United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
University of Georgia,
College of Agriculture,
Agricultural Experiment
Stations

Soil Survey of Oglethorpe County, Georgia

How To Use This Soil Survey

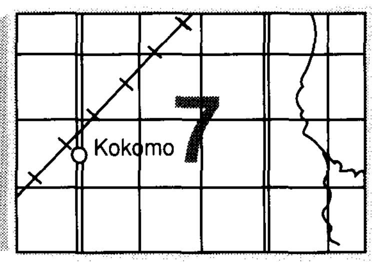
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

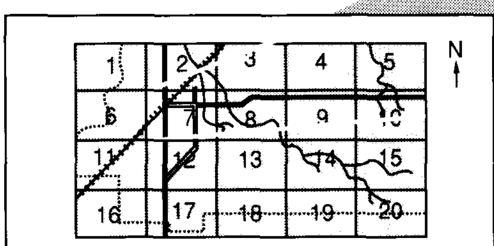
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



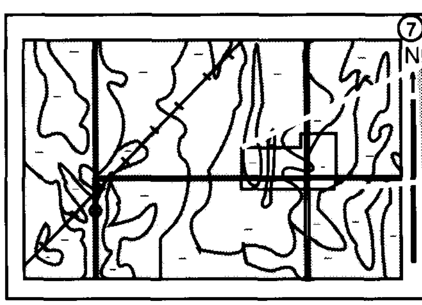
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

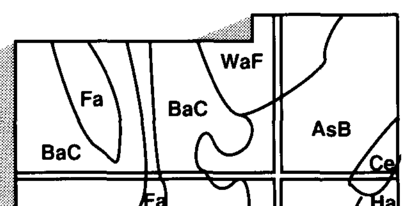


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This soil survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Broad River Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: The courthouse in Lexington, Georgia, a landmark in Oglethorpe County. The soil on this site is Cecil sandy loam, 2 to 6 percent slopes.

Contents

Issued January 1991

Index to Map Units

Summary of Tables

Foreword

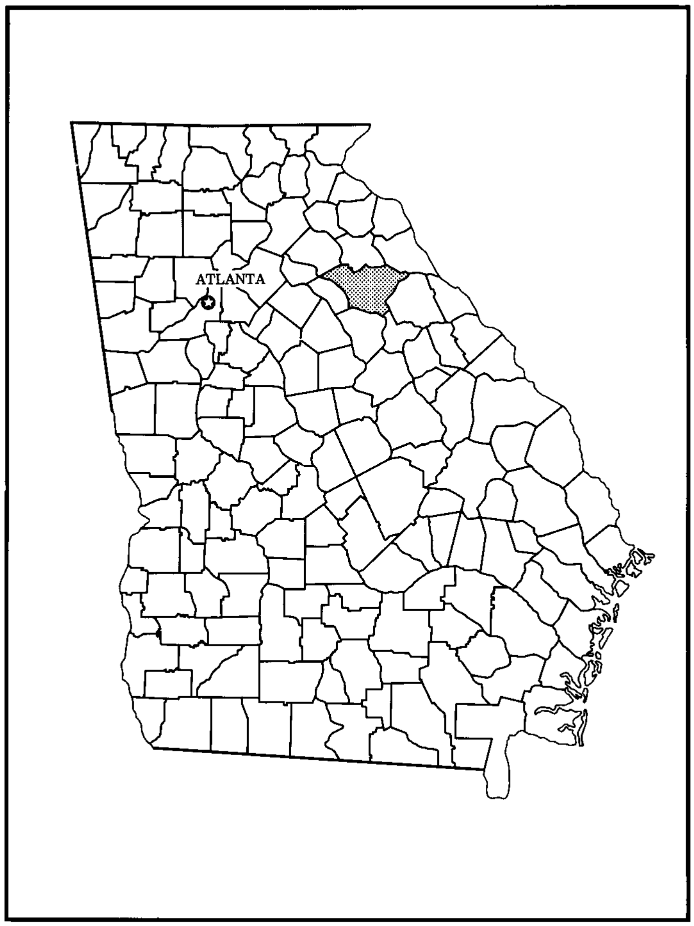
This soil survey contains information that can be used in land-planning programs in Oglethorpe County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the suitability of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Hershel R. Read
State Conservationist
Soil Conservation Service



Location of Oglethorpe County in Georgia.

Soil Survey of Oglethorpe County, Georgia

By Louie W. Frost, Soil Conservation Service

Fieldwork by Louie W. Frost, J. Tom Ammons, T.R. Lukers, and C.L. McIntyre, Soil Conservation Service

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

Oglethorpe County is in the northeastern part of Georgia. It has a land area of 435 square miles, or 278,400 acres. Lexington, the county seat, is in the center of the county.

Oglethorpe County is in the Southern Piedmont Major Land Resource Area. It is dissected by the Broad, Oconee, and North Fork Little Rivers and by the tributaries of these rivers. In the southwestern part of the county, runoff drains into the Oconee River. In the northern part and in most of the interior parts, it drains into the Broad River. In the southeastern part, it drains into the North Fork Little River.

Most of the soils in the uplands are on broad, very gently sloping ridgetops and gently sloping hillsides. The soils that are near the main creeks and rivers, however, are strongly sloping to steep. The dominant soils on the uplands are well drained and have a loamy surface layer that is brownish or reddish and a clayey subsoil that is reddish.

Near the eastern part of the county is an area that has few dissections. This area is about 50 to 200 feet lower than the adjacent plateau and is known as the Flatwoods. The dominant soils are well drained and have a loamy surface layer in shades of brown and a clayey subsoil in shades of brown and red. The subsoil is firm, sticky, and plastic.

The soils on flood plains are nearly level, well drained to somewhat poorly drained, and occasionally flooded. These are mainly loamy soils. The well drained soils are predominantly in shades of brown. The somewhat poorly drained soils are predominantly in shades of brown but commonly have mottles in shades of gray below the surface layer.

Most of the acreage in the county is used as woodland. Some areas are used for field crops or pasture.

General Nature of the County

This section gives general information about the geology, climate, settlement and history, water resources, and farming in Oglethorpe County.

Geology

William R. Fulmer, geologist, Soil Conservation Service, prepared this section.

According to the Physiographic Map of Georgia, most of Oglethorpe County is in the Washington Slope District. It is characterized by gently rolling topography that is at an elevation of about 500 feet above sea level in the southern part of the Washington Slope District and 700 feet in the northern part. The map indicates that the northern part of Oglethorpe County is in the Winder Slope District. Elevation in this part of the county ranges from 700 to 1,000 feet above sea level. Dome-shaped granitic uplands are between the stream valleys. In the Washington and Winder Slope Districts, nearly level soils commonly are on the flood plains, strongly sloping to steep soils are on the hillsides, and very gently sloping and gently sloping soils are on the ridgetops.

The soils on the rolling topography of central Oglethorpe County formed mainly in material weathered from a large granitic intrusive. From the central part of Elbert County, this intrusive extends southwest into central Oglethorpe County. This granite is inclusive within a band of Carolina series rocks, which consist of micaschist, micagneiss, and granitoid layers. This band is wide and extends across the north-central part of Georgia. The granite within this band ranges from fine and even grained, dark blue-gray biotite granite to medium grained, light gray biotite granite. The component minerals of quartz feldspar, biotite, and some muscovite are readily distinguishable. Small veins of quartz and feldspar are common in the granite mass. During weathering, the granite becomes light brown. It decreases in hardness and kaolinization of the feldspars. Weathering produces parent material for soil formation. Appling and Cecil soils, which commonly are on ridgetops, are deep to the underlying weathered granite. Pacolet soils, which commonly are on hillsides, are more shallow to the weathered granite. Exfoliation is common in exposed or sparsely covered granite outcrops. Numerous granite quarries are in Oglethorpe County. The granite is used for monuments and building stone.

North of the areas of granite, the Carolina series metamorphics, schist, and gneiss have weathered to material in which Madison and other soils have formed. The principal rock types are micaschist, sillimanite, schist, and biotite gneiss. The biotite gneiss is fine grained to coarse grained and has layers of micaschist and massive quartzite. The micaschist has about the same rock types as the gneiss but has a larger amount of mica, which gives the rock a strong schistosity. Sillimanite is widely distributed within the schist and gneiss, but it commonly is in hard ledges in the micaschist, which is interlayered by gneiss, granite, pegmatite, and quartzite.

Rocks of the Little River series are in the southeastern part of the county. This series has weathered to material in which Ennon, Mecklenburg, and other soils have formed. It is a complex group of metasedimentary extrusive and intrusive rocks of a younger age than the more highly metamorphosed schist and gneiss of the Carolina series. The principal rock types are meta-volcanic quartz, micaschist, and seritite phyllite. Interbedded within the schist rocks are low-grade slate and tuff.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Elberton, Georgia, in the period 1952 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 42 degrees F and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Elberton on December, 13, 1962, is -6 degrees. In summer, the average temperature is 76 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred at Elberton on July 8, 1977, is 105 degrees.

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

The total annual precipitation is more than 48 inches. Of this, about 24 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.04 inches at Elberton on September 26, 1956. Thunderstorms occur on about 51 days each year.

Snowfall is rare. In 99 percent of the winters, there is no measurable snowfall. In 1 percent, the snowfall, usually of short duration, is less than 1 inch.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 9 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the survey area. They are of short duration and cause damage in scattered small areas. Every few years in summer or autumn, a tropical depression or remnant of a hurricane, which has moved inland, causes extremely heavy rains for 1 to 3 days.

Settlement and History

Joseph A. Carey, district conservationist, Soil Conservation Service, prepared this section.

Oglethorpe County was established by a legislative act on December 19, 1793. It was formed from part of Wilkes County. It was named for General James Edward Oglethorpe, founder of the Colony of Georgia. Lexington, the county seat, was named for the historic town of Lexington in Massachusetts. Because the citizens of Lexington objected to the smoke and noise associated with a railroad station, Crawford, a town about 3 miles west of Lexington, was established to accommodate the station.

Farming is the chief industry in Oglethorpe County. In recent years, however, a large acreage of cropland and pasture has been planted to pine. About 80 percent of the county is currently used as woodland. Poultry and poultry products and granite quarries are economically important in the county.

Water Resources

The most abundant water supplies in Oglethorpe County are from the Broad River, the Oconee River, and the North Fork Little River and from Beaverdam Creek, Clouds Creek, Dry Fork Creek, Grove Creek, and Long Creek. Near the smaller creeks, many ponds constructed by beavers also are sources of water for the county.

Many watercourses are throughout the county. Near the upper reaches of watersheds, however, water flows only in wet periods. Most perennial streams flow through areas of flood plains. These streams occasionally overflow their banks during heavy rains. Many farm ponds have been constructed in the watersheds of the smaller streams. These ponds are used for the watering of livestock and for some recreational activities.

Adequate supplies of water for domestic use commonly can be obtained from bored or drilled wells. These wells extend to hard bedrock that commonly is 25 to 50 feet deep. Some drilled wells extend many feet into hard bedrock to ensure a dependable supply of water.

Farming

Joseph A. Carey, district conservationist, Soil Conservation Service, prepared this section.

The early settlers of Oglethorpe County were mostly farmers, and from the outset, farming has been the chief industry. The first crops, grown chiefly for subsistence, were corn, wheat, potatoes, peas, and other vegetables. Hogs, milk cows, and poultry were the main kinds of livestock. Velvet beans and cowpeas were grown for livestock feed. With the advent of the cotton gin, cotton became the main cash crop. In 1930, about 65,859 acres was used for cotton.

From 1930 until the early 1960's, cotton production declined and small grain and corn yields increased. In the late 1940's, beef cattle became economically important. A large acreage of cropland was converted to pasture. These pastures were of good quality and stimulated breeding for high-quality cattle. In the 1950's, significant quantities of pimento peppers were produced, and dairy farming was important. Since the middle 1960's, soybeans, small grain, and grain sorghum have been the major crops. In recent years a large acreage of farmland has been purchased by pulpwood companies and planted to pine.

The economic depression in the early 1930's led to misuse of the land. This misuse increased erosion on most sloping soils. Many fields were abandoned because of low crop yields. Changes in land ownership were common. Soil fertility was not maintained in most places. Protecting the land against depletion was a definite need.

The enactment of the soil conservation district legislation in 1937 by the State of Georgia was supported by many farmers in Oglethorpe County. The Broad River Soil and Water Conservation District was organized, and Oglethorpe County recognized the need for conservation measures to prevent excessive erosion and improve or maintain fertility. Terraces, grassed waterways, improved pastures, and ponds were used to control erosion and increase productivity. The soils were used according to their capability and managed according to the needs of the crops. The soil survey maps of the Soil Conservation Service were used to determine the capability of each soil. Many sloping, seriously eroded fields that had been cultivated were planted to grass or trees.

In the 1960's and early 1970's, public concern about the productive capacity of American agriculture prompted a national inventory of important farmlands. The best land available for food, forage, fiber, and oilseed crops in Oglethorpe County is identified in the section "Important Farmland."

According to the 1982 Census of Agriculture, 351 farms made up about 69,948 acres, or about 25 percent, of Oglethorpe County. The average size of these farms was 200 acres.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the descriptions of detailed soil map units, these latter soils are called inclusions or included soils. In the descriptions of general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

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

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area differ in their suitability for major land uses. In this section, each map unit is rated for the visual elements of landform, water, vegetation or land use, and structures. The map units are classified as having low to high visual diversity. This is a value rating of landscape elements and their pattern developed for local geographic areas. Visual diversity can be used in conservation planning and in establishing a desirable continuity of landscape elements. The extent of the map units and their components are identified and described. The main management concerns are identified, and the soil properties that limit use are indicated.

Each map unit is rated for *field crops, pasture,* and *woodland,*. Field crops are those grown extensively in the county. Pasture includes the areas of improved grasses grown in the county. Woodland refers to areas of native or introduced trees.

Soil Descriptions

1. Chewacla-Riverview-Toccoa

Nearly level, somewhat poorly drained and well drained soils that are mainly loamy throughout; on the flood plains

The landscape of this map unit is characterized by nearly level soils in areas that are about 0.5 to 1.0 mile wide. These soils are mainly on the flood plains along Long Creek, Dry Fork Creek, and the Broad River. Chewacla soils are somewhat poorly drained. These soils generally are on the outer part of the flood plains. Riverview and Toccoa soils are well drained. They are near the stream channels. The slope is 0 to 2 percent.

The drainage pattern in this map unit is not well defined. These soils are occasionally flooded in winter and spring. Most of the natural watercourses are perennial. There are few areas of open water. The soils are used mainly as woodland, but some of the well drained soils are used for pasture. Other than roads and bridges, manmade development is minimal. The degree of visual diversity is low.

This map unit makes up about 1 percent of Oglethorpe County. Chewacla soils make up about 28 percent of the map unit; Riverview soils, about 20 percent; Toccoa soils, about 19 percent; and soils of minor extent, about 33 percent.

Typically, Chewacla soils have a surface layer of brown silt loam 6 inches thick. The subsoil is sandy clay loam. It extends to a depth of 60 inches or more. The upper part is reddish brown and has light brownish gray mottles. The next part is grayish brown and has reddish brown mottles. The next layer is brown and has gray mottles. The lower part is mottled brown, gray, and very dark gray.

Typically, Riverview soils have a surface layer of brown silt loam 5 inches thick. The subsoil extends to a depth of 35 inches. It is reddish brown loam. The substratum to a depth of 60 inches or more is brown and has light gray mottles. It is mainly loam, but the extreme lower part is fine sandy loam. These soils have a low content of sand.

Typically, Toccoa soils have a surface layer of brown fine sandy loam 7 inches thick. The underlying material extends to a depth of 60 inches or more. The upper part is mainly brown and brownish yellow fine sandy loam that is stratified. The next part is reddish brown sandy loam that has pale brown mottles. The lower part is strong brown, stratified sandy loam and loamy sand mottled with light gray. These soils have a high content of sand.

The soils of minor extent in this map unit are the somewhat poorly drained Cartecay loam and Fluvaquents, ponded. The Cartecay loam generally is on the outer part of the flood plains. The Fluvaquents are upstream from dams built by beavers.

The main management concern is control of flooding or wetness, or both. Flooding is likely to occur on all the soils in this map unit. Also, wetness is a limitation affecting the use of the soils on the outer part of the flood plains.

The soils in this map unit are only moderately suited to field crops; however, they are well suited to pasture. The hazard of flooding and the seasonal high water table are severe limitations affecting most nonfarm uses. The potential of these soils for commercial woodland is high.

2. Cecil-Appling-Madison

Very gently sloping and gently sloping, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; on ridgetops and hillsides on the uplands

The landscape of this map unit is characterized by very gently sloping and gently sloping soils on convex ridgetops and hillsides that are mostly smooth. The slope is 2 to 10 percent.

The soils in this map unit are throughout Oglethorpe County. One of the larger areas, which is 4 to 7 miles wide, is in the eastern part. Excess surface water from the upland soils drains into a system of intermittent and perennial streams. There are few areas of open water. The soils are used mainly for field crops, pasture, or woodland. Roads, utility lines, fences, and farm houses and associated structures are common. The degree of visual diversity is high.

This map unit makes up about 52 percent of Oglethorpe County. Cecil soils make up about 46 percent of the map unit; Appling soils, about 11 percent; Madison soils, about 9 percent; and soils of minor extent, about 34 percent.

Typically, Cecil soils have a surface layer of reddish brown sandy loam 6 inches thick. The subsoil is predominantly red. It extends to a depth of 60 inches or more. The upper part is sandy clay loam. The next part is sandy clay that has a few yellowish red mottles. The lower part is sandy clay loam that has many reddish yellow mottles.

Typically, Appling soils have a surface layer of brown coarse sandy loam 6 inches thick. The subsurface layer extends to a depth of 11 inches. It is light yellowish brown coarse sandy loam. The subsoil is predominantly yellow. It extends to a depth of 50 inches. The upper few inches is reddish yellow sandy clay loam. The next part is reddish yellow sandy clay that has reddish yellow mottles. The next layer is yellowish red clay that has yellow and red mottles. The lower part is yellowish red sandy clay loam that has yellow and red mottles. The substratum is mottled red, reddish yellow, and yellowish red sandy clay loam.

Typically, Madison soils have a surface layer of strong brown sandy loam 6 inches thick. The subsoil is red. It extends to a depth of 25 inches. The upper few inches is sandy clay loam, and the lower part is clay loam. The subsoil is underlain by red, weathered material that extends to a depth of 60 inches or more. This material crushes to sandy clay loam and sandy loam. These soils have a high content of mica.

The soils of minor extent in this map unit are Pacolet soils on ridgetops and hillsides, the strongly sloping and moderately steep Madison soils on hillsides, and the nearly level Toccoa soils on flood plains.

The main management concern is controlling erosion. The soils on ridgetops are well suited to most uses; however, the slope is a limitation affecting the use of the more sloping soils on hillsides for field crops and pasture. It also limits nonfarm uses. The potential of these soils for commercial woodland is moderate.

3. Georgeville-Hiwassee

Very gently sloping and gently sloping, well drained soils that have a predominantly loamy surface layer and a clayey subsoil; on ridgetops and hillsides on the uplands

The landscape of this map unit is characterized by very gently sloping and gently sloping soils on convex ridgetops and hillsides that are mostly smooth. The slope is 2 to 10 percent.

This map unit is 4 to 7 miles wide in the eastern part of the county. Excess surface water from the upland soils drains into a system of intermittent and perennial streams. There are few areas of open water. The soils are used mainly as woodland, but a few areas are used for field crops or pasture. The unit has few roads, utility lines, fences, and farm houses and associated structures. The degree of visual diversity is low.

This map unit makes up about 9 percent of

Oglethorpe County. Georgeville soils make up about 57 percent of the map unit; Hiwassee soils, about 6 percent; and soils of minor extent, about 37 percent.

Typically, Georgeville soils have a surface layer of brown very fine sandy loam 6 inches thick. The subsoil is predominantly red. It extends to a depth of 55 inches. The upper few inches is clay loam. The next part is clay. The lower part is clay loam. The subsoil is underlain to a depth of 60 inches or more by red clay loam saprolite. These soils have a high content of silt.

Typically, Hiwassee soils have a surface layer of dark reddish brown loam 6 inches thick. The subsoil is predominantly dark red. It extends to a depth of 60 inches or more. The upper part is dark red clay. The next part is red clay that has strong brown mottles. The lower part is red clay loam that has strong brown mottles.

The soils of minor extent in this map unit are Enon soils on ridgetops and hillsides, the strongly sloping and moderately steep Georgeville soils on hillsides, and the nearly level Toccoa soils on flood plains.

The main management concern is controlling erosion. The soils on ridgetops are well suited to most uses; however, the slope is a limitation affecting the use of the more sloping soils on hillsides for field crops and pasture. It also limits nonfarm uses. The potential of these soils for commercial woodland is moderate.

4. Enon-Mecklenburg-Georgeville

Very gently sloping and gently sloping, well drained soils that have a predominantly loamy surface layer and a clayey subsoil that is mainly sticky and plastic; on ridgetops and hillsides on the uplands

The landscape of this map unit is characterized by very gently sloping and gently sloping soils on convex ridgetops and hillsides that generally are smooth. The slope is 2 to 10 percent.

This unit is 4 to 7 miles wide in the eastern part of the county. Excess surface water from the upland soils drains into a system of intermittent and perennial streams. There are few areas of open water. The soils are used mainly as woodland, but a few areas are used for field crops or pasture. The unit has few roads, utility lines, fences, and farm houses and associated structures. The degree of visual diversity is low.

This map unit makes up about 11 percent of Oglethorpe County. Enon soils make up about 38 percent of the map unit; Mecklenburg soils, about 23 percent; Georgeville soils, about 7 percent; and soils of minor extent, about 32 percent.

Typically, Enon soils have a surface layer of brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 37 inches. It is mainly yellowish brown clay that is sticky and plastic. The substratum extends to a depth of 50 inches. It is mottled strong brown, light brownish gray, gray, and white clay loam. Below this to a depth of 60 inches or more is soil material that crushes to sandy loam.

Typically, Mecklenburg soils have a surface layer of strong brown fine sandy loam 6 inches thick. The subsoil is predominantly red. It extends to a depth of 39 inches. It is sticky and plastic. The upper few inches is yellowish red silty clay loam. The next part is red clay that has reddish yellow mottles. The lower part is yellowish red and reddish yellow clay that has brownish mottles. The subsoil is underlain to a depth of 60 inches or more by mottled strong brown, yellowish red, and very pale brown material that crushes to silty clay loam.

Typically, Georgeville soils have a surface layer of brown very fine sandy loam 6 inches thick. The subsoil is predominantly red. It extends to a depth of 55 inches. The upper few inches is clay loam. The next part is clay. The lower part is clay loam. The subsoil is underlain to a depth of 60 inches or more by red clay loam saprolite. These soils have a high content of silt.

The soils of minor extent in this map unit are the strongly sloping and steep Mecklenburg soils on hillsides and the nearly level, somewhat poorly drained Cartecay and Toccoa soils on flood plains.

The main management concern is controlling erosion. The soils on ridgetops are well suited to field crops and pasture; however, the effective root zone is somewhat restricted because in most places the subsoil is sticky and plastic. The slope is a limitation affecting the use of the more sloping soils on hillsides for field crops and pasture. The shrink-swell potential and low soil strength generally are limitations affecting many nonfarm uses. The potential of these soils for commercial woodland is moderate.

5. Pacolet-Madison

Strongly sloping to steep, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; on hillsides on the uplands

The landscape of this map unit is characterized by strongly sloping to steep soils on irregularly shaped, complex and convex hillsides. The slope is 10 to 25 percent.

The soils in this map unit are throughout Oglethorpe County but are more prevalent in the southwestern part. Excess surface water drains into a system of intermittent and perennial streams. There are few areas of open water. The soils are used mainly as woodland, but a few areas are used for pasture. The unit has few manmade structures. The degree of visual diversity is moderate.

This map unit makes up about 27 percent of Oglethorpe County. Pacolet soils make up about 31 percent; Madison soils, about 13 percent; and soils of minor extent, about 56 percent.

Typically, Pacolet soils have a surface layer of yellowish red sandy clay loam 3 inches thick. The subsoil is red. It extends to a depth of 36 inches. The upper few inches is sandy clay loam. The next part is sandy clay. The lower part is sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by red, weathered material that crushes to sandy loam and sandy clay loam.

