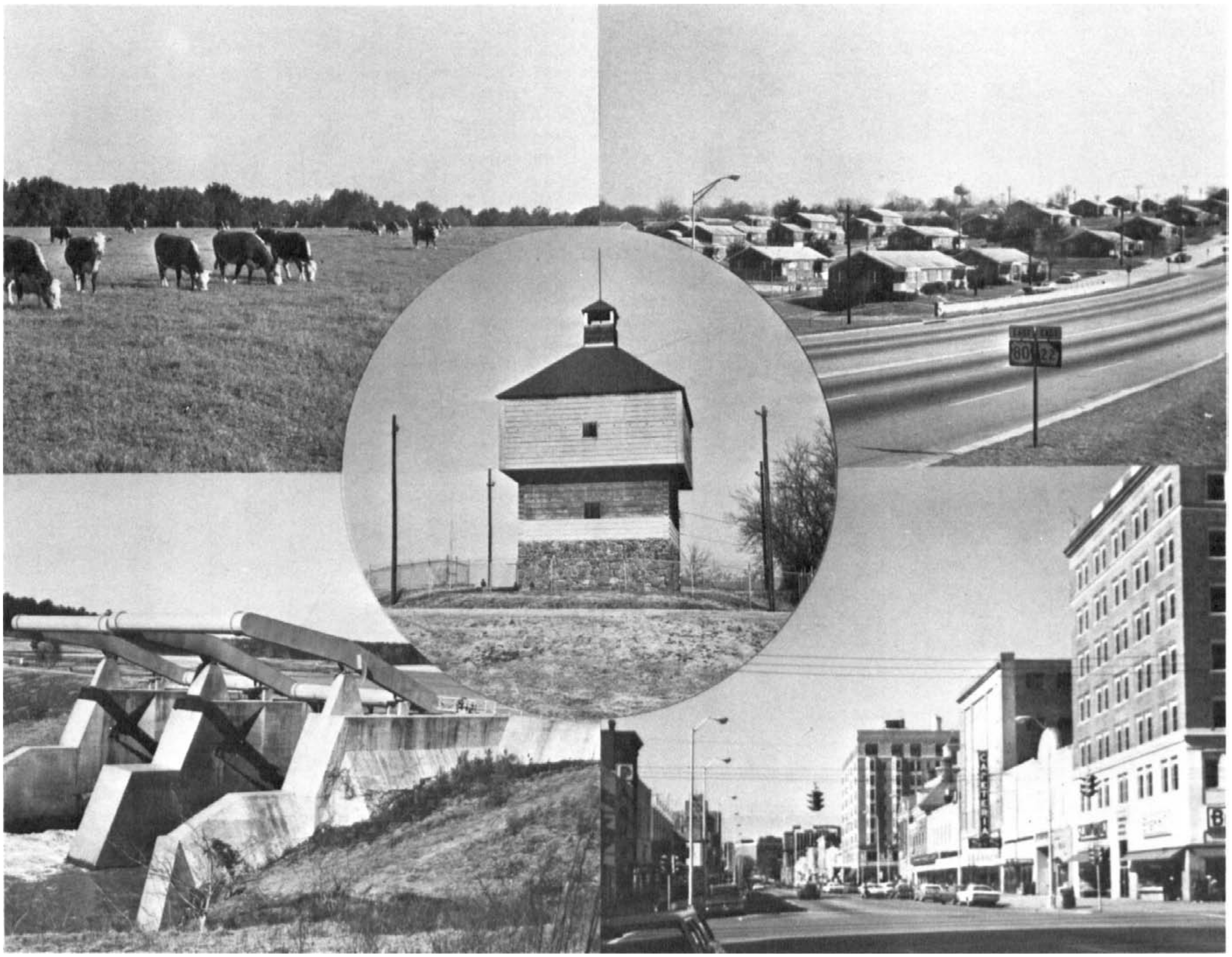
SOIL SURVEY OF

Bibb County, Georgia



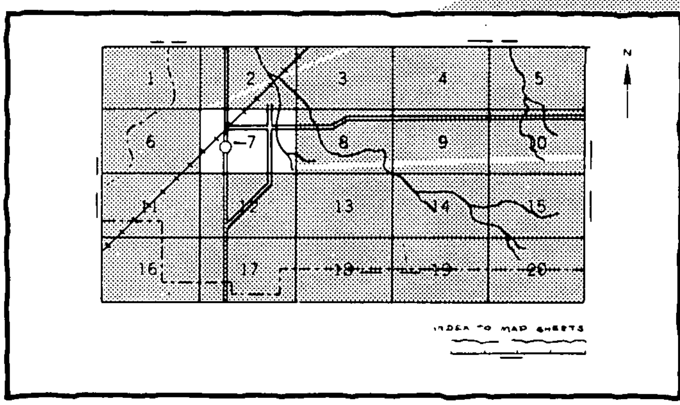
United States Department of Agriculture
Soil Conservation Service

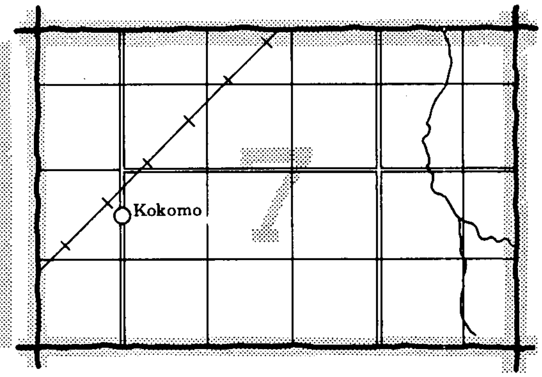
In cooperation with

University of Georgia, College of Agriculture
Agricultural Experiment Stations

HOW TO USE

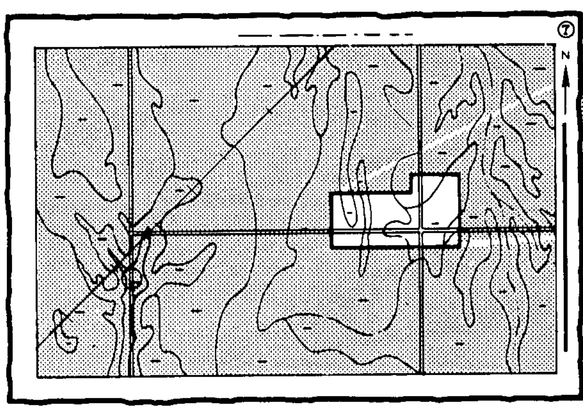
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

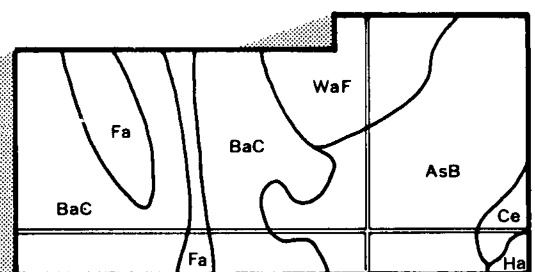




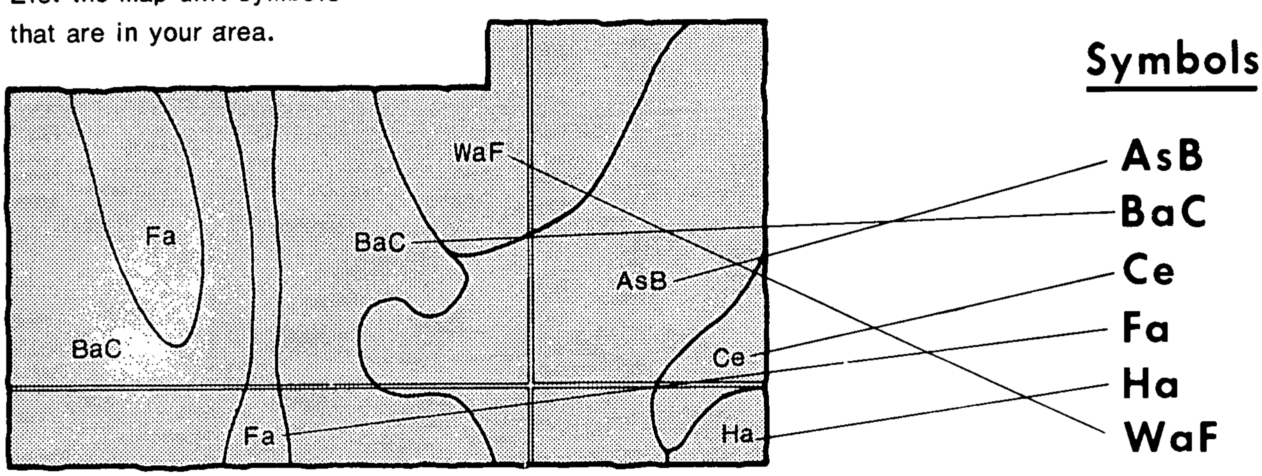
2. Note the number of the map sheet and turn to that sheet.

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



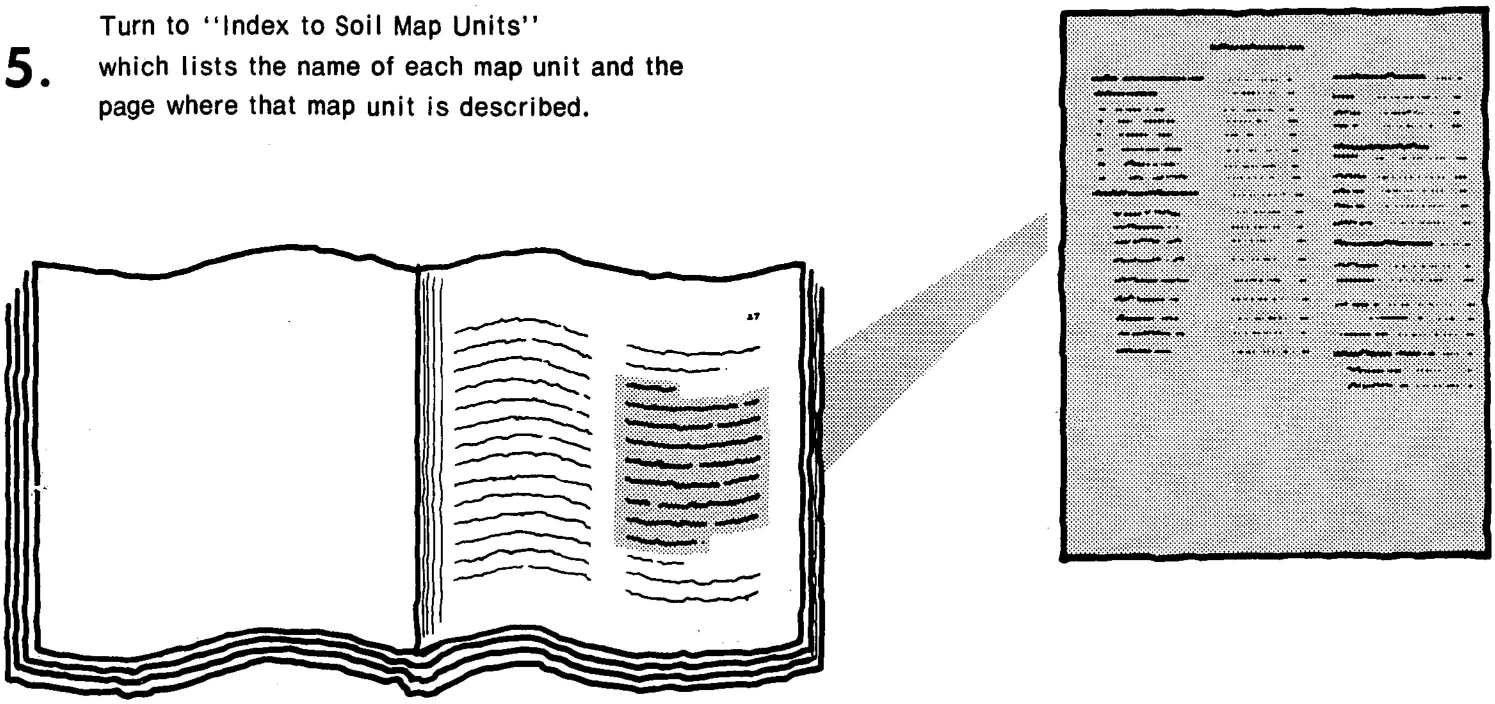


4. List the map unit symbols that are in your area.

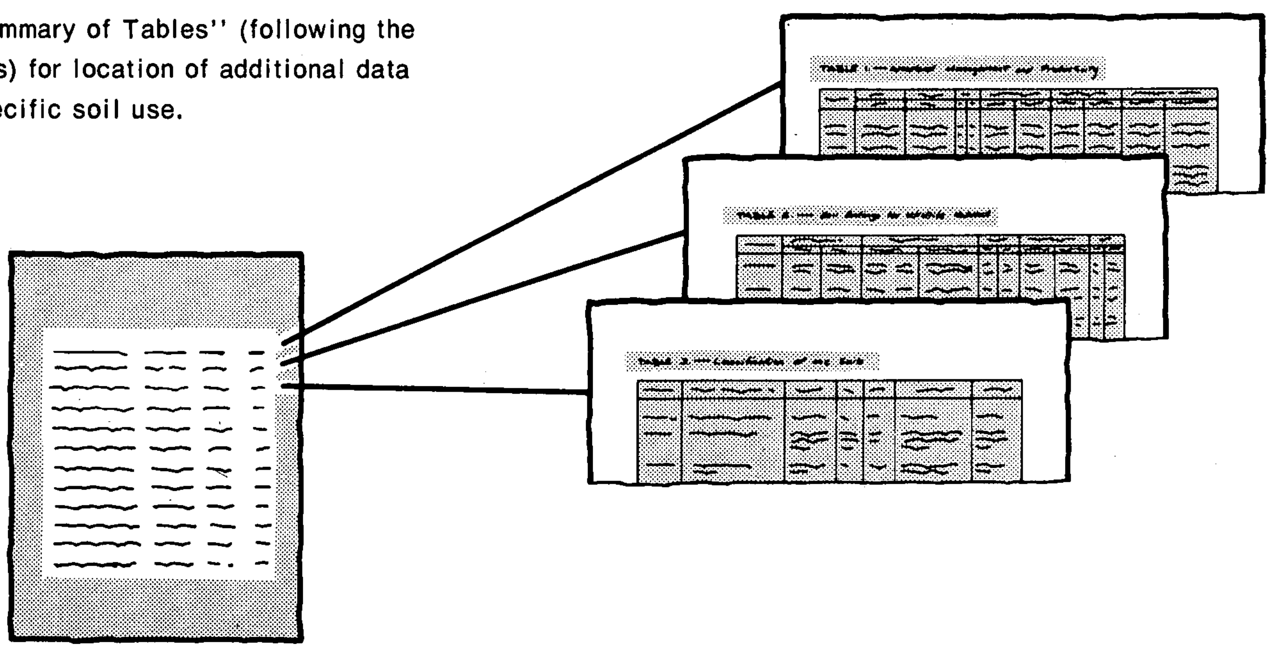


THIS SOIL SURVEY

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



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



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

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

Major fieldwork for this soil survey was completed in the period 1974-75. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. 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 Ocmulgee River Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Replica of the blockhouse at Fort Hawkins and views of farming, engineering, and urbanization in Bibb County. The large variety of soils makes possible many land uses.

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Issued March 1979

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Foreword

The Soil Survey of Bibb County, Georgia contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

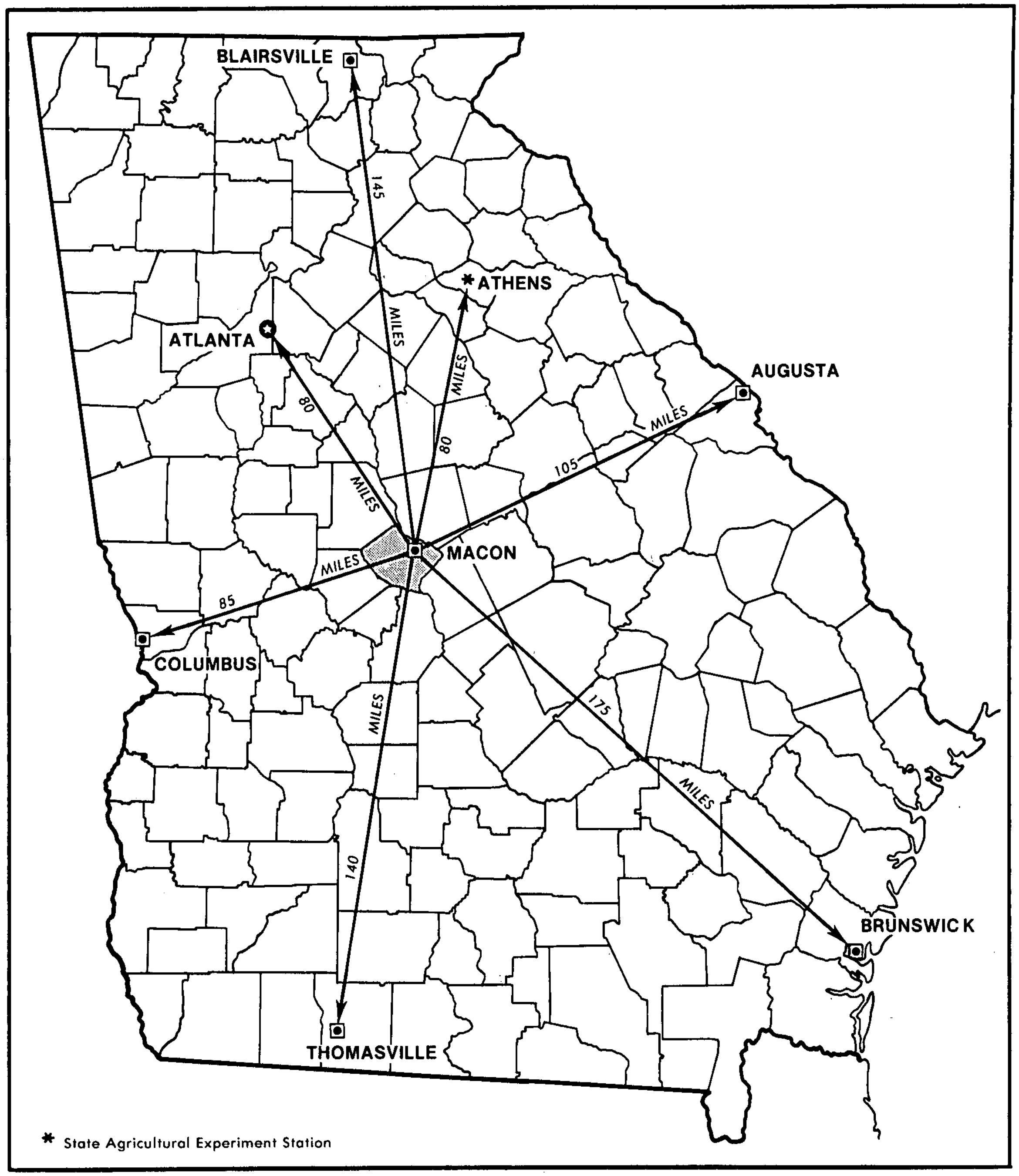
This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Dwight M. Treadway
State Conservationist
Soil Conservation Service



Location of Bibb County in Georgia.

SOIL SURVEY OF BIBB COUNTY, GEORGIA

By John C. Woods, Soil Conservation Service

Fieldwork by John C. Woods and Harley H. Payne, Soil Conservation Service

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

BIBB COUNTY is in the central part of Georgia (see facing page). It has a land area of 254 square miles or 162,560 acres. The county is somewhat diamond shaped. It is about 24 miles from east to west and 20 miles from north to south. Macon, the county seat and largest city, is near the Ocmulgee River in the northern part of the county. It is the main trade center for the middle part of Georgia and provides a convenient market for the farm products of Bibb County and surrounding counties.

The county is in three major land resource areas. The northern and western parts of the county are in the Southern Piedmont, the central part is in the Carolina and Georgia Sand Hills, and the southern and eastern parts are in the Southern Coastal Plain.

In the past, most of the upland soils in the county were used for cultivated crops. Important crops were cotton, corn, peanuts, and small grain. Tomatoes, peas, lima beans, green beans, onions, sweet potatoes, lettuce, peaches, and pecans were also important. Most farmers raised enough livestock for their own needs. Dairying was an important source of income in the Macon area.

In recent years, farming has declined in importance. Much of the cultivated cropland has reverted to woodland or is used for Urban land.

About 58 percent of Bibb County is in woodland, 23 percent is in cropland or pasture, 13 percent is urban or built up, and 6 percent is idle (*4*).

The trend in Bibb County indicates a shifting of population from areas near downtown Macon to the suburbs and the continued loss of population in rural areas.

General nature of the county

This section gives general information concerning the county. It discusses climate; settlement and history; and physiography, relief, and drainage.

Climate

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Macon, Georgia for the period 1951-74. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 49 degrees F, and the average daily minimum temperature is 37 degrees. The lowest temperature on record, which occurred at Macon on January 3, 1966, is 3 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred on June 28, 1954, is 106 degrees.

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

Of the total annual precipitation, 23 inches, or 51 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.25 inches at Macon on October 29, 1970. Thunderstorms occur on about 60 days each year, and most occur in summer.

Snowfall is rare; in 75 percent of the winters, there is no measureable snowfall. In 90 percent, the snowfall, usually of short duration, is less than 2 inches. The heaviest 1-day snowfall on record was more than 16 inches.

The average relative humidity in midafternoon in spring is less than 50 percent, and during the rest of the year it is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The percentage of possible sunshine is 70 percent in summer and 55 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 10 miles per hour, in March.

Severe local storms, including tornadoes, occur occasionally in or near the county. They are short in duration and cause variable and spotty damage. Occasionally in summer or autumn, a tropical depression or remnant of a hurricane moves inland and causes extremely heavy rains for 1 to 3 days.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Settlement and history

Fort Hawkins, an early settlement and trading post, was established in 1806. It was named for Colonel Benjamin Hawkins, a long time Commissioner of the United States. In 1822, Bibb County was organized. In 1833 a part of Twiggs County was added, and in 1834 a part of Jones County was also added.

The City of Macon, on the west side of the Ocmulgee River across from Fort Hawkins, was founded in 1823. It was named in honor of Nathaniel Macon, an early American statesman.

Most of the early settlers in this part of Georgia came from other parts of Georgia and from the Carolinas and Virginia. Many of them were attracted by offers of land by lottery.

The population in the City of Macon and the surrounding suburbs has steadily increased. In recent years, however, the rural population of the county has decreased. In 1970 the population of Bibb County was 143,418, and the population of Macon was 122,423. In 1964 the total number of farms in Bibb County was 278; in 1969 the total number was 176. The average size of farms in 1964 was 187 acres; in 1969 the average size was 209 acres. The land in farms in 1964 was 32 percent; in 1969 it was 22 percent.

Physiography, relief, and drainage

The northern and western parts of Bibb County are in the Southern Piedmont Major Land Resource Area. This resource area consists of broad to narrow ridgetops and long, irregular hillsides dissected by numerous small winding drainageways. Slopes are commonly smooth and convex, and the soils are very gently sloping to strongly sloping. Deep valleys and steep hillsides are in areas between the larger creeks, near the Ocmulgee River. Nearly level flood plains are along the Ocmulgee River and many of its tributaries. In most places they are narrow, and during the winter and early in spring they are frequently flooded.

The middle part of the county is in the Carolina and Georgia Sand Hills Major Land Resource Area. This Area separates the Southern Piedmont from the Southern Coastal Plain. The Sand Hills have smoother, broader ridgetops than the Southern Piedmont. In places, however, the landscape is rolling or hilly and is dissected by many narrow valleys and drainageways.

The southern and southeastern parts of the county are in the Southern Coastal Plain Major Land Resource Area. The very gently sloping ridges are broad. The hillsides extend to the numerous small drainageways, but they are not as steep as those of the Southern Piedmont and the Sand Hills. The flood plains along the Ocmulgee River and its tributaries are much wider in this area than flood plains in the Southern Piedmont. The Southern Coastal Plain has high potential for farming.

Elevation at the old Union Depot in Macon is 334 feet, and at Walden in the southeastern part of the county it is 390 feet. Elevation of some high ridges in Bibb County is 500 feet or more.

The Ocmulgee River and its tributaries drain most of the county. The river enters the northwestern part of the county, flows generally in a southeasterly direction, and leaves the county at the extreme southeastern corner. Important tributaries of the Ocmulgee River are Echeconnee, Tobesofkee, Rocky, Colaparchee, Beaverdam, Walnut, and Stone Creeks. Echeconnee Creek drains the southern part of Bibb County; Tobesofkee, Colaparchee, and Rocky Creeks drain the central and western parts; Beaverdam and Walnut Creeks drain the northern part; and Stone Creek drains the eastern part. These creeks and their small tributaries are throughout the county and form a well defined trellis pattern.

The soils on uplands are well drained, except some poorly drained soils in saucer-shaped depressions. The bottom lands along the Ocmulgee River and its tributaries are subject to frequent flooding overflow during winter and in early spring. Floodwater drains off the bottom lands slowly, and the soils remain wet for long periods.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; 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, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, 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 soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

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

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. This section gives general ratings of the potential of each map unit for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Each map unit is rated for *cultivated farm crops, pasture, woodland, urban uses,* and *recreation areas.* Cultivated farm crops and pasture are those grown extensively by farmers in the survey area. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas include campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic.

Soils on flood plains on the Piedmont uplands

The one map unit in this group is made up of loamy, nearly level, poorly drained to well drained soils. These soils are on flood plains. They have a surface layer that is mainly brownish and a subsoil that is brownish, mottled with gray.

1. Chewacla-Congaree-Hydraquents

Nearly level, poorly drained to well drained, loamy soils that are friable throughout

The soils in this map unit are on flood plains of the Ocmulgee River and its tributaries. These soils have low relief. They are commonly in small areas and are low lying and very poorly drained, or they are in somewhat larger areas and are higher lying and better drained. The soils in this unit have high probability of flooding late in winter and early in spring. Slopes are less than 2 percent.

This map unit makes up about 20 percent of the county. It is about 74 percent Chewacla soils, 14 percent Congaree soils, 8 percent Hydraquents, and 4 percent soils of minor extent.

Chewacla soils are somewhat poorly drained. Typically, they have a dark grayish brown silt loam surface layer about 6 inches thick. The subsoil extends to a depth of about 60 inches. The upper part of the subsoil is brown silt loam and has pale brown and grayish brown mottles, the middle part is pale brown silty clay loam and has brownish gray and gray mottles, the lower part is gray silty clay loam that has very dark grayish brown and pale brown mottles. Below this is stratified sand and loam.

Congaree soils are well drained or moderately well drained. Typically, the surface layer is dark brown silt loam about 8 inches thick. Below this, to a depth of 65 inches or more, is stratified dark brown silt loam, silty clay loam, and sandy loam. Flakes of mica are throughout the soil.

