5. Soils have one or more moderate limitations and are best suited to broadleaf trees.
6. Soils have one or more severe limitations and are best suited to broadleaf trees.
7. Soils have no significant limitations and are suited to either needleleaf or broadleaf trees.
8. Soils have one or more moderate limitations and are suited to needleleaf or broadleaf trees.
9. Soils have one or more severe limitations and are suited to needleleaf or broadleaf trees.

The woodland suitability group in which each mapping unit has been placed can be determined by referring to the "Guide to Mapping Units."

Use of the Soils for Wildlife Habitat [4]

Wildlife is a valuable resource in Montgomery, Toombs, and Wheeler Counties. About 72 percent of the soils are potentially suited or well suited as habitat for open-land wildlife and about 99 percent, for woodland wildlife. Open-land wildlife includes rabbit, fox, some deer, quail, dove, and other upland game birds. Examples of woodland wildlife are deer, fox, squirrel, and turkey. Only about 25 percent of these counties is potentially suited or well suited as habitat for wetland wildlife, including raccoon, wild hog, beaver, otter, and waterfowl.

Successful management of wildlife on any tract of land requires, among other things, that food, cover, and water be available in a suitable combination. Lack of any one of these requirements, unfavorable balance between them, or inadequate distribution of them may severely limit or account for the absence of desired wildlife species. Soils information provides a valuable tool in creating, improving, or maintaining suitable food, cover, and water for wildlife.

Most wildlife habitats are managed by planting suitable vegetation, by manipulating existing vegetation to bring about a favorable habitat, by increase or improvement of desired plants, or by combinations of such measures. The influence of soil on the growth of plants is known for many kinds of plants and can be inferred for others from a knowledge about the characteristics and behavior of the soil. In addition, water areas can be created or natural ones improved as wildlife habitats. Soil information is useful for these purposes.

Soil interpretations for wildlife habitat serve a variety of purposes. They are an aid in selecting the more suitable sites for various kinds of habitat management. They serve as indicators of the level of management needed to achieve satisfactory results. They also serve as a means of showing why it may not be feasible generally to manage a particular area for a given kind of wildlife.

These interpretations may also serve in broad scale planning of wildlife management areas, for planning of parks and nature areas, or for acquiring wildlife lands. By means of a map overlay, soil groupings can be made for any one of the habitat elements and the location and extent of the element shown. The soil areas shown on the soil survey maps, however, are rated without regard to their positional relationship with adjoining delineated areas. The size, shape, or location of the outlined areas do not affect the rating. Certain influences on habitats, such as elevation and aspect, must be appraised at the site.

In table 4, the soils of the survey area are rated according to their relative suitability as sites for the creation, improvement, or maintenance of seven wildlife habitat elements. The ratings are based on limitations imposed by the characteristics or behavior of the soil. Three levels of suitability are recognized: *well suited*, *suited*, and *poorly suited*. It also is recognized that certain conditions render a site *unsuited* to a particular habitat element. The ratings indicate the degree of soil suitability for a given habitat element. They also indicate the relative severity of a particular soil limitation. Thus, for example, a rating of *suited* for a habitat element limited by slope shows that slope is only a moderate limitation. For another habitat element, however, the same degree of slope can be a severe limitation and require a rating of *poorly suited*, or even *unsuited*.

Special attention is directed to the rating of the Coniferous Woody Plant habitat. There is a considerable body of evidence indicating that under situations of slow growth and delayed canopy closure, coniferous habitat harbors larger numbers and varieties of wildlife than under reverse growth conditions. Soil properties, therefore, that tend to promote rapid growth rates and canopy closure are classed as limitations.

[4] PAUL D. SCHUMACHER, biologist, Soil Conservation Service, assisted in writing this section.

445-937—73——4

TABLE 4.—*Suitability of the*

Soil series and map symbols	Elements of			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Ailey: AfC	Suited	Suited	Suited	Suited
Ardilla: Aq	Suited	Suited	Suited	Well suited
Carnegie:				
CnB	Well suited	Well suited	Suited	Suited
CoC2	Suited	Well suited	Suited	Suited
Cowarts:				
CqB	Well suited	Well suited	Suited	Well suited
CqC	Suited	Well suited	Suited	Well suited
Coxville and Duplin: Cod	Poorly suited	Suited	Suited	Well suited
Craven: CxC	Suited	Suited	Well suited	Suited
Dothan: DaB	Well suited	Well suited	Well suited	Well suited
Fuquay: FsB	Suited	Well suited	Well suited	Suited
Grady: GrD	Unsuited	Poorly suited	Unsuited	Suited
Irvington: Ij	Well suited	Well suited	Well suited	Well suited
Kershaw: KdC	Unsuited	Poorly suited	Unsuited	Poorly suited
Lakeland and Troup: LTC	Poorly suited	Suited	Suited	Poorly suited
Mascotte: Mn	Poorly suited	Poorly suited	Suited	Suited
Maxton: MK	Well suited	Well suited	Well suited	Well suited
Ocilla: Oh	Suited	Suited	Suited	Well suited
Osier and Bibb: Obs	Unsuited	Unsuited	Poorly suited	Well suited
Paola, cool variant: PoD	Unsuited	Poorly suited	Unsuited	Poorly suited
Pelham: Pl	Poorly suited	Suited	Suited	Well suited
Stilson: Se	Suited	Well suited	Suited	Suited
Sunsweet: ShD2	Poorly suited	Suited	Poorly suited	Suited
Tifton:				
TqA	Well suited	Well suited	Well suited	Well suited
TqB	Well suited	Well suited	Well suited	Well suited
TuC2	Suited	Suited	Suited	Suited
Wagram and Duplin: WxC	Suited	Suited	Suited	Suited
Wagram and Troup: WwE	Poorly suited	Suited	Suited	Poorly suited
Wahee: Wy	Poorly suited	Suited	Suited	Well suited

In general, soil conditions favorable to quick establishment of conifers and their rapid growth are also conducive to hardwood dominance. Hardwood trees generally represent a stage of plant succession higher than that of the conifers and for this reason are seriously competitive with conifers. A high level of frequency and intensity of management is therefore required to create, improve, or maintain a satisfactory conifer habitat.

For short-term use soils rated as "poorly suited" may provide easy establishment and temporary habitat values.

The following definitions are given for habitat suitability ratings shown in table 4.

Well suited.—Soil limitations are negligible in the management of the designated habitat element. Generally, the intensity of management required for the creation, improvement, or maintenance of the habitat element is low, and satisfactory results are well-assured.

Suited.—Soil limitations moderately affect the management of the designated habitat element. Fairly frequent attention and a moderate intensity of effort are required to achieve satisfactory results.

Poorly suited.—Soil limitations are severe. The creation, improvement, or maintenance of the designated habitat element is difficult, can be expensive, and requires intensive effort to attain satisfactory results.

Unsuited.—Soil limitations are so extreme that it is highly impractical, if not impossible, to manage the designated habitat element and achieve measurable success.

The 7 wildlife habitat elements are rated in table 4 and are defined and exemplified in the paragraphs that follow. Help in planning and establishing habitat for wildlife or fish can be obtained from the district conservationist of the Soil Conservation Service.

Grain and Seed Crops.—Agricultural grains or seed-producing annuals planted to produce food for wildlife. Examples are corn, sorghum, wheat, oats, millet, soybeans, and proso.

Grasses and Legumes.—Domestic perennial grasses and herbaceous legumes that are established by planting and that furnish wildlife food and cover. Examples are fescue, bromegrass, lovegrass, orchardgrass, reed canarygrass, bahiagrass, white clover, trefoil, alfalfa, and annual lespedeza, perennial lespedeza, and shrub lespedeza.

Wild Herbaceous Upland Plants.—Native or introduced perennial grasses and weeds that provide food and cover principally to upland forms of wildlife, and that are established mainly through natural processes. Examples are bluestem, wild ryegrass, catgrass, pokeweed, strawberries, lespedeza, beggarweed, wild beans, goldenrod, dandelion, cheat, poorjoe, and ragweed.

Hardwood Woody Plants.—Nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, or foliage used extensively as food by wildlife, and that commonly are established through natural processes, but also can be planted. Examples are oak, beech, cherry, hawthorn, dogwood, viburnum, maple, birch, poplar, grapes, honeysuckle, blueberry, briers, greenbriers, autumn olive, and multiflora rose.

Coniferous Woody Plants.—Cone-bearing trees and shrubs, important to wildlife mainly as cover, but also can

soils for wildlife habitat

wildlife habitat			Types of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Poorly suited	Poorly suited	Suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Well suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Suited	Suited	Well suited	Poorly suited	Suited	Well suited.
Well suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Well suited	Suited	Unsuited.
Poorly suited	Suited	Well suited	Poorly suited	Suited	Suited.
Suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Poorly suited	Poorly suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Poorly suited	Poorly suited	Poorly suited	Suited	Poorly suited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Poorly suited	Suited	Well suited	Unsuited.
Poorly suited	Well suited	Suited	Unsuited	Well suited	Well suited.
Suited	Unsuited	Unsuited	Unsuited	Poorly suited	Unsuited.
Suited	Suited	Well suited	Poorly suited	Suited	Well suited.
Suited	Poorly suited	Unsuited	Suited	Suited	Unsuited.
Well suited	Unsuited	Unsuited	Poorly suited	Well suited	Unsuited.
Poorly suited	Unsuited	Poorly suited	Well suited	Suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Well suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Suited	Well suited	Poorly suited	Suited	Suited.

furnish food in the form of browse, seeds, or fruitlike cones. Plants commonly are established through natural processes but also can be planted. Examples are pine and redcedar.