Typically, Madison soils have a surface layer of dark brown sandy clay loam 3 inches thick. The subsoil extends to a depth of 26 inches. The upper few inches is light brown sandy clay loam. The next part is red sandy clay. The lower part is mottled reddish yellow and red sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by reddish yellow, red, yellow, and very pale brown, weathered material that crushes to sandy loam and sandy clay loam. These soils have a high content of mica.

The soils of minor extent in this map unit are Ashlar, Cecil, Louisburg, Madison, and Toccoa soils. Ashlar and Louisburg soils are on the hillsides. The very gently sloping and gently sloping Cecil and Madison soils are mainly on ridgetops. The nearly level, somewhat poorly drained Cartecay soils and the nearly level, well drained Toccoa soils are on flood plains.

The soils in this map unit are poorly suited to most uses, mainly because of the slope. Their potential for commercial woodland, however, is moderate.

Broad Land Use Considerations

A considerable acreage in the survey area is used as cropland, pasture, or woodland. The general soil map can be used for broad planning, but it cannot be used to locate the site for a specific structure. In general, the soils in the survey area that are well suited to cultivated crops also are well suited to urban development. Their suitability as farmland should not be overlooked in planning. The data in this survey about specific soils can be helpful in planning future land use patterns.

Many of the soils in the uplands of Oglethorpe County are used as woodland. Most of the soils are well drained and are moderately suited to commercial woodland.

Part of the acreage in Oglethorpe County is used for field crops or pasture. Most of the soils are well suited or moderately suited to farming. Some of the soils, however, are poorly suited to farming because of excessive slope, a limited effective root zone, ponding, flooding, or poor tilth.

On about one-fourth of the acreage in Oglethorpe County, the soils are well suited to nonfarm uses. The remaining soils that are on the flood plains or hillsides, that have an excessive shrink-swell potential, or that are moderately deep to bedrock are not suited to these uses.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. A soil is well suited to a particular use if it has properties that are favorable; moderately suited if it has properties that require special planning and management to obtain satisfactory performance; and poorly suited if it has properties that are unfavorable. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cecil sandy loam, 2 to 6 percent slopes, is a phase of the Cecil series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Pacolet-Gullied land complex, 10 to 25 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Ashlar, Louisburg and Pacolet soils, 2 to 10 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Quarries is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

AkA—Altavista loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and moderately well drained. It is on stream terraces. It is occasionally flooded from late in winter to early in summer. The mapped areas are 7 to 20 acres in size.

Typically, the surface layer is yellowish brown loam 5 inches thick. The subsurface layer extends to a depth of 9 inches. It is brown loam. The subsoil is sandy clay loam. The upper part, to a depth of 16 inches, is light yellowish brown and has pale brown mottles. The next part, to a depth of 20 inches, is brownish yellow and has very pale brown mottles. The lower part, to a depth of 42 inches, is brownish yellow and has light gray mottles. The subsoil is underlain to a depth of 60 inches or more by mottled strong brown and light gray loamy sand.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer and subsurface layer have been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone usually is deep, but it is restricted from late in fall to early in spring, when the water table is at a depth of 1.5 to 2.5 feet and the soil is occasionally flooded for very brief periods.

Included with this soil in mapping are small areas of the very gently sloping Appling soils. Also included are areas of soils that have a clayey subsoil. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Altavista soil is well suited to field crops and pasture; however, these uses are somewhat restricted because of wetness. A drainage system is needed in most places to help overcome this limitation.

The potential of this soil for commercial woodland is high. Loblolly pine, yellow poplar, and sweetgum are commonly grown on this soil. Seasonal wetness limits the use of conventional equipment. The wetness generally can be overcome by using modified or special equipment or by scheduling such activities as planting and harvesting for the drier periods.

This soil is only moderately suited to most kinds of recreational development because of flooding and wetness. The flooding and the wetness severely limit the use of this soil for urban development. Generally, these limitations can be overcome if adequate drainage outlets are available to remove excess water and if flooding is controlled.

The capability subclass is IIw. The woodland ordination symbol is 9W.

AmB—Appling coarse sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is brown coarse sandy loam 6 inches thick. The subsurface layer extends to a depth of 11 inches. It is light yellowish brown coarse sandy loam. The upper part of the subsoil, to a depth of 18 inches, is reddish yellow sandy clay loam. The next part, to a depth of 40 inches, is reddish yellow and yellowish red sandy clay and clay mottled with yellow and red. The lower part, to a depth of 50 inches, is yellowish red sandy clay loam that has yellow and red mottles. The subsoil is underlain to a depth of 60 inches by mottled red, reddish yellow, and yellowish red sandy clay loam saprolite.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are areas of soils that are similar to the Appling soil but have a reddish yellow subsoil that is not mottled and areas of soils that have a red subsoil that is mottled. Also included are borrow pits and small areas of soils that have a sandy clay loam surface layer. The included soils make up about 25 percent of the map unit, but no one soil makes as much as 10 percent.

The Appling soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 8A.

AmC—Appling coarse sandy loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops and long hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is pale brown coarse sandy loam 6 inches thick. The subsurface layer extends to a depth of 8 inches. It is light yellowish brown coarse sandy loam. The subsoil extends to a depth of 50 inches. The upper part is reddish yellow sandy clay loam. The next part is reddish yellow and yellowish red sandy clay and clay mottled with light yellow and red. The lower part is yellowish red sandy clay loam that has yellow and red mottles. The subsoil is underlain to a depth of about 60 inches by mottled yellowish red, red, and reddish yellow sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Ashlar, Louisburg, and Wedowee soils. Also included are borrow pits and small areas of soils that have a sandy clay loam surface layer. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Appling soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

APC—Ashlar, Louisburg and Pacolet soils, 2 to 10 percent slopes. These soils are moderately deep to very deep, very gently sloping and gently sloping, and well drained to excessively drained. They are on ridgetops in the uplands. If present, the Ashlar and Louisburg soils are on the more sloping part of the ridgetops, and the Pacolet soil is on the less sloping part. The slopes are smooth and convex. The mapped areas are 10 to 125 acres in size.

The soils in this map unit are not geographically associated in a consistent pattern. Each mapped area has one or two of the soils, and most have all three. Although the composition of this map unit varies, mapping has been controlled well enough to be interpreted for the present and predicted uses of the soils.

A typical area consists of about 23 percent Ashlar soil, 22 percent Louisburg soil, 21 percent Pacolet soil, and 34 percent included soils. In the individual mapped areas, the proportion of each soil in this map unit varies.

Typically, the surface layer of the Ashlar soil is yellowish brown coarse sandy loam 3 inches thick. The subsurface layer extends to a depth of 8 inches. It is light yellowish brown coarse sandy loam. The subsoil extends to a depth of 17 inches. It is strong brown coarse sandy loam. It is underlain by weathered, reddish yellow material, which extends to a depth of 23 inches. This material crushes to coarse sandy loam. It is underlain by hard granite bedrock.

The Ashlar soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderately rapid. The available water capacity is low. Tilth is good. The effective root zone is limited because hard bedrock is at a depth of 20 to 40 inches.

Typically, the surface layer of the Louisburg soil is brown and light yellowish brown coarse sandy loam 10 inches thick. The subsoil extends to a depth of 35 inches. The upper part is pale brown and strong brown sandy loam, and the lower part is yellowish red sandy clay loam. The subsoil is underlain, to a depth of about 45 inches, by yellowish red sandy clay loam that has strong brown and very pale brown mottles. This layer is underlain by hard granite bedrock.

The Louisburg soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is rapid. The available water capacity is low. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Typically, the surface layer of the Pacolet soil is brown sandy loam 4 inches thick. The subsurface layer extends to a depth of 8 inches. It is yellowish red sandy loam. The subsoil extends to a depth of 38 inches. The upper part is red sandy clay loam, the next part is red sandy clay, and the lower part is red sandy clay loam that has streaks of reddish yellow underlying material. The subsoil is underlain to a depth of 60 inches or more by weathered granite that crushes to sandy clay loam.

The Pacolet soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with these soils in mapping are areas of soils that are similar to the Ashlar, Louisburg, and Pacolet soils but have a thinner surface layer, subsurface layer, and subsoil. These included soils make up about 30 percent of the map unit. Also included are small areas of Wedowee soils and rock outcrops, which make up about 4 percent of the map unit.

The soils in this map unit are moderately suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soils. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Generally, the more sloping soils on the ridgetops have a low available water capacity and are less productive than the less sloping soils.

The potential of these soils for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on these soils. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

The soils in this map unit are well suited to recreational development. In most places the soils on the more sloping part of the ridgetops are poorly suited to urban uses because of the underlying hard bedrock. Generally, the soils on the less sloping part of the ridgetops are well suited to urban uses; however, the moderate permeability limits the use of these soils as sites for septic tank absorption fields. In most places the limitations can be overcome by special design and proper installation procedures.

The Ashlar and Pacolet soils are in capability subclass IIIe, and the Louisburg soil is in capability subclass IVe. The woodland ordination symbol assigned to the Ashlar soil is 8S, that assigned to the Louisburg soil is 7A, and that assigned to the Pacolet soil is 8A.

APE—Ashlar, Louisburg and Pacolet soils, 15 to 35 percent slopes. These soils are moderately deep to very deep, moderately steep and steep, and well drained to excessively drained. They are on hillsides in the uplands. In some areas, the Ashlar and Louisburg soils are on the more sloping part of the hillsides and the Pacolet soil is on the less sloping part. The slopes are smooth and convex. The mapped areas are 10 to 150 acres in size.

The soils in this map unit are not geographically associated in a consistent pattern. Each mapped area has one or two of the soils, and some have all three. Although the composition of this map unit varies, mapping has been controlled well enough to be interpreted for the present and predicted uses of the soils.

A typical area consists of about 21 percent Ashlar soil, 20 percent Louisburg soil, 17 percent Pacolet soil, and 42 percent included soils. In the individual mapped areas, the proportion of each soil in this map unit varies.

Typically, the Ashlar soil has a surface layer of yellowish brown coarse sandy loam 3 inches thick. The subsurface layer extends to a depth of 8 inches. It is light yellowish brown coarse sandy loam. The subsoil extends to a depth of 17 inches. It is strong brown coarse sandy loam. The subsoil is underlain, to a depth of 23 inches, by reddish yellow material that crushes to coarse sandy loam. This layer is underlain by hard granite bedrock.

The Ashlar soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid. Permeability is moderately rapid. The available water capacity is low. Tilth is good. The effective root zone is limited because hard bedrock is at a depth of 20 to 40 inches.

Typically, the Louisburg soil has a surface layer of dark grayish brown sandy loam 5 inches thick. The subsurface layer extends to a depth of 9 inches. It is yellowish brown sandy loam. The upper part of the subsoil, to a depth of 17 inches, is yellowish brown sandy loam. The lower part, to a depth of 29 inches, is yellowish red sandy clay loam. The subsoil is underlain, to a depth of 45 inches, by mottled reddish yellow and light brownish gray sandy clay loam. This layer is underlain to a depth of 60 inches or more by reddish yellow and gray sandy loam.

The Louisburg soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid. Permeability is rapid. The available water capacity is low. The root zone is deep and can be easily penetrated by plant roots.

Typically, the Pacolet soil has a surface layer of brown sandy loam 2 inches thick. The subsurface layer extends to a depth of 6 inches. It is light brown sandy loam. The upper part of the subsoil, to a depth of 10 inches, is red sandy clay loam. The next part, to a depth of 28 inches, is red sandy clay. The lower part, to a depth of 32 inches, is red clay loam. The subsoil is underlain to a depth of 60 inches or more by highly weathered granite that crushes to clay loam and sandy clay loam.

The Pacolet soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or medium acid. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with these soils in mapping are areas of a soil that is similar to the Ashlar, Louisburg, and Pacolet soils but has a thinner surface layer, subsurface layer, and subsoil. This soil makes up about 26 percent of the map unit. Also included are small areas of Wedowee soils, rock outcrops, and a loamy, micaceous soil, which make up about 15 percent of the map unit. No one included soil makes up as much as 10 percent.

The soils in this map unit are not suited to field crops because of the slope. In the less sloping areas, these soils are moderately suited to pasture.

The potential of these soils for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on these soils. Because these soils are moderately steep and steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Also, scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems can help to overcome the equipment limitation. In addition, the need for use of heavy equipment on these soils can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

The soils in this map unit are poorly suited to urban and recreational development because of the slope. In some places the suitability of these soils for urban uses is further limited because of the underlying hard bedrock.

The capability subclass is VIIe. The woodland ordination symbol assigned to the Ashlar and Pacolet soils is 8R, and that assigned to the Louisburg soil is 7R.

Ca—Cartecay loam, occasionally flooded. This soil is very deep, nearly level, and somewhat poorly drained. It is commonly in the lower areas on flood plains. It is occasionally flooded from early winter to midspring. The mapped areas are 5 to 100 acres in size. The slope is 0 to 2 percent.

Typically, the surface layer is loam 8 inches thick. The upper part is brown. The lower part is reddish brown and has light yellowish brown mottles. The underlying material extends to a depth of 60 inches or more. In sequence downward, it is stratified reddish yellow and pink loamy sand; brown silt loam; strong brown loamy sand and sandy loam; strong brown and light brownish gray fine sandy loam and loamy sand; and light brownish gray loamy sand. The underlying material has grayish mottles.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid to slightly acid throughout the profile unless the surface layer has been limed. Permeability is moderately rapid. The available water capacity is moderate. Tilth is good. The root zone usually is deep, but it is restricted from early in winter to midspring, when the water table is at a depth of 0.5 foot to 1.5 feet and the soil is occasionally flooded for brief periods.

Included with this soil in mapping are small areas of Chewacla, Riverview, and Toccoa soils. Also included are areas of soils that are similar to the Cartecay soil but have a higher content of silt and clay. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Cartecay soil is highly productive. Because of the hazard of flooding, however, it is only moderately suited to field crops. Flooding is likely to occur during the planting season. A drainage system is needed to reduce the damage caused by flooding. The soil is well suited to pasture. Grasses and legumes should be used in the cropping system to help maintain fertility and the content of organic matter in the soil.

The potential of this soil for commercial woodland is high. Loblolly pine, sweetgum, American sycamore, and yellow poplar are commonly grown on this soil. Seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The wetness generally can be overcome by using modified or special equipment or by scheduling planting and harvesting operations for the drier periods. Bedding, controlling competing plants, and planting adapted trees generally can increase the rate of seedling survival.

This soil is poorly suited to recreational development. Wetness is the main limitation. Wetness and flooding severely limit the use of this soil for urban development. These limitations can only be overcome if major flood-control structures and extensive drainage systems are established and maintained.

The capability subclass is IIIw. The woodland ordination symbol is 9W.

CeB—Cecil sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 125 acres in size.

Typically, the surface layer is reddish brown sandy loam 6 inches thick. The upper part of the subsoil, to a depth of 9 inches, is red sandy clay loam. The next part, to a depth of 34 inches, is red sandy clay that has a few yellowish red mottles. The lower part to a depth of 60 inches or more is red sandy clay loam that has many reddish yellow mottles.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Madison soils. Also included are areas of a soil that is similar to the Cecil soil but has an eroded sandy clay loam surface layer. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Cecil soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 8A.

CeC—Cecil sandy loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on narrow to broad ridgetops and short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is reddish brown sandy loam 6 inches thick. The subsoil is red. It extends to a depth of 45 inches. The upper part is sandy clay. The next part is clay. The lower part is clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered granite that has pockets of red sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil sandy clay loam that is eroded and small areas of Appling and Madison soils. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Cecil soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

CfC2—Cecil sandy clay loam, 6 to 10 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on narrow ridgetops and moderately long hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, or galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 125 acres in size.

Typically, the surface layer is reddish brown sandy clay loam 3 inches thick. The subsoil is predominantly red. It extends to a depth of 57 inches. The upper part is sandy clay that has a few yellowish red mottles. The lower part is sandy clay loam that has many reddish yellow mottles. The subsoil is underlain to a depth of 60 inches or more by yellowish red and reddish yellow clay loam and sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded sandy clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Pacolet soils. Also included are small areas of soils that are similar to the Cecil soil but are severely eroded and have many gullies. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Cecil soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and applying erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods can help to keep further erosion within acceptable limits. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally increase the seedling survival rate. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe. The woodland ordination symbol is 7C.

Ch—Chewacla silt loam, occasionally flooded. This soil is very deep, nearly level, and somewhat poorly drained. It is commonly in low areas on flood plains. It is occasionally flooded from late in fall to midspring. The mapped areas are 5 to 100 acres in size. The slope is 0 to 2 percent.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil is sandy clay loam. The upper part, to a depth of 25 inches, is reddish brown and has light brownish gray mottles. The next part, to a depth of 30 inches, is grayish brown and has reddish brown mottles. The next layer, to a depth of 50 inches, is brown and has gray mottles. The lower part to a depth of 60 inches or more is mottled brown, gray, and very dark gray.

This soil is low in natural fertility and in content of organic matter. Reaction is slightly acid to very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity is high. Tilth is good. The root zone usually is deep, but it is restricted from late in fall to midspring, when the water table is at a depth of 0.5 foot to 1.5 feet and the soil is occasionally flooded for brief periods.

Included with this soil in mapping are small areas of sandy soils that are somewhat poorly drained but are nearer the streams than the Chewacla soil. Also included are soils that are poorly drained, have a clayey subsoil, and are near the outer edge of the flood plains. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Chewacla soil is used mainly as woodland. In a few areas it is used for field crops or pasture.

This soil is highly productive; however, it is only moderately suited to field crops because flooding is likely to occur during the planting season. A drainage system can reduce the crop damage caused by flooding. The soil is well suited to pasture. Including grasses and legumes in the cropping system can help to maintain fertility and the content of organic matter in the soil.

The potential of this soil for commercial woodland is high. Loblolly pine, yellow poplar, American sycamore, and sweetgum are commonly grown on this soil. Seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The wetness generally can be overcome by using modified or special equipment or by scheduling planting and harvesting operations for the drier periods. Bedding, controlling plant competition, and planting adapted trees generally can increase the rate of seedling survival.

This soil is poorly suited to recreational development because of wetness and flooding. The wetness and the flooding severely limit the use of this soil for urban development. These limitations can be overcome only if major flood-control structures and extensive drainage systems are established and maintained.

The capability subclass is IIIw. The woodland ordination symbol is 9W.

EnB—Enon fine sandy loam, 2 to 6 percent slopes. This soil is very gently sloping and well drained. It is shallow to a sticky and plastic subsoil. It is on low ridgetops and hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is brown fine sandy loam 5 inches thick. The upper part of the subsoil, to a depth of 9 inches, is yellowish brown sandy clay loam. The next part, to a depth of 20 inches, is yellowish brown clay that has pale brown mottles. The lower part, to a depth of 37 inches, is yellowish brown and light brownish gray clay that is sticky and plastic. The subsoil is underlain to a depth of 60 inches or more by mottled strong brown, yellowish brown, light brownish gray, gray, and white clay loam and saprolite that crushes to sandy loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid to slightly acid in the upper part of the profile unless the surface layer has been limed. Permeability is slow. The available water capacity is moderate. Tilth is good. The effective root zone is somewhat restricted because the subsoil is mainly sticky and plastic.

Included with this soil in mapping are areas of Mecklenburg and Zion soils. Also included are soils that are similar to the Enon soil but are moderately well drained. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Enon soil is well suited to field crops and pasture; however, the effective root zone is somewhat limited. Returning crop residue to the soil maintains tilth and reduces the runoff rate. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine and eastern redcedar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is poorly suited to most urban uses because of a high shrink-swell potential. The low strength and the high shrink-swell potential are limitations on sites for local roads and streets. The slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. Because of the slowly permeable subsoil, this soil is only moderately suited to most kinds of recreational development.

The capability subclass is IIe. The woodland ordination symbol is 7A.

EnC—Enon fine sandy loam, 6 to 10 percent slopes. This soil is gently sloping and well drained. It is shallow to a sticky and plastic subsoil. It is on short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 25 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 3 inches thick. The subsurface layer extends to a depth of 8 inches. It is brown fine sandy loam. The subsoil extends to a depth of 32 inches. It is mainly sticky and plastic. The upper part is mainly light yellowish brown clay loam. The next part is brownish yellow clay that has common strong brown mottles. The lower part is light yellowish brown clay and clay loam mottled with grayish green. The subsoil is underlain by light yellowish brown and grayish green weathered material that crushes to clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid to slightly acid in the upper part of the profile unless the surface layer has been limed. Permeability is slow. The available water capacity is moderate. It is reduced by rapid runoff and the slow permeability. Tilth is good. The effective root zone is somewhat restricted because the subsoil is mainly firm, sticky, and plastic.

Included with this soil in mapping are areas of Mecklenburg and Zion soils. Also included are soils that have bedrock at a depth of 40 inches and soils that are similar to the Enon soil but are moderately well drained. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Enon soil is only moderately suited to field crops because the effective root zone is limited. The slope further limits the suitability for field crops. The soil is well suited to pasture. Returning crop residue to the soil maintains tilth and reduces the runoff rate. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine and eastern redcedar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is poorly suited to most urban uses because of the slope and a high shrink-swell potential. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets. The slow permeability of the subsoil limits the use of this soil as a site for septic tank absorption fields. Because of the slope and the slowly permeable subsoil, the soil is only moderately suited to most kinds of recreational development.

The capability subclass is IIIe. The woodland ordination symbol is 7A.

Fp—Fluvaquents, ponded. These very deep and nearly level soils are on flood plains along the larger streams. They generally are in concave pockets and in coves. In places they are in a series of beaver ponds near the streams. Water ponds on the surface. It is I to 2 feet deep throughout most of the year. The slope is less than 1 percent. The mapped areas are 10 to 150 acres in size.

These soils have a brownish, loamy surface layer 7 to 12 inches thick. The underlying material is stratified. It extends to a depth of 60 inches or more. It is loamy and sandy and is mainly yellowish or brownish. Grayish mottles are throughout the underlying material.

These soils are low in natural fertility and in content of organic matter. They are strongly acid to slightly acid to a depth of 40 inches. Permeability is moderate. The available water capacity also is moderate. The root zone is limited because the soils are ponded most of the year.

Included with these soils in mapping are soils that are similar to the Fluvaquents but have a higher content of silt and clay. The included soils make up about 15 percent of the map unit.

The potential of the Fluvaquents for commercial woodland is high. Blackgum is the most common tree grown on these soils. Ponding limits the use of equipment and the survival of trees other than the common water-tolerant species.

These soils are either poorly suited to or not suited to most uses because of ponding. If drainage outlets are available, this limitation can be overcome.

The capability subclass is VIIw. The woodland ordination symbol is 9W.

GeB—Georgeville very fine sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on broad ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 10 to 100 acres in size.

Typically, the surface layer is brown very fine sandy loam 6 inches thick. The upper part of the subsoil, to a depth of 13 inches, is yellowish red clay loam. The next part, to a depth of 38 inches, is red clay. The lower part, to a depth of 55 inches, is red clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, red clay loam saprolite.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of soils that are similar to the Georgeville soil but have an eroded surface layer of clay loam, have underlying material at a depth of less than 40 inches, or have a surface layer of silt loam. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Georgeville soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine and yellow poplar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 8A.

GoC2—Georgeville clay loam, 6 to 10 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 75 acres in size.

Typically, the surface layer is reddish brown clay loam 2 inches thick. The subsoil is red. It extends to a depth of 55 inches. The upper part is clay. The lower part is silty clay loam that has yellowish red mottles. The subsoil is underlain by weathered slate that crushes to silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor in most places because of the eroded clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of a soil that is similar to the Georgeville soil but has a very fine sandy loam surface layer. The included soils make up about 15 percent of the map unit.

The Georgeville soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and applying erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods can help to keep further erosion within acceptable limits. Also, scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe. The woodland ordination symbol is 6C.

GtD2—Georgeville silty clay loam, 10 to 25 percent slopes, eroded. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and complex. The mapped areas are 10 to 60 acres in size.

Typically, the surface layer is reddish brown silty clay loam 3 inches thick. The subsoil extends to a depth of 36 inches. It is red silty clay. It has strong brown mottles in the lower part. The subsoil is underlain by weathered slate that crushes to silty clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded silty clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of a soil that is similar to the Georgeville soil but has a very fine sandy loam surface layer and small areas of soils that have a thinner surface layer, subsurface layer, and subsoil. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Georgeville soil is not suited to field crops. The slope is the main limitation. The soil is moderately suited to pasture. Continued erosion is a severe hazard if the surface is not protected. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is strongly sloping and moderately steep and is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, properly locating logging roads and skid trails, seeding heavily used areas after harvesting, and using special care in site preparation can effectively reduce the hazard of erosion. The need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 6C.