Hydraquents are very poorly drained. They commonly are gray, sticky silty clay loam to a depth of 36 to 48 inches and contain a large amount of matted roots. In most places, they are underlain with brown organic material.

Osier soils are of minor extent in this map unit. They are poorly drained and commonly are in slight depressions on the flood plain.

This map unit is mostly wooded; however, a few soils in this map unit are better drained and are used for cultivated crops or pasture. An area east of Macon is protected from flooding by a large levee (fig. 1), and this allows considerable industrial development. Nearby, clay has been mined for the manufacture of bricks and the excavated areas are filled with water. Most of this map unit has high potential for woodland. Equipment limitations and seedling mortality, however, are management problems in most places. This map unit has low potential for farming and urban use. Flooding and wetness are chief concerns in use and management.

Soils on ridgetops and hillsides on the Coastal Plain uplands

The two map units in this group are made up of loamy, well drained soils. These nearly level soils are on broad ridgetops, and the very gently sloping to sloping soils are on ridgetops and hillsides. These soils have a loamy surface layer that is dominantly dark grayish brown and a loamy or clayey subsoil that is dominantly red or yellowish brown.

2. Norfolk-Orangeburg

Nearly level to sloping, well drained, loamy soils that are friable throughout

The nearly level soils in this map unit are on broad ridgetops and the very gently sloping to sloping soils are on smooth and convex ridgetops and hillsides. These soils are mainly in the central and southern parts of the county. Slopes range from 0 to 12 percent.

This map unit makes up about 10 percent of the county. It is about 32 percent Norfolk soils, 31 percent Orangeburg soils, and 37 percent soils of minor extent and Urban land.

Norfolk soils have a predominantly brown subsoil. Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsurface layer is about 4 inches of pale brown sandy loam. The subsoil extends to a depth of about 70 inches. The upper part of the subsoil is yellowish brown sandy clay loam, the middle part is yellowish brown sandy clay loam and has strong brown and pale brown mottles, and the lower part is sandy clay loam that is mottled yellowish brown, strong brown, pale brown, yellowish red, and light brownish gray.

Orangeburg soils have a predominantly red subsoil. Typically, the surface layer is dark grayish brown sandy loam about 8 inches thick. The subsoil is sandy clay loam and extends to a depth of 60 inches or more; the upper few inches is yellowish red, and the lower part is red.

Soils of minor extent in this map unit are Cowarts, Fuquay, Grady, and Osier. Urban land makes up about 25 percent of the map unit. The well drained Cowarts and Fuquay soils are on ridgetops and hillsides. The poorly drained Grady and Osier soils are in slight depressions. Urban land is on ridgetops and hillsides and the associated drainageways and flood plains.

This map unit is used mainly for farming and urban development. In a few areas it is in pasture or woodland. Most of the soils in this map unit have high potential for these uses. Slopes that have no vegetative cover need protection from erosion, and irregular, choppy, more sloping areas need special consideration in planning use and management.

3. Orangeburg-Faceville

Nearly level to sloping, well drained soils that are friable throughout and have a loamy surface layer and a loamy or clayey subsoil

The nearly level soils in this map unit are on broad ridgetops, and the very gently sloping to sloping soils commonly are on smooth and convex ridgetops and hillsides. The soils are mainly in the southeastern part of the county. Slopes range from 0 to 12 percent.

This map unit makes up about 5 percent of the county. It is about 57 percent Orangeburg soils, 23 percent Faceville soils, and 20 percent soils of minor extent.

Orangeburg soils are loamy throughout. Typically, the surface layer is dark grayish brown sandy loam about 8 inches thick. The subsoil is sandy clay loam and extends to a depth of 60 inches or more; the upper few inches is yellowish red, and the lower part is red.

Faceville soils have a predominantly clayey subsoil. Typically, the surface layer is dark grayish brown sandy loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red sandy clay, and the lower part is red sandy clay that has strong brown and yellowish brown mottles.

The soils of minor extent in this map unit are Grady and Norfolk. The poorly drained Grady soils are in saucer-shaped depressions and sinks. The well drained Norfolk soils are on ridgetops and hillsides.

This map unit is used mainly for urban development, but in some areas it is used for cultivated crops, pasture, or woodland. The soils in this map unit have high potential for these uses. Slopes that have no vegetative cover need protection from erosion. Irregular, choppy, more sloping areas need special consideration in planning use and management. The presence of a clayey subsoil is a concern if shallow excavations are to be made or if sanitary facilities are to be installed.

Soils on ridgetops and hillsides on the Sand Hills uplands

The four map units in this group are made up of sandy or loamy, well drained to excessively drained soils. These are nearly level soils on smooth ridgetops and very gently sloping to sloping hillsides.

4. Vaucluse-Lakeland

Very gently sloping to sloping, well drained soils that have a sandy surface layer and a loamy subsoil that is mainly firm, brittle, and compact; and excessively drained soils that are loose and sandy throughout

The very gently sloping soils in this map unit are mainly on smooth and convex ridgetops, and the very gently sloping to sloping soils are on short, irregular and convex hillsides. These soils are mainly in the southern and central parts of the county. Slopes range from 2 to 17 percent.

This map unit makes up about 11 percent of the county. It is about 82 percent Vaucluse soils, 9 percent Lakeland soils, and 9 percent soils of minor extent.

Vaucluse soils are well drained and have a loamy subsoil that is mainly firm, brittle, and compact. Typically, the surface layer is dark grayish brown loamy sand about 5 inches thick. The subsurface layer is about 3 inches of yellowish brown loamy sand. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. It is yellowish brown in the upper few inches. Below this, to a depth of about 23 inches, it is strong brown and has red mottles. The lower part of the subsoil is red and has many brown and gray mottles. The subsoil is firm and brittle beginning at a depth of about 23 inches.

Lakeland soils are excessively drained. They are loose and sandy throughout. Typically, the surface layer is very dark gray sand about 5 inches thick. The underlying material, to a depth of 80 inches, is sand. The upper part is yellowish brown, the middle part is light yellowish brown, and the lower part is very pale brown.

The soils of minor extent in this map unit are Ailey and Osier. The well drained Ailey soils share the same landscape with the major soils. The poorly drained Osier soils are on adjacent bottomlands.

This map unit is mainly wooded. In some areas it is used for residential subdivisions and small industry. It has low potential for row crops and small grain, and medium potential for hay, pasture, and woodland. The less sloping soils have high potential for most urban uses, but the soils on short, irregular hillsides have medium potential for this use. The sandy surface layer and sandy texture of the soils in this unit need to be considered in planning recreational development. The compact subsoil layer in most of the soils needs to be considered in planning use and management. Slopes that have no vegetative cover need protection from erosion.

5. Vaucluse-Cowarts-Ailey

Very gently sloping to sloping, well drained soils that have a sandy or loamy surface layer and a loamy subsoil that is mainly firm, brittle, and compact

The very gently sloping, well drained soils in this map unit are on ridgetops, and the very gently sloping to sloping soils are on hillsides that are predominantly smooth and convex. These soils are in the central and southern parts of the county. Slopes range from 2 to 17 percent.

This map unit makes up about 11 percent of the county. It is about 55 percent Vaucluse soils, 28 percent Cowarts soils, 11 percent Ailey soils, and 6 percent soils of minor extent.

Vaucluse soils have a sandy surface layer. Typically, the surface layer is grayish brown loamy sand about 10 inches thick. The subsurface layer is about 6 inches of light yellowish brown loamy sand. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown, the middle part is strong brown and has red mottles, the lower part is mottled light gray, pink, and red. The subsoil is firm and brittle beginning at a depth of about 30 inches.

Cowarts soils have a loamy surface layer. Typically, the surface layer is dark grayish brown sandy loam about 5 inches thick. The subsurface layer is about 3 inches of light yellowish brown sandy loam. The subsoil is sandy clay loam and extends to a depth of more than 65 inches. The upper part of the subsoil is predominantly yellowish brown, the middle part is yellowish red and is mottled brownish yellow and light yellowish brown, and the lower part is mottled reddish brown, light gray, yellowish red, and yellowish brown. Plinthite begins at a depth of about 19 inches, and the middle and lower parts of the subsoil are firm and compact. A few nodules of ironstone are on the surface and in the upper 8 inches of the soil.

Ailey soils have a thick sandy surface layer. Typically, the surface layer is grayish brown loamy sand about 8 inches thick. The subsurface layer is pale brown loamy sand and extends to a depth of 30 inches. The subsoil extends to a depth of 65 inches or more. The upper few inches of the subsoil is brownish yellow sandy loam, the middle part is brownish yellow sandy clay loam that has red and brown mottles, and the lower part is compact, brittle sandy clay loam that is predominantly mottled yellowish brown, red, light gray, and light reddish brown.

The soils of minor extent in this map unit are Lakeland and Fuquay. The excessively drained Lakeland soils and the well drained Fuquay soils share the same landscape with the major soils.

This map unit is mainly wooded or idle. In some areas it is used for cultivated crops and pasture; and in a few areas it is used for subdivisions. This map unit has low potential for row crops and small grain; medium potential for hay, pasture, and woodland; and high potential for most urban uses. The soils in this map unit have a compact subsoil layer. This needs to be considered in planning use and management. Slopes that have no vegetative cover need protection from erosion.

6. Lakeland-Ailey

Very gently sloping to sloping, excessively drained soils that are loose and sandy throughout; and well drained soils that have a sandy surface layer and a loamy subsoil that is mainly firm, brittle, and compact

The very gently sloping soils in this map unit are on ridgetops, and the very gently sloping to sloping soils are on smooth and convex hillsides. These soils are mainly in the southwestern part of the county. Slopes range from 2 to 17 percent.

This map unit makes up about 5 percent of the county. It is about 46 percent Lakeland soils, 23 percent Ailey soils, and 31 percent soils of minor extent.

Lakeland soils are excessively drained. They are loose and sandy throughout. Typically, the surface layer is very dark gray sand about 5 inches thick. The underlying material to a depth of 80 inches or more is sand; the upper and middle parts are yellowish brown, and the lower part is very pale brown.

Ailey soils are well drained. They have a loamy subsoil that is mainly firm, brittle, and compact. Typically, the surface layer is grayish brown loamy sand about 8 inches thick. The subsurface layer is pale brown loamy sand and extends to a depth of 30 inches. The subsoil extends to a depth of 65 inches or more. The upper few inches of the subsoil is brownish yellow sandy loam, the middle part is brownish yellow sandy clay loam that has red and brown mottles, and the lower part is compact, brittle sandy clay loam that is predominantly mottled yellowish brown, red, light gray, and light reddish brown.

The soils of minor extent in this map unit are Cowarts, Fuquay, and Vaucluse. These well drained soils share the same landscape with the major soils.

This map unit is mainly wooded or idle, but in some areas it is used for cultivated crops and residential subdivisions. It has low potential for row crops and small grain (fig. 2). The sandier soils in this map unit have low potential for hay and pasture and for woodland. The less sandy soils have high potential for urban uses. Droughtiness is a concern in establishing and managing vegetation. The thick sandy surface layer or sandiness of the soil throughout needs to be considered in planning recreational developments. The compact subsoil layer in some soils in this map unit needs to be considered in planning use and management.

7. Cowarts-Norfolk-Fuquay

Nearly level to gently sloping, well drained soils that are loamy throughout and have a subsoil that is mainly firm, brittle, and compact; soils that are friable and loamy throughout; and soils that have a sandy surface layer and a firm, loamy subsoil

The nearly level or very gently sloping soils in this map unit are on broad, smooth and convex ridgetops and the short, gently sloping soils dissected by numerous small drainageways are on hillsides. These soils are mainly in the southwestern and central parts of the county. Slopes range from 0 to 8 percent.

This map unit makes up about 6 percent of the county. It is about 39 percent Cowarts soils, 34 percent Norfolk soils, 10 percent Fuquay soils, and 17 percent soils of minor extent.

Cowarts soils have a subsoil that is mainly firm, brittle, and compact. Typically, the surface layer is grayish brown sandy loam about 4 inches thick. The subsurface layer is about 3 inches of light yellowish brown sandy loam. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, the middle part is yellowish red and is mottled brownish yellow and light yellowish brown, and the lower part is mottled reddish brown, light gray, and yellowish brown. Plinthite begins at a depth of about 18 inches, and at this depth the subsoil is firm and compact. A few nodules of ironstone are on the surface and in the upper part of the surface layer.

Norfolk soils are loamy and friable throughout. Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsurface layer is about 4 inches of brown sandy loam. The subsoil is sandy clay loam and extends to a depth of 70 inches. The upper part of the subsoil is yellowish brown, the middle part is yellowish brown and has strong brown and pale brown mottles, and the lower part is mottled yellowish brown, strong brown, pale brown, yellowish red, and light brownish gray.

Fuquay soils have a sandy surface layer and a firm, loamy subsoil. Typically, the surface layer is dark grayish brown loamy sand about 7 inches thick. The subsurface layer is loamy sand and extends to a depth of 24 inches; it is brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of more than 65 inches. The upper part of the subsoil is yellowish brown sandy loam, the middle part is yellowish brown sandy clay loam that has red and light yellowish brown mottles, and the lower part is sandy clay loam and is mottled strong brown, light yellowish brown, and red. Plinthite begins at a depth of about 40 inches. Nodules of ironstone are in the soil to a depth of about 40 inches.

Soils of minor extent in this map unit are Ailey, Vaucluse, and Lakeland. The well drained Ailey and Vaucluse soils and the excessively drained Lakeland soils share the same landscape with the major soils.

This map unit is used mainly for cultivated crops and pasture. In some areas it is wooded or idle, and in a few areas it is used for residential subdivisions and small industry. Most areas of this map unit have medium potential for row crops, small grain, hay, pasture, and woodland; some areas, however, have high potential for these uses because the soils in these areas are more friable. Potential is high for most urban uses. The compact subsoil layer in most of the soils in this map unit needs to be considered when planning use and management. Slopes that have no vegetative cover need protection from erosion.

Soils on ridgetops and hillsides on the Piedmont uplands

The three map units in this group are made up of loamy, moderately well drained or well drained soils. These very gently sloping to strongly sloping soils are on ridgetops and hillsides. They have a brownish surface layer and a mostly reddish subsoil. In some soils, the subsoil is firm, sticky, and plastic.

8. Cecil-Davidson

Very gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a predominantly firm, clayey subsoil

The very gently sloping or gently sloping soils in this map unit are on long, broad ridgetops, and the strongly sloping soils are on smooth and convex hillsides. These soils are mainly in the northern part of the county. Slopes range from 2 to 10 percent.

This map unit makes up about 12 percent of the county. It is about 58 percent Cecil soils, 16 percent Davidson soils, and 26 percent soils of minor extent.

Cecil soils have a predominantly red subsoil. Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil extends to a depth of 52 inches. The upper few inches of the subsoil is yellowish red sandy clay loam, the middle part is red clay, and the lower part is red clay loam that has strong brown mottles. The underlying material, to a depth of 65 inches or more, is strong brown weathered rock that crushes to loam or clay loam.

Davidson soils have a predominantly dark red subsoil. Typically, the surface layer is dark reddish brown loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. The upper few inches of the subsoil is dark reddish brown sandy clay loam, and below this it is dark red clay that has a few strong brown mottles.

Of minor extent in this map unit are Vance and Wilkes soils and Cecil-Urban land complex. These well drained soils and the Urban land share the same landscape with the major soils.

This map unit is mostly wooded or is used for residential subdivisions and industry. In a few areas it is in row crops or pasture. Most soils in this map unit have high potential for common uses. However, the clay content of the soil needs to be considered before installing tile for septic tank absorption fields. Slopes that have no vegetative cover need protection from erosion. In places in this map unit where the soils are more sloping than is common, slopes need to be considered in planning for most uses.

9. Cecil-Vance

Very gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a predominantly firm, clayey subsoil; in some, the subsoil is sticky and plastic

The very gently sloping or gently sloping soils in this map unit are on long, narrow ridgetops, and the strongly sloping soils are on irregular, convex hillsides, near winding drainageways. These soils are in the northern part of the county. Slopes range from 10 to 17 percent.

This map unit makes up about 7 percent of the county. It is about 54 percent Cecil soils, 27 percent Vance soils, and 19 percent soils of minor extent.

Cecil soils have a subsoil that is mostly firm. Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil extends to a depth of about 50 inches. The upper part of the subsoil is yellowish red sandy clay, the middle part is red clay, and the lower part is red clay loam that has strong brown mottles. Below this, to a depth of 65 inches or more, is weathered rock that crushes to loam or clay loam.

Vance soils have a subsoil that is mostly firm, sticky, and plastic. Typically, the surface layer is grayish brown sandy clay loam about 3 inches thick. The subsoil extends to a depth of about 40 inches. The upper few inches of the subsoil is yellowish red sandy clay, the middle part is yellowish red clay, and the lower part is yellowish red clay that has strong brown and reddish yellow mottles. Below this, to a depth of 72 inches or more, is weathered rock mixed with clay. The middle and lower parts of the subsoil are firm, sticky, and plastic.

Soils of minor extent in this map unit are Davidson, Helena, and Wilkes. The moderately well drained Helena soils are less sloping and are on smoother landscapes. The well drained Davidson and Wilkes soils share the same landscapes with the major soils.

This map unit is mostly wooded. In a few areas it is used for residential subdivisions and industry. It has low potential for farming. Most soils in this map unit have high potential for woodland and medium potential for urban uses. The firm, sticky, and plastic subsoil in some soils in this map unit needs to be considered in planning their use and management. Slopes are a management concern for most uses. Slopes that have no vegetative cover need protection from erosion.

10. Vance-Helena-Wilkes

Very gently sloping to strongly sloping, moderately well drained or well drained soils that have a loamy surface layer and a predominantly firm, clayey subsoil that is sticky and plastic

The very gently sloping or gently sloping soils in this map unit are on ridgetops and the strongly sloping soils are on smooth and convex hillsides. These soils are in the northern part of the county. Slopes range from 2 to 10 percent.

This map unit makes up about 8 percent of the county. It is about 48 percent Vance soils, 30 percent Helena soils, 10 percent Wilkes soils, and 12 percent soils of minor extent.

Vance soils are well drained. Typically, the surface layer is yellowish brown sandy loam about 8 inches thick.

The subsoil extends to a depth of 44 inches. The upper 16 inches of the subsoil is yellowish brown and is a few inches of sandy clay loam underlain by sandy clay, the middle part is strong brown clay that has yellowish brown and yellowish red mottles, and the lower part is yellowish red clay that has light yellowish brown and light gray mottles. Below this, to a depth of 60 inches or more, is weathered, mixed, soft acidic rock that crushes to clay loam. The middle part of the subsoil is firm, plastic, and sticky.

Helena soils are moderately well drained. Typically, the surface layer is dark grayish brown sandy loam about 7 inches thick. The subsurface layer is about 4 inches of light yellowish brown sandy loam. The subsoil extends to a depth of 40 inches. The upper few inches of the subsoil is strong brown sandy clay that has light brownish gray mottles, the middle part is strong brown clay that has light brownish gray and grayish green mottles, and the lower part is yellowish brown sandy clay loam that has strong brown and light brownish gray mottles. The underlying material, to a depth of 60 inches or more, is strong brown sandy loam that has brownish yellow mottles. The middle part of the subsoil is very firm, sticky, and very plastic.

Wilkes soils are well drained. Typically, the surface layer is olive brown gravelly sandy loam about 4 inches thick. The subsoil is yellowish red clay loam about 8 inches thick. Below this is green, black, and gray coarse sandy clay loam and partially weathered rock fragments. Hard rock is at a depth of about 60 inches.

Soils of minor extent in this map unit are Cecil and Davidson. These well drained soils share the same landscape with the major soils.

This map unit is mostly wooded. In a few areas it is in pasture (fig. 3). Most of the soils in this map unit have low potential for farming and urban use. The soils have medium potential for pasture and woodland. The firm, sticky, and plastic subsoil needs to be considered in planning use and management. Slopes that have no vegetative cover need protection from erosion.

Soils on hillsides on the Piedmont uplands

The one map unit in this group is made up of loamy, well drained soils. These predominantly strongly sloping soils are on hillsides. They have a brownish loamy surface layer and a brownish or reddish clayey subsoil that is firm, sticky, and plastic. In places, hard rock is at a depth of 40 inches.

11. Wilkes-Vance

Predominantly strongly sloping, well drained soils that have a loamy surface layer and a firm, clayey subsoil that is sticky and plastic

The predominantly strongly sloping soils in this map unit are on long, narrow ridgetops and irregular, convex hillsides. These soils are in the northern part of the county. Slopes range from 10 to 17 percent.

This map unit makes up about 5 percent of the county. It is about 48 percent Wilkes soils, 41 percent Vance soils, and 11 percent soils of minor extent.

Wilkes soils are less than 20 inches thick. Typically, the surface layer is dark grayish brown gravelly sandy loam about 6 inches thick. The subsurface layer is about 2 inches of yellowish brown sandy loam. The subsoil is mainly yellowish brown clay and extends to a depth of about 17 inches. Below this is coarse sandy clay loam and partly weathered rock fragments. Hard rock is at a depth of about 40 inches.

Vance soils are more than 20 inches thick. Typically, the surface layer is grayish brown sandy clay loam about 3 inches thick. The subsoil extends to a depth of about 40 inches. The upper few inches of the subsoil is yellowish red sandy clay, the middle part is yellowish red clay, and the lower part is yellowish red clay that has strong brown and reddish yellow mottles. The middle and lower parts of the subsoil are firm, sticky, and plastic. Below this, to a depth of 72 inches or more, is weathered rock mixed with clay.

Soils of minor extent in this map unit are Cecil and Davidson. These well drained soils share the same landscape with major soils.

This map unit is wooded. It has low potential for farming and urban uses. It has medium potential for woodland. Slope is a concern of management for most uses. The firm, sticky, plastic subsoil and hard rock, in places as shallow as 40 inches, are limitations. These limiting features need to be considered in planning use and management of the soils.

Broad land use considerations

Deciding which land should be used for urban development is an important issue in Bibb County. Each year a considerable amount of land is being developed for urban uses. It is estimated that about 40,000 acres, or nearly one-fourth of the survey area, is urban or built-up land. The general soil map is most helpful for planning the general outline of urban areas, but it cannot be used for the selection of sites for specific urban structures. In general, the soils that have good potential for cultivated crops also have good potential for urban development. The data about specific soils in this survey can be helpful in planning future land use patterns.

Areas in which the soils are so unfavorable that urban development is extremely limited are not extensive in the county. However, the Chewacla-Congaree-Hydraquents map unit has soils on flood plains in which flooding and wetness are severe limitations. The Vaucluse-Lakeland map unit has medium potential for most urban uses, because most of the soils perc slowly or because of slope. Some soils in the Wilkes-Vance map unit have bedrock a few feet below the surface, and because of this, development is costly. The clayey soils of the Vance-Helena-Wilkes map unit have low potential for urban development, chiefly because of the firm, sticky, and plastic subsoil. Soils in the Cecil-Vance map unit have low potential for most urban uses, mainly because of slope and because of a subsoil that percs slowly.

In large areas of the county are soils that can be developed for urban uses at a lower cost than soils that have severe limitations. These soils are in the Norfolk-Orangeburg map unit, the Orangeburg-Faceville map unit, the Vaucluse-Cowart-Ailey map unit, the less sandy part of the Lakeland-Ailey map unit, the Cowarts-Norfolk-Fuquay map unit, and the Cecil-Davidson map unit. The Norfolk-Orangeburg map unit and the Orangeburg-Faceville map unit are excellent farmland, and this should not be overlooked when broad land uses are considered.

Soils in the Norfolk-Orangeburg and Orangeburg-Faceville map units are well suited to nurseries and specialty crops. Also suited to these uses are soils in the Cecil-Davidson map unit and soils in parts of the Cowarts-Norfolk-Fuquay map unit. These soils are well drained, and they warm up earlier in spring than the wetter soils.

Most of the soils in the county have high or medium potential for woodland. The soils in the Norfolk-Orangeburg and Orangeburg-Faceville map units commonly produce higher yielding wood crops than soils in other map units. Trees do not grow as well on soils in the less productive Lakeland-Ailey and the Wilkes-Vance map units as they do on soils in other map units.

The hilly Cecil-Vance, Wilkes-Vance, and Vaucluse-Lakeland map units have potential for parks and recreation areas. Hardwood forests enhance the beauty in many areas. Undrained areas of the Chewacla-Congaree-Hydraquents map unit are good for nature study, and they provide habitat for many important species of wildlife.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Norfolk sandy loam, 0 to 2 percent slopes, is one of several phases within the Norfolk series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes, soil associations, and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Cecil-Urban land complex, 2 to 10 percent slopes, is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map because it is not practical to separate them. A soil association has considerable regularity in geographic pattern and in the kinds of soil that are a part of it. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for use and management of the soils. Chewacla association is an example.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Pits is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

Soil descriptions

AgB—Ailey loamy sand, 2 to 6 percent slopes. This well drained, very gently sloping or gently sloping soil is on ridgetops and hillsides on Sand Hills uplands. Slopes are smooth and convex. Areas are 10 to 350 acres in size.

Typically, the surface layer is grayish brown loamy sand about 8 inches thick. The subsurface layer is pale brown loamy sand and extends to a depth of 30 inches. The subsoil extends to a depth of 65 inches or more. The upper few inches of the subsoil is brownish yellow sandy loam. The middle part is brownish yellow sandy clay loam and has red and brown mottles. The lower part is sandy clay loam that is predominantly mottled yellowish brown, red, light gray, and light reddish brown and is compact and brittle (fig. 4).

Included with this soil in mapping are small areas of Fuquay, Lakeland, and Vaucluse soils. The included soils make up about 10 to 15 percent of this map unit, and areas generally are less than 1 or 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow in the underlying compact and brittle layer. Available water capacity is low. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is restricted by a compact layer in the subsoil.

This soil has low potential for row crops and small grain. Low available water capacity and low fertility are limitations. Returning crop residue to the soil helps to increase available water capacity and decrease leaching of plant nutrients. Potential for hay and pasture is medium.

This Ailey soil has medium potential for slash pine and longleaf pine. Equipment limitations and seedling mortality are management concerns on this soil.

This soil has high potential for most urban uses. The compact layer in the subsoil percs slowly, and this is a limitation for septic tank absorption fields. In most places this limitation can commonly be overcome by good design and construction. Capability subclass IIIs; woodland group 4s.

CeB—Cecil sandy loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 200 acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil extends to a depth of 52 inches. The upper few inches of the subsoil is yellowish red sandy clay loam. The middle part is red clay, the lower part is red clay loam and has strong brown mottles. The underlying material extends to a depth of 65 inches or more. It is strong brown weathered rock and crushes to loam or clay loam.

Included with this soil in mapping are small areas of Davidson and Vance soils. The included soils make up less than 15 percent of this map unit and areas are less than 1 acre.

This soil is low in natural fertility and organic matter content. It is strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth. The root zone is deep and easily penetrated by plant roots.

