United States
Department of
Agriculture

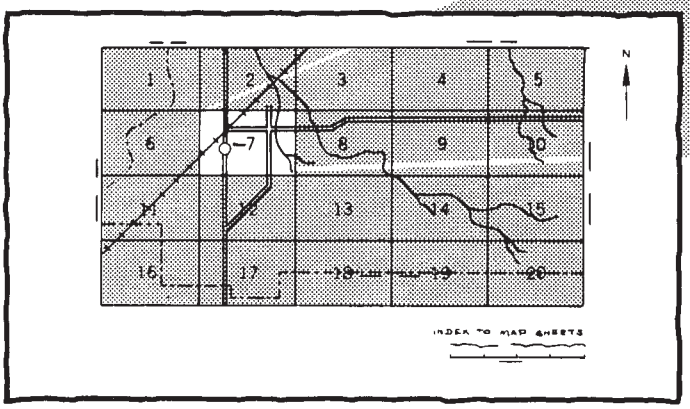
Soil
Conservation
Service

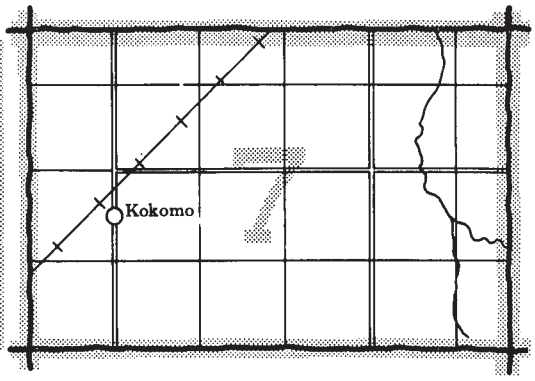
In cooperation with
The Virginia Polytechnic Institute
and State University

Soil Survey of Powhatan County Virginia

HOW TO USE

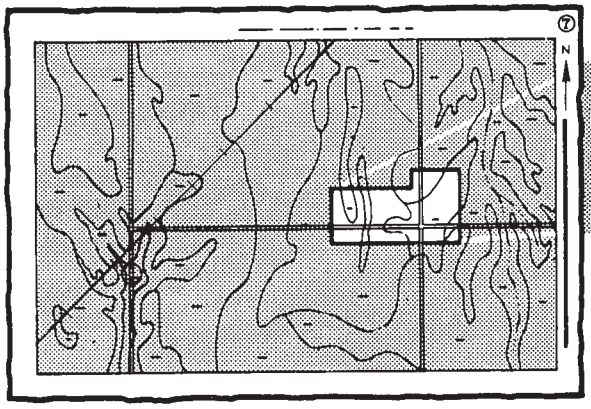
1. Locate your area of interest on the "Index to Map Sheets"

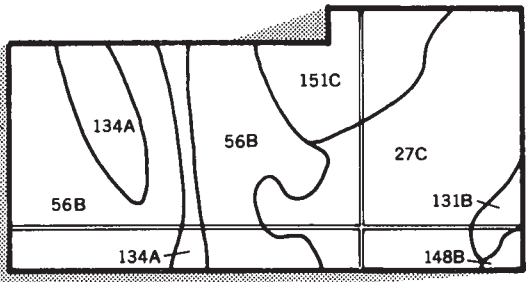




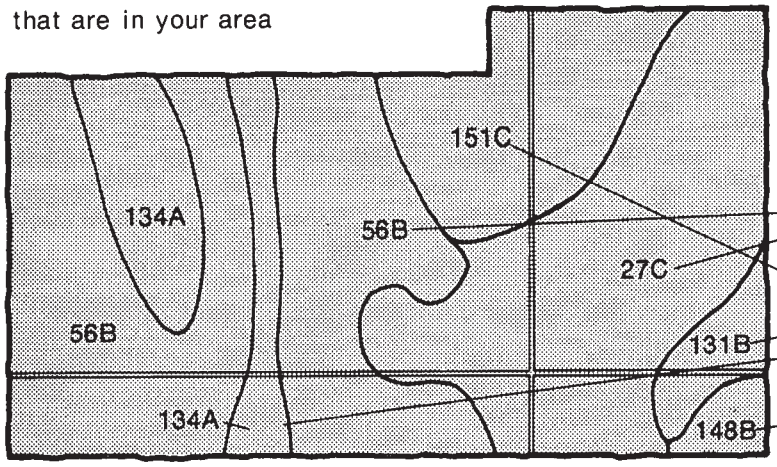
2. Note the number of the map sheet and turn to that sheet.

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





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

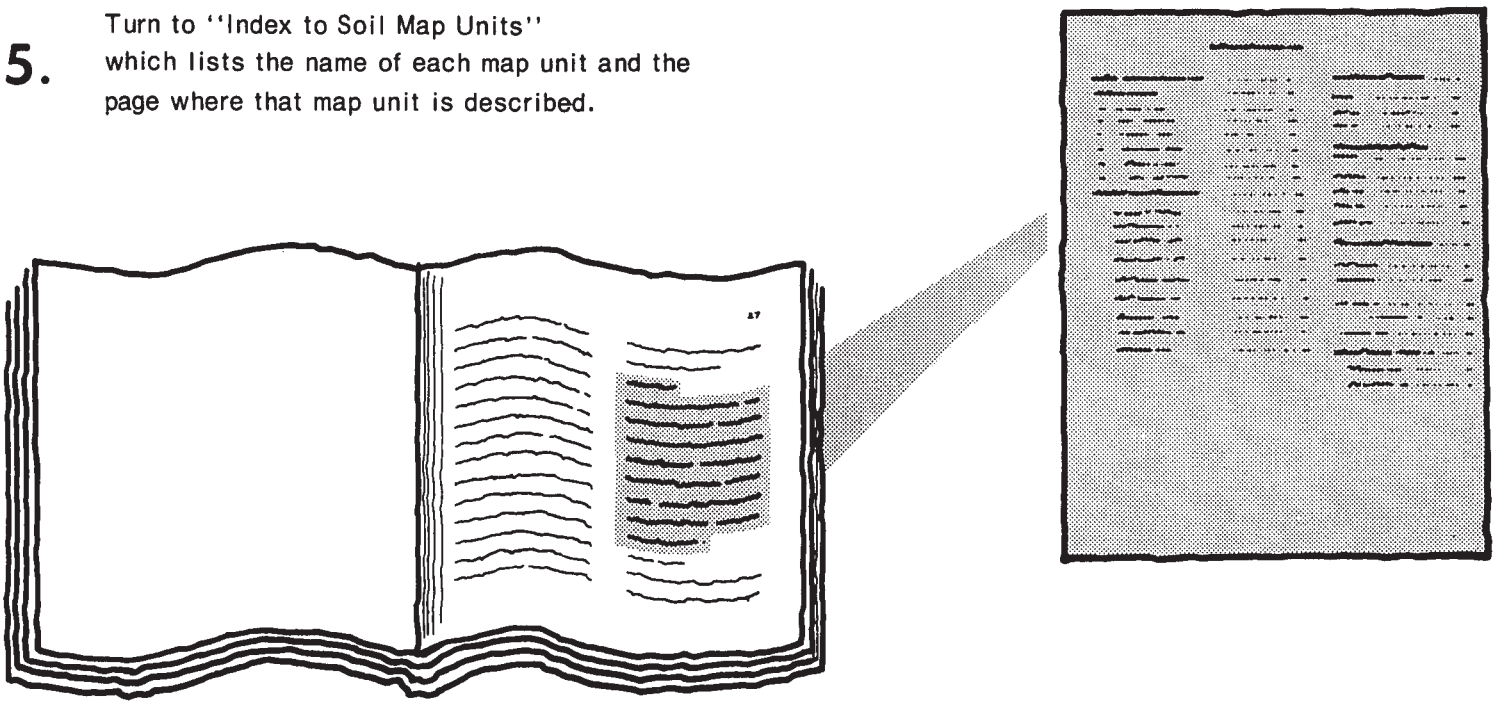


Symbols

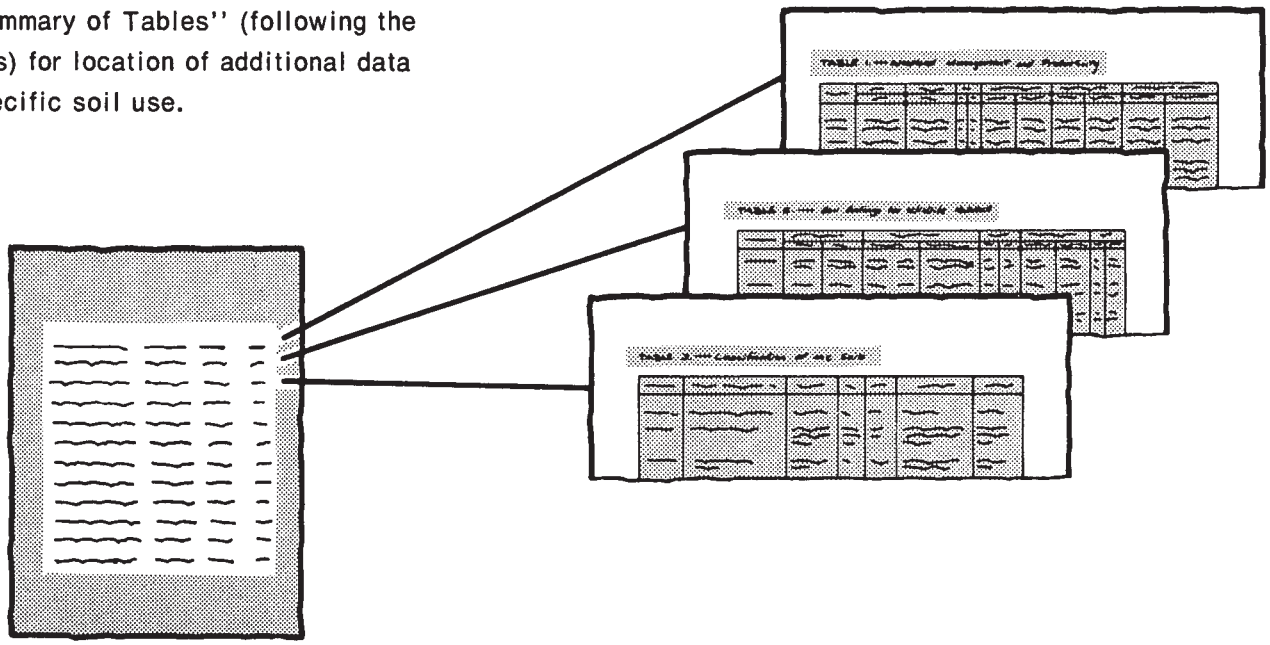
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

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



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



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

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. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983.

This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University. The survey is part of the technical assistance furnished to the Monacan Soil and Water Conservation District. This survey was financed in part by the Virginia Department of Conservation and Historic Resources and the Powhatan County Board of Supervisors.

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.

Cover: Stripcropping on Pacolet fine sandy loam, 7 to 15 percent slopes.

Contents

Soil Series

Issued May 1988

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Powhatan 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 potential 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.

George C. Norris
State Conservationist
Soil Conservation Service

Soil Survey of Powhatan County, Virginia

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Virginia Polytechnic Institute and State University

United States Department of Agriculture, Soil Conservation Service
in cooperation with
the Virginia Polytechnic Institute and State University

POWHATAN COUNTY is in central Virginia, just west of Richmond (fig.1). The county has an area of about 272 square miles, or 174,000 acres. The population in 1980 was 13,062, an increase of 70 percent over that in 1970.

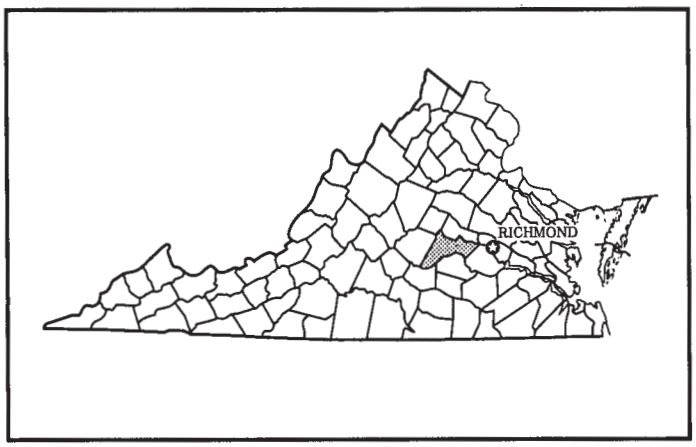

Figure 1.—Location of Powhatan County in Virginia.

Although commercial forestry and farming have been the main land uses in the county, suburban development from the Richmond metropolitan area is expanding into the county. The development is mostly in subdivisions, small farms that are primarily residences, and other large lot residences.

Most of the soils in the county have slight or moderate limitations for the kinds of land uses that go with suburban development. The eastern part of the county has a higher proportion of soils that have severe limitations for those uses than the rest of the county.

The first known tillers in what is now Powhatan County were Indians of the Monacan (Sioux) tribe. They lived near the banks of what is now the James River. French Huguenots settled in the same area in 1700 and began farming a 10,000-acre land grant in 1704. The land granted is in the eastern part of the county, contiguous along the James River, and is within a few miles of the river.

The main roadways between the county and Richmond are U.S. Route 60, which is a major east-west highway through the center of the county, and Virginia Route 711, which is in the northeastern part of the county. U.S. Route 522 and a number of state roads are also in the county, and there is one rail line.

Most of the industry in the area is related to agricultural and wood products. Wells provide the water supply.

Farming and Forestry

Cultivated crops cover about 9 percent of Powhatan County and pasture about 10 percent. The number of farms in the county and the land in farms showed a steady decrease between 1930 and 1978. Less than 50 percent of the farms in the county are operated by a person whose primary occupation is farming.

The major field crops in the county are corn, mixed hay, barley, wheat, and soybeans. A number of farms produce tobacco. Tall fescue, orchardgrass, and red clover are grown for pasture and hay, and a small acreage of alfalfa is raised primarily for hay. Dairy

farming is the major livestock enterprise in the county. Beef cattle, poultry, and hogs are raised on many farms.

Commercial woodland covers at least three-fourths of the county. Most of it is mixed hardwoods or pine. Much of the harvested acreage planted is loblolly pine. The timber is harvested dominantly for pallets, crossties, and pulpwood. Some of the larger hardwoods and pines are sawed into lumber.

Physiography, Relief, and Drainage

Powhatan County is in the Piedmont physiographic province. In Virginia, this province is between the Blue Ridge province on the west and the Coastal Plain province on the east.

The surface features of the county are those typical of a moderately high plateau dissected by numerous streams and a large river. Areas between the streams are moderately wide, and their relief is mostly gently sloping or strongly sloping.

The land surfaces in the county are of four general types: (1) gently sloping and strongly sloping, moderately wide, weakly dissected divides on the upland; (2) narrow flood plains along streams and moderately wide flood plains along the rivers; (3) moderately steep and steep areas along the rivers and along major streams that have cut deeply into the upland plateau; (4) the James River terrace, discontinuous along much of Virginia Route 711, a generally smooth plain about 1 mile wide. Entrenchment has been rapid along the James and Appomattox Rivers and their major tributaries, and steep slopes commonly rise abruptly from the flood plains.

The highest point in the county, about 490 feet above sea level, is in Red Lane near the intersection of Virginia Routes 628 and 1204. The elevation of the uplands ranges from about 160 to 490 feet. The lowest point in the county is about 120 feet above sea level at the easternmost point of the county.

Powhatan County is drained by the James and Appomattox Rivers and their tributaries. Areas of the county that are north of Virginia Routes 13 and 1671 drain northward, then eastward to the James River. Areas of the county that are south of those roads drain southward to the Appomattox River. The Appomattox River flows into the James River at Hopewell, Virginia. The James River forms the northern boundary of the county, and the Appomattox River forms the southern boundary. The western section of the county is drained by Deep Creek and Sallee Creek, which flow together and enter the James River. The northeastern section is drained by Fine Creek, Norwood Creek and Bernard's Creek into the James River. The southeastern section is drained by Fighting Creek, Rocky Ford Creek, Butterwood Creek, and Swift Creek into the Appomattox River.

Except for flood plains and some upland flats, the surface drainage in the county generally is good. Drainage is in a roughly dendritic, north-south and east-west pattern.

Climate

Prepared by the Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Richmond, Virginia, in the period 1949 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 39 degrees F, and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred at Richmond on February 10, 1979, is -8 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Richmond on July 6, 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 (40 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 43 inches. Of this, 24 inches, or 55 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 13 inches. The heaviest 1-day rainfall during the period of record was 8.79 inches at Richmond on August 12, 1955. Thunderstorms occur on about 35 days each year, and most occur in summer.

The average seasonal snowfall is 15.9 inches. The greatest snow depth at any one time during the period of record was 15 inches. On the average, 4 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

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 in which the soil formed. The

unconsolidated material has few or no roots or other living organisms and has been changed very little by other biologic 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 considerable 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, acidity, 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 generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were 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 were 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 state with a fairly high degree of probability 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. These latter soils are called inclusions or included soils.

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 soil 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 the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another 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 building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

There are areas along the borders of Powhatan County where boundaries on the general soil map and names of the general soil map units do not match those of adjoining counties. These discrepancies exist because of differences in the detail of mapping, changes in soil classification, and different proportions of the same soil in adjoining counties. Where some of these conditions exist, the adjoining counties match with similar kinds of soils.

Soil Descriptions

Powhatan County is entirely within the Piedmont physiographic province. The general soil map units have been grouped into three kinds of general landscapes, however, for broad interpretive purposes. Each of the broad groups and the units in each group are described in this section.

Soils on Flood Plains and Terraces

These soils formed in water-deposited materials that range in texture from sand to clay. They are on low-lying areas along the rivers and major creeks or on high land within about 3 miles of the James River. The soils are commonly nearly level or gently sloping, and some are waterlogged or flooded during periods of heavy rainfall. All the soils are very deep to bedrock.

1. Chenneby-Forestdale-Toccoa

Somewhat poorly drained, poorly drained, and well drained, nearly level soils that have a silty or clayey subsoil or a sandy substratum; formed in recent alluvial deposits; on floodplains

This map unit consists of a branching pattern of narrow flood plains along the lower reaches of the major creeks and in wider areas along the James and Appomattox Rivers (fig. 2). The soils are occasionally or frequently flooded. The slope range is from 0 to 2 percent.

This map unit makes up about 5 percent of the survey area. The unit is about 38 percent Chenneby soils, 30 percent Forestdale soils, 15 percent Toccoa soils, and 17 percent soils of minor extent.

The Chenneby soils are on broad flood plains of the James and Appomattox Rivers and on narrower flood plains along the lower reaches of major creeks. They have a surface layer of dark brown silt loam and a subsoil of dark brown and dark yellowish brown silty clay loam. The soils are wet at a depth of 1 to 2.5 feet during winter and early spring of most years. They are somewhat poorly drained.

The Forestdale soils are on broad flood plains of the major rivers and their tributaries. They have a surface layer of grayish brown silty clay loam and a subsoil of gray silty clay. These soils are wet at a depth of about 6 inches to 2 feet during winter and early spring of most years. They are poorly drained.

The Toccoa soils are mainly on broad flood plains of the James and Appomattox Rivers. They have a surface layer of dark brown silt loam and a substratum of dark yellowish brown loamy sand. The Toccoa soils are wet at a depth of about 2.5 to 5 feet during winter and early spring of most years. They are well drained.

The soils of minor extent are somewhat poorly drained Chewacla soils, excessively drained Buncombe soils, and moderately well drained Altavista soils. Chewacla soils are along drainageways, Buncombe soils are mostly along the rivers, and Altavista soils are on higher terraces.

Crops cover about 30 percent of this unit, and a smaller amount is in pasture. The common crops are corn, soybeans, and small grain. The uncleared land is bottomland hardwood forest.

Figure 2.—Part of the Chenneby-Forestdale-Toccoa unit near the James River.

The soils in this unit range from poorly suited to well suited for farming. Wetness and flooding during planting and harvesting are the main hazards for farming these soils.

The soils in this unit are well suited for trees. The woodland is dominantly sweetgum, yellow-poplar, and willow oak. Potential productivity is very high. Flooding and wetness damage planted tree seedlings during some years and limit the use of timber harvesting equipment during wet seasons.

This unit is very poorly suited as a site for waste-disposal facilities such as septic tanks and as a building site. Flooding and seasonal wetness are the main limitations.

2. Turbeville-Dogue-Augusta

Well drained to somewhat poorly drained, moderately steep to nearly level soils that have a clayey or loamy subsoil; formed in old alluvial deposits; on high stream terraces

This map unit consists of broad upland river terraces dissected by drainageways. The slope range is from 0 to 25 percent but is mostly 0 to 7 percent.

This map unit makes up about 6 percent of the survey area. The unit is about 70 percent Turbeville soils, 15

percent Dogue soils, 10 percent Augusta soils, and 5 percent soils of minor extent.

The Turbeville soils are on higher parts of the landscape. They have a surface layer of dark grayish brown fine sandy loam and a subsoil of red clay. They are well drained.

The Dogue soils are on broad flats and in shallow depressions. They have a surface layer of brown silt loam and a subsoil of yellowish brown silty clay. The soils are wet at a depth of about 1.5 to 3 feet in winter of most years. They are moderately well drained.

The Augusta soils are mostly in depressions and along drainageways. They have a surface layer of dark grayish brown silt loam and a subsoil of yellowish brown clay loam. These soils are wet at a depth of about 1 to 2 feet in winter and early spring of most years. They are somewhat poorly drained.

The soils of minor extent are mostly well drained Kempsville soils on the highest parts of the terrace.

Crops and pasture cover a total of about 30 percent of this unit. The common crops are corn, soybeans, and wheat. The rest of the unit is mostly hardwood forest, but some is planted to loblolly pine.

The soils on the higher parts of this map unit are mostly well suited to crops and support a type of farming based on cash crops. The soils on the flats and in shallow depressions are mostly somewhat poorly drained, have lower natural fertility, and have high exchangeable aluminum. They have limited potential for crops because of wetness. There are a number of good sites for small and large ponds throughout this unit.

The soils in this unit are suitable for trees. Potential productivity is high or very high. Hardwood species are generally on the wetter or steeper soils, and loblolly pine is planted on the gently sloping, well drained areas.

The higher areas of this unit are moderately well suited as sites for waste-disposal facilities such as septic tanks and as building sites. The areas in flats and depressions are poorly suited. Seasonal wetness, shrink-swell potential, and high clay content are the main limitations.

Soils on Triassic Basin Material

These soils formed in material weathered mostly from sedimentary deposits of Triassic sandstone and shale and are in the eastern part of the survey area. The soils are on ridges and side slopes and in drainageways. They are mostly nearly level to strongly sloping and are mostly very deep to bedrock.

3. Mayodan-Creedmoor-Partlow

Well drained, moderately well drained, and poorly drained, nearly level to strongly sloping soils that have a clayey or loamy subsoil; formed in weathered acid sedimentary rock; on uplands

This map unit consists of broad divides, narrow ridges, and narrow drainageways. The slope range is mostly from 0 to 15 percent.

This map unit makes up about 10 percent of the survey area. The unit is about 37 percent Mayodan soils, 18 percent Creedmoor soils, 10 percent Partlow soils, and 35 percent soils of minor extent.

The Mayodan soils are on gently sloping and strongly sloping ridgetops and side slopes. They have a surface layer of dark grayish brown fine sandy loam and a subsoil of mottled, yellowish red clay. They are well drained.

The Creedmoor soils are on gently sloping broad divides, foot slopes, and toe slopes. They have a surface layer of very dark grayish brown fine sandy loam and a subsoil that is mostly mottled, brownish yellow and light brownish gray silty clay. The subsoil is wet at a depth of about 1.5 to 2 feet in winter of most years. The soils are moderately well drained.

The Partlow soils are on nearly level toe slopes and in drainageways. They have a surface layer of dark grayish brown loam and a subsoil of mottled, yellowish brown and gray sandy clay loam. These soils are wet between the surface and a depth of about 1 foot from late fall through early spring of most years. They are poorly drained.

The soils of minor extent are well drained Kempsville, Wedowee, and Turbeville soils on knobs and ridgetops, moderately well drained Dogue soils on ridgetops, moderately well drained Abell soils on toe slopes and in drainageways, somewhat poorly drained Augusta soils at the heads of drainageways, and somewhat poorly drained Chewacla soils and poorly drained Forestdale soils on flood plains.

Crops and pasture cover a total of about 10 percent of this unit. The common crops are corn, soybeans, and small grain. The rest of the unit is mostly native hardwood forest, but some is planted to loblolly pine or naturally seeded to Virginia pine. Some of the acreage is in residential development.

The nearly level and gently sloping soils on ridgetops are moderately well suited to crops. Seasonal wetness, very firm clay in the subsoil, low natural fertility, and the content of exchangeable aluminum are the major limitations. The strongly sloping soils on side slopes are also moderately well suited to cropland. An erosion hazard, seasonal wetness, and difficulty of installing some conservation practices on the slope limit those soils for cropland.

The soils in this unit are suitable for trees. Potential productivity is high. Hardwood species generally are managed on the wetter and steeper soils. Loblolly pine is planted mostly on the gently sloping, well drained soils, and loblolly pine or Virginia pine is naturally regenerated in some areas. Seasonal wetness limits the use of heavy timber equipment. Erosion is a hazard along logging roads and skid trails.

The soils of this unit range from poorly suited to moderately well suited as sites for waste-disposal facilities such as septic tanks and as building sites. Wetness, shrink-swell potential, and the slow rate at which water moves through the subsoil limit the use of many areas for septic tank absorption fields. High clay content in the subsoil and slope also limit the use of the unit for waste-disposal facilities and building site development.

Soils on the Piedmont Plateau

These soils formed in material weathered mostly from residual granite, gneiss, and schist and are mainly in the central and western parts of the survey area. The soils are on ridges and side slopes and in drainageways. They are mostly nearly level to steep and are very deep or deep to bedrock.

4. Poindexter-Pacolet-Chewacla

Well drained and somewhat poorly drained, steep to nearly level soils that have a loamy or clayey subsoil; formed in material weathered from mixed acid and basic crystalline rocks and from recent alluvium; on ridges, side slopes, and flood plains

This map unit consists of soils on upland ridges and side slopes and on narrow flood plains. The soils are in areas along parts of the rivers and major creeks in the survey area. The slope range is from about 2 to 35 percent on uplands and from 0 to 2 percent on flood plains.

This map unit makes up about 13 percent of the survey area. The unit is about 35 percent Poindexter soils, 25 percent Pacolet soils, 10 percent Chewacla soils, and 30 percent soils of minor extent.

The Poindexter soils are on gently sloping to steep hillsides. They have a surface layer of yellowish brown sandy loam and a subsoil of yellowish brown sandy clay loam. They are well drained.

The Pacolet soils are on strongly sloping to steep ridges and hillsides. They have a surface layer of dark brown fine sandy loam and a subsoil of red clay. They are well drained.

The Chewacla soils are on nearly level flood plains. They have a surface layer of brown silt loam and a substratum of dark yellowish brown and gray sandy clay loam. The soils are wet at a depth of about 6 inches to 1.5 feet from late fall through early spring of most years. They are somewhat poorly drained and are frequently flooded.

The soils of minor extent are moderately well drained Abell, Dogue, Helena, and Trenholm soils and poorly drained Partlow soils, all in drainageways or on toe slopes, and well drained Cecil and Enon soils on side slopes and ridgetops.

About 10 percent of this unit has been cleared. Most of the cleared sloping areas are in pasture, and the cleared areas on flood plains are about evenly divided in use between crops and pasture. The common crops are corn, soybeans, and small grain. The other areas are mainly hardwood forests and some pine.

Most of the gently sloping and strongly sloping soils and wide sections of flood plains that have not been dammed by beavers are moderately well suited to crops. Most of the unit consists of soils which are poorly suited or unsuited to crops because of slope, a severe hazard of erosion, and droughtiness. Wetness and flooding by stream overflow are hazards to crops on the flood plains (fig. 3).

The soils in this unit are suitable for trees. Potential productivity is generally high on the uplands and very high on the flood plains. The hardwoods are mainly on the wetter or steeper soils, but large areas are planted to loblolly pine after the hardwoods are harvested. Slope limits the safe operation of heavy timber equipment on some of the soils. Wetness and flooding limit the use of equipment on the flood plains. Erosion is a hazard along log roads and skid trails.

Most of this unit is poorly suited as sites for waste-disposal facilities such as septic tanks and as sites for buildings. The main limitations are slope, flooding, and soil wetness.

5. Appling-Enon-Cecil

Well drained, gently sloping and strongly sloping soils that have a clayey subsoil; formed in material weathered from mixed acid and basic crystalline rocks; on upland ridgetops and side slopes

This map unit consists mostly of soils on hillsides and ridgetops that slope in many directions. The slope range is from 2 to 15 percent.

This map unit makes up about 18 percent of the survey area. It is about 25 percent Appling soils, 20 percent Enon soils, 15 percent Cecil soils, and 40 percent soils of minor extent.

The Appling soils are on ridgetops and side slopes. They have a surface layer of grayish brown fine sandy loam and a subsoil of yellowish red clay mottled with brownish yellow.

The Enon soils are on low ridges, near the ends of higher ridges, and on side slopes near drainageways. They have a surface layer of dark grayish brown sandy loam and a subsoil of strong brown and brown clay.

The Cecil soils are on high ridges and some side slopes. They have a surface layer of dark brown fine sandy loam and a subsoil of red clay.

The soils of minor extent are moderately well drained Abell, Helena, and Trenholm soils, poorly drained Partlow soils, and well drained Pacolet, Poindexter, and Wedowee soils. The Abell soils are at the heads of drainageways, the Helena and Trenholm soils are on upland flats, the Partlow soils are in drainageways, and

Figure 3.—This beaver dam causes flooding on Chewacla soils in the Poindexter-Pacolet-Chewacla unit.

the Pacolet, Poindexter, and Wedowee soils are on side slopes and low ridges.

About 15 percent of the acreage of this unit has been cleared and is used for crops and pasture. The common crops are corn, soybeans, small grain, and tobacco. The forested land is about two-thirds native hardwood forest and one-third planted loblolly pine plantations. The forested areas are generally steeper or wetter than the cleared land.

Most of the gently sloping soils in this unit are well suited to crops. The strongly sloping soils are limited for crops because of the erosion hazard, slope, and droughtiness. A number of good sites for small and large ponds are throughout this unit.

The soils in this unit are suitable for trees. Potential productivity is mostly high. Hardwood species are mainly on the wetter or steeper soils, but large areas of wetter and steeper soils are planted to loblolly pine after the hardwoods are harvested. Erosion is a hazard along logging roads and skid trails.

This unit is moderately well suited to poorly suited as sites for waste-disposal facilities such as septic tanks and as building sites. The main limitations are slow permeability, slope, shrink-swell potential, and high clay content.

6. Cecil-Pacolet-Abell

Well drained and moderately well drained, gently sloping to steep soils that have a clayey or loamy subsoil;

formed in material weathered from acid crystalline rock; on upland ridgetops, side slopes, and toe slopes

This map unit consists of soils on hillsides and ridgetops that slope in many directions. The slope range is from 2 to 15 percent.

This map unit makes up about 30 percent of the survey area. The unit is about 50 percent Cecil soils, 20 percent Pacolet soils, 10 percent Abell soils, and 20 percent soils of minor extent.

The Cecil soils are on gently sloping and strongly sloping ridgetops and side slopes. They have a surface layer of dark brown fine sandy loam and a subsoil of red clay. They are well drained.

The Pacolet soils are mostly on gently sloping to steep side slopes. They have a surface layer of dark brown fine sandy loam and a subsoil of red clay. They are well drained.

The Abell soils are mostly on gently sloping foot slopes and toe slopes along drainageways. They have a surface layer of dark grayish brown fine sandy loam and a subsoil of strong brown clay loam and silty clay. The soils are wet at a depth of about 2 to 3.5 feet in winter of most years. They are moderately well drained.

The soils of minor extent are well drained Turbeville soils on terraces, well drained Appling, Enon, Poindexter and Wedowee soils on low ridges, poorly drained Partlow soils along drainageways, moderately well drained Helena and Trenholm soils in shallow depressions, and somewhat poorly drained Chewacla soils on flood plains.

About 20 percent of the acreage of this unit has been cleared and is used for crops and pasture. The common crops are corn, soybeans, small grain, and tobacco. The types of woodland are about evenly divided between native hardwood forest and loblolly pine plantations or areas naturally seeded to Virginia pine. The woodland is often more severely eroded and steeper or wetter than the cropland and has been depleted of much of its fertility.

The soils on the gently sloping ridgetops are mostly well suited to the crops common to the area. The soils on the hillsides have limited potential for crops because of slope, an erosion hazard, and droughtiness. The soils on the toe slopes are narrow and winding and are subject to overwash. They require special land treatment for crops. A number of good sites for small and large ponds are throughout this unit.

The soils in this unit are suitable for trees. Potential productivity is mostly high or very high. Hardwood species are mainly on the wetter or steeper soils, while pine is planted or in volunteer stands on most gently sloping and strongly sloping soils. Erosion is a hazard along logging roads and skid trails.

The unit is moderately well suited to waste-disposal facilities and building site development. Slope and high clay content are the main limitations.

7. Cecil-Appling

Well drained, gently sloping soils that have a clayey subsoil; formed in material weathered from acid crystalline rock; on upland divides

This map unit consists of soils that are dissected by drainageways. The slope range is from 2 to 7 percent.

This map unit makes up about 18 percent of the county. The unit is about 70 percent Cecil soils, 15 percent Appling soils, and 15 percent soils of minor extent.

The Cecil soils have a surface layer of dark brown fine sandy loam and a subsoil of red clay.