HaB—Helena sandy loam, 2 to 6 percent slopes. This soil is very gently sloping and moderately well drained. It is shallow to a sticky and plastic subsoil. It is on low ridgetops and the lower parts of hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 75 acres in size.

Typically, the surface layer is yellowish brown sandy loam 7 inches thick. The upper part of the subsoil, to a depth of 13 inches, is yellowish brown sandy clay loam. The next part, to a depth of 37 inches, is brownish yellow and strong brown sandy clay that is sticky and plastic and has light gray mottles. The lower part, to a depth of 45 inches, is mottled brownish yellow and light gray sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, mottled light brownish gray and strong brown sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is slow. The available water capacity is moderate. Tilth is good. The effective root zone is limited because of a perched water table at a depth of 1.5 to 2.5 feet in winter and early in spring. Root penetration is further limited because the subsoil is mainly firm, sticky, and plastic.

Included with this soil in mapping are small areas of Appling, Enon, and Wedowee soils. Also included are soils that are similar to the Helena soil but do not have a subsoil that is clayey, sticky, and plastic and areas of soils that have a higher content of silt than the Helena soil. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Helena soil is well suited to field crops and pasture; however, these uses are somewhat restricted because of wetness. A drainage system is needed in places. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and white oak are commonly grown on this soil. Seasonal wetness limits the use of conventional equipment. The equipment limitation generally can be overcome by using modified or special implements or by scheduling planting and harvesting operations for the drier periods.

This soil is poorly suited to most urban uses because of a high shrink-swell potential. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets. The slow permeability of the subsoil limits the use of this soil as a site for septic tank absorption fields. Because of seasonal wetness, the soil is only moderately suited to recreational development.

The capability subclass is IIe. The woodland ordination symbol is 8W.

HeB—Hiwassee loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on broad ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 125 acres in size.

Typically, the surface layer is dark reddish brown loam 6 inches thick. The upper part of the subsoil, to a depth of 42 inches, is dark red clay. The next part, to a depth of 46 inches, is red clay that has strong brown mottles. The lower part, to a depth of 60 inches or more, is red clay loam that has strong brown mottles.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid to medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good in most places. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are soils that are similar to the Hiwassee soil but have a thicker or thinner subsoil, an eroded surface layer of clay loam, or a dominantly red subsoil. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Hiwassee soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, American sycamore, and yellow poplar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 7A.

HeC—Hiwassee loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on narrow to broad ridgetops and short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 20 acres in size.

Typically, the surface layer is dark reddish brown loam 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark red clay. The next part is red clay. The lower part is red clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good in most places. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are soils that are similar to the Hiwassee soil but have a thicker or thinner subsoil, an eroded surface layer of clay loam, or a dominantly red subsoil. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Hiwassee soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, American sycamore, and yellow poplar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 7A.

HwC2—Hiwassee clay loam, 6 to 10 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 85 acres in size.

Typically, the surface layer is dark red clay loam 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark red clay. The lower part is red clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is very strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of a soil that is similar to the Hiwassee soil but has a thinner subsoil, a dominantly red subsoil, or a severely eroded surface layer of clay loam. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Hiwassee soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and applying erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods helps to keep further erosion within acceptable limits. Also, scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe. The woodland ordination symbol is 6C.

HwD2—Hiwassee clay loam, 10 to 25 percent slopes, eroded. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are complex and convex. The mapped areas are 5 to 30 acres in size.

Typically, the surface layer is dark red clay loam 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark red clay. The next part is red clay. The lower part is red clay loam.

This soil is medium in natural fertility and low in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are areas of soils that have a severely eroded surface layer of clay and a few areas of soils that are similar to the Hiwassee soil but have a thinner subsoil or a dominantly red subsoil. The included soils make up 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Hiwassee soil is not suited to field crops because of the slope and the poor tilth. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is strongly sloping and moderately steep and is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, properly locating logging roads and skid trails, seeding heavily used areas after harvesting, and using special care in site preparation can effectively reduce the hazard of erosion. The need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 6C.

MaB—Madison sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 125 acres in size.

Typically, the surface layer is strong brown sandy loam 6 inches thick. The upper part of the subsoil, to a depth of 8 inches, is red sandy clay loam. The lower part, to a depth of 25 inches, is red clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, red sandy loam and sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Cecil and Georgeville soils. Also included are areas of soils that are similar to the Madison soil but have an eroded surface layer of sandy clay loam. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Madison soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 7A.

MaC—Madison sandy loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on narrow to broad ridgetops and short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is strong brown sandy loam 6 inches thick. The subsoil is red. It extends to a depth of 34 inches. The upper part is clay. The lower part is clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, mottled red and reddish yellow clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are eroded areas of Madison sandy clay loam and small areas of Cecil and Georgeville soils. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Madison soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 7A.

MaD—Madison sandy loam, 10 to 25 percent slopes. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on short hillsides in the uplands. The slopes are complex and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is yellowish brown sandy loam 3 inches thick. The subsurface layer extends to a depth of 6 inches. It is brown sandy loam. The subsoil extends to a depth of 26 inches. It is dominantly red clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, light red and yellowish red sandy loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed.

Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are eroded areas of Madison sandy clay loam and small areas of Georgeville and Pacolet soils. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Madison soil is not suited to field crops. It is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system reduces the runoff rate and helps to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. Because the soil is strongly sloping and moderately steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. The need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 7R.

MdC2—Madison sandy clay loam, 6 to 10 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on narrow ridgetops and short hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 3 inches thick. The subsoil is red. It extends to a depth of 21 inches. The upper part is clay. The lower part is sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, red sandy clay loam and sandy loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded sandy clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Cecil and Georgeville soils. Also included are soils that are similar to the Madison soil but have a surface layer and subsoil that, combined, are less than 20 inches thick. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Madison soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and applying erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods can help to keep further erosion within acceptable limits. Also, scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe. The woodland ordination symbol is 7C.

MdD2—Madison sandy clay loam, 10 to 25 percent slopes, eroded. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on short hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and complex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is dark brown sandy clay loam 3 inches thick. The subsoil extends to a depth of about 26 inches. The upper part is light brown sandy clay loam. The next part is red sandy clay. The lower part is mottled reddish yellow and red sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered, reddish yellow, red, yellow, and very pale brown sandy loam and sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded sandy clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Georgeville, Pacolet, and Wedowee soils. Also included are soils that are similar to the Madison soil but have a surface layer and subsoil that, combined, are less than 20 inches thick. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Madison soil is not suited to field crops because of the slope and the poor tilth. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is strongly sloping and moderately steep and is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, properly locating logging roads and skid trails, seeding heavily used areas after harvesting, and using special care in site preparation can effectively reduce the hazard of further erosion. The need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 7C.

MeB—Mecklenburg fine sandy loam, 2 to 6 percent slopes. This soil is very gently sloping and well drained. It is shallow to a sticky and plastic subsoil. It is on broad ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is strong brown fine sandy loam 6 inches thick. The upper part of the subsoil, to a depth of 11 inches, is yellowish red silty clay loam. The next part, to a depth of 32 inches, is red clay that has reddish yellow mottles and is sticky and plastic. The next layer, to a depth of 36 inches, is yellowish red clay that has reddish yellow mottles. The lower part, to a depth of 39 inches, is reddish yellow clay loam that has very pale brown mottles. The subsoil is underlain to a depth of 60 inches or more by mottled strong brown, yellowish red, and very pale brown saprolite that crushes to silty clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is medium acid to neutral. Permeability is slow. The available water capacity is moderate. Tilth is good. The effective root zone is somewhat restricted because the subsoil is mainly sticky and plastic.

Included with this soil in mapping are small areas of Enon and Zion soils. Also included are small areas of soils that are similar to the Mecklenburg soil but are strong brown in the lower part of the subsoil. The included soils make up about 35 percent of the map unit, but no one soil makes up as much as 10 percent.

The Mecklenburg soil is well suited to field crops and pasture; however, the effective root zone is somewhat limited. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine and yellow poplar are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most urban uses. The shrink-potential is the main limitation. Also, low strength is a limitation on sites for roads and streets, and the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is well suited to most kinds of recreational development.

The capability subclass is IIe. The woodland ordination symbol is 7A.

MeC—Mecklenburg fine sandy loam, 6 to 10 percent slopes. This soil is gently sloping and well drained. It is shallow to a sticky and plastic subsoil. It is on short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 31 inches. It is mainly sticky and plastic. The upper part is yellowish red clay. The next part is yellowish red clay that has strong brown mottles. The lower part is mottled reddish yellow, yellowish red, and olive gray clay loam. The subsoil is underlain to a depth of 60 inches by hard and soft rock that crushes to loam.

This soil is low in natural fertility and in content of organic matter. Reaction is medium acid to neutral. Permeability is slow. The available water capacity is moderate. It is reduced by rapid runoff and the slow permeability. Tilth is good. The effective root zone is somewhat restricted because the subsoil is mainly sticky and plastic.

Included with this soil in mapping are small areas of Enon and Zion soils. Also included are areas of soils that are similar to the Mecklenburg soil but have an eroded surface layer, have gray mottles in the lower part of the subsoil, or are strong brown in the lower part of the subsoil. The included soils make up about 35 percent of the map unit, but no one soil makes up as much as 10 percent.

The Mecklenburg soil is only moderately suited to field crops and pasture because the effective root zone is somewhat limited. The slope further limits the suitability for field crops. Returning crop residue to the soil maintains tilth and reduces the runoff rate. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most urban uses. The shrink-potential and the slope are the main limitations. Also, low strength is a limitation on sites for roads and streets, and the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is only moderately suited to most kinds of recreational development because of the slope.

The capability subclass is IIIe. The woodland ordination symbol is 7A.

MeD—Mecklenburg fine sandy loam, 10 to 25 percent slopes. This soil is strongly sloping and moderately steep and is well drained. It is shallow to a sticky and plastic subsoil. It is on short hillsides in the uplands. The slopes are complex and convex in most places. The mapped areas are 5 to 25 acres in size.

Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsoil extends to a depth of 38 inches. It is mainly sticky and plastic. The upper part is yellowish red clay loam. The next part is dominantly yellowish red clay that becomes dominantly strong brown as depth increases. The lower part is mottled strong brown and light yellowish brown clay loam. The subsoil is underlain to a depth of 60 inches by weathered, yellowish brown and light yellowish brown saprolite that crushes to loam.

This soil is low in natural fertility and in content of organic matter. Reaction is medium acid to neutral. Permeability is slow. The available water capacity is moderate. It is reduced by rapid runoff and the slow permeability. Tilth is good. The effective root zone is somewhat restricted because the subsoil is mainly sticky and plastic.

Included with this soil in mapping are small areas of Zion soils. Also included are soils that are similar to the Mecklenburg soil but have an eroded surface layer or are strong brown in the lower part of the subsoil. The included soils make up 30 percent of the map unit, but no one soil makes up as much as 10 percent.

The Mecklenburg soil is not suited to field crops. The slope is the main limitation. The soil is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine and shortleaf pine are commonly grown on this soil. Because the soil is strongly sloping and moderately steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, low strength is a limitation on sites for roads and streets, and the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe. The woodland ordination symbol is 7R.

PaB—Pacolet sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on ridgetops in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is light reddish yellow sandy loam 6 inches thick. The subsoil extends to a depth of 30 inches. The upper part is yellowish red sandy clay loam. The next part is red sandy clay. The lower part is red sandy clay loam that has reddish yellow streaks of weathered underlying material. The subsoil is underlain to a depth of 60 inches by highly weathered, red sandy loam and sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Appling, Cecil, Louisburg, and Madison soils. Also included are areas of a soil that is similar to the Pacolet soil but has a surface layer more coarse than sandy loam and is shallow to hard bedrock. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Pacolet soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to most kinds of urban and recreational development; however, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIe. The woodland ordination symbol is 8A.

PaC—Pacolet sandy loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on narrow to broad ridgetops and short hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 75 acres in size.

Typically, the surface layer is brown sandy loam 4 inches thick. The subsurface layer extends to a depth of 8 inches. It is yellowish red sandy loam. The subsoil extends to a depth of 38 inches. The upper part is red sandy clay loam. The next part is red sandy clay. The lower part is red sandy clay loam that has streaks of reddish yellow underlying material. The subsoil is underlain to a depth of 60 inches or more by granite that crushes to sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Appling, Cecil, Louisburg, and Madison soils. Also included are areas of a soil that is similar to the Pacolet soil but has an eroded surface layer or a thinner subsoil. The included soils make up about 30 percent of the map unit, but no one soil makes up as much as 10 percent.

The Pacolet soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern pine are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

PaD—Pacolet sandy loam, 10 to 25 percent slopes. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on short hillsides in the uplands. The slopes are complex and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is brown sandy loam 2 inches thick. The subsurface layer extends to a depth of 6 inches. It is light brown sandy loam. The upper part of the subsoil, to a depth of 10 inches, is red sandy clay loam. The next part, to a depth of 28 inches, is red sandy clay. The lower part, to a depth of 32 inches, is red clay loam. The subsoil is underlain to a depth of 60 inches or more by reddish yellow, highly weathered granite that crushes to sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Ashlar, Louisburg, Madison, and Wedowee soils. Also included are areas of a soil that is similar to the Pacolet soil but has an eroded surface layer or a thinner subsoil or is steep. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Pacolet soil is not suited to field crops. The slope is the main limitation. The soil is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. Because the soil is strongly sloping and moderately steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 8R.

PfC2—Pacolet sandy clay loam, 6 to 10 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on narrow to broad ridgetops and short hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 125 acres in size.

Typically, the surface layer is reddish yellow sandy clay loam 3 inches thick. The subsoil is red. It extends to a depth of 33 inches. The upper part is sandy clay loam. The next part is sandy clay. The lower part is sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by weathered granite that crushes to sandy clay loam and sandy loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded sandy clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Madison and Cecil soils. Also included are areas of soils that are similar to the Pacolet soil but have a severely eroded surface layer or a thinner subsoil. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Pacolet soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine is commonly grown on this soil. Because the soil is highly susceptible to erosion, the main management concern is minimizing further erosion. An equipment limitation and seedling mortality are additional management concerns. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and applying erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods can help to keep further erosion within acceptable limits. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe. The woodland ordination symbol is 6C.

PfD2—Pacolet sandy clay loam, 10 to 25 percent slopes, eroded. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on short hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and a few gullies are common. The slopes are irregular in shape and convex. The mapped areas are 5 to 100 acres in size.

Typically, the surface layer is yellowish red sandy clay loam 3 inches thick. The subsoil is red. It extends to a depth of 36 inches. The upper few inches is sandy clay loam. The next part is sandy clay. The lower part is sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by red, weathered material that crushes to sandy loam and sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is poor because of the eroded sandy clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Madison soils. Also included are soils that are similar to the Pacolet soil but have a severely eroded surface layer or a thinner subsoil. The included soils make up about 35 percent of the map unit, but no one soil makes up as much as 10 percent.

The Pacolet soil is not suited to field crops because of the slope and the poor tilth. It is moderately suited to pasture. Continued erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine, shortleaf pine, and yellow poplar are commonly grown on this soil. Because the soil is strongly sloping and moderately steep and is highly susceptible to erosion, the main management concerns are further erosion, an equipment limitation, and seedling mortality. Applying woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, properly locating logging roads and skid trails, seeding heavily used areas after harvesting, and using special care in site preparation can effectively reduce the hazard of further erosion. The need for the use of heavy machinery on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 6C.

PgD—Pacolet-Gullied land complex, 10 to 25 percent slopes. This map unit is in strongly sloping and moderately steep areas, mainly on hillsides in the uplands. The landscape is an intricate pattern of a severely eroded, well drained Pacolet soil and shallow to very deep gullies. Individual areas of the Pacolet soil and the gullies are too intricately mixed or too small to be mapped separately at the scale used for the maps at the back of this publication. The slopes are irregular in shape and complex. The mapped areas are 5 to 15 acres in size.

Pacolet sandy clay makes up about 65 percent of this map unit and Gullied land about 20 percent. The included soils make up about 15 percent, but no one soil makes up as much as 10 percent.

Typically, the surface layer of the Pacolet soil is red sandy clay about 20 inches thick. The underlying material to a depth of 60 inches or more is weathered granite that crushes to clay loam and sandy clay loam.

The Pacolet soil is very low in natural fertility and in content of organic matter. Reaction is very strongly acid to medium acid. Permeability is moderate. Runoff is rapid. Tilth is poor.

Typically, the Gullied land is highly weathered granite that crushes mainly to sandy clay loam or sandy loam.

The Gullied land is very low in natural fertility and in content of organic matter. Reaction is very strongly acid.

Included in this unit in mapping are areas of Cecil, Georgeville, and Madison soils.

This map unit is not suited to field crops because of the irregular, complex slopes and the poor tilth. If the gullies are filled and the area smoothed, pastures can be established. If proper management is applied, further erosion can be controlled and the runoff rate reduced.

The potential of this map unit for commercial woodland is moderate. Loblolly pine, shortleaf pine, and yellow poplar are commonly grown on this unit. Because the unit is strongly sloping and moderately steep and is highly susceptible to erosion, the main management concerns are the hazard of further erosion, an equipment limitation, and seedling mortality. After the gullies are filled and the area smoothed, woodland management practices and harvesting on the contour, leaving slash scattered rather than piled, properly locating logging roads and skid trails, seeding heavily used areas after harvesting, and using special care in site preparation can effectively reduce the hazard of further erosion. The need for the use of heavy machinery can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope further reduces the equipment limitation. Scheduling woodland management practices and harvesting operations for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote quick revegetation in compacted areas and increase the rate of seedling survival.

This map unit is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the Pacolet soil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIIe. The woodland ordination symbol is 6C.

Qu—Quarries. This map unit consists of large granite quarries. These areas, which total about 375 acres, are in the north-central part of the county, near Point Peter and Veribest. The mapped areas are 5 to 45 acres in size.

These quarries are about 25 to 200 feet deep. Granite bedrock, saprolite, and clay are exposed in the quarries. Poor-quality granite for monuments and soil overburden are stockpiled in most of these areas.

No capability subclass or woodland ordination symbol has been assigned.

Rv—Riverview silt loam, occasionally flooded. This soil is very deep, nearly level, and well drained. It is commonly in the higher areas on the moderately broad flood plains near perennial streams. It is occasionally flooded from late in fall to early in spring. The mapped areas are 50 to 150 acres in size. The slope is 0 to 2 percent.

Typically, the surface layer is brown silt loam 5 inches thick. The subsoil extends to a depth of 35 inches. It is reddish brown loam. The upper part of the substratum, to a depth of 55 inches, is brown loam that has light gray mottles. The lower part to a depth of 60 inches or more is brown fine sandy loam that has light gray mottles.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good in most places. The root zone usually is deep, but it is restricted from late in fall to early in spring, when the water table is at a depth of 3 to 5 feet and the soil is occasionally flooded for brief periods.

Included with this soil in mapping are small areas of sandy soils that are well drained but are nearer the streams than the Riverview soil and small areas of a soil that is similar to the Riverview soil but has a buried horizon within 20 inches of the surface. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Riverview soil is highly productive. It is well suited to field crops and pasture. In some areas, however, flooding is likely to occur in the early part of the year.

The potential of this soil for commercial woodland is high. Loblolly pine, yellow poplar, American sycamore, and sweetgum are commonly grown on this soil. Seasonal wetness limits the use of conventional equipment and increases the rate of seedling mortality. This limitation generally can be overcome by using modified or special equipment or by scheduling planting and harvesting operations for the drier periods. Bedding, controlling competing plants, and planting adapted trees generally can increase the rate of seedling survival.

Because of the flooding, this soil is only moderately suited to recreational development and is severely limited as a site for urban development. The flooding can be overcome only if major flood-control structures and extensive drainage systems are established and maintained.

The capability subclass is IIw. The woodland ordination symbol is 9W.

To—Toccoa fine sandy loam, occasionally flooded. This soil is very deep, nearly level, and well drained. It is commonly in the higher areas on flood plains. It is occasionally flooded from early in winter to midspring. The mapped areas are 10 to 150 acres in size. The slope is 0 to 2 percent.

Typically, the surface layer is brown fine sandy loam 7 inches thick. The upper part of the underlying material, to a depth of 25 inches, is brown and brownish yellow, stratified fine sandy loam. The next part, to a depth of 40 inches, is reddish brown sandy loam that has pale brown mottles. The lower part to a depth of 60 inches or more is strong brown, stratified sandy loam and loamy sand mottled with light gray.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderately rapid. The available water capacity is moderate. Tilth is good. The root zone usually is deep, but it is restricted from early in winter to midspring, when the water table is at a depth of 2.5 to 5.0 feet and the soil is occasionally flooded for brief periods.

Included with this soil in mapping are small areas of Altavista, Cartecay, and Riverview soils. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Toccoa soil is productive. Because of the hazard of flooding, however, it is only moderately suited to field crops. Flooding is likely to occur during the planting season. The soil is well suited to pasture. Including grasses and legumes in the cropping system helps to maintain fertility and the content of organic matter in the soil.

The potential of this soil for commercial woodland is high. Loblolly pine, sweetgum, black walnut, and yellow poplar are commonly grown on this soil. No significant limitations affect woodland.

Because of the flooding, this soil is only moderately suited to recreational development and is severely limited as a site for urban development. The flooding can be overcome only if major flood-control structures and extensive drainage systems are established and maintained.

The capability subclass is IIw. The woodland ordination symbol is 9A.

WeC—Wedowee sandy loam, 6 to 10 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops and long hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 45 acres in size.

Typically, the surface layer is grayish brown sandy loam 3 inches thick. The subsurface layer extends to a depth of 9 inches. It is yellowish brown sandy loam. The subsoil is brownish yellow. It extends to a depth of 30 inches. The upper part is sandy clay loam. The next part is sandy clay that has reddish yellow mottles. The lower part is sandy clay loam that has red, light brownish gray and reddish yellow streaks of weathered underlying material. The subsoil is underlain by highly weathered, light gray, red, and reddish yellow sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Ashlar and Pacolet soils. Also included are areas of a soil that is similar to the Wedowee soil but has bedrock within a depth of 30 inches. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Wedowee soil is only moderately suited to field crops because of the slope; however, it is well suited to pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability limits the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

WeD—Wedowee sandy loam, 10 to 25 percent slopes. This soil is very deep, strongly sloping and moderately steep, and well drained. It is on hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 110 acres in size.

Typically, the surface layer is very dark grayish brown sandy loam 4 inches thick. The subsurface layer extends to a depth of 10 inches. It is yellowish brown sandy loam. The upper part of the subsoil, to a depth of 16 inches, is reddish yellow sandy loam. The next part, to a depth of 32 inches, is yellowish red sandy clay that has reddish yellow mottles. The lower part, to a depth of 37 inches, is yellowish red sandy clay loam. The subsoil is underlain to a depth of 60 inches or more by yellowish red, weathered granite that crushes to sandy clay loam.

This soil is low in natural fertility and in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are small areas of Ashlar, Louisburg, and Pacolet soils. Also included are areas of soils that are similar to the Wedowee soil but have a thinner subsoil or are steep. The included soils make up as much as 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Wedowee soil is not suited to field crops. The slope is the main limitation. The soil is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. Because the soil is strongly sloping and moderately steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Also, scheduling harvesting operations for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy machinery on this soil can be reduced if seedlings can be planted by hand and winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation affecting the use of this soil as a site for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe. The woodland ordination symbol is 8R.

WkB—Wickham fine sandy loam, 2 to 6 percent slopes. This soil is very deep, very gently sloping, and well drained. It is on stream terraces. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is brown fine sandy loam 10 inches thick. The upper part of the subsoil, to a depth of 10 inches, is yellowish red fine sandy loam. The next part, to a depth of 48 inches, is red clay loam. The lower part to a depth of 60 inches or more is yellowish red sandy loam.

This soil is low in natural fertility and in content of organic matter. Reaction is strongly acid or medium acid unless the surface layer has been limed. Permeability is moderate. The available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil and Georgeville soils. Also included are small areas of soils that are similar to the Wickham soil but are more sloping. The included soils make up about 15 percent of the map unit, but no one soil makes up as much as 10 percent.