Most areas of this soil are idle or are wooded. This soil has no significant limitations for woodland use and management, and it has high potential for loblolly pine, slash pine, and yellow-poplar. This soil has high potential for farming. Tilth is easily maintained by returning crop residue to the soil. Terraces, conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Cecil soil has high potential for most recreational and urban uses (fig. 5) and for gardens. It is suited to shrubs, trees, and other kinds of vegetation common to the county. The subsoil percs slowly, and this is a limitation for septic tank absorption fields. This limitation can commonly be overcome by increasing the size of the absorption area or modifying the filter field. The hazard of erosion is moderate prior to establishing vegetative cover. Capability subclass IIe; woodland group 3o.

CeC—Cecil sandy loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are dominantly 10 to 50 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 5 inches thick. The subsoil extends to a depth of 50 inches. The upper few inches of the subsoil is yellowish red sandy clay loam. The middle part is red clay, and the lower part is red clay loam and has strong brown mottles. Below this, to a depth of 65 inches or more, is mottled red, strong brown, and pale brown weathered rock that crushes to loam or clay loam.

Included with this soil in mapping are small areas of Davidson and Vance soils. Also included are small eroded areas of soils that are dissected by small gullies and rills. The included soils make up about 10 percent of this map unit.

This soil is medium to low in natural fertility and low in content of organic matter. It is strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. Tilth is good in most places. The root zone is deep and easily penetrated by plant roots.

Most areas of this soil are wooded. This soil has no significant limitations for woodland use and management, and it has high potential for loblolly pine, slash pine, and yellow-poplar. This soil has high potential for farming. Tilth is easily maintained by returning crop residue to the soil. Contouring, conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Cecil soil has medium potential for most urban uses. The subsoil percs slowly, and this is a limitation for septic tank absorption fields. This can commonly be overcome by good design and construction. Slope is commonly a limitation for sanitary facilities, community development, and playgrounds. The common plants used for landscaping and vegetable gardens are well suited to this soil. However, the hazard of erosion is severe prior to establishing permanent vegetation. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IIIe; woodland group 3o.

CeD—Cecil sandy loam, 10 to 17 percent slopes. This well drained, strongly sloping soil is on narrow ridgetops and hillsides near drainageways on Piedmont uplands. Slopes are irregular and convex. Areas are dominantly 15 to 60 acres in size.

Typically, the surface layer is reddish brown sandy loam about 5 inches thick. The subsoil extends to a depth of about 50 inches. The upper part of the subsoil is yellowish red sandy clay. The middle part is red clay, and the lower part is red clay loam and has strong brown mottles. Below this, to a depth of 65 inches or more, is weathered rock that crushes to loam or clay loam.

Included with this soil in mapping are small areas of Davidson and Vance soils. Also included are a few areas of eroded soils that have a red clay loam surface layer and are dissected by a few small gullies and rills. The included soils make up about 10 to 15 percent of this map unit, and areas are less than 1 acre.

This soil is low in natural fertility and in content of organic matter. It is strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. Tilth is good in most places. The root zone is deep and easily penetrated by plant roots.

This soil is wooded. It has high potential for loblolly pine, slash pine, and yellow-poplar. It has no significant limitations for woodland use and management.

This soil has low potential for farming and medium potential for urban use. The strong slopes are limitations for farming, dwelling or building sites, and most recreational uses. The clayey subsoil is a limitation for most sanitary facilities. If this soil is used for urban development, these limitations can be overcome to some extent by good design and construction or by modifying the slope. The hazard of erosion is severe prior to establishing turf and other plants used for cover. Capability subclass IVe; woodland group 3o.

CeuC—Cecil-Urban land complex, 2 to 10 percent slopes. This complex consists of Cecil soils and Urban land that are so intermingled they could not be shown separately on the map. These very gently sloping and gently sloping soils are on hillsides and ridgetops on Piedmont uplands. Areas are 25 to 1,300 acres in size.

Cecil soils make up about 50 to 60 percent of each mapped area. Typically, Cecil soils have a yellowish brown sandy loam surface layer about 6 inches thick. The subsoil extends to a depth of about 54 inches. The upper few inches of the subsoil is yellowish red sandy clay loam; the middle part is red clay; and the lower part is red clay loam and has strong brown mottles. Below this is weathered rock that crushes to loam or clay loam.

Cecil soils are low in natural fertility and in content of organic matter. These soils are strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. Tilth is good. The root zone is deep and easily penetrated by plant roots.

Urban land makes up about 40 to 50 percent of each mapped area. The soils in these miscellaneous areas have been altered by grading, cutting, filling, shaping, and smoothing for community development. Urban land is used for private dwellings, industrial sites, streets and sidewalks, shopping centers, parking lots, airports, schools, and churches.

This complex has high potential for most urban uses and for gardens. It is suited to shrubs, trees, and other kinds of vegetation common to the county. Slow percolation is a limitation for septic tank absorption fields but can commonly be overcome by good design and careful installation procedures. The common plants used for landscaping and vegetable gardens are well suited to this complex. However, the hazard of erosion is severe prior to establishing permanent plant cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IIIe; Cecil soil in woodland group 3o, Urban land not assigned to a woodland group.

CK—Chewacla association. This association consists of nearly level, somewhat poorly drained soils that formed in alluvium. These soils are in broad areas on flood plains in a regular, repeating pattern. They are between the moderately well drained to well drained Congaree soils near stream channels and the very poorly drained Hydraquents in depressions or low areas at the base of foothills.

Areas of soils in this association are mainly long and moderately wide and range from 160 to 1,000 acres in size. A typical area is 74 percent Chewacla soils, 14 percent Congaree soils, and 8 percent Hydraquents.

Typically, Chewacla soils have a dark grayish brown silt loam surface layer about 6 inches thick. The subsoil extends to a depth of about 60 inches. The upper part of the subsoil is brown silt loam and has pale brown and grayish brown mottles. The middle part is pale brown silty clay loam and has brownish gray and gray mottles, and the lower part is gray silty clay loam and has very dark grayish brown and pale brown mottles. This is underlain by stratified sand and loam.

Chewacla soils have moderate permeability and medium available water capacity. They are strongly acid or medium acid throughout, except in areas where the surface layer has been limed. The water table is commonly between depths of 6 to 18 inches late in winter and early in spring, and the probability of brief flooding during this period is high.

Most areas of soils in this association are suited to hardwoods. They have high potential for loblolly pine, American sycamore, yellow-poplar, and green ash. Wetness and flooding are the main limitations to equipment use in managing and harvesting trees, but they can be overcome by using equipment and logging during drier seasons. In addition, drainage is needed to overcome high seedling mortality.

Although this association is mostly wooded, it has high potential for pasture. Management concerns are the controlling of grazing and of weeds and brush.

This association has low potential for farming and urban use. Wetness and flooding are the main limitations and can be overcome only by major flood control and drainage measures. Capability subclass IVw; woodland group 1w.

Co—Congaree silt loam. This nearly level, well drained or moderately well drained soil is on flood plains commonly adjacent to the large streams in the county. The probability of frequent, brief flooding during winter and early spring is high. Areas are 20 to 200 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. It is underlain by stratified dark brown silt loam, silty clay loam, and sandy loam to a depth of 65 inches or more. Flakes of mica are throughout the soil.

Included with this soil in mapping are a few small areas of Chewacla soils. The included soils make up about 10 percent of this map unit.

This soil is medium in natural fertility and in content of organic matter. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water supply is medium. Tilth is good, and the root zone is easily penetrated by plant roots.

This soil has high potential for row crops, small grain, hay, and pasture; however, flooding is a concern from late in fall until early in spring. Good tilth is easily maintained by returning crop residue to the soil. In addition, the use of grasses and legumes in the cropping system help to maintain the level of fertility and the content of organic matter. Row arrangements and small shallow ditches are effective in removing excess water during wet periods.

This Congaree soil has high potential for loblolly pine, slash pine, yellow-poplar, American sycamore, and sweetgum. It has no significant limitations for woodland use and managment.

This soil has low potential for urban development. Flooding is the main limitation and can be overcome only by major flood control measures. Capability subclass IIw; woodland group 1o.

CwB—Cowarts sandy loam, 2 to 5 percent slopes. This well drained, very gently sloping soil is on ridgetops on Sand Hills uplands. Slopes are smooth and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 5 inches thick. The subsurface layer is light yellowish brown sandy loam to a depth of 8 inches. The subsoil is sandy clay loam and extends to a depth of more than 65 inches. The upper part of the subsoil is predominantly yellowish brown; the middle part is yellowish red and has brownish yellow and light yellowish brown mottles; and the lower part is mottled reddish brown, light gray, yellowish red, and yellowish brown. Plinthite begins at a depth of about 19 inches, and the middle and lower parts of the subsoil are firm and compact. A few nodules of ironstone are on the surface and in the upper 8 inches of the subsoil.

Included with this soil in mapping are a few small areas of Fuquay and Norfolk soils. Also included are areas of Cowarts loamy sand. The included soils make up 10 to 15 percent of the map unit, and separate areas are less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid to very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate in the upper part of the soil, but it is slow below a depth of about 19 inches. Available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. Root penetration is somewhat limited below a depth of about 19 inches, because the subsoil is firm and compact.

This soil has medium potential for row crops, small grain, hay, and pasture. Restricted penetration of roots and movement of water in the subsoil are limitations. Good tilth is easily maintained by returning crop residue to the soil. The hazard of erosion is moderate if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Cowarts soil has medium potential for loblolly pine and slash pine. It has no significant limitations for woodland use and management.

This soil has high potential for most urban uses. The firm, compact subsoil percs slowly and is a limitation for septic tank absorption fields. Slope is a limitation for sewage lagoons or playgrounds. Capability subclass IIe; woodland group 2o.

CwC—Cowarts sandy loam, 5 to 8 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides on Sand Hills uplands. Slopes are smooth and convex. Areas are 5 to 60 acres in size.

Typically, the surface layer is grayish brown sandy loam about 4 inches thick. The subsurface layer is light yellowish brown sandy loam to a depth of 7 inches. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown; the middle part is yellowish red and has brownish yellow and light yellowish brown mottles; and the lower part is mottled reddish brown, light gray, and yellowish brown. Plinthite begins at a depth of about 18 inches, and the subsoil below this depth is firm and compact. A few nodules of ironstone are on the surface and in the upper part of the surface layer.

Included with this soil in mapping are small areas of Cowarts sandy clay loam that are eroded. Also included are small areas of Ailey, Fuquay, Lakeland, and Vaucluse soils. The included soils make up less than 15 percent of this map unit, and areas generally are less than 1 acre.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate in the upper part of the soil, but it is slow below a depth of about 18 inches. Available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. Root penetration is somewhat limited below a depth of about 18 inches, because the subsoil is firm and compact.

This soil has low potential for row crops and small grain. Slope and the severe hazard of erosion are limitations. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion. Good tilth can be maintained by returning crop residue to the soil. Potential for hay and pasture is medium.

This Cowarts soil has medium potential for loblolly pine and slash pine (fig. 6). It has no significant limitations for woodland use and management.

This soil has high potential for most urban uses. Slope is a limitation for sewage lagoons, playgrounds, or small commercial buildings. The firm, compact subsoil percs slowly and is a limitation for septic tank absorption fields. Capability subclass IVe; woodland group 2o.

DgB—Davidson loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on broad ridgetops on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is dark reddish brown loam about 6 inches thick. The upper few inches of the subsoil is dark reddish brown sandy clay loam. Below this, to a depth of 65 inches or more, the subsoil is dark red clay and has a few strong brown mottles in the lower part.

Included with this soil in mapping are a few small areas of Davidson clay loam that are eroded. Also included are small areas of Cecil soils. The included soils make up about 10 percent of this map unit, and areas are generally less than 1 acre.

This soil is medium in natural fertility and low in content of organic matter. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth. The root zone is deep and easily penetrated by plant roots.

Most areas of this soil are wooded; a few areas are in pasture. This soil has high potential for farming. Tilth is easily maintainted by returning crop residue to the soil. Terraces, conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion. This soil has high potential for loblolly pine, slash pine, sweetgum, and yellow-poplar. Management has no significant woodland use and management problems.

This Davidson soil has high potential for most urban uses and for gardens. It is suited to shrubs, trees, and other vegetation common to the county. The subsoil percs slowly, and this is a limitation for septic tank absorption fields. This limitation can be overcome by increasing the size of the absorption area or modifying the filter field. The hazard of erosion is moderate prior to establishing vegetative cover. Capability subclass IIe; woodland group 3o.

DhC2—Davidson clay loam, 6 to 10 percent slopes, eroded. This well drained, gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 50 acres in size.

Typically, the surface layer is dark reddish brown clay loam about 5 inches thick. The subsoil, to a depth of 65 inches or more, is dark red clay and has a few strong brown mottles in the lower part.

Included with this soil in mapping are areas of Davidson loam and a few small areas of Cecil soils. Also included on a few small knolls are severely eroded soils that have a dark red clay surface layer. The included soils make up about 10 to 15 percent of this map unit, and areas are generally less than 1 acre.

This soil is medium in natural fertility and low in content of organic matter. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. Tilth is poor in most areas. Because of the high clay content in the surface layer, tillage can best be performed during a reasonably dry moisture condition. The root zone is deep and easily penetrated by plant roots.

Although this soil is mostly wooded, it has medium potential for farming. It has high potential for loblolly pine, slash pine, and yellow-poplar. Woodland use and management are limited by a moderate erosion hazard. This limitation can be overcome by good management.

This soil has medium potential for most urban uses. The subsoil percs slowly, and this is a limitation for septic tank absorption fields, but can commonly be overcome by good design and construction. Slope and the high clay content in the surface layer are common limitations for sanitary facilities, community development, and recreation. The common plants used for landscaping and vegetable gardens are well suited to this soil. However, the hazard of erosion is severe prior to establishing permanent vegetation. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IVe; woodland group 3o.

DhD2—Davidson clay loam, 10 to 17 percent slopes, eroded. This well drained, strongly sloping soil is on narrow ridgetops and hillsides near drainageways on Piedmont uplands. Slopes are irregular and convex. Areas are 10 to 30 acres in size.

Typically, the surface layer is dark reddish brown clay loam about 4 inches thick. The subsoil extends to a depth of 65 inches or more. It is dark red clay and has strong brown mottles in the lower part.

Included with this soil in mapping are small areas of Cecil soils. Also included are a few severely eroded soils that are on knolls and have a dark red clay surface layer and areas of soils that are dissected by shallow gullies and rills. The included soils make up about 10 to 15 percent of this map unit, and areas generally are less than 1 acre.

This soil is medium in natural fertility and low in content of organic matter. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has poor tilth. Because of the very high clay content in the surface layer, the soil can be worked best during a reasonably dry moisture condition. The root zone is deep and easily penetrated by plant roots.

This soil is wooded. It has high potential for loblolly pine, slash pine, and yellow-poplar. Erosion hazard and equipment limitations are management problems. These problems can be overcome to some extent by good management.

This Davidson soil has low potential for farming and medium potential for most urban uses. The very high clay content and strong slopes are the main limitations for sanitary facilities, community development, and recreation. The common plants used for landscaping are well suited to this soil, but the hazard of erosion is severe prior to establishing permanent vegetative cover. Capability subclass VIe; woodland group 3o.

FdA—Faceville sandy loam, 0 to 2 percent slopes. This well drained, nearly level soil is on broad Coastal Plain uplands. Areas are 10 to 70 acres in size.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil extends to a depth of about 65 inches. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is yellowish red sandy clay, and the lower part is yellowish red sandy clay and has light yellowish brown and red mottles.

Included with this soil in mapping are a few areas of Norfolk and Orangeburg soils. The included soils make up about 15 percent of this map unit, and areas generally are less than 1 acre.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This soil has high potential for row crops and small grain. It also has high potential for hay and pasture. Good tilth is easily maintained by returning crop residue to the soil. Cropping systems that include grasses and legumes help to conserve moisture and maintain organic matter content.

This Faceville soil has high potential for loblolly pine and slash pine. It has no significant limitations for woodland use and management.

This soil has high potential for most urban uses. The clayey subsoil is a limitation for some uses. In most places, this can be overcome by good design and construction. Capability class I; woodland group 3o.

FdB—Faceville sandy loam, 2 to 5 percent slopes. This well drained, very gently sloping soil is on ridgetops and hillsides on Coastal Plain uplands. Slopes are commonly smooth and convex. Areas are 10 to 40 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red sandy clay, and the lower part is red sandy clay and has strong brown and yellowish brown mottles. Included in mapping are a few areas of Norfolk and Orangeburg soils.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots.

This soil has high potential for row crops, small grain, hay, and pasture, and high yields can be obtained. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Faceville soil has high potential for loblolly pine and slash pine. Limitations for woodland use and management are not significant.

This soil has high potential for most urban uses. The clayey subsoil is a limitation for some uses. In most places, this limitation can be overcome by good design and construction. Capability subclass IIe; woodland group 3o.

FdC—Faceville sandy loam, 5 to 8 percent slopes. This well drained, gently sloping soil is on hillsides between ridgetops and drainageways on Coastal Plain uplands. Slopes are irregular. Areas are 5 to 40 acres in size.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red sandy clay, and the lower part is red sandy clay and has strong brown and yellowish red mottles. Included in mapping are small areas of Norfolk and Orangeburg soils.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. The root zone is deep and is easily penetrated by plant roots.

This soil has medium potential for row crops and small grain. Irregular slopes are a limitation. It has high potential for hay and pasture. Tilth can be maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Faceville soil has high potential for loblolly pine and slash pine. Limitations for woodland use and management are not significant.

This soil has high potential for most urban uses. The clayey subsoil is a limitation for some uses. In most places, this limitation can be overcome by good design and construction. Capability subclass IIIe; woodland group 3o.

FsB—Fuquay loamy sand, 1 to 5 percent slopes. This well drained, nearly level or very gently sloping soil is on ridgetops and hillsides on Sand Hills uplands. Slopes are mostly smooth and convex. Areas are 5 to 60 acres in size.

Typically, the surface layer is dark grayish brown loamy sand and about 7 inches thick. The subsurface layer is loamy sand and extends to a depth of 24 inches; it is brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of more than 65 inches. The upper part of the subsoil is yellowish brown sandy loam, the middle part is yellowish brown sandy clay loam and has red and light yellowish brown mottles, and the lower part is sandy clay loam and is mottled strong brown, light yellowish brown, and red. Plinthite is in the subsoil beginning at a depth of about 40 inches. It makes up 5 to 15 percent of the lower part of the subsoil. Nodules of ironstone are in the soil to a depth of about 40 inches.

Included with this soil in mapping are a few areas of Cowarts, Lakeland, and Norfolk soils and some areas of soils that have 5 to 15 percent nodules of ironstone in the upper part.

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

This soil has medium potential for row crops, small grain, hay, and pasture. Low available water capacity and low fertility are limitations. Returning crop residue to the soil helps to overcome these limitations.

This Fuquay soil has medium potential for loblolly pine and slash pine. Equipment limitations and seedling mortality are management concerns on this soil.

This soil has high potential for most urban uses. The lower part of the subsoil percs slowly, and this is a limitation for septic tank absorption fields. In most places, this limitation can be overcome by increasing the size of the absorption areas or modifying the filter field. Capability subclass IIs; woodland group 3s.

FsC—Fuquay loamy sand, 5 to 8 percent slopes. This well drained, gently sloping soil is on hillsides on Sand Hills uplands. Slopes are mostly smooth and convex. Areas are 5 to 30 acres in size.

Typically, the surface layer is grayish brown loamy sand about 6 inches thick. The subsurface layer is light yellowish brown loamy sand and extends to a depth of 26 inches. The subsoil extends to a depth of more than 65 inches. The upper part of the subsoil is brownish yellow sandy loam, the middle part is yellowish brown sandy clay loam and has red, strong brown, and light yellowish brown mottles, and the lower part is sandy clay loam and is mottled strong brown, yellowish brown, red, and light gray. Plinthite is in the subsoil beginning at a depth of about 45 inches, and makes up 5 to 15 percent of the lower part. Nodules of ironstone extend to a depth of about 45 inches.

Included with this soil in mapping are a few areas of Cowarts and Lakeland soils. Also included are small areas of soils that have 5 to 15 percent nodules of ironstone in the upper part of the soil.

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

This soil has medium potential for row crops, small grain, hay, and pasture. Slope, low available water capacity, and low fertility are limitations. Erosion is a moderate hazard if cultivated crops are grown. Conservation tillage, cover crops, grasses and legumes in the cropping system, and returning crop residue to the soil help to overcome these limitations.

This Fuquay soil has medium potential for loblolly pine and slash pine. Equipment limitations and seedling mortality are management concerns on this soil.

This soil has high potential for most urban uses. The lower part of the subsoil percs slowly, and this is a limitation for septic tank absorption fields. In most places, this limitation can be overcome by good design and construction. Capability subclass IIIe; woodland group 3s.

Gr—Grady sandy loam. This poorly drained, nearly level soil is in saucer-shaped depressions and sinks in the Coastal Plain. Areas are 2 to 30 acres in size.

Typically, the surface layer is very dark grayish brown sandy loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper few inches of the subsoil is gray sandy clay loam and has strong brown mottles, the middle part is gray sandy clay and clay and has yellowish brown mottles, and the lower part is gray sandy clay and has yellowish brown and red mottles.

Included with this soil in mapping are small areas of Grady clay loam and a few areas of Osier soils.

This soil is low in natural fertility and medium in content of organic matter. It is very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good. This soil is commonly saturated or flooded during winter and spring, limiting the growth of plants.

This soil has low potential for cultivated crops. Wetness and flooding are limitations. Potential for pasture is medium.

This Grady soil has high potential for loblolly pine, slash pine, sweetgum, and water tupelo. Wetness is the main limitation to equipment use in managing and harvesting trees. Logging during the drier seasons helps to overcome this limitation. Drainage measures are needed to help overcome high seedling mortality.

This soil has very low potential for most urban uses. Wetness and flooding are limitations and are difficult to overcome. Capability subclass Vw; woodland group 2w.

HyB—Helena sandy loam, 2 to 6 percent slopes. This moderately well drained, very gently sloping soil is mainly on ridgetops on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 7 inches thick. The subsurface layer is light yellowish brown sandy loam and extends to a depth of 11 inches. The subsoil extends to a depth of 40 inches. The upper few inches of the subsoil is strong brown sandy clay and has light brownish gray mottles, the middle part is strong brown clay and has light brownish gray and grayish green mottles, and the lower part is yellowish brown sandy clay loam and has strong brown and light brownish gray mottles. The underlying material, to a depth of 60 inches or more, is strong brown sandy loam and has brownish yellow mottles. The middle part of the subsoil is very firm, sticky, and very plastic.

Included with this soil in mapping are areas of soils in which bedrock is at a depth of less than 40 inches. These areas make up about 15 percent of the map unit. Also included are soils that have less clay in the subsoil and are less sticky and plastic than this Helena soil. These areas make up about 10 percent of the mapping unit. Also included are a few areas of Helena sandy clay loam that is eroded and a few areas of Vance and Wilkes soils.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. This soil has good tilth. Root penetration is somewhat limited because of the firm, sticky, and plastic subsoil. The water table commonly is high in winter.

Most areas of this soil are wooded; a few areas are in pasture. This soil has medium potential for farming. It has medium potential for loblolly pine and yellow-poplar. Wetness is the main limitation to use of equipment in managing and harvesting trees. This limitation can be overcome by logging during the drier seasons.

This soil has low potential for most urban uses. The clayey, sticky, and plastic subsoil percs slowly. In addition, seasonal wetness and shrink-swell potential are limitations and are difficult to overcome. The hazard of erosion is moderate prior to establishing vegetative cover. Capability subclass IIe; woodland group 3w.

HyC—Helena sandy loam, 6 to 10 percent slopes. This moderately well drained, gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 40 acres in size.

Typically, the surface layer is light brownish gray sandy loam about 6 inches thick. The subsoil extends to a depth of 40 inches. The upper part of the subsoil is brownish yellow sandy clay loam, and the lower part is yellowish brown clay and clay loam and has gray and red mottles. The underlying material, to a depth of 60 inches or more, is strong brown sandy loam and has brownish yellow and light gray mottles. The lower part of the subsoil is firm, sticky, and plastic.

Included with this soil in mapping are small areas of Vance and Wilkes soils and areas of soils in which bedrock is at a depth of 20 to 40 inches. These areas make up about 15 percent of the map unit. Also included are a few eroded areas of Helena sandy clay loam.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good. Root penetration is somewhat limited because of the firm, sticky, and plastic subsoil. The water table is commonly high in winter.

Most areas of this soil are wooded, but a few areas are in pasture. This soil has medium potential for loblolly pine and yellow-poplar. Wetness is the main limitation for use of equipment in managing and harvesting trees, but this limitation can be overcome by logging during the drier seasons.

This soil has low potential for farming and most urban uses. The clayey, sticky, and plastic subsoil percs slowly. Seasonal wetness and shrink-swell potential are limitations and are difficult to overcome. The hazard of erosion is severe on slopes prior to establishing vegetative cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IIIe; woodland group 3w.

HZ—Hydraquents. These very poorly drained, nearly level soils are in low areas at the base of foothills and in depressions on flood plains of the Ocmulgee River and some of its tributaries. Areas are irregular in shape and range from about 40 acres to 500 acres in size. Hydraquents are frequently flooded for very long periods throughout the year. Floodwater is ponded to a depth of 1 foot to 6 feet in most areas (fig. 7).

Commonly, Hydraquents are gray silty clay loam to a depth of 36 to 48 inches. This material is sticky and contains a large amount of matted roots. In most places, it is underlain with brown organic material.

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

These soils have very low potential for common uses in which flooding, wetness, and low strength are limitations. These limitations can be overcome only by major flood control and drainage measures.

These soils have very high potential for wetland plants and for developing shallow water areas for wetland wildlife. Ducks, alligators, and crayfish are common wildlife in areas of these soils. Capability subclass VIIIw; woodland group 3w.

LaC—Lakeland sand, 2 to 8 percent slopes. This excessively drained, very gently sloping or gently sloping soil is on ridgetops and hillsides on Sand Hills uplands. Areas are 40 to 300 acres in size.

Typically, the surface layer is very dark gray sand about 5 inches thick. The underlying material to a depth of 80 inches is sand; the upper and middle parts are yellowish brown, and the lower part is very pale brown (fig. 8).

Included with this soil in mapping are small areas of Ailey, Cowarts, Fuquay, and Vaucluse soils. Also included are small areas of soils that have a higher clay content between the depths of 60 to 80 inches than is common to Lakeland soils. Included soils make up less than 15 percent of this map unit.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is very rapid, and available water capacity is low. Tilth is good. The root zone is very deep and easily penetrated by plant roots.

This soil has low potential for row crops, small grain, hay, and pasture. Low fertility and low available water capacity are limitations. Returning crop residue to the soil helps to overcome these limitations.

This Lakeland soil has low potential for loblolly pine, slash pine, and longleaf pine. Equipment limitation and seedling mortality are management concerns on this soil.

This soil has medium potential for most urban uses. It is too sandy for most recreational uses, and seepage is a limitation for most sanitary facilities. Capability subclass IVs; woodland group 4s.

