SOIL SURVEY OF

Greenwood and McCormick Counties, South Carolina

United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
South Carolina Agricultural Experiment Station
and
South Carolina Land Resources Conservation Commission

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

Major fieldwork for this soil survey was completed in the period 1965–72. Soil names and descriptions were approved in 1973. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1973. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, the South Carolina Agricultural Experiment Station, and the South Carolina Land Resources Conservation Commission. It is part of the technical assistance furnished to the Greenwood and McCormick Counties Soil and Water Conservation Districts.

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

All the soils of Greenwood and McCormick Counties are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

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

Finding and Using Information

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

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

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

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and for recreation areas in the section "Engineering Interpretations" and "Town and Country Planning."

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

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

Newcomers in Greenwood and McCormick Counties may be especially interested in the section "General Soil Maps," where broad patterns of soils are described. They may also be interested in the information about the counties given in the section "Additional Facts About the Counties."

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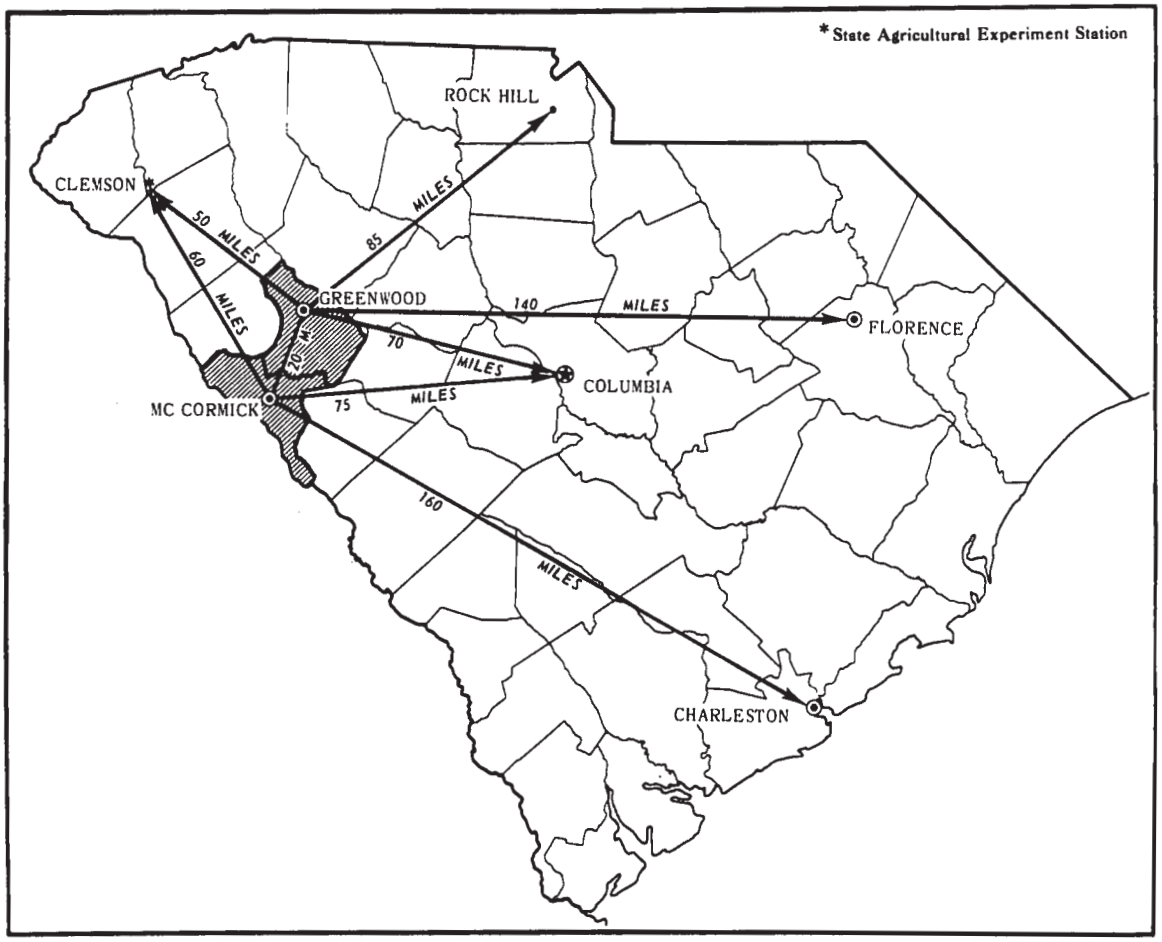

Location of Greenwood and McCormick Counties in South Carolina.

SOIL SURVEY OF GREENWOOD AND McCORMICK COUNTIES, SOUTH CAROLINA

BY WALLACE J. CAMP AND EDWARD C. HERREN, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY W. H. FLEMING, WALLACE J. CAMP, AND E. C. HERREN, SOIL CONSERVATION SERVICE, AND L. E. ANDREW, FOREST SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE AND FOREST SERVICE IN COOPERATION WITH THE SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION AND THE SOUTH CAROLINA LAND RESOURCES CONSERVATION COMMISSION

GREENWOOD AND McCORMICK COUNTIES are in the western part of South Carolina. (See map on facing page.) Greenwood County occupies approximately 292,400 acres, or 457 square miles. Also, about 6,400 acres, or 10 square miles, in the county is under water, mostly under Greenwood Lake. Greenwood is the county seat of Greenwood County.

McCormick County occupies approximately 260,000 acres, or 406 square miles. In addition, about 23,000 acres, or 36 square miles, in the county is occupied by the Clark Hill Reservoir. McCormick is the county seat of this county.

Forests occupy about 74 percent of Greenwood County and about 92 percent of McCormick County. Private pulp and paper companies own large areas of woodland in these counties. Sumter National Forest covers about 10,000 acres in Greenwood County and about 48,000 acres in McCormick County. The U.S. Army Corps of Engineers administers about 48,600 acres along the shoreline of the Clark Hill Reservoir. State parks make up about 1,100 acres.

Most of the soils in these counties have a loamy surface layer. A large acreage of the soils is suitable for cotton, corn, soybeans, grain sorghum, other row crops, and pasture. The soils most used for cultivated crops and pasture are Appling, Cecil, Coronaca, Davidson, Enon, Hiwassee, Herndon, Georgeville, Iredell, and Mecklenburg soils. The more sloping soils are susceptible to erosion. The strongly sloping to steep soils are well suited to use as woodland.

Most of the farm income in these counties is from the sale of livestock, soybeans, and grain. Streams and ponds are the chief sources of water for livestock. Wells provide water for most of the rural population.

The manufacture of textiles is an important industry in both counties.

Lake Greenwood, Clark Hill Reservoir, and the State parks located in these counties provide areas for recreational activities, such as boating, water skiing, fishing, and camping. These areas also provide natural settings for picnic areas and nature trails.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Greenwood and McCormick Counties, where they are located, and how they can be used. The soil scientists went into the counties knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

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

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Cecil sandy loam, 2 to 6

percent slopes, is one of several phases within the Cecil series.

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

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

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Greenwood and McCormick Counties: the soil complex and the undifferentiated group.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Cecil-Urban land complex, 2 to 6 percent slopes, is an example of a complex in this survey area.

An undifferentiated group is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value gained by separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Cartecay and Toccoa soils is an example of an undifferentiated group in this survey area.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called miscellaneous areas and are given descriptive names.

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

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Maps

The general soil maps at the back of this survey show, in color, the soil associations in Greenwood and McCormick Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in these counties have been grouped into three general kinds of landscapes for broad interpretative purposes. Each of the broad groups and its included soil associations are described in the following pages.

Information about the soils in each of the six associations is given in the section "Descriptions of the soils."

Soils That Are Loamy Throughout; on Flood Plains

This group consists of soils on flood plains along major streams and their tributaries. The soils formed in loamy alluvial sediment. Deposits of soil material are being continuously laid down by streams during floods. These recent deposits have a fine textured and medium textured, stratified surface layer. Many scars and scoured areas appear to have been old stream channels. In places the water table is near the surface for 6 months or more in most years.

1. Cartecay-Toccoa-Chewacla association

Nearly level, well drained to somewhat poorly drained soils

This association is on flood plains along Saluda, Little, and Savannah Rivers and along Coronaca, Wilson, Turkey, Mulberry, Ninety Six, Hard Labor, Cuffytown, Horsepen, Calhoun, Long Cane, Rocky, Buffalo, Stephens, and Stevens Creeks and their tributaries. The soils formed mainly in loamy alluvial sediment washed from soils on uplands. They are flooded frequently for short periods.

This association makes up about 6 percent of Greenwood County and 6 percent of McCormick County. The association is about 50 percent Cartecay and similar soils, 30 percent Toccoa and similar soils, 12 percent Chewacla soils, and 8 percent minor soils.

Cartecay soils are in intermediate positions on flood plains. The surface layer is dark brown very fine sandy loam over strong brown, yellowish brown, and gray sandy loam mottled with shades of gray, yellow, and brown.

Toccoa soils are on the upper reaches of the drainage pattern. The surface layer is brown sandy loam over reddish brown and yellowish brown, stratified sandy loam and sandy clay loam.

Chewacla soils are mainly on flood plains. The surface layer is brown loam over dark yellowish brown and brown loam that has brownish gray mottles. The next layer is grayish brown clay loam that has light grayish brown and brownish yellow mottles. Beneath this layer is gray, stratified loamy sand.

Minor in this association are Wehadkee and Worsham soils. Wehadkee soils are poorly drained and are in elongated areas adjacent to uplands. Worsham soils are poorly drained and are in small drainageways, at heads of drainageways, and in upland depressions.

Most of this association in Greenwood County is in pasture, and most of it in McCormick County is woodland. All of the soils can be used for pasture and wetland hardwoods. Woodland products are used for pulpwood.

The soils of this association provide suitable habitat for woodland and wetland wildlife.

Because of frequent flooding, the soils have severe limitations for dwellings that use onsite sewage disposal, as industrial sites, or for recreational uses.

Soils That Have a Silty Surface Layer and a Mostly Clayey Subsoil; on Uplands

This group consists of soils that formed in a regolith that weathered from the underlying bedrock of Carolina Slate. They are dominantly well drained.

2. Tatum-Goldston-Nason association

Dominantly sloping to steep, well drained to excessively drained soils

This association is on narrow, strongly sloping ridge crests and strongly sloping, moderately steep or steep side slopes adjacent to streams.

This association makes up about 3 percent of Greenwood County and 8 percent of McCormick County. The association is about 35 percent Tatum soils, 34 percent Goldston soils, 10 percent Nason soils, and 21 percent minor soils.

Tatum soils generally have a surface layer of brown loam, but in eroded areas they have a surface layer of yellowish red or reddish brown silty clay loam. The subsoil is mainly red clay loam to silty clay loam that has reddish yellow mottles in the lower part.

The Goldston soils have a surface layer of dark grayish brown slaty silt loam over light yellowish brown slaty silt loam that is interrupted at intervals by a subsoil of yellowish brown clay loam.

Nason soils have a surface layer of dark grayish brown loam. The subsoil is reddish yellow silty clay loam, yellowish brown silty clay that has red mottles, and yellowish brown silty clay loam that has yellowish red mottles.

Minor in this association are Alamance, Georgeville, and Herndon soils. Alamance soils are well drained and are in gently sloping areas between drainage patterns. Georgeville and Herndon soils are well drained. They are on gently sloping, broad ridges and sloping, medium-width ridges.

About 90 percent of this association is forested. The rest is in pasture, is idle, or is in cultivated crops. These soils are better suited to forest. The trees are used for woodpulp.

The soils of this association are suited to habitat for woodland wildlife. There are some sites for embankment-type ponds.

The soils have severe limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities. They are subject to erosion.

3. Georgeville-Herndon-Kirksey association

Gently sloping to sloping, well drained and moderately well drained soils

This association is on broad, gently sloping ridges and medium-width, sloping ridges that are dissected by long, shallow drainageways.

This association makes up about 13 percent of Greenwood County and 26 percent of McCormick County. The association is about 62 percent Georgeville soils, 20 percent Herndon soils, 9 percent Kirksey soils, and 9 percent minor soils.

Georgeville soils generally have a surface layer of brown silt loam, but in eroded areas they have a surface layer of yellowish red or reddish brown silty clay loam. The subsoil is mainly red silty clay that has reddish yellow mottles in the lower part.

The Herndon soils have a surface layer of brown silt loam. The upper part of the subsoil is reddish yellow clay loam that has yellowish red mottles, the middle part is yellowish brown clay that has yellowish red and reddish yellow mottles, and the lower part is yellowish brown clay that has reddish yellow, yellowish red, and red mottles.

Kirksey soils have a surface layer of light yellowish brown silt loam. The subsoil is olive yellow silt loam that has reddish yellow mottles, yellow silty clay loam that has brownish yellow mottles, yellowish brown clay loam that has gray and yellowish red mottles, and silty clay loam that has yellowish brown, gray, and yellowish red mottles.

Minor in this association are Alamance, Tatum,

Nason, Davidson, Goldston, Coronaca, Enon, and Hiwassee soils. Tatum, Nason, and Goldston soils are strongly sloping to steep and are well drained to excessively drained. Davidson, Coronaca, and Hiwassee soils are on the higher side slopes. They have a red subsoil and are well drained. Alamance soils are in gently sloping areas between drainage patterns. They are well drained. Enon soils are on gently sloping, medium-width ridges. They are well drained.

About 85 percent of this association is forested or is in pasture. The rest is in cultivated crops, is idle, or is in nonfarm uses. General farming or cattle raising is practiced by owners on a part-time basis. Soybeans, grain sorghum, oats, and corn are the principal crops.

The soils in this association are suited to habitat for woodland wildlife. Food and cover for quail, rabbits, and squirrels are well distributed. There are many excellent sites for embankment-type ponds and lakes.

The soils have moderate limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities. They are subject to erosion.

Soils That Have a Dominantly Loamy Surface Layer and a Mostly Clayey Subsoil; on Uplands

This group consists of soils that formed in a regolith that weathered from the underlying bedrock of granite or gneiss. They are dominantly well drained.

4. *Wilkes-Pacolet association*

Dominantly strongly sloping to steep, well drained soils

This association is on narrow, strongly sloping ridge crests and strongly sloping, moderately steep and steep side slopes adjacent to streams. The soils formed in material weathered from granite or gneiss.

This association makes up about 8 percent of Greenwood County and about 12 percent of McCormick County. The association is about 56 percent Wilkes soils, 31 percent Pacolet soils, and 13 percent minor soils.

Wilkes soils generally have a surface layer of dark brown fine sandy loam. The upper part of the subsoil is yellowish brown clay, and the lower part is light yellowish brown clay loam that has yellowish brown mottles.

Pacolet soils have a surface layer of dark grayish brown sandy loam. The upper part of the subsoil is red clay, and the lower part is red clay loam that has reddish yellow mottles.

Minor in this association are Cecil, Enon, Hiwassee, and Cataula soils. Cecil and Hiwassee soils are well drained. Enon soils are well drained and have a plastic subsoil. Cataula soils are on gently sloping to strongly sloping ridges. They are well drained and are moderately deep to a fragipan.

About 90 percent of this association is forested. The rest is in pasture, is in cultivated crops, is idle, or is in nonfarm uses. Most farms in this association extend into other associations. The soils of this association are suited to habitat for woodland wildlife.

The soils have severe limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities.

5. *Cataula-Enon-Cecil association*

Dominantly gently sloping to strongly sloping, well drained soils

This association is on gently sloping medium-width ridges, sloping narrow ridges, and strongly sloping side slopes.

This association makes up about 10 percent of Greenwood County and 30 percent of McCormick County. The association is about 38 percent Cataula soils, 23 percent Enon soils, 20 percent Cecil soils, and 19 percent minor soils.

Cataula soils are on gently sloping, medium-width ridges, on sloping, narrow ridges, and on side slopes adjacent to drainageways. They are well drained. These soils generally have a surface layer of brown sandy loam, but in eroded areas they have a surface layer of reddish brown or yellowish red sandy clay loam. The upper part of the subsoil is red clay and red clay that has yellowish brown mottles. Below this is a red sandy clay fragipan. The lower part of the subsoil is mottled sandy clay loam. Cataula soils are moderately deep to the fragipan.

Enon soils are on sloping and strongly sloping side slopes. They are well drained. The surface layer is brown sandy loam. The upper part of the subsoil is yellowish brown clay that has yellowish red mottles in the upper layer and pale brown mottles in the lower layer; the lower part is yellowish brown clay loam that has very pale brown mottles.

Cecil soils are on sloping ridges and strongly sloping side slopes adjacent to small streams. They are well drained. They generally have a surface layer of brown sandy loam, but in eroded areas the surface layer is yellowish red or reddish brown sandy clay loam. The lower part of the subsoil is red clay that has strong brown mottles.

Minor in this association are Appling, Georgeville, Hiwassee, Wilkes, Davidson, and Pacolet soils. The Appling, Georgeville, Hiwassee, and Davidson soils are on gently sloping and sloping ridges. They are well drained. The Wilkes and Pacolet soils are on strongly sloping, moderately steep, and steep side slopes.

Most of this association in Greenwood County is in forest, and most of it in McCormick County is in pasture and forest. The remaining acreage is in cultivated crops, is idle, or is used as homesites.

The soils of this association are suited to poorly suited as habitat for open-land wildlife and are suited to well suited as habitat for woodland wildlife. Farm ponds provide good fishing.

The soils have severe limitations for dwellings that use onsite sewage disposal, and moderate limitations for use as industrial sites and recreational facilities.

6. *Helena-Appling association*

Gently sloping to sloping, moderately well drained and well drained soils

This association is on gently sloping broad ridges and sloping medium-width ridges.

This association makes up about 5 percent of Greenwood County. The association is about 43 percent Helena soils, 32 percent Appling soils, and 25 percent minor soils.

Helena soils are on gently sloping broad ridges and sloping medium-width ridges or on sloping side slopes adjacent to drainageways. They are moderately well drained and moderately deep to deep. The surface layer is brown loamy sand. The upper part of the subsoil is light yellowish brown sandy loam; the middle part is yellowish brown clay that has brownish yellow and red mottles; the next part is mottled yellowish brown, brownish yellow, light gray, yellowish red, and white clay; and the lower part is mottled yellowish brown, brownish yellow, yellow, yellowish red, very pale brown, white, and light gray clay loam.

Appling soils are on gently sloping broad ridges and on short breaking side slopes adjacent to shallow drainageways. They are deep and well drained. The surface layer is brown loamy sand. The upper part of the subsoil is yellowish brown clay that has yellowish red mottles, the middle part is reddish yellow clay that has red and very pale brown mottles, and the lower part is mottled red, strong brown, yellow, and very pale brown clay loam.

Minor in this association are Cataula, Durham, Cecil, and Louisburg soils. Cataula soils are moderately deep to a fragipan. Durham soils are on higher parts of gently sloping broad ridges. They are deep and well drained. Cecil soils are deep and well drained. Louisburg soils are on sloping to moderately steep side slopes. They are shallow or moderately deep and excessively drained to well drained.

Most of this association is forested or is idle. The rest is in cultivated crops or is used for homesites or other nonfarm uses. General farming is practiced by the owners on a part-time basis.

The soils of this association are suited to habitat for open-land wildlife and woodland wildlife.

The soils have moderate or severe limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities.

7. *Cecil-Hiwassee association*

Gently sloping to strongly sloping, well drained soils

This association is on irregular ridges that have gently sloping crests and sloping to strongly sloping side slopes adjacent to streams. It has long, crooked, well-defined drainageways.

This association makes up about 36 percent of Greenwood County. The association is about 57 percent Cecil soils, 27 percent Hiwassee soils, and 16 percent minor soils.

Cecil soils are on gently sloping broad ridges and sloping side slopes adjacent to drainageways. They are well drained. The surface layer is brown sandy loam, but in eroded areas it is yellowish red or reddish brown sandy clay loam. The subsoil is red clay that has strong brown mottles in the lower part.

Hiwassee soils are on gently sloping broad ridges and sloping medium-width ridges. They are well drained. The surface layer is dark reddish brown sandy loam. The upper part of the subsoil is dark red clay, and the lower part is dark red clay loam that has reddish yellow mottles.

Minor in this association are Davidson, Enon, Pacolet, Wilkes, and Mecklenburg soils. Davidson soils are dark red, deep, and well drained. Enon soils are yellowish brown, moderately deep to deep, and well drained. Mecklenburg soils are deep and well drained. Pacolet soils are on the severely eroded, strongly sloping side slopes. They are moderately deep. Wilkes soils are on steep side slopes. They are shallow and well drained. Most of this association is in cultivated crops or pasture. The rest is in pine forest or is in nonfarm uses.

The soils of this association are suited to poorly suited to habitat for open-land wildlife and well suited to suited to woodland wildlife. Farm ponds provide good fishing.

The soils have moderate to severe limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities.

8. *Mecklenburg-Hiwassee-Iredell association*

Nearly level to sloping, moderately well drained and well drained soils

This association is on broad ridges, on medium-width ridges, and on side slopes adjacent to streams. It has well-defined drainageways.

This association makes up about 7 percent of Greenwood County and 11 percent of McCormick County. The association is about 42 percent Mecklenburg soils, 20 percent Hiwassee soils, 18 percent Iredell soils, and 20 percent minor soils.

Mecklenburg soils are on the gently sloping medium-width ridges and side slopes adjacent to the drainageways. They are well drained. The surface layer is dark brown sandy loam. The upper part of the subsoil is yellowish red clay, the middle part is yellowish red clay that has yellowish brown mottles, and the lower part is yellowish red clay that has olive yellow mottles.

Hiwassee soils are on gently sloping and sloping side slopes adjacent to the streams. They are deep and well drained. The surface layer is commonly dark reddish brown sandy loam, but in eroded areas it is dusky red sandy clay loam. The upper part of the subsoil is dark red clay, the middle part is dark red clay loam that has reddish yellow mottles, and the lower part is red sandy clay loam that has brownish yellow mottles.

Iredell soils are on the nearly level to gently sloping broad ridges. They are moderately well drained. The surface layer is dark grayish brown sandy loam. The upper part of the subsoil is light olive brown clay, and the lower part is light olive brown clay that has olive and reddish yellow mottles.

Minor in this association are Cataula, Cecil, Coronaca, Enon, Pacolet, and Wilkes soils. Cataula soils are moderately deep to a fragipan. Cecil and Enon soils are well drained. Coronaca soils are deep and well drained; they are dark red. Pacolet soils are moderately deep and are on steep side slopes. Wilkes soils are shallow and are on steep side slopes.

Most of this association is in pasture and cultivated crops. The rest is forested. All of the soils, except the Pacolet and Wilkes soils, can be used for crops or pasture.

The soils of this association are suited to habitat for open-land and woodland wildlife.

The soils have moderate to severe limitations for

industrial sites, recreational facilities, and dwellings that use onsite sewage disposal.

9. *Coronaca-Enon-Mecklenburg association*

Dominantly gently sloping to sloping, well drained soils

This association is on gently sloping medium-width ridges, sloping narrow ridges, and sloping short side slopes along streams.

This association makes up about 6 percent of Greenwood County. The association is about 42 percent Coronaca soils, 23 percent Enon soils, 20 percent Mecklenburg soils, and 15 percent minor soils.

Coronaca soils are on gently sloping medium-width ridges and sloping side slopes adjacent to streams. They are deep and well drained. The surface layer is dark reddish brown clay loam. The upper part of the subsoil is dusky red to dark red clay, the middle part is red clay that has yellowish brown mottles, and the lower part is red clay that has brownish yellow mottles.

Enon soils are on short sloping side slopes adjacent to streams. They are well drained. The surface layer is brown sandy loam. The subsoil is yellowish brown. The upper part of the subsoil is clay that has yellowish red mottles, the middle part is clay that has pale brown mottles, and the lower part is clay loam that has very pale brown mottles.

Mecklenburg soils are in sloping areas along streams. They are deep and well drained. The surface layer is dark brown sandy loam. The subsoil is yellowish red clay that has yellowish brown mottles in the middle part and olive yellow mottles in the lower part.

Minor in this association are Cecil, Hiwassee, and Wilkes soils. Cecil and Hiwassee soils are deep and well drained. Wilkes soils are on sloping to steep side slopes. They are shallow and well drained.

Most of this association is in pasture and cultivated crops. The rest is forested. All of the soils except the Wilkes soils are used for pasture or cultivated crops.

The soils of this association are suited to habitat for open-land wildlife and woodland wildlife.

The soils have moderate to severe limitations for dwellings that use onsite sewage disposal, industrial sites, and recreational facilities.

10. *Pacolet-Louisburg association*

Strongly sloping to steep, well drained to excessively drained soils

This association is on strongly sloping, moderately steep to steep side slopes adjacent to bottom lands along the Saluda, Savannah, and Little Rivers and near the breaks to Stephens and Cane Creeks. The soils formed in material weathered from granite or gneiss.

This association makes up about 6 percent of Greenwood County and about 7 percent of McCormick County. The association is about 48 percent Pacolet soils, 31 percent Louisburg soils, and 21 percent minor soils.

Pacolet soils have a surface layer of dark grayish brown sandy loam. The upper part of the subsoil is red clay, and the lower part is red clay loam that has reddish yellow mottles.

Louisburg soils have a surface layer of dark brown loamy sand and a subsurface layer of pale brown loamy sand. The next layer is yellowish red sandy loam that has yellow mottles and is interrupted at intervals by sandy clay loam or rock.

Minor in this association are Cataula, Cecil, Durham, Helena, and Hiwassee soils. Cataula soils are moderately deep to a fragipan. Cecil, Durham, and Hiwassee soils are well drained. Helena soils are moderately well drained. These minor soils are on gently sloping to sloping ridges.

About 90 percent of this association is forested. The rest is in pasture, is idle, or is in nonfarm uses. Most farms in this association extend into other associations.

The soils of this association are suited to habitat for woodland wildlife. The soils have limitations for dwellings that use onsite sewage disposal, as industrial sites, and for recreational facilities.

Descriptions of the Soils

In this section the soils of Greenwood and McCormick Counties are described in detail and their use and management are discussed. Each soil series is described in detail, and then, briefly, the mapping units in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the soil series is representative for mapping units in that series. If a given mapping unit has a profile in some ways different from the one described in the series, these differences are stated in the description of the mapping unit, or they are apparent in the name of the mapping unit. The description of each mapping unit contains suggestions on how the soil can be managed.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Cecil-Urban land complex, for example, does not belong to a soil series but, nevertheless, is listed in alphabetic order along with the soil series.

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

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*8*).[1]

[1] Italic numbers in parentheses refer to References, p. 66.

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

Soil	Greenwood		McCormick		Area totals	
	Acreage	Percent	Acreage	Percent	Acreage	Percent
Alamance silt loam, 2 to 6 percent slopes	1,100	0.4	2,000	0.8	3,100	0.6
Appling loamy sand, 2 to 6 percent slopes	4,100	1.4	2,000	.8	6,100	1.2
Appling loamy sand, 6 to 10 percent slopes	900	.3	1,600	.7	2,500	.5
Cartecay and Toccoa soils	12,700	4.4	12,000	5.1	24,700	4.7
Cataula sandy loam, 2 to 6 percent slopes	3,300	1.2	11,600	4.9	14,900	2.8
Cataula sandy loam, 6 to 10 percent slopes	3,250	1.1	16,750	7.1	20,000	3.8
Cataula sandy clay loam, 2 to 6 percent slopes, eroded	1,000	.4	2,000	.8	3,000	.6
Cataula sandy clay loam, 6 to 10 percent slopes, eroded	2,600	.9	2,400	1.0	5,000	1.0
Cecil sandy loam, 2 to 6 percent slopes	27,780	9.7	4,300	1.8	32,080	6.1
Cecil sandy loam, 6 to 10 percent slopes	16,900	5.9	5,900	2.5	22,800	4.4
Cecil sandy loam, 10 to 15 percent slopes	8,950	3.1	3,700	1.6	12,650	2.4
Cecil sandy clay loam, 2 to 6 percent slopes, eroded	4,200	1.5	250	.1	4,450	.9
Cecil sandy clay loam, 6 to 10 percent slopes, eroded	9,400	3.3	250	.1	9,650	1.8
Cecil-Urban land complex, 2 to 6 percent slopes	3,100	1.1	250	.1	3,350	.6
Chewacla loam	2,980	1.0	500	.2	3,480	.7
Coronaca sandy clay loam, 2 to 6 percent slopes	5,000	1.8	1,800	.8	6,800	1.3
Coronaca sandy clay loam, 6 to 10 percent slopes	2,290	.8	600	.3	2,890	.6
Davidson sandy clay loam, 2 to 6 percent slopes	1,670	.6	1,100	.5	2,770	.5
Davidson sandy clay loam, 6 to 10 percent slopes	370	.1	80	[1]	450	.1
Durham loamy sand, 2 to 6 percent slopes	350	.1			350	.1
Enon sandy loam, 2 to 6 percent slopes	6,740	2.4	4,700	2.0	11,440	2.2
Enon sandy loam, 6 to 10 percent slopes	11,750	4.1	7,200	3.0	18,950	3.6
Enon sandy loam, 10 to 15 percent slopes	6,400	2.2	5,100	2.1	11,500	2.2
Georgeville silt loam, 2 to 6 percent slopes	14,760	5.2	24,000	10.1	38,760	7.4
Georgeville silt loam, 6 to 10 percent slopes	8,570	3.0	13,500	5.7	22,070	4.2
Georgeville silty clay loam, 2 to 6 percent slopes, eroded	460	.2	900	.4	1,360	.3
Georgeville silty clay loam, 6 to 10 percent slopes, eroded	560	.2	900	.4	1,460	.3
Goldston slaty silt loam, 6 to 15 percent slopes	970	.4	5,200	2.2	6,170	1.2
Goldston slaty silt loam, 15 to 40 percent slopes	130	[1]	3,200	1.4	3,330	.6
Helena loamy sand, 2 to 6 percent slopes	3,700	1.3			3,700	.7
Helena loamy sand, 6 to 10 percent slopes	2,170	.8			2,170	.4
Herndon silt loam, 2 to 6 percent slopes	3,500	1.2	11,000	4.6	14,500	2.8
Herndon silt loam, 6 to 10 percent slopes	1,590	.6	5,400	2.3	6,990	1.3
Hiwassee sandy loam, 2 to 6 percent slopes	14,390	5.0	11,000	4.6	25,390	4.9
Hiwassee sandy loam, 6 to 10 percent slopes	7,130	2.5	8,700	3.7	15,830	3.0
Hiwassee sandy loam, 10 to 15 percent slopes	4,400	1.5	1,800	.7	6,200	1.2
Hiwassee sandy clay loam, 2 to 6 percent slopes, eroded	1,790	.6	1,000	.4	2,790	.5
Hiwassee sandy clay loam, 6 to 10 percent slopes, eroded	3,760	1.3	700	.3	4,460	.9
Iredell sandy loam, 0 to 2 percent slopes	1,220	.4	600	.3	1,820	.3
Iredell sandy loam, 2 to 6 percent slopes	3,340	1.2	3,300	1.4	6,640	1.3
Kirksey silt loam, 2 to 6 percent slopes	3,450	1.2	2,400	1.0	5,850	1.1
Kirksey silt loam, 6 to 10 percent slopes	2,650	.9			2,650	.5
Louisburg loamy sand, 6 to 10 percent slopes	1,300	.5	500	.2	1,800	.3
Louisburg loamy sand, 10 to 25 percent slopes	5,800	2.0	3,700	1.6	9,500	1.8
Mecklenburg sandy loam, 2 to 6 percent slopes	11,850	4.1	4,900	2.1	16,750	3.2
Mecklenburg sandy loam, 6 to 10 percent slopes	5,000	1.8	2,100	.9	7,100	1.4
Nason silt loam, 10 to 15 percent slopes	450	.2	2,000	.8	2,450	.5
Nason silt loam, 15 to 25 percent slopes			450	.2	450	.1
Pacolet sandy loam, 15 to 40 percent slopes	13,730	4.8	14,000	5.9	27,730	5.3
Pacolet sandy clay loam, 10 to 15 percent slopes, eroded	8,700	3.0	2,400	1.0	11,100	2.1
Tatum silt loam, 10 to 15 percent slopes	4,540	1.6	4,610	1.9	9,150	1.7
Tatum silt loam, 15 to 25 percent slopes	690	.2	1,300	.5	1,990	.4
Wehadkee soils	250	.1	900	.4	1,150	.2
Wilkes fine sandy loam, 6 to 15 percent slopes	6,300	2.2	5,600	2.4	11,900	2.3
Wilkes fine sandy loam, 15 to 40 percent slopes	9,600	3.4	14,000	5.9	23,600	4.5
Worsham loam, 1 to 4 percent slopes	900	.3	400	.2	1,300	.2
Water (bodies of water 40 acres or less)	1,520	.5	460	.2	1,980	.4
Total	286,000	100.0	237,000	100.0	523,000	100.0

[1] Less than 0.05 percent.