The Wickham soil is well suited to field crops and pasture. Good tilth can be easily maintained by returning crop residue to the soil. Erosion is a moderate hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is well suited to urban and recreational development.

The capability subclass is IIe. The woodland ordination symbol is 9A.

ZnC—Zion gravelly loam, 2 to 10 percent slopes. This soil is moderately deep, very gently sloping and gently sloping, and well drained. It is on ridgetops and long hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 45 acres in size.

Typically, the surface layer is brown gravelly loam 4 inches thick. The subsurface layer extends to a depth of 6 inches. It is light brown gravelly loam. The upper part of the subsoil, to a depth of 14 inches, is reddish brown clay. The lower part, to a depth of 22 inches, is reddish brown clay loam. The subsoil is underlain, to a depth of 38 inches, by highly weathered, olive gray and light gray saprolite that crushes to loam. This layer is underlain by hard bedrock.

This soil is moderate in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderately slow or slow. The available water capacity is moderate. Tilth is good. The effective root zone is limited because hard bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Enon and Mecklenburg soils. Also included are areas of a soil that is similar to the Zion soil but has bedrock within 20 inches of the surface. The included soils make up about 20 percent of the map unit, but no one soil makes up as much as 10 percent.

The Zion soil is poorly suited to field crops because the effective root zone is limited by the hard bedrock at a depth of 20 to 40 inches. The slope further limits the suitability for field crops. The soil is moderately suited to pasture. Erosion is a severe hazard in cultivated areas that are not protected. Conservation tillage, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is poorly suited to most urban uses, mainly because of the depth to bedrock and a high shrink-swell potential. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets, and the moderately slow or slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. Because of the moderately slowly or slowly permeable subsoil, the soil is only moderately suited to most kinds of recreational development.

The capability subclass is IIIe. The woodland ordination symbol is 4A.

ZnD—Zion gravelly loam, 10 to 15 percent slopes. This soil is moderately deep, strongly sloping, and well drained. It is on hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 50 acres in size.

Typically, the surface layer is dark brown gravelly loam 3 inches thick. The subsurface layer extends to a depth of 9 inches. It is reddish brown gravelly loam. The subsoil extends to a depth of 20 inches. It is yellowish red clay loam. The subsoil is underlain, to a depth of 38 inches, by weathered, olive gray and light gray saprolite that crushes to loam. This layer is underlain by hard bedrock.

This soil is moderate in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderately slow or slow. The available water capacity is moderate. Tilth is good. The effective root zone is limited because hard bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Enon and Mecklenburg soils. Also included are areas of soils that are similar to the Zion soil but have a thinner subsoil or are steep. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Zion soil is poorly suited to field crops, mainly because of the slope. It is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. No significant limitations affect woodland. Applying woodland management practices and harvesting on the contour help to keep erosion to a minimum.

This soil is poorly suited to urban uses, mainly because of the depth to bedrock and a high shrink-swell potential. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets, and the moderately slow or slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. Because of the slope and the moderately slowly or slowly permeable subsoil, the soil is only moderately suited to most kinds of recreational development.

The capability subclass is IVe. The woodland ordination symbol is 4A.

ZnE—Zion gravelly loam, 15 to 25 percent slopes. This soil is moderately deep, moderately steep, and well drained. It is on hillsides in the uplands. The slopes are smooth and convex. The mapped areas are 5 to 10 acres in size.

Typically, the surface layer is grayish brown gravelly loam 4 inches thick. The subsurface layer extends to a depth of 6 inches. It is brown gravelly loam. The subsoil extends to a depth of 23 inches. The upper part is reddish brown gravelly clay. The next part is yellowish red gravelly clay. The lower part is yellowish red gravelly clay loam. The subsoil is underlain, to a depth of 30 inches, by strong brown, weathered material that crushes to gravelly loam. This layer is underlain by hard bedrock.

This soil is moderate in natural fertility and low in content of organic matter. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. Permeability is moderately slow or slow. The available water capacity is moderate. Tilth is good. The effective root zone is limited because hard bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Enon and Mecklenburg soils. Also included are areas of soils that are similar to the Zion soil but have a thinner subsoil or are steep. The included soils make up about 25 percent of the map unit, but no one soil makes up as much as 10 percent.

The Zion soil is not suited to field crops. The slope is the main limitation. The soil is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control erosion and reduces the runoff rate.

The potential of this soil for commercial woodland is moderate. Loblolly pine, yellow poplar, and southern red oak are commonly grown on this soil. Because the soil is moderately steep, the main management concerns are the hazard of erosion and an equipment limitation. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails are effective in controlling erosion. Also, scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings can be planted by hand and if winching can be used to skid trees and logs during harvesting operations. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderately slow or slow permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe. The woodland ordination symbol is 4R.

Important Farmland

In Oglethorpe County, some soils are important in the production of food, feed, fiber, forage, and oilseed crops.

The map units, or soils, that make up *prime farmland* and *additional farmland of statewide importance*, and the acreage of each, are listed in table 5. This list does not constitute a recommendation for a particular land use. The location of each map unit is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

The soils that are considered prime farmland are those that are best suited to food, feed, forage, fiber, and oilseed crops. The soil properties, growing season, and moisture supply are those needed for a well managed soil to produce sustained high yields of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may be cropland, pasture, woodland, or other land. It either is used for food or fiber crops or is available for those crops. Urban or built-up land, public land, and water areas are not considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land in national forests, national parks, military reservations, and state parks is not available for farming.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 84,010 acres in Oglethorpe County, or more than 30 percent of the total acreage, meets the soil requirements for prime farmland. (See table 5.) Scattered areas of this land are throughout the county, but most are in map units 2, 3, and 4, which are described under the heading "General Soil Map Units."

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on additional farmland of statewide importance.

Additional Farmland of Statewide Importance

In Oglethorpe County, about 65,000 acres is additional farmland of statewide importance. (See table 5.) This farmland is an important part of the agricultural resource base in the county, but it does not meet the requirements for prime farmland. It is seasonally wet, cannot be easily cultivated, and is more erodible and generally less productive than prime farmland. The slope is 10 percent or less.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and suitability of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

James E. Dean, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Soil erosion is a major concern on most of the soils used for farming in Oglethorpe County. If the slope is more than 2 percent, erosion is a hazard. Cecil, Georgeville, Hiwassee, Madison, and Pacolet soils have slopes of predominantly 2 to 6 percent. The gently sloping Cecil soils and the strongly sloping and moderately steep Georgeville, Hiwassee, Madison, and Pacolet soils are eroded. The surface layer of these soils is a mixture of the original surface soil and the upper part of the subsoil. These soils have galled spots and gullies.

Loss of the surface layer through erosion is damaging for two major reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Cecil, Hiwassee, Madison, and Pacolet soils. Second, soil erosion on farmland results in the sedimentation of streams. Control of erosion minimizes this pollution and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

On eroded soils in many sloping fields, tilling or preparing a good seedbed is difficult because the original, friable surface layer has eroded away. This degree of erosion is common in areas of Cecil, Georgeville, and Pacolet soils.

Erosion-control practices provide a protective surface cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods helps to maintain the productive capacity of the soil. On livestock farms, which require pasture and hay, including grass forage crops in the cropping system reduces the hazard of erosion on sloping land and improves tilth for the following crop.

Applying conservation tillage systems that leave adequate amounts of crop residue on the surface increases the rate of water infiltration and reduces the runoff rate and the hazard of erosion. This practice can be used on most of the soils in Oglethorpe County. No-till planting of soybeans and grain sorghum reduces the hazard of erosion on sloping land. It is suitable on most of the soils in the county. No-till planting is an important conservation practice. It is being used on an increasing acreage in the county.

Terraces and diversions reduce the length of slopes and the runoff rate and control concentrated waterflow. They are most practical on well drained soils that have smooth, convex slopes. Appling, Cecil, Enon, Georgeville, Madison, and Pacolet soils are suitable for terraces.

Contour farming or contour stripcropping is an effective erosion-control practice on soils that have smooth, relatively short, uniform slopes. Examples are Appling, Cecil, Enon, Georgeville, Madison, Mecklenburg, and Pacolet soils.

Information about the design of erosion-control practices for each kind of soil is available from local offices of the Soil Conservation Service.

A drainage system is a management need on most somewhat poorly drained soils used for crops and pasture in Oglethorpe County. Unless artifically drained, the soils are so wet that crops are damaged during most years. Examples of these soils are Fluvaquents, ponded, and Cartecay and Chewacla soils.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in some areas.

Soil fertility is naturally low in most of the soils in the county. Plants on the soils respond well to applications of fertilizer and other management practices.

The soils are naturally acid. If the soils used for cultivated crops or pasture have never been limed, applications of ground limestone are needed to obtain high yields of legumes and other crops that grow best on nearly neutral soils. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

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

Most of the soils used for crops in Oglethorpe County have a surface layer of sandy loam that is low in content of organic matter. Tilth is generally good, but it has deteriorated in the eroded Cecil, Georgeville, Hiwassee, Madison, and Pacolet soils, in which the subsoil is exposed. Regular additions of crop residue, manure, and other organic material help to improve or maintain tilth.

Fall plowing is not a good practice in Oglethorpe County unless a small grain crop is planted after the field is plowed. Bare areas are subject to erosion if plowed in the fall.

Some of the more common crops that are suited to the soils and climate of Oglethorpe County are cotton, grain sorghum, and soybeans. Wheat, rye, and oats are the common small grain crops. Improved bermudagrass and tall fescue are common pasture grasses. They grow well on moderately well drained or well drained, loamy or clayey soils, such as the moderately well drained Altavista and Helena soils and the well drained Appling, Cecil, Georgeville, Pacolet, Riverview, and Toccoa soils. The somewhat poorly drained Cartecay and Chewacla soils, which are seasonally wet, are best suited to tall fescue.

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

The latest information about growing specialty crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss. The fertilizer needs of specific soils can be determined by soil tests. General fertilizer recommendations for field crops are available in a circular published in 1976 *(5)*.

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

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

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

Class I soils have few limitations that restrict their use. No capability class I soils are in this survey area.

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

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

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

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use. No capability class V soils are in this survey area.

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. No capability class VIII soils are in this survey area.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e* or *w*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained, and *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).

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Gary L. Tyre, forester, Soil Conservation Service, helped prepare this section.

Woodland is the most significant land use in Oglethorpe County. Nearly 221,000 acres, or 80 percent of the land area, is forest land. Loblolly-shortleaf pine, which makes up about 40 percent of the forest land, and oak-hickory, which makes up about 23 percent, are the predominant forest types *(8)*. Other forest types are elm-ash-cottonwood, oak-pine, and oak-gum-cypress.

Nearly 60 percent of the forest land in the county is privately owned. Ownership by the forest industry is more significant in Oglethorpe County than is common in other Southern Piedmont counties. Forest industry holdings are about 87,000 acres, or 32 percent. Generally, the most significant management problems and the greatest potential for increased growth are on private land. The most significant problem in Oglethorpe

County is inadequate regeneration of harvested stands. In recent years, the volume removed has significantly exceeded growth.

The forests are mainly on the very gently sloping and gently sloping soils that make up the Cecil-Appling-Madison, Enon-Mecklenburg-Georgeville, and Georgeville-Hiwassee general soil map units. Generally, there are few management limitations. To minimize soil erosion on soils that have slopes of about 10 percent, caution is needed in locating and constructing roads and in harvesting trees.

The strongly sloping to steep soils in the Pacolet-Madison general soil map unit are less productive than the other soils in the county. In most forested areas of this unit, soil erosion is a hazard. It is associated primarily with access systems.

The most productive soils in the county are on the flood plains in the Chewacla-Riverview-Toccoa general soil map unit. The Chewacla soils are somewhat poorly drained. All three of the major soils in this unit are occasionally flooded. Because of the flooding, the wetness, or both, the mortality rate for young pine trees is high. Plant competition is strong in most places. Intensive mechanical site preparation is not recommended because of the proximity to streams and the hazard of sedimentation. Wetness limits trafficability, and the use of wheeled vehicles is not advisable.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. The available water capacity and the depth of the root zone are major influences of tree growth.

This soil survey can be used by woodland managers in planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after logging roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the descriptions of each map unit in the survey area suitable for producing timber include information about the potential productivity for trees and the hazards or limitations that affect harvesting and timber production. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the survey area and that is generally the most productive species on a given soil.

Table 8 shows the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where the mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes. The letter *W* indicates excess water, either seasonal or year-round. The letter *C* indicates clay in the upper part of the soil. The letter *S* indicates a dry, sandy soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, W, C, and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation activities, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, operating wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. Ratings of *moderate* or *severe* indicate a need for selecting the most suitable equipment and for carefully timing harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by the kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to and duration of the seasonal high water table, rock fragments in the surface layer, rooting depth, and aspect. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, or providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

For the soils that are commonly used for timber production, the yield is predicted, in cubic feet and board feet, at the point where the mean annual increment culminates. The productivity of the soils in this survey is mainly based on loblolly pine.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedure for determining site index is specified in site index tables *(3, 4, 7, 10)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means that the soil can be expected to produce 114 cubic feet and about 568 board feet per acre per year at the point where the mean annual increment culminates.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, the topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees for reforestation.

Recreation

Oglethorpe County provides many opportunities for recreation. Opportunities for fishing and boating are available on the Broad, Little, and Oconee Rivers, on Long Creek and other creeks, and on ponds. The many wooded areas throughout the county provide excellent hunting for deer, turkey, squirrel, and raccoon. Quail, rabbit, and dove are hunted near areas of cropland, ducks are hunted on the many beaver ponds in the county. Nature study areas are available throughout the county.

The well drained, very gently sloping Appling, Cecil, Georgeville, Hiwassee, Madison, Pacolet, and Wickham soils, which are mainly on ridgetops, are well suited to playgrounds. If land shaping is necessary, they can be leveled and smoothed. These soils also are well suited to campsites, picnic areas, and golf fairways. Most of the well drained, very gently sloping to strongly sloping soils are well suited to park areas, paths for hiking, and trails for horseback riding.

In table 9, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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

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

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

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Louis Justice, biologist, Soil Conservation Service, helped prepare this section.

Oglethorpe County generally is a rural environment that provides good habitat for wildlife mainly in pastured and wooded areas. About 80 percent of the county is forested. The rest is used for field crops or pasture. The forests are about 60 percent hardwoods and 40 percent pine and mixed pine and hardwoods.

The major plants of importance to terrestrial wildlife include greenbrier, grape, honeysuckle, shrub and annual lespedezas, panicgrass, croton, ragweed, partridge pea, paspalum, tickclover, and sumac. The important overstory and understory plants are hickory, sweetgum, oak, hackberry, cherry, plum, pine, elm, dogwood, persimmon, buttonbush, and maple. The domestic plants of importance to wildlife include corn, soybeans, fescue, bahiagrass, legumes, and small grain.

Cropland and pasture interspersed with pine and hardwood forests provide habitat for white-tailed deer, turkey, mourning dove, raccoon, squirrel, opossum, fox, and other wildlife. Rabbit and bobwhite quail populations are good in areas that have suitable food and cover. Unmanaged pasture, old fields, young pine plantations, tracts of mixed pine and hardwoods, and thinned tracts of woodland produce numerous native woody and herbaceous plants that provide food and cover for deer, turkey, rabbit, fox, quail, and other wildlife. Restoring hedgerows, field borders, windbreaks, and certain areas in pastures and cropland fields improve the habitat for wildlife. Also, prescribed burning, thinning, and retaining mast-producing trees, such as oaks, can improve the ability of pine plantations to support wildlife.

Wetland habitat supports a variety of furbearers, such as otter, beaver, bobcat, raccoon, and waterfowl. The best available wetland habitat is in the areas of bottom land hardwoods along the Oconee River, the Broad River, the Little River, Falling Creek, Big Cloud Creek, Grove Creek, Big Creek, Long Creek, Dry Fork Creek, and North Fork Creek and along numerous beaver ponds.

Fishing is good in the major streams and in many farm ponds in the county. Important sport fish include largemouth bass, white bass, crappie, channel catfish, bullheads, bluegill, and redear sunfish. Because of the fragile habitat requirements of fish, special efforts are needed to control water pollution from both point and nonpoint sources.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, barley, millet, sunflowers, and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, lespedeza, bermudagrass, bahiagrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, lespedeza, goldenrod, partridge pea, threeawn, aster, beggarweed, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, flowers, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, hackberry, hawthorn, dogwood, hickory, blackberry, maple, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are plum, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, pondweed, rushes, sedges, and Asiatic dayflower.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes and beaver ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, dove, turkey, meadowlark, field sparrow, cottontail, red fox, and deer.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy, or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

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

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrink-swell potential can cause the movement of footings. Depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, and bedrock.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment (fig. 1). Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high

Figure 1.—A farm pond under construction in an area of Cecil sandy clay loam, 6 to 10 percent slopes, eroded. The pond will provide water for livestock and opportunities for recreation, such as fishing.

content of stones or boulders. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard

Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in nearby areas and in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in closed depressions is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions. There is a near 0 to 5 percent chance of flooding in any year. *Occasional* means that flooding occurs infrequently under normal weather conditions. There is a 5 to 50 percent chance of flooding in any year. *Frequent* means that flooding occurs often under normal weather conditions. There is more than a 50 percent chance of flooding in any year. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udults (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, kaolinitic, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (11)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Altavista Series

The Altavista series consists of very deep, moderately well drained, moderately permeable soils that formed in loamy sediment. These soils are on stream terraces. The seasonal high water table is at a depth of 1.5 to 2.5 feet from late in fall to early in spring. The slope is 0 to 2 percent.

Altavista soils are associated with Cartecay, Chewacla, Riverview, Toccoa, and Wickham soils. Cartecay and Chewacla soils are somewhat poorly drained, and Riverview and Toccoa soils are well drained. All four of these soils are on flood plains. They do not have an argillic horizon. Wickham soils are in positions on the landscape similar to those of the Altavista soils. They are well drained.

Typical pedon of Altavista loam, 0 to 2 percent slopes, occasionally flooded; 1 mile south of Broad River Bridge on Georgia State Highway 77, 3.3 miles east on Oglethorpe County Road 195, 1.4 miles southwest on County Road 190, 0.3 mile southeast on woods road, 260 feet southeast:

A—0 to 5 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; very friable; many fine and medium roots; few fine flakes of mica; medium acid; clear smooth boundary.

E—5 to 9 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; clear smooth boundary.

Bt1—9 to 16 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine and medium roots; strongly acid; gradual smooth boundary.

Bt2—16 to 20 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; few medium roots; few fine flakes of mica; gradual smooth boundary.

Bt3—20 to 32 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular structure; friable; few medium roots; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt4—32 to 42 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium distinct light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

C—42 to 60 inches; mottled strong brown (7.5YR 5/6) and light gray (10YR 7/2) loamy sand; massive; very friable; strongly acid.

The thickness of the solum ranges from 34 to 50 inches. Bedrock is at a depth of 5 to 10 feet or more. Reaction is very strongly acid or strongly acid unless the surface layer and subsurface layer have been limed.

The combined thickness of the A and E horizons is 7 to 17 inches. These horizons have hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

The Bt horizon has hue of 10YR, value of 6 or 7, and chroma of 3, 4, or 6 or hue of 7.5YR or 2.5Y, value of 6 or 7, and chroma of 4 or 6. Few to many, fine or medium, very pale brown, pale brown, brown, strong brown, or yellowish red mottles are in the upper part of this horizon, and light gray, light brownish gray, or very pale brown mottles are in the lower part. The texture is sandy loam or sandy clay loam.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 4, or it is neutral in hue and has value of 6 or 7. Common or many, coarse or medium, strong brown, yellowish red, yellowish brown, brownish yellow, or light gray mottles are in this horizon. The texture is sandy clay loam or loamy sand.

Appling Series

The Appling series consists of very deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, and coarse grained schist. These soils are in the uplands. The slope is 2 to 10 percent. It is dominantly 2 to 6 percent.

Appling soils are in positions on the landscape similar to those of the Cecil, Georgeville, Madison, Pacolet, and Wedowee soils. Cecil, Georgeville, Madison, and Pacolet soils have a red subsoil. In addition, Georgeville soils have a higher content of silt than the Appling soils, Madison soils have a higher content of mica, and Pacolet soils have a thinner solum. Wedowee soils also have a thinner solum.

Typical pedon of Appling coarse sandy loam, 2 to 6 percent slopes; 0.5 mile northeast on paved Oglethorpe County road from Sandy Cross Baptist Church, 420 feet north on dirt road, 20 feet east of road; in an area of hardwoods:

Oi—1 inch to 0; decomposed hardwood leaves and twigs.

Ap—0 to 6 inches; brown (10YR 5/3) coarse sandy loam; few faint pale brown splotches; weak fine granular structure; very friable; many fine and medium and few coarse roots; strongly acid; clear smooth boundary.

E—6 to 11 inches; light yellowish brown (10YR 6/4) coarse sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid; gradual smooth boundary.

Bt1—11 to 18 inches; reddish yellow (7.5YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; strongly acid; gradual wavy boundary.

Bt2—18 to 30 inches; reddish yellow (7.5YR 6/6) sandy clay; common medium faint reddish yellow (5YR 6/8) mottles; moderate medium subangular blocky structure; firm; few medium roots; many distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—30 to 40 inches; yellowish red (5YR 5/8) clay; common medium distinct yellow (10YR 7/6) and red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—40 to 50 inches; yellowish red (5YR 5/8) sandy clay loam; common coarse distinct yellow (10YR 7/6) and red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—50 to 60 inches; mottled red (2.5YR 5/8), reddish yellow (7.5YR 7/6), and yellowish red (5YR 5/6) sandy clay loam saprolite; massive; friable; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Bedrock is at a depth of 7 to 30 feet or more. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The A horizon is 5 to 12 inches thick. It has hue of 10YR, value of 4 to 6, and chroma of 2, 3, 4, or 6 or hue of 7.5YR, value of 4 to 6, and chroma of 2, 4, or 6.

The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4, 6, or 8; hue of 2.5Y, value of 5 to 7, and chroma of 4 or 6; or hue of 2.5Y, value of 6 or 7, and chroma of 8. The texture is coarse sandy loam or sandy loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 or 8. In some pedons it has few to many mottles, which have hue of 5YR or 10YR, value of 5 to 7, and chroma of 3, 4, or 8 or hue of 2.5YR, value of 5 or 6, and chroma of 4 or 8. Some pedons have a BC horizon. This horizon has hue of 5YR or 10YR, value of 5 or 6, and chroma of 8. It has few to many mottles, which have hue of 5YR, 7.5YR, or 10YR, value of 4, 6, or 7, and chroma of 6 or 8. The texture of this horizon is sandy clay loam or clay loam.

The C horizon is weathered granite, schist, or gneiss. The texture is sandy clay loam or clay loam.

Ashlar Series

The Ashlar series consists of moderately deep, well drained to excessively drained soils that formed in material weathered from granite and gneiss. These soils are in the uplands. The slope is 2 to 35 percent. It is dominantly 15 to 35 percent.

Ashlar soils are in positions on the landscape similar to those of the Appling, Cecil, Madison, Louisburg, Pacolet, and Wedowee soils. Appling, Cecil, Madison, Pacolet, and Wedowee soils have an argillic horizon. Louisburg soils have a cambic B horizon that is interrupted by a discontinuous argillic horizon.

Typical pedon of Ashlar coarse sandy loam, in an area of Ashlar, Louisburg and Pacolet soils, 15 to 35 percent slopes; 0.6 mile northwest of Veribest on Oglethorpe County dirt road, 2,445 feet west of road:

A—0 to 3 inches; yellowish brown (10YR 5/4) coarse sandy loam; weak fine granular structure; very friable; common fine roots; few small quartz fragments; strongly acid; clear smooth boundary.

E—3 to 8 inches; light yellowish brown (10YR 6/4) coarse sandy loam; weak fine granular structure; very friable; few medium roots; common small quartz fragments; strongly acid; clear smooth boundary.

Bw—8 to 17 inches; strong brown (7.5YR 5/6) coarse sandy loam; weak fine subangular blocky structure; very friable; few medium roots; common small quartz fragments; strongly acid; clear smooth boundary.

C—17 to 23 inches; reddish yellow (7.5YR 6/6 and 7/6) coarse sandy loam; massive; very friable; few medium roots; common small quartz fragments; strongly acid; abrupt smooth boundary.