LaD—Lakeland sand, 8 to 17 percent slopes. This excessively drained, sloping or strongly sloping soil is on narrow ridgetops and hillsides on Sand Hills uplands. Areas are 20 to 60 acres in size.

Typically, the surface layer is dark grayish brown sand about 4 inches thick. The underlying material to a depth of 80 inches is sand; the upper part is yellowish brown, the middle part is light yellowish brown, and the lower part is very pale brown.

Included with this soil in mapping are areas of soils that have a higher clay content between the depths of 70 to 80 inches than is common to Lakeland soils. Also included are a few areas of Ailey, Cowarts, and Vaucluse soils. The included soils make up about 10 to 15 percent of this map unit, and generally are less than 1 acre.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is very rapid, and available water capacity is low. Tilth is good. The root zone is very deep and easily penetrated by plant roots.

This soil has low potential for loblolly pine, longleaf pine, and slash pine. Equipment limitations and seedling mortality are management concerns on this soil.

This soil has low potential for farming and most urban uses. It is too sandy for many recreational uses, and seepage is a limitation for most sanitary facilities. In addition, slope is a limitation for septic tank absorption fields and sewage lagoons and for dwellings, small commercial buildings, and playgrounds. Capability subclass VIIs; woodland group 4s.

NhA—Norfolk sandy loam, 0 to 2 percent slopes. This well drained, nearly level soil is on broad ridgetops on Coastal Plain uplands. Areas are 10 to 80 acres in size.

Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsurface layer is yellowish brown sandy loam and extends to a depth of 12 inches. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, the middle part is brownish yellow and yellowish brown, and the lower part is yellowish brown and has light yellowish brown and red mottles.

Included with this soil in mapping are a few areas of Cowarts, Faceville, and Orangeburg soils. Also included are soils in slight depressions that have a darker surface layer and are wetter than this Norfolk soil. The included soils make up about 10 to 15 percent of this map unit, and areas are generally less than 1 acre.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This soil has high potential for row crops, small grain, hay, and pasture, and high yields can be obtained. Good tilth is easily maintained by returning crop residue to the soil. Grasses and legumes in the cropping system help to conserve moisture and maintain the content of organic matter.

This Norfolk soil has high potential for loblolly pine and slash pine. Limitations for woodland uses and management are not significant. This soil has high potential for most urban uses. Capability class I; woodland group 2o.

NhB—Norfolk sandy loam, 2 to 5 percent slopes. This well drained, very gently sloping soil is on ridgetops and hillsides on Coastal Plain uplands. Slopes are smooth and convex. Areas are 10 to 100 acres in size.

Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsurface layer is pale brown sandy loam and extends to a depth of about 12 inches. The subsoil is sandy clay loam and extends to a depth of about 70 inches. The upper part of the subsoil is yellowish brown, the middle part is yellowish brown and has strong brown and pale brown mottles, and the lower part is mottled yellowish brown, strong brown, pale brown, yellowish red, and light brownish gray.

Included with this soil in mapping are a few areas of Cowarts, Faceville, Fuquay, and Orangeburg soils. Also included are soils in slight depressions that have a darker surface layer and are wetter than this Norfolk soil. The included soils make up less than 15 percent of this map unit.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in the surface layer in areas that have been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This Norfolk soil has high potential for row crops, small grain, hay, and pasture, and good crop growth can be obtained. Good tilth is easily maintained by returning crop residue to the soil. The hazard of erosion is moderate if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This soil has high potential for loblolly pine and slash pine. Limitations for woodland uses and management are not significant. This soil has high potential for most urban uses. Capability subclass IIe; woodland group 2o.

OcA—Orangeburg sandy loam, 0 to 2 percent slopes. This well drained, nearly level soil is on broad ridgetops on Coastal Plain uplands. Areas are 15 to 60 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 8 inches thick. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper few inches is yellowish red, and below this the subsoil is red. Included with this soil in mapping are a few areas of Faceville and Norfolk soils.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This Orangeburg soil has high potential for row crops, small grain, hay, and pasture, and high yields can be obtained. Good tilth is easily maintained by returning crop residue to the soil. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to conserve moisture and maintain organic matter content.

This soil has high potential for loblolly pine and slash pine. Limitations for woodland uses and management are not significant. This soil has high potential for most urban uses. Capability class I; woodland group 2o.

OcB—Orangeburg sandy loam, 2 to 5 percent slopes. This well drained, very gently sloping soil is on ridgetops and hillsides on Coastal Plain uplands. Slopes are smooth and convex. Areas are 10 to 100 acres in size.

Typically, the surface layer is yellowish brown sandy loam about 7 inches thick. The subsoil is dominantly sandy clay loam and extends to a depth of 60 inches or more. The upper few inches of the subsoil is strong brown, and below this the subsoil is red.

Included with this soil in mapping are a few areas of Faceville and Norfolk soils. Also included are a few areas of soils that have a sandy clay loam surface layer and are eroded.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This Orangeburg soil has high potential for row crops, small grain, hay, and pasture, and high yields can be obtained. Good tilth is easily maintained by returning crop residue to the soil. The hazard of erosion is moderate if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This soil has high potential for loblolly pine and slash pine. No significant limitations are present for woodland uses and management. This soil has high potential for most urban uses. Capability subclass IIe; woodland group 2o.

OcC—Orangeburg sandy loam, 5 to 8 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides on Coastal Plain uplands. Slopes are commonly smooth and convex. Areas are 5 to 40 acres in size.

Typically, the surface layer is sandy loam about 11 inches thick. In the upper part it is brown, and in the lower part it is pale brown. The subsoil is dominantly sandy clay loam and extends to a depth of 60 inches or more. In the upper part it is yellowish red, and in the lower part it is red.

Included with this soil in mapping are a few areas of Faceville and Norfolk soils. Also included are a few small areas of soils that have a sandy clay loam surface layer and are eroded.

This soil is medium in natural fertility and low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. The root zone is deep and easily penetrated by plant roots.

This Orangeburg soil has medium potential for row crops and small grain. Slopes and the small size of some areas are limitations. Potential for hay and pasture is high. Good tilth is easily maintained by returning crop residue to the soil. If cultivated crops are grown, the hazard of erosion is severe. Terracing, conservation tillage, cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

This soil has high potential for loblolly pine and slash pine. No significant limitations are present for woodland uses and management.

This soil has high potential for most urban uses. Slope is a limitation for sewage lagoon areas, small commercial buildings, and playgrounds. Capability subclass IIIe; woodland group 2o.

OcD—Orangeburg sandy loam, 8 to 12 percent slopes. This well drained, sloping soil is on ridgetops and hillsides on Coastal Plain uplands. Slopes are irregular and choppy. Areas are 5 to 30 acres in size.

Typically, the surface layer is dark yellowish brown sandy loam about 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part of the subsoil is dark brown sandy loam, the middle part is yellowish red sandy clay loam, and the lower part is red sandy clay loam.

Included with this soil in mapping are small areas of Faceville and Vaucluse soils. Also included are a few small areas of soils that have a sandy clay loam surface layer, are eroded, and in places are dissected by a few shallow gullies and rills.

This soil is medium in natural fertility and is low in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is moderate, and available water capacity is medium. This soil has good tilth. The root zone is deep and easily penetrated by plant roots.

This soil has medium potential for row crops, small grain, hay, and pasture. Irregular slopes, hazard of erosion, and the small size of some areas are limitations. Good tilth can be maintained by returning crop residue to the soil. The hazard of erosion is severe if cultivated crops are grown. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion.

This Orangeburg soil has high potential for loblolly pine and slash pine. No significant limitations are present for woodland uses and management.

This soil has medium potential for most urban uses. Slope is the main limitation. In most places, this limitation can be overcome by good design and construction. Capability subclass IVe; woodland group 2o.

OcuC—Orangeburg-Urban land complex, 0 to 8 percent slopes. This complex consists of Orangeburg soils and Urban land that are so intermingled they could not be shown separately on the map. The soils in this complex are on uplands in the Coastal Plain. They are nearly level and very gently sloping on ridgetops and gently sloping on hillsides. Areas are 20 to 300 acres in size.

Orangeburg soils make up about 50 to 65 percent of each mapped area. Typically, Orangeburg soils have a yellowish brown sandy loam surface layer about 7 inches thick. The subsoil is dominantly sandy clay loam and extends to a depth of 60 inches or more. The upper few inches of the subsoil are strong brown, and the lower part is red.

Orangeburg soils are medium in natural fertility and low in content of organic matter. They are strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Tilth is good. These soils can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Urban land makes up about 35 to 50 percent of each mapped area. The soils in these miscellaneous areas have been altered by grading, cutting, filling, shaping, and smoothing for community development. Urban land is used for private dwellings, industrial sites, streets and sidewalks, shopping centers, parking lots, schools, and churches.

This complex has high potential for most urban uses and for gardens, shrubs, trees, and other kinds of vegetation common to the county. The common plants used for landscaping and vegetable gardens are well suited to this complex. However, erosion is a hazard in most places prior to establishing permanent plant cover. Tillage operations across the slope and winter cover crops help to control erosion on sloping areas in vegetable gardens. Capability subclass IIIe; Orangeburg soils in woodland group 2o, Urban land not assigned to a woodland group.

Os—Osier loamy sand. This poorly drained, nearly level soil is on bottomlands in the Coastal Plain. It is commonly flooded for brief periods during December through April. Areas are 20 to 100 acres in size.

Typically, the surface layer is very dark grayish brown loamy sand about 4 inches thick. The underlying material, to a depth of 60 inches or more, is stratified dark grayish brown loamy sand and gray sand and fine sand.

Included with this soil in mapping are a few areas of Chewacla and Grady soils. Also included are a few small areas of soils that are better drained. The included soils make up less than 15 percent of this map unit, and areas are generally less than 1 acre.

This soil is low in natural fertility and medium in content of organic matter. It is strongly acid or very strongly acid throughout. Permeability is rapid, and available water capacity is low. Although the root zone is deep, a water table is commonly at a depth of less than 12 inches in winter and spring, limiting the depth of root penetration.

This Osier soil has medium potential for loblolly pine and slash pine. Wetness and flooding are limitations to use of equipment in managing and harvesting trees. These limitations can be overcome by using special equipment and logging during the drier seasons. Also, high seedling mortality is a management problem. This can be overcome by installing drainage measures.

This soil has very low potential for farming and most urban uses. Wetness and flooding are limitations and are difficult to overcome. Capability subclass Vw; woodland group 3w.

Pt—Pits. This map unit consists mainly of borrow pits. Areas are about 10 to 15 acres in size and are throughout the county.

Pits range from 4 feet to 10 feet or more in depth. They expose bedrock and weathered bedrock in the Piedmont and clayey and sandy sediment in the Sand Hills and Coastal Plain.

Most pits are abandoned and are partly covered with natural vegetation. More intensive plant cover, including trees, is needed in most places to protect the banks from gully erosion. Pits have very low potential for most uses; many areas can be planted to hardwood trees or can be established for wildlife habitat.

UD—Urban land. This map unit is mainly in the metropolitan area of Macon on the Piedmont Plateau and Sand Hills uplands. Areas are gently sloping on ridgetops, are strongly sloping on hillsides, and are nearly level in drainageways and on flood plains.

Commonly the soil has been modified by cutting, filling, shaping, and smoothing. In places cuts are deep, and weathered bedrock or clayey and sandy sediment has been exposed.

Urban land makes up more than 85 percent of the mapped areas. Most Urban land is used for business districts, shopping centers, schools, churches, parking lots, motels, industries, streets and sidewalks, and housing developments; some Urban land is wooded or is covered with grass.

Generally, the hazard of erosion is severe in areas of Urban land under construction. In areas of Urban land on flood plains, flooding and sedimentation from uplands are hazards. Urban land not assigned to a capability subclass or a woodland group.

VaB—Vance sandy loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 15 to 40 acres in size.

Typically, the surface layer is light yellowish brown sandy loam about 6 inches thick. The subsoil is clay and extends to a depth of 49 inches. It is firm, sticky, and plastic throughout. The upper part of the subsoil is yellowish red, and the lower part is yellowish red and has brownish yellow, strong brown, red, and pale brown mottles. Below this, to a depth of 5 feet or more, is strong brown, red, and gray weathered rock material.

Included with this soil in mapping are a few areas of Cecil, Helena, and Wilkes soils. Also included are a few small areas of Vance sandy clay loam that is eroded. These included areas make up about 20 percent of this map unit, and areas generally are less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good. Root penetration is limited because of the firm, sticky, plastic subsoil.

Most areas of this soil are wooded; a few areas are used for pasture. This soil has medium potential for farming. It has medium potential for loblolly pine, slash pine, and yellow-poplar. Limitations for woodland uses and management are not significant.

This Vance soil has low potential for most urban uses. The sticky, plastic subsoil percs slowly. Low strength is a limitation for most community developments and is difficult to overcome. The hazard of erosion is severe prior to establishing vegetative cover. Capability subclass IIIe; woodland group 3o.

VaC—Vance sandy loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 10 to 40 acres in size.

Typically, the surface layer is yellowish brown sandy loam about 8 inches thick. The subsoil extends to a depth of 44 inches. The upper part of the subsoil, to a depth of 16 inches, is yellowish brown sandy clay loam and sandy clay. The middle part of the subsoil is strong brown clay and has yellowish brown and yellowish red mottles, and the lower part is yellowish red clay and has light yellowish brown and light gray mottles. The underlying material, to a depth of 60 inches or more, is weathered mixed, soft, acidic rock and crushes to clay loam. The middle part of the subsoil is firm, plastic, and sticky.

Included with this soil in mapping are a few areas of Cecil, Helena, and Wilkes soils. Also included are a few areas of Vance sandy clay loam that is eroded. These included areas make up less than 20 percent of this map unit, and areas are generally less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good in most places. Root penetration is limited because of the firm, sticky, and plastic subsoil.

Most areas of this soil are wooded; a few areas are used for pasture. This soil has medium potential for loblolly pine, slash pine, and yellow-poplar. Limitations for woodland use and management are not significant.

This Vance soil has low potential for farming and urban uses. The sticky, plastic subsoil percs slowly. Low strength is a limitation for most community developments and is difficult to overcome. Slope causes the erosion hazard to be severe prior to establishing vegetative cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IVe; woodland group 3o.

VbD2—Vance sandy clay loam, 10 to 17 percent slopes, eroded. This well drained, strongly sloping soil is predominantly on hillsides on Piedmont uplands. Slopes are irregular and convex. Areas are 15 to 60 acres in size.

Typically, the surface layer is grayish brown sandy clay loam about 3 inches thick. The subsoil extends to a depth of about 40 inches. The upper few inches of the subsoil is yellowish red sandy clay, the middle part is yellowish red clay, and the lower part is yellowish red clay and has strong brown and reddish yellow mottles. Below this, to a depth of 60 inches or more, is weathered rock mixed with clay. The middle and lower parts of the subsoil are firm, sticky, and plastic.

Included with this soil in mapping are small areas of Cecil and Wilkes soils. Also included are a few small areas of soils that are severely eroded and have a yellowish brown or yellowish red clay surface layer. These included areas make up about 20 percent of this map unit, and areas are generally less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. This soil has poor tilth. Root penetration is limited because of the firm, sticky, and plastic subsoil.

This Vance soil is wooded. It has medium potential for loblolly pine, slash pine, and yellow-poplar.

This soil has low potential for farming and urban uses. The strong slope is a limitation to farming and most recreational uses. The sticky, plastic subsoil is a limitation for most sanitary facilities. Low strength is a limitation for community developments. The hazard of erosion is very severe prior to establishing turf and plants for cover. Limitations are difficult to overcome. Capability subclass VIe; woodland group 3o.

VeC—Vaucluse loamy sand, 4 to 8 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides on Sand Hills uplands. Slopes are smooth and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is grayish brown loamy sand about 10 inches thick. The subsurface layer is light yellowish brown loamy sand to a depth of 16 inches. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown, the middle part is strong brown and has red mottles, and the lower part is mottled light gray, pink, and red. The subsoil is firm and brittle beginning at a depth of about 30 inches.

Included with this soil in mapping are a few areas of Ailey, Cowarts, Fuquay, and Lakeland soils and a few areas of Vaucluse sandy loam. Also included are areas of a soil that has more nodules of ironstone in the upper part than is common to Vaucluse soils. The included soils make up about 20 percent of this map unit, and areas are generally less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. This soil has good tilth. Root penetration is limited because of the compact layer in the subsoil.

This Vaucluse soil has medium potential for hay and pasture and for loblolly pine and slash pine. Low fertility and the compact layer in the subsoil are limitations.

This soil has low potential for cultivated crops. It has high potential for most urban uses. The compact lower part of the subsoil percs slowly, and this is a limitation for septic tank absorption fields. The sandy surface layer is a limitation for most recreational uses. The hazard of erosion is severe prior to establishing permanent vegetative cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IVe; woodland group 3o.

VeD—Vaucluse loamy sand, 8 to 17 percent slopes. This well drained, sloping or strongly sloping soil is on hillsides on Sand Hills uplands. Slopes are short, irregular, and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 5 inches thick. The subsurface layer is yellowish brown loamy sand and extends to a depth of 8 inches. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper few inches of the subsoil is yellowish brown. Below this, to a depth of about 23 inches, the subsoil is strong brown and has a few red mottles. Below this depth, the subsoil is red and has many brown and gray mottles. The subsoil is firm and brittle beginning at a depth of about 23 inches.

Included with this soil in mapping are a few areas of Ailey, Cowarts, and Lakeland soils. Also included are a few areas of eroded soils that have a sandy clay loam surface layer and are underlain by kaolin. The included soils make up about 20 percent of this map unit, and areas are generally less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. This soil has good tilth. Root penetration is limited because of the compact lower subsoil.

This soil has medium potential for hay and pasture and for loblolly pine and slash pine. Low fertility and the compact lower part of the subsoil are limitations.

This Vaucluse soil has low potential for farming. It has medium potential for most urban uses. Slope is a limitation for farming, sanitary facilities, community development, and playgrounds. The compact layer in the subsoil percs slowly and is a limitation for septic tank absorption fields. If this soil is used for urban development, these limitations can be overcome to some extent by careful design and construction or by modifying the slope. The sandy surface layer is a limitation for most recreational uses. Capability subclass VIe; woodland group 3o.

VuC—Vaucluse-Urban land complex, 2 to 8 percent slopes. This complex consists of Vaucluse soils and Urban land that are so intermingled they could not be shown separately on the map. The soils in this complex are well drained and very gently sloping to gently sloping. They are on ridgetops and hillsides in the Sand Hills. Areas are 20 to 1,000 acres in size.

Vaucluse soils make up about 50 to 60 percent of each mapped area. Typically, Vaucluse soils have a grayish brown loamy sand surface layer about 10 inches thick. The subsurface layer is light yellowish brown loamy sand to a depth of 16 inches. The subsoil is sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown, the middle part is strong brown and has red mottles, and the lower part is mottled light gray, pink, and red. The subsoil is firm and brittle beginning at a depth of about 30 inches.

Vaucluse soils are low in natural fertility and in content of organic matter. They are strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good. Root penetration is limited because of the compact layer in the subsoil.

Urban land makes up about 40 to 50 percent of each mapped area. The soils in these miscellaneous areas have been altered by grading, cutting, filling, shaping, and smoothing for community development. Urban land is used for private dwellings, industrial sites, streets and sidewalks, shopping centers, parking lots, churches, and schools (fig. 9).

This complex has high potential for most urban uses. Slow percolation is a limitation for septic tank absorption fields. The sandy surface layer is a limitation for many recreational uses. Erosion is a hazard prior to establishing permanent plant cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IVe; Vaucluse soils in woodland group 3o; Urban land not assigned to a woodland group.

VuD—Vaucluse-Urban land complex, 8 to 15 percent slopes. This complex consists of areas of Vaucluse soils and Urban land that are so intermingled they could not be shown separately on the map. The soils in this complex are well drained and predominantly strongly sloping. They are on hillsides in the Sand Hills. Areas are 10 to 600 acres in size.

Vaucluse loamy sand makes up about 50 to 65 percent of each mapped area. Typically, the surface layer is dark grayish brown loamy sand about 5 inches thick. The subsurface layer is about 2 inches of yellowish brown loamy sand. The subsoil is dominantly sandy clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish red, and the lower part is yellowish red and has brown and red mottles. The subsoil is firm and brittle beginning at a depth of about 26 inches.

Vaucluse soils are low in natural fertility and in content of organic matter. They are strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is medium. Tilth is good. Root penetration is limited because of the compact layer in the subsoil.

Urban land makes up about 35 to 50 percent of each mapped area. The soils in these miscellaneous areas have been altered by grading, cutting, filling, shaping, and smoothing for community development. Urban land is used for private dwellings, industrial sites, streets, sidewalks, shopping centers, parking lots, churches, and schools.

This complex has medium potential for most nonfarm uses because of slope. Also, the compact layer in the subsoil percs slowly and is a limitation for septic tank absorption fields. In places, these limitations can be partly overcome by careful design and construction or by modifying the slope. The sandy surface layer is a limitation for most recreational uses. The hazard of erosion is severe prior to establishing permanent plant cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass VIe; Vaucluse soils in woodland group 3o; Urban land not assigned to a woodland group.

WvC—Wilkes gravelly sandy loam, 5 to 10 percent slopes. This well drained, gently sloping soil is on narrow ridgetops and short hillsides on Piedmont uplands. Slopes are smooth and convex. Areas are 15 to 70 acres in size.

Typically, the surface layer is olive brown gravelly sandy loam about 4 inches thick. The subsoil is yellowish red clay loam about 8 inches thick. Below this is green, black, and gray coarse sandy clay loam and partly weathered rock fragments. Hard rock is at a depth of about 60 inches.

Included with this soil in mapping are a few areas of Cecil, Helena, and Vance soils. Also included are a few areas of soils that are eroded and have rocky material on the surface (fig. 10). The included areas make up about 10 percent of this map unit, and areas generally are less than 1 acre.

This soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid throughout, except in areas where the surface layer has been limed. Permeability is moderately slow, and available water capacity is low. This soil has poor tilth. Root penetration is limited because of the sticky and plastic subsoil and the firm underlying material.

Most areas of this soil are wooded. This soil has medium potential for loblolly pine, southern red oak, and sweetgum. Limitations for woodland use and management are not significant.

This Wilkes soil has low potential for farming and most urban uses. Depth to rock is a limitation for most sanitary facilities and community developments. This limitation is very difficult to overcome. Slope causes a severe hazard of erosion prior to establishing vegetative cover. Tillage operations across the slope and winter cover crops help to control erosion in vegetable gardens. Capability subclass IVe; woodland group 4o.

WvD—Wilkes gravelly sandy loam, 10 to 17 percent slopes. This well drained, strongly sloping soil is on hillsides on Piedmont uplands. Slopes are irregular and convex. Areas are 10 to 60 acres in size.

Typically, the surface layer is dark grayish brown gravelly sandy loam about 6 inches thick. The subsurface layer is about 2 inches of yellowish brown sandy loam. The subsoil is mainly yellowish brown clay and extends to a depth of about 17 inches. Below this is coarse sandy clay loam and partly weathered rock fragments. Hard rock is at a depth of about 40 inches.

Included with this soil in mapping are a few areas of Cecil and Vance soils. Also included are a few areas of soils that are eroded and have rocky material on the surface. The included soils make up less than 15 percent of this map unit, and areas are generally less than 2 acres.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or medium acid throughout, except in areas where the surface layer has been limed. Permeability is slow, and available water capacity is low. This soil has poor tilth. Root penetration is limited because of the sticky, plastic subsoil and the firm underlying material.

This soil is wooded. It has medium potential for loblolly pine, southern red oak, and sweetgum. Limitations for woodland use and management are not significant.

This soil has low potential for farming and most urban uses. Slope and depth to rock are limitations for most uses. These limitations are very difficult to overcome. Erosion hazard on slopes is severe before a vegetative cover is established. Capability subclass VIs; woodland group 4o.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Soil erosion is the major concern on about two-thirds of the cropland and pasture in Bibb County. If slope is more than 2 percent, erosion is a hazard.

Loss of the surface layer through erosion is damaging because productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Cecil, Davidson, Faceville, Helena, and Vance soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone. Such layers include the compact horizon in the subsoil as in Ailey and Vaucluse soils; bedrock as in Wilkes soils; or plinthite as in Cowarts and Fuquay soils. Loss of the surface layer through erosion is also damaging because erosion on farmland results in sedimentation of streams. Controlling erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, tilling or preparing a good seedbed is difficult on clayey spots because the original friable surface soil has been eroded away. Such spots are in places in areas of Cecil, Davidson, and Faceville soils.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land, also provide nitrogen, and improve tilth for the following crop.

Slopes are so short and irregular that contour tillage or terracing is not practical in most sloping areas of Cecil, Davidson, Orangeburg, Vance, Vaucluse, and Wilkes soils. On these soils, a cropping system that provides substantial vegetative cover is required to control erosion unless minimum tillage is practiced. Minimizing tillage and leaving crop residue on the surface help increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area, but they are more difficult to use successfully on the eroded Davidson and Vance soils that have a clayey surface layer. No tillage for corn is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area. It is more difficult to practice successfully, however, on the soils that have a clayey surface layer.

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are not practical on deep, well drained soils that have regular slopes. Faceville, Norfolk, and Orangeburg soils are suitable for terraces. The other soils are less suitable for terraces and diversions because of irregular slopes, excessive wetness in the terrace channels, a clayey subsoil which would be exposed in terrace channels, or bedrock at a depth of less than 40 inches.

Contour farming helps to control erosion. It is best adapted to soils that have smooth, uniform slopes, including most areas of the very gently sloping or gently sloping Cecil, Cowarts, Davidson, Faceville, Norfolk, and Orangeburg soils.

Information for the design of erosion control practices for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil drainage is the major management need on about 29,000 acres in the survey area. Some soils are so wet that the production of crops common to the area is generally not possible. These are the poorly drained Grady and Osier soils, which make up about 3,100 acres in the survey area. Also in this category are the very poorly drained Hydraquents, which make up about 2,500 acres.

Unless artifically drained, the somewhat poorly drained soils are so wet that crops are damaged during most years. In this category are the Chewacla soils, which make up about 24,000 acres.

Cowarts, Congaree, and Helena soils have good natural drainage most of the year, but they tend to dry out slowly after rains.

The design of drainage systems varies as the kind of soil varies. A combination of surface drainage and tile drainage is needed in most areas of poorly drained and somewhat poorly drained soils that are used for intensive row cropping. Drains have to be more closely spaced in slowly permeable soils than in more permeable soils. Tile drainage is very slow in Grady soils. Adequate outlets for tile drainage systems are difficult to find in some areas, but in most places they are available.

The underlying organic material in Hydraquents oxidizes and subsides when the pore space is filled with air; therefore, special drainage systems are needed to control the depth and the period of drainage. Information on drainage design for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil fertility is naturally low in most soils on uplands in the survey area, and these soils are naturally acid. Chewacla and Congaree soils on flood plains are strongly acid to medium acid and are naturally higher in plant nutrients than most soils on uplands. Grady and Osier soils, in depressions and drainageways, are strongly acid or very strongly acid.