The Appling soils have a surface layer of grayish brown fine sandy loam and a subsoil of yellowish red clay mottled with brownish yellow.

The soils of minor extent are well drained Turbeville soils on the higher and nearly level areas and moderately well drained Helena soils in shallow depressions, in saddles, and near heads of drainageways.

About 40 percent of the acreage of this unit has been cleared and is used for crops and pasture and hay. The common crops are corn, soybeans, barley, wheat, and tobacco. The woodland consists of hardwood forests, areas planted to loblolly pine, and volunteer stands of Virginia pine in old fields. Some of the land is used for residential development. The woodland is generaly less fertile than the cropland.

This unit is well suited to the crops that are common to the area. Some of the soils have low natural fertility.

The soils in this unit are suitable for trees. Potential productivity is high for loblolly pine.

This unit is moderately well suited for waste-disposal facilities and building site development. Shrink-swell potential and high clay content are the main limitations for 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. 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, Pacolet clay loam, 7 to 15 percent slopes, severely eroded, is one of several phases in the Pacolet series.

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

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, 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. Helena-Enon complex, 2 to 7 percent slopes, is an example.

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. Pits, quarry, 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, capabilitles, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

1B—Abell fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on foot slopes and toe slopes and in drainageways and upland swales. The areas are mostly irregular in shape or long and narrow and range from about 2 to 50 acres. Slopes are generally smooth and are about 150 to 600 feet long. Some areas are dissected by small drainageways and gullies.

Typically, the surface layer of this soil is fine sandy loam about 6 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is about 52 inches thick. The upper 24 inches of the subsoil is yellowish brown, strong brown, and yellowish red sandy clay loam and clay loam. The next 11 inches is strong brown and yellowish brown silty clay that is mottled red, yellow, brown, and gray. The lower 17 inches of the subsoil is yellowish brown and gray clay loam. The substratum is yellowish brown sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of poorly drained Partlow soils and moderately well drained Helena soils. The Partlow soils are in nearly level areas, and the Helena soils are on low ridges, on toe slopes, and in upland swales. Also included are small areas of somewhat poorly drained Chewacla soils on flood plains, well drained Pacolet soils on low ridges, well drained soils that have a subsoil of yellowish brown to red clay, and soils that have a surface layer of yellowish red clay loam. Included soils make up about 25 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: Tillage is usually feasible in late spring, in summer, and in fall.
Shrink-swell potential: Moderate in the subsoil; low in the surface layer and substratum.
Root zone: Typically extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid in the surface layer and most of the subsoil. In some areas that have been limed, the surface layer generally is less acid. The lower part of the subsoil and the substratum range from very strongly acid to slightly acid.
Water table: In most years at a depth of 2 to 3.5 feet in winter and early spring.

Most areas of this soil are in woodland. The other areas are used for cultivated crops or pasture.

If drained, this soil is prime farmland and is moderately well suited to crops such as corn, soybeans, and small grain. However, many areas are so narrow, so irregularly shaped, or so dissected by drainageways that the use of machinery is not practical. Soil wetness usually interferes with early tillage and late harvest. If the soil is tilled when wet it becomes cloddy and hard when dry. Artificial drainage helps to lower the water table during wet seasons. Diversions, grassed waterways, conservation tillage, cover crops, and grasses and legumes in the cropping system help to control the erosion hazard.

This soil is well suited to pasture and hay, especially to grasses and legumes such as clover, timothy, and fescue. Clipping pasture and harvesting hay are occasionally delayed by soil wetness. A dense stand of healthy pasture plants helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, red oak, Virginia pine, and yellow-poplar. Leaving the forest cover undisturbed near drainageways helps protect streams from sediment caused by dragging logs during timber harvest. During winter and early spring, the use of timber equipment is limited on some low areas that are wet and soft. Many undesirable plants compete with tree seedlings on this soil.

Seasonal wetness limits the use of this soil as a site for dwellings. Land shaping helps to divert surface runoff from the dwelling, and foundation drains help to make the soil under the dwelling dryer and firmer. Building a dwelling on the highest part of the landscape or on a better suited soil will help to prevent wet basements. The included areas of Pacolet soils have few limitations for dwellings with or without basements.

The surface layer of this Abell soil is frequently wet and lacks enough strength to support the vehicular traffic on local roads and streets. Drainage, suitable base material, special compacting, or building the road on raised fill material will help to prevent shifting and cracking of local roads and streets.

The seasonal high water table and the permeability limit this soil as a site for septic tank absorption fields. Placing a drainage system around the filter field, increasing the size of the absorption area, installing diversions to intercept water from higher areas, or placing the filter field in a high area of the map unit or on a more suitable soil will help prevent septic effluent from reaching the surface. The included Pacolet soil is not subject to seasonal wetness and is a more suitable site for a septic system.

This soil is in a natural landscape position for ponds, but slope limits the pond size to about 1/4 acre to 3 acres. The seasonal high water table interferes with pond construction in winter and early spring. In some areas seepage is a limitation or the water supply is limited, especially during dry periods.

The capability subclass is IIe.

2B—Altavista fine sandy loam, 2 to 6 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on low stream terraces. The areas are long and narrow and range from about 5 to 40 acres. Slopes are generally smooth and range from about 200 to 600 feet long.

Typically, the surface layer of this soil is light yellowish brown fine sandy loam about 9 inches thick. The subsoil is 35 inches thick. The upper part of the subsoil is light olive brown fine sandy loam. The next part is olive yellow and light yellowish brown clay loam with brownish yellow and light gray mottles. The lower part is light yellowish brown sandy clay loam with yellow, brown, and gray mottles. The substratum is mottled brownish yellow and gray sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Dogue soils and somewhat poorly drained Augusta soils. The Dogue soils are on slightly higher areas of the map unit, and the Augusta soils are in shallow depressions and drainageways. Also included are areas of Altavista and Dogue soils that are not flooded and areas near the James River of Dogue soils that are flooded more often than the rest of the unit. Included areas make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: Tillage is usually feasible in late spring, in summer, and in fall.
Shrink-swell potential: Low throughout.
Root zone: Typically extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Flooding: Rarely flooded for very brief periods, usually from late winter through summer.
Water table: In most years at a depth of 1.5 to 2.5 feet in late fall, in winter, and in early spring.

Most areas of this soil are in woodland. The other areas are cultivated.

This soil is prime farmland and is well suited to cultivated crops such as corn and soybeans. Soil wetness usually interferes with early tillage and late harvest. If tilled when wet, the soil becomes compacted and hard after drying. Artificial drainage lowers the water level in the soil during wet seasons. The hazard of erosion is a management concern. Conservation tillage, diversions, grassed waterways, stripcropping, cover crops, and grasses and legumes in the cropping system help to control erosion.

This soil is well suited to pasture and hay, especially to grasses and legumes such as clover and fescue. Clipping pasture and harvesting hay are occasionally delayed by soil wetness. A dense stand of healthy pasture plants helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil more susceptible to erosion. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, sweetgum, shortleaf pine, and yellow-poplar. Leaving the forest cover near drainageways undisturbed helps protect streams from sedimentation from skid trails during timber harvesting. During winter and early spring, timber equipment is limited by soft, wet soil in some low areas. Many undesirable plants compete with tree seedlings on this soil.

Flooding and wetness limit this soil as a site for dwellings or for local roads and streets. Installing drainage and building the road on raised fill material are needed to prevent cracking of the pavement and washouts.

Wetness, flooding, and permeability limit the soil as a site for septic tank absorption fields. Placing a drainage system around the filter field, increasing the absorption area, installing diversions to intercept runoff water from higher areas, or placing the filter field in a high area of the map unit or in a more suitable soil will prevent septic effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. Sealing the pond during construction helps to prevent seepage, but wetness during the winter months limits pond construction.

The capability subclass is IIe.

3B—Appling fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops, benches, and broad divides. The areas are mostly long and are wide to narrow. They range from about 4 to 600 acres. Slopes are generally smooth and range from about 200 to 1,000 feet long. Some areas are dissected by small drainageways.

Typically, the surface layer of this soil is fine sandy loam about 8 inches thick. It is grayish brown in the upper part and pale brown in the lower part. The subsoil is 36 inches thick. The upper part of the subsoil is strong brown clay loam. The next part is yellowish red clay with red and brownish yellow mottles. The lower part is mottled clay loam. The substratum is strong brown, red, and gray clay loam that extends to a depth of at least 60 inches. In some areas the subsoil is thinner, is redder, or has a higher content of mica.

Included with this soil in mapping are small areas of moderately well drained Helena soils in shallow depressions and poorly drained Partlow soils in drainageways. Also included are small areas of well drained Enon and Poindexter soils on low ridges. Included soils make up about 25 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Typically extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is the main management concern. The main erosion-control practices are conservation tillage, stripcropping, using cover crops and grasses and legumes in the cropping system, and terracing and contour farming in areas where the slopes are long and smooth. Mixing crop residue into the soil and growing grasses and legumes help to improve the organic matter content of the soil.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay, especially if lime and fertilizer are added to the soil. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. In some small included areas in drainageways and depressions, wetness interferes with timber removal during wet seasons. These areas usually can be avoided by placing skid trails near the top of the ridge.

This Appling soil has few limitations as a site for dwellings, but it does not have sufficient strength to support vehicular traffic on local roads and streets. Strengthening or replacing the base material helps improve the durability of the roads and streets.

The permeability limits this soil as a site for septic tank absorption fields. Increasing the size of the absorption area by lengthening distribution lines or using wide, deep trenches under the lines helps to prevent effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam, and undisturbed soil under the pond allows water to seep downward. Sealing the pond during construction helps to overcome that limitation.

The capability subclass is IIe.

3C—Appling fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 150 acres. Slopes are smooth to undulating and range from about 200 to 400 feet long. Most areas are dissected by small drainageways.

Typically, the surface layer of this soil is fine sandy loam about 8 inches thick. It is grayish brown in the upper part and pale brown in the lower part. The subsoil is 36 inches thick. The upper part of the subsoil is strong brown clay loam. The next part is yellowish red clay with red and brownish yellow mottles. The lower part is mottled clay loam. The substratum is strong brown, red, and gray clay loam that extends to a depth of at least 60 inches. In some areas the subsoil is thinner, is redder, or has a higher content of mica.

Included with this soil in mapping are small areas of well drained Enon and Poindexter soils, moderately well drained Abell and Helena soils, somewhat poorly drained Chewacla soils, and poorly drained Partlow soils. The Enon and Poindexter soils are on foot slopes and back slopes. The Abell and Helena soils are in intermittent drainageways. The Chewacla and Partlow soils are on flood plains. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Typically extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Generally very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. Conservation tillage, stripcropping, diversions, cover crops, and grasses and legumes in the cropping system help to control erosion.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay, especially if lime and fertilizer are added. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is moderately high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour helps to avoid erosion. In some small areas in drainageways and depressions, wetness interferes with

timber removal during wet seasons. These areas can be avoided by placing logging roads near the top of the ridge. The woodland in the small wet areas provides habitat for wildlife and helps filter out sediment from skid trails and roads upslope.

Slope limits this Appling soil as a site for dwellings or ponds. Some included areas of Abell, Helena, and Partlow soils are less sloping and are suitable for pond sites.

Slope and insufficient strength limit this Appling soil as a site for local roads and streets. Strengthening or replacing the base material helps to prevent potholes. Placing the roads or streets on the gently sloping areas near the top of the hill will make construction easier. Placing the road on the contour, shaping and grading the land, and adapting the design of the road to the slope will help to overcome the slope.

Slope and permeability limit the soil as a site for septic tank absorption fields. Increasing the size of the absorption area and using a system of absorption field pipes on the contour help to prevent effluent from seeping to the surface downslope.

The capability subclass is IIIe.

4—Augusta silt loam. This soil is very deep, nearly level, and somewhat poorly drained. It is in shallow depressions on broad divides and in drainageways. The areas are mostly long and narrow or irregular in shape and range from about 5 to 120 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown silt loam about 4 inches thick. The subsoil is mottled yellow, brown, and gray and extends to a depth of at least 60 inches. It is yellowish brown loam and clay loam in the upper part and gray clay loam and loam in the lower part. In some areas the subsoil is thinner.

Included with this soil in mapping are small areas of moderately well drained Dogue soils on slightly higher areas. Also included are poorly drained soils in drainageways and large swamps. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Slow.
Erosion hazard: Slight.
Tilth: Tillage is usually feasible in late spring, in summer, and in early fall.
Shrink-swell potential: Low throughout.
Root zone: Typically extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly extremely acid or very strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years at a depth of 1 to 2 feet for long periods in winter and early spring.
Chemical properties: Large amounts of exchangeable aluminum, which limit root development and plant growth.

Most areas of this soil are in woodland. The other areas are in pasture or are used for cultivated crops.

If drained, this soil is prime farmland and is moderately well suited to crops such as corn and soybeans. The soil is often wet during planting and harvesting. If the soil is tilled when wet, it becomes cloddy and hard upon drying. Artificial drainage lowers the level of the water table. Lime is needed on most areas to protect plants from high aluminum levels, and fertilizer is needed to supplement the low natural fertility of the soil.

This soil is well suited to grasses and legumes such as ladino clover or tall fescue for pasture and hay, especially if lime and fertilizer are added. Clipping pastures and harvesting hay are often delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, sweetgum, and willow oak. Leaving the forest cover near drainageways undisturbed helps protect streams from soil that erodes during timber harvesting. During some wet periods the soil is soft and the use of timber equipment is limited. Volunteer plants compete with planted seedlings on this soil.

The seasonal high water table limits this soil as a site for dwellings, especially those with basements. Drainage, land shaping to drain and divert water from dwellings, and placing the dwellings on a high area will help to stabilize the foundations of dwellings without basements.

This soil is too wet and too unstable to support vehicular traffic on local roads and streets. A diversion and drainage system, a thick layer of suitable base material, and special compacting help to avoid the cracking of pavements.

The seasonal high water table and permeability limit the soil as a site for septic tank absorption fields.

The soil is a suitable site for embankment ponds, but the water table limits the availability of soil for building embankments. In some areas fill material is available from nearby well drained soils.

The capability subclass is IIIw.

5B—Buncombe loamy sand, 0 to 5 percent slopes. This soil is very deep, nearly level to gently sloping, and excessively drained. It is on the higher parts of the flood

plains of the James River and the Appomattox River and is mainly closest to the rivers. The areas range from about 2 to 100 acres.

Typically, the surface layer of this soil is brown loamy sand and sand about 10 inches thick. The substratum extends to a depth of at least 60 inches. It is yellowish brown sand to a depth of about 52 inches and dark yellowish brown fine sandy loam at a depth of more than 52 inches.

Included with this soil in mapping are small areas of moderately well drained, sandy soils in shallow depressions. They make up about 15 percent of the unit.

Important soil properties—

Permeability: Rapid.
Available water capacity: Low.
Surface runoff: Very slow.
Erosion hazard: Slight.
Tilth: The surface layer is tillable through a wide range of moisture content.
Shrink-swell: Low throughout.
Root zone: Typically extends to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid to moderately acid throughout. In some areas that have been limed the surface layer and upper part of the substratum are less acid.
Flooding: Occasionally flooded for very brief periods, usually during late winter or early spring.

Most areas of this soil are in woodland. A few areas are in pasture.

This soil is suited to pasture and hay, especially to flood-tolerant and drought-tolerant grasses and legumes. A stand of healthy pasture plants helps protect the soil from erosion. Grazing is seasonal on this soil because plants stop growing during dry weather. Because of flooding, in some areas livestock have to be moved to upland areas quickly.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, eastern cottonwood, and yellow-poplar. The use of timber equipment is limited on adjacent wet soils that must be crossed during harvesting. Droughtiness damages planted seedlings in some years.

Flooding limits the use of this soil as a site for dwellings and local roads and streets. Constructing roads on specially designed dikes of raised fill material will help to prevent the roads from being washed out by floods.

Flooding and poor filtering limit the soil as a site for septic tank absorption fields.

The use of the soil as a site for embankment ponds is limited by flooding, piping, and seepage.

The capability subclass is IVw.

6B2—Cecil fine sandy loam, 2 to 7 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on ridgetops and broad divides. The areas range from about 4 to 700 acres. Slopes are generally smooth and range from 200 to 800 feet in length. Some areas are dissected by small drainageways.

Typically, the surface layer of this soil is dark brown fine sandy loam about 4 inches thick. The subsoil is 53 inches thick. The upper 4 inches of the subsoil is strong brown clay loam. The next 37 inches is red clay. The lower 12 inches is red sandy clay loam. The substratum is dark red sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Helena soils in shallow depressions and small areas of well drained Enon, Pacolet, and Wedowee soils on low ridges. Included soils make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, strip cropping, using cover crops and grasses and legumes in the cropping system, and terracing and contour farming in areas where the slopes are long and smooth enough. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content. In some years irrigation is needed during dry periods to produce a crop.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff

and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, shortleaf pine, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing and less valuable vegetation. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. These areas can often be avoided by placing skid trails near the top of the ridge.

This Cecil soil has few limitations as a site for dwellings, but the soil does not have sufficient strength to support vehicular traffic on local roads and streets. Strengthening or replacing the base material and using special construction for adequate support help to prevent shifting and cracking.

Permeability limits this soil as a site for septic tank absorption fields. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches under the lines helps to prevent effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam. Water seeps through the undisturbed soil under the pond, and the amount of slope restricts the size of a pond. Sealing the pond during construction helps to prevent downward seepage.

The capability subclass is IIe.

6C2—Cecil fine sandy loam, 7 to 15 percent slopes, eroded. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 200 acres. Slope length ranges from about 200 to 400 feet. Most areas are dissected by small drainageways.

Typically, the surface layer of this soil is dark brown fine sandy loam about 4 inches thick. The subsoil is 53 inches thick. The upper 4 inches of the subsoil is strong brown clay loam. Below this it is red clay to a depth of 45 inches. The lower 12 inches is red sandy clay loam. The substratum is dark red sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on toe slopes and along drainageways; poorly drained Partlow soils in drainageways; moderately well drained Helena soils and well drained Enon, Pacolet, and Wedowee soils on low ridges; somewhat poorly drained Chewacla soils on flood plains; and well drained Poindexter soils on foot slopes and low ridges. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Extends to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system (fig. 4).

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, shortleaf pine, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour or on the ridgetop or cutting the trail with a diversion helps to prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. These areas can be avoided by placing logging roads near the top of the ridge. The woodland in the small wet areas provides habitat for wildlife and helps filter out sediment from skid trails and roads upslope.

Slope limits the use of this Cecil soil as a site for dwellings. Designing the dwelling to conform with the natural slope or shaping the land will help to avoid foundation settling.

Slope and insufficient strength limit this soil as a site for local roads and streets. Strengthening or replacing the base material helps to prevent potholes. Placing the roads or streets on the gently sloping areas near the top of the hill will avoid the slope limitation. Placing the road on contour, shaping and grading, and adapting the design to the slope will provide a road that is in need of less maintenance.

Figure 4.—Stripcropping with wheat and clover-fescue on Cecil fine sandy loam, 7 to 15 percent slopes, eroded.

The soil is limited as a site for septic tank absorption fields because of slope and permeability. Increasing the size of the absorption area and using a system of absorption field pipes on the contour help to prevent effluent from seeping to the surface at some point downslope.

Slope limits use of this soil as a site for ponds. Some small included areas of Abell, Helena and Partlow soils, however, are less sloping and are suitable as sites for small ponds.

The capability subclass is IIIe.

7—Chenneby silt loam. This soil is very deep, nearly level, and somewhat poorly drained. It is on flood plains of the James River and Appomattox River and of some of the larger creeks. The areas range from about 2 acres to one of 900 acres near Manakin Church. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark brown silt loam about 15 inches thick. It is mottled in the lower part. The subsoil is dark brown and dark yellowish brown silty clay loam to a depth of at least 60 inches. It is mottled yellow, brown, and gray.

Included with this soil in mapping are small areas of well drained Toccoa soils closest to the river or creek and poorly drained Forestdale soils in the slackwater areas farthest from the rivers. Also included are areas that are ponded by beaver dams. Included soils make up about 25 percent of this unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: High.
Surface runoff: Slow.
Erosion hazard: Slight.

Tilth: Tillage is usually feasible in late spring, in summer, and in early fall.
Shrink-swell: Low throughout.
Root zone: Typically extends to a depth of 60 inches or more.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid to moderately acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Flooding: Occasionally flooded for very brief periods, usually from late fall through early spring.
Water table: In most years at a depth of about 1 to 2.5 feet during winter and early spring.

Most areas of this soil are in pasture or are cultivated. Some areas are in woodland.

If adequately drained, this soil is prime farmland and is moderately well suited to cultivated crops such as corn, soybeans, and small grain. The soil is often wet during the normal planting and harvesting seasons (fig. 5). If the soil is tilled when wet, it becomes cloddy and hard upon drying. Artificial drainage lowers the water level if a low outlet is available for the pipe or ditch. Crops are damaged by flooding in some years. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content and reduces the need for tillage.

This soil is well suited to pasture and hay, especially to grasses and legumes such as ladino clover or tall fescue. Clipping pasture and harvesting hay are occasionally delayed by wetness. A dense stand of healthy pasture plants helps remove excess water from

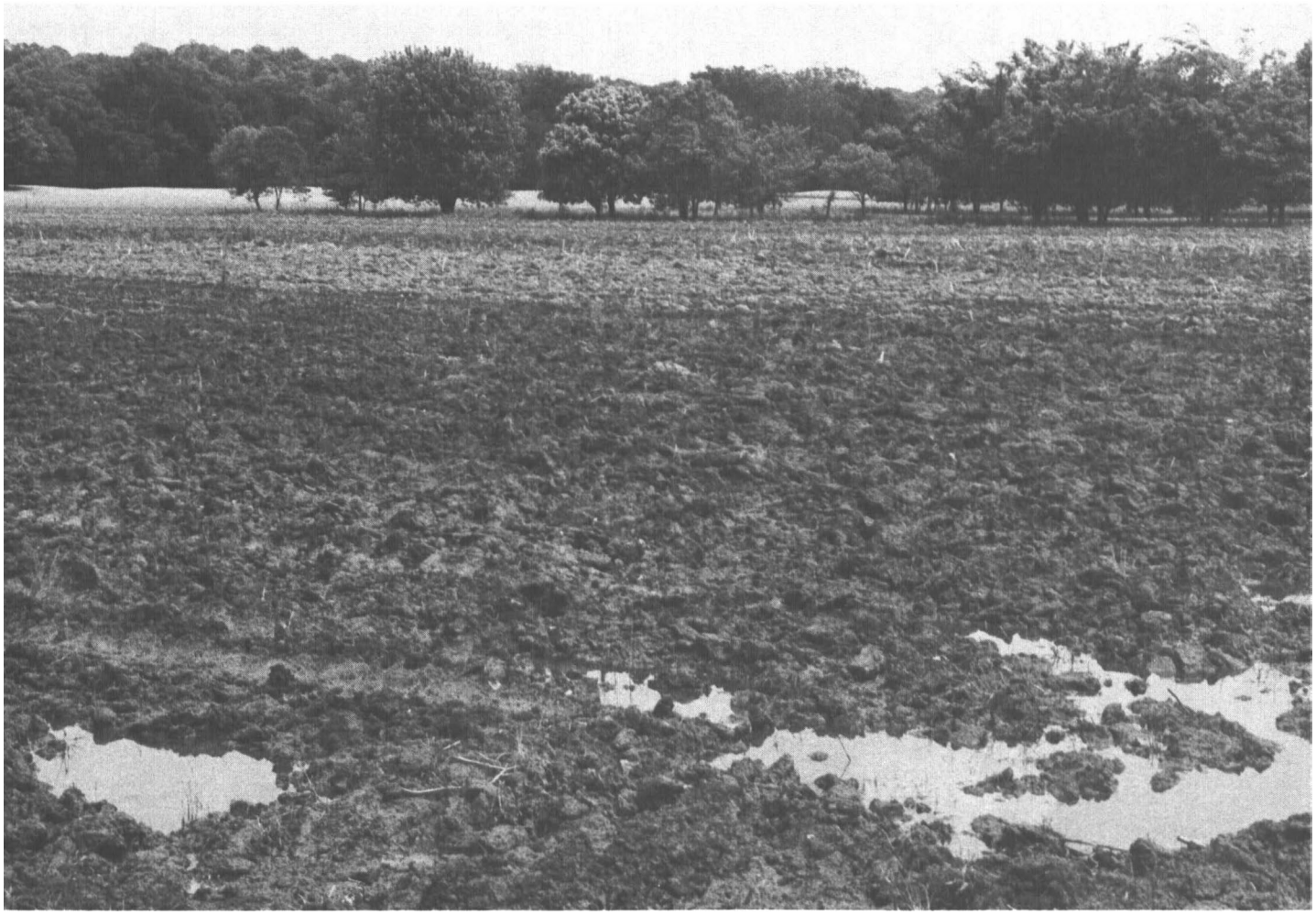

Figure 5.—Seasonal wetness on Chenneby silt loam.

the soil and helps protect the soil from compaction by livestock and farm machinery. However, overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover. Because of flooding, in some areas livestock have to be moved to upland areas quickly.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, sweetgum, and yellow-poplar. From late fall through early spring, the use of timber equipment is limited because the soil is wet and soft. Many plants compete with planted seedlings on this soil. Flooding damages planted seedlings and interferes with harvesting in some years.

Wetness and flooding limit this soil as a site for dwellings and septic tank absorption fields.

Flooding, low strength, and wetness limit the soil as a site for local roads and streets. Providing suitable subgrade or base material, installing a drainage system, constructing on raised fill material, and using special construction for adequate support will help to overcome those limitations.

This soil is limited as a site for embankment ponds because of wetness during construction, flooding of the dam, and piping, and the soil does not compact well. This soil is better suited as a site for an excavated aquifer-fed pond than for an embankment pond.

The capability subclass is IIIw.

8—Chewacla silt loam. This soil is very deep, nearly level, and somewhat poorly drained. It is on narrow flood plains along the major creeks (fig. 6). The areas range from about 10 to 100 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is brown silt loam about 6 inches thick. The upper part of the subsoil is dark yellowish brown sandy clay loam and pale brown silty clay loam about 20 inches thick. It is mottled brown

Figure 6.—The grasses on this area of Chewacla silt loam thrive on wet soil.

and gray. The lower part of the subsoil is gray sandy clay loam and sandy loam about 27 inches thick. It is mottled brown. The substratum is mottled gray and yellowish brown sandy loam to a depth of 60 inches or more. In some areas the surface is covered by a thick layer of strong brown or yellowish red sediment.

Included with this soil in mapping are small areas of well drained Toccoa soils closest to the creeks and poorly drained Forestdale soils in slackwater areas farthest from the creeks. Also included are areas that are ponded by beaver dams. Included soils make up 20 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Slow.
Erosion hazard: Slight.
Tilth: Tillage is usually feasible during summer and early fall.
Shrink-swell: Low throughout.
Root zone: Typically extends to a depth of 60 inches or more.
Depth to bedrock: More than 60 inches.
Organic matter content: Moderate in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid to slightly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Flooding: Frequently flooded for brief periods, usually from late fall through early spring.
Water table: In most years at a depth of 6 inches to 1.5 feet in late fall, in winter, and in early spring.

Nearly all areas of this soil are in woodland. Some areas are in pasture or are cultivated.

This soil is moderately well suited to cultivated crops such as corn, soybeans, and small grain. The soil is often wet during the normal planting and harvesting seasons. If the soil is tilled when wet, it becomes cloddy and hard upon drying. Artificial drainage is usually not feasible in this soil because of the lack of a low site for an outlet for the pipe or ditch. Crops are damaged by flooding in some years. Access to this soil is often difficult, and most of the units are too narrow for efficient farm operations.

This soil is well suited to pasture and hay, especially to grasses and legumes such as ladino clover or tall fescue. Clipping pasture and harvesting hay are often delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the surface layer from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover. Because of flooding, in some areas livestock have to be moved to upland areas quickly.

The potential productivity for trees on this soil is very high. The main types of suitable trees are loblolly pine, sweetgum, and yellow-poplar. During wet seasons timber equipment bogs down on some areas of this soil. Many plants compete with planted seedlings. Flooding damages planted seedlings and interferes with harvesting in some years.

Wetness and flooding limit this soil as a site for dwellings and septic tank absorption fields. The permeability is an additional limitation for septic systems.

Flooding, low strength, and wetness limit this soil as a site for local roads and streets. Providing suitable subgrade or base material, constructing on raised fill material, building a bridge over the stream, and using special construction for adequate support will help to overcome those limitations.

This soil is limited as a site for embankment ponds because of wetness during construction, flooding of the dam, and piping, and the soil does not compact well. This soil is better suited as a site for an excavated aquifer-fed pond than for an embankment pond.

The capability subclass is IVw.

9B—Creedmoor fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on broad divides. The areas are mostly long. They range from about 3 to 250 acres. Slopes are generally smooth and range from about 200 to 400 feet long.

Typically, the surface layer of this soil is fine sandy loam about 5 inches thick. It is very dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 54 inches thick. It is brownish yellow sandy clay loam in the upper part, mottled, yellowish brown clay and brownish yellow and light brownish gray silty clay in the next part, and mottled, yellowish brown silty clay loam in the lower part. The substratum is brown silty clay loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of poorly drained Partlow soils in drainageways and well drained Mayodan soils on slightly higher areas. Also included are a few strongly sloping soils in the Clayville-Dorset area. Included soils make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer, moderately slow in the upper part of the subsoil, and very slow in the lower part of the subsoil and in the substratum.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.

Tilth: Except for periods of wet weather, tillage is normally feasible in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer, moderate in the subsoil, and low in the substratum.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically extremely acid or very strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: Perched at a depth of 1.5 to 2 feet mostly during winter.
Chemical properties: Large amounts of exchangeable aluminum that limit the growth of some plants.

Nearly all areas of this soil are in woodland. The other areas are used for pasture.

This soil is moderately well suited to cultivated crops such as corn, soybeans, and small grain. The soil is often wet during the normal planting and harvesting seasons. If the soil is tilled when wet, it becomes cloddy and hard upon drying. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, and using grasses and legumes in the cropping system. Lime and fertilizer help to overcome the low natural fertility and high acidity of the soil.

This soil is moderately well suited to pasture and hay, especially to grasses and legumes such as ladino clover or tall fescue if lime and fertilizer are used. Clipping pasture and harvesting hay are occasionally delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, sweetgum, and yellow-poplar. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. The soil is soft and wet during most winter months, thus limiting the use of timber equipment.

Wetness and shrink-swell limit this soil as a site for dwellings, especially those with basements. For dwellings without basements, using extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations. Using footing drains, shaping the land so that surface water moves away from dwellings, and placing the dwelling on a high area of the map unit will help prevent foundation settling and soggy lawns.

Low strength, wetness, and shrink-swell limit this soil as a site for local roads and streets. An artificial drainage system, a thick layer of coarser grained fill material, and special construction for adequate support help to prevent potholes.

Wetness and the very slow rate that water moves through the lower part of the soil limit the soil as a site for septic tank absorption fields.

If this soil is used as a site for embankment ponds, the clay is hard to pack. In some areas better fill material is available from nearby well drained soils.

The capability subclass is IIe.

10A—Dogue silt loam, 0 to 2 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is on terraces along the James River and some of the major creeks. The areas are mostly long and narrow. They range from about 2 to 30 acres. Slopes are smooth and range from about 200 to 700 feet long.

Typically, the surface layer of this soil is brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is brownish yellow clay loam in the upper part; mottled, yellowish brown silty clay loam and silty clay in the next part; and mottled red, brown, and gray silty clay and silty clay loam in the lower part.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta soils in swales and well drained Turbeville soils on slightly higher areas. Some areas of Dogue soils on lower-lying terraces are rarely flooded. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Slow.
Erosion hazard: Slight.
Tilth: Tillage is usually feasible in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically extremely acid or very strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most areas at a depth of about 1.5 to 3 feet in winter and early spring.

Most areas of this soil are in woodland. The other areas are used for pasture or cultivated crops.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, and small grain. Tillage in the spring is often delayed because of soil wetness. If the soil is tilled when wet, it becomes cloddy and hard upon drying. The erosion hazard is slight but is still a management concern. The main erosion-control practices are conservation tillage and using grasses and legumes in the cropping system. Lime offsets the acidity, and fertilizer helps to overcome the low natural fertility.

This soil is well suited to pasture and hay, especially to grasses and legumes such as tall fescue and ladino clover if lime and fertilizer are used. A dense stand of healthy pasture plants helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and increases the erosion hazard. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The major tree species are loblolly pine, sweetgum, and yellow-poplar. Many plants compete with planted seedlings on this soil. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less desirable vegetation. Wetness limits the operation of heavy timber equipment on this soil during wet seasons.

Wetness and shrink-swell limit this soil as a site for dwellings, especially those with basements. For dwellings without basements, using extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations. Using footing drains, shaping the land so that surface water moves away from dwellings, and placing the dwelling on a high area of the map unit will help prevent foundation settling and soggy lawns.

This soil is too wet and lacks enough strength to support vehicular traffic on local roads and streets. Proper sloping for surface drainage, a thick layer of coarser-grained fill material, and special construction for adequate support help to prevent potholes.

Wetness and the moderately slow rate that water moves through the subsoil limit the soil as a site for septic tank absorption fields.

If this soil is used as a site for embankment ponds, wetness interferes with pond construction.

The capability subclass is IIw.

10B—Dogue silt loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on broad divides and upland swales within a few miles of the James River and on lower terraces along some of the major creeks. The areas are mostly long and narrow. They range from about 2 to 150 acres. Slopes are smooth and range from about 200 to 1,000 feet long.