R—23 inches; hard granite.

The thickness of the solum ranges from 14 to 27 inches. Bedrock is at a depth of 20 to 35 inches. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The combined thickness of the A and E horizons is 5 to 9 inches. These horizons have hue of 10YR, value of 5 or 6, and chroma of 3 or 4 or hue of 7.5YR, value of 5 or 6, and chroma of 4. The texture is coarse sandy loam or sandy loam.

The Bw horizon is 8 to 20 inches thick. It has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. The texture is coarse sandy loam or sandy loam.

The C horizon is weathered granite or gneiss. The texture is coarse sand, coarse sandy loam, or sandy loam.

Cartecay Series

The Cartecay series consists of very deep, somewhat poorly drained, moderately rapidly permeable soils that formed in predominantly loamy sediment. These soils are on flood plains. They are near streams that drain from the uplands. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet from early in winter to midspring. The slope is 0 to 2 percent.

Cartecay soils are associated with Altavista, Chewacla, Riverview, and Toccoa soils. Altavista soils are on low-lying stream terraces. They are moderately well drained and are in a fine-loamy family. Chewacla, Riverview, and Toccoa soils are in positions on the landscape similar to those of the Cartecay soils. Chewacla and Riverview soils are in a fine-loamy family. Riverview soils are well drained. Toccoa soils also are well drained.

Typical pedon of Cartecay loam, occasionally flooded; 50 feet south on Georgia State Highway 77 from Little Indian Creek, 1,395 feet northwest:

A1—0 to 3 inches; brown (7.5YR 5/4) loam; weak medium granular structure; friable; many very fine and common fine roots; few fine flakes of mica; medium acid; clear smooth boundary.

A2—3 to 8 inches; reddish brown (5YR 5/4) loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium granular structure; friable; many medium and common fine roots; few fine flakes of mica; medium acid; abrupt smooth boundary.

C1—8 to 15 inches; mottled reddish yellow (7.5YR 6/6) and pink (7.5YR 8/4) loamy sand; massive; very friable; few coarse roots; few fine flakes of mica; strongly acid; abrupt smooth boundary.

C2—15 to 18 inches; brown (7.5YR 5/4) silt loam; common medium distinct gray (10YR 6/1) mottles; massive; friable; few coarse roots; few fine flakes of mica; strongly acid; abrupt smooth boundary.

C3—18 to 30 inches; strong brown (7.5YR 5/6) loamy sand and sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; massive; very friable; few fine flakes of mica; strongly acid; clear smooth boundary.

C4—30 to 50 inches; mottled strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) fine sandy loam and loamy sand; massive; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

Cg—50 to 60 inches; light brownish gray (10YR 6/2) loamy sand; massive; very friable; few fine flakes of mica; very strongly acid.

The thickness of the loamy and sandy sediment ranges from 5 to more than 10 feet. Reaction is strongly acid to slightly acid throughout the profile unless the surface layer has been limed.

The A horizon is 7 to 8 inches thick. It has hue of 5YR and 7.5YR, value of 5 or 6, and chroma of 4 or 6.

The C1 horizon has hue of 10YR, value of 5 to 8, and chroma of 3, 4, or 6 or hue of 7.5YR, value of 5 to 8, and chroma of 2, 4, or 6. It is underlain by horizons that have hue of 10YR, value of 5 to 8, and chroma of 2, 3, 4, or 6 or hue of 7.5YR, value of 5 to 8, and chroma of 2, 4, or 6. Most pedons have common, gray or light brownish gray mottles within 20 inches of the surface. The texture of the C horizon is predominately sandy loam, but layers of loamy sand, loam, silt loam, or silty clay loam are in most pedons.

Cecil Series

The Cecil series consists of very deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, and schist. These soils are in the uplands. The slope is 2 to 10 percent. It is dominantly 2 to 6 percent.

Cecil soils are in positions on the landscape similar to those of the Appling, Georgeville, Hiwassee, Madison, and Wedowee soils. Appling and Wedowee soils have a subsoil that is more yellowish than that of the Cecil soils. Also, Wedowee soils have a thinner solum. Georgeville soils have a higher content of silt throughout than the Cecil soils. Hiwassee soils have a predominately dark red subsoil. Madison soils have a solum that is thinner than that of the Cecil soils and have a higher content of mica flakes.

Typical pedon of Cecil sandy loam, 2 to 6 percent slopes; 0.5 mile northeast of Arnoldsville Church on paved Oglethorpe County road; 510 feet north of road; adjacent to mobile home park:

Ap—0 to 6 inches; reddish brown (5YR 5/4) sandy loam; weak fine granular structure; friable; many fine roots; few fine flakes of mica; medium acid; clear smooth boundary.

Bt1—6 to 9 inches; red (2.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt2—9 to 22 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt3—22 to 34 inches; red (2.5YR 4/6) sandy clay; few medium distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

BC—34 to 60 inches; red (2.5YR 4/8) sandy clay loam; many medium distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 40 to more than 65 inches. Bedrock is at a depth of 6 to 25 feet or more. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The A horizon is 3 to 8 inches thick. It has hue of 5YR or 10YR, value of 4 to 6, and chroma of 3, 4, or 6 or hue of 7.5YR, value of 4 to 6, and chroma of 4 or 6. The texture is sandy loam or sandy clay loam.

Some pedons have a BE horizon, which has hue of 2.5YR, value of 4 to 6, and chroma of 4, 6, or 8; hue of 5YR, value of 4 to 6, and chroma of 4 or 6; or hue of 5YR, value of 5 or 6, and chroma of 8. The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8. In some pedons few, medium, reddish yellow, and yellowish red mottles are in the lower part of the Bt horizon. This horizon is clay loam, sandy clay, or clay. The BC horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it has common or many, medium, reddish yellow, yellowish red, or strong brown mottles. It is sandy clay loam or clay loam.

The C horizon is weathered granite or granite gneiss that crushes to sandy loam, sandy clay loam, or clay loam.

Chewacla Series

The Chewacla series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in loamy sediment. These soils are on flood plains. They are near perennial streams that drain from the uplands. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet from late in fall to midspring. The slope is 0 to 2 percent.

Chewacla soils are associated with Altavista, Cartecay, Riverview, Toccoa, and Wickham soils. Altavista and Wickham soils have an argillic horizon and are on stream terraces. Altavista soils are moderately well drained, and Wickham soils are well drained. Cartecay, Riverview, and Toccoa soils are in positions on the landscape similar to those of the Chewacla soils. Cartecay and Toccoa soils are in a coarse-loamy family. Toccoa and Riverview soils are well drained.

Typical pedon of Chewacla silt loam, occasionally flooded; 375 feet south along Long Creek from the intersection with Troublesome Creek, 590 feet west:

A—0 to 6 inches; brown (7.5YR 5/4) silt loam; weak fine granular structure; friable; many fine and medium roots; few fine flakes of mica; medium acid; clear smooth boundary.

Bw1—6 to 25 inches; reddish brown (5YR 4/4) sandy clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw2—25 to 30 inches; grayish brown (10YR 5/2) sandy clay loam; common medium distinct reddish brown (5YR 4/4) mottles; weak medium subangular blocky structure; friable; few medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw3—30 to 50 inches; brown (7.5YR 5/4) sandy clay loam; common medium distinct gray (10YR 6/1) mottles; weak fine subangular blocky structure; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw4—50 to 60 inches; mottled brown (7.5YR 5/4), gray (10YR 6/1), and very dark gray (5YR 3/1) sandy clay loam; weak fine subangular blocky structure; very friable; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 50 to more than 65 inches. Reaction is very strongly acid to slightly acid unless the surface layer has been limed.

The A horizon has hue of 7.5YR, value of 5, and chroma of 4 or 6. The Bw1 horizon has hue of 5YR or 10YR, value of 4 or 5, and chroma of 3 or 4 or hue of 7.5YR, value of 4 or 5, and chroma of 4. In some pedons few or common, brownish or grayish mottles are within a depth of 10 inches. The Bw2 or Bg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 4 or hue of 7.5YR, value of 5 to 7, and chroma of 2 or 4, or it is neutral in hue and has value of 5 to 7. These horizons have common or many mottles in shades of gray, brown, and yellow. Some pedons have a C horizon, which is mottled brown, very dark gray, and gray.

Enon Series

The Enon series consists of well drained, slowly permeable soils that formed in material weathered from diorite, gabbro, quartz, and related acidic and basic rocks. These soils are shallow to a sticky and plastic subsoil. They are in the uplands. The slope is 2 to 10 percent. It is dominantly 2 to 6 percent.

Enon soils are in positions on the landscape similar to those of the Georgeville, Hiwassee, Mecklenburg, and Zion soils. Georgeville and Hiwassee soils have less than 35 percent base saturation and do not have a sticky and plastic subsoil. In addition, Georgeville soils have a higher content of silt than the Enon soils, and Hiwassee soils have a dominantly dark red subsoil. Mecklenburg soils have a dominantly reddish subsoil. Zion soils have hard bedrock at a depth of 20 to 40 inches.

Typical pedon of Enon fine sandy loam, 2 to 6 percent slopes; 1 mile south of Buffalo Creek on Georgia Highway 22 to the crossroads; 2.5 miles east on Oglethorpe County road to abandoned house site; 860 feet south on woods road; in a pine plantation:

Ap—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; common small black concretions; medium acid; clear smooth boundary.

B/E—5 to 9 inches; yellowish brown (10YR 5/6) sandy clay loam and brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; fine small black concretions; medium acid; clear smooth boundary.

Bt1—9 to 20 inches; yellowish brown (10YR 5/6) clay; common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; firm; few fine roots; few small black concretions; common distinct clay films on faces of peds; slightly acid; gradual smooth boundary.

Bt2—20 to 30 inches; yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; firm, sticky and plastic; few fine roots; common small black concretions; common distinct clay films on faces of peds; neutral; gradual smooth boundary.

BC—30 to 37 inches; light brownish gray (2.5Y 6/2) clay; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; few fine roots; neutral; clear smooth boundary.

C1—37 to 50 inches; mottled strong brown (7.5YR 5/6), light brownish gray (2.5Y 6/2), gray (10YR 5/1), and white (10YR 8/1) clay loam; massive; firm; few fine roots; mildly alkaline; clear smooth boundary.

C2—50 to 60 inches; mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), light brownish gray (2.5Y 6/2), and white (10YR 8/1) saprolite that crushes to sandy loam; massive; firm; mildly alkaline.

The thickness of the solum ranges from 22 to 40 inches. Hard bedrock is at a depth of 72 inches or more. Reaction ranges from strongly acid to neutral throughout the solum and is slightly acid or neutral in the C horizon.

The A horizon is 2 to 6 inches thick. It has hue of 7.5YR, value of 3 or 4, and chroma of 2 or 4; hue of 10YR, value of 3 or 4, and chroma of 2 to 4; hue of 2.5Y or 5Y, value of 3 or 4, and chroma of 2; or hue of 2.5Y or 5Y and value and chroma of 4. Some pedons have an E horizon, which has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4.

Some pedons have a BE horizon. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. It is sandy clay loam or clay loam. The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4, 6 or 8; hue of 2.5Y, value of 5 or 6, and chroma of 4 or 6; or hue of 2.5Y, value of 6, and chroma of 8. In some pedons it has few to many brownish or yellowish mottles. Some pedons have gray mottles below the upper 10 inches of the Bt horizon. Some pedons have a BC horizon, which has hue of 7.5YR or 2.5Y, value of 5 or 6, and chroma of 2, 4, or 6 or hue of 10YR or 5Y, value of 5 or 6, and chroma of 2, 3, 4, or 6. The mottles in this horizon have hue of 5YR or 10YR, value of 5 to 7, and chroma of 2, 3, 4, 6, or 8; hue of 7.5YR, value of 5 to 7, and chroma of 2, 4, 6, or 8; hue of 2.5Y, value of 5 to 7, and chroma of 2, 4, or 6; or hue of 2.5Y, value of 6 or 7, and chroma of 8.

The C horizon is weathered acidic and basic rocks that crush to sandy loam, loam, or clay loam.

Georgeville Series

The Georgeville series consists of very deep, well drained, moderately permeable soils that formed in material weathered from fine grained Carolina slate.

These soils are in the uplands. The slope is 2 to 25 percent. It is dominantly 2 to 10 percent.

Georgeville soils are in positions on the landscape similar to those of the Appling, Cecil, Enon, Hiwassee, Madison, Mecklenburg, Pacolet, and Wedowee soils. All of these soils have a lower content of silt than the Georgeville soils. In addition, Enon, Madison, Mecklenburg, Pacolet, and Wedowee soils have a thinner solum. Enon and Mecklenburg soils have a predominately plastic, sticky subsoil.

Typical pedon of Georgeville very fine sandy loam, 2 to 6 percent slopes; 1.2 miles northwest on Georgia State Highway 22 from the intersection with Oglethorpe County road directly northwest of Philomath, 700 feet east:

Ap—0 to 6 inches; brown (7.5YR 5/4) very fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; medium acid; clear smooth boundary.

Bt1—6 to 13 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; gradual wavy boundary.

Bt2—13 to 30 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; few medium roots; many prominent clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—30 to 38 inches; red (2.5YR 4/6) clay; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few coarse roots; many prominent clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt4—38 to 55 inches; red (2.5YR 4/6) clay loam; weak medium subangular blocky structure; friable; few large roots; common distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—55 to 60 inches; red (2.5YR 4/6) clay loam saprolite; massive; friable if crushed; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to more than 80 inches. Bedrock is at a depth of 6 to 10 feet or more. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The Ap horizon is 2 to 7 inches thick. It has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 or 6. If not eroded, it is very fine sandy loam. If eroded, it is clay loam.

The upper part of the Bt horizon has hue of 2.5YR, value of 4 to 6, and chroma of 6 or 8; hue of 5YR, value of 4 to 6, and chroma of 6; or hue of 5YR, value of 5 or 6, and chroma of 8. It is silty clay loam or clay loam. The lower part has hue of 10R or 2.5YR, value of 4 to 6, and chroma of 6 or 8. It is silty clay, clay loam, or clay. If the lower part of the Bt horizon is mottled, the mottles are few or common and are reddish yellow, yellowish red, or strong brown. Some pedons have a BC horizon, which has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 or 8. If this horizon is mottled, the mottles are common or many and are reddish yellow, strong brown, light brown, or yellowish red.

The C horizon is weathered slate that is mottled red, light red, yellowish red, reddish yellow, and reddish brown. The texture is silt loam, silty clay loam, or clay loam.

Helena Series

The Helena series consists of moderately well drained, slowly permeable soils that formed in material weathered from gneiss and granite. These soils are shallow to a sticky and plastic subsoil. They are in the uplands. The slope is 2 to 6 percent.

Helena soils are in positions on the landscape similar to those of the well drained Appling, Enon, Mecklenburg, and Wedowee soils. Appling and Wedowee soils do not have a sticky and plastic subsoil, and Mecklenburg soils have a reddish subsoil.

Typical pedon of Helena sandy loam, 2 to 6 percent slopes; 3.6 miles south of Vesta on Oglethorpe County road, 2,200 feet northeast of Palmetto on dirt road, 2,000 feet southeast of road:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; many fine and medium roots; few light yellowish brown (10YR 6/4) and dark brown (7.5YR 4/4) splotches; very strongly acid; clear smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; few small black concretions; very strongly acid; clear smooth boundary.

Bt2—13 to 24 inches; brownish yellow (10YR 6/6) sandy clay; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots; common prominent clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—24 to 37 inches; strong brown (7.5YR 5/8) sandy clay; common medium distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots; common prominent clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—37 to 45 inches; mottled brownish yellow (10YR 6/6) and light gray (10YR 7/2) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; very strongly acid; clear wavy boundary.

C—45 to 60 inches; mottled light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) sandy clay loam; massive; very friable; highly weathered granite; very strongly acid.

The thickness of the solum ranges from 25 to 45 inches. Bedrock is at a depth of 60 inches or more. Reaction is strongly acid or very strongly acid unless the surface layer has been limed.

The A horizon is 6 to 11 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

Some pedons have an E horizon. This horizon is 2 to 4 inches thick. It has hue of 10YR, value of 5 or 6, and chroma of 1 to 4.

The Bt1 horizon has hue of 10YR, value of 4 to 7, and chroma of 4 or 6; hue of 2.5Y, value of 5 to 7, and chroma of 4 or 6; or hue of 2.5Y and value and chroma of 4. The Bt2 and Bt3 horizons have hue of 7.5YR or 2.5Y, value of 5 to 7, and chroma of 2, 4, 6, or 8 or hue of 10YR, value of 5 to 7, and chroma of 1, 2, 3, 4, 6, or 8. The mottles in these horizons have hue of 2.5YR, value of 4 to 6, and chroma of 2, 4, 6, or 8; hue of 5YR, value of 4 to 7, chroma of 2, 3, 4, 6, or 8; hue of 7.5YR, value of 4 to 7, and chroma of 2, 4, 6, or 8; hue of 10YR, value of 4 to 7, and chroma of 2, 3, 4, 6, or 8; hue of 2.5Y, value of 4 to 7, and chroma of 2 or 4; or hue of 2.5Y, value of 5 to 7, and chroma of 6 or 8. The mottles that have chroma of 2 or less are within the upper 24 inches of the argillic horizon. They range from few to many. The Bt horizon is sandy clay or clay.

The BC horizon is mottled in hue of 2.5YR, value of 4 to 6, and chroma of 2, 4, 6, or 8; hue of 7.5YR, value of 4 to 7, and chroma of 2, 4, or 6; hue of 10YR, value of 4 to 7, and chroma of 1, 2, 3, 4, or 6; or hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 8. The texture is sandy clay loam or clay loam.

The C horizon is weathered, acidic and basic rock that is sandy loam, sandy clay loam, or silty clay loam.

Hiwassee Series

The Hiwassee series consists of very deep, well drained, moderately permeable soils that formed in material weathered from diorite and other similar rocks. These soils are in the uplands. The slope is 2 to 25 percent. It is dominantly 2 to 10 percent.

Hiwassee soils are in positions on the landscape similar to those of the Cecil, Enon, Georgeville, Madison, and Mecklenburg soils. All of these soils are less red than the Hiwassee soils. In addition, Enon, Mecklenburg, and Madison soils have a thinner solum, Enon and Mecklenburg soils have a subsoil that is dominantly sticky and plastic, and Madison soils have a higher content of mica. Georgeville soils have a higher content of silt than the Hiwassee soils.

Typical pedon of Hiwassee loam, 2 to 6 percent slopes; 1 mile south from Broad River bridge on Georgia State Highway 77 to crossroads, 3 miles southeast on Oglethorpe County dirt road, 1 mile northeast on woods road, 0.3 mile northwest on woods road, 130 feet west of road; in a pine plantation.

Ap—0 to 6 inches; dark reddish brown (2.5YR 3/4) loam; moderate medium granular structure; friable; common fine and medium roots; medium acid; clear smooth boundary.

Bt1—6 to 15 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm; few fine and medium roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—15 to 32 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm; many prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—32 to 42 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm; many prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—42 to 46 inches; red (2.5YR 4/6) clay; few medium distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; firm; many prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—46 to 60 inches; red (2.5YR 4/6) clay loam; few medium distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; strongly acid.

The solum is 60 or more inches thick. Bedrock is at a depth of 6 to 10 feet or more. Reaction is very strongly acid to medium acid unless the surface layer has been limed.

If not eroded, the A horizon is loam about 6 to 8 inches thick. If eroded, it is clay loam about 3 to 6 inches thick. This horizon has hue of 2.5YR, value of 3, and chroma of 2 or 4.

The upper part of the Bt horizon has hue of 10R or 2.5YR, value of 3, and chroma of 6. The lower part has hue of 2.5YR, value of 3 or 4, and chroma of 6. If the lower part is mottled, the mottles are few, medium, and yellowish red or strong brown. The BC horizon has hue of 2.5YR, value of 4, and chroma of 6 or 8. In some pedons this horizon has few, medium, yellowish red or strong brown mottles. It is silty clay loam or clay loam.

Louisburg Series

The Louisburg series consists of deep, well drained to excessively drained soils that formed in material weathered from granite and gneiss. These soils are in the uplands. The slope is 2 to 35 percent. It is dominantly 15 to 35 percent.

Louisburg soils are in positions on the landscape similar to those of the Appling, Ashlar, Cecil, Madison, Pacolet, and Wedowee soils. Appling, Cecil, Madison, Pacolet, and Wedowee soils have a continuous argillic horizon. Ashlar soils are moderately deep and have a continuous cambic horizon.

Typical pedon of Louisburg sandy loam, in an area of Ashlar, Louisburg and Pacolet soils, 15 to 35 percent slopes; 1 mile south from South Fork Broad River bridge on secondary road S1092, 2 miles east to crossroad, left on woods road, 0.8 mile to large granite rock outcrop on left, 3,000 feet north:

A—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many very fine and fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

E—5 to 9 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine roots; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bw—9 to 17 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; few medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt—17 to 29 inches; yellowish red (5YR 5/6) sandy clay loam; common distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

C—29 to 45 inches; mottled reddish yellow (5YR 6/8) and light brownish gray (10YR 6/2) sandy clay loam; massive; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

Cr—45 to 60 inches; partially decomposed reddish yellow (7.5YR 6/8) and gray (10YR 6/1) granite that crushes to sandy loam; massive; very friable if crushed; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 29 to 35 inches. Bedrock is at a depth of 55 inches or more. Reaction is very strongly acid to medium acid unless the surface layer has been limed.

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

Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. The texture is sandy loam or sandy clay loam.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 4, 6, or 8. It is sandy loam or coarse sandy loam and has 7 to 18 percent clay. Some pedons have a Bt horizon, which has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 6; or hue of 10YR, 7.5YR, or 5YR, value of 5, and chroma of 8. This horizon is sandy clay loam or stony sandy clay loam.

The C horizon is weathered granite gneiss that, if crushed, is coarse sandy loam, sandy loam, loam, or sandy clay loam. Some pedons have the stony analogs of these textures.

Madison Series

The Madison series consists of very deep, well drained, moderately permeable soils that formed in material weathered from granite gneiss, mica schist, mica gneiss, or other micaceous metamorphic rocks. These soils are in the uplands. The slope is 2 to 25 percent. It is dominantly 2 to 10 percent.

Madison soils are in positions on the landscape similar to those of the Appling, Cecil, Georgeville, Pacolet, and Wedowee soils. All of these soils have a lower content of mica than the Madison soils. In addition, Appling, Cecil, and Georgeville soils have a thicker solum, Appling and Wedowee soils have a more yellowish subsoil, and Georgeville soils have a higher content of silt.

Typical pedon of Madison sandy loam, 2 to 6 percent slopes; about 2 miles northeast of Lexington on Georgia State Highway 77, about 4.2 miles east on paved Oglethorpe County road past Wesley Chapel Church, 1,560 feet south on woods road, 1,584 feet southeast; in a pine plantation:

Ap—0 to 6 inches; strong brown (7.5YR 5/6) sandy loam; weak fine granular structure; very friable;

common fine and medium roots; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bt1—6 to 8 inches; red (2.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—8 to 20 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; firm; few medium roots; many prominent clay films on faces of peds; many fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—20 to 25 inches; red (2.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; few medium roots; few faint clay films on faces of peds; many fine flakes of mica; strongly acid; gradual wavy boundary.

C1—25 to 36 inches; red (2.5YR 5/8), highly weathered granite gneiss that crushes to sandy clay loam; massive; very friable; many fine flakes of mica; strongly acid; gradual wavy boundary.

C2—36 to 60 inches; red (2.5YR 5/8), highly weathered granite gneiss that crushes to sandy loam; massive; very friable; many fine flakes of mica; strongly acid.

The thickness of the solum ranges from 20 to 33 inches. Hard rock is at a depth of 3 to 6 feet or more. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The A horizon is 2 to 6 inches thick. It has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6. The texture is sandy loam or sandy clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or hue of 5YR, value of 5, and chroma of 8. It is sandy clay loam or clay loam in the upper few inches and sandy clay, clay loam, or clay in the lower part. The BC horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 or 8; hue of 5YR, value of 4 or 5, and chroma of 6; or hue of 5YR, value of 5, and chroma of 8. In some pedons this horizon has mottles with hue of 2.5YR or 5YR, value of 5 or 6, and chroma of 6 or 8. It is sandy clay loam or clay loam.