All soils on uplands are very strongly acid or strongly acid in their natural state. If they have never been limed, applications of ground limestone are required to raise the pH level sufficiently for good growth of legumes and other crops that grow only on nearly neutral soils. Available phosphorus and potash levels are naturally low in most of these soils. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

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

Most of the soils used for crops in the survey area have a surface layer of sandy loam and are low in content of organic matter. Generally, the structure of such soils is weak, and intense rainfall causes the formation of a crust on the surface. The crust is hard when dry. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help improve soil structure and to reduce crust formation.

Fall plowing is generally not a good practice. Most of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

Field crops suited to the soils and climate of the survey area are not being grown or are decreasing because of urban expansion. Corn, soybeans, wheat, oats, rye, barley, grain sorghum, peanuts, cotton, and potatoes are some of these crops. Although production of grass seed is not common in the county, ryegrass, fescue, and bahiagrass are suited and have good potential.

Special crops grown commercially in the survey area are vegetables, small fruits, tree fruits, and nursery plants. A small acreage throughout the county is used for melons, strawberries, sweet corn, tomatoes, peppers, and other vegetables and small fruits. In addition, large areas can be adapted to other special crops such as blueberries, grapes, and many vegetables. Peaches are the most important tree fruits grown in the survey area, and pecans are important nut trees.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. In the survey area these are Cecil, Davidson, Faceville, Norfolk, and Orangeburg soils that have of less than 6 percent, and they total about 23,000 acres. Crops can generally be planted and harvested earlier on all of these soils than on the other soils in the survey area.

Where adequately drained and protected from flooding, most of the poorly drained and somewhat poorly drained soils are suited to a wide range of vegetable crops. Chewacla and Grady soils that make up about 23,500 acres in the survey area are examples.

Most of the well drained soils in the survey area are suitable for orchards and nursery plants. Soils in low positions where frost is frequent and air drainage is poor, however, generally are poorly suited to early vegetables, small fruits, and orchards.

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

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The fertilizer needs for specified crops on a particular soil can be accurately determined by soil tests; general fertilizer recommendations for field crops are also available (*3*).

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are 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 that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in 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 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil mapping unit in the section "Soil maps for detailed planning."

Gardening and landscaping

GERALD SMITH, extension horticulturist, and DOUG CRATER, extension horticulturist-floriculturist, University of Georgia, helped to prepare this section.

Many homeowners who want to landscape their property need to know the kind of soil they have and the kind of trees and ornamental plants best suited to these soils.

To attain plants of high quality, the soil needs good internal drainage, a deep root zone, and optimun fertility. In addition, it needs organic matter incorporated into the surface layer prior to planting. Applying mulch on the surface helps to retain moisture and prevent evaporation. Good permeability is needed to allow for movement of water, air, and roots through the soil. The soil needs to hold enough water for plant use during prolonged dry periods. Also to be considered in selecting plants is the degree of acidity of the soil.

Annuals such as ageratum, alyssum, larkspur, marigold, morningglory, petunia, portulaca, salvia, sunflower, verbena, vinca, and zinnia are particularly well suited to the droughty Ailey, Fuquay, Lakeland, and Wilkes soils. Roses, most annual flowers, most vegetables, and most grasses are suited to soils that are neutral or slightly acid. Dahlia, gladiolus, petunia, Shasta daisy, and zinnia grow best on neutral soils. Azaleas, camellias, and similar plants need acid soils. Such annuals as alyssum, burningbush, calendula, candytuft, celosia, dianthus, dustymiller, marigold, nasturtium, petunia, phlox, portulaca, verbena, and vinca tolerate soils that are not fertilized and are low in organic matter.

Most of the soils in Bibb County have high potential for the common trees and ornamental plants used in landscaping. Cecil, Congaree, Davidson, Norfolk, and Orangeburg soils have high potential for yard and garden plants. Some soils have a seasonal high water table and some have low available water capacity; because of this, these soils are better suited to certain specified plants (*8*).

Table 7 shows soil groups and gives the map units in the groups. It also lists deciduous and evergreen trees, shrubs, and vines and ground cover that are suited to the soil groups. Map units that are not listed in the table and do not have a seasonal high water table or low available water capacity are well adapted to all of the plants in the table, except Hydraquents which are poorly suited to landscaping.

Data for permeability, available water capacity, and soil reaction are shown in table 16. Other information about characteristics of the soils are given in the section "Soil maps for detailed planning." For information concerning suitability of plants not mentioned in this section, consult a local nurseryman or the County Extension Agent.

Woodland management and productivity

W.P. THOMPSON, forester, Soil Conservation Service, helped to prepare this section.

This section is provided to show how the soils in Bibb County affect the growth and management of trees.

Originally, forests covered most of the county. Now, commercial forests cover about 57 percent of the total land area. Good stands of loblolly pine and mixed upland hardwoods are on the ridges and lower slopes. Yellow-poplar, sycamore, gum, maple, water oak, red oak, and other hardwoods are on bottom lands.

The uses of woodland are substantial for wood products, wildlife habitat, recreation, and natural beauty and for conservation of soil and water. The use for wood products is below its potential.

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

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

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

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

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

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

Engineering

FELTON P. FLOURNOY, civil engineer, Soil Conservation Service, helped to prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility (fig. 11), slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted (fig. 12); and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor.*

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The potential for recreational facilities inside the City of Macon and throughout Bibb County are high. The Ocmulgee River and its tributaries, farm ponds, lakes (fig. 13), and the smaller streams have high potential for such sports as fishing and boating. In the southern part of the county and in places in the eastern and western parts of the county, the potential for hunting bobwhite quail, doves, squirrels, rabbits, migrating ducks, and deer is high. The wide flood plains along the major streams have high potential for hunting and for such recreational activities as making nature studies and using paths and trails. Most of the well drained, nearly level or very gently sloping soils on ridgetops have high potential for playgrounds, ball fields, tennis courts, and golf courses. Most nearly level to gently sloping areas are well suited to and have high potential for campsites and picnic areas. Many of the more sloping areas have high potential for park areas, paths and trails, and nature study areas.

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

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

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

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

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

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

Wildlife habitat

JESSE MERCER, JR., biologist, Soil Conservation Service, helped to prepare this section.

Bibb County is highly urban, but it provides habitat for a variety of wildlife species. The woodland provides habitat for deer, squirrel, raccoon, many nongame animals, and songbirds. Quail, rabbits, and doves are most abundant near cropland areas. Streams and water impoundment areas provide habitat for waterfowl and other wetland wildlife. There are approximately 200 acres of beaver ponds that are especially attractive to wood ducks. Streams, lakes, and ponds provide an excellent habitat for fish.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are oats, millet, cowpeas, soybeans, lovegrass, rescuegrass, rye, and clover.

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

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, and cordgrass and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

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

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 18. The estimated classification, without group index numbers, is given in table 15. Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Engineering test data

The results of analyses of engineering properties of several typical soils of the survey area are given in table 18.

The data presented are for soil samples that were collected from carefully selected sites. The soil profiles sampled are typical of the series discussed in the section "Soil series and morphology." The soil samples were analyzed by the Department of Transportation, State of Georgia, Office of Materials and Research.

The methods used in obtaining the data are listed by code in the next paragraph. Most of the codes, in parentheses, refer to the methods assigned by the American Association of State Highway and Transportation Officials (*1*). The code for Unified classification was assigned by the American Society for Testing and Materials (*2*).

The methods and codes are AASHTO classification (M-145-66); Unified classification (D-2487-69); mechanical analysis (T88-57); liquid limit (T89-60); plasticity index (T90-56); moisture-density, method A (T99-57); volume change (GHD-6) [Georgia only].

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*6*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Ailey series

The Ailey series consists of well drained soils that formed in thick beds of sandy and loamy marine sediment. These soils are on ridgetops and hillsides on Sand Hills uplands. They have slow permeability in the Bx horizon. Slopes are dominantly 3 percent but range from 2 to 6 percent.

Ailey soils are geographically associated with Cowarts, Fuquay, Lakeland, Norfolk, and Vaucluse soils. Cowarts and Fuquay soils do not have a fragipan and have more than 5 percent plinthite in some horizon above a depth of 60 inches. Lakeland soils are excessively drained and are sandy to a depth of more than 80 inches. Norfolk soils have no fragipan and have a sandy A horizon less than 20 inches thick. Vaucluse soils have an A horizon less than 20 inches thick.

Typical pedon of Ailey loamy sand in an area of Ailey loamy sand, 2 to 6 percent slopes, in an idle field, 0.6 mile southwest of the intersection of U.S. Highway 80 and Interstate 475, 150 yards south on Ivey Drive and 75 feet east:

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; very friable; common very fine roots; strongly acid; abrupt smooth boundary.

A2—8 to 30 inches; pale brown (10YR 6/3) loamy sand; single grain; loose; few very fine roots; 2 to 5 percent pebbles in lower part; very strongly acid; clear irregular boundary.

B1—30 to 40 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots;

sand grains coated and bridged with clay; very strongly acid; clear wavy boundary.

B2t—40 to 50 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium prominent red (2.5YR 4/6) mottles and common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

Bx1—50 to 56 inches; strong brown (7.5YR 5/8) sandy clay loam; many coarse distinct red (2.5YR 4/6) and common medium distinct pale brown (10YR 6/3) mottles, common medium distinct light gray (10YR 7/2) mottles in lower part; moderate thick platy structure parting to moderate medium subangular blocky; firm and brittle; patchy clay films mostly on horizontal faces of peds; few very fine roots that are more than 4 inches apart; very strongly acid; clear wavy boundary.

Bx2—56 to 65 inches; mottled yellowish brown (10YR 5/6), red (2.5YR 4/6), light gray (10YR 7/1), and light reddish brown (5YR 6/4) sandy clay loam; compound weak coarse subangular blocky and angular blocky structure in the upper part; becoming moderate coarse platy as depth increases; material is massive in the lower part; firm; compact and brittle in place; friable if displaced; few thin patchy clay films on horizontal faces of peds; few pebbles; very strongly acid.

The solum ranges from 60 to 96 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The A horizon has a hue of 10YR, value of 3 to 6, and chroma of 1 or 2.

The B1 horizon has a hue of 10YR, value of 5 or 6, and chroma of 4 or 6. The Bt horizon has a hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. The Bx horizon is at a depth of 36 to 50 inches. This horizon has a hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It has few to many, fine or medium brown, gray, yellow, or red mottles; in places the Bx horizon is variegated brown, gray, yellow, or red.

Cecil series

The Cecil series consists of well drained, moderately permeable soils that formed in material weathered from granite. These soils are on broad ridgetops and hillsides on the Piedmont uplands. Slopes are dominantly about 12 percent but range from 2 to 17 percent.

Cecil soils are geographically associated with Davidson and Vance soils. Davidson soils are darker red throughout. Vance soils have a B horizon that is less red and more plastic.

Typical pedon of Cecil sandy loam from an area of Cecil sandy loam, 2 to 6 percent slopes, in a wooded area, 2.0 miles southwest of U.S. Highway 23 on Georgia Highway 361, west of road:

Ap—0 to 6 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine and very fine roots; strongly acid; clear smooth boundary.

B1—6 to 10 inches; yellowish red (5YR 4/8) sandy clay loam; weak fine subangular blocky structure; friable; few fine and medium roots; strongly acid; clear smooth boundary.

B21t—10 to 25 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm; patchy clay films on faces of peds; few fine flakes of mica; few fine roots; strongly acid; gradual wavy boundary.

B22t—25 to 40 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; nearly continuous clay films on faces of peds; common fine flakes of mica; strongly acid; clear wavy boundary.

B3—40 to 52 inches; red (2.5YR 5/8) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine flakes of mica; strongly acid; clear smooth boundary.

Cr—52 to 65 inches; red (2.5YR 5/8) and strong brown (7.5YR 5/6) weathered rock that crushes to loam or clay loam.

The solum ranges from 45 to 70 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The A horizon has a hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 2 to 4.

The B1 horizon is sandy clay loam to clay loam. It has a hue of 2.5YR or 5YR, value of 4, and chroma of 6 or 8. The B3 horizon is sandy clay loam to clay loam. It has strong brown and pale brown mottles in most pedons.

Chewacla series

The Chewacla series consists of nearly level, somewhat poorly drained, moderately permeable soils that formed in loamy alluvium on flood plains. These soils are along streams that drain from the Piedmont uplands. The water table is commonly at a depth of 6 to 18 inches late in winter and early in spring, and the probability of brief flooding during this period is high. Slopes are dominantly less than 2 percent.

Chewacla soils are geographically associated with Congaree soils and Hydraquents. Congaree soils have no mottles with chroma of 2 or lower at a depth of 20 inches or less. Hydraquents are very poorly drained and are on lower lying flood plains.

Typical pedon of Chewacla silt loam in an area of Chewacla association, in a cultivated field, 0.7 mile west of Pio Nona Drive in Macon on Williamson Road and 100 feet south:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; few fine flakes of mica; medium acid; abrupt smooth boundary.

B1—6 to 18 inches; brown (10YR 4/3) silt loam; few medium faint pale brown (10YR 6/3) and grayish brown (10YR 5/2) mottles; weak fine granular structure; friable; few fine flakes of mica; medium acid; abrupt smooth boundary.

B2—18 to 30 inches; pale brown (10YR 6/3) silty clay loam; few medium faint light brownish gray (10YR 6/2) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine flakes of mica; strongly acid; gradual wavy boundary.

B3g—30 to 60 inches; gray (10YR 6/1) silty clay loam; common medium distinct very dark grayish brown (10YR 3/2) and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—60 to 70 inches; stratified sand and loam; strongly acid.

The solum ranges from 60 to 72 inches in thickness. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Mica content ranges from a few flakes to common.

The A horizon has a hue of 7.5YR and 10YR, value of 3 or 4, and chroma of 2 to 4.

The B1 horizon is silt loam, clay loam, or silty clay loam. It has a hue of 5YR to 10YR, value of 4, and chroma of 2 to 4. The B2 horizon is silty clay loam or sandy clay loam. It has a hue of 5YR to 10YR, value of 6, and chroma of 3 or 4.

Congaree series

The Congaree series consists of nearly level, well drained or moderately well drained, moderately permeable soils that formed in loamy alluvium on flood plains. These soils are near streams that drain from the Piedmont uplands. The water table is commonly at a depth of 30 to 48 inches during winter and early spring and the probability of frequent, brief flooding during this period is high. Slopes range from 0 to 2 percent.

Congaree soils are geographically associated with Chewacla soils. They are better drained than Chewacla soils and do not have chroma of 2 or less above a depth of 20 inches.

Typical pedon of Congaree silt loam in an area of Congaree silt loam, in a cultivated field, 1.6 miles southwest of junction of U.S. Highway 129 and Bondview Drive and 50 feet southeast of Bondview Drive:

Ap—0 to 8 inches; dark brown (7.5YR 4/4) silt loam; weak fine granular structure; friable; many very fine roots; common flakes of mica; strongly acid; clear smooth boundary.

C1—8 to 18 inches; dark brown (7.5YR 4/4) silt loam; massive; common thin bedding planes; friable; many very fine roots; common fine flakes of mica; strongly acid; clear wavy boundary.

C2—18 to 25 inches; dark brown (7.5YR 4/4) silty clay loam; massive; common thin bedding planes; few very fine roots; friable; common fine flakes of mica; strongly acid; clear wavy boundary.

C3—25 to 45 inches; dark brown (7.5YR 4/4) silt loam; few fine faint brown mottles; massive; friable; common fine flakes of mica; medium acid; clear wavy boundary.

C4—45 to 65 inches; dark brown (7.5YR 4/4) sandy loam; massive; friable; common fine flakes of mica; few lenses of loamy sand; medium acid.

The alluvium ranges from 5 to 10 feet or more in thickness. It is medium acid or strongly acid throughout, except in areas where the surface layer has been limed. Bedding planes are few or common in the upper part of the C horizon. Mica flakes are common or many throughout the A and C horizons.

The Ap horizon has a hue of 10YR, 7.5YR, and 5YR, value of 3 or 4, and chroma of 2 to 4.

The C horizon above a depth of 40 inches is loam, silt loam, sandy loam, or silty clay loam; below a depth of 40 inches it is loamy sand to silty clay. The C horizon has a hue of 7.5YR and 5YR, value of 4 or 5, and chroma of 3 to 6. It has brown, gray, and red mottles below a depth of 20 inches.

Cowarts series

The Cowarts series consists of well drained, slowly permeable soils that formed in thick beds of predominantly loamy marine sediment. These soils are on broad ridgetops and hillsides on Sand Hills uplands. Slopes are dominantly 3 percent but range from 2 to 8 percent.

Cowarts soils are geographically associated with Ailey, Fuquay, Lakeland, Norfolk, and Vaucluse soils. Ailey soils have an arenic surface layer; have a fragipan that begins at a depth of 36 to 50 inches; and contain less than 5 percent plinthite above a depth of 60 inches. Fuquay soils have an arenic surface layer. Lakeland soils are sandy to a depth of more than 80 inches. Norfolk soils contain less than 5 percent plinthite above a depth of 60 inches. Vaucluse soils have a fragipan that begins at a depth of about 15 to 36 inches, and they have less than 5 percent plinthite.

Typical pedon of Cowarts sandy loam in an area of Cowarts sandy loam, 2 to 5 percent slopes, in an idle field, 0.5 mile south of Hartley Bridge exit on Interstate 75 in Macon, 500 yards east of Interstate 75:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; common fine roots; few nodules of ironstone; strongly acid; abrupt wavy boundary.

A2—5 to 8 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; very friable; few fine roots; few nodules of ironstone; strongly acid; clear wavy boundary.

B1—8 to 13 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; strongly acid; clear smooth boundary.

B21t—13 to 19 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; common thin patchy clay films on faces of peds; 1 to 2 percent plinthite; strongly acid; abrupt wavy boundary.

B22t—19 to 27 inches; yellowish brown (10YR 5/8) sandy clay loam; common to many medium distinct yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; friable; firm and brittle in plinthic part; thin continuous clay films on faces of peds; 15 percent plinthite; strongly acid; clear wavy boundary.

B23t—27 to 40 inches; yellowish red (5YR 5/8) sandy clay loam; common medium and coarse distinct brownish yellow (10YR 6/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate and strong thin platy structure parting to angular blocky; firm, brittle and compact in places; thin continuous clay films on faces of peds; 15 percent plinthite; strongly acid; clear wavy boundary.

B3—40 to 65 inches; mottled reddish brown (2.5YR 5/4), light gray (10YR 7/2), yellowish red (5YR 5/8), and yellowish brown (10YR 5/6) sandy clay loam; weak medium angular blocky structure and platy structure; firm brittle and compact in place; thin patchy clay films on faces of peds; 5 percent plinthite; strongly acid.

Solum thickness ranges from 60 to 70 inches or more. Nodules of ironstone range from 0 to about 5 percent in the upper part of the profile. Depth to the plinthic layer ranges from 18 to 24 inches.

The A horizon has a hue of 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon is commonly sandy clay loam but can be sandy clay in the lower part. It has a hue of 10YR to 5YR, value of 5 or 6, and chroma of 5, 6, or 8. It can have brown, red, yellow, and gray mottles in the lower part. The B3 horizon is commonly sandy clay loam, but can be sandy clay in places. It has mottles in a hue of 2.5YR to 10YR, value of 3 to 7, and chroma of 1 to 8.

Davidson series

The Davidson series consists of well drained, moderately permeable soils that formed in material weathered from dark rock. These soils are on broad ridgetops and hillsides on Piedmont uplands. Slopes are dominantly about 5 percent, but range from 2 to 17 percent.

Davidson soils are geographically associated with Cecil, Vance, and Wilkes soils. Cecil soils are less red throughout. Vance soils are brown and have a firmer and more plastic B horizon. Wilkes soils have a higher color value throughout and a stickier, firmer, and more plastic B horizon. All the associated soils commonly have a thinner solum than is common in Davidson soils.

Typical pedon of Davidson loam in an area of Davidson loam, 2 to 6 percent slopes, in northeast roadcut 400 yards southeast on county road from Loraine:

Ap—0 to 6 inches; dark reddish brown (5YR 2/2) loam; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

B1—6 to 10 inches; dark reddish brown (2.5YR 3/4) sandy clay loam; moderate medium subangular blocky structure; friable; many fine roots; medium acid; clear smooth boundary.

B21t—10 to 30 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; few fine roots; strongly acid; gradual wavy boundary.

B22t—30 to 65 inches; dark red (2.5YR 3/6) clay; few medium distinct strong brown (7.5YR 5/6) mottles in the lower part; moderate medium subangular blocky structure; firm; few fine roots in upper part; continuous clay films on faces of peds; strongly acid.

The solum ranges from 65 to 100 inches or more in thickness. It is medium acid to strongly acid throughout, except in areas where the surface layer has been limed.

The A horizon is 4 to 8 inches thick. It has a hue of 10R to 5YR, value of 2 or 3, and chroma of 2 to 4. It is loam or clay loam.

The B1 horizon, if present, is 4 to 6 inches thick. It is sandy clay loam or clay loam. It has a hue of 10R to 2.5YR, value of 3, and chroma of 2 to 6. The Bt horizon has a hue of 10R or 2.5YR, value of 3, and chroma of 4 or 6. It has few to common strong brown mottles in the lower part.

Faceville series

The Faceville series consists of nearly level to gently sloping, well drained, moderately permeable soils that formed mainly in clayey marine sediment. These soils are on broad Coastal Plain uplands. Slopes are predominantly less than 5 percent but range to 8 percent near drainageways.

Faceville soils are geographically associated with Norfolk and Orangeburg soils. Norfolk soils have a B horizon that is more yellow and contains less clay. Orangeburg soils commonly have a B horizon that is as red but contains less clay.

Typical pedon of Faceville sandy loam in an area of Faceville sandy loam, 2 to 5 percent slopes, in a cultivated field, 0.2 mile west of junction with Georgia Highway 11 on Jones Road, north side of road:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

B1—6 to 14 inches; yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few patchy clay films; few very fine black concretions; common fine pores; common fine roots; strongly acid; abrupt smooth boundary.

B21t—14 to 20 inches; red (2.5YR 5/6) sandy clay; moderate medium subangular blocky structure; few weak discontinuous prisms; friable; patchy clay films on faces of peds; few very fine black concretions in upper part; strongly acid; gradual wavy boundary.

B22t—20 to 50 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; friable; few very fine roots; patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

B23t—50 to 65 inches; red (2.5YR 4/6) sandy clay; common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common patchy clay films on peds; strongly acid.

The solum ranges from 65 to 72 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The Ap horizon has a hue of 10YR, value of 4, and chroma of 2 to 4.

The B1 horizon is sandy clay loam or sandy clay. It has a hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6. The Bt horizon has a hue of 2.5YR to 5YR, value of 4 or 5, and chroma of 6. It has brown, yellow, and red mottles in the lower part.

Fuquay series

The Fuquay series consists of well drained soils that formed in sandy and loamy marine sediment on Sand Hills uplands. These soils have moderate permeability in the upper part of the subsoil and slow permeability in the lower part. Slopes are dominantly 3 percent but range from 1 to 8 percent.

Fuquay soils are geographically associated with Cowarts, Lakeland, and Norfolk soils. Cowarts soils have an A horizon less than 20 inches thick. Lakeland soils are sandy throughout and do not have an argillic horizon. Norfolk soils have an A horizon less than 20 inches thick and do not have a significant amount of plinthite in the B horizon.

Typical pedon of Fuquay loamy sand in an area of Fuquay loamy sand, 1 to 5 percent slopes, in an idle field, 1.1 miles west of Interstate 75 on Mount Pleasant Church Road to the junction of Griffin Mill Road, at the southeast corner of the junction:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; few nodules of ironstone; common fine roots; strongly acid; clear smooth boundary.

A21—7 to 12 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; few nodules of ironstone; common fine roots; strongly acid; clear smooth boundary.

A22—12 to 24 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; few nodules of ironstone; few fine roots; strongly acid; gradual wavy boundary.

B1—24 to 30 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; few nodules of ironstone; few fine roots; strongly acid; gradual wavy boundary.

B21t—30 to 40 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; common nodules of ironstone; strongly acid; gradual wavy boundary.

B22t—40 to 50 inches; yellowish brown (10YR 5/8) sandy clay loam; many medium prominent red (2.5YR 4/8) and many medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; 2 to 5 percent plinthite; strongly acid; gradual smooth boundary.

B23t—50 to 65 inches; mottled strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; 15 percent plinthite; strongly acid.

The solum ranges from 80 to 85 inches or more in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The Ap horizon is 6 to 8 inches thick. It has a hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon has a hue of 10YR, value of 5 or 6, and chroma of 3 or 4. A few nodules of ironstone are commonly in the surface layer and throughout the A2 horizon.

The B1 horizon is 6 to 8 inches thick. It has a hue of 10YR, value of 5, and chroma of 3 to 6. The Bt horizon has a hue of 10YR, value of 5, and chroma of 6 or 8. The lower part of the Bt horizon has red, light yellowish brown, strong brown, and gray mottles and has plinthite content ranging from 5 to 15 percent.

Grady series

The Grady series consists of nearly level, poorly drained, slowly permeable soils that formed predominantly in clayey marine sediment. These soils are in depressions on Coastal Plain uplands. The water table is at a depth of less than 12 inches for 6 or 7 months each year. During wet seasons, water commonly stands on the surface for 2 or 3 months. Slopes are dominantly less than 1 percent but range to 2 percent.

Grady soils are geographically associated with Faceville, Norfolk, and Orangeburg soils. Faceville, Norfolk, and Orangeburg soils are better drained and are on higher lying positions. In addition, Norfolk and Orangeburg soils have less clay in the B horizon.

Typical pedon of Grady sandy loam in an area of Grady sandy loam, in a depression, 1.0 mile south on Georgia Highway 11 from the junction of Georgia Highway 11 and Hartley Bridge Road and 0.3 mile east:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B1g—6 to 10 inches; gray (10YR 6/1) sandy clay loam; few fine distinct strong brown mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B21tg—10 to 28 inches; gray (10YR 6/1) sandy clay; common fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

B22tg—28 to 40 inches; gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

B23tg—40 to 60 inches; gray (10YR 6/1) sandy clay; few fine distinct yellowish brown and red mottles; moderate medium subangular blocky structure; firm; very strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The Ap horizon has a hue of 10YR, value of 3, and chroma of 1 or 2.

The Btg horizon is sandy clay or clay. It has a hue of 10YR, value of 6 or 7, and chroma of 1. It has few to common strong brown and red mottles.

Helena series

The Helena series consists of moderately well drained, slowly permeable soils that formed in material weathered mainly from granite. These soils are on broad ridgetops and hillsides on Piedmont uplands. Slopes are dominantly 6 percent but range from 2 to 10 percent.

Helena soils are geographically associated with Vance and Wilkes soils. Vance soils are better drained. Wilkes soils are better drained, have a thinner solum, and have higher base saturation.