Alamance Series

The Alamance series consists of gently sloping, moderately deep to deep, well drained soils. These soils formed in materials weathered from Carolina Slate.

In a representative profile the surface layer is dark grayish brown silt loam about 2 inches thick. The subsurface layer is about 7 inches of very pale brown silt loam. The next layer, in sequence from the top, is about 3 inches of yellow silt loam; about 10 inches of yellowish brown silty clay loam; about 9 inches of yellowish brown silty clay loam that has yellowish red and very pale brown mottles; and about 7 inches of mottled, brownish yellow, very pale brown, yellowish red, and

strong brown silty clay loam. The underlying material, to a depth of 47 inches or more, is mottled very pale brown, brownish yellow, strong brown, and light gray saprolite weathered from Carolina Slate that crushes to very fine sandy loam.

Permeability is moderate. Available water capacity is medium.

Representative profile of Alamance silt loam, 2 to 6 percent slopes, about 3 miles east of Plum Branch, 200 feet east of Secondary State Highway 21, in McCormick County:

A1—0 to 2 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; strongly acid (pH 5.3); abrupt smooth boundary.

A2—2 to 9 inches, very pale brown (10YR 7/4) silt loam; weak fine granular structure; very friable; few fine and medium roots; few quartz fragments of gravel size; strongly acid (pH 5.4); abrupt smooth boundary.

B1—9 to 12 inches, yellow (10YR 7/6) silt loam; weak fine subangular blocky structure; friable; few fine and medium roots; common fine pores; few quartz fragments of gravel size; very strongly acid (pH 5.0); clear smooth boundary.

B21t—12 to 22 inches, yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; thin patchy faint clay films on faces of peds; few medium roots; few fine pores; few quartz fragments of gravel size; very strongly acid (pH 4.9); gradual smooth boundary.

B22t—22 to 31 inches, yellowish brown (10YR 5/8) silty clay loam; few fine distinct yellowish red mottles and few fine faint very pale brown mottles; moderate medium subangular blocky structure; friable; thin patchy distinct clay films on faces of peds; few medium roots; few fine pores; very strongly acid (pH 5.0); gradual smooth boundary.

B3—31 to 38 inches, mottled brownish yellow (10YR 6/8), very pale brown (10YR 7/3), yellowish red (5YR 5/8), and strong brown (7.5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; thin patchy faint clay films on faces of peds; few medium roots; strongly acid (pH 5.3); gradual smooth boundary.

C—38 to 47 inches, mottled very pale brown (10YR 7/3), brownish yellow (10YR 6/8), strong brown (7.5YR 5/6), and light gray (10YR 7/2) saprolite that is weathered from Carolina Slate that crushes to very fine sandy loam; rock controlled structure; medium acid (pH 5.6).

The solum ranges from 36 to 48 inches in thickness. The A and B horizons are strongly acid or very strongly acid, and the C horizon is strongly acid or medium acid. The A1 horizon is dark grayish brown, grayish brown, or brown. The A2 horizon is pale yellow or very pale brown. The B1 horizon is yellow, very pale brown, or yellowish brown silt loam or silty clay loam. The B21t horizon is yellowish brown or strong brown and has few to many mottles of light yellowish brown, pale yellow, pale brown, very pale brown, or reddish yellow. It is silty clay loam or clay loam. The B22t horizon is yellowish brown or brownish yellow and has mottles of very pale brown, pale brown, yellowish red, or brownish yellow silty clay loam or clay loam. The B3 horizon is yellowish brown or brownish yellow and has mottles of very pale brown, pale brown, strong brown, pale yellow, or yellowish red. It is silt loam, silty clay loam, or clay loam. The C horizon has mottles of very pale brown, brownish yellow, strong brown, gray, yellowish red, red, light brownish gray, or white.

Alamance soils are near the Herndon, Kirksey, and Georgeville soils. They do not have so much clay in the B horizon as Herndon soils. They are better drained than Kirksey soils. Alamance soils do not have the red B horizon that is typical of Georgeville soils.

AmB—Alamance silt loam, 2 to 6 percent slopes. This soil is on the gently sloping stream divides and broad ridges.

Included with this soil in mapping are small areas of Georgeville, Herndon, and Kirksey soils. Also included are small areas of soils that have slopes greater than 6 percent.

Most areas of this soil are in woods and pasture. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

Appling Series

The Appling series consists of gently sloping and sloping, deep, well drained soils. These soils formed in material weathered from granite or gneiss.

In a representative profile the surface layer is brown loamy sand about 8 inches thick. The next layer, in sequence from the top, is 14 inches of yellowish brown clay that has yellowish red mottles, 18 inches of reddish yellow clay that has red and very pale brown mottles, and about 10 inches of mottled red, strong brown, yellow, and white clay loam. The underlying material to a depth of 65 inches or more is mottled light red, reddish yellow, yellow, and white weathered gneiss that crushes to sandy clay loam.

Permeability is moderate. Available water capacity is medium.

Representative profile of Appling loamy sand, 2 to 6 percent slopes, about 2 miles south of Harris plant in Greenwood County, near top of 4 percent slope:

Ap—0 to 8 inches, brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine roots; few coarse sand grains; medium acid (pH 5.9); abrupt smooth boundary.

B1—8 to 10 inches, brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots and few medium roots; few fine pores; medium acid (pH 5.8); abrupt smooth boundary.

B21t—10 to 22 inches, yellowish brown (10YR 5/8) clay; few fine distinct yellowish red mottles; moderate medium subangular blocky structure; firm; thin patchy distinct clay films on faces of peds; few medium roots; few fine pores; strongly acid (pH 5.1); gradual smooth boundary.

B22t—22 to 40 inches, reddish yellow (7.5YR 6/8) clay; common medium distinct red (2.5YR 5/8) and common fine distinct very pale brown mottles; strong medium and coarse subangular blocky structure; firm; thin complete distinct clay films on faces of peds; few medium roots; few fine pores; few fine mica flakes; strongly acid (pH 5.1); gradual smooth boundary.

B3—40 to 50 inches, mottled red (2.5YR 5/8), strong brown (7.5YR 5/8), yellow (10YR 8/6), and white (10YR 8/2) clay loam; weak medium subangular blocky structure; firm; thin patchy faint clay films on faces of some peds; few fine pores; few fine mica flakes; strongly acid (pH 5.1); clear wavy boundary.

C—50 to 65 inches, mottled light red (2.5YR 6/8), reddish yellow (7.5YR 7/8), yellow (10YR 8/6), and white (10YR 8/2) saprolite of weathered granite that crushes to sandy clay loam; rock controlled structure; common fine mica flakes; few fine quartz fragments of gravel size; very strongly acid (pH 4.9).

The solum ranges from 44 to 59 inches in thickness. The A and B1 horizons are strongly acid or medium acid, and the B2, B3, and C horizons are strongly acid or very strongly acid. The A horizon is brown or grayish brown. The B1 horizon is light yellowish brown, yellowish brown, light brownish yellow, brownish yellow, or strong brown. It is sandy loam or sandy clay loam. The B2t and B3 horizons are brownish yellow, yellowish brown, strong brown, reddish yellow, yellowish red, or yellow and have mottles of yellow, brown, or red. The B2t horizon is clay loam, clay, or sandy clay. The C horizon is weathered granite or gneiss. It is mottled with red, brown, yellow, or white. It crushes to sandy loam or sandy clay loam.

Appling soils are near Cecil, Helena, Durham, and Louisburg soils. They lack the red B horizon of Cecil soils. They are better drained than Helena soils, and they have a finer textured B horizon than Durham soils. They have a thicker solum than Louisburg soils.

ApB—Appling loamy sand, 2 to 6 percent slopes. This soil is on broad, irregularly shaped, gently sloping ridges and side slopes adjacent to shallow drainageways. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Helena, Cecil, Durham, and Louisburg soils. Also included are small areas of soils that have slopes greater than 6 percent, and spots where the surface layer has been removed during road construction. Some included areas have a surface layer of sandy loam.

Most areas of this soil are in cultivated crops, pasture, or woodland. The plow layer is easily tilled. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

ApC—Appling loamy sand, 6 to 10 percent slopes. This soil is on irregularly shaped, sloping ridgetops and short, breaking slopes at the head of and adjacent to shallow drainageways.

Included with this soil in mapping are small areas of Cecil and Helena soils. Also included are small areas of soils that have slopes of less than 6 percent and small areas of soils that have a surface layer of sandy loam.

Most areas of this soil are in cultivated crops or pasture. The plow layer is easily tilled. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 3o7.

Cartecay Series

The Cartecay series consists of nearly level, deep, moderately well drained to somewhat poorly drained soils. These soils formed in alluvial sediment that washed from soils that formed in material derived from granite, gneiss, schist, and basic rocks. They have a water table within 20 to 40 inches of the surface during the rainy season.

In a representative profile the surface layer is dark brown very fine sandy loam about 8 inches thick. The underlying material, in sequence from the top, is about 12 inches of strong brown very fine sandy loam that has gray and light yellowish brown mottles, 20 inches of gray very fine sandy loam that has grayish brown and yellowish brown mottles, and 18 inches or more of mottled gray and grayish brown very fine sandy loam.

Permeability is moderately rapid. The available water capacity is medium.

Representative profile of Cartecay very fine sandy loam in an area of Cartecay and Toccoa soils, about 3 miles northwest of Hodges, 350 feet east of Secondary State Highway 180, in Greenwood County:

Ap—0 to 8 inches, dark brown (10YR 4/3) very fine sandy loam; weak fine granular structure; very friable; many fine roots; few fine mica flakes; medium acid (pH 6.0); abrupt smooth boundary.

C1g—8 to 20 inches, strong brown (7.5YR 5/6) very fine sandy loam; common medium prominent gray (10YR 5/1) mottles, and few fine distinct light yellowish brown (10YR 6/4) mottles; massive; very friable; common fine roots; common fine mica flakes; few dark colored concretions; thin bedding planes of loam, silt loam, and sandy loam; medium acid (pH 5.6); clear smooth boundary.

C2g—20 to 40 inches, gray (10YR 6/1) very fine sandy loam; common coarse distinct grayish brown (10YR 5/2) mottles, and few common prominent yellowish brown (10YR 5/6) mottles; massive; very friable; few medium roots; common fine mica flakes; few dark colored concretions; few coarse sand grains; thin bedding planes of silt loam and sandy loam; medium acid (pH 5.6); gradual smooth boundary.

C3g—40 to 58 inches, mottled gray (10YR 6/1) and grayish brown (10YR 5/2) very fine sandy loam; massive; very friable; many fine mica flakes; few fine water-rounded pebbles; medium acid (pH 6.0).

The A horizon is very fine sandy loam, fine sandy loam, sandy loam, loam, or silt loam. It is very dark grayish brown, dark grayish brown, grayish brown, dark brown, or reddish brown. The C1 horizon is strong brown, yellowish brown, reddish brown, or brown. It has mottles that have chroma of 2 or less within 20 inches of the surface. The C2 and C3 horizons are gray and are mottled gray, yellow, brown, or red. The C1 and C2 horizons are very fine sandy loam, fine sandy loam, sandy loam, or loam. The C3 horizon is very fine sandy loam, fine sandy loam, sandy loam, loamy sand, or sand that has a gravel content of 0 to 10 percent. The profile is slightly acid or medium acid throughout. It has thin bedding planes of contrasting textures. Few to many mica flakes are in all horizons.

The Cartecay soils are near Chewacla, Toccoa, and Wehadkee soils. They have less clay in the 10- to 40-inch section than Chewacla soils. They are not so well draind as Toccoa soils but are better drained than Wehadkee soils.

Ca—Cartecay and Toccoa soils. These soils are in drainageways and on flood plains. They are nearly level. This undifferentiated group is about 45 percent Cartecay soils or soils that are very similar to Cartecay soils, 30 percent Toccoa soils or soils that are very similar to Toccoa soils, and 25 percent soils that are similar to Cartecay soils but are wetter. Any mapped area may be mainly Cartecay soils, mainly Toccoa soils, or any combination of Cartecay and Toccoa soils.

The Cartecay soils are on medium-width flood plains along creeks and branches. A Cartecay soil in this mapping unit has the profile described as representative of the Cartecay series.

The Toccoa soils are mainly near drainageways and the highest parts of the flood plains. A Toccoa soil in this mapping unit has the profile described as representative of the Toccoa series.

Included with these soils in mapping are recently overwashed areas of soils that have a surface layer of gravelly sandy loam or clay loam. Also included are areas of soils that are less acid than Cartecay and Toccoa soils.

Most areas of these soils are used as woodland or pasture. Drainage, siltation, a high water table, and flooding are the main concerns of management. Capability unit IIIw–1; Cartecay part in woodland suitability group 2w8, and Toccoa part in woodland suitability group 1o7.

Figure 1.—**Profile of Cataula sandy loam showing horizontal layers and mottling in the fragipan horizon.**

Cataula Series

The Cataula series consists of gently sloping to sloping, moderately deep, well drained soils. These soils formed in material weathered from gneiss.

In a representative profile (fig. 1) the surface layer is brown sandy loam about 6 inches thick. The next layer, in sequence from the top, is about 9 inches of red clay, 10 inches of red clay that has yellowish brown mottles, 14 inches of red sandy clay (fragipan) that has horizontal layers separated by brownish yellow clay loam and has intermittent pockets of gray clay. The next layer, to a depth of 76 inches, is mottled red, brownish yellow, reddish yellow, and white sandy clay loam.

Permeability is slow. Available water capacity is medium.

Representative profile of Cataula sandy loam, 2 to 6 percent slopes, ½ mile northeast of Buffalo Church, 40

feet north of Secondary State Highway 51 in McCormick County:

Ap—0 to 6 inches, brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; many fine roots; few coarse sand grains; medium acid (pH 5.7); abrupt smooth boundary.

B21t—6 to 15 inches, red (2.5YR 4/6) clay; moderate medium angular blocky structure; very firm; thin continuous distinct clay films on faces of peds; common fine roots and few medium roots; few coarse sand grains; strongly acid (pH 5.1); clear smooth boundary.

B22t—15 to 25 inches, red (2.5YR 4/8) clay; common medium distinct yellowish brown (10YR 5/8) mottles; strong coarse angular blocky structure; extremely firm; thick continuous prominent clay films on faces of peds; few fine roots between peds; few medium and large roots; strongly acid (pH 5.5); abrupt smooth boundary.

Bx—25 to 39 inches, red (2.5YR 4/8) horizontal layers of sandy clay ½ inch to 1¾ inches thick, separated by brownish yellow (10YR 6/6) clay loam layers about ½ to 1 inch thick; intermittent common pockets of gray (10YR 6/1) clay in brownish yellow layers; brownish yellow material extends vertically through red layers at 6- to 10-inch intervals; when crushed, texture is sandy clay loam; moderate thick platy structure that parts to moderate medium angular blocky; red material is brittle; brownish yellow and gray material is very firm; thin distinct continuous clay films on horizontal faces of peds; common fine roots along top of horizon, and few extend vertically through brownish yellow material branching between platy structure; very strongly acid (pH 5.0); clear wavy boundary.

B3—39 to 76 inches, mottled red (2.5YR 4/8), brownish yellow (10YR 6/6), reddish yellow (7.5YR 6/6), and white (10YR 8/1) sandy clay loam; weak coarse subangular blocky structure; firm; hard; few coarse sand grains; very strongly acid (pH 5.0).

Depth to the fragipan ranges from 20 to 38 inches. The A horizon is medium acid or strongly acid. The Ap horizon is brown, grayish brown, yellowish red, or reddish brown sandy loam or sandy clay loam. The Bt horizon is medium acid or strongly acid, and the Bx and C horizons are strongly acid or very strongly acid. The Bt horizon is red and has yellowish or brownish mottles in the lower part. The Bx horizon has horizontal layers of red, brownish yellow, yellowish brown, strong brown, and gray sandy clay loam, sandy clay, clay loam, or clay. The B3 horizon is coarsely mottled red, brownish yellow, reddish yellow, and white sandy clay loam or clay loam, but in places it is clay that has gray mottles surrounded by yellowish brown, strong brown, or brownish yellow mottles.

Cataula soils are near Cecil, Enon, Hiwassee, and Wilkes soils. They have a fragipan that is lacking in Cecil, Enon, Hiwassee, and Wilkes soils.

CbB—Cataula sandy loam, 2 to 6 percent slopes. This gently sloping soil is on medium-width ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Cecil, Hiwassee, and Enon soils. Also included are small areas of soils that have slopes of 6 to 10 percent and small areas of soils that have a surface layer of sandy clay loam.

Most areas of this soil were formerly cultivated but are now in pasture or pine trees. Controlling erosion and compensating for restricted root zone and water movement are the main concerns of management. Capability unit IIIe–3; woodland suitability group 3o7.

CbC—Cataula sandy loam, 6 to 10 percent slopes. This sloping soil is on irregularly shaped narrow ridges and short breaks adjacent to streams.

Included with this soil in mapping are areas of Cecil, Hiwassee, Enon, and Wilkes soils. Also included are small areas of soils that have slopes of 2 to 6 percent and small areas of soils that have a surface layer of sandy clay loam or clay loam.

Most areas of this soil are in pine trees or pasture. Controlling erosion and compensating for restricted root zone and water movement are the main concerns of management. Capability unit IVe–2; woodland suitability group 3o7.

CcB2—Cataula sandy clay loam, 2 to 6 percent slopes, eroded. This gently sloping soil is on medium-width ridges. It has a profile similar to the one described as representative for the series, but the surface layer is 1 to 3 inches of yellowish red or reddish brown sandy clay loam. Rills and galled areas are common. There are a few shallow gullies.

Included with this soil in mapping are small areas of Cecil, Enon, and Hiwassee soils. Also included are areas of soils that have slopes of 6 to 10 percent and some small areas of soils that have a surface layer of sandy loam or clay loam.

Most areas of this soil have been in cultivated crops but are now in pine forest or pasture. Controlling erosion and compensating for restricted root growth and water movement are the main concerns of management. Capability unit IVe–2; woodland suitability group 5c3e.

CcC2—Cataula sandy clay loam, 6 to 10 percent slopes, eroded. This soil is in sloping areas near drainageways and narrow ridges. It has a profile similar to the one described as representative for the series, but the surface layer is 1 to 3 inches of yellowish red or reddish brown sandy clay loam. Galled areas, rills, and shallow gullies are common.

Included with this soil in mapping are small areas of Cecil, Enon, Hiwassee, and Wilkes soils. Also included are small areas of soils that have slopes of 2 to 6 percent and small areas of soils that have a surface layer of sandy loam or clay loam.

Most areas of this soil are in pine trees or pasture. Controlling erosion is the main concern of management. Capability unit VIe–3; woodland suitability group 5c3e.

Cecil Series

The Cecil series consists of gently sloping to strongly sloping, deep, well drained soils. These soils formed in materials weathered from granite, gneiss, or schist.

In a representative profile (fig. 2) the surface layer is brown sandy loam about 5 inches thick. The next layer, in sequence from the top, is 23 inches of red clay, 16 inches of red clay that has strong brown mottles, and 11 inches of red clay loam that has strong brown mottles. The underlying material, to a depth of 77 inches or more, is mottled, yellowish red, reddish yellow, and very pale brown weathered gneiss that crushes to clay loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Cecil sandy loam, 2 to 6 percent slopes, about 7 miles south of Greenwood, 900 feet south of intersection of Secondary State Highways 154 and 44, about 100 feet west of Secondary State Highway 44 in Greenwood County:

Ap—0 to 5 inches, brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; many fine roots; few coarse sand grains; strongly acid (pH 5.5); abrupt smooth boundary.

B21t—5 to 28 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of most peds; few fine roots; strongly acid (pH 5.3); gradual wavy boundary.

Figure 2.—**Profile of Cecil sandy loam, 2 to 6 percent slopes, showing the very friable surface layer and roots that have penetrated into the subsoil.**

B22t—28 to 44 inches, red (2.5YR 4/8) clay; few fine prominent strong brown mottles; moderate medium subangular blocky structure; firm; thin distinct continuous clay films on faces of peds; few fine mica flakes; strongly acid (pH 5.2); gradual wavy boundary.

B3—44 to 55 inches, red (2.5YR 5/8) clay loam; common fine prominent strong brown mottles; weak fine subangular blocky structure; friable; thin patchy faint clay films on faces of some peds; few fine mica flakes; very strongly acid (pH 4.8); gradual wavy boundary.

C—55 to 77 inches, yellowish red (5YR 5/8); many medium distinct reddish yellow (7.5YR 6/8) and common medium distinct very pale brown (10YR 7/4) mottles; weathered gneiss that crushes to clay loam; rock controlled structure; friable; very strongly acid (pH 5.0).

The solum ranges from 42 to 58 inches in thickness. The A horizon is 1 to 8 inches thick and is strongly acid or medium acid. It is dark brown, grayish brown, yellowish brown, brown, reddish brown, or yellowish red sandy loam or sandy clay loam. The B horizon is very strongly acid. The B2t horizon is clay loam or clay that is 35 to 70 percent clay. The B3 horizon is clay loam or sandy clay loam. The C horizon is multicolored. It crushes to clay loam or sandy loam.

Cecil soils are near Appling, Helena, Hiwassee, Pacolet, and Louisburg soils. They have a redder B horizon than Appling and Helena soils. They are better drained than Helena soils. They lack the weatherable minerals and dark red color of Hiwassee soils and have a thicker solum than Pacolet and Louisburg soils.

CdB—Cecil sandy loam, 2 to 6 percent slopes. This gently sloping soil is on broad ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Appling, Helena, and Hiwassee soils. Also included are areas of soils that have slopes of 6 to 10 percent and some small areas of soils that have a surface layer of sandy clay loam or clay loam.

Most areas of this soil are in cultivated crops or pasture. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

CdC—Cecil sandy loam, 6 to 10 percent slopes. This soil is on medium-width ridges and in sloping areas adjacent to drainageways.

Included with this soil in mapping are small areas of Appling, Hiwassee, Helena, and Louisburg soils. Also included are areas of soils that have slopes of 2 to 6 percent or 10 to 15 percent and small areas of soils that have a surface layer of sandy clay loam.

Most areas of this soil in Greenwood County are in pasture or cultivated crops, and most areas in McCormick County are in pine trees. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 3o7.

CdD—Cecil sandy loam, 10 to 15 percent slopes. This soil is on strong side slopes adjacent to small and medium-sized streams.

Included with this soil in mapping are small areas of Hiwassee, Enon, Pacolet, and Louisburg soils. Also included are areas of soils that have slopes of 6 to 10 percent and small areas of soils that have a surface layer of sandy clay loam or clay loam.

Most areas of this soil are in forest that consists of mixed hardwoods and pines. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 3o7.

CeB2—Cecil sandy clay loam, 2 to 6 percent slopes, eroded. This gently sloping soil is on narrow and medium-width ridges. It has a profile similar to the one described as representative for the series, but the surface layer is reddish brown or yellowish red sandy clay loam 1 inch to 3 inches thick. Rills and galled areas are common.

Included with this soil in mapping are areas of Cataula, Enon, and Hiwassee soils. Also included are small areas of soils that have slopes of 6 to 10 percent and small areas of soils that have a surface layer of sandy clay loam.

Some areas of this soil have been cleared and cultivated, but most of the acreage is in pine forest. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 4c2e.

CeC2—Cecil sandy clay loam, 6 to 10 percent slopes, eroded. This soil is on short side slopes and sloping narrow ridges. It has a profile similar to the one described as representative for the series, but the surface layer is yellowish red or reddish brown sandy clay loam 1 inch to 3 inches thick. Rills and galled areas are common. There are few shallow to moderately deep gullies (fig. 3) on this soil.

Included with this soil in mapping are small areas of Appling, Helena, Hiwassee, and Louisburg soils. Also included are small areas of soils that have slopes of 2 to 6 percent and small areas of soils that have a surface layer of sandy loam or clay loam.

Some areas of this soil have been cleared and cultivated, but most of the acreage is in pine forest. Controlling erosion is the chief concern of management. Capability unit IVe–1; woodland suitability group 4c2e.

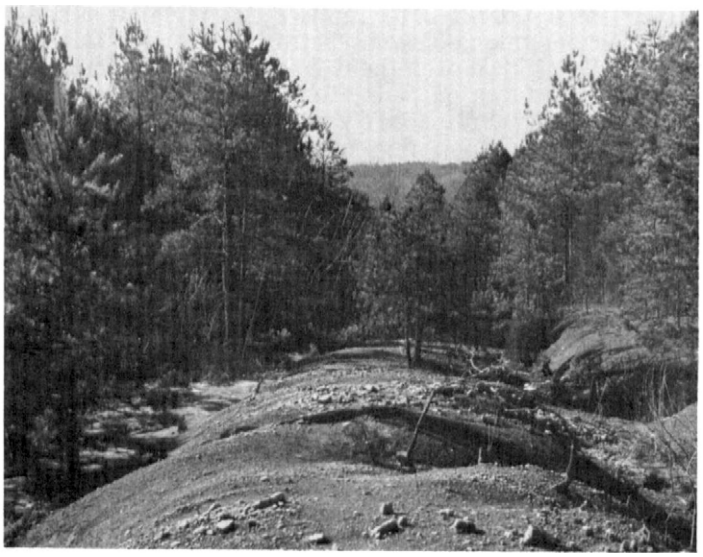

Figure 3.—**Gullies in abandoned roadbed on Cecil sandy clay loam, 6 to 10 percent slopes, eroded.**

CmB—Cecil-Urban land complex, 2 to 6 percent slopes. This mapping unit consists of sloping areas within the city limits and suburbs of Greenwood, McCormick, Ninety-Six, and Ware Shoals. The soils and Urban land are so intricately intermingled that it was not practical to map them separately. Cecil soils and soils that are similar to Cecil soils are in all areas of this complex, and they make up about 35 to 40 percent of the acreage.

Urban land is made up of areas of soils that have been excavated, filled, or otherwise disturbed by man. It consists of variable amounts of sand, silt, and clay. About 60 to 65 percent of this area is covered by pavement, industrial, commercial, or residential buildings.

Included with this complex in mapping are small areas of Appling, Georgeville, Herndon, Hiwassee, and Pacolet soils. Also included are small areas of soils that have a surface layer of loamy sand, sandy clay loam, clay loam, and silt loam and of soils that have slopes of 6 to 15 percent.

This mapping unit is not used for crops. Where the natural soil is exposed or covered by fill of topsoil, it is suited to lawn grasses, trees, and shrubs. This mapping unit has moderate limitations for residential and for light industrial uses unless there have been drastic alterations.

Controlling runoff, erosion, and siltation is the main concern of management. Capability class and woodland suitability group not assigned.

Chewacla Series

The Chewacla series consists of nearly level, moderately deep to deep, somewhat poorly drained soils. These soils formed in alluvial sediment washed from soils that formed in residuum from granite, gneiss, schist, and other rocks.

In a representative profile the surface layer is dark brown loam about 7 inches thick. The next layer, in sequence from the top, is about 7 inches of brown silt loam, 15 inches of yellowish brown clay loam that has dark brown and light brownish gray mottles, 11 inches of strong brown clay loam that has light brownish gray and yellowish red mottles, and 9 inches of light brownish gray fine sandy clay loam that has brown and brownish yellow mottles. The underlying material to a depth of 62 inches or more is gray fine sandy loam.

Permeability is moderate. The available water capacity is high.

Representative profile of Chewacla loam about 3 miles northwest from Troy, on flood plains of Cane Creek in McCormick County:

A—0 to 7 inches, dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine roots; many fine and medium pores; few fine mica flakes; medium acid (pH 5.8); abrupt smooth boundary.

B1—7 to 14 inches, brown (7.5YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; few medium roots; common fine pores;

few fine mica flakes; medium acid (pH 5.6); clear smooth boundary.

B21—14 to 29 inches, yellowish brown (10YR 5/6) clay loam; few fine distinct dark brown and light brownish gray mottles; weak medium and course subangular blocky structure; friable; few fine roots; few fine pores; few fine mica flakes; strongly acid (pH 5.4); gradual smooth boundary.

B22—29 to 40 inches, strong brown (7.5YR 5/6) clay loam; common fine distinct light brownish gray and few fine distinct yellowish red mottles; weak medium subangular blocky structure; friable; few fine mica flakes; strongly acid (pH 5.4); clear smooth boundary.

B3g—40 to 49 inches, light brownish gray (10YR 6/2) fine sandy clay loam; many medium distinct brown (10YR 5/3) and few fine faint brownish yellow mottles; weak medium subangular blocky structure, friable; common fine mica flakes; strongly acid (pH 5.2); clear wavy boundary.

Cg—49 to 62 inches, gray (10YR 5/1) fine sandy loam; structureless; very friable; many fine mica flakes; strongly acid (pH 5.2).

The solum ranges from 36 to 60 inches in thickness. It is medium acid or strongly acid in all horizons. The A horizon is pale brown, brown, or dark brown. The upper part of the B horizon is yellowish brown, strong brown, brown, dark brown, or light brownish gray and has mottles that have chroma of 2 or less within 20 inches of the surface. The lower part of the B horizon is light brownish gray or gray, and the amount of gray increases as depth increases. It contains few to many mottles of dark brown or yellowish red. The B horizon is heavy sandy loam, sandy clay loam, clay loam, loam, silt loam, or silty clay loam. The C horizon is fine sandy loam, sandy loam, or silt loam.

Chewacla soils are near Cartecay, Toccoa, and Wehadkee soils. Chewacla soils have more clay in the 10 to 40 inch section than Cartecay and Toccoa soils. They are better drained than Wehadkee soils.

Cn—Chewacla loam. This soil is on flood plains of large and medium streams. It is nearly level.

Included with this soil in mapping are small areas of Cartecay, Toccoa, and Wehadkee soils. Some mapped areas include small areas of soils that have a sandy loam, fine sandy loam, or silt loam surface layer. Also included are areas of soils that were recently overwashed. Some areas of this soil have slightly higher reaction in the lower horizons than is normal for the series.

The Chewacla soils are subject to frequent flooding, and loss of crops from flooding or waterlogging can be expected about 1 year out of 3. Flooding and siltation are the main concerns of management. Capability unit IIIw-1; woodland suitability group 1w8.

Coronaca Series

The Coronaca series consists of gently sloping to sloping, deep, well drained soils. These soils formed in material weathered from hornblende gneiss cut by dikes of gabbro-diorite.

In a representative profile the surface layer is dark reddish brown sandy clay loam about 6 inches thick. The next layer, in sequence from the top, is 19 inches of dusky red clay, 19 inches of dark red clay, 18 inches of red clay that has yellowish brown mottles, and 19 inches of red clay that has brownish yellow mottles. The next layer, a depth of 97 inches or more, is mottled red, white, light red, and reddish yellow clay loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Coronaca sandy clay loam, 2 to 6 percent slopes, 3 miles southeast of Cokesbury and 30 feet east of Secondary State Highway 227 in Greenwood County:

Ap—0 to 6 inches, dark reddish brown (2.5YR 2/4) sandy clay loam; weak fine granular structure; friable; very sticky; many fine roots; few dark colored concretions, few quartz gravel; neutral (pH 7.0); abrupt smooth boundary.