The C horizon is weathered granite gneiss, schist, and mica schist. The texture is sandy loam, loam, sandy clay loam, or clay loam.

Mecklenburg Series

The Mecklenburg series consists of well drained, slowly permeable soils that formed in material weathered from acidic and basic crystalline rocks. These soils are shallow to a sticky and plastic subsoil. They are in the uplands. The slope is 2 to 25 percent. It is dominantly 2 to 10 percent.

Mecklenburg soils are in positions on the landscape similar to those of the Cecil, Enon, Georgeville, Hiwassee, and Zion soils. Cecil, Georgeville, and Hiwassee soils have less than 35 percent base saturation and do not have a sticky and plastic subsoil. Georgeville soils have a higher content of silt than the Mecklenburg soils. Hiwassee soils generally have a dark red subsoil. Enon soils have a brownish subsoil. Zion soils have hard bedrock at a depth of 20 to 40 inches.

Typical pedon of Mecklenburg fine sandy loam, 2 to 6 percent slopes; about 3 miles northwest from the Wilkes County line on Georgia State Highway 78, about 4 miles northeast on Oglethorpe County road past Bethesda Church, 0.9 mile east on County Road S2164, 100 feet north of road:

Ap—0 to 6 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine granular structure; very friable; common fine roots; common small concretions; medium acid; clear smooth boundary.

Bt1—6 to 11 inches; yellowish red (5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common small concretions; medium acid; gradual smooth boundary.

Bt2—11 to 29 inches; red (2.5YR 5/6) clay; moderate medium angular blocky structure; firm, sticky and plastic; few medium roots; many prominent clay films on faces of peds; common small concretions; medium acid; gradual smooth boundary.

Bt3—29 to 32 inches; red (2.5YR 4/6) clay; many medium distinct reddish yellow (7.5YR 6/6) mottles; strong medium angular blocky structure; very firm, sticky and plastic; few medium roots; many prominent clay films on faces of peds; few small concretions; slightly acid; gradual smooth boundary.

Bt4—32 to 36 inches; yellowish red (5YR 5/6) clay; common medium distinct reddish yellow (7.5YR 6/6) mottles; strong medium angular blocky structure; friable, plastic; few medium roots; common distinct clay films on faces of peds; few small concretions; slightly acid; clear smooth boundary.

BC—36 to 39 inches reddish yellow (7.5YR 6/6) clay loam; many medium distinct very pale brown (10YR 8/3) mottles; weak medium subangular blocky structure; friable; few medium roots; neutral; clear smooth boundary.

C—39 to 60 inches; mottled strong brown (7.5YR 5/8), yellowish red (5YR 5/6), and very pale brown (10YR 7/4) saprolite that crushes to silty clay loam; massive; friable; neutral.

The thickness of the solum ranges from 25 to more than 39 inches. Bedrock is at a depth of more than 4 feet. Reaction is medium acid to neutral.

The Ap horizon is 5 to 8 inches thick. It has hue of 7.5YR, value of 4 or 5, and chroma 2, 4, or 6 or hue of 5YR, value of 4 or 5, and chroma of 2, 3, 4, or 6.

Some pedons have a BA horizon. This horizon has hue of 7.5YR or 5YR, value of 5 or 6, and chroma of 4, 6, or 8. It is sandy clay loam or clay loam. The Bt horizon generally has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8; hue of 5YR, value of 4 or 5, and chroma of 6; or hue of 5YR, value of 5, and chroma of 8. In some pedons, however, the lower part has matrix colors and mottles with hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8. The extreme upper part of the Bt horizon is silty clay loam or clay loam, and the rest of this horizon is clay or silty clay. The BC horizon has hue of 7.5YR or 2.5YR, value of 4 to 6, and chroma of 4, 6, or 8. In some pedons it has brownish or yellowish mottles.

The C horizon is weathered, acidic and basic crystalline rocks that, if crushed, are sandy loam, loam, or silty clay loam.

Pacolet Series

The Pacolet series consists of very deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, and schist. These soils are in the uplands. The slope is 2 to 25 percent. It is dominantly 10 to 25 percent.

Pacolet soils are in positions on the landscape similar to those of the Appling, Ashlar, Cecil, Georgeville, Louisburg, Madison, and Wedowee soils. Appling soils have a dominantly yellowish subsoil and have a solum that is thicker than that of the Pacolet soils. Ashlar and Louisburg soils have a loamy subsoil. Ashlar soils are moderately deep, and Louisburg soils are deep. Cecil and Georgeville soils have a solum that is thicker than that of the Pacolet soils. Georgeville soils have more than 30 percent silt in the control section. Madison soils have a high content of mica. Wedowee soils have a Bt horizon that is less red than that of the Pacolet soils.

Typical pedon of Pacolet sandy loam, 10 to 25 percent slopes; 0.5 mile south on Georgia State Highway 77 from Little Indian Creek bridge, 2,270 feet east on woods road, 1,575 feet southeast on ridgetop and down hillside:

O—1 inch to 0; partially decomposed hardwood, pine leaves, and branches; few fine roots.

A—0 to 2 inches; brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—2 to 6 inches; light brown (7.5YR 6/4) sandy loam; weak fine granular structure; very friable; many fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—6 to 10 inches; red (2.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt2—10 to 28 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; firm; few fine and medium roots; common prominent clay films on faces of peds; common fine flakes of mica; medium acid; gradual smooth boundary.

BC—28 to 32 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable; few medium roots; few faint clay films on faces of peds; common fine flakes of mica; medium acid; gradual smooth boundary.

C1—32 to 56 inches; red (2.5YR 4/8), highly weathered granite that crushes to sandy loam; massive; very friable; many fine flakes of mica; very strongly acid; clear smooth boundary.

C2—56 to 60 inches; reddish yellow (5YR 6/8), highly weathered granite that crushes to sandy loam; massive; very friable; many fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 25 to 38 inches. Bedrock is at a depth of 60 inches or more. Reaction is very strongly acid to medium acid unless the surface layer has been limed.

In uneroded areas the A and E horizons are sandy loam. The combined thickness of these two horizons is about 6 to 9 inches. In eroded areas, the texture is sandy clay loam and the thickness is about 2 to 4 inches. The A horizon has hue of 5YR or 10YR, value of 3 to 7, and chroma of 2, 3, 4, or 6 or hue of 7.5YR, value of 3 to 7, and chroma of 2, 4, or 6. The E horizon has hue of 10YR or 5YR, value of 5 or 6, and chroma of 3, 4, or 6 or hue of 7.5YR, value of 5 or 6, and chroma of 4 or 6.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. The upper part of this horizon is sandy clay loam or sandy clay. The lower part is sandy clay or clay. The BC horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it has common or many, medium, reddish yellow or strong brown mottles. It is sandy clay loam or clay loam.

The C horizon is weathered granite, granite gneiss, or schist that, if crushed, is coarse sandy loam, sandy loam, loam, sandy clay loam, or clay loam.

Riverview Series

The Riverview series consists of very deep, well drained, moderately permeable soils that formed in loamy sediment. These soils are on flood plains. They are mainly near perennial streams that drain from the uplands. The seasonal high water table is at a depth of 3 to 5 feet from late in fall until early in spring. The slope is 0 to 2 percent.

Riverview soils are associated with Altavista, Chewacla, Toccoa, and Wickham soils. Altavista and Wickham soils have an argillic horizon. They are on stream terraces. Altavista soils are moderately well drained. Chewacla and Toccoa soils are in positions on the landscape similar to those of the Riverview soils. Chewacla soils are somewhat poorly drained, and Toccoa soils are in a coarse-loamy family.

Typical pedon of Riverview silt loam, occasionally flooded; 0.7 mile northeast of Palmetto on Oglethorpe County road, about 1 mile southeast on woods road to a flood plain along a creek, 460 feet southeast; in an area of hardwoods:

A—0 to 5 inches; brown (7.5YR 5/3) silt loam; weak fine granular structure; friable; common fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw—5 to 35 inches; reddish brown (5YR 5/4) loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

C1—35 to 55 inches; brown (7.5YR 5/4) loam; common medium distinct light gray (10YR 7/2) mottles; massive; very friable; few medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.

C2—55 to 60 inches; brown (7.5YR 5/4) fine sandy loam; many medium distinct light gray (10YR 7/2) mottles; massive; very friable; few fine roots; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 24 to 40 inches. Reaction is strongly acid or very strongly acid unless the surface layer has been limed.

The A horizon is 5 to 10 inches thick. It has hue of 5YR or 10YR, value of 3 to 5, and chroma of 3 or 4 or hue of 7.5YR, value of 3 to 5, and chroma of 4.

The Bw horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3, 4, or 6. It has grayish mottles at a depth of 24 inches or more in some pedons. The texture is loam and silt loam.

Some pedons have buried horizons between depths of 33 and 40 inches. These horizons have hue of 2.5YR or 7.5YR, value of 4 to 6, and chroma of 2, 4, or 6 or hue of 5YR or 10YR, value of 4 to 6, and chroma of 2, 3, 4, or 6. In some pedons they have common or many red, pale brown, light brown, dark brown, light brownish gray, or pinkish gray mottles. The texture of these horizons is very fine sandy loam, silt loam, clay loam, or clay.

The C horizon is stratified in some pedons. It has hue of 5YR, value of 4 or 5, and chroma of 3, 4, or 6 or hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6. Some pedons have common or many gray mottles. The texture of this horizon is fine sandy loam, loam, or clay loam.

Toccoa Series

The Toccoa series consists of very deep, well drained, moderately rapidly permeable soils that formed in dominantly loamy sediment. These soils are on flood plains. They are near streams that drain from the uplands. The seasonal high water table is at a depth of 2.5 to 5.0 feet from late in fall to midspring. The slope is 0 to 2 percent.

Toccoa soils are associated with Altavista, Cartecay, and Riverview soils. Altavista soils are moderately well drained and are on stream terraces. They have an argillic horizon. Cartecay and Riverview soils are in positions on the landscape similar to those of the Toccoa soils. They are in a fine-loamy family. Cartecay soils are somewhat poorly drained.

Typical pedon of Toccoa fine sandy loam, occasionally flooded; about 5 miles northeast from the Wilkes County line on Georgia State Highway 78, about 4.5 miles northeast past Stevens Grove Church, about 1,300 feet southeast to first bottom near Brook Creek:

A—0 to 7 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; few fine flakes of mica; medium acid; clear smooth boundary.

C1—7 to 25 inches; brown (7.5YR 5/4) and brownish yellow (10YR 6/6), stratified fine sandy loam; massive; very friable; few medium roots; common fine flakes of mica; thin strata of loamy sand; medium acid; clear smooth boundary.

C2—25 to 35 inches; reddish brown (5YR 5/4) sandy loam; common fine distinct pale brown (10YR 6/3) mottles; massive; friable; few medium roots; few fine flakes of mica; medium acid; clear smooth boundary.

C3—35 to 40 inches; reddish brown (5YR 5/4) sandy loam; many medium distinct pale brown (10YR 6/3) mottles; massive; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

C4—40 to 60 inches; strong brown (7.5YR 4/6), stratified sandy loam and loamy sand; common medium distinct light gray (10YR 7/2) mottles; massive; very friable; few fine flakes of mica; strongly acid.

The thickness of the loamy and sandy sediment ranges from 5 to more than 10 feet. Reaction is strongly acid to slightly acid.

The A horizon is 6 to 12 inches thick. It has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4.

The C horizon has hue of 5YR or 10YR, value of 4 to 6, and chroma of 3, 4, or 6 or hue of 7.5YR, value of 4 to 6, and chroma of 4 or 6. In some pedons it has few or common gray, grayish brown, or light brownish gray mottles at a depth of more than 20 inches. The texture of this horizon is dominantly sandy loam, but in some pedons it is loamy sand, fine sandy loam, or loam.

Wedowee Series

The Wedowee series consists of very deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, or coarse grained schist. These soils are in the uplands. The slope is 6 to 25 percent. It is dominantly 10 to 25 percent.

Wedowee soils are in positions on the landscape similar to those of the Appling, Cecil, Georgeville, Madison, and Pacolet soils. Appling, Cecil, and Georgeville soils have a solum that is thicker than that of the Wedowee soils. In addition, Cecil and Georgeville soils have a dominantly red subsoil, and Georgeville soils have a higher content of silt. Madison and Pacolet soils have a dominantly red subsoil and have a high content of mica.

Typical pedon of Wedowee sandy loam, 10 to 25 percent slopes; 4.3 miles southwest on Georgia State Highway 77 from Vesta, 330 feet northwest on Oglethorpe County dirt road, 1,716 feet north of road:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—4 to 10 inches; yellowish brown (10YR 5/6) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; gradual smooth boundary.

BE—10 to 16 inches; reddish yellow (7.5YR 6/8) sandy loam; weak fine subangular blocky structure; friable; many fine and few medium roots; strongly acid; gradual smooth boundary.

Bt—16 to 32 inches; yellowish red (5YR 5/8) sandy clay; few fine faint reddish yellow mottles; moderate medium subangular blocky structure; firm; many fine and few medium roots; many prominent clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—32 to 37 inches; yellowish red (5YR 5/8) sandy clay loam; few faint reddish yellow mottles; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

C1—37 to 44 inches; yellowish red (5YR 5/8) saprolite that crushes to sandy clay loam; few faint reddish yellow mottles; rock structure; few fine roots; very friable; strongly acid; gradual wavy boundary.

C2—44 to 60 inches; yellowish red (5YR 5/8) saprolite that crushes to sandy clay loam; common medium distinct red (2.5YR 4/8) and reddish yellow (7.5YR 6/8) and few fine faint pale brown mottles; rock structure; few fine roots; strongly acid.

The thickness of the solum ranges from 25 to 38 inches. Bedrock is at a depth of 48 inches or more. Reaction is very strongly acid or strongly acid unless the surface layer has been limed.

The A horizon is 2 to 5 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 4 or 5, and chroma of 4 or 6.

Some pedons have a BE horizon, which has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 or 8. In some pedons it has mottles with hue of 2.5YR, value of 4 to 6, and chroma of 8; hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6; hue of 5YR, value of 5 or 6, and chroma of 8; or hue of 7.5YR, value of 5 or 6, and chroma of 8. The upper part of the Bt horizon is sandy clay loam or sandy clay, and the lower part is sandy clay or clay. The BC horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 or 8. It has mainly reddish, brownish, or grayish mottles. It is sandy clay loam or clay loam.

The C horizon is weathered granite, granite gneiss, or schist that, if crushed, is sandy clay loam, clay loam, or sandy clay.

Wickham Series

The Wickham series consists of very deep, well drained, moderately permeable soils that formed in loamy sediment. These soils are on stream terraces. The slope is 2 to 6 percent.

Wickham soils are associated with Altavista, Appling, Cecil, and Georgeville soils. Altavista soils are in positions on the landscape similar to those of the Wickham soils. They are moderately well drained. Appling, Cecil, and Georgeville soils are in the uplands. They have a clayey subsoil. In addition, Appling soils have a dominantly yellowish subsoil, and Georgeville soils have a higher content of silt than the Wickham soils.

Typical pedon of Wickham fine sandy loam, 2 to 6 percent slopes; 300 feet southeast of Broad River bridge on Georgia State Highway 77:

Ap—0 to 10 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; medium acid; clear smooth boundary.

BE—10 to 15 inches; yellowish red (5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—15 to 28 inches; red (2.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm; few medium roots; common faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—28 to 48 inches; red (2.5YR 5/8) clay loam; weak medium subangular blocky structure; friable; few medium roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—48 to 60 inches; yellowish red (5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; strongly acid.

The thickness of the solum ranges from 42 to more than 60 inches. Bedrock is at a depth of 6 to 10 feet or more. Reaction is very strongly acid to medium acid unless the surface layer has been limed.

The Ap horizon is 6 to 10 inches thick. It has hue of 10YR, 7.5YR, or 5YR, value of 3 to 6, and chroma of 4.

The BE horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam or loam. The Bt1 horizon has hue of 2.5YR or 7.5YR, value of 4 to 6, and chroma of 4, 6, or 8; hue of 5YR, value of 4 to 6, and chroma of 3, 4, or 6; or hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 8. It is sandy clay loam or clay loam. The Bt2 horizon has hue of 2.5YR, value of 4 or 5, and chroma of 4 or 6; hue of 5YR or 7.5YR, value of 5, and chroma of 8; or hue of 2.5YR, value of 4 or 5, and chroma of 8. Some pedons have reddish yellow mottles in the lower part of the Bt horizon. The texture of the Bt2 horizon is sandy clay loam or clay loam. The BC horizon has hue of 2.5YR or 5YR, value of 5 or 6, and chroma of 8. In some pedons it has common or many reddish yellow or yellow mottles. It is sandy loam, sandy clay loam, or clay loam.

Some pedons have a C horizon. This horizon is mottled red, reddish yellow, or yellow.

Zion Series

The Zion series consists of moderately deep, well drained, moderately slowly or slowly permeable soils that formed in material weathered from dark basic rock. These soils are in the uplands. The slope is 2 to 25 percent. It is dominantly 2 to 15 percent.

Zion soils are in positions on the landscape similar to those of the Enon, Georgeville, and Mecklenburg soils. All of these soils have a Bt horizon that is thicker than that of the Zion soils and are more than 40 inches deep over bedrock.

Typical pedon of Zion gravelly loam, 2 to 10 percent slopes; 2.9 miles west of Philomath on Oglethorpe County dirt road, 2 miles north on woods road, 250 feet west of road:

A—0 to 4 inches; brown (10YR 5/3) gravelly loam; weak fine granular structure; very friable; many fine and medium roots; common small pebbles; strongly acid; clear smooth boundary.

E—4 to 6 inches; light brown (7.5YR 6/4) gravelly loam; weak medium granular structure; very friable; many fine and medium roots; common small pebbles; very strongly acid; abrupt smooth boundary.

Bt—6 to 14 inches; reddish brown (5YR 5/4) clay; moderate medium subangular blocky structure; firm; common fine and few medium roots; many prominent clay films on faces of peds; common small pebbles; medium acid; clear smooth boundary.

BC—14 to 22 inches; reddish brown (5YR 5/4) clay loam; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; slightly acid; gradual wavy boundary.

C—22 to 38 inches; olive gray (5Y 5/2) and light gray (10YR 7/1) saprolite that crushes to loam; rock structure; firm; slightly acid; abrupt wavy boundary.

R—38 inches; hard basic rock.

The thickness of the solum ranges from 20 to 28 inches. Bedrock is at a depth of 20 to 40 inches. Reaction is very strongly acid or strongly acid in the A and E horizons unless the surface layer has been limed, and it is strongly acid to slightly acid in the B and C horizons.

The A horizon is 2 to 4 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 or 3 or hue of 7.5YR, value of 3 or 4, and chroma of 2 or 4. Some pedons have an E horizon, which has hue of 5YR, 7.5YR, or 10YR, value of 5 or 6, and chroma of 3 or 4.

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

The BC horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 4, 6, or 8. It has mainly reddish, brownish, or grayish mottles. It is clay loam or gravelly clay loam.

The C horizon is weathered basic rock that crushes to loam or clay loam.

Formation of the Soils

Soil characteristics are determined by the physical and mineralogical composition of the parent material; the plant and animal life on and in the soil; the climate under which the parent material accumulated and has existed since accumulation; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material *(6)*. All of these factors influence every soil, but the significance of each factor varies from place to place. In one area, one factor may dominate soil formation; in another area, a different factor may be dominant.

The interrelationships among these five factors are complex, and the effects of any one factor cannot be isolated and completely evaluated. It is convenient, however, to describe each factor separately and to indicate the probable effects of each.

Parent Material

Parent material is the unconsolidated mass in which soil forms. The chemical and mineralogical composition of the soil is derived largely from the parent material. The soils in Oglethorpe County formed mainly from material weathered from crystalline rock *(9)*.

Most of the soils on uplands in the western three-fourths of the county formed in material weathered from granite, intermediate gneiss, and aluminous schist. The well drained Appling, Cecil, Madison, and Pacolet soils are the main soils that formed in this material. These very gently sloping to moderately steep soils have a brownish, loamy surface layer, have a reddish or yellowish, clayey subsoil, and are underlain by reddish or yellowish loamy material. The soils of minor extent that formed in this parent material are the well drained to excessively drained Ashlar and Louisburg soils and the well drained Wedowee soils.

Most of the soils on uplands in the eastern part of the county formed in material weathered from metavolcanic rocks. The well drained Enon, Georgeville, and Mecklenburg soils are the main soils that formed in this material. These very gently sloping to moderately steep soils have a brownish, loamy surface layer and a reddish or yellowish, clayey subsoil that is mainly sticky and plastic. They are underlain by mottled, loamy material. The soils of minor extent that formed in this parent material are the well drained Hiwassee and Zion soils.

Stream terraces are near some of the creeks and rivers in Oglethorpe County. The soils on these terraces formed in sediment that is more recent than that in which the soils on uplands formed. An even more recent sediment is that in which the soils on low-lying alluvial plains formed. The nearly level, moderately well drained Altavista and very gently sloping, well drained Wickham soils on stream terraces are the main soils that formed in parent material. These soils are mainly loamy throughout. The moderately well drained soils on the stream terraces have a brownish surface layer and a subsoil that is mottled in shades of yellow. They are underlain by mottled, loamy material. The well drained soils have a brownish surface layer and a reddish subsoil.

Stream alluvium is adjacent to all the streams in Oglethorpe County. This alluvium is more recent than the sediment in which the soils on uplands and stream terraces formed. The somewhat poorly drained Cartecay and Chewacla soils, the moderately well drained and well drained Toccoa soils, the well drained Riverview soils, and the somewhat poorly drained, ponded Fluvaquents are the main soils on the flood plains. These soils are nearly level and are primarily loamy throughout. The somewhat poorly drained soils have a brownish surface layer and brownish underlying layers that are mottled in shades of gray and brown. The moderately well drained and well drained soils are brownish in the upper part. They also are brownish in the lower part but are mottled in shades of gray.

Plants and Animals

The effects of plants, animals, and other organisms on soil formation are significant. Plants and animals increase the content of organic matter and nitrogen in the soil, increase or decrease the content of plant nutrients, and change soil structure and porosity.

Plants recycle nutrients, add organic matter, and provide food and cover for animals. They stabilize the surface layer so that soil-forming processes can continue. They also provide a more stable environment for the soil-forming processes by protecting the soils from extremes in temperature.

The soils in Oglethorpe County formed under a succession of briers, brambles, and woody plants that yielded to pine and hardwoods. Later, the hardwoods suppressed most other plants and became the climax vegetation.

Animals rearrange soil material by roughening the surface, forming and filling channels, and shaping the peds and voids. The soil is mixed by ants, wasps, worms, and spiders, which make channels; by crustacea, such as crabs and crayfish; and by turtles and foxes, which dig burrows. Humans affect the soil-forming process by tilling the crops, removing natural vegetation and establishing different plants, and reducing or increasing the level of fertility.

Bacteria, fungi, and other micro-organisms hasten the decomposition of organic matter and increase the rate at which minerals are released for plant growth. The net gains and losses caused by plants and animals are important in Oglethorpe County. The relationships among plants and animals, climate, and parent material, however, are very close; therefore, the soils within the county do not differ significantly because of plants and animals.

Climate

The present climate of Oglethorpe County is thought to be similar to the climate that existed as the soils formed. The relatively high rainfall and warm temperature contribute to rapid soil formation and are the two most important climatic features that relate to soil properties.

Water from precipitation is essential in the formation of soil. Water dissolves soluble materials and is used by plants and animals. It transports material from one part of the soil to another part and from one area to another.

The soils in Oglethorpe County formed under a thermic temperature regime; that is, the mean soil temperature at a depth of 20 inches is 59 to 72 degrees. Based on the mean annual air temperature, the estimated soil temperature in Oglethorpe County is about 64 to 65 degrees. The rate of chemical reactions and other processes in the soil depends to some extent on temperature. In addition, temperature affects the type and quantity of vegetation, the amount and kind of organic matter, and the rate at which the organic matter decomposes.

Relief

Relief is the elevations, or inequalities, of the land surface considered collectively. The color of the soil, the degree of wetness, the thickness of the A horizon, the content of organic matter, and the plant cover are commonly related to relief. In Oglethorpe County, the most obvious effects of relief are those that relate to the color of the soil and the degree of wetness.

