SOIL SURVEY

Saluda County, South Carolina

United States Department of Agriculture
Soil Conservation Service
In cooperation with
South Carolina Agricultural Experiment Station

Series 1958, No. 21
Issued August 1962

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of Saluda County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; serve as a reference for students and teachers; aid foresters in managing woodlands; help county planning or development boards to decide on future development of the area; and add to our knowledge of soils.

In making this soil survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in the growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from the photographs the detailed soil map in the back of this report. Fields, woods, roads, and many other landmarks can be seen on the map.

This soil survey was made as part of the technical assistance furnished by the Soil Conservation Service to the Lower Saluda Soil Conservation District. The fieldwork was completed in 1958. Unless otherwise indicated, all statements refer to conditions at the time the survey was in progress.

Locating the soils

Turn to the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show what part of the county each sheet of the large map covers. To locate your farm on this index map, look for roads, streams, towns, and other familiar landmarks. When you have found the correct sheet of the large map, you will note that the soil areas are outlined and that each soil is designated by a symbol. All areas marked with the same symbol are the same kind of soil.

Suppose, for example, the area you have located on the map has the symbol GeB. The legend for the detailed map shows that this symbol identifies Georgeville silt loam, 2 to 6 percent slopes. This soil and all others mapped in the county are described in the section "Soil Series and Mapping Units." The Guide to Mapping Units at the back of the report gives the map symbol for each soil, the name of the soil, and the capability unit and woodland group in which it has been placed.

Finding information

Some readers will be more interested in one part of the report than another.

Farmers and those who work with farmers will want to refer to the section "Soil Series and Mapping Units" to learn about the soils on their farm. They can then turn to the section "Management of the Soils" to find how these soils can be managed and what yields can be expected. Within this section the soils are placed in capability units, or groups of soils that respond in about the same way. The last two parts of this section show the relative suitability of the different soils for specified crops and the probable yields of certain crops. The section on "Agriculture" gives a brief history of agriculture in the county and includes some agricultural statistics.

Foresters and those interested in woodland and wildlife can refer to the section "Use of the Soils for Woodland and Wildlife." The first part tells of the hazards involved in growing trees on different soils and the yields that can be expected from the most important kinds of pine. The last part concerns the use of the soils for growing wildlife food and includes some suggestions for managing ponds for fish and ducks.

Engineers will find useful information in the section "Engineering Properties of the Soils," which evaluates the mapping units in terms of soil mechanics.

Soil scientists will find information about how the soils were formed by reading the section "Genesis, Classification, and Morphology of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest. Those not familiar with the county may want to refer to the section "General Soil Areas," which gives a broad summary of the soils in the county. They may also want to refer to the section "Additional Facts About the County."

Cover illustration.—General landscape of Saluda County.

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Series 1958, No. 21

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SOIL SURVEY OF SALUDA COUNTY, SOUTH CAROLINA

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U.S. DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION

SALUDA COUNTY is in the west-central part of South Carolina (fig. 1). It is bounded on the east by Lexington and Aiken Counties, on the south by Edgefield County, on the west by Edgefield and Greenwood Counties, and on the north by the Saluda River. Saluda is the county seat.

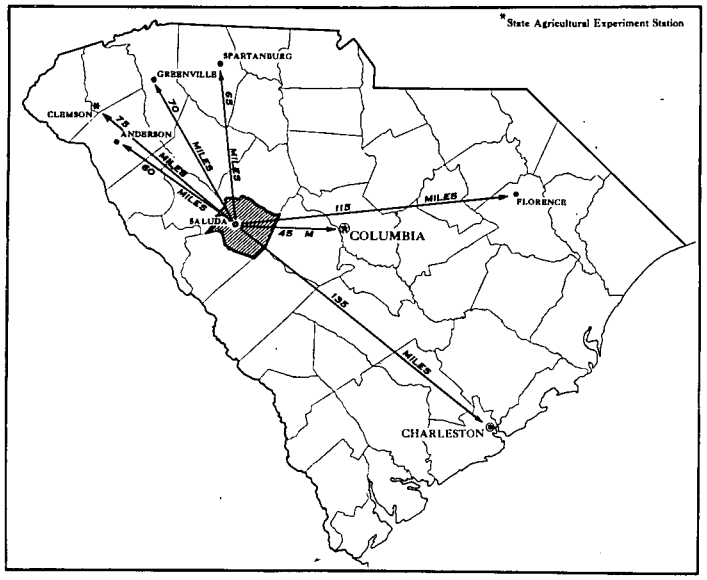

Figure 1.—**Location of Saluda County in South Carolina.**

The total area of the county is 450 square miles, or 288,000 acres, of which about 5,120 acres is water. Lake Murray extends into the northeastern part and is the largest body of water in the county. Sumter National Forest occupies about 4,000 acres in the western part of the county.

The soils of the county developed under a mixed forest in an environment of moderately high temperature and moderately heavy, well-distributed rainfall. Nearly all of the soils have been cultivated at some time or other, but many large areas were abandoned after they became eroded. These areas have reverted to forest, predominantly of pine. Other smaller areas have been planted to pine. In 1954 about 54 percent of the acreage was in forest.

How Soils Are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Saluda County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, which are called horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by plant roots.

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important distinguishing characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first described and mapped. Cecil and Herndon, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

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

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their

management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Herndon silt loam, 2 to 6 percent slopes, is one of several phases of Herndon silt loam, a soil type that ranges from nearly level to steep.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. Photos are used for a base map because they show woodlands, buildings, field borders, trees, and other details that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

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

In most mapping, there are areas to be shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Gullied land or Sloping sandy land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientist had named and described the soil series and mapping units and had shown the location of the mapping units on the soil map. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands, and engineers.

To do this efficiently, he had to consult with persons in other fields of work and jointly prepare with them groupings that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed mainly for those interested in producing crops and tame pasture; woodland suitability groups, for those who manage wooded tracts; and engineering characteristics and classifications, for those who build highways or structures to conserve soil and water.

General Soil Areas

After study of the soils in a locality and the way in which they are arranged, it is possible to make a general map that shows the main patterns of the soils. Such a map is the colored general soil map in the back of this report. The general soil areas are also called soil associations. Each kind of general soil area, or association, as a rule contains a few major soils and several minor soils in a pattern that is characteristic although not strictly uniform.

The soils within any one association are likely to differ greatly among themselves in some properties—for example, slope, depth, stoniness, or natural drainage. Thus, the general map does not show the kind of soil at any particular place but a pattern that has in it several kinds of different soils.

The general soil areas are named for the major soil series in them, but, as already noted, soils of other series may also be present. The major soil series of one general soil area may also be present in another area but in a different pattern.

The general map that shows patterns of soils is useful to people who want a general idea of the soils, who want to compare different parts of the county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

There are nine soil associations in Saluda County. Following are descriptions of these associations.

Association 1

Level to sloping soils on first bottoms and stream terraces: Congaree, Mixed alluvial land, Mixed wet alluvial land

This association consists of soils on narrow bottom lands and stream terraces. These soils occupy about 5 percent of the county and occur along the Saluda and Little Saluda Rivers and along Clouds, Richland, Mine, Red Bank, and Big Creeks (fig. 2). All of these soils are deep over bedrock.

The dominant soils are of the Congaree series. They developed from general alluvium and are well drained. To a depth of 27 to 40 inches these soils consist of dark-brown fine sandy loam to silt loam. This is underlain by mottled yellowish-brown and brown silty clay loam to loamy fine sand. The two land types in this association, Mixed alluvial land and Mixed wet alluvial land, are on first bottoms and consist of recent alluvium that varies in texture.

The minor soils of this association are of the Altavista, Wehadkee, Chewacla, Hiwassee, Goldston, and Wilkes series. The Altavista soils are on stream terraces. They are moderately well drained and have a surface layer of silt loam and a subsoil of clay loam to clay. The mottled, gray Wehadkee soils are on first bottoms and are poorly drained. The somewhat poorly drained Chewacla soils also are on first bottoms. The well-drained, dark-red Hiwassee soils are on the older and higher stream terraces. The well drained Goldston soils and the well drained to excessively drained Wilkes soils are adjacent to bottom lands and stream terraces. In places they are on moderately steep breaks between the bottom lands and high stream terraces.

The Congaree soils form about 50 percent of the association; Mixed alluvial land and Mixed wet alluvial land, 35 percent; and the minor soils, 15 percent. Soils of capability subclasses IIw, IIIw, and Vw make up about 92 percent of the acreage. About 50 percent of the acreage is in pasture.

Most of the farms are between 100 and 300 acres in size and are farmed full time. They are mainly beef-cattle farms. The soils on terraces are well suited to many crops, including small grain, corn, grain sorghum, and truck crops. The soils on bottom lands are well suited to corn and certain legumes but are frequently flooded for short periods. Crops are lost about once in every 4 years. Dallisgrass, bermudagrass, tall fescue, and whiteclover are well-suited pasture plants.

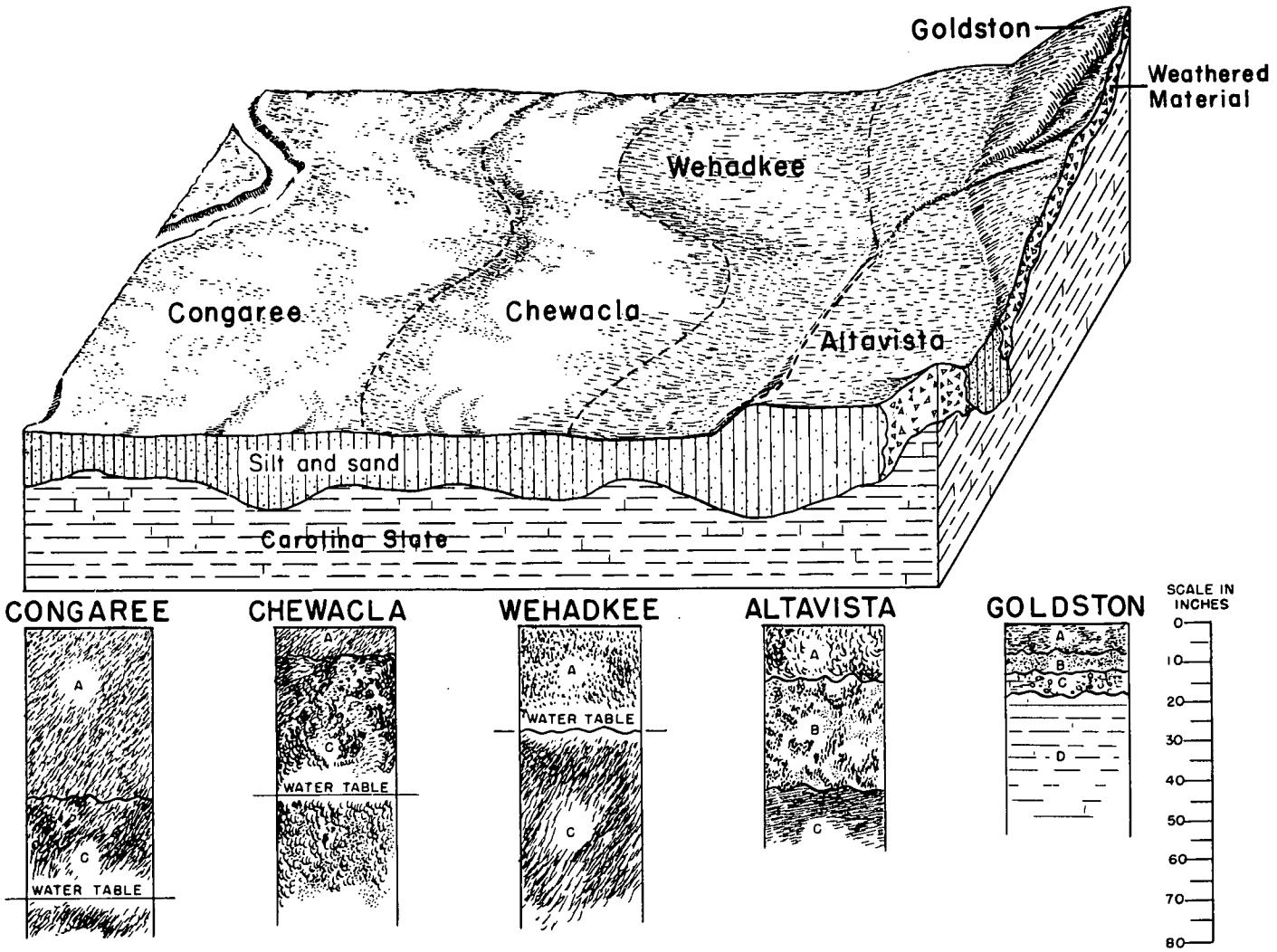

Figure 2.—**Landscape showing association of soils developed in alluvium.**

Association 2

Nearly level to sloping sandy soils of the Coastal Plain uplands: Norfolk, Ruston, Lakeland

This association consists of soils on broad uplands dissected by a few shallow and narrow drainageways. In some places the slopes adjacent to the larger drainageways are short and strongly sloping. A few depressions, locally called Carolina bays, are in this association. Bedrock is at a depth of more than 10 feet. This association covers about 2 percent of the county and is in the extreme southeastern part.

The dominant soil types are Norfolk loamy sand, thick surface; Ruston loamy sand, thick surface; and Lakeland sand. These soils developed from unconsolidated beds of sand and clay. The surface layer ranges from loamy sand to sand. Norfolk loamy sand, thick surface, has an excessively drained surface layer and a well drained subsoil. Its yellowish-brown subsoil of sandy clay loam is at a depth of about 21 inches. Ruston loamy sand, thick surface, has an excessively drained surface layer. Its strong-brown to red subsoil of sandy clay loam is at a depth of about 24 inches. Lakeland sand is excessively drained and is sandy throughout.

The minor soils of this association are of the Vaucluse, Gilead, and Grady series. The Vaucluse soils are well drained and are on the short, stronger slopes. The Gilead soils are moderately well drained and are near the streams. Mixed wet alluvial land is along the streams. Sloping sandy land is on the short, stronger slopes from streams. Local alluvial land is in shallow depressions on the uplands. The poorly drained to very poorly drained Grady soils are in the bays.

Norfolk loamy sand, thick surface, makes up about 30 percent of this association; Ruston loamy sand, thick surface, 25 percent; Lakeland sand, 20 percent; and the remaining soils, about 25 percent. Soils of capability classes II and III make up more than 80 percent of the acreage.

The surface layer of the soils in this association is severely leached. Wind erosion is a hazard.

Most farms are more than 200 acres in size and are mainly general farms or peach farms. Farming is on a full-time basis.

The soils of this association are easy to work, and about 90 percent of the acreage is in crops. The crops commonly grown are small grain, cotton, soybeans, peaches, corn, and some asparagus. Much of the acreage is slightly droughty and is not well suited to pasture.

Association 3

Nearly level to sloping soils of the Coastal Plain uplands; reddish sandy clay loam to clay subsoil: Magnolia, Faceville, Ruston

This association consists of soils on broad uplands dissected by a few shallow drainageways. The slopes adjacent to the streams are relatively narrow. Some ridgetops are broad and nearly level and are about 75 acres in size. Locally, this area is called the ridge, (fig. 3). It is in the extreme southern and southeastern parts and makes up about 4 percent of the county.

The dominant soils are of the Magnolia, Faceville, and Ruston series. They developed from unconsolidated beds of sand and clay. The surface layer is sandy loam. Bedrock is at a depth of more than 10 feet. The Magnolia soils are well drained and have a red to dark-red subsoil of clay loam to clay. The Faceville and Ruston soils are well drained and have a strong-brown to red subsoil. The subsoil of the Faceville soils is sandy clay to clay; that of the Ruston soils is friable sandy clay loam.

Soils of the Vaucluse, Grady, Marlboro, and Norfolk series and Local alluvial land, Mixed wet alluvial land, and Sloping sandy land make up the rest of this association. The Vaucluse soils are well drained and are on some of the stronger slopes. The poorly drained to very poorly drained Grady soils are in large depressions, locally called bays. The Marlboro and Norfolk soils are well drained. Local alluvial land is in the small, shallow, depressions and along shallow drainageways; Mixed wet

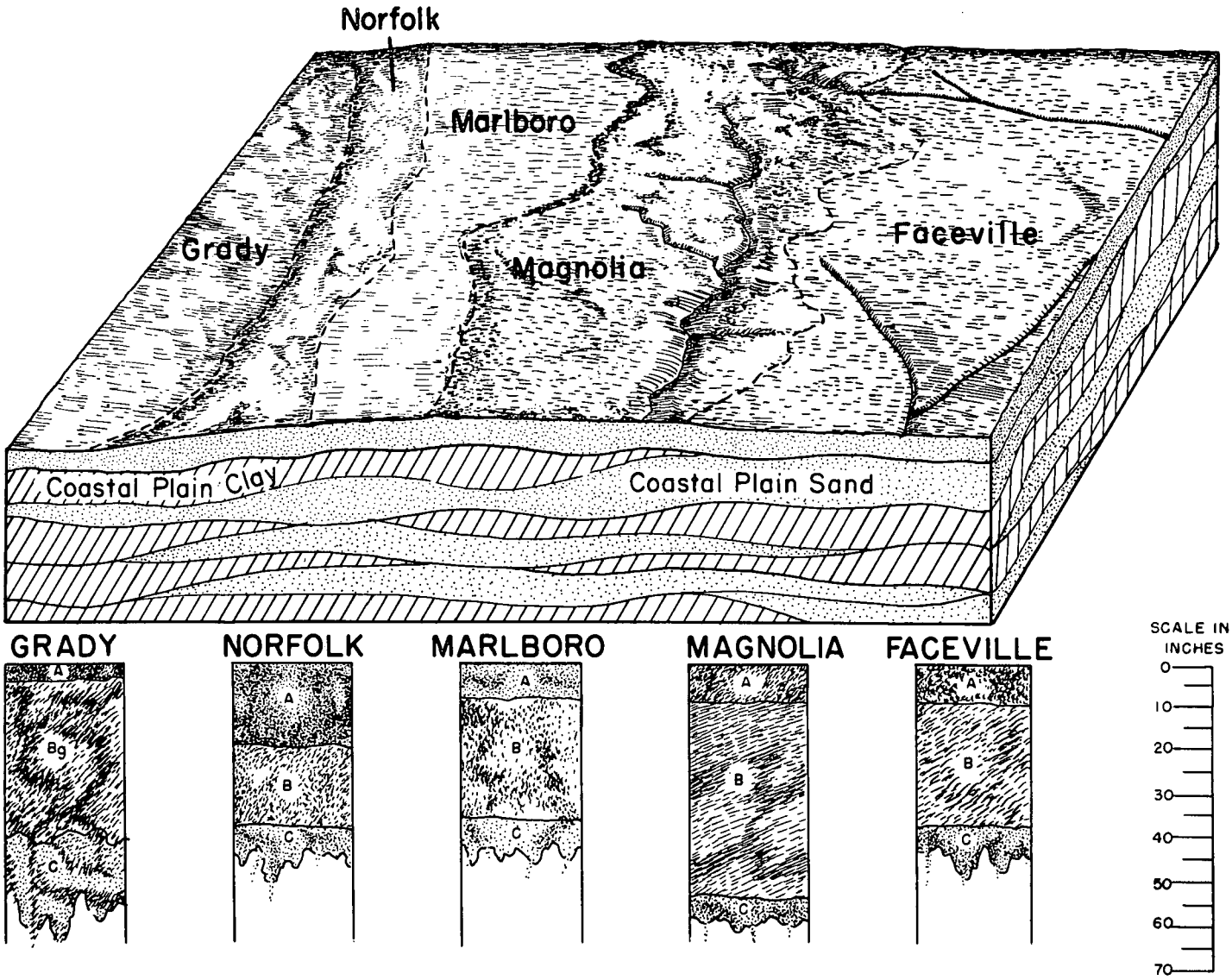

Figure 3.—Landscape showing association of Coastal Plain soils in the ridge section.

alluvial land is along the streams; and Sloping sandy land is on the sharp breaks.

The Magnolia soils form about 45 percent of the association; the Faceville soils, about 25 percent; the Ruston soils, about 15 percent; the Grady soils and the other minor soils, about 15 percent. Soils of capability classes I, II, and III make up more than 90 percent of the acreage. About 92 percent of the acreage is cultivated. About 8 percent is in pasture or woods or is used for nonagricultural purposes.

The soils of this association have a shallower surface layer than the soils of association 2 and a finer textured subsoil. They also are less droughty.

Most of the farms are more than 200 acres in size. Most of the farming is full time and of the general type, but there are some farms that specialize in peaches. There are also a few large beef-cattle farms. The principal crops are small grain, soybeans, cotton, peaches, grain sorghum, and some truck crops. Bermudagrass, tall fescue, dallisgrass, bahiagrass, annual lespedeza, white clover, and crimson clover are the commonly grown pasture plants.

Association 4

Gently sloping to moderately steep soils of the uplands; Coastal Plain material over Piedmont residuum: Chesterfield, Bradley

This association consists of soils on relatively narrow uplands dissected by many shallow to moderately deep drainageways. The slopes adjacent to streams are broken and are sloping to moderately steep. This association covers about 3 percent of the county. It is in an irregular strip in the southern and southeastern parts. It varies in width from about ¼ to 1½ miles.

The Chesterfield and Bradley soils are dominant. They developed from marine deposits underlain by gneiss, granite, and Carolina slate. In most places bedrock is at a depth of more than 5 feet. The surface layer is sandy loam. The Chesterfield soils are well drained and have a yellowish-brown to yellow, clayey subsoil that is mottled in the lower part. The Bradley soils are well drained and have a yellowish-red to reddish-yellow, clayey subsoil. Mixed wet alluvial land is along the streams, and Local alluvial land is in the shallow depressions.

The Chesterfield soils form about 51 percent of the association; the Bradley soils, 46 percent; and the rest, 3 percent. About 65 percent of the acreage is in capability class II, 25 percent is in capability class III, and the rest is in capability classes IV, V, and VI. About 60 percent of the acreage is cultivated, 25 percent is in woods, and 15 percent is in pasture.

Some small, widely scattered areas have a considerable amount of water-rounded gravel in the surface layer, but not enough to interfere with tillage. This gravel seems to lessen the hazard of erosion.

Most of the farms are between 80 and 100 acres in size, but a few are larger. Most farming is full time and of the general type. There are a few dairy and beef-cattle farms and a few poultry farms. The principal crops are small grain, corn, cotton, grain sorghum, and some truck crops. Bermudagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, and whiteclover are grown for grazing.

Association 5

Gently sloping to strongly sloping soils of the Piedmont uplands; sandy loam surface soil, yellowish-brown to brownish-yellow subsoil: Appling, Durham, Helena

This association consists of soils on broad uplands dissected by many narrow drainageways. The slopes adjacent to the streams are short and are sloping to strongly sloping. At the heads of drainageways and in shallow depressions between drainageways, gently sloping areas are common. This association covers about 4 percent of the county and is in the southeastern part near Holston Crossroads.

The dominant soils are of the Appling, Durham, and Helena series. These soils formed from material weathered from granite and gneiss. In most places bedrock is at a depth of more than 5 feet. The surface layer is sandy loam. The Appling soils are well drained and have a yellowish-brown to yellowish-red subsoil of clay loam. The Durham soils are well drained and have a yellow to yellowish-brown subsoil of clay loam to clay. The Helena soils are moderately well drained to somewhat poorly drained and have a tough, mottled brownish-yellow to yellowish-brown, clayey subsoil.

Soils of the Cecil, Colfax, Worsham, Durham, Lloyd, Enon, and Wilkes series, and Local alluvial land, Mixed alluvial land, and Mixed wet alluvial land make up the rest of the association.

The Cecil soils are in the northern part of this association. They are well drained and have a red clayey subsoil. The somewhat poorly drained Colfax soils are at heads of drainageways, and the poorly drained Worsham soils are along small drains and streams. There are areas of well-drained Durham loamy sand, thick surface phase, in the central part of this association. Areas of well drained Lloyd soils and well drained to moderately well drained Enon soils are in the northeastern and southwestern parts of this association. The well drained to excessively drained Wilkes soils are on steep breaks to the larger streams. Local alluvial land is in shallow depressions. Mixed alluvial land, ranging from well drained to poorly drained, is on the bottom lands.

The Appling soils form about 25 percent of the association; the Durham soils, 20 percent; the Helena soils, 15 percent; and the other soils, 40 percent. Soils of capability classes II and III make up 75 percent of the acreage. The remaining 25 percent is in capability classes IV, V, and VI.

Many of the farms are between 100 and 150 acreas in size, but a few are larger. Most of the farming is full time and is of the general type. A few large dairy and beef-cattle farms and a few chicken farms are in this area. The principal crops are small grain, corn, cotton, grain sorghum, soybeans, and some truck crops. Bermudagrass, tall fescue, bahiagrass, dallisgrass, annual lespedeza, sericea lespedeza, and whiteclover are grown mainly for pasture.

Northwest of West Creek Church is an area 200 feet to a mile wide that contains granite boulders 2 to 10 feet in diameter (fig. 4). It is difficult to cultivate between the boulders.

Figure 4.—**Boulders on Appling and Durham soils.**

Association 6

Gently sloping to moderately steep soils of the Piedmont uplands; mostly well drained; silt loam surface soil, clayey subsoil: Herndon, Georgeville, Alamance

This association consists of soils on broad to narrow, gently sloping to sloping uplands dissected by many shallow and narrow drainageways. The slopes adjacent to the flood plains of the larger streams are moderately steep and broken. Quartz fragments are common on the narrow ridgetops. This association covers about 74 percent of the county and makes up most of the central, western, and eastern parts.

The dominant soils are of the Herndon, Georgeville, and Alamance series. These soils developed in residuum derived from a fine-grained metamorphic rock called Carolina slate (fig. 5). In most places bedrock is at a depth of more than 2 feet. The surface soil is silt loam. The Herndon soils are well drained and have a yellowish-brown to strong-brown subsoil of silty clay. The Georgeville soils are well drained and have a red subsoil of silty clay. The Alamance soils are moderately well drained and have a brownish-yellow to yellowish-brown subsoil of silty clay loam.

Soils of the Goldston and Worsham series and Local alluvial land, Mixed alluvial land, Mixed wet alluvial land, and Gullied land, firm materials, make up the rest of the association. The well-drained Goldston soils are on the steeper slopes. The poorly drained Worsham soils occur in narrow strips around the heads of drainageways and adjacent to drainageways. Local alluvial land is at the heads of draws and in depressions. Mixed alluvial land ranges from well drained to poorly drained and occurs on the flood plains.

The Herndon soils form about 40 percent of the association; the Georgeville soils, 35 percent; the Alamance soils, 15 percent; and the other soils and land types, 10 percent. Soils of capability classes II and III make up about 85 percent of the acreage. About 55 percent of the acreage is wooded, 25 percent is cultivated, and 20 percent is pastured.

Most of the farms are between 80 and 100 acres in size, but a few are larger. Most of the farming is full time and of the general type, but there are a few large beef-cattle and dairy farms and a few poultry farms. The principal crops are small grain, corn, cotton, grain sorghum, and some truck crops. Bermudagrass, dallisgrass, tall fescue, bahiagrass, annual lespedeza, sericea lespedeza, white clover, and crimson clover are grown for pasture and hay.

Northwest of Saluda there is an almost circular area, about 200 acres in size, in which the soil is coarse textured. This soil is derived from porphyritic granite and is used by the county mainly as a base for county roads.

Association 7

Gently sloping to moderately steep, well-drained soils of the Piedmont uplands: Cecil, Appling, Wilkes

This association consists of soils on uplands dissected by many narrow and moderately deep drainageways. The slopes adjacent to the medium-sized and large streams are broken and are strongly sloping to moderately steep. Quartz fragments are common on the ridgetops in the western part of this association. This association covers about 5 percent of the county and is in the northern and northwestern parts.

The dominant soils are of the Cecil, Appling, and Wilkes series. These soils developed in residuum derived from gneiss, granite, and schist. In most places, bedrock is at a depth of more than 5 feet. The surface layer is sandy loam except where the soils are severely eroded; there, it is clay loam. The Cecil soils are well drained and have a yellowish-red to red subsoil of sandy clay loam to clay. The Appling soils are well drained and have a yellowish-brown to yellowish-red subsoil of clay loam to clay. The Wilkes soils are well drained to excessively drained and are on steep breaks near the Saluda River. They have a thin, discontinuous subsoil of strong-brown clay.

The minor soils of the association are of the Lloyd, Durham, Enon, Helena, and Worsham series. The well-drained Lloyd soils are in the eastern part of the association. The well-drained Durham soils are in the west-central part. The well drained to moderately well drained Enon soils and the moderately well drained to somewhat poorly drained Helena soils are in the western and central parts. The poorly drained Worsham soils are at the heads of and along small drainageways.

The Cecil soils form about 25 percent of the association; the Appling soils, 20 percent; the Wilkes soils, 18 percent; and the other soils, 37 percent. Soils of capability classes II and III make up 25 percent. About 90 percent of the total acreage is wooded, 7 percent is pastured, and 3 percent is cultivated.

Most of the farms are more than 250 acres in size. The principal crops are small grain, cotton, and corn. Ber-

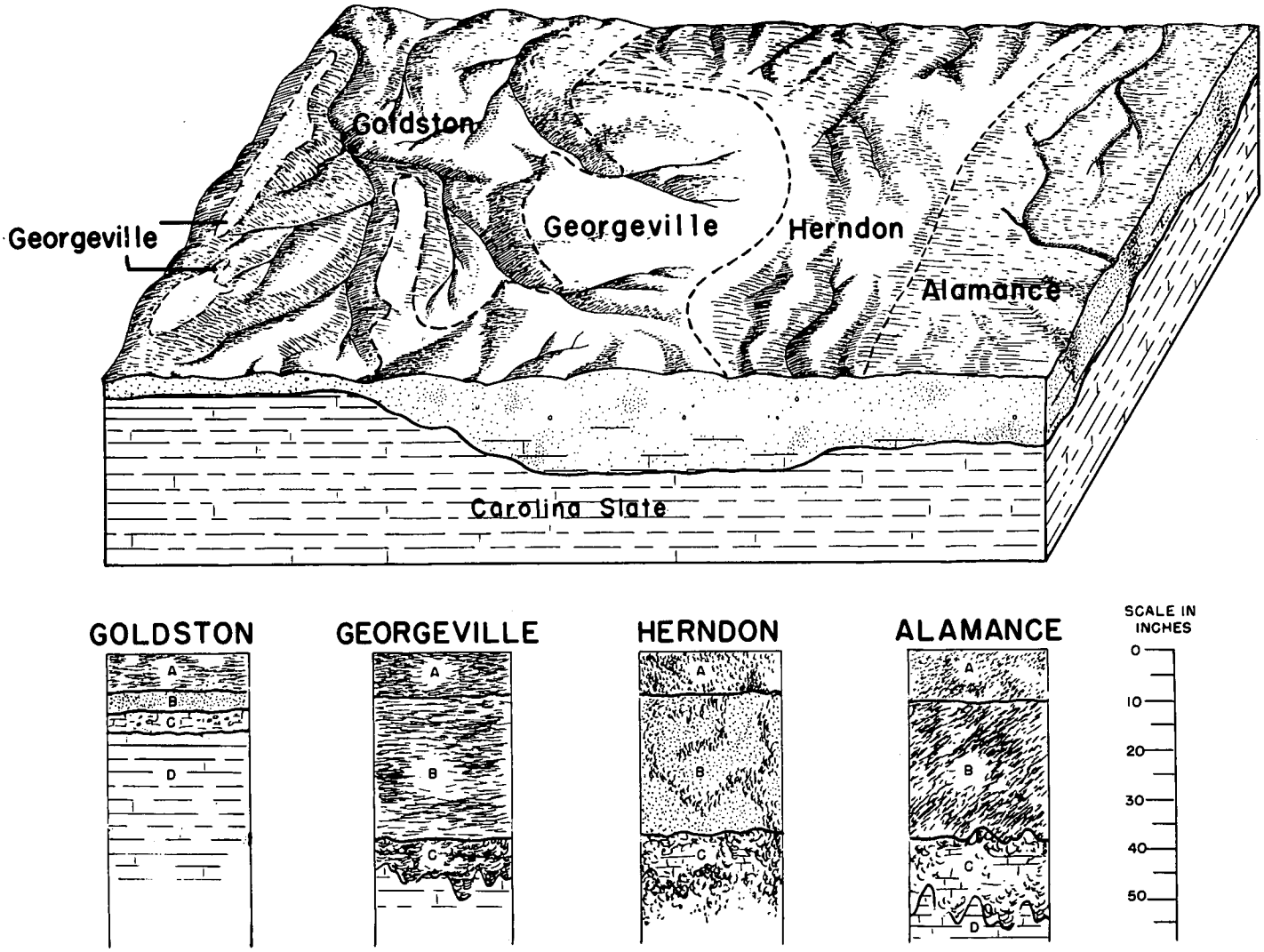

Figure 5.—**Landscape showing association of soils in the Carolina slate belt.**

mudagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, and whiteclover are grown for pasture.

Association 8

Gently sloping to strongly sloping soils of the Piedmont uplands; clayey subsoil: Tirzah, Efland, Orange

This association consists of soils on broad to narrow uplands dissected by many shallow drainageways. The areas adjacent to the streams are sloping to strongly sloping. This association covers about 2 percent of the county and is about 6 to 8 miles northeast of Saluda, near Merchant.

The dominant soils are of the Tirzah, Efland, and Orange series. These soils developed in residuum derived from mixed basic, dark-colored rock and acid Carolina slate. In most places bedrock is at a depth of more than 3 feet. The surface layer is silt loam. The Tirzah soils are well drained and have a red to dark-red subsoil of silty clay. The Efland soils are moderately well drained and have a yellowish-brown subsoil of clay. The Orange soils are somewhat poorly drained and have a light yellowish-brown subsoil of mottled clay.

There are areas of the well-drained Goldston soils on the steeper slopes. Small areas of the Georgeville and Herndon soils and the moderately well drained Alamance soils also are in this association. Mixed alluvial land, ranging from well drained to poorly drained, is on the bottom lands. Local alluvial land is in depressions.

The Tirzah soils form about 35 percent of the association; the Efland soils, 30 percent; the Orange soils, 15 percent; and the other soils, 20 percent. Soils of capability classes II and III make up about 85 percent of the acreage. Soils of capability classes IV, V, and VI make up about 15 percent.

Most of the farms are more than 200 acres in size. There are a few large dairy and beef-cattle farms. Most of the farming is full time.

Small grain, corn, grain sorghum, and some truck crops are grown. Bermudagrass, dallisgrass, tall fescue, annual lespedeza, and whiteclover are grown for pasture.

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Association 9

Gently sloping to sloping soils of the Piedmont uplands; moderately well drained to somewhat poorly drained; yellowish-brown clayey subsoil: Efland, Orange

This association consists of soils on broad uplands dissected by many shallow and narrow drainageways. The stronger slopes are adjacent to the drainageways and streams. The two small areas of this association cover about 1 percent of the county. One area is northeast of Saluda, near Deans Chapel Church. The other is about 2 miles west of Owdoms, in the western part of the county.

The dominant soils are of the Efland and Orange series. These soils developed in residuum weathered from mixed basic and acid Carolina slate. In most places bedrock is at a depth of more than 3 feet. The surface layer is silt loam. The Efland soils are moderately well drained and have a yellowish-brown subsoil of clay. The Orange soils are somewhat poorly drained and have a light yellowish-brown subsoil of mottled clay.

The well-drained Georgeville soils are on some of the high slopes. The poorly drained Worsham soils are in narrow strips at heads of drainageways and adjacent to drainageways. Local alluvial land is at the heads of some draws. Mixed alluvial land, ranging from well drained to poorly drained, is on the first bottoms along streams.

The Efland soils comprise about 35 percent of this association; the Orange soils, 20 percent; and the other soils, 45 percent. Soils of capability class II make up about 50 percent of the acreage. The remaining 50 percent is in capability classes III, IV, and VI. About 60 percent of the total acreage is wooded, 20 percent is cultivated, and 20 percent is pastured.

Most of the farms are more than 100 acres in size, but a few are much larger. Most of the farming is full time. The larger farms are beef-cattle and dairy farms. The principal crops are small grain, corn, grain sorghum, and some truck crops. Bermudagrass, tall fescue, dallisgrass, annual lespedeza, and whiteclover are grown for pasture.

Soil Series and Mapping Units

In this section the soil series of Saluda County are described in alphabetical order. Following the general description of each series is a profile description of one of the mapping units in that series. Each of the other mapping units of that series is compared with that soil for which a profile is described, and additional facts about each are given. Further information on the use and management of each soil is given in the section "Management of the Soils." Terms used to describe the soils are defined in the Glossary.

A list of soils mapped is given at the back of the report, along with the capability unit and woodland suitability group of each. The approximate acreage and the proportionate extent of the soils are given in table 1. The location and distribution are shown on the soil map at the back of this report.

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

Soil	Acres	Percent	Soil	Acres	Percent
Alamance silt loam, 2 to 6 percent slopes	25, 982	9. 0	Cecil clay loam, 10 to 20 percent slopes, severely eroded	486	. 2
Alamance silt loam, 2 to 6 percent slopes, eroded	665	. 2	Chesterfield sandy loam, 2 to 6 percent slopes	3, 510	1. 2
Alamance silt loam, 6 to 10 percent slopes	1, 090	. 4	Chesterfield sandy loam, 6 to 10 percent slopes	1, 344	. 5
Alamance silt loam, 6 to 10 percent slopes, eroded	196	. 1	Chesterfield sandy loam, 10 to 15 percent slopes, eroded	234	. 1
Altavista silt loam, 2 to 6 percent slopes	488	. 2	Chewacla silt loam	232	. 1
Altavista silt loam, 0 to 2 percent slopes	286	. 1	Colfax sandy loam, 2 to 6 percent slopes	139	(1)
Appling sandy loam, 2 to 6 percent slopes	3, 565	1. 2	Congaree fine sandy loam	557	. 2
Appling sandy loam, 2 to 6 percent slopes, eroded	151	(1)	Congaree silt loam	1, 885	. 7
Appling sandy loam, 6 to 10 percent slopes	918	. 3	Durham sandy loam, 2 to 6 percent slopes	3, 598	1. 2
Appling sandy loam, 6 to 10 percent slopes, eroded	523	. 2	Durham sandy loam, 6 to 10 percent slopes	681	. 2
Appling sandy loam, 10 to 20 percent slopes	214	. 1	Durham loamy sand, thick surface, 2 to 6 percent slopes	303	. 1
Appling sandy loam, 10 to 20 percent slopes, eroded	274	. 1	Efland silt loam, 2 to 6 percent slopes	8, 140	2. 8
Bradley sandy loam, 2 to 6 percent slopes, eroded	2, 996	1. 0	Efland silt loam, 6 to 10 percent slopes	1, 835	. 6
Bradley sandy loam, 6 to 10 percent slopes, eroded	1, 373	. 5	Efland silt loam, 10 to 15 percent slopes, eroded	169	. 1
Bradley sandy loam, 10 to 20 percent slopes, eroded	239	. 1	Efland silty clay loam, 2 to 6 percent slopes, severely eroded	628	. 2
Cecil sandy loam, 2 to 6 percent slopes	3, 690	1. 3	Efland silty clay loam, 6 to 10 percent slopes, severely eroded	1, 090	. 4
Cecil sandy loam, 6 to 10 percent slopes, eroded	2, 031	. 7	Enon sandy loam, 2 to 6 percent slopes	212	. 1
Cecil sandy loam, 10 to 15 percent slopes, eroded	687	. 2	Enon sandy loam, 6 to 10 percent slopes, eroded	206	. 1
Cecil clay loam, 2 to 6 percent slopes, severly eroded	2, 004	. 7	Faceville sandy loam, 2 to 6 percent slopes	1, 043	. 4
Cecil clay loam, 6 to 10 percent slopes, severely eroded	2, 133	. 7	Faceville sandy loam, 0 to 2 percent slopes	276	. 1
			Georgeville silt loam, 2 to 6 percent slopes	21, 599	7. 5
			Georgeville silt loam, 2 to 6 percent slopes, eroded	22, 200	7. 7
			Georgeville silt loam, 6 to 10 percent slopes	3, 039	1. 1

See footnote at end of table.

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

Soil	Acres	Percent	Soil	Acres	Percent
Georgeville silt loam, 6 to 10 percent slopes, eroded	5, 408	1. 9	Local alluvial land	2, 731	. 9
Georgeville silt loam, 10 to 15 percent slopes, eroded	548	. 2	Magnolia sandy loam, 2 to 6 percent slopes	2, 327	. 8
Georgeville silt loam, 15 to 25 percent slopes, eroded	228	. 1	Magnolia sandy loam, 0 to 2 percent slopes	2, 019	. 7
Georgeville silty clay loam, 2 to 6 percent slopes, severely eroded	1, 505	. 5	Magnolia sandy loam, 6 to 10 percent slopes, eroded	237	. 1
Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded	3, 427	1. 2	Marlboro sandy loam, 0 to 2 percent slopes	535	. 2
Georgeville silty clay loam, 10 to 15 percent slopes, severely eroded	937	. 3	Mixed alluvial land	16, 440	5. 7
Gilead sandy loam, 2 to 6 percent slopes	198	. 1	Mixed wet alluvial land	2, 408	. 8
Goldston silt loam, 2 to 6 percent slopes	3, 572	1. 2	Norfolk sandy loam, 2 to 8 percent slopes	978	. 3
Goldston silt loam, 6 to 10 percent slopes	5, 124	1. 8	Norfolk sandy loam, 0 to 2 percent slopes	505	. 2
Goldston silt loam, 10 to 15 percent slopes	2, 009	. 7	Norfolk loamy sand, thick surface, 2 to 6 percent slopes	1, 988	. 7
Goldston silt loam, 15 to 30 percent slopes	1, 046	. 4	Norfolk loamy sand, thick surface, 0 to 2 percent slopes	1, 012	. 3
Grady loam	1, 194	. 4	Norfolk loamy sand, thick surface, 6 to 10 percent slopes	372	. 1
Gullied land, firm materials	763	. 3	Orange silt loam, 2 to 6 percent slopes	3, 453	1. 2
Gullied land, friable materials	585	. 2	Orange silt loam, 6 to 10 percent slopes, eroded	294	. 1
Helena sandy loam, 2 to 6 percent slopes	1, 528	. 5	Ruston sandy loam, 2 to 6 percent slopes	1, 045	. 4
Helena sandy loam, 2 to 6 percent slopes, eroded	497	. 2	Ruston sandy loam, 0 to 2 percent slopes	671	. 2
Helena sandy loam, 6 to 10 percent slopes	339	. 1	Ruston sandy loam, 6 to 10 percent slopes	293	. 1
Helena sandy loam, 6 to 10 percent slopes, eroded	480	. 2	Ruston loamy sand, thick surface, 2 to 6 percent slopes	684	. 2
Herndon silt loam, 2 to 6 percent slopes	49, 400	17. 1	Ruston loamy sand, thick surface, 0 to 2 percent slopes	214	. 1
Herndon silt loam, 2 to 6 percent slopes, eroded	6, 492	2. 2	Sloping sandy land	321	. 1
Herndon silt loam, 6 to 10 percent slopes	16, 504	5. 7	Tirzah silt loam, 2 to 6 percent slopes	1, 341	. 5
Herndon silt loam, 6 to 10 percent slopes, eroded	5, 057	1. 8	Tirzah silt loam, 2 to 6 percent slopes, eroded	1, 557	. 5
Herndon silt loam, 10 to 15 percent slopes	690	. 2	Tirzah silt loam, 6 to 10 percent slopes	225	. 1
Herndon silt loam, 10 to 25 percent slopes, eroded	462	. 2	Tirzah silty clay loam, 6 to 10 percent slopes, severely eroded	640	. 2
Herndon silty clay loam, 2 to 6 percent slopes, severely eroded	601	. 2	Vaucluse loamy sand, 2 to 6 percent slopes	255	. 1
Herndon silty clay loam, 6 to 10 percent slopes, severely eroded	1, 312	. 5	Vaucluse loamy sand, 6 to 10 percent slopes	1, 033	. 4
Hiwassee sandy loam, 2 to 8 percent slopes	207	. 1	Wehadkee silt loam	266	. 1
Lakeland sand, 0 to 6 percent slopes	718	. 2	Wickham fine sandy loam, 2 to 6 percent slopes	196	. 1
Lakeland sand, 6 to 10 percent slopes	211	. 1	Wilkes sandy loam, 2 to 10 percent slopes	553	. 2
Lloyd sandy loam, 2 to 6 percent slopes, eroded	298	. 1	Wilkes sandy loam, 10 to 15 percent slopes	893	. 3
Lloyd clay loam, 2 to 6 percent slopes, severely eroded	541	. 2	Wilkes sandy loam, 15 to 30 percent slopes	656	. 2
Lloyd clay loam, 6 to 15 percent slopes, severely eroded	446	. 2	Worsham sandy loam, 0 to 6 percent slopes	979	. 3
			Worsham silt loam, 0 to 6 percent slopes	521	. 2
			Total land area	282, 880	98. 2
			Water area	5, 120	1. 8
			Total area of county	288, 000	100. 0

[1] Less than 0.1 percent.

Alamance Series

The Alamance series consists of deep, moderately well drained soils that commonly have a surface layer of grayish-brown silt loam and a subsoil of brownish-yellow to yellowish-brown silty clay loam. Weathered, soft rock is at depths of 24 to 48 inches. These soils developed in residuum from Carolina slate. The slope range is 2 to 10 percent. The original vegetation was oak, pine, gum, cedar, elm, hickory, and an understory of briers, pencil weeds, muscadine, and native grasses.

These soils occur near the Georgeville, Herndon, Efland, Orange, and Goldston soils. They have a more yellow and less red subsoil than the Georgeville soils, and they are not so well drained as the Georgeville or the Herndon soils. They have a less plastic and slightly coarser textured subsoil than the Efland soils. They are deeper and better drained than the Orange soils and are deeper and have more distinct horizons than the Goldston soils.

The rate of infiltration in the Alamance soils is slow. Permeability is moderately slow, and the water-holding capacity is moderate. The content of organic matter is very low, and the natural fertility is low. Tilth is easy to maintain.

The Alamance soils occur in small, medium, and large areas throughout the central, western, and northeastern parts of Saluda County. The total acreage is large, and much of it is in forest.

Alamance silt loam, 2 to 6 percent slopes (AmB).—This soil occurs in small, medium, and large areas and is the most extensive of the Alamance soils. The subsoil is silty clay loam.

Profile in a moist area in woods, chiefly of pine, 2 miles northwest of Saluda, 100 yards east of State Highway No. 39:

- A_1 0 to 2 inches, very thin covering of leaf mold and decaying organic matter over grayish-brown (2.5Y 5/2) silt loam; weak, fine, crumb structure; very friable; abundance of fine roots; a little fine quartz gravel; very strongly acid; clear, smooth boundary; 2 to 7 inches thick.
- A_2 2 to 6 inches, pale-olive (5Y 6/3) silt loam; weak, fine, crumb structure; very friable; abundance of fine roots and many medium roots; some fine quartz gravel; strongly acid; clear, smooth boundary; 3 to 8 inches thick.
- A_3 6 to 10 inches, pale-yellow (5Y 7/4) silt loam, including some coarse silt; moderate, coarse, granular structure; very friable; many fine and medium roots; few small quartz stones and a little fine quartz gravel; strongly acid; clear, smooth boundary; 3 to 6 inches thick.
- B_1 10 to 16 inches, brownish-yellow (10YR 6/8) silty clay loam; weak, fine, subangular blocky structure; friable; faint clay skins; few fine and medium roots; very strongly acid; clear, smooth boundary; 4 to 12 inches thick.
- B_2 16 to 23 inches, brownish-yellow (10YR 6/8) silty clay loam; mottles and splotches of yellowish brown (10YR 5/6); moderate, medium, subangular blocky structure; friable; hard when dry, slightly sticky when wet; faint clay skins; few medium and fine roots; strongly acid; clear, smooth boundary; 5 to 12 inches thick.
- B_3 23 to 38 inches, yellowish-brown (10YR 5/8) silty clay loam; mottles and splotches of yellow (10YR 7/8) and pale yellow (2.5Y 7/4); moderate, medium, subangular blocky structure; friable; hard when dry, sticky when wet; faint clay skins; few fine roots; few flakes of weathered Carolina slate rock; strongly acid; gradual, wavy boundary; 10 to 18 inches thick.
- C_1 38 to 44 inches, pale-olive (5Y 6/4), brownish-yellow (10YR 6/8), gray (10YR 6/1), and reddish-yellow (7.5YR 6/8), weathered and soft Carolina slate rock; seams and lenses of clay material; massive structure; the lighter colored rock crumbles very readily when exposed to air; medium acid; 4 to 12 inches thick.
- C_2 44 to 56 inches, yellowish-brown (10YR 5/6), light yellowish-brown (10YR 6/4), pale-olive (5Y 6/4), and black (10YR 2/1), weathered Carolina slate rock; fragments of the rock in place; a little fine quartz gravel; few fine roots penetrating the cracks and crevices of the parent material.
- D 56 to 74 inches +, yellowish-brown (10YR 5/4), black (10YR 2/1), pale-olive (5Y 6/4), and light olive-gray (5Y 6/2), partially decomposed Carolina slate rock; the darker colored rock is much harder than the lighter colored.

The surface soil ranges in color from dark gray to pale yellow, depending on the content of organic matter and the extent of erosion. The subsoil ranges from brownish yellow to yellowish brown. Concretions and gravel in the profile vary in number from few to many and range in size from small to medium. In places there are no concretions.

Included are some areas of Herndon soils, too small to be shown separately. Also included are small areas that have a surface soil of very fine sandy loam to coarse silt loam. In places the depth to the D horizon is only 30 to 48 inches.

The principal crops are small grain, corn, and annual lespedeza. Other crops that grow well are cotton and soybeans. All crops respond to applications of fertilizer. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Fields more than 15 acres in size should be stripcropped. A close-growing crop every other year helps to control erosion and to maintain the content of organic matter.

Much of this soil is in improved permanent pasture. Dallisgrass, bermudagrass, tall fescue, and whiteclover are well-suited pasture and hay crops. *Capability unit 7(IIe-2). Woodland suitability group 6.*

Alamance silt loam, 2 to 6 percent slopes, eroded (AmB2).—The profile of this soil is similar to that of Alamance silt loam, 2 to 6 percent slopes, except that the surface soil is thinner. The surface soil, to a depth of 4 to 6 inches, ranges in color from light brown to pale olive. The slopes are generally short, and the areas are much smaller than those of the Alamance silt loam, 2 to 6 percent slopes. Included are some areas that have a surface soil of silty clay loam.

The principal crops are small grain, annual lespedeza, corn, and cotton. Heavy applications of fertilizer are required for average yields. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. A rotation that includes close-growing crops 2 years out of 3 helps to control erosion and to maintain the content of organic matter.

If liberally fertilized, this soil produces fair yields of bermudagrass, dallisgrass, annual lespedeza, and whiteclover for pasture and hay. *Capability unit 16 (IIIe-2). Woodland suitability group 7.*

Alamance silt loam, 6 to 10 percent slopes (AmC).—This soil occurs on breaks from the more gently sloping areas of Alamance and other soils. The profile is similar to that of Alamance silt loam, 2 to 6 percent slopes, except that the solum generally is about 12 inches shallower. Because of shorter and steeper slopes, gullies start more readily on this soil than on Alamance silt loam, 2 to 6 percent slopes. Some areas of Goldston soils are included.

Most of this soil was cleared, but much of it has reverted to forest, predominantly of pine. If this soil is cultivated, a complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. A rotation that includes close-growing crops 2 years out of 3 helps to control erosion and to maintain the content of organic matter. *Capability unit 16(IIIe-2). Woodland suitability group 6.*

Alamance silt loam, 6 to 10 percent slopes, eroded (AmC2).—This soil has shorter and more abrupt slopes than Alamance silt loam, 2 to 6 percent slopes, and a thinner surface soil. The surface soil, to depths of 4 to 6 inches, ranges in color from light brown to pale olive.

Most of this soil is in forest, predominantly of pine.

Because of rapid runoff, the erosion hazard in cultivated areas is severe. The rotation should include close-growing crops at least 3 years out of every 4. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Altavista Series

The Altavista series consists of deep, moderately well drained soils that have a surface layer of dark grayish-brown silt loam. The upper part of the subsoil is strong-brown clay loam, and the lower part is brownish-yellow clay mottled with yellowish red. The parent material was old general alluvium washed from soils underlain by granite, gneiss, schist, and Carolina slate. The slope range

is 0 to 6 percent. The original vegetation was oak, gum, elm, maple, pine, some hickory, and an undergrowth of briers and native grasses.

These soils are on the second bottoms (terraces) of the large streams of the lower Piedmont, along with areas of the Wickham and Hiwassee soils, which have a redder subsoil.

Infiltration and permeability in the Altavista soils are moderately slow. The water-holding capacity is moderate. The organic-matter content is low, and the natural fertility is low. The reaction is medium acid to strongly acid.

The total acreage of the Altavista soils in Saluda County is relatively small. Most of the acreage is wooded or is in permanent pasture. Little is cultivated.

Altavista silt loam, 2 to 6 percent slopes (AnB).—This deep, moderately well drained soil is on second bottoms along the larger streams.

Profile in a moist, recently cleared pasture, 1 mile east of Saluda, north of U.S. Highway No. 378:

- A_p 0 to 4 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; friable; abundance of fine roots; very little fine, water-rounded gravel; moderate amount of incorporated, partially decomposed organic matter; medium acid; clear, smooth boundary; 2 to 7 inches thick.
- A_2 4 to 14 inches, olive-yellow (2.5Y 6/6) silt loam; weak, medium, granular structure, crushes very easily to weak, fine, granular structure; friable; abundance of fine roots and many medium roots; a little very fine, water-rounded gravel; very few fine mica flakes; medium acid; clear, smooth boundary; 2 to 12 inches thick.
- B_1 14 to 24 inches, strong-brown (7.5YR 5/8) clay loam; moderate, fine, subangular blocky structure; friable; few fine and medium roots; strongly acid; clear, smooth boundary; 7 to 18 inches thick.
- B_2 24 to 31 inches, brownish-yellow (10YR 6/8) clay; few, distinct mottles of yellowish red (5YR 5/8); moderate, medium, subangular blocky structure; friable; few fine roots; medium acid; clear, smooth boundary; 5 to 24 inches thick.
- B_3 31 to 42 inches, reddish-yellow (7.5YR 6/8) clay; common, faint to distinct mottles of brownish yellow (10YR 6/8) and red (2.5YR 4/8); strong, medium, subangular blocky structure; firm; sticky when wet; few fine mica flakes; strongly acid; clear, wavy boundary; 8 to 14 inches thick.
- C 42 to 48 inches +, reddish-yellow (5YR 6/8) silty clay loam containing some fine and very fine sand; mottled with strong brown (7.5YR 5/8), red (2.5YR 4/8), and yellow (10YR 7/8); weak, thin, platy structure that crumbles easily to structureless mass; very friable; grades to coarser textured material; numerous fine mica flakes; few small, water-rounded rocks; very strongly acid; 4 inches to several feet thick.

In some cultivated fields the surface layer is pale brown to light grayish brown. Included are small areas of Wickham soils, which have a subsoil of red clay loam. Also included are some areas that have a fine sandy loam surface layer and a small area along the Little Saluda River that is somewhat poorly drained. Fine to medium-sized waterworn gravel, mostly quartz, is common. The depth to the C horizon varies from 38 to 45 inches.

The principal crops are corn, grain sorghum, small grain, and annual lespedeza. All crops respond to liberal applications of fertilizer. Cultivated areas need complete water-disposal systems, including terraces and vegetated outlets, to help control erosion.

Suitable pasture plants are dallisgrass, bermudagrass, and sericea lespedeza. These crops respond to liberal applications of fertilizer and to control of grazing. *Capability unit 7(IIe-2). Woodland suitability group 3.*

Altavista silt loam, 0 to 2 percent slopes (AnA).—This soil commonly is on ridgetops and is surrounded by larger areas of Altavista silt loam, 2 to 6 percent slopes.

The principal crops are small grain, corn, and annual lespedeza. Other crops that grow well are soybeans, grain sorghum, and some truck crops. All crops respond to applications of fertilizer.

Most of the acreage is in pasture. Bahiagrass, bermudagrass, dallisgrass, tall fescue, and whiteclover are suitable plants for pasture and hay. *Capability unit 3(I-2). Woodland suitability group 3.*

Appling Series

The Appling series consists of deep, well-drained soils that have a surface layer of grayish-brown to light yellowish-brown sandy loam and a subsoil of yellowish-brown to yellowish-red sandy clay loam to clay. At a depth of about 20 to 30 inches the soil is mottled with yellow and pale yellow. The mottles become more prominent with depth.

These soils developed in residuum from granite, gneiss, and schist. The slope range is 2 to 20 percent but is mostly less than 6 percent. The orginal vegetation was oak, hickory, gum, pine, and an undergrowth of briers, vines, and grasses.

These soils are on the Piedmont uplands, among areas of Cecil, Durham, Enon, and Helena soils. They have a more yellow and a less red subsoil than the Cecil soils and a more brown and a less yellow subsoil than the Durham soils. They have been less influenced by basic materials than the Enon and Helena soils and have a more friable, less plastic and sticky, and slightly coarser textured subsoil.

Permeability is moderate in the Appling soils; the rate of infiltration is moderate; and the water-holding capacity is moderate. The natural fertility is low, and the organic-matter content is low. The reaction is medium acid.

These soils occur in the southeastern part of the county and in the extreme northern and northwestern parts. Approximately 40 percent of the acreage is cultivated. The rest is in forest or pasture or is used for nonagricultural purposes.

Appling sandy loam, 2 to 6 percent slopes (ApB).—This deep, well-drained soil is on the Piedmont uplands.

Profile in a moist, wooded area, 1½ miles south of the bridge over the Saluda River, on State Highway No. 19:

- A_p 0 to 5 inches, grayish-brown (2.5Y 5/2) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; a little fine quartz gravel; medium acid; clear, smooth boundary; 2 to 8 inches thick.
- A_2 5 to 11 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, medium, granular structure; very friable; many fine roots; a little fine and medium quartz gravel; medium acid; clear, smooth boundary; 4 to 10 inches thick.
- B_1 11 to 16 inches, yellowish-brown (10YR 5/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; many fine roots; medium acid; clear, smooth boundary; 4 to 10 inches thick.

B_2 16 to 28 inches, yellowish-brown (10YR 5/8) clay loam mottled with yellowish red (5YR 5/8); moderate, medium, subangular blocky structure; friable; few medium roots; faint, patchy clay skins; medium acid; clear, smooth boundary; 8 to 14 inches thick.

B_3 28 to 38 inches, brownish-yellow (10YR 6/8) clay mottled with yellowish red (5YR 4/8) and pale yellow (2.5Y 7/4); weak, coarse, blocky structure that breaks easily into moderate, medium, angular blocky structure; firm; small flakes of weathered gneiss; medium acid; clear, wavy boundary; 6 to 14 inches thick.

C 38 to 42 inches +, yellowish-brown (10YR 5/8) sandy clay loam, grading to coarser textured material, mottled with yellowish red (5YR 5/6), pale yellow (2.5Y 7/4), and white (2.5Y 8/2); massive structure; small to medium pieces of disintegrated gneiss; fine and medium quartz gravel; medium acid; several feet to bedrock.

The surface layer ranges from grayish brown to light yellowish brown. The B_2 horizon ranges in color from yellowish brown to yellowish red and in texture from clay loam to clay. The number of small concretions and pebbles varies; in places there are many, and in other places there are none. Medium to large granite boulders occur in a narrow strip near the West Springs Church in the southeastern part of the county. These boulders have to be bypassed in tillage.

Included are some areas of Cecil, Durham, Helena, and Enon soils too small to be shown separately. Also included are areas that have a surface soil of fine sandy loam, coarse sandy loam, or gravelly sandy loam.

Gentle slopes, good tilth, and favorable moisture conditions make this soil suitable for all crops grown in the county, but a complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Stripcropping the large fields also helps to control erosion.

All crops respond to applications of fertilizer and lime. A close-growing crop every other year helps to control erosion and to maintain the content of organic matter. Bahiagrass, bermudagrass, sericea lespedeza, annual lespedeza, and crimson clover are suitable plants for pasture and hay. *Capability unit 7(IIe–2). Woodland suitability group 6.*

Appling sandy loam, 2 to 6 percent slopes, eroded (ApB2).—This soil occurs on ridgetops and sharp breaks. The solum is 4 to 8 inches shallower than that of Appling sandy loam, 2 to 6 percent slopes. The 4- to 8-inch plow layer, a mixture of the remaining surface soil and the subsoil, ranges from grayish brown to light yellowish brown. Shallow gullies and areas of accelerated sheet erosion are common. Included are small areas that have a surface soil of sandy clay loam, fine sandy loam, coarse sandy loam, or gravelly sandy loam. In the gravelly sandy loam, the pebbles are not numerous enough to interfere with tillage.