Wetland Food and Cover Plants.—Annual and perennial wild herbaceous plants in moist to wet sites, exclusive of submerged or floating aquatics, that produce food or cover that is extensively and dominantly used by wetland forms of wildlife. Examples are smartweed, wild millet, bulrush, spike sedge, rushes, sedges, burreeds, wild rice, rice cutgrass, mannagrass, and cattails.

Shallow Water Developments.—Impoundments or excavations for control of water, generally not exceeding 6 feet in depth. Examples are low dikes and levees; shallow dugouts; level ditches; devices for water-level control in marshy drainageways or channels (fig. 15).

Openland Wildlife.—These are quail, doves, cottontail rabbit, fox, meadowlark, field sparrow, and other birds and mammals that normally live on cropland, pasture, meadow, lawn, and in other openland areas where grasses, herbs, and shrubby plants grow.

Woodland Wildlife.—These are woodcock, thrush, vireo, squirrel, deer, raccoon, wild turkey, and other birds and mammals that normally live in wet areas, marshes, and swamps.

Wetland Wildlife.—These are ducks, geese, rail, herons, shorebirds, mink, muskrat, beaver, and other wildlife requiring mainly an aquatic environment.

***Figure 15.*—Impounded water used as habitat for ducks on Pelham loamy sand.**

Engineering Uses of the Soils [5]

Soil engineering is a part of structural engineering and deals with soils used as foundation material on which

[5] JAMES E. PAYNE, agricultural engineer, and JACK R. BROWN, soil scientist, Soil Conservation Service, assisted in preparing this section.

structures are built and with use of soils as structural material. To engineers, soil is a natural material that occurs in great variety over the earth and that can 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 Montgomery, Toombs, and Wheeler Counties contains information about the depth to the seasonal high water table, permeability, drainage, grain size, shrink-swell properties, and compaction characteristics. This information is 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 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 grassed waterways.
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 topsoil, road fill, 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 limitations of soils as sites for residential, industrial, and recreational facilities.

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 do not eliminate the need for sampling and testing at the sites 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 have 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 section is given in tables 5, 6, and 7, 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."

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) (*8*), and the U.S. Department of Agriculture (USDA).

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,

TABLE 5.—*Engineering*

[Tests performed by Georgia State Highway Department, in cooperation with Bureau of Public Roads, U.S. Department

Soil name and location	Parent material	Georgia report No.	Depth from surface	Moisture-density data [1]		Volume change [2]		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	*Pounds per cubic foot*	*Percent*			
Fuquay loamy sand, 1 to 5 percent slopes:	Medium-textured marine deposits.	S69–153						
Wheeler County: 2.3 miles south of U.S. Highway 280 in Glenwood along State Route 19, then 2.0 miles southwest along county road. (Modal)		4–1	4–22	116	8	0. 6	0. 4	1. 0
		4–2	28–46	110	14	. 6	4. 7	5. 3
		4–3	46–60	112	14	4. 3	2. 4	6. 7
Wheeler County: 1.2 miles north of State Route 134 at Spring Hill Church, along paved county road, 10 feet east of road. (Slightly coarser textured in the 26–58 inch layer than modal)	Medium-textured marine deposits.	6–1	6–22	116	11	1. 5	5. 9	7. 4
		6–2	26–58	117	13	3. 5	2. 8	6. 3
		6–3	65–78	110	16	5. 9	3. 7	9. 6

See footnotes at end of table.

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 the 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."

Engineering test data

Soil samples from five principal soil series that were recognized in Montgomery, Toombs, and Wheeler 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 5. Each soil series was sampled at 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 6½ feet or less, the test data are not adequate for estimating the characteristics of soil material in deep cuts.

In moisture-density test, soil material was compacted in a mold several times, using constant compaction effort at a successively higher moisture content each time. The density, or unit weights, 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.

test data

of Commerce, in accordance with standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis[3]									Liquid limit	Plasticity index	Classification	
Percentage passing sieve—					Percentage smaller than—						AASHO	Unified
⅜ 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.	0.002 mm.				
99	97	97	83	16	14	11	7	5	----------	(4)	A–2–4(0)	SM
100	98	98	86	41	39	36	34	32	32	9	A–4(1)	SC
100	100	100	70	33	32	30	29	27	----------	(4)	A–2–4(0)	SM
100	100	100	85	21	16	13	9	7	----------	(4)	A–2–4(0)	SM
98	97	95	78	32	30	28	23	22	28	8	A–2–4(0)	SC
100	100	97	69	35	34	32	30	28	36	14	A–2–6(0)	SC

TABLE 5.—*Engineering*

Soil name and location	Parent material	Georgia report No.	Depth from surface	Moisture-density data [1]		Volume change [2]		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	*Pounds per cubic foot*	*Percent*			
Ocilla loamy sand:	Medium-textured	S69-138						
Toombs County: 0.5 mile east of Pendleton Creek along State Route 292, then 0.25 mile north of highway along county road.	marine deposits.	4-1	8-20	119	8	0.4	2.6	3.0
		4-2	29-62	121	10	1.3	2.8	4.1
Pelham loamy sand:								
Montgomery County: 0.6 mile west of U.S. Highway 221 along Bells Ferry Landing road, 50 feet north of road. (Modal)	Medium-textured Coastal Plain sediments.	4-1	4-30	119	11	1.4	2.5	3.9
		4-2	38-56	115	13	2.6	.4	3.0
		4-3	56-62	114	13	5.0	3.4	8.4
Montgomery County: 2 miles northeast of Seaboard Railroad in Kibbee, along county paved road; then 0.2 miles north along county paved road. (Less clay in 22 to 54 inch layer than modal)	Medium-textured Coastal Plain sediments.	5-1	0-4	110	12	.8	6.2	7.0
		5-2	22-38	126	9	2.1	1.5	3.6
		5-3	38-54	125	9	2.2	1.9	4.1
Sunsweet sandy loam, 5 to 12 percent slopes, eroded:	Fine- to medium-textured marine deposits.	S69-138						
Toombs County, 0.75 mile north of State Route 107, along State Route 147, then 100 feet east of highway. (More plastic in 10 to 22 inch layer than modal)		1-1	10-22	96	24	11.6	2.1	13.7
		1-2	26-62	104	18	8.6	4.9	13.5
Toombs County: 0.75 mile south of State Route 56 at Johnson Corner crossroads along county paved road 25 feet west of road. (Modal)	Fine- to medium-textured marine deposits.	2-1	0-6	122	11	1.0	.1	1.1
		2-2	26-56	109	16	9.8	4.4	14.2
		2-3	56-72	102	19	13.7	6.0	19.7
Toombs County: 3 miles south of Lyons along U.S. Highway 1, then 0.4 mile west of county road. (Slightly more plastic in 36 to 60 inch layer than modal)	Fine- to medium-textured marine deposits.	3-1	4-8	121	11	3.6	2.0	5.6
		3-2	8-36	99	22	10.6	5.6	16.2
		3-3	36-60	94	24	17.6	14.0	31.6
Wahee soils:	Loamy and clayey sediments of marine or fluvial origin.	S69-153						
Wheeler County: 1.1 miles west of Spring Hill Church along State Route 134; 25 feet north of highway.		3-1	4-11	118	9	1.0	8.0	9.0
		3-2	11-22	104	19	12.9	5.8	18.7
		3-3	22-38	94	24	18.3	7.5	25.8

[1] Based on AASHO Designation T 99-57, method A (*2*).

[2] Densities and volume changes were not corrected for total sample. Volume change based on "A System of Soil Classification" by W. F. Abercrombie (*1*).

[3] Mechanical analyses according to the AASHO Designation T 88-57 (*2*). Results by this procedure differ somewhat from results that would have been 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

'est data—Continued

Mechanical analysis[3]									Liquid limit	Plasticity index	Classification	
Percentage passing sieve—					Percentage smaller than—						AASHO	Unified
⅜ 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.	0.002 mm.				
100	100	100	84	20	16	11	8	5	----------	(4)	A–2–4(0)	SM
100	100	100	86	29	25	22	18	15	----------	(4)	A–2–4(0)	SM
100	100	100	79	22	17	13	10	9	----------	(4)	A–2–4(0)	SM
100	100	100	80	33	32	31	27	25	24	9	A–2–4(0)	SC
100	100	100	78	30	27	26	23	21	----------	(4)	A–2–4(0)	SM
100	100	100	79	28	24	16	8	7	----------	(4)	A–2–4(0)	SM
100	100	98	77	26	22	20	14	13	----------	(4)	A–2–4(0)	SM
100	100	100	77	26	23	21	17	15	----------	(4)	A–2–4(0)	SM
100	100	100	97	68	65	62	57	56	41	16	A–7–6(10)	CL
100	100	100	98	61	59	50	47	44	44	25	A–7–6(13)	CL
[5] 78	66	62	46	17	14	6	7	5	----------	(4)	A–2–4(0)	SM
100	100	100	92	63	58	53	46	42	40	23	A–6(12)	CL
100	100	100	96	68	62	58	50	46	36	20	A–6(11)	CL
100	95	85	55	23	21	20	17	15	----------	(4)	A–2–4(0)	SM
100	100	100	94	63	59	56	51	49	39	18	A–6(9)	CL
100	100	100	99	77	73	65	60	53	47	24	A–7–6(19)	CL
100	100	100	87	43	37	27	10	7	----------	(4)	A–4(0)	SM
100	100	100	97	77	72	64	52	46	36	21	A–6(14)	CL
100	100	100	98	86	84	78	67	61	48	27	A–7–6(24)	CL

that coarser than 2 millimeters in 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 used in this table are not suitable for naming textural classes for soils.