Typically, the surface layer of this soil is brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is brownish yellow clay loam in the upper part; mottled, yellowish brown silty clay loam and silty clay in the next part; and mottled red, brown, and gray silty clay and silty clay loam in the lower part.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta soils in bottoms of swales and well drained Turbeville soils on slightly higher areas. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: Tillage is usually feasible in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically extremely acid or very strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years at a depth of 1.5 to 3 feet in winter and early spring.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, and small grain. Tillage in the spring is often delayed because of soil wetness. If the soil is tilled when wet, it becomes cloddy and hard upon drying. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, and using grasses and legumes in the cropping system. Lime offsets the acidity, and fertilizer helps to overcome the low natural fertility.

This soil is well suited to pasture and hay, especially to grasses and legumes such as tall fescue and ladino clover if lime and fertilizer are used. A dense stand of healthy pasture plants helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and increases the erosion hazard. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The major tree species are loblolly pine, sweetgum,

and yellow-poplar. Many plants compete with planted seedlings on this soil. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less desirable vegetation. Wetness limits the operation of heavy timber equipment on this soil during wet seasons.

This soil is too wet and lacks enough strength to support vehicular traffic on local roads and streets. Proper sloping for surface drainage, a thick layer of coarser-grained fill material, and special construction for adequate support help to prevent potholes.

Wetness and shrink-swell limit this soil as a site for dwellings, especially those with basements. For dwellings without basements, using extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations. Using footing drains, shaping the land so that surface water moves away from dwellings, and placing the dwelling on a high area of the map unit will help prevent foundation settling and soggy lawns.

Wetness and the moderately slow rate of water movement through the subsoil limit the soil as a site for septic tank absorption fields.

If the soil is used as a site for embankment ponds, wetness interferes with pond construction in winter.

The capability subclass is IIe.

10C—Dogue silt loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on side slopes within about 2 miles of the James River. The areas are mostly long and narrow and range from about 2 to 40 acres. Slopes are smooth and range from about 150 to 600 feet long.

Typically, the surface layer of this soil is brown silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is brownish yellow clay loam in the upper part; mottled, yellowish brown silty clay loam and silty clay in the next part; and mottled red, brown, and gray silty clay and silty clay loam in the lower part.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta soils in swales. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: Tillage is usually feasible in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically extremely acid or very strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years at a depth of about 1.5 to 3 feet in winter and early spring.

Nearly all areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, and small grain. Tillage in the spring is often delayed because of soil wetness. If the soil is tilled when wet, it becomes cloddy and hard upon drying. The hazard of erosion is a major management concern. The main erosion-control practices are conservation tillage, using diversions, stripcropping, and using grasses and legumes in the cropping system. Lime offsets the acidity, and fertilizer will help to overcome the low natural fertility.

This soil is well suited to pasture and hay, especially to grasses and legumes such as tall fescue and ladino clover if lime and fertilizer are used. A dense stand of healthy pasture plants helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and increases the erosion hazard. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is very high. The major tree species are loblolly pine, sweetgum, and yellow-poplar. Many plants compete with planted seedlings on this soil. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less desirable vegetation. Wetness limits the operation of heavy timber equipment on this soil during wet seasons.

Slope, wetness, and shrink-swell limit this soil as a site for dwellings, especially those with basements. For dwellings without basements, using extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations. Using footing drains and shaping the land so that surface water moves away from the dwellings will help prevent foundation settling and soggy lawns. Designing the dwelling to the natural slope or shaping the land will help to overcome the slope limitation.

Low strength, shrink-swell, wetness, and slope limit this soil as a site for local roads and streets. Proper sloping for surface drainage, a thick layer of coarser-grained fill material, and special construction for adequate support help to prevent potholes.

Wetness, slope, and the moderately slow rate of water movement through the subsoil limit the soil as a site for septic tank absorption fields.

This soil is too sloping for the construction of ponds. Some included small areas of Augusta soils are more suitable, but only for very small ponds.

The capability subclass is IIIe.

11B—Enon sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops, benches, and broad divides. The areas are long and narrow or irregular in shape and range from about 4 to 90 acres. Slopes are generally smooth and range from about 200 to 1,000 feet long. A few areas are dissected by small drainageways.

Typically, the surface layer of this soil is sandy loam about 6 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 37 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam. The next part is strong brown and brown clay. The lower part is brown sandy clay loam. The substratum is yellowish brown and strong brown clay loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of well drained Poindexter soils on ends of narrow ridges and moderately well drained Trenholm soils in intermittent drainageways, saddles, and shallow depressions on ridgetops. Also included are areas that have large stones on the surface, areas in which the subsoil is thicker than 60 inches, and areas in which the subsoil is redder than in this Enon soil. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Medium.
Soil reaction: Typically ranges from strongly acid to slightly acid in the surface layer and upper part of the subsoil, and is slightly acid or neutral in the lower part of the subsoil and in the substratum. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are cultivated or in pasture.

This soil is well suited to cultivated crops such as corn, soybeans, and small grain. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, and using cover crops and grasses and legumes in the cropping system. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content and reduces the amount of tillage.

This soil is well suited to most grasses and legumes used for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Wetness in some small areas in drainageways and depressions interferes with timber removal during winter.

The shrink-swell potential in the subsoil limits this soil as a site for dwellings. Using extra reinforcement in footings and backfilling with sandy material help to avoid cracks in foundations.

Low strength limits this soil as a site for local roads and streets. In addition, the roadbed is subject to heaving when the soil is wet and breaking when the soil is dry. Replacing the base material with a thick layer of coarser grained material, using special construction for adequate support, and installing a surface drainage system help to prevent breaking of the pavement.

The soil is limited as a site for septic tank absorption fields because water moves through the subsoil at a slow rate. Use of a system with a wide, deep trench below the distribution lines will help to prevent effluent from reaching the surface.

This soil is limited as a site for embankment ponds because the clay in the soil shrinks and swells, and the soil is hard to pack, causing a hazard of water piping through the embankment. Using fill material that readily compacts will help to avoid piping.

The capability subclass is IIe.

11C—Enon sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides. The areas are mostly long and narrow and range from about 2 to 70 acres. Slopes are generally smooth and range from about 200 to 400 feet long. Most areas are dissected by small drainageways and shallow gullies.

Typically, the surface layer of this soil is sandy loam about 6 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 37 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam. The next part is strong brown and brown clay. The lower part is brown sandy clay loam. The substratum is yellowish brown and strong brown clay loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Helena soils in intermittent

drainageways and well drained Poindexter soils on low narrow ridges. Also included are areas that have large stones on the surface, areas in which the subsoil is thicker than 60 inches, and areas in which the subsoil is redder than in this Enon soil. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Medium.
Soil reaction: Typically ranges from strongly acid to slightly acid in the surface layer and upper part of the subsoil, and is slightly acid or neutral in the lower part of the subsoil and in the substratum. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are mostly in pasture.

This soil is poorly suited to cultivated crops such as corn, soybeans, and small grain because of droughtiness, the erosion hazard, a slow infiltration rate, and slope. The main erosion-control practices are stripcropping, using diversions and grassed waterways, conservation tillage, and using grasses and legumes in the cropping system.

This soil is moderately well suited to most grasses and legumes used for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour helps to prevent gullies caused by uphill and downhill skidding. Placing logging roads on the contour at the uphill edge of the unit or crossing the roads with nearly level exit channels helps to prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons.

The high shrink-swell potential in the subsoil and slope limit this soil as a site for dwellings. Using extra reinforcement in footings and backfilling with sandy material help to avoid cracks in foundations.

Slope and low strength limit this soil as a site for local roads and streets. In addition, the roadbed is subject to heaving when the soil is wet and breaking when the soil is dry. Replacing the base material with a thick layer of coarser-grained material, using special construction for adequate support, and installing a surface drainage system help to prevent the breaking of pavement.

The soil is limited as a site for septic tank absorption fields because of slope and the slow permeability in the subsoil. A system with a wide, deep trench below the distribution lines or with lines across the slope will help to prevent effluent from reaching the surface.

Slope makes this soil generally unsuitable as a site for ponds. Some included small areas of Helena soils, however, are less sloping and are suitable as sites for very small ponds.

The capability subclass is IIIe.

12—Forestdale silty clay loam. This soil is very deep, nearly level, and poorly drained. It is on flood plains of rivers and major creeks and is mainly adjacent to uplands. The areas are mostly long and winding and range from about 2 to 300 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is grayish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. To a depth of 57 inches it is gray silty clay mottled with yellowish brown. At a depth of more than 57 inches, it is silty clay loam. On the James River flood plain, the surface layer is thicker and is dark brown.

Included with this soil in mapping are small areas of somewhat poorly drained Chenneby soils near the channels of creeks. Also included and adjacent to some small creeks are poorly drained soils that have a loamy subsoil. Many areas in this unit are ponded by beaver dams. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately slow in the surface layer and very slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Very slow.
Erosion hazard: Slight.
Tilth: Tillage is feasible only when the soil moisture content is optimum, usually in late spring or in summer when the soil is not too wet.
Shrink-swell potential: Moderate in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Medium in the surface layer.
Natural fertility: Medium.

Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years at a depth of 6 inches to 2 feet in winter and spring.
Flooding: Frequently flooded for brief periods, usually in winter and early spring.

Most areas of this soil are in woodland. The other areas are in pasture or cultivated crops.

This soil is poorly suited to cultivated crops such as corn and soybeans, because the soil is subject to flooding and is usually wet when planting and harvesting normally take place. If the soil is tilled when wet, it becomes cloddy and hard upon drying. Artificial drainage lowers the water level somewhat if a low outlet is available for the pipe or ditch, but water moves very slowly to the drains.

This soil is moderately well suited to pasture and hay, especially to grasses and legumes such as reed canarygrass or tall fescue. Wetness often delays mowing and harvesting on this soil. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the surface from compaction by livestock and farm machinery. However, overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover. Because of flooding in some areas livestock may have to be moved quickly to upland areas.

The potential productivity for trees on this soil is very high. The main types of suitable trees are willow oak, water oak, sweetgum, and sycamore. In wet seasons timber equipment bogs down on this soil. Many plants compete with planted seedlings on this soil. Flooding damages planted tree seedlings and interferes with timber harvest in some years.

Wetness, flooding, and shrink-swell limit this soil as a site for dwellings or local roads and streets. Low strength is an additional limitation for roads and streets. A drainage system, a dike system, special fill material, and special construction for adequate support on high raised fill will help to prevent breaks in pavement.

Wetness, flooding, and the permeability limit this soil as a site for septic tank absorption fields.

Use of the soil as a site for embankment ponds is limited by wetness during construction, by floodwaters washing over the dam, and by clayey soil material that is hard to pack.

The capability subclass is Vw.

13B—Helena-Enon complex, 2 to 7 percent slopes. This unit consists of very deep, gently sloping soils in broad to narrow, concave areas along drainageways, on broad low ridges, and on ends of high ridges. The areas of the unit range from about 2 to 70 acres. They consist of about 50 percent moderately well drained Helena soils, 25 percent well drained Enon soils, and 25 percent other soils. The Helena and Enon soils are so intermingled that it was not practical to map them separately. The Helena soils are generally at a slightly lower landscape position than the Enon soils. Slopes are generally smooth and range from about 200 to 500 feet long. A few areas are cut by small drainageways.

Typically, the surface layer of the Helena soils is brown loam about 2 inches thick. The subsoil is about 41 inches thick. It is yellowish brown clay loam and brownish yellow clay in the upper part and gray sandy clay loam in the lower part. The substratum extends to a depth of at least 60 inches. It is white, brownish yellow, and gray clay loam and loam saprolite.

Typically, the surface layer of the Enon soil is sandy loam about 6 inches thick. The upper part is dark grayish brown, and the lower part is yellowish brown. The subsoil is 37 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam. The next part is strong brown and brown clay. The lower part is brown sandy clay loam. The substratum is yellowish brown and strong brown clay loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of well drained Appling soils, moderately well drained Abell and Trenholm soils, and poorly drained Partlow soils. The Appling soils are on slightly higher, convex areas, the Abell soils are mostly in intermittent drainageways, the Partlow soils are in depressions and drainageways, and the Trenholm soils are mostly on upland flats and in shallow depressions.

Important soil properties—

Permeability: Helena soils—moderately rapid in the surface layer and slow in the subsoil. Enon soils—moderate in the surface layer and slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: Tillage is usually feasible in late spring, in summer, and in early fall.
Shrink-swell potential: Low in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches in both soils.
Organic matter content: Low in the surface layer.
Natural fertility: Low in the Helena soils and medium in the Enon soils.
Soil reaction: Helena soils—typically very strongly acid or strongly acid throughout. Enon soils—typically strongly acid to slightly acid in the surface layer and upper part of the subsoil, slightly acid in the surface layer and upper part of the subsoil, and slightly acid or neutral in the lower part of the subsoil and in the

substratum. In some areas that have been limed, the surface layer of both soils is less acid.
Water table: In most years the Helena soil has a perched seasonal high water table at a depth of 1.5 to 2.5 feet in late fall, in winter, and in early spring.

Most areas of this unit are in woodland. The other areas are in pasture or cropland.

The soils in this unit are well suited to cultivated crops such as corn, soybeans, and small grain. The soils, especially the Helena soils, are often wet when planting and harvesting normally take place. If these soils are tilled when wet, they become cloddy and hard upon drying. The hazard of erosion is a main management concern. The main erosion-control practices are using diversions, conservation tillage, stripcropping, and using cover crops and grasses and legumes in the cropping system.

The soils in this unit are well suited to pasture and hay, especially to grasses and legumes such as tall fescue and ladino clover. Clipping pasture and harvesting hay are often delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on these soils is high. The main types of suitable trees are loblolly pine, Virginia pine, and yellow-poplar. Many plants compete with planted seedlings on these soils. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Soil wetness limits the operation of heavy timber equipment on this soil in winter. The limitations of these soils as a site for logging roads can be avoided by placing the roads on other soils that are higher on the ridge.

Wetness and shrink-swell limit these soils as a site for dwellings, especially dwellings with basements. For dwellings without basements, using extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations. Using footing drains, shaping the land so that surface water moves away from dwellings, or placing the dwelling on the included Appling soils in the unit will help prevent foundation settling and soggy lawns.

Low strength, shrink-swell, and wetness limit these soils as a site for local roads and streets. A drainage system, a thick layer of coarser-grained fill material, and special construction for adequate support will help to prevent potholes.

Wetness and the slow rate of water movement through these soils limit them as a site for septic tank absorption fields. Placing the field in an included area of more suitable soil will avoid those limitations.

If these soils are used as a site for embankment ponds, wetness interferes with pond construction and the clay is hard to pack. Using fill material from a more suitable soil will help to prevent piping.

The capability subclass is IIe.

14B—Kempsville gravelly fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops and broad divides. The areas are mostly long and narrow and range from about 3 to 40 acres. Slopes are generally smooth and range from about 200 to 400 feet long.

Typically, the surface layer of this soil is gravelly fine sandy loam about 7 inches thick. It is gray in the upper part and pale brown in the lower part. The subsoil extends to a depth of at least 60 inches. The upper part of the subsoil is mostly yellowish brown and strong brown gravelly sandy loam and sandy clay loam. The lower part is clay that is mottled yellow, red, brown, and gray.

Included with this soil in mapping are small areas of somewhat poorly drained Augusta soils, moderately well drained Creedmoor soils, and well drained Turbeville, Cecil, and Mayodan soils. The Augusta and Creedmoor soils are in shallow depressions, and the Cecil, Mayodan and Turbeville soils are on shoulders of slopes. Also included on low stream terraces are areas of soils that have less gravel or more gravel than this Kempsville soil. Included areas make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and upper part of the subsoil, and moderate in the lower part of the subsoil.
Available water capacity: Low.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled, but gravel causes rapid wear of tillage equipment.
Shrink-swell potential: Low throughout.
Root zone: Typically to a depth of about 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is fairly well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. Droughtiness during the growing season and the moderate hazard of erosion are the main management concerns. The main erosion-control practices are conservation tillage,

stripcropping, and using cover crops and grasses and legumes in the cropping system. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation.

This soil has few limitations as a site for dwellings or local roads and streets.

The soil is limited as a site for septic tank absorption fields because of the permeability in the lower part of the subsoil. Increasing the size of the absorption area by lengthening effluent lines or using a wide, deep trench under the line helps to prevent effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. There is only a thin layer of suitable soil to use when building a dam, and the undisturbed soil under the reservoir area allows water to seep downward. Sealing the pond during construction and bringing fill material from offsite help to overcome the limitations.

The capability subclass is IIe.

15B—Mayodan fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops, benches, and broad divides. The areas are mostly long and narrow. They range from about 4 to 150 acres. Slopes typically are smooth and range from about 200 to 600 feet long. A few areas are dissected by small drainageways.

Typically, the surface layer of this soil is fine sandy loam about 8 inches thick. It is dark grayish brown in the upper part and very pale brown in the lower part. The subsoil is 44 inches thick. The upper part of the subsoil is yellowish red clay. The lower part is yellowish red and multicolored silty clay loam. The substratum is brownish yellow, red, and white loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Creedmoor soils on nearly level areas and in shallow depressions. Also included are soils that have more gravel than this Mayodan soil and soils that have less clay in the subsoil. Inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Chemical properties: Large amounts of exchangeable aluminum in this soil limit the growth of some plants.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, using cover crops and grasses and legumes in the cropping system, contour farming, and terracing in areas where the slopes are long and smooth enough. Mixing crop residue into the soil and growing grasses and legumes help to maintain the organic matter content. Lime is needed on most areas of this soil to offset the acidity and high level of exchangeable aluminum. Fertilizer helps to overcome the low natural fertility.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay, especially if lime and fertilizer are used. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, shortleaf pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing and less valuable vegetation. Wetness in some included soils on flats and in drainageways and depressions interferes with timber removal during wet periods.

Shrink-swell limits this Mayodan soil as a site for dwellings. Using extra reinforcement in footings and foundations or backfilling with sandy material helps to avoid cracked foundations and settling. Low strength and shrink-swell limit this soil as a site for local roads and streets. Providing a coarser textured subgrade or base material or using special construction for adequate support helps to prevent potholes.

The permeability in the subsoil limits this soil as a site for septic tank absorption fields. Increasing the size of the absorption area by lengthening effluent lines or using a wide, deep trench under the line helps to prevent effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam, and the undisturbed soil under the reservoir area allows water to seep downward. Sealing the pond during construction helps to overcome the limitations.

The capability subclass is IIe.

15C—Mayodan fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and winding and range from about 4 to 150 acres. Slopes are generally smooth and range from about 200 to 500 feet long. Most areas are dissected by small drainageways.

Typically, the surface layer of this soil is fine sandy loam about 8 inches thick. It is dark grayish brown in the upper part and very pale brown in the lower part. The subsoil is 44 inches thick. The upper part of the soil is yellowish red clay. The lower part is yellowish red and multicolored silty clay loam. The substratum is brownish yellow, red, and white loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small gently sloping areas of moderately well drained Creedmoor soils and poorly drained Partlow soils on toe slopes. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Chemical properties: Large amounts of exchangeable aluminum limit the growth of some plants.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is a major management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system. Lime is needed on most areas of this soil to offset the acidity and high levels of exchangeable aluminum. Fertilizer helps to overcome the low natural fertility.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay, especially if lime and fertilizer are used. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, shortleaf pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour will help to prevent gullies caused by uphill and downhill skidding. Placing logging roads on the contour and cutting the roads with diversions will help to prevent erosion. Wetness in some included soils on toe slopes, in drainageways, and in depressions interferes with timber removal during winter. The woodland in the wet areas in drainageways provides habitat for wildlife and helps filter out sediment from skid trails and roads upslope.

The shrink-swell potential in the subsoil and slope limit this soil as a site for dwellings. Using extra reinforcement in footings and backfilling with sandy material help to avoid cracks in foundations.

Shrink-swell, slope, and low strength limit this soil as a site for local roads and streets. Providing coarser textured subgrade or base material, using special construction for adequate support, placing the roads or streets near the top of the slope, and land shaping and grading help to avoid the cracking of pavement and potholes.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the subsoil. Increasing the size of the absorption area by lengthening effluent lines, using a wide, deep trench under the line, or using a system of absorption field pipes on the contour will help to prevent effluent from reaching the surface.

Slope is a major limitation of this soil as a site for embankment ponds. Some included small areas of Creedmoor and Partlow soils, however, are less sloping and are suitable for small ponds.

The capability subclass is IIIe.

16C—Pacolet fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 200 acres. Slope length ranges from about 200 to 400 feet. Most areas are dissected by small drainageways.

Typically, the surface layer of this soil is dark brown and yellowish brown fine sandy loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next

part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on toe slopes and in intermittent drainageways; poorly drained Partlow soils in drainageways; moderately well drained Helena soils and well drained Cecil, Wedowee, Enon, and Poindexter soils on low ridges; and somewhat poorly drained Chewacla soils on flood plains. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil and substratum.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The hazard of erosion is a major management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system. In some years irrigation is needed during dry periods to produce a crop, but irrigation causes runoff and siltation of drainageways.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour will help to prevent gullying caused by uphill and downhill skidding. Placing logging roads on the ridgetop or cutting the road with a diversion helps to prevent erosion. Wetness in some small included soils in drainageways and depressions interferes with timber removal during wet seasons. The woodland in these wet areas provides habitat for wildlife and helps filter out sediment from skid trails and roads upslope.

Slope limits this soil as a site for dwellings or embankment ponds. Special design to conform with natural slope or shaping of the land is needed to avoid settling of dwellings. Some of the included Abell, Helena, and Partlow soils are less sloping and are suitable as sites for small ponds.

This Pacolet soil is limited as a site for local roads and streets by slope and low strength. Strengthening or replacing the base material and using special construction for adequate support help to prevent potholes. Placing the roads or streets on the gently sloping areas near the top of the ridge will avoid the slope limitation. Placing the road on contour, shaping and grading the land, and adapting the design of the road to the slope will provide a road that needs less maintenance.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the substratum. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches under the lines and using a system of absorption field pipes on the contour will help to prevent effluent from seeping to the surface at a point downslope.

The capability subclass is IIIe.

16D—Pacolet fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on hillsides in long, winding areas that range from about 4 to 80 acres. Slope length ranges from about 150 to 400 feet. The surface is commonly dissected by small drainageways.

Typically, the surface layer of this soil is dark brown and yellowish brown fine sandy loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on foot slopes and in intermittent drainageways and well drained Cecil, Poindexter, and Wedowee soils on foot slopes. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil and substratum.
Available water capacity: Moderate.
Surface runoff: Very rapid.
Erosion hazard: Severe.

Tilth: Steep slopes limit the use of most types of farm equipment.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Very strongly acid or strongly acid throughout.

Most areas of this soil are in woodland. A few areas are used for pasture.

Steep slopes and the erosion hazard limit the use of this soil for cultivated crops. The soil is moderately well suited to pasture and hay, especially to grasses and legumes such as tall fescue, Bermudagrass, ladino clover, and red clover. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are Virginia pine, shortleaf pine, loblolly pine, and a variety of oaks. Placing skid trails on the contour during timber removal prevents excessive erosion and gullies. Placing logging roads on the ridgetop or cutting the road with diversions will help to prevent erosion. The slope of the soil limits the safe operation of heavy timber equipment. Wetness in some small included areas in drainageways and depressions interferes with timber removal during winter. The woodland in these wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads.

Slope limits this soil as a site for dwellings or embankment ponds. Special design to conform with the natural slope and shaping the land are needed to avoid settling of dwellings. Some areas of included Abell soils are less sloping and are suitable as sites for small ponds.

This soil is limited as a site for local roads and streets by slope and low strength. Placing the roads or streets on the less sloping areas will avoid this limitation. Placing the road on the contour, shaping and grading the land, and adapting the design of the road to the natural slope will provide a road that needs less maintenance.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the substratum. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches under the lines and using a system of absorption field pipes on the contour will help to prevent effluent from seeping to the surface at a point downslope.

The capability subclass is IVe.

17D3—Pacolet sandy clay loam, 15 to 25 percent slopes, severely eroded. This soil is very deep, moderately steep, and well drained. It is on hillsides in long, winding areas that range from about 4 to 80 acres. Slope length ranges from about 150 to 400 feet. The surface is commonly dissected by small drainageways and gullies. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer of this soil is strong brown sandy clay loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on foot slopes and in intermittent drainageways and well drained Poindexter and Wedowee soils on foot slopes. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Tilth: Steep slopes limit the use of most types of farm equipment.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Very strongly acid or strongly acid throughout.

Most areas of this soil are in woodland. A few areas are used for pasture.

This soil is unsuited to cultivated crops because of slope, rills and gullies, and the hazard of further erosion.

This soil is poorly suited to pasture. Slope is a limitation to the safe operation of farm equipment, and the hazard of erosion is a major management concern.

The potential productivity for trees on this soil is high. The main types of suitable trees are Virginia pine, shortleaf pine, and loblolly pine. Poor seed germination and a high rate of seedling mortality are hazards because of the texture and low organic matter content of the surface layer. Placing skid trails on the contour helps to prevent gullies. Placing logging roads on the ridgetop or cutting the roads with diversions helps to prevent erosion. The slope limits the safe operation of heavy timber equipment.

Slope limits this Pacolet soil as a site for dwellings or embankment ponds. Special design to conform with the natural slope and shaping the land are needed to avoid

settling of dwellings. Some areas of included Abell soils are less sloping and are suitable as sites for small ponds.

This soil is limited as a site for local roads and streets by slope and low strength. Placing the roads or streets on the less sloping areas will avoid this limitation. Placing the road on the contour, shaping and grading the land, and adapting the design of the road to the natural slope will provide a road that needs less maintenance.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the substratum. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches under the lines and using a system of absorption field pipes on the contour will help to prevent effluent from seeping to the surface at a point downslope.

The capability subclass is VIe.

17E3—Pacolet sandy clay loam, 25 to 35 percent slopes, severely eroded. This soil is very deep, steep, and well drained. It is on hillsides in long, winding areas that range from about 4 to 40 acres. Slope length ranges from about 150 to 400 feet. The surface is commonly dissected by small drainageways and gullies. Erosion has removed much of the original surface layer.

Typically, the surface layer of this soil is strong brown sandy clay loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on foot slopes and in drainageways and well drained Poindexter and Wedowee soils on foot slopes. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Very strongly acid or strongly acid throughout.

This soil is unsuited to cultivated crops and is poorly suited to pasture because of slope and the severe hazard of further erosion. Slope is also a limitation to the safe operation of most types of farm equipment.

The potential productivity for trees on this soil is high, and nearly all areas are wooded. The main types of suitable trees are Virginia pine, shortleaf pine, and loblolly pine. Poor seed germination and a high rate of seedling mortality are hazards because of the texture and low organic matter content of the surface layer. The erosion hazard is a major concern during timber harvesting. Placing skid trails on the ridgetop and cutting the trails with diversions will help prevent erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope limits this soil as a site for dwellings and embankment ponds. Some included small areas of Abell soils, however, are less sloping and are suitable as sites for very small ponds.

This soil is limited as a site for local roads and streets by slope and by low strength, especially when the soil is wet.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the subsoil.

The capability subclass is VIIe.

18B3—Pacolet clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, gently sloping, and well drained. It is on ridgetops and broad divides. The areas range from about 4 to 150 acres. Slope length ranges from about 200 to 600 feet. The areas commonly are dissected by small drainageways. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer of this soil is strong brown clay loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Helena soils in shallow depressions. Also included are areas of well drained Cecil and Wedowee soils throughout the unit. Included soils make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is best tilled when the moisture content is optimum.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the

surface layer and upper part of the subsoil are less acid.

The areas of this soil are mostly in woodland or are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. Erosion of the original surface layer has removed most of the organic matter and many nutrients, causing poor germination and low yields, and further erosion is a major management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content and reduce the need for tillage.

This soil is moderately well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and more erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, and Virginia pine. Poor seed germination and a high rate of seedling mortality are hazards on this soil because of the texture and low organic matter content of the surface layer.

This Pacolet soil has few limitations as a site for dwellings, but it does not have sufficient strength to support vehicular traffic on local roads and streets. Strengthening or replacing the base material and special construction for adequate support will help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because of the permeability in the subsoil. Increasing the size of the absorption area by lengthening effluent lines or using a wide, deep trench under the line helps to prevent effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil, and the soil is hard to pack when building a dam. The undisturbed soil under the pond area allows water to seep downward. Sealing the pond during construction helps to prevent seepage.

The capability subclass is IIIe.

18C3—Pacolet clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 500 acres. Slope length ranges from about 200 to 400 feet. The areas are dissected by small drainageways and gullies. Erosion has removed much of the original surface layer, and the subsoil is exposed in places.

Typically, the surface layer of this soil is strong brown clay loam about 4 inches thick. The subsoil is 31 inches thick. The upper part of the subsoil is yellowish red loam and clay loam. The next part is red clay. The lower part is yellowish red clay loam. The substratum is mostly yellowish red clay loam and sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell soils on foot slopes and in intermittent drainageways and well drained Poindexter soils on low ridges. Also included are soils that have a thicker, yellower subsoil or a higher content of mica in the subsoil than this Pacolet soil. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate throughout.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is best tilled when the moisture content is optimum.
Shrink-swell potential: Low throughout.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is poorly suited to cultivated crops because of the texture of the surface layer and the hazard of further erosion. Erosion of the original surface layer has removed most of the organic matter and many nutrients, causing poor germination and low yields. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system. In most years irrigation is needed during dry periods to produce a crop, but irrigation increases runoff and causes siltation in drainageways.

This soil is moderately well suited to a variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is moderate. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Poor seed germination and a high rate of seedling

mortality are hazards because of the texture and low organic matter content of the surface layer. Placing skid trails on the contour will help to prevent gullies that develop from uphill and downhill skidding. Placing logging roads on the ridgetop or cutting the roads with diversions helps to prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. These areas can be avoided by placing logging roads near the top of the ridge. The woodland in these wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads upslope.

Slope limits this soil as a site for dwellings or embankment ponds. Special design to conform with natural slope or shaping of the land is needed to avoid settling of dwellings. Some areas of included Abell soils are less sloping and are suitable as sites for small ponds.

This Pacolet soil is limited as a site for local roads and streets by slope and low strength. Strengthening or replacing the base material and using special construction for adequate support help to prevent potholes. Placing the roads or streets on less sloping areas near the top of the hill will avoid the slope limitation. Placing the road on the contour, shaping and grading the land, and adapting the design of the road to the slope will provide a road that needs less maintenance.

The soil is limited as a site for septic tank absorption fields because of slope and the permeability in the subsoil. Increasing the size of the absorption area and using a system of absorption field pipes on the contour will help to prevent effluent from reaching the surface.

The capability subclass is IVe.

19—Partlow loam. This soil is very deep, nearly level, and poorly drained. It is in drainageways and upland swales. The areas are mostly long and narrow or are irregular in shape and range from about 2 to 50 acres. Slopes are mostly smooth and concave and range from about 150 to 400 feet long. They range from 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown and pale brown loam about 8 inches thick. The subsoil is 32 inches thick. It is mostly gray sandy clay loam in the upper part and gray fine sandy loam in the lower part. The substratum is mostly gray sandy clay loam and sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained and moderately well drained Abell and Helena soils near the edges of the map unit and well drained Wedowee soils on low ridges. Also included, mostly in the eastern part of the county, are soils that have more silt and clay than this Partlow soil has.

Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Slow. This soil typically receives runoff from areas at higher elevations.
Erosion hazard: Slight.
Tilth: Tillage is most feasible during dry periods.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Moderate in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Flooding: Occasionally flooded for brief periods.
Water table: In most years at the surface in late fall, in winter, and in spring.

Most areas of this soil are in woodland. The other areas are mostly used for pasture.

This soil is poorly suited to cultivated crops because it is poorly drained and is usually wet when planting and harvesting normally take place. If the soil is tilled when wet, it becomes cloddy and hard upon drying. Artificial drainage reduces wetness, but a low outlet must be available for the pipe or ditch.

This soil is moderately well suited to pasture and hay, especially to grasses and legumes such as reed canarygrass or tall fescue. Clipping pasture and harvesting hay are often delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, sweetgum, and willow oak. Leaving the forest cover undisturbed near drainageways helps protect streams from sediment from skid trails during timber harvest. Use of timber equipment is limited because the soil is wet and soft from late fall through early spring. Many plants compete with seedlings planted on this soil.

This soil is limited as a site for dwellings by the water table and by runoff from upland areas.

Flooding and the water table limit this soil as a site for local roads and streets and for septic tank absorption fields. Low strength is an additional limitation for roads and streets, and the permeability of the subsoil also limits septic systems.

The soil is a natural landscape position for a pond, but wetness interferes with pond construction. Seepage in the floor of the pond and piping through the embankment are hazards. Using fill material from

adjacent soils helps prevent piping. Sealing the pond during construction helps prevent seepage.

The capability subclass is IVw.

20—Pits, quarry. This map unit consists mainly of open excavations from which granite rock has been removed. The pits are mostly northeast of Flat Rock and south of Genito. The excavations range from 5 to 20 feet deep and have steep side slopes and a nearly level floor. These pits are mainly oval and range from about 2 to 15 acres. Water is ponded in some areas, but little or no vegetation is in the pits.

Included with this unit in mapping are small areas of Wedowee soils. Also included is spoil from the pits. The included areas make up about 10 percent of this unit.

The permeability of this unit varies but is mostly moderate or moderately rapid. Surface runoff is generally slow. The material in the bottom and on the sides of most pits is mainly moderately acid.

The rock floor generally makes this map unit unsuitable for farming, woodland, or community development. Ground-water pollution is a hazard in areas used for waste disposal. Onsite investigation is needed to determine the suitability of the unit for most uses and to determine the feasibility of reclamation.