This soil produces fair yields of small grain, cotton, corn, annual lespedeza, and grain sorghum. All crops respond to applications of fertilizer and lime. Surface runoff causes a moderate hazard of erosion, but erosion can be controlled by terraces and vegetated waterways.

If fertilized and limed, this soil produces fair amounts of bermudagrass, dallisgrass, sericea lespedeza, annual lespedeza, crimson clover, and white clover for pasture and hay. *Capability unit 16(IIIe–2). Woodland suitability group 7.*

Appling sandy loam, 6 to 10 percent slopes (ApC).—This soil occurs on the steeper breaks from the more gently sloping Appling, Cecil, and Durham soils. It has a profile similar to that of Appling sandy loam, 2 to 6 percent slopes, except that the mottling in the B horizon is at a greater depth. It also has shorter and stronger slopes, a greater rate and volume of runoff, and a more severe erosion hazard. Small areas of gravelly sandy loam are included.

The principal crops are small grain, annual lespedeza, corn, and cotton. Other crops that grow well are sericea lespedeza and soybeans. All crops respond to applications of fertilizer and lime. Because of the strong slopes, a complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion.

If adequately fertilized and limed, this soil produces fair to moderate yields of bermudagrass, bahiagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, crimson clover, and white clover for hay and pasture. *Capability unit 16(IIIe–2). Woodland suitability group 6.*

Appling sandy loam, 6 to 10 percent slopes, eroded (ApC2).—The 2- to 4-inch plow layer of this soil is a mixture of the remaining surface soil and the subsoil. This layer is brown to dark-yellow sandy loam. The depth to mottling is greater than in Appling sandy loam, 2 to 6 percent slopes. The rate of infiltration is slower, and surface runoff is greater and faster. There is a serious erosion hazard. Shallow gullies are common.

This soil responds to heavy fertilization and adequate liming. The serious hazard of erosion limits its use for crops. If cultivated, this soil should not be terraced but should be tilled on the contour. All natural drainageways should be sodded with close-growing perennials to help control erosion.

Bermudagrass, sericea lespedeza, and kudzu are suitable pasture plants. *Capability unit 26(IVe–1). Woodland suitability group 7.*

Appling sandy loam, 10 to 20 percent slopes (ApD).—This soil is widely scattered throughout the northern and southeastern parts of the county. It is on breaks from more nearly level areas of Appling, Cecil, and Durham soils. Only small areas have a slope of more than 15 percent. The surface layer ranges in thickness from 4 to 12 inches, and the subsoil from 18 to 30 inches. Included are some areas that have a surface layer of gravelly sandy loam and fine sandy loam.

This soil has stronger and shorter slopes than Appling sandy loam, 2 to 6 percent slopes. It has a slower rate of infiltration and a greater rate and volume of runoff. Erosion is a more serious hazard.

These slopes are too strong to be terraced, but stripcropping on the contour is practical if the rotations are long and three-fourths of the strips are in close-growing perennials. Crops respond to fertilizer and lime, but yields are below average.

Suitable plants for pasture and hay are bermudagrass, bahiagrass, annual lespedeza, sericea lespedeza, crimson clover, and kudzu. *Capability unit 26(IVe–1). Woodland suitability group 7.*

Appling sandy loam, 10 to 20 percent slopes, eroded (ApD2).—This soil occurs on steep breaks from more gently sloping areas of Appling, Cecil, and Durham soils. The

slope ranges from 10 to 20 percent, but only on the short, abrupt breaks is it more than 15 percent.

The 3- to 7-inch surface layer is a mixture of the remaining surface soil and the subsoil. There are some areas where all of the surface soil has been lost through erosion and the plow layer is yellowish-brown sandy clay loam. The subsoil ranges from 15 to 32 inches in thickness and is usually yellowish brown. Shallow gullies are common. Included are some areas that have a surface layer of gravelly sandy loam.

The rate and volume of runoff are greater on this soil than on Appling sandy loam, 2 to 6 percent slopes, and the erosion hazard is more serious.

This soil is mostly in forest. The serious hazard of erosion makes it unsuitable for crops and limits its use for pasture. The better suited pasture plants are bermudagrass, sericea lespedeza, and kudzu. Pasture yields are only fair. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Bradley Series

The Bradley series consists of deep, well-drained soils that commonly have a yellowish-brown, sandy surface layer of Coastal Plain material and a yellowish-red to reddish-yellow, clayey subsoil of Piedmont material. These soils developed in marine deposits underlain by clayey Piedmont residuum weathered from granite, gneiss, and Carolina slate. The slope range is 2 to 20 percent but is mostly less than 6 percent. The original vegetation was pine, oak, hickory, some dogwood, holly, cedar, and an understory of vines, briers, shrubs, and native grasses.

These soils are next to the Chesterfield soils, on the divides between the Coastal Plain and the Piedmont. They have a redder subsoil than the Chesterfield soils.

The rate of infiltration in the Bradley soils is moderate. Permeability is moderate, and the water-holding capacity is moderate. The content of organic matter is low, and the natural fertility is low. The reaction is medium acid to strongly acid.

Bradley soils occupy a narrow strip in the southern and southeastern parts of the county. The total acreage is small. Most of it has been cleared, but much of it has reverted to forest.

Bradley sandy loam, 2 to 6 percent slopes, eroded (BrB2).—This deep, well-drained soil developed in Coastal Plain deposits and is underlain by Piedmont residuum. It occurs in medium to large areas, some as much as 55 acres in size.

Profile in a moist, cultivated field, 2.3 miles northeast of Ridge Spring:

- A_p 0 to 5 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; very friable; abundant fine roots; many fine and medium, water-rounded, dark-colored concretions and quartz pebbles; strongly acid; clear, smooth boundary; 3 to 7 inches thick.
- A_2 5 to 9 inches, brownish-yellow (10YR 6/8) sandy loam; weak, fine, granular structure; very friable; abundant fine roots; many fine and medium, water-rounded, dark-colored concretions and quartz pebbles; strongly acid; clear, smooth boundary; 2 to 8 inches thick.
- B_1 9 to 15 inches, yellowish-red (5YR 5/8) sandy clay loam; weak, moderate, subangular blocky structure; friable; few fine roots; many water-rounded, dark-colored concretions and quartz pebbles; medium acid; clear, smooth boundary; 4 to 10 inches thick.
- B_2 15 to 29 inches, reddish-yellow (7.5YR 6/8) clay; few, fine, faint mottles of yellowish red; moderate, medium, subangular blocky structure; friable; faint clay skins; medium acid; clear, smooth boundary; 10 to 18 inches thick.
- B_3 29 to 44 inches, red (2.5YR 4/8) clay; common, fine, prominent mottles of brownish yellow (10YR 6/8); moderate, fine, angular blocky structure; firm; broken and faint clay skins; medium acid; clear, wavy boundary; 10 to 20 inches thick.
- C 44 to 47 inches +, red (2.5YR 4/8) fine sandy clay loam mottled with reddish yellow (7.5YR 7/8) and yellow (10YR 7/8); massive; fragments of Carolina slate rock partially weathered; medium acid.

The surface layer is very dark grayish brown to pale brown, depending on the content of organic matter and the degree of erosion. The subsoil is yellowish red to reddish yellow. The number of small to medium-sized concretions and pebbles varies; in some places there are none, in others there are many, and in still others the pebbles and concretions occur in pockets. Cobblestones are found in places, but they are too few in number to interfere with tillage. Included are some areas of Chesterfield soils, which have a yellowish-brown subsoil.

The principal crops are small grain, cotton, corn, and annual lespedeza. Other crops that grow well are soybeans, peanuts, grain sorghum, and peaches. Crops respond to applications of fertilizer and lime. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion. In addition, cultivation should be on the contour and close-growing crops should be grown every other year. *Capability unit 5(IIe-1). Woodland suitability group 6.*

Bradley sandy loam, 6 to 10 percent slopes, eroded (BrC2).—This soil has a profile similar to that of Bradley sandy loam, 2 to 6 percent slopes, eroded, but has stronger and shorter slopes. Because of the stronger slopes, runoff is faster and the hazard of erosion is more severe. These stronger slopes generally are on breaks from the more gently sloping Coastal Plain soils, on breaks above the Chesterfield soils, and at the heads of and along the breaks to small drainageways.

This soil is suited to the same crops as Bradley sandy loam, 2 to 6 percent slopes, eroded. It needs a complete water-disposal system and a rotation that includes close-growing crops 2 years out of every 3. All crops respond to applications of fertilizer and lime.

If properly fertilized and limed, this soil will produce average to good yields of bahiagrass, bermudagrass, tall fescue, sericea lespedeza, annual lespedeza, crimson clover, and white clover. *Capability unit 14(IIIe-1). Woodland suitability group 6.*

Bradley sandy loam, 10 to 20 percent slopes, eroded (BrD2).—This soil is on breaks to and around the heads of small streams adjacent to soils of the Coastal Plain. It has shorter and steeper slopes than Bradley sandy loam, 2 to 6 percent slopes, eroded, and commonly has a thinner solum. Runoff is faster, and the hazard of erosion is more severe.

Because of the strong slopes and consequent severe hazard of erosion, this soil is not suited to frequent cultivation. Most of it is in forest. If used for pasture, it will produce fair yields of bermudagrass, sericea lespedeza, dallisgrass, crimson clover, and white clover, but

it needs to be limed and fertilized. *Capability unit 26(IVe–1). Woodland suitability group 7.*

Cecil Series

The Cecil series consists of deep, well-drained soils that commonly have a grayish-brown sandy loam surface layer and a yellowish-red to red subsoil of sandy clay loam to clay. At a depth of about 32 to 42 inches there are reddish-yellow mottles. These soils developed in residuum from granite, gneiss, and schist. The slope range is 2 to 20 percent but generally is less than 6 percent. The original vegetation was oak, hickory, gum, poplar, pine, some dogwood and cedar, and an understory of briers, shrubs, and vines.

The Cecil soils commonly are adjacent to areas of the Durham, Appling, Enon, and Lloyd soils on the Piedmont uplands. They have a redder subsoil than the Durham and Appling soils. They have a less plastic and sticky and a more friable subsoil than the Enon soils, and a lighter red subsoil than the Lloyd soils. They have been less influenced by basic materials than the Enon or Lloyd soils.

The rate of infiltration is moderate in the Cecil soils. Permeability is moderate, and the water-holding capacity is moderate. The organic-matter content is low, and the natural fertility is low. The reaction is medium acid.

These soils are in the southeastern part of the county and in the extreme northern and northwestern parts. About 70 percent of the acreage is in forest. The rest is in crops or pasture or is used for nonagricultural purposes.

Cecil sandy loam, 2 to 6 percent slopes (CdB).—This deep, well-drained soil has a reddish, clayey subsoil.

Profile in a moist area in woods, three-fourths of a mile south of the Saluda River Bridge, on State Highway No. 19:

- A_p 0 to 5 inches, grayish-brown (10YR 5/2) sandy loam; weak, fine, granular structure; very friable; abundant fine roots; many fine pores; a little fine gravel; medium acid; abrupt, smooth boundary; 2 to 8 inches thick.
- A_2 5 to 11 inches, yellowish-brown (10YR 5/8) sandy loam; weak, medium and fine, granular structure; very friable; abundant fine roots; few small pores; a little fine quartz gravel; medium acid; clear, smooth boundary; 4 to 8 inches thick.
- B_1 11 to 16 inches, yellowish-red (5YR 5/8) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; many fine roots; few fine pores; a little fine gravel; medium acid; clear, smooth boundary; 2 to 10 inches thick.
- B_2 16 to 27 inches, red (2.5YR 5/8) clay; moderate, medium, subangular blocky structure; friable; slightly sticky when wet, hard when dry; few fine and medium roots; few fine mica flakes; medium acid; clear, smooth boundary; 8 to 18 inches thick.
- B_3 27 to 38 inches, red (2.5YR 5/8) clay; moderate, medium, subangular blocky structure; friable; slightly sticky when wet, hard when dry; patchy clayskins; few fine mica flakes; medium acid; clear, wavy boundary; 8 to 16 inches thick.
- C 38 to 42 inches +, red (2.5YR 5/8) sandy clay loam; common, fine and medium, distinct mottles of reddish yellow (7.5YR 6/6); massive structure; many fine mica flakes; a little fine quartz gravel; few weathered flakes or scales of parent rock; medium acid; grades to a coarser textured material.

The color of the surface soil commonly is grayish brown, but in some cultivated areas it is strong brown or yellowish brown. The color of the subsoil ranges from red to yellowish red. The number of small to medium concretions and pebbles varies; in some places there are many, and in other places there are none. Included are some areas that have a surface soil of coarse sandy loam and gravelly sandy loam. Also included are eroded phases of Cecil, Appling, Enon, and Lloyd soils, in areas too small to be shown separately.

Gentle slopes, good tilth, and good moisture conditions make this soil suitable for all crops grown in the county. All crops respond to applications of fertilizer and lime. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion. A close-growing crop every other year helps to conserve the soil and maintain the content of organic matter. *Capability unit 5(IIe–1). Woodland suitability group 6.*

Cecil sandy loam, 6 to 10 percent slopes, eroded (CdC2).—This soil commonly occurs in smaller areas and on shorter slopes than Cecil sandy loam, 2 to 6 percent slopes. It has a similar profile, except that the surface soil is 3 to 4 inches shallower.

This soil is suited to the same crops as Cecil sandy loam, 2 to 6 percent slopes, but needs more fertilizer to produce average yields. A moderately long rotation that keeps two-thirds of the acreage in grass or other close-growing crops is needed to help control erosion and maintain the content of organic matter.

If fertilized, this soil produces average yields of bermudagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, crimson clover, and white clover for pasture and hay. *Capability unit 14(IIIe–1). Woodland suitability group 7.*

Cecil sandy loam, 10 to 15 percent slopes, eroded (CdD2).—The solum of this soil ranges from 18 to 36 inches in thickness. The plow layer is a mixture of the remaining surface soil and the subsoil. It is predominantly yellowish brown to reddish brown. It is lighter colored than the plow layer of Cecil sandy loam, 2 to 6 percent slopes, and is from 3 to 4 inches shallower. Runoff is faster than on the more gently sloping soil. Included are small areas that are severely eroded and have a dominantly red or light-red surface soil.

This soil occurs on the breaks from the more gently sloping Cecil, Appling, Durham, and Lloyd soils, in the southeastern, northern, and northwestern parts of the county. It is not extensive.

Because of strong slopes and the consequent serious hazard of erosion, this soil is of limited use for crops. If used for crops, it should not be terraced but should be tilled on the contour. All natural drainageways should be sodded with close-growing plants to help control erosion.

Bermudagrass and sericea lespedeza are well-suited pasture plants and, if properly fertilized, provide fair grazing. *Capability unit 26(IVe–1). Woodland suitability group 7.*

Cecil clay loam, 2 to 6 percent slopes, severely eroded (CcB3).—This soil commonly occurs in smaller areas and on shorter slopes than Cecil sandy loam, 2 to 6 percent slopes. The 2- to 5-inch plow layer is predomi-

nantly red or light-red clay loam and consists mostly of subsoil material. Infiltration is slower than on Cecil sandy loam, 2 to 6 percent slopes, and runoff is greater. Sheet erosion and shallow gullies are common. The fertility is very low, and the organic-matter content is very low.

All of this soil has been cultivated, and much of it was used continuously for cotton, but most of the acreage has reverted naturally to or has been planted to trees, predominantly pine. If it is needed for crops, it should be kept in grass or other close-growing crops 2 years out of every 3, to increase fertility and to supply organic matter. Even if heavily fertilized, however, it produces only fair yields. Bermudagrass and sericea lespedeza provide fair grazing. *Capability unit 14(IIIe-1). Woodland suitability group 7.*

Cecil clay loam, 6 to 10 percent slopes, severely eroded (CcC3).—This soil occurs on breaks from the more gently sloping Cecil, Appling, Durham, and Lloyd soils. Accelerated sheet erosion and shallow gullies are common. The 2- to 5-inch plow layer is light-red to red clay loam and consists mostly of the upper part of the subsoil. In places the red, clayey subsoil is exposed. The solum is several inches shallower than that of Cecil sandy loam, 2 to 6 percent slopes.

Because of the serious hazard of erosion, this soil is not suited to cultivation. However, crops such as bermudagrass and sericea lespedeza respond to heavy applications of fertilizer and lime and provide fair grazing. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Cecil clay loam, 10 to 20 percent slopes, severely eroded (CcD3).—This soil occurs at the heads of and along small drainageways on breaks from the more gently sloping Cecil, Lloyd, and Appling soils. It is not extensive. The 2- to 5-inch plow layer is light-red to red clay loam and consists mostly of subsoil material. In places the red, clayey subsoil is exposed. The solum ranges from 10 to 24 inches in thickness and is much thinner than that of Cecil sandy loam, 2 to 6 percent slopes. Because of the short, strong slopes, surface runoff is very fast and erosion is a severe hazard. Accelerated sheet erosion and shallow gullies are common.

This soil is not suited to crops. It is in forest, predominantly of pine. Bermudagrass, sericea lespedeza, and kudzu provide limited grazing under good management. *Capability unit 34(VIIe-1). Woodland suitability group 7.*

Chesterfield Series

The Chesterfield series consists of deep, well-drained soils that commonly have a brown to light-brown surface soil of sandy Coastal Plain material and a yellowish-brown to yellow subsoil of clayey Piedmont material. These soils developed in sandy marine deposits underlain by clayey Piedmont residuum weathered from granite, gneiss, and Carolina slate. The slope range is 2 to 15 percent but is mostly less than 6 percent. The original vegetation was oak, gum, maple, pine, some hickory, and an understory of shrubs, vines, and native grasses.

These soils are adjacent to the Bradley soils, on the divides between the Coastal Plain and the Piedmont. They have a more brown and less red subsoil than the Bradley soils.

Infiltration is rapid in the Chesterfield soils. Permeability is moderate, and the water-holding capacity is moderate. The organic-matter content is medium to low, and the natural fertility is low. The reaction is slightly acid to medium acid.

The Chesterfield soils occupy a relatively small acreage in Saluda County. They are distributed in fairly large areas along the borderline between the Piedmont and the Coastal Plain, in the southern part of the county. Much of the acreage is in forest.

Chesterfield sandy loam, 2 to 6 percent slopes (ChB).—This soil consists of sandy Coastal Plain material underlain by clayey Piedmont residuum. It is a deep soil and has a yellowish-brown to yellow subsoil.

Profile in a moist, cultivated field, 1 mile north of Ward:

- A_p 0 to 5 inches, brown (10YR 5/3) sandy loam; weak, fine, granular structure; very friable; many fine roots; much fine and medium, water-rounded gravel; slightly acid; clear, smooth boundary; 3 to 8 inches thick.
- A_2 5 to 11 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, coarse, granular structure; very friable; many fine roots; much fine, water-rounded gravel; medium acid; clear, smooth boundary; 4 to 8 inches thick.
- B_1 11 to 19 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; a little fine gravel; medium acid; clear, smooth boundary; 5 to 12 inches thick.
- B_2 19 to 43 inches, yellowish-brown (10YR 5/6) clay; common, fine, distinct mottles of olive yellow (2.5Y 6/8) and reddish yellow (5YR 6/8); weak, coarse, subangular blocky structure that crushes to moderate, fine, subangular blocky structure; friable; few fine pores; strongly acid; clear, wavy boundary; 12 to 30 inches thick.
- C 43 to 47 inches +, yellow (10YR 7/8) fine sandy clay, grading to coarser textured material, mottled with yellowish brown (10YR 5/6), pink (5YR 7/4), red (2.5YR 5/8), and pale yellow (2.5Y 7/4); fine fragments of slate rock; a little medium quartz gravel; strongly acid; few to several feet thick.

In color, the surface soil ranges from brown to light brown, and the subsoil from yellowish brown to yellow. The number of small to medium, waterworn concretions and pebbles varies; in some places there are many, and in other places there are none. In some places, there are pockets of gravel in the A_2 and B_1 horizons. Included are some small areas of the Bradley soils that have a yellowish-red to reddish-yellow subsoil.

The principal crops are small grain, corn, cotton, annual lespedeza, and some truck crops. Other crops that grow well are soybeans, peanuts, sweetpotatoes, peaches, and grain sorghum. Crops respond to applications of fertilizer and line. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Cultivating and stripcropping on the contour also help to conserve the soil. A close-growing crop every other year helps to prevent erosion and to maintain the content of organic matter.

Pasture plants that are well suited are bermudagrass, dallisgrass, bahiagrass, whiteclover, annual lespedeza, and sericea lespedeza. *Capability unit 7(IIe-2). Woodland suitability group 6.*

Chesterfield sandy loam, 6 to 10 percent slopes (ChC).—This soil has stronger slopes and a thinner solum than Chesterfield sandy loam, 2 to 6 percent slopes. It occurs on breaks above or below areas of the gently sloping soil and along small drainageways.

This soil is suited to the same crops as Chesterfield sandy loam, 2 to 6 percent slopes, but because of the stronger slopes, rotations should be based on grasses or should include close-growing crops 2 years out of every 3. All crops including pasture crops respond to applications of fertilizer. Yields are average. *Capability unit 16(IIIe-2). Woodland suitability group 6.*

Chesterfield sandy loam, 10 to 15 percent slopes, eroded (ChD2).—This soil has shorter and steeper slopes than Chesterfield sandy loam, 2 to 6 percent slopes, and has a surface soil that is from 2 to 6 inches thinner. Included are some severely eroded areas in which the yellowish-brown silty clay loam subsoil is exposed. Shallow gullies are common.

Because of the strong slopes, which cause a serious erosion hazard, this soil is not suited to frequent cultivation. Much of the acreage is idle or is reverting to forest. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Chewacla Series

The Chewacla series consists of deep, somewhat poorly drained to moderately well drained soils that are subject to overflow. The surface layer commonly is dark-brown to dark grayish-brown silt loam. It is underlain by mottled, pale-olive silt loam. These soils are developing in young general alluvium washed from soils underlain by granite, gneiss, schist, Carolina slate, and basic rock. The slope range is 0 to 2 percent. The original vegetation was oak, ash, cottonwood, gum, birch, sycamore, some hickory, and an understory of reeds, briers, and native grasses.

These soils are adjacent to the Congaree and Wehadkee soils on the flood plains of the larger streams in the Piedmont region of the county. They formed from the same kind of parent material as the Congaree and Wehadkee soils, but they are not so well drained as the Congaree soils and are better drained than the Wehadkee soils.

The rate of infiltration is slow in the Chewacla soils, permeability is moderately slow, and the available moisture holding capacity is moderately high. The depth to the water table ranges from 24 to 60 inches. The content of organic matter and the natural fertility are moderately high. The reaction is slightly acid to very strongly acid.

There is only one Chewacla soil in Saluda County. It occurs in elongated narrow strips on the first bottoms of large streams. The total acreage is small. Much of the acreage is in forest, and the rest is mostly in pasture.

Chewacla silt loam (Ck).—This deep, somewhat poorly drained to moderately well drained soil is on the first bottoms of the larger streams.

Profile in a moist pasture, 3 miles east of Saluda, near the bend of the Little Saluda River:

A_{1p} 0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; mass of fine roots; a little quartz gravel; few very fine mica flakes; slightly acid; clear, smooth boundary; very slick when wet; 4 to 9 inches thick.

A_{12} 7 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam faintly mottled with grayish brown (2.5Y 5/2); weak, fine, granular structure; very friable; abundance of fine roots; few fine pores; very fine mica flakes; medium acid; clear, smooth boundary; 6 to 12 inches thick.

C_1 17 to 30 inches, pale-olive (5Y 6/3) silt loam mottled with light olive brown (2.5Y 5/6); weak, medium, granular structure; friable; many fine roots; fine flakes of mica, few dark-colored concretions, and a little fine quartz gravel; very strongly acid; clear, smooth boundary; 12 to 24 inches thick.

C_2 30 to 43 inches, pale-olive (5Y 6/3) silty clay loam mottled with light brownish gray (10YR 6/2) and grayish brown (2.5Y 5/2); weak, coarse, angular blocky structure; friable; few medium to fine roots; dark spots of decaying organic matter; many fine mica flakes; strongly acid; clear, smooth boundary; 10 to 24 inches thick.

C_3 43 to 62 inches, yellowish-brown (10YR 5/8) silty clay loam mottled with light brownish gray (2.5Y 6/2); moderate, medium and coarse, angular blocky structure; friable; very few roots; few fine pores; dark-brown to black spots of decaying or decayed organic matter; many fine mica flakes; slightly acid; clear, smooth boundary; 15 to 25 inches thick.

C_4 62 to 72 inches, yellowish-brown (10YR 5/8) silt loam and coarse sandy loam mixed; mottled with gray (5Y 5/1) and grayish brown (2.5Y 5/2); weak structure; very friable; abundance of fine mica flakes; much fine and medium rounded gravel; slightly acid; at a depth of about 65 inches, a noticeable amount of water; 8 to 24 inches thick.

The surface layer ranges in color from black to light brown and in places is as much as 20 inches deep. In some areas the subsoil is darker colored. In other areas, at a depth of about 8 inches, the mottles are lighter grayish brown. The content of mica varies. Included are some areas that have a surface layer of silty clay loam and fine sandy loam.

This soil is fairly well suited to corn, oats, soybeans, and annual lespedeza. To produce moderately high yields, however, it needs to be limed and fertilized and otherwise well managed. Tilth is easy to maintain. Turning under green-manure crops and plant residues helps to maintain the organic-matter content.

Loss of a crop every 2 to 4 years as a result of flooding or waterlogging can be expected. If crops are grown, open ditches or other kinds of drains are needed to remove surface water quickly. Favorable moisture conditions make this soil suitable for dallisgrass, bermudagrass, tall fescue, whiteclover, and annual lespedeza for hay and pasture. *Capability unit 22(IIIw-2). Woodland suitability group 1.*

Colfax Series

The Colfax series consists of deep, somewhat poorly drained soils that commonly have a surface layer of light brownish-gray sandy loam and a mottled, brownish-yellow to strong brown, clayey subsoil. These soils developed from granite and gneiss. They are at the heads of small drainageways and on the low divides between drainageways in the lower and middle Piedmont. The slope range is 2 to 6 percent. The original vegetation was oak, gum, alder, elm, and an understory of reeds, briers, shrubs, and native grasses.

These soils are near the Durham, Helena, and Worsham soils. They are at lower elevations than the Durham and Helena soils and are more poorly drained. They are at higher elevations than the Worsham soils and are better drained. They have more gray mottles in the subsoil than the Durham soils and are grayer in the lower part of the profile.

The Colfax soils have a well drained surface soil and a somewhat poorly drained subsoil. The rate of infiltration is rapid, permeability is moderately slow to slow, and the water-holding capacity is low to moderate. The organic-matter content and the natural fertility are low. The reaction is strongly acid.

There is only one Colfax soil in Saluda County. Most of it is in small areas in the southeastern part of the county. The total acreage is small. About half of it is in forest.

Colfax sandy loam, 2 to 6 percent slopes (CoB).—This somewhat poorly drained soil occurs in small areas on the uplands. It is near small drainageways and on low divides, or saddles, between drainageways.

Profile in a moist area in woods, 200 yards southeast of West Creek Church, about a fourth of a mile south of Holston Crossroads:

- A_{00} 1 to ½ inch, dark-brown (7.5YR 4/2), partially decomposed leaves and pine needles.
- A_0 ½ to 0 inch, black (2.5Y 2/0) organic material, fully decomposed; structureless; mass of fine roots; strongly acid; abrupt, smooth boundary; 0 to 2 inches thick.
- A_1 0 to 6 inches, light brownish-gray (2.5Y 6/2) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; few coarse sand grains; strongly acid; clear, smooth boundary; 3 to 8 inches thick.
- A_2 6 to 14 inches, olive (5Y 5/3) sandy loam; weak, coarse, granular structure; very friable; many fine roots, few medium and large roots; few coarse sand grains and a little fine quartz gravel; strongly acid; clear, smooth boundary; 6 to 16 inches thick.
- B_1 14 to 22 inches, brownish-yellow (10YR 6/8) sandy clay loam; common, fine, faint to distinct mottles of pale yellow (2.5Y 7/4); moderate, medium, subangular blocky structure; friable; few fine roots, few large roots; few fine mica flakes; medium acid; clear, smooth boundary; 6 to 12 inches thick.
- B_2 22 to 36 inches, strong-brown (7.5YR 5/8) clay; common, fine to medium, distinct mottles of gray (10YR 6/1); strong, medium, angular blocky structure; firm; plastic when wet, hard when dry; few fine mica flakes; patchy clay skins; strongly acid; clear, smooth boundary; 10 to 18 inches thick.
- B_{3g} 36 to 44 inches, gray (2.5Y 6/0) clay; common, medium to coarse, faint mottles of gray (10YR 6/1); strong, coarse, angular blocky structure; firm; plastic and sticky when wet, hard when dry; many fine flakes of mica; strongly acid; clear, wavy boundary; 6 to 12 inches thick.
- C_g 44 to 48 inches, light-gray (5Y 7/1), gravelly sandy clay; grades to a coarser textured sand; abundance of fine mica flakes; partially weathered, crumbly fragments of granite rock; strongly acid; variable depth to bedrock.

The surface layer commonly is light brownish gray to pale yellow, but ranges to dark grayish brown. The subsoil ranges in color from mottled yellowish brown to strong brown, in the upper part, to gray, in the lower part. In places there are small quartz pebbles and dark-colored concretions. In other places, there are thin deposits sloughed from adjoining higher slopes. Included are small areas that have a surface layer of fine sandy loam to coarse loamy sand. Also included are some areas of Helena and Worsham soils, and small areas that have a slope of 0 to 2 percent.

The principal crops are oats, corn, annual lespedeza, and some truck crops. All crops produce moderate yields if the soil is heavily fertilized and limed. Erosion is not a serious hazard, but the gradient is strong enough that a complete water-disposal system, including terraces and vegetated waterways, is needed to control gully erosion. On the nearly level areas, open ditches are needed to remove surface water.

Dallisgrass, bermudagrass, tall fescue, bahiagrass, annual lespedeza, and whiteclover are grown for pasture and hay. Liberal applications of fertilizer and lime are needed for moderate yields. *Capability unit 24(IIIw-3). Woodland suitability group 8.*

Congaree Series

The Congaree series consists of deep, well-drained soils that are subject to occasional overflow. These soils have a thick surface layer of dark-brown to dark yellowish-brown silt loam and fine sandy loam. This is underlain at a depth of about 27 inches by mottled yellowish-brown to brown loamy fine sand to silty clay loam. The parent material was young general alluvium washed from soils derived from granite, gneiss, schist, and Carolina slate. The slope range is 0 to 2 percent. The original vegetation was oak, hickory, elm, beech, gum, ash, and an undergrowth of cane, briers, and native grasses.

These soils are on flood plains, along with the Chewacla and Wehadkee soils and other wet alluvial soils, all of which formed from similar material but are grayer and less well drained.

Infiltration is moderately rapid in the Congaree soils. Permeability is moderately rapid. The available water holding capacity is moderately high. The fertility is medium, and the organic-matter content is high. The reaction is medium acid.

The Congaree soils occur on the first bottoms of large streams. The acreage in this county is small and is mostly in pasture and forest. Little is cultivated.

Congaree fine sandy loam (Cn).—This deep, well-drained soil is on the first bottoms of the larger streams.

Profile in a moist pasture, one-fourth of a mile east of State Highway No. 39, near Chappells Bridge over the Saluda River:

- A_p 0 to 6 inches, dark-brown (7.5YR 3/2) fine sandy loam; weak, fine, granular structure; very friable; abundant roots; many small pores; few fine mica flakes; medium acid; clear, smooth boundary; 4 to 8 inches thick.
- C_1 6 to 12 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; few fine mica flakes; small amount of decaying organic matter; medium acid; clear, smooth boundary; 4 to 10 inches thick.
- C_2 12 to 27 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, coarse, granular structure that crushes easily to weak, fine, granular structure; very friable; few fine roots and many small pores; many fine mica flakes; medium acid; clear, smooth boundary; 10 to 20 inches thick.
- C_3 27 to 71 inches +, yellowish-brown (10YR 5/6) loamy fine sand; few, fine, faint mottles of brown (7.5YR 5/4); massive structure; abundance of fine mica flakes; medium acid; 10 to 80 inches thick.

The surface soil ranges in color from dark yellowish brown and dark brown to grayish brown. The pebbles, concretions, and mica flakes vary both in size and in number. Small areas of somewhat poorly drained to moderately well drained Chewacla soils are included.

This is one of the most productive soils in the county for corn, truck crops, hay, and pasture. About once in every 3 or 4 years, however, crops are damaged or destroyed by overflow. *Capability unit 11(IIw-2). Woodland suitability group 2.*

Congaree silt loam (Cs).—This deep, well-drained soil is on the first bottoms of the larger streams.

Profile in a pasture, one-fourth of a mile north of the bridge on U.S. Highway No. 378, 2 miles east of Saluda:

A_p 0 to 8 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; very friable; abundance of fine roots; many fine pores; few fine mica flakes; slightly acid; clear, smooth boundary; 5 to 10 inches thick.

C_1 8 to 30 inches, dark-brown (10YR 4/3) silt loam; weak, fine and medium, granular structure; friable; many fine roots; few small pores; few very fine mica flakes; medium acid; clear, smooth boundary; 12 to 26 inches thick.

C_2 30 to 43 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, coarse, granular structure; friable; few medium and fine roots; few small pores; few very fine mica flakes; medium acid; clear, smooth boundary; 9 to 16 inches thick. (This layer is lacking in some Congaree soils.)

C_3 43 to 58 inches, yellowish-brown (10YR 5/6) silty clay loam; faint, medium mottles of dark brown (10YR 4/3); weak, medium, subangular blocky structure; friable; few fine roots to a depth of about 56 inches; few fine pores; few very fine mica flakes; medium acid; clear, smooth boundary; 10 to 20 inches thick.

C_4 58 to 68 inches, dark grayish-brown (10YR 4/2) fine sandy loam; massive structure, breaking when crushed to coarse, granular structure; very friable; many fine mica flakes; strongly acid; clear, smooth boundary; 6 to 30 inches thick.

C_5 68 to 73 inches +, dark-brown (10YR 4/3) coarse sandy loam mottled with light yellowish brown (2.5Y 6/4); massive structure; very friable; many fine mica flakes; much fine, water-rounded quartz gravel; strongly acid.

Included are some areas that are darker colored and some that are lighter colored; some areas that have a dark-colored, compact subsoil; and some areas that are mottled at a depth of about 18 inches. There is no significant agricultural difference between these soils and the soil described. This soil is friable; roots penetrate easily, and air and water circulate freely. Small areas that have a surface soil of fine sandy loam and silty clay loam are also included.

The principal crops are corn, small grain, annual lespedeza, and truck crops. Crops respond to limited amounts of fertilizer. The content of organic matter should be maintained by turning under green-manure crops and crop residues. Good tilth is easy to maintain, and runoff is not a serious problem. Crops are damaged or destroyed by overflow, however, about once in every 3 or 4 years.

Because of favorable moisture conditions, this soil produces good yields of dallisgrass, bermudagrass, bahiagrass, tall fescue, whiteclover, and annual lespedeza for hay and pasture. *Capability unit 11(IIw-2). Woodland suitability group 2.*

Durham Series

The Durham series consists of deep, well-drained soils that commonly have a pale-olive to grayish-brown surface layer and a yellow to yellowish-brown subsoil. The surface layer is sandy loam, and the subsoil is sandy clay loam to clay. These soils developed in residuum weathered from granite. The slope range is 2 to 10 percent. The original vegetation was oak, hickory, some dogwood, gum, and pine.

These soils occur among areas of the Appling, Cecil, Colfax, and Helena soils on the uplands of the lower Piedmont. They commonly have a thicker surface soil and a more yellow subsoil than the browner Appling soils and the redder Cecil soils. Their subsoil is not so plastic and clayey as that of the Helena soils. They are better drained than the Colfax soils and occur at higher elevations.

The rate of infiltration is high in the Durham soils. The available moisture holding capacity is low. Permeability is moderate to moderately slow. The organic-matter content is low, and the natural fertility is low. The reaction is strongly acid.

These soils are in the southeastern and northwestern parts of the county. About half of the acreage is in forest.

Durham sandy loam, 2 to 6 percent slopes (DuB).—This deep, well-drained soil is on the Piedmont uplands.

Profile in a moist pine forest, near State Highway No. 39, 2.8 miles southeast of Chappells Bridge over the Saluda River:

A_p 0 to 5 inches, pale-olive (5Y 6/4) sandy loam; weak, medium, granular structure; very friable; abundant fine roots; low in organic matter; a little fine quartz gravel; strongly acid; clear, smooth boundary; 4 to 8 inches thick.

A_2 5 to 10 inches, pale-yellow (5Y 8/4) sandy loam; weak, medium, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary; 3 to 8 inches thick.

A_3 10 to 16 inches, light-gray (5Y 7/2) sandy loam; weak, coarse, granular structure; very friable; few fine and medium roots; a little fine quartz gravel; strongly acid; clear, smooth boundary; 2 to 8 inches thick.

B_1 16 to 24 inches, yellow (2.5Y 7/8) sandy clay loam; few, fine, faint mottles of light gray (5Y 7/2); moderate, medium, subangular blocky structure; friable; few fine roots and pores; few fine mica flakes; strongly acid; clear, smooth boundary; 6 to 20 inches thick.

B_2 24 to 29 inches, yellow (2.5Y 7/8) clay loam; fine, distinct mottles of light gray (2.5Y 7/2); breaks easily into weak, thick, platy or coarse, angular blocky structure, which then breaks into moderate, medium, subangular blocky structure; friable to firm; few small pores; many fine mica flakes; strongly acid; clear, smooth boundary; 10 to 17 inches thick.

B_3 29 to 37 inches, yellow (2.5Y 7/6) clay; medium, distinct mottles of gray (10YR 6/1) and (2.5Y 6/0); strong, coarse, angular blocky structure; firm; few small fragments of disintegrated granite; abundance of fine mica flakes; very hard when dry; very strongly acid; clear, wavy boundary; 6 to 12 inches thick.

C 37 to 42 inches +, yellowish-brown (10YR 5/6) sandy clay loam mottled with olive yellow (2.5Y 6/8) and gray (2.5Y 6/0); massive; considerable amount of weathered granite; a little fine and medium quartz gravel; abundance of fine mica flakes; very strongly acid; 10 to 60 feet to bedrock.

The surface layer ranges in color from pale olive to grayish brown. The subsoil ranges in color from yellow to yellowish brown and in texture from sandy clay loam to clay loam. The gravel varies in size and amount, and in some places there is none. There are many large granite boulders, which interfere with tillage. These stony areas are shown on the detailed map by symbols. Included are some areas that have a surface layer of thick loamy sand. Also included are small areas that have a surface layer of fine sandy loam and coarse sandy loam.

Because of low water-holding capacity, this soil is not suited to all crops grown in the county. It is fairly well suited to watermelons, peanuts, crotalaria, and sweetpotatoes. Yields of cotton, corn, and small grain are fair if the soil is heavily fertilized and organic matter is added.

A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion. A rotation that keeps half of the acreage in close-growing crops is a good conservation practice. Large areas should be stripcropped. Cover crops and crop residues help to maintain the content of organic matter.

Most of the acreage is in row crops. Well-suited pasture plants are bahiagrass, bermudagrass, and sericea lespedeza. *Capability unit 7(IIe-2). Woodland suitability group 6.*

Durham sandy loam, 6 to 10 percent slopes (DuC).—This soil commonly is in smaller areas and has a thinner subsoil than Durham sandy loam, 2 to 6 percent slopes. It occurs on the sharper breaks from the more gently sloping areas of Durham sandy loam. Shallow gullies start readily. A close-growing crop is needed 2 years out of every 3 to prevent accelerated sheet erosion.

All crops respond to liberal applications of fertilizer. *Capability unit 16(IIIe-2). Woodland suitability group 6.*

Durham loamy sand, thick surface, 2 to 6 percent slopes (DyB).—This soil is in the southeastern and extreme northwestern parts of the county. It is similar to Durham sandy loam, 2 to 6 percent slopes, except that the surface soil is a thick layer of loamy sand and commonly has a cemented layer in the lower part. Because of the sandier surface soil, plant nutrients are leached more rapidly. The acreage is small.

Profile in a moist, mixed forest, 1 mile northwest of Holston Crossroads:

A_{00} 1½ inches to ½ inch, forest litter consisting of leaves, twigs, and pine needles; 1 to 5 inches thick.

A_0 ½ to 0 inch, black (2.5Y 2/0) decomposed organic matter; abundance of fine roots; extremely acid; abrupt, smooth boundary; 0 to 2 inches thick.

A_1 0 to 4 inches, very dark gray (5Y 3/1) loamy sand; weak, medium, granular structure; very friable; many fine roots; a little fine quartz gravel; very strongly acid; clear, smooth boundary; 1 to 4 inches thick.

A_{21} 4 to 16 inches, olive (5Y 5/4) loamy sand; weak, medium, granular structure; very friable; many fine roots; few fine mica flakes; medium acid; clear, smooth boundary; 6 to 12 inches thick.

A_{22} 16 to 20 inches, light yellowish-brown (2.5Y 6/4) loamy sand; weak, medium, granular structure; partially cemented; medium and fine pores; few fine and medium roots; a little medium quartz gravel; medium acid; clear, wavy boundary; 4 to 20 inches thick.

B_1 20 to 26 inches, brownish-yellow (10YR 6/8) sandy clay loam; weak, medium, subangular blocky structure; friable; few medium roots; many fine mica flakes; very strongly acid; clear, smooth boundary; 2 to 10 inches thick.

B_2 26 to 34 inches, brownish-yellow (10YR 6/6) clay loam; few, faint, medium mottles of yellow (2.5Y 7/6); moderate, medium, subangular blocky structure; friable; few large roots; many fine mica flakes; very strongly acid; clear, smooth boundary; 2 to 12 inches thick.

B_3 34 to 44 inches, yellowish-brown (10YR 5/6) clay; fine, medium, distinct mottles of yellow (2.5Y 7/6) and reddish-yellow (5YR 6/6); moderate, coarse, angular blocky structure; firm; few small fragments of disintegrated granite; many fine mica flakes; very strongly acid; clear, wavy boundary; 8 to 16 inches thick.

C 44 to 48 inches +, strong-brown (7.5YR 5/6) sandy clay loam; common, medium, distinct mottles of yellow (2.5Y 7/6), reddish yellow (5YR 6/6), and gray (2.5Y 6/0); massive structure; many fine mica flakes; some flakes or small pieces of disintegrated granite; extremely acid; 10 to 60 feet to bedrock.

In some areas the surface layer ranges in color from very dark gray to pale yellow. Included are areas of Durham sandy loam and Appling sandy loam, too small to be shown separately.

The principal crops are small grain, cotton, corn, and soybeans. Other crops commonly grown are peanuts, grain sorghum, sweetpotatoes, watermelons, crotalaria, and velvetbeans. This soil is droughty, but crops respond to fertilization and irrigation. In the large fields, windbreaks and stripcropping are good conservation practices to control soil blowing.

Most of this soil is planted to row crops. Bahiagrass, bermudagrass, and sericea lespedeza are fairly well suited pasture plants. *Capability unit 12(IIs-1). Woodland suitability group 6.*

Efland Series

The Efland series consists of deep, moderately well drained soils that commonly have a surface layer of dark yellowish-brown silt loam and a subsoil of yellowish-brown clay. In most places there are pronounced mottles below a depth of 30 inches. These soils developed in residuum from Carolina slate that contained intrusions of basic rock. The slope range is 2 to 15 percent but is mostly less than 6 percent. The original vegetation was oak, hickory, gum, pine, elm, redcedar, and an understory of shrubs and native grasses.

These soils are among areas of the Tirzah, Herndon, Alamance, and Orange soils. Their subsoil lacks the red coloring of that of the Tirzah soils and is more plastic than that of the Herndon and Alamance soils. The Efland soils are deeper and better drained than the Orange soils.

Infiltration is slow in the Efland soils. Permeability is moderately slow to slow. The available water holding capacity is moderate. The content of organic matter is low, and fertility is moderately high. The reaction is slightly acid to medium acid.

These soils are in the central, northeastern, and extreme western parts of the county. Most of the acreage is in forest.

Efland silt loam, 2 to 6 percent slopes (EfB).—This deep, moderately well drained soil has a slightly plastic subsoil.

Profile in a moist pine forest, 6 miles east of Saluda, near U.S. Highway No. 378:

A_0 ½ to 0 inch, covering of leaves and decayed leaves, ⅛ to ½ inch thick.

A_p 0 to 4 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; very friable; abundance of fine roots; many small dark-colored concretions; few medium-sized and small quartz stones; strongly acid; clear, smooth boundary; 2 to 8 inches thick.

A_2 4 to 8 inches, yellowish-brown (10YR 5/6) silt loam; weak, fine, granular structure; very friable; abundance of fine roots, few medium roots; many small, dark-colored concretions and a little fine quartz gravel; strongly acid; clear, smooth boundary; 2 to 6 inches thick.

B_1 8 to 10 inches, strong-brown (7.5YR 5/6) silty clay; moderate, medium, angular blocky structure; friable; many fine roots; few small, dark-colored concretions; sticky when wet, hard when dry; strongly acid; clear, smooth boundary; 2 to 16 inches thick.

B_{21} 10 to 26 inches, yellowish-brown (10YR 5/8) clay; faint mottles of yellowish red (5YR 5/6); strong, medium, angular blocky structure; firm; faint clay skins; few fine roots; few small, dark-colored concretions; sticky when wet, hard when dry; strongly acid; clear, smooth boundary; 6 to 20 inches thick.

B_{22} 26 to 38 inches, yellowish-brown (10YR 5/8) clay; fine to medium, distinct mottles of olive gray (5Y 5/2); strong, coarse, angular blocky structure; firm; hard when dry, very sticky when wet; distinct clay skins; few fine roots; few fine fragments of weathered rock; medium acid; clear, smooth boundary; 10 to 18 inches thick.

C_1 38 to 41 inches, brownish-yellow (10YR 6/8) silty clay; mottles or streaks of light yellowish brown (2.5Y 6/4) and gray (2.5Y 6/0); massive; many fragments of weathered schist and Carolina slate; slightly acid. (Depth to bedrock ranges from about 3 to 20 feet.)

The surface soil ranges in color from very dark brown to yellowish brown. The number of small to medium-sized concretions and pebbles varies. In some places there are many, and in others there are none. Included are small areas that have a surface soil of silty clay loam, clay loam, or sandy loam.

This soil is well suited to corn, cotton, soybeans, small grain, and annual lespedeza. Crops respond to fertilizer and lime. A rotation of moderate length is suitable. The rotation should include a deep-rooted legume to improve the permeability and aeration of the subsoil. Green-manure crops help to conserve the soil and supply organic matter. Stripcropping and contour tillage are also good conservation practices. Terraces and vegetated waterways are needed to help control erosion.

If fertilized and limed, this soil is suited to dallisgrass, bermudagrass, tall fescue, annual lespedeza, and whiteclover. *Capability unit 9(IIe-3). Woodland suitability group 9.*

Efland silt loam, 6 to 10 percent slopes (EfC).—This soil is on the breaks from the more gently sloping areas of Efland silt loam. It has a profile similar to that of Efland silt loam, 2 to 6 percent slopes, but is more subject to erosion. Commonly, it is in smaller areas.

This soil is suited to the same crops as the more gently sloping soil, but rotations should include close-growing crops 2 years out of 3 to help control erosion and supply organic matter.

Dallisgrass, bermudagrass, tall fescue, annual lespedeza, and whiteclover provide good grazing if liberally fertilized. *Capability unit 18(IIIe-3). Woodland suitability group 9.*

Efland silt loam, 10 to 15 percent slopes, eroded (EfD2).—This soil is at the heads of and along drainageways on short, strong slopes from areas of more gently sloping Efland soils. Its profile is similar to that of Efland silt loam, 2 to 6 percent slopes, except that the surface soil is thinner. The solum ranges from 20 to 32 inches in thickness. Shallow gullies and accelerated sheet erosion are common.

This soil is not suited to cultivation. Most of the acreage is in forest, predominantly pine. Plants such as bermudagrass and annual lespedeza provide fair grazing if heavily fertilized. *Capability unit 27(IVe-2). Woodland suitability group 14.*

Efland silty clay loam, 2 to 6 percent slopes, severely eroded (EkB3).—This soil generally is on ridgetops or on the lower part of slopes. It is commonly in smaller areas than Efland silt loam, 2 to 6 percent slopes, and has a thinner, lighter colored, and finer textured surface soil. The 3- to 5-inch plow layer is yellowish-brown silty clay loam and consists mostly of subsoil material.

This soil is not suited to frequent cultivation. It needs heavy fertilization to produce fair yields. To help control erosion and supply organic matter, the rotation should include close-growing crops at least 3 years out of 4 and all crop residues should be turned under. *Capability unit 18(IIIe-3). Woodland suitability group 14.*

Efland silty clay loam, 6 to 10 percent slopes, severely eroded (EkC3).—This soil is at the heads of and along small drainageways, on short slopes from areas of more gently sloping Efland soils. It has a profile similar to that of Efland silt loam, 2 to 6 percent slopes, except that the surface soil is thinner and finer textured and the solum is shallower. The 4- to 6-inch plow layer is light yellowish-brown silty clay loam and consists mostly of subsoil material. Accelerated sheet erosion and shallow gullies are common. This soil generally is in smaller areas than the more gently sloping soil.

This soil is not suited to frequent cultivation. Most of the acreage is in forest, predominantly pine. If heavily fertilized, crops such as bermudagrass and annual lespedeza provide limited grazing. *Capability unit 27(IVe-2). Woodland suitability group 14.*

Enon Series

The Enon series consists of deep, well drained to moderately well drained soils that have a surface layer of dark yellowish-brown to dark grayish-brown sandy loam that grades at a depth of about 15 inches to red, moderately plastic clay. These soils developed in residuum from mixed acidic and basic rock. The slope range is 2 to 10 percent. The original vegetation was pine, gum, elm, persimmon, cedar, some hickory, and an undergrowth of briers and vines.

These soils are among areas of the Appling, Cecil, and Lloyd soils on the uplands of the lower Piedmont. They have a more plastic and sticky and less friable subsoil than the associated soils.

The rate of infiltration is moderate in the Enon soils. Permeability is moderately slow, and the water-holding capacity is low. The content of organic matter is low,

and the natural fertility is low. The reaction is slightly acid to medium acid.

Small areas of these soils are scattered throughout the southeastern and northern parts of the county, but the total acreage is small. Little of the acreage is in crops; some is in pasture, but most is in forest.

Enon sandy loam, 2 to 6 percent slopes (EnB).—This deep, well drained to moderately well drained soil has a firm subsoil.

Profile in a moist, cultivated field, 3 miles northeast of Holston Crossroads:

- A_p 0 to 6 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, fine, granular structure; very friable; many fine roots; few small, dark-colored concretions; a little fine quartz gravel; medium acid; clear, smooth boundary; 5 to 7 inches thick.
- B_1 6 to 15 inches, yellowish-brown (10YR 5/6) clay loam; many, fine, faint mottles of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; friable; few fine roots; few dark-colored concretions; medium acid; clear, smooth boundary; 3 to 10 inches thick.
- B_{21} 15 to 27 inches, red (2.5YR 5/8) clay; fine, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm; hard when dry, plastic and sticky when wet; few fine and medium pores; few dark-colored concretions; strongly acid; clear, smooth boundary; 10 to 25 inches thick.
- B_{22} 27 to 35 inches, yellowish-brown (10YR 5/8) clay; few, medium, distinct mottles of light yellowish brown (2.5Y 6/4); strong, medium, angular blocky structure; firm; plastic and sticky when wet; few dark-colored concretions; patchy clay skins; medium acid; clear, smooth boundary; 6 to 10 inches thick.
- B_3 35 to 45 inches, light yellowish-brown (2.5Y 6/4) clay; common, medium, distinct mottles of yellowish brown (10YR 5/6); strong, fine, angular blocky structure; very firm; very sticky when wet; fragments of weathered parent rock; distinct clay skins; neutral; clear, wavy boundary; 6 to 14 inches thick.
- C 45 to 50 inches +, light brownish-gray (2.5Y 6/2) clay loam and partially weathered rock; mottles or streaks of brownish yellow (10YR 6/8) and gray (7.5YR 5/0); massive; mildly alkaline; medium-sized fragments of mixed acidic and basic rock.

The surface soil ranges in color from very dark grayish brown in some wooded areas to dark yellowish brown in cultivated fields. In some places there are quartz pebbles and dark-colored concretions that vary in size and number. Included are some eroded areas that have a surface soil of light yellowish brown. Also included are some areas of Appling and Mecklenburg soils too small to be shown separately. Mecklenburg soils are not mapped in Saluda County.

The principal crops are small grain, corn, and cotton. Other crops that grow well are soybeans, grain sorghum, and annual lespedeza. All crops respond to fertilizer. A complete water-disposal system, including terraces and vegetated meadow outlets, is needed to help control erosion. Rotations that include close-growing crops 2 years out of every 4 also help to conserve this soil.

Bahiagrass, bermudagrass, dallisgrass, tall fescue, annual lespedeza, and whiteclover provide fair hay and pasture if liberally fertilized and limed. *Capability unit 9(IIe-3). Woodland suitability group 9.*

Enon sandy loam, 6 to 10 percent slopes, eroded (EnC2).—This soil occurs at the heads of and along small drainageways. It occurs in smaller areas and on stronger slopes than Enon sandy loam, 2 to 6 percent slopes, but it is suited to the same crops.

A rotation that includes close-growing crops 2 years out of every 3 helps to control erosion and to supply organic matter. All crops respond to liberal applications of fertilizer. *Capability unit 18(IIIe-3). Woodland suitability group 9.*

Faceville Series

The Faceville series consists of deep, well-drained soils that commonly have a surface layer of dark grayish-brown sandy loam and a subsoil of strong-brown to red sandy clay to clay. Reddish-brown to reddish-yellow mottles are common below a depth of 30 inches. These soils developed in thick, unconsolidated beds of sandy clay and clay. The slope range is 0 to 6 percent. The original vegetation was pine, oak, some hickory, and an understory of shrubs and native grasses.

These soils are among areas of the Magnolia and Marlboro soils on the uplands of the upper Coastal Plain. Their subsoil is not so red as that of the Magnolia soils, nor so yellow as that of the Marlboro soils.

The rate of infiltration in the Faceville soils is moderate to rapid. The permeability and water-holding capacity are moderate. The content of organic matter is medium, and the natural fertility is medium to high. The reaction is medium acid.

Medium-sized and large areas of these soils are scattered through the southern and southeastern parts of the county, but the total acreage is small. Little of the acreage is in forest.

Faceville sandy loam, 2 to 6 percent slopes (FaB).—This deep, well-drained soil has a sticky subsoil. It occurs on the Coastal Plain in medium-sized to large areas, some as much as 50 acres in size.

Profile in a moist peach orchard, about one-quarter of a mile south of Ridge Spring:

- A_p 0 to 5 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; abundant fine roots; few small, dark-colored concretions; medium acid; abrupt, smooth boundary; 3 to 7 inches thick.
- A_2 5 to 10 inches, brownish-yellow (10YR 6/6) sandy loam; weak, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary; 3 to 7 inches thick.
- B_1 10 to 15 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; slightly sticky when wet; few fine roots; medium acid; clear, smooth boundary; 4 to 9 inches thick.
- B_2 15 to 30 inches, reddish-brown (5YR 4/3) sandy clay; few, fine to medium, distinct mottles of red (2.5YR 5/8); moderate, medium, subangular blocky structure; friable; sticky when wet; medium acid; clear, smooth boundary; 10 to 18 inches thick.
- B_3 30 to 40 inches, red (2.5YR 4/8) clay loam; common, medium, distinct mottles of reddish brown (5YR 5/4); moderate, coarse and medium, subangular blocky structure; friable; slightly sticky when wet, hard when dry; medium acid; clear, wavy boundary; 6 to 16 inches thick.
- C 40 to 42 inches +, red (2.5YR 4/8) sandy clay loam; many, medium, distinct mottles of reddish yellow (7.5YR 6/8); massive; very hard when dry; medium acid.

The surface soil ranges in color from very dark grayish brown in some wooded areas to grayish brown in some cultivated areas. The subsoil ranges in color from

strong brown to red and in texture from sandy clay to clay. In some places there are concretions that vary in size and number. Included are a few severely eroded areas that have a surface soil of brownish yellow to light reddish brown sandy clay loam. Also included are areas of Magnolia soils too small to be shown separately.

The principal crops are small grain, cotton, corn, and peaches. Other crops that grow well are soybeans, lespedeza, sweetpotatoes, and peanuts. Crops respond to fertilization and to irrigation. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Close-growing crops should be grown every other year to help conserve this soil and to supply organic matter. In some fields, windbreaks or strips are needed to control soil blowing. *Capability unit 8(IIe-2, A4). Woodland suitability group 5.*

Faceville sandy loam, 0 to 2 percent slopes (FaA).—This soil has a profile similar to that of Faceville sandy loam, 2 to 6 percent slopes, and is suited to the same crops. Some of the areas are as much as 75 acres in size.

Most of this soil is in row crops. Crops respond to fertilizer and to irrigation. Winter cover crops should be plowed under to supply organic matter. In some large fields, windbreaks or strips are needed to control soil blowing.

Well-suited pasture plants are bahiagrass, bermudagrass, annual lespedeza, and sericea lespedeza. *Capability unit 4(I-2, A4). Woodland suitability group 5.*

Georgeville Series

The Georgeville series consists of deep, well-drained soils that have a surface layer of dark-brown to light-brown silt loam and a subsoil of red silty clay. Reddish-yellow, pale-olive, and light-brown mottles are common below a depth of 30 inches. These soils developed in residuum weathered from Carolina slate. The slope range is 2 to 25 percent but is mostly less than 6 percent. The original vegetation was oak, hickory, pine, some cedar, some holly, dogwood, gum, sourwood, and an understory of shrubs, vines, briers, and native grasses.

These soils are among areas of the Herndon, Alamance, Efland, Orange, and Goldston soils on the uplands of the lower Piedmont. They have a redder subsoil than the Herndon, Alamance, and Efland soils. They are better drained than the Orange soils, and have a thicker solum. They have a thicker B horizon and in general a thicker profile than the Goldston soils, which have a thin and discontinuous B horizon.

The rate of infiltration is low in the Georgeville soils. The permeability and water-holding capacity are moderate. The content of organic matter is low, and the fertility is low. The reaction is strongly acid to medium acid.

These soils are distributed from east to west across the central part of the county and are among the more important agricultural soils. They are the most extensive soils in the county. Much of the acreage is in forest, predominantly of pine.

Georgeville silt loam, 2 to 6 percent slopes (GeB).—This deep, well-drained soil developed from Carolina slate and has a red subsoil. It is subject to accelerated sheet erosion.

Profile in a moist, wooded area, 3 miles northwest of Owdoms, in the western part of the county:

- A_0 1 to 0 inch, very dark grayish-brown (10YR 3/2) shallow covering of partially decomposed organic matter, leaf mold, and forest litter; medium acid; ¼ inch to 3 inches thick.
- A_1 0 to 5 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, granular structure; very friable; abundance of fine roots and many medium roots; a little fine quartz gravel; strongly acid; clear, smooth boundary; 2 to 6 inches thick.
- A_2 5 to 9 inches, brown (7.5YR 5/4) silt loam; weak, medium, granular structure; friable; abundance of fine roots and a few medium roots; a little fine quartz gravel and few fine, dark-colored concretions; very strongly acid; clear, smooth boundary; 2 to 6 inches thick.
- B_1 9 to 15 inches, red (2.5YR 5/8) silty clay loam; weak, medium, subangular blocky structure; friable; many fine roots and a few medium roots; a little fine gravel; very strongly acid; clear, smooth boundary; 5 to 9 inches thick.
- B_2 15 to 31 inches, red (2.5YR 5/6) silty clay; moderate, medium and coarse, subangular blocky structure; friable; few fine roots; a little fine gravel; faint clay skins; very strongly acid; clear, smooth boundary; 10 to 18 inches thick.
- B_3 31 to 38 inches, red (2.5YR 5/6) silty clay; fine, faint to distinct mottles of reddish yellow (5YR 6/8) and pale olive (5Y 6/4); mottling is caused by fragments of weathered parent material; moderate, medium, subangular blocky structure; friable; a little fine gravel; very strongly acid; clear, wavy boundary; 4 to 12 inches thick.
- C_1 38 to 43 inches, red (2.5YR 4/6), light-brown (7.5YR 6/4), reddish-yellow (7.5YR 7/8), and pale-olive (5Y 6/4) silty clay loam; mottled; streaks or splotches caused by weathered fragments of parent material (Carolina slate); massive; trongly acid; 2 to 40 feet to bedrock.