[4] Nonplastic.

[5] 97 percent of the material passed the 1-inch sieve; 92 percent of the material passed the ¾-inch sieve.

TABLE 6.—*Estimated engineering*

[These soils do not contain material coarser than 3 inches in diameter. An asterisk in the first column indicates that at least one mapping and for this reason it is necessary to refer to other series as indicated.

Soil series and map symbol	Depth to seasonally high water table	Depth from surface	Classification	
			Dominant USDA texture	Unified
		Inches		
Ailey: AfC	More than 60 inches.	0–30	Loamy coarse sand	SM
		30–36	Sandy clay loam	SM, SC
		36–72	Sandy clay loam	SM, SC
Ardilla: Aq	15 to 20 inches for 1 to 2 months each year.	0–14	Loamy sand	SM
		14–30	Sandy loam and sandy clay loam.	SM, SM–SC
		30–64	Sandy clay loam	SC
Bibb:				
Mapped only in undifferentiated group with Osier soils.	0 to 15 inches for 3 to 6 months each year.	0–6	Loam	SM, ML
		6–24	Loamy sand	SM
		24–62	Sandy loam	SM, SC
Carnegie: CnB, CoC2	More than 60 inches.	0–6	Sandy loam	SM
		6–19	Sandy clay loam	SC
		19–36	Sandy clay loam	SC, CL
		36–62	Sandy clay loam	SC, CL, ML–CL
Cowarts: CqB, CqC	More than 60 inches.	0–12	Loamy sand	SM
		12–18	Sandy clay loam	SC, SM
		18–37	Sandy clay loam	SC, SM
		37–65	Sandy clay loam	SC, SM
*Coxville: Cod	Less than 15 inches for 2 to 6 months each year.	0–4	Silt loam	ML
For properties of Duplin part of Cod, refer to Duplin series.		4–60	Clay	MH, CL
Craven: CxC	30 to 60 inches for 1 to 2 months each year.	0–12	Loamy sand	SM
		12–16	Sandy clay loam	SC, CL
		16–36	Clay	CH, CL
		36–54	Sandy clay	SC, CL
Dothan: DaB	More than 60 inches.	0–12	Loamy sand	SM
		12–17	Sandy loam	SM
		17–41	Sandy clay loam	SC, SM, SM–SC
		41–70	Sandy clay loam	SC
Duplin:				
Mapped only in undifferentiated groups with Coxville and Wagram soils.	15 to 30 inches for 1 to 2 months each year.	0–14	Loamy sand	SM
		14–18	Sandy clay loam	SM, SC
		18–62	Sandy clay	SC, CL
Fuquay: FsB	More than 60 inches.	0–26	Loamy sand	SM
		26–30	Sandy loam	SM, SC
		30–41	Sandy clay loam	SC
		41–80	Sandy clay loam	SC, SM
Grady: GrD	Less than 15 inches for more than 6 months each year.	0–5	Loam	ML, SM
		5–10	Clay loam	CL, ML, ML–CL
		10–65	Clay and sandy clay	MH, CL, ML–CL
Irvington: Ij	15 to 30 inches for 1 to 2 months each year.	0–7	Loamy sand	SM
		7–26	Sandy clay loam	SM, SC
		26–60	Sandy clay loam	SC, CL
Kershaw: KdC	More than 108 inches.	0–80	Sand	SP, SP–SM
*Lakeland: LTC	More than 60 inches.	0–80	Sand	SP–SM
For properties of Troup part of LTC, refer to the Troup series.				

properties of the soils

unit in this series is made up of two or more kinds of soil. The soil in such mapping units may have different properties and limitations, The symbol < means less than; the symbol > means more than]

Classification—Con.	Percentage passing sieve—				Permeability	Available water capacity	Shrink-swell potential
AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)			
					Inches per hour	*Inches per inch of soil*	
A-2	85–95	60–85	50–70	12–20	>6. 3	0. 03–0. 05	Low.
A-2, A-4	90–100	75–95	60–80	30–40	0. 63–2. 0	0. 09–0. 12	Low.
A-2, A-4	90–100	75–95	60–80	30–40	<0. 2	0. 06–0. 10	Low.
A-2	100	100	60–90	15–30	>6. 3	0. 08–0. 10	Low.
A-2	100	95–100	70–95	25–35	2. 0–6. 3	0. 10–0. 12	Low.
A-4	100	95–100	80–90	40–50	0. 2–0. 63	0. 09–0. 11	Low.
A-4	100	75–95	60–80	36–55	2. 0–6. 3	0. 12–0. 14	Low.
A-2	100	100	60–75	15–25	>6. 3	0. 08–0. 10	Low.
A-2 or A-4	100	100	60–80	25–40	0. 63–2. 0	0. 10–0. 13	Low.
A-2	75–95	75–85	55–70	20–30	2. 0–6. 3	0. 10–0. 12	Low.
A-6	90–95	85–95	55–75	36–45	0. 63–2. 0	0. 10–0. 14	Moderate.
A-6, A-7	85–100	80–100	55–80	40–55	<0. 2	0. 11–0. 14	Moderate.
A-6, A-7	100	90–100	60–90	40–70	0. 63–2. 0	0. 10–0. 13	Moderate.
A-2	95–100	95–100	60–80	15–25	>6. 3	0. 06–0. 08	Low.
A-2, A-4	95–100	90–100	70–80	30–40	0. 63–2. 0	0. 12–0. 14	Low.
A-2, A-4	85–100	80–100	70–80	30–40	<0. 2	0. 10–0. 12	Low.
A-2, A-6	90–100	80–95	70–85	30–40	0. 63–2. 0	0. 10–0. 13	Low.
A-4	100	100	70–90	55–70	0. 63–2. 0	0. 13–0. 15	Low.
A-7	100	100	70–90	65–80	0. 2–0. 63	0. 11–0. 13	Moderate.
A-2	95–100	95–100	60–80	15–25	>6. 3	0. 06–0. 08	Low.
A-6, A-7	100	100	55–80	40–65	0. 2–0. 63	0. 10–0. 12	Moderate.
A-7	100	100	70–90	70–85	<0. 20	0. 12–0. 14	High.
A-7	100	100	70–85	40–60	<0. 20	0. 12–0. 15	Moderate to high.
A-2	100	90–100	80–90	15–25	>6. 3	0. 07–0. 09	Low.
A-2	100	95–100	80–90	25–35	2. 0–6. 3	0. 08–0. 10	Low.
A-2, A-4	90–100	90–100	70–85	30–40	0. 63–2. 0	0. 12–0. 14	Low.
A-2, A-4	75–95	70–95	65–80	30–50	0. 2–0. 63	0. 10–0. 12	Low.
A-2	100	100	80–95	15–25	2. 0–6. 3	0. 06–0. 08	Low.
A-4, A-6	100	100	70–90	36–50	0. 63–2. 0	0. 12–0. 14	Low.
A-6	100	100	70–90	36–60	<0. 20	0. 12–0. 15	Moderate.
A-2	90–100	95–100	80–95	15–25	>6. 3	0. 06–0. 08	Low.
A-2, A-4	90–100	95–100	70–90	25–45	2. 0–6. 3	0. 10–0. 12	Low.
A-4, A-2	95–100	95–100	70–90	30–45	0. 63–2. 0	0. 12–0. 14	Low.
A-2, A-6	100	95–100	65–75	30–40	<0. 2	0. 10–0. 12	Low.
A-4, A-2	100	100	80–95	30–55	0. 63–2. 0	0. 10–0. 13	Low.
A-6	100	100	80–95	50–80	0. 20–0. 63	0. 12–0. 14	Moderate.
A-6, A-7	100	100	90–100	60–80	<0. 2	0. 11–0. 14	Moderate.
A-2	80–95	80–95	70–85	15–25	>6. 3	0. 06–0. 08	Low.
A-2, A-4	80–95	80–95	60–85	30–45	0. 63–2. 0	0. 12–0. 14	Low.
A-6	85–100	80–95	70–90	36–55	<0. 2	0. 10–0. 12	Low.
A-3, A-2	100	100	51–80	3–6	>6. 3	0. 02–0. 03	Low.
A-2	100	100	70–80	5–10	>6. 3	0. 03–0. 05	Low.