B21t—6 to 25 inches, dusky red (10R 3/3) clay; moderate medium subangular structure; firm; very sticky; thick prominent continuous clay films on faces of peds; common fine roots; few quartz fragments of gravel size; few dark colored concretions; few fine mica flakes; slightly acid (pH 6.5); gradual smooth boundary.

B22t—25 to 44 inches, dark red (10R 3/6) clay; strong medium subangular blocky structure; firm; very sticky; thick prominent continuous clay films on faces of peds; few quartz fragments of gravel size; few dark colored concretions; few fine mica flakes; medium acid (pH 6.0); gradual smooth boundary.

B23t—44 to 62 inches, red (10R 4/6) clay; common medium prominent yellowish brown (10YR 5/6) mottles; strong fine subangular blocky structure; firm; very sticky; thick prominent continuous clay films on faces of peds; few quartz fragments of gravel size; few dark colored concretions; common fine mica flakes; medium acid (pH 6.0); clear smooth boundary.

B24t—62 to 81 inches, red (2.5YR 4/6) clay; many fine distinct brownish yellow (10YR 6/6) and few fine distinct very pale brown (10YR 7/4) mottles; weak fine subangular blocky structure; firm; sticky; thin patchy distinct clay films on faces of some peds; few quartz fragments of gravel size; few fine mica flakes; few feldspar crystals; medium acid (pH 6.0); clear wavy boundary.

B3—81 to 97 inches, mottled red (2.5YR 4/6), white (10YR 8/2), light red (2.5YR 6/6), and reddish yellow (5YR 6/6) clay loam; weak fine subangular blocky structure; firm; slightly sticky; few thin

patchy faint clay films on faces of peds; few fine mica flakes; common feldspar crystals; medium acid (pH 5.8).

The solum ranges from 61 to 100 inches or more in thickness. The A horizon is dark reddish brown, dusky red, or dark red. It is slightly acid or neutral. The B horizon has base saturation of more than 35 percent. It has dark-colored concretions and fine mica flakes in most profiles. It is slightly acid or medium acid. The lower part of the B horizon contains feldspar crystals. The Bt horizon generally has a clay content of 40 to 60 percent. The upper part of the B2t horizon is dusky red or dark red, and the lower part is dark red or red. The lower part of the B2t horizon and the B3 horizon are dark red or red and have few to common mottles of brownish yellow, very pale brown, yellowish brown, yellowish red, light red, reddish yellow, or white. The B3 horizon is clay loam or silty clay loam.

Coronaca soils are near Iredell, Mecklenburg and Wilkes soils. These soils have a thicker solum than the Iredell, Mecklenburg, and Wilkes soils.

CoB—Coronaca sandy clay loam, 2 to 6 percent slopes. This gently sloping soil is on medium-width ridges. It has the profile described as representative for the series. Rills and galled areas are common. Material from the subsoil has been mixed into the surface layer by tillage. Clodding and crusting occur if this soil is tilled while it has a high moisture content.

Included with this soil in mapping are small areas of Hiwassee, Mecklenburg, and Iredell soils. Also included are areas of soils that have a surface layer of loam or fine sandy loam and small areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in cultivated crops or pasture. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 4c2.

CoC—Coronaca sandy clay loam, 6 to 10 percent slopes. This soil is on sloping narrow ridges. Material from the subsoil has been mixed into the surface layer by tillage. Rills, galled areas, and shallow V-shaped gullies are common. Good stands of crops are difficult to obtain because of clodding and crusting.

Included with this soil in mapping are areas of Hiwassee, Mecklenburg, and Wilkes soils. Also included are areas of soils that have a surface layer of fine sandy loam or loam and small areas of soils that have slopes of 2 to 6 percent.

Most areas of this soil were formerly cultivated, but many areas are now in forest and pasture. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 4c2.

Davidson Series

The Davidson series consists of gently sloping to sloping, deep, well drained soils. These soils formed in material weathered from hornblende gneiss, hornblende schist, and diorite.

In a representative profile the surface layer is dusky red sandy clay loam about 5 inches thick. The next layer, in sequence from the top, is 20 inches of dusky red clay, 32 inches of dark red clay, and 16 inches of dark red clay that has yellowish brown mottles. The next layer, to a depth of 86 inches or more, is red clay that has yellowish brown and light yellowish brown mottles.

Permeability is moderate. The available water capacity is medium.

Representative profile of Davidson sandy clay loam, 2 to 6 percent slopes, 1 mile east of Tranquil Church in McCormick County, near crest of 3 percent slope.

Ap—0 to 5 inches, dusky red (10R 3/2) sandy clay loam; weak fine granular structure; friable; very sticky; many fine roots; few medium roots; few dark colored concretions; strongly acid (pH 5.5); abrupt smooth boundary.

B21t—5 to 25 inches, dusky red (10R 3/2) clay; moderate medium subangular blocky structure; firm; very sticky; thick prominent continuous clay films on faces of peds; common fine roots; few dark colored concretions; few quartz fragments of gravel size; strongly acid (pH 5.4); clear smooth boundary.

B22t—25 to 57 inches, dark red (10R 3/6) clay; strong medium subangular blocky structure; firm; very sticky; thick prominent continuous clay films on faces of peds; few fine roots; few fine quartz gravel; few dark colored concretions; strongly acid (pH 5.4); clear smooth boundary.

B23t—57 to 73 inches, dark red (10R 3/6) clay; common medium distinct yellowish brown (10YR 5/8) mottles, moderate fine subangular blocky structure; firm; very sticky; thin distinct continuous clay films on faces of peds; few dark colored concretions; few fine quartz gravel; strongly acid (pH 5.1); gradual wavy boundary.

B3—73 to 86 inches, red (2.5YR 4/6) clay; many coarse distinct yellowish brown (10YR 5/6) mottles and few fine distinct light yellowish brown mottles; weak fine subangular blocky structure; firm; slightly sticky; thin patchy faint clay films on faces of peds; few quartz fragments of gravel size; strongly acid (pH 5.2).

The solum ranges from 60 inches to more than 86 inches in thickness. Reaction is strongly acid or medium in all horizons. The Ap horizon is dark red, dark reddish brown, or dusky red. The Bt horizon is dusky red or dark red. The B21t and B22t horizons commonly are more than 50 percent clay. The B3 horizon is red or dark red clay or clay loam. The B23t and B3 horizons have many mottles of yellowish brown, light yellowish brown, reddish yellow, or strong brown.

The kaolin content of Davidson soils in the survey area is slightly less than is defined as within the range for the series, but this difference does not alter the usefulness and behavior of these soils.

Davidson soils are near Cecil, Hiwassee, Enon, and Georgeville soils. They are darker red than Cecil, Enon, and Georgeville soils. They lack the 10 percent content of weatherable minerals that is characteristic of Hiwassee soils.

DaB—Davidson sandy clay loam, 2 to 6 percent

slopes. This soil is on the more gently sloping positions on broad ridges. It has the profile described as representative for the series. Rills and galled areas are common.

Included with this soil in mapping are areas of Cecil, Enon, Hiwassee, and Georgeville soils. Also included are areas of soils that have a surface layer of clay loam and some areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil were formerly in cultivated crops, but most of the acreage is now in pasture and woodland. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 4c2.

DaC—Davidson sandy clay loam, 6 to 10 percent slopes. This soil is on the more sloping positions on medium-width ridges. Rills and galled areas are common. A few shallow V-shaped gullies are in some areas.

Included with this soil in mapping are areas of Cecil, Enon, Hiwassee, and Georgeville soils. Also included are small areas of soils that have a surface layer of clay loam and some small areas that have slopes of 2 to 6 percent.

Most areas of this soil were formerly in cultivated crops, but much of the acreage is now in pine forest. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 4c2.

Durham Series

The Durham series consists of gently sloping, deep, well drained soils. These soils formed in material weathered from granite.

In a representative profile the surface layer is grayish brown loamy sand about 7 inches thick. The subsurface layer is 7 inches of light yellowish brown loamy sand. The next layer, in sequence from the top, is 9 inches of pale yellow sandy loam, 6 inches of brownish yellow sandy clay loam, 14 inches of brownish yellow sandy clay loam that has strong brown and reddish yellow mottles, and 10 inches of yellow sandy clay loam that has strong brown mottles. The underlying material to a depth of 60 inches or more is brownish yellow weathered granite that crushes to sandy clay loam and has yellowish red and light gray mottles.

Permeability is moderate. The available water capacity is medium.

Representative profile of Durham loamy sand, 2 to 6 percent slopes, 2 miles east of Hodges, 30 feet north of South Carolina Primary Highway 246 in Greenwood County, in a mixed hardwood and pine forest near center of 5 percent slope:

A1—0 to 7 inches, grayish brown (2.5Y 5/2) loamy sand; weak fine granular structure; very friable; many fine roots and few medium roots; few course sand grains; few fine quartz gravel; strongly acid (pH 5.2); clear smooth boundary.

A2—7 to 14 inches; light yellowish brown (2.5Y 6/4) loamy sand; weak fine and medium granular structure; very friable; few fine roots and few medium roots; few coarse sand grains; strongly acid (pH 5.5); clear smooth boundary.

B1—14 to 23 inches, pale yellow (2.5Y 7/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few coarse sand grains; strongly acid (pH 5.4); clear smooth boundary.

B21t—23 to 29 inches; brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; friable; slightly sticky; thin patchy faint clay films on faces of peds; few medium pores; strongly acid (pH 5.1); clear smooth boundary.

B22t—29 to 43 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles and few fine prominent reddish yellow mottles; moderate medium subangular blocky structure; friable; slightly sticky; thin distinct continuous clay films on faces of peds; common fine pores and few medium pores; strongly acid (pH 5.1); clear smooth boundary.

B3—43 to 53 inches; yellow (10YR 7/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; slightly sticky; few quartz fragments of gravel size; few fine mica flakes; few fine feldspar crystals; few medium fragments of partly weathered granite; strongly acid (pH 5.3); clear wavy boundary.

C—53 to 60 inches; mottled brownish yellow (10YR 6/6), yellowish red (5YR 5/8), and light gray (10YR 7/2) weathered granite that crushes to sandy clay loam; rock controlled structure; friable; slightly sticky; few fine mica flakes; common fine and medium feldspar crystals; common fragments of partly weathered granite; very strongly acid (pH 5.0).

The solum ranges from 40 to 60 inches in thickness. The A horizon is strongly acid or medium acid, the B and C horizons are very strongly acid or strongly acid. The A1 horizon is dark grayish brown, grayish brown, or brown. The A2 horizon is light brownish gray, pale brown, or light yellowish brown. The B1 horizon is pale yellow or very pale brown heavy loamy sand or sandy loam. The Bt horizon is brownish yellow or strong brown and has a few common mottles of light yellowish brown, yellowish brown, or yellowish red. The B3 horizon is mottled brownish yellow, yellowish red, reddish yellow, or light gray and contains weatherable minerals of mica and feldspar. The C horizon is mottled brownish yellow, yellowish red, reddish yellow, yellowish brown, light gray, or white. It crushes to sandy loam or sandy clay loam.

Durham soils are near Appling and Helena soils. These soils are coarser textured in the B horizon than Appling soils and are better drained than Helena soils.

DuB—Durham loamy sand, 2 to 6 percent slopes. This gently sloping soil is on the higher broad ridges. It has the profile described as representative for the series.

Included with this soil in mapping are areas of Appling and Helena soils. The surface layer has been removed in a few areas for road construction purposes. Also included are small areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in woods or are idle. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

Enon Series

The Enon series consists of gently sloping to strongly sloping, moderately deep to deep, well-drained soils. These soils formed in materials weathered from hornblende gneiss or hornblende schist containing intrusions of diorite-gabbro.

In a representative profile the surface layer is dark brown sandy loam about 6 inches thick. The next layer, in sequence from the top, is about 11 inches of yellowish brown clay that has yellowish red mottles, 10 inches of yellowish brown clay that has pale brown mottles, and 8 inches of yellowish brown clay loam that has very pale brown mottles. The underlying material to a depth of 60 inches or more is mottled yellowish brown, strong brown, yellow, and gray weathered gneiss that crushes to sandy loam.

Permeability is slow. Available water capacity is medium.

Representative profile of Enon sandy loam, 2 to 6 percent slopes, 2 miles northwest of Coronaca, on Secondary State Highway 98, about 60 feet north of road in Greenwood County, near top of 5 percent slope:

Ap—0 to 6 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine roots; few medium roots; few quartz fragments of gravel size; common dark concretions; slightly acid (pH 6.1); abrupt smooth boundary.

B21t—6 to 17 inches; yellowish brown (10YR 5/6) clay; common medium prominent yellowish red (5YR 4/6) mottles; moderate medium angular blocky structure; firm; plastic; sticky; thin continuous distinct clay films on faces of peds; common fine roots; common dark concretions; neutral (pH 6.6) clear smooth boundary.

B22t—17 to 27 inches; yellowish brown (10YR 5/4) clay; common medium distinct pale brown (10YR 6/3) mottles; strong coarse angular blocky structure; very firm; plastic; sticky; thin continuous distinct clay films on faces of peds; few fine roots; few dark concretions; slightly acid (pH 6.4); clear smooth boundary.

B3—27 to 35 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct very pale brown (10YR 7/4) mottles; weak medium angular blocky structure; firm; plastic; sticky; thin continuous distinct clay films on vertical faces of peds and thin patchy faint clay films on horizontal faces of peds; few dark concretions; slightly acid (pH 6.4); clear wavy boundary.

C—35 to 60 inches; mottled yellowish brown (10YR 5/8), strong brown (7.5YR 5/6), yellow (10YR 7/6), and gray (10YR 6/1) weathered hornblende gneiss that crushes to sandy loam; rock controlled structure; firm in place; slightly plastic; sticky; common dark concretions; common fragments of rock; neutral (pH 6.8).

The solum ranges from 28 to 43 inches in thickness. The A horizon is slightly acid or medium acid, and the B and C horizons are slightly acid or neutral. Few to common dark colored concretions are throughout the profile. The Ap horizon is brown, yellowish brown, grayish brown, or dark brown. The upper part of the B2t horizon is strong brown, yellowish brown, brownish yellow, or reddish yellow and in places has mottles of yellow or red; the lower part of the B2t horizon and the B3 horizon are yellowish brown, brownish yellow, or strong brown and in places have mottles of red, brown, yellow, or gray. The C horizon is multicolored and contains varying amounts of rock fragments.

Enon soils are near Cataula, Cecil, Hiwassee, Iredell, and Wilkes soils. Enon soils have a less red, more plastic B horizon than Cataula, Cecil, and Hiwassee soils. They are better drained and less plastic than Iredell soils. They have a thicker solum than Wilkes soils.

EnB—Enon sandy loam, 2 to 6 percent slopes. This gently sloping soil is on medium-width ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Cataula, Cecil, Mecklenburg, and Iredell soils. Also included are small areas of soils that have slopes of 6 to 10 percent and areas of soils that have a surface layer of silt loam or loam.

Most areas of this soil are in cultivated crops or pasture. Controlling erosion is the main concern of management. Capability unit IIe–3; woodland suitability group 4o1.

EnC—Enon sandy loam, 6 to 10 percent slopes. This sloping soil is on narrow ridges and on side slopes adjacent to drainageways and small streams.

Included with this soil in mapping are small areas of Cataula, Cecil, Mecklenburg, and Wilkes soils. Also included are areas of soils that have slopes of 2 to 6 percent or 10 to 15 percent and areas of soils that have a surface layer of loam or silt loam.

Most areas of this soil are in pasture or are wooded. Controlling erosion is the main concern of management. Capability unit IIIe–3; woodland suitability group 4o1.

EnD—Enon sandy loam, 10 to 15 percent slopes. This strongly sloping soil is on side slopes adjacent to streams and on narrow ridges.

Included with this soil in mapping are small areas of Cecil, Pacolet, and Wilkes soils. Also included are small areas of soils that have slopes of 6 to 10 percent and areas of soils that have a surface layer of loam or silt loam.

Most areas of this soil are forested. Controlling erosion is the main concern of management. Capability unit IVe–2; woodland suitability group 4o1.

Georgeville Series

The Georgeville series consists of gently sloping to sloping, deep, well drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is brown silt loam about 5 inches thick. The next layer, in sequence from the top, is about 12 inches of red silty clay, 22 inches of red silty clay that has reddish yellow mottles, and 12 inches of red silty clay that has brownish yellow mottles. The underlying material to a depth of 60 inches or more is mottled red, yellowish red, reddish yellow, brownish yellow, and white weathered Carolina Slate that crushes to silty clay loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Georgeville silt loam, 2 to 6 percent slopes, about 6 miles east of McCormick and ½ mile south of U.S. Highway 378 in McCormick County, in a pine forest, near center of 4 percent slope:

Ap—0 to 5 inches; brown (7.5YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; medium acid (pH 5.8); abrupt smooth boundary.

B21t—5 to 17 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; common fine roots and few medium roots; strongly acid (pH 5.1); gradual smooth boundary.

B22t—17 to 39 inches; red (2.5YR 4/8) silty clay; few fine faint reddish yellow mottles; moderate medium and fine subangular blocky structure; firm; thin distinct continuous clay films on faces of peds; very strongly acid (pH 4.9); clear smooth boundary.

B3—39 to 51 inches; red (2.5YR 4/8) silty clay; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; few thin patchy faint clay films on faces of peds; very strongly acid (pH 4.8); clear wavy boundary.

C—51 to 60 inches; mottled red (2.5YR 4/8), yellowish red (5YR 5/8), reddish yellow (5YR 6/8), brownish yellow (10YR 6/6), and white (10YR 8/2) saprolite weathered from Carolina Slate that crushes to silty clay loam; rock controlled structure; common fragments of partially weathered rock; very strongly acid (pH 4.8).

The solum ranges from 41 to 57 inches in thickness. The A horizon is brown, yellowish brown, pale brown, yellowish red, and reddish brown silt loam or silty clay loam. The Bt horizon is strongly acid or very strongly acid. It is red and has brownish or yellowish mottles in the lower part. The B horizon is red or yellowish red and has mottles of strong brown, brownish yellow, or yellow. It is silt loam, silty clay loam, silty clay, or clay loam. The C horizon is strongly acid or very strongly acid, has multicolored layers of red, yellow, and brown, and contains few to common fragments of hard Carolina Slate.

Georgeville soils are near Alamance, Herndon, Kirksey, and Tatum soils. They have a redder B horizon than Alamance, Herndon, and Kirksey soils. They have a thicker solum than Tatum soils.

GaB—Georgeville silt loam, 2 to 6 percent slopes. This gently sloping soil is on broad ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Alamance, Herndon, and Kirksey soils. Also included are small areas of soils that have a surface layer of silty clay loam or clay loam and soils that have slopes of 6 to 10 percent.

Most areas of this soil are in pasture or cultivated crops. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

GaC—Georgeville silt loam, 6 to 10 percent slopes. This sloping soil is on ridges and side slopes adjacent to drainageways.

Included with this soil in mapping are areas of Herndon, Kirksey and Tatum soils. Also included are areas of soils that have a surface layer of silty clay loam or clay loam and areas of soils that have slopes of 2 to 6 percent.

Most areas of this soil are in pasture or woodland. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 3o7.

GeB2—Georgeville silty clay loam, 2 to 6 percent slopes, eroded. This gently sloping soil is on narrow ridges. It has a profile similar to the one described as representative for the series, but the surface layer is yellowish red silty clay loam 1 to 4 inches thick. Rills and galled areas are common.

Included with this soil in mapping are areas of Herndon and Kirksey soils. Also included are areas of soils that have a surface layer of silt loam or clay loam and small areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in pine forest. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 4c2e.

GeC2—Georgeville silty clay loam, 6 to 10 percent slopes, eroded. This sloping soil is on ridge crests. It has a profile similar to the one described as representative for the series, but the surface layer is yellowish red silty clay loam 1 to 4 inches thick. Rills and galled areas are common. There are a few V-shaped gullies in some areas of this soil.

Included with this soil in mapping are areas of Herndon, Kirksey, and Tatum soils. Also included are small areas of soils that have a surface layer of silt loam or clay loam and areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in pine forest. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 4c2e.

Goldston Series

The Goldston series consists of sloping to steep, shallow, well drained to excessively drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is dark grayish brown slaty silt loam about 5 inches thick. This layer is about 30 percent slate fragments. The next layer is 10 inches of light yellowish brown slaty silt loam that is interspersed with clay loam or slate. It is about 45 percent slate fragments. The underlying material is brownish yellow slaty silt loam interspersed with slate. This layer is about 70 percent slate fragments. Hard slate is at a depth of 30 inches.

Permeability is moderately rapid. Available water capacity is low.

Representative profile of Goldston slaty silt loam, 15 to 40 percent slopes, 3 miles northeast of Parksville in McCormick County, near top of 18 percent slope in wooded area:

A—0 to 5 inches, dark grayish brown (10YR 4/2) slaty silt loam; about 30 percent, by volume, is brownish yellow and grayish brown broken slate fragments; weak medium granular structure; very friable; many fine roots ¼ inch to 2½ inches in diameter; strongly acid (pH 5.5); clear smooth boundary.

B—5 to 15 inches, light yellowish brown (2.5Y 6/4) slaty silt loam and slaty silty clay loam; about 45 percent, by volume, is brownish yellow, grayish brown, and pale brown broken slate fragments ¼ inch to 3 inches in diameter; about 35 percent, by volume, is silt loam and about 20 percent is silty clay loam; silty clay loam is in a discontinuous irregular nearly horizontal layer about 2 to 6 inches thick; silt loam has weak fine granular structure, and silty clay loam has weak medium subangular blocky structure; friable; silty clay loam is slightly sticky; common fine and medium roots; strongly acid (pH 5.2); clear wavy boundary.

C—15 to 30 inches, brownish yellow (10YR 6/6) weathered Carolina Slate that crushes to slaty silt loam; about 70 percent, by volume, is yellowish red, yellowish brown, and pale brown slate fragments 1 inch to 3½ inches in diameter; rock structure; friable; strongly acid (pH 5.2).

R—30 inches, hard Carolina Slate.

The solum ranges from 11 to 18 inches in thickness. The A horizon is strongly acid or medium acid, and the B horizon is strongly acid or very strongly acid. The A horizon is dark grayish brown or dark brown in wooded areas. It is 30 to 40 percent slate fragments. The Ap horizon is yellowish brown, light yellowish brown, brown, or pale brown. The B horizon is light yellowish brown, yellowish brown, brownish yellow, or brown. There is a thin Bt horizon of silty clay loam or clay loam that is discontinuous within distances of a few feet. About 35 to 55 percent of the B horizon is slate fragments. The C horizon may have mottles of yellow and brown, which are inherited from the parent rock. About 60 to 75 percent of the C horizon is rock fragments.

Goldston soils are near Georgeville, Herndon, Nason, and Tatum soils. They have a thinner solum than these soils.

GoD—Goldston slaty silt loam, 6 to 15 percent slopes. This sloping and strongly sloping soil is on short side slopes adjacent to streams.

Included with this soil in mapping are small areas of Georgeville, Herndon, and Kirksey soils. Also included are areas of soils that have slopes of 15 to 40 percent and small areas that have angular quartz fragments on the surface.

Most areas of this soil are mixed hardwood and pine forest. Controlling erosion and a shallow root zone are the main concerns of management. Capability unit VIe–2; woodland suitability group 4o1.

GoF—Goldston slaty silt loam, 15 to 40 percent slopes. This moderately steep and steep soil is on side slopes adjacent to bottom lands along large streams. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Nason and Tatum soils. Also included are areas of soils that have slopes of 6 to 15 percent.

Most areas of this soil are in hardwood forest. It is not practical to disturb the ground cover of the soil. Controlling erosion is the main concern of management. Capability unit VIIe–2; woodland suitability group 4r2.

Helena Series

The Helena series consists of gently sloping to sloping, moderately deep to deep, moderately well drained soils. These soils formed in material weathered from gneiss, schist, or granite cut by dikes of quartz diorite.

In a representative profile the surface layer is brown loamy sand about 8 inches thick. The next layer is light yellowish brown sandy loam about 5 inches thick. Below this is 14 inches of yellowish brown clay that has brownish yellow and red mottles; 5 inches of mottled yellowish brown, brownish yellow, light gray, yellowish red, and white clay; and 10 inches of mottled yellowish brown, brownish yellow, yellow, yellowish red, very pale brown, white, and light gray clay loam. The underlying material to a depth of 60 inches or more is mottled brownish yellow, yellowish brown, light gray, and white sandy clay loam.

Permeability is slow. Available water capacity is medium.

Most areas of the Helena soils are in cultivated crops or pasture. Vegetation is hardwood and pine forest. The understory is shrubs, vines, briers, and native grasses.

Representative profile of Helena loamy sand, 2 to 6 percent slopes, ½ mile west of Hodges and 1 mile south of Piney Grove Church, about 200 feet northwest of South Carolina Primary Highway 185 in Greenwood County, near bottom of 4 percent slope:

Ap—0 to 8 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; strongly acid (pH 5.5); abrupt smooth boundary.

B1—8 to 13 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium subangular blocky structure; very friable; few

fine roots; strongly acid (pH 5.5); clear wavy boundary.

B21t—13 to 27 inches; yellowish brown (10YR 5/4) clay that has common medium distinct brownish yellow (10YR 6/6) mottles and few medium distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; thin distinct continuous clay films on faces of peds; few fine roots; very strongly acid (pH 4.7); gradual wavy boundary.

B22t—27 to 32 inches; mottled yellowish brown (10YR 5/4), brownish yellow (10YR 6/8), light gray (10YR 7/2), yellowish red (5YR 5/8), and white (10YR 8/2) clay; moderate medium subangular blocky structure; very firm; thin distinct continuous clay films on faces of peds; few fine mica flakes; very strongly acid (pH 4.6); gradual wavy boundary.

B3—32 to 42 inches; mottled yellowish brown (10YR 5/4), brownish yellow (10YR 6/8), yellow (10YR 7/6), yellowish red (5YR 5/8), very pale brown (10YR 7/3), white (10YR 8/2), and light gray (10YR 7/2) clay loam; weak medium subangular blocky structure; firm; few fine mica flakes; few feldspar crystals; very strongly acid (pH 4.5); gradual wavy boundary.

C—42 to 60 inches; mottled brownish yellow (10YR 6/6), yellowish brown (10YR 5/4), light gray (10YR 7/2), and white (10YR 8/2) weathered granite that crushes to sandy clay loam; rock controlled structure; friable; few fine mica flakes; few feldspar crystals; strongly acid (pH 5.4).

The solum ranges from 33 to 48 inches in thickness. Reaction is strongly acid or very strongly acid throughout. The A horizon is brown, yellowish brown, pale brown, grayish brown, or light yellowish brown. The Bt horizon is light yellowish brown, yellowish brown, yellow, brownish yellow, or strong brown and has mottles of red, brown, yellow, and gray. The B2t and B3 horizons are clay loam or clay. The C horizon is multicolored and has fragments of partly weathered granite, gneiss, or schist that, when crushed, is sandy clay loam or sandy loam; seams in the rock are filled with clay or clay loam.

Helena soils are near Appling, Cecil, and Louisburg soils. They are not so well drained as Appling, Cecil, and Louisburg soils. They also have a thicker solum than Louisburg soils.

HeB—Helena loamy sand, 2 to 6 percent slopes. This gently sloping soil is on broad ridges, at heads of streams, and adjacent to drainageways. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Appling, Durham, and Cecil soils. Also included are areas of soils that have slopes of 6 to 10 percent and areas of soils that have a surface layer of coarse loamy sand and sandy loam.

Most areas of this soil are in cultivated crops or pasture. Controlling erosion is the main concern of management. Capability unit IIe–3; woodland suitability group 3w8.

HeC—Helena loamy sand, 6 to 10 percent slopes. This sloping soil is in areas adjacent to drainageways.

Included with this soil in mapping are small areas of Appling, Cecil, and Louisburg soils. Also included are some areas of soils that have slopes of 2 to 6 percent and small areas of soils that have a surface layer of coarse loamy sand and sandy loam.

Most areas of this soil are in pasture or cultivated crops. Controlling erosion is the main concern of management. Capability unit IIIe–3; woodland suitability group 3w8.

Herndon Series

The Herndon series consists of gently sloping to sloping, deep, well drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The next layer, in sequence from the top, is about 10 inches of reddish yellow clay loam that has yellowish red mottles, 17 inches of light yellowish brown clay that has reddish yellow and yellowish red mottles, and 13 inches of light yellowish brown clay that has reddish yellow, yellowish red, and red mottles. The underlying material to a depth of 53 inches or more is mottled brownish yellow, pale yellow, reddish yellow, and white weathered Carolina Slate that crushes to clay loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Herndon silt loam, 2 to 6 percent slopes, 6 miles southeast of McCormick, 3¾ miles northeast of Plum Branch, 150 feet northeast of junction of Secondary State Highways 22 and 21 in McCormick County, near center of 5 percent slope in forest of 6-year-old pines:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; strongly acid (pH 5.3); abrupt smooth boundary.

B21t—6 to 16 inches; reddish yellow (7.5YR 6/6) clay loam; common medium distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; few medium roots; strongly acid (pH 5.1); gradual smooth boundary.

B22t—16 to 33 inches; light yellowish brown (10YR 6/4) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles and few medium distinct yellowish red (5YR 5/8) mottles; strong coarse subangular blocky structure; firm; thin distinct continuous clay films on faces of peds; strongly acid (pH 5.1); clear smooth boundary.

B3—33 to 46 inches; light yellowish brown (10YR 6/4) clay; common fine faint reddish yellow (7.5YR 7/6) mottles, few fine distinct yellowish red (5YR 5/8) mottles, and

few fine distinct red (2.5YR 5/6) mottles; weak medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; very strongly acid (pH 5.0); clear wavy boundary.

C—46 to 53 inches; mottled brownish yellow (10YR 6/6), pale yellow (2.5Y 7/4), reddish yellow (7.5YR 6/6), and white (10YR 8/2) saprolite weathered from Carolina Slate that crushes to clay loam; rock controlled structure; fragments of hard rock and feldspar; very strongly acid (pH 4.8).

The solum ranges from 45 to 60 inches in thickness. The A horizon is medium acid or strongly acid, and the B horizon is strongly acid or very strongly acid. The A horizon is brown, yellowish brown, grayish brown, or light olive brown. The B2t horizon is light yellowish brown and reddish yellow and is mottled with yellow, brown, or red. It is silty clay, clay, or clay loam. The B3 horizon is yellowish brown or light yellowish brown and is mottled with yellow, brown, or red. The C horizon is multicolored—brown, yellow, and white. It crushes to silt loam or clay loam.

Herndon soils are near Alamance, Georgeville, Kirksey, and Nason soils. Herndon soils have more clay in the Bt horizon than Alamance soils, and they lack the red B horizon typical of Georgeville soils. Herndon soils are better drained than Kirksey soils. They have a thicker solum than Nason soils.

HrB—Herndon silt loam, 2 to 6 percent slopes. This gently sloping soil is on irregularly shaped, medium-width and broad ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Alamance, Georgeville, and Kirksey soils. Also included are small areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in pasture or cultivated crops. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

HrC—Herndon silt loam, 6 to 10 percent slopes. This soil is on sloping, medium-width ridges and on slopes adjacent to drainageways.

Included with this soil in mapping are areas of Georgeville, Kirksey, and Nason soils. Also included are areas of soils that have slopes of 2 to 6 percent.

Most areas of this soil are in pasture or woods. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 3o7.

Hiwassee Series

The Hiwassee series consists of gently sloping to strongly sloping, deep, well drained soils. They formed in material weathered from gneiss, schist, or old alluvium.