Typical pedon of Helena sandy loam in an area of Helena sandy loam, 2 to 6 percent slopes, in bahiagrass pasture, 1.1 miles south on Dennis Road from the intersection of Dennis Road and lower Thomaston Road and 200 yards east of an old cemetery:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many very fine roots; strongly acid; clear wavy boundary.

A2—7 to 11 inches; light yellowish brown (10YR 6/4) sandy loam; common medium faint yellowish brown mottles; weak fine granular structure; very friable; common very fine roots; strongly acid; abrupt irregular boundary.

B21t—11 to 14 inches; strong brown (7.5YR 5/6) sandy clay; common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common very fine roots and pores; thin patchy clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—14 to 27 inches; strong brown (7.5YR 5/6) clay; common medium distinct light brownish gray (2.5Y 6/2) and few fine distinct grayish green mottles in lower part; weak fine angular blocky structure; very firm, sticky and very plastic; common very fine roots and pores; thin patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B3—27 to 40 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (2.5YR 6/2) mottles; weak fine subangular blocky structure; firm; common very fine pores; very strongly acid; abrupt wavy boundary.

IIC—40 to 60 inches; strong brown (7.5YR 5/8) sandy loam; many medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; very strongly acid.

The solum ranges from 32 to 60 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The Ap horizon has a hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. The A2 horizon has a hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4.

The Bt horizon is clay or sandy clay. It has a hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 6 or 8.

Lakeland series

The Lakeland series consists of excessively drained, very rapidly permeable soils that formed in sandy marine deposits. These soils are on broad ridgetops and hillsides on Sand Hills uplands. Slopes are dominantly about 3 percent but range from 2 to 17 percent.

Lakeland soils are geographically associated with Ailey, Cowarts, Fuquay, and Vaucluse soils. Ailey, Cowarts, and Vaucluse soils have a loamy compact B horizon, and Ailey soils are arenic. Fuquay soils are arenic and have a loamy B horizon.

Typical pedon of Lakeland sand in an area of Lakeland sand, 2 to 8 percent slopes, in a wooded area, 0.2 mile east on Mount Pleasant Church Road from junction with Fulton Mill Road, north of road:

A1—0 to 5 inches; very dark gray (10YR 3/1) sand; single grain; loose; common medium and fine roots; strongly acid; clear smooth boundary.

C1—5 to 10 inches; yellowish brown (10YR 5/4) sand; single grain; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

C2—10 to 60 inches; yellowish brown (10YR 5/6) sand; single grain; loose; few fine roots; strongly acid; gradual wavy boundary.

C3—60 to 80 inches; very pale brown (10YR 7/3) sand; single grain; loose; many uncoated sand grains; strongly acid.

The sand layer ranges from 80 to 85 inches or more in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The A horizon has a hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The C horizon has a hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6.

Norfolk series

The Norfolk series consists of nearly level or gently sloping, well drained, moderately permeable soils that formed in dominantly loamy marine sediment. These soils are on broad Coastal Plain uplands. Slopes are dominantly 3 percent but range from 0 to 5 percent.

Norfolk soils are geographically associated with Cowarts, Faceville, Fuquay, and Orangeburg soils. Cowarts soils have a somewhat compact B horizon that contains plinthite. Faceville soils have a B horizon that is redder and has a higher clay content. Fuquay soils are arenic and have a B horizon that contains plinthite. Orangeburg soils have a redder B horizon.

Typical pedon of Norfolk sandy loam in an area of Norfolk sandy loam, 2 to 5 percent slopes, in a cultivated field, 150 yards west on Hartley Bridge Road from junction with Sardis Church Road, south of road:

Ap—0 to 8 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A2—8 to 12 inches; pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

B1—12 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

B21t—16 to 24 inches; yellowish brown (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; few fine pores; strongly acid; clear wavy boundary.

B22t—24 to 45 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots in upper part; few patchy clay films on faces of peds; few fine pores; strongly acid; clear wavy boundary.

B23t—45 to 60 inches; yellowish brown (10YR 5/6) sandy clay loam; few medium faint strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles, and few medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few fine pores; strongly acid.

B3—60 to 70 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), pale brown (10YR 6/3), yellowish red (5YR 5/6), and light brownish gray (10YR 6/2) sandy clay loam; weak fine subangular blocky structure; friable; strongly acid.

The solum ranges from 70 to 100 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The A2 horizon has a hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The Bt horizon has a hue mainly of 10YR, but hue can be 7.5YR. It has a value of 5 and chroma of 6 or 8. The B3 horizon has yellow, brown, red, and gray mottles.

Orangeburg series

The Orangeburg series consists of nearly level to sloping, well drained, moderately permeable soils that formed in loamy marine sediment. These soils are on Coastal Plain uplands. Slopes are dominantly about 3 percent but range from 0 to 12 percent.

Orangeburg soils are geographically associated with Faceville and Norfolk soils. Faceville soils have a B horizon that has a higher content of clay. Norfolk soils have a brown subsoil.

Typical pedon of Orangeburg sandy loam in an area of Orangeburg sandy loam, 0 to 2 percent slopes, in a peach orchard, 1.0 mile south on Feagin Road from junction with Georgia Highway 247, southwest of road:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

B1—8 to 14 inches; yellowish red (5YR 4/8) sandy clay loam; weak fine subangular blocky structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

B21t—14 to 30 inches; red (2.5YR 4/8) sandy clay loam; weak medium, subangular blocky structure; friable; many fine roots; strongly acid.

B22t—30 to 60 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots in upper part; patchy clay films on faces of peds; strongly acid.

The solum ranges from 70 to 90 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The Ap horizon has a hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The B1 horizon is sandy loam or sandy clay loam. It has a hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The Bt horizon has a hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8.

Osier series

The Osier series consists of nearly level, poorly drained, rapidly permeable soils that formed in sandy alluvium. These soils are on narrow flood plains in the Coastal Plain. They are frequently flooded for brief periods late in winter and early in spring. A water table is at a depth of less than 12 inches for about 6 months each year. Slopes are less than 2 percent.

Osier soils are geographically associated with the Cowarts, Fuquay, Lakeland, Norfolk, and Vaucluse soils. These associated soils are better drained and are on uplands.

Typical pedon of Osier loamy sand in an area of Osier loamy sand, in a wooded area, 0.25 mile south on Knoxville Road from intersection of U.S. Highway 80, east side of road:

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; many very fine roots; very strongly acid; clear wavy boundary.

C1—4 to 12 inches; dark grayish brown (10YR 4/2) loamy sand; single grain; very friable; many fine roots; very strongly acid; gradual wavy boundary.

C2g—12 to 20 inches; gray (10YR 6/1) sand; single grain; loose; few fine roots; very strongly acid; gradual wavy boundary.

C3g—20 to 60 inches; gray (10YR 5/1) fine sand; single grain; loose; few fine roots; very strongly acid.

The sandy layer is more than 60 inches thick. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed.

The A horizon has a hue of 2.5Y or 10YR, value of 3 to 5, and chroma of 2.

The C horizon is coarse sand, sand, loamy sand, and fine sand. It has a hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2.

Vance series

The Vance series consists of well drained, slowly permeable soils that formed in material weathered from acid crystalline rock. These soils are on ridgetops and hillsides on Piedmont uplands. Slopes are dominantly about 8 percent but range from 2 to 17 percent.

Vance soils are geographically associated with Cecil, Helena, and Wilkes soils. Cecil soils have a B horizon that is redder and less plastic. Helena soils are less well drained. Wilkes soils have a higher base saturation and a thinner solum.

Typical pedon of Vance sandy loam in an area of Vance sandy loam, 6 to 10 percent slopes, in a wooded area, 0.9 mile west on Northside Drive from Riverside Drive in Macon:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

B1—8 to 12 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; gradual smooth boundary.

B21t—12 to 16 inches; yellowish brown (10YR 5/8) sandy clay; moderate medium subangular blocky structure; firm; few fine roots; patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—16 to 21 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; continuous thin clay films on faces of peds; strongly acid; gradual wavy boundary.

B23—21 to 36 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/6) mottles; strong medium angular blocky structure; very firm, plastic and sticky; continuous thin clay films on faces of peds; strongly acid; gradual wavy boundary.

B3—36 to 44 inches; yellowish red (5YR 4/8) clay; common medium distinct light yellowish brown (10YR 6/4) and light gray (10YR 7/2) mottles; moderate medium angular blocky structure; very firm; strongly acid; clear wavy boundary.

C—44 to 60 inches; weathered mixture of soft acidic rock; massive, rock controlled structure; clay loam if crushed; friable; strongly acid.

The solum ranges from 26 to 50 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas that have been limed. Few to common angular quartz pebbles, 1/2 to 1 inch in diameter, are on the surface and throughout the soil.

The Ap horizon ranges from sandy loam to sandy clay loam. It has a hue of 10YR, value of 5, and chroma of 2 to 4.

The B1 horizon is sandy clay loam or clay loam. It has a hue of 10YR to 5YR, value of 5, and chroma of 4 to 8. The Bt horizon is commonly clay, but in places it is sandy clay. It has a hue of 10YR to 5YR, value of 4 or 5, and chroma of 6 or 8. Common brown or red mottles are in the middle and lower parts. The B3 horizon is mottled in a hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 2 to 8.

The C horizon is mixed disintegrated rock and soil material. It crushes to loam, sandy clay loam, or clay loam. It is mottled strong brown, red, yellowish brown, and gray.

Vaucluse series

The Vaucluse series consists of well drained, slowly permeable soils that formed in sandy and loamy marine sediment. These soils are on ridgetops and hillsides on Sand Hills uplands. Slopes are dominantly about 10 percent but range from 4 to 17 percent.

Vaucluse soils are geographically associated with Ailey, Cowarts, Fuquay, and Lakeland soils. Ailey soils are arenic. Cowarts soils have a firm, brittle horizon within a depth of 60 inches that contains more than 5 percent plinthite. Fuquay soils are arenic and have a horizon within a depth of 60 inches that contains more than 5 percent plinthite. Lakeland soils are sandy throughout.

Typical pedon of Vaucluse loamy sand in an area of Vaucluse loamy sand, 8 to 17 percent slopes, in a wooded area, 1.0 mile south on Hartley Bridge Road from intersection with Mt. Pleasant Road, north of road:

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine roots; few nodules of ironstone; strongly acid; clear smooth boundary.

A2—5 to 8 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine roots; few nodules of ironstone; strongly acid; gradual wavy boundary.

B1—8 to 13 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

B2t—13 to 23 inches; strong brown (7.5YR 5/8) sandy clay loam; few medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common medium roots between peds; continuous clay films on faces of peds; moderate thin platy structure in lower 1 inch; strongly acid; abrupt wavy boundary.

Bx1—23 to 40 inches; red (2.5YR 4/6) sandy clay loam; many medium prominent strong brown (7.5YR 5/6), very pale brown (10YR 7/4), and light gray (10YR 7/1) mottles; moderate medium platy structure parting to angular blocky; firm and brittle; few very fine roots between peds; thick continuous clay films on horizontal faces of peds; common nodules of ironstone; very strongly acid; clear wavy boundary.

Bx2—40 to 60 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/6), light gray (10YR 7/1), and yellowish brown (10YR 5/6) sandy clay loam; massive or weak moderate subangular blocky structure; very firm, hard, brittle and compact; few very fine roots between peds; vertical and horizontal fractures 1 to 3 feet apart; very strongly acid.

The solum ranges from 60 to 90 inches in thickness. It is strongly acid or very strongly acid throughout, except in areas where the surface layer has been limed. Nodules of ironstone range from few to common in the A horizon and none to common in the B horizon. Depth to the horizon that is brittle ranges from 15 to 30 inches. Pebbles are commonly on the surface and throughout the soil.

The A1 horizon has a hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The B2 horizon, if present, ranges from sandy loam to loamy sand and has a hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The B1 horizon ranges from sandy clay loam to sandy loam and has a hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 or 8. The Bt horizon has a hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. The Bx horizon is commonly mottled in a hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 1 to 8.

Wilkes series

The Wilkes series consists of gently sloping to strongly sloping, well drained, moderately slowly permeable soils that formed in weathered basic and acidic rocks. These soils are on ridgetops and hillsides on Piedmont uplands. Slopes are dominantly about 12 percent but range from 5 to 17 percent.

Wilkes soils are geographically associated with Cecil, Davidson, Helena, and Vance soils. Cecil and Davidson soils have a thicker solum, a redder argillic horizon, and lower base saturation. Helena soils are less well drained, have a thicker solum, and have lower base saturation. Vance soils have a thicker solum and lower base saturation.

Typical pedon of Wilkes gravelly sandy loam from an area of Wilkes gravelly sandy loam, 10 to 17 percent slopes, in a wooded area, 300 feet southwest on Haslett

Drive from junction with Upper River Road, northwest of road:

A1—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; weak fine granular structure; very friable; about 20 percent by volume pebbles; strongly acid; clear smooth boundary.

A2—6 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; common cobbles and pebbles; strongly acid; clear smooth boundary.

B2t—8 to 14 inches; yellowish brown (10YR 5/6) clay; weak medium subangular blocky structure; firm, hard, sticky and plastic; common pebbles and cobbles; thin patchy clay films on faces of peds; slightly acid; clear wavy boundary.

B3—14 to 17 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; firm; slightly acid; clear wavy boundary.

C1—17 to 21 inches; strong brown (7.5YR 5/6) and light yellowish brown (10YR 6/4) coarse sandy clay loam; partly weathered rock mixed with soil; firm; massive; slightly acid; clear smooth boundary.

Cr—21 to 40 inches; yellowish brown, green, black, and gray saprolite that is coarse sandy clay loam if crushed; platy rock structure; firm; slightly acid; clear irregular boundary.

R—40 inches; hard rock.

Thickness of the solum ranges from 12 to 17 inches. Depth to hard rock ranges from 40 to 80 inches. The A horizon is medium acid or strongly acid, and the B horizon is slightly acid or medium acid.

The A1 horizon has a hue of 2.5Y or 10YR, value of 4, and chroma of 2 to 4. It is 15 to 25 percent pebbles. The A2 horizon has a hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The B horizon has a hue of 10YR to 5YR, value of 4 or 5, and chroma of 6 to 8. It ranges from clay to sandy clay loam.

The C horizon is coarse sandy clay loam and partly weathered rock fragments.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*7*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 19, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquents (*Hapl*, meaning simple horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

GLENN L. BRAMLET, soil scientist, Soil Conservation Service, helped to prepare this section.

This section discusses the factors of soil formation and relates them to soils in the survey area. It also explains the processes of soil formation.

Soils are formed when parent material, plants and animals, climate, and topography, or relief, interact for long periods of time (*5*). This combination of factors largely determines the properties of the soil at any given point on the earth. These factors have influenced the formation of each soil in Bibb County.

Climate and vegetation are the principal active forces that gradually alter the parent material to form a soil. Topography, though not active, mainly influences soil drainage and runoff, but it also influences soil temperature. Therefore, climate, vegetation, and topography act over long periods of time to bring about changes in parent material. The five factors of soil formation are discussed in the paragraphs that follow.

Parent material

Parent material is the unconsolidated mass or raw material from which a soil forms. It is converted to soil by soil forming processes and is largely responsible for the chemical and mineralogical composition of the soil. In Bibb County the parent material is quite variable, consisting of igneous and metamorphic rock and of sedimentary material deposited by water.

The parent material in the northern one-third of Bibb County consists of saprolite of igneous and metamorphic rocks, such as biotite gneiss, granite gneiss, and granites which are probably pre-Cambrian. Included are small areas of diorite injection gneiss and a narrow band of sericite schist of the Little River series. Tectonic processes during the Triassic Period produced the diorite gneiss plus complex folding and faulting of the existing rock masses. Cecil, Helena, and Vance soils formed in these materials.

In the southern part of Bibb County the parent material is largely sedimentary. It has been transported from other areas by water and deposited over the residuum of metamorphic and igneous rocks. This deposit is very thin along the northern boundary. It ranges to as much as 500 feet in thickness at the southern boundary.

Deep, excessively drained Lakeland soils and well drained Vaucluse and Ailey soils have formed in the sands and clays of the Tuscaloosa Formation of the Cretaceous Period. This formation is exposed at the surface in the southern part of Bibb County and in valleys along some streams.

Norfolk and Orangeburg soils formed in loamy sediment of the Barnwell Formation. This formation of the Eocene age lies on top of the Tuscaloosa Formation on wide interstream ridges in the southeastern part of Bibb County.

Chewacla and Congaree soils are on flood plains of the larger streams. The parent material of these soils is alluvium, consisting mostly of fine sediment that was carried in suspension and deposited by high floodwaters.

Topography

Topography, or shape of the landscape, affects soil formation through its influence on drainage, erosion, soil temperature, and plant cover. The survey area is dissected by streams that cut into the land surface in a dendritic pattern. The landscape mainly consists of broad ridges and long, gently sloping to strongly sloping upland soils. Slopes generally are 2 to 17 percent. In places slopes are short and irregular, the soils are strongly sloping, and escarpments are present. In places these soils are comparatively shallow to bedrock. In contrast, the gently sloping soils in broad areas are deep to bedrock. Stones, boulders, and outcrops of bedrock are also associated with the shallow, strongly sloping soils.

Most of the soils in the survey area are well drained, except those soils along the broader flood plains and in seepage areas at the base of slopes. Davidson soils are examples of well drained soils that have medium runoff. Helena soils are moderately well drained and have medium runoff. Runoff is very slow in level to depressional areas of Grady soils, and they are wet.

Plants and animals

The species and number of plants and animals living on and in the soil are determined mainly by climate and, to a lesser degree, by partly weathered soil material, topography, and age of the soil. Micro-organisms aid in the weathering process of rock and in the decomposition of organic matter. Each cubic foot of soil contains millions of bacteria, fungi, insects, and small plants and animals which exert a continuous change in the physical and chemical properties of the soils.

The larger plants supply organic matter. They also transfer elements from the subsurface and subsoil layers to the surface by assimilating these elements into plant tissue and then depositing this tissue on the surface soil as fallen fruits, nuts, leaves, or stems. Earthworms and other small invertebrates carry on a slow, but continuous, process of soil mixing.

In Bibb County the native vegetation was chiefly pine and oak on uplands and yellow-poplar, sweetgum, and water tolerant oaks in the low wet areas. This kind of vegetation contributed varying amounts of organic matter.

Clearing forests, cultivating soils, and accelerating erosion affect the rate of soil formation. Few results of these changes can be seen and probably some of the results will not be evident for many centuries. Man's activities have drastically changed the kinds and number of living organisms that affect soil formation.

Time

The length of time required for a well developed profile to form depends largely on the intensity or degree of other factors of soil formation. Generally, less time is required if the climate is warm and humid, the parent material is loamy, and the vegetation is luxuriant.

Congaree soils, formed in local alluvium, are an example of young soils that have little horizon development. These soils retain most of the characteristics of the parent material. Lakeland soils, because of the high percentage of quartz sand in the parent material, will probably never have well expressed horizons. Cowarts soils have been in-place long enough for the development of a well defined profile, but their profile is not so well developed as some other soils in the county. Profile development is somewhat retarded by slow permeability in the parent material and by slow movement of water in the profile. Norfolk and Orangeburg soils, which formed in finer textured material than Lakeland soils, have a well developed profile. They have been in place a long time, and their subsoil is moderately permeable. They have an acid B horizon that has an accumulation of clay.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and on the decomposition of minerals and organic matter. It also affects biological activity in the soils and the leaching and movement of weathered material.

Bibb County has a moist, temperate climate that is presumed to be similar to that under which the soils formed. The temperate climate and moist soils promote rapid chemical and biological action. The large amount of rainfall causes the soils to be highly leached. Because of the leaching of such basic elements as calcium, magnesium, and sodium and replacement of these elements by hydrogen, the soils tend to be acid. The translocation of solid material as bases and of less soluble material as colloidal substance has resulted in the soils being less fertile than when they were first formed.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Bergeaux, P.J. 1972. South Georgia fertilizer recommendations for field crops. Univ. of Ga. Coll. of Agric., Circ. 639., 6 pp., illus. [rev. Mar. 1976]

(4) Georgia Conservation Needs Inventory. 1970. Conservation needs inventory. U.S. Dep. Agric., Soil Conserv. Serv., 209 pp., illus.

(5) United States Department of Agriculture. 1938. Soils and men. U.S. Dep. Agric. Yearb., 1232 pp., illus.

(6) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962]

(7) United States Department of Agriculture. 1975. Soil taxonomy: a basic system for making and interpreting soil surveys. U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(8) Whitcomb, Carl. [rev. 1976]. Know it and grow it. Okla. State Univ., pp. 461-473 and 479-485., illus.

Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

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 a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characterisitc that affects management. These differencees are too small to justify separate series.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on exposure to repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade, whereas ironstone cannot be cut but can be broken or shattered with a spade. Plinthite is one form of the material that has been called laterite.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Illustrations

Figure 1.—A large levee that protects bottom land from floods.

Figure 2.—Typical vegetation in a map unit of Lakeland-Ailey soils. These soils are droughty; potential for row crops and small grain is low.

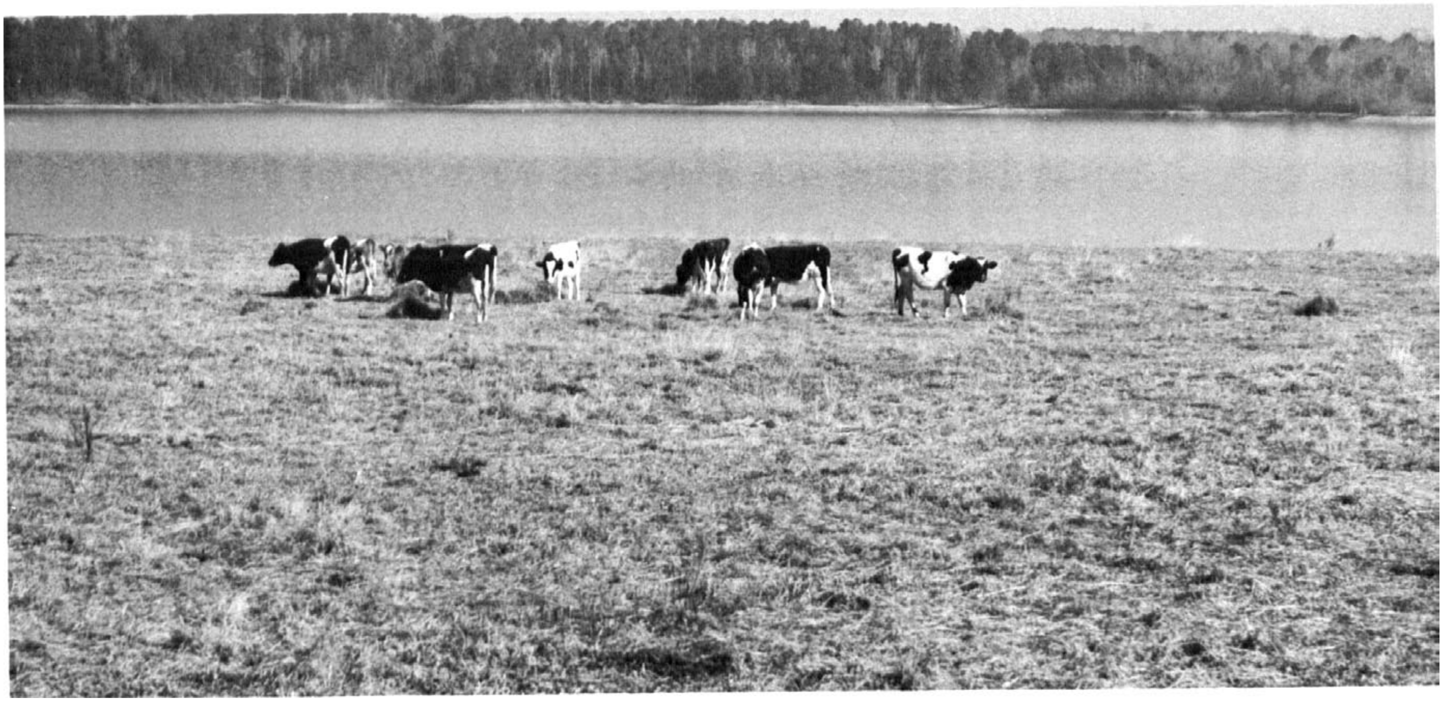


Figure 3.—Cattle on native pasture in a map unit of Vance-Helena-Wilkes soils. Potential for pasture is medium.

Figure 4.—A cutbank that exposes the profile of an Ailey loamy sand.

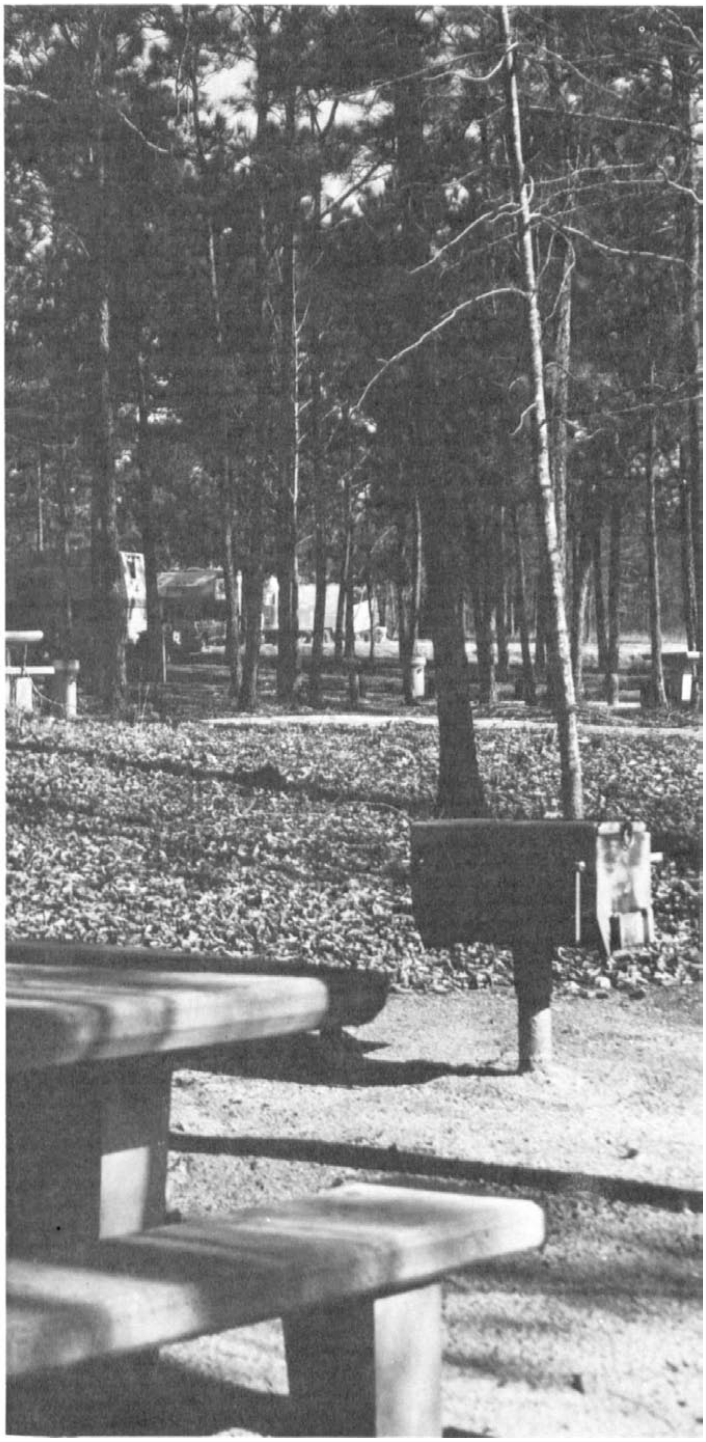


Figure 5.—A camping and picnic area on Cecil sandy loam, 2 to 6 percent slopes.