The surface soil ranges in color from dark brown in some uncleared areas to grayish brown and light brown in some cultivated areas. There are varying quantities of small to large pebbles, commonly milky quartz, in some profiles. Pebbles and small stones are on many of the ridgetops, though not in sufficient quantity to interfere with tillage. Included are some areas that have a surface soil of silty clay loam. A few areas of the Herndon soils, too small to be shown separately, are also included.

The principal crops are small grain, cotton, corn, and annual lespedeza. Other crops that grow well are soybeans, grain sorghum, sericea lespedeza, and some truck crops. All crops need moderate to liberal amounts of fertilizer and lime. A complete water-disposal system, including terraces and vegetated waterways, is needed. Strip rotations and rotations that include close-growing crops 2 years out of 4 help to prevent erosion.

Some of the better suited hay and pasture plants are bermudagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, and whiteclover. These crops respond to liberal fertilization and liming. *Capability unit 5(IIe-1). Woodland suitability group 6.*

Georgeville silt loam, 2 to 6 percent slopes, eroded (GeB2).—This soil commonly is on ridgetops and gentle slopes. It has a profile similar to that of Georgeville silt loam, 2 to 6 percent slopes, except that the surface soil is thinner. It is suited to the same crops but needs heavier applications of fertilizer to produce average yields.

Much of the acreage has been used continuously for cotton and is now eroded. A rotation that keeps most of

the acreage in grass or that includes close-growing crops 2 years out of every 3 helps to control erosion. Stripcropping is also a good conservation practice.

Pastures produce good yields if adequately fertilized. *Capability unit 14(IIIe-1). Woodland suitability group 7.*

Georgeville silt loam, 6 to 10 percent slopes (GeC).—This soil commonly is on sharp breaks from more gently sloping areas of Georgeville and Herndon soils. It has a profile similar to that of Georgeville silt loam, 2 to 6 percent slopes, but has greater runoff.

This soil is suited to the same crops as the more gently sloping Georgeville soil. Rotations that are basically grass or that include close-growing crops 2 years out of 3 will help to control erosion. Stripcropping is also a good conservation practice.

This soil is suited to the same grasses and legumes as Georgeville silt loam, 2 to 6 percent slopes. *Capability unit 14(IIIe-1). Woodland suitability group 6.*

Georgeville silt loam, 6 to 10 percent slopes, eroded (GeC2).—The profile of this soil is similar to that of Georgeville silt loam, 2 to 6 percent slopes, except that the solum is 8 to 18 inches thinner. The 3- to 5-inch plow layer is grayish-brown to red silt loam. On about 85 percent of the acreage, the plow layer is a mixture of the remaining surface soil and subsoil material. In places the surface soil is silty clay loam. Runoff is greater than on Georgeville silt loam, 2 to 6 percent slopes, because of the stronger slopes, finer texture, and slower rate of infiltration.

This soil is mostly in forest, predominantly of pine. Because of the severe hazard of erosion, it is not suited to frequent cultivation. Rotations should be from 4 to 12 years long and should include a deep-rooted legume, grown in strips on the contour. Three-fourths of the acreage should be kept in close-growing crops to help control erosion.

Bermudagrass and sericea lespedeza respond to heavy applications of fertilizer. Yields are fair. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Georgeville silt loam, 10 to 15 percent slopes, eroded (GeD2).—This soil is along medium-sized and large streams, on short, strongly sloping breaks from areas of more gently sloping Georgeville soils. It has a profile similar to that of Georgeville silt loam, 2 to 6 percent slopes, except that the solum is 18 to 36 inches thick. There are small areas from which all of the surface soil has been removed by sheet erosion. Shallow gullies are common.

Because of the short, strong slopes, this soil is not suited to frequent cultivation. Bermudagrass and sericea lespedeza, if heavily fertilized, provide fair grazing. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Georgeville silt loam, 15 to 25 percent slopes, eroded (GeE2).—This soil is along large streams in the central part of the county. It is on short, steep breaks from more gently sloping areas of Georgeville soils. It has a shallower profile than Georgeville silt loam, 2 to 6 percent slopes, and a more serious erosion hazard. The brown to red surface soil is from 2 to 8 inches thick. The solum is 12 to 18 inches thick.

This soil is not suited to cultivation. Bermudagrass and sericea lespedeza respond to heavy applications of fertilizer, but, even if grazing is rotated, they provide only a limited amount of forage. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Georgeville silty clay loam, 2 to 6 percent slopes, severely eroded (GgB3).—This soil occurs on ridgetops, commonly in smaller areas than Georgeville silt loam, 2 to 6 percent slopes. The 4- to 6-inch plow layer is reddish-brown to red silty clay loam or, in places, red silty clay. It consists mostly of the upper part of the subsoil.

Because of the severe erosion hazard, the rotation should include close-growing crops 3 years out of 4. Returning crop residues to the soil helps to increase the content of organic matter. Crops respond to heavy applications of fertilizer. Even if management is very good, only fair yields can be expected. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded (GgC3).—This soil occurs in long, narrow areas along streams that drain areas of more gently sloping Georgeville soils. Its profile is similar to that of Georgeville silt loam, 2 to 6 percent slopes, except that the original surface soil has been removed by erosion and the solum is thinner. The solum is 12 to 20 inches thick. The present surface layer is reddish-brown or red silty clay loam and consists mostly of the upper part of the subsoil. There are small areas from which accelerated erosion has removed as much as 6 to 12 inches of the original B horizon. Shallow gullies are common. In places the surface soil contains some slate rock, but not enough to interfere with tillage.

Because of the serious hazard of sheet erosion, this soil is not suited to cultivation. Bermudagrass and sericea lespedeza, even if liberally fertilized, provide only limited grazing. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Georgeville silty clay loam, 10 to 15 percent slopes, severely eroded (GgD3).—The profile of this soil is only 12 to 24 inches thick. The reddish-brown to red surface layer consists mostly of subsoil material. Because of the stronger slopes and finer textured surface soil, surface runoff is much faster than on the more gently sloping soil and erosion is a more serious hazard. Shallow gullies are common.

This soil is not suited to cultivation. Bermudagrass and sericea lespedeza, if liberally fertilized, provide limited grazing. *Capability unit 34(VIIe-1). Woodland suitability group 7.*

Gilead Series

The Gilead series consists of moderately deep to deep, moderately well drained soils that have a surface layer of dark-brown sandy loam and a subsoil of yellowish-brown sandy clay loam. At a depth of 24 to 40 inches there are beds of mottled sand and clay. The slope range is 2 to 6 percent. The original vegetation was longleaf pine, loblolly pine, scrub oak, and an understory of vines, shrubs, and native grasses.

These soils are among areas of Vaucluse, Lakeland, Ruston, and Norfolk soils on the uplands of the upper Coastal Plain. They have a yellowish-brown subsoil, and

the Vaucluse soils have a strong-brown to red subsoil. They are less well drained and finer textured than the Lakeland soils and have a well developed B horizon. They are less friable and have a browner subsoil than the Ruston soils. The Gilead soils are mottled nearer to the surface than the Norfolk soils.

Infiltration is rapid in the Gilead soils. Permeability is moderately slow to slow. The water-holding capacity is low. The content of organic matter is low, and the fertility is low. The reaction is strongly acid.

There is only one Gilead soil in Saluda County. It occurs in small areas in the extreme southeastern part. The total acreage is small, and most of it is in forest.

Gilead sandy loam, 2 to 6 percent slopes (GnB).—This moderately well drained soil has a thin, firm, slightly compact subsoil. It is susceptible to erosion.

Profile in a moist, forested area, 2 miles southwest of Ridge Spring:

- A_1 0 to 6 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, crumb structure; very friable; abundance of fine roots and few medium roots; a little coarse sand or small quartz gravel; strongly acid; clear, smooth boundary 1 to 6 inches thick.
- A_{21} 6 to 12 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, fine, crumb structure; very friable; abundance of fine roots; a little fine quartz gravel; strongly acid; clear, smooth boundary; 3 to 8 inches thick.
- A_{22} 12 to 16 inches, pale-yellow (2.5Y 7/4) sandy loam; weak, medium, granular structure; very friable; few fine roots; a little small and medium-sized quartz gravel; strongly acid; clear, wavy boundary; 2 to 8 inches thick.
- B_1 16 to 20 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary; 3 to 7 inches thick.
- B_2 20 to 29 inches, yellowish-brown (10YR 5/4) sandy clay loam; common, fine to medium, faint to distinct mottles of light yellowish brown (2.5Y 6/4) and strong brown (7.5 YR 5/6); moderate, medium, subangular blocky structure; compact in place; friable to firm; patchy clay skins; strongly acid; abrupt, wavy boundary; 6 to 12 inches thick.
- C 29 to 33 inches +, gray (10YR 6/1), pale-yellow (2.5Y 7/4), yellowish-brown (10YR 5/4), and red (2.5YR 5/8) coarse sandy clay; many, medium, distinct mottles; massive; firm; slightly sticky; nonconforming layer.

The surface soil ranges in color from dark grayish brown in some wooded areas to olive gray in some cultivated areas. In places it is coarse sandy loam. In some areas the upper part of the subsoil is mottled with gray, red, purple, and yellow. In places there are quartz pebbles and concretions in the profile. Included are some areas of Vaucluse soils too small to be shown separately.

The principal crops are oats, corn, crotalaria, and some truck crops. Crops respond to liberal applications of fertilizer and lime. Yields are fair. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. The rotation should include close-growing crops at least 2 years out of every 4.

Bahiagrass, bermudagrass, dallisgrass, sericea lespedeza, and crimson clover, if fertilized and limed, produce fair yields of hay and pasture. *Capability unit 10(IIe-4). Woodland suitability group 5.*

Goldston Series

The Goldston series consists of moderately shallow to shallow, well-drained soils that commonly have a surface layer of grayish-brown silt loam and a thin, discontinuous subsoil of light brownish-gray silty clay loam. Mottled red, yellow, and brown weathered slate material is at a depth of about 10 to 18 inches. The depth to bedrock ranges from 12 to 48 inches. These soils developed in residuum weathered from Carolina slate. The slope range is 2 to 30 percent. The original vegetation was oak, sourwood, redcedar, pine, a little hickory, and an understory of shrubs and native grasses.

These soils are among areas of Georgeville, Herndon, Efland, Alamance, and Orange soils on the uplands of the lower Piedmont. They are shallow and have a thin, discontinuous, weakly developed B horizon, whereas the associated soils are deeper and have a well-developed B horizon.

The rate of infiltration in the Goldston soils is slow. The water-holding capacity is low, the content of organic matter is very low, and fertility is very low.

These soils occupy a relatively large acreage in Saluda County. They are scattered throughout the central part of the county. Most of the acreage is in forest.

Goldston silt loam, 2 to 6 percent slopes (GoB).—This well-drained soil is moderately shallow to shallow and is underlain by Carolina slate rock. It is medium acid.

Profile in a moist, wooded area, 1 mile south of traffic circle on State Highway No. 391:

- A_p 0 to 8 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; abundance of fine roots; few small quartz stones; few thin flakes and fragments of Carolina slate; medium acid; abrupt, smooth boundary; 2 to 12 inches thick.
- B 8 to 12 inches, light brownish-gray (2.5Y 6/2) silty clay loam; mottles of olive yellow (5Y 6/8); moderate, medium, subangular blocky structure; friable; few fine and medium roots; some flakes and fragments of Carolina slate; medium acid; clear, smooth boundary; 0 to 7 inches thick. (In places this layer is lacking.)
- C 12 to 16 inches, red (2.5YR 5/6), weathered slate material; mottles of yellowish red (5YR 5/8) and grayish brown (10YR 5/2); slightly acid; abrupt, smooth boundary; 2 to 12 inches thick.
- D 16 inches +, Carolina slate bedrock; ranges in color from gray to red.

The surface soil ranges in color from dark grayish brown in some wooded areas to light brown in some cultivated fields. A few small areas have enough quartz stones and slate fragments in the surface layer to interfere with tillage. These areas are indicated on the detailed map by gravel symbols. Included are areas where there is no B horizon.

Most of the acreage is in forest, predominantly of pine. If liberally fertilized and limed, this soil will produce fair yields of small grain, particularly oats, annual lespedeza, corn, and cotton. A rotation that includes close-growing crops 2 years out of 3, preferably in strips, is needed to control erosion. Terracing is difficult because this soil is shallow. All natural drainageways should be kept in vegetation.

Bermudagrass, dallisgrass, tall fescue, white clover, annual lespedeza, and crimson clover produce fair yields if liberally fertilized. *Capability unit 20(IIIe-5). Woodland suitability group 15.*

Goldston silt loam, 6 to 10 percent slopes (GoC).—This soil generally occurs along medium-sized streams on breaks from gently sloping areas of Georgeville, Herndon, Efland, and Alamance soils. It has a profile similar to that of Goldston silt loam, 2 to 6 percent slopes, but has greater and faster runoff and, consequently, a more serious erosion hazard (fig. 6).

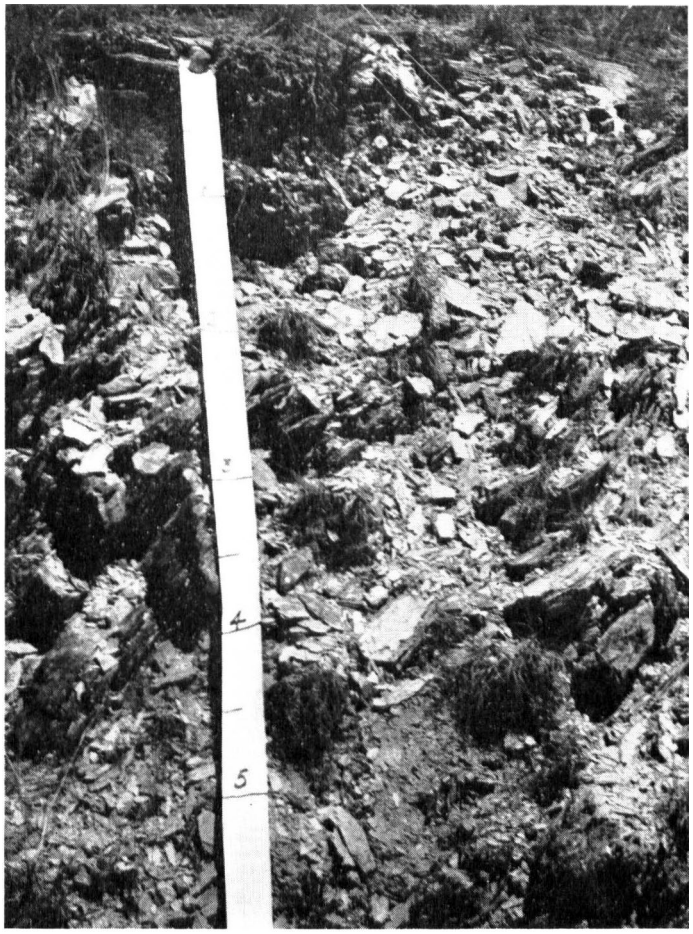

Figure 6.—**Goldston silt loam, 6 to 10 percent slopes; shallow surface layer underlain by weathered slate.**

This soil is not suited to frequent cultivation. It responds to heavy applications of fertilizer, but close-growing crops should be grown 3 years out of every 4 to help control erosion.

If well fertilized, bermudagrass, dallisgrass, and annual lespedeza produce fair yields for grazing. *Capability unit 28(IVe-4). Woodland suitability group 15.*

Goldston silt loam, 10 to 15 percent slopes (GoD).—This soil generally is on sharp breaks along medium-sized and large streams in the central part of the county. It is very susceptible to erosion. Its profile is shallower than that of Goldston silt loam, 2 to 6 percent slopes. It ranges from 8 to 16 inches in thickness. In many small areas the B horizon is lacking, and in a few the C horizon as well.

This soil is not suited to frequent cultivation. It should be kept in a continuous cover crop, such as bermudagrass, or in forest. *Capability unit 28(IVe-4). Woodland suitability group 15.*

Goldston silt loam, 15 to 30 percent slopes (GoE).—This soil is along the backwaters of Lake Murray, along the Saluda and Little Saluda Rivers, and along Clouds, Richland, Mine, Red Bank, Big, and Indian Creeks. It is in elongated areas on short slopes from more gently sloping areas of Georgeville, Herndon, and Tirzah soils.

There are many areas that have a very thin subsoil, some areas where the surface soil is directly over the parent material, and some where the surface soil is on the slate rock. In many places fragments of slate rock are in the surface soil.

All of this soil is in forest. The steeper slopes need a continuous cover to prevent erosion. Sometimes pine trees on this shallow soil are uprooted by the wind. *Capability unit 33(VIe-3). Woodland suitability group 15.*

Grady Series

The Grady series consists of poorly drained to very poorly drained soils that commonly have a very dark gray, loamy surface soil and a mottled, gray, clayey subsoil. These soils generally developed in marine sediments but in places have been influenced by limestone residuum. The slope range is 0 to 2 percent. The original vegetation was live oak, tupelo-gum, cypress, swamp elm, sweetgum, some maple, and an understory of gallberries, briers, and native grasses.

The Grady soils occur on the Coastal Plain, in depressions locally called upland bays. They are among areas of well-drained Magnolia, Marlboro, Ruston, and Norfolk soils.

Some areas of Grady soils are flooded for short periods, and others for longer periods. The rate of infiltration is moderate, and permeability is slow. The water-holding capacity is moderately high. The content of organic matter is high, and the fertility is medium. The reaction is very strongly acid.

There is only one Grady soil in Saluda County. It is scattered throughout the southern and southeastern parts, but the total acreage is small. Little of the acreage is in forest.

Grady loam (Gr).—This soil occurs in oval depressions. It has a heavy, very firm, clayey subsoil.

Profile in a moist, cultivated field, 1 mile northeast of Ward:

A_p 0 to 5 inches, very dark gray (2.5Y 3/0) loam; weak, fine, granular structure; friable; abundance of fine and medium roots; high in organic matter; very strongly acid; abrupt, smooth boundary; 3 to 7 inches thick.

B_{1g} 5 to 25 inches, gray (2.5Y 5/0) sandy clay; few, medium, distinct mottles of light olive brown (2.5Y 5/6); weak, medium to fine, subangular blocky structure; firm; hard when dry, sticky when wet; few medium and fine roots; very strongly acid; gradual, wavy boundary; 8 to 22 inches thick.

B_{21g} 25 to 34 inches, gray (2.5Y 6/0) clay; common, fine to medium, prominent mottles of light gray (10YR 7/1) and olive yellow (2.5Y 6/6); weak, fine, subangular blocky structure; very firm; very hard when dry, sticky when wet; noticeable content of kaolinitic clay; very strongly acid; gradual, wavy boundary; 7 to 14 inches thick.

B_{23g} 34°to 41 inches, gray (2.5Y 6/0) clay; common, coarse, prominent mottles of light gray (2.5Y 7/0); moderate, coarse, subangular blocky structure; very firm; very hard when dry, sticky when wet; high content of kaolinitic clay; very strongly acid; gradual, wavy boundary; 4 to 10 inches thick.

C_{1g} 41 to 52 inches, gray (2.5Y 5/0) sandy clay loam; mottles of yellowish brown (10YR 5/8); massive; sticky; stratified streaks of sand ranging from 1 to 5 inches in thickness; very strongly acid; 8 to 20 inches thick.

The surface layer commonly is very dark gray, but it ranges from black in some wooded areas to light grayish brown in some cultivated areas. Included are small areas that have a surface soil of silty clay loam to light sandy loam. The sandy loam generally is near the rims of depressions. In some profiles there is evidence of stratification in the C horizon. Some areas of Portsmouth soils, too small to be shown separately, are included. Portsmouth soils are not mapped in Saluda County.

The principal crops are truck crops, corn, small grain, and annual lespedeza. Other crops that grow well are soybeans, peanuts, and sugarcane. This soil responds to fertilizer and lime.

Most of the acreage is in improved pasture. The pasture plants are dallisgrass, bermudagrass, bahiagrass, tall fescue, whiteclover, and annual lespedeza.

Before this soil is used for crops or pasture, drains are needed to remove excess water. One area is covered with water most of the time. In several areas watering ponds for stock are being dug. *Capability unit 23(IIIw-2, A4). Woodland suitability group 4.*

Gullied Land

Gullied land consists of areas that are so cut by gullies that they are generally not suited to crops or pasture. These areas are classified as miscellaneous land types. Except in small areas between gullies, the soil profiles have generally been destroyed.

Gullied land, firm materials (Gu).—This land type consists of moderately deep gullies separated by small areas that have a surface layer that varies in thickness. Most of the gullies are stabilized by trees or honeysuckle. The slope range is 4 to more than 30 percent. The surface layer between the gullies varies in texture from gravelly sandy loam to clay. The subsoil varies in thickness and ranges in color from light brown to red. The subsoil is firm. The exposed parent material is firm to friable.

This land type is in all parts of the county except the Coastal Plain region. Most of the areas are small, but just northwest of Saluda there is an area of approximately 200 acres from which material has been removed for use in road foundations. Except for this area, all of the acreage is in forest.

This land is not suited to crops or pasture, and the cost of reclaiming it by mechanical methods would be prohibitive. *Capability unit 36(VIIe-3). Woodland suitability group 16.*

Gullied land, friable materials (Gv).—This land type consists of moderately deep gullies separated by areas that have a surface soil and a subsoil. Most of the gullies are stabilized by trees, kudzu, or honeysuckle. The slope ranges from 4 to more than 25 percent. The surface layer between the gullies ranges from gravelly sandy loam to clay. The subsoil is friable and varies in thickness. It ranges from yellow to red. The exposed parent material is friable to very friable.

This land type is scattered throughout the county. Most areas are small, but some in the northern part of the county are fairly large. All of the acreage is in forest. It is not suited to crops or pasture, and the cost of reclaiming it by mechanical methods would be prohibitive. *Capability unit 34(VIIe-1). Woodland suitability group 16.*

Helena Series

The Helena series consists of moderately well drained to somewhat poorly drained soils that commonly have a surface layer of olive to pale-olive sandy loam and a subsoil of tough, mottled, brownish-yellow to yellowish-brown clay. The parent material was residuum derived from mixed acidic and basic rock, mostly aplitic granite and dikes of quartz diorite. The slope range is 2 to 10 percent. The original vegetation was pine, oak, gum, elm, and an understory of vines and shrubs.

These soils are among areas of Durham, Appling, Enon, Colfax, Worsham, and Wilkes soils, on the uplands of the lower Piedmont. They are less well drained than the Durham and Appling soils, and they have a finer textured and less friable subsoil. They are not so well drained as the Enon soils. The Helena soils are better drained and have less gray mottling than the Colfax and Worsham soils, and they are at higher elevations. They are deeper to bedrock and have a thicker, more clayey, and more strongly developed B horizon than the Wilkes soils.

The rate of infiltration is moderate in the Helena soils. Permeability is moderately slow. The available moisture holding capacity is moderate. The content of organic matter is low, and the fertility is low. The reaction is medium acid.

These soils occur mostly in small areas in the southeastern and northwestern parts of the county. Much of the acreage is in forest, a small part is in crops, and some is in pasture. Just northwest of Saluda there is an area, about 200 acres in size, of coarse-textured soil, much of which has been used as base for dirt roads.

Helena sandy loam, 2 to 6 percent slopes (HeB).—This moderately well drained to somewhat poorly drained soil has a firm, moderately plastic and sticky subsoil. This soil is susceptible to erosion.

Profile in a moist, cultivated field, 3 miles southeast of Chappells Bridge, on State Highway No. 39:

A_p 0 to 5 inches, olive (5Y 5/3) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; a little fine quartz gravel; medium acid; abrupt, smooth boundary; 3 to 8 inches thick.

A_2 5 to 12 inches, light olive-brown (2.5Y 5/4) sandy loam; weak, fine, granular structure; very friable; many small roots; a little fine and medium-sized quartz gravel; medium acid; clear, smooth boundary; 6 to 10 inches thick.

B_1 12 to 19 inches, light olive-brown (2.5Y 5/4) sandy clay loam; fine, faint mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; friable; few fine roots; medium acid; clear, smooth boundary; 5 to 12 inches thick.

B_2 19 to 27 inches, brownish-yellow (10YR 6/8) clay; mottles of dark yellowish brown (10YR 4/4), light brownish gray (2.5Y 6/2), and gray (2.5Y 5/0); moderate, medium, angular blocky structure; firm when moist, hard when dry, and moderately plastic and sticky when wet; a little fine quartz gravel; slightly acid; clear, smooth boundary; 5 to 15 inches thick.

B_3 27 to 38 inches, yellowish-brown (10YR 5/8) clay; mottles of olive yellow (2.5Y 6/6), light brownish gray (2.5Y 6/2), and light gray (2.5Y 7/0); moderate, coarse, angular blocky structure that crushes to moderate, fine, angular blocky structure; firm when moist, hard when dry, and moderately plastic and firm when wet; a little fine and medium-sized quartz gravel; slightly acid; clear, wavy boundary; 8 to 15 inches thick.

C 38 to 41 inches +, brownish-yellow (10YR 6/8) partially weathered parent material; mottles of strong brown (7.5YR 5/8) and light brownish gray (2.5Y 6/2); massive; contains seams and lenses of clay that have a slick, smooth feel; slightly acid; 5 to 60 feet to bedrock.

The surface layer ranges from dark grayish brown in some wooded areas to olive and pale olive in some cultivated areas. The B horizon ranges from brownish yellow to yellowish brown. Small areas that have a surface layer of coarse sandy loam are included. Also included are areas of Durham and Colfax soils too small to be mapped separately.

The principal crops are small grain, corn, soybeans, and cotton. Other crops that grow well are annual lespedeza, grain sorghum, sericea lespedeza, and some truck crops. All crops respond to fertilizer. To help conserve this soil, the rotation should include a close-growing crop 2 years out of 4, and a deep-rooted legume. Other good conservation measures are contour tillage, terraces, and vegetated waterways.

Bermudagrass, bahiagrass, dallisgrass, annual lespedeza, sericea lespedeza, and whiteclover produce good yields of forage and hay if fertilized and limed. *Capability unit 9(IIe-3). Woodland suitability group 9.*

Helena sandy loam, 2 to 6 percent slopes, eroded (HeB2).—This soil is on hilltops near Helena sandy loam, 2 to 6 percent slopes. Areas that have slopes of 5 to 6 percent are near the Colfax soils but are at higher elevations. Here, the original surface soil has been sloughed off by sheet erosion. The profile of this soil is similar to that of Helena sandy loam, 2 to 6 percent slopes, except that the surface layer is shallower, or only 2 to 4 inches thick. The hazard of erosion is serious. Included are small, severely eroded areas that have a surface layer of light olive-brown sandy clay loam.

Small grain, annual lespedeza, soybeans, corn, and cotton produce fair yields if heavily fertilized.

Bermudagrass, dallisgrass, tall fescue, annual lespedeza, and whiteclover, if liberally fertilized, produce fair yields of forage and hay. *Capability unit 18(IIIe-3). Woodland suitability group 9.*

Helena sandy loam, 6 to 10 percent slopes (HeC).—This soil is at the heads of small drainageways on sharp, short slopes breaking from more gently sloping areas of Helena and Durham soils. It has a profile similar to that of Helena sandy loam, 2 to 6 percent slopes, but has more rapid runoff and is more susceptible to erosion.

All crops respond to fertilization. A rotation that includes a close-growing crop 2 years out of 3 is needed to help control erosion. *Capability unit 18(IIIe-3). Woodland suitability group 9.*

Helena sandy loam, 6 to 10 percent slopes, eroded (HeC2).—This soil has a thinner surface layer than Helena sandy loam, 2 to 6 percent slopes, and has greater and faster runoff. The 3- to 5-inch plow layer includes some of the original subsoil. It commonly is pale-olive sandy clay loam.

This soil is mostly in forest, predominantly of pine. It is not suited to frequent cultivation. All crops respond to liberal applications of fertilizer, but only fair yields can be expected.

The best use for this soil is forest or a continuous cover of bermudagrass, dallisgrass, annual lespedeza, or whiteclover. Permanent sod should have liberal applications of fertilizer and lime. *Capability unit 27(IVe-2). Woodland suitability group 14.*

Herndon Series

The Herndon series consists of deep, well-drained soils that commonly have a surface layer of very dark grayish-brown to grayish-brown silt loam and a yellowish-brown to strong-brown, clayey subsoil. The parent material was derived from Carolina slate. The slope range is 2 to 25 percent. The original vegetation was oak, hickory, gum, dogwood, pine, and an understory of shrubs and native grasses.

These soils are among areas of Georgeville, Efland, Alamance, and Goldston soils on the uplands of the lower Piedmont. Their subsoil lacks the red color of the Georgeville soils and is more friable than that of the Efland soils. The Herndon soils are better drained than the Alamance soils and have a slightly finer textured subsoil. They are deeper to bedrock and have a thicker and more strongly developed B horizon than the Goldston soils.

Infiltration is slow in the Herndon soils. Permeability is moderate, and the water-holding capacity is low. The content of organic matter is low, and the natural fertility is low. The reaction is very strongly acid.

These soils are scattered in medium, large, and small areas throughout the central part of the county. The total acreage is large, and much of it is forest.

Herndon silt loam, 2 to 6 percent slopes (HnB).—This deep, well-drained soil is very strongly acid. The subsoil is friable silty clay.

Profile in a moist, mixed-forest area, one-quarter of a mile south of Colemans Crossroads, west of State Highway No. 19. (A very thin layer of leaves and decayed leaves covers the surface.):

A_1 0 to 2 inches, very dark grayish-brown (2.5Y 3/2) silt loam; weak, fine, granular structure; friable; many fine roots; a little quartz gravel; very strongly acid; clear, smooth boundary; 1 to 4 inches thick.

A_2 2 to 9 inches, pale-olive (5Y 6/4) silt loam; weak, fine, granular structure; friable; many fine roots, few medium roots; a little quartz gravel; few brown concretions; very strongly acid; clear, smooth boundary; 3 to 9 inches thick.

B_1 9 to 17 inches, pale-yellow (2.5Y 7/4) silty clay loam; moderate, medium, subangular blocky structure; friable; few fine and medium roots; some quartz gravel; very strongly acid; clear, smooth boundary; 4 to 12 inches thick.

B_{21} 17 to 30 inches, yellowish-brown (10YR 5/8) silty clay; fine, medium, distinct mottles of olive yellow (2.5Y 6/8); moderate, medium, subangular blocky structure; friable; faint clay skins; few medium roots; very strongly acid; clear, smooth boundary; 10 to 16 inches thick.

B_{22} 30 to 37 inches, strong-brown (7.5YR 5/6) clay; mottles of reddish yellow (5YR 6/8) and brownish yellow (10YR 6/6); moderate, medium, subangular blocky structure; friable; hard when dry; few dark-brown concretions; faint clay skins; few fragments of slate rock; very strongly acid; clear, wavy boundary; 4 to 12 inches thick.

C_1 37 to 43 inches +, reddish-yellow (7.5YR 7/8) silty clay loam; mottles of strong brown (7.5YR 5/8), very pale brown (10YR 7/3), yellowish red (5/YR 5/8), olive yellow (5Y 6/8), and pinkish white (5YR 8/2); massive structure; fragments of parent material; a little fine and medium quartz gravel; very soft fragments of Carolina slate rock that break readily; extremely acid; 2 to 50 feet thick.

The surface layer ranges in color from dark grayish brown in some uncleared areas to pale yellow in some cultivated areas. The B_2 horizon ranges from yellowish brown to strong brown.

Included are small areas that have a surface layer of fine sandy loam, coarse silt loam, or silty clay loam. Also included are small areas of Georgeville and Alamance soils, too small to be shown separately. There are quartz pebbles in some small areas, but not in amounts that interfere with tillage. Most of the included areas are suited to cultivation.

The principal crops are small grain, corn, cotton, and annual lespedeza. Other crops that grow well are grain sorghum, soybeans, and some truck crops. This soil responds to fertilizing and liming. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. A rotation that includes a close-growing crop 2 years in every 4, and a green-manure crop, helps to control erosion and supplies organic matter. Large fields should be stripcropped.

Bermudagrass, dallisgrass, tall fescue, whiteclover, annual lespedeza, and sericea lespedeza grow well on this soil. Crimson clover grows fairly well. These crops need fertilizer and lime for average or better yields. *Capability unit 7(IIe-2). Woodland suitability group 6.*

Herndon silt loam, 2 to 6 percent slopes, eroded (HnB2).—This soil generally is on ridgetops and on gentle breaks near other Herndon soils. It occurs in small areas throughout the central part of the county. Its profile is similar to that of Herndon silt loam, 2 to 6 percent slopes, except that the surface layer is thinner. In most places the 4- to 6-inch plow layer includes some of the original subsoil.

This soil is suited to the same crops as Herndon silt loam, 2 to 6 percent slopes, but needs heavier applications of lime and fertilizer. Otherwise, yields will be somewhat lower. Rotations should keep close-growing crops on the soil 2 years out of 3.

Pasture plants respond to fertilizer and produce fair yields. *Capability unit 16(IIIe-2). Woodland suitability group 7.*

Herndon silt loam, 6 to 10 percent slopes (HnC).—The profile of this soil is similar to that of Herndon silt loam, 2 to 6 percent slopes, but runoff is faster and the erosion hazard is more serious.

This soil is suited to the same crops as the more gently sloping soil, but, because of stronger slopes, it should be kept in close-growing crops 2 years out of 3. Where practical, crops should be grown in strips to help control erosion.

The same kinds of grasses and legumes that are suited to the more gently sloping soil can be grown on this soil for pasture and hay. Fair to good yields are produced if fertilizer and lime are applied. *Capability unit 16(IIIe-2). Woodland suitability group 6.*

Herndon silt loam, 6 to 10 percent slopes, eroded (HnC2).—This soil is in small, elongated areas along and at heads of small drainageways throughout the central part of the county. The surface soil is thinner than that of Herndon silt loam, 2 to 6 percent slopes, and the slopes are shorter. Much of this soil is in forest, predominantly of pine.

This soil is suited to the same crops as Herndon silt loam, 2 to 6 percent slopes, but it should not be used so frequently for cultivated crops. Crops respond to fertilizer and lime. Yields are fair.

Pasture grasses and legumes respond to fertilizer and lime and produce fair yields. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Herndon silt loam, 10 to 15 percent slopes (HnD).—The profile of this soil is shallower than that of Herndon silt loam, 2 to 6 percent slopes. The solum ranges from 12 to 24 inches in thickness. Erosion is a very serious hazard.

The total acreage is small and is mostly in forest. This soil is not suited to row crops. It should be kept under a complete ground cover at all times.

Bermudagrass, tall fescue, sericea lespedeza, and whiteclover respond to liberal applications of fertilizer and lime. To maintain a good ground cover, grazing should be controlled. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Herndon silt loam, 10 to 25 percent slopes, eroded (HnD2).—This soil commonly occurs in elongated areas on short slopes along and at the heads of medium-sized drainageways in the central part of the county. The slope is commonly less than 15 percent. The solum is 12 to 30 inches thick. Included are small areas that have a surface soil of silty clay loam.

Most of the acreage is in forest. Because of the serious hazard of erosion, this soil is not suited to cultivated crops. Bermudagrass and sericea lespedeza produce fair yields if fertilizer and lime are liberally applied. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Herndon silty clay loam, 2 to 6 percent slopes, severely eroded (HtB3).—This soil is on eroded hilltops and in other areas where accelerated sheet erosion has been very active. Its profile is shallower than that of Herndon silt loam, 2 to 6 percent slopes. The 3- to 5-inch plow layer is pale-yellow silty clay loam and consists mostly of subsoil material.

The acreage is small and is mostly in forest, predominantly of pine. Yields of cultivated crops are only fair, even with heavy applications of fertilizer.

Sericea lespedeza and bermudagrass need heavy applications of fertilizer and lime to produce fair yields. Grazing should be rotated. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Herndon silty clay loam, 6 to 10 percent slopes, severely eroded (HtC3).—This soil is along and at the heads of small drainageways on short, steep slopes from more gently sloping areas of Herndon and Alamance soils. The 2- to 4-inch surface layer is pale-olive silty clay loam and consists mostly of material that was originally the upper part of the subsoil. The solum is 12 to 30 inches thick. Erosion is a serious hazard, and shallow gullies are common.

This soil is not suited to cultivated crops. Bermudagrass and sericea lespedeza respond to liberal applications of fertilizer and lime. A complete ground cover is needed to help control erosion. *Capability unit 32(VIe-2). Woodland suitability group 7.*

Hiwassee Series

The Hiwassee series consists of deep, well-drained soils that have a surface layer of dark reddish-brown sandy loam and a dark-red or dusky-red, clayey subsoil. These soils developed in old general alluvium that washed from material weathered from dark-colored basic rock. The slope range is 2 to 8 percent. The original vegetation was oak, hickory, dogwood, sourwood, cedar, holly, pine, and an understory of brambles, shrubs, briers, and native grasses.

These soils are adjacent to the Wickham soils on old, high, stream terraces and near the Cecil and Georgeville soils, which commonly are on adjacent uplands. The Hiwassee soils are redder than these associated soils.

The rate of infiltration in the Hiwassee soils is moderate. The permeability and the water-holding capacity are moderate. The content of organic matter is low, and the fertility is relatively high. The reaction is slightly acid to medium acid.

There is only one Hiwassee soil in Saluda County. It occurs in small areas in the northern part along the Saluda River. The total acreage is very small and is mostly in forest.

Hiwassee sandy loam, 2 to 8 percent slopes (HwB).—This deep, well-drained, friable soil is on stream terraces.

Profile in a moist pasture, 4 miles northwest of Higgins Community Center:

A_p 0 to 4 inches, dark reddish-brown (5YR 3/2) sandy loam; weak, fine, granular structure; very friable; abundant fine roots; a little fine and medium, water-rounded, quartz gravel and a few small, dark-colored concretions; medium acid; clear, smooth boundary; 2 to 8 inches thick.

A_3 4 to 8 inches, dark reddish-brown (2.5YR 2/4) sandy loam; weak, medium, granular structure; very friable; abundant fine roots; a little fine, rounded, quartz gravel; slightly acid; clear, smooth boundary; 2 to 7 inches thick.

B_1 8 to 18 inches, dusky-red (10R 3/4) clay loam; moderate, medium, subangular blocky structure; friable; few small roots; medium acid; clear, smooth boundary; 4 to 16 inches thick.

B_2 18 to 32 inches, dark-red (10R 3/6) clay; moderate, fine, subangular blocky structure; friable; medium acid; clear, smooth boundary; 8 to 20 inches thick.

B_3 32 to 49 inches, dark-red (10R 3/6) clay; moderate, coarse, subangular blocky structure that crushes to weak, fine, angular blocky structure; friable; slightly acid; clear, wavy boundary; 6 to 40 inches thick.

C 49 to 54 inches +, red (2.5YR 4/6) sandy clay loam; faint to distinct mottles of strong brown (7.5YR 5/6); friable; much fine gravel and other weathered dark-colored material; slightly acid.

The surface layer ranges from dark reddish brown to reddish brown, and the B_2 horizon, from dark red to dusky red. The number and size of concretions in the profile vary. In some places there are none. In places quartz stones 4 to 10 inches in size are prevalent in the surface layer. There is a line of stones in some profiles. These stones are waterworn and range in size from 1 to 20 inches. Included are some areas of Cecil and Georgeville soils, too small to be shown separately. Also included are small, severely eroded spots where the plow layer consists mostly of red clay loam that was originally part of the subsoil.

The principal crops are corn, small grain, and annual lespedeza. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion. Close-growing crops should be grown every other year, to help conserve this soil and to supply organic matter.

Good pasture plants are bermudagrass, dallisgrass, fescue, crimson clover, white clover, sericea lespedeza, and annual lespedeza. These plants respond to applications of fertilizer. Grazing should be controlled. *Capability unit 5(IIe-1). Woodland suitability group 6.*

Lakeland Series

The Lakeland series consists of excessively drained, sandy soils that formed from unconsolidated, thick beds of sand. These soils developed under a thin forest cover of longleaf pine, turkey oak, bluejack oak, sand post oak, persimmon, and sweetgum. The slope range is 0 to 10 percent.

These soils are among areas of Norfolk, Vaucluse, and Gilead soils. They are sandier than these associated soils and generally are lighter colored.

Infiltration is rapid in the Lakeland soils. Permeability is rapid. The content of organic matter is very low, and the fertility is very low. The capacity for holding available moisture is very low. The reaction is strongly acid.

The acreage in this county is small. It is widely scattered in small to medium-sized areas throughout the southern and southeastern parts. This part of the Coastal Plain is commonly called the ridge section.

Lakeland sand, 0 to 6 percent slopes (LaB).—This deep, droughty soil is on the upper Coastal Plain.

Profile in a moist, cultivated field, 2 miles southeast of Ridge Spring, near the Edgefield County and Saluda County line:

A_p 0 to 7 inches, dark grayish-brown (2.5Y 4/2) sand; very weak, fine, crumb structure; loose; numerous fine roots; few coarse sand grains; strongly acid; abrupt smooth boundary; 6 to 9 inches thick.

A_2 7 to 10 inches, light olive-brown (2.5Y 5/4) loamy sand; single grain or massive; loose, compact in places; few fine roots; this layer is packed and cemented as a plowsole; strongly acid; abrupt, smooth boundary; 1 to 4 inches thick.

C_1 10 to 28 inches, pale-olive (5Y 6/4) loamy sand; single grain; loose; strongly acid; gradual, wavy boundary; 12 to 40 inches thick.

C_2 28 to 40 inches, yellowish-brown (10YR 5/6) loamy sand; single grain; loose; a few lighter colored splotches; strongly acid; gradual, wavy boundary; 8 to 18 inches thick.

C_3 40 to 44 inches +, strong-brown (7.5YR 5/6) loamy sand; few to common, distinct mottles of red (2.5YR 4/6); single grain; loose; a little fine quartz gravel; strongly acid; 2 to 30 inches thick.

The surface soil ranges from coarse sand to fine sand. The depth to the D horizon ranges from about 40 inches to several feet. Included are small areas of fine gravel, but these do not interfere with tillage.

The principal crops are crotalaria, rye, oats, peaches, corn, cowpeas, sericea lespedeza, and some asparagus. All crops respond to applications of fertilizer, but yields are only fair. Because this soil is very droughty and is rapidly leached of plant nutrients, green-manure crops and crop residues should be plowed under to supply organic matter. A rotation that includes close-growing crops 2 years out of 3 helps to control erosion. Windbreaks planted at right angles to the prevailing winds are needed to control wind erosion (fig. 7).

Figure 7.—**Pine windbreak on Lakeland sand, 0 to 6 percent slopes.**

Bahiagrass and sericea lespedeza respond to fertilization, but yields are only fair. *Capability unit 25(IIIs-2). Woodland suitability group 10.*

Lakeland sand, 6 to 10 percent slopes (LaC).—This soil is in the southeastern part of the county, on strong slopes that break from more gently sloping areas of Lakeland sand and Norfolk loamy sand. Because of the stronger slope, water erosion is a more serious problem than on Lakeland sand, 0 to 6 percent slopes.

This soil is not suited to frequent cultivation. Crotalaria, rye, sericea lespedeza, and corn respond to frequent applications of fertilizer, but yields are only fair. *Capability unit 30(IVs-1) Woodland suitability group 10.*

Lloyd Series

The Lloyd series consists of deep, well-drained soils that commonly have a surface layer of dark-brown sandy loam and a subsoil that is red and clayey. These soils developed in residuum derived from a mixture of basic and acidic rock, principally hornblende, gneiss, and schist. The slope ranges from 2 to 15 percent. The original vegetation was oak, hickory, dogwood, sourwood, redcedar, holly, pine, and an understory of briers and native grasses.

These soils are among areas of Cecil and Enon soils on the uplands of the lower Piedmont. They have a darker brown surface layer and a darker red subsoil than the Cecil and Enon soils and are slightly better drained than the Enon soils. Gullies are not so deep in the Lloyd soils as in the Cecil soils, because of the texture of the parent material.

The rate of infiltration of the Lloyd soils is moderate. The permeability and the water-holding capacity are moderate. The content of organic matter is low, and the natural fertility is low. The reaction is strongly acid.

These soils are in small and medium-sized areas throughout the southeastern and northern parts of the county. The total acreage is small, and much of it is in forest.

Lloyd sandy loam, 2 to 6 percent slopes, eroded (LdB2).—This deep, well-drained soil is in medium-sized areas on the Piedmont uplands. All of it was cleared at one time, but much of it has reverted to forest.

Profile in a moist, wooded area, about 4 miles northwest of Ridge Spring, on State Highway No. 39:

A_p 0 to 6 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; few concretions; strongly acid; abrupt, smooth boundary; 4 to 8 inches thick.

B_1 6 to 14 inches, red (2.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; slightly sticky when wet; many fine roots; medium acid; clear, smooth boundary; 6 to 14 inches thick.

B_{21} 14 to 28 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; friable; slightly sticky when wet; few medium roots; medium acid; clear, smooth boundary; 10 to 18 inches thick.

B_{22} 28 to 43 inches, dark-red (2.5YR 3/6) clay; moderate, fine, subangular blocky structure; firm; sticky when wet; medium acid; clear, wavy boundary; 12 to 18 inches thick.

C 43 to 47 inches +, dark-red (2.5YR 3/6) sandy clay; mottles of reddish yellow (5YR 6/6); massive; fragments of dark-colored weathered rock; medium acid.

The color of the surface layer ranges from dark grayish brown in some less eroded areas to dark brown or red in more eroded areas. The number of small to medium-sized concretions in the surface layer varies. In some places there are many, and in others there are none. Included are some severely eroded spots where the plow layer consists mostly of red clay loam that was originally part of the subsoil. Also included are some areas of Cecil and Enon soils that are too small to be mapped separately.

The principal crops are small grain, cotton, corn, and some truck crops. Other crops that grow well are soybeans, lespedeza, and peaches. All crops respond to fertilization. A complete water-disposal system, including

terraces and vegetated waterways, is needed to help control erosion. Peach orchards planted on the contour will also help to conserve this soil. Stripcropping is another good conservation practice.

Bahiagrass, bermudagrass, dallisgrass, crimson clover, white clover, and sericea lespedeza respond to applications of fertilizer and produce good yields for hay and pasture. *Capability unit 5(IIe-1). Woodland suitability group 7.*

Lloyd clay loam, 2 to 6 percent slopes, severely eroded (LcB3).—This soil is in the southeastern and northern parts of the county. It occurs in small, widely scattered areas on ridgetops and breaks. It has a thinner and finer textured surface soil than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and, consequently, has slower infiltration and greater runoff. The 3- to 5-inch plow layer is brownish-red to red clay loam; it consists mostly of the upper part of the original subsoil. The subsoil is 30 to 40 inches thick. Shallow gullies and accelerated sheet erosion are common. Good tilth is difficult to maintain.

At one time most of this soil was used continuously for row crops, but much of it has reverted to forest, predominantly of pine. If crops are grown, a moderately long rotation that keeps two-thirds of the acreage in close-growing crops is needed to control erosion. To supply organic matter, green-manure crops and all crop residues should be plowed under.

Applications of fertilizer and lime help to establish and maintain permanent stands of grasses and legumes for grazing. Yields are average. *Capability unit 14(IIIe-1). Woodland suitability group 7.*

Lloyd clay loam, 6 to 15 percent slopes, severely eroded (LcD3).—This soil is on breaks along small streams in the southeastern and northern parts of the county. The total acreage is small. The surface layer is thinner and finer textured than that of Lloyd sandy loam, 2 to 6 percent slopes, eroded, and runoff is greater and faster. Consequently, erosion is a more serious hazard. The 3- to 5-inch plow layer is brownish-red to red clay loam; it consists mostly of the upper part of the original subsoil. The subsoil is red clay, 24 to 36 inches thick.

This soil responds to frequent and liberal applications of fertilizer, but it is not suited to cultivation, because of the serious erosion hazard.

If well fertilized, bermudagrass and sericea lespedeza produce fair grazing. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Local Alluvial Land

Local alluvial land (Lo).—This miscellaneous land type consists of deep, moderately well drained to well drained soils that have a slope range of 0 to 4 percent. It occurs in low, flat depressions and in nearly level to very gently sloping areas at the heads of small drainageways in the lower Piedmont and on the upper Coastal Plain. The surface layer is black to light brownish-gray silt loam to loamy sand. The subsoil is brownish-yellow to strong-brown sandy loam or silty clay loam. The soil material washed or sloughed from surrounding uplands. The original vegetation was oak, gum, poplar, some pine, and an understory of briers, vines, and grasses.

Infiltration is moderately rapid to rapid. Permeability is moderate to rapid. The organic-matter content is medium to high, and the fertility is moderate to high. The reaction is slightly acid to medium acid.

Most areas are less than 5 acres in size, and some are less than 1 acre. Much of the acreage is in crops or pasture. Areas near homes are commonly used for home gardens.

There is no typical profile for this mapping unit, but following are three profile descriptions—one of Coastal Plain material, one of Piedmont material, and one of Carolina slate material.

Profile of Coastal Plain material, in a moist, cultivated field, 2 miles west of Batesburg:

- A_{1p} 0 to 5 inches, dark-gray (10YR 4/1) sandy loam; weak, fine, crumb structure; very friable; abundant fine roots; slightly acid; abrupt, smooth boundary; 4 to 8 inches thick.
- A_{12} 5 to 13 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, coarse, subangular blocky structure; packed, almost weakly cemented; firm; many fine roots; very narrow streaks of decaying organic matter, very dark in color; strongly acid; clear, smooth boundary; 4 to 12 inches thick.
- C_1 13 to 27 inches, dark-brown (7.5YR 4/4) sandy loam; moderate, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary; 10 to 18 inches thick.
- C_2 27 to 36 inches, strong-brown (7.5YR 5/6) sandy clay loam; mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary; 5 to 11 inches thick.
- C_3 36 to 47 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; medium acid; clear, smooth boundary; 7 to 14 inches thick.
- C_4 47 inches +, strong-brown (7.5YR 5/6) sandy loam; massive; medium acid.

Profile of Piedmont material, in a moist, cultivated field, 3 miles northeast of Chestnut Hill Church, in the northern part of the county:

- A_p 0 to 6 inches, very dark grayish-brown (10YR 3/2) sandy loam; weak, fine, crumb structure; very friable; abundance of fine roots; medium acid; abrupt, smooth boundary; 3 to 8 inches thick.
- A_3 6 to 16 inches, strong-brown (7.5YR 5/8) sandy loam; moderate, coarse, granular structure; very friable; abundance of fine roots; much smooth quartz gravel; slightly acid; clear, smooth boundary; 8 to 12 inches thick.
- B_2 16 to 24 inches, brownish-yellow (10YR 6/8) sandy clay loam; mottles of pale yellow (2.5Y 7/4); moderate, coarse, subangular blocky structure; friable; slightly acid; abrupt, smooth boundary; 4 to 10 inches thick.
- C_1 24 to 30 inches, light-gray (2.5Y 7/2) loamy sand; mottles of reddish yellow (7.5YR 6/6); weak, fine, granular structure; very friable; much fine gravel; slightly acid; clear, smooth boundary; 4 to 10 inches thick.
- C_2 30 to 34 inches, white (2.5Y 8/2) sandy clay loam; mottles of yellow (10YR 7/8); moderate, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary; 2 to 6 inches thick.
- C_3 34 to 40 inches, white (2.5Y 8/2) sandy clay; mottles of strong brown (7.5YR 5/8) and light brown (7.5YR 6/4); moderate, medium, subangular blocky structure; friable; slightly acid; clear, wavy boundary; 4 to 8 inches thick.
- D 40 to 43 inches +, partially disintegrated parent rock.

Profile of Carolina slate material, in a moist, idle field, 4¼ miles northwest of Saluda:

A_{1p} 0 to 6 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; very friable; abundance of fine roots; medium acid; abrupt, smooth boundary; 4 to 8 inches thick.

A_{12} 6 to 14 inches, very dark grayish-brown (10YR 3/2) silt loam; strong, coarse, granular structure; friable; abundance of fine roots; medium acid; abrupt, smooth boundary; 4 to 12 inches thick.

C_1 14 to 26 inches, brownish-yellow (10YR 6/6) silty clay loam; few, fine, distinct mottles of light yellowish brown (2.5Y 6/4) and red (10R 4/6); moderate, medium, subangular blocky structure; friable; few fine roots; medium acid; clear, smooth boundary; 8 to 16 inches thick.

C_2 26 to 40 inches, strong-brown (7.5YR 5/6) clay; few, faint to medium mottles of light yellowish brown (2.5Y 6/4); moderate, medium, angular blocky structure; firm; a little fine quartz gravel; medium acid; clear, wavy boundary; 12 to 24 inches thick.

The alluvial deposit ranges from 12 to 40 inches in thickness and from black to light olive gray in color. The surface layer ranges from light loamy sand to silt loam. The number of small to medium-sized pebbles and concretions varies. In some places there are many, and in others there are none.

Because of its favorable tilth and moisture conditions, this soil is suited to intensive use. It is well suited to a wide variety of crops if organic matter and fertilizer are added, but it should be protected from runoff from higher areas by terraces and diversion channels.

Pasture plants that produce good yields are tall fescue, bermudagrass, dallisgrass, whiteclover, and annual lespedeza. *Capability unit 1(I-1). Woodland suitability group 16.*

Magnolia Series

The Magnolia series consists of deep, well-drained soils that commonly have a surface layer of dark-brown sandy loam and a red to dark-red, clayey subsoil. These soils developed from thick, unconsolidated beds of sand and clay. The slope range is 0 to 10 percent. The original vegetation was longleaf pine, loblolly pine, red oak, white oak, post oak, water oak, some hickory, holly, and cedar, and an understory of shrubs and grasses.

These soils are among areas of Faceville, Ruston, and Marlboro soils on the uplands of the upper Coastal Plain. They have a redder subsoil than these associated soils.

The rate of infiltration in the Magnolia soils is moderate. Permeability is moderate, and the water-holding capacity is moderate. The content of organic matter is medium, and fertility is medium.

The Magnolia soils occur in broad areas throughout the southwestern part of the county. The total acreage is large. Little of the acreage is in forest.

Magnolia sandy loam, 2 to 6 percent slopes (MaB).—This deep soil has a red to dark-red, friable, sticky subsoil. It is on the Coastal Plain.

Profile in a moist, cultivated field, 2 miles west of Ridge Spring:

A_p 0 to 6 inches, dark-brown (10YR 4/3) sandy loam; weak, fine, crumb structure; very friable; many fine roots; medium acid; clear, smooth boundary; 4 to 10 inches thick.

A_2 6 to 10 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary; 1 to 5 inches thick.

B_1 10 to 19 inches, red (2.5YR 4/6), light clay loam; weak, fine, subangular blocky structure; friable; slightly sticky when wet; small, dark-colored concretions; medium acid; clear, smooth boundary; 8 to 14 inches thick.

B_{21} 19 to 35 inches, red (10R 4/6) clay loam; moderate, fine, angular blocky structure; firm; sticky when wet, hard when dry; many fine pores; medium acid; clear, smooth boundary; 12 to 24 inches thick.

B_{22} 35 to 54 inches, dark-red (10R 3/6) clay loam; moderate, medium, angular blocky structure; firm: sticky when wet, hard when dry; few fine pores; very strongly acid; clear, wavy boundary; 18 to 36 inches thick.

C 54 inches +, red (10R 4/8) sandy clay grading to coarser textured material; many shiny sand grains; very strongly acid; variable thickness.

The surface layer is dark grayish brown to dark brown. The subsoil ranges from clay loam to clay. In some places there are a few concretions. Included are some areas of Faceville soils too small to be shown separately.

Most of the acreage is in crops. The principal crops are cotton, corn, small grain, and peaches. Other crops that grow well are soybeans, grain sorghum, and annual lespedeza. All crops respond to fertilizer and lime. A complete water-disposal system, including terraces and vegetated outlets, is needed to control erosion. In large fields, stripcropping is needed to prevent sheet erosion and soil blowing.

Bahiagrass, bermudagrass, dallisgrass, crimson clover, and sericea lespedeza are well-suited pasture and hay crops. *Capability unit 8(IIe-2, A4). Woodland suitability group 5.*

Magnolia sandy loam, 0 to 2 percent slopes (MaA).—This soil has a profile similar to that of Magnolia sandy loam, 2 to 6 percent slopes, and is suited to the same crops. It commonly is in larger areas, some as much as 75 acres in size.

Most of the acreage is in row crops or peaches. Rotations generally consist of row crops for 1 to 2 years, then grain, followed by soybeans for 1 year. Windbreaks or strips are needed on large fields to control wind erosion. *Capability unit 4(I-2, A4). Woodland suitability group 5.*

Magnolia sandy loam, 6 to 10 percent slopes, eroded (MaC2).—This soil is on short slopes from nearly level or gently sloping areas of Magnolia soils. It has a profile similar to that of Magnolia sandy loam, 2 to 6 percent slopes, but has a thinner surface layer. The 5- to 7-inch plow layer is dark-brown to red sandy loam; it is a mixture of original surface soil and the upper part of the subsoil. Included are some severely eroded areas where the surface layer is red sandy clay loam.

The total acreage of this soil is small. Crops respond to liberal applications of fertilizer. The rotation should include close-growing crops 2 years out of 3.

Pasture plants respond to liberal applications of fertilizer. Yields are good. *Capability unit 17(IIIe-2, A4). Woodland suitability group 7.*

Marlboro Series

The Marlboro series consists of deep, well-drained soils that have a surface layer of light olive-brown to grayish-brown sandy loam and a subsoil of brownish-yellow

clay loam. These soils are underlain by mottled, yellowish-brown sandy clay loam at a depth of about 36 to 40 inches. They developed in unconsolidated beds of sand and clay. The slope range is 0 to 2 percent. The original vegetation was pine, oak, some hickory, and an understory of shrubs and grasses.

These soils are among areas of Magnolia, Faceville, Ruston, and Norfolk soils on the uplands and commonly are adjacent to the Grady soils, which are in depressions on the upper Coastal Plain. They have a brownish-yellow subsoil, whereas the Magnolia, Faceville, and Ruston soils have a much redder subsoil. They have a thinner surface soil, a finer textured subsoil, and a more distinct boundary between the A and B horizons than the Ruston and Norfolk soils.

The rate of infiltration in the Marlboro soils is moderate. Permeability is moderate, and the water-holding capacity is moderate. The content of organic matter is medium, and natural fertility is medium. The reaction is medium acid.

There is only one Marlboro soil in Saluda County. Medium-sized areas are scattered throughout the southern part, but the total acreage is small. Little of the acreage is in forest.

Marlboro sandy loam, 0 to 2 percent slopes (MbA).—This soil has a friable, brownish-yellow subsoil. The areas range from 8 to 25 acres in size.

Profile in a moist, cultivated field, 2 miles east of Monetta, on State Highway No. 23:

- A_p 0 to 5 inches, light olive-brown (2.5Y 5/4) sandy loam; weak, fine, crumb structure; very friable; abundance of fine roots; medium acid; clear, smooth boundary; 4 to 8 inches thick.
- A_2 5 to 9 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, medium, crumb structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary; 3 to 5 inches thick.
- B_1 9 to 16 inches, brownish-yellow (10YR 6/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; slightly sticky when wet; few fine roots; very strongly acid; clear, smooth boundary; 4 to 9 inches thick.
- B_2 16 to 27 inches, brownish-yellow (10YR 6/6) clay loam; moderate, fine, subangular blocky structure; friable; sticky when wet, hard when dry; faint clay skins; very strongly acid; clear, smooth boundary; 8 to 14 inches thick.
- B_3 27 to 37 inches, yellow (10YR 7/8) clay loam; common, fine, distinct mottles of red (2.5YR 5/8) and strong brown (7.5YR 5/6); weak, coarse, subangular blocky structure; friable; sticky when wet, hard when dry; faint clay skins; very strongly acid; 8 to 12 inches thick.
- C 37 to 42 inches, yellowish-brown (10YR 5/6) sandy clay loam; many, fine to medium, distinct mottles of yellow (10YR 7/8), strong brown (7.5YR 5/8), and pale olive (5Y 6/4); massive; grades to coarser textured material; very strongly acid.