TABLE 6.—*Estimated engineering*

Soil series and map symbol	Depth to seasonally high water table	Depth from surface	Classification	
			Dominant USDA texture	Unified
		Inches		
Mascotte: Mn	15 to 30 inches for 2 to 6 months each year.	0–16	Sand	SP–SM, SM
		16–21	Sand	SP–SM, SM
		21–38	Loamy sand	SM
		38–65	Sandy clay loam	SC
Maxton: MK	More than 60 inches.	0–6	Loamy sand and sandy loam	SM
		6–22	Sandy clay loam	SM, SC
		22–36	Sandy loam	SM
		36–60	Loamy sand and loamy coarse sand.	SM
Ocilla: Oh	15 to 30 inches for 2 to 6 months each year.	0–23	Loamy sand	SM
		23–50	Sandy loam	SM
		50–62	Sandy clay loam	SC, SM
*Osier: Obs For properties of Bibb part of Obs, refer to the Bibb series.	0 to 15 inches for 3 to 6 months each year.	0–4	Fine sandy loam	SM
		4–24	Sand	SP, SP–SM
		24–30	Loamy fine sand	SM
		30–60	Coarse sand	SP
Paola: PoD	More than 108 inches.	0–80	Sand	SP, SP–SM
Pelham: Pl	0 to 15 inches for more than 6 months each year.	0–30	Loamy sand	SM
		30–38	Sandy loam	SM
		38–62	Sandy clay loam and sandy loam.	SC, SM
Stilson: Se	30 to 60 inches for 1 to 2 months each year.	0–28	Loamy sand and sandy loam	SM
		28–66	Sandy clay loam	SM, SC
Sunsweet: ShD2	More than 48 inches.	0–6	Sandy loam	SM
		6–56	Sandy clay	CL
		56–72	Clay	CL
Tifton: TqA, TqB, TuC2	More than 60 inches.	0–10	Loamy sand	SM
		10–37	Sandy clay loam	SM, SC
		37–65	Sandy clay loam	SC, SM–SC
Troup: Mapped only in undifferentiated groups with Lakeland and Wagram soils.	More than 60 inches.	0–52	Sand	SM, SP–SM
		52–62	Sandy loam	SM
		62–74	Sandy clay loam	SC
*Wagram: WxC, WwE For properties of Duplin and Troup parts of WwE and WxC, see Duplin and Troup series.	More than 60 inches.	0–24	Loamy sand	SM
		24–62	Sandy clay loam	SM, SC
Wahee: Wy	15 to 30 inches for 2 to 6 months each year.	0–8	Fine sandy loam	SM, SC
		8–35	Sandy clay and clay	CL
		35–60	Sandy clay loam	SM, SC
		60–65	Sandy loam	SM

properties of the soils—Continued

Classification—Con.	Percentage passing sieve—				Permeability	Available water capacity	Shrink-swell potential
AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)			
					Inches per hour	*Inches per inch of soil*	
A–2	100	100	70–85	5–15	>6. 3	0. 03–0. 05	Low.
A–2	100	100	70–85	5–15	0. 63–2. 0	0. 10–0. 12	Low.
A–2	100	100	70–85	12–20	>6. 3	0. 06–0. 08	Low.
A–6	100	100	70–90	35–45	0. 63–2. 0	0. 10–0. 13	Low.
A–2	100	95–100	80–90	15–25	>6. 3	0. 08–0. 10	Low.
A–6	100	95–100	80–90	40–50	0. 63–2. 0	0. 12–0. 14	Low.
A–2	100	95–100	80–90	25–35	2. 0–6. 3	0. 10–0. 12	Low.
A–2	100	95–100	70–85	5–15	>6. 3	0. 05–0. 07	Low.
A–2	100	95–100	80–95	15–30	>6. 3	0. 06–0. 08	Low.
A–2	100	95–100	80–95	20–35	0. 63–2. 0	0. 09–0. 13	Low.
A–6, A–2	100	100	80–95	25–40	0. 63–2. 0	0. 10–0. 12	Low.
A–2	100	100	80–95	15–25	2. 0–6. 3	0. 10–0. 12	Low.
A–2	100	100	70–90	5–12	>6. 3	0. 03–0. 05	Low.
A–2	100	100	80–90	12–20	>6. 3	0. 06–0. 08	Low.
A–3	100	100	70–90	<5	>6. 3	0. 03–0. 05	Low.
A–3, A–2	100	100	51–80	3–7	>6. 3	0. 02–0. 03	Low.
A–2	100	100	75–85	20–30	2. 0–6. 3	0. 06–0. 08	Low.
A–2	100	95–100	75–85	25–35	2. 0–6. 3	0. 10–0. 12	Low.
A–2, A–6	100	95–100	75–85	25–50	0. 63–2. 0	0. 10–0. 13	Low.
A–2	100	95–100	75–95	15–25	>6. 3	0. 07–0. 09	Low.
A–2, A–6	90–100	90–100	75–90	25–45	0. 63–2. 0	0. 09–0. 12	Low.
A–2	65–95	60–85	45–60	15–30	2. 0–6. 3	0. 09–0. 12	Low.
A–6, A–7	100	100	90–100	60–80	0. 2–0. 63	0. 10–0. 13	Moderate.
A–6, A–7	100	100	90–100	60–80	0. 2–0. 63	0. 10 0. 14	Moderate.
A–2	75–90	55–90	40–64	12–25	>6. 3	0. 06–0. 08	Low.
A–2, A–6	75–85	65–85	50–80	30–45	0. 63–2. 0	0. 11–0. 15	Low.
A–6, A–7	85–95	85–95	70–80	36–50	0. 63–2. 0	0. 10–0. 12	Low to moderate.
A–2, A–3	100	100	80–95	8–15	>6. 3	0. 04–0. 06	Low.
A–2	100	100	80–95	25–35	2. 0–6. 3	0. 08–0. 10	Low.
A–4	100	95–100	80–95	36–45	0. 63–6. 3	0. 10–0. 13	Low.
A–2	100	100	75–85	15–25	>6. 3	0. 06–0. 08	Low.
A–2, A–6	100	100	75–85	30–45	2. 0–6. 3	0. 10–0. 13	Low.
A–2, A–4	100	100	80–90	25–45	2. 0–6. 3	0. 10–0. 12	Low.
A–6, A–7	100	100	80–100	60–90	<0. 2	0. 10–0. 14	High.
A–4, A–6, A–7	100	100	70–90	36–45	0. 63–2. 0	0. 10–0. 12	Low.
A–2	100	90–100	70–85	25–35	2. 0–6. 3	0. 08–0. 10	Low.

TABLE 7.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The

Soil series and map symbols	Suitability as source of—		Soil features adversely affecting—	
	Topsoil	Road fill	Highway location	Farm ponds— Reservoir area
Ailey: AfC	Poor: low productivity.	Good	Fair stability	Permeability is rapid in upper 30 inches.
Ardilla: Aq	Fair: medium productivity.	Fair: somewhat poorly drained.	Seasonally high water table; fair stability.	Features generally favorable.
Bibb Mapped only in undifferentiated group with Osier soils.	Fair: medium productivity.	Poor: poorly drained; flooding.	Flooding; seasonally high water table.	Moderate permeability.
Carnegie: CnB, CoC2	Fair: iron concretions in the upper 6 inches and sandy clay loam in subsoil limit usefulness.	Fair: moderate shrink-swell potential.	Fair stability; moderate shrink-swell potential.	Features generally favorable.
Cowarts: CqB, CqC	Fair: medium productivity.	Good	Fair stability	Features generally favorable.
*Coxville: Cod For properties of Duplin part of Cod, see Duplin series.	Poor: fine texture of subsoil; wetness.	Poor: poorly drained; moderate shrink-swell potential.	Flooding; seasonally high water table.	Features generally favorable.
Craven: CxC	Fair: medium productivity.	Poor: high shrink-swell potential.	Poor stability; plastic material below depth of 16 inches; sandstone below depth of 50 inches; outcrops of sandstone in places.	Sandstone below depth of 50 inches; high seepage potential.
Dothan: DaB	Good: uppermost 12 inches is poor, but if entire soil from surface to depth of 41 inches is mixed, the material is good.	Good	Features generally favorable.	Features generally favorable.
Duplin Mapped only in undifferentiated groups with Coxville and Wagram soils.	Fair: medium productivity.	Fair: moderate shrink-swell potential.	Flooding on level areas; fair stability.	Features generally favorable.
Fuquay: FsB	Fair: medium productivity.	Good	Features generally favorable.	Permeability is rapid in upper 26 inches.
Grady: GrD	Poor: fine textured subsoil; wetness.	Poor: poorly drained; flooding.	Flooding; seasonally high water table.	Features generally favorable.

interpretations of the soils

soils in such mapping units may have different properties and limitations, and it is necessary to refer to other series as indicated]