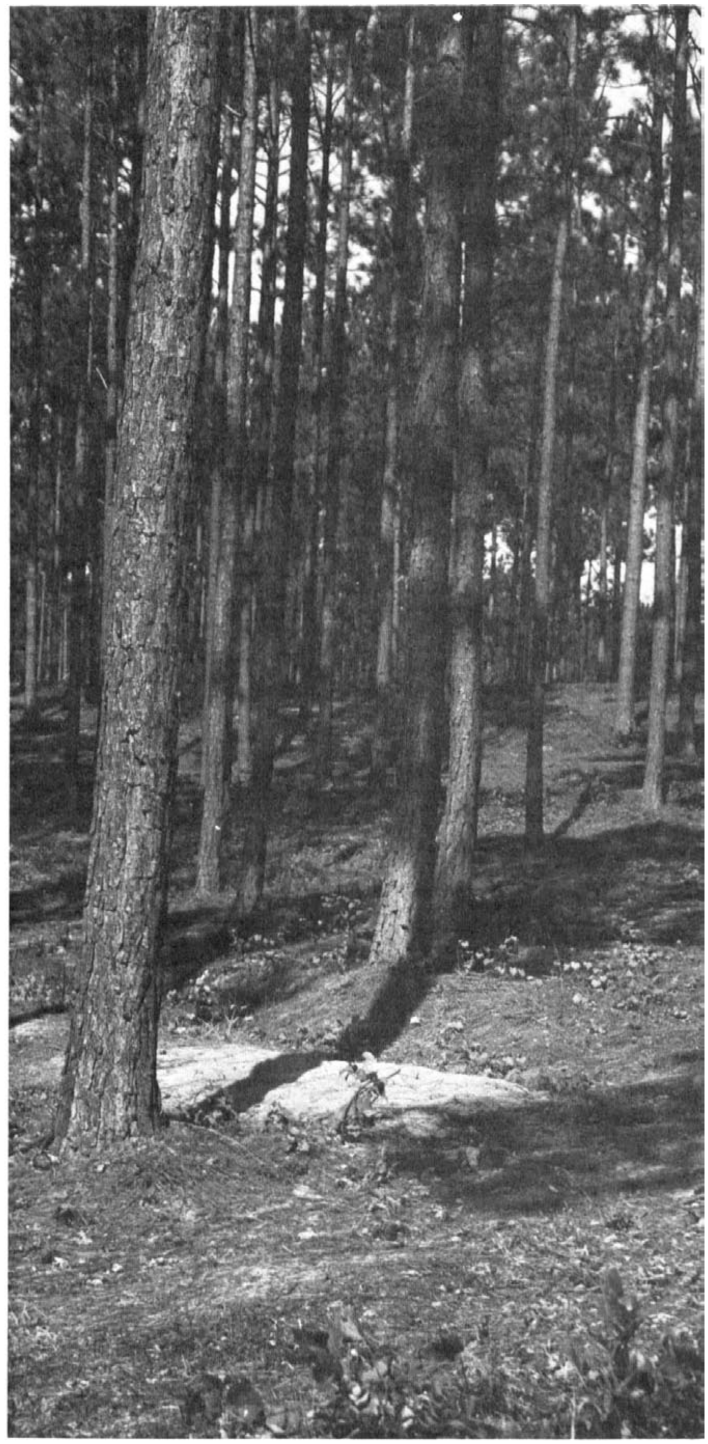


Figure 6.—Slash pine on Cowarts sandy loam, 5 to 8 percent slopes.

Figure 7.—An area of Hydraquents. These soils are commonly flooded throughout the year.

Figure 8.—A roadside cut that exposes the profile of a Lakeland sand.

Figure 9.—A school in an area of Vaucluse-Urban land complex, 2 to 8 percent slopes.

Figure 10.—Rock outcrop in an area of Wilkes gravelly sandy loam, 5 to 10 percent slopes.

Figure 11.—Damage that occurred to a small commercial building constructed on unstable fill material. The fill material was highly compressible and had low shear strength.

Figure 12.—The behavior of the soil in this industrial area can be used to predict the performance of similar structures on the same soil or on a similar soil in other locations.

Figure 13.—A shoreline view of Lake Tobesofkee. This lake is an excellent example of the water recreational areas in the county.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature*						Precipitation*				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days**	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	58.2	36.1	47.2	78	13	104	4.07	1.98	5.77	7	0.2
February---	61.1	37.8	49.5	80	16	120	4.77	2.75	6.41	8	.9
March------	68.4	44.1	56.3	86	25	239	4.85	2.62	6.67	8	0
April------	78.2	52.4	65.4	92	34	462	3.48	1.76	4.87	5	0
May--------	85.3	60.1	72.8	98	42	707	3.69	1.76	5.26	5	0
June-------	90.3	67.3	78.8	101	52	864	4.09	2.48	5.53	7	0
July-------	92.1	70.5	81.3	101	62	970	4.54	2.56	6.14	9	0
August-----	91.9	69.9	80.9	100	59	958	3.77	2.36	5.04	7	0
September--	86.9	64.7	75.8	98	48	774	2.98	1.24	4.38	5	0
October----	78.3	52.6	65.5	93	32	481	2.02	0.39	3.30	4	0
November---	67.9	42.0	55.0	85	23	171	2.23	1.07	3.18	4	0
December---	60.3	37.4	48.8	79	17	107	4.36	2.31	6.04	7	0
Year-----	76.6	52.9	64.8	103	11	5,957	44.85	38.05	51.39	76	1.1

* Recorded in the period 1951-74 at Macon, Georgia.
** A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature*		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 16	March 27	April 6
2 years in 10 later than--	March 4	March 19	March 30
5 years in 10 later than--	February 9	March 3	March 17
First freezing temperature in fall:			
1 year in 10 earlier than--	November 14	November 5	October 25
2 years in 10 earlier than--	November 21	November 10	October 29
5 years in 10 earlier than--	December 5	November 20	November 6

* Recorded in the period 1951-74 at Macon, Georgia.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season*		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	259	232	208
8 years in 10	272	242	217
5 years in 10	296	262	234
2 years in 10	323	281	250
1 year in 10	340	291	259

* Recorded in the period 1951-74 at Macon, Georgia.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS*

Map symbol	Soil name	Acres	Percent
AgB	Ailey loamy sand, 2 to 6 percent slopes	5,160	3.2
CeB	Cecil sandy loam, 2 to 6 percent slopes	4,490	2.8
CeC	Cecil sandy loam, 6 to 10 percent slopes	5,865	3.6
CeD	Cecil sandy loam, 10 to 17 percent slopes	6,460	4.0
CeuC	Cecil-Urban land complex, 2 to 10 percent slopes	4,890	3.0
CK	Chewacla association	23,965	14.7
Co	Congaree silt loam	4,630	2.8
CwB	Cowarts sandy loam, 2 to 5 percent slopes	6,965	4.3
CwC	Cowarts sandy loam, 5 to 8 percent slopes	3,400	2.1
DgB	Davidson loam, 2 to 6 percent slopes	1,760	1.1
DhC2	Davidson clay loam, 6 to 10 percent slopes, eroded	1,865	1.1
DhD2	Davidson clay loam, 10 to 17 percent slopes, eroded	845	0.5
FdA	Faceville sandy loam, 0 to 2 percent slopes	720	0.4
FdB	Faceville sandy loam, 2 to 5 percent slopes	1,050	0.6
FdC	Faceville sandy loam, 5 to 8 percent slopes	200	0.1
FsB	Fuquay loamy sand, 1 to 5 percent slopes	2,420	1.5
FsC	Fuquay loamy sand, 5 to 8 percent slopes	665	0.4
Gr	Grady sandy loam	510	0.3
HyB	Helena sandy loam, 2 to 6 percent slopes	2,080	1.3
HyC	Helena sandy loam, 6 to 10 percent slopes	2,900	1.8
HZ	Hydraquents	2,575	1.6
LaC	Lakeland sand, 2 to 8 percent slopes	4,560	2.8
LaD	Lakeland sand, 8 to 17 percent slopes	1,540	0.9
NhA	Norfolk sandy loam, 0 to 2 percent slopes	2,740	1.7
NhB	Norfolk sandy loam, 2 to 5 percent slopes	7,415	4.6
OcA	Orangeburg sandy loam, 0 to 2 percent slopes	895	0.6
OcB	Orangeburg sandy loam, 2 to 5 percent slopes	3,860	2.4
OcC	Orangeburg sandy loam, 5 to 8 percent slopes	1,090	0.7
OcD	Orangeburg sandy loam, 8 to 12 percent slopes	625	0.4
OcuC	Orangeburg-Urban land complex, 0 to 8 percent slopes	3,360	2.1
Os	Osier loamy sand	3,110	1.9
Pt	Pits	1,010	0.6
UD	Urban land	3,765	2.3
VaB	Vance sandy loam, 2 to 6 percent slopes	2,790	1.7
VaC	Vance sandy loam, 6 to 10 percent slopes	4,500	2.8
VbD2	Vance sandy clay loam, 10 to 17 percent slopes, eroded	6,575	4.0
VeC	Vaucluse loamy sand, 4 to 8 percent slopes	2,215	1.4
VeD	Vaucluse loamy sand, 8 to 17 percent slopes	10,250	6.4
VuC	Vaucluse-Urban land complex, 2 to 8 percent slopes	9,245	5.7
VuD	Vaucluse-Urban land complex, 8 to 15 percent slopes	2,615	1.6
WvC	Wilkes gravelly sandy loam, 5 to 10 percent slopes	2,030	1.2
WvD	Wilkes gravelly sandy loam, 10 to 17 percent slopes	4,955	3.0
	Total	162,560	100.0

*Areas of water greater than 40 acres total 2,375 acres. These areas are not included in the table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 1976. Absence of a yield figure indiates that the soil is not suited to the crop or the crop is generally not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Wheat	Oats	Improved bermuda-grass	Bahiagrass	Pasture
	Bu	Bu	Bu	Bu	AUM*	AUM*	AUM*
AgB----------------------- Ailey	50	20	25	50	6.0	6.0	---
CeB----------------------- Cecil	95	35	45	90	9.0	7.0	6.5
CeC----------------------- Cecil	90	25	40	85	8.5	6.0	6.5
CeD----------------------- Cecil	80	---	---	75	7.0	5.5	6.0
CeuC---------------------- Cecil	---	---	---	---	---	---	---
CK**---------------------- Chewacla	80	30	---	40	---	8.0	9.0
Co------------------------ Congaree	125	45	45	80	10	9.0	7.0
CwB----------------------- Cowarts	80	30	35	60	8.0	7.0	---
CwC----------------------- Cowarts	70	25	30	55	7.5	5.5	---
DgB----------------------- Davidson	110	45	45	90	10.0	7.0	8.5
DhC2---------------------- Davidson	75	35	35	65	8.8	6.5	5.2
DhD2---------------------- Davidson	---	---	---	---	8.3	5.5	4.5
FdA----------------------- Faceville	105	40	40	75	10.0	7.0	---
FdB----------------------- Faceville	105	40	40	75	10.0	7.0	---
FdC----------------------- Faceville	80	30	35	70	9.5	6.0	---
FsB----------------------- Fuquay	80	30	35	60	8.5	7.5	8.5
FsC----------------------- Fuquay	75	25	30	50	7.5	6.5	7.5
Gr------------------------ Grady	---	---	---	---	---	---	---
HyB----------------------- Helena	75	35	30	65	6.0	5.0	5.8
HyC----------------------- Helena	65	30	25	55	5.5	4.5	5.3
HZ**. Hydraquents							

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Wheat	Oats	Improved bermuda-grass	Bahiagrass	Pasture
	Bu	Bu	Bu	Bu	AUM*	AUM*	AUM*
LaC----- Lakeland	55	20	---	---	6.5	6.5	---
LaD----- Lakeland	---	---	---	---	6.0	6.0	---
NhA----- Norfolk	110	40	60	90	10.5	8.5	10.5
NhB----- Norfolk	100	35	55	85	10.0	8.5	10.0
OcA----- Orangeburg	100	50	60	90	10.5	8.5	---
OcB----- Orangeburg	100	45	55	85	10.5	8.5	---
OcC----- Orangeburg	90	35	50	80	10.0	8.0	---
OcD----- Orangeburg	80	30	45	75	9.0	7.0	---
OcuC----- Orangeburg	---	---	---	---	---	---	---
Os----- Osier	---	---	---	---	---	5.0	---
Pt**. Pits							
UD**. Urban land							
VaB----- Vance	80	35	60	90	6.0	5.0	8.0
VaC----- Vance	75	30	55	80	5.5	4.5	8.0
VbD2----- Vance	---	---	---	---	5.0	4.0	5.0
VeC----- Vaucluse	50	20	30	50	7.0	6.0	---
VeD----- Vaucluse	---	---	---	---	7.0	6.0	---
VuC----- Vaucluse	---	---	---	---	---	---	---
VuD----- Vaucluse	---	---	---	---	---	---	---
WvC----- Wilkes	65	25	35	65	7.0	5.0	7.5
WvD----- Wilkes	---	---	---	---	6.0	4.5	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	4,355	---	---		---
II	34,670	27,620	4,630	2,420	---
III	26,920	21,760	---	5,160	---
IV	58,865	30,340	23,965	4,560	---
V	3,620	---	3,620	---	---
VI	25,240	20,285	---	4,955	---
VII	1,540	---	---	1,540	---
VIII	2,575	---	2,575	---	---

TABLE 7.--LANDSCAPE PLANTS ADAPTED TO WET SOILS AND DRY SOILS

[Soils not listed are adapted to all the plants in the table, except Hydraquents (HZ) which are poorly suited for landscaping]

Soil group and map symbols	Deciduous trees	Deciduous shrubs and vines	Broadleaf evergreen trees, shrubs, and vines	Ground cover	Narrowleaf evergreens
Soils that have a seasonal high water table in winter and spring: CK; Gr; HyB, HyC; Os.*	American elm, baldcypress, Japanese zelcova, pin oak, red maple, river birch, sweetbay magnolia, sweetgum, sugar hackberry, tuliptree, water oak, weeping willow, willow oak.	Oakleaf hydrangea, Virginia creeper.	American holly, bamboo, Carolina laurelcherry, Carolina yellow jessamine, evergreen euonymous, gallberry, Japanese fatsia, live oak, oleander, osmanthus, pampasgrass, silverberry, southern magnolia, southern waxmyrtle, thorny elaeagnus, waxleaf ligustrum, yaupon holly.	English ivy, liriope, monkey grass, vinca.	Spruce, pine.
Soils that have low available water capacity and are droughty: AgB; FsB, FsC; LaC, Lad; WvC, WvD.	American elm, baldcypress, Chinese chestnut, Chinese elm, Chinese pistache, common persimmon, eastern redbud, flowering crab-apple, goldenrain tree, honey-locust, Japanese zelcova, pecan, pin oak, Siberian elm, southern catalpa, water oak, willow oak.	Carolina yellow jessamine, Chinese redbud, crape myrtle, flowering quince, goldenbell, pomegranate, spirea, Virginia creeper, winter creeper, winter jasmine, wisteria.	Barberry, Carolina laurelcherry, common boxwood, elaeagnus, evergreen euonymous, Frazier's photinia, glossy abelia, Japanese boxwood, ligustrum, live oak, nandina, oleander, pampasgrass, pittosporum, pricklypear, pyracantha, yaupon holly, yucca.	Goldmoss stonecrop, liriope, rosemary, santolina.	Japgarden juniper, podocarpus, shore juniper.

* The soils that have a seasonal high water table, except HyB and HyE, are subject to overflow unless protected. The frequency and duration of flooding differs between soils in the group. See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Site index was calculated at age 30 for eastern cottonwood, at age 35 for American sycamore, and at age 50 for all other species]

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
AgB: Ailey	4s	Slight	Moderate	Moderate	Slash pine	70	Slash pine, longleaf pine.
					Longleaf pine	60	
CeB, CeC, CeD: Cecil	3o	Slight	Slight	Slight	Eastern white pine	80	Eastern white pine, loblolly pine, slash pine, yellow-poplar.
					Loblolly pine	80	
					Shortleaf pine	69	
					Virginia pine	73	
					Black oak	66	
					Northern red oak	82	
					Post oak	65	
					Scarlet oak	80	
CeuC*:							
Cecil	3o	Slight	Slight	Slight	Eastern white pine	80	Eastern white pine, loblolly pine, slash pine, yellow-poplar.
					Loblolly pine	80	
					Shortleaf pine	69	
					Virginia pine	73	
					Black oak	66	
					Northern red oak	82	
					Post oak	65	
					Scarlet oak	80	
Urban land.							
CK*: Chewacla	1w	Slight	Moderate	Moderate	Loblolly pine	96	Loblolly pine, slash pine, American sycamore, yellow-poplar, sweetgum, eastern white pine, green ash.
					Yellow-poplar	104	
					American sycamore	90	
					Sweetgum	97	
					Water oak	86	
					Eastern cottonwood	100	
					Green ash	97	
					Southern red oak	90	
Co: Congaree	1o	Slight	Slight	Slight	Sweetgum	100	Loblolly pine, slash pine, yellow-poplar, American sycamore, black walnut, cherrybark oak, eastern cottonwood, sweetgum.
					Yellow-poplar	107	
					Cherrybark oak	107	
					Loblolly pine	90	
					Eastern cottonwood	107	
					American sycamore	89	
					Black walnut	100	
					Scarlet oak	100	
					Willow oak	95	
CwB, CwC: Cowarts	2o	Slight	Slight	Slight	Loblolly pine	86	Loblolly pine, slash pine.
					Slash pine	86	
					Longleaf pine	70	
DgB: Davidson	3o	Slight	Slight	Slight	Loblolly pine	81	Loblolly pine, slash pine, yellow-poplar.
					Shortleaf pine	68	
					Northern red oak	86	
					Southern red oak	72	
					Sweetgum	80	
					White oak	71	
					Yellow-poplar	80	
DhC2, DhD2: Davidson	3o	Moderate	Slight	Slight	Loblolly pine	81	Loblolly pine, slash pine, yellow-poplar.
					Shortleaf pine	68	
					Northern red oak	86	
					Southern red oak	72	
					Sweetgum	80	
					White oak	71	
					Yellow-poplar	80	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
FdA, FdB, FdC------ Faceville	3o	Slight	Slight	Slight	Loblolly pine---------- Slash pine------------- Longleaf pine----------	82 80 65	Loblolly pine, slash pine.
FsB, FsC----------- Fuquay	3s	Slight	Moderate	Moderate	Loblolly pine---------- Slash pine------------- Longleaf pine----------	83 83 67	Slash pine, longleaf pine.
Gr----------------- Grady	2w	Slight	Severe	Severe	Loblolly pine---------- Slash pine------------- Sweetgum---------------	90 88 90	Loblolly pine, slash pine, American sycamore, water tupelo.
HyB, HyC----------- Helena	3w	Slight	Moderate	Slight	Loblolly pine---------- Shortleaf pine--------- White oak-------------- Yellow-poplar----------	80 63 64 87	Loblolly pine, Virginia pine, yellow-poplar.
LaC, LaD----------- Lakeland	4s	Slight	Moderate	Moderate	Slash pine------------- Loblolly pine---------- Longleaf pine----------	75 75 60	Slash pine, loblolly pine.
NhA, NhB----------- Norfolk	2o	Slight	Slight	Slight	Loblolly pine---------- Longleaf pine---------- Slash pine-------------	86 68 86	Slash pine, loblolly pine.
OcA, OcB, OcC, OcD- Orangeburg	2o	Slight	Slight	Slight	Loblolly pine---------- Slash pine------------- Longleaf pine----------	86 86 70	Slash pine, loblolly pine.
OcuC*:							
Orangeburg---------	2o	Slight	Slight	Slight	Loblolly pine---------- Slash pine------------- Longleaf pine----------	86 86 70	Slash pine, loblolly pine.
Urban land.							
Os----------------- Osier	3w	Slight	Severe	Severe	Slash pine------------- Loblolly pine---------- Longleaf pine----------	80 80 68	Slash pine, loblolly pine.
VaB, VaC, VbD2----- Vance	3o	Slight	Slight	Slight	Loblolly pine---------- Northern red oak------- Shortleaf pine--------- White oak--------------	76 --- --- ---	Loblolly pine, Virginia pine, slash pine, yellow-poplar.
VeC, VeD----------- Vaucluse	3o	Slight	Slight	Slight	Loblolly pine----------	76	Loblolly pine, slash pine.
VuC*, VuD*:							
Vaucluse-----------	3o	Slight	Slight	Slight	Loblolly pine----------	76	Loblolly pine, slash pine.
Urban land.							
WvC, WvD----------- Wilkes	4o	Slight	Slight	Slight	Loblolly pine---------- Post oak--------------- Shortleaf pine--------- Southern red oak------- Sweetgum---------------	75 79 63 76 82	Eastern redcedar, loblolly pine, Virginia pine.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
AgB: Ailey	Slight	Slight	Slight	Moderate: slope.	Slight.
CeB: Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
CeC, CeD: Cecil	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
CeuC*:					
Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
Urban land.					
CK*:					
Chewacla	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Co: Congaree	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
CwB: Cowarts	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
CwC: Cowarts	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight.
DgB: Davidson	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
DhC2, DhD2: Davidson	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
FdA, FdB: Faceville	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.
FdC: Faceville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
FsB: Fuquay	Slight	Slight	Slight	Slight	Slight.
FsC: Fuquay	Slight	Slight	Slight	Moderate: slope.	Slight.
Gr: Grady	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
HyB: Helena	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.
HyC: Helena	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell.
HZ*. Hydraquents					
LaC: Lakeland	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
LaD---------------- Lakeland	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
NhA, NhB---------- Norfolk	Slight-----------	Slight-----------	Slight-----------	Slight------------	Slight.
OcA, OcB---------- Orangeburg	Slight-----------	Slight-----------	Slight-----------	Slight------------	Slight.
OcC---------------- Orangeburg	Slight-----------	Slight-----------	Slight-----------	Moderate: slope.	Slight.
OcD---------------- Orangeburg	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
OcuC*: Orangeburg--------	Slight-----------	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Urban land.					
Os----------------- Osier	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Pt*. Pits					
UD*. Urban land					
VaB---------------- Vance	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.
VaC, VbD2--------- Vance	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
VeC---------------- Vaucluse	Slight-----------	Slight-----------	Slight-----------	Moderate: slope.	Slight.
VeD---------------- Vaucluse	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
VuC*: Vaucluse---------	Slight-----------	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Urban land.					
VuD*: Vaucluse---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Urban land.					
WvC---------------- Wilkes	Moderate: depth to rock.	Slight-----------	Moderate: depth to rock.	Moderate: slope.	Slight.
WvD---------------- Wilkes	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgB----------------- Ailey	Severe: percs slowly.	Moderate: slope.	Slight-----------	Slight-----------	Good.
CeB----------------- Cecil	Moderate: percs slowly.	Moderate: seepage.	Severe: too clayey.	Slight-----------	Fair: too clayey.
CeC, CeD------------ Cecil	Moderate: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
CeuC*:					
Cecil---------------	Moderate: percs slowly.	Moderate: seepage.	Severe: too clayey.	Slight-----------	Fair: too clayey.
Urban land.					
CK*----------------- Chewacla	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Good.
Co------------------ Congaree	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
CwB, CwC------------ Cowarts	Severe: percs slowly, wetness.	Moderate: slope, wetness.	Moderate: wetness.	Severe: wetness.	Fair: thin layer, area reclaim.
DgB----------------- Davidson	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
DhC2, DhD2---------- Davidson	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
FdA----------------- Faceville	Slight-----------	Moderate: seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
FdB, FdC------------ Faceville	Slight-----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
FsB, FsC------------ Fuquay	Moderate: percs slowly.	Moderate: slope.	Slight-----------	Slight-----------	Good.
Gr------------------ Grady	Severe: floods, percs slowly, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness, too clayey.
HyB----------------- Helena	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey.
HyC----------------- Helena	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
HZ*. Hydraquents					
LaC----------------- Lakeland	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LaD----------------- Lakeland	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
NhA----------------- Norfolk	Slight-----------	Moderate: seepage.	Slight-----------	Slight-----------	Good.
NhB----------------- Norfolk	Slight-----------	Moderate: slope, seepage.	Slight-----------	Slight-----------	Good.
OcA----------------- Orangeburg	Slight-----------	Moderate: seepage.	Slight-----------	Slight-----------	Good.
OcB, OcC------------ Orangeburg	Slight-----------	Moderate: slope, seepage.	Slight-----------	Slight-----------	Good.
OcD----------------- Orangeburg	Moderate: slope.	Severe: slope.	Slight-----------	Moderate: slope.	Fair: slope.
OcuC*:					
Orangeburg---------	Slight-----------	Moderate: slope, seepage.	Slight-----------	Slight-----------	Good.
Urban land.					
Os------------------ Osier	Severe: floods, wetness.	Severe: floods, seepage.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness, too sandy.
Pt*. Pits					
UD*. Urban land					
VaB----------------- Vance	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey.
VaC, VbD2----------- Vance	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
VeC----------------- Vaucluse	Severe: percs slowly.	Moderate: slope.	Slight-----------	Slight-----------	Good.
VeD----------------- Vaucluse	Severe: percs slowly.	Severe: slope.	Slight-----------	Moderate: slope.	Fair: slope.
VuC*:					
Vaucluse-----------	Severe: percs slowly.	Moderate: slope.	Slight-----------	Slight-----------	Good.
Urban land.					
VuD*:					
Vaucluse-----------	Severe: percs slowly.	Severe: slope.	Slight-----------	Moderate: slope.	Fair: slope.
Urban land.					
WvC----------------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Slight-----------	Poor: thin layer.
WvD----------------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgB: Ailey	Good	Poor: excess fines.	Unsuited	Fair: too sandy.
CeB, CeC, CeD: Cecil	Fair: low strength.	Unsuited	Unsuited	Fair: too clayey.
CeuC*:				
Cecil	Fair: low strength.	Unsuited	Unsuited	Fair: too clayey.
Urban land.				
CK*: Chewacla	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Co: Congaree	Fair: low strength.	Unsuited	Unsuited	Good.
CwB, CwC: Cowarts	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
DgB: Davidson	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
DhC2, DhD2: Davidson	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, slope.
FdA, FdB, FdC: Faceville	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
FsB, FsC: Fuquay	Good	Poor: excess fines.	Unsuited: excess fines.	Poor: too sandy.
Gr: Grady	Poor: wetness.	Unsuited	Unsuited	Poor: wetness.
HyB, HyC: Helena	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
HZ*. Hydraquents				
LaC, LaD: Lakeland	Good	Good	Unsuited	Poor: too sandy.
NhA, NhB: Norfolk	Good	Unsuited: excess fines.	Unsuited: excess fines.	Good.
OcA, OcB, OcC, OcD: Orangeburg	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
OcuC*:				
Orangeburg	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Urban land.				
Os: Osier	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy, wetness.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pt*. Pits				
UD*. Urban land				
VaB, VaC, VbD2: Vance	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
VeC, VeD: Vaucluse	Good	Unsuited	Unsuited	Fair: too sandy.
VuC*:				
Vaucluse	Good	Unsuited	Unsuited	Fair: too sandy.
Urban land.				
VuD*:				
Vaucluse	Good	Unsuited	Unsuited	Fair: too sandy.
Urban land.				
WvC, WvD: Wilkes	Fair: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
AgB----------------- Ailey	Slight----------	Moderate: piping.	Not needed-----	Droughty, complex slope.	Cemented pan, complex slope.	Droughty.
CeB, CeC, CeD------ Cecil	Moderate: seepage.	Severe: compressible.	Not needed-----	Complex slope	Complex slope	Complex slope.
CeuC*:						
Cecil--------------	Moderate: seepage.	Severe: compressible.	Not needed-----	Complex slope	Complex slope	Complex slope.
Urban land.						
CK*----------------- Chewacla	Moderate: seepage.	Moderate: piping.	Poor outlets, floods.	Wetness, floods.	Not needed-----	Not needed.
Co------------------ Congaree	Moderate: seepage.	Moderate: compressible, piping, low strength.	Not needed-----	Floods----------	Not needed-----	Not needed.
CwB----------------- Cowarts	Slight----------	Slight----------	Not needed-----	Percs slowly---	Favorable, percs slowly.	Favorable, percs slowly.
CwC----------------- Cowarts	Slight----------	Slight----------	Not needed-----	Slope, percs slowly.	Favorable, percs slowly.	Favorable, percs slowly.
DgB----------------- Davidson	Moderate: seepage.	Moderate: hard to pack.	Not needed-----	Favorable------	Favorable------	Favorable.
DhC2---------------- Davidson	Moderate: seepage.	Moderate: hard to pack.	Not needed-----	Slope-----------	Favorable------	Favorable.
DhD2---------------- Davidson	Moderate: seepage.	Moderate: hard to pack.	Not needed-----	Slope-----------	Slope-----------	Slope.
FdA, FdB----------- Faceville	Moderate: seepage.	Slight----------	Not needed-----	Favorable------	Favorable------	Favorable.
FdC----------------- Faceville	Moderate: seepage.	Slight----------	Not needed-----	Slope-----------	Favorable------	Favorable.
FsB, FsC----------- Fuquay	Slight----------	Moderate: piping.	Not needed-----	Fast intake----	Favorable------	Favorable.
Gr------------------ Grady	Moderate: seepage.	Slight----------	Floods, wetness, poor outlets.	Wetness, percs slowly, floods.	Not needed-----	Not needed.
HyB----------------- Helena	Moderate: depth to rock.	Moderate: shrink-swell, erodes easily.	Not needed-----	Erodes easily	Favorable------	Favorable.
HyC----------------- Helena	Moderate: depth to rock.	Moderate: shrink-swell, erodes easily.	Not needed-----	Erodes easily	Slope-----------	Slope.
HZ*. Hydraquents						
LaC, LaD----------- Lakeland	Severe: seepage.	Severe: seepage, piping.	Not needed-----	Droughty, seepage, fast intake.	Not needed-----	Not needed.
NhA----------------- Norfolk	Moderate: seepage.	Slight----------	Not needed-----	Favorable------	Not needed-----	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
NhB: Norfolk	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
OcA: Orangeburg	Moderate: seepage.	Slight	Not needed	Favorable	Not needed	Favorable.
OcB: Orangeburg	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
OcC: Orangeburg	Moderate: seepage.	Slight	Not needed	Slope	Favorable	Favorable.
OcD: Orangeburg	Moderate: seepage.	Slight	Not needed	Slope	Slope	Slope.
OcuC*: Orangeburg	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
Urban land.						
Os: Osier	Severe: seepage.	Severe: seepage, unstable fill.	Floods, cutbanks cave.	Floods, seepage.	Not needed	Not needed.
Pt*. Pits						
UD*. Urban land						
VaB: Vance	Slight	Moderate: hard to pack.	Not needed	Percs slowly	Percs slowly, erodes easily.	Percs slowly.
VaC, VbD2: Vance	Slight	Moderate: hard to pack.	Not needed	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
VeC, VeD: Vaucluse	Slight	Moderate: piping.	Not needed	Complex slope	Complex slope, percs slowly.	Percs slowly.
VuC*: Vaucluse	Slight	Moderate: piping.	Not needed	Complex slope	Complex slope, percs slowly.	Percs slowly.
Urban land.						
VuD*: Vaucluse	Slight	Moderate: piping.	Not needed	Complex slope	Complex slope, percs slowly.	Percs slowly.
Urban land.						
WvC: Wilkes	Severe: depth to rock.	Severe: thin layer.	Not needed	Complex slope	Depth to rock, complex slope.	Favorable.
WvD: Wilkes	Severe: depth to rock.	Severe: thin layer.	Not needed	Complex slope	Depth to rock, complex slope.	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
AgB: Ailey	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
CeB: Cecil	Slight	Slight	Moderate: slope.	Slight.
CeC, CeD: Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
CeuC*:				
Cecil	Slight	Slight	Severe: slope.	Slight.
Urban land.				
CK*: Chewacla	Severe: wetness, floods.	Severe: floods.	Severe: wetness, floods.	Moderate: wetness, floods.
Co: Congaree	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.
CwB: Cowarts	Slight	Slight	Moderate: slope.	Slight.
CwC: Cowarts	Slight	Slight	Severe: slope.	Slight.
DgB: Davidson	Slight	Slight	Moderate: slope.	Slight.
DhC2, DhD2: Davidson	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
FdA: Faceville	Slight	Slight	Slight	Slight.
FdB: Faceville	Slight	Slight	Moderate: slope.	Slight.
FdC: Faceville	Slight	Slight	Severe: slope.	Slight.
FsB: Fuquay	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.
FsC: Fuquay	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.
Gr: Grady	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness. floods.
HyB: Helena	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly.	Moderate: wetness.
HyC: Helena	Moderate: percs slowly.	Moderate: slope, wetness.	Moderate: percs slowly, slope.	Moderate: wetness.
HZ*. Hydraquents				