In a representative profile the surface layer is dark reddish brown sandy loam about 6 inches thick. The next layer, in sequence from the top, is about 11 inches of dark red clay, 22 inches of dark red clay that has reddish yellow mottles, and 12 inches of red sandy clay loam that has brownish yellow mottles. The underlying material to a depth of 60 inches or more is mottled red, brownish yellow, and yellowish red weathered gneiss that crushes to sandy loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Hiwassee sandy loam, 2 to 6 percent slopes, 4 miles east of Ninety-Six and 2½ miles southeast of Salem Church in Greenwood County, on upper part of 4 percent slope in pine forest:

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) sandy loam; weak fine and medium granular structure; very friable; many fine roots; medium acid (pH 5.6); abrupt smooth boundary.

B21t—6 to 17 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm; sticky; thin patchy distinct clay films on faces of peds; common fine roots; few fine mica flakes; strongly acid (pH 5.5); clear smooth boundary.

B22t—17 to 39 inches; dark red (2.5YR 3/6) clay; few fine distinct reddish yellow (7.5YR 6/8) mottles; strong medium and fine subangular blocky structure; firm; thick prominent continuous clay films on faces of peds; common fine mica flakes; strongly acid (pH 5.2); clear wavy boundary.

B3—39 to 51 inches; red (2.5YR 4/6) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; many fine mica flakes; strongly acid (pH 5.2); clear wavy boundary.

C—51 to 60 inches; mottled red (2.5YR 4/6), brownish yellow (10YR 6/6), and yellowish red (5YR 5/6) weathered gneiss that crushes to sandy loam; structureless; friable; many fine mica flakes; common fine feldspar crystals; strongly acid (pH 5.3).

The solum ranges from 41 inches to more than 60 inches in thickness. Reaction is medium acid or strongly acid throughout. Few to common mica flakes are throughout the profile in most places. The A horizon is dark reddish brown, dusky red, or dark brown. It is sandy loam or sandy clay loam. The B2t horizon is clay or clay loam. The B3 horizon is dark red, red, or yellowish red and has mottles of brown and yellow. It is clay loam, sandy clay, or sandy clay loam. The C horizon is red, brownish yellow, yellowish red, yellowish brown, or brown sandy loam, silty clay loam, or clay loam.

Hiwassee soils are near Cecil, Georgeville, Enon, Mecklenburg, Davidson, and Wilkes soils. Hiwassee soils have a darker red B horizon than Cecil, Georgeville, Enon, Mecklenburg, and Wilkes soils. They have 10 percent weatherable minerals that are lacking in the Davidson soils. They have a thicker solum than the Wilkes soils.

HwB—Hiwassee sandy loam, 2 to 6 percent slopes. This gently sloping soil is on broad and medium-width ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Cecil, Georgeville, Enon, and Coronaca soils. Also included are small areas of soils that have a surface layer of sandy clay loam and small areas of soils that have slopes of 6 to 10 percent.

Most areas of this soil are in cultivated crops or pasture. Controlling erosion is the main concern of management. Capability unit IIe–1; woodland suitability group 3o7.

HwC—Hiwassee sandy loam, 6 to 10 percent slopes. This sloping soil is on ridges and side slopes adjacent to drainageways.

Included with this soil in mapping are small areas of Cecil, Coronaca, Davidson, and Enon soils. Also included are areas of soils that have slopes of 2 to 6 percent or 10 to 15 percent and areas of soils that have a surface layer of sandy clay loam or clay loam.

Most areas of this soil are in pasture or cultivated crops. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 3o7.

HwD—Hiwassee sandy loam, 10 to 15 percent slopes. This strongly sloping soil is on side slopes adjacent to streams.

Included with this soil in mapping are small areas of Enon, Pacolet, and Wilkes soils. Also included are small areas of soils that have slopes of 6 to 10 percent and areas of soils that have a surface layer of sandy clay loam or clay loam.

Most areas of this soil are in pine forest. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 3o7.

HyB2—Hiwassee sandy clay loam, 2 to 6 percent slopes, eroded. This gently sloping soil is on narrow ridge crests. It has a profile similar to the one described as representative for the series, but the surface layer is dusky red sandy clay loam 2 to 4 inches thick. Rills and galled areas are common. A few shallow gullies are in some areas.

Included with this soil in mapping are areas of Cecil, Georgeville, and Enon soils. Also included are areas of soils that have slopes of more than 6 percent and soils that have a surface layer of sandy loam or clay loam.

This soil has been cleared and cultivated, but it is mostly in pine forest. Controlling erosion is the main concern of management. Capability unit IIIe–1; woodland suitability group 4c2e.

HyC2—Hiwassee sandy clay loam, 6 to 10 percent slopes, eroded. This sloping soil is on short side slopes adjacent to drainageways and small streams. It has a profile similar to the one described for the series, but the surface layer is dusky red sandy clay loam 2 to 4 inches thick. Rills and galled areas are common. A few shallow gullies are in some areas.

Included with this soil in mapping are areas of Cecil, Coronaca, Davidson, and Enon soils. Also included are areas of soils that have slopes of 2 to 6 percent and soils that have a surface layer of sandy loam or clay loam.

This soil was formerly cleared and cultivated, but it is now mostly in mixed hardwood and pine forest. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 4c2e.

Iredell Series

The Iredell series consists of nearly level to gently sloping, moderately deep, moderately well drained soils. These soils formed in material weathered from hornblende gneiss, hornblende schist, gabbro, or diorite.

In a representative profile the surface layer is dark grayish brown sandy loam about 7 inches thick. The next layer, in sequence from the top, is 10 inches of light olive brown clay, 7 inches of light olive brown clay that has olive and reddish yellow mottles, and 12 inches of mottled light olive brown, brownish yellow, pale yellow, and gray clay loam. The underlying material to a depth of 58 inches or more is mottled light olive brown, light yellowish brown, dark grayish brown, and yellowish brown weathered hornblende gneiss that crushes to sandy loam.

Permeability is slow. Available water capacity is high.

Representative profile of Iredell sandy loam, 2 to 6 percent slopes, 5 miles northeast of Mt. Carmel, about ¼ mile east of South Carolina Primary Highway 823 in McCormick County, near middle of 3 percent slope:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine roots; few dark colored concretions; medium acid (pH 6.0); abrupt smooth boundary.

B21t—7 to 17 inches; light olive brown (2.5Y 5/4) clay; strong medium angular blocky structure; extremely firm; very sticky; very plastic; thick prominent continuous clay films on faces of peds; few fine roots; slightly acid (pH 6.1); clear smooth boundary.

B22t—17 to 24 inches; light olive brown (2.5Y 5/4) clay; common medium distinct olive (5Y 5/6) mottles and few fine distinct reddish yellow mottles; strong coarse angular blocky structure; extremely firm; very sticky; very plastic; thick prominent continuous clay films on faces of peds; few fine roots; few fine feldspar crystals; slightly acid (pH 6.2); clear wavy boundary.

B3—24 to 36 inches; mottled light olive brown (2.5Y 5/4), brownish yellow (10YR 6/6), pale yellow (5Y 7/4), and gray (N/5) clay loam; weak coarse angular blocky structure; very firm; slightly sticky; slightly plastic; thin patchy distinct clay films on faces of peds; common fine feldspar crystals; slightly acid (pH 6.1); gradual wavy boundary.

C—36 to 58 inches; mottled light olive brown (2.5Y 5/6), light yellowish brown (2.5Y 6/4), dark grayish brown (2.5Y 4/2), and yellowish brown (10YR 5/6) weathered hornblende gneiss that crushes to sandy loam; rock structure; firm in place; common fine feldspar crystals; fragments of partially weathered hornblende gneiss; slightly acid (pH 6.3).

The solum ranges from 24 to 35 inches in thickness. The A horizon is slightly acid or medium acid. It is dark grayish brown, grayish brown, olive brown, or brown. The Bt horizon is slightly acid or neutral, and the B2 horizon is slightly acid to mildly alkaline. The B21t horizon is olive brown, yellowish brown, brownish yellow, or light olive brown. The B22t horizon is light olive brown, yellowish brown, or brownish yellow and is mottled with yellow, brown, or olive. The B3 horizon is light olive brown, yellowish brown, olive yellow, or brownish yellow and is mottled with brown, yellow, or gray. The C horizon is slightly acid to mildly alkaline. It is variegated with colors of black, brown, yellow, olive, gray, and white. The C horizon is soft saprolite that crushes to sandy loam or loam.

Iredell soils are near Mecklenburg, Coronaca, and Enon soils. They are more plastic than Mecklenburg and Enon soils. They have a thinner solum and are not so well drained as Coronaca soils.

IeA—Iredell sandy loam, 0 to 2 percent slopes. This nearly level soil is on broad ridges.

Included with this soil in mapping are areas of Mecklenburg, Hiwassee, and Enon soils. Also included are areas of soils that have a thicker surface layer and subsoil than Iredell soils and small areas of soils that have slopes of 2 to 6 percent.

Most areas of this soil are in cultivated crops or pasture (fig. 4). Workability of the soils is the main concern of management. Capability unit IIw–3; woodland suitability group 4c2.

IeB—Iredell sandy loam, 2 to 6 percent slopes. This gently sloping soil is on broad ridges (fig. 5). It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Mecklenburg and Hiwassee soils and small areas of soils that have slopes of 0 to 2 percent.

Most areas of this soil are in pasture or cultivated crops. Controlling erosion and the workability of the soil are the main concerns of management. Capability unit IIe–3; woodland suitability group 4c2.

Kirksey Series

The Kirksey series consists of gently sloping to sloping, moderately deep to deep, moderately well drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is light yellowish brown silt loam about 8 inches thick. The next layer, in sequence from the top, is about 5 inches of olive yellow silt loam that has reddish yellow mottles, 13 inches of yellow silty clay loam that has brownish yellow mottles, 7 inches of yellowish brown clay loam that has gray and yellowish red mottles, and 5 inches of mottled yellowish brown, gray, and yellowish red silty clay loam. The underlying material to a depth of 41 inches or more is mottled pale yellow, gray, yellowish brown, and yellowish red weathered Carolina Slate that crushes to silt loam. Hard rock is at a depth of about 41 inches.

Permeability is moderately slow. The available water capacity is medium.

Representative profile of Kirksey silt loam, 2 to 6 percent slopes, 3 miles northeast of Mountain Creek Church on Secondary State Highway 62, 100 yards north of highway and 1 mile west of Saluda County line in Greenwood County:

Ap—0 to 8 inches; light yellowish brown (2.5YR 6/4) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; strongly acid (pH 5.5) ; abrupt smooth boundary.

B1—8 to 13 inches; olive yellow (2.5Y 6/6) silt loam; few fine distinct reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; friable; common fine roots; few quartz fragments of gravel size; strongly acid (pH 5.3) ; clear smooth boundary.

B21t—13 to 26 inches; yellow (2.5Y 7/6) silty clay loam; common medium faint brownish yellow (10YR 6/8) mottles; moderate

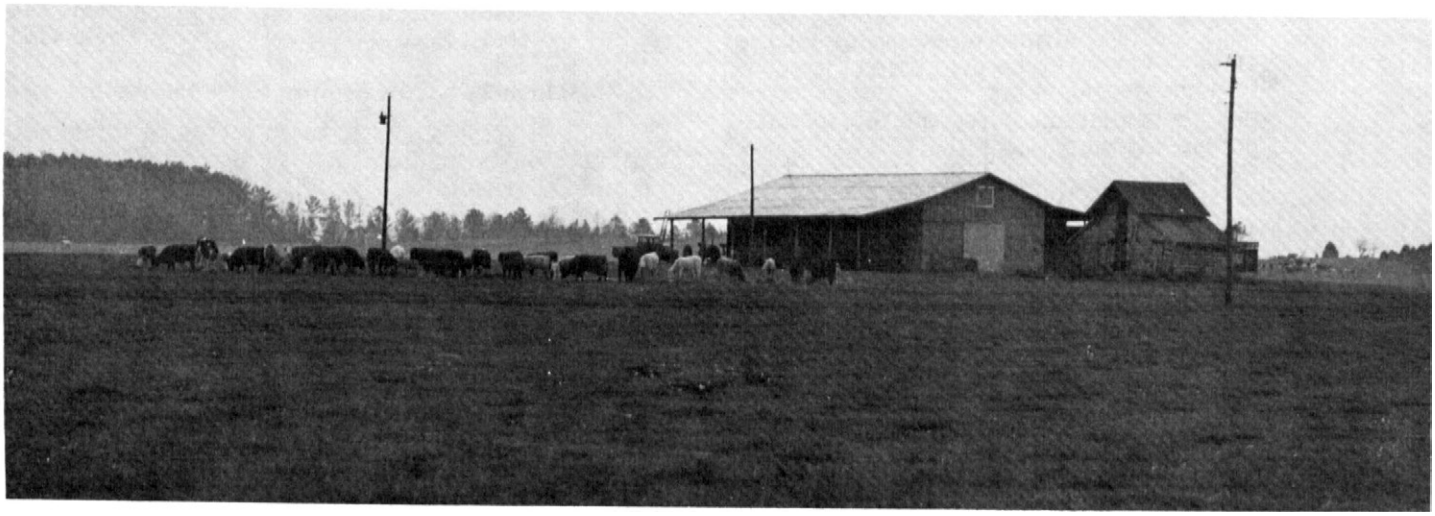

Figure 4.—**Typical fescue pasture on Iredell sandy loam, 0 to 2 percent slopes.**

Figure 5.—**Cotton planted on the contour on Iredell sandy loam, 2 to 6 percent slopes.**

medium angular blocky structure; firm; thin patchy faint clay films on faces of peds; few fine roots; few fine pores; strongly acid (pH 5.3); clear smooth boundary.

B22t—26 to 33 inches; yellowish brown (10YR 5/8) clay loam; common medium prominent gray (10YR 6/1) mottles and few common prominent yellowish red (5YR 5/8) mottles; strong medium and coarse angular blocky structure; firm; thin continuous distinct clay films on faces of peds; common fine pores and few medium pores; strongly acid (pH 5.2); clear wavy boundary.

B3—33 to 38 inches; mottled yellowish brown (10YR 5/8), gray (10YR 6/1), and yellowish red (5YR 5/8) silty clay loam; gray material has more clay than yellowish brown material or yellowish red material; common medium prominent gray mottles and few to moderate medium and distinct yellowish red mottles; weak thick platy structure that breaks to moderate coarse angular blocky structure; firm; thin patchy faint clay films on vertical faces of peds; few fine roots along horizontal faces; few fine and medium fragments of Carolina Slate; few white feldspar crystals; very strongly acid (pH 5.0); clear smooth boundary.

C—38 to 41 inches, mottled pale yellow (2.5Y 7/4), gray (10YR 6/1), yellowish brown (10YR 5/8), and yellowish red (5YR 5/6) weathered Carolina Slate that crushes to silt loam; rock controlled structure; common fine and medium fragments of Carolina Slate; common fine feldspar crystals; very strongly acid (pH 4.8).

R—41 inches, hard Carolina Slate bedrock.

The solum ranges from 30 to 40 inches in thickness. The A horizon is medium acid or strongly acid, and the B and C horizons are strongly acid or very strongly acid. The A horizon is light yellowish brown, pale brown, very pale brown, light brownish gray, dark brown, grayish brown, or brown. The B1 horizon is olive yellow, yellow, brownish yellow, or yellowish brown and has mottles of pale yellow, very pale brown, or pale brown. It is silt loam or silty clay loam. The B2t horizon is yellow, yellowish brown, brownish yellow, strong brown, or olive yellow and is mottled with yellow, brown, or red and gray. Gray mottles are 15 to 24 inches below the top of the Bt horizon. The B2t horizon is silty clay loam or clay loam. The B3 horizon is yellow, light yellowish brown, brownish yellow, or light olive brown and is mottled with gray, red, brown,

or yellow. White mottles in the B3 horizon are feldspar crystals. The B3 horizon is clay loam or silty clay loam. The C horizon consists of partly weathered Carolina Slate rock that commonly crushes to silt loam or fine sandy loam. Some seams are filled with gray clay loam. The lower part of the subsoil ranges from 0 to 6 percent feldspar crystals.

Kirksey soils are near Alamance, Herndon, and Goldston soils. Kirksey soils are not so well drained as Alamance and Herndon soils. They have a thicker solum than Goldston soils.

KaB—Kirksey silt loam, 2 to 6 percent slopes. This gently sloping soil is on broad and medium-width ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Alamance and Herndon soils. Also included are small areas of soils that have a combined surface layer and subsoil less than 30 inches thick and small areas of soils that have a combined surface layer and subsoil more than 40 inches thick. Small areas of soils that have slopes of 6 to 10 percent are also included.

Most areas of this soil are forested. Controlling erosion is the main concern of management. Capability unit IIIe–6; woodland suitability group 4w2.

KaC—Kirksey silt loam, 6 to 10 percent slopes. This sloping soil is on breaks that extend to drainageways.

Included with this soil in mapping are small areas of Herndon, Georgeville, and Goldston soils. Also included are small areas of soils where the combined thickness of the surface layer and subsoil is less than 30 inches and small areas of soils where the combined thickness of the surface layer and subsoil is more than 40 inches. Small areas of soils that have slopes of 2 to 5 percent are also included.

Most areas of this soil are forested. Controlling erosion is the main concern of management. Capability unit IVe–2; woodland suitability group 4w2.

Louisburg Series

The Louisburg series consists of sloping and moderately steep, shallow or moderately deep, well drained to excessively drained soils. These soils formed in material weathered from granite and gneiss.

In a representative profile the surface layer is dark brown loamy sand about 4 inches thick. The subsurface layer is pale brown loamy sand 8 inches thick. The next layer is 10 inches of yellowish red sandy loam that has yellow mottles. This layer has an interrupted horizon of sandy clay loam and has intrusions of rock in places. The underlying material to a depth of 42 inches or more is mottled reddish yellow, yellow, and strong brown weathered granite that crushes to loamy sand.

Permeability is rapid. The available water capacity is low.

Representative profile of Louisburg loamy sand, 10 to 25 percent slopes, 5 miles southwest of Verdery, and ½ mile east of Cedar Springs Church in Greenwood County, near center of 16 percent slope:

Ap—0 to 4 inches; dark brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine roots; common coarse sand grains; common fine gravel; medium acid (pH 6.0); abrupt smooth boundary.

A2—4 to 12 inches; pale brown (10YR 6/3) loamy sand; weak fine granular structure; very friable; many fine roots; common coarse sand grains; common fine gravel; strongly acid (pH 5.5); clear wavy boundary.

B—12 to 22 inches; yellowish red (5YR 5/8) sandy loam; common medium distinct yellow (10YR 7/6) mottles; weak medium subangular blocky structure; friable; interrupted by discontinuous layer of sandy clay loam 2 to 5 inches thick that is parallel to soil surface and contains pockets or tongues of clay loam 3 to 8 inches in diameter; hard granite rock, which extends through this horizon and to the surface at irregular intervals, makes up 15 percent of horizon; common medium fragments of weathered granite; common fine feldspar crystals; few fine mica flakes; very strongly acid (pH 5.0); clear irregular boundary.

C—22 to 42 inches; mottled reddish yellow (5YR 6/8), yellow (10YR 7/6), and strong brown (7.5YR 5/6) weathered granite that crushes to loamy sand; rock controlled structure; friable; many medium and coarse fragments of partly weathered granite; common fine feldspar crystals; common fine mica flakes; very strongly acid (pH 4.8).

The solum ranges from 12 to 30 inches in thickness. The A horizon is medium or strongly acid. The Ap horizon is dark yellowish brown or dark brown, and the A2 horizon is pale brown or very pale brown. The B horizon is strongly acid or very strongly acid. The B horizon is dominantly sandy loam or loamy sand, but it has a discontinuous layer of sandy clay loam or clay loam 2 to 12 inches thick. The loamy sand and sandy loam are yellowish red, yellowish brown, or strong brown. The sandy clay loam and clay loam are yellowish red or strong brown. The C horizon is weathered gneiss or granite, and it is 5 to 20 percent rock fragments.

Louisburg soils are near Appling, Cecil, Pacolet, and Helena soils. They have a thinner solum than Appling, Cecil, Pacolet, and Helena soils.

LoC—Louisburg loamy sand, 6 to 10 percent slopes. This sloping soil is adjacent to small streams.

Included with this soil in mapping are small areas of Cecil, Appling, and Helena soils. Also included are small areas of soils that have slopes of more than 10 percent.

Most areas of this soil are forested. Erosion and droughtiness are the main concerns of management. Capability unit IVe–3; woodland suitability group 3o7.

LoE—Louisburg loamy sand, 10 to 25 percent slopes. This strongly sloping or moderately steep soil is on short side slopes adjacent to medium and large streams. It has the profile described as representative for the series.

Included with this soil in mapping are small areas

of Cecil, Helena, and Pacolet soils. Also included are areas of soils that have slopes of 6 to 10 percent.

Most of the soil is forested. Erosion is the main concern of management. Capability unit VIIe–2; woodland suitability group 3r8.

Mecklenburg Series

The Mecklenburg series consists of gently sloping to sloping, moderately deep to deep, well drained soils. These soils formed in material weathered from gneiss or schist influenced by basic minerals.

In a representative profile the surface layer is dark brown sandy loam about 5 inches thick. The next layer, in sequence from the top, is 9 inches of yellowish red clay, about 14 inches of yellowish red clay that has yellowish brown mottles, and 10 inches of yellowish red clay that has light red mottles. The underlying material to a depth of 44 inches or more is mottled strong brown, yellowish brown, green, and black weathered gneiss that crushes to sandy clay loam.

Permeability is slow. The available water capacity is medium.

Representative profile of Mecklenburg sandy loam, 2 to 6 percent slopes, 2½ miles north of Coronaca, 30 feet north of Secondary State Highway 98 in Greenwood County, on lower part of 4 percent slope in improved pasture:

Ap—0 to 5 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; many fine roots; common dark colored concretions; medium acid (pH 5.7); abrupt smooth boundary.

B21t—5 to 14 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm; sticky; slightly plastic; thin patchy distinct clay films on faces of peds; common fine roots; few dark colored concretions; few quartz fragments of gravel size; medium acid (pH 5.6); clear smooth boundary.

B22t—14 to 28 inches; yellowish red (5YR 5/6) clay; common fine distinct yellowish brown (10YR 5/4) mottles; moderate coarse subangular blocky structure; firm; sticky; slightly plastic; thick prominent continuous clay films on faces of peds; few fine roots; few fine pores; common dark colored concretions; medium acid (pH 5.8); clear wavy boundary.

B3—28 to 38 inches; yellowish red (5YR 5/8) clay; common medium distinct light red (2.5YR 6/6) mottles; weak medium and coarse subangular blocky structure; firm; slightly sticky; slightly plastic; thin patchy distinct clay films on faces of peds; common dark colored concretions; few fragments of partially weathered gneiss rock; slightly acid (pH 6.2); clear wavy boundary.

C—38 to 44 inches; mottled strong brown (7.5YR 5/8), yellowish brown (10YR 5/4), green, and black weathered gneiss that crushes to sandy clay loam; rock controlled structure; firm in place; about 3 percent fragments of parent rock too firm to crush; neutral (pH 6.8).

The solum ranges from 35 to 55 inches in thickness. The A and B horizons are medium acid or slightly acid, and the C horizon is slightly acid or neutral. The A and B horizons have few to common dark colored concretions. The Ap horizon is dark brown, brown, or reddish brown. The B2t horizon is yellowish red or reddish brown and has red or brown mottles. The B3 horizon is yellowish red, yellowish brown, or strong brown clay or clay loam. The C horizon is saprolite that crushes to loam, sandy clay loam, or clay loam. It has 35 to 60 percent base saturation.

Mecklenburg soils are near Coronaca, Cecil, Davidson, Hiwassee, Iredell, and Wilkes soils. They lack the dark red B horizon typical of Coronaca, Davidson, and Hiwassee soils and the red B horizon typical of Cecil soils. They lack the plastic B horizon typical of Iredell soils. Mecklenburg soils have a thicker solum than Wilkes soils.

MeB—Mecklenburg sandy loam, 2 to 6 percent slopes. This gently sloping soil is on broad ridges. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Cecil, Hiwassee, Davidson, Coronaca, Iredell, and Wilkes soils. Also included are small areas of soils that have slopes of 6 to 10 percent.

Most areas of the soil are in pasture or cultivated crops. Controlling erosion is the main concern of management. Capability unit IIe–3; woodland suitability group 4o1.

MeC—Mecklenburg sandy loam, 6 to 10 percent slopes. This sloping soil is on breaks that extend from broad ridges to drainageways.

Included with this soil in mapping are small areas of Cecil, Coronaca, Davidson, Hiwassee, and Wilkes soils. Also included are small areas of soils that have slopes of 2 to 6 percent.

Most areas of this soil are in pasture. Controlling erosion is the main concern of management. Capability unit IIIe–3; woodland suitability group 4o1.

Nason Series

The Nason series consists of strongly sloping to moderately steep, moderately deep, well drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is brown silt loam about 5 inches thick. The next layer, in sequence from the top, is about 9 inches of yellowish red clay, 9 inches of yellowish red clay that has red and reddish yellow mottles, and 14 inches of yellowish red silty clay loam that has red and reddish yellow mottles. The underlying material to a depth of 56 inches or more is mottled light yellowish brown, yellow, and very pale brown weathered Carolina Slate that crushes to silt loam.

Permeability is moderate. The available water capacity is medium.

Representative profile of Nason silt loam, 10 to 15 percent slopes, 2 miles west of Kirksey and 4 miles southeast of Gaines, about 200 feet west Secondary State Highway 289 in Greenwood County, near center of 14 percent slope in mixed hardwood and pine forest:

A1—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size and small quartz rocks; very strongly acid (pH 5.0); abrupt smooth boundary.

B21t—5 to 14 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; friable; thin patchy faint clay films on faces of some peds; few medium roots; few quartz fragments of gravel size; strongly acid (pH 5.1); gradual wavy boundary.

B22t—14 to 23 inches; yellowish red (5YR 5/8) clay; common medium distinct red (2.5YR 4/8) mottles and few fine prominent reddish yellow mottles; moderate medium subangular blocky structure; firm; thin patchy distinct clay films on faces of most peds; few medium roots; few quartz fragments of gravel size; strongly acid (pH 5.3); gradual wavy boundary.

B3—23 to 37 inches; yellowish red (5YR 5/8) silty clay loam; few fine distinct red and reddish yellow mottles; weak medium subangular blocky structure; friable; thin patchy faint clay films on faces of some peds; very strongly acid (pH 4.5); gradual wavy boundary.

C—37 to 56 inches; mottled light yellowish brown (10YR 6/4), yellow (10YR 7/6), and very pale brown (10YR 7/3) weathered Carolina Slate that crushes to silt loam; rock controlled structure; fragments of partly weathered Carolina Slate; very strongly acid (pH 4.5).

The solum ranges from 25 to 40 inches in thickness. Reaction is strongly acid or very strongly acid throughout. The A horizon is brown or dark grayish brown in areas of hardwood trees, brown or dark brown in areas of pine trees, and brown or yellowish brown in areas of grass. The B2t horizon is yellowish red, reddish yellow, yellowish brown, or strong brown and is mottled with red, brown, or yellow. It is silty clay, silty clay loam, clay loam, or clay. The B3 horizon is mottled with red, brown, or yellow. It is silty clay loam or clay loam.

Nason soils are near Herndon, Georgeville, Tatum, and Goldston soils. They lack the red B horizon that is typical of Georgeville and Tatum soils and the thick solum that is typical of Herndon soils. Nason soils have a thicker solum than Goldston soils.

NaD—Nason silt loam, 10 to 15 percent slopes. This strongly sloping soil is on medium-width side slopes adjacent to streams. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Georgeville, Herndon, Tatum, and Goldston soils. Also included are small areas of soils that have slopes of 15 to 25 percent and small areas of soils that have a few quartz fragments of gravel size or slate fragments on the surface in places.

Most areas of this soil are in hardwood and pine trees. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 3o7.

NaE—Nason silt loam, 15 to 25 percent slopes. This moderately steep soil is on short side slopes adjacent to streams.

Included with this soil in mapping are small areas of Tatum and Goldston soils. Also included are small areas of soils that have slopes of 10 to 15 percent and small areas of soils that have quartz or slate fragments on the surface.

Most areas of this soil are in hardwood forest. Controlling erosion is the main concern of management. Capability unit VIe–1; woodland suitability group 3r8.

Pacolet Series

The Pacolet series consists of strongly sloping to steep, moderately deep, well drained soils. These soils formed in material weathered from gneiss or granite.

In a representative profile the surface layer is dark grayish brown sandy loam about 5 inches thick. The upper part of the next layer is 17 inches of red clay, and the lower part is 11 inches of red clay loam that has reddish yellow mottles. The underlying material to a depth of 45 inches or more is mottled yellowish red, reddish yellow, and red weathered gneiss that crushes to sandy loam.

Permeability is moderate. Available water capacity is medium.

Representative profile of Pacolet sandy loam, 15 to 40 percent slopes, about 1¼ miles southwest of Ware Shoals on South Carolina Primary Highway 420 in Greenwood County, near center of 23 percent slope in wooded area:

A—0 to 5 inches, dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size on surface; strongly acid (pH 5.4); abrupt smooth boundary.

B2t—5 to 22 inches, red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm; thin continuous distinct clay films on faces of peds and in old root channels; common fine roots; few medium roots; few fine mica flakes; few fine feldspar crystals; strongly acid (pH 5.4); clear smooth boundary.

B3—22 to 33 inches, red (2.5YR 4/8) clay loam; common fine distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; few large roots; common fine mica flakes; few feldspar crystals; very strongly acid (pH 5.0); clear smooth boundary.

C—33 to 45 inches, mottled yellowish red (5YR 5/8), reddish yellow (7.5YR 6/6), and red (2.5YR 5/8) weathered gneiss that crushes to sandy loam; rock controlled structure; firm in place; fragments of partially weathered gneiss; common fine mica flakes; few fine feldspar crystals; very strongly acid (pH 4.8).

The solum ranges from 25 to 39 inches in thickness. The A horizon is medium acid or strongly acid. The Bt and C horizons are strongly acid or very strongly acid. The B2t horizon has few to common mica flakes, and the B3 and C horizons have few to many mica flakes. The A horizon is brown, strong brown, grayish brown, or dark grayish brown, and, where it is eroded, it is red, reddish brown, or yellowish red. It is sandy loam or sandy clay loam. The B2t horizon has mottles of reddish yellow or yellow in places. The B3 horizon has yellowish or brownish mottles. The C horizon is multicolored. It crushes to sandy loam, clay loam, or loam.

Pacolet soils are near the Cecil, Hiwassee, Louisburg, and Wilkes soils. They lack the thick solum that is typical of the Cecil and Hiwassee soils. They have a thicker solum than Louisburg and Wilkes soils.

PaF—Pacolet sandy loam, 15 to 40 percent slopes. This moderately steep or steep soil is on short side slopes adjacent to the medium-sized and large streams. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Hiwassee, Louisburg, and Wilkes soils. Also included are small areas of soils that have a surface layer of sandy clay loam.

Most areas of this soil are in mixed forest. Controlling erosion is the main concern of management. Capability unit VIIe–1; woodland suitability group 3r8.

PcD2—Pacolet sandy clay loam, 10 to 15 percent slopes, eroded. This strongly sloping soil is on side slopes adjacent to streams. It has a profile similar to the one described as representative for the series, but the surface layer is red, reddish brown, or yellowish red sandy clay loam 2 to 3 inches thick. Rills and galled areas are common. A few shallow gullies and a few moderately deep or deep gullies are in some areas.

Included with this soil in mapping are areas of Cecil, Cataula, and Hiwassee soils. Also included are areas of soils that have a surface layer of sandy loam or clay loam and small areas of soils that have slopes of 15 to 40 percent.

Most areas of this soil are in pine forest. Controlling erosion is the main concern of management. Capability unit VIe–1; woodland suitability group 4c2e.