Soil features adversely affecting—Continued				
Farm ponds—Continued Embankment	Agricultural drainage	Irrigation	Terraces	Grassed waterways
Fair strength and stability; upper 36 inches moderately permeable after compaction.	Well drained	Rapid intake rate; low available water capacity.	Features generally favorable.	Slopes greater than about 5 percent are subject to moderate gullying.
Fair strength and stability.	Seasonally high water table.	Features generally favorable.	Nearly level	Nearly level.
Fair strength and stability.	Flooding; seasonally high water table.	Poorly drained; seasonally high water table.	Nearly level	Seasonally high water table; flooding.
Fair strength and stability; moderate shrink-swell potential.	Well drained	Features generally favorable; severe erosion hazard where the slope is more than 5 percent.	Features generally favorable.	Features generally favorable.
Fair strength and stability.	Well drained	Features generally favorable; severe erosion hazard where the slope is more than 5 percent.	Features generally favorable.	Features generally favorable.
Poor strength and stability; moderate shrink-swell potential.	Flooding; seasonally high water table; moderately slow permeability.	Poorly drained; seasonally high water table.	Nearly level	Flooding; seasonally high water table.
Poor strength and stability; high shrink-swell potential; sandstone below depth of 50 inches.	Slow permeability	Severe erosion hazard where the slope is more than 5 percent.	Slow permeability	Clayey subsoil.
Fair strength and stability.	Well drained	Features generally favorable.	Features generally favorable.	Features generally favorable.
Fair strength and stability.	Flooding on level areas; slow permeability.	Slow permeability; severe erosion hazard where the slopes are more than 5 percent.	Features generally favorable.	Features generally favorable.
Fair strength and stability; upper 26 inches moderately permeable after compaction.	Well drained	Low to medium available water capacity.	Features generally favorable.	Low to medium available water capacity; subject to gullying.
Fair to poor strength and stability; moderate shrink-swell potential.	Flooding; seasonally high water table; slow permeability.	Poorly drained; seasonally high water table.	Nearly level	Seasonal high water table; flooding.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features adversely affecting—	
	Topsoil	Road fill	Highway location	Farm ponds— Reservoir area
Irvington: Ij	Fair: uppermost 7 inches is poor, but if entire soil from surface to depth of 26 inches is mixed, the material is fair.	Fair: moderately well drained.	Seasonally high water table; fair stability.	Features generally favorable.
Kershaw: KdC	Poor: low productivity.	Good: may need binder.	Loose sand; difficult to travel over when dry.	Rapid permeability; rapid seepage rate.
*Lakeland: LTC For properties of Troup part of LTC, see Troup series.	Poor: low productivity.	Good	Loose sand; somewhat difficult to travel over when dry.	Rapid permeability; rapid seepage rate.
Mascotte: Mn	Poor: low productivity.	Poor: poorly drained.	Seasonally high water table; poor stability.	Moderate permeability; rapid seepage rate in upper 38 inches.
Maxton: MK	Good	Good	Features generally favorable.	Permeability is moderate in upper part; rapid below depth of 36 inches.
Ocilla: Oh	Fair: medium productivity.	Fair: somewhat poorly drained.	Seasonally high water table; fair stability.	Permeability is rapid in upper part; moderate below depth of 23 inches; seasonally high water table.
*Osier: Obs For properties of the Bibb part of Obs, see the Bibb series.	Poor: low productivity.	Poor: poorly to very poorly drained; flooding.	Flooding; seasonally high water table.	Rapid permeability; rapid seepage rate; seasonally high water table.
Paola: PoD	Poor: low productivity.	Good: may need binder.	Loose sand; slopes	Rapid permeability; rapid seepage rate.
Pelham: Pl	Poor: low productivity of the upper 30-inch layer.	Poor: poorly drained; flooding.	Flooding; seasonally high water table.	Rapid permeability in upper part; moderate below depth of 38 inches.
Stilson: Se	Fair to poor: medium to low productivity in the upper 28-inch layer.	Good	Seasonally high water table; fair stability.	Rapid permeability in upper part; moderate below depth of 28 inches.
Sunsweet: ShD2	Poor: 6 inches deep to clayey material.	Fair: moderate shrink-swell potential.	Slopes	Features generally favorable.

interpretations of the soils—Continued

Soil features adversely affecting—Continued				
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces	Grassed waterways
Embankment				
Fair strength and stability.	Seasonally high water table; fragipan at a depth of about 26 inches.	Features generally favorable.	Nearly level	Features generally favorable.
Rapid seepage rate after compaction.	Excessively drained	Very low available water capacity.	Features generally favorable.	Subject to gullying on slopes greater than about 6 percent.
Rapid seepage rate after compaction.	Excessively drained	Very low available water capacity.	Features generally favorable.	Very low available water capacity; subject to gullying on slopes greater than about 6 percent.
Moderately rapid seepage in upper 38 inches after compaction.	Seasonally high water table; organic hardpan at a depth of about 16 inches.	Poorly drained; seasonally high water table; organic hardpan at a depth of about 16 inches.	Nearly level	Poorly drained; seasonally high water table.
Fair strength and stability.	Well drained	Features generally favorable.	Nearly level	Features generally favorable.
Fair strength and stability; upper 28 inches moderately permeable after compaction.	Seasonally high water table.	Low to medium available water capacity.	Nearly level	Nearly level.
Moderately rapid seepage rate after compaction.	Flooding; seasonally high water table.	Poorly to very poorly drained; low available water capacity.	Nearly level	Nearly level.
Rapid seepage rate after compaction.	Excessively drained	Very low available water capacity.	Slopes greater than about 10 percent; otherwise features are favorable.	Very low available water capacity; subject to gullying on slopes greater than about 10 percent.
Fair strength and stability; upper 30 inches moderately permeable after compaction.	Flooding; seasonally high water table.	Poorly drained; seasonally high water table.	Nearly level	Seasonally high water table; flooding.
Fair strength and stability; upper 28 inches moderately permeable after compaction.	Seasonally high water table.	Low available water capacity.	Nearly level	Features generally favorable.
Moderate shrink-swell potential.	Well drained	Slopes; severe erosion hazard.	Slopes; moderately slow permeability.	Slopes; clayey subsoil.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features adversely affecting—	
	Topsoil	Road fill	Highway location	Farm ponds— Reservoir area
Tifton: TqA, TqB, TuC2	Good	Good	Fair stability	Features generally favorable.
Troup. Mapped only in undifferentiated groups with Lakeland and Wagram soils.	Poor: low productivity.	Good	Loose sand in upper 52 inches; slopes.	Rapid to moderately rapid permeability in the upper 62 inches; rapid seepage rate.
Wagram: WxC, WwE. Mapped only in undifferentiated groups with Duplin and Troup soils.	Fair to poor: medium to low productivity.	Good	Fair stability; slopes.	Rapid permeability and rapid seepage rate in upper 24 inches.
Wahee: Wy	Fair to poor: 6 inches of suitable material over clay.	Poor: high shrink-swell potential.	Flooding; seasonally high water table.	Features generally favorable.

Engineering properties of the soils

Table 6 gives soil characterstics 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 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.

Most soils in the survey area are deep enough over bedrock that bedrock generally does not affect their use. Sandstone is at a depth of about 50 inches in the Craven soils.

Depth to a seasonally high water table is based on field observations. Soils that have a high water table are of limited 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, also termed moisture capacity, is the capacity of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Shrink-swell potential is estimated according to the expected volume change of the soil material when its moisture content changes from dry to wet conditions. 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 6. 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.

All of the soils in the three counties are strongly acid or very strongly acid throughout, therefore the reaction for each individual soil is not listed.

Engineering interpretations of the soils

Engineering interpretations of the soils in Montgomery, Toombs, and Wheeler Counties are given in table 7. This table rates the suitability of soils as a source of materials for highway construction. It also lists features that adversely affect the location of highways and the construction of farm ponds, drainage systems, sprinkler irrigation systems, and terraces and diversions. These interpretations are made on the basis of estimates given in table 6, on test data shown in table 5, 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 7, the ratings are for the entire soil profile. The suitability of a soil for road fill depends largely on its texture, kind of clay, and degree of wetness. Normally wet, plastic clay is rated poor for road fill, and sand is rated good or fair. Sand is difficult to compact and needs close control of moisture during compaction.

interpretations of the soils—Continued

Soil features adversely affecting—Continued				
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces	Grassed waterways
Embankment				
Fair strength and stability.	Well drained	Features generally favorable; severe erosion hazard where the slope is more than 5 percent.	Features generally favorable.	Features generally favorable.
Rapid seepage in upper 52 inches after compaction.	Well drained	Low available water capacity; slopes greater than about 5 percent.	Features generally favorable where the slopes are less than 10 percent.	Subject to gullying where the slope is greater than about 6 percent.
Fair strength and stability; upper 24 inches moderately permeable after compaction.	Well drained	Low to medium available water capacity; slopes greater than about 5 percent.	Slopes greater than about 10 percent.	Slopes greater than about 10 percent.
High shrink-swell potential.	Flooding; seasonally high water table; slow permeability.	Slow intake rate; slow permeability.	Nearly level	Seasonally high water table; clayey layers in the subsoil.

The suitability of the soils in these three counties as a source of sand is not given in table 7, 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 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 5 and 6.

The selection of highway locations is affected by susceptibility to seepage and flooding, a seasonally high water table, shrink-swell potential, and other factors that affect construction.

The reservoir areas of farm ponds are adversely affected by rapid permeability, seepage, depth of water table, and flooding. Material that has low strength and stability and high shrink-swell potential is not well suited to 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, available water capacity, and slope.

Slope, depth to rock, available water capacity, seasonally high water table, and stability of soil material are considered when determining the suitability of a soil for terraces and grassed waterways. For waterways to function properly without undue erosion, they should be protected by sod. Therefore, the soil must have properties suitable for plant growth.

Use of the Soils for Town and Country Planning

In table 8, the soils of Montgomery, Toombs, and Wheeler 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, sites for light industries, trafficways, sanitary landfills, and intensive play areas, campsites, and picnic areas. Definitions of soil limitations are as follows.

Slight: Soils have properties favorable for the rated use. Limitations are so minor that they can be easily overcome. Good performance and low maintenance can be expected from these soils.

Moderate: Soils have properties moderately favorable for the rated use. Limitations can be overcome or modified with planning, design, or special maintenance.

Severe: Soils have one or more properties unfavorable for the rated use. Limitations are difficult and costly to modify or overcome, requiring major soil reclamation, special design, or intense maintenance.

If the rating is moderate or severe, the main limitation or limitations causing the rating are given.