Cecil and Pacolet soils mainly have a reddish subsoil, whereas the subsoil of Cartecay and Chewacla soils is mottled primarily in shades of brown, yellow, and gray. This difference in color results from a difference in relief and a corresponding difference in internal drainage. Cecil and Pacolet soils are in the higher positions on the landscape and are better drained than Cartecay and Chewacla soils; therefore, the soil material is better oxidized and the subsoil is reddish.

The movement of water across the surface and through the soil is controlled mostly by relief. Water flowing across the surface commonly carries solid particles and causes erosion or deposition, depending on the kind of relief. More water runs off the sloping areas; therefore the soils are drier because less water penetrates the surface. The soils in low-lying areas are commonly wetter because they receive the water that flows off and through the soils in the higher positions on the landscape.

Time

The length of time that the soil-forming processes have acted on the parent material helps to determine the characteristics of the soil. Determinations of when soil formation began in the survey area are not exact. Most of the soils are considered mature. Mature soils are in equilibrium with the environment. They are characterized by readily recognizable pedogenic horizons and a regular decrease in content of carbon with increasing depth. Some areas of Cecil and Pacolet soils are on stable landscapes where the soil-forming processes have been active for thousands of years. These mature soils have a highly weathered solum and a well expressed zone of illuviation. In places erosion has removed most of the zone of illuviation.

Cartecay soils receive sediment annually from floodwater. These young soils are stratified and are not old enough to have a zone of illuviation. They do not have pedogenic horizons. They are characterized by an irregular decrease in content of carbon with increasing depth.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(2) American Society for Testing and Materials. 1986. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Applequist, M.B. 1959. Soil-site studies of southern hardwoods. *In* Southern Forest Soils, 8th An. For. Symp., La. State Univ., pp. 49-63, illus.

(4) Beck, Donald E. 1962. Yellow-poplar site index curves. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Res. Note 180, 2 pp., illus.

(5) Bergeaux, P.J. 1976. Fertilizer recommendations for field crops. Univ. Ga., Coll. Agric. Circ. 639.

(6) Byers, H.G., Charles E. Kellogg, M.S. Anderson, and James Thorp. 1938. Formation of soil. *In* Soils and men. U.S. Dep. Agric. Yearb., pp. 948-978.

(7) Coile, T.S., and F.X. Schumacher. 1953. Site index of young stands of loblolly and shortleaf pines in the Piedmont Plateau Region. J. For. 51: 432-435, illus.

(8) Eyre, F.H., ed. 1980. Forest cover types of the United States and Canada. Soc. of Amer. For., pp. 51-76.

(9) Georgia Department of Natural Resources. 1976. Geologic map of Georgia. Geol. and Water Resour. Div., Ga. Geol. Surv., 1 p. map.

(10) Olson, D.J. 1959. Site index curves for upland oak in the southeast. U.S. Dep. Agric. Forest Serv., Southeast. Forest Exp. Stn. Res. Note 125, 2 pp.

(11) United States Department of Agriculture. 1951 (Being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962)

(12) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., Agric. Handb. 436, 754 pp., illus.

Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

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 coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough for most mesophytic crops to be 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 so slowly 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 so long 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.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon 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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have 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 in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments that are 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

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).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the 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 degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

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 fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or 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.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters).

Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1952-81 at Elberton, Georgia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	52.5	28.6	40.6	72	4	57	5.16	3.07	7.01	8	0.0
February---	56.6	28.9	42.8	76	8	21	4.38	2.31	6.18	7	.0
March------	67.5	37.0	52.3	85	16	148	5.54	3.42	7.43	8	.6
April------	76.9	45.2	61.1	91	27	333	4.01	2.20	5.60	6	.0
May--------	81.9	52.9	67.4	93	33	539	4.39	2.32	6.19	7	.0
June-------	87.5	60.8	74.2	98	43	726	3.86	1.85	5.59	6	.0
July-------	90.1	64.8	77.5	100	52	853	4.71	2.23	6.84	7	.0
August-----	89.2	63.9	76.6	97	52	825	3.58	1.95	5.00	6	.0
September--	83.8	58.0	70.9	94	38	627	3.32	.92	5.27	5	.0
October----	74.5	44.4	59.5	87	24	301	2.88	.71	4.59	4	.0
November---	63.6	35.8	49.7	79	14	80	2.99	1.46	4.31	5	.0
December---	55.0	30.1	42.6	75	8	37	3.89	2.13	5.44	7	.0
Yearly:											
Average--	73.3	45.9	59.6	---	---	---	---	---	---	---	---
Extreme--	---	---	---	101	4	---	---	---	---	---	---
Total----	---	---	---	---	---	4,547	48.71	41.75	55.91	76	.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1952-81 at Elberton, Georgia]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 30	Apr. 14	May 7
2 years in 10 later than--	Mar. 25	Apr. 9	Apr. 30
5 years in 10 later than--	Mar. 14	Mar. 31	Apr. 19
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 25	Oct. 10	Oct. 3
2 years in 10 earlier than--	Oct. 31	Oct. 17	Oct. 7
5 years in 10 earlier than--	Nov. 10	Oct. 30	Oct. 15

TABLE 3.--GROWING SEASON

[Recorded in the period 1952-81 at Elberton, Georgia]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	217	196	157
8 years in 10	225	202	164
5 years in 10	240	212	179
2 years in 10	256	222	193
1 year in 10	264	227	201

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AkA	Altavista loam, 0 to 2 percent slopes, occasionally flooded	320	0.1
AmB	Appling coarse sandy loam, 2 to 6 percent slopes	10,910	3.9
AmC	Appling coarse sandy loam, 6 to 10 percent slopes	6,430	2.3
APC	Ashlar, Louisburg and Pacolet soils, 2 to 10 percent slopes	2,620	0.9
APE	Ashlar, Louisburg and Pacolet soils, 15 to 35 percent slopes	6,035	2.2
Ca	Cartecay loam, occasionally flooded	8,080	2.9
CeB	Cecil sandy loam, 2 to 6 percent slopes	32,935	11.8
CeC	Cecil sandy loam, 6 to 10 percent slopes	17,845	6.4
CfC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	32,230	11.6
Ch	Chewacla silt loam, occasionally flooded	3,220	1.2
EnB	Enon fine sandy loam, 2 to 6 percent slopes	10,520	3.8
EnC	Enon fine sandy loam, 6 to 10 percent slopes	2,100	0.8
Fp	Fluvaquents, ponded	1,525	0.5
GeB	Georgeville very fine sandy loam, 2 to 6 percent slopes	8,510	3.1
GoC2	Georgeville clay loam, 6 to 10 percent slopes, eroded	8,045	2.9
GtD2	Georgeville silty clay loam, 10 to 25 percent slopes, eroded	5,560	2.0
HaB	Helena sandy loam, 2 to 6 percent slopes	1,220	0.4
HeB	Hiwassee loam, 2 to 6 percent slopes	1,670	0.6
HeC	Hiwassee loam, 6 to 10 percent slopes	390	0.1
HwC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded	980	0.3
HwD2	Hiwassee clay loam, 10 to 25 percent slopes, eroded	705	0.3
MaB	Madison sandy loam, 2 to 6 percent slopes	5,880	2.1
MaC	Madison sandy loam, 6 to 10 percent slopes	5,400	1.9
MaD	Madison sandy loam, 10 to 25 percent slopes	3,570	1.3
MdC2	Madison sandy clay loam, 6 to 10 percent slopes, eroded	8,120	2.9
MdD2	Madison sandy clay loam, 10 to 25 percent slopes, eroded	11,040	4.0
MeB	Mecklenburg fine sandy loam, 2 to 6 percent slopes	4,235	1.5
MeC	Mecklenburg fine sandy loam, 6 to 10 percent slopes	4,110	1.5
MeD	Mecklenburg fine sandy loam, 10 to 25 percent slopes	1,875	0.7
PaB	Pacolet sandy loam, 2 to 6 percent slopes	4,320	1.5
PaC	Pacolet sandy loam, 6 to 10 percent slopes	2,500	0.9
PaD	Pacolet sandy loam, 10 to 25 percent slopes	8,455	3.0
PfC2	Pacolet sandy clay loam, 6 to 10 percent slopes, eroded	2,045	0.7
PfD2	Pacolet sandy clay loam, 10 to 25 percent slopes, eroded	33,090	11.9
PgD	Pacolet-Gullied land complex, 10 to 25 percent slopes	150	0.1
Qu	Quarries	375	0.1
Rv	Riverview silt loam, occasionally flooded	1,865	0.7
To	Toccoa fine sandy loam, occasionally flooded	10,760	3.9
WeC	Wedowee sandy loam, 6 to 10 percent slopes	1,360	0.5
WeD	Wedowee sandy loam, 10 to 25 percent slopes	3,580	1.3
WkB	Wickham fine sandy loam, 2 to 6 percent slopes	1,625	0.6
ZnC	Zion gravelly loam, 2 to 10 percent slopes	800	0.3
ZnD	Zion gravelly loam, 10 to 15 percent slopes	825	0.3
ZnE	Zion gravelly loam, 15 to 25 percent slopes	570	0.2
	Total	278,400	100.0

TABLE 5.--IMPORTANT FARMLAND

Map symbol and soil name	Prime farmland acreage*	Additional farmland acreage of statewide importance*
AkA------------------ Altavista	320	---
AmB------------------ Appling	10,910	---
AmC------------------ Appling	---	6,430
APC------------------ Ashlar, Louisburg and Pacolet	---	2,620
Ca------------------- Cartecay	---	8,080
CeB------------------ Cecil	32,935	---
CeC------------------ Cecil	---	17,845
Ch------------------- Chewacla	---	3,220
EnB------------------ Enon	10,520	---
EnC------------------ Enon	---	2,100
GeB------------------ Georgeville	8,510	---
HaB------------------ Helena	1,220	---
HeB------------------ Hiwassee	1,670	---
HeC------------------ Hiwassee	---	370
MaB------------------ Madison	5,880	---
MaC------------------ Madison	---	5,400
MeB------------------ Mecklenburg	4,235	---
MeC------------------ Mecklenburg	---	4,100
PaB------------------ Pacolet	4,320	---
PaC------------------ Pacolet	---	2,500

See footnote at end of table.

TABLE 5.--IMPORTANT FARMLAND--Continued

Map symbol and soil name	Prime farmland acreage*	Additional farmland acreage of statewide importance*
Rv: Riverview	1,865	---
To: Toccoa	---	10,760
WeC: Wodowee	---	1,360
WkB: Wickham	1,625	---

* The acreage is as of the date when fieldwork was completed. Soils not listed do not qualify as prime farmland or as additional land of statewide importance.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Soybeans	Wheat	Pasture
		Bu	Bu	AUM*
AkA----------------------- Altavista	IIw	45	55	9.0
AmB----------------------- Appling	IIe	35	45	8.0
AmC----------------------- Appling	IIIe	30	40	7.5
APC:				
Ashlar-------------------	IIIe	25	30	6.0
Pacolet------------------	IIIe	25	30	6.0
Louisburg----------------	IVe	---	---	5.0
APE----------------------- Ashlar, Louisburg and Pacolet	VIIe	---	---	4.0
Ca------------------------ Cartecay	IIIw	30	40	10.0
CeB----------------------- Cecil	IIe	35	45	8.0
CeC----------------------- Cecil	IIIe	30	40	7.5
CfC2---------------------- Cecil	IVe	---	---	5.0
Ch------------------------ Chewacla	IIIw	35	45	11.0
EnB----------------------- Enon	IIe	35	45	8.5
EnC----------------------- Enon	IIIe	30	40	8.0
Fp------------------------ Fluvaquents	VIIw	---	---	---
GeB----------------------- Georgeville	IIe	35	45	8.0
GoC2---------------------- Georgeville	IVe	---	---	5.0
GtD2---------------------- Georgeville	VIe	---	---	4.5
HaB----------------------- Helena	IIe	30	40	7.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Wheat	Pasture
		Bu	Bu	AUM*
HeB------------------------ Hiwassee	IIe	40	50	7.5
HeC------------------------ Hiwassee	IIIe	35	45	7.0
HwC2----------------------- Hiwassee	IVe	---	---	5.0
HwD2----------------------- Hiwassee	VIe	---	---	4.5
MaB------------------------ Madison	IIe	35	45	7.5
MaC------------------------ Madison	IIIe	30	40	6.5
MaD------------------------ Madison	VIe	---	---	5.5
MdC2----------------------- Madison	IVe	---	---	5.0
MdD2----------------------- Madison	VIe	---	---	4.5
MeB------------------------ Mecklenburg	IIe	40	50	6.0
MeC------------------------ Mecklenburg	IIIe	35	45	5.5
MeD------------------------ Mecklenburg	VIe	---	---	4.5
PaB------------------------ Pacolet	IIe	35	45	8.0
PaC------------------------ Pacolet	IIIe	30	40	7.5
PaD------------------------ Pacolet	VIe	---	---	5.5
PfC2----------------------- Pacolet	IVe	---	---	5.0
PfD2----------------------- Pacolet	VIe	---	---	4.5
PgD------------------------ Pacolet-Gullied land	VIIe	---	---	4.0
Qu. Quarries				
Rv------------------------- Riverview	IIw	30	40	8.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Wheat	Pasture
		Bu	Bu	AUM*
To------------------------ Toccoa	IIw	40	50	8.0
WeC----------------------- Wedowee	IIIe	30	40	7.5
WeD----------------------- Wedowee	VIe	---	---	5.5
WkB----------------------- Wickham	IIe	50	65	9.5
ZnC----------------------- Zion	IIIe	25	30	4.0
ZnD----------------------- Zion	IVe	---	---	3.5
ZnE----------------------- Zion	VIe	---	---	3.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)	
		Erosion (e)	Wetness (w)
		Acres	Acres
I	---	---	---
II	94,770	81,825	12,945
III	53,990	42,690	11,300
IV	53,110	53,110	---
V	---	---	---
VI	68,445	68,445	---
VII	7,710	6,185	1,525
VIII	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
AkA----------------- Altavista	9W	Slight	Moderate	Slight	Loblolly pine--------	91	9	Loblolly pine, yellow poplar, black walnut, sweetgum, American sycamore, cherrybark oak.
					Longleaf pine--------	84	8	
					Shortleaf pine-------	77	9	
					Sweetgum------------	84	6	
					White oak-----------	---	---	
					Red maple-----------	---	---	
					Yellow poplar--------	---	---	
					Southern red oak-----	---	---	
					Northern red oak-----	---	---	
					Water oak-----------	---	---	
AmB, AmC----------- Appling	8A	Slight	Slight	Slight	Loblolly pine--------	81	8	Eastern redcedar, loblolly pine, yellow poplar.
					Shortleaf pine-------	65	7	
					Scarlet oak----------	68	4	
					Southern red oak-----	76	4	
					White oak-----------	71	4	
					Yellow poplar--------	90	6	
					Sweetgum------------	---	---	
					Hickory-------------	---	---	
APC:								
Ashlar------------	8S	Slight	Slight	Slight	Shortleaf pine-------	70	8	Loblolly pine.
					Northern red oak-----	60	3	
Louisburg---------	7A	Slight	Slight	Slight	Loblolly pine--------	77	7	Loblolly pine, yellow poplar.
					Shortleaf pine-------	69	8	
					Southern red oak-----	72	4	
					Yellow poplar--------	84	6	
					White oak-----------	68	4	
Pacolet-----------	8A	Slight	Slight	Slight	Loblolly pine--------	78	8	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine-------	70	8	
					Yellow poplar--------	90	6	
APE:								
Ashlar------------	8R	Moderate	Moderate	Slight	Shortleaf pine-------	70	8	Loblolly pine.
					Northern red oak-----	60	3	
Louisburg---------	7R	Moderate	Moderate	Slight	Loblolly pine--------	77	7	Loblolly pine, yellow poplar.
					Shortleaf pine-------	69	8	
					Southern red oak-----	72	4	
					Yellow poplar--------	84	6	
					White oak-----------	68	4	
Pacolet-----------	8R	Moderate	Moderate	Slight	Loblolly pine--------	78	8	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine-------	70	8	
					Yellow poplar--------	90	6	
Ca----------------- Cartecay	9W	Slight	Moderate	Slight	Loblolly pine--------	95	9	Loblolly pine, sweetgum, yellow poplar, water oak, American sycamore, eastern cottonwood.
					Sweetgum------------	95	8	
					Yellow poplar--------	105	8	
					Water oak-----------	85	---	
					Southern red oak-----	85	4	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
CeB, CeC----------- Cecil	8A	Slight	Slight	Slight	Loblolly pine--------	80	8	Loblolly pine, yellow poplar.
					Shortleaf pine-------	69	8	
					Black oak-----------	66	3	
					Northern red oak-----	82	4	
					Post oak------------	65	3	
					Scarlet oak----------	80	4	
CfC2--------------- Cecil	7C	Moderate	Moderate	Moderate	Loblolly pine--------	72	7	Loblolly pine.
					Shortleaf pine-------	66	7	
Ch----------------- Chewacla	9W	Slight	Moderate	Slight	Loblolly pine--------	96	9	Loblolly pine, American sycamore, yellow poplar, sweetgum, green ash.
					Yellow poplar--------	100	8	
					American sycamore----	---	---	
					Sweetgum-------------	97	9	
					Water oak------------	86	---	
					Eastern cottonwood---	---	---	
					Green ash------------	---	---	
					Southern red oak-----	---	---	
					Blackgum-------------	---	---	
EnB, EnC----------- Enon	7A	Slight	Slight	Slight	Loblolly pine--------	73	7	Loblolly pine.
					Shortleaf pine-------	63	7	
					Northern red oak-----	84	4	
					Sweetgum-------------	78	5	
					White oak------------	69	4	
					Yellow-poplar--------	88	6	
					Hickory--------------	---	---	
Fp----------------- Fluvaquents	9W	Slight	Severe	Severe	Blackgum-------------	85	9	Blackgum.
GeB---------------- Georgeville	8A	Slight	Slight	Slight	Loblolly pine--------	81	8	Loblolly pine, black walnut, yellow poplar.
					Longleaf pine--------	67	5	
					Shortleaf pine-------	63	7	
					White oak------------	69	4	
					Scarlet oak----------	70	4	
					Southern red oak-----	67	3	
GoC2--------------- Georgeville	6C	Moderate	Moderate	Moderate	Loblolly pine--------	70	6	Loblolly pine.
					Longleaf pine--------	60	4	
GtD2--------------- Georgeville	6C	Severe	Severe	Moderate	Loblolly pine--------	70	6	Loblolly pine.
					Longleaf pine--------	60	4	
HaB---------------- Helena	8W	Slight	Moderate	Slight	Loblolly pine--------	80	8	Loblolly pine, yellow popar.
					Shortleaf pine-------	63	7	
					White oak------------	64	3	
					Yellow poplar--------	87	6	
HeB, HeC----------- Hiwassee	7A	Slight	Slight	Slight	Loblolly pine--------	75	7	Loblolly pine, yellow poplar.
					Northern red oak-----	70	4	
					Shortleaf pine-------	70	8	
					White oak------------	70	4	
					Yellow poplar--------	85	6	
HwC2--------------- Hiwassee	6C	Slight	Moderate	Moderate	Loblolly pine--------	70	6	Loblolly pine.
					Shortleaf pine-------	60	6	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
HwD2 Hiwassee	6C	Moderate	Severe	Moderate	Loblolly pine	70	6	Loblolly pine.
					Shortleaf pine	60	6	
MaB, MaC Madison	7A	Slight	Slight	Slight	Loblolly pine	73	7	Loblolly pine, longleaf pine, yellow poplar.
					Longleaf pine	63	4	
					Shortleaf pine	66	7	
					Southern red oak	81	4	
					Yellow poplar	96	7	
MaD Madison	7R	Moderate	Moderate	Slight	Loblolly pine	73	7	Loblolly pine, longleaf pine, yellow poplar.
					Longleaf pine	63	4	
					Shortleaf pine	66	7	
					Southern red oak	81	4	
					Yellow poplar	96	7	
MdC2, MdD2 Madison	7C	Moderate	Moderate	Moderate	Loblolly pine	72	7	Eastern redcedar, loblolly pine.
					Shortleaf pine	66	7	
					Longleaf pine	60	4	
MeB, MeC Mecklenburg	7A	Moderate	Slight	Slight	Loblolly pine	75	7	Loblolly pine, yellow poplar.
					Shortleaf pine	67	7	
					Southern red oak	75	4	
					Sweetgum	82	6	
					White oak	71	4	
					Yellow poplar	89	6	
MeD Mecklenburg	7R	Moderate	Moderate	Slight	Loblolly pine	75	7	Loblolly pine, yellow poplar.
					Shortleaf pine	67	7	
					Southern red oak	75	4	
					Sweetgum	82	6	
					White oak	71	4	
					Yellow poplar	89	6	
PaB, PaC Pacolet	8A	Slight	Slight	Slight	Loblolly pine	78	8	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	70	8	
					Yellow poplar	90	6	
PaD Pacolet	8R	Moderate	Moderate	Slight	Loblolly pine	78	8	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	70	8	
					Yellow poplar	90	6	
PfC2 Pacolet	6C	Moderate	Moderate	Moderate	Loblolly pine	70	6	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	60	6	
					Yellow poplar	80	5	
PfD2 Pacolet	6C	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	60	6	
					Yellow poplar	80	5	
PgD:								
Pacolet	6C	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	60	6	
					Yellow poplar	80	5	
Gullied land.	6C	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, shortleaf pine, yellow poplar.
					Shortleaf pine	60	6	
					Yellow poplar	80	5	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi-nation symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Common trees	Site index	Produc-tivity class*	
Rv----------------- Riverview	9W	Slight	Moderate	Moderate	Yellow poplar-------- Loblolly pine-------- Sweetgum-------------	110 100 100	9 9 10	Loblolly pine, eastern cottonwood, sweetgum, yellow poplar, American sycamore.
To----------------- Toccoa	9A	Slight	Slight	Slight	Loblolly pine-------- Yellow poplar-------- Sweetgum------------- Southern red oak-----	90 107 100 ---	9 8 10 ---	Loblolly pine, yellow poplar, American sycamore, cherrybark oak.
WeC---------------- Wedowee	8A	Slight	Slight	Slight	Loblolly pine-------- Shortleaf pine------- Southern red oak----- Northern red oak----- White oak------------	80 69 70 68 65	8 8 4 4 3	Loblolly pine, shortleaf pine, yellow poplar.
WeD---------------- Wedowee	8R	Moderate	Moderate	Slight	Loblolly pine-------- Shortleaf pine------- Southern red oak----- Northern red oak----- White oak------------	80 69 70 68 65	8 8 4 4 3	Loblolly pine, shortleaf pine, yellow poplar.
WkB---------------- Wickham	9A	Slight	Slight	Slight	Loblolly pine-------- Yellow-poplar-------- Southern red oak-----	90 100 ---	9 8 ---	Loblolly pine, yellow poplar.
ZnC, ZnD----------- Zion	4A	Slight	Slight	Slight	Northern red oak----- Shortleaf pine------- Virginia pine--------	70 60 60	4 6 6	Loblolly pine.
ZnE---------------- Zion	4R	Moderate	Moderate	Slight	Northern red oak----- Shortleaf pine------- Loblolly pine--------	70 60 70	4 6 6	Loblolly pine.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AkA------------------- Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
AmB------------------- Appling	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
AmC------------------- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
APC:					
Ashlar---------------	Slight----------	Slight----------	Severe: slope.	Slight----------	Moderate: droughty, depth to rock.
Louisburg------------	Slight----------	Slight----------	Severe: slope.	Slight----------	Moderate: large stones, droughty.
Pacolet--------------	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
APE:					
Ashlar---------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Louisburg------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ca-------------------- Cartecay	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CeB------------------- Cecil	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
CeC, CfC2------------- Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Ch-------------------- Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
EnB------------------- Enon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
EnC------------------- Enon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Fp. Fluvaquents					

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GeB: Georgeville	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
GoC2: Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
GtD2: Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HaB: Helena	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
HeB: Hiwassee	Slight	Slight	Moderate: slope.	Slight	Slight.
HeC, HwC2: Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
HwD2: Hiwassee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MaB: Madison	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MaC, MdC2: Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MaD, MdD2: Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MeB: Mecklenburg	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MeC: Mecklenburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MeD: Mecklenburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PaB: Pacolet	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
PaC, PfC2: Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PaD, PfD2: Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PgD:					
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Gullined land	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Qu. Quarries					