Tatum Series

The Tatum series consists of strongly sloping or moderately steep, moderately deep, well drained soils. These soils formed in material weathered from Carolina Slate.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The next layer, in sequence from the top, is about 6 inches of red clay loam, 11 inches of red silty clay loam that has reddish yellow mottles, and 12 inches of mottled red, reddish yellow, strong brown, and brownish yellow silty clay loam. The underlying material to a depth of 60 inches or more is mottled yellowish red, strong brown, very pale brown, and white weathered Carolina Slate that crushes to silt loam.

Permeability is moderate. Available water capacity is medium.

Representative profile of Tatum silt loam, 10 to 15 percent slopes, ¼ mile north of McCormick, 200 feet west of Secondary State Highway 35 in McCormick County, in forest of mixed pines and hardwoods:

Ap—0 to 6 inches; brown (7.5YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; very strongly acid (pH 4.9); abrupt smooth boundary.

B21t—6 to 12 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable; continuous clay films on faces of most peds; few fine and medium pores; common fine roots, few medium roots; very strongly acid (pH 5.0); clear smooth boundary.

B22t—12 to 23 inches; red (2.5YR 4/8) silty clay loam; common fine distinct reddish yellow (5YR 6/8) mottles; moderate medium subangular blocky structure; friable; thin distinct continuous clay films on faces of most peds; few fine and medium pores; few fine and medium roots; very strongly acid (pH 5.0); clear wavy boundary.

B3—23 to 35 inches; mottled red (2.5YR 4/8), reddish yellow (7.5YR 7/8), strong brown (7.5YR 5/6), and brownish yellow (10YR 6/8) silty clay loam; weak medium subangular blocky structure; friable; thin patchy faint clay films on faces of most peds; few medium and large roots; few fine and medium pores; very strongly acid (pH 5.0); clear wavy boundary.

C—35 to 60 inches; mottled yellowish red (5YR 5/8), strong brown (7.5YR 5/6), very pale brown (10YR 7/3), and white (10YR 8/2) weathered Carolina Slate that crushes to silt loam; rock controlled structure; firm in place, friable when dug out; strong acid (pH 5.2).

The solum ranges from 28 to 38 inches in thickness. Reaction is very strongly acid or strongly acid throughout. The Ap horizon is brown or strong brown, but where eroded, it is yellowish red or reddish brown. The B2t horizon has reddish brown or yellowish red mottles in the lower part. It is clay loam, silty clay, silty clay loam, or clay. The B3 horizon is mottled with red, brown, or yellow. It is silty clay, silty clay loam, or silt loam.

Tatum soils are near Georgeville, Herndon, Nason, and Goldston soils. Tatum soils have a thinner solum than Georgeville and Herndon soils. They have a redder B horizon than Nason soils. Tatum soils have a thicker solum than Goldston soils.

TaD—Tatum silt loam, 10 to 15 percent slopes. This strongly sloping soil is on side slopes adjacent to medium-sized streams. It has the profile described as representative for the series. A few areas in Greenwood County, 5 to 10 acres in size, have a yellowish red or reddish brown silty clay loam surface layer 2 to 4 inches thick.

Included with this soil in mapping are small areas of Georgeville, Nason, and Goldston soils. Also included are areas of soils that have slopes of 15 to 25 percent

and a few areas of soils that have a surface layer of loam or silty clay loam.

The fine textured plow layer is fairly easy to keep in good tilth. Because this soil is strongly sloping, most areas are used for forest or pasture. Controlling erosion is the main concern of management. Capability unit IVe–1; woodland suitability group 4o1.

TaE—Tatum silt loam, 15 to 25 percent slopes. This moderately steep soil is on elongated, irregular side slopes adjacent to large streams.

Included with this soil in mapping are Nason and Goldston soils. Also included are areas of soils that have slopes of 10 to 15 percent and small areas of soils that have a surface layer of loam or silty clay loam.

Most areas of this soil are in hardwood and pine forest. Because of moderately steep slopes, it is not practical to disturb the surface layer of this soil. Controlling erosion is the main concern of management. Capability unit VIe–1; woodland suitability group 4r2.

Toccoa Series

The Toccoa series consists of nearly level, deep, well drained soils. These soils formed in alluvial material washed from soils that formed in material weathered from granite, gneiss, schist, and basic rock. These soils are subject to flooding for short periods (fig. 6).

In a representative profile the surface layer is brown sandy loam about 8 inches thick. The upper part of the underlying material is 14 inches of reddish brown loamy sand, the middle part is 11 inches of reddish brown sandy loam that has brown and yellowish red mottles, and the lower part to a depth of 51 inches or more is yellowish brown sandy loam that has grayish brown, reddish brown, and faint brown mottles.

Permeability is moderately rapid. The available water capacity is medium.

Representative profile of Toccoa sandy loam in an area of Cartecay and Toccoa soils, 3 miles north of Greenwood, about 1 mile southeast of Pine Crest School, 175 feet north of Secondary State Highway 119 on Sample Branch, 100 feet east in Greenwood County:

Ap—0 to 8 inches; brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; many fine roots; common fine mica flakes; slightly acid (pH 6.5); clear smooth boundary.

C1—8 to 22 inches; reddish brown (2.5YR 5/4) loamy sand; single grained; loose; common fine roots; common fine mica flakes; slightly acid (pH 6.3); gradual smooth boundary.

C2—22 to 33 inches; reddish brown (5YR 5/4)

Figure 6.—**Recently plowed area of Toccoa soils. These soils formed in stratified alluvium. They are well drained but are subject to flooding.**

sandy loam; common medium prominent brown (10YR 5/3) mottles, and few medium faint yellowish red (5YR 5/6) mottles; massive; friable; common fine mica flakes; few black concretions; medium acid (pH 5.6); gradual smooth boundary.

C3—33 to 51 inches; yellowish brown (10YR 5/4) sandy loam; common medium distinct grayish brown (10YR 5/2) mottles, few medium prominent reddish brown (5YR 5/4) mottles, and few medium faint brown (10YR 4/3) mottles; massive; very friable; common fine mica flakes; few black concretions; medium acid (pH 5.7).

The profile is slightly acid or medium acid. It has thin bedding planes of different textures throughout. It has common to many fine mica flakes in all horizons. Stratification is evident throughout the profile. The A horizon is brown or dark brown, and in areas of recent deposition, it is red or reddish brown. It is loam or sandy loam. The C horizon is reddish brown, yellowish brown, or yellowish red and has mottles of red, brown, or yellow. Gravelly strata are below a depth of 40 inches in some profiles.

Toccoa soils are near Cartecay, Chewacla, and Wehadkee soils. They are better drained than these soils.

Wehadkee Series

The Wehadkee series consists of nearly level, deep, poorly drained soils. These soils formed in sediment washed from soils that formed in material weathered from granite, gneiss, schist, and other rocks.

In a representative profile the surface layer is about 9 inches of dark brown silt loam that has grayish brown mottles. The upper part of the underlying material, in sequence from the top, is 9 inches of light brownish gray loam that has reddish brown mottles, 15 inches of gray clay loam that has olive yellow mottles, 8 inches of gray clay loam, and 8 inches of gray loam that has olive yellow mottles. The lower part to a depth of 62 inches is dark gray fine sandy loam that has olive yellow mottles.

Permeability is moderate. The available water capacity is high.

Representative profile of Wehadkee silt loam from an area of Wehadkee soils, 4 miles north of McCormick, ¼ mile west of intersection of Secondary State Highways 34 and 52, 150 feet south of Secondary State Highway 52, and 200 feet west of Rocky Creek in McCormick County:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; common fine distinct grayish brown (10YR 5/2) mottles; weak medium granular structure; friable; many fine roots; few fine quartz pebbles; strongly acid (pH 5.4); abrupt smooth boundary.

C1g—9 to 18 inches; light brownish gray (2.5Y 6/2) loam; few fine faint reddish brown mottles; massive; friable; common fine roots; very strongly acid (pH 5.0); clear smooth boundary.

C2g—18 to 33 inches; gray (5Y 6/1) clay loam; common fine distinct olive yellow (2.5Y 6/8) mottles; massive; firm; few fine roots; medium acid (pH 5.8); clear smooth boundary.

C3g—33 to 41 inches; gray (5Y 5/1) clay loam; massive; firm; neutral (pH 7.2); clear smooth boundary.

C4g—41 to 49 inches; gray (5Y 6/1) loam; few fine distinct olive yellow mottles; massive; friable; few dark concretions; thin bedding planes are evidence of stratification; mildly alkaline (pH 7.5); abrupt smooth boundary.

C5g—49 to 62 inches; dark gray (N 4/0) fine sandy loam; common medium distinct olive yellow (5Y 6/6) mottles; massive; very friable; few dark colored concretions; mildly alkaline (pH 7.5).

The profile contains few to common mica flakes and none to common dark concretions. The A and C1 horizons are very strongly acid to slightly acid, and the C2 to C5 horizons are slightly acid to mildly alkaline. The A horizon is dark grayish brown or dark brown and has light brownish gray to grayish brown mottles. The A horizon is fine sandy loam, silt loam, clay loam, or loam. In recently overwashed areas it is sandy loam, gravelly sandy loam, or sandy clay loam. The upper part of the C horizon is light brownish gray, yellowish brown, or gray and has mottles of gray, brown, or yellow. The middle part of the C horizon is gray, dark gray, or dark grayish brown fine sandy loam, clay loam, or loam and has mottles of yellow and brown. The lower part of the C horizon is gray, light gray, or dark gray and has mottles of yellow or brown. It is sandy loam or is strata of sand, clay, silt, or gravel.

The reaction of these soils is more alkaline in the lower horizons than is defined as within the range for the series, but this difference does not affect their usefulness.

Wehadkee soils are near Cartecay, Chewacla, and Toccoa soils. Wehadkee soils are more poorly drained than these soils.

We—Wehadkee soils. These soils are on bottom lands of medium-sized and large streams. They are nearly level.

Included with these soils in mapping are areas of Cartecay, Chewacla, and Toccoa soils. Also included are wet depressional areas, which are shown on the soil map by a symbol for wet spots.

Most areas of this soil are in wetland hardwoods and pasture. Providing adequate drainage is the main concern of management. The hazard of flooding is the main limitation. Capability unit IVw–1; woodland suitability group 1w9.

Wilkes Series

The Wilkes series consists of sloping to steep, shallow, well drained soils. These soils formed in material weathered from hornblende gneiss and schist cut by dikes of basic rocks.

In a representative profile the surface layer is dark brown fine sandy loam about 5 inches thick. The next layer is about 6 inches of yellowish brown clay. Below

this is 4 inches of light yellowish brown clay loam that has yellowish brown mottles and a few black streaks. The underlying material to a depth of 24 inches is brown weathered gneiss that crushes to fine sandy loam. Hard bedrock is at a depth of 24 inches.

Permeability is moderately slow. The available water capacity is low.

Representative profile of Wilkes fine sandy loam, 15 to 40 percent slopes, 4 miles southwest of Bordeaux, in McCormick County, near top of 18 percent slope that has southern exposure, in mixed hardwood and pine forest:

A—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; few quartz fragments of gravel size; strongly acid (pH 5.3); abrupt smooth boundary.

B2t—5 to 11 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; thin patchy distinct clay films on faces of peds; few fine roots; common medium roots; medium acid (pH 5.7); clear smooth boundary.

B3—11 to 15 inches; light yellowish brown (10YR 6/4) clay loam; common medium faint yellowish brown (10YR 5/4) mottles and few fine distinct black streaks; weak medium and fine subangular blocky structure; friable; few medium fragments of partly weathered gneiss rock; medium acid (pH 6.0); clear wavy boundary.

C—15 to 24 inches; brown (10YR 5/3) weathered gneiss that crushes to fine sandy loam; rock controlled structure; friable; common fine streaks of black minerals; many fragments of partially weathered gneiss; neutral (pH 6.6).

R—24 inches, hard bedrock.

The solum ranges from 12 to 19 inches in thickness. The A horizon is strongly acid or medium acid. It is dark brown, grayish brown, light olive brown, dark grayish brown, or brown. The B horizon is medium acid or slightly acid. The B2t horizon is yellowish brown, brownish yellow, reddish yellow, or strong brown sandy clay loam, clay loam, or clay. The B3 horizon is brown, grayish brown, light yellowish brown, yellowish brown, or pale brown sandy loam, sandy clay loam, clay loam, or clay. Mottles of red, gray, black, or brown are common. Fragments of partly weathered parent material are common. The C horizon is medium acid to neutral. It is mottled with red, brown, yellow, black, and gray. Rock controlled structure. The C horizon is sandy loam, fine sandy loam, or sandy clay loam when crushed.

Wilkes soils are near Enon, Mecklenburg, Pacolet, Iredell, Coronaca, and Cataula soils. They have a thinner solum than these soils.

WkD—Wilkes fine sandy loam, 6 to 15 percent slopes. This sloping to strongly sloping soil is in irregularly shaped areas adjacent to small streams.

Included with this soil in mapping are areas of Enon, Mecklenburg, Coronaca, and Iredell soils. Also included are small areas of soils that have slopes of 15 to 40 percent.

Most areas of this soil are forested. Controlling erosion is the main concern of management. A shallow rooting zone is the main limitation. Capability unit VIe–2; woodland suitability group 4o1.

WkF—Wilkes fine sandy loam, 15 to 40 percent slopes. This moderately steep or steep soil is on short side slopes adjacent to streams. It has the profile described as representative for the series. Geologic erosion is common.

Included with this soil in mapping are small areas of Pacolet soils and some areas of soils that have slopes of 6 to 15 percent. Also included are shallow gullies that are less than 4 acres in size. Rock outcrops are common in some areas.

Most areas of this soil are in forest. It is not practical to disturb the surface layer of this soil. Controlling erosion and keeping a permanent ground cover are the main concerns of management. A shallow rooting zone is the main limitation. Capability unit VIIe–2; woodland suitability group 4r2.

Worsham Series

The Worsham series consists of nearly level or gently sloping, deep, poorly drained soils. These soils are at the heads of drainageways, along drainageways, and on flats and in depressions on uplands. They formed in a mixture of colluvium and local alluvium or residuum derived from granite, gneiss, or Carolina Slate.

In a representative profile the surface layer is dark brown loam about 8 inches thick. The next layer, in sequence from the top, is about 11 inches of light brownish gray clay, 12 inches of gray clay that has brownish yellow mottles, 13 inches of gray clay that has yellow and yellowish red mottles, and 10 inches of gray clay that has yellow mottles. The underlying material to a depth of 70 inches is light gray weathered gneiss that crushes to clay loam that has yellowish brown mottles.

Permeability is slow. The available water capacity is medium.

Representative profile of Worsham loam, 1 to 4 percent slopes, 2 miles northeast of Epworth in Greenwood County, in idle field near center of 3 percent slope that has eastern exposure:

Ap—0 to 8 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable; many fine roots; strongly acid (pH 5.4); abrupt smooth boundary.

B21tg—8 to 19 inches; light brownish gray (10YR 6/2) clay; weak fine subangular blocky structure; friable; thin patchy faint clay films on faces of peds; many fine roots; strongly acid (pH 5.2); clear smooth boundary.

B22tg—19 to 31 inches; gray (N 6/0) clay; many fine prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of most peds; few medium holes; very strongly acid (pH 4.9); clear smooth boundary.

B23tg—31 to 44 inches; gray (10YR 5/1) clay; many fine distinct yellow (10YR 7/8)

and few fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; very strongly acid (pH 4.8); gradual wavy boundary.

B3g—44 to 54 inches; gray (10YR 6/1) clay; common medium prominent yellow (10YR 7/8) mottles; weak medium subangular blocky structure; firm; very strongly acid (pH 4.5); clear smooth boundary.

Cg—54 to 70 inches; light gray (10YR 7/1) weathered gneiss that crushes to clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; rock controlled structure; firm; few fine and medium quartz fragments of gravel size; pieces of partly weathered gneiss or granitoid gneiss; very strongly acid (pH 4.6).

The solum ranges from about 44 to 58 inches in thickness. The A horizon is strongly acid or medium acid. The B and C horizons are very strongly acid or strongly acid. The A horizon is dark brown or olive brown. The B21tg horizon is light brownish gray or light gray clay or sandy clay. The B22tg horizon is gray clay or sandy clay that has brownish yellow or light yellow mottles. The B23tg horizon is clay or sandy clay that has yellow or yellowish red mottles. The B3g horizon is clay, sandy clay, or sandy clay loam. The C horizon is clay loam or sandy loam.

Worsham soils are near Appling, Helena, Herndon, and Kirksey soils. Worsham soils are more poorly drained than these soils.

WoB—Worsham loam, 1 to 4 percent slopes. This soil is nearly level in upland depressions and gently sloping in areas at the head of drainageways.

Included with this soil in mapping are small areas of Appling, Helena, and Herndon soils. Also included are small areas of soils that have a surface layer of loamy sand and a subsoil of sandy clay loam.

Most areas of this soil are in woodland. Drainage is the main concern of management. Capability unit Vw–1; woodland suitability group 2w8.

Use and Management of the Soils

In this section the capability classification used by the Soil Conservation Service is explained. Then the capability units are discussed in detail, and suggestions about use and management of the soils are given. Next, predicted yields of the principal crops are listed. Finally, information about the use of the soils for wildlife, woodland, and engineering purposes is given.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

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

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

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

Class I soils have few limitations that restrict their use. (None in Greenwood and McCormick Counties.)

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

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

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

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

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

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

Class VIII soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or to esthetic purposes. (None in Greenwood and McCormick Counties.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold to too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain,

at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol; for example, IIe–1 or IIIe–3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units [2]

In this section the soils of Greenwood and McCormick Counties that require about the same kind of management are grouped in capability units. The significant features of the soils in each capability unit, together with their hazards and limitations, are described, and suggestions for use and management of the soils of each unit are given. Arabic numerals used in the symbol for the capability units are not consecutive because not all the capability units used in South Carolina are represented in Greenwood and McCormick Counties.

CAPABILITY UNIT IIe–1

This unit consists of gently sloping soils that have a surface layer of loamy sand, sandy loam, sandy clay loam, or silt loam and a subsoil of sandy clay loam, clay loam, silty clay loam, silty clay, or clay. These soils are well drained. The root zone is moderately deep to deep. Permeability is moderate. Available water capacity is medium. Natural fertility is low.

Terraces, grassed waterways, contour farming, and cropping systems that keep a protective cover on these soils are used to control erosion when the soils are used for cultivated crops. Erosion is seldom a concern when the soils are used for small grain, pasture, or hay. Uniform crop stands are more difficult to establish on the soils that have a surface layer of sandy clay loam. These soils are also more difficult to work over a wide range of moisture conditions.

CAPABILITY UNIT IIe–3

This unit consists of gently sloping soils that have a surface layer of loamy sand or sandy loam and a subsoil of clay loam or clay. These soils are well drained and moderately well drained. The root zone is moderately deep to deep. Permeability is slow, and available water capacity is medium. Natural fertility is low.

Water management systems that include terraces, grassed waterways, and contour farming are used to control erosion when these soils are used for crops, but terraces are difficult to build and maintain on the Iredell soils. Crop rotations should include small grain and grasses.

CAPABILITY UNIT IIw–3

Iredell sandy loam, 0 to 2 percent slopes, is the only soil in this unit. It has a very firm, very plastic clay subsoil. This soil is moderately well drained. The root zone is moderately deep. Permeability is slow, and available water capacity is high.

Drainage is required for good crop production. Tillage is difficult because of the very plastic subsoil, and care must be used to prevent tillage when this soil is wet. The clay subsoil also limits use of the soil for deep-rooted crops.

CAPABILITY UNIT IIIe–1

This unit consists of gently sloping to sloping soils that have a surface layer of loamy sand, sandy clay loam, sandy loam, silt loam, or silty clay loam and a subsoil of silty clay loam, silty clay, clay loam, or clay. These soils are well drained. The root zone is deep. Permeability is moderate, and available water capacity is medium. Natural fertility is low.

Erosion control practices are needed for continuous crop production. Good management practices include the use of terraces and waterways, contour stripcropping, and cropping systems that include intensive crop residue management and sod crops. Uniform crop stands are more difficult to establish on the soils that have a surface layer of sandy clay loam or silty clay loam. These soils are also more difficult to work over a wide range of moisture conditions. Most areas of these soils are commonly used for pasture.

CAPABILITY UNIT IIIe–3

This unit consists of gently sloping to sloping soils that have a surface layer of loamy sand or sandy loam and a subsoil of clay loam or clay. These soils are well drained and moderately well drained. The root zone is moderately deep to deep. Permeability is moderate to slow, and available water capacity is medium. Natural fertility is low.

Erosion is the chief hazard to management of these soils. Grassed waterways, terraces, and contour farming or stripcropping are needed to control erosion. A cropping system that includes frequent sod crops is used to maintain a favorable root zone and to control erosion. Most of the soils in this unit are used for pasture.

CAPABILITY UNIT IIIe–6

Kirksey silt loam, 2 to 6 percent slopes, is the only soil in this unit. This soil has a subsoil of silty clay loam underlain by silt loam. It is moderately well drained. Permeability is moderately slow, and available water capacity is medium. Natural fertility is low. The root zone is moderately deep to deep.

Erosion is the chief limitation to management of this soil. When this soil is cultivated, grassed waterways, terraces, and contour farming or stripcropping are needed to control erosion. Most areas of this soil are in forests consisting of mixed hardwood and pine trees.

[2] By CHARLES A. HOLDEN, conservation agronomist, Soil Conservation Service.

CAPABILITY UNIT IIIw-1

This unit consists of frequently flooded soils on first bottoms. The soils are in elongated, narrow strips along the streams. The texture of the surface layer and the subsoil is variable. In places the underlying material is stratified with sand, silt, or clay. These soils are somewhat poorly drained to well drained. The root zone is moderately deep to deep. Infiltration is rapid to moderate. Permeability is moderate to moderately rapid, and available water capacity is medium or high. Natural fertility is low.

The chief concerns on these soils are siltation, a high water table, and flooding. Effective management provides ditches for drainage and diversions to protect against runoff from adjacent uplands and from flooding. Unless these soils are protected from flooding, the loss of crops can be expected once every 3 to 5 years.

CAPABILITY UNIT IVe-1

This unit consists of sloping to strongly sloping soils that have a surface layer of sandy loam, sandy clay loam, silt loam, or silty clay loam and a subsoil of clay loam, silty clay loam, silty clay, or clay. These soils are well drained. The root zone is moderately deep to deep. Permeability is moderate, and available water capacity is medium. Natural fertility is low.

These soils are commonly used for pasture, but the eroded soils are generally reverting to pine forest. Because the soils are sloping to strongly sloping, tillage and control of erosion are difficult. If cultivated crops are grown, perennial grasses and legumes are needed in the rotation to help control erosion. Grassed waterways and contour farming are also needed. Uniform crop stands are more difficult to establish on the soils that have a surface layer of sandy clay loam or silty clay loam. These soils are also more difficult to work over a wide range of moisture conditions.

CAPABILITY UNIT IVe-2

This unit consists of sloping to strongly sloping soils that have a surface layer of sandy loam, silt loam, or sandy clay loam and a subsoil of clay, clay loam, or silty clay loam. Permeability is moderately slow or slow, and available water capacity is medium. The root zone is deep to moderately deep. Natural fertility is low.

If cultivated crops are grown, a rotation that includes perennial grasses should be used most of the time. Erosion is the chief hazard on these soils and is difficult to control. Keeping waterways in closegrowing, vigorous plants is essential but difficult. Uniform crop stands are more difficult to establish on the soils that have a silty clay loam surface layer. These soils are also more difficult to work over a wide range of moisture conditions.

CAPABILITY UNIT IVe-3

Louisburg loamy sand, 6 to 10 percent slopes, is the only soil in this unit. This soil has a surface layer of loamy sand and a subsoil of sandy loam and discontinuous horizons of sandy clay loam or clay loam. It is underlain by sandy loam or loamy sand. It is well drained to excessively well drained. Permeability is rapid, and available water capacity is low. The root zone is shallow to moderately deep. Natural fertility is low.

Most of the acreage of this soil is forested. Only limited cultivation is suitable on this soil because it is shallow and difficult to till. Response to lime and fertilizer is good, but yields are only fair. Management that provides a long term rotation in which closegrowing crops are grown most of the time is needed. All tillage needs to be on the contour, and stripcropping is beneficial where it is feasible.

CAPABILITY UNIT IVw-1

Only Wehadkee soils are in this unit. They are in nearly level, elongated areas on the flood plains of the creeks and rivers, mainly adjacent to the uplands. The surface layer is loam, fine sandy loam, silt loam, or clay loam that is underlain by sediment of fine sandy loam, clay loam, or loam that washed from soils at higher elevations. These soils are well drained. Because the water table is high, the root zone is shallow to moderately deep. Permeability is moderate, and the available water capacity is high. Natural fertility is medium.

Wetness limits the use of these soils for crops or pasture. The chief concerns of management are wetness and flooding. These soils can be used for improved pasture if they are adequately drained. Effective management provides drainage ditches and diversions to protect against flooding.

CAPABILITY UNIT Vw-1

Worsham loam, 1 to 4 percent slopes, is the only soil in this unit. This soil is mainly in long, narrow areas along small streams. It also occurs along intermittent streams, along drainageways, in upland depressions, and around the heads of streams and draws. The surface layer is loam, and the subsoil is clay or sandy clay. Material that washed or sloughed from adjacent higher lying soils is on the surface in many places.

This soil is poorly drained. It is excessively wet during the first part of the growing season, partly because of its slow to very slow permeability, its position on the landscape, and its slow drainage. Natural fertility is low. Flooding is frequent along the streams.

Because of excessive wetness, this soil is not suited to cultivated crops and is suited only to limited grazing. Drainage is impractical because of the lack of suitable outlets.

CAPABILITY UNIT VIe-1

This unit consists of strongly sloping to moderately steep soils that have a surface layer of silt loam or sandy clay loam and a subsoil of clay, clay loam, silty clay, or silty clay loam. These soils are well drained. Permeability is moderate, and available water capacity is medium. The root zone is moderately deep. Natural fertility is low.

Most areas of these soils are forested. Erosion is the chief management concern. When these soils are used for pasture, management that provides controlled grazing to maintain a good sod cover is needed. Uniform crop stands are more difficult to establish on the soils that have a sandy clay loam surface layer. These soils are also more difficult to work over a wide range of moisture conditions.

CAPABILITY UNIT VIe-2

This unit consists of sloping to strongly sloping, shal-

low soils that have a surface layer of fine sandy loam or slaty silt loam and a subsoil of slaty silt loam, clay loam, or clay that has fragments of partially weathered rock. These soils are well drained to excessively drained. Permeability is moderately rapid or moderately slow, and available water capacity is low. Natural fertility is low.

Most of the acreage of these soils is forested. Erosion and drought are management concerns. When these soils are used for pasture, management that provides carefully controlled grazing is needed.

CAPABILITY UNIT VIe-3

Cataula sandy clay loam, 6 to 10 percent slopes, eroded, is the only soil in this unit. Permeability is slow, and available water capacity is medium. The root zone is moderately deep. Natural fertility is low.

Most of the acreage of this soil is forested. Erosion, droughtiness, and workability are concerns of management. Uniform crop stands are difficult to establish because of the sandy clay loam surface layer. When this soil is used for pasture, management that provides carefully controlled grazing is needed.

CAPABILITY UNIT VIIe-1

Pacolet sandy loam, 15 to 40 percent slopes, is the only soil in this unit. It has a clay subsoil. This soil is well drained. The root zone is moderately deep. Permeability is moderate, and available water capacity is medium. Natural fertility is low.

This soil is too steep to be used for cultivated crops or pasture. It is suited to trees and to habitat for wildlife.

CAPABILITY UNIT VIIe-2

This unit consists of strongly sloping, moderately steep and steep soils that have a surface layer of loamy sand, sandy loam, or slaty silt loam and a subsoil of sandy loam, slaty silty clay loam, or clay. These soils are well drained to excessively drained. Permeability is moderately slow to rapid, and available water capacity is low. The root zone is shallow to moderately deep. Natural fertility is low.

These soils are too steep for use as cropland or pasture. They are suited to trees and to habitat for wildlife.

Estimated Yields

In table 2 the estimated average acre yields of the principal crops grown under a high level of management on the soils in Greenwood and McCormick Counties are given. These yields are higher than average and are based largely on observations by members of the soil survey party and on information from farmers and agricultural workers who are familiar with the counties. Comparisons were also made with crop yields obtained from similar soils in other counties in South Carolina. The practices used in high level management vary according to the soils. The practices necessary for high yields are (1) proper choice and sequencing of crops; (2) correct use of commercial fertilizers, lime, and manure; (3) correct methods of tillage; (4) return of organic matter to the soils; (5) adequate control of water; (6) maintenance or improvement of soil tilth; and (7) conservation of soil material, plant nutrients, and soil moisture. The soils of Greenwood and McCormick Counties are responsive to good management and fertilization. Higher yields can be obtained from nearly all soils in the counties through improved management.

In table 2 the suitability of the soils is rated for selected crops. A rating of 1 indicates that the soil is well suited to the stated crop. Hazards are few, intensive management is not needed, and favorable yields are likely. A rating of 2 indicates that the soil is fairly well suited. Use of the soil is limited by excessive moisture, too little moisture, low fertility, or some other limitation. A rating of 3 indicates that the soil is not well suited. Favorable yields are not likely unless intensive management is practiced. A rating of 4 indicates that the soil is poorly suited to the stated crop and that growing the crop on that soil is not practical.

Woodland [8]

Trees cover about 74 percent of Greenwood County and about 92 percent of McCormick County. Needleleaf trees are mainly on the hills, and broadleaf trees generally predominate on the bottoms along the rivers and creeks.

Good stands of merchantable trees have been produced, but their potential for commercial uses has not been reached. Other uses of woodland include grazing, wildlife habitat, recreation, natural beauty, and conservation of soil and water. The effects of the soils on the growth and management of trees (*7*) are explained in this section.

In table 3 the soils in the survey area are placed in woodland suitability groups, and the soils in that group are briefly described. Each group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity. Next, the potential productivity of each kind of tree suited to these groups is indicated by site index, and the trees suitable for planting are listed. Finally, ratings of the management hazards and limitations for each woodland suitability group are given.

Each woodland suitability group is identified by an ordination symbol. The first part of the symbol, an Arabic numeral, indicates the relative productivity of the soils: 1 = very high; 2 = high; 3 = moderately high; 4 = moderate; and 5 = low. The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood crops. The letter *w* shows that excessive water in or on the soil is the chief limitation; *c* shows that clay in the upper part of the soil is a limitation; *r* shows the soils have steep slopes; and *o* shows the soils have no significant restrictions or limitations for woodland use or management. If a soil has more than one limitation, priority in placing it is in the following order: w, c, and r.

Some of the commercially important trees that are suited to the soil are listed. These are the trees that

[8] GEORGE E. SMITH, JR. woodland conservationist, Soil Conservation Service.

TABLE 2.—*Estimated acre yields of crops grown under a high level of*

[Absence of yield indicates that crop is not generally grown on that soil. Only arable soils are listed.