The ratings shown in table 8 can be helpful in selecting sites and in planning community developments if they are used with the soil map at the back of this soil survey. Also helpful are the engineering tables 5, 6, and 7. None of the tables, however, eliminates the need for an investigation at the site of the planned use, or development. The items in table 8 are explained in the following paragraphs.

TABLE 8.—*Limitations of the soils*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils for referring to other series that

Soil series and map symbols	Foundations for houses	Septic tank filter fields	Sites for light industry
Ailey: AfC	Slight to moderate: slope.	Severe: percolation rate is slow.	Slight to moderate: slope.
Ardilla: Aq	Severe: seasonally high water table; flooding.	Severe: seasonally high water table; flooding.	Moderate: seasonally high water table; flooding.
Bibb: Mapped only in undifferentiated group with Osier soils.	Severe: flooding	Severe: flooding	Severe: flooding
Carnegie: CnB, CoC2	Moderate: moderate shrink-swell potential.	Severe: percolation rate is slow.	Moderate: moderate shrink-swell potential.
Cowarts: CqB, CqC	Slight where slope is 2 to 5 percent. Moderate where slope is 5 to 8 percent.	Severe: percolation rate is slow.	Slight where slope is 2 to 5 percent. Moderate where slope is 5 to 8 percent.
*Coxville: Cod For interpretations of Duplin part of Cod, see Duplin series.	Severe: flooding	Severe: flooding; percolation rate is slow.	Severe: flooding
Craven: CxC	Severe: high shrink-swell potential.	Severe: percolation rate is slow.	Servere: high shrink-swell potential.
Dothan: DaB	Slight	Moderate: percolation rate is moderate.	Slight
Duplin: Mapped only in undifferentiated groups with Coxville and Wagram soils.			
Duplin part of Cod	Severe: flooding	Severe: flooding; percolation rate is slow.	Severe: flooding
Duplin part of WxC	Moderate: moderate shrink-swell potential; slope.	Moderate: slope; percolation rate is slow.	Moderate: slope
Fuquay: FsB	Slight	Moderate: percolation rate is slow.	Slight
Grady: GrD	Severe: flooding	Severe: flooding	Severe: flooding
Irvington: Ij	Moderate: seasonally high water table.	Severe: seasonally high water table; percolation rate is slow.	Moderate: seasonally high water table.
Kershaw: KdC	Moderate: may need binder; slopes.	Severe: poor filtering properties; nearby water supply may be contaminated.	Moderate: slope
*Lakeland: LTC For interpretations of Troup part of LTC, see Troup series.	Slight to moderate: slope	Moderate: poor filtering properties; nearby water supply may be contaminated.	Slight to moderate: slope

See footnote at end of table.

for town and country planning

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions appear in the first column of this table]

Trafficways	Sanitary landfill [1] (trench method)	Intensive play areas	Campsites	Picnic areas
Slight to moderate: slope.	Slight	Moderate to severe: loamy coarse sand surface layer; slope.	Moderate: loamy coarse sand surface layer.	Moderate: loamy coarse sand surface layer.
Moderate: seasonally high water table; flooding.	Severe: seasonally high water table; flooding.	Moderate: seasonally high water table; flooding.	Moderate: seasonally high water table; flooding.	Moderate: seasonally high water table; flooding.
Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Moderate: moderate shrink-swell potential.	Slight	Moderate where slope is 2 to 5 percent. Severe where slope is 5 to 8 percent.	Moderate: slow permeability.	Slight.
Slight	Slight	Moderate where slope is 2 to 5 percent. Severe where slope is 5 to 8 percent.	Slight	Slight.
Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Severe: high shrink-swell potential; poor traffic-supporting capacity.	Severe: clayey layer in subsoil; depth to rock less than 60 inches.	Moderate to severe: slow permeability; slope.	Moderate: slow permeability.	Moderate: seasonally high water table.
Slight	Slight	Moderate: slope	Slight	Slight.
Severe: flooding	Severe: flooding	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.
Moderate: moderate shrink-swell potential.	Moderate: clayey layer in subsoil; seasonally high water table.	Moderate to severe: slow permeability; slope.	Moderate: slow permeability.	Slight.
Slight	Slight	Moderate: slope	Moderate: loamy sand to a depth of 26 inches.	Moderate: loamy sand to a depth of 26 inches.
Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Moderate: seasonally high water table.	Severe: seasonally high water table.	Slight to moderate: seasonally high water table.	Slight to moderate: seasonally high water table.	Slight to moderate: seasonally high water table.
Moderate: soil may need binder.	Severe: probability of contaminating shallow water supply.	Severe: loose sand to depth of 80 inches.	Severe: loose sand to a depth of 80 inches.	Severe: loose sand to a depth of 80 inches.
Slight	Moderate: probability of contaminating shallow water supply.	Severe: surface soil texture is sand; slope.	Moderate: surface soil texture is sand.	Moderate: surface soil texture is sand.

TABLE 8.—*Limitations of the soils*

Soil series and map symbols	Foundations for houses	Septic tank filter fields	Sites for light industry
Mascotte: Mn	Severe: seasonally high water table.	Severe: seasonally high water table.	Severe: seasonally high water table.
Maxton: MK	Slight to moderate: floods once in 35 to 50 years.	Slight to moderate: floods once in 35 to 50 years.	Slight to moderate: floods once in 35 to 50 years.
Ocilla: Oh	Severe: seasonally high water table.	Severe: seasonally high water table.	Moderate: seasonally high water table.
*Osier: Obs For interpretations of Bibb part of Obs, see Bibb series.	Severe: flooding	Severe: flooding	Severe: flooding
Paola: PoD	Moderate: slope	Severe: slope; poor filtering properties; nearby water supply may be contaminated.	Moderate to severe: slope.
Pelham: Pl	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.	Severe: seasonally high water table.
Stilson: Se	Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.
Sunsweet: ShD2	Moderate: slope; moderate shrink-swell potential.	Severe: slope; percolation rate is slow.	Moderate to severe: slope.
Tifton: TqA, TqB, TuC2	Slight	Moderate: percolation rate is moderate.	Moderate: low to moderate shrink-swell potential; slope.
Troup: Mapped only in undifferentiated groups with Lakeland and Wagram soils.			
Troup part of LTC	Slight to moderate: slope	Slight	Slight to moderate: slope.
Troup part of WwE	Moderate to severe: slope	Moderate to severe: slope	Severe: slope
*Wagram: WxC For interpretations of Duplin part, see Duplin series.	Slight	Slight	Slight
WwE For interpretations of Troup part of WwE, see Troup series.	Moderate: slope	Moderate to severe: slope	Severe: slope
Wahee: Wy	Severe: flooding; high shrink-swell potential.	Severe: flooding; percolation rate is slow.	Severe: flooding; high shrink-swell potential.

[1] Onsite investigation of the underlying strata, depth to water table, and the hazard of pollution of water supplies should be made for land fills deeper than 5 or 6 feet.

for town and country planning—Continued

Trafficways	Sanitary landfill [1] (trench method)	Intensive play areas	Campsites	Picnic areas
Severe: seasonally high water table.	Severe: seasonally high water table.	Severe: seasonally high water table.	Severe: seasonally high water table.	Severe: seasonally high water table.
Slight to moderate: floods once in 35 to 50 years.	Slight to moderate: floods once in 35 to 50 years.	Slight	Slight	Slight.
Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.
Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Moderate: slope	Severe: probability of contaminating shallow water supply.	Severe: loose sand to a depth of 80 inches.	Severe: loose sand to a depth of 80 inches.	Severe: loose sand to a depth of 80 inches.
Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.	Severe: flooding; seasonally high water table.
Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.	Moderate: seasonally high water table.
Moderate: slope; moderate shrink-swell potential.	Moderate to severe: slope; clayey subsoil texture.	Severe: slope; moderately slow permeability.	Moderate: slope; moderately slow permeability.	Moderate: slope.
Slight	Slight	Slight where slope is 0 to 2 percent. Moderate where slope is 2 to 6 percent. Severe where slope is 6 to 8 percent.	Slight	Slight.
Slight to moderate: slope	Moderate: probability of contaminating shallow water supply.	Severe: surface soil texture.	Moderate: surface soil texture.	Moderate: surface soil texture.
Moderate to severe: slope.	Moderate to severe: slope; probability of contaminating shallow water supply.	Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.
Slight	Slight	Moderate to severe: slope.	Moderate: loamy sand to a depth of about 24 inches.	Moderate: loamy sand to a depth of about 24 inches.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.
Severe: flooding; high shrink-swell potential.	Severe: flooding	Moderate: flooding; slow permeability.	Moderate: flooding; slow permeability.	Moderate: flooding.

Foundations for houses.—In Montgomery, Toombs, and Wheeler Counties the main features that influence the use of soils as foundations for houses are a seasonal high water table, flooding, shrink-swell potential, and slope (fig. 16). The ratings in table 8 are for houses of three stories or less.

***Figure 16.*—Tile drainage system being installed in Ardilla loamy sand to make this soil more suitable for residences.**

Septic tank filter fields.—In these counties, the major soil features that influence the use of soils for septic tank filter fields are a seasonally high water table, flooding, rate of percolation, and slope.

Sites 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 the limitations are slope, depth to seasonal high water table, hazard of flooding, soil stability, and shrink-swell 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 soil if used as trafficways are slope, depth to seasonal high water table, the hazard of flooding, and the shrink-swell potential that is related to the traffic-supporting capacity. Traffic-supporting capacity is the ability of an undisturbed soil to support moving loads.