The color of the surface soil ranges from dark gray in some wooded areas to light olive brown in some cultivated areas. In places the texture of the surface soil is loamy sand. The number of small to medium-sized concretions varies. In places there are few, and in other places there are many. Included are areas of Norfolk and Faceville soils too small to be shown separately.

Most of this soil is in row crops. The principal crops are cotton, corn, small grain, peaches, and some truck crops. Other crops that grow well are soybeans, peanuts, sweetpotatoes, asparagus, and lespedeza. Most crops respond to fertilizer. Windbreaks or crops planted in strips help to control wind erosion.

Bahiagrass, bermudagrass, and sericea lespedeza are well-suited pasture and hay crops. *Capability unit 4(I-2, A4). Woodland suitability group 5.*

Mixed Alluvial Land

Mixed alluvial land (Mv).—This miscellaneous land type consists of deep, well drained to moderately well drained soils that form narrow, elongated strips on low-lying first bottoms along small and medium-sized streams. The soil material washed or sloughed from adjoining soils and from soils upstream. The slope range is 0 to 3 percent.

The surface layer ranges in texture from loamy sand to clay loam and in color from grayish brown to reddish brown. Included are small areas that have a surface soil of coarse sand or of silty clay loam. In some places there are gray mottles at a depth of about 2 feet. In others the water table is not more than 3 feet below the surface. In some areas rock fragments, gravel, and stones are in the profile. The original vegetation was hardwoods, shrubs, vines, briers, and grasses.

These soils are scattered throughout the county. They are flooded frequently but only for short periods. The reaction is strongly acid. The organic-matter content is moderate, and the fertility is moderate. Infiltration and permeability are moderately rapid. The capacity for holding available moisture is adequate, except in seasons of extreme drought. Tilth is easy to maintain, but, because of the hazard of flooding, only a small acreage is cultivated. Some of the acreage is in pasture, but most of it is in forest, predominantly of hardwoods. The acreage that is idle or that is not farmed is very small.

This land type is so susceptible to flooding that corn, annual lespedeza, and small grain are about the only crops grown. Shallow V-type ditches or other artificial means are essential for the removal of surface water. Crops respond to fertilizer and lime, and yields are fair.

Pasture plants, such as bermudagrass, dallisgrass, tall fescue, annual lespedeza, and whiteclover, provide moderately good grazing if adequately fertilized and limed. *Capability unit 11(IIw-2). Woodland suitability group 16.*

Mixed wet alluvial land (Mw).—This miscellaneous land type consists of somewhat poorly drained to poorly drained, deep soils that occur in narrow, elongated strips along streams and in the backwater areas of Lake Murray. These soils formed from a mixture of materials derived from all of the different kinds of rocks in the county.

The surface layer ranges in texture from loam to loamy sand and in color from light brown to brown. The subsurface layer ranges in color from gray or mottled gray to brown. Included are small areas of gravel, coarse sand, or silt loam. Quartz pebbles and cobblestones and fragments of parent rock are common. The slope range is 0 to 3 percent. The original vegetation was undesirable hardwoods, alders, canes, briers, and grasses.

Infiltration is moderately rapid, and permeability is rapid. The fertility is low, and the content of organic matter is low. The reaction is strongly acid. The water-

holding capacity is low, but, because of the high water table, it is adequate. Flooding is common.

Some of the acreage is in pasture, and a small part is idle, but most of the soil is in forest, mainly of undesirable hardwoods.

These soils are not suited to crops that require tillage. If seeded for pasture, they need V-type ditches and lateral V-type ditch drains to control floods. The better suited pasture plants are dallisgrass, tall fescue, whiteclover, and annual lespedeza. For fair yields these crops should be frequently and liberally fertilized and limed. Grazing should be rotated. *Capability unit 2g(IVw-1). Woodland suitability group 16.*

Norfolk Series

The Norfolk series consists of deep, well-drained soils that have a surface layer of dark grayish-brown sandy loam and a subsoil of yellowish-brown sandy clay loam. Mottled, yellowish-brown to red sandy clay loam is at a depth of 36 to 48 inches. These soils developed in thick, unconsolidated beds of sand and clay. The range in slope is 0 to 10 percent. The original vegetation was pine, oak, some hickory, and an understory of shrubs and grasses.

These soils are among areas of Marlboro, Ruston, Magnolia, Faceville, and Vaucluse soils on the uplands of the upper Coastal Plain. They have a more friable and slightly coarser textured subsoil than the Marlboro soils and a more yellowish-brown subsoil than the Ruston, Faceville, Magnolia, and Vaucluse soils. They do not have the compact subsoil common in the Vaucluse soils.

Infiltration in the Norfolk soils is moderate to rapid. Permeability is moderate, and the water-holding capacity is moderate. The organic-matter content is medium, and the natural fertility is medium to high. The reaction is medium acid.

These soils are distributed in medium-sized to large areas throughout the southern and southeastern parts of the county. Little of the acreage is in forest.

Norfolk sandy loam, 2 to 8 percent slopes (NsB).—This deep, well-drained soil has a yellowish-brown, friable subsoil. It is on the Coastal Plain. The areas are medium-sized to large; some are as much as 50 acres in size.

Profile in a moist, idle field, one-half mile southwest of Batesburg, on U.S. Highway No. 1:

A 0 to 6 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, crumb structure; very friable; abundance of fine roots; many dark-colored concretions; medium acid; clear, smooth boundary; 4 to 8 inches thick.

A_2 6 to 14 inches, pale-olive (5Y 6/4) sandy loam; weak, fine, granular structure; very friable; many fine roots; few dark-colored concretions; medium acid; clear, smooth boundary; 6 to 12 inches thick.

B_{21} 14 to 30 inches, yellowish-brown (10YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; slightly sticky; friable; few dark-colored concretions; few small pores; medium acid; gradual, wavy boundary; 12 to 18 inches thick.

B_{22} 30 to 40 inches, yellowish-brown (10YR 5/8) sandy clay; common, fine, distinct mottles of yellowish red (5YR 4/6); weak, fine, subangular blocky structure; friable; slightly sticky; patchy clay skins; medium acid; gradual, wavy boundary; 8 to 14 inches thick.

C 40 to 44 inches +, red (10R 4/6), light sandy clay loam; many, medium, prominent mottles of yellowish brown (10YR 5/6); massive; mottles are beginning of concretions; many dark-colored concretions; concretions and mottles are more common with depth.

The color of the surface layer ranges from dark grayish brown in some wooded areas to light brownish gray in some cultivated areas. In places the texture of the surface layer is loamy sand. The number and size of concretions in the profile vary; in places there are none. Included are some areas of Ruston soils that are too small to be shown separately.

The principal crops are small grain, cotton, soybeans, annual lespedeza, peaches, and some truck crops. Crops respond to fertilizer and lime, and yields of most crops are good. A close-growing crop every other year helps to prevent erosion and to maintain the content of organic matter. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion. In large fields wind erosion can be controlled by windbreaks or by stripcropping.

If liberally fertilized, this soil produces good yields of bahiagrass, bermudagrass, tall fescue, and sericea lespedeza for hay and pasture. *Capability unit 6(IIe-1, A4). Woodland suitability group 5.*

Norfolk sandy loam, 0 to 2 percent slopes (NsA).—This soil commonly occurs in fairly large areas on broad ridgetops. It has a profile similar to that of Norfolk sandy loam, 2 to 8 percent slopes, and is suited to the same crops.

Most of this soil is in row crops. These crops respond to fertilization. Some large fields need windbreaks to prevent wind erosion. Stripcropping also helps to control erosion.

Bahiagrass, bermudagrass, tall fescue, whiteclover, annual lespedeza, and sericea lespedeza are well-suited pasture and hay plants. *Capability unit 2(I-1, A4). Woodland suitability group 5.*

Norfolk loamy sand, thick surface, 2 to 6 percent slopes (NoB).—This soil is in medium-sized to large areas in the southeastern part of the county. Some areas are as much as 60 acres in size. The surface layer is thicker and coarser textured than that of Norfolk sandy loam, 2 to 8 percent slopes. The upper part of the profile, to a depth of 18 to 30 inches, is loamy sand. This soil is readily leached and is susceptible to wind and water erosion.

Profile in a moist, cultivated field, 1 mile southeast of Ridge Spring:

A_p 0 to 7 inches, light olive-brown (2.5Y 5/4) loamy sand; weak, fine, crumb structure; very friable; abundance of fine roots; few dark-colored concretions; strongly acid; clear, smooth boundary; 4 to 9 inches thick.

A_2 7 to 21 inches, pale-olive (5Y 6/3) loamy sand; very weak, fine, crumb structure; loose; many fine roots; few coarse sand grains; strongly acid; clear, smooth boundary; 12 to 18 inches thick.

B_1 21 to 30 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, moderate, subangular blocky structure; friable; few small pores; medium acid; clear, smooth boundary; 7 to 12 inches thick.

B_2 30 to 39 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, faint mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; friable; few small pores; medium acid; clear, wavy boundary; 7 to 12 inches thick.

C 39 to 44 inches +, yellowish-brown (10YR 5/8) sandy clay loam; common, coarse, prominent mottles of olive (5Y 5/3) and yellowish red (5YR 5/8); mottles are beginning of concretions; massive; firm; hard when dry, sticky when wet; medium acid; grades to coarser textured material.

Included are some areas of Ruston soils, thick surface phase, too small to be shown separately.

The principal crops are small grain, cotton, soybeans, peaches, and asparagus. All crops respond to fertilization and to irrigation. Yields are good but are lower than on Norfolk sandy loam, 2 to 8 percent slopes. A close-growing crop every other year will supply organic matter and help prevent erosion. A complete water-disposal system, including terraces and vegetated waterways, is needed to control water erosion. Windbreaks and crops planted in strips help to prevent wind erosion.

If liberally fertilized, bahiagrass, bermudagrass, and sericea lespedeza produce fairly good yields for hay and pasture. *Capability unit 13(IIs-1, A4). Woodland suitability group 11.*

Norfolk loamy sand, thick surface, 0 to 2 percent slopes (NoA).—This soil is on large, flat hilltops in the southeastern part of the county. Some areas are as much as 100 acres in size. This soil is readily leached and is susceptible to blowing. It has a profile similar to that of Norfolk loamy sand, thick surface, 2 to 6 percent slopes, and is suited to the same crops (fig. 8).

***Figure 8.*—Peach trees on Norfolk loamy sand, thick surface, 0 to 2 percent slopes.**

Crops respond to irrigation and fertilization. Yields are average. A close-growing crop every other year supplies organic matter and reduces leaching. Wind erosion can be controlled by windbreaks and by stripcropping.

Bahiagrass, bermudagrass, and sericea lespedeza, if adequately fertilized, produce fair yields for pasture and hay. *Capability unit 13(IIs-1, A4). Woodland suitability group 11.*

Norfolk loamy sand, thick surface, 6 to 10 percent slopes (NoC).—This soil is on strong slopes at the heads of and along small drainageways in the southeastern part of the county. Erosion is a more serious hazard than on Norfolk loamy sand, thick surface, 2 to 6 percent slopes. Included are areas of Ruston loamy sand, thick surface.

Because of the strong slopes, irrigation is not practicable. Crops respond to fertilizer, but the rotation should include close-growing crops 2 years out of 3 to control water and wind. Turning under green-manure crops and all crop residues helps to supply organic matter. *Capability unit 21(IIIe-5, A4). Woodland suitability group 11.*

Orange Series

The Orange series consists of moderately deep, somewhat poorly drained soils that have a surface layer of dark grayish-brown silt loam and a subsoil of mottled, light yellowish-brown clay. Gray silty clay loam is at a depth of about 30 inches. These soils developed in residuum weathered from Carolina slate and light-colored basic rock. The slope range is 2 to 10 percent. The original vegetation was oak, elm, gum, cedar, a little pine, and an understory of shrubs and grasses.

These soils are among areas of Herndon, Alamance, and Efland soils on the uplands of the lower Piedmont. They have a finer textured, more plastic subsoil and are more poorly drained than these associated soils.

Infiltration is slow in the Orange soils, and permeability is very slow. Surface runoff is medium, and internal drainage is slow. The water-holding capacity is moderate. The organic-matter content is very low, and the natural fertility is very low. The reaction is slightly acid to strongly acid.

These soils are distributed in small areas in the central part of the county. Much of the acreage is in forest.

Orange silt loam, 2 to 6 percent slopes (OrB).—This moderately deep, somewhat poorly drained soil has a firm, plastic, clayey subsoil.

Profile in a moist, wooded area, 1 mile northwest of intersection of U.S. Highway No. 378 and State Highway No. 21:

A_1 0 to 2 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; friable; abundance of fine roots; many dark-colored concretions and much fine quartz gravel; slippery when wet; strongly acid; clear, smooth boundary; 1 to 6 inches thick.

A_2 2 to 6 inches, grayish-brown (2.5Y 5/2) silt loam; weak, fine, granular structure; friable; many fine roots; few dark-colored concretions and a little fine quartz gravel; slick when wet; strongly acid; clear, smooth boundary; 2 to 8 inches thick.

A_3 6 to 9 inches, light yellowish-brown (2.5Y 6/4) silt loam; weak, medium and coarse, granular structure; friable; few medium and few fine roots; a little quartz gravel; strongly acid; clear, smooth boundary; 1 to 5 inches thick.

B_1 9 to 14 inches, yellowish-brown (10YR 5/8) silty clay; fine to medium, faint mottles of strong brown (7.5YR 5/8); moderate, medium, angular blocky structure; firm; hard when dry, plastic when wet; faint clay skins; many fine roots; few medium roots; strongly acid; clear, smooth boundary; 3 to 8 inches thick.

B_{21} 14 to 22 inches, light yellowish-brown (2.5Y 6/4) clay; medium and distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm; hard when dry, plastic when wet; distinct clay skins; fine roots between faces of blocks; strongly acid; clear, smooth boundary; 6 to 10 inches thick.

B_{22} 22 to 29 inches, strong-brown (7.5YR 5/8) clay; fine to medium, distinct mottles of red (2.5YR 5/6) and gray (2.5YR 6/0); moderate, coarse, angular blocky structure; firm; hard when dry, plastic when wet; few fine roots between faces of blocks; distinct clay skins; few fragments of weathered basic rock and Carolina slate; strongly acid; clear, smooth boundary; 6 to 10 inches thick.

C_1 29 to 52 inches, gray (7.5YR 6/0) silty clay loam; mottles of strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4); massive; seams and lenses of clay, penetrating along cracks and crevices of the weathered slate and basic rock; few fine roots on faces of weathered rock; strongly acid; clear, wavy boundary; 2 to 10 inches thick.

D 52 inches +, gray (7.5YR 6/0), white (2.5Y 8/2), brown (7.5YR 5/4), olive (5Y 5/4), yellowish-brown (10YR 5/4), and yellowish-red (5YR 5/8) mixed basic rock and Carolina slate; slate crumbles and breaks into a floury mass; dark fragments of basic rock are much harder than the slate.

The surface layer ranges from very dark grayish brown in some wooded areas to light yellowish brown in some cultivated areas. The number of small to medium-sized concretions and pebbles varies; in some places there are many, and in others there are none. Included are small areas that have a surface layer of fine sandy loam. Also included are areas of Alamance and Efland soils, too small to be shown separately.

This soil is not suited to frequent cultivation, because of poor drainage and shallowness to clayey material. It is used for corn, oats, and annual lespedeza. To produce fair yields of corn and hay, this soil needs artificial drainage, heavy applications of fertilizer and lime, and additional organic matter. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control erosion.

Generally, this soil is best suited to hay and pasture crops. The better suited legumes and grasses are dallisgrass, bermudagrass, tall fescue, annual lespedeza, and whiteclover. These plants need heavy applications of fertilizer and lime. In places artificial drainage is needed. *Capability unit 27(IVe-2). Woodland suitability group 12.*

Orange silt loam, 6 to 10 percent slopes, eroded (OrC2).—This soil is on short breaks from gently sloping areas of Efland and Orange soils. It has a thinner surface layer than Orange silt loam, 2 to 6 percent slopes, and is more susceptible to erosion. Because of its strong slopes, it is not suited to cultivation. A continuous cover of grasses or trees will help to control erosion. *Capability unit 33(VIe-3). Woodland suitability group 12.*

Ruston Series

The Ruston series consists of deep, well-drained soils that have a surface layer of grayish-brown sandy loam and a subsoil of strong-brown to red sandy clay loam. These soils developed from thick, unconsolidated beds of sand and clay. The slope range is 0 to 10 percent. The original vegetation was pine, oak, hickory, and an understory of shrubs and grasses.

These soils are among areas of Magnolia, Faceville, Norfolk, and Vaucluse soils on the uplands of the upper Coastal Plain. They have a coarser textured, lighter red subsoil than the Magnolia soils and a lighter colored, thicker surface layer than the Faceville soils. They have a redder subsoil than the Norfolk soils and lack the compact subsoil common in the Vaucluse soils.

The rate of infiltration of the Ruston soils is moderate, and the permeability and water-holding capacity are moderate. The content of organic matter is medium, and the natural fertility is high. The reaction is medium acid.

These soils occur in small to medium-sized areas in the southern and southeastern parts of the county. Little of the acreage is in forest.

Ruston sandy loam, 2 to 6 percent slopes (RsB).—This is a deep, friable, well-drained soil. The areas are from 5 to 35 acres in size and are on the Coastal Plain.

Profile in a moist, cultivated field, 1¼ miles east of Ward:

A_p 0 to 7 inches, grayish-brown (10YR 5/2) sandy loam; weak, fine, crumb structure; very friable; few dark-colored concretions; many fine roots; medium acid; abrupt, smooth boundary; 4 to 8 inches thick.

A_2 7 to 14 inches, pale-brown (10YR 6/3) sandy loam; weak, fine crumb structure; very friable; many fine roots; few dark-colored concretions and large sand grains; medium acid; clear, smooth boundary; 4 to 10 inches thick.

B_1 14 to 18 inches, brownish-yellow (10YR 6/8) sandy clay loam; weak, medium, subangular blocky structure; friable; slightly sticky when wet; few fine roots; medium acid; clear, smooth boundary; 2 to 6 inches thick.

B_{21} 18 to 31 inches, red (2.5YR 5/8) sandy clay loam; weak, medium, subangular blocky structure; friable; slightly sticky when wet; strongly acid; clear, smooth boundary; 10 to 16 inches thick.

B_{22} 31 to 44 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; slightly sticky when wet; few faint, patchy clay skins; strongly acid; clear, wavy boundary; 12 to 16 inches thick.

C 44 to 48 inches +, red (2.5YR 4/8) sandy clay loam; common, fine to medium, distinct mottles of strong brown (7.5YR 5/6); massive; slightly sticky when wet, hard when dry; a little water-rounded quartz gravel; very strongly acid.

The surface soil ranges in color from dark grayish brown in some uncleared areas to light yellowish brown in some cultivated areas. In places the texture of the surface soil is loamy sand. The number of small to medium-sized concretions and pebbles varies; in some places there are many, and in others there are none. Included are some areas of Norfolk and Vaucluse soils, too small to be shown separately.

Most of this soil is in row crops. The principal crops are small grain, cotton, corn, soybeans, and peaches. Other crops that grow well are lupine, peanuts, sweetpotatoes, lespedeza, and asparagus. Crops respond to fertilization and to irrigation. Yields are good. A complete water-disposal system, including terraces and vegetated waterways, is needed to help control water erosion. Windbreaks are needed in large fields to prevent wind erosion. A close-growing crop every other year helps to conserve this soil and to maintain the content of organic matter.

Bahiagrass, bermudagrass, and sericea lespedeza are well suited for pasture and hay. *Capability unit 6(IIe-1, A4). Woodland suitability group 5.*

Ruston sandy loam, 0 to 2 percent slopes (RsA).—This soil is on large, nearly level hilltops in the southeastern

part of the county. It has a profile similar to that of Ruston sandy loam, 2 to 6 percent slopes, and is suited to the same crops. It generally is more susceptible to wind erosion than to water erosion. Windbreaks and stripcropping help to control erosion.

Most of the acreage is in row crops. If adequately fertilized, bermudagrass, tall fescue, and sericea lespedeza produce good yields for grazing or hay. *Capability unit 2(I-1, A4). Woodland suitability group 5.*

Ruston sandy loam, 6 to 10 percent slopes (RsC).—This soil is on very short, sharp breaks from the nearly level and gently sloping areas of Ruston, Magnolia, and Faceville soils. It has a profile similar to that of Ruston sandy loam, 2 to 6 percent slopes, but has greater and faster runoff. Consequently, water erosion is a more serious hazard. This soil is in smaller areas than the more gently sloping soil and is not subject to wind erosion.

Crops respond to applications of fertilizer. A rotation that includes close-growing crops 2 years out of 3 is needed to control water erosion.

Liberal applications of fertilizer help to establish and maintain a good ground cover. Pasture plants produce fair yields for grazing. *Capability unit 15(IIIe-1, A4). Woodland suitability group 5.*

Ruston loamy sand, thick surface, 2 to 6 percent slopes (RmB).—The surface layer of this soil is from 18 to 30 inches deep. This deep, coarse-textured layer makes this soil more droughty than Ruston sandy loam, 2 to 6 percent slopes. This soil is susceptible to wind and water erosion.

The rate of infiltration is high, and the water-holding capacity is moderate. The organic-matter content is low, and the natural fertility is low.

Profile in a moist woods, 1½ miles southwest of Ridge Spring:

- A_p 0 to 5 inches, yellowish-brown (10YR 5/4) loamy sand; weak, fine, crumb structure; very friable; many fine roots; few small, dark-colored concretions; medium acid; abrupt, smooth boundary; 3 to 8 inches thick.
- A_{21} 5 to 17 inches, light yellowish-brown (2.5Y 6/4), light sandy loam or loamy sand; weak, fine, crumb structure; very friable; many fine roots; medium acid; clear, smooth boundary; 6 to 17 inches thick.
- A_{22} 17 to 24 inches, pale-olive (5Y 6/4) loamy sand; weak, fine, granular structure; very friable; few medium roots; a little fine quartz gravel; medium acid; clear, wavy boundary; 5 to 12 inches thick.
- B_1 24 to 29 inches, strong-brown (7.5YR 5/8) sandy loam; weak, medium, subangular blocky structure; friable; few fine pores; few medium roots; medium acid; clear, smooth boundary; 3 to 12 inches thick.
- B_2 29 to 34 inches, red (2.5YR 5/8) sandy clay loam; few fine, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, subangular blocky structuroe friable; medium acid; clear, smooth boundary; 4 t; 14 inches thick.
- B_3 34 to 40 inches, red (2.5YR 4/8) sandy clay; common, medium, distinct mottles of reddish yellow (7.5YR 6/8) and yellow (10YR 7/8); moderate, medium, subangular blocky structure; friable; hard when dry, sticky when wet; patchy clay skins; medium acid; clear, wavy boundary; 4 to 14 inches thick.
- C 40 to 46 inches +, red (2.5YR 5/8) sandy clay; many fine to coarse, faint to prominent mottles of yellowish red (5YR 5/6), reddish yellow (7.5YR 6/6), and yellow (10YR 7/6); massive; sticky when wet, hard when dry; grades to coarser textured sandy material; medium acid.

Included are areas of Norfolk loamy sand, thick surface, too small to be shown separately.

Most of the acreage is used for cotton, small grain, corn, peaches, and asparagus. Crops respond to fertilizer and to irrigation. Yields are average. If crops are grown, a complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Windbreaks or strips of close-growing crops are needed to control wind erosion.

If adequately fertilized, sericea lespedeza and bermudagrass produce good yields for grazing and hay. *Capability unit 13(IIs-1, A4). Woodland suitability group 11.*

Ruston loamy sand, thick surface, 0 to 2 percent slopes (RmA).—This soil is in small areas on nearly level hilltops in the southeastern part of the county. It has a profile similar to that of Ruston loamy sand, thick surface, 2 to 6 percent slopes, and is suited to the same crops. It is subject to wind erosion.

Crops respond to fertilization and irrigation. To maintain the organic-matter content and control wind erosion, the rotation should include a close-growing crop 2 years out of 4 and a winter cover crop. All crop residues should be plowed under. *Capability unit 13(IIs-1, A4). Woodland suitability group 11.*

Sloping Sandy Land

Sloping sandy land (Sa).—This miscellaneous land type is on steep slopes at the heads of and along drainageways in the southeastern part of the country. The slope range is 10 to 25 percent. The surface layer generally is light brownish-gray loamy sand or sand and is 12 to 34 inches deep. It appears to have been deposited by wind or sloughed from areas of Norfolk, Ruston, and Lakeland soils. The subsoil (B horizon) in some places is 2 to 5 inches thick and is similar to that of the Vaucluse soils, but in other places there is none. The vegetation is scrub oak and a few pines.

Infiltration is very rapid, permeability is moderate, and the water-holding capacity is low. The content of organic matter is very low, and the natural fertility is very low.

Because of the steep slopes, this land is not suited to cultivation. *Capability unit 35(VIIe-2). Woodland suitability group 16.*

Tirzah Series

The Tirzah series consists of deep, well-drained soils that have a surface layer of dark reddish-brown silt loam and a subsoil of red to dark-red silty clay. These soils developed in residuum weathered from dark-colored basic rocks and Carolina slate. The slope range is 2 to 10 percent. The original vegetation was oak, hickory, dogwood, sourwood, cedar, holly, pine, and an understory of shrubs and grasses.

These soils are among the Georgeville, Efland, and Orange soils on the uplands of the lower Piedmont. They have a darker red and slightly stickier subsoil than the Georgeville soils and a darker red subsoil than the Efland soils. They have a redder subsoil and generally are deeper than the Orange soils.

Infiltration is slow in the Tirzah soils, permeability is moderate, and the water-holding capacity is moderate. The content of organic matter is low, and the natural fertility is low. The reaction is slightly acid to medium acid.

These soils occupy a small acreage in the county, mostly in the northeastern part. Much of the acreage is now wooded.

Tirzah silt loam, 2 to 6 percent slopes (TrB).—This deep, well-drained soil has a friable, red to dark-red subsoil.

Profile in an old, moist field, 5 miles south of Saluda, just north of State Highway No. 193:

A_p 0 to 6 inches, reddish-brown (5YR 4/4) silt loam; weak, fine, crumb structure; very friable; sticky when wet; abundance of fine roots; few small, dark-colored concretions; few medium-sized quartz stones; medium acid; clear, smooth boundary; 1 to 8 inches thick.

B_1 6 to 19 inches, red (2.5YR 4/6) silty clay; moderate, medium, subangular blocky structure; friable; sticky when wet, hard when dry; few fine roots; few small pores; few small, dark-colored concretions; very strongly acid; clear, smooth boundary; 4 to 30 inches thick.

B_2 19 to 32 inches, dark-red (2.5YR 3/6) silty clay; moderate, medium, subangular blocky structure; friable; sticky when wet, hard when dry; distinct clay skins; very strongly acid; clear, smooth boundary; 6 to 20 inches thick.

B_3 32 to 41 inches, dark-red (10R 3/6) clay; moderate, fine, subangular blocky structure; friable; faint, discontinuous clay skins; very strongly acid; clear, wavy boundary; 6 to 18 inches thick.

C 41 to 45 inches +, red (10R 4/6) silty clay loam mottled with red (2.5YR 4/6) and olive brown (2.5Y 5/4); mottles more streaked because of parent material; massive; small fragments of weathered parent material and a little fine to medium quartz gravel; very strongly acid; 5 to 25 feet to bedrock.

In places the surface soil ranges in color from red to dusky red, and the subsoil from red to dark red or dusky red. The number of small to medium-sized concretion and pebbles in the profile varies; in some places there are many, and in others there are none. Some road cuts disclose a few dikes of quartz that rise at a 45° angle almost to the surface. Included are small areas that have some large gravel or small stones in the surface layer, but not enough to interfere with tillage.

This soil, if adequately fertilized, produces good yields of cotton, corn, soybeans, small grain, and annual lespedeza. If crops are grown, a complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. To conserve both soil and water, tillage should be on the contour and rotations of moderate length should include crops grown in strips.

If adequately fertilized and limed, bermudagrass, dallisgrass, tall fescue, annual lespedeza, sericea lespedeza, crimson clover, and white clover produce average yields of pasture and hay. Alfalfa is only moderately well suited and produces fair yields. *Capability unit 5(IIe-1). Woodland suitability group 6.*

Tirzah silt loam, 2 to 6 percent slopes, eroded (TrB2).—This soil is on hilltops. It has been used mostly for row crops and is subject to accelerated sheet erosion. It has a thinner and lighter colored surface soil than Tirzah silt loam, 2 to 6 percent slopes. It is suited to the same crops but needs more fertilizer for average yields.

A rotation that includes close-growing crops 2 years out of 3 helps to control erosion. Crop residues and winter cover crops should be turned under to supply organic matter.

Pasture plants respond to liberal applications of fertilizer and produce good yields for grazing. *Capability unit 14(IIIe-1). Woodland suitability group 7.*

Tirzah silt loam, 6 to 10 percent slopes (TrC).—This soil is along small drainageways and on strong slopes that break from areas of Tirzah silt loam, 2 to 6 percent slopes. It has a profile similar to that of the more gently sloping soil but is susceptible to accelerated sheet erosion.

It is suited to the same crops as Tirzah silt loam, 2 to 6 percent slopes, but needs a rotation that will keep two-thirds of the acreage in close-growing crops. All crops respond to fertilizer.

Pasture plants respond to liberal applications of fertilizer and produce average yields. *Capability unit 14(IIIe-1). Woodland suitability group 6.*

Tirzah silty clay loam, 6 to 10 percent slopes, severely eroded (TzC3).—This soil is at the heads of and along drainageways and on sharp, strong slopes in areas of more gently sloping Tirzah soils. It has greater and faster surface runoff than Tirzah silt loam, 2 to 6 percent slopes, and, consequently, is susceptible to accelerated sheet erosion. Its surface layer is thinner and finer textured and, in most places, includes some of the original subsoil. Shallow gullies are common.

This soil is not suited to frequent cultivation. It should always have a complete ground cover. Suitable pasture plants are bermudagrass, dallisgrass, annual lespedeza, sericea lespedeza, and crimson clover. If liberally fertilized pasture plants produce fair yields. *Capability unit 26(IVe-1). Woodland suitability group 7.*

Vaucluse Series

The Vaucluse series consists of moderately deep to deep, well-drained soils that have a surface layer of dark grayish-brown to light brownish-gray loamy sand and a subsoil of hard, compact, strong-brown to red sandy clay. These soils developed in unconsolidated beds of sand and clay. The slope range is 2 to 10 percent. The original vegetation was longleaf pine, loblolly pine, scrub oak, and an understory of grasses. On the shallower soils, windthrow of pine trees is common.

These soils are among areas of Norfolk, Ruston, Gilead, and Lakeland soils on the uplands of the upper Coastal Plain. They have a hard, compact, cemented subsoil that is lacking in the associated soils. Their subsoil is redder than that of the Norfolk and Gilead soils. They have a moderately well developed B horizon; the excessively drained Lakeland soils, in contrast, have no B horizon.

The surface drainage of the Vaucluse soils is moderate to excessive, but internal drainage is moderate. The rate of infiltration is rapid to moderate. Permeability is moderate to slow, and the water-holding capacity is low. The organic-matter content is low, and the natural fertility is low. The reaction is strongly acid.

These soils occur in small, medium-sized, and large areas adjacent to streams in the southern and south-

eastern parts of the county. The total acreage is small. Most of it is now in forest.

Vaucluse loamy sand, 2 to 6 percent slopes (VaB).—This moderately deep to deep soil has a thin, compact subsoil. It is on the Coastal Plain. Erosion is a serious hazard.

Profile in a moist field, 1¼ miles south of Ridge Spring:

- A_p 0 to 5 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, crumb structure; very friable; abundance of fine roots; smooth, rounded, quartz gravel and dark-colored concretions; strongly acid; abrupt, smooth boundary; 3 to 8 inches thick.
- A_2 5 to 10 inches, very pale brown (10YR 7/4) loamy sand; weak, medium, crumb structure; very friable; many fine roots; a little fine, smooth, quartz gravel; strongly acid; abrupt, smooth boundary; 4 to 8 inches thick.
- B_1 10 to 16 inches, reddish-yellow (7.5YR 6/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; a little fine, smooth gravel; medium acid; clear, smooth boundary; 4 to 18 inches thick.
- B_2 16 to 27 inches, strong-brown (7.5YR 5/6) sandy clay; few, fine, distinct mottles of red (2.5YR 5/8); moderate, medium, subangular blocky structure; friable to firm; hard and weakly cemented when dry; patchy clay skins; strongly acid; clear, smooth boundary; 7 to 14 inches thick.
- B_3 27 to 34 inches, red (2.5YR 5/8) sandy clay; common, medium, distinct mottles of reddish yellow (7.5YR 6/8) and yellow (10YR 7/8); moderate, fine, subangular blocky structure; firm; strongly acid; clear, wavy boundary; 4 to 10 inches thick.
- C 34 to 42 inches +, red (2.5YR 5/8) sandy clay loam; common, medium, distinct mottles of strong brown (7.5YR 5/6), yellowish brown (10YR 5/4), pale yellow (2.5Y 7/4), and very pale brown (10YR 7/4); massive; slightly sticky when wet, hard when dry; contains pockets of sandy material; strongly acid; variable in depth.

The surface soil ranges from dark gray to grayish brown; the subsoil, from strong brown to red. The small to medium-sized concretions vary in number; in some places there are many, and in others there are none. In places the surface soil is sandy loam. Included are some areas of Gilead and Lakeland soils, too small to be shown separately.

The principal crops are oats, cotton, corn, and crotalaria. Other crops that grow fairly well are velvetbeans, watermelons, and peaches. This soil needs additions of organic matter and liberal applications of fertilizer and lime. A rotation that includes close-growing crops 2 years out of every 4 helps to maintain productivity and to control erosion. For the larger areas, stripcropping and grass-based rotations are advisable. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bermudagrass, bahiagrass, sericea lespedeza, annual lespedeza, and crimson clover are fairly well suited hay and pasture plants. *Capability unit 10(IIe-4). Woodland suitability group 13.*

Vaucluse loamy sand, 6 to 10 percent slopes (VaC).—This soil is at the heads of and along small drainageways, on strong slopes down from nearly level to gently sloping areas of Norfolk, Ruston, and Lakeland soils in the southeastern part of the county. It has greater and faster surface runoff than Vaucluse loamy sand, 2 to 6 percent slopes, and, consequently, is more susceptible to erosion. It is suited to the same crops as the more gently sloping soil but yields less.

A grass-based rotation, or a rotation that consists of close-growing crop 2 years out of 3, helps to conserve this soil. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bermudagrass, bahiagrass, and sericea lespedeza, if adequately fertilized, produce fair yields for grazing. *Capability unit 19(IIIe-4). Woodland suitability group 13.*

Wehadkee Series

The Wehadkee series consists of poorly drained soils that occur in small areas near the confluence of large streams and in very narrow, elongated strips on first bottoms. The surface layer commonly is olive silt loam. It is underlain by gray silt loam to silty clay. These soils developed from young general alluvium washed from soils underlain by granite, gneiss, schist, Carolina slate, and basic rock. The natural vegetation consists of water oak, ash, cottonwood, gum, birch, beech, sycamore, and an undergrowth of reeds, briers, and grasses.

These soils are on flood plains along with the browner, less mottled, and better drained Chewacla and Congaree soils.

The natural fertility of the Wehadkee soils is high, and the organic-matter content is moderately high. Surface drainage is slow, and the permeability of the subsoil is slow. Infiltration is slow, and the capacity for holding available moisture is moderately high to high. The reaction is medium acid to strongly acid. The depth to the water table ranges from 12 to 48 inches.

There is only one Wehadkee soil in Saluda County. It is frequently flooded for long periods.

Wehadkee silt loam (We).—This deep, poorly drained soil is on first bottoms along large streams.

Profile in a moist pasture, 3 miles east of Saluda, near the bend of the Little Saluda River, north of U.S. Highway No. 378:

- A_{1p} 0 to 4 inches, olive (5Y 5/3) silt loam; many, fine, distinct mottles; weak, fine and medium, granular structure; very friable; abundance of fine roots; few very fine, shiny mica flakes; very slick when wet, cracks when dry; medium acid; clear, smooth boundary; 4 to 9 inches thick.
- A_{12} 4 to 9 inches, olive-gray (5Y 5/2) silt loam; mottles of grayish brown (10YR 5/4); weak, fine, granular structure; very friable; many fine roots; few pores; fine mica flakes; medium acid; clear, smooth boundary; 3 to 10 inches thick.
- C_1 9 to 27 inches, gray (5Y 6/1) silt loam; common, medium, distinct mottles of light brownish gray (2.5Y 6/2); weak, coarse, granular structure; friable; few fine roots; noticeable amount of moisture; few fine mica flakes; slightly acid; clear, smooth boundary; 12 to 24 inches thick.
- C_2 27 to 42 inches, gray (5Y 6/1) silty clay; common, medium, prominent mottles of yellowish brown (10YR 5/6) with spots, blotches, and streaks of dark-colored decaying organic matter; weak, medium, angular blocky structure; friable; noticeable amount of excess moisture; many very fine mica flakes; alkaline (this site is in pasture and has been limed several times in the past 12 years); clear, smooth boundary; 10 to 20 inches thick.

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C_3 42 to 64 inches, light olive-brown (2.5Y 5/6) silty clay; many, coarse, prominent mottles of gray (5Y 6/2); moderate, medium, angular blocky structure; very sticky; friable; noticeable amount of excess moisture; many very fine mica flakes; alkaline; gradual, smooth boundary; 12 to 24 inches thick.

C_4 64 to 73 inches +, gray (5Y 6/1) fine sandy clay loam; many, coarse, prominent mottles of light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/8); weak massive structure; very friable; abundance of fine and very fine mica flakes; a few coarse sand grains and a little fine, rounded, quartz gravel; some excess moisture, almost free of excess water; alkaline; 8 to 36 inches thick.

Included are some areas where the surface layer is darker colored and some areas where it is lighter colored. In some places the subsoil is darker colored, and in others the mottles are lighter gray. In some small areas the texture of the surface soil ranges from silty clay loam to very fine sandy loam. No significant agricultural differences resulting from these variations are apparent. The amounts of micaceous material and of decaying organic matter vary from place to place.

This soil is fairly well suited to corn, annual lespedeza, and soybeans but needs fertilizer and lime for moderate yields. Good tilth is easy to maintain. Green-manure crops and crop residues should be turned under to supply organic matter. Where crops are grown, open ditches are needed to remove excess water rapidly. Loss of a crop 1 year out of every 3 is to be expected because of flooding or waterlogging.

Because of the exceptional moisture conditions, dallisgrass, tall fescue, annual lespedeza, and whiteclover produce good yields for hay and pasture. To maintain a good ground cover, fertilizer and lime should be liberally applied, and open ditches should be provided to remove excess water. *Capability unit 2g(IVw-1). Woodland suitability group 1.*

Wickham Series

The Wickham series consists of deep, well-drained soils that have a surface layer of very dark grayish-brown fine sandy loam, and a subsoil of red fine sandy clay loam to clay. These soils developed from old general alluvium washed from soils underlain by granite, gneiss, schist, basic rock, and Carolina slate. The slope range is 2 to 6 percent. The original vegetation was oak, hickory, elm, gum, pine, and an understory of elders, vines, briers, and grasses.

The Wickham soils are on stream terraces along with the darker red Hiwassee soils and the yellower and slightly less well drained Altavista soils. Their subsoil is intermediate in color between the dark red of the Hiwassee soils and the strong brown to brownish yellow of the Altavista subsoil.

The rate of infiltration in the Wickham soils is moderate, and the permeability and water-holding capacity are moderate. The organic-matter content is low, and the natural fertility is low. The reaction is medium acid.

There is only one Wickham soil in Saluda County. It occurs in small areas along the large streams. The total acreage is small. Little of it is in forest.

Wickham fine sandy loam, 2 to 6 percent slopes (WhB).—This deep, well-drained, friable soil is on stream terraces. It is susceptible to erosion.

Profile in a moist pasture, 1½ miles east of Saluda, south of U.S. Highway No. 378:

A_p 0 to 6 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; a little fine, water-rounded gravel; medium acid; clear, smooth boundary; 2 to 8 inches thick.

B_1 6 to 19 inches, yellowish-red (5YR 5/8) fine sandy clay loam; weak, fine, subangular blocky structure; friable; few fine roots; medium acid; clear, smooth boundary; 5 to 15 inches thick.

B_2 19 to 31 inches, red (2.5YR 5/8) clay loam; moderate, medium, subangular blocky structure; friable; slightly sticky when wet; few, very faint, discontinuous clay skins; medium acid; clear, smooth boundary; 10 to 18 inches thick.

B_3 31 to 42 inches, red (2.5YR 4/6) clay; moderate, coarse, subangular blocky structure; friable; faint clay skins; strongly acid; clear, wavy boundary; 8 to 18 inches thick.

C 42 to 48 inches +, red (2.5YR 4/6) sandy clay loam; mottles of reddish yellow (7.5YR 6/6); massive; grades to coarser textured material; much fine quartz gravel; some fragments of slate rock; strongly acid; 5 to 60 feet thick.

The surface layer ranges from dark grayish brown in some wooded areas to light brown in some cultivated areas. The number of small to medium, water-rounded pebbles varies. In some places there are many, and in others there are none. Included are small areas that have a surface layer of sandy loam to silty clay loam. Also included are small areas of Altavista soils.

This soil is well suited to corn, soybeans, small grain, and annual lespedeza. Crop yields are high if applications of fertilizer and lime are adequate. Terraces, contour tillage, and vegetated waterways are needed to help control erosion.

Suitable plants for pasture and hay are annual lespedeza, sericea lespedeza, whiteclover, bermudagrass, dallisgrass, and tall fescue. *Capability unit 5(IIe-1). Woodland suitability group 3.*

Wilkes Series

The Wilkes series consists of moderately shallow, well drained to excessively drained soils that have a surface layer of dark grayish-brown sandy loam and a thin, discontinuous, strong-brown, clayey subsoil. The depth to bedrock varies but commonly is less than 2 feet. These soils developed in residuum weathered from acidic rock in which there were dikes of dark-colored basic rock. The slope range is 2 to 30 percent but is mostly more than 10 percent. The original vegetation was oak, cedar, pine, and an understory of shrubs, briers, and grasses.

These soils are among areas of Cecil, Lloyd, Appling, Durham, Enon, and Worsham soils on the uplands of the middle and lower Piedmont. They have a thin, discontinuous B horizon, whereas the associated soils have a thicker and more strongly developed B horizon and generally a much thicker profile.

The rate of infiltration in the Wilkes soils is moderate. Permeability is slow, and the water-holding capacity is very low. The organic-matter content is very low, and the natural fertility is very low. The reaction is strongly acid.

These soils occur in medium-sized areas throughout the northern and southeastern parts of the county. Most of the acreage is in forest.

Wilkes sandy loam, 2 to 10 percent slopes (WkB).—This moderately shallow, well-drained soil is underlain by mixed acidic and basic rock. It is easily eroded. Most of the acreage is in forest, predominantly of pine. Some large areas are on breaks near small streams in the northern part of the county.

Profile in a moist pine forest, 1½ miles southeast of Tillman Church:

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; a little medium and fine quartz gravel; few dark-colored concretions; strongly acid; abrupt, smooth boundary; 2 to 6 inches thick.

A_2 3 to 8 inches, yellowish-brown (10YR 5/8) sandy loam; weak, fine, granular structure; very friable; many fine roots; much fine quartz gravel; few small, dark-colored concretions; strongly acid; clear, smooth boundary; 3 to 10 inches thick.

B_2 8 to 15 inches, strong-brown (7.5YR 5/8) clay; moderate, coarse, angular blocky structure; firm; slightly plastic when wet; few fine roots between faces of aggregates; faint, splotchy clay skins; consistence varies from friable to very firm; medium acid; clear, wavy boundary; discontinuous; 2 to 8 inches thick.

C 15 to 24 inches, strong-brown (7.5YR 5/8) sandy loam; mottles of red (2.5YR 4/8) and olive yellow (5Y 6/6); massive structure; much fine and a little medium to coarse quartz gravel; fragments of disintegrated rock; many fine mica flakes; strongly acid; abrupt, smooth boundary; 4 to 20 inches thick.

D 24 inches +, material weathered from mixed granite and basic rock, hard in some places and soft in other places.

The surface soil ranges in color from dark gray to brownish yellow, depending on the content of organic matter. In places there is no B horizon. The number of small to large concretions and pebbles in the profile varies. In some places there are many, and in others there are none. Included are areas of Helena, Enon, Cecil, and Worsham soils, too small to be shown separately.

Crops are seldom grown on this shallow soil. If crops are grown, the rotation should include close-growing crops, such as bermudagrass, annual lespedeza, or sericea lespedeza, 3 out of every 4 years. Three-fourths of the acreage should be kept in close-growing crops planted in strips on the contour. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion. Even with liberal fertilization, yields are only fair. *Capability unit 28(IVe-4). Woodland suitability group 15.*

Wilkes sandy loam, 10 to 15 percent slopes (WkD).—This soil is at the heads of and along drainageways, mainly in the northern part of the county. Most of the acreage is in forest. Runoff is greater and faster than on Wilkes sandy loam, 2 to 10 percent slopes, and erosion is a more serious hazard. Shallow gullies are common.

This soil is not suited to frequent cultivation. Even if liberally fertilized, pasture plants such as bermudagrass, tall fescue, sericea lespedeza, and whiteclover produce only fair yields. The best use for this soil is forest. *Capability unit 28(IVe-4). Woodland suitability group 15.*

Wilkes sandy loam, 15 to 30 percent slopes (WkE).—This soil is on steep breaks to large streams in the northern and northwestern parts of the county. The subsoil commonly ranges from 2 to 5 inches in thickness, but in some places there is none. Surface runoff is rapid. The fertility is low.

This soil is not suited to cultivation. Its best use is forest. *Capability unit 33(VIe-3). Woodland suitability group 15.*

Worsham Series

The Worsham series consists of poorly drained soils that commonly have a surface layer of dark grayish-brown to dark-brown sandy loam or silt loam and a mottled, brownish-yellow to light-gray, clayey subsoil. These soils developed mostly in residuum weathered from granite, gneiss, schist, and Carolina slate but have been influenced in places by local alluvium. The slope range is 0 to 6 percent. The original vegetation was oak, alder, ash, elm, and an understory of canes, shrubs, briers, and grasses.

These soils are among areas of Colfax, Helena, Alamance, Durham, Cecil, and Appling soils at the heads of drains, at the bases of slopes, and along small drainageways in the lower Piedmont. They are more poorly drained, have a grayer subsoil, and are at slightly lower elevations than the associated soils.

The rate of infiltration in the Worsham soils is moderate. Permeability is slow, and the water-holding capacity is low. The content of organic matter is low, and the natural fertilty is low. The reaction is medium acid to strongly acid.

These soils occur in narrow strips along small drainageways in all parts of the county except the southern part of the Coastal Plain. The total acreage is small, and most of it is in forest.

Worsham sandy loam, 0 to 6 percent slopes (WoB).—This poorly drained soil is in small, elongated areas along small drainageways and at the heads of drainageways. It has a clayey subsoil.

Profile in a moist, cultivated field, 3 miles east of Chestnut Hill Church:

A_p 0 to 6 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; abundance of fine roots; a little fine quartz gravel; strongly acid; abrupt, smooth boundary; 3 to 8 inches thick.

A_2 6 to 11 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; may fine roots; a little fine quartz gravel; medium acid; clear, smooth boundary; 3 to 8 inches thick.

A_3 11 to 14 inches, pale-yellow (2.5Y 7/4) sandy loam; weak, medium, granular structure; very friable; few fine roots; a little fine quartz gravel; medium acid; clear, smooth boundary; 2 to 8 inches thick.

B_1 14 to 21 inches, brownish-yellow (10YR 6/8) sandy clay loam; common, medium, distinct mottles of light brownish gray (2.5Y 6/2); moderate, medium, subangular blocky structure; friable; sticky when wet, hard when dry; a little fine gravel; medium acid; clear, smooth boundary; 5 to 12 inches thick.

B_{2g} 21 to 26 inches, light-gray (2.5Y 7/2) clay; common, medium, distinct mottles of yellowish brown (10YR 5/6) and olive yellow (2.5Y 6/6); moderate, coarse, angular blocky structure; firm; sticky when wet, hard when dry; medium acid; clear, smooth boundary; 3 to 10 inches thick.

B_{3g} 26 to 33 inches, yellow (10YR 7/8) clay; common, coarse, distinct mottles of light yellowish brown (2.5Y 6/4) and gray (2.5Y 6/0); moderate, coarse, angular blocky structure; firm; few fine mica flakes and large sand grains; medium acid; clear, wavy boundary; 3 to 10 inches thick.

C_g 33 to 37 inches +, light-gray (2.5Y 7/0) sandy clay; common, medium, distinct mottles of brownish yellow (10YR 6/8); massive; hard when dry; abundance of fine mica flakes; small shalelike fragments of disintegrated granite rock; much fine to medium quartz gravel; medium acid; grades to coarser textured material.

The surface layer ranges from black to light gray, depending on the content of organic matter. In places from 3 to 20 inches of recent local alluvium has been deposited on the surface. In areas that are adjacent to red, well-drained soils, the B horizon contains some red and brown mottles. The number of small to medium-sized concretions and pebbles varies. In some places there are many, and in others there are none.

Because of the poor drainage and clayey subsoil, this soil is not suited to frequent cultivation. *Capability unit 31(Vw-1). Woodland suitability group 8.*

Worsham silt loam, 0 to 6 percent slopes (WsB).—This poorly drained soil has a clayey subsoil.

Profile in a moist field, 4 miles northwest of Saluda:

A_p 0 to 5 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, granular structure; very friable; abundance of fine roots; strongly acid; abrupt, smooth boundary; 3 to 7 inches thick.

A_2 5 to 11 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; many fine roots; medium acid; clear, smooth boundary; 4 to 8 inches thick.

B_1 11 to 20 inches, grayish-brown (10YR 5/2) silty clay; few, fine, faint mottles of gray (7.5YR 5/0); moderate, medium, subangular blocky structure; friable; sticky when wet, hard when dry; few fine roots; medium acid; clear, smooth boundary; 6 to 11 inches thick.

B_{2g} 20 to 30 inches, light-gray (7.5YR 7/0) clay; few, medium, distinct mottles of gray (7.5YR 5/0) and light olive brown (2.5Y 5/6); strong, coarse, angular blocky structure; firm; very hard when dry, sticky when wet; medium acid; smooth boundary; 5 to 12 inches thick.

B_{3g} 30 to 38 inches, yellowish-brown (10YR 5/8) clay; many, fine, faint to distinct mottles of light brownish gray (2.5Y 6/2) and light gray (2.5Y 7/2); strong, coarse, angular blocky structure; firm; very hard when dry, very sticky when wet; medium acid; clear, wavy boundary; 6 to 12 inches thick.

C_g 38 to 40 inches +, light olive-gray (5Y 6/2) fine sandy loam; structureless; partially decomposed fragments of Carolina slate rock; medium acid.

Included are well-drained areas and poorly drained areas of colluvial soils and some spots of wet, gray, sandy soils, too small to be shown separately.

This soil is not suited to cultivated crops. Some corn, oats, and truck crops are grown, but yields are only fair. If crops are grown, open ditches are needed to remove excess water.

If adequately fertilized and limed, this soil produces fair pasture of tall fescue, of dallisgrass, and of bermudagrass seeded with whiteclover and annual lespedeza. *Capability unit 31(Vw-1). Woodland suitability group 8.*

Management of the Soils

This section has two main parts. In the first, the kinds of soils mapped in the county are placed in capability units. Most of the capability units consist of several soils that are similar; others are made up of only one soil.

In the second part, there are two tables. One rates each soil in the county according to its suitability for certain crops; the other shows the estimated average acre yields of certain crops grown on each soil under two levels of management.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels—the capability class, the subclass, and the unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, grazing, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated 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* means that water in or on the soil will interfere 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 country, indicates 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 or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no erosion hazard but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units—groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for making many statements about their management. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-2.

Soils are classified in capability classes, subclasses, and units according to the degree and kind of permanent limitations; but without consideration of major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

The capability classes, subclasses, and units in which the soils of Saluda County are classified are defined in the following list.

Class I. Soils that have few limitations that restrict their use.
- Unit 1(I-1). Deep, moderately well drained and well drained, local alluvial soils that are not subject to erosion.
- Unit 2(I-1, A4). Deep or moderately deep, well-drained soils that have a thick, very friable surface layer and a friable subsoil.
- Unit 3(I-2). Deep, moderately well drained soils that are on terraces and have a friable surface layer.
- Unit 4(I-2, A4). Deep, well-drained, nearly level soils that have a very friable surface layer and a sticky subsoil.

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

Subclass IIe. Soils that have a moderate risk of erosion if they are not protected.
- Unit 5 (IIe-1). Deep, gently sloping, well-drained soils that are moderately permeable.
- Unit 6(IIe-1, A4). Deep or moderately deep, well-drained, gently sloping soils that have a friable subsoil.
- Unit 7(IIe-2). Deep, moderately well drained and well drained, gently sloping soils that have a light-colored surface layer.
- Unit 8(IIe-2, A4). Deep, well-drained soils that have a sticky subsoil.
- Unit 9(IIe-3). Deep and moderately deep soils that have a moderately plastic subsoil.
- Unit 10(IIe-4). Moderately deep, moderately well drained and well drained soils that are gently sloping and have a compact subsoil.

Subclass IIw. Soils that have moderate limitations because of excess water.
- Unit 11(IIw-2). Deep, well-drained soils on first bottoms.

Subclass IIs. Soils that have moderate limitations of moisture capacity or tilth.
- Unit 12(IIs-1). Deep, excessively drained upland soils that have a thick surface layer of loamy sand.
- Unit 13(IIs-1, A4). Nearly level to gently sloping soils that have a thick surface layer of loamy sand and a friable subsoil.

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

Subclass IIIe. Soils that have a severe risk of erosion if they are cultivated and not protected.
- Unit 14(IIIe-1). Permeable soils that have a subsoil of red clay.
- Unit 15(IIIe-1, A4). Deep, well-drained, sloping soils that are slightly to moderately eroded and have a friable subsoil.
- Unit 16(IIIe-2). Gently sloping to sloping soils that have a gray to brown surface layer and a friable subsoil.
- Unit 17(IIIe-2, A4). Gently sloping to sloping soils that have a brown to reddish-brown surface layer and a fine-textured, red subsoil.
- Unit 18(IIIe-3). Soils that have a moderately plastic subsoil.
- Unit 19(IIIe-4). Shallow to moderately deep, sloping soils that have a slightly compact subsoil.
- Unit 20(IIIe-5). Shallow soils that have a thin subsoil or no developed subsoil.
- Unit 21(IIIe-5, A4). Deep, droughty, sloping soils that have a thick surface layer of loamy sand and a friable subsoil.

Subclass IIIw. Soils that have severe limitations because of excess water.
- Unit 22(IIIw-2). Deep, moderately permeable soils on first bottoms.
- Unit 23(IIIw-2, A4). Deep, poorly drained soils that have a subsoil of tough sandy clay or sandy clay loam.
- Unit 24(IIIw-3). Deep, gently sloping, slowly permeable soils of the uplands.

Subclass IIIs. Soils that have severe limitations of moisture capacity or tilth.
- Unit 25(IIIs-2). Deep, sandy soils that have a sandy surface layer and are subject to severe leaching and to wind erosion.

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

Subclass IVe. Soils that have a very severe risk of erosion if they are cultivated and not protected.
- Unit 26(IVe-1). Deep, well-drained, permeable soils.
- Unit 27(IVe-2). Deep to moderately deep soils that have a subsoil of firm, moderately plastic clay.
- Unit 28(IVe-4). Shallow soils that have poorly developed horizons.

Subclass IVw. Soils that have very severe limitations for cultivation because of excess water.
- Unit 29(IVw-1). Poorly drained soils along small streams and on the bottom lands of large streams.

Subclass IVs. Soils that have very severe limitations of stones, moisture capacity, or other soil features.
- Unit 30(IVs-1). Deep, sloping, sandy soils through which water moves rapidly.

Class V. Soils that have little or no erosion hazard but have other limitations that are impractical to remove without major reclamation and that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.
- Unit 31(Vw-1). Narrow, elongated areas of crawfish land along small streams.

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

Subclass VIe. Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Unit 32(VIe-2). Severely eroded and moderately steep soils that have a friable subsoil.

Unit 33(VIe-3). Sloping to moderately steep, shallow soils.

Class VII. Soils that have very severe limitations that make them unsuited for cultivation without major reclamation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe. Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.

Unit 34(VIIe-1). Eroded or severely eroded, strongly sloping to steep soils that have a red, clayey subsoil and friable parent material.

Unit 35(VIIe-2). Soils that are on moderately steep to steep slopes and are not productive.

Unit 36(VIIe-3). Soils that have a very firm subsoil or firm parent material.

Class VIII. Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants, and restrict their use to recreation, wildlife, water supply, or aesthetic purposes. (There are no class VIII soils in Saluda County.)

In the following pages, each capability unit is described, the soils in each are listed, and some suggestions for use and management are given.

Capability unit 1(I-1)

Deep, moderately well drained and well drained, local alluvial soils that are not subject to erosion

This unit consists of a land type, Local alluvial land, which is nearly level to gently sloping and occurs on the uplands in small, widely scattered areas in depressions and at the heads of small drainageways.

Local alluvial land has a surface layer of sandy loam or silt loam. The subsoil is friable and permeable.

This land type is moderate in fertility. Its moisture-holding capacity is moderate, and moisture conditions are favorable. It is slightly acid to medium acid. Tilth is easy to maintain, and runoff causes no serious damage.

This unit is suited to intensive use for truck crops, corn, soybeans, grain sorghum, and small grain. Row crops need to be liberally fertilized and limed for above average yields. If row crops are grown every year, it is necessary to replenish the supply of organic matter. Turning under green-manure crops and crop residues supplies organic matter, increases bacterial activity, increases the moisture-holding capacity, and helps to conserve the soil.

Annual lespedeza, tall fescue, dallisgrass, bermudagrass, and whiteclover are well-suited hay and pasture plants. Regular use of fertilizer and lime is necessary to maintain a good pasture cover and produce a good hay crop.

Capability unit 2(I-1, A4)

Deep or moderately deep, well-drained soils that have a thick, very friable surface layer and a friable subsoil

The soils in this unit are in nearly level areas in the southeastern and southern parts of the county. They are extensively cropped. They are—

Norfolk sandy loam, 0 to 2 percent slopes.
Ruston sandy loam, 0 to 2 percent slopes.

The very friable surface layer is from 12 to 18 inches thick. The subsoil of friable sandy clay loam provides a deep root zone.

These soils are moderate in permeability and low to moderate in water-holding capacity. They are medium acid. They are medium in content of organic matter and moderate to high in fertility. Plant nutrients are readily leached because of the sandy texture of the surface layer. Tilth is easy to maintain.

All of these soils are well suited to cultivation. They respond to the use of fertilizer and lime and to other good management. Row crops can be grown each year. Productivity can be maintained and organic matter supplied by applying fertilizer liberally, turning under crop residues and winter cover crops, and growing a grass or legume crop every few years. In large fields where wind erosion is a hazard, a close-growing crop should be grown in strips at right angles to the prevailing wind. These soils can be irrigated without loss of soil or water if a properly designed system is used.

Bermudagrass, bahiagrass, tall fescue, crimson clover, and sericea lespedeza, if liberally fertilized, provide good yields of hay and pasture.

Capability unit 3(I-2)

Deep, moderately well drained soils that are on terraces and have a friable surface layer

There is only one soil in this unit, Altavista silt loam, 0 to 2 percent slopes. This soil is in widely scattered small areas along the larger streams of the county.

The surface layer of friable silt loam is from 8 to 12 inches thick. The subsoil of friable to firm clay loam to clay provides a deep root zone.

This soil is moderate to moderately slow in permeability and moderate in water-holding capacity. It is medium acid to strongly acid. It is low in organic-matter content and low in fertility. Tilth is fairly easy to maintain.

This soil is well suited to cultivation. Row crops can be grown each year. Yields of corn, soybeans, oats, rye, and other small grain are good. Productivity can be maintained and organic matter supplied by applying fertilizer and lime liberally, plowing under winter cover crops and crop residues, and growing a mixture of grasses and legumes every few years.

Bermudagrass, tall fescue, dallisgrass, annual lespedeza, and whiteclover, if liberally fertilized and adequately limed, provide above-average yields of hay and pasture.