Soil	Corn		Cotton (lint)		Soybeans	
	Yield	Suitability	Yield	Suitability	Yield	Suitability
	Bu		*Lbs*		*Bu*	
Alamance silt loam, 2 to 6 percent slopes	80	2	550	2	30	2
Appling loamy sand, 2 to 6 percent slopes	90	1	700	1	35	2
Appling loamy sand, 6 to 10 percent slopes	80	2	600	1	25	3
Cartecay and Toccoa soils	85	1	----------	4	25	3
Cataula sandy loam, 2 to 6 percent slopes	65	2	650	1	30	2
Cataula sandy loam, 6 to 10 percent slopes	55	3	550	2	30	2
Cataula sandy clay loam, 2 to 6 percent slopes, eroded	45	3	500	2	30	2
Cecil sandy loam, 2 to 6 percent slopes	95	1	750	1	40	1
Cecil sandy loam, 6 to 10 percent slopes	85	1	700	1	35	2
Cecil sandy loam, 10 to 15 percent slopes	75	2	600	1	30	2
Cecil sandy clay loam, 2 to 6 percent slopes, eroded	70	2	500	2	25	3
Cecil sandy clay loam, 6 to 10 percent slopes, eroded	55	3	425	3	25	3
Chewacla loam	90	1	----------	4	25	3
Coronaca sandy clay loam, 2 to 6 percent slopes	80	2	500	2	35	2
Coronaca sandy clay loam, 6 to 10 percent slopes	65	2	400	3	25	3
Davidson sandy clay loam, 2 to 6 percent slopes	65	2	450	2	40	1
Davidson sandy clay loam, 6 to 10 percent slopes	55	3	375	3	35	2
Durham loamy sand, 2 to 6 percent slopes	85	1	650	1	30	2
Enon sandy loam, 2 to 6 percent slopes	75	2	550	2	35	2
Enon sandy loam, 6 to 10 percent slopes	65	2	500	2	30	2
Enon sandy loam, 10 to 15 percent slopes	50	3	400	3	20	4
Georgeville silt loam, 2 to 6 percent slopes	85	1	650	1	40	1
Georgeville silt loam, 6 to 10 percent slopes	75	2	600	1	35	2
Georgeville silty clay loam, 2 to 6 percent slopes, eroded	70	2	500	2	30	2
Georgeville silty clay loam, 6 to 10 percent slopes, eroded	55	3	400	3	25	3
Helena loamy sand, 2 to 6 percent slopes	70	2	525	2	35	2
Helena loamy sand, 6 to 10 percent slopes	60	3	450	2	30	2
Herndon silt loam, 2 to 6 percent slopes	85	1	650	1	35	2
Herndon silt loam, 6 to 10 percent slopes	75	2	550	2	30	2
Hiwassee sandy loam, 2 to 6 percent slopes	90	1	600	1	40	1
Hiwassee sandy loam, 6 to 10 percent slopes	85	1	500	2	35	2
Hiwassee sandy loam, 10 to 15 percent slopes	70	2	400	3	25	3
Hiwassee sandy clay loam, 2 to 6 percent slopes, eroded	70	2	500	2	30	2
Hiwassee sandy clay loam, 6 to 10 percent slopes, eroded	65	2	375	3	25	3
Iredell sandy loam, 0 to 2 percent slopes	60	3	750	1	35	2
Iredell sandy loam, 2 to 6 percent slopes	50	3	900	1	40	1
Kirksey silt loam, 2 to 6 percent slopes	65	2	600	1	30	2
Kirksey silt loam, 6 to 10 percent slopes	60	3	500	2	25	3
Louisburg loamy sand, 6 to 10 percent slopes	45	3	350	3	25	3
Mecklenburg sandy loam, 2 to 6 percent slopes	75	2	550	2	35	2
Mecklenburg sandy loam, 6 to 10 percent slopes	70	2	450	2	30	2
Nason silt loam, 10 to 15 percent slopes	75	2	350	3	25	3
Tatum silt loam, 10 to 15 percent slopes	75	2	400	3	30	2
Wehadkee soils	55	3	----------	4	25	3

[1] AUM is an abbreviation for animal-unit-month. It is a measure of the forage or feed required to maintain one animal unit for

woodland managers will generally favor in intermediate or improved cuttings.

The potential productivity of the soils for trees is given in terms of site index. Site index is the average height of the dominant trees in the stand, to the nearest 10 feet, at age 30 for cottonwood, at age 35 for sycamore, and at age 50 for all other species or types. Average annual growth for natural unmanaged stands, by site indexes at 50 years, is shown in figures 7 (*3*) and 8 (*4*). Merchantable volume for loblolly pine plantations, by site indexes at 25 years, is shown in figure 9 (*7*). Data on growth and yields of unmanaged stands are not a true measure of potential productivity of stands that are managed, but such information permits a comparison of productivity between sites or between species on the same site.

Erosion hazard refers to the risk of soil losses in well managed woodland. Erosion hazard is *slight* if ex-

management, and suitability of soils for selected crops and pasture

A rating of 1 means well suited; 2, fairly suited; 3, not well suited; and 4, poorly suited]

Grain sorghum		Oats		Wheat		Pasture			
						Fescue and white clover		Common bermudagrass	
Yield	Suitability	Yield	Suitability	Yield	Suitability	Yield	Suitability	Yield	Suitability
Bu		*Bu*		*Bu*		*AUM* [1]		*AUM* [1]	
50	2	70	2	50	2	5.5	2	6.0	1
55	2	85	2	60	1	6.0	1	6.0	1
45	2	70	2	50	2	5.5	2	5.5	2
65	1	----------	4	----------	4	7.0	1	2.5	4
45	2	50	3	45	3	6.0	1	6.0	1
30	3	30	4	40	3	5.5	2	5.5	2
30	3	30	4	35	4	5.5	2	5.5	2
65	1	90	1	60	1	6.5	1	6.5	1
55	2	85	2	55	2	6.0	1	6.0	1
50	2	70	2	50	2	6.0	1	6.0	1
45	2	70	2	40	3	5.5	2	5.5	2
40	3	60	3	35	4	4.5	2	4.5	2
60	1	75	2	----------	4	10.0	1	2.5	4
50	2	85	2	60	1	6.0	1	7.0	1
35	3	70	2	50	2	5.5	2	6.5	1
50	2	70	1	60	1	5.5	2	5.5	2
45	2	65	3	50	2	5.0	2	5.0	2
55	2	80	2	50	2	5.0	2	5.0	2
55	2	75	2	40	3	6.0	1	6.0	1
45	2	65	3	40	3	5.5	2	5.5	2
40	3	60	3	25	4	4.5	2	4.5	2
55	2	80	2	50	2	6.0	1	5.5	2
50	2	70	2	45	3	5.5	2	4.5	2
40	3	65	3	40	3	5.0	2	4.5	2
35	3	50	3	30	4	4.5	2	4.0	3
50	2	70	2	40	3	5.5	2	5.5	2
40	3	55	3	35	4	5.0	2	5.0	2
60	1	80	2	45	3	7.5	1	7.0	1
45	2	70	2	40	3	7.0	1	6.5	1
60	1	90	1	60	1	6.5	1	6.5	1
55	2	85	2	55	2	6.0	1	6.0	1
45	2	70	2	35	4	5.5	2	5.5	2
50	2	70	2	40	3	5.5	2	5.5	2
40	3	60	3	35	4	5.0	2	5.0	2
50	2	45	4	30	4	7.0	1	7.0	1
50	2	55	3	35	4	8.0	1	7.5	1
40	3	60	3	40	3	5.5	2	6.0	1
35	3	50	3	35	4	5.0	2	5.5	2
35	3	55	3	30	4	3.0	3	3.0	3
55	2	70	2	50	2	6.0	1	6.0	1
45	2	60	3	35	4	5.5	2	5.5	2
30	3	60	3	40	3	6.5	1	6.0	1
35	3	60	3	40	3	6.5	1	6.0	1
30	3	----------	4	----------	4	6.5	1	2.5	4

[1] a period of 30 days.

pected soil loss is small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitation ratings reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. A rating of *slight* indicates that equipment use is not limited to kind or time of year; *moderate* indicates that a seasonal limitation exists or that modifications of methods or equipment are needed; and *severe* indicates that specialized equipment or operations are needed.

Seedling mortality ratings indicate the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. A rating of *slight* indicates that expected mortality is less than 25 percent; *moderate* indicates a 25 to 50

TABLE 3.—*Suitability of the soils for wood crops*

Woodland suitability groups and map symbols	Potential productivity		Trees suitable for planting	Hazards and limitations		
	Trees	Site index		Erosion hazard	Equipment limitation	Seedling mortality
Group 1o7: soils suited to broadleaf and needleleaf trees. Ca (Toccoa part).	Black cherry Black walnut Cottonwood Green ash Loblolly pine Shortleaf pine Sugarberry Sweetgum Sycamore Water oak Yellow-poplar	90 100 110 90 90 80 80 100 90 90 110	Loblolly pine, cherrybark oak, cottonwood, sweetgum, sycamore, black walnut, yellow-poplar.	Slight	Slight	Slight.
Group 1w8: seasonally wet soils suited to broadleaf and needleleaf trees. Cn.	Cottonwood Green ash Loblolly pine Red oak Sweetgum Sycamore Water oak Yellow-poplar	100 100 100 90 100 90 90 100	Cottonwood, loblolly pine, sweetgum, sycamore, yellow-poplar, cherrybark oak.	Slight	Moderate	Slight to moderate.
Group 1w9: excessively wet soils suited to broadleaf and needleleaf trees. We.	Cottonwood Green ash Loblolly pine Red maple Sweetgum Sycamore Water oak White ash Yellow-poplar	90 100 100 90 90 90 90 90 100	Cherrybark oak, cottonwood, green ash, sweetgum, sycamore, loblolly pine, yellow-poplar.	Slight	Slight	Severe.
Group 2w8: seasonally wet soils suited to broadleaf and needleleaf trees. Ca (Cartecay part), WoB.	Loblolly pine Sweetgum Yellow-poplar Red oak White oak Sycamore	90 90 100 80 80 90	Loblolly pine, sweetgum, sycamore, yellow-poplar, cottonwood.	Slight	Moderate	Slight to moderate.
Group 3o7: soils suited to broadleaf and needleleaf trees. Amb, ApB, ApC, CbB, CbC, CdB, CdC, CdD, DuB, GaB, GaC, HrB, HrC, HwB, HwC, HwD, LoC, NaD.	Loblolly pine Shortleaf pine Red oak White oak Yellow-poplar Virginia pine	80 70 70–80 70–80 90 70	Loblolly pine, Virginia pine, yellow-poplar.	Slight	Slight	Slight.
Group 3r8: soils suited to broadleaf and needleleaf trees. LoE, NaE, PaF.	Loblolly pine Shortleaf pine Yellow-poplar Red oak White oak Virginia pine	80 70 90 70–80 70–80 70+	Loblolly pine, yellow-poplar, northern red oak, Virginia pine.	Moderate	Moderate	Slight.
Group 3w8: seasonally wet soils suited to broadleaf and needleleaf trees. HeB, HeC.	Loblolly pine Yellow-poplar Red oak Sweetgum White oak Shortleaf pine	80 90 70 80 70 70	Loblolly pine, sycamore, yellow-poplar, sweetgum.	Slight	Moderate	Slight to moderate.
Group 4o1: soils suited to needleleaf trees. EnB, EnC, EnD, GoD, MeB, MeC, TaD, WkD.	Loblolly pine Shortleaf pine Virginia pine Red oak White oak Yellow-poplar	70 60 60 70 70 80	Loblolly pine, eastern redcedar, Virginia pine.	Slight	Slight	Slight.

TABLE 3.—*Suitability of the soils for wood crops*—Continued

Woodland suitability groups and map symbols	Potential productivity		Trees suitable for planting	Hazards and limitations		
	Trees	Site index		Erosion hazard	Equipment limitation	Seedling mortality
Group 4r2: moderately steep to steep soils suited to needleleaf trees. GoF, TaE, WkF.	Loblolly pine Shortleaf pine Virginia pine Red oak White oak	70 60 60 70 70	Loblolly pine, Virginia pine, eastern redcedar.	Moderate	Moderate	Slight.
Group 4c2: clayey soils suited to needleleaf trees. CoB, CoC, DaB, DaC, IeA, IeB.	Loblolly pine Eastern red-cedar Shortleaf pine White oak	70 40 60 50	Eastern redcedar, loblolly pine.	Slight	Moderate	Moderate.
Group 4c2e: eroded soils suited to needleleaf trees. CeB2, CeC2, GeB2, GeC2, HyB2, HyC2, PcD2.	Loblolly pine Virginia pine Shortleaf pine Red oak White oak	70 60 60 70 60	Loblolly pine, Virginia pine, shortleaf pine.	Moderate	Moderate	Slight to moderate.
Group 4w2: seasonally wet soils suited to needleleaf trees. KaB, KaC.	Loblolly pine	67	Eastern redcedar, loblolly pine.	Slight	Moderate	Slight.
Group 5c3e: eroded soils suited to needleleaf trees. CcB2, CcC2.	Loblolly pine Shortleaf pine Virginia pine	60 50 50	Virginia pine, loblolly pine, eastern redcedar.	Moderate to severe.	Moderate to severe.	Moderate to severe.

percent loss; and *severe* indicates more than 50 percent loss of seedlings.

Wildlife[4]

Soils directly influence the kinds and amounts of vegetation and the amounts of water available, and in this way they directly influence the kinds of wildlife that can live in the area. Soil properties that affect wildlife habitat are (1) thickness of soil useful to crops, (2) texture of the surface layer, (3) available water capacity to a depth of 40 inches, (4) wetness, (5) surface stoniness or rockiness, (6) hazard of flooding, (7) slope, and (8) permeability of the soil to air and water.

In table 4 the soils of this survey area are rated for producing seven elements of wildlife habitat and three groups, or kinds, of wildlife. The ratings indicate relative suitability for various elements.

A rating of *good* means the element of wildlife habitat, and habitats generally, are easily created, improved, and maintained. Few or no limitations affect management of soils in this category, and satisfactory results are expected when the soil is used for the prescribed purpose.

A rating of *fair* means the element of wildlife habitat, and habitats generally, can be created, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention, however, may be required for satisfactory results.

A rating of *poor* means limitations for the element or kind of wildlife habitat are rather severe. Habitats can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

A rating of *very poor* means the limitations for the element of wildlife habitat are very severe and that unsatisfactory results are to be expected. It is either

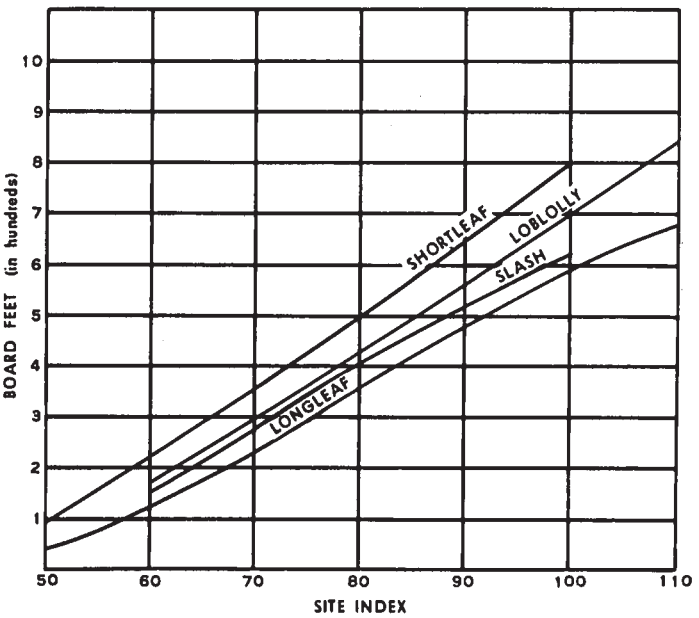

Figure 7.—**Average yearly growth per acre in board feet for 50-year-old, well-stocked stands of southern pines. (Scribner log rule, all stems 8 inches or larger in diameter.)**

[4] By WILLIAM W. NEELY, biologist, Soil Conservation Service.

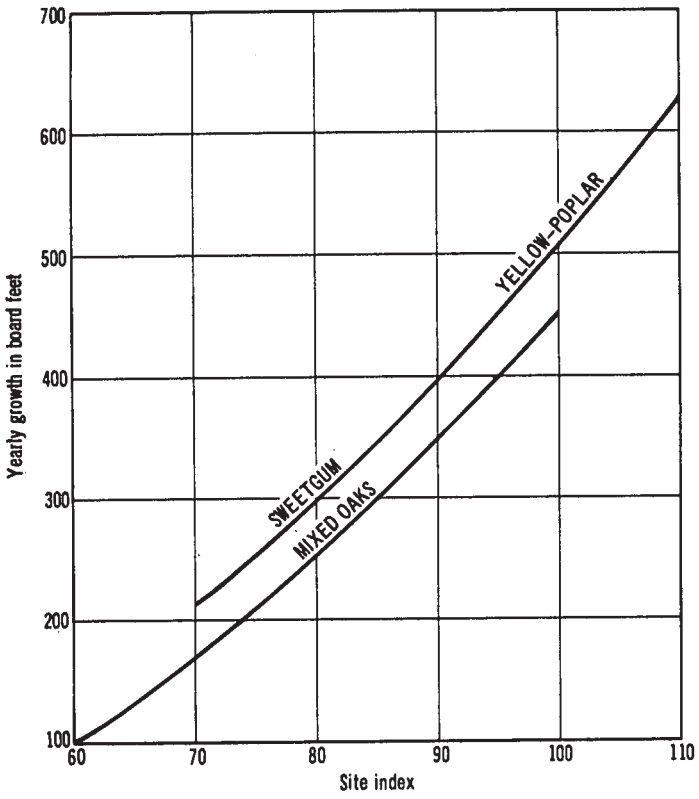

Figure 8.—**Average yearly growth per acre in board feet for well-stocked, even-aged southern hardwood stands to age 60. (Scribner log rule.)**

impossible or impractical to create, improve, or maintain habitats on soils in this category.

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

Grain and seed crops.—These crops are annual grain-producing plants, such as corn, sorghum, millet, and soybeans.

Domestic grasses and legumes.—Making up the group are domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Grasses include bahiagrass, ryegrass, and panicgrass; legumes include annual lespedeza, shrub lespedeza, and other clovers.

Wild herbaceous plants.—This group consists of native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, and cheatgrass are examples. On rangeland, typical plants are bluestem, grama, perennial forbs, and legumes.

Hardwood trees.—These plants are nonconiferous trees, shrubs, and woody vines that produce wildlife food in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical trees in this category are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and silverberry.

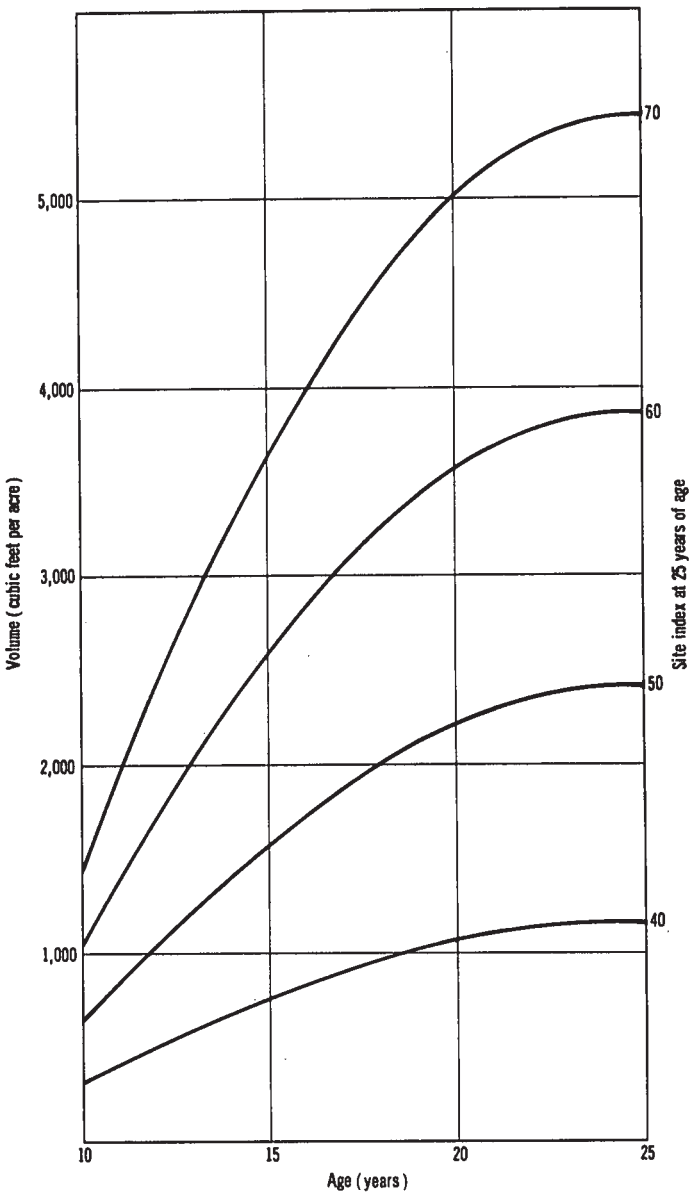

Figure 9.—**Volume of merchantable wood (inside bark) to a 3-inch top in cubic feet per acre for loblolly pine plantations. Stocking: 700 trees per acre.**

Coniferous plants.—These include cone-bearing trees and shrubs that are important to wildlife mainly as cover, but they also provide food in the form of browse, seeds, or fruitlike cones. They may become established through natural processes or may be planted. Examples are native cedars, pines, and introduced ornamentals.

Wetland plants.—In this group are annual and perennial herbaceous plants that grow wild on moist and wet sites. They furnish food and cover mostly for wetland wildlife. Examples of these plants are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, and aneilema. Submersed and floating aquatics are not included in this category.

Shallow water areas.—These are areas of impoundments or excavations for controlling water, generally

not more than 5 feet deep, to create habitats that are suitable for waterfowl. Some are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submersed aquatics.

The three major classes of wildlife in Greenwood and McCormick Counties are defined as follows:

Open-land wildlife consists of birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are examples of open-land wildlife.

Woodland wildlife consists of birds and mammals that normally live in wooded areas of hardwood trees, coniferous trees, and shrubs. Woodcocks, thrushes, wild turkeys, vireos, deer, squirrels, and raccoons are examples of woodland wildlife.

Wetland wildlife consists of birds and mammals that normally live in wet areas, marshes, and swamps. Ducks, geese, rails, shore birds, herons, minks, and muskrats are examples of wetland wildlife.

Engineering Uses of the Soils [5]

This section is useful to planning commissions, town and city managers, land developers, engineers, contractors, farmers, and others who need information about soils on which structures are built.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the soils on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5, 6, and 7. Table 5 shows estimated soil properties significant to engineering. Table 6 gives interpretations for various engineering uses. Table 7 shows the results of engineering laboratory tests on soil samples.

This information, along with the soil map and data in other parts of this publication, can be used to make interpretations in addition to those given in tables 5, 6, and 7, and it also can be used to make useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have different meanings in soil science and in engineering. The Glossary defines many of these terms.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified soil classification system (*2*), used by the SCS engineers, Department of Defense, and others, and the AASHTO System (*1*), adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity index, liquid limit, and organic-matter content, and on their grouping with respect to engineering behavior. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. The dual classification system will favor the higher plasticity for fine-grained soils and the lower plasticity for coarse-grained soils; for example, CL–ML, GM–GC.

The AASHTO system is used to classify soils according to those properties that affect their use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups, ranging from A–1 through A–7, on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils with high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. When laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHTO classification for tested soils, with group index numbers in parentheses, is shown in table 7; the estimated classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

Engineering properties

Several estimated soil properties significant in engi-

[5] RICHARD G. CHRISTOPHER, III, area engineer, Soil Conservation Service, assisted in the preparation of this section.

TABLE 4.—*Suitability of soils for elements*

Soil	Elements of wildlife habitat		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants
Alamance silt loam, 2 to 6 percent slopes	Good	Good	Good
Appling loamy sand, 2 to 6 percent slopes	Good	Good	Good
Appling loamy sand, 6 to 10 percent slopes	Good	Good	Good
Cartecay and Toccoa soils	Poor	Fair	Fair
Cataula sandy loam, 2 to 6 percent slopes	Fair	Good	Good
Cataula sandy loam, 6 to 10 percent slopes	Poor	Fair	Fair
Cataula sandy clay loam, 2 to 6 percent slopes, eroded	Fair	Fair	Fair
Cataula sandy clay loam, 6 to 10 percent slopes, eroded	Poor	Fair	Fair
Cecil sandy loam, 2 to 6 percent slopes	Good	Good	Good
Cecil sandy loam, 6 to 10 percent slopes	Good	Good	Good
Cecil sandy loam, 10 to 15 percent slopes	Fair	Fair	Fair
Cecil sandy clay loam, 2 to 6 percent slopes, eroded	Fair	Fair	Fair
Cecil sandy clay loam, 6 to 10 percent slopes, eroded	Fair	Fair	Fair
Cecil-Urban land complex, 2 to 6 percent slopes. Suitability variable; onsite determination required.			
Chewacla loam	Very poor	Poor	Poor
Coronaca sandy clay loam, 2 to 6 percent slopes	Good	Good	Good
Coronaca sandy clay loam, 6 to 10 percent slopes	Fair	Good	Fair
Davidson sandy clay loam, 2 to 6 percent slopes	Good	Good	Good
Davidson sandy clay loam, 6 to 10 percent slopes	Fair	Good	Fair
Durham loamy sand, 2 to 6 percent slopes	Good	Good	Good
Enon sandy loam, 2 to 6 percent slopes	Fair	Good	Good
Enon sandy loam, 6 to 10 percent slopes	Fair	Fair	Fair
Enon sandy loam, 10 to 15 percent slopes	Poor	Poor	Poor
Georgeville silt loam, 2 to 6 percent slopes	Good	Good	Good
Georgeville silt loam, 6 to 10 percent slopes	Fair	Good	Good
Georgeville silty clay loam, 2 to 6 percent slopes, eroded	Fair	Good	Fair
Georgeville silty clay loam, 6 to 10 percent slopes, eroded	Fair	Fair	Fair
Goldston slaty silt loam, 6 to 15 percent slopes	Poor	Poor	Poor
Goldston slaty silt loam, 15 to 40 percent slopes	Very poor	Very poor	Very poor
Helena loamy sand, 2 to 6 percent slopes	Good	Good	Good
Helena loamy sand, 6 to 10 percent slopes	Fair	Fair	Fair
Herndon silt loam, 2 to 6 percent slopes	Good	Good	Good
Herndon silt loam, 6 to 10 percent slopes	Fair	Good	Good
Hiwassee sandy loam, 2 to 6 percent slopes	Good	Good	Good
Hiwassee sandy loam, 6 to 10 percent slopes	Good	Good	Good
Hiwassee sandy loam, 10 to 15 percent slopes	Fair	Fair	Fair
Hiwassee sandy clay loam, 2 to 6 percent slopes, eroded	Fair	Fair	Fair
Hiwassee sandy clay loam, 6 to 10 percent slopes, eroded	Fair	Fair	Fair
Iredell sandy loam, 0 to 2 percent slopes	Fair	Good	Good
Iredell sandy loam, 2 to 6 percent slopes	Fair	Good	Good
Kirksey silt loam, 2 to 6 percent slopes	Fair	Good	Good
Kirksey silt loam, 6 to 10 percent slopes	Fair	Fair	Fair
Louisburg loamy sand, 6 to 10 percent slopes	Poor	Fair	Fair
Louisburg loamy sand, 10 to 25 percent slopes	Very poor	Poor	Fair
Mecklenburg sandy loam, 2 to 6 percent slopes	Good	Good	Good
Mecklenburg sandy loam, 6 to 10 percent slopes	Fair	Good	Good
Nason silt loam, 10 to 15 percent slopes	Fair	Good	Good
Nason silt loam, 15 to 25 percent slopes	Poor	Fair	Fair
Pacolet sandy loam, 15 to 40 percent slopes	Very poor	Poor	Poor
Pacolet sandy clay loam, 10 to 15 percent slopes, eroded	Poor	Fair	Fair
Tatum silt loam, 10 to 15 percent slopes	Fair	Good	Good
Tatum silt loam, 15 to 25 percent slopes	Poor	Fair	Fair
Wehadkee soils	Very poor	Poor	Poor
Wilkes fine sandy loam, 6 to 15 percent slopes	Very poor	Poor	Poor
Wilkes fine sandy loam, 15 to 40 percent slopes	Very poor	Very poor	Very poor
Worsham loam, 1 to 4 percent slopes	Poor	Fair	Fair

neering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 5.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 5 in the standard terms used by the U.S. Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil

of wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Cont.				Kinds of wildlife		
Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Open-land	Woodland	Wetland
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Fair	Very poor	Very poor	Good	Good	Very poor.
Good	Fair	Very poor	Very poor	Good	Good	Very poor.
Good	Fair	Fair	Fair	Fair	Good	Fair.
Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Fair	Fair	Poor	Good	Fair.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Fair	Very poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Poor	Very poor	Very poor	Poor	Fair	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Fair	Very poor	Very poor	Fair	Good	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Fair	Very poor	Very poor	Very poor	Poor	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Good	Poor	Very poor	Very poor	Fair	Good	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Good	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Poor	Very poor	Very poor	Poor	Fair	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Good	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Fair	Very poor	Very poor	Fair	Poor	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Good	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Good	Fair	Poor	Fair	Fair.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Fair	Very poor	Very poor	Very poor	Poor	Very poor.
Fair	Fair	Fair	Poor	Fair	Fair	Fair.

contains gravel or other particles coarser than sand, an appropriate modifer is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in the USDA textural classification are defined in the Glossary.