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Rv: Riverview	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
To: Toccoa	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
WeC: Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WeD: Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WkB: Wickham	Slight	Slight	Moderate: slope.	Slight	Slight.
ZnC: Zion	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
ZnD: Zion	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, droughty, slope.
ZnE: Zion	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.	Severe: slope.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AkA----------------- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
AmB----------------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AmC----------------- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
APC:										
Ashlar-------------	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Louisburg----------	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Pacolet------------	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
APE:										
Ashlar-------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Louisburg----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Pacolet------------	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ca------------------ Cartecay	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair.
CeB----------------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeC----------------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CfC2---------------- Cecil	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ch------------------ Chewacla	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
EnB----------------- Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnC----------------- Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Fp. Fluvaquents										
GeB----------------- Georgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GoC2: Georgeville	Poor	Poor	Poor	Fair	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
GtD2: Georgeville	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
HaB: Helena	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeB: Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeC: Hiwassee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HwC2: Hiwassee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HwD2: Hiwassee	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MaB: Madison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MaC: Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MaD: Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
MdC2: Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MdD2: Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
MeB: Mecklenburg	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeC: Mecklenburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeD: Mecklenburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PaB, PaC: Pacolet	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PaD: Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PfC2: Pacolet	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PfD2: Pacolet	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PgD:										
Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PgD:										
Gullied land	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Qu. Quarries										
Rv Riverview	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
To Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WeC, WeD Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WkB Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ZnC Zion	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ZnD, ZnE Zion	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AkA: Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
AmB: Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
AmC: Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
APC:						
Ashlar	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: droughty, depth to rock.
Louisburg	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: large stones, droughty.
Pacolet	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
APE:						
Ashlar	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ca: Cartecay	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness.
CeB: Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CeC, CfC2: Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Slight.
Ch: Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Moderate: wetness.
EnB: Enon	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
EnC: Enon	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Fp. Fluvaquents						
GeB: Georgeville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength	Slight.
GoC2: Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
GtD2: Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HaB: Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
HeB: Hiwassee	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Modetate: low strength.	Slight.
HeC, HwC2: Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
HwD2: Hiwassee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MaB: Madison	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
MaC, MdC2: Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
MaD, MdD2: Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MeB: Mecklenburg	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MeC: Mecklenburg	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MeD: Mecklenburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
PaB: Pacolet	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
PaC, PfC2: Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.	Moderate: slope.
PaD, PfD2: Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PgD:						
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PgD:						
Gullied land-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Qu. Quarries						
Rv---------------- Riverview	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
To---------------- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
WeC--------------- Wedowee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.	Moderate: slope.
WeD--------------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WkB--------------- Wickham	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
ZnC--------------- Zion	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones, droughty.
ZnD--------------- Zion	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones, droughty, slope.
ZnE--------------- Zion	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell, slope.	Severe: slope.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AkA----------------- Altavista	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
AmB----------------- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
AmC----------------- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
APC:					
Ashlar-------------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: depth to rock, small stones.
Louisburg----------	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Moderate: depth to rock.
Pacolet------------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
APE:					
Ashlar-------------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Poor: depth to rock, small stones, slope.
Louisburg----------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope.
Pacolet------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ca------------------ Cartecay	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
CeB----------------- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
CeC, CfC2----------- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Ch------------------ Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EnB----------------- Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
EnC----------------- Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Fp. Fluvaquents					
GeB----------------- Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
GoC2---------------- Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
GtD2---------------- Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
HaB----------------- Helena	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
HeB----------------- Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
HeC, HwC2----------- Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
HwD2---------------- Hiwassee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MaB----------------- Madison	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
MaC, MdC2----------- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
MaD, MdD2----------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MeB----------------- Mecklenburg	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
MeC----------------- Mecklenburg	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MeD----------------- Mecklenburg	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PaB----------------- Pacolet	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
PaC, PfC2----------- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
PaD, PfD2----------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PgD:					
Pacolet------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Gullied land-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Qu. Quarries					
Rv------------------ Riverview	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
To------------------ Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
WeC----------------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
WeD----------------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WkB----------------- Wickham	Slight-----------	Moderate: seepage, slope.	Severe: seepage.	Slight-----------	Good.
ZnC----------------- Zion	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
ZnD----------------- Zion	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
ZnE----------------- Zion	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AkA------------------- Altavista	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Moderate: too clayey.
AmB, AmC-------------- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
APC:				
Ashlar-----------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Louisburg------------	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Pacolet--------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
APE:				
Ashlar-----------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Louisburg------------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Pacolet--------------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Ca-------------------- Cartecay	Fair: wetness.	Probable-------------	Improbable: too sandy.	Fair: wetness.
CeB, CeC, CfC2-------- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ch-------------------- Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: wetness.
EnB, EnC-------------- Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Fp. Fluvaquents				
GeB, GoC2------------- Georgeville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GtD2------------------ Georgeville	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
HaB------------------- Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
HeB, HeC, HwC2-------- Hiwassee	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HwD2------------------ Hiwassee	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MaB, MaC, MdC2-------- Madison	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MaD, MdD2------------- Madison	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MeB, MeC-------------- Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MeD------------------- Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
PaB, PaC, PfC2-------- Pacolet	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PaD, PfD2------------- Pacolet	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PgD:				
Pacolet--------------	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Gullied land---------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Qu. Quarries				
Rv-------------------- Riverview	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
To-------------------- Toccoa	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
WeC------------------- Wedowee	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WeD------------------- Wedowee	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WkB------------------- Wickham	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
ZnC, ZnD-------------- Zion	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ZnE------------------- Zion	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AkA------------ Altavista	Moderate: seepage.	Moderate: wetness.	Flooding-------	Wetness--------	Wetness--------	Favorable.
AmB------------ Appling	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
AmC------------ Appling	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
APC:						
Ashlar---------	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, depth to rock.	Depth to rock	Droughty, depth to rock.
Louisburg------	Severe: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Favorable------	Droughty.
Pacolet--------	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
APE:						
Ashlar---------	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Louisburg------	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Slope----------	Slope, droughty.
Pacolet--------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Ca------------- Cartecay	Severe: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
CeB------------ Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
CeC, CfC2------ Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Ch------------- Chewacla	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
EnB------------ Enon	Slight---------	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
EnC------------ Enon	Slight---------	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Fp. Fluvaquents						
GeB------------ Georgeville	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
GoC2, GtD2: Georgeville	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
HaB: Helena	Slight	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
HeB: Hiwassee	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
HeC, HwC2, HwD2: Hiwassee	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MaB: Madison	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
MaC, MaD, MdC2, MdD2: Madison	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MeB: Mecklenburg	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
MeC, MeD: Mecklenburg	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
PaB: Pacolet	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
PaC, PaD, PfC2, PfD2: Pacolet	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
PgD:						
Pacolet	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Gullied land	Severe: seepage.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
Qu. Quarries						
Rv: Riverview	Moderate: seepage.	Moderate: piping.	Deep to water	Flooding	Favorable	Favorable.
To: Toccoa	Severe: seepage.	Severe: piping.	Flooding	Flooding	Favorable	Favorable.
WeC, WeD: Wedowee	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
WkB: Wickham	Moderate: seepage.	Slight	Deep to water	Slope	Favorable	Favorable.
ZnC: Zion	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Depth to rock, erodes easily.	Erodes easily, droughty.
ZnD, ZnE: Zion	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AkA-------------- Altavista	0-9	Loam------------	ML, CL-ML, SM, SM-SC	A-4, A-2	0	95-100	90-100	65-99	35-60	<23	NP-7
	9-42	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	42-60	Variable---------	---	---	---	---	---	---	---	---	---
AmB, AmC--------- Appling	0-11	Coarse loam------	SM	A-2	0-5	86-100	80-100	55-91	15-35	<27	NP-5
	11-40	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	40-50	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	50-60	Variable---------	---	---	---	---	---	---	---	---	---
APC, APE:											
Ashlar----------	0-17	Coarse loam------	SM, SM-SC	A-2, A-4, A-1	0-2	80-95	75-95	40-80	20-50	<25	NP-6
	17-23	Variable---------	---	---	---	---	---	---	---	---	---
	23-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Louisburg-------	0-9	Sandy loam-------	SM, SM-SC	A-2	0-15	80-100	75-95	50-80	25-35	<30	NP-6
	9-29	Sandy loam-------	SM, SM-SC	A-2, A-4	0-15	85-100	75-98	53-78	25-40	<40	NP-7
	29-60	Variable---------	---	---	---	---	---	---	---	---	---
Pacolet---------	0-6	Sandy loam-------	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	6-32	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	32-60	Variable---------	---	---	---	---	---	---	---	---	---
Ca--------------- Cartecay	0-8	Loam------------	ML, CL, CL-ML	A-4, A-6	0	98-100	95-100	90-100	51-95	<40	NP-15
	8-50	Sandy loam, fine sandy loam, loam.	SM, SC, SM-SC	A-2, A-4	0	90-100	75-100	60-85	25-50	<30	NP-10
	50-60	Loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-1	0	80-100	35-95	25-80	5-35	---	NP
CeB, CeC--------- Cecil	0-6	Sandy loam-------	SM, SM-SC	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-6
	6-9	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	74-100	72-100	68-95	38-81	21-35	3-15
	9-34	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	34-60	Variable---------	---	---	---	---	---	---	---	---	---
CfC2------------- Cecil	0-3	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0-5	74-100	72-100	68-95	38-81	21-35	3-15
	3-39	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	39-57	Variable---------	---	---	---	---	---	---	---	---	---
Ch--------------- Chewacla	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-100	55-90	25-49	4-20
	6-50	Sandy clay loam, loam, sandy loam.	SM, SM-SC, ML	A-4, A-7-6	0	96-100	95-100	60-96	36-70	20-45	NP-15
	50-60	Variable---------	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EnB, EnC: Enon	0-5	Fine sandy loam	SM, SM-SC, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	<30	NP-10
	5-37	Clay loam, sandy clay loam.	CL	A-4, A-6	0-5	80-100	80-100	70-90	50-80	25-40	7-20
	37-60	Variable	---	---	---	---	---	---	---	---	---
Fp. Fluvaquents											
GeB: Georgeville	0-6	Very fine sandy loam.	ML	A-4	0-2	90-100	85-100	65-100	51-98	<40	NP-10
	6-13	Silty clay loam, clay loam.	CL, ML	A-6, A-7, A-4	0-1	90-100	90-100	85-100	70-98	30-49	8-20
	13-38	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-79	15-40
	38-55	Silty clay loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	90-100	65-100	51-95	<30	NP-12
	55-60	Variable	---	---	---	---	---	---	---	---	---
GoC2: Georgeville	0-2	Clay loam	CL, ML	A-6, A-7	0-2	90-100	90-100	85-100	65-98	30-49	11-20
	2-14	Silty clay loam, clay loam.	CL, ML	A-6, A-7, A-4	0-1	90-100	90-100	85-100	70-98	30-49	8-20
	14-55	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-79	15-40
	55-60	Variable	---	---	---	---	---	---	---	---	---
GtD2: Georgeville	0-3	Silty clay loam	CL, ML	A-6, A-7	0-2	90-100	90-100	85-100	65-98	30-49	11-20
	3-36	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-79	15-40
	36-60	Variable	---	---	---	---	---	---	---	---	---
HaB: Helena	0-7	Sandy loam	SM, SM-SC, SC	A-2, A-4	0-5	95-100	90-100	51-90	26-46	<30	NP-9
	7-13	Sandy clay loam, clay loam, sandy loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	49-70	30-49	15-26
	13-45	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	45-60	Variable	---	---	---	---	---	---	---	---	---
HeB, HeC: Hiwassee	0-6	Loam	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	6-46	Clay, silty clay, clay loam.	CL, ML, MH	A-7-5, A-7-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	46-60	Sandy loam, loam, sandy clay loam.	SM, ML, SM-SC, CL	A-4, A-5, A-6, A-7	0-5	90-100	85-99	60-90	36-70	20-49	4-20
HwC2, HwD2: Hiwassee	0-4	Clay loam	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	4-53	Clay, silty clay, clay loam.	CL, ML, MH	A-7-5, A-7-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	53-60	Sandy loam, loam, sandy clay loam.	SM, ML, SM-SC, CL	A-4, A-5, A-6, A-7	0-5	90-100	85-99	60-90	36-70	20-49	4-20
MaB, MaC, MaD: Madison	0-6	Sandy loam	SM	A-2, A-4	0-3	85-100	80-100	60-90	26-49	<35	NP-8
	6-25	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	25-60	Variable	---	---	---	---	---	---	---	---	---
MdC2, MdD2: Madison	0-3	Sandy clay loam	CL, ML	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	3-21	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	21-60	Variable	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
MeB, MeC, MeD---- Mecklenburg	0-6	Fine sandy loam	ML, SM	A-4, A-6, A-7-6	0-5	90-100	80-100	65-90	36-65	<45	NP-15
	6-36	Clay-------------	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	24-45
	36-39	Loam, sandy clay loam, clay loam.	CL, ML	A-4, A-6, A-7	0-5	90-100	85-100	80-100	50-80	25-49	11-25
	39-60	Variable---------	---	---	---	---	---	---	---	---	---
PaB, PaC, PaD---- Pacolet	0-6	Sandy loam-------	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	6-28	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	28-32	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	32-60	Variable---------	---	---	---	---	---	---	---	---	---
PfC2, PfD2------- Pacolet	0-3	Sandy clay loam	SM-SC, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	3-19	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	19-33	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	33-60	Variable---------	---	---	---	---	---	---	---	---	---
PgD:											
Pacolet---------	0-20	Sandy clay-------	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	20-60	Variable---------	---	---	---	---	---	---	---	---	---
Gullied land----	0-60	Variable---------	---	---	---	---	---	---	---	---	---
Qu. Quarries											
Rv--------------- Riverview	0-5	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	60-80	16-30	3-14
	5-35	Sandy clay loam, silty clay loam, loam.	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	60-95	20-40	3-20
	35-60	Variable---------	---	---	---	---	---	---	---	---	---
To--------------- Toccoa	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	98-100	95-100	85-100	20-60	<30	NP-4
	7-60	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
WeC, WeD--------- Wedowee	0-10	Sandy loam-------	SM, SM-SC	A-4, A-2-4	0	95-100	90-100	60-99	23-50	<30	NP-6
	10-16	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	90-100	90-100	80-97	40-75	<32	NP-15
	16-37	Sandy clay, clay loam, clay.	SC, ML, CL, SM	A-6, A-7	0	95-100	95-100	65-97	45-75	30-58	10-25
	37-60	Variable---------	---	---	---	---	---	---	---	---	---
WkB-------------- Wickham	0-10	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
	10-60	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	5-15

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ZnC, ZnD, ZnE---- Zion	0-4	Gravelly loam----	ML, SM, CL, CL-ML	A-4	0-5	85-100	75-100	60-100	45-85	20-34	2-10
	4-6	Very gravelly clay loam, gravelly clay loam, gravelly loam.	SC, GC	A-2, A-7, A-6	0	60-90	25-50	22-50	15-40	30-45	12-20
	6-14	Clay, silty clay, silty clay loam.	MH, CH, CL	A-7	0	95-100	90-100	85-100	80-95	41-80	20-50
	14-22	Gravelly clay, clay loam, clay.	CH, SC, GC	A-7	0-20	55-95	45-95	40-90	36-85	50-70	30-40
	22-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AkA--------------	0-9	10-24	1.30-1.50	2.0-6.0	0.12-0.20	4.5-6.0	Low----------	0.24	5	.5-3
Altavista	9-42	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.24		
	42-60	---	---	---	---	---	-------------	----		
AmB, AmC---------	0-11	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
Appling	11-40	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	40-50	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	50-60	---	---	---	---	---	-------------	----		
APC, APE:										
Ashlar----------	0-17	5-15	1.30-1.55	2.0-6.0	0.08-0.15	4.5-6.0	Low----------	0.24	2	.5-1
	17-23	---	---	---	---	---	-------------	----		
	23-60	---	---	---	---	---	-------------	----		
Louisburg-------	0-9	5-15	1.25-1.45	6.0-20	0.09-0.12	4.5-6.0	Very low-----	0.24	2	.5-2
	9-29	7-18	1.30-1.50	6.0-20	0.10-0.12	4.5-6.0	Very low-----	0.24		
	29-60	---	---	---	---	---	-------------	----		
Pacolet---------	0-6	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.20	3	.5-2
	6-32	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	32-60	---	---	---	---	---	-------------	----		
Ca---------------	0-8	20-35	1.25-1.45	2.0-6.0	0.12-0.16	5.1-6.5	Low----------	0.32	5	2-3
Cartecay	8-50	8-18	1.30-1.50	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.24		
	50-60	2-16	1.30-1.55	6.0-20	0.06-0.09	5.1-6.5	Low----------	0.15		
CeB, CeC---------	0-6	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	4	.5-2
Cecil	6-9	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.0	Low----------	0.28		
	9-34	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	34-60	---	---	---	---	---	-------------	----		
CfC2-------------	0-3	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.0	Low----------	0.28	4	.5-1
Cecil	3-39	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	39-57	---	---	---	---	---	-------------	----		
Ch---------------	0-6	10-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.28	5	1-4
Chewacla	6-50	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low----------	0.28		
	50-60	---	---	---	---	---	-------------	----		
EnB, EnC---------	0-5	5-15	1.45-1.65	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.28	2	.5-2
Enon	5-37	20-35	1.30-1.50	0.6-2.0	0.15-0.20	5.1-6.5	Low----------	0.24		
	37-60	35-60	1.20-1.40	0.06-0.2	0.15-0.20	5.1-7.8	High---------	0.28		
Fp.										
Fluvaquents										
GeB--------------	0-6	5-27	1.20-1.40	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.43	4	.5-2
Georgeville	6-13	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	13-38	35-60	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		
	38-60	15-40	1.20-1.40	0.6-2.0	0.05-0.10	4.5-5.5	Low----------	0.32		
GoC2-------------	0-2	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-6.0	Low----------	0.49	4	<.5
Georgeville	2-14	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	14-55	35-60	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		
	55-60	---	---	---	---	---	-------------	----		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
GtD2----------- Georgeville	0-3	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-6.0	Low----------	0.49	4	<.5
	3-36	35-60	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		
	36-60	---	---	---	---	---	-------------	-----		
HaB------------ Helena	0-7	5-20	1.58-1.62	2.0-6.0	0.10-0.12	4.5-6.0	Low----------	0.15	3	.5-2
	7-13	20-35	1.46-1.56	0.2-0.6	0.13-0.15	4.5-5.5	Moderate-----	0.28		
	13-45	35-60	1.44-1.55	0.06-0.2	0.13-0.15	4.5-5.5	High---------	0.28		
	45-60	---	---	---	---	---	-------------	-----		
HeB, HeC--------- Hiwassee	0-6	10-35	1.35-1.55	0.6-2.0	0.12-0.15	4.5-6.5	Low----------	0.28	5	.5-2
	6-46	35-60	1.30-1.45	0.6-2.0	0.12-0.15	4.5-6.5	Moderate-----	0.28		
	46-60	7-35	1.45-1.65	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.28		
HwC2, HwD2------- Hiwassee	0-4	10-35	1.35-1.55	0.6-2.0	0.12-0.15	4.5-6.5	Low----------	0.28	5	.5-2
	4-53	35-60	1.30-1.45	0.6-2.0	0.12-0.15	4.5-6.5	Moderate-----	0.28		
	53-60	7-35	1.45-1.65	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.28		
MaB, MaC, MaD---- Madison	0-6	5-15	1.45-1.65	2.0-6.0	0.11-0.15	4.5-6.0	Low----------	0.24	4	.5-2
	6-25	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	25-60	---	---	---	---	---	-------------	-----		
MdC2, MdD2------- Madison	0-3	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.28	4	.5-2
	3-21	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	21-60	---	---	---	---	---	-------------	-----		
MeB, MeC, MeD---- Mecklenburg	0-6	8-25	1.30-1.50	0.6-2.0	0.14-0.19	5.6-7.3	Low----------	0.24	4	.5-2
	6-36	40-60	1.40-1.60	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-----	0.32		
	36-39	20-35	1.40-1.60	0.6-2.0	0.12-0.14	5.6-7.3	Low----------	0.32		
	39-60	---	---	---	---	---	-------------	-----		
PaB, PaC, PaD---- Pacolet	0-6	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.20	3	.5-2
	6-28	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	28-32	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	32-60	---	---	---	---	---	-------------	-----		
PfC2, PfD2------- Pacolet	0-3	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.24	2	.5-1
	3-19	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	19-33	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low----------	0.28		
	33-60	---	---	---	---	---	-------------	-----		
PgD:										
Pacolet---------	0-20	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28	---	---
	20-60	---	---	---	---	---	-------------	-----		
Gullied land.	0-60	---	---	---	---	---	-------------	-----		
Qu. Quarries										
Rv--------------- Riverview	0-5	10-27	1.30-1.60	0.6-2.0	0.16-0.24	4.5-5.5	Low----------	0.32	5	.5-2
	5-35	18-35	1.20-1.40	0.6-2.0	0.15-0.22	4.5-5.5	Low----------	0.24		
	35-60	---	---	---	---	---	-------------	-----		
To--------------- Toccoa	0-7	3-17	1.35-1.45	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.24	5	1-2
	7-60	2-19	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.10		
WeC, WeD--------- Wedowee	0-10	6-20	1.25-1.60	2.0-6.0	0.10-0.18	4.5-5.5	Low----------	0.24	3	<1
	10-16	14-30	1.30-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
	16-37	35-45	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	37-60	---	---	---	---	---	-------------	-----		
WkB-------------- Wickham	0-10	8-15	1.45-1.65	2.0-6.0	0.11-0.16	4.5-6.0	Low----------	0.24	5	.5-2
	10-60	18-25	1.30-1.40	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.24		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ZnC, ZnD, ZnE---- Zion	0-4	10-25	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	2	.5-2
	4-6	20-40	1.20-1.50	0.06-0.6	0.06-0.13	4.5-6.0	Low----------	0.28		
	6-14	35-60	1.20-1.50	0.06-0.6	0.10-0.19	4.5-7.3	High---------	0.28		
	14-22	35-50	1.30-1.60	0.2-2.0	0.07-0.15	5.1-7.3	High---------	0.17		
	22-38	---	---	---	---	---	-------------	----		

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AkA-----Altavista	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
AmB, AmC-----Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
APC, APE:											
Ashlar-----------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Louisburg--------	B	None--------	---	---	>6.0	---	---	>40	Hard	Low------	Moderate.
Pacolet----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Ca-----Cartecay	C	Occasional	Brief-----	Dec-Mar	0.5-1.5	Apparent	Jan-Apr	>60	---	Low------	Moderate.
CeB, CeC, CfC2-----Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ch-----Chewacla	C	Occasional	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
EnB, EnC-----Enon	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Fp. Fluvaquents											
GeB, GoC2, GtD2-----Georgeville	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
HaB-----Helena	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	48-60	Soft	High-----	High.
HeB, HeC, HwC2, HwD2-----Hiwassee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
MaB, MaC, MaD, MdC2, MdD2-----Madison	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
MeB, MeC, MeD-----Mecklenburg	C	None--------	---	---	>6.0	---	---	48-60	Soft	High-----	Moderate.
PaB, PaC, PaD, PfC2, PfD2-----Pacolet	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
PgD:											
Pacolet----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Gullined land----	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Qu. Quarries											

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
Rv----------------- Riverview	B	Occasional	Brief-----	Dec-Mar	3.0-5.0	Apparent	Dec-Mar	>60	---	Low------	Moderate.
To----------------- Toccoa	B	Occasional	Brief-----	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	Low------	Moderate.
WeC, WeD---------- Wedowee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
WkB--------------- Wickham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
ZnC, ZnD, ZnE----- Zion	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Ashlar	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Cartecay	Coarse-loamy, mixed, nonacid, thermic Aquic Udifluvents
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Enon	Fine, mixed, thermic Ultic Hapludalfs
Fluvaquents	Fluvaquents
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Helena	Clayey, mixed, thermic Aquic Hapludults
Hiwassee	Clayey, kaolinitic, thermic Typic Rhodudults
Louisburg	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Madison	Clayey, kaolinitic, thermic Typic Hapludults
Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Riverview	Fine-loamy, mixed, thermic Fluventic Dystrochrepts
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults
Wickham	Fine-loamy, mixed, thermic Typic Hapludults
Zion	Fine, mixed, thermic Ultic Hapludalfs

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457–3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632–9992 (English) or (800) 877–8339 (TDD) or (866) 377–8642 (English Federal-relay) or (800) 845–6136 (Spanish Federal-relay). USDA is an equal opportunity provider and employer.