Capability unit 4(I–2, A4)

Deep, well-drained, nearly level soils that have a very friable surface layer and a sticky subsoil

The soils in this unit are in nearly level areas in the southern and southeastern parts of the county. Some areas are as much as 100 acres in size. These soils are extensively cropped. They are—

Faceville sandy loam, 0 to 2 percent slopes.
Magnolia sandy loam, 0 to 2 percent slopes.
Marlboro sandy loam, 0 to 2 percent slopes.

The surface layer of very friable sandy loam is from 6 to 14 inches thick. The permeable subsoil provides a deep root zone.

All of these soils are moderate in rate of infiltration, moderate in permeability, and moderate in water-holding capacity. They are medium acid. They are medium in organic-matter content and medium to high in fertility. These soils are not so droughty as the soils in unit 2(I-1, A4) and are not so readily leached of plant nutrients. Tilth is easy to maintain.

These soils are productive and are well suited to the crops commonly grown. Productivity can be maintained by the liberal use of fertilizer. Soil bacteria can be increased and organic matter supplied by turning under crop residues and green-manure crops and by growing a legume or a grass, or a mixture of both, every few years. Lime should be applied according to soil tests. Windbreaks planted at right angles to the prevailing wind are needed in large fields to prevent soil blowing. With a properly designed system, these soils can be irrigated without loss of soil or water.

Tall fescue, bermudagrass, annual lespedeza, crimson clover, sericea lespedeza, and white clover respond to fertilizer and provide above-average yields of hay and pasture.

Capability unit 5(IIe–1)

Deep, gently sloping, well-drained soils that are moderately permeable

The soils in this unit are in all parts of the county except the extreme southern and southeastern. They are fairly extensively cropped. The soils are—

Bradley sandy loam, 2 to 6 percent slopes, eroded.
Cecil sandy loam, 2 to 6 percent slopes.
Georgeville silt loam, 2 to 6 percent slopes.
Hiwassee sandy loam, 2 to 8 percent slopes.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Tirzah silt loam, 2 to 6 percent slopes.
Wickham fine sandy loam, 2 to 6 percent slopes.

The surface layer is yellowish-brown to dark-brown, friable sandy loam to silt loam. It ranges from 4 to 12 inches in thickness. The friable to firm, red subsoil provides a deep root zone.

These soils are medium acid to strongly acid. They are low in organic-matter content and low in fertility. They are moderate in permeability and moderate in water-holding capacity. Leaching is not so rapid as in the sandier soils. Tilth is fairly easy to maintain.

The soils in this unit are well suited to a wide variety of crops, including truck crops, small grain, cotton, corn, soybeans, grain sorghum, and peaches. If well managed they are suited to short rotations that keep half the acreage in close-growing crops. A grass-based rotation in which a grass or legume is grown for 2 years and a row crop for 2 years helps to supply organic matter and to increase the water-holding capacity. Crops respond to fertilizer and lime. Deep-rooted legumes supply nitrogen and help to improve the condition of the soil. Turning under crop residues and green-manure crops adds organic matter and helps control erosion.

All tillage should be on the contour, and the long slopes should be stripcropped. A complete water-disposal system, including terraces and vegetated waterways, is needed to prevent erosion.

Bermudagrass, dallisgrass, annual lespedeza, sericea lespedeza, crimson clover, white clover, and kudzu respond to liberal applications of fertilizer and lime. Yields are average or above.

Capability unit 6(IIe–1, A4)

Deep or moderately deep, well-drained, gently sloping soils that have a friable subsoil

The soils in this unit are in the southern and southeastern parts of the county. They are extensively cropped. They are—

Norfolk sandy loam, 2 to 8 percent slopes.
Ruston sandy loam, 2 to 6 percent slopes.

The gray to brown, very friable surface layer is 12 to 18 inches thick. The yellow to red subsoil is friable sandy clay loam.

These soils are moderate in permeability and moderate to low in water-holding capacity. They are medium acid. They are medium in organic-matter content and moderate to high in fertility. Plant nutrients are readily leached. Tilth is easy to maintain.

The soils in this unit are well suited to cotton, small grain, corn, soybeans, and truck crops. All crops respond to liberal applications of fertilizer and lime. A moderately long rotation that includes close-growing crops half the time is needed to control erosion and conserve moisture. A grass-based rotation in which a legume or grass is grown for 2 years, and then a row crop for 2 years, supplies organic matter and helps to conserve the soil.

All tillage should be on the contour. Large fields and long slopes should be stripcropped. Windbreaks planted at right angles to the prevailing wind help to prevent wind erosion. A complete water-disposal system, including terraces and vegetated waterways, is needed to prevent erosion.

Pasture and hay crops respond to fertilization and lime. Good yields of bermudagrass, bahiagrass, dallisgrass, crimson clover, annual lespedeza, sericea lespedeza, and kudzu can be expected.

Capability unit 7(IIe–2)

Deep, moderately well drained and well drained, gently sloping soils that have a light-colored surface layer

The soils in this unit are in all parts of the county except the extreme southern and southeastern. Much of the acreage is cropped. The soils are—

Alamance silt loam, 2 to 6 percent slopes.
Altavista silt loam, 2 to 6 percent slopes.
Appling sandy loam, 2 to 6 percent slopes.
Chesterfield sandy loam, 2 to 6 percent slopes.
Durham sandy loam, 2 to 6 percent slopes.
Herndon silt loam, 2 to 6 percent slopes.

These soils differ from those in unit 5(IIe-1) in having a lighter colored and thicker surface layer and a more brownish-red to yellowish subsoil that normally is mottled. They are slower in permeability and lower in water-holding capacity.

The surface layer ranges in color from pale olive to dark brown, in thickness from 8 to 18 inches, and in texture from sandy loam to silt loam. The thick, friable subsoil provides a deep root zone. Tilth commonly is good and easy to maintain, but, in the southeastern part of the county, large boulders on the Durham and Appling soils interfere with tillage.

These soils are medium acid to very strongly acid. They are low in organic-matter content and low in fertility. They are moderate to moderately slow in permeability and moderate to moderately low in water-holding capacity.

The soils in this unit are suited to a wide variety of crops, including small grain, cotton, corn, soybeans, and some truck crops. Crops respond to liberal fertilization and to adequate liming. A rotation that keeps half the acreage in close-growing crops is needed to control erosion. In addition, tillage should be on the contour, and the longer slopes should be stripcropped. Turning under crop residues, winter cover crops, and green-manure crops helps to supply organic matter and to conserve moisture. A complete water-disposal system, including terraces and vegetated waterways, is needed to prevent erosion.

Average yields of bermudagrass, bahiagrass, dallisgrass, tall fescue, annual lespedeza, whiteclover, and sericea lespedeza can be expected if these plants are liberally fertilized. Crimson clover grows fairly well on the Appling and Herndon soils.

Capability unit 8(IIe-2, A4)

Deep, well-drained soils that have a sticky subsoil

The soils in this unit are in the southern and southeastern parts of the county. They are the finer textured soils of the ridge section. Most of the acreage is cultivated. The soils are—

Faceville sandy loam, 2 to 6 percent slopes.
Magnolia sandy loam, 2 to 6 percent slopes.

The surface layer ranges in color from dark grayish brown to reddish brown and in thickness from 8 to 14 inches. The thick, friable to firm subsoil affords a deep root zone. The color of the subsoil ranges from yellowish red to red.

These soils are moderate in rate of infiltration, moderate in permeability, and moderate in water-holding capacity. They are medium acid, medium in organic-matter content, and medium to high in fertility. Tilth is easy to maintain.

Most of the common crops of the county can be grown on these soils. The principal crops are small grain, cotton, corn, soybeans, and peaches. Annual lespedeza, cowpeas, velvetbeans, crotalaria, and some truck crops also grow well. Liberal applications of a complete fertilizer are needed for maximum yields. Lime should be applied according to the results of soil tests. These soils respond favorably to irrigation.

These soils should be kept in close-growing crops half the time to prevent erosion and to maintain productivity. Suitable rotations are (1) grass and whiteclover for 2 years followed by row crops for 2 years; (2) small grain followed by soybeans, annual lespedeza, or crotalaria, then a row crop the second year.

All tillage should be on the contour. To help control both wind and water erosion, crops should be planted in strips and half the acreage kept in close-growing crops. Windbreaks at right angles to the prevailing wind are needed in large fields to control wind erosion. A complete water-disposal system, including terraces and vegetated waterways, is needed to prevent erosion.

These soils are well suited to dallisgrass, bermudagrass, bahiagrass, tall fescue, whiteclover, annual lespedeza, and sericea lespedeza. These plants respond to liberal applications of fertilizer and lime. Yields are good.

Capability unit 9(IIe-3)

Deep and moderately deep soils that have a moderately plastic subsoil

The soils in this unit are nearly level to gently sloping. They are in all parts of the county except the southern and southeastern. They are—

Efland silt loam, 2 to 6 percent slopes.
Enon sandy loam, 2 to 6 percent slopes.
Helena sandy loam, 2 to 6 percent slopes.

The surface soil ranges from dark brown to pale olive in color and from 3 to 14 inches in thickness. The friable to firm subsoil is mottled with reddish brown and yellow. It provides a deep root zone. These soils are moderately well drained.

These soils are medium acid to strongly acid. They contain little organic matter and are low in fertility. They are slowly permeable and have a moderate capacity for holding available moisture.

The soils in this unit are fairly well suited to cultivation, but, because of their more plastic, clayey subsoil and slower permeability, they are less well suited than the soils in units 5(IIe-1) and 7(IIe-2). If well managed they are suited to a 2- to 4-year rotation in which close-growing crops are grown half the time. Small grain, corn, cotton, soybeans, and grain sorghum respond to liberal applications of a complete fertilizer. Yields are average.

All cultivation should be on the contour, and the long slopes should be stripcropped. Organic matter can be supplied by turning under winter cover crops and plant residues. A complete water-disposal system, including terraces and vegetated waterways, is needed to prevent erosion.

These soils are well suited to annual lespedeza, sericea lespedeza, bermudagrass, dallisgrass, tall fescue, and whiteclover for hay and pasture.

Capability unit 10(IIe-4)

Moderately deep, moderately well drained and well drained soils that are gently sloping and have a compact subsoil

The soils in this unit are mostly in the extreme southeastern part of the county. They are—

Gilead sandy loam, 2 to 6 percent slopes.
Vaucluse loamy sand, 2 to 6 percent slopes.

The surface layer ranges from dark brown to dark grayish brown, except in places where there is less or-

ganic matter. In these places the color ranges from gray to olive gray. The surface layer ranges from 6 to 20 inches in thickness. The mottled red, brown, and yellow subsoil is slightly cemented sandy loam to sandy clay loam. The root zone is moderately shallow.

These soils are moderate to slow in permeability and low in water-holding capacity. They are low in organic-matter content and low in fertility. They are strongly acid.

The principal crops are small grain, cotton, corn, crotalaria, and grain sorghum. Soybeans, annual lespedeza, and velvetbeans grow fairly well. For average yields these crops require liberal applications of fertilizer and adequate amounts of lime. A moderately long rotation that includes a deep-rooted legume or grass, such as sericea lespedeza or bahiagrass, is needed to conserve both soil and moisture.

All tillage should be on the contour. A complete water-disposal system that includes terraces and vegetated waterways is needed. Terraces should be constructed after the vegetated waterways are established and should be laid out so that water will drain from the ridges to the natural draws. If sprinkler irrigation is used, water should be applied carefully; otherwise, the cemented subsoil may cause the water to run off instead of soaking in.

These soils are fairly well suited to bermudagrass, bahiagrass, annual lespedeza, sericea lespedeza, and crimson clover. These plants respond to liberal applications of fertilizer and lime and provide fair to average yields for hay or grazing.

Capability unit 11(IIw-2)

Deep, well-drained soils on first bottoms

The soils in this unit are nearly level to very gently sloping. They are in fairly narrow strips along streams and are sometimes flooded. They are—

Congaree fine sandy loam.
Congaree silt loam.
Mixed alluvial land.

The surface layer ranges in texture from silt loam to coarse sandy loam and in color from dark brown to light yellowish brown. The subsoil is silt loam to fine sandy loam and provides a deep root zone.

These soils are slightly acid to strongly acid. They are moderate in fertility, high in content of organic matter, and high in water-holding capacity. Good tilth is easy to maintain.

All crops respond to lime and fertilizer. The principal crops are vegetables, corn, oats, and annual lespedeza. If these soils are used intensively for row crops, it is necessary to replenish the supply of organic matter by turning under crop residues and winter cover crops.

Dallisgrass, bermudagrass, tall fescue, and whiteclover are well-suited hay and pasture plants.

The loss of a crop by flooding can be expected once every 4 years.

Capability unit 12(IIs-1)

Deep, excessively drained upland soils that have a thick surface layer of loamy sand

There is only one soil in this unit, Durham loamy sand, thick surface, 2 to 6 percent slopes. Most of this soil is in the southeastern part of the county, near Holston Crossroads, but a small acreage is in the northwestern part.

The sandy surface layer ranges from 18 to 30 inches in thickness and from very dark gray where there is the most organic matter to olive where there is little. The subsoil is yellowish-brown or brownish-yellow sandy clay loam to clay. It is friable to firm and provides a deep root zone.

This soil is strongly acid to slightly acid. It is low in fertility and contains little organic matter. It is rapid in infiltration, low in water-holding capacity, and moderately permeable. It is droughty and excessively leached. Tilth is easy to maintain.

This soil is suited to cultivation. It is fairly well suited to sweetpotatoes, peanuts, watermelons, corn, crotalaria, oats, rye, and velvetbeans. These crops respond to heavy applications of a complete fertilizer. A moderately long rotation that includes 2 to 4 years of legume or grass crops that are turned under, then row crops for 2 to 4 years, will supply organic matter and conserve both soil and moisture. All tillage should be on the contour. A complete water-disposal system that includes terraces and vegetated waterways is needed to control erosion.

Bahiagrass, bermudagrass, sericea lespedeza, and kudzu respond to liberal applications of fertilizer and lime. Yields of hay or pasture are fair.

Capability unit 13(IIs-1, A4)

Nearly level to gently sloping soils that have a thick surface layer of loamy sand and a friable subsoil

These soils are in the southern and southeastern parts of the county. Some areas are as much as 65 acres in size. The soils are—

Norfolk loamy sand, thick surface, 0 to 2 percent slopes.
Norfolk loamy sand, thick surface, 2 to 6 percent slopes.
Ruston loamy sand, thick surface, 0 to 2 percent slopes.
Ruston loamy sand, thick surface, 2 to 6 percent slopes.

The surface layer ranges from yellowish brown to light olive brown. It is excessively drained and easily leached. The friable subsoil ranges in texture from sandy clay loam to sandy clay. In color it is red to yellow and mottled with brown. The root zone is deep.

These soils are medium acid. They are moderate in permeability and rapid in infiltration. They are low in fertility, low in organic-matter content, and moderate to low in water-holding capacity. They are droughty, and wind erosion is a serious hazard in large fields. Tilth is easy to maintain.

The principal crops are small grain, cotton, peaches, soybeans, grain sorghum, asparagus, and soybeans. Peanuts, watermelons, corn, and crotalaria are fairly well suited. Crops respond to liberal fertilization. Yields are fair.

A rotation that keeps these soils in close-growing crops half the time is needed to control both wind and water erosion. All tillage should be on the contour. Additional organic matter and liberal amounts of fertilizer are needed to maintain productivity, decrease leaching, and control wind erosion. In large, nearly level fields, alternate strips of close-growing and clean-tilled crops should be grown at right angles to the prevailing wind. On gently sloping areas, the strips should be on the contour.

A complete water-disposal system, including terraces and vegetated waterways, is needed on the gently sloping areas to control erosion. On uniform slopes, parallel terraces make it possible to have parallel rows of equal length in the terrace intervals. Sprinkler irrigation can be used on peaches.

Yields of bahiagrass, bermudagrass, and sericea lespedeza are fair. These plants respond to liberal applications of fertilizer.

Capability unit 14(IIIe-1)

Permeable soils that have a subsoil of red clay

The soils in this unit are deep and well drained. They are in all parts of the county except the southern and southeastern. They are—

Bradley sandy loam, 6 to 10 percent slopes, eroded.
Cecil sandy loam, 6 to 10 percent slopes, eroded.
Cecil clay loam, 2 to 6 percent slopes, severely eroded.
Georgeville silt loam, 2 to 6 percent slopes, eroded.
Georgeville silt loam, 6 to 10 percent slopes.
Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
Tirzah silt loam, 2 to 6 percent slopes, eroded.
Tirzah silt loam, 6 to 10 percent slopes.

The yellowish-brown to dark-red surface layer is friable to very friable and is from 2 to 12 inches thick. The subsoil is friable and provides a moderately deep to deep root zone.

These soils are medium acid to strongly acid. They contain little organic matter. They are low in fertility, moderate in permeability, and moderate in water-holding capacity.

These soils are easy to work. All crops respond to liberal applications of fertilizer and adequate amounts of lime. The principal crops are small grain, cotton, corn, soybeans, and grain sorghum. Because of the hazard of erosion, rotations should include close-growing crops at least two-thirds of the time. Suitable rotations are (1) 4 years or more of tall fescue and whiteclover or sericea lespedeza, then 2 years of row crops; (2) 1 year of small grain and annual lespedeza, 1 year of volunteer lespedeza, and 1 year of a row crop.

Tillage should be on the contour, and the long slopes should be stripcropped. Turning under crop residues and winter cover crops replenishes the supply of organic matter. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bermudagrass, dallisgrass, tall fescue, crimson clover, annual lespedeza, sericea lespedeza, and white clover are suitable plants for hay or pasture. Yields of bahiagrass are average.

Capability unit 15(IIIe-1, A4)

Deep, well-drained, sloping soils that are slightly to moderately eroded and have a friable subsoil

There is only one soil in this unit, Ruston sandy loam, 6 to 10 percent slopes. This soil is in the southern and southeastern parts of the county on the Coastal Plain upland.

The surface layer of grayish-brown sandy loam is 12 to 18 inches thick. The subsoil is red, friable sandy clay loam. It is permeable and provides a deep root zone.

This soil is medium acid. It is moderate in water-holding capacity, moderate in fertility, and moderate in organic-matter content. There are a few galled spots that are low in organic-matter content. Tilth is good. This soil can be cultivated throughout a wide range of moisture conditions.

All crops respond to liberal applications of fertilizer and lime. The principal crops are cotton, small grain, corn, soybeans, and peaches. Rotations that include close-growing crops two-thirds of the time are needed to control erosion. Suitable rotations are (1) 2 years of bahiagrass or sericea lespedeza, then 1 year of a row crop; (2) 2 years of oats, or other small grain, and crotalaria, then 1 year of a row crop. All tillage should be on the contour. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bahiagrass, bermudagrass, sericea lespedeza, kudzu, and crimson clover, if liberally fertilized and limed, produce average yields of pasture or hay.

Capability unit 16(IIIe-2)

Gently sloping to sloping soils that have a gray to brown surface layer and a friable subsoil

The soils in this unit are in all parts of the county except the southern and southeastern. They are—

Alamance silt loam, 2 to 6 percent slopes, eroded.
Alamance silt loam, 6 to 10 percent slopes.
Appling sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes.
Chesterfield sandy loam, 6 to 10 percent slopes.
Durham sandy loam, 6 to 10 percent slopes.
Herndon silt loam, 2 to 6 percent slopes, eroded.
Herndon silt loam, 6 to 10 percent slopes.

The surface layer is friable to very friable. The yellow to brown subsoil is friable to firm and provides a deep root zone. These soils are easy to work, and tilth is easy to maintain.

These soils are slightly acid to very strongly acid. They contain little organic matter and are low in fertility. They are fairly low in water-holding capacity and are more droughty than the soils in unit 14(IIIe-1).

All of these soils are intensively cropped. If adequately limed and fertilized, they are suited to small grain, cotton, corn, soybeans, and grain sorghum. Because of the hazard of erosion, they should be kept in close-growing crops two-thirds of the time. Suitable rotations are (1) 4 years of bahiagrass or sericea lespedeza, then 2 years of row crops; (2) 2 years of small grain and annual lespedeza, then 1 year of a row crop. Turning under crop residues and winter cover crops helps to maintain the content of organic matter and to conserve both soil and moisture.

Tillage should be on the contour, and the long slopes should be stripcropped. A complete water-disposal system that includes vegetated waterways and terraces is needed to control erosion.

The principal plants for hay and pasture are annual lespedeza, sericea lespedeza, bermudagrass, dallisgrass, and whiteclover. Crimson clover grows fairly well on the Appling and Herndon soils.

Capability unit 17(IIIe-2, A4)

Gently sloping to sloping soils that have a brown to reddish-brown surface layer and a fine-textured, red subsoil

There is only one soil in this unit, Magnolia sandy loam, 6 to 10 percent slopes, eroded. This soil is widely distributed in the ridge section in the southern and southeastern parts of the county.

The surface layer of friable sandy loam ranges from 4 to 12 inches in thickness. In most places it is reddish brown, but in a few small galled spots it is red. The subsoil is permeable clay and provides a deep root zone.

This soil is moderate in rate of infiltration, moderate in permeability, and moderate in water-holding capacity. It is medium acid. It is medium in natural fertility and medium in content of organic matter.

This soil is well suited to general crops, principally small grain, soybeans, cotton, corn, peaches, and annual lespedeza. Grain sorghum, some truck crops, and crotalaria also grow well. Crops respond to liberal applications of a complete fertilizer and lime.

To control erosion, close-growing crops should be grown at least 2 years out of 3. Suitable rotations are (1) 2 or more years of fescue and whiteclover or bahiagrass, then 1 year of a row crop; (2) small grain and annual lespedeza the first year, volunteer lespedeza the second year, and a row crop the third year. These rotations are more effective if crops are grown in contour strips. All tillage should be on the contour. A complete water-disposal system, including terraces and vegetated waterways, is needed. The waterways should be established before the terraces are constructed.

Bermudagrass, bahiagrass, tall fescue, white clover, annual lespedeza, crimson clover, sericea lespedeza, and kudzu are well-suited pasture and hay plants. These plants respond to liberal applications of a complete fertilizer and lime. Yields are above average.

Capability unit 18(IIIe-3)

Soils that have a moderately plastic subsoil

The soils in this unit are in all parts of the county except the southern and southeastern. They are moderately deep to deep, moderately well drained, and slightly to severely eroded. They are—

Efland silty clay loam, 2 to 6 percent slopes, severely eroded.
Efland silt loam, 6 to 10 percent slopes.
Enon sandy loam, 6 to 10 percent slopes, eroded.
Helena sandy loam, 2 to 6 percent slopes, eroded.
Helena sandy loam, 6 to 10 percent slopes.

The very friable surface layer ranges in color from olive to brown and in thickness from 2 to 12 inches. The subsoil has mottles of red, brown, and yellow.

These soils are medium acid to strongly acid. They are low in content of organic matter and low in fertility. They are moderate in water-holding capacity and are moderate in permeability.

Crops respond to liberal applications of a complete fertilizer and adequate amounts of lime. The principal crops are small grain, cotton, corn, and annual lespedeza. Soybeans, grain sorghum, and sericea lespedeza also grow well.

If used for crops, these soils should be kept in close-growing crops at least two-thirds of the time. Rotations should be moderately long. Suitable rotations are (1) 4 years of tall fescue and whiteclover and 2 years of row crops; (2) 2 years of small grain and lespedeza and 1 year of a row crop. Contour strips are practicable. All tillage should be on the contour. A complete water-disposal system, including terraces and vegetated waterways, is needed.

Pasture and hay plants respond to liberal applications of fertilizer and lime. The principal plants are dallisgrass, tall fescue, bermudagrass, and whiteclover.

Capability unit 19(IIIe-4)

Shallow to moderately deep, sloping soils that have a slightly compact subsoil

There is one soil in this unit, Vaucluse loamy sand, 6 to 10 percent slopes. Most of this soil is in the extreme southeastern part of the county. It is shallow to moderately deep and is moderately well drained.

The surface layer of loamy sand ranges from 5 to 18 inches in thickness. The subsoil ranges from 12 to 22 inches in thickness and is weakly cemented. This soil is slow in permeability and low to very low in water-holding capacity. It is low in organic-matter content and low in fertility. It is medium acid to strongly acid.

The principal crops are oats, cotton, corn, and crotalaria. Crops respond to liberal applications of a complete fertilizer and to lime. Yields are fair. Suitable rotations are (1) 4 years of sericea lespedeza or bahiagrass, then 2 years of row crops; (2) 2 years of oats and crotalaria, then 1 year of a row crop. All tillage should be on the contour. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bermudagrass, bahiagrass, and sericea lespedeza respond to liberal applications of fertilizer and provide fair yields for hay or pasture. In dry periods grazing should be rotated because pastures are easily overgrazed.

Capability unit 20(IIIe-5)

Shallow soils that have a thin subsoil or no developed subsoil

There is only one soil in this unit, Goldston silt loam, 2 to 6 percent slopes. This soil is widely distributed on breaks to small streams and on ridgetops in the central part of the county. It is well drained.

The surface soil of grayish-brown, very friable silt loam is 4 to 12 inches thick. The brownish-gray to olive-yellow subsoil is weakly developed and contains much partially disintegrated parent material.

This soil is slowly permeable and is low in water-holding capacity. It is medium acid. It is low to very low in organic-matter content and low to very low in fertility.

Some of this soil is in crops, but most of it is in forest or pasture. The principal crops are oats or other small grain, corn, grain sorghum, sericea lespedeza, and whiteclover. Row crops should be grown only a third of the time. Suitable rotations are (1) 4 years of tall fescue and whiteclover, then 2 years of row crops; (2) 2 years of oats and annual lespedeza, then 1 year of a row crop. Crops should be grown in strips on the contour. All tillage should be on the contour. A complete water-disposal system, including terraces and vegetated water-

ways, is needed, but terraces are difficult to construct on this shallow soil.

Capability unit 21(IIIe–5, A4)

Deep, droughty, sloping soils that have a thick surface layer of loamy sand and a friable subsoil

There is only one soil in this unit, Norfolk loamy sand, thick surface, 6 to 10 percent slopes. This soil is mostly in the southeastern part of the county. It is deep and well drained.

The surface layer of light olive-brown, very friable loamy sand is 18 to 30 inches thick. The subsoil is yellowish-brown, brown, and red, friable sandy clay loam.

This soil is rapid in rate of infiltration and moderate in water-holding capacity. It is slightly droughty. It is moderate in fertility and low in organic-matter content. It is medium acid. Leaching is a serious problem.

This soil is fairly well suited to sweetpotatoes, watermelons, asparagus, crotalaria, peanuts, cotton, corn, small grain, and soybeans. These crops respond to liberal applications of a complete fertilizer and lime.

The rotation should include close-growing crops at least 2 years out of 3. Suitable rotations are (1) bahiagrass or sericea lespedeza for 3 years, then a row crop for 1 year; (2) small grain and crotalaria for 2 years, then a row crop for 1 year. Crops should be grown in strips on the contour. All tillage should be on the contour. Turning under crop residues and cover crops replenishes organic matter and helps conserve soil and moisture.

To control wind erosion in large fields, windbreaks should be planted at right angles to the prevailing wind. A complete water-disposal system, including terraces and vegetated waterways, is needed to control erosion.

Bermudagrass, bahiagrass, and sericea lespedeza respond to liberal applications of fertilizer and lime and provide fair yields of hay and pasture.

Capability unit 22(IIIw–2)

Deep, moderately permeable soils on first bottoms

There is only one soil in this unit, Chewacla silt loam. This soil is nearly level and occurs in narrow strips along the larger streams of the county. It is frequently flooded.

The surface layer of dark-brown silt loam grades to a substratum of mottled brown, olive, and gray silty clay loam. The root zone is deep.

This soil is slightly acid to very strongly acid. It is moderate in fertility, moderate in organic-matter content, and high in water-holding capacity. Good tilth is easy to maintain.

If drained, this soil is suited to corn, soybeans, oats, tall fescue, dallisgrass, bermudagrass, whiteclover, and annual lespedeza. Because of the favorable moisture conditions, it is well suited to hay and pasture plants. All crops need lime and a complete fertilizer.

Suitable rotations are (1) 2 or more years of fescue and whiteclover, then 2 or more years of row crops; (2) 2 years of oats and annual lespedeza, then 2 years of row crops.

Open ditches help to remove excess surface water. Diversion ditches protect the soil from hillside runoff. The loss of a crop from flooding once every 3 years is to be expected.

Capability unit 23(IIIw–2, A4)

Deep, poorly drained soils that have a subsoil of tough sandy clay or sandy clay loam

There is only one soil in this unit, Grady loam. This soil is nearly level and is frequently flooded. It is in the Coastal Plain section of the county, in flat depressions locally called Carolina bays. Most bays in Saluda County have been drained (fig. 9).

***Figure 9.*—Ditch to drain the bays in the ridge section.**

The texture of the surface layer ranges from silt loam to sandy loam. The sandy loam generally is around the edges of depressions where soil material has been sloughed from surrounding sandy soils. The surface layer is very dark gray. The subsoil is gray sandy clay loam mottled with light gray.

This soil is slow in permeability and is moderately high in water-holding capacity. It is medium to low in organic-matter content and moderate in fertility. It is very strongly acid. Good tilth is fairly easy to maintain.

If properly drained, this soil is suited to truck crops, corn, soybeans, oats, and annual lespedeza. Row crops can be grown each year on adequately drained areas if a complete fertilizer is applied liberally and the content of organic matter is maintained. Unless the organic-matter content is maintained, the soil becomes hard and is difficult to work. Suitable rotations are (1) tall fescue and whiteclover for 2 years or more, followed by row crops for 2 years or more; (2) oats and annual lespedeza for 2 years, then row crops for 2 years. Open ditches are needed to remove excess surface water.

This soil is well suited to pasture and hay plants. Dallisgrass, bermudagrass, tall fescue, whiteclover, and annual lespedeza respond to liberal applications of a complete fertilizer and lime. Yields are average.

Capability unit 24(IIIw-3)

Deep, gently sloping, slowly permeable soils of the uplands

Colfax sandy loam, 2 to 6 percent slopes, is the only soil in this unit. This soil is mostly in the southeastern part of the county near Holston Crossroads. It is near drainageways and on saddles between drainageways.

The surface layer is light brownish gray and is from 12 to 20 inches thick. The subsoil is predominantly gray and is firm and compact.

This soil is strongly acid. It is low in organic-matter content and low in fertility. It is moderately low to low in water-holding capacity, but, because of its position on the landscape, it receives enough water for plants. It is somewhat poorly drained. If artificially drained, this soil has a deep root zone. It is easy to work, and tilth is fairly easy to maintain.

If heavily fertilized and limed, this soil produces fair yields of corn, oats, grain sorghum, soybeans, and annual lespedeza. Tillage should be on the contour. Organic matter can be supplied by turning under cover crops and crop residues. Open ditches are needed to remove surplus water.

Tall fescue, whiteclover, bermudagrass, dallisgrass, and bahiagrass provide fair yields of pasture.

Capability unit 25(IIIs-2)

Deep, sandy soils that have a sandy surface layer and are subject to severe leaching and to wind erosion

There is only one soil in this unit, Lakeland sand, 0 to 6 percent slopes. This soil is in small areas and is mostly in the extreme southeastern part of the county.

The dark grayish-brown surface layer is from 10 to 20 inches thick. It is underlain by olive to yellowish-brown sand to sandy loam.

This soil is medium acid to strongly acid. It is very rapid in infiltration, very rapid in permeability, very low in organic-matter content, and very low in fertility. It is excessively drained and is very low in water-holding capacity. This soil is rapidly leached of plant nutrients. Wind erosion is a serious hazard.

Crotalaria, corn, sericea lespedeza, rye, and watermelons are the principal crops. These crops respond to liberal and frequent applications of a complete fertilizer and to lime. Yields are fair. Adding large amounts of organic matter helps to control wind erosion and increases the capacity of the soil to hold moisture and plant nutrients. To provide organic matter, rotations should include close-growing crops two-thirds of the time. Suitable rotations are (1) 2 years of crotalaria, then 1 year of corn with voluntary crotalaria; (2) 3 years of bahiagrass, then 1 year of a row crop; (3) 2 years of row crops, then 6 years of crotalaria or weeds.

All tillage should be on the contour. Alternating strips of clean-tilled crops and strips of close-growing crops helps to control both wind and water erosion. Terracing is not practicable.

This soil is not well suited to pasture, but sericea lespedeza or bahiagrass, or a mixture of both, produces fair yields if heavily fertilized and limed. Grazing should be controlled to prevent injury to pasture plants.

Capability unit 26(IVe-1)

Deep, well-drained, permeable soils

The soils of this unit occur throughout the county except in the southern and southeastern parts. They are—

Alamance silt loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 10 to 20 percent slopes.
Bradley sandy loam, 10 to 20 percent slopes, eroded.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Chesterfield sandy loam, 10 to 15 percent slopes, eroded.
Georgeville silty clay loam, 2 to 6 percent slopes, severely eroded.
Georgeville silt loam, 6 to 10 percent slopes, eroded.
Georgeville silt loam, 10 to 15 percent slopes, eroded.
Herndon silty clay loam, 2 to 6 percent slopes, severely eroded.
Herndon silt loam, 6 to 10 percent slopes, eroded.
Herndon silt loam, 10 to 15 percent slopes.
Lloyd clay loam, 6 to 15 percent slopes, severely eroded.
Tirzah silty clay loam, 6 to 10 percent slopes, severely eroded.

These soils have a red, yellow, grayish-brown, or dark-brown surface layer and a friable to firm, clayey subsoil. The eroded and severely eroded soils have lost most, and in places all, of the original surface layer and part of the subsoil. Shallow gullies are common.

All of these soils are low in fertility, low in content of organic matter, and moderate to low in water-holding capacity. They are slightly acid to very strongly acid. Tilth is poor.

These soils are extremely susceptible to further erosion and consequently are not suited to crops that require tillage. They can be used to a limited extent for corn or small grain, but only fair yields can be expected. If row crops are grown, they should be part of a long rotation in which sericea lespedeza, kudzu, and perennial grasses are the predominant crops. Another satisfactory rotation is one that, for at least three-fourths of the time, includes close-growing crops grown in strips on the contour.

The soils in this unit are best suited to hay and pasture plants. Tall fescue, dallisgrass, bermudagrass, and whiteclover, if heavily fertilized and limed, produce moderate yields. Annual lespedeza and crimson clover also respond to fertilization.

All tillage should be on the contour. Natural drainageways should be kept in permanent vegetation. Terraces are not practicable.

Capability unit 27(IVe-2)

Deep to moderately deep soils that have a subsoil of firm, moderately plastic clay

The soils in this unit are in small areas in all parts of the county except the southern and southeastern. They are—

Efland silty clay loam, 6 to 10 percent slopes, severely eroded.
Efland silt loam, 10 to 15 percent slopes, eroded.
Helena sandy loam, 6 to 10 percent slopes, eroded.
Orange silt loam, 2 to 6 percent slopes.

These soils are moderately well drained. The surface layer is grayish brown to light brown, and the subsoil is olive gray to yellowish brown. The root zone is shallow. Shallow gullies are common.

These soils are medium acid to strongly acid. They are low in fertility, low in organic-matter content, slow in permeability, and moderate in water-holding capacity.

A small acreage is in crops and pasture, but most of the acreage is in forest. The best use for these soils is forest, pasture, or hay crops. Corn, small grain, tall fescue, bermudagrass, dallisgrass, sericea lespedeza, whiteclover, and annual lespedeza produce fair yields. A suitable rotation is 3 years of sericea lespedeza, or a mixture of sericea lespedeza and Coastal bermudagrass, then 1 year of a row crop.

These soils should be tilled on the contour and, where practicable, should be stripcropped. They are not suited to terracing. To prevent further erosion, the natural draws should be kept in permanent vegetation.

Pasture plants produce fair yields if heavily fertilized, but grazing should be rotated to prevent injury to the sod.

Capability unit 28(IVe-4)

Shallow soils that have poorly developed horizons

The soils in this unit are well drained and slightly eroded to moderately eroded. They are in all parts of the county except the southern and southeastern. They are—

Goldston silt loam, 6 to 10 percent slopes.
Goldston silt loam, 10 to 15 percent slopes.
Wilkes sandy loam, 2 to 10 percent slopes.
Wilkes sandy loam, 10 to 15 percent slopes.

The surface layer ranges from 4 to 18 inches in thickness. The subsoil is thin, or weakly developed, or both. In places it contains fragments of weathered parent material. These soils are difficult to till. They are highly erodible, and surface runoff is a serious hazard.

All of these soils are medium acid. They are very low in organic-matter content, very low in fertility, and very low in water-holding capacity.

These soils are not well suited to cultivation, mainly because they are shallow and have a shallow root zone. Crops respond to heavy applications of a complete fertilizer and to adequate amounts of lime, but yields of small grain, corn, bermudagrass, dallisgrass, tall fescue, crimson clover, annual lespedeza, and sericea lespedeza are only fair. Rotations should be long and should keep close-growing crops on the soil three-fourths of the time.

All tillage should be on the contour. Where practicable, fields should be stripcropped. Terracing to control runoff is not feasible. All natural drainageways should be kept in permanent sod.

Pasture plants respond to fertilizer and adequate amounts of lime, but only fair yields can be expected. Grazing should be rotated to prevent injury to the pasture stand.

Capability unit 29(IVw-1)

Poorly drained soils along small streams and on the bottom lands of large streams

This unit consists of one land type and one soil. They occur in long, narrow areas on the first bottoms of small and large streams. They are frequently flooded. The mapping units are—

Mixed wet alluvial land.
Wehadkee silt loam.

The surface layer is sandy loam to silt loam and is from 8 to 36 inches thick. In the land type, the subsoil varies in texture and in color. In Wehadkee silt loam, the subsoil is silty clay and is mottled with gray and yellowish brown.

Because of excessive moisture, these soils are of limited use for crops. They can be used in their natural state for range pasture, but their usefulness for pasture is greatly increased if they are drained by V-type ditches. Hay and pasture plants respond to fertilizer and adequate amounts of lime. Yields of tall fescue, dallisgrass, whiteclover, and annual lespedeza are fair. Corn and some truck crops grow fairly well. Grazing should be rotated to prevent injury to the permanent sod.

Capability unit 30(IVs-1)

Deep, sloping, sandy soils through which water moves rapidly

There is only one soil in this unit, Lakeland sand, 6 to 10 percent slopes. This soil is on relatively short slopes and on breaks to small streams. It is mostly in the extreme southeastern part of the county.

This soil has a sandy surface layer underlain by sand or loamy sand. It is droughty and excessively drained. It is subject to severe leaching. Infiltration is very rapid, permeability is very rapid, and the water-holding capacity is very low. The organic-matter content is very low, and fertility is very low.

Even if this soil is frequently and heavily fertilized and adequately limed, yields are low. Consequently, cultivation generally is not practicable. The most suitable crops are corn, rye, velvetbeans, watermelons, crotalaria, bahiagrass, Coastal bermudagrass, and sericea lespedeza. Suitable rotations are (1) crotalaria for 3 years, then corn and velvetbeans for 1 year; (2) bahiagrass and sericea lespedeza for 4 years, then corn and velvetbeans for 2 years; (3) crotalaria as a summer crop and rye as a winter crop for 3 years, then a row crop for 1 year. To add organic matter, crop residues and cover crops should be turned under 3 years out of 4.

To control wind and water erosion, rotations in strips on the contour are effective. All tillage should be on the contour. Terraces are not practicable.

Bahiagrass, sericea lespedeza, or a combination of both, responds to heavy and frequent applications of a complete fertilizer and adequate amounts of lime. These plants provide fair yields for grazing, but grazing should be rotated to protect the permanent sod.

Capability unit 31(Vw-1)

Narrow, elongated areas of crawfish land along small streams

The soils in this unit occur in small areas along intermittent streams, in depressions, and at the heads of small streams and draws, in all parts of the county except the southern and southeastern parts. In many areas there are

recent deposits that washed or sloughed from surrounding soils. The soils are—

Worsham sandy loam, 0 to 6 percent slopes.
Worsham silt loam, 0 to 6 percent slopes.

The surface layer ranges from 4 to 20 inches or more in thickness. The subsoil is firm, gray clay. It is hard when dry and sticky when wet.

These soils are poorly drained. They remain excessively wet in the early part of the growing season. They are slowly permeable and are very low in organic-matter content and in fertility. They are medium acid to strongly acid.

These areas are not suited to cultivation. If drained with V-type ditches and lateral drains, they are fairly well suited to pasture. The principal crops are tall fescue, dallisgrass, whiteclover, and annual lespedeza. These plants respond to liberal applications of a complete fertilizer and lime. If the amounts of fertilizer and lime are not sufficient, water grasses crowd out the better plants. Yields are fair.

Capability unit 32(VIe-2)

Severely eroded and moderately steep soils that have a friable subsoil

The soils in this unit are deep, well drained, and moderately permeable. They are in all parts of the county except the southern and southeastern. They are—

Appling sandy loam, 10 to 20 percent slopes, eroded.
Cecil clay loam, 6 to 10 percent slopes, severely eroded.
Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded.
Georgeville silt loam, 15 to 25 percent slopes, eroded.
Herndon silty clay loam, 6 to 10 percent slopes, severely eroded.
Herndon silt loam, 10 to 25 percent slopes, eroded.

Most of the original surface layer and in many places part of the subsoil have been lost through erosion. Consequently, these soils are low in content of organic matter and low in plant nutrients. Surface runoff is great. Shallow gullies are common.

All of these soils are slow in rate of infiltration and moderate to low in water-holding capacity. They are medium acid to very strongly acid.

These soils are not suited to cultivation. The less eroded areas are suited to bermudagrass, tall fescue, whiteclover, annual lespedeza, dallisgrass, and sericea lespedeza for permanent pasture. These plants respond to liberal applications of a complete fertilizer and lime. Grazing should be rotated to prevent damage to the sod.

Capability unit 33(VIe-3)

Sloping to moderately steep, shallow soils

The soils in this unit are in all parts of the county except the southern and southeastern. They are—

Goldston silt loam, 15 to 30 percent slopes.
Orange silt loam, 6 to 10 percent slopes, eroded.
Wilkes sandy loam, 15 to 30 percent slopes.

The surface layer ranges from 4 to 16 inches in thickness. The subsoil is thin and is slowly permeable. In many places it contains fragments of weathered parent material. These droughty soils are slightly to moderately eroded and are susceptible to further erosion. Surface runoff is excessive. Shallow gullies are common. About 125 acres of the Goldston soil and about 125 acres of the Wilkes soil are steep.

All of these soils are very low in organic-matter content, very low in fertility, and very low in water-holding capacity. They are medium acid to strongly acid.

These soils are not suited to cultivation. Productivity is very low, and yields are only fair. Pasture plants, including bermudagrass, tall fescue, whiteclover, annual lespedeza, and sericea lespedeza, produce fair yields. These plants respond to heavy applications of a complete fertilizer and adequate amounts of lime. To maintain a good ground cover, grazing should be rotated.

Capability unit 34(VIIe-1)

Eroded or severely eroded, strongly sloping to steep soils that have a red, clayey subsoil and friable parent material

The soils in this unit are in all parts of the county except the southern and southeastern. They are deep, well drained, and moderately permeable. They are—

Cecil clay loam, 10 to 20 percent slopes, severely eroded.
Georgeville silty clay loam, 10 to 15 percent slopes, severely eroded.
Gullied land, friable materials.

The surface layer is sandy loam to clay, and the subsoil is red, friable clay. Organic matter and plant nutrients have been lost through erosion. Shallow and moderately deep gullies are common.

All of these soils are medium acid. They are very low in organic-matter content and very low in fertility. Infiltration is slow, and the water-holding capacity is low.

These soils are not suited to crops. Generally, they are best suited to forest. Bermudagrass, sericea lespedeza, and kudzu respond to heavy applications of a complete fertilizer and lime, but pasture yields are poor. Seedbed preparation for these plants should be done on the contour.

Capability unit 35(VIIe-2)

Soils that are on moderately steep to steep slopes and are not productive

This unit consists of one land type, Sloping sandy land, which occurs on steep breaks to streams, chiefly in the southeastern part of the county.

The surface layer is sand and ranges from 20 to 36 inches or more in thickness. In places the subsoil is thin and slightly cemented. In other places there is no subsoil.

This land type is very droughty. It is very low in organic-matter content and very low in fertility. Infiltration is very rapid, permeability is very rapid, and the water-holding capacity is very low. Plant nutrients leach out very rapidly.

This land type is not suited to cultivation or to pasture. Its best use is forest.

Capability unit 36(VIIe-3)

Soils that have a very firm subsoil or firm parent material

This unit consists of one land type, Gullied land, firm materials, which is in all parts of the county except the

TABLE 2.—*Relative suitability of the principal soil types for specified crops*

[Number 1 means soil is well suited; 2 means fairly well suited; 3 means less well suited; 4 means not suited]

Soil type	Corn	Cotton	Grain sorghum	Barley	Oats	Rye	Wheat	Grapes	Peaches	Bahiagrass	Bermudagrass	Dallisgrass	Fescue	Ryegrass	Crimson clover	Annual lespedeza	Sericea lespedeza	Soybeans	White clover
Alamance silt loam	2	3	2	3	2	2	3	3	4	1	2	1	1	1	3	1	3	2	2
Altavista silt loam	2	3	2	3	2	2	3	3	4	1	1	2	2	2	3	2	3	2	2
Appling sandy loam	3	2	2	2	2	1	2	2	2	1	1	3	3	2	2	2	1	2	3
Bradley sandy loam	2	2	2	2	2	1	2	1	2	1	1	3	3	2	2	2	2	2	3
Cecil sandy loam	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2
Cecil clay loam	3	2	2	3	2	3	2	2	2	2	2	3	2	2	2	2	2	3	3
Chesterfield sandy loam	2	2	2	3	2	1	2	1	2	1	1	3	3	2	3	2	1	2	3
Chewacla silt loam	1	4	1	4	3	3	4	4	4	1	1	1	1	1	3	1	4	2	1
Colfax sandy loam	2	4	2	3	3	2	3	3	4	2	2	2	2	2	3	1	4	2	2
Congaree silt loam	1	4	1	3	1	2	3	4	4	1	1	1	1	1	2	1	3	1	1
Durham sandy loam	3	2	2	3	2	1	3	3	3	1	1	3	3	2	3	3	2	2	4
Durham loamy sand, thick surface	3	3	3	3	2	1	3	4	4	1	2	4	4	2	4	3	2	3	4
Efland silt loam	2	3	2	2	2	2	2	3	4	1	1	1	2	2	2	1	3	2	1
Enon sandy loam	3	3	2	3	2	2	3	3	4	2	2	2	2	2	3	2	3	3	2
Faceville sandy loam	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	3	1	1	3
Georgeville silt loam	2	2	2	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2
Georgeville silty clay loam	3	3	2	3	3	3	3	3	3	3	2	3	3	3	2	3	2	3	3
Gilead sandy loam	2	3	2	3	2	2	3	3	4	2	2	3	3	2	3	3	3	3	3
Goldston silt loam	4	4	3	4	3	3	4	4	4	3	3	3	3	3	3	3	3	4	3
Grady loam	2	4	2	3	2	2	3	4	4	2	2	2	2	2	4	1	4	2	1
Helena sandy loam	3	3	2	3	2	2	3	3	4	2	2	3	3	2	2	2	2	3	2
Herndon silt loam	3	2	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2
Hiwassee sandy loam	2	3	1	1	1	1	1	1	3	1	1	2	1	1	1	1	1	2	1
Lakeland sand	3	3	3	4	3	2	4	3	2	2	2	4	4	3	4	4	2	3	4
Lloyd sandy loam	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1
Local alluvial land	1	3	1	4	2	2	3	4	4	1	1	1	1	1	2	1	3	1	1
Magnolia sandy loam	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	2	1	1	3
Marlboro sandy loam	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	2	1	1	3
Mixed alluvial land	2	4	2	4	3	3	4	4	4	2	2	2	2	2	3	2	3	2	2
Mixed wet alluvial land	4	4	4	4	4	4	4	4	4	2	3	2	2	3	4	3	4	4	3
Norfolk sandy loam	1	1	1	2	1	1	2	1	1	1	1	3	3	1	1	3	1	1	4
Norfolk loamy sand, thick surface	2	2	2	3	2	2	3	2	1	1	1	3	4	2	3	4	1	2	4
Orange silt loam	4	4	4	4	3	3	4	4	4	2	3	2	3	3	4	2	4	4	2
Ruston sandy loam	1	1	1	2	1	1	2	1	1	1	1	3	3	1	1	3	1	2	4
Ruston loamy sand, thick surface	2	2	2	3	2	2	3	2	1	1	1	3	4	2	3	4	1	2	4
Tirzah silt loam	2	3	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	2	1
Vaucluse loamy sand	3	3	3	4	3	3	4	4	3	3	3	4	4	3	3	4	3	3	4
Wehadkee silt loam	3	4	3	4	4	4	4	4	4	2	3	2	3	3	4	3	4	4	3
Wickham fine sandy loam	2	2	1	2	2	1	2	2	4	1	1	2	2	1	2	2	1	2	2
Wilkes sandy loam	3	3	3	4	3	3	4	4	4	3	3	3	3	3	3	2	3	3	3
Worsham sandy loam	3	4	4	4	3	3	4	4	4	2	2	2	2	3	4	3	4	4	3

southern and southeastern. The largest area is just northwest of Saluda. In this area erosion was started by the removal of soil for road foundations.

The surface layer of Gullied land, firm materials, varies from sandy loam to clay. In the narrow areas between the gullies, the subsoil is firm clay. Runoff is great, and erosion is a serious hazard. Organic matter and plant nutrients have been lost through erosion. Medium-sized gullies are common.

This land type is not suited to crops. Its best use is pine forest. Bermudagrass and sericea lespedeza respond to heavy applicants of fertilizer, but yields are poor.

Relative Suitability and Estimated Yields

The first part of this subsection shows the relative suitability of the principal soil types in the county for crops that are commonly grown or that are known to be suited to the soils and to the climate.

The second part gives the estimated average acre yields of principal crops on the different soils in the county.

Relative suitability of the soils for crops

In table 2 the degree of suitability of the principal soil types in the county for certain crops is expressed by index numbers. Number 1 indicates that the soil is well suited; numbers 2 and 3, that it is progressively less well suited; and number 4, that it is not at all suited.

Soils that have index number 1 are the most desirable for the given crop. On these soils the least intensive management is needed, hazards are less than on other soils in the county, and yields are most dependable. Soils having index number 2 are suited to the crop named, but they are materially limited by excess moisture, lack of moisture, a shallow root zone, low fertility or some other factor. Index number 3 indicates that the soils cannot be expected to produce good yields of the specified crop without intensive management that generally would not be justified. Number 4 indicates that the soils are not suited to that particular crop.

Estimated yields

Table 3 gives estimated average acre yields of the principal crops grown in the county under two levels of management. Listed in columns A are the yields to be expected under the management now prevailing in the county. Yields in columns B are those to be expected under improved management.

The figures in columns A are based largely on observations made by members of the soil survey party, on information obtained by interviewing farmers and other agricultural workers who have had experience with the soils and crops of the area, and on comparisons with yield tables for other counties in South Carolina that have similar soils.

The requirements of improved management vary according to the soils, but the following practices are considered requisites to obtaining the yields in columns B: (1) Proper choice and rotation of crops; (2) correct use of commercial fertilizers, lime, and manure; (3) proper tillage methods; (4) return of organic matter to the soils; (5) adequate control of water; (6) maintenance or improvement of workability of the soil; (7) conservation of soil material, plant nutrients, and soil moisture.

TABLE 3.—*Estimated average acre yields of the principal crops under two levels of management*

[Yields in columns A are those obtained under common management; those in columns B are yields to be expected under improved management. Absence of figure indicates crop is not commonly grown]

Soil	Cotton		Corn		Oats		Wheat		Annual lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bales	*Bales*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Alamance silt loam, 2 to 6 percent slopes	0.4	0.8	25	60	25	50	10	25	1.0	2.0	130	260
Alamance silt loam, 2 to 6 percent slopes, eroded	.3	.5	20	40	20	40	10	20	.9	1.7	125	250
Alamance silt loam, 6 to 10 percent slopes	.3	.6	12	30	20	40	10	25	.8	1.5	125	250
Alamance silt loam, 6 to 10 percent slopes, eroded					15	30	8	20	.7	1.4	120	240
Altavista silt loam, 2 to 6 percent slopes	.4	.8	30	60	35	75	15	25	1.0	2.0	120	240
Altavista silt loam, 0 to 2 percent slopes			25	50	35	65	15	25	1.0	2.0	110	220
Appling sandy loam, 2 to 6 percent slopes	.5	1.0	15	30	25	50	15	25	.5	1.5	100	200
Appling sandy loam, 2 to 6 percent slopes, eroded	.4	.8	10	30	20	40	10	20	.4	1.0	90	180
Appling sandy loam, 6 to 10 percent slopes	.4	.8	10	25	20	40	10	20	.4	1.0	90	180
Appling sandy loam, 6 to 10 percent slopes, eroded	.2	.6	10	20	15	30	8	15	.3	1.0	75	150
Appling sandy loam, 10 to 20 percent slopes			10	20	15	30			.3	1.0	75	150
Appling sandy loam, 10 to 20 percent slopes, eroded											60	125
Bradley sandy loam, 2 to 6 percent slopes, eroded	.5	1.0	15	30	25	50	15	30	.5	1.5	110	220
Bradley sandy loam, 6 to 10 percent slopes, eroded	.4	.8	15	30	25	50	15	30	.4	1.2	100	200
Bradley sandy loam, 10 to 20 percent slopes, eroded					15	30	10	15	.3	.7	90	180
Cecil sandy loam, 2 to 6 percent slopes	.8	2.0	20	50	35	75	20	40	.7	1.5	130	260
Cecil sandy loam, 6 to 10 percent slopes, eroded	.3	.7	10	25	15	30	10	25	.5	1.0	120	240
Cecil sandy loam, 10 to 15 percent slopes, eroded					10	30			.5	1.0	90	175

[1] The number of days in 1 year that 1 acre will support 1 animal (1 cow, steer, or horse; 5 hogs; or 7 sheep or goats) without injury to the pasture.

TABLE 3.—*Estimated average acre yields of the principal crops under two levels of management*—Continued

Soil	Cotton		Corn		Oats		Wheat		Annual lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bales	*Bales*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Cecil clay loam, 2 to 6 percent slopes, severely eroded	0. 3	0. 6	12	25	15	45	------	------	0. 3	0. 8	75	120
Cecil clay loam, 6 to 10 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	60	115
Cecil clay loam, 10 to 20 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	50	------
Chesterfield sandy loam, 2 to 6 percent slopes	. 5	1. 0	20	45	25	50	15	25	. 7	1. 5	100	200
Chesterfield sandy loam, 6 to 10 percent slopes	. 4	. 8	15	35	20	40	12	20	. 5	1. 0	90	180
Chesterfield sandy loam, 10 to 15 percent slopes, eroded	------	------	------	------	15	35	8	15	. 5	. 8	80	150
Chewacla silt loam	------	------	40	80	15	35	------	------	1. 5	2. 0	160	240
Colfax sandy loam, 2 to 6 percent slopes	------	------	15	50	15	35	8	15	. 6	1. 5	100	210
Congaree fine sandy loam	------	------	50	80	40	80	------	------	1. 0	2. 0	120	240
Congaree silt loam	------	------	50	80	40	80	------	------	1. 0	2. 0	120	240
Durham sandy loam, 2 to 6 percent slopes	. 5	1. 0	15	30	25	50	8	15	. 4	. 8	90	180
Durham sandy loam, 6 to 10 percent slopes	. 3	. 8	8	25	15	40	6	12	. 2	. 6	80	160
Durham loamy sand, thick surface, 2 to 6 percent slopes	. 2	. 7	7	20	15	30	5	20	. 1	. 5	70	140
Efland silt loam, 2 to 6 percent slopes	. 3	. 7	25	50	25	50	10	25	1. 0	1. 8	110	220
Efland silt loam, 6 to 10 percent slopes	. 3	. 8	10	25	20	40	8	25	. 5	1. 3	100	210
Efland silt loam, 10 to 15 percent slopes, eroded	------	------	------	------	10	25	------	------	. 4	1. 2	90	180
Efland silty clay loam, 2 to 6 percent slopes, severely eroded	. 2	. 6	15	30	15	40	5	20	. 4	1. 0	90	200
Efland silty clay loam, 6 to 10 percent slopes, severely eroded	------	------	------	------	10	20	------	------	. 3	1. 0	90	180
Enon sandy loam, 2 to 6 percent slopes	. 4	. 8	15	35	25	50	8	15	. 5	1. 0	110	220
Enon sandy loam, 6 to 10 percent slopes, eroded	. 3	. 7	10	30	20	45	5	10	. 5	. 8	100	200
Faceville sandy loam, 2 to 6 percent slopes	1. 0	2. 0	30	70	45	60	20	35	. 4	. 6	100	200
Faceville sandy loam, 0 to 2 percent slopes	1. 0	2. 2	30	80	50	70	20	40	. 4	. 7	100	220
Georgeville silt loam, 2 to 6 percent slopes	. 4	1. 0	25	50	25	50	12	30	1. 0	2. 0	120	220
Georgeville silt loam, 2 to 6 percent slopes, eroded	. 2	. 8	10	30	20	40	10	25	. 8	1. 5	100	200
Georgeville silt loam, 6 to 10 percent slopes	. 2	. 6	15	25	15	30	10	15	. 8	1. 5	90	180
Georgeville silt loam, 6 to 10 percent slopes, eroded	------	------	------	------	10	20	------	------	. 7	1. 0	80	160
Georgeville silt loam, 10 to 15 percent slopes, eroded	------	------	------	------	10	20	------	------	. 6	1. 0	80	160
Georgeville silt loam, 15 to 25 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	60	100
Georgeville silty clay loam, 2 to 6 percent slopes, severely eroded	. 2	. 6	15	30	15	30	5	20	. 3	. 8	80	110
Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	60	100
Georgeville silty clay loam, 10 to 15 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	50	------
Gilead sandy loam, 2 to 6 percent slopes	. 3	. 7	25	60	25	45	8	15	. 4	. 7	100	200
Goldston silt loam, 2 to 6 percent slopes	. 2	. 5	10	20	10	30	------	------	. 4	. 9	70	110
Goldston silt loam, 6 to 10 percent slopes	------	------	------	------	8	25	------	------	. 4	. 9	70	110
Goldston silt loam, 10 to 15 percent slopes	------	------	------	------	8	15	------	------	. 3	. 6	65	100
Goldston silt loam, 15 to 30 percent slopes	------	------	------	------	------	------	------	------	------	------	50	------
Grady loam	. 3	. 6	25	60	25	55	8	15	1. 2	2. 0	110	200
Gullied land, firm materials	------	------	------	------	------	------	------	------	------	------	------	------
Gullied land, friable materials	------	------	------	------	------	------	------	------	------	------	------	------
Helena sandy loam, 2 to 6 percent slopes	. 3	. 7	15	35	25	60	8	15	. 7	1. 3	100	200
Helena sandy loam, 2 to 6 percent slopes, eroded	. 2	. 5	10	30	10	40	7	12	. 5	1. 0	90	180
Helena sandy loam, 6 to 10 percent slopes	. 2	. 5	10	30	10	40	7	15	. 5	1. 0	90	180
Helena sandy loam, 6 to 10 percent slopes, eroded	------	------	------	------	8	20	------	------	. 3	. 7	80	150
Herndon silt loam, 2 to 6 percent slopes	. 4	1. 0	15	35	25	50	10	15	. 8	1. 8	100	240
Herndon silt loam, 2 to 6 percent slopes, eroded	. 3	. 7	10	25	20	40	8	12	. 5	1. 2	90	180
Herndon silt loam, 6 to 10 percent slopes	. 3	. 7	10	25	20	40	8	12	. 5	1. 2	90	170
Herndon silt loam, 6 to 10 percent slopes, eroded	. 2	. 5	7	16	10	20	------	------	. 3	1. 0	75	160
Herndon silt loam, 10 to 15 percent slopes	------	------	------	------	8	15	------	------	. 3	. 8	75	160
Herndon silt loam, 10 to 25 percent slopes, eroded	------	------	------	------	------	------	------	------	------	------	60	125
Herndon silty clay loam, 2 to 6 percent slopes, severely eroded	. 2	. 5	8	20	10	25	------	------	. 3	1. 0	80	170
Herndon silty clay loam, 6 to 10 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	60	115
Hiwassee sandy loam, 2 to 8 percent slopes	. 4	. 7	25	50	25	70	20	40	. 7	1. 5	120	240

See footnote on p. 55.