This unit is not assigned a capability subclass.

21B—Poindexter sandy loam, 2 to 7 percent slopes. This soil is deep, gently sloping, and well drained. It is on low ridges and benches. The areas range from about 4 to 20 acres. Slope length ranges from about 150 to 400 feet. The areas are dissected by small drainageways.

Typically, the surface layer of this soil is yellowish brown sandy loam about 8 inches thick. The subsoil is 18 inches thick and is mottled with black and very pale brown. It is yellowish brown sandy loam and sandy clay loam in the upper part and strong brown sandy loam in the lower part. The substratum is mostly strong brown sandy loam and saprolite that crushes to fine sandy loam. Hard bedrock is at a depth of 53 inches.

Included with this soil in mapping are small areas of moderately well drained Trenholm and Helena soils in shallow depressions and well drained Enon soils throughout the unit. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Low.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Typically to hard bedrock.
Depth to bedrock: About 50 to 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Strongly acid to slightly acid throughout.

Nearly all areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is moderately well suited to cultivated crops such as corn, soybeans, and small grain. The erosion hazard and available water capacity are the main management concerns. The main erosion-control practices are conservation tillage, stripcropping, and using cover crops and grasses and legumes in the cropping system.

This soil is well suited to pasture and hay. Grazing is seasonal on this soil because plant growth is slow during extended dry weather. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main suitable trees are loblolly pine, Virginia pine, and southern red oak. Wetness in some small areas of included Helena and Trenholm soils limits the operation of timber equipment during winter.

This soil has few limitations as a site for dwellings without basements or for local roads and streets. The depth to bedrock and water seeping along the bedrock limit construction of houses with basements. Footing drains help to keep basements dry.

The soil is limited as a site for septic tank absorption fields because of the depth to bedrock. Some of the included soils are suitable as sites for septic systems.

Embankment ponds on this soil are subject to seepage in the floor of the pond and piping through the dam. Slope limits the size of ponds. Lining the pond during construction helps to prevent seepage.

The capability subclass is IIe.

21C—Poindexter sandy loam, 7 to 15 percent slopes. This soil is deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 60 acres. Slope length ranges from about 150 to 400 feet. The areas are dissected by small drainageways.

Typically, the surface layer of this soil is yellowish brown sandy loam about 8 inches thick. The subsoil is 18 inches thick and is mottled with black and very pale brown. It is yellowish brown sandy loam and sandy clay loam in the upper part and strong brown sandy loam in the lower part. The substratum is mostly strong brown sandy loam and saprolite that crushes to fine sandy loam. Hard bedrock is at a depth of 53 inches.

Included with this soil in mapping are small areas of poorly drained Partlow soils and moderately well drained Abell and Helena soils in intermittent drainageways. Also

included are well drained Enon soils and moderately well drained Trenholm soils throughout the unit. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Low.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Typically to hard bedrock.
Depth to bedrock: About 50 to 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Strongly acid to slightly acid throughout.

Nearly all areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is poorly suited to cultivated crops such as corn, soybeans, and small grain because of the severe erosion hazard and the low available water capacity. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system.

This soil is moderately well suited to pasture and hay. Grazing is seasonal on this soil because plant growth declines during dry weather. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main suitable trees are loblolly pine, Virginia pine, and southern red oak. Placing skid trails on the contour will help to prevent gullies caused by uphill and downhill skidding. Placing logging roads on the ridgetop and cutting the roads with diversions will help to prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads upslope.

Slope limits the use of this soil as a site for dwellings without basements. Shaping the land or designing the dwelling to conform with the natural slope helps to overcome the slope limitation. The slope and the depth to bedrock limit construction of houses with basements, and in some areas water seeps from the rock into basements. Footing drains help to keep the basements dry.

Slope limits this Poindexter soil as a site for local roads and streets. Placing the roads or streets on the contour, shaping and grading the land, and adapting the design to the natural slope help provide a safe road that is maintainable.

The soil is limited as a site for septic tank absorption fields because of the slope and the depth to bedrock in the soil. Using a system of absorption field pipes on the contour and using included areas of deeper and less sloping soils will help to prevent unfiltered effluent from seeping into the ground water table.

This soil is too sloping for construction of embankment ponds. Some included small areas of Abell, Helena, and Partlow soils, however, are less sloping and are suitable as sites for very small ponds.

The capability subclass is IIIe.

21D—Poindexter sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on hillsides in long and winding areas that range from about 4 to 50 acres. Slope length ranges from about 150 to 400 feet. The areas are dissected by small drainageways and gullies.

Typically, the surface layer of this soil is yellowish brown sandy loam about 8 inches thick. The subsoil is 18 inches thick and is mottled with black and very pale brown. It is yellowish brown sandy loam and sandy clay loam in the upper part and strong brown sandy loam in the lower part. The substratum is mostly strong brown sandy loam and saprolite that crushes to fine sandy loam. Hard bedrock is at a depth of 53 inches.

Included with this soil in mapping are small areas of moderately well drained Abell and Helena soils on foot slopes and in intermittent drainageways. Also included are well drained Enon soils throughout the unit. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Low.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled; however, slope limits the safe operation of most farm equipment.
Shrink-swell potential: Low throughout.
Root zone: Typically to hard bedrock.
Depth to bedrock: About 50 to 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Strongly acid to slightly acid throughout.

Most areas of this soil are in woodland. The other areas are used for pasture.

This soil is poorly suited to cultivated crops because of slope, the low available water capacity, and the severe hazard of erosion. Also, the slope poses a safety hazard for the operation of most types of farm equipment.

This soil is poorly suited to pasture because water runs off the soil at a very rapid rate. The main types of grasses and legumes are tall fescue, Bermudagrass, ladino clover, and red clover. Grazing is seasonal on this soil because plant growth declines during dry weather. Use of the soil for pasture helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover. Renovation of the pasture in strips less than 100 feet wide and on the contour helps to control erosion.

The potential productivity for trees on this soil is high. The main suitable trees are loblolly pine, Virginia pine, and southern red oak. Placing skid trails on the contour will help to prevent gullies caused by uphill and downhill skidding. Placing logging roads on the ridgetop and cutting the roads with diversions will help to prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads upslope.

Slope limits the use of this soil as a site for dwellings without basements. Shaping the land or designing the dwelling to conform with the natural slope helps to avoid settling and provides an attractive setting. The slope and depth to bedrock limit construction of dwellings with basements.

Slope limits this soil as a site for local roads and streets. Placing the roads or streets on the contour, shaping and grading the land, and adapting the design to the natural slope will provide a safe road that can be maintained.

The soil is limited as a site for septic tank absorption fields because of slope and depth to bedrock. Increasing the size of the absorption area and using a system of absorption field pipes on the contour will help to prevent effluent from reaching the soil surface.

This soil is too steep for construction of ponds. Some included smaller areas of Abell or Helena soils, however, are less sloping and are suitable as sites for very small ponds.

The capability subclass is IVe.

21E—Poindexter sandy loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained. It is on hillsides in long and winding areas that range from about 3 to 20 acres. Slope length ranges from about 150 to 300 feet. The areas are dissected by small drainageways and gullies.

Typically, the surface layer of this soil is yellowish brown sandy loam about 8 inches thick. The subsoil is 18 inches thick and is mottled with black and very pale brown. It is yellowish brown sandy loam and sandy clay loam in the upper part and strong brown sandy loam in the lower part. The substratum is mostly strong brown sandy loam and saprolite that crushes to fine sandy loam. Hard bedrock is at a depth of 53 inches.

Included with this soil in mapping are small areas of moderately well drained Abell and Helena soils on foot slopes and in intermittent drainageways and well drained Enon soils throughout the unit. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Low.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Shrink-swell: Low throughout.
Root zone: Typically to hard bedrock.
Depth to bedrock: About 50 to 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Strongly acid to slightly acid throughout.

This soil is not suited to cultivated crops and is poorly suited to pasture because of slope and the severe hazard of erosion. Slope limits the safe operation of most types of farm equipment on this soil.

The potential productivity for trees on this soil is high, and most areas are wooded. The main suitable trees are Virginia pine, loblolly pine, and southern red oak. The erosion hazard is severe for timber harvest. Placing skid trails on the ridgetop and cutting the trails with diversions will help prevent erosion. The slope of the soil limits the safe operation of heavy timber equipment. Wetness in some small included areas in drainageways and depressions limits harvesting during wet seasons. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads.

Slope limits use of this soil as a site for dwellings and roads and streets. Slope and the depth to bedrock also limit the soil as a site for septic tank absorption fields.

This soil is too steep for construction of ponds. Some small included areas of Abell or Helena soils, however, are less sloping and are suitable as sites for very small ponds.

The capability subclass is VIe.

22—Toccoa silt loam. This soil is very deep, nearly level, and well drained. It is on higher parts of flood plains of the James River and Appomattox River and on alluvial fans of the major creeks. The areas range from about 2 to 150 acres. Slope ranges from 0 to 2 percent.

Typically, the surface layer of this soil is dark brown silt loam about 7 inches thick. The subsurface layer is dark brown silt loam and loam 28 inches thick. The substratum is dark yellowish brown fine sandy loam and loamy sand to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Chenneby soils that are mostly farther from the river and excessively drained Buncombe soils that are mostly closer to the river. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid throughout.
Available water capacity: Moderate.
Surface runoff: Very slow.
Erosion hazard: Slight.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low throughout.
Root zone: Typically to a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly strongly acid to slightly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Flooding: The soil is occasionally flooded for brief periods, usually from late fall through early spring.
Water table: In most years at a depth of 2.5 to 5 feet during winter and early spring.

This soil is used for pasture, cultivated crops, and woodland.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, and small grain. Crops are damaged by flooding in some years. Mixing crop residue into the soil or growing grasses and legumes helps to maintain the organic matter content.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Livestock sometimes have to be moved to upland areas on short notice because of flooding.

The potential productivity for trees on this soil is very high. The main suitable trees are loblolly pine, sweetgum, and yellow-poplar. Undesirable plants compete with tree seedlings planted on this soil, and flooding damages seedlings in some years.

Flooding limits this Toccoa soil as a site for dwellings. The water table and flooding limit the soil as a site for septic tank absorption fields.

If used as a site for local roads and streets, this soil is limited by flooding and the need for access roads to cross wet soils. Using raised fill material and a drainage system will help to prevent damage to pavements.

The suitability of embankment ponds on this soil is limited by flooding, piping, and seepage. An excavated aquifer-fed pond is better suited to this soil.

The capability subclass is IIw.

23B—Trenholm sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on broad low ridges, on ends of some high ridges, and in upland swales. The areas are mostly long and narrow. They range from about 2 to 40 acres. Slopes are smooth and range from about 200 to 500 feet long.

Typically, the surface layer of this soil is very dark gray sandy loam about 2 inches thick. The subsurface layer is yellowish brown sandy loam 7 inches thick. The subsoil is 27 inches thick. It is yellowish brown sandy loam in the upper part. The lower part of the subsoil is brownish yellow and light olive brown clay and is mottled olive, brown, and gray. The substratum is yellowish brown sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of well drained Enon and Poindexter soils that are mostly on slightly higher areas. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and very slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: Tillage is usually best in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches, but root growth is somewhat restricted by the very firm clayey subsoil.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Mainly very strongly acid to moderately acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years, perched at a depth of 1 to 3 feet in late fall, in winter, and in early spring.

Most areas of this soil are used for woodland or pasture.

This soil is moderately well suited to cultivated crops such as corn, soybeans, and small grain. The soil is often wet during planting and harvesting. Artificial drainage is often ineffective. The moderate hazard of erosion is a management concern. The main erosion-control practices are conservation tillage, stripcropping, and using grasses and legumes in the cropping system. Irrigation is needed during dry periods of most years.

This soil is moderately well suited to grasses and legumes used for pasture and hay, especially to tall fescue and ladino clover. Clipping pasture and harvesting hay are occasionally delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil

from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy or dusty. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are Virginia pine and a variety of oaks. Soil wetness limits the operation of heavy timber equipment on this soil in winter.

Wetness and the shrink-swell potential in the subsoil limit this soil as a site for dwellings, especially those with basements. Using extra reinforcement in footings and backfilling with sandy material will help to prevent cracking and settling of foundations of dwellings without basements. Using drains near footings, shaping the land so that surface water moves away from dwellings, and placing the dwelling on a high area of the unit will help prevent settling of foundations.

Low strength, the shrink-swell potential, and wetness limit this soil as a site for local roads and streets. An artificial drainage system, a thick layer of coarser-textured fill material, and special measures to provide adequate support will help to prevent potholes.

Wetness and the very slow rate that water moves through this soil limit the soil as a site for septic tank absorption fields. In some areas installing absorption fields at a depth of more than 3 feet or installing them in the included Poindexter soils will help to prevent effluent from reaching the surface.

If this soil is used as a site for embankment ponds, the clay in the soil is hard to pack. In some areas better fill material is available from nearby well drained soils.

The capability subclass is IIe.

23C—Trenholm sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on hillsides near drainageways. The areas are long and winding and range from about 4 to 50 acres. Slope length ranges from about 200 to 600 feet. The areas are dissected by small drainageways.

Typically, the surface layer of this soil is very dark gray sandy loam about 2 inches thick. The subsurface layer is yellowish brown sandy loam of 7 inches. The subsoil is 27 inches thick. It is yellowish brown sandy loam in the upper part. The lower part of the subsoil is brownish yellow and light olive brown clay and is mottled olive, brown, and gray. The substratum is yellowish brown sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas throughout the unit of moderately well drained Helena soils and well drained Enon and Poindexter soils. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and very slow in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: Tillage is usually best in late spring, in summer, and in fall.
Shrink-swell potential: Low in the surface layer and high in the subsoil.
Root zone: Typically to a depth of at least 60 inches, but root growth is somewhat restricted by the very firm clayey subsoil.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: High.
Soil reaction: Mainly very strongly acid to moderately acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.
Water table: In most years, perched at a depth of 1 to 3 feet in late fall, in winter, and in early spring.

Most areas of this soil are in woodland or pasture.

This soil is poorly suited to cultivated crops such as corn, soybeans, and small grain because of slope, the severe erosion hazard, and wetness during periods of high rainfall. The soil is often wet during planting and harvesting. Artificial drainage is often ineffective. The main erosion-control practices are conservation tillage, stripcropping, using diversions and grassed waterways, and using grasses and legumes in the cropping system.

This soil is moderately well suited to grasses and legumes used for pasture and hay, especially to tall fescue or ladino clover. Clipping pasture and harvesting hay are occasionally delayed by soil wetness. A dense stand of healthy pasture plants helps remove excess water from the soil and helps protect the soil from erosion and from compaction by livestock and farm machinery. Overgrazing damages plants and makes the soil muddy or dusty. Periodically moving livestock to another pasture allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine and Virginia pine. Soil wetness limits the operation of heavy timber equipment on this soil in winter.

Wetness, slope, and the shrink-swell potential limit this soil as a site for dwellings, especially those with basements. Using extra reinforcement in footings and backfilling with sandy material will help to prevent cracking and settling of foundations of dwellings without basements. Using drains near footings and diverting surface water away from the dwelling will help prevent settling of foundations.

Low strength, the shrink-swell potential, wetness, and slope limit this soil as a site for local roads and streets. An artificial drainage system, a thick layer of coarser-textured fill material, and special measures to provide adequate support will help to prevent potholes.

Wetness, slope, and the very slow rate that water moves through this soil limit the soil as a site for septic tank absorption fields. Installing lines across the slope at a depth of more than 3 feet will help prevent effluent from reaching the surface.

This soil is too sloping for the construction of ponds. Some small included areas of gently sloping Helena soils are suitable as sites for small ponds.

The capability subclass is IIIe.

24A—Turbeville fine sandy loam, 0 to 2 percent slopes. This soil is very deep, nearly level, and well drained. It is on broad divides. The areas are wide to narrow and range from about 4 to 100 acres. Slopes are smooth.

Typically, the surface layer of this soil is fine sandy loam about 9 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of 60 inches or more. The upper 8 inches of the subsoil is brownish yellow loam. Below that it is yellowish red clay loam and red clay.

Included with this soil in mapping are small areas of moderately well drained Dogue soils in shallow depressions. Also included are soils that have a yellower subsoil. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Slow.
Erosion hazard: Slight.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are cultivated. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The main erosion-control practices are conservation tillage and using cover crops. Mixing crop residue into the soil or growing grasses and legumes helps to improve the organic matter content of the soil.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay.

The potential productivity for trees on this soil is high. The main suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing and less valuable vegetation. Soil wetness often limits the use of timber harvesting equipment during winter.

The shrink-swell potential limits this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to avoid cracking and settling of foundations.

Low strength and the shrink-swell potential limit this soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

The soil is limited as a site for septic tank absorption fields because water moves through it at only a moderate rate. Increasing the size of the absorption area by lengthening effluent lines or by using wide, deep trenches below the lines helps to prevent the effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam, and the undisturbed soil under the pond area allows water to move downward at a moderate rate. Sealing the pond during construction helps to overcome the seepage.

The capability class is I.

24B2—Turbeville fine sandy loam, 2 to 7 percent slopes, eroded. This soil is very deep, gently sloping, and well drained. It is on ridgetops and broad divides. The areas are wide to narrow. They are mostly large but range from about 4 to 700 acres. Slope length ranges from 200 to 800 feet. Erosion has removed part of the original surface layer.

Typically, the surface layer of this soil is fine sandy loam about 9 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of 60 inches or more. The upper 8 inches of the subsoil is brownish yellow loam. Below that it is yellowish red clay loam and red clay.

Included with this soil in mapping are small areas of moderately well drained Dogue soils in shallow depressions (fig. 7). Also included are soils that have a yellower subsoil. Included soils make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.

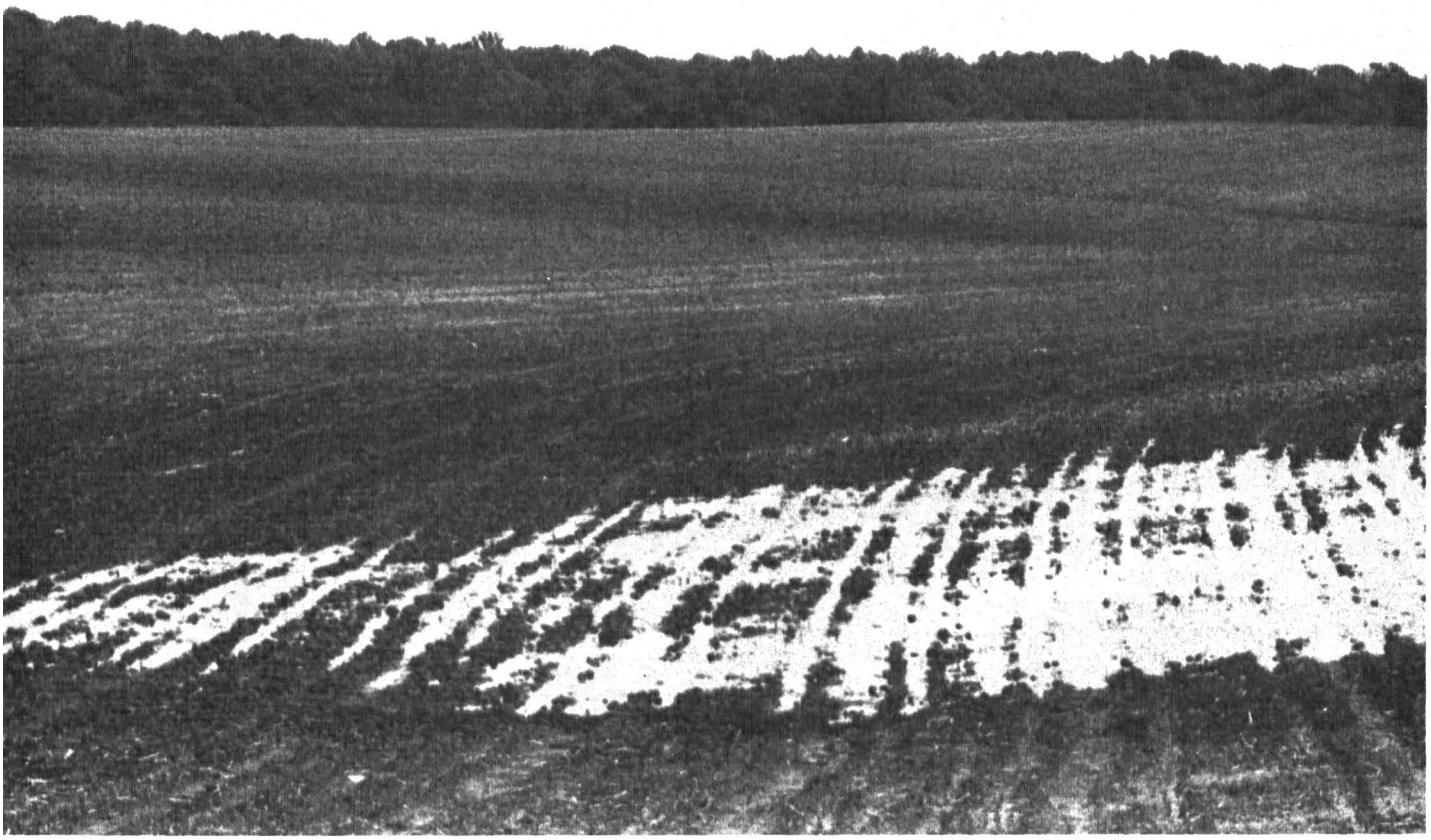

Figure 7.—This wet spot of Dogue soils is in a field that is mainly Turbeville fine sandy loam, 2 to 7 percent slopes, eroded.

Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are cultivated. The other areas are used for residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The moderate hazard of erosion is a management concern. The main erosion-control practices are conservation tillage, stripcropping, using cover crops and grasses and legumes in the cropping system, terracing, and contour farming. Mixing crop residue into the soil or growing grasses and legumes helps to improve the organic matter content of the soil.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation.

The shrink-swell potential limits this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to avoid cracking and settling of foundations.

Low strength and the shrink-swell potential limit this soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because water moves through it at a moderate rate. Increasing the size of the absorption area by lengthening effluent lines or by using wide, deep

trenches below the lines helps to prevent the effluent from reaching the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam, and the undisturbed soil under the ponds allows water to move downward at a moderate rate. Sealing the pond during construction helps to overcome the seepage.

The capability subclass is IIe.

25C—Turbeville gravelly fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow and range from about 4 to 100 acres. Slopes are mostly smooth and range from about 200 to 800 feet long. Some areas are dissected by small drainageways.

Typically, the surface layer of this soil is gravelly fine sandy loam about 9 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of 60 inches or more. The upper 8 inches of the subsoil is brownish yellow loam. Below that it is yellowish red clay loam and red clay.

Included with this soil in mapping are small areas of moderately well drained Dogue soils on toe slopes and along intermittent drainageways and poorly drained Partlow soils in drainageways. Also included are soils that have a yellower subsoil. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled, but gravel in the soil wears out tillage equipment rapidly.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are wooded. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The severe hazard of erosion is a management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing damages plants and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour will help to avoid the gullying from uphill and downhill dragging. Placing logging roads on the ridgetop or cutting the road with diversions will help prevent erosion. Wetness in some small areas in drainageways and depressions interferes with timber removal during winter. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads upslope.

Slope and the shrink-swell potential limit this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to avoid cracking and settling of foundations.

Low strength, the shrink-swell potential, and slope limit this soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because of slope and the moderate rate at which water moves through the soil. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches below the lines and using a system of absorption field pipes on the contour help to prevent the effluent from reaching the surface.

This soil is too sloping for construction of ponds. Some small included areas of Dogue and Partlow soils, however, are less sloping and are suitable for small ponds.

The capability subclass is IIIe.

25D—Turbeville gravelly fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on hillsides near drainageways. The areas are mostly long and narrow. They are commonly dissected by small drainageways.

Typically, the surface layer of this soil is gravelly fine sandy loam about 9 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil extends to a depth of 60 inches or more. The upper 8 inches of the subsoil is brownish yellow loam. Below that it is yellowish red clay loam and red clay.

Included with this soil in mapping are small areas of moderately well drained Dogue soils on foot slopes and along intermittent drainageways and well drained Cecil soils on foot slopes. Also included are soils that have a

yellower subsoil. Included soils make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled but gravel in the soil wears out tillage equipment rapidly.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Mainly very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for pasture.

This soil is poorly suited to cultivated crops because of slope and the severe erosion hazard. Slope also limits the operation of most types of farm equipment.

This soil is moderately well suited to a wide variety of grasses and legumes for pasture and hay. Use of the soil for pasture and hay helps to control erosion, but overgrazing damages plants and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover. Renovating the pasture in strips about 100 feet wide and on the contour helps to control erosion.

The potential productivity for trees on this soil is high. The main suitable trees are Virginia pine, yellow-poplar, loblolly pine, and a variety of oaks. Placing skid trails on the contour helps to prevent gullies. Placing logging roads on the ridgetop or cutting the roads with diversions will also help prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during wet seasons. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads.

Slope and the shrink-swell potential limit this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to avoid cracking and settling of foundations.

Low strength, the shrink-swell potential, and slope limit this soil as a site for local roads and streets. Coarser textured base material and special construction help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because of slope and the moderate rate at which water moves through the soil. Increasing the size of the absorption area by lengthening effluent lines or using wide, deep trenches below the lines and using a system of absorption field pipes on the contour help to prevent the effluent from reaching the surface.

This soil is too steep for construction of ponds. Some small included areas of Dogue soils, however, are less sloping and are suitable for very small ponds.

The capability subclass is IVe.

26—Udorthents, gently sloping. This unit consists of very deep, well drained soils that have been disturbed by excavation. The areas are mostly sources of fill material for roads. The areas of the unit range from about 3 to 10 acres. Slope commonly is 0 to 10 percent.

Included with this unit in mapping are small areas of well drained Appling and Cecil soils mostly west of Flat Rock and small areas of moderately well drained Creedmoor soils mostly east of Flat Rock. Also included are moderately steep areas along the edges of cut areas. Included soils make up about 20 percent of this unit.

The properties and characteristics of this unit are so variable that an onsite investigation is generally needed to determine the suitability of the unit for most uses.

Capability subclass: not assigned.

27B—Wedowee sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridgetops, benches, and foot slopes. The areas range from about 4 to 100 acres. Slope length ranges from 200 to 400 feet. The areas are commonly dissected by small drainageways.

Typically, the surface layer of this soil is sandy loam about 7 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 26 inches thick. The upper part of the subsoil is strong brown clay loam. The next part is yellowish red clay. The lower part is strong brown clay loam with reddish yellow mottles. The substratum is mottled and streaked clay loam and sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Helena soils in shallow depressions and well drained Enon soils on low ridges. Also included are soils similar to this Wedowee soil but that have less clay in the subsoil, are shallower to bedrock, or have stones and boulders on the surface. They are mostly near Flat Rock and Fine Creek Mills. Some soils in this unit have a thicker, redder subsoil that contains many flakes of mica. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.

Available water capacity: Moderate.
Surface runoff: Medium.
Erosion hazard: Moderate.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is prime farmland and is well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The moderate hazard of erosion is a management concern. The main erosion-control practices are conservation tillage, stripcropping, and using cover crops and grasses and legumes in the cropping system. Mixing crop residue into the soil or growing grasses and legumes helps to improve the organic matter content of the soil.

This soil is well suited to a wide variety of grasses and legumes for pasture and hay if lime and fertilizer are used. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of suitable trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Wetness in some small areas in depressions interferes with timber removal during winter.

The shrink-swell potential limits this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to avoid cracking and settling of foundations.

Low strength and the shrink-swell potential limit this soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because water moves through it at a moderate rate. Increasing the size of the absorption area by lengthening effluent lines or by using wide, deep trenches below the lines helps to prevent the effluent from reaching to the surface.

Seepage is a hazard for embankment ponds on this soil. The soil is hard to pack when building a dam, and the undisturbed soil under the pond allows water to move downward at a moderate rate. Sealing the pond during construction helps to overcome the seepage.

The capability subclass is IIe.

27C—Wedowee sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hillsides near drainageways. The areas are mostly long and winding and range from about 4 to 150 acres. Slope length ranges from about 200 to 400 feet. The areas are dissected by small drainageways, and gullies are in some areas.

Typically, the surface layer of this soil is sandy loam about 7 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 26 inches thick. The upper part of the subsoil is strong brown clay loam. The next part is yellowish red clay. The lower part is strong brown clay loam with reddish yellow mottles. The substratum is mottled and streaked clay loam and sandy loam that extends to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Abell and Helena soils along intermittent drainageways and poorly drained Partlow soils in the drainageways. Also included are soils that have a thicker and redder subsoil that has many flakes of mica. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid throughout. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for farming or residential development.

This soil is moderately well suited to cultivated crops such as corn, soybeans, small grain, and tobacco. The severe hazard of erosion is a main management concern. The main erosion-control practices are conservation tillage, stripcropping, using diversions, and using cover crops and grasses and legumes in the cropping system.

This soil is moderately well suited to a wide variety of grasses and legumes for pasture and hay if lime and fertilizer are used. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion.

Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover.

The potential productivity for trees on this soil is high. The main types of trees are loblolly pine, yellow-poplar, Virginia pine, and a variety of oaks. Prescribed burning, drum chopping, clearing, and cutting or girdling help to control competing, less valuable vegetation. Placing skid trails on the contour will help to avoid gullying and erosion from up and downhill dragging. Placing logging roads on the ridgetop or cutting the road with diversions will help prevent erosion. Wetness in some small included areas in drainageways and depressions interferes with timber removal during winter. The woodland in the small wet areas provides habitat for wildlife and helps filter out sediment from skid trails and roads upslope.

Slope and the shrink-swell potential limit this soil as a site for dwellings. Extra reinforcement in footings or backfilling with sandy material helps to prevent cracking and settling of foundations.

Low strength, the shrink-swell potential, and slope limit this soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

The soil is limited as a site for septic tank absorption fields because of slope and the moderate rate at which water moves through the soil. Increasing the size of the absorption area by lengthening effluent lines or by using wide, deep trenches below the lines and using a system of absorption field pipes on the contour help to prevent the effluent from reaching the surface.

The slope of this soil limits construction of embankment ponds. Some included small areas of Abell, Helena, and Partlow soils, however, are less sloping and are suitable for very small ponds.

The capability subclass is IIIe.

27D—Wedowee sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on hillsides. The areas are mostly long and narrow and range from about 4 to 60 acres. Slope length ranges from about 150 to 400 feet. The areas are dissected by small drainageways.

Typically, the surface layer of this soil is sandy loam about 7 inches thick. It is dark grayish brown in the upper part and yellowish brown in the lower part. The subsoil is 26 inches thick. The upper part of the subsoil is strong brown clay loam. The next part is yellowish red clay. The lower part is strong brown clay loam with reddish yellow mottles. The substratum is mottled and streaked clay loam and sandy loam to a depth of at least 60 inches.

Included with this soil in mapping are small areas of well drained Poindexter soils and moderately well drained Abell soils. The Poindexter soils are mostly on points of ridges, and the Abell soils are on foot slopes and along intermittent drainageways. Also included are soils that have a thicker and redder subsoil that contains many flakes of mica.

Important soil properties—

Permeability: Moderately rapid in the surface layer and moderate in the subsoil.
Available water capacity: Moderate.
Surface runoff: Very rapid.
Erosion hazard: Severe.
Tilth: The surface layer is easily tilled; however, the moderately steep slopes limit the use of most farm machinery.
Shrink-swell potential: Low in the surface layer and moderate in the subsoil.
Root zone: To a depth of at least 60 inches.
Depth to bedrock: More than 60 inches.
Organic matter content: Low in the surface layer.
Natural fertility: Low.
Soil reaction: Typically very strongly acid or strongly acid. In some areas that have been limed, the surface layer and upper part of the subsoil are less acid.

Most areas of this soil are in woodland. The other areas are used for pasture.

This soil is not suited to cultivated crops and is poorly suited to pasture and hay because of slope and the very severe hazard of erosion. Slope limits the safe operation of most types of farm equipment. Use of the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and causes increased runoff and erosion. Periodically moving livestock to another pasture prevents overgrazing and allows the pasture plants to recover. Renovating the pasture in narrow strips on the contour helps to control erosion.

The potential productivity for trees on this soil is high. The main suitable trees are Virginia pine, yellow-poplar, loblolly pine, and a variety of oaks. Placing skid trails on the contour helps to prevent gulleys. Placing logging roads on the ridgetop or cutting the roads with diversions will also help prevent erosion. Wetness in some small included areas in drainageways interferes with timber removal during winter. The woodland in the small wet areas provides habitat for wildlife and helps trap sediment from skid trails and roads.

Slope and shrink-swell limit this soil as a site for dwellings. Extra reinforcement in footings and backfilling with sandy material help to prevent cracking and settling of foundations.

Low strength, the shrink-swell potential, and slope limit the soil as a site for local roads and streets. Coarser-textured base material and special construction help to prevent potholes.

This soil is limited as a site for septic tank absorption fields because of slope and the moderate rate at which water moves through the soil. Increasing the size of the absorption area by lengthening effluent lines or by using

wide, deep trenches below the lines and using a system of absorption field pipes on the contour help to prevent effluent from reaching to the surface.

This soil is too steep for construction of ponds. Some included small areas of Abell soils, however, are less sloping and are suitable for very small ponds.

The capability subclass is IVe.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. Identification of prime farmland is a major step in meeting the Nation's needs for food and fiber.

The U.S. Department of Agriculture defines prime farmland as the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops while using acceptable farming methods. Prime farmland produces the highest yields and requires minimal amounts of energy and economic resources, and farming it results in the least damage to the environment.