Sanitary land fill.—This is an area that is used for the disposal of solid wastes, such as trash, refuse, or garbage, from a city or communities. The collected trash, refuse, or garbage is placed in an excavated trench and is covered at the end of each day. The size of the trench depends upon the needs and demands of the community and the type of equipment used. The ramp method is used where the landfill area is sloping, is subject to seasonal high water table, or has a subsoil of fair to poor texture. The features that affect the use of soils for sanitary landfill in this three county area are depth to seasonally high water table, slope, soil texture, and hazard of flooding.

Intensive play areas.—These are areas developed for playgrounds and organized games such as softball, badminton, and tennis. They are subject to much foot traffic and generally require a nearly level surface, good drainage, and a texture and consistence that give a stable surface. The properties important in evaluating soils for these uses are depth to seasonal high water table, flooding, permeability, slope, and texture of the surface layer.

Campsites.—These are areas suitable for trailer campers and tents, and for outdoor living for extended periods. Soil properties considered in the evaluation for this use are mainly slope, permeability, seasonal high water table, texture, and susceptibility to flooding.

Picnic areas.—These are sites used extensively for park-type picnicking. It is assumed that most vehicular traffic will be confined to access roads. Wetness, flooding, slope, texture of the surface layer, and coarse fragments are considered in the evaluation.

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 Montgomery, Toombs, and Wheeler Counties. It also explains the current system of soil classification and placement of the soil series in higher categories. The soil series in the three 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 that 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 Montgomery, Toomb, and Wheeler Counties and throughout the world.

The relative importance of each factor differs from place to place. In some areas one factor can 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 Montgomery, Toombs, and Wheeler 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 clay.

The Kershaw, Lakeland, and Paola soils formed in thick beds of sand. Because these soils consist mostly of highly resistant quartz sand, they do not have clay-enriched horizons.

The Ardilla, Carnegie, Cowarts, Dothan, Stilson, and Tifton soils formed in beds of loamy material and contain plinthite at some depth. All of these soils have well-developed, clay-enriched horizons.

The Craven soils formed in deposits of clay. They have a subsoil of clay or sandy clay that does not permit much movement of water and air through it. This restricted movement of air and water slows the soil-forming processes.

The Maxton soils formed on stream terraces in deposits of loamy material. The material from which these soils formed is chiefly of Coastal Plain origin. Most of it washed from sandy clays and clays of the uplands.

The Mascotte soils formed in moderately thick deposits of sandy materials in areas where the water table is high. The weakly cemented organic horizon below the leached subsurface horizon is an important characteristic of these soils. This horizon formed over a long period under the influence of a slightly fluctuating water table, during which time organic matter and mineral constituents have accumulated and cemented with the sand.

Most of the Coxville, Duplin, and Wahee soils are on the flood plains of the Oconee, Ocmulgee, and Altamaha Rivers. 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 rivers. This alluvium came mostly from soils of the Coastal Plain but partly from 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 Montgomery, Toombs, and Wheeler 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. Most 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 three counties. Because of the translocation of bases and other soluble material, and of colloidal matter and other less soluble material, the soils of the counties have a more sandy surface layer and are less fertile than they formerly were.

Relief

Relief is the entrenchment of the drainage pattern into the land surface. The other soil-forming processes are affected by relief through its effect 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. 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 Montgomery, Toombs, and Wheeler 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.

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 content. 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 Montgomery, Toombs, and Wheeler Counties have sandy surface layers and are low in organic-matter content. In wooded areas, however, the soils have a thin cover of leaf mold and a small organic-matter content 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 somewhat according to the kind of vegetation it developed under. In these three 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 chiefly 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 about 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. Results of these activities can now be seen, and studies show that the organic-matter content in soils is sharply reduced after fields are cultivated for a few years. In some of the sloping areas under cultivation, some of the eluviated surface 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 Montgomery, Toombs, and Wheeler Counties has been drastically changed as a result of man's activity.

Time

The length of time required for a well-developed soil profile to form 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 material is modified so that genetic horizons of an A, B, and C sequence are formed.

In Montgomery, Toombs, and Wheeler Counties the soils that formed in alluvium along 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. Bibb and Osier are examples of these soils. Tifton and Dothan soils, on the other hand, formed in materials which have been in place significantly longer. They have profiles which exhibit a sandy A horizon and a clay-enriched B horizon. Estimates are that the Dothan and Tifton soils are about the same age.

Classification of Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes, in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*3*) and revised later (*5*). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (*7*) and was adopted in 1965. It is under continual study (*4*).

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The characteristics for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

In table 9, the soil series of Montgomery, Toombs, and Wheeler Counties are placed in 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 9 shows the three soil orders recognized in Montgomery, Toombs, and Wheeler Counties. They are Entisols, Spodosols, and Ultisols. Entisols are recent mineral soils that do not have genetic diagnostic horizons or have only the beginning of such horizons. 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. 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 that have 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 9, 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 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.

SERIES: The series has the narrowest range of characteristics of the classes in the classification system. It is explained in the section "How this Survey Was Made." A detailed description of each soil series in the three counties is given in the "Description of the Soils."

TABLE 9.—*Classification of soil series*

Series	Family	Subgroup	Order
Ailey	Loamy, siliceous, thermic	Arenic Fragiudults	Ultisols.
Ardilla [1]	Fine-loamy, siliceous, thermic	Plinthaquic Paleudults	Ultisols.
Bibb	Coarse-loamy, siliceous, acid, thermic	Typic Haplaquents	Entisols.
Carnegie	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Cowarts	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Coxville	Clayey, kaolinitic, thermic	Typic Paleaquults	Ultisols.
Craven	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Dothan	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Duplin	Clayey, kaolinitic, thermic	Aquic Paleudults	Ultisols.
Fuquay	Loamy, siliceous, thermic	Arenic Plinthic Paleudults	Ultisols.
Grady	Clayey, kaolinitic, thermic	Typic Paleaquults	Ultisols.
Irvington	Fine-loamy, siliceous, thermic	Plinthic Fragiudults	Ultisols.
Kershaw	Siliceous, thermic, uncoated	Typic Quartzipsamments	Entisols.
Lakeland	Siliceous, thermic, coated	Typic Quartzipsamments	Entisols.
Mascotte	Sandy over loamy, siliceous, thermic	Ultic Haplaquods	Spodosols.
Maxton	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols.
Ocilla	Loamy, siliceous, thermic	Aquic Arenic Paleudults	Ultisols.
Osier	Siliceous, thermic	Typic Psammaquents	Entisols.
Paola (variant [2])	Siliceous, thermic, uncoated	Spodic Quartzipsamments	Entisols.
Pelham	Loamy, siliceous, thermic	Arenic Paleaquults	Ultisols.
Stilson	Loamy, siliceous, thermic	Arenic Plinthic Paleudults	Ultisols.
Sunsweet	Clayey, kaolinitic, thermic	Plinthic Paleudults	Ultisols.
Tifton [3]	Fine-loamy, siliceous, thermic	Plinthic Paleudults	Ultisols.
Troup	Loamy, siliceous, thermic	Grossarenic Paleudults	Ultisols.
Wagram	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Wahee [4]	Clayey, kaolinitic, thermic	Aeric Ochraquults	Ultisols.

[1] These soils are taxadjuncts to the series. The epipedons are 13 to 19 inches in thickness, which is outside the defined range for the series. These taxadjuncts, however, are similar to soils of the Ardilla series in morphology, composition, and behavior.

[2] These soils are a cool variant. The mean annual soil temperature is about 68°F., which is slightly cooler than that within the defined range for the series.

[3] These soils are taxadjuncts to the series. The pedons in TqB have epipedons that are 2 to 4 inches thicker than that in the defined range for the series.

[4] These soils are taxadjuncts to the series. They have slightly less than 30 percent silt in the upper 20 inches of the Bt horizon, which is outside the defined range for the series.

Additional Facts About the Counties

This section provides general information about these counties. It describes the climate and water supply. It also discusses the history, population, farming, and industry. The farming statistics and population figures used are mainly from records of the U.S. Bureau of the Census.

Climate [6]

The location of these counties in the middle Coastal Plain, less than 100 miles from the Atlantic Ocean, results in warm, humid summers and relatively mild winters. Precipitation is usually adequate and well distributed throughout the year. Table 10 shows temperature and precipitation data for Montgomery, Toombs, and Wheeler Counties.

Summer temperatures are consistently warm. There are only minor variations, as a rule, from day to day. The maximum reaches or exceeds 90° F. on 2 out of 3 days from June through August and on about 1 out of 3 days in May and September. The temperature will reach or exceed 100° on 1 or more days during most summers. Extended periods of extreme heat are rare, however, because of the high incidence in summer of afternoon showers. Summer nights are usually comfortable. The average minimum for the summer months is less than 70°. During summer the relative humidity averages higher than 90 percent from 4 to 6 a.m. but drops below 60 percent from noon to 5 p.m. The humidity averages higher in summer than in any other season.

Winter weather is usually variable. Cold fronts move through the area at fairly regular intervals from mid-November to mid-March, but the periods of cold weather are usually short and are followed by longer periods with mild temperatures. Freezing occurs on less than half the winter days. Low temperatures in the 40° to 60° range are common in mid-winter. The temperature will drop below 20° on 2 or 3 days during an average winter. Winter daytime temperatures are usually quite comfortable. The average maximum for the winter months is about 62°. The frost-free growing season averages around 240 days; it ordinarily extends from just after mid-March to just before mid-November. Table 11 shows the probabilities of the last freezing temperature in spring and the first freezing temperature in fall.