TABLE 3.—*Estimated average acre yields of the principal crops under two levels of management*—Continued

Soil	Cotton		Corn		Oats		Wheat		Annual lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bales	*Bales*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Lakeland sand, 0 to 6 percent slopes	0.3	0.7	15	30	15	30	5	10			50	150
Lakeland sand, 6 to 10 percent slopes	.2	.5	8	20	10	20					45	150
Lloyd sandy loam, 2 to 6 percent slopes, eroded	.5	1.0	20	60	30	75	20	40	0.7	2.0	125	255
Lloyd clay loam, 2 to 6 percent slopes, severely eroded	.5	1.0	15	30	25	50	12	25	.5	2.0	90	190
Lloyd clay loam, 6 to 15 percent slopes, severely eroded					10	20	5	15	.3	1.0	80	160
Local alluvial land	.3	.7	40	80	35	80	12	25	1.3	2.0	120	240
Magnolia sandy loam, 2 to 6 percent slopes	.7	2.0	35	85	38	70	20	40	.7	2.0	100	200
Magnolia sandy loam, 0 to 2 percent slopes	.8	2.2	40	90	40	80	20	45	.7	2.0	100	200
Magnolia sandy loam, 6 to 10 percent slopes, eroded	.5	1.8	25	70	32	65	15	35	.5	1.5	90	180
Marlboro sandy loam, 0 to 2 percent slopes	.8	2.2	40	90	40	80	20	45	.4	.7	100	200
Mixed alluvial land			20	50	15	30			1.0	2.0	110	225
Mixed wet alluvial land									.5	.8	80	130
Norfolk sandy loam, 2 to 8 percent slopes	.8	1.8	30	65	35	65	12	25	.2	.5	100	200
Norfolk sandy loam, 0 to 2 percent slopes	.9	2.0	40	80	40	80	12	25	.2	.6	100	200
Norfolk loamy sand, thick surface, 2 to 6 percent slopes	.5	1.0	18	45	20	50	8	15			135	220
Norfolk loamy sand, thick surface, 0 to 2 percent slopes	.5	1.0	20	55	20	50	8	15			140	220
Norfolk loamy sand, thick surface, 6 to 10 percent slopes	.3	.7	15	30	15	40	5	12			115	200
Orange silt loam, 2 to 6 percent slopes			8	12	15	30			.5	1.5	100	200
Orange silt loam, 6 to 10 percent slopes, eroded											70	115
Ruston sandy loam, 2 to 6 percent slopes	.8	1.8	30	65	35	65	12	20	.2	.5	100	200
Ruston sandy loam, 0 to 2 percent slopes	.9	2.0	40	80	40	80	12	25	.2	.6	100	200
Ruston sandy loam, 6 to 10 percent slopes	.3	.7	15	30	15	40	5	12			115	200
Ruston loamy sand, thick surface, 2 to 6 percent slopes	.5	1.0	18	40	15	40	8	15			135	200
Ruston loamy sand, thick surface, 0 to 2 percent slopes	.5	1.0	28	50	20	50	8	15			140	210
Sloping sandy land											50	
Tirzah silt loam, 2 to 6 percent slopes	.3	.7	25	50	35	75	12	25	1.0	2.0	120	240
Tirzah silt loam, 2 to 6 percent slopes, eroded	.2	.6	20	40	30	60	10	20	.5	1.7	110	230
Tirzah silt loam, 6 to 10 percent slopes	.2	.6	15	35	25	50	10	30	.4	1.4	110	230
Tirzah silty clay loam, 6 to 10 percent slopes, severely eroded					20	40			.4	1.0	80	160
Vaucluse loamy sand, 2 to 6 percent slopes	.3	.7	15	30	15	30					70	100
Vaucluse loamy sand, 6 to 10 percent slopes	.2	.7	15	30	10	40	10	30			70	100
Wehadkee silt loam									.4	.7	80	115
Wickham fine sandy loam, 2 to 6 percent slopes	.5	1.0	25	50	25	50	12	25	.7	1.5	120	240
Wilkes sandy loam, 2 to 10 percent slopes					15	30			.4	1.5	70	110
Wilkes sandy loam, 10 to 15 percent slopes									.3	.6	65	100
Wilkes sandy loam, 15 to 30 percent slopes												
Worsham sandy loam, 0 to 6 percent slopes			10	35	15	30			.4	.7	90	150
Worsham silt loam, 0 to 6 percent slopes			10	35	15	30			.4	.7	90	150

See footnote on p. 55.

Use of the Soils for Woodland and Wildlife [1]

The Piedmont region originally was covered by hardwoods or by mixed stands of pine and hardwoods. There was enough pine so that, as land was cleared and subsequently abandoned, the original hardwood forest was replaced, through natural reseeding, by pure pine stands *(4)*.[2]

Now, pine is being replaced by hardwoods. Better protection from fire and the heavy cutting of pine in mixed stands have speeded up the natural succession of hardwoods. In places the cutting of pine in mixed stands is leaving an overstory of poor-quality hardwoods. Littleleaf disease of pine has been partly responsible for the conversion of some stands to hardwoods *(13)*.

A survey made in 1954 showed that 54 percent of the total area of the county was in woodland. Loblolly pine is the most important species commercially. Shortleaf pine and longleaf pine are less common. Slash pine has been introduced by planting, and its growth to pulpwood and small sawlog sizes approximates that of loblolly pine on the same sites. Sweetgum and yellow-poplar are the more important hardwood species.

[1] This section was prepared by GEORGE E. SMITH, JR., woodland conservationist, Soil Conservation Service, Orangeburg, South Carolina.

[2] Italic numbers in parentheses refer to Literature Cited, page 101.

Interest in woodland conservation has been stimulated by the rapid expansion of the pulp and paper industry in South Carolina. There are 13 certified tree farms in the county, totaling 21,092 acres. During the 5-year period ending June 30, 1959, tree seedlings were planted on 4,018 acres. In this period an average of 22 wildfires, averaging 3 acres in size, occurred annually.

Forest industries consist of 2 planing mills, 1 stationary sawmill, 25 portable sawmills, and 1 concentration yard. Markets exist for pulpwood, veneer bolts, and other miscellaneous forest products.

Woodland grazing is common throughout the county.

Land use has had a drastic effect upon wildlife in Saluda County. At the time of the first settlers, there were large numbers of native animals and birds, particularly deer and wild turkeys, in the county. The development of the area for farming disturbed the natural habitats, and much of the wildlife became extinct. Now,

TABLE 4.—*Woodland suitability groups*

Woodland groups	Site index [1]				Suitable species in order of priority
	Loblolly pine	Shortleaf pine	Virginia pine	Longleaf pine	
Group 1 Somewhat poorly drained to poorly drained alluvial soils on flood plains.	110	90		70	Loblolly pine, slash pine, sweetgum, yellow-poplar, white ash, cottonwood, sycamore, tupelo-gum, blackgum, swamp chestnut oak, cherrybark oak.
Group 2 Well drained to moderately well drained, alluvial soils on flood plains.	100	100			Loblolly pine, slash pine, blackgum and sweetgum, yellow-poplar, white ash, cottonwood, black cherry, sycamore, swamp chestnut oak, cherrybark oak.
Group 3 Well drained to moderately well drained soils that have a friable subsoil and are on second bottoms and stream terraces.	90	70		70	Loblolly pine, slash pine, shortleaf pine, sweetgum, yellow-poplar, blackgum.
Group 4 Poorly drained to very poorly drained soils that have a very firm subsoil.	90	70		70	Loblolly pine, slash pine, longleaf pine, blackgum, sweetgum, tupelo-gum.
Group 5 Well drained to moderately well drained soils that have a friable to firm subsoil and are on the middle and upper parts of the Coastal Plain.	80 to 90	70 to 80		60 to 80	Slash pine, loblolly pine, longleaf pine, shortleaf pine.
Group 6 Deep, well-drained soils that have a friable subsoil and are on the uplands.	80 to 90	70	70	70	Loblolly pine, shortleaf pine, Virginia pine, longleaf pine, slash pine, redcedar, dogwood, black walnut, red oak, white oak.
Group 7 Deep, well-drained soils that have a friable subsoil and are eroded or have slopes of more than 10 percent; these soils are on the uplands.	70 to 80	60 to 70	60 to 70	60 to 70	Loblolly pine, slash pine, shortleaf pine, Virginia pine, longleaf pine.
Group 8 Moderately deep to deep soils that have a firm to plastic subsoil.	80	70	70	70	Loblolly pine, slash pine, Virginia pine, longleaf pine, shortleaf pine, sweetgum, blackgum.
Group 9 Deep soils that have a well-drained surface layer and a moderately plastic subsoil.	80	60 to 70		60	Loblolly pine, slash pine, shortleaf pine, longleaf pine, dogwood.
Group 10 Deep, excessively drained sands.	70 to 80	60 to 70		60 to 70	Slash pine, longleaf pine, loblolly pine, shortleaf pine.

See footnotes at end of table.

with the trend to extensive reforestation, deer and wild turkey have been restocked and large populations have become established.

Woodland Suitability Groups

The soils of Saluda County have been placed in 16 woodland suitability groups. The soils in each group are similar in major characteristics.

In table 4 the groups are listed and some factors that affect woodland management are given. The seriousness of a management problem is indicated by the rating *slight*, *moderate*, or *severe*.

Following table 4 is a description of each group. In each description is a list of the soils in the group and facts concerning plant competition, limitation on use of equipment, seedling mortality, windthrow hazard, and erosion hazard, as well as other information affecting the

and factors affecting woodland management

Interpretations for woodland management					Remarks
Plant competition [2]	Equipment limitations [3]	Seedling mortality [4]	Windthrow hazard [5]	Erosion hazard [6]	
Slight to severe.	Severe	Slight to severe.	Slight	Slight	Controlled drainage may be necessary to establish desired species and to improve site quality. Surface drainage is poor because of level topography.
Slight to severe.	Moderate	Slight to severe.	Slight	Slight	Controlled drainage may facilitate woodland conservation.
Slight to severe.	Slight to moderate.	Slight	Slight	Slight to moderate.	Equipment limitation is moderate on Altavista silt loam, 0 to 2 percent slopes. Site index for sweetgum and yellow-poplar approximates the site index for loblolly pine.
Moderate to severe.	Severe	Slight to severe.	Slight	Slight	Controlled drainage may be necessary to establish pine where water stands on surface and hazards are severe.
Severe	Slight	Slight	Slight	Slight to moderate.	Erosion hazard is moderate on the steeper slopes of the Faceville, Magnolia, Norfolk, and Ruston sandy loams. Large open areas are subject to wind erosion.
Severe	Slight to severe.	Slight	Slight	Slight to moderate.	Erosion hazard is slight on the 2 to 6 percent slopes and moderate on the 6 to 10 percent slopes. Dikes of quartz are near the surface in a few places in Tirzah silt loam. Boulders on the Durham and Appling sandy loams may restrict use of equipment. Gravel in places on Cecil sandy loam may interfere somewhat with some types of equipment.
Severe	Slight to severe.	Slight to moderate.	Slight to moderate.	Moderate to severe.	Erosion hazard is severe on steeper slopes and on eroded sites. Strong slopes, shallow gullies, and gravel or boulders restrict use of equipment. Plant competition is severe on sites that are not eroded and may be only slight on sites that are severely eroded because sufficient time has not elapsed in the plant succession to permit encroachment of undesired species. Seedling mortality is moderate on dry, strong slopes and on some severely eroded sites.
Moderate to severe.	Moderate to severe.	Moderate to severe.	Slight to moderate.	Slight	Reduce site index 10 points for eroded phase. These soils are plastic when wet and hard when dry. They spew and crack, and moisture conditions are adverse.
Severe	Moderate	Slight to moderate.	Slight to moderate.	Moderate to severe.	Surface layer is thin, and hazards are greater on eroded areas.
Severe	Slight	Moderate to severe.	Slight	Slight	During droughts the use of certain types of light equipment may be restricted because of poor traction on sand.

TABLE 4.—*Woodland suitability groups and factors*

Woodland groups	Site index [1]				Suitable species in order of priority
	Loblolly pine	Shortleaf pine	Virginia pine	Longleaf pine	
Group 11 Deep, well drained to excessively drained soils that have a surface layer of thick, loamy sand and a friable subsoil.	70 to 80			60 to 70	Slash pine, longleaf pine, loblolly pine
Group 12 Moderately deep, somewhat poorly drained soils that have a fine-textured, plastic subsoil.	70	60	60		Loblolly pine, slash pine, shortleaf pine
Group 13 Moderately deep to deep soils that have a surface layer of loamy sand and a compact subsoil that restricts root development.	60 to 70			50 to 60	Loblolly pine, slash pine, longleaf pine, shortleaf pine, Virginia pine.
Group 14 Soils that have a thin surface layer and a moderately plastic subsoil.	60 to 70	50 to 60		50 to 60	Loblolly pine, slash pine, Virginia pine.
Group 15 Shallow, well-drained soils that have a low water-holding capacity.	70	60 to 70		70	Loblolly pine, slash pine, longleaf pine, shortleaf pine, redcedar.
Group 16 Miscellaneous land types.	Site index varies from below 40 to above 100, depending on site and species.				Hardwoods on wet sites; pines on drained sites.

[1] The site index is the height, in feet, that a tree of a given species, growing on a given soil, in an even-aged, well-managed stand, will attain in 50 years. The figures are rounded to the nearest 10-foot site class. The site indexes are tentative and are subject to revision. They are based on field studies by the Soil Conservation Service and the South Carolina State Commission of Forestry.

[2] A rating of slight indicates that plant competition does not impede the natural regeneration of the designated species; a rating of moderate, that competition may delay but does not prevent regeneration; and a rating of severe, that natural regeneration cannot be relied upon to restock the site and that seedlings must be planted and measures taken to remove competing plants.

[3] A rating of slight indicates that any kind of equipment commonly used in crop tending or tree harvesting can be used at any time of the year; a rating of moderate, that most types of equipment can be used and that there are periods of no more than 3 months when the use of equipment is restricted; a rating of severe, that the kinds of equipment that can be used are limited and that

suitability of the soils for trees. Some suggestions for woodland management are also given.

Woodland suitability group 1

Somewhat poorly drained to poorly drained alluvial soils on flood plains

The soils in this group are level to nearly level. They have a surface layer of deep silt loam and a friable subsoil. They are—

Chewacla silt loam.
Wehadkee silt loam.

These soils are slow to moderately slow in permeability, slow in infiltration, and moderately high to high in water-holding capacity. They are moderately high in organic-matter content and high in fertility.

The natural vegetation, composed primarily of hardwoods and ground cover, competes severely with the pine. Prescribed burning, applying chemicals, clearing sites, disking, or other intensive treatment is needed to control or eradicate competing vegetation and to prepare seedbeds for restocking desirable species. For the regeneration of specific hardwoods, the competition hazard may be severe and intensive treatment may be needed. If no particular species is preferred, the hazard is slight to moderate. A mixed stand that contains desirable hardwoods generally is easily regenerated, but regeneration and growth may be retarded by competition.

The use of equipment on these soils is restricted because of poor drainage and the hazard of overflow. The water table is near the surface, and the slow rate of infiltration causes water to stand on the surface after rains. Adequate drainage is needed on roads. Controlled drainage will facilitate the use of equipment.

Seedling mortality depends on the individual tree species. Because of overflow and excess surface water, these soils normally are not suited to the reproduction of conifers. The mortality of conifers would exceed 50 percent of planted stock, and natural regeneration would not be satisfactory. The same mortality rate would

affecting woodland management—Continued

Interpretations for woodland management					Remarks
Plant competition [2]	Equipment limitations [3]	Seedling mortality [4]	Windthrow hazard [5]	Erosion hazard [6]	
Severe	Slight	Slight to moderate.	Slight	Slight	Large open areas are subject to wind erosion.
Moderate	Moderate to severe.	Moderate to severe.	Moderate	Moderate to severe.	Fine-textured, plastic subsoil of clay and poor internal drainage restrict root development.
Moderate	Slight	Slight to moderate.	Moderate to severe.	Severe	Observations in other counties indicate site index for shortleaf and Virginia pine equals the site index for longleaf pine. Subsoil is hard, very compact, and cemented.
Severe	Moderate to severe.	Moderate to severe.	Moderate	Severe	Equipment limitation is moderate on Helena sandy loam, 6 to 10 percent slopes, eroded. Shallow solum, strong slopes, and many shallow gullies restrict tree growth and limit use of equipment.
Severe	Moderate to severe.	Moderate to severe.	Slight to severe.	Moderate to severe.	In some areas surface layer is on underlying bedrock and root development is restricted. Rock fragments occur in places in surface layer. Slope increases runoff and hazard of erosion and restricts use of equipment.
Slight to severe.	Slight to severe.	Slight to severe.	Slight to severe.	Slight to severe.	On a few small areas between gullies, there is some remaining surface soil. The alluvial soils are productive tree sites but are dependent upon species and drainage. Controlled drainage may be necessary to establish pine and to improve site quality.

for periods of 3 months or more, equipment cannot be used without danger of serious damage to the soil.

[4] A rating of slight indicates that ordinarily no more than 25 percent of either planted or naturally occurring seedlings will die, and that one planting will probably produce a satisfactory stand; a rating of moderate indicates that losses will be between 25 and 50 percent; and a rating of severe, that more than half the seedlings will die.

[5] A rating of slight indicates that individual trees will withstand normal winds, even when released on all sides; a rating of moderate, that trees will remain standing unless the wind is of high velocity or the soil is excessively wet; a rating of severe, that the soil does not allow adequate rooting for stability.

[6] Refers to potential erosion hazard when the area is managed according to current acceptable standards.

occur in hardwood seedlings, except for species suited to very wet sites. Controlled drainage improves site quality and reduces mortality.

Root development for designated species is adequate for stability. Exposure to wind does not result in windthrow. Individual trees will remain standing if released on all sides.

There is little hazard of erosion, because the topography is level to nearly level.

A wide variety of species is suited to these soils. The production potential is excellent and justifies intensive treatment that includes the selection of species and the improvement of sites. To attain the potential production, it is necessary to recognize the requirements of the various sites and the treatment needed for each species. Putnam (*25*) lists 55 important commercial species of the southern bottom lands and describes some of their important characteristics and site requirements.

Woodland suitability group 2

Well drained to moderately well drained, alluvial soils on flood plains

The soils in this group are level to nearly level. They have a deep surface layer and a friable subsoil. They are—

Congaree fine sandy loam.
Congaree silt loam.

Permeability is moderately rapid, infiltration is moderately rapid, and the water-holding capacity is moderately high. The organic-matter content is high, and fertility is medium.

The natural vegetation, composed primarily of hardwoods and ground cover, competes with the pine. Intensive treatment is needed to control or eradicate competing vegetation and to prepare seedbeds. Such treatment includes prescribed burning, applying chemicals, clearing sites, and disking. For the regeneration of specific hardwoods, the competition hazard may be severe and intensive treatment is needed. If no particular species is preferred, the hazard is slight to moderate. A mixed stand containing desirable hardwoods generally is easily regenerated, but regeneration and growth may be retarded by competition.

Occasional flooding restricts the use of equipment, but only to a moderate extent, because the texture of the soils permits free downward movement of water. Controlled drainage facilitates the construction and maintenance of roads and makes access to the sites possible immediately after rains.

Conifer and hardwood seedlings may be severely damaged or destroyed by excess water and overflow. Controlled drainage will reduce this mortality and improve the quality of the sites. Species suited to wet soils are not affected by excess moisture.

These soils have a deep root zone. Except during overflow, their texture, structure, drainage, and moisture conditions are favorable for the development of root systems adequate for stability. Windthrow is not a special problem if winds are normal.

There is little hazard of erosion because the topography is level to nearly level.

These soils are suited to a wide variety of species. Their production potential is excellent and justifies intensive treatment that includes the selection of species and the improvement of sites. To attain the potential production it is necessary to recognize the requirements of the various sites and the treatment needed for each species. Putnam lists 55 important commercial species of the southern bottom lands and describes some of their important characteristics and site requirements *(25)*.

Woodland suitability group 3

Well drained to moderately well drained soils that have a friable subsoil and are on second bottoms and stream terraces

The soils in this group have a deep surface layer of fine sandy loam or silt loam. They are—

Altavista silt loam, 0 to 2 percent slopes.
Altavista silt loam, 2 to 6 percent slopes.
Wickham fine sandy loam, 2 to 6 percent slopes.

These soils are moderately slow to moderate in permeability, moderately slow to moderate in rate of infiltration, and moderate in water-holding capacity. They are low in organic-matter content and low in fertility.

The natural vegetation, composed primarily of hardwoods and ground cover, competes with the pine. Intensive treatment is needed to control or eradicate competing vegetation and to prepare seedbeds. Such treatment includes prescribed burning, applying chemicals, clearing sites, and disking. As hardwoods compete with other hardwoods, intensive treatment may be necessary to regenerate a specific hardwood. If no particular species is preferred, competition is relatively unimportant. A mixed stand containing desirable hardwoods generally is easily regenerated, but regeneration and growth may be retarded by competition.

Because surface drainage is better on the 2 to 6 percent slopes than on the 0 to 2 percent slopes, equipment generally can be used without restriction on the steeper soils. On the more nearly level soils, the use of equipment is moderately restricted after rains.

The soils in this group are favorable for regeneration and growth of trees. In planted stands the survival of 75 percent of the seedlings can be expected. Natural regeneration is adequate for immediate restocking if rainfall is normal and other factors, including seed supply, fire, or plant competition, do not affect reproduction.

The root zone is deep, and root systems are adequate for stability. Cutting is not likely to create a windthrow hazard. During normal winds, individual trees will remain standing when released on all sides.

The erosion hazard is slight on the more nearly level soils and moderate on the more sloping silt loams.

These soils are suited to a wide variety of species. The production potential is excellent and justifies intensive treatment that includes the selection of species and the improvement of sites. To attain the potential production, the requirements of the various sites and the treatment needed for each species should be recognized.

Woodland suitability group 4

Poorly drained to very poorly drained soils that have a very firm subsoil

There is only one soil in this group, Grady loam. This soil is level to nearly level and occurs in saucerlike depressions on the upper part of the Coastal Plain. The surface layer is deep loam. This soil is slow in permeability, moderate in rate of infiltration, and moderately high in water-holding capacity. The organic-matter content is high, and fertility is medium.

A heavy ground cover competes severely with desirable hardwoods and pine. The degree of competition varies. In some places the establishment and growth of desired species may be only retarded, but in others the establishment and growth of desired species is not possible unless intensive treatment is undertaken. Intensive treatment to control or eradicate competing vegetation and to prepare seedbeds includes controlling drainage, prescribed burning, applying chemicals, clearing sites, and disking. There is considerable variation in the effect of competing vegetation on different species. The effect on pine is more severe than the effect on hardwoods that are suited to wet sites.

Because both surface and internal drainage are slow, water may stand on the surface for short or long periods. The use of equipment is severely restricted during these periods. Where practical, drainage should be controlled to permit access to sites and to facilitate operations. Adequate drainage will permit the use of equipment for 9 months of the year without damage to the soil.

Water that stands on the surface for long periods is detrimental to seed germination and seedling development. Pine will not regenerate or become established on the more poorly drained sites. Some hardwoods are suited to wet soils and have only a slight mortality hazard. If rainfall is normal, the loss in planted stands will not exceed 25 percent, and no replanting will be necessary. Natural regeneration is adequate if rainfall is normal and other factors, such as fire, seed supply, and plant competition, do not affect reproduction.

The very firm subsoil somewhat restricts root development but does not create a serious windthrow hazard. Trees are expected to remain standing when released on all sides.

The erosion hazard on this soil is slight.

The site potential is good. Pine can be established if excess surface water is removed. Hardwoods are suited to the wetter areas.

Woodland suitability group 5

Well drained to moderately well drained soils that have a friable to firm subsoil and are on the middle and upper parts of the Coastal Plain

Most of the soils in this group have a deep surface layer and a friable subsoil. The Gilead soil is moderately deep to deep and has a friable to firm subsoil. The soils are—

Faceville sandy loam, 0 to 2 percent slopes.
Faceville sandy loam, 2 to 6 percent slopes.
Gilead sandy loam, 2 to 6 percent slopes.
Magnolia sandy loam, 0 to 2 percent slopes.
Magnolia sandy loam, 2 to 6 percent slopes.
Marlboro sandy loam, 0 to 2 percent slopes.
Norfolk sandy loam, 0 to 2 percent slopes.
Norfolk sandy loam, 2 to 8 percent slopes.
Ruston sandy loam, 0 to 2 percent slopes.
Ruston sandy loam, 2 to 6 percent slopes.
Ruston sandy loam, 6 to 10 percent slopes.

The Gilead soil is moderately well drained. It is moderately slow to slow in permeability, rapid in infiltration, low in water-holding capacity, low in organic-matter content, and low in fertility. The other soils are moderate in permeability, moderate to rapid in infiltration, and moderate in water-holding capacity. They are medium in organic-matter content and medium to high in fertility.

If not controlled, competition by undesirable species is serious in areas that have been forested long enough to permit the encroachment of upland hardwoods and other ground cover. Prescribed burning, applying chemicals, clearing sites, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for restocking desirable species. Cultivated fields that have been abandoned can be planted successfully or restocked before severe competition develops. To maintain well-stocked pine stands for several successive rotations, the natural plant succession must be disrupted periodically.

Because of the depth, texture, drainage, and topography of these soils, the use of equipment is not restricted, except immediately after heavy rains. The slope does not exceed 10 percent and does not interfere appreciably with the operation of equipment.

These soils are favorable for regeneration in years of normal rainfall, provided the supply of seed is adequate and establishment and growth are not affected by fire or competition.

A deep root zone and favorable moisture conditions permit the development of root systems that are adequate for stability. Thinning and cutting operations that expose trees on all sides can be undertaken without creating a danger of windthrow in normal winds. The subsoil of Gilead sandy loam is somewhat firm, but it can be penetrated by roots and is deep enough for an adequate root system.

Erosion is a hazard on the steeper slopes of the Faceville, Magnolia, Norfolk, and Ruston soils. These soils should be kept in ground cover. Where possible, all operations that disturb the surface soil, including the establishment of firebreaks, should be on the contour. Windbreaks and windstrips are needed in the larger fields to control soil blowing.

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These soils are well suited to pine and have a good production potential. An understory of selected hardwoods in the pine stands is desirable because the high calcium content of the leaf litter will improve the site. The production potential for hardwoods is lower than that for pine.

Woodland suitability group 6

Deep, well-drained soils that have a friable subsoil and are on the uplands

Most of the soils in this group have a surface layer of sandy loam or silt loam. They are—

Alamance silt loam, 2 to 6 percent slopes.
Alamance silt loam, 6 to 10 percent slopes.
Appling sandy loam, 2 to 6 percent slopes.
Appling sandy loam, 6 to 10 percent slopes.
Bradley sandy loam, 2 to 6 percent slopes, eroded.
Bradley sandy loam, 6 to 10 percent slopes, eroded.
Cecil sandy loam, 2 to 6 percent slopes.
Chesterfield sandy loam, 2 to 6 percent slopes.
Chesterfield sandy loam, 6 to 10 percent slopes.
Durham sandy loam, 2 to 6 percent slopes.
Durham sandy loam, 6 to 10 percent slopes.
Durham loamy sand, thick surface, 2 to 6 percent slopes.
Georgeville silt loam, 2 to 6 percent slopes.
Georgeville silt loam, 6 to 10 percent slopes.
Herndon silt loam, 2 to 6 percent slopes.
Herndon silt loam, 6 to 10 percent slopes.
Hiwassee sandy loam, 2 to 8 percent slopes.
Tirzah silt loam, 2 to 6 percent slopes.
Tirzah silt loam, 6 to 10 percent slopes.

All of these soils are well drained except the Alamance soils, which are moderately well drained. The Alamance soils are moderately slow in permeability, the Durham soils are moderate to moderately slow in permeability, and the other soils are moderate. The silt loams are slow in rate of infiltration, and the sandy loams are moderate to high. The Durham and the Herndon soils are low in water-holding capacity, and the other soils are moderate in water-holding capacity. The Alamance soils are very low in organic-matter content; the Chesterfield soils are medium to low; and the other soils are low. All of the soils are low in fertility.

If not controlled, competition by undesirable species is serious in areas that have been forested long enough to permit the encroachment of upland hardwoods and other ground cover. Prescribed burning, applying chemicals, clearing sites, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for restocking desirable species. Cultivated fields that have been abandoned can be planted successfully or restocked before severe competition develops. To maintain well-stocked pine stands for several successive rotations, the natural plant succession must be disrupted periodically.

The use of equipment on the sandy loams is not restricted, except immediately after heavy rains. On the gently sloping silt loams, there is a slight restriction because runoff and infiltration are slow. The dikes of quartz that are near the surface of the Tirzah soils, the boulders on the Appling and Durham soils, and the gravel on the surface of the Cecil soil restrict the use of equipment. The restriction is slight to severe, depending on the type of equipment. In the Alamance soils, the subsoil is sticky when wet and hard when dry and in places the depth to the D horizon is only 30 to 48 inches.

The use of equipment on these shallow areas is restricted in wet weather.

These soils are favorable for regeneration in years of normal rainfall, provided the supply of seed is adequate and the establishment and growth of seedlings are not affected by fire or competition.

On most of these soils, a deep root zone and favorable moisture conditions permit the development of root systems that are adequate for stability. Thinning and cutting operations that expose trees on all sides can be undertaken on these soils without creating a danger of windthrow in normal winds. On the Alamance soils, root development is restricted by a shallow root zone, and windthrow may occur in periods of greatest normal wind velocity. Thinning and other cutting operations may increase the windthrow hazard and necessitate salvage cuttings or modification of cutting practices.

These soils, particularly those having slopes of more than 6 percent, are subject to erosion. Where possible, firebreak construction or other operations that disturb the surface soil should be on the contour. Erosion is not a serious problem on the slopes of less than 6 percent.

These soils are well suited to pine and have a good production potential. An understory of selected hardwoods in the pine stands is desirable because the high calcium content of the litter will improve the site. The production potential for hardwoods is lower than that for pine. If hardwoods are preferred, however, intensive management practices are needed to encourage the more valuable species.

Woodland suitability group 7

Deep, well-drained soils that have a friable subsoil and are eroded or have slopes of more than 10 percent; these soils are on the uplands

The soils in this group have a surface layer of sandy loam, silt loam, clay loam, or silty clay loam. They are—

Alamance silt loam, 2 to 6 percent slopes, eroded.
Alamance silt loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 10 to 20 percent slopes.
Appling sandy loam, 10 to 20 percent slopes, eroded.
Bradley sandy loam, 10 to 20 percent slopes, eroded.
Cecil sandy loam, 6 to 10 percent slopes, eroded.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Cecil clay loam, 2 to 6 percent slopes, severely eroded.
Cecil clay loam, 6 to 10 percent slopes, severely eroded.
Cecil clay loam, 10 to 20 percent slopes, severely eroded.
Chesterfield sandy loam, 10 to 15 percent slopes, eroded.
Georgeville silt loam, 2 to 6 percent slopes, eroded.
Georgeville silt loam, 6 to 10 percent slopes, eroded.
Georgeville silt loam, 10 to 15 percent slopes, eroded.
Georgeville silt loam, 15 to 25 percent slopes, eroded.
Georgeville silty clay loam, 2 to 6 percent slopes, severely eroded.
Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded.
Georgeville silty clay loam, 10 to 15 percent slopes, severely eroded.
Herndon silt loam, 10 to 15 percent slopes.
Herndon silt loam, 2 to 6 percent slopes, eroded.
Herndon silt loam, 6 to 10 percent slopes, eroded.
Herndon silt loam, 10 to 25 percent slopes, eroded.
Herndon silty clay loam, 2 to 6 percent slopes, severely eroded.
Herndon silty clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
Lloyd clay loam, 6 to 15 percent slopes, severely eroded.
Magnolia sandy loam, 6 to 10 percent slopes, eroded.
Tirzah silt loam, 2 to 6 percent slopes, eroded.
Tirzah silty clay loam, 6 to 10 percent slopes, severely eroded.

The Alamance soils are only moderately well drained and are moderately slow in permeability. The other soils are moderate in permeability. The sandy loams are moderate in rate of infiltration; the other soils are low in rate infiltration. The Herndon soils are low in water-holding capacity; the other soils are moderate in water-holding capacity. The Chesterfield soil is medium to low in organic-matter content, the Magnolia soil is medium in organic-matter content, and the other soils are low in organic-matter content. The Magnolia soil is medium in fertility; the other soils are low in fertility.

If not controlled, competition by undesirable species is serious in areas that have been forested long enough to permit the encroachment of upland hardwoods and other ground cover. Prescribed burning, applying chemicals, clearing sites, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for the restocking of desirable species. Cultivated fields that have been abandoned can be planted successfully or restocked before severe competition develops. To maintain well-stocked pine stands for several successive rotations, the natural plant succession must be disrupted periodically. In some severely eroded areas, there is little competition because sufficient time has not elapsed to permit encroachment of undesirable species. The hazard of serious competition exists, however, and will become progressively more apparent as plant succession trends develop. The competition hazard on these soils, therefore, is considered severe.

Short, abrupt slopes and many shallow gullies interfere somewhat with the operation of equipment. In some eroded areas the subsoil is sticky when wet and hard when dry, and equipment cannot be used without severe damage to the soils. On strong slopes the hazard of accelerated erosion prohibits the use of equipment that destroys the ground cover or disturbs the surface soil. Dikes of quartz at or near the surface in some areas of the Tirzah soils obstruct the use of certain types of equipment. Gravel or boulders occur in places and may interfere with the operation of equipment.

Intensive treatment is needed on severely eroded sites to control erosion and to establish ground cover or a desired species. Rapid runoff on some of these soils reduces seedling survival. Unless protection is provided, seedling losses on these poorer sites can be expected to exceed 50 percent of the planted stock. Natural regeneration cannot be relied on to establish well-stocked stands.

Where erosion has not been severe and some of the original surface soil remains, natural regeneration will maintain well-stocked stands, if the seed supply is adequate and other factors, including fire or plant competition, do not affect reproduction. Survival of 75 percent of planted seedlings is expected in these areas, and replanting is not necessary in years of normal rainfall.

Where the soils are not severely eroded, root systems are adequate for stability. In these areas, thinning and cutting operations that release trees on all sides can be undertaken without creating a danger of windthrow if

winds are normal. Root development is restricted in areas where there are boulders or underlying dikes or where the soils are severely eroded or are shallow because of slope. Trees may be stable on these sites, however, except in periods of extreme wetness and of highest normal wind velocity.

Erosion is a serious problem on the soils in this group. Operations that destroy ground cover or disturb the surface soil should be avoided. To prevent further erosion, a ground cover should be established in exposed areas. The erosion hazard is moderate on the less sloping soils, but care is needed to prevent further erosion. Where possible, road construction or other soil-disturbing operations should be on the contour.

These soils are best suited to pine and have a good production potential. An understory of selected hardwoods in the pine stands is desirable because of the high calcium content of the leaf litter. The production potential for hardwoods is lower than that for pine. Eroded areas generally revert to pine, and for a considerable time there is little encroachment of undesirable species. As natural succession occurs, however, competition becomes severe (fig. 10).

Woodland suitability group 8

Moderately deep to deep soils that have a firm to plastic subsoil

The soils in this group are at the heads of drainageways or in narrow strips along drainageways. They are somewhat poorly drained to poorly drained. They are—

Colfax sandy loam, 2 to 6 percent slopes.
Worsham sandy loam, 0 to 6 percent slopes.
Worsham silt loam, 0 to 6 percent slopes.

The Colfax soil has a firm subsoil that is plastic when wet and hard when dry. The Worsham soils have a subsoil that is sticky when wet and hard when dry. The Colfax soil has rapid infiltration; the Worsham soils are moderate in infiltration. All of these soils are moderately slow to slow in permeability and low in water-holding capacity. They are low in organic-matter content and low in fertility.

In areas that have been in forest for long periods, hardwoods and ground cover compete severely with pine. Poor internal drainage stimulates competition by sweetgum, blackgum, and other moisture-tolerant species. Prescribed burning, applying chemicals, clearing, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for more desirable species. Abandoned fields can be planted or restocked successfully before severe competition develops. To maintain well-stocked pine stands for several successive rotations, the natural plant succession must be disrupted periodically.

Because the subsoil is sticky or plastic when wet and hard when dry, the use of equipment should be severely restricted for long periods after rains or in periods of drought. Roads need to be adequately drained. Controlled drainage will facilitate the use of equipment.

Seedling mortality is likely to be high because of the spewing and cracking of the soils and adverse moisture conditions. Expected losses in planted stands vary from 25 percent to more than 50 percent. Interplanting may be necessary to obtain well-stocked stands.

***Figure 10.*—Thin stand of loblolly pine on Georgeville silty clay loam, 6 to 10 percent slopes, severely eroded.**

In the Colfax soil, root development is restricted by the plastic subsoil. Trees that are released on all sides may be in danger of windthrow in periods of highest normal wind velocity. The Worsham soils are underlain at a depth of 24 to 42 inches by sandy clay loam, mixed with weathered rock. Even though their subsoil is firm and sticky when wet, the depth of the root zone generally is sufficient for stability. Thinning and other cutting operations can be accomplished without danger of windthrow.

There is no serious erosion hazard if these soils are properly used and protected.

These soils have only a medium production potential. They are best suited to loblolly pine.

Woodland suitability group 9

Deep soils that have a well-drained surface layer and a moderately plastic subsoil

The soils in this group range in slope from 2 to 10 percent. They are—

Efland silt loam, 2 to 6 percent slopes.
Efland silt loam, 6 to 10 percent slopes.
Enon sandy loam, 2 to 6 percent slopes.
Enon sandy loam, 6 to 10 percent slopes, eroded.
Helena sandy loam, 2 to 6 percent slopes.
Helena sandy loam, 2 to 6 percent slopes, eroded.
Helena sandy loam, 6 to 10 percent slopes.

The Efland soils are moderately well drained, the Enon soils are well drained to moderately well drained, and the Helena soils are moderately well drained to somewhat poorly drained. The Efland soils are moderately slow to slow in permeability; the other soils are moderately slow in permeability. The Efland soils are slow in rate of infiltration; the other soils are moderate in rate of infiltration. The Enon soils are low in water-holding capacity; the other soils are moderate in water-holding capacity. The Efland soils are moderately high in fertility; the other soils are low in fertility. All of the soils are low in organic-matter content.

If not controlled, competition by undesirable species is serious in areas that have been forested long enough to permit the encroachment of upland hardwoods and other ground cover. Prescribed burning, applying chemicals, clearing sites, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for the restocking of desirable species. Cultivated fields that have been abandoned can be planted or restocked successfully before severe competition develops. To maintain well-stocked pine stands for several successive rotations, the natural plant succession must be disrupted periodically.

The use of equipment is not restricted to any extent on the well-drained, more gently sloping soils that are only slightly eroded. On the strongly sloping soils or where the surface layer is thin or eroded, the use of equipment is restricted in wet seasons and is somewhat restricted in dry seasons. Because of the moderately plastic subsoil, damage to the soils occurs when equipment is used in wet seasons. In periods of drought, the firm subsoil interferes with tillage operations and with the use of hand tools, particularly if the surface layer is thin or eroded.

In years of normal rainfall, initial plantings on the more gently sloping soils where the erosion hazard is slight can be expected to be successful. Interplanting or replanting is not necessary. Natural regeneration is sufficient if the seed supply is adequate and other factors, including fire and plant competiton, do not affect reproduction. On the steeper, eroded soils, seedling survival may vary from 50 to 75 percent and interplanting will be required in openings. Natural regeneration cannot be relied on to provide adequate restocking.

Windthrow is not a serious problem, except on some of the steep, eroded soils. Where erosion has removed part of the surface layer, the firm subsoil restricts root development. In these areas trees that have been released or exposed by thinning or other cutting operations are subject to the hazard of windthrow during winds of the highest normal velocity.

These soils are susceptible to erosion. The hazard of erosion is greater on the steeper soils. Operations that disturb the surface layer will increase the erosion hazard.

The soils in this group are well suited to pine and have a good production potential. An understory of selected hardwoods in the pine stands will improve the sites because of the high calcium content of the leaf litter. The production potential for hardwoods is lower than that for pine.

Woodland suitability group 10

Deep, excessively drained sands

The soils in this group are on the middle and upper parts of the Coastal Plain. They range in slope from 0 to 10 percent and have a very friable to loose subsoil. They are—

Lakeland sand, 0 to 6 percent slopes.
Lakeland sand, 6 to 10 percent slopes.

These soils are rapid in permeability, rapid in infiltration, and very low in water-holding capacity. They are very low in organic-matter content and very low in fertility.

Plant competition for soil moisture, nutrients, and growing space is severe on these sites *(27)*. Pine is at a great disadvantage if planted in stands of scrub oak because it cannot compete successfully for the limited supply of moisture *(14)*. Competition from wiregrass and other ground cover or from grass and weeds in old, abandoned fields is severe. Clearing, disking, furrowing, undercutting root systems, prescribed burning, applying chemicals, or other intensive treatment is needed to control or eradicate competing vegetation and to prepare seedbeds.

These sandy soils are excessively drained, and equipment can be used immediately after rains. In periods of drought, the use of light equipment is somewhat limited by poor traction. The slope is not sufficient to restrict the use of equipment.

Drought is the principal cause of seedling mortality. Although the average rainfall is about 45 inches a year, these sandy soils do not retain moisture, and drought conditions may prevail within 3 days after a summer rain. Frequently, there is no rain for 3 or 4 weeks at a time in the critical growing period. The exceedingly high temperature of the surface soil intensifies the rapid evaporation of soil moisture *(27)*. Natural regeneration cannot be relied on to restock the stands, and the planting of seedlings is necessary. Hatcher *(11)* prepared a guide for prescription planting and site preparation for these soils. Improved planting techniques and selection of superior stock can cut down seedling mortality.

Windthrow is not a special problem on these soils. Root development is sufficient for stability during winds of normal velocity. Thinning and cutting operations are not likely to cause a windthrow hazard.

Erosion is not a problem, but the hazard of soil blowing in large exposed areas may necessitate the establishment of a ground cover before seedlings are planted.

The rapid growth of slash pine and the resistance of longleaf pine to fire and to infection by southern fusiforme rust (*Cronartium fusiforme*) make these two species favorable for restocking *(27)*. A test of various conifers planted in the South Carolina Sand Hills indicates a wider choice of species than was formerly thought possible. Redcedar, slash pine, longleaf pine, Virginia pine, jackpine, and shortleaf pine exhibited good initial vigor *(21)*. There are several natural stands of Virginia pine and shortleaf pine in the South Carolina Sand Hills that have a site index equal to that of longleaf pine growing on the same kind of soil. Loblolly pine is better

suited to more moist soils, as on sandy soils it is subject to severe damage by the tip month.

Woodland suitability group 11

Deep, well drained to excessively drained soils that have a surface layer of thick, loamy sand and a friable subsoil

The soils in this group are on the middle and upper parts of the Coastal Plain. They are—

Norfolk loamy sand, thick surface, 0 to 2 percent slopes.
Norfolk loamy sand, thick surface, 2 to 6 percent slopes.
Norfolk loamy sand, thick surface, 6 to 10 percent slopes.
Ruston loamy sand, thick surface, 0 to 2 percent slopes.
Ruston loamy sand, thick surface, 2 to 6 percent slopes.

These soils are moderate in permeability, rapid in infiltration, and moderate to moderately low in water-holding capacity. They are low in organic-matter content and low in fertility.

Scrub oak and other hardwoods compete severely with pine on these soils. Pine cannot become established, because stands of scrub oak use most of the available soil moisture. Competition from grass and weeds in abandoned fields may also be severe. Clearing, furrowing, undercutting of root systems, prescribed burning, applying chemicals, or other intensive treatment is needed to control or eradicate competing vegetation and to prepare seedbeds.

Equipment can be operated on these soils at any time of the year. The use of light vehicles may be somewhat restricted in dry weather by poor traction.

The depth of these soils and their low water-holding capacity contribute to the poor rate of seedling survival, and so do long dry periods and high temperatures. Seedling losses can be expected to range from 25 percent to more than 50 percent of the planted stock. Natural regeneration cannot be relied on to provide well-stocked stands. Hatcher and Shipman report that survival and vigor improved where site treatment increased the water-holding capacity of the soils *(11, 27)*. A prescription planting guide prepared by Hatcher *(11)* indicates that seedling mortality can be cut down by improved planting techniques and the selection of superior stock.

Windthrow is not a special problem on these soils. Root development is sufficient for stability if winds are normal. Thinning and cutting operations that release trees on all sides can be undertaken without creating a windthrow hazard.

These soils are susceptible to erosion. Where possible, the construction of roads and firebreaks should be on the contour and other operations that disturb the surface layer should be limited. These soils are also susceptible to soil blowing, and the clearing of large areas should be avoided. Windbreaks of pine and an understory of redcedar, laurelcherry, ligustrum, or other suitable species will help to control wind erosion.

Longleaf pine and slash pine are best suited to these soils. Slash pine grows more rapidly, but longleaf pine has remarkable resistance to fire and to infection by southern fusiforme rust *(Cronartium fusiforme) (27)*. The survival rate of longleaf pine is improved if prescription planting techniques are followed. Damage to loblolly pine by the tip moth is severe. There are several natural stands of Virginia pine and shortleaf pine in this area that have a site index equal to that of longleaf pine growing on the same kind of soils.

Woodland suitability group 12

Moderately deep, somewhat poorly drained soils that have a fine-textured, plastic subsoil

The soils in this group developed in residuum derived from Carolina slate. They are shallow in places, either because of erosion or because rock is near the surface. They are—

Orange silt loam, 2 to 6 percent slopes.
Orange silt loam, 6 to 10 percent slopes, eroded.

Permeability is very slow, infiltration is slow, and the water-holding capacity is moderate. The organic-matter content is very low, and fertility is very low.

A somewhat limited moisture supply results in severe competition between pine and upland hardwoods or other vegetation. Prescribed burning, applying chemicals, clearing, disking, or other intensive treatment is needed to eliminate competing vegetation and to prepare seedbeds for restocking of desirable species. Areas that have been abandoned may not be immediately invaded by undesirable species and can be planted or restocked successfully before severe competition develops. To maintain well-stocked pine stands for several successive rotations, natural plant succession must be periodically disrupted.

These soils have poor internal drainage, and the subsoil is sticky or plastic when wet and hard when dry. To prevent damage to the soils, the use of equipment must be severely limited in dry spells and for long periods after rains. Where the solum is thin because of erosion or rock near the surface, the use of equipment may be severely restricted.

Because of the plastic subsoil, the mortality of planted seedlings may be more than 50 percent. Considerable replanting or interplanting will be necessary, even in years of normal weather. Natural regeneration cannot be relied on to establish well-stocked stands.

Root development is severely restricted by the plastic subsoil, adverse moisture conditions, and poor aeration. Trees that are released on all sides or exposed may be in danger of windthrow during winds of highest normal velocity. Where the solum is thin, the danger of windthrow is severe. In these areas thinning and cutting operations that expose individual trees on all sides increase the windthrow hazard. Salvage cuttings are necessary to avoid the loss of stumpage.

Erosion is a serious problem on short breaks and strong slopes and in areas that are eroded or where the solum is thin. Loss of the surface soil restricts the use of equipment and increases seedling mortality and the windthrow hazard. The potential for growing trees on these sites can be so reduced by erosion that the production of commercial sawtimber would not be practical.

These soils have only a medium production potential. They are best suited to loblolly pine. Hardwoods that can tolerate adverse moisture conditions and poor aeration can be grown, but their production potential is lower than that for pine.

Woodland suitability group 13

Moderately deep to deep soils that have a surface layer of loamy sand and a compact subsoil that restricts root development

The soils in this group have moderate to excessive surface drainage but only moderate internal drainage. Water moves rapidly through the deep, coarse-textured surface layer but slowly through the cemented subsoil. These soils are—

Vaucluse loamy sand, 2 to 6 percent slopes.
Vaucluse loamy sand, 6 to 10 percent slopes.

The rate of infiltration is high, but permeability is moderate to slow. The water-holding capacity is low, the organic-matter content is low, and fertility is low.

In years of normal rainfall, plant competition is not severe enough to prevent the establishment of the desired species. Special site preparation is not essential, but if it is not undertaken, the establishment of desirable species will be delayed and their initial growth slowed. Light seedbed preparation will minimize this problem. Seedlings may benefit from the slow movement of water through the compact subsoil. As trees develop to pulpwood size, the cemented subsoil restricts both root development and moisture supply.

The use of equipment is not restricted, except where its use may cause erosion on these sandy soils. Poor traction may restrict the use of light equipment in dry weather.

Because of the droughty surface layer, seedling mortality may be as much as 50 percent of the planted stock, even in years of normal rainfall. Replanting generally is necessary to fill openings, except where prescription planting techniques are used and sites are prepared by furrowing or other treatment.

Root development is restricted by the cemented subsoil, but, because of the thick surface layer, it is adequate for stability except in periods of greatest normal wind velocity. If the original surface layer is removed by erosion, root development is severely restricted.

Erosion is a serious hazard. If possible, the ground cover on these soils should not be disturbed.

These soils are not suited to hardwoods of commercial value. Longleaf pine and slash pine are the preferred species. On similar sites in other counties, there is some loblolly pine, Virginia pine, and shortleaf pine.

Woodland suitability group 14

Soils that have a thin surface layer and a moderately plastic subsoil

The soils in this group are eroded to severely eroded. They have slopes of 2 to 15 percent. They are—

Efland silty clay loam, 2 to 6 percent slopes, severely eroded.
Efland silty clay loam, 6 to 10 percent slopes, severely eroded.
Efland silt loam, 10 to 15 percent slopes, eroded.
Helena sandy loam, 6 to 10 percent slopes, eroded.

These soils are well drained to moderately well drained. They are moderately slow to slow in permeability, moderate to slow in infiltration, and moderate in water-holding capacity. They are low in organic-matter content. The Efland soils are high in fertility, and the Helena soil is low in fertility.

Where erosion is active, plant competition is slight. As the soils become stabilized, competition from undesirable species will become serious. Applying chemicals, girdling, planting or replanting, or other intensive treatment is needed for the reproduction of desirable species.

The use of equipment on the sandy loam is restricted to a moderate degree. Tree roots may be damaged in wet seasons because of the shallow surface layer and the moderately plastic subsoil. This restriction is seasonal and is for less than 3 months during the year. In the silt loam and silty clay loams, the root zone is shallow and in places the subsoil is exposed. The use of equipment on these soils may seriously damage tree roots and affect the structure and stability of the soils. In some places shallow gullies or steep slopes interfere somewhat with the use of equipment.

The mortality of seedlings on these soils is influenced by the shallow root zone, steep slopes, and many shallow gullies. In severely eroded areas, the mortality exceeds 50 percent of the planted stock. Replanting, special seedbed preparation, or other prescription planting techniques are needed to secure adequate stands. Where the soils are more gently sloping and erosion is not severe, seedling mortality generally will be between 25 and 50 percent of the planted stock. Some replanting is necessary to fill openings. Natural regeneration cannot be relied on to restock the stands.

The shallow solum restricts the development of a root system adequate for stability. Exposed trees are subject to windthrow in periods of highest normal wind velocity.

Erosion is a serious hazard on these soils. Further erosion may necessitate extensive site treatment.

These soils are best suited to loblolly pine, slash pine, longleaf pine, and Virginia pine. They are low in production potential. If further eroded, they will be suited only to short rotations of trees suitable for pulpwood. Continued erosion may make them unsuited to the production of commercial timber.

Woodland suitability group 15

Shallow, well-drained soils that have a low water-holding capacity

The soils in this group either have a weakly developed, friable to very firm subsoil or no subsoil. In places the surface layer is directly over bedrock. The slope ranges from 2 to 30 percent. These soils are—

Goldston silt loam, 2 to 6 percent slopes.
Goldston silt loam, 6 to 10 percent slopes.
Goldston silt loam, 10 to 15 percent slopes.
Goldston silt loam, 15 to 30 percent slopes.
Wilkes sandy loam, 2 to 10 percent slopes.
Wilkes sandy loam, 10 to 15 percent slopes.
Wilkes sandy loam, 15 to 30 percent slopes.

Permeability is slow, infiltration is moderate to slow, and the water-holding capacity is low to very low. The organic-matter content is low to very low, and fertility is low.

These soils are droughty, and many species compete severely with pine. Applying chemicals, girdling, planting, or other intensive treatment is needed to control competing vegetation.

The shallow surface layer and plastic subsoil limit the use of equipment on these soils. The operation of equip-

ment, particularly in wet weather, may seriously damage tree roots and break down the soil structure. On the stronger slopes, the use of certain types of equipment is restricted and there is an erosion hazard. On slopes of less than 10 percent, the use of equipment is restricted only in wet weather and the erosion hazard is moderate.

Because of the low water-holding capacity of these soils, the mortality of seedlings on slopes of less than 10 percent is from 25 to 50 percent of the planted stock, even in years of normal rainfall. On slopes of more than 10 percent, seedling mortality may exceed 50 percent of the planted stock, and intensive treatment is needed to adequately restock desirable species. Natural regeneration cannot be relied on.

Root development is restricted by the fine-textured subsoil and poor drainage. Trees are subject to windthrow during winds of highest normal velocity.

Loblolly pine is the preferred species for these soils. Slash pine, longleaf pine, shortleaf pine, and Virginia pine are also suitable. These soils are not suited to hardwoods of commercial value.

Woodland suitability group 16

Miscellaneous land types

The miscellaneous land types in this group vary widely in characteristics. These land types are—

Gullied land, firm materials.
Gullied land, friable materials.
Local alluvial land.
Mixed alluvial land.
Mixed wet alluvial land.
Sloping sandy land.

Gullied land consists of small areas in which moderately deep gullies are separated by areas that have a surface layer of varying thickness. The slope ranges from 4 to 25 percent. Permeability is variable, infiltration is variable, and the water-holding capacity is low. The organic-matter content is low, and fertility is low.

Where erosion is active, plant competition is slight. Where the soil is stabilized, competition for the limited moisture supply is very severe. The use of equipment is restricted. Seedling mortality is more than 50 percent. Mulching and other intensive site treatment is needed to establish adequate stands. The hazard of erosion is severe, and a ground cover should be established as quickly as possible. If possible the ground cover should not be disturbed.

Trees can be grown in the areas between the gullies, but the production potential is low. Generally, these areas are not suited to the production of sawtimber.

Local alluvial land has favorable moisture conditions. This land is deep and is moderately well drained to well drained. Infiltration is moderately rapid to rapid, the water-holding capacity is moderate, the organic-matter content is medium to high, and fertility is medium to high. For hardwoods, plant competition is slight. For pine, competition from hardwoods and ground cover is severe and intensive site treatment is needed to establish well-stocked stands.

There are no special restrictions on the use of equipment. Seedling mortality is slight if plant competition, seed supply, fire, or other factors do not affect regeneration. There is no special windthrow hazard. Because the topography is level to nearly level, the erosion hazard is slight.

Mixed alluvial land consists of deep soils that vary in drainage, permeability, infiltration, water-holding capacity, organic-matter content, and fertility. Plant competition is slight to severe, depending on the choice of species. The use of equipment is severely limited on wet sites that need controlled drainage or other intensive site treatment. The mortality of seedlings varies from slight to severe, according to the species planted and the surface drainage of the sites. These sites are subject to overflow. The windthrow hazard is slight to severe in the wet areas. There is no special erosion problem, because the topography is level to nearly level.

Sloping sandy land has slopes of 10 to 25 percent. Its characteristics and ratings vary but are somewhat like those of the soils in group 13.

Management of Woodland

In woodland management, as in any kind of management, there are alternative courses of action. In timber management, decisions must be made first on how the forest will respond to different treatments. This is the silvicultural part of management. Next, decisions must be made on how to utilize labor and equipment. This is the engineering part of management. For reliable judgment, data on both aspects of management are needed, and these data must be translated into economic terms *(6)*. This evaluation of alternatives on the basis of cost and revenue is the economic aspect.

In this subsection are some suggestions for the protection of woodlands, for the selection of species of trees best suited to woodland sites, and for the treatment needed for improvement of sites.

Woodland protection

If high yields are to be obtained from woodlands, trees should be protected from fire, insects, and disease; grazing should be limited; and erosion controlled.

Protection from fire.—Fire destroys the litter that helps to maintain the fertility of the soil. The rapid decomposition of hardwood litter releases large amounts of plant nutrients to the surface layer. If this litter is destroyed, fertility is lessened and the danger of subsequent erosion is serious. Nitrogen in the soils can be depleted by repeated fires or by removal of wood, twigs, and leaves *(18)*.

The development of a fire-protection system is influenced to a large extent by natural barriers and physiographic features. The spacing and location of firebreaks depend on the location of roads, sloughs, swamps, and drainageways and on slope and erosion. The ease or difficulty of operating equipment on these soils influences the type of firefighting equipment selected.

Protection from overgrazing.—Overgrazing is injurious to any kind of forest. If the soil is trampled and packed, rain runs off quickly and tree roots are deprived of water and air. If the soil is trampled when wet, it becomes hard when dry. Heavy grazing destroys soil structure and eventually lowers the quality of the site. Damage is most likely to occur on the finer textured soils and on soils that have a plastic subsoil or that are eroded.

If properly managed, pine woodlands can be grazed without serious damage. Kaufman *(12)* states that in the Piedmont uplands, primarily suited to pine, grazing need not interfere with forest production. In these areas, any reduction in hardwoods is beneficial. Continuous heavy grazing, however, should be avoided.

Water erosion and wind erosion.—Loss of soil by erosion reduces productivity and lowers site quality.

In eroded areas any disturbance of the surface layer may encourage further erosion. Where erosion is a serious problem, litter should be disturbed as little as possible, even during logging operations. Roads and skid trails should be constructed across, instead of up and down, the steeper slopes *(26)*. Brush and limbs thrown on slopes help to stabilize the soil. Soils that are severely eroded should not be grazed *(8)*.

Light erosion may be favorable for the reproduction of pine because it encourages absence of competing vegetation. Even severe erosion may injure only seedlings. Where the subsoil is exposed, natural regeneration may not be adequate *(3)*.

Wind erosion is a serious hazard on some of the coarse-textured soils on the middle and upper parts of the Coastal Plain. To prevent it, windbreaks of native pine should have an understory of redcedar, laurelcherry, ligustrum, or other species suited to these soils. In places it is advisable to establish a ground cover before pine seedlings are planted. Soils dried by sun and wind in areas where there has been heavy cutting may be susceptible to wind erosion. A border of low trees or shrubs around the outer edge of the forest helps to reduce wind velocity *(26)*.

Diseases and insects.—Damage to trees by diseases and insects is more severe in areas where the soils are not favorable for tree growth.

Littleleaf is a disease affecting primarily shortleaf pine and, to a lesser extent, loblolly pine. Campbell and Copeland *(4)* report that extensive investigations indicate that littleleaf results from a nitrogen deficiency and is associated with the dying of new root tips and fine roots. A parasitic root fungus (*Phytophthora cinnamomi*) probably is primarily responsible, but soil factors, including poor aeration, low fertility, and adverse moisture conditions, also cause damage to the fine roots. Littleleaf seldom affects trees on well-drained soils, particularly if the surface layer is fairly deep. Shortleaf pine growing on soils derived from Carolina slate is much less likely to be damaged by this disease than are trees growing on finer textured soils, such as those derived from basic igneous rock. Poorly drained, severely eroded, or shallow soils and soils that are variable in porosity, permeability, compactness, or plasticity and normally low in fertility may be regarded as potential littleleaf sites. Management plans for these sites should be modified accordingly.

Cooper [3] indicates that littleleaf disease is largely confined to certain soil series and suggests that a toxic condition, or an imbalance of ions, such as iron and manganese, rather than a specific organism is the primary cause of littleleaf disease in shortleaf pine. Soils derived from a mixture of acidic and basic rock may not be favorable for maintaining pure cultures of pine for long periods. An understory of selected hardwoods in the pine stand may be desirable because the high calcium content of the leaf litter tends to reduce the acidity caused by the pine litter. Hardwood trees in the forest cover may prevent or significantly delay littleleaf disease on some soils.

Spot die-out is a relatively new disease of young loblolly pine. The cause has not been determined. Mortality appears greatest in trees on very poorly drained soils that have little or no surface soil *(15)*.

Dieback of sweetgum may be related to soil conditions. Reports indicate there is evidence that insufficient soil moisture is one of the prime causes for the recent decline of sweetgum stands.

Soil conditions also may be important factors in root rot (*Fomes annosus*). Until recently this disease has not been serious in the southeast, except as a killer of redcedar. Windthrow or the outright killing of slash pine by root rot in Georgia and South Carolina is now causing concern *(22)*. Shipman *(27)* reports that some stands of planted slash pine in the Sand Hills, especially those on the finer textured soils, are infected by root-rot fungus.