An area identified as prime farmland must be used for producing food or fiber or must be available for those uses. Thus, urban and built-up land and water areas are not classified as prime farmland.

The general criteria for prime farmland are as follows: a generally adequate and dependable supply of moisture from precipitation or irrigation, favorable temperature and growing-season length, acceptable levels of acidity or alkalinity, few or no rocks, and permeability to air and water. Prime farmland is not excessively erodible, is not saturated with water for long periods, and is not flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

The survey area contains about 82,590 acres of prime farmland. That acreage makes up about 47 percent of the total acreage in the survey area and is mainly in the central and western parts of the county.

The soil map units that make up prime farmland in the survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4, and the location of each unit is shown on the detailed soill maps at the back of this publication. The soil properties and characteristics that affect use and management of the units are described in the section "Detailed Soil Map Units."

Some soils in table 5 are classified as prime farmland if certain limitations of the soil are overcome. The measures needed to overcome the limitations of such soils are given in parentheses after the name of the map unit.

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 potentials 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 in 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 potentials and 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 all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

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

John W. Bailey, extension agent, Virginia Cooperative Extension 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, including some not commonly grown in the survey area, 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 hay 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.

In 1981, according to the Virginia Crop Reporting Service and USDA Agricultural Stabilization and Conservation Service, about 19 percent, or 33,000 acres, of Powhatan County was used for agriculture. Of the 33,000 acres, about 16,000 acres was used for cultivated crops and 17,000 acres for pasture and hay. Corn, soybeans, and flue-cured tobacco are the main row crops; wheat, barley, and sorghum are the major close-grown crops. The main pasture and hay crops are alfalfa, orchardgrass, red clover, and tall fescue. Nearly all of the pasture and hay production is used to support the livestock enterprises in the county. At least 70,000 acres of land—40 percent of the county—used for woodland and pasture has good suitability for crops.

Very deep, well drained, nearly level and gently sloping upland soils, such as Cecil and Appling soils, cover about 39 percent of the county. A wide variety of row crops, close-grown crops, and grasses and legumes are suited to those soils.

The acreage in field crops in the county has gradually decreased and the acreage in pasture has increased as more beef cattle are being raised. Some cropland and pasture has been converted to residential developments.

Erosion is the major concern on most of the cropland in Powhatan County. Most soils in the county have slopes of more than 2 percent and thus are susceptible to erosion.

Loss of the surface layer to erosion reduces the productivity of the soil and reduces the fertility and available water capacity. Erosion is especially damaging to soils that have a clayey subsoil, such as Appling, Cecil, Creedmoor, Trenholm, and Turbeville soils. Erosion also reduces productivity on soils that tend to be droughty, such as Poindexter and Wedowee soils.

Erosion also results in sediment-loaded streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Preparing a good seedbed through tillage is difficult on severely eroded Pacolet clay loam, for example, because much of the original surface layer has been lost. It is also difficult to establish a good stand of any crop on the eroded soils because of the reduced available moisture in the seedbed. Severely eroded areas are in some units of Cecil, Turbeville, Enon, Mayodan, Pacolet, Poindexter, and Wedowee soils and in a few units of Appling and Kempsville soils.

Erosion-control practices that provide protective surface cover help to reduce runoff and increase water infiltration. For example, using a cropping system that keeps the plant cover on the soil for extended periods can hold erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion, provide nitrogen, and improve soil tilth for the next crop in the rotation.

Contour stripcropping and using grassed waterways are the common erosion-control practices in the county. These practices are best suited to soils with smooth, uniform slopes. Terraces and diversions, which reduce the length of slope and reduce runoff and erosion, are most practical on very deep, well drained soils with long, regular slopes. Some Appling, Cecil, and Turbeville soils are suitable for terraces. Contour tillage or terracing is not practical in most areas of Enon, Pacolet, Poindexter, and Wedowee soils. A dense plant cover is required to control erosion on these soils.

Conservation tillage, leaving crop residue on the surface, and using winter cover crops help to increase infiltration and reduce the hazards of runoff and erosion. These practices are suitable for most soils in the survey area but are difficult to use on the more eroded soils.

Fertility is low in most soils in the county, and most are very strongly acid or strongly acid unless they have been limed. However, the Enon and Poindexter soils on uplands and the Forestdale and Toccoa soils on flood plains are commonly less acid and have higher natural fertility. The proper soil reaction enables crops to use fertilizer and soil moisture more efficiently. Crops on nearly all soils in the county respond well to applications of fertilizer and lime.

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

Most soils used for crops in the survey area have a surface layer of sandy loam, fine sandy loam, loam, or silt loam and are low in organic matter content. Generally, the structure of the surface layer of these soils is weak, and rainfall causes a crust to form on the surface. The crust is hard when dry, and thus infiltration of water is reduced and runoff is increased. Regular additions of crop residue and other organic material help to improve soil structure and reduce crust formation.

Tilth is of particular concern on the Altavista, Augusta, Chenneby, Chewacla, Creedmoor, Dogue, Forestdale, Helena, and Partlow soils. These soils often stay wet until about midspring. If they are wet when plowed, they tend to be cloddy when dry and a good seed bed is difficult to prepare.

Drainage is a major management need in some areas used for crops and pasture in the county. Some soils are naturally so wet that the production of crops common to the area is generally not practical or possible unless the soils are drained. Somewhat poorly drained Augusta, Chenneby, and Chewacla soils and poorly drained Forestdale and Partlow soils are examples of soils that require drainage for crops.

The design of surface and subsurface drainage systems varies with the kind of soil. Sometimes a combination of surface drainage and tile drainage can be used. Drains have to be more closely spaced in soils with slower permeability than in the more permeable soils. Tile drainage is suited to soils with moderate permeability, such as Augusta, Chenneby, Chewacla, and Partlow soils. However, most of these soils are subject to flooding and adequate drainage outlets often are not available in areas of Chenneby, Chewacla, and Partlow soils.

Field crops commonly suited to the soils and climate of the survey area are corn, soybeans, grain sorghum, sunflower, flue-cured tobacco, and sun-cured tobacco. Barley, wheat, oats, and rye are the common small grains.

Pastures in the county commonly consist of tall fescue, bluegrass, orchardgrass, ryegrass, or clover. Most improved pastures are a seeded mixture of tall fescue and ladino clover. Pastures of cool-season plants, such as tall fescue and clover, provide most of the grazing in the spring and fall. Warm-season plants, such as common bermudagrass, lespedezas, and sudangrass or sudangrass-sorghum hybrids, provide summer grazing.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are the major pasture management concerns. The use of proper stocking rates, rotation and deferred grazing, weed control, restriction of grazing during the wet season on the moderately well drained to poorly drained soils, and the use of lime and fertilizer are the major pasture management practices. Stockpiling the accumulated growth of tall fescue for winter grazing reduces the need for hay.

The major plants grown and harvested for hay in the county are orchardgrass, red clover, alfalfa, and Kentucky-31 fescue. Alfalfa is suitable for many soils in the survey area if the proper amounts of lime and fertilizer are applied. Midland bermudagrass can be grown and managed for good quality hay.

Special crops grown in the county on a small scale are vegetables, strawberries, and nursery plants. Most are produced for local markets. The very deep, well drained

Appling and Turbeville soils in the northern and western parts of the county are especially well suited to most of these special crops.

Most of the well drained soils in the county are suitable for strawberries, raspberries, blackberries, sweetcorn, muskmelons, string beans, broccoli, and nursery plants. These soils are also suitable for producing grapes where the soils are sloping and irrigation is to be used. Soils in low landscape positions, where frost is frequent and air drainage is poor, are generally poorly suited to early-season vegetables and small fruits.

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 land capability classification of each map unit also is shown in the table.

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 ensures the smallest possible loss.

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 most kinds of field crops. 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 or 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. The levels are defined in the following paragraphs.

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

Class I soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

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

Commercial woodland covers about three-fourths of Powhatan County. Nearly all of the commercial woodland is privately owned. The timber harvesting and wood-related industries provide employment for many people in the area.

The major hardwoods in the county are various species of oak, hickory, yellow-poplar, and sweetgum. The major pine species are Virginia pine, loblolly pine, and shortleaf pine.

Nearly all of the woodland in the county has been cut over at least once. Loggers have generally selected the most valuable tree species for removal, leaving less valuable species for reseeding. Much of the Virginia pine in the county grew up in fields that were abandoned in the 1940s, usually because of depleted fertility.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 through 8, high; 9 through 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *X*, stones or rocks on the surface; *W*, excessive water in or on the soil; *T*, excessive alkalinity, acidity, sodium salts, or other toxic substances in the soil; *D*, restricted rooting depth caused by bedrock, hardpan, or other restrictive layer; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil profile. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R,X,W,T,D,C,S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that erosion can occur as a result of site preparation or following cutting operations and where the soil is exposed, for example, roads, skid trails, fire lanes, and log handling areas. Forests that are abused by fire or overgrazing are also subject to erosion. The ratings for the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 15. A rating of *slight* indicates that no particular measures to prevent erosion are needed under ordinary conditions. A rating of *moderate* indicates that erosion control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities. The proper construction and maintenance of roads, trails, landings, and fire lanes will help overcome the erosion hazard.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that equipment use normally is not restricted either in kind of equipment that can be used or time of year because of soil factors. If soil wetness is a factor, equipment use can be restricted for a period not to exceed 2 months. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 2 to 6 months. A rating of *severe* indicates that equipment use is severely restricted either in kind of equipment or season of use. If soil wetness is a factor, equipment use is restricted for more than 6 months.

Choosing the most suitable equipment and timing harvesting and other management operations to avoid seasonal limitations help overcome the equipment limitation.

Seedling mortality refers to the probability of death of naturally occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary.

The use of special planting stock and special site preparation, such as bedding, furrowing, or surface drainage, can help reduce seedling mortality.

Windthrow hazard is the likelihood of trees being uprooted (tipped over) by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions are a seasonal high water table and bedrock or a fragipan or other limiting layer. A rating of *slight* indicates that normally no trees are blown down by the wind. Strong winds may break trees but do not uproot them. A rating of *moderate* indicates that moderate or

strong winds occasionally blow down a few trees during periods of soil wetness. A rating of *severe* indicates that moderate or strong winds may blow down many trees during periods of soil wetness.

The use of specialized equipment that does not damage surficial root systems during partial cutting operations can help reduce windthrow. Care in thinning or no thinning also can help reduce windthrow.

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

The *productivity class*, a number, represents an expected volume produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand. One cubic meter per hectare equals 14.3 cubic feet per acre.

The first tree species listed under common trees for a soil is the indicator species for that soil. The indicator species is the species that is common in the area and is generally the most productive on the soil. The productivity class of the indicator species is the number used for the ordination symbol.

Trees to plant are those that are suited to the soil and are planted for commercial wood production.

Recreation

The soils of the survey area are rated in table 8 according to 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 recreation 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 8, 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 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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 mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing 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 or 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

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 9, 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, and barley.

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, timothy, bromegrass, 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, goldenrod, beggar-ticks, quackgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, birch, cherry, maple, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, 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, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, burreed, pickerelweed, rushes, sedges, and reeds.

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, swamps and 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. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

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, gray 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, beaver, birds, muskrat, frogs, and tree swallow.

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. 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 need to 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 to 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, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) 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 10 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, a cemented pan, 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, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 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 or to a cemented pan, 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, frost-action 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, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials 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 11 shows the degree and 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 11 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 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, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan 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 11 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, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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, bedrock, and cemented pans 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 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium 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, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty 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, a cemented pan, 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 12 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, 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 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. They 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 12, 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. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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 toxic material and 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, bedrock, and toxic material.

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 low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, 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, stones, or soluble salts, or

soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, 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 nutrients for plant growth.

Water Management

Table 13 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; embankments, dikes, and levees; and aquifer-fed excavated ponds. 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 for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. 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 even 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 content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

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, to a cemented pan, 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; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, 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 or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, 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 classifications, 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 14 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 of each layer 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 about 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, CL-ML.

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.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

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 the survey area and in nearby areas and on estimates made 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 the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally 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 15 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 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 determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and 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 1/3 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 downward movement of water 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 is given in inches of water per inch of soil for each major soil layer. 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 in tons per acre per year. The 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 0.05 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 without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, 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 of 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 16 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 not protected by vegetation are assigned to one of four groups. They are grouped according to the intake 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, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional, common,* 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). *Common* is used when classification as occasional or frequent does not affect interpretations. 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 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian,* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

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. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. 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. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than

6.0" indicates that the water table is below a depth of 6 feet or that the water table exists 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 severe corrosion 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 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 (*5*). 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 from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten 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 Udult (*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 *udult*, the suborder of the Ultisols that have an 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. Mostly 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, mixed, 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. The texture of the surface layer or of the substratum can differ 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* (*4*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*5*). 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."

Abell Series

The soils of the Abell series are very deep and moderately well drained. They formed in local alluvial material along upland drainageways. Slope ranges from 2 to 7 percent.

Abell soils are similar to Altavista soils and are near Appling, Cecil, Helena, Pacolet, and many other soils. The Abell soils differ from the Altavista soils by having a lithologic discontinuity in the argillic horizon. The Abell soils have less clay in the Bt horizon than the Appling, Cecil, Helena, or Pacolet soils.

Typical pedon of Abell fine sandy loam, 2 to 7 percent slopes, 3,000 feet east of the intersection of VA-603 and VA-615, 3,600 feet north of VA-615:

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

E—2 to 6 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; very strongly acid; clear wavy boundary.

BE—6 to 12 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate coarse subangular blocky structure; friable, slightly sticky, nonplastic; common fine medium and coarse roots; very strongly acid; clear smooth boundary.

Btl—12 to 21 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm, sticky, slightly plastic; common fine medium and coarse roots; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—21 to 30 inches; yellowish red (5YR 5/8) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak very coarse subangular blocky structure; firm, nonsticky, nonplastic; few fine and medium roots on vertical faces of peds; common distinct clay films on faces of peds; few distinct sand coatings on vertical faces of peds; common fine flakes of mica; strongly acid; abrupt wavy boundary.

2Bt3—30 to 36 inches; strong brown (7.5YR 5/8) silty clay; many fine faint yellowish red (5YR 5/8) mottles and few light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine medium and coarse roots; many distinct clay films on faces of peds; common fine flakes of mica; strongly acid; abrupt wavy boundary.

2Bt4—36 to 41 inches; yellowish brown (10YR 5/6) silty clay; common fine distinct light brownish gray (10YR 6/2) streaks and many fine faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine medium and coarse roots; many distinct clay films on faces of peds; few fine flakes of mica; strongly acid; abrupt wavy boundary.

2BC1—41 to 53 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct gray (10YR 6/1) and pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm, slightly sticky, nonplastic; few fine roots; common faint clay films on some vertical and horizontal faces of peds; few fine flakes of mica; strongly acid; abrupt smooth boundary.

2BC2—53 to 58 inches; gray (10YR 6/1) clay loam; common coarse distinct yellowish brown (10YR 5/8) mottles; weak very coarse subangular blocky structure parting to moderate thick platy; firm, sticky, slightly plastic; few fine roots; few faint clay films on some vertical and horizontal faces of peds; few fine flakes of mica; moderately acid; abrupt irregular boundary.

2C—58 to 64 inches; yellowish brown (10YR 5/6) sandy loam; common coarse distinct gray (10YR 6/1) mottles; massive; firm, nonsticky, nonplastic; few fine roots; 50 percent of the mass is brittle; moderately acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to the 2B horizon ranges from 24 to 48 inches. The depth to bedrock is more than 60 inches. Rock fragments of subrounded quartz gravel make up 0 to 15 percent of the solum. The A, E, BE, B, and 2B horizons are very strongly acid or strongly acid unless the soil has been limed. The 2BC and 2C horizons range from very strongly acid to slightly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is sandy loam, fine sandy loam, or loam.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 through 6. It is sandy loam, fine sandy loam, or loam. Some pedons do not have an E horizon.

The BE horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is sandy clay loam or clay loam. Some pedons do not have a BE horizon.

The Bt and 2Bt horizons have hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. The Bt horizon is loam, sandy clay loam, or clay loam. The 2Bt horizon is clay loam, silty clay loam, silty clay, or clay.

The 2BC horizon has hue of 10YR or 2.5Y, value of 4 through 8, and chroma of 1 through 8, or it is mottled without a dominant matrix hue. The range of texture is the same as that for the 2Bt horizon. Some pedons do not have a 2BC horizon.

The 2C horizon is variable in color. It generally is loamy soil or saprolitic material.

Altavista Series

The soils of the Altavista series are very deep and moderately well drained. They formed in alluvial material on stream terraces. Slope ranges from 2 to 6 percent.

Altavista soils are similar to Abell soils and are near the Augusta, Chenneby, Chewacla, and Forestdale soils. The Altavista soils do not have a lithologic discontinuity in the argillic horizon, as do the Abell soils; have less clay in the Bt horizon than the Forestdale soils and are not as gray throughout; are less gray than the Augusta

soils; and have an argillic horizon, which neither the Chenneby nor the Chewacla soils have.

Typical pedon of Altavista fine sandy loam, 2 to 6 percent slopes, 9,300 feet south of the intersection of VA-603 and VA-604, 530 feet southwest of VA-603:

Ap—0 to 9 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; moderate medium granular structure; very friable, slightly sticky, nonplastic; many fine and medium and few coarse roots; moderately acid; abrupt smooth boundary.

BA—9 to 13 inches; light olive brown (2.5Y 5/6) fine sandy loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and common medium roots; few faint sand coatings on vertical faces of peds; few very fine flakes of mica; strongly acid; gradual wavy boundary.

Btl—13 to 21 inches; olive yellow (2.5Y 6/6) clay loam; common medium distinct brownish yellow (10YR 6/8) mottles and few fine distinct light gray (N 7/0) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and common medium roots; many distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—21 to 26 inches; light yellowish brown (2.5Y 6/4) clay loam; many medium distinct light gray (N 7/0) mottles and common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common medium roots; common distinct sand coatings and clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—26 to 37 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; many fine distinct gray (5Y 6/1) mottles and common medium distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—37 to 44 inches; mottled light yellowish brown (2.5Y 6/4), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/6) sandy clay loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C—44 to 60 inches; mottled brownish yellow (10YR 6/8) and gray (N 6/0) sandy loam; massive; very friable, nonsticky, nonplastic; few fine flakes of mica; strongly acid.

The argillic horizon is fine-loamy, ranges from 18 to 26 inches in thickness, and extends to a depth of 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of flakes of mica ranges from few to common in the B and C horizons. The soil is very strongly acid or strongly acid unless the surface has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is sandy loam or fine sandy loam.

The BA and Bt horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. The BA horizon is sandy loam or fine sandy loam, and the Bt horizon is sandy clay loam or clay loam.

The BC horizon is mottled yellow, brown, and gray. It is sandy loam or sandy clay loam.

The C horizon is neutral or has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 0 through 8. It is sand, loamy sand, or sandy loam.

Appling Series

The soils of the Appling series are very deep and well drained. They formed on uplands in residual material from granite gneiss rock. Slope ranges from 2 to 15 percent.

Appling soils are similar to Cecil, Pacolet, and Wedowee soils and are near Abell, Helena, and Partlow soils. The Appling soils have a yellower Bt horizon than the Cecil or Pacolet soils, have a thicker Bt horizon than the Pacolet or Wedowee soils, and do not have the gray colors or the gray mottling that is in the solum of the Abell, Helena, and Partlow soils.

Typical pedon of Appling fine sandy loam, 2 to 7 percent slopes, 4,500 feet south of the intersection of VA-622 and VA-639:

A—0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many fine medium and coarse roots; 10 percent subrounded and angular quartz gravel; very strongly acid; abrupt wavy boundary.

E—2 to 8 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; 10 percent subrounded and angular quartz gravel; very strongly acid; abrupt smooth boundary.

BE—8 to 13 inches; strong brown (7.5YR 5/6) clay loam; weak coarse subangular blocky structure; firm, sticky, slightly plastic; many fine medium and coarse roots; few very fine flakes of mica; 10 percent subrounded and angular quartz gravel; very strongly acid; clear wavy boundary.

Bt1—13 to 23 inches; yellowish red (5YR 5/8) clay; few fine distinct red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; many fine medium and coarse roots; many distinct yellowish red (5YR 4/6) clay films on faces of peds; few very

fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—23 to 33 inches; yellowish red (5YR 5/8) clay; many fine distinct red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure parting to weak thin platy; many fine medium and coarse roots; many distinct clay films on faces of peds; common fine flakes of mica; very strongly acid; clear wavy boundary.

BC—33 to 44 inches; mottled and streaked yellowish red (5YR 4/8), strong brown (7.5YR 5/6), and light yellowish brown (10YR 6/4) clay loam; moderate very coarse subangular blocky structure parting to weak very thick platy; friable, sticky, slightly plastic; few fine and medium roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—44 to 56 inches; strong brown (7.5YR 5/6) and red (2.5YR 5/8) clay loam; massive; friable, sticky, slightly plastic; few fine roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—56 to 63 inches; strong brown (7.5YR 5/6), red (2.5YR 5/8), and light gray (10YR 7/2) clay loam; massive; friable, sticky, slightly plastic; few fine roots; common fine flakes of mica; very strongly acid.

The argillic horizon ranges from 18 to 40 inches thick and extends to a depth of 23 to 58 inches. The depth to hard bedrock is more than 60 inches. Gravel-size rock fragments make up 0 to 20 percent of the A and E horizons and 0 to 10 percent of the B and C horizons. Unless limed, the soil is very strongly acid or strongly acid. Mica content ranges from few to common in the Bt horizon and from few to many in the BC and C horizons.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 6. In the fine earth fraction it is sandy loam or fine sandy loam.

The E horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 3 through 8. The texture range is the same as that of the A horizon. Some pedons do not have an E horizon.

The BE horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 3 through 8. Is is sandy clay loam or clay loam. Some pedons do not have a BE horizon.

The Bt horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. Pedons that have a Bt horizon with hue of 5YR also have evident patterns of mottling in that horizon. The content of red, brown, or yellow mottles ranges from few to many in the middle and lower parts of the Bt horizon. The Bt horizon is clay loam or clay.

The range of the matrix and mottle color of the BC horizon is the same as that of the Bt horizon. The BC horizon is loam, sandy clay loam, or clay loam. Some pedons do not have a BC horizon.

The C horizon has variable colors and commonly is multicolored. It is loam, sandy clay loam, or clay loam.

Augusta Series

The soils of the Augusta series are very deep and somewhat poorly drained. They formed in old alluvium along drainageways on high terraces. Slope ranges from 0 to 2 percent.

Augusta soils are similar to Partlow soils and are near Dogue and Turbeville soils. The Augusta soils are more gray and have less clay in the subsoil than the Dogue soils. The Augusta soils have a browner, more clayey subsoil than the Turbeville soils, and the Turbeville soils do not have mottles in the subsoil. The Augusta soils are less gray in the subsoil than the Partlow soils.

Typical pedon of Augusta silt loam, 2,015 feet east of the intersection of VA-711 and VA-635, 780 feet north of VA-711:

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; extremely acid; abrupt wavy boundary.

Bt1—4 to 8 inches; yellowish brown (10YR 5/4) loam; many fine distinct light brownish gray (10YR 6/2) mottles and many fine faint yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, sticky, slightly plastic; common fine medium and coarse roots; few faint clay films on faces of peds; 4 percent quartz gravel; extremely acid; abrupt broken boundary.

Bt2—8 to 15 inches; yellowish brown (10YR 5/6) clay loam; many medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse and medium subangular blocky structure; friable, sticky, plastic; common fine medium and coarse roots; few faint clay films on faces of peds; very strongly acid; abrupt smooth boundary.

Btg1—15 to 23 inches; light gray (10YR 6/1) clay loam; many medium distinct strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) mottles; moderate coarse and medium subangular blocky structure; firm, very sticky, plastic; few fine and medium roots; common distinct clay films on faces of peds; 2 percent quartz gravel; extremely acid; gradual wavy boundary.

Btg2—23 to 41 inches; gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles and few medium distinct yellowish red (5YR 5/8) mottles; moderate coarse subangular blocky structure; very friable, very sticky, plastic; few fine and medium roots; common distinct clay films on faces of peds; few iron nodules; extremely acid; gradual wavy boundary.

Btg3—41 to 53 inches; gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles and few fine distinct yellowish red (5YR

5/8) mottles; moderate very coarse subangular blocky structure parting to weak very thick platy; very firm, sticky, plastic; few fine and medium roots; common distinct clay films on faces of peds; few iron nodules; extremely acid; clear wavy boundary.

BCg—53 to 64 inches; gray (10YR 5/1) loam; many coarse distinct strong brown (7.5YR 5/8) mottles; moderate very coarse subangular blocky structure parting to weak thick platy; very firm, sticky, slightly plastic; few fine and medium roots; common distinct clay films on faces of peds; few iron nodules; extremely acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The soil is extremely acid or very strongly acid unless the surface layer is limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 6. It is loam or silt loam.

The Bt and BC horizons have hue of 10YR or 2.5Y and value of 4 through 6. The matrix chroma in the upper part of the Bt horizon ranges from 3 to 6; the mottles have chroma of 0 through 8. The matrix chroma in the lower part of the Bt horizon and in the BC horizon is 1 or 2; the mottles have chroma of 3 through 8. The Bt and BC horizons are loam, sandy clay loam, or clay loam.

The Augusta soils in this survey area are a taxadjunct to the Augusta series because they have fewer weatherable minerals in the sand fraction and lower reaction than defined in the range for the series. These differences do not significantly affect use and management.

Buncombe Series

The soils of the Buncombe series are very deep and excessively drained. They formed in recent alluvium on flood plains. Slope ranges from 0 to 5 percent.

Buncombe soils are similar to Toccoa soils and are near Chenneby, Forestdale, and Toccoa soils. The Buncombe soils have more sand and less silt and clay than any one of those soils.

Typical pedon of Buncombe loamy sand, 0 to 5 percent slopes, 1.5 miles west of the US-522 bridge over the James River, 300 feet west-southwest of the river:

A1—0 to 4 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine roots; common black grains of sand; common fine flakes of mica; moderately acid; abrupt smooth boundary.

A2—4 to 10 inches; brown (10YR 4/3) sand; single grain; loose; common fine roots; common black grains of sand; common fine flakes of mica; moderately acid; abrupt wavy boundary.

C1—10 to 20 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few fine roots; common thin horizontal streaks of black sand; common fine flakes of mica; moderately acid; clear smooth boundary.

C2—20 to 33 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few fine roots; common thin horizontal streaks and grains of black sand; common fine flakes of mica; moderately acid; gradual wavy boundary.

C3—33 to 52 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few thin horizontal streaks of dark grayish brown sand; common fine flakes of mica; moderately acid; abrupt wavy boundary.

C4—52 to 60 inches; dark yellowish brown (10YR 4/4) fine sandy loam; many faint brown (10YR 4/3) mottles; massive; very friable; common fine flakes of mica; moderately acid.

The depth to bedrock is more than 60 inches. Few to many flakes of mica are throughout the soil. The soil ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. It is sand or loamy sand.

The C horizon has hue of 5YR through 2.5Y, value of 4 through 8, and chroma of 2 through 8. It is sand or loamy sand above a depth of 40 inches and ranges from sand to loam below 40 inches.

Cecil Series

The soils of the Cecil series are very deep and well drained. They formed on uplands in residual material from granite gneiss rock. Slope ranges from 2 to 15 percent.

Cecil soils are similar to Appling, Pacolet, and Wedowee soils and are adjacent to many other soils. The Cecil soils have a redder Bt horizon than the Appling or Wedowee soils and a thicker Bt horizon than the Pacolet soils.

Typical pedon of Cecil fine sandy loam, 2 to 7 percent slopes, eroded, 1,700 feet east of the intersection of VA-627 and VA-662, 30 feet north of VA-662:

Ap—0 to 4 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; friable, nonsticky, nonplastic; many fine and medium roots; few fine flakes of mica; strongly acid; abrupt wavy boundary.

BA—4 to 8 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine and medium roots; few faint silt coatings on vertical faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

Bt1—8 to 17 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium roots; many distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—17 to 25 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and medium roots; many distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.
Bt3—25 to 35 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure parting to weak medium platy; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.
Bt4—35 to 45 inches; red (2.5YR 4/6) clay; moderate coarse subangular blocky structure parting to weak thick platy; friable, slightly sticky, nonplastic; many distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; clear wavy boundary.
BC—45 to 57 inches; red (2.5YR 4/6) sandy clay loam; weak very coarse subangular blocky structure parting to weak thick platy; friable, nonsticky, nonplastic; common faint clay films on some vertical faces of peds; many fine and medium flakes of mica; very strongly acid; gradual wavy boundary.
C—57 to 66 inches; dark red (2.5YR 3/6) sandy loam; massive; friable, nonsticky, nonplastic; common coarse root channels filled with red (2.5YR 4/6) clay having no mica; many medium flakes of mica; very strongly acid.

The argillic horizon ranges from 24 to 48 inches in thickness and extends to a depth of 30 to 60 inches. The depth to bedrock is more than 60 inches. Gravel-size rock fragments of mostly angular quartz make up 0 to 20 percent of the A horizon and 0 to 5 percent of the B horizon. The mica content ranges from none to common in the Bt horizon and from few to many in the BC and C horizons. Unless limed, the soil is very strongly acid or strongly acid.

The A horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. In the fine earth fraction it is fine sandy loam, loam, sandy clay loam, or clay loam.

The BA horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 through 8. It is sandy clay loam or clay loam. Some pedons do not have a BA horizon.

The Bt horizon has hue mainly of 10R or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the lower part of the Bt horizon, the hue ranges to 5YR in subhorizons with no evident pattern of mottling. The Bt horizon is clay or clay loam.

The BC horizon has a color range the same as that of the Bt horizon. The BC horizon is sandy clay loam.

The C horizon has hue of 10R through 2.5Y, value of 3 through 8, and chroma of 2 through 8. In some pedons the C horizon is multicolored. It is sandy loam, loam, or sandy clay loam.

Chenneby Series

The soils of the Chenneby series are very deep and somewhat poorly drained. They formed in recent alluvium on broad flood plains. Slope ranges from 0 to 2 percent.

Chenneby soils are similar to Chewacla soils and are near Buncombe, Forestdale, and Toccoa soils. The Chenneby soils have more silt and less sand than the Chewacla soils and have less clay and less gray in the B horizon than the Forestdale soils. Unlike the Buncombe and Toccoa soils, the Chenneby soils have gray mottles, and have more silt and clay than the Buncombe or Toccoa soils.

Typical pedon of Chenneby silt loam, 5,000 feet north-northwest of the VA-711 bridge over Norwood Creek, and 660 feet southwest of the James River:

Ap—0 to 11 inches; dark brown (10YR 4/3) silt loam; moderate coarse granular structure; friable, slightly sticky, nonplastic; common fine roots; few fine flakes of mica; very strongly acid; abrupt wavy boundary.
A—11 to 15 inches; dark brown (10YR 4/3) silt loam; common fine faint dark yellowish brown (10YR 4/4) and dark grayish brown (10YR 4/2) mottles; moderate medium granular structure; friable, slightly sticky, nonplastic; common fine roots; many distinct silt films on faces of peds; few fine flakes of mica; very strongly acid; abrupt smooth boundary.
Bw1—15 to 23 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark yellowish brown (10YR 4/4) and dark grayish brown (10YR 4/2) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; many distinct silt films on faces of peds; few sand-size black oxide concretions; few fine flakes of mica; very strongly acid; clear wavy boundary.
Bw2—23 to 32 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark yellowish brown (10YR 4/4) and dark grayish brown (10YR 4/2) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; many distinct dark grayish brown (10YR 4/2) silt films on faces of peds; few sand-size black oxide concretions; few fine flakes of mica; very strongly acid; gradual wavy boundary.
Bw3—32 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine faint dark brown (10YR 4/3) mottles and few fine faint dark grayish brown (10YR 4/2) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; many distinct dark grayish brown (10YR 4/2) silt films on faces of peds; many sand-size black oxide concretions; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bw4—37 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles and few fine faint dark grayish brown (10YR 4/2) mottles; moderate very coarse subangular blocky structure parting to weak medium subangular blocky; firm, sticky, plastic; many distinct dark grayish brown (10YR 4/2) silt films on faces of peds; common sand-size black oxide concretions; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of mica flakes in the solum is few or common. Unless limed, the soil ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. It is loam, silt loam, or silty clay loam.

The upper part of the Bw horizon has hue of 10YR, value of 3 through 5, and chroma of 3 or 4. The middle and lower parts of the Bw horizon have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. The Bw horizon has high- and low-chroma mottles. It is silt loam or silty clay loam.

Chewacla Series

The soils of the Chewacla series are very deep and somewhat poorly drained. They formed in recent alluvium on narrow flood plains. Slope ranges from 0 to 2 percent.

Chewacla soils are similar to Chenneby soils and are near Forestdale and Toccoa soils. The Chewacla soils have more sand and less silt in the solum than the Chenneby soils and have less clay and less gray in the B horizon than the Forestdale soils. Unlike the Toccoa soils, the Chewacla soils have gray mottles, and have more clay and less sand than the Toccoa soils.

Typical pedon of Chewacla silt loam, 3,100 feet east of the intersection of US-522 and VA-615, 100 feet south of VA-615:

A—0 to 6 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; friable, slightly sticky, nonplastic; many fine and medium and few coarse roots; few fine flakes of mica; moderately acid; clear smooth boundary.

Bw1—6 to 17 inches; dark yellowish brown (10YR 4/4) sandy clay loam; many medium faint light olive brown (2.5Y 5/4) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; few faint clay films in some pores and on some vertical faces of peds; few fine flakes of mica; moderately acid; gradual smooth boundary.