Both spring and fall have mild temperatures but may differ markedly in other respects. Fall is usually characterized by long periods of clear, sunny weather. Spring is frequently wet and windy, and sometimes stormy. The balmy weather of fall is occasionally interrupted by a tropical storm moving through or near the area.

[6] By HORACE S. CARTER, State climatologist, National Weather Service, Athens, Ga.

TABLE 10.—*Temperature and precipitation data*

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One 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.	In.	In.	In.
January	61.4	36.7	79	21	3.23	1.1	5.6
February	62.4	38.4	80	22	4.08	1.2	7.3
March	70.2	43.3	86	27	4.36	1.4	6.9
April	78.7	52.5	89	35	3.29	1.4	5.7
May	85.7	60.1	95	48	4.56	1.5	7.7
June	90.0	65.9	99	56	3.94	2.3	6.0
July	92.0	68.9	100	63	5.60	2.3	9.2
August	91.9	68.3	99	60	5.26	2.5	8.8
September	86.7	63.4	95	52	3.92	1.3	7.1
October	79.4	53.1	89	35	2.39	.5	5.6
November	69.8	42.1	84	25	2.13	.7	4.5
December	62.5	36.6	79	21	3.64	1.5	6.7
Year	77.6	52.4	[1] 101	18	[1] 46.40	38.8	59.6

[1] The extreme temperature that will be equaled or exceeded (minimum equal or lower) on at least 4 days in 2 years out of 10.

TABLE 11.—*Probabilities of freezing temperatures*

Probability	Dates for given probability and temperature		
	24° F. or lower	28° F. or lower	32° F. or lower
Spring:			
1 year in 10 later than	March 7	March 25	April 9
2 years in 10 later than	February 27	March 19	March 29
5 years in 10 later than	February 3	March 8	March 20
Fall:			
1 year in 10 earlier than	November 15	November 3	October 27
2 years in 10 earlier than	November 25	November 9	November 1
5 years in 10 earlier than	December 2	November 26	November 7

The average annual rainfall is about 46 inches. Except for the tropical midsummer maximum and autumn minimum, distribution is fairly uniform through the year. Most warm-season rainfall occurs as showers, which have their highest frequency in the afternoon and evening and are usually of short duration. Winter and spring rainfall is more frequently associated with cyclonic storms and may be quite prolonged. Rains that produce an inch or more in 24 hours are likely about 12 times per year. Snow flurries occur in the area occasionally, but significant amounts are very rare.

Tornadoes have been observed several times, but no deaths have been attributed to these storms, and property damage has been small. Hail and locally damaging winds have occurred with some of the more severe thunderstorms.

Water Supply

Water for municipal, industrial, and farm needs is obtained from drilled wells 30 to 70 feet deep and from drilled artesian wells 300 to 600 feet deep. There are a few free-flowing artesian wells along the rivers in all three counties. Many streams and drainageways occur throughout these counties, but in most of them, water flows only in wet weather. Numerous ponds have been built on a number of the drainageways and smaller streams (fig. 17). These ponds provide water for livestock, irrigation, or fishing and serve as reservoir areas to reduce the hazard of flooding.

Figure 17.—One of many irrigation ponds on Pelham loamy sand.

History and Population

Montgomery County was created from Washington County by an act of the Legislature in 1793 and was named in honor of Richard Montgomery, a general during the Revolutionary War. It ranks as the 18th oldest county created in Georgia. Originally, the area of this county was much larger than it is at the present time; it contained all of Wheeler and Tattnall Counties and parts of Toombs and other adjoining counties.

Toombs County was created by a Legislative Act in 1905 from parts of Tattnall, Montgomery, and Emanuel Counties. It was named for General Robert Toombs, former member of Congress, Senator, and a leading figure in urging Georgia to secede from the Union in 1861.

Wheeler County was created from Montgomery County by an act of the Legislature in 1912. This county was named for Gen. Joseph Wheeler, a Civil War veteran.

The early settlers of these counties were mostly of Scottish descent and came from the mountains of North Carolina at the close of the Revolutionary War. The population of the counties continued to grow until the early 1900's and remained fairly steady until 1940. From the period 1940 to 1960 the population decreased about 50 percent, mainly because of the tremendous changes in the agricultural economy that displaced many farm workers.

The 1960 census shows the population of these counties as follows: Montgomery County, 6,284; Toombs County, 16,837; and Wheeler County, 5,342.

Preliminary 1970 census figures indicate an increase in the population of all three counties since 1960.

Farming

Farming in Montgomery, Toombs, and Wheeler Counties is favored by a temperate climate, a long growing season, well-distributed rainfall, and responsive soils. About 51 percent of the total acreage was in farms in 1964, according to the census of the Department of Agriculture. There were 1,334 farms, and the average size was about 250 acres in Montgomery and Wheeler Counties and 200 acres in Toombs County.

The farms are mostly of the general type. Farming is diversified, and row crops, pasture, livestock, and wood products all contribute to farm income. Corn for all purposes was grown on 45,347 acres in 1964, most of which was harvested for grain; cotton was grown on 11,683 acres; peanuts on 3,280 acres; and tobacco on 2,990 acres. The acreage of soybeans has increased since 1964. It is estimated that about 8,000 acres of soybeans were planted in these three counties in 1969.

Industry

Many of the industries in Montgomery, Toombs, and Wheeler Counties are closely related to farming and are based on natural resources of the area.

Forestry is important to industry in these counties. Among the products that provide income from this source are lumber, single-ply veneer, pulpwood, and resins.

Garment manufacturing is a major activity. Among the products made are dresses, shirts, pants, and lingerie.

There are also factories that make mobile homes, electrical switches, building supplies, and many other products.

Manufacturing is important to these three counties. It has rapidly grown since 1950, and employment is no longer completely dependent on farming in the area.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is 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 soil 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 and 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 when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but are not all the time, and some soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Fragipan. A loamy, brittle subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it 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.

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 plants 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 therefore is marked by the accumulation 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 distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. 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.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical mineralogical, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottling, soil. 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 millimeters 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.

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 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.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in the reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. 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). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

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 an equal 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), *blocky* (angular or subangular), and *granular.* Structureless soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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 (geology). 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.

Variant, soil. A soil having properties sufficiently different from those of other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the series to which the mapping unit belongs. The suitability of the soils for use as cropland is discussed under "Use and Management of the Soils" and in the soil descriptions. The classification system is explained on pages 29 through 31. Other information is given in tables as follows:

Acreage and extent, table 1, p. 7.
Estimated yields, table 2, p. 32.
Suitability of the soils for woodland, table 3, p. 34.
Suitability of the soils for wildlife, table 4, p. 36.
Engineering uses of the soils, tables 5, 6, and 7, pp. 38 through 51.
Limitations of the soils for town and country planning, table 8, p. 52.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability group
			Symbol	Number
AfC	Ailey loamy coarse sand, 2 to 8 percent slopes	7	IVs-1	4s2
Aq	Ardilla loamy sand	8	IIw-2	2w8
CnB	Carnegie loamy sand, 2 to 5 percent slopes	9	IIe-4	2o1
CoC2	Carnegie sandy loam, 5 to 8 percent slopes, eroded	10	IVe-4	2o1
Cod	Coxville and Duplin soils	11	IVw-4	2w9
CqB	Cowarts loamy sand, 2 to 5 percent slopes	10	IIe-4	2o1
CqC	Cowarts loamy sand, 5 to 8 percent slopes	10	IVe-4	2o1
CxC	Craven soils, 2 to 8 percent slopes	12	IIIe-3	3w2
DaB	Dothan loamy sand, 1 to 5 percent slopes	13	IIe-1	2o1
FsB	Fuquay loamy sand, 1 to 5 percent slopes	14	IIs-1	3s2
GrD	Grady soils	15	Vw-1	2w9
Ij	Irvington loamy sand	16	IIw-2	2o7
KdC	Kershaw sand, 2 to 8 percent slopes	17	VIIs-1	5s3
LTC	Lakeland and Troup soils, 0 to 8 percent slopes	17	VIs-1	4s2
MK	Maxton soils	19	I-1	2o7
Mn	Mascotte sand	18	IIIw-4	3w2
Obs	Osier and Bibb soils	20	Vw-2	3w3
Oh	Ocilla loamy sand	20	IIIw-1	3w2
Pl	Pelham loamy sand	22	IVw-4	2w3
PoD	Paola sand, cool variant, 5 to 12 percent slopes	21	VIIs-1	5s3
Se	Stilson loamy sand	23	IIw-2	3s2
ShD2	Sunsweet sandy loam, 5 to 12 percent slopes, eroded	23	VIe-2	3c2
TqA	Tifton loamy sand, 0 to 2 percent slopes	24	I-2	2o1
TqB	Tifton loamy sand, 2 to 5 percent slopes	25	IIe-2	2o1
TuC2	Tifton sandy loam, 5 to 8 percent slopes, eroded	25	IIIe-2	2o1
WwE	Wagram and Troup soils, 8 to 17 percent slopes	27	VIs-1	3s2
WxC	Wagram and Duplin soils, 2 to 8 percent slopes	27	IIIe-3	3s2
Wv	Wahee soils	28	IIIw-2	2w8

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