Longleaf pine seedlings are highly susceptible to brown-spot needle blight (*Scirrhia acicola*). This disease also affects slash pine and may cause needle browning on loblolly pine.

Eastern gall rust (*Cronartium cerebrum*) attacks many hard pines, particularly Virginia pine, spruce pine, pitch pine, and shortleaf pine, and it is common in the State *(7)*.

Slash pine and loblolly pine are highly susceptible to fusiform gall rust (*C. fusiforme*). Longleaf pine is resistant, and shortleaf pine is nearly immune.

Pitch canker (*Fusarium lateritium f. pini*) attacks principally Virginia, slash, and longleaf pines *(7)*.

Cankers also affect hardwoods. Hispidus canker (*Polyporus hispidus*) attacks many species of oak but is most common on southern red, northern red, scarlet, white, and chestnut oaks. Hypoxylon canker (*Hypoxylon atropunctatum*) affects mostly old oaks or trees that have been damaged by prolonged drought *(7)*.

Seedlings on very sandy soils, particularly on soils previously used for agricultural crops, may become infested with nematodes. Knots form on roots, and the growth of trees is checked. The mortality rate is high *(30)*.

Injury by the Nantucket pine moth, or tip moth, (*Rhyacionia frustrana*) is greatest on loblolly pine and shortleaf pine growing in abandoned fields, particularly if the soils are not well suited to these species *(30)*. Slash pine is less susceptible to attack and has been planted successfully on coarser textured soils on the middle and upper parts of the Coastal Plain.

Pine that has been weakened by fire, drought, overmaturity, lightning, wind, or generally poor growing conditions is particularly susceptible to injury by the pine engraver beetle (*Ips* spp.), the black turpentine beetle (*Dendroctonus terebrans*), and the southern pine beetle (*D. frontalis*) *(7)*.

The larvae of the pine sawfly (*Neodiprion* spp.) feed on needles and sometimes on the tender bark of twigs of young pine, often causing severe defoliation *(7)*.

[3] COOPER, H. P. THE PROBLEM OF LITTLELEAF ON SHORTLEAF PINE TREES. Newsletter 13,195, 1958. Clemson Agricultural College.

Adaptability of species

Conifers generally will grow where hardwoods will not. It is difficult to grow high-quality hardwoods on a poor site. Hardwoods grow well in loose, crumbly soils that have a deep root zone. They need large amounts of water and grow best in soils that absorb water readily (*26*).

Virginia pine is suitable for barren sites; loblolly pine, shortleaf pine, and redcedar for poor to moderate sites; and yellow-poplar and black walnut for the best sites. Longleaf pine may be planted on dry sands or on sandy loams; loblolly pine on most soils that are at lower elevations; and shortleaf pine on most soils that are not too wet. Various hardwoods, including walnut, are often interplanted in the small forest but need good farm soils (*26*).

Loblolly pine grows best on the better and wetter sites, particularly on the edges of swampy areas. Shortleaf pine can grow where the terrain is steep and the soil shallow, or on mountains. In these areas the stands generally are pure because loblolly pine cannot thrive under such harsh conditions. Shortleaf pine will grow on tight, wet soils. Loblolly pine also does well on these soils. Neither species grows well on badly eroded sites, but their value in preventing erosion is great (*10*).

Loblolly pine is better for areas where littleleaf disease is prevalent because it is far more resistant to this disease than shortleaf pine (*10*).

Slash pine grows best along edges of depressions and on better drained lowlands. It also grows well on the sandy loams on the middle and upper parts of the Coastal Plain. Slash pine generally does not grow on very dry, deep sands where scrub oak is dominant (*23*).

Site improvement

Soil rehabilitation.—The most feasible way to rehabilitate forest soils is to favor soil-building species in the forest stands. Some species, including dogwood, hickory, yellow-poplar, redbud, and redcedar, return large quantities of plant nutrients to the soil in the leaf litter.

Metz (*17*) reports the quantity of the various elements returned to the forest floor annually in leaf material under stands of pure pine, pine-hardwood, and hardwood. In the Piedmont the annual litter fall, by weight, from each of these stands is approximately the same—from 4,000 to 5,000 pounds per acre, oven-dry weight. Analyses of freshly fallen leaf material show that the litter from the hardwoods common in this region contains about twice as much nitrogen as that from shortleaf pine, and that the calcium content in the hardwood litter is from 2 to 3 percent, as compared to only 0.59 percent in the pine litter. Pine returns the smallest amounts of nitrogen, calcium, and magnesium to the soil. A mixed stand of pine-hardwoods returns approximately twice as much of all three elements as a pure pine stand, and a hardwood stand returns about twice as much nitrogen and almost four times as much calcium and magnesium as a pine stand. In any program of soil improvement, these major differences in amounts of plant nutrients returned to the soil cannot be ignored.

There are other benefits from an increase in hardwood vegetation. The nitrification rate increases, and the bacterial count increases. Acidity decreases. Plant nutrients become more readily available. The number of soil animals tends to increase. Ammoniacal nitrogen is utilized. The structure of the soil is improved through the incorporation of organic matter and the formation of a mull-type humus. Such improvements would help restore the forest soils of the Piedmont to nearer their original productivity level (*4*).

Controlled drainage.—Seedlings cannot survive if they are submerged and scalded during hot weather. This may happen if drainage is poor. A good drainage system keeps water moving so that seedlings are not damaged. Water-control gates permit the discharge of excess surface water and help retain the water level needed for tree growth. Areas that have been drained show a marked improvement in the reseeding, germination, and growth of certain species of pine. Other benefits include improved logging conditions and better access to sites.

Graham and Rebuck (*9*) report that the growth of pond pine on a better drained site was nearly double that of pond pine on a poorly drained site.

Not all wet forest soils need drainage. On bottom lands, a good hardwood-cypress forest that contains large sawtimber and veneer logs of gum, ash, cottonwood, and cypress probably will yield greater returns than slash pine on a similar site that is drained (*20*).

Water impoundment.—Shallow water impoundments have been built in recent years to attract migrating waterfowl. These impoundments are created by constructing low dikes and dams in flats or sloughs. The impoundment of water increases the amount of moisture absorbed by the soils. This extra moisture is especially beneficial to trees during dry periods in summer, but the water should be drained promptly each spring to prevent damage to trees (*2*).

Woodland Production and Yields

Height growth is primarily a function of both site and age. Rate of growth is a function of both site and spacing. Cutting cycles can be determined with considerable accuracy for each site index. Mitchell (*19*) found that the length of the cutting cycle for all four southern pines is about the same for a given site index.

Forest stands have not been managed long enough to determine the total amount of wood that can be grown and harvested per acre in managed stands. If variation in soil quality is considered, it would seem that reasonably well stocked stands, if carefully managed, should produce 400 to 500 board feet of sawtimber or 1 to 1½ cords of pulpwood an acre a year. Under favorable conditions this rate of growth often has been exceeded (*10*).

Two cords or more per acre are possible on the best sites if the timber is harvested at 25 to 30 year intervals. Average stands growing on relatively good forest land usually yield about 1 cord per acre per year. On hardpan soils or deep sands, only 0.5 cord per acre per year can be produced under good management (*23*).

Table 5, based on published research (*29*), shows how site index ratings can be converted readily into cords or into cubic or board foot measure. This table can be used as a guide until information on managed stands is available.

597228—62——6

TABLE 5.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*

[Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50(*29*)]

LOBLOLLY PINE

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Year	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
60	20	1,500	12	----------	32	3.6	121	1,600
	30	2,750	25	1,250	45	5.4	138	850
	40	3,700	35	4,500	54	6.8	147	585
	50	4,300	41	8,550	60	7.9	152	440
	60	4,700	46	12,250	64	8.9	156	360
	70	5,000	49	15,250	67	9.7	158	310
	80	5,200	51	17,550	69	10.4	160	275
70	20	1,900	17	100	38	4.3	125	1,185
	30	3,350	31	3,500	52	6.5	143	640
	40	4,500	42	9,400	63	8.1	151	435
	50	5,200	50	15,200	70	9.4	157	325
	60	5,700	55	19,600	75	10.6	160	270
	70	6,000	59	22,550	78	11.5	163	230
	80	6,200	62	24,600	80	12.3	165	205
80	20	2,350	22	700	43	5.0	129	950
	30	4,000	38	6,500	59	7.4	147	510
	40	5,300	51	14,800	72	9.2	156	345
	50	6,150	60	21,700	80	10.7	162	255
	60	6,650	66	26,400	85	12.0	165	210
	70	7,000	70	29,500	89	13.1	168	185
	80	7,300	73	31,550	92	14.0	170	160
90	20	2,850	27	1,000	48	5.6	133	790
	30	4,700	46	10,700	67	8.2	152	420
	40	6,200	61	20,550	81	10.2	162	290
	50	7,200	71	28,250	90	12.0	167	220
	60	7,800	78	33,100	96	13.4	171	180
	70	8,200	82	36,600	100	14.6	174	150
	80	8,550	85	39,100	103	15.6	176	135
100	20	3,300	32	2,750	54	6.1	138	690
	30	5,400	53	14,800	74	9.0	158	375
	40	7,150	71	26,700	90	11.2	168	255
	50	8,400	84	35,050	100	13.1	174	190
	60	9,150	92	41,000	107	14.6	178	155
	70	9,600	96	44,750	112	15.9	181	135
	80	9,950	100	47,400	115	17.1	182	115
110	20	3,850	37	4,300	59	6.6	145	615
	30	6,200	62	19,200	81	9.7	166	335
	40	8,200	82	32,800	99	12.1	176	225
	50	9,650	96	42,500	110	14.1	182	170
	60	10,500	106	49,200	118	15.9	186	140
	70	11,150	112	53,100	122	17.3	189	120
	80	11,500	116	55,900	126	18.4	191	105
120	20	4,400	42	6,500	64	7.1	152	560
	30	7,150	70	24,350	89	10.4	174	305
	40	9,400	93	39,600	108	13.0	185	205
	50	11,000	110	50,100	120	15.1	192	155
	60	12,050	121	57,250	128	17.0	196	125
	70	12,700	128	62,000	133	18.5	199	105
	80	13,150	134	65,000	137	19.7	201	95

LONGLEAF PINE

50	20	500	4	----------	26	2.8	64	1,410
	30	1,150	11	200	37	4.1	78	900
	40	1,700	17	900	45	5.1	88	625
	50	2,150	21	2,100	50	5.9	95	505
	60	2,550	25	3,700	55	6.6	100	430
	70	2,850	28	5,400	58	7.2	104	375
	80	3,150	31	7,250	61	7.8	106	335

TABLE 5.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*—Continued

LONGLEAF PINE—Continued

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Year	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
60	20	1,000	8	50	31	3.3	79	1,290
	30	1,900	19	900	44	4.9	97	815
	40	2,750	27	2,800	53	6.0	108	575
	50	3,450	34	5,900	60	7.0	118	465
	60	4,000	40	9,300	65	7.8	124	395
	70	4,500	45	12,350	70	8.5	128	345
	80	4,900	49	15,000	73	9.1	131	305
70	20	1,500	14	200	36	3.8	92	1,150
	30	2,700	28	2,000	52	5.5	113	730
	40	3,800	39	6,100	62	6.8	127	515
	50	4,750	48	11,400	70	7.9	138	415
	60	5,600	55	16,400	77	8.8	145	355
	70	6,200	62	20,400	82	9.6	150	305
	80	6,800	67	23,700	86	10.3	153	270
80	20	2,050	20	550	41	4.3	102	1,050
	30	3,500	36	3,800	59	6.1	124	655
	40	4,900	49	10,800	71	7.6	140	465
	50	6,000	61	17,600	80	8.8	152	375
	60	7,000	70	23,500	87	9.8	160	315
	70	7,850	78	28,300	93	10.6	166	270
	80	8,550	85	32,100	98	11.5	169	240
90	20	2,550	26	1,000	46	4.7	109	910
	30	4,250	43	6,500	66	6.7	134	575
	40	5,800	59	15,800	80	8.3	150	405
	50	7,150	72	24,100	90	9.6	162	330
	60	8,350	84	31,000	98	10.7	170	275
	70	9,400	94	36,200	105	11.6	176	240
	80	10,250	103	40,600	110	12.5	180	210
100	20	2,950	30	1,700	52	5.2	114	790
	30	4,900	49	10,150	74	7.4	140	500
	40	6,600	66	20,200	89	9.0	158	355
	50	8,200	82	29,550	100	10.5	170	285
	60	9,500	96	37,400	109	11.7	179	240
	70	10,700	108	43,000	110	12.7	185	205
	80	11,600	118	48,100	123	13.7	189	185
110	20	3,250	34	2,550	57	5.6	118	690
	30	5,350	54	13,000	81	7.9	144	445
	40	7,200	73	24,440	98	9.8	162	315
	50	8,950	90	34,200	110	11.4	176	250
	60	10,500	106	42,100	120	12.7	185	210
	70	11,700	119	48,600	128	13.8	192	180
	80	12,700	130	54,000	135	14.9	196	160

SHORTLEAF PINE

50	20	----------	----------	----------	25	2.5	139	3,425
	30	2,040	23	50	35	3.9	158	1,855
	40	2,980	33	1,450	44	5.1	162	1,085
	50	3,970	43	4,400	50	6.1	162	760
	60	4,430	48	8,150	55	6.9	162	590
	70	4,780	51	11,600	59	7.6	162	485
	80	5,050	53	14,400	62	8.3	162	420
60	20	1,060	12	----------	30	2.9	142	2,520
	30	2,880	32	750	42	4.6	162	1,370
	40	4,200	46	4,400	52	6.0	166	815
	50	5,080	54	10,600	60	7.2	166	570
	60	5,690	60	15,850	66	8.2	166	445
	70	6,170	65	19,700	71	9.0	166	370
	80	6,520	68	22,600	74	9.8	166	315

TABLE 5.—*Stand and yield information per acre for well-stocked, unmanaged, normally growing loblolly, longleaf, shortleaf, and slash pines*—Continued

SHORTLEAF PINE—Continued

Site index	Age	Total merchantable volume			Total height of average dominant trees	Average diameter at breast height	Basal area at breast height	Trees
	Year	*Cu. ft.*	*Cords*	*Bd. ft. (Scribner)*	*Feet*	*Inches*	*Sq. ft.*	*Number*
70	20	1,600	18		34	3.5	145	1,965
	30	3,720	41	2,400	49	5.4	165	1,060
	40	5,210	56	9,900	61	7.0	169	625
	50	6,250	66	17,850	70	8.3	169	440
	60	7,000	73	23,450	77	9.4	169	345
	70	7,580	79	27,550	82	10.4	169	285
	80	8,020	83	30,700	86	11.2	169	240
80	20	2,190	25	200	39	4.1	147	1,495
	30	4,420	48	5,200	56	6.2	167	815
	40	6,100	65	16,200	70	8.0	171	485
	50	7,380	77	24,900	80	9.5	171	335
	60	8,250	85	30,900	88	10.8	171	260
	70	8,920	92	35,200	94	11.9	171	215
	80	9,460	97	38,550	99	12.9	171	185
90	20	2,660	30	1,100	44	5.0	148	1,080
	30	5,050	54	11,200	63	7.3	169	590
	40	7,000	73	23,400	78	9.4	173	345
	50	8,450	87	32,400	90	11.2	173	245
	60	9,500	98	38,700	99	12.8	173	185
	70	10,280	105	43,000	106	14.1	173	160
	80	10,910	112	46,500	111	15.3	173	140
100	20	3,040	33	3,200	49	6.0	149	740
	30	5,720	60	17,700	70	8.8	170	405
	40	7,940	82	30,600	87	11.3	174	235
	50	9,650	89	40,000	100	13.5	174	170
	60	10,860	111	46,400	110	15.3	174	130
	70	11,780	121	50,900	117	17.0	174	110
	80	12,500	128	54,400	123	18.5	174	90
				SLASH PINE				
60	20	1,850	20		36	3.5	143	2,035
	30	3,150	32	1,050	48	5.0	152	1,140
	40	4,050	40	4,100	55	6.3	155	710
	50	4,750	45	7,500	60	7.2	157	550
	60	4,900	48	10,500	64	7.9	158	470
70	20	2,750	28		42	4.2	146	1,445
	30	4,000	40	3,500	56	6.0	156	820
	40	4,850	49	9,300	64	7.5	159	500
	50	5,850	55	14,250	70	8.6	161	390
	60	6,050	59	17,400	74	9.4	162	335
80	20	3,400	35	900	48	4.9	148	1,090
	30	4,850	48	7,300	63	7.0	158	610
	40	5,850	58	15,150	73	8.7	161	380
	50	6,900	65	20,350	80	10.0	163	295
	60	7,150	69	23,600	85	10.8	164	250
90	20	4,050	41	2,750	54	5.6	149	835
	30	5,550	54	12,300	71	8.0	159	470
	40	6,650	66	20,600	83	10.0	163	295
	50	7,850	73	25,900	90	11.4	165	220
	60	8,100	78	29,600	95	12.5	166	195
100	20	4,600	46	5,050	61	6.4	150	625
	30	6,100	59	16,850	79	9.1	160	365
	40	7,350	72	25,450	92	11.4	164	225
	50	8,700	81	31,250	100	13.1	166	175
	60	8,950	86	35,400	106	14.2	167	150

Wildlife [4]

Before the soils of Saluda County were cultivated, the forests and streams afforded favorable habitats for wildlife and fish. By the early part of the twentieth century, much of the county was being used for agriculture and most wildlife had become extinct. Some streams had become polluted and were unfit for fish. The present trend toward reforestation has resulted in an increase in the wildlife population.

Until about 1935, specific practices to benefit wildlife were not generally known. Wildlife production was mostly the byproduct of farming and woodland operations. Now, land and water management techniques for almost every species of wildlife are available.

Clover and grasses planted on suitable soils are a source of food for deer and wild turkeys. Multiflora rose hedges, which are favorable habitats for cottontail rabbits, can be grown on soils suited to perennials.

Some bottom lands can be used as feeding areas for waterfowl. Dikes or low levees need to be constructed around these areas, and browntop millet or other annual crops planted. The areas should be shallowly flooded in fall and winter to produce feeding grounds for wild ducks.

Bicolor lespedeza planted in strips about 15 feet wide and 350 feet long on the border of a field or in an opening in the woods will provide food for quail.

The county is well supplied with sites suitable for farm ponds, and more than 1,020 ponds have been built. Most ponds are stocked with fish.

Stocking ponds with fish provides a source of food, recreation, and income. For the stocking to be satisfactory, it is necessary to (1) use soil conservation practices on watersheds to prevent silting and mudding, (2) divert excess runoff water around ponds that are constructed in large watershed areas, (3) clear trees and brush from the basins of ponds, (4) remove all wild fish by applying rotenone prior to stocking with hatchery fish, (5) stock with 1,000 bluegill and 100 bass fingerlings per surface acre of water, and (6) regularly apply mineral fertilizer (4-4-1 ratio) from March to October to increase the growth of plankton. Plankton shades out submerged pondweeds and increases the food supply for fish.

The suitability of the soils in Saluda County as a source of food or as habitats for wildlife can be considered on the basis of land capability classes and subclasses.

The soils in class I are well suited to the production of any kind of wildlife food.

The soils in subclass IIe are also well suited to the production of wildlife food (fig. 11). Most of these soils are in crops or pasture, but field borders and odd areas can be used for seeding. Openings in woods may be used for the planting of bicolor lespedeza. Suitable sites for ponds occur in many places.

The soils in subclass IIw are suited to the development of areas attractive to ducks. Shooting privileges may be sold as a source of farm income. These soils are suitable grazing areas for deer or will provide food for wild turkeys. Annual plants are better suited than perennials.

Figure 11.—**Field border of bicolor lespedeza on Alamance silt loam, 2 to 6 percent slopes, used for wildlife food.**

Bicolor lespedeza is not suited to many areas, because of the flood hazard. Oaks in forested areas are a natural source of food for wild ducks.

The soils in subclass IIs are suitable for bicolor lespedeza but need frequent applications of fertilizer. Bicolor lespedeza is difficult to establish from seed. Only a few sites are suitable for ponds.

The soils of subclass IIIe are fairly productive of annual plants for wildlife food. Perennials help to control erosion on field borders. The Goldston soils are not suitable for ponds, because they are shallow to bedrock. The other soils have many sites suitable for ponds. Farm ponds will become silty and muddy if cultivated fields are not carefully managed.

The soils of subclass IIIw, if drained, are productive of annuals for wildlife food. They are not suited to perennials, such as bicolor lespedeza. Sites suitable for ducks occur on the Chewacla soils. Other sites are also suitable but need drainage outlets and an available water supply for fall and winter flooding.

The soils of subclass IIIs are not well suited to wildlife plantings. It is difficult to establish perennials on these soils. Bicolor lespedeza needs regular applications of fertilizer.

The soils in subclass IVe are mostly in pine forest. The Goldston, Orange, and Wilkes soils are not suited to perennials but are suited to annuals; they are shallow and are not suitable for farm ponds. Wildlife food plantings help to control erosion.

The soils in subclass IVw are not suited to duck fields because of slope. Much of the area is used for farm ponds.

[4] WILLIAM W. NEELY, biologist, Soil Conservation Service, Walterboro, South Carolina, prepared this section.

The soils in subclass Vw are too wet for quail, but some areas are suitable for duck fields. Hardwoods furnish food and habitats for squirrels, raccoons, and opossums.

The soils in subclass VIe are suited to about the same uses as those in subclass IVe.

The soils in subclass VIIe have a low potential for the production of wildlife food. Perennials can be grown but are difficult to establish and maintain. In places, gullies contribute much silt to farm ponds.

Engineering Properties of the Soils [5]

This report contains information that can be used by engineers to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make estimates of the engineering properties of the soil to aid in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway, airport, and pipeline locations and in planning detailed investigations of the selected locations.
4. Locate probable sources of sand and gravel for use in construction.
5. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
6. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining the structures.
7. Supplement information obtained from other published maps and reports and aerial photographs for the purpose of making soil maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

This report will not eliminate the need for sampling and testing at the site of specific engineering works. It should be used primarily in planning more detailed field investigations to determine the in-place condition of the

[5] This section by HOWARD E. MORRISON, area engineer, Soil Conservation Service, Orangeburg, South Carolina.

TABLE 6.—*Engineering*

[Tests performed by the Bureau of Public Roads in accordance with standard

Soil name and location	Parent material	Bureau of Public Roads report no.	Depth	Horizon	Moisture-density [1]		Mechanical analysis [2]			
					Maximum dry density	Optimum moisture	Percentage passing sieve—			
							3-in.	2-in.	1½-in.	1-in.
			Inches		*lb. per cu. ft.*	*Percent*				
Alamance silt loam:										
2 miles NW. of Saluda on State Highway No. 39.	Carolina slate	S33971	0–10	A	108	15				
		S33972	10–38	B	109	19				
		S33973	38–56	C	104	20				
		S33974	56–74	D_r	110	17	100	86	84	80
Efland silt loam:										
6 miles E. of Saluda on U.S. Highway No. 378.	Carolina slate	S33975	0–8	A	117	13				
		S33976	8–38	B	94	26				
		S33977	38–44	C	124	13				
		S33978	44–62	D_r	127	13	100	90	80	56
Georgeville silt loam:										
1.5 miles NW. of crossroads of U.S. Highway No. 378 and State Highway No. 21.	Carolina slate	S33979	0–9	A	105	18				
		S33980	9–38	B	100	23				
		S33981	38–78	C	100	23				
Herndon silt loam:										
0.25 mile S. of Colemans Crossroads on State Highway No. 19.	Carolina slate	S33982	0–9	A	105	15				
		S33983	9–37	B	109	19				
		S33984	37–73	C	98	24				
Orange silt loam:										
1 mile NW. of crossroads of U.S. Highway No. 378 and State Highway No. 21.	Mixed basic rock and Carolina slate.	S33985	0–9	A	108	18				
		S33986	9–29	B	101	22				
		S33987	29–52	C	105	19				
		S33988	52–78	D_r	107	17				
Tirzah silt loam:										
0.25 mile S. of Five Point Crossroads.	Metamorphic rock and some quartz dikes.	S33989	0–8	A	102	19				
		S33990	8–43	B	110	17				
		S33991	43–76+	C	100	24				

[1] Moisture-density according to AASHO Designation: T 99–57. Method A used when sample contained no particles retained on No. 4 sieve. Method C used for other samples.

[2] Mechanical analyses according to the AASHO Designation: T 88–54. Results from this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2

soil at the proposed construction site. The depth of sampling must be considered a limiting factor by the engineer. Excavations generally extend to much greater depths.

Some of the terms used by the agricultural soil scientist may be unfamiliar to the engineer. Some of those words —for example, soil, sand, silt, topsoil, and parent material—are defined in the Glossary.

To make the best use of the soil map and the soil survey report, the engineer should know the physical properties of the soil materials and the in-place condition of the soil. After testing the soil materials and observing the behavior of each soil when used in engineering structures and foundations, the engineer can develop recommendations for each soil unit designated on the map.

Engineering Classification of Soils

Most highway engineers classify soil materials in accordance with the AASHO method (*1*). In this system there are seven principal groups. They range from A-1, which consists of gravelly soils of high bearing capacity, to A-7, which consists of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses.

Some engineers prefer the Unified soil classification system (*24*, *31*). In this system, soil materials are identified as coarse-grained (8 classes), fine-grained (6 classes), or highly organic.

The classification of a soil material by either the AASHO or the Unified system identifies that soil material with regard to gradation and plasticity characteristics. The classification permits the engineer to make a rapid appraisal of this soil material through association with more familiar soils that have the same classification.

Engineering Test Data

Soil samples of the principal types of each of six extensive series were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The test data are given in table 6. Because the samples tested were generally obtained from depths of less than 6 feet, they do not represent materials that are encountered in earthwork at a greater depth.

The engineering soil classifications in table 6 are based

test data

procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [2]—Continued											Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued							Percentage smaller than—							
¾-in.	⅜-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [3]	Unified [4]
------	100	96	92	84	82	75	70	37	11	8	[5]	[5]	A–4(8)	ML.
100	99	96	96	95	92	88	84	60	36	32	44	20	A–7–6(13)	CL.
100	99	96	96	92	91	88	85	67	44	36	55	31	A–7–6(19)	CH.
78	71	66	57	51	50	46	43	32	16	10	42	16	A–7–6(4)	GM–GC.
------	100	90	77	59	56	50	45	27	9	7	23	3	A–4(3)	SM.
------	------	------	100	96	95	90	87	76	64	58	80	50	A–7–5(20)	CH.
100	98	94	68	57	51	35	31	20	13	10	30	12	A–2–6(1)	SC.
48	40	37	35	33	30	21	18	11	6	4	27	8	A–2–4(0)	GC.
100	99	96	95	93	92	84	80	54	22	14	26	4	A–4(8)	ML–CL.
------	------	------	100	99	99	96	94	79	52	38	60	29	A–7–5(20)	MH–CH.
------	------	------	100	98	96	92	90	77	45	30	53	20	A–7–5(13)	MH.
100	99	98	97	94	92	85	78	46	13	9	[5]	[5]	A–4(8)	ML.
------	------	------	100	97	96	92	89	66	41	34	44	20	A–7–6(13)	CL.
------	------	------	100	99	98	95	92	76	56	47	66	36	A–7–5(20)	CH.
------	100	99	93	84	82	76	72	52	24	17	36	10	A–4(8)	ML–CL.
------	------	------	100	96	95	92	91	78	53	45	63	33	A–7–5(20)	MH–CH.
------	------	------	100	99	98	96	94	80	47	29	63	33	A–7–5(20)	MH–CH.
------	------	------	100	98	97	93	90	73	37	19	52	22	A–7–5(15)	MH–CH.
------	------	------	100	97	96	90	87	61	33	24	37	10	A–4(8)	ML.
------	------	------	100	99	98	95	91	69	48	41	43	10	A–5(9)	ML.
------	------	------	100	99	99	97	95	81	62	51	65	32	A–7–5(20)	MH–CH.

millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[3] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145–49.

[4] Based on the Unified Soil Classification System, Technical Memorandum No. 3–357, Vol. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[5] Nonplastic.

on data obtained by mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods.

The plastic limit and liquid limit tests measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or plastic, state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the plastic limit and the liquid limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Features Affecting Engineering Work

Table 7 gives the estimated soil characteristics most likely to affect engineering practices. These soil characteristics are evaluated on the basis of estimates, test data shown in table 6, or actual field experience and performance.

TABLE 7.—*Estimated soil*

[J. B. Ramsay, resident engineer, S.C. Highway Dept., Saluda, S.C., assisted in

Soil series	Suitability for—			Suitability as source of—		Features affecting suitability for—
	Winter or wet-season grading	Road subgrade	Road fill	Topsoil	Sand and gravel	Farm ponds: Reservoir area
Alamance	Poor	Poor	Poor	Poor	Not suitable	Slow seepage
Altavista	Poor	Poor	Poor	Poor to fair	Not suitable	Slow seepage
Appling	Fair	Good	Good	Good	Poorly graded sand	Moderate seepage
Bradley	Fair	Good	Good	Good	Poorly graded sand	Moderate seepage
Cecil	Fair	Good	Good	Good	Poorly graded sand	Moderate seepage
Chesterfield	Fair	Good	Good	Good	Poorly graded sand	Moderately slow to moderate seepage.
Chewacla	Poor	Poor	Poor	Poor	Not suitable	Moderate seepage
Colfax	Poor	Poor	Poor	Poor	Poorly graded sand	Moderately rapid seepage
Congaree	Poor	Poor	Poor	Poor	Not suitable	Moderately rapid seepage
Durham	Fair to good.	Good	Good	Good	Poorly graded sand	Moderate seepage
Efland	Poor to fair	Fair	Fair	Fair	Not suitable	Slow seepage
Enon	Poor	Fair	Fair	Fair	Not suitable	Moderate seepage
Faceville	Fair	Good	Good	Good	Poorly graded sand	Slow seepage

The ratings for winter or wet-season earthwork are based on the physical properties of the soils and the depth to the seasonally high water table. Soils with a high content of silt and a high water table are rated poor.

The ratings for road subgrade are based on the classification of the soil material and on environmental characteristics. In flat terrain the ratings apply to the A and B horizons. On steeper slopes they apply primarily to the C horizon. Soils that have a plastic, clayey subsoil, such as Orange silt loam, have poor internal drainage and, when wet, have low stability and, hence, are rated poor. The loamy fine sands are very erodible and are rated poor to fair because of their poor grading qualities and general lack of stability unless properly confined. The coarser textured and better graded soils are rated good.

The suitability of a soil for road fill depends largely on its natural water content and texture. Wet, highly plastic soils are difficult to dry to the desired water content and to compact, hence, they are rated poor. Silty soils, which are difficult to compact unless their moisture content is closely controlled, are similarly rated. Very sandy soils are generally difficult to place and to compact because they do not contain enough binding materials. They are rated poor to fair.

properties that affect engineering

preparing this table. Dashes indicate that information does not apply or is not available]

Features affecting suitability for—Continued				
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Embankment				
Moderate strength and stability; moderately slow permeability.	Shallow surface drainage needed on slopes of 1 percent or less.	Very slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low to moderate strength and stability; moderately slow permeability.	Shallow surface drainage needed on slopes of 1 percent or less.	Moderately slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; moderate permeability.	----------	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; moderate permeability.	----------	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; moderate permeability.	----------	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate strength and stability; moderately slow to moderate permeability.	----------	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low strength and stability; moderate permeability.	Seasonal high water table; moderately slow permeability.	Slow infiltration; medium to high water-holding capacity.	----------	
Moderate strength and stability; slow to moderately slow permeability.	Shallow surface drainage needed on slopes of 1 percent or less.	Rapid infiltration; low water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low strength and stability; moderate to moderately rapid permeability.	----------	Slow to moderate infiltration; high water-holding capacity.	----------	
Moderate strength and stability; moderately slow to moderate permeability.	----------	Rapid infiltration; low water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate strength and stability; slow to moderately slow permeability.	Shallow surface drainage needed on slopes of 1 percent or less.	Slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate strength and stability; slow to moderately slow permeability.	----------	Moderate infiltration; medium water-holding capacity.	Highly erodible.	Highly erodible.
Moderate to high strength and stability; slow to moderately slow permeability.	----------	Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.

TABLE 7.—*Estimated soil*

Soil series	Suitability for—			Suitability as source of—		Features affecting suitability for—
	Winter or wet-season grading	Road subgrade	Road fill	Topsoil	Sand and gravel	Farm ponds: Reservoir area
Georgeville	Fair	Poor	Poor	Poor	Not suitable	Moderate seepage
Gilead	Poor	Poor	Poor	Poor	Poorly graded sand	Slow seepage in subsoil
Goldston	Good	Poor	Poor	Not suitable	Not suitable	Moderate to rapid seepage
Grady	Poor	Poor	Poor	Poor	Not suitable	Slow seepage
Helena	Fair	Good	Good	Good	Poorly graded sand; parent material suitable for gravel.	Slow seepage
Herndon	Fair	Poor to fair	Poor to fair	Poor	Not suitable	Slow seepage
Hiwassee	Fair	Poor	Fair	Poor	Not suitable	Moderate seepage
Lakeland	Good	Poor	Poor	Poor	Suitable for sand	Excessive seepage
Lloyd	Fair	Good	Good	Poor to fair	Not suitable	Moderate seepage
Magnolia	Fair	Fair to good	Fair to good	Good	Not suitable	Moderately slow seepage
Marlboro	Fair	Fair to good	Fair to good	Good	Not suitable	Slow seepage in subsoil
Norfolk	Good	Good	Good	Good	Poorly graded sand	Slow to moderate seepage
Orange	Poor	Poor	Poor	Not suitable	Not suitable	Very slow seepage
Ruston	Good	Good	Good	Good	Poorly graded sand	Slow to moderate seepage
Tirzah	Fair	Fair	Fair	Poor	Not suitable	Moderate seepage
Vaucluse	Good	Poor	Poor	Poor	Poorly graded sand	Slow to high seepage
Wehadkee	Poor	Poor	Poor	Poor	Not suitable	Slow seepage
Wickham	Fair	Fair	Fair	Fair	Not suitable	Moderate seepage
Wilkes	Good	Poor	Poor	Not suitable	Not suitable	Slow to rapid seepage
Worsham	Poor	Poor	Poor	Poor	Not suitable	Slow seepage

properties that affect engineering—Continued

Features affecting suitability for—Continued				
Farm ponds—Continued	Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Embankment				
Moderate strength and stability; moderate permeability.		Slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; slow to moderate permeability.	Hillside seepage and seasonal high water table occur along natural drains.	Moderate infiltration; medium water-holding capacity.	Highly erodible.	Highly erodible.
Low strength and stability; slow permeability.		Slow infiltration; low water-holding capacity.	Highly erodible.	Highly erodible.
Moderate strength and stability; slow permeability.	Seasonal high water table; internal drainage needed.	Moderate infiltration; high water-holding capacity.		
Moderate strength and stability; moderately slow permeability.	Hillside seepage and seasonal high water table along natural drains.	Moderate infiltration; medium water-holding capacity.	Highly erodible.	Highly erodible.
Moderate strength and stability; moderately slow permeability.		Slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low to moderate strength and stability; moderate permeability.		Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low to moderate strength and stability; very rapid permeability.		Rapid to very rapid infiltration; low water-holding capacity.		
Moderate to high strength and stability; moderate permeability.		Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; moderate permeability.		Moderate infiltration; high water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; slow to moderately slow permeability.		Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate to high strength and stability; slow to moderate permeability.		Rapid to very rapid infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Low strength and stability; very slow permeability.	Surface and internal drainage needed.	Slow infiltration; medium water-holding capacity.	Erodible	Erodible.
Moderate to high strength and stability; moderate to rapid permeability.		Rapid infiltration; low water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate strength and stability; moderate permeability.		Slow infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Moderate strength and stability; slow to rapid permeability.	Hillside seepage and seasonal high water table along natural drains.	Moderate infiltration; low to medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Not suitable; slow to moderately slow permeability.	Surface and internal drainage needed.	Slow infiltration; high water-holding capacity.		
Moderate strength and stability; moderate permeability.		Moderate infiltration; medium water-holding capacity.	Erodible where sloping.	Erodible where sloping.
Not suitable; slow to rapid permeability.	Hillside seepage along natural draws.	Moderate infiltration; low water-holding capacity.	Highly erodible	Highly erodible.
Not suitable; slow to moderately slow permeability.	Shallow surface drainage needed.	Moderate infiltration; medium water-holding capacity.	Erodible	Erodible.

Engineering Descriptions and Physical Properties

Table 8 gives, for all but the severely eroded soils and the miscellaneous land types, some of the soil characteristics significant in engineering and the engineering classification of the soil materials in the principal horizons.

Depth to the seasonal high water table is based on field observations. Normally, the water table can be expected to rise to this point during wet seasons.

Dispersion refers to the degree to which and the rate at which the aggregates disintegrate when saturated with

TABLE 8.—*Brief description of soils and*

[Test data are given when available; otherwise an estimated value is

Map symbol	Soil	Depth to seasonally high water table	Brief description of site and soil	Depth from surface (typical profile)	Classification: USDA textural class
		Feet		*Inches*	
AmB	Alamance silt loam, 2 to 6 percent slopes.	3 or more	3 to 14 inches of moderately well drained silt loam, underlain by 24 to 48 inches of moderately well drained silty clay loam; developed in residuum derived from Carolina slate.	0 to 14	Silt loam
AmB2	Alamance silt loam, 2 to 6 percent slopes, eroded.			14 to 38	Silty clay loam
AmC	Alamance silt loam, 6 to 10 percent slopes.				
AmC2	Alamance silt loam, 6 to 10 percent slopes, eroded.				
AnA	Altavista silt loam, 0 to 2 percent slopes.	1 or more	6 to 12 inches of moderately well drained silt loam, underlain by 14 to 32 inches of clay loam to clay; developed from general alluvium.	0 to 6	Silt loam
AnB	Altavista silt loam, 2 to 6 percent slopes.			6 to 32	Clay loam to clay.
ApB	Appling sandy loam, 2 to 6 percent slopes.	2 or more	About 11 inches of well-drained sandy loam, underlain by 20 to 30 inches of well-drained sandy clay loam to clay; developed from granite, gneiss, or schist.	0 to 12	Sandy loam
ApB2	Appling sandy loam, 2 to 6 percent slopes, eroded.			12 to 36	Sandy clay loam to clay.
ApC	Appling sandy loam, 6 to 10 percent slopes.				
ApC2	Appling sandy loam, 6 to 10 percent slopes, eroded.				
ApD	Appling sandy loam, 10 to 20 percent slopes.				
ApD2	Appling sandy loam, 10 to 20 percent slopes, eroded.				
BrB2	Bradley sandy loam, 2 to 6 percent slopes, eroded.	2 or more	About 9 inches of well-drained sandy loam, underlain by 25 to 36 inches of well-drained sandy clay loam to clay; developed from Coastal Plain material underlain by granite, gneiss, schist, or slate.	0 to 8	Sandy loam
BrC2	Bradley sandy loam, 6 to 10 percent slopes, eroded.			8 to 40	Sandy clay loam to clay.
BrD2	Bradley sandy loam, 10 to 20 percent slopes, eroded.				
CdB	Cecil sandy loam, 2 to 6 percent slopes.	3 or more	About 12 inches of well-drained sandy loam, underlain by 24 to 36 inches of well-drained sandy clay loam to clay; developed from granite, gneiss, or schist.	0 to 11	Sandy loam
CdC2	Cecil sandy loam, 6 to 10 percent slopes, eroded.			11 to 38	Sandy clay loam to clay.
CdD2	Cecil sandy loam, 10 to 15 percent slopes, eroded.				
ChB	Chesterfield sandy loam, 2 to 6 percent slopes.	1 or more	About 11 inches of well-drained sandy loam, underlain by 11 to 45 inches of well-drained silty clay loam to clay; developed from Coastal Plain material underlain by granite, gneiss, schist, or slate.	0 to 12	Sandy loam
ChC	Chesterfield sandy loam, 6 to 10 percent slopes.			12 to 28	Silty clay loam to clay.
ChD2	Chesterfield sandy loam, 10 to 15 percent slopes, eroded.				
Ck	Chewacla silt loam	0	About 10 inches of somewhat poorly drained silt loam, underlain by 10 to 30 inches of silt loam to silty clay loam; developed from general alluvium.	0 to 7	Silt loam
				7 to 62	Silt loam to silty clay loam.
CoB	Colfax sandy loam, 2 to 6 percent slopes.	0	About 14 inches of somewhat poorly drained sandy loam, underlain by 14 to 44 inches of poorly drained sandy clay loam to clay; developed from granite.	0 to 14	Sandy loam
				14 to 42	Sandy clay loam to clay.

[1] Nonplastic.

water. This property is estimated on the basis of soil structure and texture.

The shrink-swell potential is an indication of the volume change to be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay.

Permeability is estimated for the uncompacted soil material. The estimates are based on structure and consistence and on field observations. A limited amount of laboratory data is available.

their physical properties

used. Absence of entry indicates that information is not available]

Classification—Continued		Percentage passing—		Selected characteristics significant to engineering					
Unified	AASHO	No. 10 sieve	No. 200 sieve	pH	Dispersion	Shrink-swell potential	Plasticity index	Liquid limit	Permeability
									Inches per hour
ML	A-4 (8)	92	75	5.7 to 6.2	Moderate	Moderate	(1)	(1)	0.2 to 0.8.
CL	A-7-6	96	88	5.3 to 5.8	Moderate	High	20	44	
ML	A-4	100	75 to 85	5.3 to 5.8	Moderate	Moderate			0.2 to 0.8.
ML, CL	A-6	100	75 to 85	4.8 to 5.3	Moderate to slow.	High			
SM	A-2	90 to 100	25 to 35	5.3 to 5.8	Fast	Low	2	18	0.8 to 2.5.
CL	A-7-5	100	60 to 70	5.2 to 5.8	Moderate	Moderate	25	50	
SM, ML	A-4	100	40 to 55	4.7 to 5.2	Fast	Low			2.5 to 5.0.
MH, CH	A-7	100	60 to 70	5.3 to 5.8	Moderate	Moderate			
SM	A-4	100	40 to 50	5.2 to 5.8	Fast	Low			2.5 to 5.0.
MH, CH	A-7	100	60 to 70	5.2 to 5.8	Moderate to slow.	High			
SM	A-2	100	20 to 30	5.2 to 6.2	Fast	Low			0.8 to 2.5.
MH, CH	A-7	100	70 to 80	4.8 to 5.3	Moderate to slow.	Moderate to high.			
ML	A-4	100	90 to 100	5.7 to 6.2	Moderate	Moderate			0.8 to 2.5.
CL	A-7	100	95 to 100	4.8 to 5.5	Slow	High			
SM, ML	A-4	100	40 to 55	4.8 to 5.2	Fast	Low	2	15	0.8 to 2.5.
CL	A-6	100	50 to 60	4.5 to 5.5	Moderate to slow.	High	13	35	

TABLE 8.—*Brief description of soils and*

Map symbol	Soil	Depth to seasonally high water table	Brief description of site and soil	Depth from surface (typical profile)	Classification: USDA textural class
		Feet		*Inches*	
Cn	Congaree fine sandy loam	0	About 27 inches of well-drained silt loam or fine sandy loam, underlain by 27 to 71 inches of loamy fine sand to silty clay loam; developed from general alluvium.	0 to 27	Fine sandy loam and silt loam.
Cs	Congaree silt loam.			27 to 70	Loamy fine sand to silty clay loam.
DuB	Durham sandy loam, 2 to 6 percent slopes.	1 or more	About 16 inches of well-drained sandy loam or loamy sand, underlain by 16 to 40 inches of well-drained sandy clay loam to clay; developed from granite or gneiss.	0 to 14	Sandy loam
DuC	Durham sandy loam, 6 to 10 percent slopes.			14 to 40	Sandy clay loam to clay.
DyB	Durham loamy sand, thick surface, 2 to 6 percent slopes.	1 or more	About 16 inches of well-drained sandy loam or loamy sand, underlain by 16 to 40 inches of well-drained sandy clay loam to clay; developed from residuum derived from granite or gneiss.	0 to 16	Loamy sand
				16 to 38	Sandy clay loam to clay.
EfB	Efland silt loam, 2 to 6 percent slopes.	1 or more	About 8 inches of well-drained silt loam, underlain by 8 to 38 inches of moderately well drained silty clay to clay; developed from residuum derived from basic rock and Carolina slate.	0 to 8	Silt loam
EfC	Efland silt loam, 6 to 10 percent slopes.			8 to 38	Silty clay to clay.
EfD2	Efland silt loam, 10 to 15 percent slopes, eroded.				
EnB	Enon sandy loam, 2 to 6 percent slopes.	1 or more	About 6 inches of well-drained sandy loam, underlain by 6 to 45 inches of moderately well drained clay loam to clay; developed from residuum derived from mixed acidic and basic rock.	0 to 8	Sandy loam
EnC2	Enon sandy loam, 6 to 10 percent slopes, eroded.			8 to 40	Clay loam to clay.
FaA	Faceville sandy loam, 0 to 2 percent slopes.	3 or more	About 10 inches of well-drained sandy loam; underlain by 10 to 40 inches of well-drained sandy clay loam to clay loam; developed from unconsolidated sand and clay.	0 to 10	Sandy loam
FaB	Faceville sandy loam, 2 to 6 percent slopes.			10 to 40	Sandy clay loam to clay.
GeB	Georgeville silt loam, 2 to 6 percent slopes.	3 or more	About 9 inches of well-drained silt loam, underlain by 9 to 38 inches of well-drained silty clay loam to silty clay; developed from residuum derived from Carolina slate.	0 to 9	Silt loam
GeB2	Georgeville silt loam, 2 to 6 percent slopes, eroded.			9 to 38	Silty clay loam to silty clay.
GeC	Georgeville silt loam, 6 to 10 percent slopes.				
GeC2	Georgeville silt loam, 6 to 10 percent slopes, eroded.				
GeD2	Georgeville silt loam, 10 to 15 percent slopes, eroded.				
GeE2	Georgeville silt loam, 15 to 25 percent slopes, eroded.				
GnB	Gilead sandy loam, 2 to 6 percent slopes.	2 or more	About 16 inches of well-drained sandy loam, underlain by 16 to 30 inches of moderately well drained sandy clay loam; developed from unconsolidated beds of sandy clay.	0 to 16	Sandy loam
				16 to 29	Sandy clay loam
GoB	Goldston silt loam, 2 to 6 percent slopes.	3 or more	About 8 inches of well-drained silt loam, underlain by 8 to 12 inches of well-drained silty clay loam; developed from residuum derived from Carolina slate.	0 to 8	Silt loam
GoC	Goldston silt loam, 6 to 10 percent slopes.			8 to 12	Silty clay loam over parent material.
GoD	Goldston silt loam, 10 to 15 percent slopes.				
GoE	Goldston silt loam, 15 to 30 percent slopes.				
Gr	Grady loam	0	About 5 inches of moderately well drained loam; underlain by 5 to 40 inches of poorly drained sandy clay to clay; developed from unconsolidated beds of sand and clay in depressions.	0 to 5	Loam
				5 to 40	Sandy clay to clay.

[1] Nonplastic.

their physical properties—Continued

Classification—Continued		Percentage passing—		Selected characteristics significant to engineering					
Unified	AASHO	No. 10 sieve	No. 200 sieve	pH	Dispersion	Shrink-swell potential	Plasticity index	Liquid limit	Permeability
									Inches per hour
ML	A-4	100	45 to 90	5.8 to 6.2	Fast to moderate.	Moderate to low.			2.5 to 5.0.
SP to ML–CL.	A-2, A-4	100	20 to 90	4.8 to 5.5	Moderate	High			
SM	A-2-4, A-4	100	30 to 40	4.8 to 6.5	Fast	Low	2	12	0.8 to 2.5.
CL	A-6	100	50 to 55	4.2 to 5.2	Moderate	Moderate	18	40	
SM	A-2, A-4	100	20 to 40	5.1 to 6.0	Fast	Low	2	2	10+.
CL	A-6	100	50 to 55	4.2 to 5.2	Moderate to slow.	Moderate to high.	18	40	
SM, ML	A-4	77	50 to 70	5.8 to 6.3	Moderate	Moderate	3	23	0.2 to 0.8.
CH	A-7	100	90	5.8 to 6.3	Slow	High	50	80	
SM	A-2-4, A-4	100	30 to 40	5.2 to 5.7	Fast to moderate.	Low	1	18	0.2 to 0.8.
CH	A-7	100	60 to 70	5.1 to 6.8	Slow	High	53	86	
SM, ML	A-4	100	40 to 55	5.4 to 6.0	Fast	Low	7	25	0.2 to 0.8.
CL	A-6	100	55 to 75	5.1 to 5.7	Moderate to slow.	Moderate	12	30	
ML	A-4(8)	95	84	4.8 to 5.8	Moderate	Moderate	26	4	0.8 to 2.5.
MH	A-7	100	95 to 100	4.5 to 5.5	Moderate to slow.	High	29	60	
SM	A-1-b, A-2-4	100	15 to 25	4.8 to 5.4	Fast	Low	(1)	(1)	0.8 to 2.5.
SC	A-6	100	35 to 45	4.8 to 5.5	Moderate	Low	16	37	
ML	A-4	85 to 95	55 to 65	5.2 to 5.8	Moderate	Moderate			0.05 to 0.2.
MH	A-7	85 to 95	55 to 65	5.2 to 6.2	Moderate to fast.	Moderate			
SM, ML	A-4	100	45 to 55	5.3 to 5.8	Moderate	Low			0.05 to 0.2.
SM, CL	A-4	100	50 to 60	5.3 to 7.0	Moderate to slow.	Low to moderate.			

TABLE 8.—*Brief description of soils and*

Map symbol	Soil	Depth to seasonally high water table	Brief description of site and soil	Depth from surface (typical profile)	Classification: USDA textural class
		Feet		*Inches*	
HeB	Helena sandy loam, 2 to 6 percent slopes.	1 or more	About 12 inches of moderately well drained sandy loam, underlain by 12 to 38 inches of moderately well drained sandy clay loam to clay; developed from residuum derived from mixed acidic and basic rock.	0 to 12	Sandy loam
HeB2	Helena sandy loam, 2 to 6 percent slopes, eroded.			12 to 38	Sandy clay loam to clay.
HeC	Helena sandy loam, 6 to 10 percent slopes.				
HeC2	Helena sandy loam, 6 to 10 percent slopes, eroded.				
HnB	Herndon silt loam, 2 to 6 percent slopes.	3 or more	About 9 inches of well-drained silt loam, underlain by 9 to 37 inches of well-drained silty clay loam to clay; developed from residuum derived from Carolina slate.	0 to 9	Silt loam
HnB2	Herndon silt loam, 2 to 6 percent slopes, eroded.			9 to 37	Silty clay loam to clay.
HnC	Herndon silt loam, 6 to 10 percent slopes.				
HnC2	Herndon silt loam, 6 to 10 percent slopes, eroded.				
HnD	Herndon silt loam, 10 to 15 percent slopes.				
HnD2	Herndon silt loam, 10 to 25 percent slopes, eroded.				
HwB	Hiwassee sandy loam, 2 to 8 percent slopes.	4 or more	About 8 inches of well-drained sandy loam, underlain by 8 to 37 inches of well-drained clay loam to clay; developed from general alluvium.	0 to 10	Sandy loam
				10 to 48	Clay loam to clay.
LaB	Lakeland sand, 0 to 6 percent slopes.	5 or more	3 to 15 feet of excessively drained sand; developed from unconsolidated beds of sand.	0 to 10	Loamy sand
LaC	Lakeland sand, 6 to 10 percent slopes.			10 to 44+	Loamy sand
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded.	4 or more	About 6 inches of well-drained sandy loam, underlain by 6 to 43 inches of well-drained clay loam to clay; developed in residuum derived from acidic and basic rock.	0 to 6	Sandy loam
				6 to 43	Clay loam to clay.
MaA	Magnolia sandy loam, 0 to 2 percent slopes.	3 or more	About 8 inches of well-drained sandy loam, underlain by 8 to 64 inches of well-drained clay loam to clay; developed from unconsolidated beds of sandy clay.	0 to 8	Sandy loam
MaB	Magnolia sandy loam, 2 to 6 percent slopes.			8 to 64	Clay loam to clay.
MaC2	Magnolia sandy loam, 6 to 10 percent slopes, eroded.				
MbA	Marlboro sandy loam, 0 to 2 percent slopes.	3 or more	About 9 inches of well-drained sandy loam, underlain by 9 to 37 inches of well-drained sandy clay loam to clay loam; developed from unconsolidated beds of sandy clay.	0 to 9	Sandy loam
				9 to 37	Sandy clay loam to clay loam.
NsA	Norfolk sandy loam, 0 to 2 percent slopes.	3 or more	About 14 inches of well-drained sandy loam, underlain by 14 to 40 inches of well-drained sandy clay loam to sandy clay; developed from unconsolidated beds of sand and clay.	0 to 14	Sandy loam
NsB	Norfolk sandy loam, 2 to 8 percent slopes.			14 to 40	Sandy clay
NoA	Norfolk loamy sand, thick surface, 0 to 2 percent slopes.	3 or more	18 to 30 inches of well-drained loamy sand, underlain by 30 to 44 inches of well-drained sandy clay loam to sandy clay; developed from unconsolidated beds of sand and clay.	0 to 30	Loamy sand
NoB	Norfolk loamy sand, thick surface, 2 to 6 percent slopes.			30 to 44	Sandy clay loam to sandy clay.
NoC	Norfolk loamy sand, thick surface, 6 to 10 percent slopes.				
OrB	Orange silt loam, 2 to 6 percent slopes.	0	About 9 inches of moderately well drained silt loam, underlain by 9 to 29 inches of moderately well drained to poorly drained clay; developed from residuum derived from light-colored basic rock occurring with Carolina slate.	0 to 9	Silt loam
OrC2	Orange silt loam, 6 to 10 percent slopes, eroded.			9 to 29	Clay

[1] Nonplastic.

their physical properties—Continued

Classification—Continued		Percentage passing—		Selected characteristics significant to engineering					
Unified	AASHO	No. 10 sieve	No. 200 sieve	pH	Dispersion	Shrink-swell potential	Plasticity index	Liquid limit	Permeability
									Inches per hour
SM	A-2	100	25 to 35	5.2 to 5.7	Fast	Low	(1)	(1)	0.2 to 0.8.
ML	A-7	100	50 to 60	5.3 to 6.1	Moderate to slow.	High	18	50	
ML	A-4(8)	97	85	5.2 to 5.8	Moderate	Moderate	(1)	(1)	0.2 to 0.8.
CL	A-7	100	92	5.0 to 5.8	Moderate to slow.	High	20	44	
SM	A-2	95	35	5.8 to 6.8	Fast	Moderate			2.5 to 5.0.
MH, CH	A-7	100	65 to 75	5.5 to 6.8	Moderate	High			
SP, SP-SM	A-3	100	5 to 10	4.7 to 5.4	Fast	Low	(1)	(1)	10+.
SP, SP-SM, SM.	A-1-a, A-1-b, A-2-4, A-3.	100	5 to 20	4.7 to 5.4	Fast	Low	(1)	(1)	
SM-SC	A-2-4(0)	93	35	5.3 to 5.8	Fast	Moderate	4	20	
ML-CL	A-7-6	100	65 to 75	5.3 to 5.8	Moderate to slow.	High	23	50	2.5 to 5.0.
SM, ML	A-4	100	40 to 55	5.8 to 6.3	Fast	Low	(1)	(1)	0.8 to 2.5.
CL	A-6	100	55 to 65	5.2 to 5.8	Slow	Moderate	18	35	
SM	A-4	100	35 to 45	5.2 to 5.8	Fast	Low	2	16	0.2 to 0.8.
CL	A-6	100	55 to 65	5.2 to 5.8	Slow	Moderate	19	39	
SM	A-4	100	35 to 45	5.2 to 5.8	Fast	Low	(1)	(1)	0.8 to 2.5.
CL	A-6	100	55 to 65	5.2 to 5.8	Moderate	Moderate	14	33	
SP-SM, SM	A-2-4	100	10 to 30	4.8 to 5.4	Fast	Low	(1)	(1)	2.5 to 5.0.
SC	A-4	100	35 to 45	5.3 to 5.8	Fast	Low to moderate	10	26	
ML-CL	A-4(8)	93	76	5.8 to 6.0	Slow	Moderate	10	36	−0.05.
MH-CH	A-7-5(20)	100	92	4.8 to 5.2	Slow	High	33	63	

TABLE 8.—*Brief description of soils and*

Map symbol	Soil	Depth to seasonally high water table	Brief description of site and soil	Depth from surface (typical profile)	Classification: USDA textural class
		Feet		*Inches*	
RsA	Ruston sandy loam, 0 to 2 percent slopes.	3	About 14 inches of well-drained sandy loam, underlain by 14 to 44 inches of well-drained sandy clay loam; developed from unconsolidated beds of sand and clay.	0 to 14	Sandy loam
RsB	Ruston sandy loam, 2 to 6 percent slopes.			14 to 44	Sandy clay loam
RsC	Ruston sandy loam, 6 to 10 percent slopes.				
RmA	Ruston loamy sand, thick surface, 0 to 2 percent slopes.	3	About 24 inches of well-drained light sandy loam to loamy sand, underlain by 24 to 40 inches of well-drained sandy loam to sandy clay loam, developed from unconsolidated beds of sand and clay.	0 to 24	Sandy loam and loamy sand.
RmB	Ruston loamy sand, thick surface, 2 to 6 percent slopes.			24 to 40	Sandy clay loam
TrB	Tirzah silt loam, 2 to 6 percent slopes.	4	About 8 inches of well-drained silt loam, underlain by 8 to 43 inches of well-drained silty clay to clay; developed from residuum derived from mixed basic rock and Carolina slate.	0 to 8	Silt loam
TrB2	Tirzah silt loam, 2 to 6 percent slopes, eroded.			8 to 43	Silty clay to clay
TrC	Tirzah silt loam, 6 to 10 percent slopes.				
VaB	Vaucluse loamy sand, 2 to 6 percent slopes.	4	About 10 inches of well-drained sandy loam, underlain by 10 to 34 inches of compacted sandy clay loam to sandy clay; developed from unconsolidated beds of sand and clay.	0 to 10	Loamy sand to sandy loam.
VaC	Vaucluse loamy sand, 6 to 10 percent slopes.			10 to 34	Sandy clay loam to sandy clay.
We	Wehadkee silt loam	0	About 27 inches of moderately well drained to poorly drained silt loam, underlain by 27 to 73 inches + of poorly drained silty clay to fine sandy clay loam; developed from general alluvium.	0 to 27	Silt loam
				27 to 73+	Silty clay
WhB	Wickham fine sandy loam, 2 to 6 percent slopes.	2	About 7 inches of well-drained fine sandy loam, underlain by 7 to 38 inches of fine sandy clay loam to clay; developed from general alluvium.	0 to 7	Fine sandy loam
				7 to 38	Fine sandy clay loam to clay.
WkB	Wilkes sandy loam, 2 to 10 percent slopes.	5	About 8 inches of well-drained sandy loam, underlain by 8 to 15 inches of clay; developed from residuum derived from acidic and basic rock.	0 to 8	Sandy loam
WkD	Wilkes sandy loam, 10 to 15 percent slopes.			8 to 15	Clay
WkE	Wilkes sandy loam, 15 to 30 percent slopes.				
WoB	Worsham sandy loam, 0 to 6 percent slopes.	0	About 14 inches of moderately well drained sandy loam or silt loam, underlain by 14 to 38 inches of sandy clay to clay; developed in residuum derived from granite, gneiss, schist, and Carolina slate; at heads of and along small drainageways.	0 to 14	Sandy loam to silt loam.
WsB	Worsham silt loam, 0 to 6 percent slopes.			14 to 38	Sandy clay to clay.

[1] Nonplastic.

Genesis, Classification, and Morphology of Soils

Soils are the outer crust of the earth's surface and are the natural media for the growth of plants. They consist of mixtures of fragments of partly or wholly weathered rocks, minerals, organic matter, water, and air, in varying proportions. Soils have more or less distinct layers, called horizons, that form under the influence of climate and living organisms. The cross section extending from the surface into the parent material is called the profile. The degree of development of the profile is influenced by the intensity of the soil-forming factors and the length of time they have been acting on the parent material. Soils are constantly undergoing change but may reach a state of near equilibrium with their environment after a long period of exposure to a given set of conditions.