Bw2—17 to 26 inches; pale brown (10YR 6/3) silty clay loam; many medium faint light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable, sticky, slightly plastic; few fine roots; few faint brownish gray (2.5Y 5/2) silt films on vertical faces of peds; few fine flakes of mica; moderately acid; abrupt wavy boundary.

Bwg—26 to 37 inches; gray (10YR 6/1) sandy clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to coarse subangular blocky; very friable, sticky, nonplastic; few fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

BCg—37 to 53 inches; gray (10YR 6/1) sandy loam; few fine distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; few fine roots; few fine flakes of mica; 2 percent rounded quartz gravel; moderately acid; clear wavy boundary.

2Cg—53 to 60 inches; mottled and streaked gray (10YR 6/1) and yellowish brown (10YR 5/6) sandy loam; massive; friable, slightly sticky, nonplastic; few fine roots; common fine flakes of mica; common white grains of feldspar; 10 percent angular quartz gravel; strongly acid.

The thickness of the B horizon ranges from 35 to 55 inches. The depth to hard bedrock is more than 60 inches. The content of flakes of mica ranges from few to common throughout the soil. The content of gravel-size rock fragments of mostly quartz ranges from 0 to 5 percent in the A and B horizons. Unless limed, the soil ranges from very strongly acid to slightly acid.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is sandy loam, fine sandy loam, loam, or silt loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. The lower part of the B horizon, including the BC horizon, has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 through 8 or is mottled without a dominant matrix hue. The B and BC horizons mainly are loam, sandy loam, sandy clay loam, or clay loam, but some individual subhorizons are silt loam or silty clay loam.

The C horizon has a color range the same as that of the lower part of the B horizon. The C horizon is stratified sandy and loamy sediments.

Creedmoor Series

The soils of the Creedmoor series are very deep and moderately well drained. They formed on uplands in residual material from Triassic-age shale, siltstone, and fine-grained sandstone. Slope ranges from 2 to 7 percent.

Creedmoor soils are similar to Dogue, Helena, and Trenholm soils and are near Kempsville and Mayodan soils. The Creedmoor soils have a firmer, stickier, and

more plastic Bt horizon than the Dogue, Helena, Kempsville, or Mayodan soils; have a lower base saturation than the Trenholm soils; have a higher clay content in the Bt horizon than the Kempsville soils; and are grayer in the Bt horizon than the Mayodan soils.

Typical pedon of Creedmoor fine sandy loam, 2 to 7 percent slopes, 1.45 miles north-northwest of the intersection of VA-671 and VA-642:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine medium and coarse roots; very strongly acid; abrupt wavy boundary.

E—1 to 5 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate coarse granular structure; friable, nonsticky, nonplastic; common fine medium and coarse roots; very strongly acid; clear wavy boundary.

Btl—5 to 10 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium faint yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; common fine medium and coarse roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—10 to 14 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium faint yellowish brown (10YR 5/4) mottles; moderate coarse subangular blocky structure; friable, sticky, slightly plastic; few fine and medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—14 to 25 inches; yellowish brown (10YR 5/8) clay; many medium faint yellowish brown (10YR 6/6) mottles and common fine distinct light brownish gray (10YR 6/2) and red (2.5YR 5/8) mottles; moderate coarse subangular blocky structure; very firm, very sticky, very plastic; few fine and medium roots; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—25 to 43 inches; brownish yellow (10YR 6/8) silty clay; many medium distinct light gray (10YR 7/1) mottles and few fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm, very sticky, very plastic; few fine roots; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

Bt5—43 to 52 inches; light brownish gray (10YR 6/2) silty clay; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; firm, very sticky, very plastic; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

BC—52 to 59 inches; yellowish brown (10YR 5/4) silty clay loam; many fine distinct light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) mottles; massive; firm, sticky, slightly plastic; extremely acid; clear smooth boundary.

C—59 to 62 inches; brown (10YR 4/3) silty clay loam; massive; firm, sticky, slightly plastic; 10 percent channer-size fragments of shale; very strongly acid.

The thickness of the Bt horizon ranges from 15 to 50 inches. The depth to hard bedrock is more than 60 inches. Unless limed, the soil is extremely acid or very strongly acid throughout.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 1 through 4. It is sandy loam, fine sandy loam, or loam.

The E horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 or 4. It is sandy loam, fine sandy loam, or loam.

Some pedons have a BE horizon. It has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 6. It is sandy loam or sandy clay loam.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 2 through 8. It is mottled red, brown, yellow, or gray. The Bt horizon is sandy clay loam, clay loam, or clay in the upper part and clay or silty clay in the lower part.

The BC and C horizons have hue of 7.5YR or 10YR, value of 4 through 8, and chroma of 2 through 8 or are mottled in these colors. They are silty clay loam or clay loam.

Some pedons have a Cr horizon that is at a depth of 40 to 60 inches. The Cr horizon has a color range the same as that of the BC and C horizons and crushes to silty clay loam or clay loam.

Dogue Series

The soils of the Dogue series are very deep and moderately well drained. They formed in old alluvium on high river terraces. Slope ranges from 0 to 15 percent.

Dogue soils are similar to Creedmoor, Helena, and Trenholm soils and are near Turbeville and Augusta soils. The Dogue soils have a thicker Bt horizon than the Creedmoor soils, a dominantly redder subsoil than the Helena or Trenholm soils, and less gray in the Bt horizon than the Augusta soils. Unlike the Turbeville and Augusta soils, the Dogue soils have gray mottles in the Bt horizon.

Typical pedon of Dogue silt loam, 2 to 7 percent slopes, 1,635 feet north of the intersection of VA-711 and VA-635:

Ap—0 to 10 inches; brown (10YR 5/3) silt loam; moderate coarse granular structure; friable, slightly sticky, nonplastic; few fine and medium roots; many distinct silt films on faces of peds; strongly acid; abrupt wavy boundary.

BA—10 to 20 inches; brownish yellow (10YR 6/6) clay loam; moderate medium and coarse subangular

blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; few distinct clay films on faces of peds; extremely acid; clear wavy boundary.

Bt1—20 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable, sticky, plastic; few fine and medium roots; common distinct clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—26 to 37 inches; yellowish brown (10YR 5/8) silty clay; common fine distinct red (2.5YR 4/8) mottles and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium and fine subangular blocky structure; friable, sticky, plastic; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

Bt3—37 to 46 inches; mottled red (2.5YR 5/6), yellowish brown (10YR 5/6), and light brownish gray (2.5Y 6/2) silty clay; moderate medium and fine subangular blocky structure; firm, sticky, plastic; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

Bt4—46 to 54 inches; mottled red (10R 4/8) and yellowish brown (10YR 5/8) silty clay; moderate medium and fine subangular blocky structure; firm, sticky, plastic; common distinct clay films on faces of peds; extremely acid; gradual wavy boundary.

BC—54 to 62 inches; mottled red (2.5YR 4/8), strong brown (7.5YR 5/8), and light gray (N 7/0) silty clay loam; moderate medium subangular blocky structure; firm, sticky, plastic; few faint clay films on faces of peds; few fine flakes of mica; extremely acid.

The thickness of the solum is more than 60 inches. The depth to bedrock is more than 60 inches. Gravel-size rock fragments of mostly subrounded quartz make up 0 to 15 percent of the solum. Unless limed, the soil is extremely acid or very strongly acid.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is sandy loam, fine sandy loam, or silt loam.

The BA horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 through 8. It is loam, clay loam, or sandy clay loam.

The upper part of the Bt horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. The lower part of the Bt horizon and the BC horizon are neutral or have hue of 10R through 2.5Y, value of 4 through 7, and chroma of 0 through 8 or are mottled without dominant matrix hue. The Bt horizon is clay loam, silty clay loam, silty clay, or clay. The BC horizon is silty clay loam or clay loam.

The Dogue soils in this survey area are a taxadjunct to the Dogue series because the B horizon is redder and has more silt and fewer weatherable minerals in the sand and silt fractions than defined in the range for the series.

Enon Series

The soils of the Enon series are very deep and well drained. They formed on uplands in residual material from hornblende gneiss rock. Slope ranges from 2 to 15 percent.

Enon soils are similar to Poindexter soils and are near Trenholm soils. The Enon soils do not have gray mottles in the Bt horizon as do the Trenholm soils, and have a clayey argillic horizon that is thicker than the argillic horizon in the Poindexter soils.

Typical pedon of Enon sandy loam, 2 to 7 percent slopes, 4,000 feet east of the intersection of US-60 and VA-603, 3,750 feet north of US-60, 160 feet northwest of access road:

A—0 to 1 inch; dark grayish brown (2.5Y 4/2) sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine and medium and few coarse roots; strongly acid; abrupt wavy boundary.

E—1 to 6 inches; yellowish brown (10YR 5/4) sandy loam; weak coarse granular structure; very friable, slightly sticky, nonplastic; common fine medium and coarse roots; moderately acid; clear wavy boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/6) sandy clay loam; weak very coarse subangular blocky structure; firm, sticky, slightly plastic; common fine and medium and few coarse roots; common medium black concretions; 2 percent angular quartz gravel; moderately acid; clear wavy boundary.

Bt1—11 to 20 inches; strong brown (7.5YR 5/6) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, very sticky, very plastic; common fine medium and coarse roots; few distinct clay films on faces of peds; 2 percent angular quartz gravel; slightly acid; gradual wavy boundary.

Bt2—20 to 31 inches; strong brown (7.5YR 5/6) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm, very sticky, very plastic; few fine medium and coarse roots; common distinct clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt3—31 to 38 inches; brown (7.5YR 5/4) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm, very sticky, very plastic; few fine and medium roots; common distinct clay films on faces of peds; common coarse black concretions; neutral; clear wavy boundary.

BC—38 to 43 inches; brown (7.5YR 5/4) sandy clay loam; common fine faint brownish yellow (10YR 6/6) mottles; moderate coarse subangular blocky structure; very firm, sticky, plastic; few fine and

medium roots; few faint clay films on vertical faces of peds; many coarse black horizontal streaks of hard mineral; neutral; clear broken boundary.

C1—43 to 53 inches; yellowish brown (10YR 5/4) and strong brown (7.5YR 4/4) clay loam; massive; very firm, slightly sticky, nonplastic; few fine roots; many coarse black streaks of hard mineral; many fine flakes of mica; neutral; clear wavy boundary.

C2—53 to 62 inches; strong brown (7.5YR 4/6) clay loam; common fine distinct dark brown (7.5YR 4/2) mottles; massive; firm, slightly sticky, nonplastic; many fine black minerals; many fine flakes of mica; neutral.

The thickness of the argillic horizon ranges from 14 to 30 inches. The depth to bedrock is more than 60 inches. Gravel-size rock fragments of angular quartz make up 0 to 10 percent of each horizon. The soil ranges from strongly acid to slightly acid in the upper part of the solum and is slightly acid or neutral in the lower part of the Bt horizon and in the C horizon. The content of manganese concretions and dark streaks of minerals ranges from few to many in most pedons.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 through 4. It is sandy loam, fine sandy loam, loam, or sandy clay loam.

The E horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 3 through 6. It is sandy loam, fine sandy loam, or loam.

The BE horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is loam or sandy clay loam.

The Bt and BC horizons have hue of 7.5YR or 10YR, value or 5 or 6, and chroma of 4 through 8. The Bt horizon is clay or clay loam. The BC horizon is loam or sandy clay loam.

The C horizon is variable in color and commonly is multicolored. It is sandy loam or clay loam.

Forestdale Series

The soils of the Forestdale series are very deep and poorly drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Forestdale soils are near Buncombe, Chenneby, and Chewacla soils. The Forestdale soils have more clay and a more expansive type of clay in the B horizon than any of these soils.

Typical pedon of Forestdale silty clay loam, 5,200 feet south and 630 feet east of the intersection of VA-711 and VA-719:

A—0 to 2 inches; grayish brown (10YR 5/2) silty clay loam; moderate coarse granular structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; strongly acid; abrupt wavy boundary.

BA—2 to 5 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles and stains; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine medium and coarse roots; few faint silt films on faces of peds and in pores; few fine flakes of mica; very strongly acid; abrupt wavy boundary.

Btg1—5 to 9 inches; gray (10YR 5/1) silty clay; many fine distinct yellowish brown (10YR 5/6) mottles and stains; strong coarse prismatic structure parting to moderate medium subangular blocky; firm, sticky, plastic; common fine medium and coarse roots; common distinct silt and clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg2—9 to 30 inches; gray (10YR 5/1) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles and stains; strong coarse prismatic structure parting to moderate medium subangular blocky; very firm, sticky, plastic; common fine roots; common distinct silt and clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg3—30 to 57 inches; gray (N 5/0) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles and stains; moderate medium angular blocky structure; very firm, very sticky, very plastic; few fine roots; common distinct silt and clay films on faces of peds; few fine flakes of mica; very strongly acid; clear wavy boundary.

BC—57 to 60 inches; gray (N 5/0) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles and stains; massive; firm, sticky, plastic; few fine flakes of mica; strongly acid.

The thickness of the solum is 60 inches or more. The depth to bedrock is more than 60 inches. Unless limed, the soil is very strongly acid or strongly acid.

The A horizon is neutral or has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 0 through 2. It is loam, silt loam, or silty clay loam.

The BA and Bt horizons are neutral or have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 0 through 2. The BA horizon is silty clay loam, and the Bt horizon is clay or silty clay.

The BC horizon has a color range the same as that of the Bt horizon. The BC horizon is very fine sandy loam, silt loam, clay loam, or silty clay loam.

Helena Series

The soils of the Helena series are very deep and moderately well drained. They formed on uplands in residual material from mixed granite gneiss and biotite gneiss rocks. Slope ranges from 2 to 7 percent.

Helena soils are similar to Creedmoor, Dogue, and Trenholm soils, are near Appling and Cecil soils, and are in a complex with Enon soils. The Helena soils have less

exchangeable aluminum and a firmer Bt horizon than the Creedmoor soils, a thinner argillic horizon than the Dogue soils, and a lower base saturation than the Trenholm soils. The Helena soils have gray mottles, unlike the Appling or Cecil soils.

Typical pedon of Helena loam, in an area of Helena-Enon complex, 2 to 7 percent slopes, 100 feet south of the intersection of US-60 and VA-1002, 50 feet west of VA-1002:

A—0 to 2 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many fine and few medium roots; strongly acid; clear smooth boundary.

BA—2 to 8 inches; yellowish brown (10YR 5/6) clay loam; moderate medium granular structure; friable, slightly sticky, nonplastic; common fine and few medium roots; strongly acid; gradual smooth boundary.

Bt1—8 to 13 inches; brownish yellow (10YR 6/8) clay; weak coarse subangular blocky structure; friable, sticky, plastic; common fine and few coarse roots; few faint clay films on vertical faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—13 to 19 inches; brownish yellow (10YR 6/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; common distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—19 to 24 inches; brownish yellow (10YR 6/8) clay; few fine distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common fine and few coarse roots; common distinct clay films on faces of peds; common fine flakes of mica; strongly acid; clear wavy boundary.

Bt4—24 to 28 inches; brownish yellow (10YR 6/8) clay; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm, sticky, plastic; common fine roots; common distinct clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

BCg—28 to 43 inches; gray (10YR 6/1) sandy clay loam; common fine distinct brownish yellow (10YR 6/8) mottles; weak very coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine flakes of mica; strongly acid; abrupt smooth boundary.

C1—43 to 51 inches; mottled white (10YR 8/1), brownish yellow (10YR 6/8), and light gray (10YR 7/2) saprolite that crushes to clay loam; massive; friable, slightly sticky, slightly plastic; few fine roots; many fine flakes of mica; 5 percent angular quartz gravel; strongly acid; abrupt wavy boundary.

C2—51 to 60 inches; mottled and streaked white (10YR 8/1), brownish yellow (10YR 6/8), and light gray (10YR 7/2) saprolite that crushes to loam; massive; friable, slightly sticky, slightly plastic; few fine roots; few fine flakes of mica; strongly acid.

The lower boundary of the clayey layers is at a depth of less than 48 inches, and the thickness of the argillic horizon commonly is 12 to 25 inches. The depth to soft bedrock is more than 48 inches. Rock fragments of angular quartz gravel make up 0 to 15 percent of the soil. Unless limed, the soil is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is sandy loam or loam.

The BA horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is sandy clay loam or clay loam. Some pedons do not have a BA horizon.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 6 or 8. The Bt horizon is mainly clay, but some pedons have subhorizons of clay loam. High- and low-chroma mottles are in the lower part of the Bt horizon.

The BC horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 1 through 8. It is sandy clay loam or clay loam. Some pedons do not have a BC horizon.

The C horizon has hue of 7.5YR or 10YR, value of 5 through 8, and chroma of 1 through 8. It is mostly saprolite that crushes to sandy clay loam, clay loam, or loam.

Kempsville Series

The soils of the Kempsville series are very deep and well drained. They formed in old fluvial sediments on uplands. Slope ranges from 2 to 7 percent.

Kempsville soils are near Creedmoor, Mayodan, and Turbeville soils. The Kempsville soils have less clay and more rock fragments in the Bt horizon than any of these soils. Unlike the Creedmoor soils, the Kempsville soils have a lithologic discontinuity, and they do not have the gray mottles in the Bt horizon that are typical of the Creedmoor soils.

Typical pedon of Kempsville gravelly fine sandy loam, 2 to 7 percent slopes, 940 feet west and 190 feet north of the Powhatan-Chesterfield County line marker along VA-607:

A—0 to 2 inches; gray (10YR 5/1) gravelly fine sandy loam; weak medium granular structure; friable, nonsticky, nonplastic; many fine and medium and few coarse roots; 20 percent quartz gravel; very strongly acid; clear wavy boundary.

E—2 to 7 inches; pale brown (10YR 6/3) gravelly fine sandy loam; weak very coarse granular structure; friable, nonsticky, nonplastic; many fine and medium and few coarse roots; 20 percent quartz gravel; very strongly acid; clear wavy boundary.

BE—7 to 13 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak thick platy structure; friable, slightly sticky, nonplastic; common fine roots; 10 percent quartz gravel; very strongly acid; abrupt wavy boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/6) gravelly sandy loam; many medium faint light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few faint clay films on faces of peds and rock fragments; 30 percent quartz gravel; very strongly acid; clear wavy boundary.

Bt2—20 to 28 inches; strong brown (7.5YR 5/8) gravelly sandy loam; many fine faint brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few faint clay films on faces of peds, on rock fragments, and in pores; 35 percent quartz gravel; strongly acid; clear wavy boundary.

Bt3—28 to 38 inches; strong brown (7.5YR 5/8) sandy clay loam; common fine faint brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; firm in place, friable, sticky, slightly plastic; few fine roots; few faint clay films on faces of peds, in pores, and on rock fragments; 10 percent quartz gravel; strongly acid; clear wavy boundary.

Bt4—38 to 47 inches; mottled red (2.5YR 4/8), brownish yellow (10YR 6/6), and strong brown (7.5YR 5/8) gravelly sandy clay loam; weak coarse subangular blocky structure; firm in place, friable, sticky, slightly plastic; few faint clay films on faces of peds, in pores, and on rock fragments; 15 percent quartz gravel; strongly acid; clear wavy boundary.

2Bt5—47 to 60 inches; mottled brownish yellow (10YR 6/6), red (2.5YR 4/8), strong brown (7.5YR 5/8) and light gray (5Y 7/1) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few distinct clay films on faces of peds; 2 percent quartz gravel; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 50 to 85 inches. The depth to bedrock is more than 60 inches. Gravel size rock fragments of mostly quartz make up 0 to 20 percent of the A, E, and BE horizons and 0 to 35 percent of the Bt horizon. Unless limed, the soil is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 through 4. In the fine earth fraction it is sandy loam or fine sandy loam.

The E and BE horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6. In the fine earth fraction they are sandy loam, fine sandy loam, or loam.

The Bt horizon has hue mainly of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. The lower subhorizons of the Bt horizon range to hue of 2.5YR and 5YR. In the fine earth fraction the Bt horizon is sandy loam, loam, or sandy clay loam. The 2Bt horizon is mottled in hue of 2.5YR through 5Y, value of 4 through 7, and chroma of 1 through 8. The 2Bt horizon is clay or clay loam.

The Kempsville soils in this survey area are a taxadjunct to the Kempsville series because they have a lithological discontinuity and have less clay in the particle-size control section and more clay in the lower part of the solum than defined in the range for the series.

Mayodan Series

The soils of the Mayodan series are very deep and well drained. They formed on uplands in residual material from sandstone and shale of Triassic age. Slope ranges from 2 to 15 percent.

Mayodan soils are similar to Appling, Cecil, Pacolet, and Wedowee soils and are near Creedmoor and Kempsville soils. The Mayodan soils have more exchangeable aluminum than the Appling, Cecil, Pacolet, or Wedowee soils; have more clay in the argillic horizon than the Kempsville soils; and do not have the gray that is typical in the subsoil of the Creedmoor soils.

Typical pedon of Mayodan fine sandy loam, 2 to 7 percent slopes, 2,100 feet southwest of the intersection of VA-671 and VA-635:

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

E—2 to 8 inches; very pale brown (10YR 7/4) fine sandy loam; weak fine granular structure; friable, slightly sticky, nonplastic; common fine and medium roots; 10 percent quartz gravel; very strongly acid; abrupt smooth boundary.

Bt1—8 to 17 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium roots; common distinct clay films on faces of peds; few very fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt2—17 to 26 inches; yellowish red (5YR 5/8) clay; many medium distinct brownish yellow (10YR 6/6) mottles and few fine faint very pale brown (10YR 8/3) mottles; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium roots; common distinct clay films on faces of peds; few very fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—26 to 36 inches; yellowish red (5YR 5/8) silty clay loam; many medium distinct brownish yellow (10YR 6/6) mottles and few fine faint very pale brown (10YR 8/3) and red (2.5YR 4/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky and moderate thin platy; friable, sticky, plastic; common fine and medium roots; common distinct clay films on faces of peds; few very fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—36 to 52 inches; variegated yellowish red (5YR 5/8), brownish yellow (10YR 6/6), red (2.5YR 4/8), and white (10YR 8/2) silty clay loam; moderate coarse prismatic structure parting to moderate medium platy; friable, sticky, plastic; few fine and medium roots; few distinct clay films on faces of peds; few very fine flakes of mica; very strongly acid; abrupt wavy boundary.

C—52 to 61 inches; mottled and horizontally streaked brownish yellow (10YR 6/6), red (2.5YR 4/8), and white (10YR 8/2) loam; massive; friable, slightly sticky, nonplastic; few fine and medium flakes of mica; very strongly acid.

The thickness of the argillic horizon ranges from 15 to 45 inches. The depth to hard rock is more than 60 inches. Gravel-size rock fragments of quartz make up 0 to 20 percent of the A and E horizons and 0 to 5 percent of the B horizon. Unless limed, the soil is very strongly acid or strongly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. In the fine earth fraction it is sandy loam or fine sandy loam.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. In the fine earth fraction it is sandy loam or fine sandy loam.

The upper part of the Bt horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. It is clay loam, silty clay loam, sandy clay, or clay. The lower part of the Bt horizon has hue of 2.5YR or 5YR, value of 5 or 6, and chroma of 4 through 8. It is clay loam, silty clay loam, sandy clay, or clay.

The BC horizon has hue of 2.5YR through 10YR, value of 3 through 6, and chroma of 2 through 8. It is sandy clay loam, loam, clay loam, or silty clay loam. Some pedons do not have a BC horizon.

The C horizon has hue of 10R through 10YR, value of 3 through 6, and chroma of 2 through 8. It is sandy loam or loam.

Pacolet Series

The soils of the Pacolet series are very deep and well drained. They formed on uplands in residual material from granite gneiss rock. Slope ranges from 2 to 35 percent.

Pacolet soils are similar to and near Appling, Cecil, and Wedowee soils and are near Abell and Helena soils. The Pacolet soils have a redder Bt horizon than the Abell, Appling, Helena, or Wedowee soils; have a thinner Bt horizon than the Cecil soils; and do not have gray mottles, as do the Abell and Helena soils.

Typical pedon of Pacolet fine sandy loam, 7 to 15 percent slopes, 5,400 feet west of the intersection of VA-13 and VA-620:

A—0 to 1 inch; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; 2 percent angular quartz gravel; very strongly acid; abrupt wavy boundary.

E—1 to 4 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; 2 percent angular quartz gravel; very strongly acid; abrupt wavy boundary.

BE—4 to 8 inches; yellowish red (5YR 4/6) loam; weak fine subangular blocky structure; very friable, slightly sticky, nonplastic; many fine and medium and few coarse roots; 2 percent angular quartz gravel; very strongly acid; clear wavy boundary.

Bt1—8 to 12 inches; yellowish red (5YR 5/6) clay loam; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; common faint clay films on faces of peds and in pores; few very fine flakes of mica; strongly acid; clear wavy boundary.

Bt2—12 to 26 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable, sticky, plastic; common fine and medium and few coarse roots; common distinct clay films on faces of peds; few very fine flakes of mica; strongly acid; gradual irregular boundary.

BC—26 to 35 inches; yellowish red (5YR 5/6) clay loam; many fine faint reddish yellow (5YR 6/6) streaks and mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine medium and coarse roots; few distinct clay films on vertical faces of peds and few faint clay films on horizontal faces of peds; common fine flakes of mica; strongly acid; clear wavy boundary.

C1—35 to 48 inches; yellowish red (5YR 5/6) clay loam; common fine faint red (2.5YR 5/6) and reddish yellow (5YR 6/6) streaks and mottles; massive parting to weak very thick plates; very friable, slightly sticky, nonplastic; few fine medium and coarse roots; few faint clay flows on faces of some plates; few iron or manganese stains on faces of plates; common fine flakes of mica; strongly acid; gradual wavy boundary.

C2—48 to 60 inches; mottled and streaked yellowish red (5YR 5/6) and reddish yellow (7.5YR 7/6) sandy loam; massive; friable, nonsticky, nonplastic; few

fine medium and coarse roots; common fine flakes of mica; strongly acid.

The argillic horizon ranges from 12 to 24 inches thick and does not extend below a depth of 30 inches. The depth to bedrock is more than 60 inches. Gravel-size fragments of quartz make up 0 to 20 percent of the A and E horizons and 0 to 5 percent of the BE and Bt horizons. Each horizon is very strongly acid or strongly acid unless the soil has been limed. In most pedons the content of flakes of mica is few to common in one or more horizons.

The A horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 2 through 4. In the fine earth fraction it is sandy loam, fine sandy loam, or loam. In eroded areas the A horizon is sandy clay loam or clay loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. In the fine earth fraction it is sandy loam or fine sandy loam. Some pedons do not have an E horizon.

The BE horizon has hue of 2.5YR through 10YR, value of 4 or 5, and chroma of 4 through 8. It is loam, sandy clay loam, or clay loam. Some pedons do not have a BE horizon.

The Bt horizon has hue of 2.5YR or 5YR in the upper part and 10R or 2.5YR in the middle and lower parts, value of 4 or 5, and chroma of 6 or 8. It is clay loam, sandy clay, or clay.

The BC horizon has hue of 10R through 5YR, value of 4 or 5, and chroma of 6 or 8. It commonly is mottled yellow or brown. It is loam, sandy clay loam, or clay loam.

The C horizon is mottled and streaked or has mottles in shades of red, yellow, brown, or white. It is sandy loam, loam, sandy clay loam, or clay loam.

Partlow Series

The soils of the Partlow series are very deep and poorly drained. They formed in local alluvial and residual material along upland drainageways. Slope ranges from 0 to 2 percent.

Partlow soils are similar to Augusta soils and are near Abell and Cecil soils. The Partlow soils have more gray throughout the profile than any of these soils.

Typical pedon of Partlow loam, 840 feet north of the intersection of VA-620 and VA-718:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) and pale brown (10YR 6/3) loam; strong coarse granular structure; very friable, nonsticky, nonplastic; many fine and medium and few coarse roots; few very fine flakes of mica; strongly acid; abrupt smooth boundary.

Btg1—8 to 14 inches; gray (10YR 5/1) sandy clay loam; common fine prominent yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm, slightly sticky, slightly plastic; common fine roots mostly on faces of prisms; common distinct sand and silt coatings on faces of peds; few very fine flakes of mica; strongly acid; abrupt wavy boundary.

Btg2—14 to 25 inches; gray (5Y 6/1) sandy clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure parting to weak very coarse subangular blocky; firm, sticky, plastic; common fine and few coarse roots on faces of prisms; common distinct silt and clay coatings on faces of peds; common very fine flakes of mica; strongly acid; gradual wavy boundary.

Btg3—25 to 32 inches; gray (5Y 6/1) sandy clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure parting to weak very coarse subangular blocky; firm, sticky, plastic; common fine and few coarse roots on faces of prisms; common distinct silt and clay coatings on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

BCg—32 to 40 inches; gray (N 6/0) fine sandy loam; many fine distinct yellowish brown (10YR 5/8) mottles; weak very coarse prismatic structure; friable, slightly sticky, nonplastic; few fine medium and coarse roots; many fine flakes of mica; strongly acid; clear irregular boundary.

C1—40 to 47 inches; dark gray (N 4/0), light olive brown (2.5Y 5/4), and gray (5Y 6/1) sandy clay loam; massive; friable, slightly sticky, nonplastic; few fine medium and coarse roots; many fine flakes of mica; strongly acid; diffuse wavy boundary.

C2—47 to 60 inches; dark gray (N 4/0) and gray (5Y 6/1) sandy loam; many coarse distinct light olive brown (2.5Y 5/6) mottles; massive; friable, nonsticky, nonplastic; few fine medium and coarse roots; many fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. Gravel-size fragments of mostly subrounded quartz make up 0 to 10 percent of the solum. The content of flakes of mica is few or common in the solum and ranges from few to many in the C horizon. Unless limed, the soil is very strongly acid or strongly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 3. It is sandy loam or loam.

The Bt horizon is neutral or has hue of 10YR through 5Y, value of 5 or 6, and chroma of 0 through 2. It is sandy clay loam or clay loam.

The BC horizon is neutral or has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 0 through 2. It is sandy loam, fine sandy loam, or clay loam. Some pedons do not have a BC horizon.

The C horizon has variable colors and is commonly mottled. It is sandy loam, loam, or sandy clay loam.

Poindexter Series

The soils of the Poindexter series are deep and well drained. They formed on uplands in residual material from basic rocks or a mixture of basic and acidic rocks. Slope ranges from 2 to 35 percent.

Poindexter soils are near Abell, Appling, Cecil, and Trenholm soils. The Poindexter soils do not have gray mottles in the Bt horizon, as do the Abell and Trenholm soils, and have a thinner argillic horizon and less clay in the argillic horizon than the Appling, Cecil, or Trenholm soils.

Typical pedon of Poindexter sandy loam, 15 to 25 percent slopes, 1,000 feet southwest of the confluence of Salmon Creek and Sallee Creek:

Oi—1 inch to 0; undecomposed fragments of twigs and leaves of hardwood trees.

A—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; common medium roots; strongly acid; clear wavy boundary.

BA—8 to 14 inches; yellowish brown (10YR 5/6) sandy loam; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; common medium and coarse roots; strongly acid; clear wavy boundary.

Bt—14 to 21 inches; yellowish brown (10YR 5/6) sandy clay loam; many fine faint yellowish brown (10YR 5/4) mottles and common fine distinct black (10YR 2/1) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common medium and coarse roots; common faint clay films on faces of peds; many fine and medium flakes of mica; strongly acid; clear wavy boundary.

BC—21 to 26 inches; strong brown (7.5YR 5/6) sandy loam; common fine black (10YR 2/1) and very pale brown (10YR 8/4) mottles and streaks; weak very coarse subangular blocky structure parting to moderate medium platy; firm in place, friable, nonsticky, nonplastic; few fine and medium roots; common faint clay films on vertical faces of peds; many fine and medium flakes of mica; strongly acid; clear wavy boundary.

C—26 to 38 inches; strong brown (7.5YR 5/6) sandy loam; many coarse distinct very pale brown (10YR 8/4) mottles and common thin black and white streaks; moderate thick platy structure; firm, nonsticky, nonplastic; few clay flows in pores; many fine and medium flakes of mica; common white fragments of feldspar; moderately acid; gradual wavy boundary.

Cr—38 to 53 inches; multicolored and streaked black, white, and yellowish brown biotite gneiss saprolite that crushes to fine sandy loam; massive; hard; slightly acid.

R—53 inches; hard biotite gneiss rock.

The thickness of the solum ranges from 14 to 36 inches. The depth to weathered rock ranges from 20 to 40 inches, and the depth to hard bedrock ranges from 50 to 60 inches. Gravel-size fragments of mostly quartz make up 0 to 10 percent of the solum. The content of mica flakes ranges from none to many and commonly increases with depth. The soil ranges from strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. It is sandy loam or fine sandy loam.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or fine sandy loam.

The BA, Bt, and BC horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The Bt horizon mainly is sandy clay loam or clay loam and has lenses of clay in some pedons. The BA and BC horizons are sandy loam or fine sandy loam. Some pedons do not have a BA or BC horizon.

The C horizon commonly is multicolored brown, yellow, white, gray, olive, black, or green. It is sandy loam, fine sandy loam, loam, or sandy clay loam.

Toccoa Series

The soils of the Toccoa series are very deep and well drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Toccoa soils are similar to and near Buncombe soils and are near Chenneby, Chewacla, and Forestdale soils. The Toccoa soils have more silt and clay and less sand than the Buncombe soils and do not have the gray colors or gray mottles that are in the B horizon of the Chenneby, Chewacla, and Forestdale soils. The Toccoa soils have less clay than the Chenneby, Chewacla, or Forestdale soils.