Liquid limit and plasticity index indicate the effect of water on the strength and consistency of soil material. As the moisture content of a clayey soil is increased from a moist state, the material changes from a semisolid to a plastic state of consistency. If the moisture content is further increased, the material changes from a plastic to a liquid state of consistency. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 5, but in table 7 the data on liquid

TABLE 5.—*Estimated soil properties*

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

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Ft	*Ft*	*In*			
Alamance: AmB	>5	>5	0–12	Silt loam	ML	A–4
			12–38	Silty clay loam	CL	A–6, A–7
			38–47	Very fine sandy loam	ML	A–4
Appling: ApB, ApC	>6	>6	0–10	Loamy sand	SM	A–2
			10–40	Clay	MH	A–7
			40–65	Sandy clay loam, clay loam	SM, ML	A–5, A–7
*Cartecay: Ca	>5	0–2	0–8	Very fine sandy loam, silt loam.	SM, SM–SC, ML, CL–ML	A–4
For Toccoa part, see Toccoa series.			8–40	Very fine sandy loam, sandy loam.	SM	A–4
			40–58	Very fine sandy loam, sandy loam.	SM	A–4
Cataula:						
CbB, CbC	>5	>5	0–6	Sandy loam	SM, SM–SC	A–2, A–4
			6–25	Clay	MH	A–7
			25–39	Sandy clay	MH	A–7
			39–76	Sandy clay loam	SM, ML	A–4, A–5
CcB2, CcC2	>5	>5	0–3	Sandy clay loam	SC, SM–SC, CL–ML	A–4
Except for the surface layer, estimates are the same as those for CbB and CbC.						
Cecil:						
CdB, CdC, CdD	>6	>6	0–5	Sandy loam	SM	A–2, A–4
			5–44	Clay	MH	A–7
			44–77	Clay loam, loam	MH, ML	A–7
CeB2, CeC2	>6	>6	0–3	Sandy clay loam	SM, ML, CL–ML, SM–SC	A–4
Except for the surface layer, estimates are the same as those for CdB, CdC, and CdD.						
Cecil-Urban land complex: CmB.						
Properties too variable to rate.						
Chewacla: Cn	>4	1–3	0–14	Loam, silt loam	ML	A–4, A–6
			14–49	Clay loam, sandy clay loam	ML, CL, CL–ML	A–4, A–6
			49–62	Loamy sand, fine sandy loam	SM	A–2, A–4
Coronaca: CoB, CoC	>6	>6	0–6	Sandy clay loam	SC, SM–SC, CL, CL–ML	A–4, A–6
			6–81	Clay	MH, ML	A–7
			81–97	Clay loam	MH, ML	A–7
Davidson: DaB, DaC	>6	>6	0–5	Sandy clay loam	SM, ML	A–4
			5–86	Clay	MH, ML	A–7, A–6
Durham: DuB	>5	>6	0–23	Loamy sand, sandy loam	SM	A–2
			23–53	Sandy clay loam	SC, CL	A–6, A–7
			53–60	Sandy clay loam	SC, SM–SC	A–4, A–6
Enon: EnB, EnC, EnD	>5	>6	0–6	Sandy loam	SM	A–2, A–4
			6–35	Clay, clay loam	MH, CH	A–7
			35–60	Sandy loam	SM, SC, SM–SC	A–2, A–4
Georgeville: GaB, GaC, GeB2, GeC2.	>5	>5	0–5	Silt loam	ML	A–4
			5–39	Silty clay, clay	MH	A–7
			39–60	Silty clay loam, silt loam, silty clay.	MH	A–7

significant in engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
column of this table. The symbol > means more than; <means less than]

Coarse fraction greater than 3 inches	Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)						
Pct							*In per hr*	*In per in of soil*	*pH*	
----------	100	85–100	80–90	70–85	----------	[1] NP	0.6–2.0	0.14–0.18	4.5–5.5	Low.
----------		100	95–100	80–95	35–50	15–25	0.6–2.0	0.15–0.20	4.5–5.5	Low.
----------		100	75–90	55–65	20–40	NP–10	0.6–2.0	0.10–0.13	5.1–6.0	Low.
----------	90–100	85–100	75–90	15–30	NP	NP	2.0–6.0	0.07–0.10	5.6–6.5	Low.
----------	100	90–100	75–92	60–75	55–70	20–30	0.6–2.0	0.12–0.14	4.5–5.5	Low.
----------	95–100	90–100	75–95	45–65	42–50	5–20	0.6–2.0	0.12–0.14	4.5–5.5	Low.
----------	100	100	85–95	40–60	15–30	NP–7	2.0–6.0	0.12–0.16	5.6–6.5	Low.
----------	100	85–100	75–90	36–50	15–30	NP–7	2.0–6.0	0.09–0.12	5.6–6.5	Low.
----------	90–100	85–100	75–90	36–50	15–30	NP–7	2.0–6.0	0.10–0.15	5.6–6.5	Low.
----------	95–100	90–100	65–85	20–40	<18	NP–7	0.6–2.0	0.08–0.10	5.1–6.0	Low.
----------	98–100	90–100	80–95	70–85	55–70	15–25	0.2–0.6	0.13–0.16	5.1–6.0	Low.
----------	98–100	90–100	85–95	60–80	55–70	15–25	0.06–0.2	0.10–0.15	4.5–5.5	Low.
----------	95–100	90–100	80–95	45–65	30–48	NP–10	0.6–2.0	0.10–0.15	4.5–5.5	Low.
----------	96–100	90–100	70–90	40–60	10–30	5–10	0.6–2.0	0.12–0.16	5.1–6.0	Low.
----------	90–100	85–100	70–95	30–50	----------	NP	2.0–6.0	0.12–0.14	5.1–6.0	Low.
----------	97–100	92–100	90–99	70–90	51–70	20–35	0.6–2.0	0.13–0.15	4.5–5.5	Moderate.
----------	100	90–100	80–100	60–90	41–55	11–25	0.6–2.0	0.13–0.15	4.5–5.5	Low.
----------	90–100	85–100	70–95	40–80	20–40	5–10	0.6–2.0	0.13–0.15	5.1–6.0	Low.
----------	99–100	95–100	80–95	55–75	25–40	NP–13	0.6–2.0	0.13–0.15	5.1–6.0	Low.
----------	96–100	97–100	80–95	70–90	20–40	6–11	0.6–2.0	0.17–0.19	5.1–6.0	Low.
----------	95–100	90–100	65–85	30–50	----------	NP	0.6–2.0	0.08–0.12	5.1–6.0	Low.
----------	95–100	90–100	85–95	45–65	20–35	5–15	0.6–2.0	0.12–0.18	6.1–7.3	Low.
----------	95–100	95–100	85–95	65–90	45–60	15–25	0.6–2.0	0.12–0.16	5.1–6.0	Low.
----------	95–100	90–100	80–95	60–80	45–65	15–25	0.6–2.0	0.12–0.16	5.1–6.0	Low.
----------	90–100	85–100	80–90	40–60	20–40	NP–10	0.6–2.0	0.10–0.14	5.1–6.0	Low.
----------	97–100	95–100	85–95	65–80	35–60	11–25	0.6–2.0	0.12–0.14	5.1–6.0	Moderate.
----------	95–100	95–100	60–70	20–35	----------	NP	2.0–6.0	0.08–0.10	5.1–6.0	Low.
----------	95–100	90–100	60–75	40–60	30–50	15–25	0.6–2.0	0.12–0.14	4.5–5.5	Low.
----------	95–100	90–100	65–80	40–50	15–40	5–25	0.6–2.0	0.10–0.12	4.5–5.5	Low.
----------	85–100	80–95	60–80	30–45	----------	NP	2.0–6.0	0.11–0.13	5.6–6.5	Low.
----------	100	95–100	90–100	75–90	51–70	20–40	0.06–0.2	0.13–0.15	6.1–7.3	High.
----------	95–100	90–100	55–80	25–50	NP–30	NP–10	0.6–2.0	0.13–0.15	6.6–7.3	Low.
----------	90–100	85–95	80–95	55–75	15–35	NP–8	0.6–2.0	0.15–0.20	5.6–6.0	Low.
----------	100	95–100	90–100	75–100	51–68	20–30	0.6–2.0	0.13–0.18	4.5–5.5	Low.
----------	95–100	90–100	85–100	75–95	51–68	15–30	0.6–2.0	0.11–0.16	4.5–5.5	Low.

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Ft	*Ft*	*In*			
Goldston: GoD, GoF	1.5–3	>5	0–5	Slaty silt loam	GM, ML	A–4
			5–15	Slaty silty clay loam	GM, GC, GM–GC	A–4
			15–30	Slaty silt loam	GM, GS, GM–GC	A–2
Helena: HeB, HeC	>4	>2	0–13	Loamy sand, sandy loam	SM	A–2
			13–32	Clay	MH, CH	A–7
			32–60	Clay loam, sandy clay loam	CL	A–6
Herndon: HrB, HrC	>5	>6	0–6	Silt loam	ML, CL–ML	A–4
			6–46	Clay loam, clay	MH	A–7
			46–53	Silt loam, clay loam	ML, CL	A–7
Hiwassee: HwB, HwC, HwD, HyB2, HyC2.	>5	>6	0–3	Sandy clay loam	CL	A–7, A–6
			0–6	Sandy loam	SM	A–2, A–4
			6–39	Clay	MH	A–7
			39–60	Sandy loam, sandy clay loam	SM	A–2–4, A–4
Iredell: IeA, IeB	3–6	1–2	0–7	Sandy loam	SM, SM–SC	A–4, A–2
			7–24	Clay	MH, CH	A–7
			24–58	Clay loam, loam, sandy loam	CH, CL	A–7
Kirksey: KaB, KaC	3.5–5	>2	0–13	Silt loam	ML, CL, CL–ML	A–4
			13–38	Silty clay loam, clay loam	CL	A–6, A–4
			38–41	Silt loam	ML, CL, CL–ML	A–4, A–6
Louisburg: LoC, LoE	2–6	>6	0–12	Loamy sand	SM	A–2
			12–22	Sandy loam	SM	A–2, A–4
			22–42	Loamy sand	SM	A–2
Mecklenburg: MeB, MeC	>4	>6	0–5	Sandy loam	SM–SC, SM, SC	A–2, A–4
			5–38	Clay	MH	A–7
			38–44	Sandy clay loam	SM, ML, SM–SC, CL–ML	A–4
Nason: NaD, NaE	3–5	>6	0–5	Loam, silt loam	ML, CL, CL–ML	A–4
			5–37	Clay, clay loam	MH, CH	A–7
			37–56	Silt loam	ML, CL–ML	A–5, A–7
Pacolet: PaF, PcD2	>4	>6	0–5	Sandy clay loam, sandy loam	SM, SC, SM–SC	A–2, A–4
			5–33	Clay, clay loam	MH	A–7
			33–45	Sandy loam	SM	A–2, A–4
Tatum: TaD, TaE	3–6	>5	0–6	Loam, silt loam	ML	A–4
			6–35	Clay loam, silty clay loam	MH, CH	A–7
			35–60	Silt loam	ML	A–4
Toccoa Mapped only with Cartecay soils.	>5	2–4	0–51	Sandy loam, loamy sand	SM	A–2, A–4
Wehadkee: We	>5	0–3	0–18	Loam, silt loam	CL	A–7
			18–49	Clay loam, loam	CL	A–7
			49–62	Fine sandy loam	SM, SC, ML, CL, SM–SC, CL–ML	A–4
Wilkes: WkD, WkF	1.5–4	>5	0–5	Fine sandy loam	SM	A–4
			5–15	Clay, clay loam	CL, CH	A–7
			15–24	Fine sandy loam, sandy clay loam.	SM, ML	A–4
Worsham: WoB	>6	0–3	0–8	Loam	CL, CL–ML	A–4, A–6
			8–54	Clay	MH, ML, CL, CH	A–7
			54–70	Clay loam	SM, ML, CL, CL–ML, SC, SM–SC	A–6

[1] NP means nonplastic.

significant in engineering—Continued

Coarse fraction greater than 3 inches	Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)						
Pct							*In per hr*	*In per in of soil*	*pH*	
2–10	60–70	60–70	55–65	45–60	10–35	NP–10	2.0–6.0	0.05–0.10	5.1–6.0	Low.
2–10	55–65	50–65	45–60	36–50	<30	NP–10	2.0–6.0	0.05–0.10	4.5–5.5	Low.
2–20	25–40	25–40	20–40	15–35	<20	NP–8	2.0–6.0	0.05–0.10	4.5–5.5	Low.
----------	100	95–100	55–75	20–35	----------	NP	2.0–6.0	0.07–0.12	4.5–5.5	Low.
----------	95–100	95–100	75–90	65–80	50–69	25–40	0.06–0.2	0.13–0.15	4.5–5.5	High.
----------	100	96–100	75–90	51–75	25–40	10–20	0.2–0.6	0.11–0.13	4.5–5.5	Moderate.
----------	90–100	85–100	80–95	65–90	<20	NP–5	0.6–2.0	0.14–0.18	5.1–6.0	Low.
----------	98–100	95–100	95–100	80–95	55–70	20–35	0.6–2.0	0.14–0.18	4.5–5.5	Low.
----------	95–100	90–100	80–100	70–95	41–50	11–20	0.6–2.0	0.12–0.16	4.5–5.5	Low.
----------	100	100	90–100	55–80	30–45	11–20	0.6–2.0	0.12–0.15	5.1–6.0	Low.
----------	100	90–100	80–95	30–50	----------	NP	2.0–6.0	0.10–0.14	5.1–6.0	Low.
----------	100	100	85–100	60–85	55–70	15–35	0.6–2.0	0.12–0.15	5.1–6.0	Moderate.
----------	95–100	90–100	70–95	25–45	NP	NP	0.6–2.0	0.10–0.15	5.1–6.0	Low.
----------	95–100	80–90	65–80	30–50	20–40	2–10	2.0–6.0	0.12–0.15	5.6–6.5	Low.
----------	99–100	85–100	80–100	65–95	60–100	30–60	0.06–0.2	0.16–0.20	6.1–7.3	Very high.
----------	98–100	85–100	70–98	40–75	41–60	20–45	0.06–0.6	0.14–0.18	6.1–7.8	High.
----------	90–100	88–99	80–95	70–90	<30	NP–10	0.6–2.0	0.15–0.22	5.1–6.0	Low.
----------	95–100	90–100	90–98	80–95	20–40	8–18	0.2–0.6	0.12–0.18	4.5–5.5	Low.
----------	95–100	90–100	85–98	75–90	<40	NP–15	0.6–2.0	0.11–0.15	4.5–5.5	Low.
0–5	90–100	90–100	55–70	15–35	----------	NP	6.0–20.0	0.05–0.08	5.1–6.0	Low.
0–5	90–100	90–100	40–70	20–40	<15	NP	6.0–20.0	0.06–0.10	4.5–5.5	Low.
0–15	80–95	80–95	40–70	15–35	----------	NP	6.0–20.0	0.05–0.08	4.5–5.0	Low.
----------	90–100	85–100	70–90	25–50	20–30	NP–10	0.6–2.0	0.14–0.18	5.6–6.5	Low.
----------	95–100	90–100	90–100	70–90	52–70	15–30	0.06–0.2	0.12–0.14	5.6–6.5	Moderate.
----------	100	96–100	75–95	36–55	<25	NP–5	0.2–0.6	0.14–0.17	6.1–7.3	Low.
----------	95–100	90–100	85–95	60–75	20–34	NP–10	0.6–2.0	0.14–0.18	4.5–5.5	Low.
----------	95–100	95–100	90–100	85–95	50–60	20–35	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
----------	80–90	70–85	65–85	65–80	20–50	5–15	0.6–2.0	0.11–0.15	4.5–5.5	Low.
----------	90–100	90–100	60–80	25–50	<30	NP–10	2.0–6.0	0.10–0.14	5.1–6.0	Low.
----------	98–100	95–100	70–80	55–70	51–60	11–25	0.6–2.0	0.12–0.15	4.5–5.5	Low.
0–5	90–100	85–100	60–75	25–40	30–45	6–15	0.6–2.0	0.09–0.12	4.5–5.5	Low.
----------	95–100	90–100	75–95	55–75	20–34	NP–10	0.6–2.0	0.14–0.18	4.5–5.5	Low.
----------	95–100	90–100	80–100	75–95	50–60	20–35	0.6–2.0	0.12–0.18	4.5–5.5	Moderate.
----------	95–100	90–100	80–95	65–85	30–40	NP–10	0.6–2.0	0.10–0.15	4.5–5.5	Low.
----------	95–100	90–100	65–90	20–40	<40	NP–8	2.0–6.0	0.08–0.11	5.6–6.5	Low.
----------	100	98–100	85–99	60–90	30–45	15–25	2.0–6.0	0.14–0.16	5.6–6.5	Low.
----------	100	95–100	75–85	60–80	30–45	11–20	0.6–2.0	0.16–0.20	6.1–7.8	Low.
----------	95–100	95–100	65–80	40–60	<30	NP–10	0.6–2.0	0.14–0.16	6.6–7.8	Low.
----------	95–100	90–100	80–90	36–50	<35	NP–10	0.6–2.0	0.10–0.15	5.1–6.0	Low.
0–5	95–100	90–100	75–95	55–80	45–60	20–35	0.2–0.6	0.12–0.18	5.6–6.5	Moderate.
0–25	85–95	75–90	60–90	36–65	<40	NP–10	0.6–2.0	0.10–0.15	5.6–7.3	Low.
----------	100	95–100	85–95	55–70	20–35	5–12	0.6–2.0	0.14–0.18	5.1–6.0	Low.
----------	100	95–100	80–95	65–85	41–65	22–35	0.06–0.2	0.10–0.15	4.5–5.5	Moderate.
----------	90–100	85–95	75–95	40–75	20–40	5–20	0.2–0.6	0.08–0.15	4.5–5.5	Low.

TABLE 6.—*Engineering*

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

Soil series and map symbols	Suitability as a source of—		Soil features affecting—
	Topsoil	Road fill	Ponds Reservoirs
Alamance: AmB	Fair: less than 16 inches thick.	Fair: fair traffic-supporting capacity.	Moderate permeability
Appling: ApB, ApC	Fair: less than 16 inches thick.	Fair: fair traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
*Cartecay: Ca For Toccoa part, see Toccoa series.	Good	Fair: somewhat poorly drained.	Moderately rapid permeability.
Cataula: CbB, CbC, CcB2, CcC2	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity.	Slopes of more than 6 percent.
Cecil: CdB, CdC, CdD, CeB2, CeC2	Fair: less than 16 inches thick.	Fair: fair traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Cecil-Urban land complex: CmB. Properties too variable to rate.			
Chewacla: Cn	Good	Fair: somewhat poorly drained; fair traffic-supporting capacity.	Moderate permeability
Coronaca: CoB, CoC	Poor: clayey texture	Fair: fair traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Davidson: DaB, DaC	Fair: clayey texture	Fair: fair traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Durham: DuB	Fair: too clayey	Fair: fair traffic-supporting capacity.	Moderate permeability
Enon: EnB, EnC, EnD	Fair: less than 8 inches thick.	Poor: poor traffic-supporting capacity; high shrink-swell.	Slopes of more than 6 percent.
Georgeville: GaB, GaC, GeB2, GeC2.	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Goldston: GoD, GoF	Poor: too clayey	Poor: thin layer	Moderately rapid permeability; slopes of more than 6 percent.
Helena: HeB, HeC	Fair: less than 16 inches thick.	Poor: poor traffic-supporting capacity; high shrink-swell.	Slopes of more than 6 percent.
Herndon: HrB, HrC	Fair: too clayey	Poor: poor traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Hiwassee: HwB, HwC, HwD, HyB2, HyC2.	Fair: less than 16 inches thick.	Fair: fair traffic-supporting capacity.	Moderate permeability; slopes of more than 6 percent.
Iredell: IeA, IeB	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity; high shrink-swell.	Favorable

interpretations of soils

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-
that appear in the first column of this table]

Soil features affecting—Cont.				
Ponds—Cont. Embankments	Agricultural drainage	Sprinkler irrigation	Terraces and diversions	Grassed waterways
Medium to low shear strength.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Medium to low shear strength.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Susceptibility to piping; hard to pack.	High water table; flood hazard.	Flood hazard	Nearly level	Nearly level; somewhat poorly drained.
Low shear strength	Well drained	Slow permeability	Fragipan; erodes easily; complex slopes.	Erodes easily; complex slopes.
Medium to low shear strength.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Medium to low shear strength; hard to pack.	Flood hazard; wet	Flood hazard; wet	Nearly level	Nearly level; somewhat poorly drained.
Medium to low shear strength.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Medium to low shear strength; moderate shrink-swell.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Favorable	Well drained	Fast intake; complex slopes.	Complex slopes	Complex slopes.
Low shear strength; high compressibility; high shrink-swell.	Well drained	Slow permeability; complex slopes.	Slow permeability; complex slopes.	Slow permeability; complex slopes.
Low shear strength; high compressibility.	Well drained	Slow intake; complex slopes.	Complex slopes	Complex slopes.
Thin layer	Well drained	Limited root depth; complex slopes.	Limited root depth; complex slopes.	Limited root depth; complex slopes.
Low shear strength; high compressibility; high shrink-swell.	Slow permeability	Slow permeability; complex slopes.	Complex slopes	Complex slopes.
Low shear strength; high compressibility.	Well drained	Slow intake; complex slopes.	Complex slopes	Complex slopes.
Medium to low shear strength.	Well drained	Complex slopes	Complex slopes	Complex slopes.
Low shear strength; high compressibility; high shrink-swell.	Slow permeability	Slow permeability	Slow permeability	Slow permeability.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Soil features affecting—
	Topsoil	Road fill	Ponds Reservoirs
Kirksey: KaB, KaC	Fair: too clayey	Fair: fair traffic-supporting capacity.	Slopes of more than 6 percent.
Louisburg: LoC, LoE	Poor: sandy texture; coarse fragments.	Fair: stones and boulders	Rapid permeability
Mecklenburg: MeB, MeC	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity; moderate shrink-swell.	Slopes of more than 6 percent.
Nason: NaD, NaE	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity; slopes of 10 to 25 percent.	Moderate permeability; slopes of 10 to 25 percent.
Pacolet: PaF, PcD2	Poor: less than 8 inches thick.	Fair: fair traffic-supporting capacity; slopes of 10 to 40 percent.	Moderate permeability; slopes of 10 to 40 percent.
Tatum: TaD, TaE	Poor: less than 8 inches thick.	Poor: poor traffic-supporting capacity; slopes of 10 to 25 percent.	Moderate permeability; slopes of 10 to 25 percent.
Toccoa Mapped only with Cartecay soils.	Good	Good	Moderately rapid permeability.
Wehadkee: We	Poor: wet	Poor: wet	Moderate permeability
Wilkes: WkD, WkF	Poor: less than 8 inches thick.	Poor: thin layer	Slopes of 15 to 40 percent
Worsham: WoB	Poor: wet	Poor: wet	Favorable

limit and plasticity index are based on tests of soil samples.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 are a numerical rating for average conditions only and should not be confused with the coefficient of permeability "K" used by engineers and as defined by Darcy's equation of Q-KiA. This rating does not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations

In table 6 the soils in Greenwood and McCormick Counties are rated according to their suitability as sources of topsoil and road fill. Table 6 also lists the major soil features that affect the use of the soils as sights for ponds and for agricultural engineering. The information given in the table is based on the results of testing the soils of the series named in table 5, on information given in the rest of the survey, and on information gained from experience with the same kinds of soil in other counties.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when

interpretations of soils—Continued

Soil features affecting—Cont.				
Ponds—Cont. Embankments	Agricultural drainage	Sprinkler irrigation	Terraces and diversions	Grassed waterways
Low shear strength; high compressibility.	Moderately slow permeability.	Slow intake; moderately slow permeability; complex slopes.	Complex slopes	Complex slopes.
Rapid permeability	Well drained	Rapid permeability; complex slopes.	Complex slopes	Complex slopes.
Moderate shrink-swell; low shear strength; high compressibility.	Well drained	Slow permeability; complex slopes.	Complex slopes	Complex slopes.
Low shear strength; high compressibility; moderate shrink-swell.	Well drained	Slopes	Slopes	Slopes.
Medium to low shear strength.	Well drained	Slopes	Slopes	Slopes.
Low shear strength; high compressibility; moderate shrink-swell.	Well drained	Slopes	Slopes	Slopes.
Moderately rapid permeability.	Flood hazard	Flood hazard	Nearly level	Nearly level.
Susceptibility to piping; hard to pack.	Wet; flood hazard	Wet; flood hazard	Nearly level	Nearly level.
Thin layer; moderate shrink-swell.	Well drained	Slopes	Slopes	Slopes.
Hard to pack; moderate shrink-swell.	Slow permeability	Slow permeability	Nearly level	Nearly level.

fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Road fill is soil material used in embankments for roads. The suitability ratings in table 6 reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Agricultural drainage is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to water table; slope stability in ditchbanks; susceptibility to stream overflow; and availability of outlets for drainage.

Sprinkler irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion or soil blowing; soil texture; content of stones; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Grassed waterways are used to carry runoff water safely to outlets. The features that affect the use of

TABLE 7.—*Engineering*

[Tests Performed by Soil Testing Laboratory,

Soil name and location	Parent material	South Carolina report No.	Depth from surface	Moisture density data [1]	
				Maximum dry density	Optimum moisture content
			In	*Lb per cu ft*	*Pct*
Alamance silt loam:					
3 miles east of Plum Branch, 100 feet east of county road, McCormick County. (Modal)	Carolina Slate	H-54094	2-9	105	15
		H-54095	22-31	101	20
		H-54096	38-47	112	15
Appling loamy sand:					
2 miles south of Harris Plant, Greenwood County. (Modal)	Granite and gneiss	H-54076	0-8	114	10
		H-54077	22-40	96	24
		H-54078	50-65	101	20
Cartecay very fine sandy loam:					
3 miles northwest of Hodges, Greenwood County. (Modal)	Loamy alluvial sediment.	H-79323	0-8		
		H-79324	20-40		
		H-79325	40-58		
Coronaca sandy clay loam:					
3 miles southwest of Cokesbury, Greenwood County. (Modal)	Hornblende gneiss cut by dikes of gabbro-diorite.	H-18911	0-5	104	18
		H-18912	5-59	97	26
		H-18913	59-74	96	27
Durham loamy sand:					
2 miles east of Hodges, Greenwood County. (Modal)	Granite	H-18914	0-7	117	11
		H-18915	24-35	119	12
		H-18916	35-46	108	17
		H-18917	46-53	113	15
Enon sandy loam:					
2 miles northwest of Coronaca, Greenwood County. (Modal)	Hornblende gneiss and hornblende schist.	H-18925	0-6	118	13
		H-18926	17-27	98	22
		H-18927	35-47	121	12
Georgeville silt loam:					
6 miles east of McCormick, McCormick County. (Modal)	Carolina Slate	H-25828	0-5	102	18
		H-25829	17-39	102	22
		H-25830	51-60	89	36
Helena loamy sand:					
1 mile south of Piney Grove Church, Greenwood County. (Modal)	Gneiss and granite	H-79301	0-8		
		H-79302	27-32		
		H-79303	42-60		
Herndon silt loam:					
6 miles southeast of McCormick, McCormick County. (Modal)	Carolina Slate	H-25818	0-6	107	16
		H-25819	16-33	92	27
		H-25820	46-53	103	19
Hiwassee sandy loam:					
4 miles east of Ninety-Six, Greenwood County. (Modal)	Gneiss, schist, and old alluvium.	H-25821	0-6	119	11
		H-25822	17-39	93	27
		H-25823	51-60	106	19
Kirksey silt loam:					
3 miles northeast of Mountain Creek Church, Greenwood County. (Modal)	Carolina Slate	H-18921	0-6	108	13
		H-18922	16-32	110	13
		H-18923	32-47	105	17
Mecklenburg sandy loam:					
2½ miles north of Coronaca, Greenwood County. (Modal)	Dark-colored gneiss or schist.	H-25815	0-5	119	12
		H-25816	14-28	90	24
		H-25817	38-44	114	17

test data

South Carolina State Highway Department]

Mechanical analysis [2]					Liquid limit	Plasticity index	Classification	
Percentage passing sieve—				Percentage smaller than— 0.005 mm			AASHTO [3]	Unified [4]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					
100	90	85	74	19	[5] NP	NP	A-4(8)	ML
----------	100	98	92	54	37	16	A-6(10)	CL
----------	100	80	56	25	32	5	A-4(4)	ML
100	98	88	18	8	NP	NP	A-2-4	SM
100	98	92	69	61	58	23	A-7-5(15)	MH
100	99	92	62	48	48	15	A-7-5(8)	ML
----------	100	93	51	26	27	4	A-4(3)	ML
100	91	83	49	24	26	3	A-4(3)	SM
100	89	81	47	24	28	6	A-4(2)	SM-SC
98	97	89	51	35	32	11	A-6(4)	CL
99	98	91	78	69	51	16	A-7-5(12)	MH
96	96	86	69	58	57	20	A-7-5(14)	MH
99	97	67	28	18	NP	NP	A-2-4	SM
99	96	73	43	29	32	12	A-6(2)	SC
99	98	74	54	42	52	22	A-7-5(10)	MH
99	97	72	46	33	37	15	A-6(4)	SC
91	81	60	33	15	NP	NP	A-2-4	SM
----------	100	94	83	67	68	36	A-7-5(20)	CH
99	91	63	28	14	NP	NP	A-2-4	SM
94	87	87	61	25	26	2	A-4(5)	ML
----------	100	100	98	77	63	29	A-7-5(20)	MH
----------	100	100	93	75	66	22	A-7-5(17)	MH
100	97	60	23	8	NP	NP	A-2-4	SM
----------	100	89	77	64	68	36	A-7-5(20)	CH
100	98	76	57	33	39	12	A-6(5)	ML
96	89	89	69	23	NP	NP	A-4(7)	ML
----------	100	100	93	66	67	32	A-7-5(20)	MH
----------	100	100	83	52	42	16	A-7-6(10)	ML
100	99	83	32	15	NP	NP	A-2-4	SM
----------	100	94	68	56	66	16	A-7-5(11)	MH
----------	100	75	29	18	NP	NP	A-2-4	SM
98	95	90	79	22	NP	NP	A-4(8)	ML
98	97	95	89	49	36	14	A-6(10)	CL
----------	100	96	81	40	38	12	A-6(9)	ML
97	89	75	26	15	23	5	A-2-4	SM-SC
----------	100	98	84	72	70	24	A-7-5(18)	MH
----------	100	85	37	21	NP	NP	A-4(0)	SM

TABLE 7.—*Engineering*

Soil name and location	Parent material	South Carolina report No.	Depth from surface	Moisture density data [1]	
				Maximum dry density	Optimum moisture content
			In	*Lb per cu ft*	*Pct*
Toccoa sandy loam: 1 mile southeast of Pine Crest School, Greenwood County. (Modal)	Loamy alluvium	H–79329 H–79330 H–79331	0–8 22–33 33–51		

[1] Based on AASHTO Designation T 99–57, Method A (*1*).

[2] Mechanical analysis according to AASHTO Designation T 88–57 (*1*). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO 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,

soils for waterways are permeability, erodibility, and suitability for permanent vegetation.

Engineering test data

Table 7 contains engineering test data for some of the major soil series in Greenwood and McCormick Counties. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limit and plastic limit. The mechanical analyses were made by combined sieve and hydrometer methods.

In the *moisture density*, or compaction, test a sample of the soil material is compacted several times with a constant compactive effort, each time at a successively higher moisture content. The density of the compacted material increases as the moisture content increases until the optimum moisture content is reached. After that the density decreases with the increase in moisture content. The highest density obtained in the compaction test is termed "maximum density." Moisture-density data are important in construction because, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

The results of the mechanical analysis may be used to determine the relative proportions of the different size particles that make up the soil sample. The percentage of fine-grained material obtained by the hydrometer method, which generally is used by engineers, should not be used to determine the textural classes of the soils.

The tests used to determine the liquid limit and the plastic limit measure the effect of water on consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state.

The *plastic limit* is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the soil material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range in moisture content within which a soil material is in a plastic condition.

Town and Country Planning

Knowledge of the soils is necessary in planning, developing, and maintaining areas for recreation and other nonfarm uses (fig. 10). In table 8 the soils of Greenwood and McCormick Counties are rated according to their limitations for these uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained.

A rating of *slight* means that soil properties are generally favorable and limitations are so minor that they can easily be overcome.

A rating of *moderate* means that soil limitations can be overcome or modified by planning, by design, or by special maintenance.

A rating of *severe* means that limitations can be overcome only by costly soil reclamation, special design, or intensive maintenance, or by a combination of all of these.

The uses listed in table 8 are explained in the following paragraphs.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock and hardpan, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage, within a depth of 2 to 5 feet, long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of com-

test data—Continued

Mechanical analysis [2]					Liquid limit	Plasticity index	Classification	
Percentage passing sieve—				Percentage smaller than— 0.005 mm			AASHTO [3]	Unified [4]
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					
----------	100	86	36	25	26	4	A-4(0)	SM
----------	100	81	24	16	NP	NP	A-2-4	SM
----------	100	89	31	22	NP	NP	A-2-4	SM

and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

[3] Based on AASHTO Designation M 145-49 (*1*).

[4] Based on the Unified soil classification system (*2*).

[5] NP — Nonplastic.

pacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and embankment. Those that affect the pond floor are permeability, content of organic matter, and slope. If the floor needs to be leveled, depth to bedrock is important. The soil properties that affect the embankment are the engineering properties of the embankment material, as interpreted from the Unified soil classification system, and the amount of stones, if any, that influences the ease of excavation and compaction of the embankment material.

Light industries are rated according to limitations of bearing strength, slope, depth to the water table, hazard of flooding, and depth to rock. Facilities for sewage disposal are assumed to be available. Engineers and others should not apply specific values to the estimates given for bearing strength of soils.