The Factors of Soil Genesis

Genesis is the mode of origin of soil. The term refers to the processes responsible for the development of the

their physical properties—Continued

Classification—Continued		Percentage passing—		Selected characteristics significant to engineering					
Unified	AASHO	No. 10 sieve	No. 200 sieve	pH	Dispersion	Shrink-swell potential	Plasticity index	Liquid limit	Permeability
									Inches per hour
SM	A-2-4	100	20 to 35	5.8 to 6.2	Fast	Low	(1)	(1)	0.8 to 2.5.
SC	A-6	100	40 to 50	5.3 to 5.8	Fast	Moderate	15	33	
SM, SP-SM	A-2-4(0)	100	10 to 30	5.4 to 5.7	Fast	Low	(1)	(1)	2.5 to 5.0.
SC	A-6	100	35 to 45	5.3 to 5.8	Fast	Low	19	37	
ML	A-4(8)	100	90	5.8 to 6.2	Moderate	Moderate	10	37	0.8 to 2.5.
ML	A-5(9)	100	95	5.3 to 5.8	Moderate to slow.	Moderate	10	43	
ML	A-2-7, A-4	100	20 to 45	4.8 to 5.2	Fast	Low	11	47	0.2 to 0.8.
CL	A-6	100	35 to 45	4.8 to 5.8	Moderate	Moderate	14	33	
ML	A-7-6	100	85 to 100	5.4 to 5.8	Moderate	Moderate	17	46	0.2 to 0.8.
CL	A-7	100	95 to 100	6.8 to 7.2	Moderate to slow.	Moderate to high.			
SM	A-2-4(0)	93	26	5.3 to 5.7	Fast	Low	(1)	(1)	2.5 to 5.0.
ML-CL	A-7-6(8)	93	53	5.2 to 5.8	Moderate to slow.	Moderate	23	50	
SM	A-2, A-4	85 to 95	30 to 40	4.8 to 5.2	Fast	Low			0.05 to 0.2.
MH	A-7	85 to 95	60 to 80	5.2 to 5.7	Moderate	Moderate			
SC, ML-CL	A-4	100	45 to 70	5.8 to 6.3	Fast to moderate.	Low	9	31	0.05 to 0.2.
CH	A-7-6	100	50 to 85	5.3 to 5.8	Slow	High to moderate.	34	60	

solum from the unconsolidated parent material. Through these processes, primary minerals disintegrate, secondary minerals and new chemical compounds form, organic matter accumulates and decomposes, and materials in suspension and solution move downward and are partly removed by drainage water. True soil is the product of five principal factors of soil formation: parent material, climate, living organisms (vegetation and animal life), time, and relief. The five factors influence and modify the effectiveness of one another in the process of soil formation. The influence of climate on soils and plants through temperature, rainfall, and humidity are modified by the physical characteristics of the soil material and by relief, which in turn strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind.

Climate and living organisms are the active forces in the formation of a soil from parent material. Relief is a conditioning factor that, in most places, largely controls natural drainage and influences the effectiveness of climate, vegetation, and animal life. If the climate, vegetation, and animal life have not been operating long enough to produce a soil in near equilibrium with its environment, the soil is considered young or immature. Well-drained alluvial and recent colluvial soils are con-

sidered very young in their development—so young that climate, animal life, and vegetation have not had sufficient time to produce any apparent morphological results. When a soil has acquired definite genetic characteristics, it is said to be a mature soil.

The soil-forming factors are complex, each modifying or interacting with the others, and they are slowly but constantly effecting changes. A soil is a complex substance that is always undergoing changes and never reaches a static condition. It does have a life history, passing through stages which may be considered as youth, maturity, and, in some instances, old age. The character and thickness of a soil depend upon the resistance of the parent material to change, the intensity of the soil-forming processes, and the length of time these processes have been active.

Mechanical agencies may affect a soil at any stage in its history. The surface layer may be partly or wholly removed by erosion. Then, the soil-forming processes begin in the newly exposed material. These changes may be either detrimental or beneficial, depending on the rate of removal and on the supply of nutrient elements in the newly formed surface layer. Normal erosion is beneficial and should not be confused with accelerated erosion brought about by misuse.

Despite these complexities, it is possible to get some understanding of the processes of soil formation by considering each of the formative factors separately.

Parent material

Disintegrated material that has accumulated as a result of the weathering of rock is called parent material. The formation of parent material is the first step in the development of soils. The parent material is largely responsible for the chemical and mineral composition of the soils. In Saluda County the parent material was derived from three different sources: residuum, sediments once deposited in the Atlantic Ocean, and recent alluvium.

Residual parent material is formed in place through the weathering of the underlying rock. The soils that formed from residual material are in the Piedmont plateau. They constitute about 85 percent of the county. The rocks of Saluda County are chiefly (1) volcanic rocks of the Carolina slate belt, (2) gneiss and schist, mostly mica gneiss and mica schist, and (3) granite rocks, either massive or weakly foliated.

The sediments deposited by the Atlantic Ocean are of marine origin but were subjected to some fluvial influence during either the Pleistocene or the Recent epoch. The soils of the Coastal Plain area in the southern part of the county formed from these sediments. These soils constitute about 10 percent of the county. According to Cooke's Geology of the Coastal Plain of South Carolina (*5*), the Aiken plateau is the coastal terrace in this area. The elevation of this plateau ranges from 400 to 500 feet above sea level. The unconsolidated material deposited by the ocean on this plateau is Barnwell sand (*5*). It varies widely in texture.

The recent alluvium was transported and deposited by streams. It is composed of mixtures of gravel, sand, silt, and clay. Much of this alluvium was derived from the rocks of the nearby uplands, but some was derived from granite and metamorphosed rocks of the Piedmont and the mountains to the northwest. The soils that formed from recent alluvium are those on bottom lands and terraces. Those on the first bottoms are weakly developed and still subject to deposition, but those on the old, high terraces and benches have been in place long enough to have developed horizons. The recent deposits of the smaller streams show little evidence of soil development. Along drainageways and in depressions throughout the uplands, there are narrow strips of local alluvium that have been modified hardly at all by soil-forming processes.

Climate

The climate of Saluda County is of a humid, warm-temperate, continental type. The average annual precipitation is about 46.25 inches. The average temperature is about 62.9 degrees. Rainfall is slightly higher in spring and summer than in fall and winter.

Climate affects the physical, chemical, and biological relationships in the soil through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports the mineral and organic residue through the soil profile. High rainfall promotes leaching of the soluble bases and translocation of the less soluble collodial matter downward in the soil profile. A long frost-free season and relatively high rainfall cause active leaching of fine materials and removal of plant nutrients.

The amount of water that percolates through the soil is dependent upon rainfall, relative humidity, and the length of the frost-free period. The rate of downward movement, or percolation, is affected by physiographic position and soil permeability. The weathering of parent material is intensified if percolation is interrupted only by brief periods of shallow freezing; therefore, a relatively high average temperature speeds up weathering.

Temperature also influences the number and kinds of organisms. Thus, climate is responsible for certain changes in the soil that are brought about by plants and animals.

Living organisms

The numbers and kinds of plants and animals that live in and on the soil are determined by the climate, the parent material, the relief, and the age of the soil.

Micro-organisms are indispensable in soil development. The weathering of rock into parent material and the decomposing of organic matter are hastened by bacteria, fungi, and other micro-organisms. Larger plants serve to alter the soil microclimate, to furnish organic matter, and to transfer elements from the subsoil to the surface soil.

The fungi and other micro-organisms in the soils of Saluda County are largely confined to the uppermost few inches of soil. The activity of the earthworms and other small invertebrates is chiefly in the A horizon, where they carry on a slow but continuous cycle of soil mixing. Bacteria and fungi decompose organic matter and release nutrients for plant use.

Except on the bottom lands, the native vegetation was chiefly oak, hickory, cedar, loblolly pine, shortleaf pine, and longleaf pine. On the bottom lands, the trees were

lowland hardwoods, chiefly yellow-poplar, sweetgum, cottonwood, ash, oak, and sycamore. On the poorly drained areas the trees were chiefly willow, birch, blackgum, beech, and water-tolerant oaks.

Time

The length of time required for soil development depends largely on the other factors of soil formation. Less time is required for a soil to form in a humid, warm region where the vegetation is luxuriant than in a cold, dry region where the vegetation is scanty; also, less time is required for a soil to form from coarse-textured parent material than from fine-textured parent material, other things being equal.

On the smoother parts of the uplands and older stream terraces, the soils have generally developed to maturity. On the stronger slopes, geologic erosion has removed soil material almost as rapidly as it has formed; consequently, the soils are shallow and there is little profile development. On the first bottoms and other areas of local alluvium, the material has been in place too short a time to allow for mature development.

Relief

Relief influences soil formation through its effect on moisture relations, erosion, temperature, and plant cover. The factor of relief in soil formation is modified by the other four soil-forming factors.

The slopes in Saluda County range from 0 to 30 percent. Upland soils on slopes of less than about 15 percent have thick, well-expressed profiles. On slopes of 15 to 35 percent, the effect of topography is to cause geological removal of soil almost as fast as it forms. As a result, some of the soils—for example, those of the Wilkes and Goldston series—have thin, weakly expressed profiles. On the stream bottoms and terraces, the slopes range from 0 to about 15 percent, but the soils are young because the parent material has been in place for a relatively short time.

Classification of Soils

Man classifies natural objects in order to remember them better and to understand relationships among them. This is true for soils, as it is for plants, animals, and rocks. The soil forms a mantle over most of the land surface of the earth, but it differs from place to place, both locally and regionally. Differences among soils must have been recognized soon after man began growing food instead of gathering it. Consequently, efforts have been made down through the ages to recognize different kinds of soils and to classify soils so as to bring out the relationships of one to another. Efforts are still being made to devise better approaches to the classification of soils, not only so that they can be remembered more easily but also so that knowledge about the uses and responses of soils can be transferred from place to place more effectively.

The number of local kinds of soils, known as soil types and phases, is very large for the United States as a whole. The number is fairly large within the limits of one State. To remember the characteristics of each individual kind is impossible, but if soils that share a number of characteristics are classified by groups the nature of those soils is more easily remembered.

The soil classification used in the United States consists of six categories. Beginning with the most inclusive, the six categories are the order, suborder, great soil group, family, series, and type.

There are three orders and thousands of types. The suborder and family categories have never been fully developed and thus have been little used. Attention has been concentrated on the classification of soils into types and series within counties or comparable areas and on the subsequent grouping of series into great soil groups and orders.

The classes in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders.

Zonal soils have well-developed characteristics that reflect the influence of climate and living organisms (chiefly vegetation). These characteristics are best developed on gently sloping, well-drained uplands. The parent material is not of extreme texture or chemical composition, and it has been in place long enough for biological forces to have expressed their full influence. Zonal soils have moderately well to well developed profiles that are in equilibrium with the climate as well as with the other soil-forming factors.

The zonal soils in Saluda County are members of the Red-Yellow Podzolic (*16*) and Reddish-Brown Lateritic great soil groups (see table 9).

Intrazonal soils have more or less well developed characteristics that reflect the dominating influence of some local factor, such as relief or parent material, over the normal effects of climate and vegetation. The intrazonal soils in Saluda County are members of the Low-Humic Gley and Planosol groups.

Azonal soils lack well-developed profile characteristics, due to their youth, parent material, or relief that has prevented definite soil profile characteristics. The azonal soils in Saluda County are members of the Regosol and Alluvial groups.

The classification of soil series of Saluda County into great soil groups is given in table 9. It should be stressed that the classification of series into great soil groups is based on characteristics observable in the field. Further study of the soils may result in changes in the classification of some series in the future.

Morphology of Soils

Certain morphological features are of special interest in the genesis and classification of soils. A number of such features are discussed in this section. Detailed descriptions of typical profiles of each series are given in the section "Soil Series and Mapping Units." The main distinguishing features of each series are listed in table 9. These include characteristics of the surface soil and subsoil, drainage, predominant slope range, and kind of parent material. Following the table, there is a discussion of each of the great soil groups in Saluda County.

TABLE 9.—*Classification of soil series into great soil*

[Characteristics described are of profiles not

Great soil group and series	Surface soil			Subsoil
	Color [1]	Texture [1]	Structure [1]	Color [2]
Red-Yellow Podzolic soils.				
Representative—				
Alamance	Grayish brown	Silt loam	Crumb	Brownish yellow to yellowish brown.
Altavista	Dark grayish brown	Silt loam	Granular	Brownish yellow mottled with yellowish red.
Appling	Grayish brown to light yellowish brown.	Sandy loam	Granular	Yellowish brown to yellowish red
Bradley	Yellowish brown	Sandy loam	Granular	Reddish yellow to yellowish red
Cecil	Grayish brown	Sandy loam	Granular	Red
Chesterfield	Brown to light brown	Sandy loam	Granular	Yellowish brown mottled with olive yellow and reddish yellow.
Durham	Pale olive to grayish brown	Sandy loam	Granular	Yellow mottled with light gray
Efland	Dark yellowish brown	Silt loam	Granular	Yellowish brown mottled with yellowish red.
Enon	Dark yellowish brown to dark grayish brown.	Sandy loam	Granular	Red mottled with yellowish brown.
Faceville	Dark grayish brown	Sandy loam	Granular	Strong brown to red
Georgeville	Dark brown to light brown	Silt loam	Granular	Red
Gilead	Dark brown	Sandy loam	Crumb	Yellowish brown mottled with light yellowish brown and strong brown.
Herndon	Very dark grayish brown to grayish brown.	Silt loam	Granular	Yellowish brown to strong brown mottled with olive yellow.
Marlboro	Light olive brown to grayish brown.	Sandy loam	Crumb	Brownish yellow
Norfolk	Dark grayish brown	Sandy loam	Crumb	Yellowish brown
Ruston	Grayish brown	Sandy loam	Crumb	Red
Vaucluse	Dark grayish brown to light brownish gray.	Loamy sand	Crumb	Mottled strong brown to red
Wickham	Very dark grayish brown	Fine sandy loam.	Granular	Red
Grading toward Reddish-Brown Lateritic soils—				
Lloyd	Dark brown	Sandy loam	Granular	Red
Magnolia	Dark brown	Sandy loam	Crumb	Red to dark red
Tirzah	Dark reddish brown	Silt loam	Granular	Red to dark red
Grading toward Low-Humic Gley soils—				
Colfax	Light brownish gray	Sandy loam	Granular	Strong brown mottled with gray
Helena	Olive to pale olive	Sandy loam	Granular	Brownish yellow mottled with dark yellowish brown.
Grading toward Lithosols—				
Goldston	Grayish brown	Silt loam	Granular	Light brownish gray mottled with olive yellow.[3]
Wilkes	Dark grayish brown	Sandy loam	Granular	Strong brown
Reddish-Brown Lateritic soils.				
Hiwassee	Dark reddish brown	Sandy loam	Crumb	Dark red to dusky red
Low-Humic Gley soils.				
Grady	Very dark gray	Loam	Granular	Gray mottled with light gray and olive yellow.
Wehadkee	Olive	Silt loam	Granular	Gray to light olive brown [4]
Worsham	Dark brown to dark grayish brown.	Silt loan and sandy loam.	Granular	Light gray mottled with gray, light olive brown, yellowish brown, and olive yellow.

[1] Of the A_1 or A_p horizons.
[2] Of the B_2 horizon unless otherwise specified.
[3] Of the B horizon where present.

groups, and distinguishing characteristics of soil series

materially affected by accelerated erosion]

Subsoil—Continued			Drainage class	Predominant slope range	Parent material
Texture [2]	Structure [2]	Consistence [2]			
				Percent	
Silty clay loam	Subangular blocky	Friable	Moderately well drained.	2 to 10	Carolina slate.
Clay	Subangular blocky	Friable	Moderately well drained.	0 to 6	Old general alluvium.
Clay loam to clay	Subangular blocky	Friable	Well drained	2 to 20	Granite, gneiss, and schist.
Clay	Subangular blocky	Friable	Well drained	2 to 20	Marine deposit over granite, gneiss, and Carolina slate.
Clay	Subangular blocky	Friable	Well drained	2 to 20	Granite, gneiss, and schist.
Clay	Subangular blocky	Friable	Well drained	2 to 15	Marine deposit over granite, gneiss, and Carolina slate.
Clay loam	Subangular blocky	Friable to firm	Well drained	2 to 10	Granite.
Clay	Angular blocky	Firm	Moderately well drained.	2 to 15	Carolina slate that includes basic rock.
Clay	Angular blocky	Firm	Well to moderately well drained.	2 to 10	Mixed acid and basic rock.
Sandy clay to clay	Subangular blocky	Friable	Well drained	0 to 6	Unconsolidated sandy clay and clay.
Silty clay	Subangular blocky	Friable	Well drained	2 to 25	Carolina slate.
Sandy clay loam	Subangular blocky	Friable to firm	Moderately well drained.	2 to 6	Unconsolidated sand and clay.
Silty clay	Subangular blocky	Friable	Well drained	2 to 25	Carolina slate.
Clay loam	Subangular blocky	Friable	Well drained	0 to 2	Unconsolidated sand and clay.
Sandy clay loam	Subangular blocky	Friable	Well drained	0 to 10	Unconsolidated sand and clay.
Sandy clay loam	Subangular blocky	Friable	Well drained	0 to 10	Unconsolidated sand and clay.
Sandy clay	Subangular blocky	Friable to firm	Well drained	2 to 10	Unconsolidated sand and clay.
Clay loam to clay	Subangular blocky	Friable to firm	Well drained	2 to 6	General alluvium.
Clay	Subangular blocky	Friable	Well drained	2 to 15	Mixed acid and basic rocks.
Clay loam to clay	Angular blocky	Firm	Well drained	0 to 10	Unconsolidated sand and clay.
Silty clay	Subangular blocky	Friable	Well drained	2 to 10	Mixed basic rock and Carolina slate.
Clay	Angular blocky	Firm	Somewhat poorly drained.	2 to 6	Granite and gneiss.
Clay	Angular blocky	Firm	Moderately well to somewhat poorly drained.	2 to 10	Mixed acid and basic rocks.
Silty clay loam [3]	Subangular blocky [3]	Friable [3]	Well drained	2 to 30	Carolina slate.
Clay	Angular blocky	Firm	Well to excessively drained.	2 to 30	Granite, gneiss, schist, and basic rock.
Clay	Subangular blocky	Friable to firm	Well drained	2 to 8	Old general alluvium from dark-colored basic rocks.
Clay to sandy clay	Subangular blocky	Very firm	Poorly to very poorly drained.	0 to 2	Unconsolidated sand and clay.
Silty clay [4]	Angular blocky [4]	Friable [4]	Poorly drained	0 to 2	Young general alluvium.
Clay	Angular blocky	Firm	Poorly drained	0 to 6	Granite, gneiss, schist, Carolina slate.

[4] Of second layer in C horizon.

[5] Of first layer in C horizon.

TABLE 9.—*Classification of soil series into great soil groups,*

Great soil group and series	Surface soil			Subsoil
	Color [1]	Texture [1]	Structure [1]	Color [2]
Planosols.				
Orange	Dark grayish brown	Silt loam	Granular	Light yellowish brown mottled with yellowish brown.
Regosols.				
Lakeland	Dark grayish brown	Loamy sand	Crumb	Yellowish brown [4]
Alluvial soils.				
Representative—				
Congaree	Dark brown to dark yellowish brown.	Fine sandy loam to silt loam.	Granular	Dark grayish brown [4]
Grading toward Low-Humic Gley soils—				
Chewacla	Dark brown to dark grayish brown.	Silt loam	Granular	Pale olive mottled with olive brown.[4]

See footnotes on pp. 92 and 93.

Red-Yellow Podzolic soils

Red-Yellow Podzolic soils are well-developed, well-drained, acid soils that have a thin organic (A_0) horizon, an organic mineral (A_1) horizon, a light-colored, bleached (A_2) horizon, and a red, yellowish-red, or yellow, more clayey (B) horizon. The parent material is all more or less siliceous. Coarse reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of the deeper horizons in places where the parent material is thick (*28*).

Red-Yellow Podzolic soils develop under deciduous, coniferous, or mixed forest in a warm-temperate, moist climate. Under these conditions, leaching of plant nutrients and the decomposition of organic matter are rapid. These soils are slightly to strongly acid in reaction and are very low in bases, such as calcium and magnesium. The clay fraction is dominated by kaolinite but contains large quantities of free iron oxides or hydroxides and, in places, small amounts of aluminum. Hydrous mica and montmorillonite dilute the clay fraction in some of the soils but are not considered typical. Streaks or mottles occur nearer the surface in the profiles that have a yellow B horizon than in those that have a red B horizon. In a few soils of the group, especially the more sandy ones, the reticulately mottled horizon is lacking. In cultivated areas the A_0 and A_1 horizons are mixed in the plow layer. In many places accelerated erosion has removed all, or nearly all, of the A horizon and the B horizon is exposed.

The representative Red-Yellow Podzolic soils in Saluda County are the Alamance, Altavista, Appling, Bradley, Cecil, Chesterfield, Durham, Efland, Enon, Faceville, Georgeville, Gilead, Herndon, Marlboro, Norfolk, Ruston, Vaucluse, and Wickham soils.

In all of these soils, the A_1 horizon is darker colored than the A_2 horizon. They all have a thin A_1 horizon in which the organic-matter content ranges from about 2.5 percent to 7 percent. The A_2 horizon is well defined, has a weak granular or crumb structure, and is no more than 2 percent organic matter. The soils are slightly to strongly acid in the A_2 horizon. They have a moderate to strong, medium, subangular or angular blocky structure in the B_2 horizon, which contains more clay than the A_2 horizon. The B_2 horizon is medium to strongly acid. The C horizon is mottled or reticulated with red, brown, yellow, and gray. The structure is less strong in the C horizon than in the B horizon, and the proportion of clay is less.

The Cecil, Georgeville, Ruston, and Wickham series are good examples of Red-Yellow Podzolic soils that have a thick, red subsoil of moderate to strong, medium, subangular to angular blocky structure. The Georgeville soils are finer textured than the Cecil, Ruston, and Wickham soils in all horizons. The Georgeville soils have a silty clay horizon formed from residuum of Carolina slate. The Wickham soils, which developed from general alluvium on stream terraces, have a fine sandy loam surface soil and a sandy clay loam to clay B horizon. The A horizon is finer textured than that of the Cecil soils. The Ruston soils developed in unconsolidated beds of sand and clay. They have a red sandy clay loam B horizon.

Other red members of the Red-Yellow Podzolic group in Saluda County are the Bradley, Efland, Enon, Faceville, and Vaucluse soils. All of these soils have reticulate mottling higher in the B horizon than do the Cecil soils. The Bradley soils differ from the Cecil soils in having formed from a marine deposit overlying residuum derived from granite, gneiss, schist, or Carolina slate. The Efland soils are not so red in the B horizon as the Cecil and Georgeville soils. Their parent material was derived from a mixture of basic rocks and Carolina slate. The C horizon and the lower part of the B horizon are somewhat gleyed. The Enon soils are not so red as the Cecil and Georgeville soils. They have a plastic clay B horizon that has distinct clay films and a moderate to fine, angular blocky structure. Internal drainage is slow. The Faceville soils formed from unconsolidated beds of sand and clay. They have a sticky B horizon and brown

and distinguishing characteristics of soil series —Continued

Subsoil Continued			Drainage class	Predominant slope range	Parent material
Texture [2]	Structure [2]	Consistence [2]			
Clay	Angular blocky	Firm	Somewhat poorly drained.	*Percent* 2 to 10	Carolina slate and basic intrusions.
Loamy sand [4]	Crumb [4]	Very friable [4]	Excessively drained.	0 to 10	Unconsolidated beds of sand.
Loamy fine sand to silty clay loam.[4]	Subangular blocky	Friable	Well drained	0 to 2	Young general alluvium.
Silt loam [5]	Granular [5]	Friable [4]	Somewhat poorly to moderately well drained.	0 to 2	Young general alluvium.

mottling in the B_2 horizon, which the Cecil soils do not have. The Ruston soils have a coarser textured B horizon that is less sticky than the B horizon of the Faceville soils. The Vaucluse soils differ from the Ruston soils in being somewhat more variable in thickness of profile and in having a compacted lower B or upper C horizon.

The yellow members of the Red-Yellow Podzolic group are the Alamance, Altavista, Appling, Chesterfield, Durham, Gilead, Herndon, Marlboro, and Norfolk soils. These soils are distinguished from the red members by a predominantly yellower B horizon. Generally the B_2 horizon of the yellow soils is not so fine-textured as that of the Cecil or Georgeville series. The C horizon may be as fine textured. The Alamance soils developed from Carolina slate and have a finer textured A horizon than do the Cecil soils. The Altavista soils developed in old general alluvium, are moderately well drained, and have a silt loam surface soil. They commonly lie adjacent to areas of the redder Wickham soils on stream terraces. The Durham soils do not have as fine textured an A horizon as the Alamance soils. The Chesterfield soils are similar to the Bradley soils but have a yellower B horizon. The Gilead soils, which are relatively inextensive in this county, resemble the Norfolk soils but differ from them in having a compacted layer in the lower part of the B horizon. The Norfolk soils have a yellower B horizon than the Ruston. The Marlboro soils are similar in color to the Norfolk but characteristically have a thinner A horizon and a somewhat finer textured B horizon. The thick surface phases of the Durham, Norfolk, and Ruston soils have a notably thicker and sandier A horizon and a more weakly developed B_2 horizon than the Alamance or Marlboro soils.

The Appling and Herndon soils have similar characteristics in the A and B horizon. They differ from the Cecil and Georgeville soils chiefly in having a less reddish B_2 horizon and a lesser depth to mottled or reticulated material. The Appling and Herndon soils differ from each other in texture of the A and C horizons and in parent material.

The Lloyd, Tirzah, and Magnolia soils are Red-Yellow Podzolic soils that have some characteristics of Reddish-Brown Lateritic soils. A dark reddish-brown surface soil and a darker red subsoil distinguish the Lloyd and Tirzah soils from the representative Red-Yellow Podzolic soils. A dark-brown surface soil and a dark-red lower subsoil are the characteristics that distinguish the Magnolia soils from the typical Red-Yellow Podzolic soils. The Magnolia soils developed in unconsolidated beds of sand and clay; they have a red to dark-red sandy clay to clay B horizon. The A_2 horizon of the Tirzah soils is lighter colored than that of the Hiwassee, which are Reddish-Brown Lateritic soils. The B_2 horizon of the Lloyd soils is not so red as the B_2 horizon of the Hiwassee soils. The B_2 horizon of the Lloyd and Tirzah soils is darker red than that of the Cecil. The depth to mottled material is greater than in the Cecil soils. The Tirzah soils are associated with soils that developed from Carolina slate.

The Colfax and Helena soils are in the Red-Yellow Podzolic group but have some characteristics of the Low-Humic Gley group. These soils have a gleyed layer but no claypan. This indicates that they are grading toward the Low-Humic Gley great soil group rather than being typical Red-Yellow Podzolic soils. In some places the C horizon is brittle and has a few characteristics of a fragipan. The Colfax soils are somewhat poorly drained. Their parent material was derived from granite. The Helena soils are moderately well drained to somewhat poorly drained. Their parent material was derived from acid rock mixed with some basic rock.

The Wilkes and Goldston soils are Red-Yellow Podzolic soils that have some characteristics of Lithosols. Lithosols are soils that have an incomplete solum or no clearly expressed soil morphology. They consist of a freshly and imperfectly weathered mass of hard rock or hard rock fragments. They are largely confined to steeply sloping land (*28*). The Wilkes and Goldston

soils generally occupy the steeper slopes of the uplands. However, there are areas of Goldston on the gently sloping, long, narrow ridges in Saluda County. Geologic erosion has nearly kept pace with the soil-forming processes, and, consequently, the soil profiles are less well developed than those of the representative Red-Yellow Podzolic soils. The B horizon is thinner, and the profile is shallower. There is less contrast in color between the A_1 and A_2 horizons than in the representative Red-Yellow Podzolic soils.

The Goldston soils have a silt loam A horizon and a silty clay loam B horizon. The Wilkes soils have a sandy loam A horizon and a sandy clay loam B horizon.

Reddish-Brown Lateritic soils

This great soil group consists of well-drained, acid soils formed under forest vegetation in climates ranging from warm temperate to tropical humid. These soils have a dark reddish-brown granular surface soil, a dark-red, friable, clayey B_2 horizon, and red or reticulately mottled "lateritic" parent materials. They lack the distinct A_2 horizon characteristic of the Red-Yellow Podzolic soils and have a B_2 horizon that is darker red in color. The B_2 horizon commonly has a moderate to strong subangular blocky structure with clay films on some ped faces and in channels.

Only one member of this group occurs in Saluda County. The Hiwassee soils may differ from the representative Reddish-Brown Lateritic soils in that the subsoil is a little less friable than is typical of the group. The clays in the subsoil are composed mostly of kaolinite and vermiculite and are not significantly different from those in the Red-Yellow Podzolic soils.

The Hiwassee soils have a dark-colored A horizon, a thick, dark-red, rather friable B horizon, and a reticulated C horizon. They formed from old alluvium that apparently originated from dark-colored basic rocks, such as gabbro, diorite, and hornblende schist. Small quartz pebbles and small dark-colored concretions are common in the Hiwassee soils. In reaction, the Hiwassee soils are slightly less acid than the Red-Yellow Podzolic soils in this county.

Low-Humic Gley soils

Low-Humic Gley soils are imperfectly and poorly drained. They have a very thin surface horizon that is moderately high in organic matter and overlies mottled gray and brown gleylike mineral horizons that have a low degree of textural differentiation (*28*). They are intrazonal soils in which the dominant soil development process is gleization. The representative Low-Humic Gley soils in Saluda County are members of the Grady, Worsham, and Wehadkee series. The first two developed under forest cover of loblolly pines and hardwoods. The Wehadkee soils developed under hardwoods. These three series have characteristics that reflect the influence of nearly level relief, a high water table, and impeded drainage over the effects of climate and vegetation. The surface soil ranges in color from light gray to dark brown. The subsoil ranges in color from mottled yellow, brown, and gray to dominantly gray. In texture it ranges from sandy clay to clay.

The Grady soils developed in ponded or bay areas in Saluda County. The Worsham soils are at the heads of and along the drainageways in the Piedmont. They formed from residuum derived from granite, gneiss, and Carolina slate. The Wehadkee soils are developing in young general alluvium on flood plains. They are poorly drained; grayish mottling is noticeable very near the surface. At greater depths, gray is the predominant color.

Planosols

Planosols are intrazonal soils that have one or more horizons abruptly separated from and sharply contrasting with an adjacent horizon because of high clay content, compactness, or weak cementation. The most widely distributed Planosols have a B horizon high in clay beneath an A horizon much lower in clay, with an abrupt boundary between the two.

The Orange soils in Saluda County are classified as Planosols, though they are not typical of the group. They do have a light-colored silty A_2 horizon and a mottled, plastic B_2 horizon. The boundary between the A_2 and B_2 horizons is not abrupt, in the main, according to the definition of an abrupt boundary in the Soil Survey Manual, but it almost qualifies. Consequently, the Orange soils are considered Planosols with some features of the Red-Yellow Podzolic group. The B horizon is less red in hue and lower in chroma than is characteristic of Red-Yellow Podzolic soils. The Orange soils are somewhat poorly drained and have mottling at a depth of 9 to 14 inches. They have less indication of wetness than is normal for Low-Humic Gley soils.

Regosols

Regosols are azonal soils that are without definite genetic horizons and that developed from deep, unconsolidated deposits or soft rocks. The Lakeland soils are the only Regosols in Saluda County. Derived from unconsolidated beds of sand deposited in the Coastal Plain, they are sandy throughout the profile.

Alluvial soils

This group consists of soils that are developing in transported and fairly recently deposited material (alluvium). The original material has been modified little or not at all by soil-forming processes.

The Congaree and Chewacla soils are in this group. The soils of these two series occupy flood plains and may either receive or lose material during floods. In areas of very recent deposition there is no horizon differentiation. In areas of older deposition there is slight to moderate horizon differentiation. The native vegetation was probably a mixture of hardwoods with some pine.

The Congaree soils are representative of the Alluvial soils. They are well drained, brownish, and medium textured.

The Chewacla soils are Alluvial soils that have some characteristics of Low-Humic Gley soils. They have a slightly darker colored surface soil than the Congaree. They are faintly mottled below a depth of 6 to 12 inches and noticeably mottled below a depth of 15 to 18 inches. Generally the material below a depth of 20 to 30 inches is finer textured than that of the Congaree. The Chewacla soils are somewhat poorly drained to moderately well drained.

Additional Facts About the County

This section describes the physiography and climate of Saluda County. It also discusses the settlement and development of the county and includes some facts about industries and about transportation and other facilities.

Physiography

Saluda County is a thoroughly dissected plain. Most of it is on the Piedmont plateau, but a narrow strip along the southeastern and southern edges is on the Coastal Plain. The relief ranges from nearly level to steep but is mostly gently sloping to strongly sloping. The first bottoms are narrow and are nearly level to gently sloping. The maximum width of the flood plains along the largest streams is about a fourth of a mile. The highest elevation—about 500 to 550 feet—is in the extreme northwestern part. The lowest elevation—about 300 feet—is in the northeastern part along the Saluda River.

The county is dissected by a dendritic drainage system. The southwestern part drains westward to the Savannah River through the tributaries of Turkey and Rock Creeks. On the narrow strip along the southern and southeastern border, drainage is southward to the Edisto River. On the rest of the county, drainage is to the Saluda River through the Little Saluda River and Clouds, Richland, Big, Indian, and Halfway Swamp Creeks. Mine Creek and Red Bank Creek join just south of Saluda to form the Little Saluda River.

Each of the two physiographic regions in the county, the Piedmont region and the Coastal Plain region, is occupied by a distinct group of soils.

In the Piedmont region the soils were derived from igneous and metamorphic rock that disintegrated and weathered in place and from material deposited by floods or washed from higher lying areas.

These soils, particularly those on the uplands, have been severely leached. They are mostly well drained to moderately well drained, but drainage ranges from good to poor. The relief is prevailingly gently sloping to strongly sloping but ranges from nearly level to steep. Some of the upland soils are severely eroded.

Much of the acreage is fairly free of stones, but on some ridgetops there are quartz cobblestones as much as 8 inches in diameter. A few large granite boulders occur west to northwest of West Springs Church in the southeastern part of the county. Rock crops out in a few places on some of the Wilkes and Goldston soils. Northwest of Saluda there is an area about 200 acres in size that is mostly coarse-grained granite. This material is being used by the county to construct roads.

The soils on the uplands developed from residual material that weathered from crystalline rock and Carolina slate. Carolina slate consists of volcanic and sedimentary rock, possibly of the Paleozoic era. It is composed of various proportions of slate and siltstone, probably in part tuffaceous; of rhyolitic and andesitic flow; and of breccias. It is well bedded and has the appearance of water-laid deposits.

On the old high terraces along the larger streams, the soils consist of alluvium washed from the uplands and deposited on old flood plains. The subsequent cutting of stream channels left these deposits well above the present flood plains. The soils on the uplands and on stream terraces are medium acid to strongly acid. They contain very little organic matter and are low to very low in fertility.

The soils on the bottom lands consist of alluvium recently deposited by floodwater and by wash from adjoining uplands. Many of these soils are high in fertility. They are medium acid to strongly acid and contain a moderate supply of organic matter.

In the Coastal Plain region, locally known as the ridge, the soils developed from beds of unconsolidated, sedimentary deposists of sand and clay. They are overlain by 2 to 40 inches, or more, of sandy loam, loamy sand, or sand.

The soils in this region, particularly those on the uplands, have been severely leached. They are mostly well drained, but drainage ranges from poor to excessive. The poorly drained soils on the uplands are locally called bays. Because of poor drainage, they have a surface layer of dark loam or sandy loam and a subsoil of gray, mottled sandy clay.

The relief is prevailingly nearly level, gently sloping, or sloping; but it ranges from nearly level to steep. On the sharp breaks, some soils are severely eroded. The hilltops are large, nearly level areas. These formations evidently were formed, in part, by the wind.

The soils on the uplands are low to medium in fertility and contain very small to moderate amounts of organic matter. They are medium acid.

Climate

Saluda County has long, hot summers and short, mild winters. Table 10, compiled from records of the United States Weather Bureau at Saluda, gives the normal monthly, seasonal, and annual temperatures. The coldest months normally are December and January. The soils occasionally freeze to a depth of 3 to 5 inches. The hottest months are July and August.

The wettest season is summer, and the driest is fall. Moderately dry periods of short duration are common in these seasons. These dry periods do some damage to crops but are favorable for harvesting hay and cotton crops. Moisture conditions generally are favorable in winter and spring, but dry periods of short duration sometimes occur late in spring.

The average annual precipitation is 46.25 inches, and the average temperature is 62.9. The latest killing frost is in April, and the earliest is late in October. The growing season averages 211 days.

Settlement and Development

The early settlers of Saluda County found a forest of hardwoods and pine. Shortleaf pine was dominant in the central and northern parts, and longleaf pine was dominant in the southeastern. Chestnut trees grew on a ridge in the northwestern part of the county.

The first settlers were mostly hunters, trappers, and traders. They were followed by settlers interested in collecting and herding cattle for markets at Charleston and other distant towns. About this time the area also

TABLE 10.—*Temperature and precipitation at Saluda, Saluda County, South Carolina*

[Elevation, 536 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1925)	Wettest year (1929)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	45. 7	81	7	4. 00	2. 62	4. 89	0. 2
January	45. 4	83	4	3. 77	9. 38	3. 91	. 5
February	47. 4	83	7	4. 48	1. 27	10. 57	. 6
Winter	46. 2	83	4	12. 25	13. 27	19. 37	1. 3
March	55. 0	92	8	4. 32	1. 38	9. 88	. 1
April	62. 1	96	21	3. 51	1. 19	5. 58	(3)
May	70. 7	103	35	3. 15	1. 67	7. 74	(3)
Spring	62. 6	103	8	10. 98	4. 24	23. 20	. 1
June	78. 1	106	43	4. 40	2. 17	5. 81	0
July	80. 3	108	51	4. 77	1. 86	6. 09	(3)
August	79. 2	108	50	5. 04	1. 00	1. 17	0
Summer	79. 2	108	43	14. 21	5. 03	13. 07	(3)
September	74. 9	109	36	3. 50	1. 46	6. 77	0
October	63. 3	97	21	2. 99	2. 31	11. 79	(3)
November	52. 7	89	12	2. 32	2. 99	5. 45	. 1
Fall	63. 6	109	12	8. 81	6. 76	24. 01	. 1
Year	62. 9	109	4	46. 25	29. 30	79. 65	1. 5

[1] Average temperature based on a 53-year record, through 1955; highest temperature on a 47-year record and lowest temperature on a 46-year record, through 1952.

[2] Average precipitation based on a 54-year record, through 1955; wettest and driest years based on a 49-year record, in the period 1902–1955; snowfall based on a 47-year record, through 1952.

[3] Trace.

was being settled by persons interested in farming. The sandy soils in the southern and northern parts were more easily worked than those in other parts, and these sections were the first settled and the most extensively farmed. Scotch families settled in the northwestern part, on the ridge covered with chestnut trees.

Saluda County was created by the Constitutional Convention of 1895. The 1960 census showed the population to be 14,554. Saluda is the largest town, and Ridge Spring is the next largest. Other towns are Batesburg, Ward, and Monetta. The population of the county has decreased since 1950; there has been a slight increase in urban population, and a slight decrease in rural population.

The schools were consolidated in 1952 and 1953. There are now six elementary schools and four high schools. Pupils are transported to school by bus.

There are several small industries in the county. Bedspreads, shirts, socks, and underwear are manufactured. Many residents work in nearby counties.

Forest covers about 54 percent of the county. It is composed mainly of pine that has been planted or that has reseeded naturally on cleared soils. The forest products are mostly pulpwood and lumber. Much of the pulpwood is shipped to papermills from a siding at Ward or from adjoining counties. There are two lumber mills in the county.

In 1930 farmers began mechanizing farm operations, and by 1954 there were 1,086 tractors in the county. Many former agricultural workers are now employed by companies producing forest products or by other industries in the county.

Several paved or tar-and-gravel Federal and State highways cross Saluda County. Well-maintained tar-and-gravel roads reach all parts of the county. There are also many unimproved dirt roads, but in winter these roads are almost impassable.

The only railroad entering the county is the Southern Railway. It passes through Monetta, Ridge Spring, and Ward and connects Columbia, S.C. and Augusta, Ga. Some freight is shipped from Chappells in Newberry County, on the Greenville and Columbia branch of the Southern Railway.

Electricity is available to all communities. Much of the stationary power used on farms is furnished by electric motors. Many of the rural houses have electric stoves, radios, and television sets. Telephone service is maintained in the towns and suburbs and is available to many farmhouses along the main roads.

Streams, ponds, and drilled wells are the chief sources of water for livestock. Most of the water used for irrigation is from ponds. Farm homes are supplied by drilled, or bored, wells. The smaller streams and some wells are dry late in summer and in fall.

Water for Saluda is pumped from Red Bank Creek. Water for Batesburg is pumped from Duncan Creek in Lexington County. Ridge Spring is supplied by a deep well. Monetta and Ward are supplied by individual wells.

There are more than 1,000 farm ponds in the county that are from a quarter of an acre to 15 acres in size. The backwaters of Lake Murray occupy about 5,000 acres.

Agriculture

Ever since the county was first settled, it has been chiefly agricultural. Until the Civil War, crops were grown mainly for home use. The principal crops were corn, wheat, and oats. Almost every farmer raised cattle, hogs, and sheep. Timbered areas were used for pasture. If a field became so eroded that crops could not be profitably grown, it was abandoned and a new area cleared. The abandoned areas grew up in pine.

After the Civil War, it was necessary to grow a crop that would bring a ready cash return, and cotton was the crop grown. Little attention was given to the raising of stock or the growing of other crops. Poor management of the soils resulted in yields so low that it was not profitable to farm unless commercial fertilizers were used. Many landowners moved, and tenants operated the farms.

In the early part of this century, soils on which row crops were grown were left bare during the winter months. Little plowing was done until early in spring.

Then the soils were shallowly plowed and cultivated. Yields were low, and the soils were seriously damaged by erosion.

At that time there was no systematic rotation of crops. Cotton followed cotton, and corn followed corn. No cover crops were grown to supply organic matter. This two-crop system of farming lowered the productivity of the soils and increased the hazard of erosion. In 1900 there were about 40,800 acres in cotton, 32,000 acres in corn, 13,500 acres in oats, 7,500 acres in wheat, and less than 4,000 acres in all other crops combined.

Early in the 1900's, the growing of vegetables and peaches for northern markets developed on a small scale in the southern part of the county. Peaches are still grown, mostly for shipment to northern markets. From about 1920 to 1940, sweetpotatoes were grown in the vicinity of Ward. There is still a small acreage in sweetpotatoes.

Crops

The principal crops of the county are oats, corn, cotton, lespedeza, soybeans, and wheat. Table 11 shows the acreage of the principal crops for stated years. There has been a decline in the acreage in row crops and an increase in the acreage in close-growing crops, particularly oats. Oats are grown for grain, hay, and grazing. Annual lespedeza is grown mainly for hay. In a favorable year, annual lespedeza yields as much as 1½ tons of hay per acre. Sericea lespedeza is grown for hay and seed. It requires one season to establish a root system. It then can be cut for hay two or three times a season, and, if fertilized, produces good yields for a number of years.

The factors that contributed to the decline in the acreage in cotton are (1) infestation by the boll weevil, (2) low prices during the depression, (3) government acreage controls, and (4) increased acre yields through improvement in methods of farming.

TABLE 11.—*Acreage of principal crops for stated years*

Crop	1929	1939	1949	1954
	Acres	*Acres*	*Acres*	*Acres*
Cotton	25, 279	17, 871	16, 540	8, 763
Corn harvested for grain	23, 555	27, 141	21, 361	14, 796
Oats threshed or combined	6, 277	9, 370	10, 584	14, 826
Wheat threshed or combined	4, 935	7, 385	3, 106	2, 930
Barley threshed or combined	13	311	231	238
Small grains cut for hay	30	69	191	3, 943
Lespedeza cut for hay	(1)	5, 226	6, 462	4, 236
Soybeans, all purposes	15	3, 193	1, 539	3, 022

[1] Not reported.

Crops that are grown less extensively include sorghums, cowpeas, rye, peanuts, Irish potatoes, sweetpotatoes, watermelons, cantaloups, asparagus, Turkish tobacco, alfalfa, and crotalaria. Milo, a grain sorghum, grows well. Vegetables are grown mainly for home use, but some are marketed in Columbia. Some pecans are produced.

Peaches are grown for commercial use in the southern part of the county. There are fairly large orchards near Ridge Spring. The trees are fertilized and sprayed. They produce good quality fruit, most of which is shipped to northern markets. There were 128,721 peach trees in the county in 1954.

In 1954 there were 201 grapevines in the county. Since then many vines have been planted. The fruit is sold to companies making grapejuice.

Livestock

Table 12 shows the number of livestock in the county in stated years. A comparison of the census figures of 1954 with those of 1950 shows that in 1954 there was a large increase in the number of cattle; there were fewer horses and mules; and slightly fewer hogs and pigs. The number of chickens declined, but the number of turkeys increased tremendously.

TABLE 12.—*Livestock of all ages on farms in stated years*

Livestock	1950	1954
Horses and mules	2, 782	1, 703
Cattle and calves	9, 293	17, 959
Milk cows	3, 690	4, 727
Hogs and pigs	7, 634	7, 614
Turkeys raised	9, 689	28, 808
Chickens	[1] 96, 775	[1] 87, 017

[1] Over 4 months old.

Land Use

In 1954 there were 204,233 acres in farms. This included 53,036 acres of cropland harvested; 8,102 acres of cropland not harvested and not pastured; 19,169 acres of cropland used only for pasture; 16,802 acres, not cropland and not woodland, in pasture, of which 5,500 acres was in improved pasture; 67,744 acres in woodland not pastured; 34,567 acres in woodland pastured; and 4,813 acres in other land, including house lots, roads, and wasteland. About 54 percent of the county was in forest.

There were fewer farms in the county in 1954 than in 1950, but the size of the farms had increased and there were fewer general farms. In 1950 there were 2,376 farms averaging 92.8 acres in size; in 1954 there were only 1,964 farms, but they averaged 104 acres in size. In 1950, 960 farms produced mainly field crops other than vegetables, fruits, and nuts; in 1954, farms of this type had decreased to 595. In 1950 there were 47 dairy farms, 150 poultry farms, and 20 livestock farms other than dairy and poultry farms. By 1954 the dairy farms had increased to 115, the poultry farms had decreased to 86, and the livestock farms had increased to 120.

Conservation

The early settlers cleared land, cropped it intensively, then abandoned it and cleared new land. Later, large acreages were used continuously for cotton. There was no systematic rotation of crops, and no effort was made to replenish the exhausted supply of organic matter. At one time the bottom lands were extensively cultivated, but after the uplands were cleared floods became so de-

structive that cultivating the bottom lands was not practical.

The change to conservation farming began in the 1930's. The Soil Erosion Service and Civilian Conservation Corps, both established in the early thirties, began the trend. In 1930 Saluda County became part of the Lower Saluda Soil Conservation District, and in 1947 it was established as a separate district. The Soil Conservation Service has been providing technical assistance in farm planning through the soil conservation district.

Many farmers in the county now use crop rotations that keep one-half to three-fourths of their cultivated soils in close-growing crops. Much of the bottom land is flooded too often to cultivate and is used for pasture. Terracing has helped to reclaim some severely eroded areas on the uplands, but shallow gullies still remain. Cultivated fields are protected by terracing, sodding waterways, tilling and cultivating on the contour, rotating crops, and growing cover crops.

Many areas have reverted to or have been planted to pine. The United States Forest Service has jurisdiction over the Sumter National Forest, 4,235 acres of which is in Saluda County. A substantial acreage of timbered land is owned by paper companies, forest-product companies, and private landowners. About 90 percent of the woodland is in pine.

Erosion

Nearly all of the upland soils in the county have been cleared and cultivated at one time or another since the county was first settled. Most of these soils have been damaged by erosion. Soils that have been the least damaged occur on stream divides where the slope is gentle. Accelerated sheet erosion is active on soils derived from Carolina slate. These soils are fine textured and have a slow rate of infiltration.

There have been two major periods of change in the use of land in the county. The first occurred during and immediately after the Civil War. As large acreages used for cotton became eroded, they were abandoned and grew up in second-growth pine. The second period began in the 1920's when certain areas were allowed to revert to forest. By 1954 more than half the acreage in the county was in forest.

Pasture Management

The fine-textured soils of the Piedmont are suited to grasses, and much of the acreage once planted to cotton is now in pasture.

Operators of dairy farms and beef-cattle farms recognize the importance of liberal fertilization and rotational grazing. Many operators are trying new species of grasses that have proven suitable for the soils of the county.

The most commonly grown grasses are bermudagrass, dallisgrass, tall fescue, carpetgrass, and some bahiagrass. Native grasses, especially those growing on bottom lands, are pastured. If these pastures are not well fertilized, broomsedge becomes dominant. It can be used for pasture but is a poor substitute for the better grasses.

White clover is the principal legume. Crimson clover, annual lespedeza, and sericea lespedeza also grow well.

The poor permanent pastures in Saluda County are mostly on soils that are moderately gullied, steep, stony, sandy, or very severely eroded. The vegetation in these areas consists of povertygrass, broomsedge, common lespedeza, and bulrush.

Good permanent pastures are more common on nearly level to strongly sloping soils that are less severely eroded and on soils that are moderately wet. These pastures have been seeded, or sprigged, to bermudagrass, dallisgrass, bahiagrass, whiteclover, annual lespedeza, and sericea lespedeza for grazing late in spring, in summer, and in fall, and to tall fescue and whiteclover for grazing in winter and early in spring. Some soils are not well suited to legumes and should be seeded only to grasses.

The ideal pasture stand consists of about half grasses and half legumes. To obtain a good stand, it is necessary to prepare a good seedbed. The soil, or old sod, should be broken with a disk tiller or disk harrow. Fertilizer and lime should be worked into the soil before seeding. After sod is established, lime can be applied as a topdressing every 3 to 4 years.

Phosphate is essential for legumes and, if applied with nitrogen, is also beneficial to grasses. Phosphate on pastures is not readily lost through leaching, and pasture plants do not use large amounts. Small amounts applied each year, or larger amounts applied every 3 to 4 years, are effective. Phosphate also can be applied as topdressing.

Grasses and legumes need potassium. Moderate amounts of potash give good response, especially if applied to sandy soils.

Nitrogen is most effective if applied frequently in small amounts. It is more beneficial to grasses than to mixtures of grasses and legumes.

Controlled grazing is essential for high yields of pasture plants. If whiteclover is included in a mixed sod, frequent grazing is needed to keep the grasses from crowding out the clover.

The best time to renovate pastures that are not productive is early in summer. The old sod should be broken with a heavy disk harrow or with a subsoiler and pulverized with a lighter disk harrow. The old sod acts as a mulch and protects the soil from erosion until a new stand is established. Lime and fertilizer should be applied and thoroughly mixed with the soil. Then a suitable mixture of grasses and legumes should be seeded. Pastures that have not been previously renovated need more phosphate than those that have.

If areas to be renovated are not too strongly sloping, they can be seeded to annuals 1 year before seeding to permanent grasses and legumes. By the following year the old sod has decayed and the soils are in better condition for the seeding of perennial grasses and legumes.

Pastures need to be mowed two or three times a season to control obnoxious weeds and woody plants. The residue from these plants acts as an organic mulch and protects the soil from accelerated erosion. It also adds small amounts of organic matter that increase the activities of soil micro-organisms. In addition it protects the soil from the direct rays of the sun, thereby decreasing loss of moisture by evaporation.

Mixtures of small grain and legumes or of ryegrass and crimson clover should be planted annually for supplemental grazing late in fall, in winter, and early in spring. Annual plantings of sudangrass or millet will supplement grazing late in summer and early in fall.

On many dairy farms and beef-cattle farms, a mixture of small grain, rye grass, and crimson clover is sown annually for winter grazing. This mixture provides grazing until late in spring and protects the soil from erosion until the plants die or are plowed under.

Irrigation

Irrigation is fairly new to the farmers of Saluda County. The irrigation of specialized crops is now being tried by a few farmers. These crops include peaches, corn for silage, and pasture plants on some dairy farms. Sprinkling is the method best suited to local conditions.

Soils that have a surface layer of sandy loam to loamy sand are best suited to irrigation. Fine-textured soils that have a slow or very slow rate of infiltration are not well suited. It is not practical to irrigate soils that have a shallow surface layer and a low water-holding capacity or soils that are rapidly permeable. It is also not practical to irrigate soils that have slopes of more than 8 to 10 percent.

Drainage

Drainage is not a major problem in Saluda County. Most soils on the uplands and terraces are well drained to moderately well drained. The less well drained soils are on first bottoms, in small drainageways, and in bays.

Shallow drains that have a slight gradient are needed to remove excess water from the Alamance, Altavista, Chewacla, Colfax, Congaree, Helena, and Orange soils that have slopes of 1 percent or less. The Grady soils are in bays and need to be drained by open ditches. The alluvial land types also need to be drained.

Artificial drainage generally is not needed on the other soils in the county. In places water that runs off hillsides should be diverted by ditches so that it will not accumulate on the bottom lands.

Ponds

Saluda County is well supplied with sites suitable for farm ponds, and more than 1,000 ponds have been built. These ponds are a major source of water for livestock, and they also supply water for supplemental irrigation of crops (fig. 12). Most ponds are stocked with fish.

In constructing farm ponds, it is important to (1) select a site where the maximum pond area can be obtained at a minimum cost, (2) prevent seepage under or through the dam by the proper design and construction of the dam and by the use of suitable fill material, (3) provide emergency spillways to carry off surplus storm water, and (4) sod the dam and spillways to prevent erosion.

Table 7 in the subsection "Features Affecting Engineering Work" gives some of the soil properties that affect the suitability of the soils for farm ponds.

Figure 12.—**Watering pond for stock to provide better use of improved pasture on Georgeville and Herndon soils.**

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Glossary

Acidity.—See Reaction.
Alluvium.—Sand, mud, and other sediments deposited on land by streams.
Bedrock.—The solid rock underlying soils and other earthy surface formations.
Clay.—As a soil separate, mineral soil grains less than 0.002 millimeter in diameter. As a textural class, soil that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
Clayskins.—A thin coating of clay particles on the faces of soil aggregates.
Colluvium.—Soil material that has moved downhill and has accumulated on the lower parts of slopes and at the foot of hills. Colluvial material is moved downhill by the force of gravity and, to some extent, by soil creep, frost action, and local wash.
Consistence.—The combination of properties of soil material that determine its resistance to crushing and its ability to be molded or changed in shape. Consistence depends mainly on the forces of attraction between soil particles. Consistence is described by such words as loose, friable, firm, soft, plastic, and sticky.
Contour furrows.—Furrows plowed at right angles to the direction of the slope, at the same level throughout, and at regular intervals.
Duck fields.—A field planted with duck food plants, such as browntop millet, smartweed, and corn, then flooded to attract wild ducks.
Erosion.—The wearing away or removal of soil material by water or wind.

Fertility, soil.—The presence in a soil of the necessary elements, in sufficient amounts, in the proper balance, and available for the growth of specified plants, when other factors, such as light, temperature, and the physical condition of the soil, are favorable.

Firebreak (forestry).—An existing barrier, or one constructed before a fire occurs, from which inflamable materials have been removed. A barrier designed to stop or check creeping or running fires. Also serves as a line from which to work and to facilitate the movement of men and equipment in suppressing fires.

First bottom.—The normal flood plain of a stream. Some first bottom areas are flooded frequently, others at less frequent intervals.

Genesis, soil.—Mode of origin of the soil; refers particularly to the processes responsible for the development of the solum from unconsolidated material.

Gravel.—A mass of rounded rock fragments between 2.0 millimeters and 3 inches in diameter.

Green-manure crops.—Any crop grown for the purpose of being turned under while green or soon after maturity to improve the soil.

Horizon, soil.—A layer, approximately parallel to the land surface, with distinct characteristics produced by soil-forming processes.

Horizon A.—The surface horizon of a mineral soil, having maximum biological activity, or eluviation (removal of materials dissolved or suspended in water, or both).

Horizon B.—A soil horizon, usually beneath an A horizon, or surface soil, in which (1) clay, iron, or aluminum, with accessory organic matter, have accumulated as a result of removal of material in suspension from the A horizon or by clay development in place; (2) the structure is blocky or prismatic; or (3) there is some combination of these features. In soils that have distinct profiles, the B horizon is roughly equivalent to what is generally termed the subsoil.

Horizon C.—The unconsolidated rock material in the lower part of the soil profile, like that from which the upper horizons (or at least a part of the B horizon) have developed.

Horizon D.—Any stratum underlying the soil profile that is unlike the material from which the soil has formed.

Internal drainage.—The movement of water through the soil profile. The rate is affected by the texture of the surface soil and subsoil, and by the height of the ground water table, either permanent or perched. Relative terms for expressing internal drainage are very rapid, rapid, medium, slow, very slow, and none.

Loam, soil.—Soil having approximately equal amounts of sand, silt, and clay.

Mottled.—Irregularly marked with spots of color. A common cause of mottling is imperfect or impeded drainage.

Normal soil.—A soil having a profile in near equilibrium with its environment; developed under good, but not excessive, drainage from parent material of mixed mineral, physical, and chemical composition; and expressing in its characteristics the full effects of the forces of climate and living matter.

Parent material.—The weathered rock or partly weathered soil materials from which a soil has formed. The C horizon.

Permeable.—Easily penetrated by water and air.

Phase, soil.—That subdivision of a soil having variations in characteristics not significant to the classification of the soil in its natural landscape but significant to the use and management of the soil. The variations are chiefly in such external characteristics as relief, stoniness, or erosion.

Productivity.—The capability of a soil to produce a specified plant or sequence of plants under a defined set of management practices.

Profile, soil.—A vertical section of the soil extending through all the horizons and into the parent material.

Reaction.—The degree of acidity or alkalinity of the soil mass, expressed in pH values or in words, as follows:

	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.

Runoff.—Surface drainage of rain or melted snow.

Sand.—As a soil separate, individual mineral particles, mostly of quartz, between 0.05 millimeter and 2.0 millimeters in size. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Series, soil.—A group of soils that have horizons similar in differentiating characteristics, except for texture of the surface soil, and in arrangement in the profile, and that formed from a particular type of parent material.

Silt.—As a soil separate, individual mineral particles between 0.002 millimeter and 0.05 millimeter in size. As a textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Soil.—The natural medium for the growth of land plants. A soil is a natural three-dimensional body on the surface of the earth, unlike the adjoining bodies.

Solum.—The upper part of the soil profile, above the parent material, in which the processes of soil formation are taking place.

Structure, soil.—The aggregation of primary soil particles into compound particles or clusters of primary particles; the aggregates are separated by surfaces of weakness. Soil structure is classified according to grade, class, and type.

Grade.—Distinctness of aggregation. It is described as weak, moderate, or strong.

Class.—Size of aggregates. It is described as very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

Type.—Shape and arrangement of aggregates. The common types are platy, prismatic, columnar, blocky, subangular blocky, granular, and crumb.

Subsoil.—Technically, the B horizon; roughly, that part of the profile below plow depth.

Substratum.—Any layer beneath the solum.

Surface drainage.—Removal of water by flow over the surface of the soil. The rate is affected by the slope, ground cover, and texture of the soil.

Surface soil.—The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace (geological).—An old alluvial plain, usually flat or undulating, bordering a stream; frequently called second bottoms, as contrasted with flood plains; seldom subject to overflow.

Texture, soil.—The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. A coarse-textured soil is one high in content of sand; a fine-textured soil is one high in content of clay.

Topsoil.—A general term used in at least four different senses: (1) A presumably fertile soil material, usually rich in organic matter, used to topdress roadbanks, lawns, and gardens; (2) the plow layer of a soil, and thus a synonym for surface soil; (3) the original or present dark-colored upper soil, which ranges from a mere fraction of an inch to 2 or 3 feet deep in different kinds of soil; and (4) the original or present A horizon, varying widely among the different soils. If applied to soils in the field, the term has no precise meaning unless defined as to depth or productivity in relation to a specific kind of soil.

Type, soil.—A subdivision of a soil series, based on the texture of the surface soil.

Upland (geologic).—Land consisting of material unworked by water in recent geologic time and lying, in general, at higher elevations that the alluvial plain or stream terrace.

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If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

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program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Supplemental Nutrition Assistance Program

For additional information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, call either the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or the State Information/Hotline Numbers (http://directives.sc.egov.usda.gov/33085.wba).

All Other Inquiries

For information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices (http://directives.sc.egov.usda.gov/33086.wba).