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
LaC Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
LaD Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.
NhA Norfolk	Slight	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
NhB Norfolk	Slight	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
OcA Orangeburg	Slight	Slight	Slight	Slight.
OcB Orangeburg	Slight	Slight	Moderate: slope.	Slight.
OcC Orangeburg	Slight	Slight	Severe: slope.	Slight.
OcD Orangeburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
OcuC*: Orangeburg	Slight	Slight	Moderate: slope.	Slight.
Urban land.				
Os Osier	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Pt*. Pits				
UD*. Urban land				
VaB Vance	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
VaC, VbD2 Vance	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope, percs slowly.	Slight.
VeC, VeD Vaucluse	Moderate: percs slowly, too sandy.	Moderate: too sandy.	Severe: slope.	Slight.
VuC*: Vaucluse	Moderate: percs slowly, too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Slight.
Urban land.				
VuD*: Vaucluse	Moderate: percs slowly. too sandy.	Moderate: too sandy.	Severe: slope.	Slight.
Urban land.				

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
WvC Wilkes	Slight	Slight	Severe: slope.	Slight.
WvD Wilkes	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgB----------------- Ailey	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
CeB----------------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeC, CeD----------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeuC*:										
Cecil--------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
CK*----------------- Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
Co------------------ Congaree	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CwB----------------- Cowarts	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CwC----------------- Cowarts	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DgB----------------- Davidson	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Poor.
DhC2, DhD2---------- Davidson	Fair	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
FdA----------------- Faceville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FdB----------------- Faceville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FdC----------------- Faceville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FsB----------------- Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
FsC----------------- Fuquay	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Gr------------------ Grady	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
HyB----------------- Helena	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HyC----------------- Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HZ*. Hydraquents										
LaC, LaD----------- Lakeland	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
NhA, NhB------------ Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OcA, OcB------------ Orangeburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OcC, OcD------------ Orangeburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
OcuC*:										
Orangeburg---------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
Os------------------ Osier	Very poor.	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
Pt*. Pits										
UD*. Urban land										
VaB----------------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaC----------------- Vance	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
VbD2---------------- Vance	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VeC----------------- Vaucluse	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VeD----------------- Vaucluse	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VuC*:										
Vaucluse-----------	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Urban land.										
VuD*:										
Vaucluse-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Urban land.										
WvC, WvD------------ Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AgB----------------- Ailey	0-30	Loamy sand------	SM, SP-SM	A-2, A-3	0	85-100	75-100	50-80	5-20	---	NP
	30-50	Sandy loam, sandy clay loam.	SM, SC	A-2, A-4, A-6	0	90-100	75-100	60-90	30-40	30-40	8-16
	50-65	Sandy loam, sandy clay loam.	SM, SC	A-2, A-4, A-6	0	90-100	75-100	55-90	20-40	28-40	8-14
CeB, CeC, CeD------ Cecil	0-6	Sandy loam------	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	6-52	Clay------------	MH, ML	A-7	0	97-100	92-100	72-99	55-95	41-80	9-37
	52-65	Weathered bedrock.	---	---	---	---	---	---	---	---	---
CeuC*: Cecil-------------	0-6	Sandy loam------	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	6-52	Clay------------	MH, ML	A-7	0	97-100	92-100	72-99	55-95	41-80	9-37
	52-65	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
CK*----------------- Chewacla	0-18	Silt loam-------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	70-100	55-90	36-50	4-18
	18-60	Silt loam, silty clay loam, clay loam.	ML, CL, MH	A-4, A-5, A-6, A-7	0	96-100	95-100	80-100	51-98	36-56	4-20
	60-70	Variable--------	---	---	---	---	---	---	---	---	---
Co------------------ Congaree	0-18	Silt loam-------	CL-ML, ML, CL	A-4	0	95-100	95-100	70-100	51-90	20-35	3-10
	18-25	Silty clay loam, fine sandy loam, loam.	SM, SC, ML, CL	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	4-22
	25-65	Variable--------	---	---	---	---	---	---	---	---	---
CwB, CwC----------- Cowarts	0-8	Sandy loam------	SM, SM-SC	A-2, A-4	0	95-100	92-100	75-90	20-40	<25	NP-5
	8-19	Sandy clay loam, sandy loam.	SM-SC, SC, SM	A-2, A-4, A-6	0	95-100	90-100	68-90	23-45	<40	NP-15
	19-65	Sandy clay loam, sandy clay.	SM-SC, SC	A-2, A-4, A-6, A-7	0	85-100	80-100	70-95	30-50	25-45	4-20
DgB----------------- Davidson	0-10	Loam------------	CL, CL-ML, ML	A-4, A-6	0	94-100	84-100	80-95	60-75	18-30	4-15
	10-65	Clay------------	CL, CH, ML, MH	A-7, A-6	0	96-100	95-100	85-100	65-85	35-65	15-35
DhC2, DhD2--------- Davidson	0-5	Clay loam-------	CL, SC, CL-ML, SM-SC	A-6, A-4	0	94-100	84-100	75-95	40-70	25-40	5-18
	5-65	Clay------------	CL, CH, ML, MH	A-7, A-6	0	96-100	95-100	85-100	65-85	35-65	15-35

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
FdA, FdB, FdC------ Faceville	0-6	Sandy loam------	SM, SM-SC	A-2, A-4	0	90-100	85-100	72-97	17-38	<25	NP-5
	6-14	Sandy clay loam, sandy clay.	SC, ML, CL, SM	A-4, A-6	0	98-100	90-100	85-98	46-66	<35	NP-13
	14-65	Sandy clay, clay, clay loam.	CL, SC	A-6, A-7	0	98-100	95-100	75-99	45-72	25-43	11-23
FsB, FsC----------- Fuquay	0-24	Loamy sand------	SP-SM, SM	A-2, A-3	0	95-100	90-100	50-83	5-35	---	NP
	24-50	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	85-100	85-100	60-80	23-45	<25	NP-13
	50-65	Sandy clay loam	SC, CL	A-2, A-4, A-6	0	95-100	90-100	60-93	28-55	20-39	8-25
Gr----------------- Grady	0-6	Sandy loam------	SM, ML, CL-ML, SM-SC	A-4, A-6	0	100	99-100	85-100	40-75	<30	NP-15
	6-10	Clay loam, sandy clay loam, loam.	CL, CH	A-6	0	100	100	90-100	51-80	25-40	11-20
	10-60	Clay, sandy clay	CL, ML, CH	A-6, A-7	0	100	100	90-100	55-90	30-50	12-25
HyB, HyC----------- Helena	0-11	Sandy loam------	SM, SM-SC	A-2, A-4	0	95-100	90-100	51-86	27-46	<25	NP-7
	11-40	Clay loam, sandy clay, clay.	CH, MH	A-7	0	95-100	95-100	73-93	56-80	50-85	24-50
	40-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
HZ*. Hydraquents											
LaC, LaD----------- Lakeland	0-60	Sand------------	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	60-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
NhA, NhB----------- Norfolk	0-12	Sandy loam------	SM, SM-SC, SC	A-2	0	95-100	95-100	50-91	15-33	<25	NP-14
	12-70	Sandy loam, sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-55	20-40	4-20
OcA, OcB, OcC, OcD- Orangeburg	0-8	Sandy loam------	SM	A-2	0	98-100	95-100	75-95	20-35	---	NP
	8-60	Sandy clay loam	SC, CL	A-6, A-4	0	98-100	95-100	71-91	38-55	22-40	8-19
OcuC*:											
Orangeburg--------	0-8	Sandy loam------	SM	A-2	0	98-100	95-100	75-95	20-35	---	NP
	8-60	Sandy clay loam	SC, CL	A-6, A-4	0	98-100	95-100	71-91	38-55	22-40	8-19
Urban land.											
Os----------------- Osier	0-4	Loamy sand------	SP-SM	A-2, A-3	0	100	98-100	60-85	5-12	---	NP
	4-20	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	95-100	65-90	5-20	---	NP
	20-60	Coarse sand, sand, fine sand.	SP, SP-SM	A-1, A-3	0	100	90-100	40-60	2-10	---	NP
Pt*. Pits											

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
UD*. Urban land											
VaB, VaC----------- Vance	0-8	Sandy loam------	SM, SM-SC	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-5
	8-44	Clay loam, sandy clay, clay.	CH, MH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	44-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
VbD2--------------- Vance	0-3	Sandy clay loam	CL, SC	A-6	0-5	95-100	90-100	70-95	40-70	25-40	8-20
	3-44	Clay loam, sandy clay, clay.	CH, MH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	44-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
VeC, VeD----------- Vaucluse	0-8	Loamy sand------	SM, SP-SM	A-2, A-3	0	98-100	90-100	51-70	8-30	---	NP
	8-23	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	98-100	90-100	51-70	25-50	20-40	5-18
	23-60	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC	A-2, A-4, A-6	0	95-100	92-100	55-75	20-50	22-40	4-20
VuC*, VuD*: Vaucluse----------	0-8	Loamy sand------	SM, SP-SM	A-2, A-3	0	98-100	90-100	51-70	8-30	---	NP
	8-23	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	98-100	90-100	51-70	25-50	20-40	5-18
	23-60	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC	A-2, A-4, A-6	0	95-100	92-100	55-75	20-50	22-40	4-20
Urban land.											
WvC, WvD----------- Wilkes	0-8	Gravelly sandy loam.	SM, SM-SC	A-2, A-4, A-1-b	10-25	70-80	60-75	45-75	20-49	<20	NP-7
	8-17	Clay loam, clay, sandy clay loam.	CL, CH, MH, ML	A-6, A-7	0-10	80-100	80-100	75-95	50-80	30-60	11-32
	17-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
AgB	0-30	6.0-20	0.03-0.05	4.5-6.5	Low	Low	Moderate	0.20	4
Ailey	30-50	0.6-2.0	0.09-0.12	4.5-5.5	Low	Moderate	Moderate	0.24	
	50-65	0.06-0.2	0.06-0.10	4.5-5.5	Low	Moderate	Moderate	0.17	
CeB, CeC, CeD	0-6	2.0-6.0	0.12-0.14	4.5-6.0	Low	Moderate	Moderate	0.28	3
Cecil	6-52	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	52-65	---	---	---	---	---	---	---	
CeuC*:									
Cecil	0-6	2.0-6.0	0.12-0.14	4.5-6.0	Low	Moderate	Moderate	0.28	3
	6-52	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	52-65	---	---	---	---	---	---	---	
Urban land.									
CK*	0-18	0.6-2.0	0.15-0.24	5.1-6.5	Low	High	Moderate	0.28	4
Chewacla	18-60	0.6-2.0	0.15-0.24	5.6-6.5	Low	High	Moderate	0.32	
	60-70	---	---	---	---	---	---	---	
Co	0-18	0.6-2.0	0.12-0.20	5.1-7.3	Low	Moderate	Moderate	0.37	5
Congaree	18-25	0.6-2.0	0.12-0.20	5.1-7.3	Low	Moderate	Moderate	0.37	
	25-65	---	---	---	---	---	---	---	
CwB, CwC	0-8	2.0-6.0	0.08-0.13	4.5-5.5	Very low	Moderate	Moderate	0.24	3
Cowarts	8-19	0.6-2.0	0.10-0.14	4.5-5.5	Low	Moderate	Moderate	0.28	
	19-65	0.06-0.2	0.08-0.12	4.5-5.5	Low	Moderate	Moderate	0.24	
DgB	0-10	0.6-2.0	0.14-0.18	4.5-6.5	Low	High	Moderate	0.28	5
Davidson	10-65	0.6-2.0	0.12-0.16	4.5-6.0	Low	High	Moderate	0.24	
DhC2, DhD2	0-5	0.6-2.0	0.14-0.18	4.5-6.5	Low	High	Moderate	0.28	5
Davidson	5-65	0.6-2.0	0.12-0.16	4.5-6.0	Low	High	Moderate	0.24	
FdA, FdB, FdC	0-6	6.0-20	0.06-0.09	4.5-5.5	Low	Low	Moderate	0.28	5
Faceville	6-14	0.6-2.0	0.12-0.15	4.5-5.5	Low	Low	Moderate	0.37	
	14-65	0.6-2.0	0.12-0.18	4.5-5.5	Low	Low	Moderate	0.37	
FsB, FsC	0-24	>6.0	0.04-0.09	4.5-5.5	Low	Low	High	0.20	5
Fuquay	24-50	0.6-2.0	0.12-0.15	4.5-5.5	Low	Low	High	0.20	
	50-65	0.06-0.2	0.10-0.13	4.5-5.5	Low	Low	High	0.20	
Gr	0-6	0.6-2.0	0.10-0.18	3.6-5.5	Low	High	High	0.10	---
Grady	6-10	0.2-0.6	0.10-0.15	3.6-5.5	Low	High	High	0.10	
	10-60	0.06-0.2	0.12-0.16	3.6-5.5	Moderate	High	High	0.10	
HyB, HyC	0-11	2.0-6.0	0.10-0.12	4.5-6.0	Low	High	Moderate	0.37	3
Helena	11-40	0.06-0.2	0.13-0.15	4.5-5.5	High	High	High	0.32	
	40-60	---	---	---	---	---	---	---	
HZ*. Hydraquents									
LaC, LaD	0-60	>20	0.05-0.08	4.5-6.0	Very low	Low	Moderate	0.17	5
Lakeland	60-80	>20	0.03-0.08	4.5-6.0	Very low	Low	Moderate	---	
NhA, NhB	0-12	2.0-6.0	0.06-0.10	4.5-6.0	Low	Moderate	High	0.17	5
Norfolk	12-70	0.6-2.0	0.10-0.15	4.5-5.5	Low	Moderate	High	0.24	
OcA, OcB, OcC, OcD	0-8	2.0-6.0	0.07-0.10	4.5-6.0	Low	Moderate	Moderate	0.24	5
Orangeburg	8-60	0.6-2.0	0.10-0.13	4.5-5.5	Low	Moderate	Moderate	0.24	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
OcuC:									
Orangeburg	0-8	2.0-6.0	0.07-0.10	4.5-6.0	Low	Moderate	Moderate	0.24	5
	8-60	0.6-2.0	0.10-0.13	4.5-5.5	Low	Moderate	Moderate	0.24	
Urban land.									
Os	0-4	6.0-20	0.03-0.10	4.5-6.0	Low	High	High	---	---
Osier	4-20	6.0-20	0.03-0.10	4.5-6.0	Low	High	High	---	
	20-60	>20	0.02-0.05	4.5-6.0	Low	High	High	---	
Pt*. Pits									
UD*. Urban land									
VaB, VaC	0-8	2.0-6.0	0.10-0.14	4.5-6.0	Low	High	Moderate	0.28	3
Vance	8-44	0.06-0.2	0.12-0.15	4.5-5.5	Moderate	High	High	0.37	
	44-60	---	---	---				---	
VbD2	0-3	0.6-2.0	0.12-0.15	4.5-6.0	Low	High	Moderate	0.37	1
Vance	3-44	0.06-0.2	0.12-0.15	4.5-5.5	Moderate	High	High	0.37	
	44-60	---	---	---				---	
VeC, VeD	0-8	6.0-20	0.04-0.08	4.5-5.5	Low	Low	High	0.17	3
Vaucluse	8-23	0.6-6.0	0.10-0.15	4.5-5.5	Low	Low	High	0.20	
	23-60	0.06-0.2	0.05-0.08	4.0-5.5	Low	Low	High	0.17	
VuC*, VuD*:									
Vaucluse	0-8	6.0-20	0.04-0.08	4.5-5.5	Low	Low	High	0.17	3
	8-23	0.6-6.0	0.10-0.15	4.5-5.5	Low	Low	High	0.20	
	23-60	0.06-0.2	0.05-0.08	4.0-5.5	Low	Low	High	0.17	
Urban land.									
WvC, WvD	0-8	2.0-6.0	0.10-0.14	5.1-6.5	Low	Moderate	Moderate	0.24	2
Wilkes	8-17	0.2-0.6	0.15-0.20	6.1-7.8	Moderate	Moderate	Moderate	0.32	
	17-40	---	---	---				---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain such terms as "rare," "brief," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
AgB---------------- Ailey	B	None---------	---	---	>6.0	---	---	>60	---
CeB, CeC, CeD----- Cecil	B	None---------	---	---	>6.0	---	---	>60	---
CeuC*: Cecil-------------	B	None---------	---	---	>6.0	---	---	>60	---
Urban land.									
CK*---------------- Chewacla	C	Common-------	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---
Co----------------- Congaree	B	Frequent----	Brief-----	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---
CwB, CwC---------- Cowarts	C	None---------	---	---	2.0-3.0	Perched	Jan-Mar	>60	---
DgB, DhC2, DhD2--- Davidson	B	None---------	---	---	>6.0	---	---	>60	---
FdA, FdB, FdC----- Faceville	B	None---------	---	---	>6.0	---	---	>60	---
FsB, FsC---------- Fuquay	B	None---------	---	---	2.5-4.0	Perched	Jan-Mar	>60	---
Gr----------------- Grady	D	Frequent----	Very long	Dec-Jun	**(2)-1.0	Swamp	Dec-Jun	>60	---
HyB, HyC---------- Helena	C	None---------	---	---	1.0-2.5	Perched	Jan-Mar	>48	Rippable
HZ*. Hydraquents									
LaC, LaD---------- Lakeland	A	None---------	---	---	>6.0	---	---	>72	---
NhA, NhB---------- Norfolk	B	None---------	---	---	>6.0	---	---	>60	---
OcA, OcB, OcC, OcD--------------- Orangeburg	B	None---------	---	---	>6.0	---	---	>60	---
OcuC*: Orangeburg--------	B	None---------	---	---	>6.0	---	---	>60	---
Urban land.									
Os----------------- Osier	D	Common-------	Brief-----	Dec-Apr	0.0-1.0	Apparent	Nov-Mar	>60	---
Pt*. Pits									
UD*. Urban land									

See footnotes at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
VaB, VaC, VbD2---- Vance	C	None--------	---	---	>6.0	---	---	>60	---
VeC, VeD---------- Vaucluse	C	None--------	---	---	>6.0	---	---	>60	---
VuC*, VuD*: Vaucluse---------	C	None--------	---	---	>6.0	---	---	>60	---
Urban land.									
WvC, WvD---------- Wilkes	C	None--------	---	---	>6.0	---	---	40-80	Hard

* See description of the map unit for composition and behavior characteristics of the map unit.
** (2) indicates high water table is 2 feet deep on the surface.

TABLE 18.--ENGINEERING TEST DATA

Soil name and location	SCS No. S76GA-	Depth	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture	Volume change: Shrinkage	Volume change: Swell	Volume change: Total	Mechanical analysis, Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO	Classification: Unified
		In	Lb/ft3	Pct	Pct	Pct	Pct												
Ailey loamy sand:																			
In an idle field, 0.6 mile southwest of intersection of U.S. Highway 80 and Interstate 475; 150 yards south on Ivey Drive and 75 feet east.	11-2-2	8-30	121	10	0.3	2.2	2.5	100	97	61	18	17	12	7	4	---	NP	A-2-4(0)	SM
	11-2-4	40-50	115	11	2.5	5.9	8.4	100	97	75	32	30	26	20	18	23	8	A-2-4(0)	SC
	11-2-6	56-65	103	15	2.0	4.2	6.2	100	99	57	34	33	32	29	27	40	15	A-2-6(1)	SC

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ailey	Loamy, siliceous, thermic Arenic Fragiudults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Cowarts	Fine-loamy, siliceous, thermic Fragic Paleudults
Davidson	Clayey, kaolinitic, thermic Rhodic Paleudults
Faceville	Clayey, kaolinitic, thermic Typic Paleudults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Grady	Clayey, kaolinitic, thermic Typic Paleaquults
Helena	Clayey, mixed, thermic Aquic Hapludults
Hydraquents	Typic Hydraquents
Lakeland	Thermic, coated Typic Quartzipsamments
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Orangeburg	Fine-loamy, siliceous, thermic Typic Paleudults
Osier	Siliceous, thermic Typic Psammaquents
Vance	Clayey, mixed, thermic Typic Hapludults
Vaucluse	Fine-loamy, siliceous, thermic Typic Fragiudults
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs

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