Typical pedon of Toccoa silt loam, 1.75 miles west of the bridge over the James River at Powhatan State Farm, and 200 feet south of the river:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; few very fine flakes of mica; moderately acid; abrupt smooth boundary.

A—7 to 15 inches; dark brown (7.5YR 4/4) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; common fine roots; few fine flakes of mica; moderately acid; abrupt smooth boundary.

Ab1—15 to 27 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable, slightly sticky, nonplastic; few fine roots; few fine flakes of mica; moderately acid; clear wavy boundary.

Ab2—27 to 35 inches; dark brown (10YR 4/3) loam; weak medium granular structure; friable, nonsticky, nonplastic; few fine roots; few fine flakes of mica; moderately acid; clear wavy boundary.

C1—35 to 47 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable, nonsticky, nonplastic; few fine roots; common fine flakes of mica; moderately acid; gradual wavy boundary.
C2—47 to 60 inches; dark yellowish brown (10YR 4/4) loamy sand; massive; very friable, nonsticky, nonplastic; common fine flakes of mica; moderately acid.

The combined thickness of the Ap and A horizons ranges from 8 to 20 inches. The thickness of the Ab horizon ranges from 12 to 24 inches. The depth to bedrock is more than 60 inches. The content of flakes of mica ranges from few to many throughout the soil. In unlimed areas the soil ranges from strongly acid to slightly acid.

The Ap, A, and Ab horizons have hue of 5YR through 10YR, value of 3 through 5, and chroma of 2 through 4. The Ap and A horizons are sandy loam, fine sandy loam, loam, or silt loam. The Ab horizon is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It mainly is sandy loam or fine sandy loam. Gravelly or very gravelly strata are at a depth of more than 40 inches, and in some pedons strata of loamy sand or sand are at a depth of more than 40 inches.

Trenholm Series

The soils of the Trenholm series are very deep and moderately well drained. They formed on uplands in residual material from hornblende gneiss and biotite gneiss. Slope ranges from 2 to 15 percent.

Trenholm soils are similar to Creedmoor, Dogue, and Helena soils and are near Enon and Poindexter soils. The Trenholm soils have a more abrupt texture change in the surface layer and higher base saturation than the Creedmoor, Dogue, or Helena soils. Unlike the Enon and Poindexter soils, the Trenholm soils have gray wetness mottles in the Bt horizon, and have more clay in the Bt horizon than the Poindexter soils.

Typical pedon of Trenholm sandy loam, 2 to 7 percent slopes, 1,080 feet east of the intersection of VA-13 and VA-627, 1,850 feet south of VA-13:

A—0 to 2 inches; very dark gray (10YR 3/1) sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; many fine medium and common coarse roots; 3 percent angular quartz gravel; strongly acid; clear smooth boundary.
E—2 to 9 inches; yellowish brown (10YR 5/4) sandy loam; moderate coarse granular structure; very friable, nonsticky, nonplastic; common fine medium and coarse roots; 2 percent angular quartz gravel; few manganese concretions; strongly acid; clear smooth boundary.
BE—9 to 12 inches; mottled yellowish brown (10YR 5/6), pale brown (10YR 6/3), and light brownish gray (2.5Y 6/2) sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine medium and coarse roots; 2 percent angular quartz gravel; few manganese concretions; strongly acid; abrupt wavy boundary.
Bt1—12 to 20 inches; yellowish brown (10YR 5/6) clay; common distinct light brownish gray (2.5Y 6/2) mottles and few distinct yellowish red (5YR 5/6) mottles; moderate coarse subangular blocky structure; very firm, very sticky, very plastic; few medium and coarse roots; many distinct clay films on faces of peds; few slickensides; strongly acid; 2 percent angular quartz gravel; few coarse grains of feldspar; very strongly acid; gradual wavy boundary.
Bt2—20 to 30 inches; light olive brown (2.5Y 5/4) clay; few fine distinct pale brown (10YR 6/3) and light brownish gray (2.5Y 6/2) mottles; moderate coarse subangular blocky structure; very firm, very sticky, very plastic; few medium and coarse roots; many distinct clay films on faces of peds; few slickensides; 2 percent angular quartz gravel; few coarse grains of feldspar; strongly acid; gradual wavy boundary.
BC—30 to 36 inches; yellowish brown (10YR 5/8) clay loam; common fine distinct pale yellow (5Y 7/3) and reddish yellow (7.5YR 6/8) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, nonplastic; few medium and coarse roots; few faint clay films on faces of peds; few coarse grains of feldspar; common weathered rock fragments of hornblende gneiss; very strongly acid; gradual wavy boundary.
C1—36 to 45 inches; yellowish brown (10YR 5/8) sandy loam; massive; friable, slightly sticky, nonplastic; common fine roots along rock structure faces; few faint films on horizontal rock structure faces; common coarse grains of feldspar; common streaks, specks, and patches of green, black, and white hornblende gneiss; very strongly acid; gradual wavy boundary.
C2—45 to 62 inches; yellowish brown (10YR 5/8) sandy loam; massive; very friable; slightly sticky, nonplastic; few fine and medium roots; common coarse grains of feldspar; few highly weathered fragments of hornblende gneiss; strongly acid.

The thickness of the solum ranges from 20 to 40 inches, and the thickness of the Bt horizon ranges from about 13 to 26 inches. The depth to the abrupt texture change ranges from about 10 to 12 inches. The depth to hard bedrock is more than 60 inches. Rock fragments of mostly angular quartz gravel and weathered feldspar make up 0 to 15 percent of the soil. The content of flakes of mica ranges from none to common in the lower part of the solum and in the C horizon. Unless limed, the

soil ranges from very strongly acid to moderately acid throughout.

The A or Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 4. It is sandy loam or fine sandy loam.

The E horizon has hue of 10YR through 5Y, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or fine sandy loam. Some pedons do not have an E horizon.

The BE or BA horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6, or it is mottled without a dominant matrix hue. It is sandy loam, fine sandy loam, clay loam, or sandy clay loam. Some pedons do not have a BE or BA horizon.

The Bt horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8, or it is mottled without a dominant matrix color in hue of 7.5YR through 5Y, value of 5 or 6, and chroma of 2 through 8. It is commonly clay but ranges to sandy clay loam and sandy clay.

The BC or CB horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 2 through 8, or it is mottled without a dominant matrix hue. The BC or CB horizon is clay loam, sandy clay loam, or silty clay loam. Some pedons do not have a BC or CB horizon.

The C horizon has the same color range as the BC or CB horizon, or it is multicolored. It is sandy loam, fine sandy loam, or loam.

Turbeville Series

The soils of the Turbeville series are very deep and well drained. They formed in old alluvium on high river terraces. Slope ranges from 0 to 25 percent.

Turbeville soils are similar to Cecil soils and are near Dogue, Kempsville, and Augusta soils. The Turbeville soils have a thicker Bt horizon than the Cecil soils and a redder Bt horizon than the Dogue, Kempsville, or Augusta soils. The Turbeville soils do not have the gray colors or gray mottling that is typical in the Bt horizons of Dogue and Augusta soils and have more clay in the Bt horizon than the Kempsville or Augusta soils.

Typical pedon of Turbeville fine sandy loam, 0 to 2 percent slopes, 5,800 feet south-southwest of the intersection of VA-635 and VA-711:

A—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium and few large roots; slightly acid; abrupt smooth boundary.

E—2 to 9 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; common fine and medium and few large roots; strongly acid; gradual wavy boundary.

BE—9 to 17 inches; brownish yellow (10YR 6/6) loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine and medium roots; strongly acid; clear wavy boundary.

Bt1—17 to 28 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—28 to 46 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine and medium roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—46 to 64 inches; red (10R 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine and medium roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

The thickness of the solum and the depth to bedrock are more than 60 inches. Gravel- and cobble-size rock fragments of mostly quartz make up 0 to 25 percent of the solum. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. In the fine-earth fraction it is sandy loam or fine sandy loam.

The E horizon has hue of 7.5YR or 10YR, value of 5 through 7, and chroma of 4 through 8. In the fine-earth fraction it is sandy loam or fine sandy loam. Some pedons do not have an E horizon.

The BE horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. In the fine-earth fraction it is loam, sandy clay loam, or clay loam.

The upper part of the Bt horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. The lower part of the Bt horizon has hue of 10R through 5YR, value of 3 or 4, and chroma of 6 or 8. In the fine-earth fraction the Bt horizon is sandy clay loam, clay loam, sandy clay, or clay.

Udorthents

Udorthents consist of very deep, nearly level to strongly sloping, loamy and clayey soil material that is well drained. Udorthents are mainly on ridges and side slopes and consist mostly of areas that have been sources of fill material. Some areas have been excavated to a depth of 30 feet or more, and some have been filled with a combination of soil material and nonsoil material. Udorthents are mostly along US Route 60 and other roads, and some are near the Appomattox River. Slope ranges mostly from 0 to 10 percent.

Udorthents commonly are near Cecil, Creedmoor, Mayodan, and Turbeville soils, all of which have a well defined subsoil.

Because of the variability of Udorthents, a typical pedon is not given. Udorthents are more than 60 inches

deep. The material ranges mainly from extremely acid to strongly acid, but the surface layer in some areas ranges to neutral because of liming. The content of quartz gravel and cobbles ranges from 0 to 15 percent, and the content of fine flakes of mica ranges from none to many.

The surface layer has hue of 5YR through 10YR, value of 4 through 6, and chroma of 3 through 6. It ranges from sandy loam to clay. The surface layer commonly is about 2 to 5 inches thick, but it ranges from 2 to 10 inches thick.

The lower layers extend to a depth of more than 50 inches. They mainly have hue of 2.5YR through 10YR, value of 4 through 7, and chroma of 4 through 8. The material ranges from sandy loam to clay. Mottles with hue of 2.5YR through 2.5Y, value of 3 through 8, and chroma of 1 through 8 are in some pedons.

Wedowee Series

The soils of the Wedowee series are very deep and well drained. They formed on uplands in residual material from granite gneiss rock. Slope ranges from 2 to 25 percent.

Wedowee soils are similar to Appling, Cecil, and Pacolet soils and are near Abell, Helena, and Partlow soils. The Wedowee soils do not have the gray colors or mottles in the Bt horizon as do the Abell, Helena, and Partlow soils. The Wedowee soils have a thinner argillic horizon than the Appling or Cecil soils and a browner subsoil than the Cecil or Pacolet soils.

Typical pedon of Wedowee sandy loam, 15 to 25 percent slopes, 3,200 feet north and 715 feet east of the intersection of VA-633 and VA-617:

Oi—1 inch to 0; partly decomposed organic matter in a mat of fine roots; abrupt wavy boundary.

A—0 to 1 inch; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine medium and coarse roots; 2 percent angular gravel; very strongly acid; abrupt smooth boundary.

E—1 to 7 inches; yellowish brown (10YR 5/6) sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine medium and coarse roots; 2 percent angular gravel; very strongly acid; abrupt smooth boundary.

Bt1—7 to 11 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium and coarse roots; few faint clay films on faces of peds; 2 percent angular gravel; strongly acid; clear wavy boundary.

Bt2—11 to 17 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few medium and coarse roots; common faint clay films on faces of peds; 2 percent angular gravel; few fine flakes of mica; strongly acid; clear wavy boundary.

Bt3—17 to 25 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium and coarse roots; common distinct clay films on faces of peds; 2 percent angular gravel; few fine flakes of mica; strongly acid; clear wavy boundary.

BC—25 to 33 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium and coarse roots; 2 percent angular gravel; few fine flakes of mica; strongly acid; clear wavy boundary.

C1—33 to 41 inches; mottled strong brown (7.5YR 5/6), very pale brown (10YR 8/4), and white (10YR 8/1) clay loam; massive; friable, nonsticky, nonplastic; few medium and coarse roots; few clay-filled krotovinas; few fine flakes of mica; strongly acid; gradual wavy boundary.

C2—41 to 60 inches; mottled and streaked layers of white (10YR 8/1), gray (10YR 6/1), black (10YR 2/1), and strong brown (7.5YR 5/6) sandy loam saprolite; massive; very friable after crushing, nonsticky, nonplastic; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to hard bedrock is more than 60 inches. Gravel-size rock fragments of mostly quartz make up 0 to 10 percent of the A and E horizons and 0 to 2 percent of the Bt horizon. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. Some pedons have an Ap horizon. The Ap and E horizons have value of 4 through 7 and chroma of 4 through 6. The A and E horizons are sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is clay loam or clay.

The BC horizon has a color range the same as that of the Bt horizon. It is loam, sandy clay loam, or clay loam.

The C horizon is mottled red, brown, yellow, and white. It is saprolite that crushes to sandy loam, sandy clay loam, or clay loam.

Formation of the Soils

Factors of Soil Formation

The five major factors of soil formation are parent material, relief, climate, plants and animals, and time (*3*). Climate and plants and animals are the active forces in soil formation. Their effects on the parent material are modified by relief and the length of time the parent material has been subjected to weathering. In some areas one factor may dominate in the formation of a soil and determine most of its properties. Normally, however, the interaction of all five factors determines the kind of soil that forms.

Parent Material

Parent material is the material in which a soil forms. The two broad classes of parent material in the county are residual material and transported material.

Residual material has weathered in place from the underlying bedrock. The parent material is highly weathered saprolite that remains after the weathering of the rock. The characteristics of the residual parent material are related directly to the characteristics of the underlying bedrock.

Transported material was eroded from uplands and moved by floodwaters. It was laid down as deposits of sand, silt, clay, and rock fragments on the terraces and flood plains of rivers and streams. The characteristics of transported materials are related to the characteristics of the soils or rocks from which the materials were eroded.

Most of the residual parent material in the county has weathered in place from gneiss, schist, granite, sandstone, and shale bedrock. The parent material in about 90 percent of the county is from gneiss, schist, and granite.

Residual materials from sandstone and shale cover about 10 percent of the county, mostly in the extreme eastern part. They originated during Triassic time as sediments in a huge basin created when a large block of underlying rock weakened and began to sink. The sediment was washed from nearby soils and rock. As the sediment grew deeper, the increased weight forced the floor of the basin deeper and compressed the lower layers of sediment into shale and sandstone rock.

Rocks are also classified as acidic or basic. The classification depends on the type and amount of minerals in the rocks. Basic rocks commonly contain some amount of calcium, which is not present in acidic rocks.

Granite gneiss, muscovite (mica) gneiss, mica schist, and granite are examples of acidic rocks that weathered to form the residual parent material for the Appling, Cecil, Helena, Pacolet, and Wedowee soils. Arkosic sandstone and shale of Triassic age are examples of acidic rocks that weathered to form the residual parent materials for the Creedmoor and Mayodan soils. These soils commonly have a very strongly acid or strongly acid subsoil.

Basic rocks, such as biotite gneiss and hornblende gneiss, weathered into residual parent material for the Enon, Trenholm, and Poindexter soils. These soils commonly have a moderately acid to neutral subsoil.

Kempsville soils formed from alluvial-fan sediments deposited by streams on top of upland residual and high-terrace deposits. Subsequent erosion has removed most of the sediments, but some remain on broad gently sloping ridgetops.

Buncombe, Chenneby, Chewacla, Forestdale, and Toccoa soils formed in sediments moved and deposited by floodwaters on the flood plains of streams and rivers. Some soils that formed in deposition materials on stream terraces are Altavista, Augusta, Dogue, and Turbeville soils. Abell and Partlow soils formed in local alluvial sediments that were deposited along upland drainageways.

Relief

Relief affects the formation of soils by influencing the quantity of water infiltration, rate of surface-water runoff, soil drainage, soil temperature, and geologic erosion. It can alter the effects of climatic factors acting on the parent material to the extent that several different kinds of soils form from the same kind of parent material. Relief also affects the amount of radiant energy absorbed by the soils, which in turn affects the type of native vegetation that grows on the soils.

Relief in Powhatan County ranges from nearly level to steep. The nearly level soils are commonly on flood plains of streams, on low stream terraces, and at the heads of drainageways. Most of these soils are often wet because of frequent flooding or a seasonal high water table, and surface runoff is usually slow. The soils typically have a subsoil that is gray or mottled gray, and they are somewhat poorly drained or poorly drained.

Augusta, Chenneby, Chewacla, Forestdale, and Partlow are examples of such soils.

The gently sloping and strongly sloping soils are commonly well drained or moderately well drained. Geologic erosion is slight, surface water runoff is slow to rapid, and water infiltration is optimum. Translocation of bases and clay has occurred downward through the soil. Appling, Cecil, Creedmoor, Enon, Helena, Mayodan, Trenholm, Pacolet, and Wedowee soils are in this group. Most of these soils have well defined horizons.

The moderately steep and steep soils commonly have very rapid surface runoff, reduced water infiltration, reduced movement of clay and bases through the soil, and a severe erosion hazard. They commonly have weakly developed soil horizons. The Poindexter soils are an example of such soils.

Poindexter and Trenholm soils, for instance, formed from the same general type parent material but, because of relief, have different characteristics. The steep Poindexter soils have weak horizon development because surface water runoff is very rapid and erosion has removed some soil material before the layers have had time to form. The gently sloping and strongly sloping Trenholm soils have well defined horizons because surface-water runoff is slower and erosion is not so severe.

Climate

Climate determines in large part the rate and degree of weathering. The weathering of parent material and minerals in the soils is more rapid and intense under the warm and humid climate of Powhatan County, for example, than under a climate that is cold and dry. Climatic influences are expressed through or in combination with other soil forming factors, especially in the weathering of parent material and the type and abundance of vegetation on a soil.

The amount of precipitation and the downward movement of water through the soil affect the movement of clay and leaching of minerals in the soil. Precipitation is a factor in soil erosion.

The climate of this survey area promotes the leaching of soluble minerals and the movement of clay downward through the soil. Because of the abundance and infiltration of precipitation, clay has moved downward and accumulated in the subsoil of the Appling, Cecil, and Mayodan soils and most other soils in the county.

Weathering, translocation, and leaching of soil material occur throughout most of each year. These forces are activated by climate and determine, to a large degree, the characteristics of most of the soils in the county.

The climate is uniform throughout the county. Its effect on soil formation may be modified locally by the steepness and position of slopes. Local variation in climate may cause some variation among soils. However, variations resulting from climate are not great enough to account for the wide differences that exist among many soils in the county.

Plant and Animal Life

All living organisms—plants, animals, bacteria, and fungi—are important to soil formation. The plants generally influence the composition of organic matter, the color of the surface layer, and the supply of nutrients in the organic matter. Animals, especially burrowing animals, help keep the soil open and porous. Bacteria and fungi decompose the plants, thus releasing nutrients for plant food.

The native trees in Powhatan County have had more influence on soil formation than any other living organism. Man, however, has greatly changed, physically and chemically, the surface layer where he has cleared the forests and cultivated the soil. Man has mixed some of the soil horizons by plowing, and has added fertilizer, lime, pesticides, and herbicides to the soil.

Time

The formation of soil requires time for changes to take place in the parent materials.

Soils that formed in parent material resistant to weathering require more time to develop well defined horizons than do soils formed in easily weathered material. The development of soil horizons in soils on the flood plains of streams can also be slowed or prevented if sediments continue to be deposited on them.

Basic Soil Morphology

A soil profile and its layers, or horizons, are the results of the interaction of the soil-forming factors. The soil profile can be observed on the side of a dug pit, and it generally extends from the surface down to materials that are little altered by the soil-forming processes.

Many soils have four major horizons, called A, E, B, and C horizons. They are normally in that order from the surface downward. These major horizons may be further subdivided by the use of numbers and letters to indicate changes within one horizon. An example would be the Bt horizon, a B horizon that has an accumulation of clay.

The A horizon is the surface layer that has the largest accumulation of organic matter.

The E horizon is the layer of maximum leaching and eluviation of clay and iron. The E horizon underlies the A horizon.

The B horizon underlies the E horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the surface layer. In some soils the B horizon is formed by alteration in place rather than by illuviation. The alteration can be caused by oxidation and reduction of iron or by the weathering of clay minerals. The B horizon commonly

has blocky or prismatic structure, and it generally is firmer and lighter in color than the A horizon but darker in color than the E and C horizons.

The C horizon is below the B horizon or, in some cases, below the A horizon. It consists of materials that are little altered by the soil-forming processes.

Processes of Soil Formation

Several processes are involved in the formation of the soil horizons. Among these processes are the accumulation of organic matter, the leaching of soluble salts, the reduction and transfer of iron, the formation of soil structure, and the formation and downward movement of clay minerals. These are continuous and generally simultaneous processes that have been going on for thousands of years.

Organic matter accumulates as plant and animal material decomposes. It darkens the surface layer and helps to form the A horizon. Organic matter, once lost, normally takes a long time to replace. In the soils in Powhatan County, the content of organic matter in the surface layer averages about 2 percent.

Soils that have distinct subsoil horizons were leached of some of the bases and other soluble salts before the clay minerals began to move downward. Among the factors that affect this leaching are the kinds of salts originally present, the depth to which water penetrates, and the texture of the soil profile.

Well drained and moderately well drained soils in Powhatan County have red to yellowish brown subsoil horizons. These colors are caused mainly by thin coatings of iron oxides on sand and silt grains. In some soils, such as Toccoa soils, the colors are inherited from the more recent alluvial parent material.

The reduction and transfer of iron occurs mainly in the wetter, more poorly drained soils. Moderately well drained and somewhat poorly drained soils have mottles of yellowish brown and strong brown and red, which indicate the segregation of iron. In poorly drained Forestdale and Partlow soils, the subsoil and underlying material are grayish, indicating reduction and transfer of iron in solution.

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. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Jenny, Hans. 1941. Factors of soil formation. McGraw-Hill Book Co., Inc., 281 pp., illus.

(4) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962.)

(5) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv. U.S. Dep. Agric. Handb. 436, 754 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very High	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

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.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

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.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage and planting system in which crop residue covers at least 30 percent of the soil surface after planting. Where soil erosion by wind is the main concern, the system leaves the equivalent of at least 1,000 pounds per acre of flat small-grain residue on the surface during the critical erosion period.

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.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

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.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

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 that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 7.6 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 (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

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.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

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. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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, any plowed or disturbed surface layer.

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 (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 overlying 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be

limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

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.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

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.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

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.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the 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.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material).

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 affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperture below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward 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). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

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.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

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.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or

browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

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.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables.) Water that is too salty for consumption by livestock.

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.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Much has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

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.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multipled 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.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity are—

	SAR
Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

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.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

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.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period the the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that 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 specifiying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

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.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1949-81 at Richmond, Virginia]

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-- More than--	2 years in 10 will have-- Less than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	47.4	27.2	37.3	74.0	3.0	94	3.12	4.58	1.50	6	5.2
February---	49.8	28.4	39.1	76.0	7.0	101	3.05	4.38	1.71	6	4.3
March------	58.5	35.7	47.1	84.0	18.0	257	3.46	4.02	2.97	7	3.3
April------	70.4	44.9	57.7	92.0	27.0	531	2.82	3.97	1.76	6	0.1
May--------	77.8	54.3	66.1	94.0	36.0	806	3.69	4.68	2.44	7	0
June-------	84.9	62.3	73.6	98.0	46.0	1007	3.52	5.26	1.80	6	0
July-------	88.4	67.3	77.9	100.0	54.0	1173	5.19	6.69	2.63	7	0
August-----	87.0	66.4	76.7	98.0	54.0	1139	5.01	7.20	2.28	7	0
September--	80.8	59.2	70.0	95.0	40.0	900	3.48	4.83	1.78	5	0
October----	70.6	47.0	58.8	88.0	27.0	583	3.65	5.35	1.55	5	0
November---	60.6	37.3	49.0	82.0	17.0	287	2.98	5.50	1.43	5	0.4
December---	50.1	29.5	39.8	74.0	10.0	112	3.36	5.04	2.28	6	2.6
Yearly:											
Average--	69.0	46.8	57.9	---	---	---	---	---	---	---	---
Extreme--	---	---	---	105	-8	---	---	---	---	---	---
Total----	---	---	---	---	---	6,989	43.33	61.50	23.89	73	15.9

* 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 (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1949-81 at Richmond, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 31	April 14	April 30
2 years in 10 later than--	March 29	April 13	April 27
5 years in 10 later than--	March 23	April 10	April 15
First freezing temperature in fall:			
1 year in 10 earlier than--	October 27	October 21	October 3
2 years in 10 earlier than--	October 29	October 22	October 12
5 years in 10 earlier than--	November 1	October 27	October 18

TABLE 3.--GROWING SEASON

[Data recorded in the period 1949-81 at Richmond, Virginia]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	273	236	209
8 years in 10	276	241	210
5 years in 10	278	257	220
2 years in 10	283	266	223
1 year in 10	302	269	224

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Abell fine sandy loam, 2 to 7 percent slopes	9,361	5.4
2B	Altavista fine sandy loam, 2 to 6 percent slopes	434	0.3
3B	Appling fine sandy loam, 2 to 7 percent slopes	8,795	5.0
3C	Appling fine sandy loam, 7 to 15 percent slopes	3,958	2.3
4	Augusta silt loam	2,104	1.2
5B	Buncombe loamy sand, 0 to 5 percent slopes	336	0.2
6B2	Cecil fine sandy loam, 2 to 7 percent slopes, eroded	39,096	22.4
6C2	Cecil fine sandy loam, 7 to 15 percent slopes, eroded	15,124	8.7
7	Chenneby silt loam	3,478	2.0
8	Chewacla silt loam	4,991	2.8
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	3,285	1.9
10A	Dogue silt loam, 0 to 2 percent slopes	165	0.1
10B	Dogue silt loam, 2 to 7 percent slopes	2,296	1.3
10C	Dogue silt loam, 7 to 15 percent slopes	187	0.1
11B	Enon sandy loam, 2 to 7 percent slopes	4,295	2.4
11C	Enon sandy loam, 7 to 15 percent slopes	3,772	2.1
12	Forestdale silty clay loam	4,000	2.3
13B	Helena-Enon complex, 2 to 7 percent slopes	2,053	1.2
14B	Kempsville gravelly fine sandy loam, 2 to 7 percent slopes	1,081	0.6
15B	Mayodan fine sandy loam, 2 to 7 percent slopes	2,713	1.6
15C	Mayodan fine sandy loam, 7 to 15 percent slopes	3,698	2.1
16C	Pacolet fine sandy loam, 7 to 15 percent slopes	7,909	4.5
16D	Pacolet fine sandy loam, 15 to 25 percent slopes	1,509	0.9
17D3	Pacolet sandy clay loam, 15 to 25 percent slopes, severely eroded	4,153	2.4
17E3	Pacolet sandy clay loam, 25 to 35 percent slopes, severely eroded	685	0.4
18B3	Pacolet clay loam, 2 to 7 percent slopes, severely eroded	842	0.5
18C3	Pacolet clay loam, 7 to 15 percent slopes, severely eroded	3,095	1.8
19	Partlow loam	3,222	1.9
20	Pits, quarry	21	*
21B	Poindexter sandy loam, 2 to 7 percent slopes	1,076	0.6
21C	Poindexter sandy loam, 7 to 15 percent slopes	5,432	3.1
21D	Poindexter sandy loam, 15 to 25 percent slopes	5,081	2.9
21E	Poindexter sandy loam, 25 to 35 percent slopes	436	0.3
22	Toccoa silt loam	1,806	1.1
23B	Trenholm sandy loam, 2 to 7 percent slopes	2,110	1.2
23C	Trenholm sandy loam, 7 to 15 percent slopes	913	0.5
24A	Turbeville fine sandy loam, 0 to 2 percent slopes	987	0.6
24B2	Turbeville fine sandy loam, 2 to 7 percent slopes, eroded	9,130	5.2
25C	Turbeville gravelly fine sandy loam, 7 to 15 percent slopes	2,663	1.6
25D	Turbeville gravelly fine sandy loam, 15 to 25 percent slopes	951	0.6
26	Udorthents, gently sloping	66	*
27B	Wedowee sandy loam, 2 to 7 percent slopes	1,150	0.7
27C	Wedowee sandy loam, 7 to 15 percent slopes	2,971	1.7
27D	Wedowee sandy loam, 15 to 25 percent slopes	940	0.5
W	Water	1,630	1.0
	Total	174,000	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
1B	Abell fine sandy loam, 2 to 7 percent slopes
2B	Altavista fine sandy loam, 2 to 6 percent slopes
3B	Appling fine sandy loam, 2 to 7 percent slopes
4	Augusta silt loam (where drained)
6B2	Cecil fine sandy loam, 2 to 7 percent slopes, eroded
7	Chenneby silt loam (where drained)
10A	Dogue silt loam, 0 to 2 percent slopes
10B	Dogue silt loam, 2 to 7 percent slopes
15B	Mayodan fine sandy loam, 2 to 7 percent slopes
21B	Poindexter sandy loam, 2 to 7 percent slopes
22	Toccoa silt loam
24A	Turbeville fine sandy loam, 0 to 2 percent slopes
24B2	Turbeville fine sandy loam, 2 to 7 percent slopes, eroded
27B	Wedowee sandy loam, 2 to 7 percent slopes

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)

Soil name and map symbol	Land capability	Corn	Corn, silage	Wheat	Soybeans	Tobacco	Alfalfa hay	Grass-clover
		Bu	Tons	Bu	Bu	Lbs	Tons	AUM*
1B---------- Abell	IIe	110	22	50	40	---	---	---
2B---------- Altavista	IIe	115	23	55	40	2,400	3.0	5.7
3B---------- Appling	IIe	85	17	45	35	2,400	4.5	8.5
3C---------- Appling	IIIe	80	16	40	30	2,200	4.0	7.6
4---------- Augusta	IIIw	100	20	---	40	---	---	---
5B---------- Buncombe	IVw	---	---	---	---	---	---	---
6B2---------- Cecil	IIe	90	18	45	35	2,100	5.5	10.5
6C2---------- Cecil	IIIe	85	17	40	30	2,000	5.0	9.5
7---------- Chenneby	IIIw	100	20	---	40	---	3.5	6.6
8---------- Chewacla	IVw	90	18	---	35	---	---	---
9B---------- Creedmoor	IIe	70	14	30	30	2,000	2.5	4.7
10A---------- Dogue	IIw	110	22	55	40	---	---	---
10B---------- Dogue	IIe	100	20	50	35	1,900	3.0	5.7
10C---------- Dogue	IIIe	85	17	45	30	1,800	3.5	6.6
11B---------- Enon	IIe	85	18	45	35	2,100	3.5	6.6
11C---------- Enon	IIIe	75	15	40	25	1,700	2.5	4.7
12---------- Forestdale	Vw	---	---	---	---	---	---	---
13B---------- Helena-Enon	IIe	85	17	40	35	2,100	3.0	5.7
14B---------- Kempsville	IIe	80	17	40	30	2,100	5.0	9.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn, silage	Wheat	Soybeans	Tobacco	Alfalfa hay	Grass-clover
		Bu	Tons	Bu	Bu	Lbs	Tons	AUM*
15B---------- Mayodan	IIe	85	17	40	35	2,100	3.5	6.6
15C---------- Mayodan	IIIe	80	16	35	30	2,000	3.0	5.7
16C---------- Pacolet	IIIe	85	17	40	30	1,800	4.0	7.6
16D---------- Pacolet	IVe	---	---	---	---	---	3.5	6.6
17D3---------- Pacolet	VIe	---	---	---	---	---	---	---
17E3---------- Pacolet	VIIe	---	---	---	---	---	---	---
18B3---------- Pacolet	IIIe	80	16	40	30	1,900	4.5	8.5
18C3---------- Pacolet	IVe	55	11	35	25	1,600	3.5	6.6
19---------- Partlow	IVw	---	---	---	---	---	---	---
20**. Pits								
21B---------- Poindexter	IIe	65	13	35	30	1,800	2.5	4.7
21C---------- Poindexter	IIIe	50	10	30	25	1,600	2.5	4.7
21D---------- Poindexter	IVe	---	---	---	---	---	---	---
21E---------- Poindexter	VIe	---	---	---	---	---	---	---
22---------- Toccoa	IIw	90	18	---	---	---	4.0	7.6
23B---------- Trenholm	IIe	70	14	35	30	---	---	---
23C---------- Trenholm	IIIe	---	---	30	20	---	---	---
24A---------- Turbeville	I	115	23	55	35	2,200	6.0	11.0
24B2---------- Turbeville	IIe	110	22	50	35	2,000	6.0	11.0
25C---------- Turbeville	IIIe	95	19	45	25	1,800	5.0	9.5
25D---------- Turbeville	IVe	75	15	40	25	---	4.5	8.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn, silage	Wheat	Soybeans	Tobacco	Alfalfa hay	Grass-clover
		Bu	Tons	Bu	Bu	Lbs	Tons	AUM*
26. Udorthents								
27B---------- Wedowee	IIe	80	16	40	30	2,000	4.0	7.6
27C---------- Wedowee	IIIe	70	14	35	25	1,800	3.5	6.6
27D---------- Wedowee	IVe	---	---	---	---	---	2.5	4.7