Dwellings are not more than three stories high and are supported by foundation footings placed in undisturbed soil at a depth of not less than 2 feet. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity

Figure 10.—**Recreation center on Georgeville silt loam, 6 to 10 percent slopes. Clark Hill Lake in foreground.**

TABLE 8.—*Limitation of soils for*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Light industry	Dwellings
Alamance: AmB	Moderate: moderate permeability.	Moderate: moderate permeability; slopes of 2 to 6 percent.	Slight if slope is 2 to 4 percent. Moderate if slope is 4 to 6 percent.	Moderate: fair bearing strength.
Appling: ApB, ApC	Moderate: moderate permeability.	Moderate if slopes of 2 to 7 percent; moderate permeability. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.
Cartecay: Ca. For Toccoa part, see Toccoa series.	Severe: flood hazard; high water table.	Severe: moderately rapid permeability; flood hazard.	Severe: flood hazard; high water table.	Severe: flood hazard; high water table.
Cataula: CbB, CbC, CcB2, CcC2.	Severe: slow permeability.	Moderate if slope is 2 to 7 percent. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.
Cecil: CdB, CdC, CdD, CeB2, CeC2	Moderate: moderate permeability	Moderate if slope is 2 to 7 percent; moderate premeability. Severe if slope is 7 to 15 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 15 percent.	Moderate: fair bearing strength; slopes of 10 to 15 percent.
Cecil-Urban land complex: CmB. Properties too variable to rate.				
Chewacla: Cn	Severe: flood hazard; high water table.	Severe: flood hazard.	Severe: flood hazard; high water table.	Severe: flood hazard; high water table.
Coronaca: CoB, CoC	Moderate: moderate permeability.	Moderate if slope is 2 to 7 percent; moderate permeability. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.
Davidson: DaB, DaC	Moderate: moderate permeability.	Moderate if slope is 2 to 7 percent; moderate permeability. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength; moderate shrink-swell.
Durham: DuB	Moderate: moderate permeability.	Moderate: moderate permeability; slopes of 2 to 6 percent.	Slight if slope is 2 to 4 percent. Moderate if slope is 4 to 6 percent.	Moderate: fair bearing strength.
Enon: EnB, EnC, EnD	Severe: slow permeability.	Moderate if slope is 2 to 7 percent. Severe if slope is 7 to 15 percent.	Severe: high shrink-swell.	Severe: high shrink-swell.
Georgeville: GeB, GeC, GeB2, GeC2	Moderate: moderate permeability.	Moderate if slope is 2 to 7 percent; moderate permeability. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.

town and country planning

Sanitary landfill (Trench)	Local roads and streets	Recreation sites			
		Camp areas	Picnic areas	Playgrounds	Paths and trails
Moderate: clayey texture.	Moderate: fair traffic-supporting capacity.	Slight	Slight	Moderate: slopes of 2 to 6 percent.	Slight.
Moderate: clayey texture.	Moderate: fair traffic-supporting capacity.	Slight	Slight	Moderate if slope is 2 to 6 percent. Severe if slope is 6 to 10 percent.	Slight.
Severe: flood hazard; high water table.	Severe: flood hazard; drainage.	Severe: wetness; flood hazard.	Moderate: wetness; flood hazard.	Severe: flood hazard; wetness.	Moderate: wetness; flood hazard.
Moderate: clayey texture.	Severe: poor traffic-supporting capacity.	Moderate: slow permeability; slopes of 8 to 10 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Moderate if slope is 2 to 6 percent; slow permeability. Severe if slope is 6 to 10 percent.	Slight.
Severe: clayey texture.	Moderate: fair traffic-supporting capacity.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 15 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 15 percent.	Moderate if slope is 2 to 6 percent. Severe if slope is 6 to 15 percent.	Slight.
Severe: flood hazard; high water table.	Severe: flood hazard; drainage.	Severe: flood hazard; wetness.	Severe: flood hazard; wetness.	Severe: flood hazard; wetness.	Moderate: wetness; flood hazard.
Severe: clayey texture.	Moderate: fair traffic-supporting capacity.	Moderate: soil texture; slopes of 8 to 10 percent.	Moderate: soil texture; slopes of 8 to 10 percent.	Moderate if slope is 2 to 6 percent; soil texture. Severe if slope is 6 to 10 percent.	Moderate: soil texture.
Severe: clayey texture.	Moderate: fair traffic-supporting capacity.	Moderate: soil texture; slopes of 8 to 10 percent.	Moderate: soil texture; slopes of 8 to 10 percent.	Moderate if slope is 2 to 6 percent; soil texture. Severe: slopes of 6 to 10 percent.	Moderate: soil texture.
Slight	Moderate: fair traffic-supporting capacity.	Slight	Slight	Moderate: slopes of 2 to 6 percent.	Slight.
Severe: clayey texture.	Severe: poor traffic-supporting capacity; high shrink-swell.	Moderate: slow permeability; slopes of 8 to 15 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 15 percent.	Moderate if slope is 2 to 6 percent; slow permeability. Severe if slope is 6 to 15 percent.	Slight.
Severe: clayey texture.	Severe: poor traffic-supporting capacity.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Moderate if slope is 2 to 6 percent. Severe if slope is 6 to 10 percent.	Slight.

TABLE 8.—*Limitation of soils for*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Light industry	Dwellings
Goldston: GoD, GoF	Severe: shallow to rock; slopes of 15 to 40 percent.	Severe: shallow to rock; slopes of 7 to 40 percent.	Severe: depth to bedrock.	Moderate if slope is 6 to 15 percent. Severe if slope is 15 to 40 percent.
Helena: HeB, HeC	Severe: slow permeability.	Moderate if slope is 2 to 7 percent. Severe if slope is 7 to 10 percent.	Severe: high shrink-swell.	Severe: high shrink-swell.
Herndon: HrB, HrC	Moderate: moderate permeability.	Moderate if slope is 2 to 7 percent; moderate permeability. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.
Hiwassee: HwB, HwC, HwD, HyB2, HyC2	Moderate: moderate permeability.	Moderate if slope is 2 to 7 percent; moderate permeability. Severe if slope is 7 to 15 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 15 percent.	Moderate: fair bearing strength; slopes of 10 to 15 percent.
Iredell: IeA, IeB	Severe: slow permeability.	Slight if slope is 0 to 2 percent. Moderate if slope is 2 to 6 percent.	Severe: high shrink-swell.	Severe: high shrink-swell.
Kirksey: KaB, KaC	Severe: moderately slow permeability.	Moderate: 3.5 to 5 feet to rock; slopes of 2 to 7 percent. Severe if slope is 7 to 10 percent.	Moderate: depth to bedrock. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength; depth to rock.
Louisburg: LoC, LoE	Severe: 2 to 6 feet to rock; slopes of 15 to 25 percent.	Severe: rapid permeability; slopes of 7 to 25 percent.	Moderate: depth to bedrock. Severe if slope is 8 to 25 percent.	Moderate if slope is 6 to 10 percent; 2 to 6 feet to rock. Severe if slope is 10 to 25 percent.
Mecklenburg: MeB, MeC	Severe: slow permeability.	Moderate if slope is 2 to 7 percent. Severe if slope is 7 to 10 percent.	Moderate: fair bearing strength. Severe if slope is 8 to 10 percent.	Moderate: fair bearing strength.
Nason: NaD, NaE	Severe: 3 to 5 feet to rock; slopes of 15 to 25 percent.	Severe: slopes of 10 to 25 percent.	Severe: slopes of 10 to 25 percent.	Moderate if slope is 10 to 15 percent; fair bearing strength; moderate shrink-swell. Severe if slope is 15 to 25 percent.
Pacolet: PaF, PcD2	Moderate if slope is 10 to 15 percent; moderate permeability. Severe if slope is 15 to 40 percent.	Severe: slopes of 10 to 40 percent.	Severe: slopes of 10 to 40 percent.	Moderate if slope is 10 to 15 percent; fair bearing strength. Severe if slope is 15 to 40 percent.

town and country planning—Continued

Sanitary landfill (Trench)	Local roads and streets	Recreation sites			
		Camp areas	Picnic areas	Playgrounds	Paths and trails
Severe: shallow to rock; slopes of 25 to 40 percent.	Moderate if slope is 6 to 15 percent; shallow to rock. Severe if slope is 15 to 40 percent.	Moderate if slope is 8 to 15 percent; coarse fragments. Severe if slope is 15 to 40 percent.	Moderate if slope is 8 to 15 percent; coarse fragments. Severe if slope is 15 to 40 percent.	Severe: slopes of 6 to 40 percent; coarse fragments.	Moderate if slope is 15 to 25 percent; coarse fragments. Severe if slope is 25 to 40 percent.
Severe: clayey texture.	Severe: poor traffic-supporting capacity; high shrink-swell.	Moderate: slow permeability; slopes of 8 to 10 percent.	Silght if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Moderate if slope is 2 to 6 percent; slow permeability. Severe if slope is 6 to 10 percent.	Slight.
Severe: clayey texture.	Severe: poor traffic-supporting capacity.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Moderate if slope is 2 to 6 percent. Severe if slope is 6 to 10 percent.	Slight.
Severe: clayey texture.	Moderate: fair traffic-supporting capacity; slopes of 10 to 15 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 15 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 15 percent.	Moderate if slope is 2 to 6 percent. Severe if slope is 6 to 15 percent.	Slight.
Severe: clayey texture.	Severe: low traffic-supporting capacity; high shrink-swell.	Moderate: wetness; slow permeability.	Moderate: wetness.	Moderate: slow permeability; wetness; slopes of 2 to 6 percent.	Moderate: wetness.
Severe: 3.5 to 5 feet to rock.	Moderate: fair traffic-supporting capacity.	Moderate: moderately slow permeability; slopes of 8 to 10 percent.	Slight ----------	Moderate if slope is 2 to 6 percent; moderately slow permeability. Severe if slope is 6 to 10 percent.	Slight.
Severe: rapid permeability; 2 to 6 feet to rock.	Moderate if slope is 8 to 15 percent; 2 to 6 feet to rock. Severe if slope is 15 to 25 percent.	Moderate: sandy texture; slopes of 8 to 15 percent; coarse fragments. Severe: slopes of 8 to 25 percent.	Moderate where slope is 6 to 15 percent; sandy texture; coarse fragments. Severe where slope is 15 to 25 percent.	Severe: slopes of 6 to 25 percent; coarse fragments.	Moderate: sandy texture; slopes of 15 to 25 percent; coarse fragments.
Severe: 4 to 6 feet deep to rock; clayey texture.	Severe: poor traffic-supporting capacity.	Moderate: slow permeability; slopes of 8 to 10 percent.	Slight if slope is 2 to 8 percent. Moderate if slope is 8 to 10 percent.	Moderate if slope is 2 to 6 percent; slow permeability. Severe if slope is 6 to 10 percent.	Slight.
Severe: 3 to 5 feet deep to rock.	Severe: poor traffic-supporting capacity; slopes of 15 to 25 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 25 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 25 percent.	Severe: slopes of 10 to 25 percent.	Slight if slope is 10 to 15 percent. Moderate if slope is 15 to 25 percent.
Moderate if slope is 15 to 25 percent. Severe if slope is 25 to 40 percent.	Moderate if slope is 10 to 15 percent; fair traffic-supporting capacity. Severe if slope is 15 to 40 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 40 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 40 percent.	Severe: slopes of 10 to 40 percent.	Slight if slope is 10 to 15 percent. Moderate if slope is 15 to 25 percent. Severe if slope is 25 to 40 percent.

TABLE 8.—*Limitation of soils for*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Light industry	Dwellings
Tatum: TaD, TaE	Severe: 3 to 6 feet deep to rock; slopes of 15 to 25 percent.	Severe: slopes of 10 to 25 percent.	Severe: slopes of 10 to 25 percent.	Moderate if slope is 10 to 15 percent; fair bearing strength; moderate shrink-swell. Severe if slope is 15 to 25 percent.
Toccoa Mapped only with Cartecay soils.	Severe: flood hazard.	Severe: moderately rapid permeability.	Severe: flood hazard.	Severe: flood hazard.
Wehadkee: We	Severe: flood hazard; high water table.	Severe: flood hazard.	Severe: flood hazard; high water table.	Severe: flood hazard; high water table.
Wilkes: WkD, WkF	Severe: 1.5 to 4 feet deep to rock; slopes of 15 to 40 percent.	Severe: 1.5 to 4 feet deep to rock; slopes of 7 to 40 percent.	Severe: depth to bedrock.	Moderate if slope is 6 to 15 percent; 1.5 to 4 feet deep to rock; moderate shrink-swell. Severe if slope is 15 to 40 percent.
Worsham: WoB	Severe: high water table; slow permeability.	Slight if slope is 1 to 2 percent. Moderate if slope is 2 to 4 percent.	Severe: wetness	Severe: high water table; poorly drained.

to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 8 apply only to a depth of about 6 feet, and therefore limitation ratings of slight and moderate may not be valid if trenches are to be much deeper than 6 feet. For some soils, reliable predictions can be made to a depth of 10 to 15 feet, but regardless of that, every site should be investigated before it is selected.

Local roads and streets have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement, and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fill are less than 6 feet deep. In rating the soil as a source of material for local roads and streets, it is assumed that the penetration of frost will be less than 6 inches and that the surface foot of soil material is removed.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Picnic areas (fig. 11) are attractive natural or landscaped tracts used primarily for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry; are free of flooding during the season of use; do not have slopes or stoniness that greatly increase cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Paths and trails are used for local and cross-country

town and country planning—Continued

Sanitary landfill (Trench)	Local roads and streets	Recreation sites			
		Camp areas	Picnic areas	Playgrounds	Paths and trails
Severe: 3 to 6 feet deep to rock.	Severe: poor traffic-supporting capacity; slopes of 15 to 25 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 25 percent.	Moderate if slope is 10 to 15 percent. Severe if slope is 15 to 25 percent.	Severe: slopes of 10 to 25 percent.	Slight if slope is 10 to 15 percent. Moderate if slope is 15 to 25 percent.
Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.	Moderate: flood hazard.	Severe: flood hazard.	Moderate: flood hazard.
Severe: flood hazard; high water table.	Severe: flood hazard; poorly drained.	Severe: wetness; flood hazard.	Severe: wetness	Severe: flood hazard; wetness.	Severe: wetness; flood hazard.
Severe: 1.5 to 4 feet deep to rock; slopes of 25 to 40 percent.	Severe: 1.5 to 4 feet deep to rock; slopes of 15 to 40 percent.	Moderate if slope is 6 to 15 percent; moderately slow permeability. Severe if slope is 15 to 40 percent.	Slight if slope is 6 to 8 percent. Moderate if slope is 8 to 15 percent. Severe if slope is 15 to 40 percent.	Severe: slopes of 6 to 40 percent; 1.5 to 4 feet deep to rock.	Slight if slope is 6 to 15 percent. Moderate if slope is 15 to 25 percent. Severe if slope is 25 to 40 percent.
Severe: high water table; clayey texture.	Severe: poorly drained.	Severe: wetness; slow permeability.	Severe: wetness	Severe: wetness	Severe: wetness.

travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry; are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Formation, Morphology, and Classification of the Soils

This section discusses the major factors of soil formation as they have existed in Greenwood and McCormick Counties. It also gives the classification of the soils of the counties according to the system currently used by the National Cooperative Soil Survey.

Factors of Soil Formation

The characteristics of the soil at any given place are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil development have acted on the soil material.

Climate and vegetation are the active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and bring about the development of genetically related horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme instances, determines it almost entirely. Finally, time is needed for the changing of the parent material into a soil profile. Generally, a long time is required for the development of distinct horizons.

Parent material

The two broad classes of parent material in Greenwood and McCormick Counties are residual material and transported material. Residual material has weathered in place from the underlying bedrock. Soils that formed in residual material have morphological, chemical, and textural characteristics directly related to the underlying bedrock. The transported material–alluvium and colluvium–was carried by water or was moved by gravity and laid down as unconsolidated deposits of clay, silt, sand, gravel, and fragments of rock. Characteristics of the transported material are related to the characteristics of the soils or rocks from which the material has washed or rolled.

The rocks of Greenwood and McCormick Counties chiefly are granite, gneiss, schist, Carolina Slate, and gabbrodiorite. Many soils in Greenwood and McCormick Counties formed in material weathered from two or more of these rocks.

Soils that formed in material weathered from granite have a sandy surface layer. Appling, Durham, Helena,

Figure 11.—**Picnic area on Georgeville silt loam, 2 to 6 percent slopes.**

and Louisburg soils are examples of soils that formed in material derived from granite.

Gneiss is not so hard or so dense as granite, and it weathers more readily. Schist is micallous, relatively soft, and deeply weathered. Soils that formed from gneiss and schist parent materials have a sandy loam or a loam surface layer. Cataula, Cecil, Coronaca, Davidson, Hiwassee, Pacolet, and Worsham soils are examples of soils that formed in material derived from gneiss and schist.

Carolina Slate is fine textured, is relatively hard, and weathers slowly. Soils that formed in material weathered from Carolina Slate have a loam or silt loam surface layer. Alamance, Georgeville, Goldston, Herndon, Kirksey, Nason, and Tatum soils are examples of soils that formed in material derived from Carolina Slate.

Gabbrodiorite is fine textured, is hard, and weathers slowly. Soils that formed in material weathered from gabbrodiorite have a surface layer of sandy loam or fine sandy loam and have a subsoil of plastic clay. Enon, Iredell, Mecklenburg, and Wilkes soils are examples of soils that formed in material derived from gabbrodiorite.

Soils that formed in transported alluvial material on first bottoms are weakly developed and still receive deposits during floods. Recent deposits along drainageways and smaller streams show little development. Cartecay, Chewacla, Toccoa, and Wehadkee soils are examples of soils that formed in alluvium.

Climate

Climate affects the physical, chemical, and biological relationships in the soil through the influence of precipitation and temperature. Water dissolves minerals, supports chemical and biological activity, and transports mineral and organic residue through the soil.

The amount of water that percolates through the soil depends on rainfall, humidity, the frost-free period, infiltration, physiographic position, slope, and soil permeability. Rainwater promotes leaching of soluble bases and the translocation of less soluble and colloidal material downward through the soil.

Temperature influences the kinds and growth of liv-

ing organisms and the speed of physical and chemical reactions in the soils.

Living organisms

Trees, shrubs, grasses, micro-organisms, worms, and other forms of plant and animal life are agents in the formation of soils. The environmental factors of parent material, climate, relief, and time determine the kinds of plants and animals that live on and in the soil.

Plants supply organic matter, and they transfer moisture and plant nutrients from the lower horizons to the upper horizons. Organic matter decomposes and is mixed into the soil by the action of micro-organisms and worms or by chemical reaction. The rate at which organic matter decomposes is influenced by temperature; moisture; the population of bacteria, fungi, and other micro-organisms; and the content of organic matter. In these counties organic matter has not accumulated to any great extent.

With the development of farming, man has become a soil-forming factor. Man has affected soil formation by clearing the forest and cultivating the land. He has changed the soil by mixing the upper horizons, by cultivating the slopes and causing erosion, and by adding chemicals and nutrients.

Bacteria, fungi, and other micro-organisms hasten the weathering of rock and the decomposing of organic matter. They assimilate and transform chemicals in the soil. Most of the bacteria, fungi, and other micro-organisms are in the upper few inches of the soil.

Time

Time is an important factor in the alteration of parent material and is necessary for the development of distinct genetic horizons in the soil profile. In soil genesis, time refers to the degree of development of the soil profile rather than to the actual length of time the soil has been subjected to the processes that lead to the development of a soil profile. Soils are considered either mature or immature. Mature soils, such as the Cecil soils, have well-defined genetic horizons and are considered to be in equilibrium with their environment. Immature soils, such as the Toccoa soils, show little or no development of genetic horizons.

Although time largely determines the degree of maturity of a soil, relief, the kind of parent material from which the soil is derived, climate, and plants and animals also are great influences. The steeply sloping Goldston soils show little or no development of a subsoil and are considered to be immature because geologic erosion has removed soil material as fast as it has accumulated. Soils on the flood plains, such as the Cartecay soils, show weak development, because soil material is constantly being added during periods of flooding. Also, these Cartecay soils are not altered by the soil-forming processes, because they have been in place for only a short time.

Relief

Relief affects the formation of soils by causing differences in internal drainage, runoff, geologic erosion, temperature, and plant cover. It can alter the effects of parent material on the development of soils to the extent that several different kinds of soil may form from the same kind of parent material.

In these counties relief ranges from nearly level to steep. Most soils on uplands that have slopes of less than 15 percent have a thick, well-developed profile. Appling and Cecil soils are examples. Where slopes are steep, geologic erosion removes the soil material almost as fast as it forms, and shallow soils, such as Wilkes and Goldston soils, are formed. In nearly level areas where the soil material is too wet for good aeration and where organic matter accumulates, poorly drained soils are formed. Wehadkee soils formed in this kind of environment.

Morphology of Soils

If a vertical cut is dug into a soil, several layers, or horizons, are evident. The differentiation of horizons is the result of many soil-forming processes. These include the accumulation of organic matter; the leaching of soluble salts; the reduction and translocation of iron; the formation of soil structure; physical weathering, such as freezing and thawing; and chemical weathering of primary minerals or rocks.

Some of these processes are continually taking place in all soils, but the number of active processes and the degree of their activity vary from one soil to another.

Most soils have three major horizons called A, B, and C horizons. These major horizons may be further subdivided by the use of subscripts and letters to indicate changes within one horizon. An example is the B2t horizon, which is a layer in the B horizon that has translocated clay illuviated from the A horizon.

The A horizon is the surface layer. The layer with the largest accumulation of organic matter is called an A1 horizon. If the soils are cleared and plowed, the surface layer becomes an Ap horizon. The A horizon is the layer of maximum leaching or eluviation of clay and iron. When considerable leaching has taken place, an A2 horizon is formed just below the surface layer. Normally, it is the lightest colored horizon in the soil. It is expressed in the Alamance soils.

The B horizon lies underneath the A horizon and is called the subsoil. It is the horizon of accumulation, or illuviation of clay, iron, aluminum, or other compounds leached from the A horizon. The Cecil and Hiwassee soils are among the soils that have a well-expressed B horizon.

The C horizon is below the A or B horizon. Some soils, such as Cartecay and Wehadkee soils, have not formed a B horizon and the C horizon lies immediately under the A horizon. The C horizon consists of materials that have been altered very little by the soil-forming processes, but these materials are modified by weathering.

Cataula soils have a fragipan horizon that generally is 20 to 38 inches below the surface. This horizon is very low in organic-matter content. It seems to be cemented and is very hard when dry. When moist the fragipan layer is brittle. This layer is horizontally streaked, is slowly permeable to water, and generally has few or many bleached fracture planes that form polygons.

Well drained soils in Greenwood and McCormick Counties have a yellowish brown, brownish yellow, or reddish subsoil. These colors are mainly caused by thin coatings of iron oxide on the sand, silt, and clay

particles. A soil is considered well drained if it is free of gray (chroma of 2 or less) mottles to a depth of at least 30 inches. Cecil, Coronaca, and Tatum soils are among the well drained soils in Greenwood and McCormick Counties.

Moderately well drained soils are wet for short periods and generally are free of gray (chroma of 2 or less) mottles to a depth of about 15 to 20 inches. Helena soils are representative of moderately well drained soils. Somewhat poorly drained soils have gray mottles near the A horizon. Cartecay soils are representative of the somewhat poorly drained soils.

The reduction and transfer of iron is associated with the wetter, more poorly drained soils. This process is called gleying. Poorly drained soils, such as Wehadkee soils, have underlying materials that are grayish, indicating reduction and transfer of iron.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification currently used (*5, 6*) was adopted by the National Cooperative Soil Survey in 1965 and is called the Soil Taxonomy.

The Soil Taxonomy has six categories. Beginning with broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 9 the soil series of Greenwood and McCormick Counties are classified according to some classes of the Soil Taxonomy. Classes of the Soil Taxonomy are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The three exceptions to this are the Entisols, Inceptisols, and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol.*

SUBORDER: Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order.

GREAT GROUP: Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have

TABLE 9.—*Classification of soil series*

Series	Family	Subgroup	Order
Alamance	Fine-silty, siliceous, thermic	Typic Hapludults	Ultisols.
Appling	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Cartecay	Coarse-loamy, mixed, nonacid, thermic	Aquic Udifluvents	Entisols.
Cataula	Clayey, kaolinitic, thermic	Typic Fragiudults	Ultisols.
Cecil	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Coronaca	Clayey, mixed (oxidic), thermic	Rhodic Paleudalfs	Alfisols.
Davidson	Clayey, kaolinitic (oxidic), thermic	Rhodic Paledults	Ultisols.
Durham	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols.
Enon	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Georgeville	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Goldston	Loamy-skeletal, siliceous, thermic	Ruptic-Ultic Dystrochrepts	Inceptisols.
Helena	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Herndon	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Hiwassee	Clayey, kaolinitic (oxidic), thermic	Typic Rhodudults	Ultisols.
Iredell	Fine-montmorillonitic, thermic	Typic Hapludalfs	Alfisols.
Kirksey	Fine-silty, siliceous, thermic	Aquic Hapludults	Ultisols.
Louisburg	Coarse-loamy, mixed, thermic	Ruptic-Ultic Dystrochrepts	Inceptisols.
Mecklenburg	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Nason	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Pacolet	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Tatum	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Toccoa	Coarse-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Wehadkee	Fine-loamy, mixed, nonacid, thermic	Typic Fluvaquents	Entisols.
Wilkes	Loamy, mixed, thermic, shallow	Typic Hapludalfs	Alfisols.
Worsham	Clayey, mixed thermic	Typic Ochraquults	Ultisols.

pans that interfere with growth of roots or movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark red and dark brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder.

SUBGROUP: Great groups are subdivided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group.

FAMILY: Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reactions, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used as family differentiae.

SERIES: The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement of the profile.

Additional Facts About the Counties

This section was prepared for those who desire additional information about Greenwood and McCormick counties. First it describes the physiography, drainage, and geology, and then it discusses the climate.

Physiography, Drainage, and Geology

Greenwood and McCormick Counties are between the Savannah and the Saluda Rivers. The general slope is southeastward, which is the general direction of the main drainageways. These counties are on a dissected plain. The relief ranges from nearly level to steep but is chiefly gently sloping to moderately steep.

The highest elevation in these counties, about 714 feet, is in the vicinity of Hodges. The elevation in the central part of these counties ranges from about 450 to 650 feet. The lowest elevation, about 190 feet, is at the intersection of the McCormick County line and the Savannah River in the extreme southern part of McCormick County.

The surface drainage of the counties forms a dendritic pattern. All areas of the upland drain into the major streams, which flow into the Savannah or Saluda Rivers. The chief tributaries of these rivers are Little River, Russells, Calhoun, Lee, Canes, Baker, Rocky, Hard Labor, Stephens, Stevens, Cuffey Town, Beaverdam, Horsepen, Mountain, Ninety-Six, Wilson, Coronaca, Mulberry, and Turkey Creeks.

Greenwood and McCormick Counties are in the Piedmont area of the State. The materials underlying the soils are mainly granite, gneiss, schist, Carolina Slate, gabbrodiorite, and alluvium. Dikes of materials from minor rocks are intrusions into these major underlying rocks.

Climate[6]

These counties have mild winters and warm summers. The climate from midautumn to midspring is mainly controlled by the west to east flow of fronts, cyclones, and airmasses. Airmass exchanges are infrequent during summer, and maritime tropical air remains in the area for extended periods. Although these counties are in one of the drier regions of the State, rainfall is ample, averaging from 46 to 48 inches annually (*9*). Average monthly rainfall ranges from 2.5 to 5.4 inches (table 10).

The prevailing wind is from the northeast in fall and from the southwest the rest of the year. Average windspeed ranges from 6 to 9 miles per hour. Average relative humidity at midday and early in the morning is, respectively, 52 percent and 76 percent in winter, 48 percent and 77 percent in spring, 55 percent and 86 percent in summer, and 53 percent and 84 percent in autumn. The sun shines about 60 percent of the possible annual total, ranging from 54 percent in winter to 64 percent in spring and fall. Precipitation of 0.1 inch or more falls on about 76 days per year. February and March each have 8 of these days, but October has only 4. Annual rainfall has varied from 28 inches in 1954 to 68 inches in 1936 and 1964.

Summer is rather warm and long, and it has an average of 58 days when temperatures are 90° F or higher. Temperatures reach 100° on 1 or 2 days annually. About 26 percent of the annual rainfall comes in summer. Showers and thunderstorms are frequent as a result of the warm, moist, relatively unstable, maritime tropical air that is generally present during this season. Some rain comes from infrequent tropical storms. Storms of hurricane intensity seldom occur this far inland.

Autumn begins warm and humid, as summer showers still persist. The frequency of tropical storms is slightly greater than in summer. The warm, dry, and pleasant Indian summer weather begins in October and continues into November. The first freezing temperature can be expected about November 4th (table 11). About 20 percent of the annual rainfall comes in autumn.

Winter is rather short and is relatively mild. Nearly one-half of the winter days have an early morning minimum temperature of 32° or less. There may be 8 days when the temperature is below 20° and 3 days when it is below 15°. Slightly more than 25 percent of the annual precipitation comes in winter. Annual snowfall averages 1.5 inches.

Spring is a transition period between the rather uniform types of weather occurring in winter and summer. Rainfall in spring is slightly more than that in

[6] BY HOLBROOK LANDERS, climatologist for South Carolina, National Weather Service, U.S. Department of Commerce.

TABLE 10.—*Temperature and precipitation (9)*

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Days with snow cover of 1.0 inch or more	Average depth of snow on days with snow cover
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—		
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*		*Inches*
January	54	33	67	17	4.4	2.1	6.8	1	0.6
February	57	34	73	17	4.4	1.6	7.0	1	.1
March	64	41	80	24	5.4	2.8	9.6	(1)	.4
April	74	49	86	34	4.3	1.1	6.9	0	0
May	83	58	92	44	3.4	.4	7.2	0	0
June	89	66	96	54	3.4	1.2	6.3	0	0
July	90	69	98	62	4.5	1.9	7.7	0	0
August	90	68	98	58	4.6	1.7	9.3	0	0
September	84	62	93	48	3.8	1.0	7.8	0	0
October	75	51	85	32	2.6	.5	7.2	0	0
November	64	40	78	26	2.9	.7	7.5	(1)	0
December	54	33	69	18	3.8	1.7	6.8	(1)	.3
Year	73	50	[2] 99	[3] 10	47.5	36.7	59.9	2	1.4

[1] Less than one-half day.
[2] Average annual maximum.
[3] Average annual minimum.

TABLE 11.—*Probabilities of last freezing temperatures in spring and first in fall (9)*

Probability	Dates for given probability and temperature		
	24° F or lower	28° F or lower	32° F or lower
Spring:			
1 year in 10 later than	March 27	March 31	April 20
2 years in 10 later than	March 19	March 27	April 4
5 years in 10 later than	March 5	March 19	March 25
Fall:			
1 year in 10 earlier than	November 6	October 27	October 16
2 years in 10 earlier than	November 16	November 4	October 26
5 years in 10 earlier than	November 25	November 12	November 4

summer and winter—about 28 percent of the annual total. Precipitation comes from frontal cyclones, cold fronts, squall lines, and air-mass thunderstorms. Tornadoes are more frequent in spring than in any other season. In the last 60 years, three of the four tornadoes in Greenwood and McCormick Counties occurred in spring. March 25 is the average date of the last freezing temperature in spring.

Severe weather can occur in the form of tornadoes, damaging winds from violent thunderstorms, and tropical cyclones. The tropical storm season is mainly from June through October. Hurricanes are rare. They have generally been downgraded to tropical storms or depressions before reaching this area. Depressions occur once every 2 or 3 years and bring heavy rains, but the winds are usually less than 40 miles per hour and are not damaging.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Short and irregular slopes. Planning the construction of terraces, diversions, and other water-control measures are difficult.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Favorable. Features of the soil are favorable for the intended use.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B

horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—few, common, and many; size—fine, medium, and coarse; and contrast—faint, distinct, and prominent. The size measurements are of the diameter along the greatest dimension. Fine indicates less than 5 millimeters (about 0.2 inch); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and coarse, more than 15 millimeters (about 0.6 inch).

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. The soil is susceptible to the formation of tunnels or pipelike cavities by moving water.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Rooting depth. A layer that greatly restricts the downward rooting of plants occurs at a shallow depth.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Shrink-swell. The soil expands on wetting and shrinks on drying, which may cause damage to roads, dams, building foundations, or other structures.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a full stock stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slow intake. Water infiltrates slowly into the soil.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Thin layer. Suitable soil material is not thick enough for use as borrow material or topsoil.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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