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--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)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
1B---------- Abell	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, yellow-poplar, black walnut.
						Yellow-poplar-------	90	6	
						Northern red oak----	80	4	
						Shortleaf pine------	80	9	
						Virginia pine-------	80	8	
2B---------- Altavista	9W	Slight	Moderate	Slight	Slight	Loblolly pine-------	91	9	Loblolly pine, yellow-poplar, black walnut.
						Southern red oak----	---	--	
						Shortleaf pine------	77	9	
						Sweetgum------------	84	6	
						White oak-----------	---	--	
						Yellow-poplar-------	---	--	
3B, 3C---------- Appling	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	81	8	Eastern redcedar, eastern white pine, Loblolly pine, yellow-poplar.
						Shortleaf pine------	65	7	
						Southern red oak----	76	4	
						Virginia pine-------	74	8	
						White oak-----------	71	4	
						Yellow-poplar-------	90	6	
						Sweetgum------------	---	--	
						Hickory------------	---	--	
4---------- Augusta	9W	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, sweetgum, yellow-poplar.
						Sweetgum------------	90	7	
						White oak-----------	80	4	
						Southern red oak----	80	4	
						Willow oak----------	---	--	
						Shortleaf pine------	---	--	
5B---------- Buncombe	8S	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	100	8	Eastern cottonwood, loblolly pine, American sycamore.
						American sycamore---	90	--	
						Sweetgum------------	90	7	
						Loblolly pine-------	90	9	
						Eastern cottonwood--	100	--	
6B2, 6C2-------- Cecil	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	80	8	Eastern white pine, loblolly pine, yellow-poplar.
						Scarlet oak---------	80	4	
						Shortleaf pine------	69	8	
						Virginia pine-------	73	8	
						Northern red oak----	82	4	
						Post oak------------	65	3	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
7---------- Chenneby	9W	Slight	Moderate	Moderate	Slight	Loblolly pine-------	100	9	Loblolly pine, yellow-poplar, sweetgum, American sycamore.
						Sweetgum----------	100	10	
						Willow oak----------	100	--	
						Yellow-poplar-------	110	9	
						American sycamore---	110	--	
8---------- Chewacla	9W	Slight	Moderate	Slight	Slight	Loblolly pine-------	96	9	Loblolly pine, American sycamore, yellow-poplar, sweetgum.
						Yellow-poplar-------	100	8	
						American sycamore---	---	--	
						Sweetgum----------	97	9	
						Willow oak----------	86	--	
						Southern red oak----	---	--	
9B---------- Creedmoor	8W	Slight	Moderate	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, sweetgum, yellow-poplar.
						Shortleaf pine------	55	5	
						Sweetgum----------	---	--	
						Willow oak----------	---	--	
						Yellow-poplar-------	---	--	
10A, 10B-------- Dogue	9W	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine.
						Southern red oak----	80	4	
						Sweetgum----------	90	7	
						Yellow-poplar-------	93	7	
						White oak----------	80	4	
10C---------- Dogue	9R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine.
						Southern red oak----	80	4	
						Sweetgum----------	90	7	
						Yellow-poplar-------	93	7	
						White oak----------	80	4	
11B, 11C-------- Enon	7A	Slight	Slight	Slight	Slight	Loblolly pine-------	73	7	Loblolly pine.
						Shortleaf pine------	63	7	
						Virginia pine-------	63	7	
						Northern red oak----	84	4	
						White oak----------	69	4	
						Yellow-poplar-------	88	6	
12---------- Forestdale	10W	Slight	Severe	Moderate	Slight	Sweetgum----------	100	10	Green ash, eastern cottonwood, sweetgum, American sycamore.
						Eastern cottonwood--	100	--	
						Green ash----------	78	3	
						Willow oak----------	94	--	
						American sycamore---	---	--	
13B**: Helena---------	8W	Slight	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, Virginia pine, yellow-poplar.
						Shortleaf pine------	63	7	
						White oak----------	64	3	
						Yellow-poplar-------	87	6	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
13B**:									
Enon	7A	Slight	Slight	Slight	Slight	Loblolly pine	73	7	Loblolly pine.
						Shortleaf pine	63	7	
						Virginia pine	63	7	
						Northern red oak	84	4	
						White oak	69	4	
						Yellow-poplar	88	6	
14B	8A	Slight	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine.
Kempsville						Southern red oak	70	4	
						Virginia pine	74	8	
						Sweetgum	80	6	
						Yellow-poplar	80	5	
15B, 15C	8A	Slight	Slight	Slight	Slight	Loblolly pine	82	8	Loblolly pine,
Mayodan						Shortleaf pine	---	--	Virginia pine,
						Yellow-poplar	---	--	yellow-poplar.
						Sweetgum	---	--	
						Southern red oak	---	--	
						White oak	---	--	
						Hickory	---	--	
16C	8A	Slight	Slight	Slight	Slight	Loblolly pine	78	8	Loblolly pine,
Pacolet						Shortleaf pine	70	8	shortleaf
						Yellow-poplar	90	6	pine, yellow-
						Virginia pine	74	8	poplar.
16D	8R	Moderate	Moderate	Slight	Slight	Loblolly pine	78	8	Loblolly pine,
Pacolet						Shortleaf pine	70	8	shortleaf
						Yellow-poplar	90	6	pine, yellow-
						Virginia pine	74	8	poplar.
17D3, 17E3	6C	Severe	Severe	Severe	Slight	Loblolly pine	70	6	Loblolly pine,
Pacolet						Shortleaf pine	60	6	shortleaf
						Yellow-poplar	80	5	pine, yellow-
						Virginia pine	65	7	poplar.
18B3, 18C3	6C	Moderate	Moderate	Moderate	Slight	Loblolly pine	70	6	Loblolly pine,
Pacolet						Shortleaf pine	60	6	shortleaf
						Yellow-poplar	80	5	pine, yellow-
						Virginia pine	65	7	poplar.
19	8W	Slight	Severe	Moderate	Moderate	Loblolly pine	78	8	Loblolly pine.
Partlow						Willow oak	70	--	
						Sweetgum	75	5	
						Maple	65	3	
21B, 21C	6A	Slight	Slight	Slight	Slight	Loblolly pine	70	6	Loblolly pine.
Poindexter						Virginia pine	65	7	
						Southern red oak	60	3	
						Shortleaf pine	60	6	
21D, 21E	6R	Moderate	Moderate	Slight	Slight	Loblolly pine	70	6	Loblolly pine.
Poindexter						Virginia pine	65	7	
						Southern red oak	60	3	
						Shortleaf pine	60	6	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
22--------- Toccoa	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, yellow-poplar, American sycamore.
						Yellow-poplar-------	107	8	
						Sweetgum----------	100	10	
23B, 23C-------- Trenholm	8W	Slight	Moderate	Slight	Slight	Virginia pine-------	75	8	Loblolly pine.
						Northern red oak----	60	3	
						Southern red oak----	60	3	
						White oak----------	60	3	
24A, 24B2, 25C-- Turbeville	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	84	6	
						Virginia pine-------	70	8	
						Shortleaf pine------	70	8	
						Southern red oak----	70	4	
25D--------- Turbeville	8R	Moderate	Severe	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, yellow-poplar.
						Yellow-poplar-------	84	6	
						Virginia pine-------	70	8	
						Shortleaf pine------	70	8	
						Southern red oak----	70	4	
27B, 27C-------- Wedowee	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, Virginia pine.
						Virginia pine-------	70	8	
						Shortleaf pine------	69	8	
						Southern red oak----	70	4	
						Northern red oak----	68	4	
						White oak----------	65	3	
27D--------- Wedowee	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, Virginia pine.
						Virginia pine-------	70	8	
						Shortleaf pine------	69	8	
						Southern red oak----	70	4	
						Northern red oak----	68	4	
						White oak----------	65	3	

* 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.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Abell	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight	Slight.
2B Altavista	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
3B Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
3C Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
4 Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
5B Buncombe	Severe: flooding.	Moderate: too sandy.	Moderate: too sandy, flooding.	Moderate: too sandy.	Severe: droughty.
6B2 Cecil	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
6C2 Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Slight.
7 Chenneby	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness, flooding.
8 Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
9B Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
10A Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
10B Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
10C Dogue	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
11B Enon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
11C---------- Enon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
12---------- Forestdale	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
13B*: Helena----------	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
Enon----------	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
14B---------- Kempsville	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
15B---------- Mayodan	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
15C---------- Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
16C---------- Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
16D, 17D3---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
17E3---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
18B3---------- Pacolet	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
18C3---------- Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
19---------- Partlow	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20*. Pits					
21B---------- Poindexter	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
21C---------- Poindexter	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
21D---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
21E---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22---------- Toccoa	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
23B---------- Trenholm	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
23C---------- Trenholm	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.
24A---------- Turbeville	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
24B2---------- Turbeville	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
25C---------- Turbeville	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
25D---------- Turbeville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
26. Udorthents					
27B---------- Wedowee	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
27C---------- Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
27D---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B---------- Abell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2B---------- Altavista	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3B---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3C---------- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4---------- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
5B---------- Buncombe	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
6B2---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
6C2---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
7---------- Chenneby	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8---------- Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
9B---------- Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10A---------- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
10B---------- Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10C---------- Dogue	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
11B---------- Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11C---------- Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12---------- Forestdale	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
13B*: Helena----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
13B*: Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B Kempsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15B Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15C Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
16C Pacolet	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
16D Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
17D3, 17E3 Pacolet	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
18B3 Pacolet	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
18C3 Pacolet	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
19 Partlow	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
20*. Pits										
21B Poindexter	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
21C Poindexter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
21D Poindexter	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
21E Poindexter	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
22 Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23B Trenholm	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23C Trenholm	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24A, 24B2 Turbeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25C Turbeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
25D---------- Turbeville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26. Udorthents										
27B---------- Wedowee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
27C---------- Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
27D---------- Wedowee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B---------- Abell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
2B---------- Altavista	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness.
3B---------- Appling	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
3C---------- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
4---------- Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
5B---------- Buncombe	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
6B2---------- Cecil	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
6C2---------- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Slight.
7---------- Chenneby	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
8---------- Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
9B---------- Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
10A---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
10B---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
10C---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
11B---------- Enon	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
11C---------- Enon	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
12---------- Forestdale	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: wetness, flooding.
13B*:						
Helena----------	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
Enon----------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
14B---------- Kempsville	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: small stones, droughty.
15B---------- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
15C---------- Mayodan	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
16C---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
16D, 17D3, 17E3--- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
18B3---------- Pacolet	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
18C3---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
19---------- Partlow	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
20*. Pits						
21B---------- Poindexter	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
21C---------- Poindexter	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
21D, 21E---------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22---------- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
23B---------- Trenholm	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
23C---------- Trenholm	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
24A---------- Turbeville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
24B2---------- Turbeville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
25C---------- Turbeville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
25D---------- Turbeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
26* Udorthents						
27B---------- Wedowee	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
27C---------- Wedowee	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27D---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B Abell	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too clayey, wetness.
2B Altavista	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
3B Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: thin layer.
3C Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: thin layer.
4 Augusta	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
5B Buncombe	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
6B2 Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
6C2 Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
7 Chenneby	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
8 Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
9B Creedmoor	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
10A, 10B Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
10C Dogue	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
11B---------- Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
11C---------- Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
12---------- Forestdale	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
13B*: Helena----------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Enon----------	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
14B---------- Kempsville	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Fair: small stones.
15B---------- Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
15C---------- Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
16C---------- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
16D, 17D3, 17E3----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
18B3---------- Pacolet	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
18C3---------- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
19---------- Partlow	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
20*. Pits					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21B---------- Poindexter	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: area reclaim, too clayey.
21C---------- Poindexter	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: too clayey, area reclaim, slope.
21D, 21E---------- Poindexter	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope.
22---------- Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
23B---------- Trenholm	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
23C---------- Trenholm	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
24A---------- Turbeville	Moderate: percs slowly.	Slight----------	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
24B2---------- Turbeville	Moderate: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack.
25C---------- Turbeville	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
25D---------- Turbeville	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
26. Udorthents					
27B---------- Wedowee	Moderate: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, thin layer.
27C---------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
27D---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B Abell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
2B Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
3B Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
3C Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
4 Augusta	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
5B Buncombe	Good	Probable	Improbable: too sandy.	Fair: too sandy.
6B2, 6C2 Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
7 Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
8 Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
9B Creedmoor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
10A, 10B, 10C Dogue	Fair: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: thin layer.
11B, 11C Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
12 Forestdale	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
13B*: Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
14B---------- Kempsville	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
15B, 15C---------- Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16C---------- Pacolet	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16D, 17D3---------- Pacolet	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
17E3---------- Pacolet	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
18B3, 18C3---------- Pacolet	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
19---------- Partlow	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
20*. Pits				
21B---------- Poindexter	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
21C---------- Poindexter	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
21D---------- Poindexter	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
21E---------- Poindexter	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
22---------- Toccoa	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
23B, 23C---------- Trenholm	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
24A, 24B2---------- Turbeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
25C---------- Turbeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
25D---------- Turbeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
26. Udorthents				
27B, 27C---------- Wedowee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
27D---------- Wedowee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
1B---------- Abell	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Slope----------	Wetness--------	Favorable.
2B---------- Altavista	Moderate: seepage.	Moderate: wetness.	Moderate: deep to water.	Slope----------	Wetness--------	Favorable.
3B---------- Appling	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
3C---------- Appling	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
4---------- Augusta	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
5B---------- Buncombe	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy------	Droughty, rooting depth.
6B2---------- Cecil	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
6C2---------- Cecil	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
7---------- Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Flooding-------	Erodes easily, wetness.	Wetness, erodes easily.
8---------- Chewacla	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Flooding-------	Wetness--------	Wetness.
9B---------- Creedmoor	Slight---------	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly.	Percs slowly.
10A---------- Dogue	Moderate: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Favorable------	Erodes easily, wetness.	Erodes easily.
10B---------- Dogue	Moderate: seepage, slope.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Slope----------	Erodes easily, wetness.	Erodes easily.
10C---------- Dogue	Severe: slope.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Slope----------	Slope, erodes easily, wetness.	Slope, erodes easily.
11B---------- Enon	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Percs slowly---	Percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
11C---------- Enon	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, percs slowly.
12---------- Forestdale	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
13B*:						
Helena----------	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly.	Percs slowly.
Enon----------	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Percs slowly---	Percs slowly.
14B---------- Kempsville	Moderate: seepage, slope.	Slight---------	Severe: no water.	Deep to water	Favorable------	Droughty.
15B---------- Mayodan	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
15C---------- Mayodan	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
16C, 16D, 17D3, 17E3---------- Pacolet	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
18B3---------- Pacolet	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
18C3---------- Pacolet	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
19---------- Partlow	Moderate: seepage.	Severe: wetness, piping.	Moderate: slow refill.	Flooding-------	Wetness--------	Wetness.
20*. Pits						
21B---------- Poindexter	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
21C, 21D, 21E----- Poindexter	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
22---------- Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Flooding-------	Favorable------	Favorable.
23B---------- Trenholm	Moderate: slope.	Severe: hard to pack.	No water-------	Percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.
23C---------- Trenholm	Severe: slope.	Severe: hard to pack.	No water-------	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, slope, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
24A---------- Turbeville	Moderate: seepage.	Moderate: hard to pack.	Severe: no water.	Deep to water	Soil blowing---	Favorable.
24B2---------- Turbeville	Moderate: seepage, slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Soil blowing---	Favorable.
25C, 25D---------- Turbeville	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
26* Udorthents						
27B---------- Wedowee	Moderate: slope.	Moderate: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
27C, 27D---------- Wedowee	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----------	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1B---------- Abell	0-6	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	90-100	85-100	50-100	20-50	<25	NP-10
	6-30	Sandy clay loam, clay loam, sandy loam.	CL, CL-ML, ML, SC	A-2, A-4, A-6	0	90-100	75-100	50-95	25-85	<40	NP-20
	30-58	Clay, clay loam, silty clay loam.	CL, CH	A-6, A-7	0-5	90-100	75-95	70-95	65-90	30-60	15-30
	58-64	Loam, sandy loam, silt loam.	SM, ML	A-2, A-4	0-5	75-100	75-100	60-95	30-85	<30	NP-7
2B---------- Altavista	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0	95-100	90-100	65-99	35-60	<23	NP-7
	9-44	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
	44-60	Variable---------	---	---	---	---	---	---	---	---	---
3B, 3C---------- Appling	0-8	Fine sandy loam	SM	A-2	0-5	86-100	80-100	55-91	15-35	<27	NP-5
	8-33	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	33-63	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
4---------- Augusta	0-4	Silt loam--------	ML, CL-ML	A-4	0	90-100	75-100	75-100	51-75	<35	NP-10
	4-64	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
5B---------- Buncombe	0-10	Loamy sand-------	SM, SP-SM	A-2, A-3	0	98-100	98-100	90-97	7-32	---	NP
	10-52	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2, A-3	0	98-100	98-100	98-100	7-32	---	NP
	52-60	Variable---------	---	---	---	---	---	---	---	---	---
6B2, 6C2---------- Cecil	0-4	Fine sandy loam	SM, SM-SC	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-6
	4-8	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
	8-57	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	57-66	Variable---------	---	---	---	---	---	---	---	---	---
7---------- Chenneby	0-15	Silt loam--------	CL, ML	A-4, A-6	0	100	95-100	90-100	60-90	20-35	3-15
	15-60	Loam, silt loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	0	100	95-100	90-100	75-95	30-55	8-20
8---------- 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
	6-26	Silt loam, silty clay loam, clay loam.	ML, CL	A-4, A-6, A-7	0	96-100	95-100	80-100	51-98	30-49	4-22
	26-53	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
	53-60	Variable---------	---	---	---	---	---	---	---	---	---
9B---------- Creedmoor	0-5	Fine sandy loam	SM, SM-SC	A-4, A-2	0-3	98-100	95-100	70-90	30-49	<25	NP-7
	5-14	Sandy clay loam, clay loam.	CL	A-7	0-3	98-100	95-100	85-95	60-80	40-50	20-30
	14-62	Clay, silty clay, sandy clay.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
10A, 10B, 10C---- Dogue	0-10	Silt loam--------	ML, CL, SM, SC	A-4	0	95-100	75-100	60-100	40-85	<30	NP-10
	10-62	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
11B, 11C--------- Enon	0-6	Sandy loam-------	SM, SM-SC, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	<30	NP-10
	6-43	Clay loam, sandy clay loam.	CL	A-4, A-6	0-5	80-100	80-100	70-90	50-80	25-40	7-20
	43-62	Clay loam, clay	CH, CL	A-7-6, A-6	0-5	85-100	80-100	75-98	65-95	38-60	15-35
	33-75	Variable---------	---	---	---	---	---	---	---	---	---
12---------- Forestdale	0-5	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	90-100	30-58	12-30
	5-57	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	20-40
	57-60	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	20-50	5-30
13B*:											
Helena----------	0-2	Loam----------	SM, SM-SC, SC	A-2, A-4	0-5	95-100	90-100	51-90	26-46	<30	NP-9
	2-8	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
	8-43	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	43-60	Variable---------	---	---	---	---	---	---	---	---	---
Enon----------	0-6	Loam----------	CL, CL-ML	A-4, A-6	0-5	80-100	80-100	70-90	50-80	20-40	4-20
	6-43	Clay loam, sandy clay loam.	CL	A-4, A-6	0-5	80-100	80-100	70-90	50-80	25-40	7-20
	43-62	Clay loam, clay	CH, CL	A-7-6, A-6	0-5	85-100	80-100	75-98	65-95	38-60	15-35
	33-75	Variable---------	---	---	---	---	---	---	---	---	---
14B---------- Kempsville	0-7	Gravelly fine sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2, A-4	0-2	65-80	50-75	20-60	15-45	<18	NP-7
	7-13	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-2	65-80	50-75	25-70	20-50	<22	NP-10
	13-60	Gravelly sandy clay loam, gravelly fine sandy loam, gravelly loam.	SC, CL, GC	A-2, A-6	0-2	65-80	50-75	30-65	20-55	25-40	10-20
15B, 15C--------- Mayodan	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-5	92-100	90-100	49-98	30-70	<36	NP-5
	8-52	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	52-61	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
16C, 16D--------- Pacolet	0-4	Fine sandy loam	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	4-35	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
	35-48	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
	48-60	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
17D3, 17E3------- Pacolet	0-4	Sandy clay loam	SM-SC, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	4-35	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
	35-48	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
	48-60	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
18B3, 18C3------- Pacolet	0-4	Clay loam---------	SM-SC, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	4-35	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
	35-48	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
	48-60	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
19--------------- Partlow	0-8	Loam-------------	ML, CL-ML	A-4	0	95-100	95-100	80-95	60-75	<20	NP-7
	8-40	Sandy loam, sandy clay loam, clay loam.	SC, CL, CL-ML	A-2, A-4, A-6	0	90-100	85-100	50-100	25-80	20-50	5-25
	40-60	Sandy loam, loam, sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	90-100	85-100	50-95	25-75	15-40	NP-20
20*. Pits											
21B, 21C, 21D, 21E------------- Poindexter	0-14	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0	90-100	85-100	50-100	20-50	<25	NP-10
	14-26	Clay loam, sandy clay loam, loam.	SC, CL	A-6	0	90-100	85-100	80-100	35-85	30-40	11-20
	26-53	Silty clay loam, loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	55-95	30-70	<20	NP-5
	53-57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
22--------------- Toccoa	0-7	Silt loam--------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	20-60	<30	NP-4
	7-35	Silt loam--------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	20-60	<30	NP-4
	35-60	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
23B, 23C--------- Trenholm	0-9	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0	85-95	80-95	75-90	20-50	<25	NP-10
	9-12	Sandy loam, clay loam, sandy clay loam.	SC, CL, SM-SC, CL-ML	A-4, A-6	0	85-95	80-90	75-90	35-60	20-40	5-20
	12-30	Clay, sandy clay	CL, CH	A-7	0	90-95	85-95	75-95	65-85	42-70	20-40
	30-36	Clay loam, sandy clay loam, clay.	SC, CL	A-4, A-6, A-7	0	90-95	85-95	75-95	40-75	25-50	10-30
	36-62	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0-2	85-95	85-90	75-90	35-75	<25	NP-10
24A, 24B2-------- Turbeville	0-9	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-2, A-4	0-2	80-100	75-100	50-85	25-55	<25	NP-5
	9-17	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0-2	90-100	80-100	60-100	35-75	30-45	8-20
	17-64	Clay loam, sandy clay, clay.	CL, CH	A-7	0-5	90-100	80-100	65-100	55-95	45-65	20-35
25C, 25D--------- Turbeville	0-9	Gravelly fine sandy loam.	GM, GM-GC, SM-SC	A-2, A-4	0-3	60-80	50-75	40-70	30-55	<25	NP-5
	9-17	Loam, clay loam, gravelly sandy clay loam.	GC, CL, SC	A-4, A-6, A-7	0-2	60-85	55-75	45-75	35-70	30-45	8-20
	17-64	Clay loam, sandy clay, gravelly clay.	GC, CL, SC, CH	A-7	0-5	60-85	55-75	45-75	35-70	45-65	20-35
26. Udorthents											
27B, 27C, 27D---- Wedowee	0-7	Sandy loam-------	SM, SM-SC	A-4, A-2-4	0	95-100	90-100	60-99	23-50	<30	NP-6
	7-33	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
	33-60	Variable---------	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--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)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
1B----------	0-6	5-18	1.30-1.55	0.6-6.0	0.08-0.15	4.5-5.5	Low----------	0.28	4	1-2
Abell	6-30	18-35	1.35-1.55	0.6-2.0	0.13-0.19	4.5-5.5	Low----------	0.28		
	30-58	30-45	1.35-1.55	0.6-2.0	0.11-0.17	4.5-5.5	Moderate-----	0.28		
	58-64	10-27	1.45-1.60	0.6-6.0	0.08-0.18	4.5-6.5	Low----------	0.28		
2B----------	0-9	10-24	1.30-1.50	2.0-6.0	0.12-0.20	4.5-5.5	Low----------	0.24	5	.5-2
Altavista	9-44	18-35	1.30-1.50	0.6-2.0	0.12-0.20	4.5-5.5	Low----------	0.24		
	44-60	---	---	---	---	---	----------	----		
3B, 3C----------	0-8	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	8-33	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	33-63	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
4----------	0-4	10-25	1.35-1.60	0.6-2.0	0.15-0.22	3.6-4.5	Low----------	0.24	4	.5-2
Augusta	4-64	20-35	1.35-1.60	0.6-2.0	0.12-0.18	3.6-4.5	Low----------	0.24		
5B----------	0-10	3-12	1.60-1.75	>6.0	0.06-0.10	4.5-6.0	Low----------	0.10	5	.5-1
Buncombe	10-52	3-12	1.60-1.75	>6.0	0.03-0.07	4.5-6.0	Low----------	0.10		
	52-60	---	---	---	---	---	----------	----		
6B2, 6C2----------	0-4	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-5.5	Low----------	0.28	4	.5-2
Cecil	4-8	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	8-57	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	57-66	---	---	---	---	---	----------	----		
7----------	0-15	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	.5-2
Chenneby	15-60	12-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
8----------	0-6	10-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.28	5	2-4
Chewacla	6-26	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.32		
	26-53	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low----------	0.28		
	53-60	---	---	---	---	---	----------	----		
9B----------	0-5	7-20	1.55-1.70	2.0-6.0	0.10-0.14	3.6-4.5	Low----------	0.28	3	.5-2
Creedmoor	5-14	20-35	1.45-1.65	0.2-0.6	0.13-0.15	3.6-4.5	Moderate-----	0.32		
	14-62	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-4.5	Moderate-----	0.32		
10A, 10B, 10C----	0-10	5-15	1.30-1.45	0.6-2.0	0.14-0.20	3.6-4.5	Low----------	0.37	4	.5-1
Dogue	10-62	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-4.5	Moderate-----	0.28		
11B, 11C----------	0-6	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	6-43	20-35	1.30-1.50	0.6-2.0	0.15-0.20	6.1-6.5	Low----------	0.24		
	43-62	35-60	1.20-1.40	0.06-0.2	0.15-0.20	5.1-7.8	High---------	0.28		
	33-75	---	---	---	---	---	----------	----		
12----------	0-5	27-38	1.50-1.55	0.2-0.6	0.20-0.22	4.5-5.5	Moderate-----	0.37	5	2-4
Forestdale	5-57	35-60	1.50-1.60	<0.06	0.14-0.18	4.5-5.5	High---------	0.28		
	57-60	10-35	1.45-1.55	0.2-0.6	0.17-0.22	4.5-5.5	Moderate-----	0.37		
13B*:										
Helena----------	0-2	5-20	1.58-1.62	2.0-6.0	0.10-0.12	4.5-5.5	Low----------	0.15	3	.5-2
	2-8	20-35	1.46-1.56	0.2-0.6	0.13-0.15	4.5-5.5	Moderate-----	0.28		
	8-43	35-60	1.44-1.55	0.06-0.2	0.13-0.15	4.5-5.5	High---------	0.28		
	43-60	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
13B*:										
Enon	0-6	10-35	1.30-1.50	0.6-2.0	0.15-0.20	5.1-6.5	Low	0.24	2	.5-2
	6-43	20-35	1.30-1.50	0.6-2.0	0.15-0.20	5.1-6.5	Low	0.24		
	43-62	25-60	1.20-1.40	0.06-0.2	0.15-0.20	5.1-7.8	High	0.28		
	33-75	---	---	---	---	---	---	---		
14B	0-7	5-15	1.30-1.45	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.24	4	.5-2
Kempsville	7-13	12-24	1.30-1.50	2.0-6.0	0.08-0.12	4.5-5.5	Low	0.24		
	13-60	18-35	1.35-1.70	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.24		
15B, 15C	0-8	5-20	1.40-1.65	>6.0	0.11-0.17	4.5-5.5	Low	0.24	4	.5-2
Mayodan	8-52	35-60	1.25-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Moderate	0.28		
	52-61	---	---	---	0.02-0.06	4.5-5.5	Low	---		
16C, 16D	0-4	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-5.5	Low	0.20	3	.5-2
Pacolet	4-35	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low	0.28		
	35-48	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.28		
	48-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.28		
17D3, 17E3, 18B3,										
18C3	0-4	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.24	2	.5-1
Pacolet	4-35	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low	0.28		
	35-48	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.28		
	48-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.28		
19	0-8	10-25	1.25-1.45	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.32	4	2-4
Partlow	8-40	18-35	1.30-1.60	0.6-2.0	0.10-0.19	4.5-5.5	low	0.28		
	40-60	5-35	1.30-1.60	2.0-6.0	0.10-0.17	4.5-5.5	Low	0.28		
20*.										
Pits										
21B, 21C, 21D,										
21E	0-14	5-18	1.30-1.55	2.0-6.0	0.08-0.15	5.1-6.5	Low	0.28	3	.5-2
Poindexter	14-26	20-35	1.35-1.45	0.6-2.0	0.13-0.19	5.1-6.5	Low	0.24		
	26-53	10-35	1.30-1.55	2.0-6.0	0.08-0.15	5.1-6.5	Low	0.24		
	53-57	---	---	---	---	---	---	---		
22	0-7	3-15	1.35-1.45	2.0-6.0	0.09-0.12	5.1-6.5	Low	0.24	5	1-2
Toccoa	0-35	3-17	1.35-1.45	2.0-6.0	0.09-0.12	5.1-6.5	Low	0.24		
	35-60	2-19	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5	Low	0.10		
23B, 23C	0-9	8-18	1.30-1.45	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.32	3	.5-2
Trenholm	9-12	12-35	1.30-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28		
	12-30	35-60	1.30-1.60	<0.06	0.10-0.14	4.5-6.0	High	0.24		
	30-36	20-40	1.30-1.60	0.2-0.6	0.10-0.16	4.5-6.0	Moderate	0.24		
	36-62	12-25	1.30-1.45	0.2-2.0	0.10-0.16	4.5-6.0	Low	0.24		
24A, 24B2	0-9	8-18	1.35-1.55	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.32	5	.5-2
Turbeville	9-17	25-40	1.30-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	17-64	30-60	1.35-1.50	0.6-2.0	0.13-0.16	4.5-5.5	Moderate	0.24		
25C, 25D	0-9	8-18	1.35-1.55	2.0-6.0	0.08-0.12	4.5-5.5	Low	0.24	4	.5-2
Turbeville	9-17	25-40	1.30-1.45	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.24		
	17-64	30-60	1.35-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Moderate	0.24		
26.										
Udorthents										
27B, 27C, 27D	0-7	6-20	1.25-1.60	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	3	.5-2
Wedowee	7-33	35-45	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Moderate	0.28		
	33-60	---	---	---	---	---	---	---		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "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)

Soil name and map symbol	Hydrologic group	Flooding		High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
				Ft			In			
1B---------- Abell	B	None--------	---	2.0-3.5	Apparent	Dec-Mar	>60	---	Moderate---	High.
2B---------- Altavista	C	Rare--------	---	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate---	Moderate.
3B, 3C---------- Appling	B	None--------	---	>6.0	---	---	>60	---	Moderate---	Moderate.
4---------- Augusta	C	None--------	---	1.0-2.0	Apparent	Jan-May	>60	---	High-------	Moderate.
5B---------- Buncombe	A	Occasional	Very brief	>6.0	---	---	>60	---	Low--------	Moderate.
6B2, 6C2---------- Cecil	B	None--------	---	>6.0	---	---	>60	---	Moderate---	Moderate.
7---------- Chenneby	C	Occasional	Very brief	1.0-2.5	Apparent	Jan-Mar	>60	---	High-------	Moderate.
8---------- Chewacla	C	Frequent----	Brief-----	0.5-1.5	Apparent	Nov-Apr	>60	---	High-------	Moderate.
9B---------- Creedmoor	C	None--------	---	1.5-2.0	Perched	Jan-Mar	>60	---	High-------	High.
10A, 10B, 10C----- Dogue	C	None--------	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High-------	High.
11B, 11C---------- Enon	C	None--------	---	>6.0	---	---	>60	---	High-------	Moderate.
12---------- Forestdale	D	Frequent----	Brief to long.	0.5-2.0	Apparent	Jan-Apr	>60	---	High-------	Moderate.
13B*:										
Helena----------	C	None--------	---	>6.0	Perched	Jan-Apr	>60	---	High-------	High.
Enon----------	C	None--------	---	>6.0	---	---	>60	---	High-------	Moderate.
14B---------- Kempsville	B	None--------	---	>6.0	---	---	>60	---	Low--------	Moderate.
15B, 15C---------- Mayodan	B	None--------	---	>6.0	---	---	>60	---	High-------	Moderate.
16C, 16D, 17D3, 17E3, 18B3, 18C3- Pacolet	B	None--------	---	>6.0	---	---	>60	---	High-------	High.
19---------- Partlow	D	Occasional	Brief-----	0-1.0	Apparent	Nov-May	>60	---	High-------	High.
20*. Pits										

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
				Ft			In			
21B, 21C, 21D, 21E---------- Poindexter	B	None--------	---	>6.0	---	---	50-60	Hard	Moderate---	Moderate.
22---------- Toccoa	B	Occasional	Brief-----	2.5-5.0	Apparent	Dec-Apr	>60	---	Low--------	Moderate.
23B, 23C---------- Trenholm	D	None--------	---	1.0-3.0	Perched	Dec-May	>60	---	High-------	Moderate.
24A, 24B2, 25C, 25D---------- Turbeville	C	None--------	---	>6.0	---	---	>60	---	High-------	High.
26. Udorthents										
27B, 27C, 27D----- Wedowee	B	None--------	---	>6.0	---	---	>60	---	Moderate---	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Abell	Fine-loamy, mixed, thermic Aquic Hapludults
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Appling	Clayey, kaolinitic, thermic Typic Hapludults
*Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Buncombe	Mixed, thermic Typic Udipsamments
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chenneby	Fine-silty, mixed, thermic Fluvaquentic Dystrochrepts
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Creedmoor	Clayey, mixed, thermic Aquic Hapludults
*Dogue	Clayey, mixed, thermic Aquic Hapludults
Enon	Fine, mixed, thermic Ultic Hapludalfs
Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Helena	Clayey, mixed, thermic Aquic Hapludults
*Kempsville	Fine-loamy, siliceous, thermic Typic Hapludults
Mayodan	Clayey, mixed, thermic Typic Hapludults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Partlow	Fine-loamy, mixed, thermic Typic Ochraquults
Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Trenholm	Fine, mixed, thermic Albaquic Hapludalfs
Turbeville	Clayey, mixed, thermic Typic Paleudults
Udorthents	Udorthents
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults

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