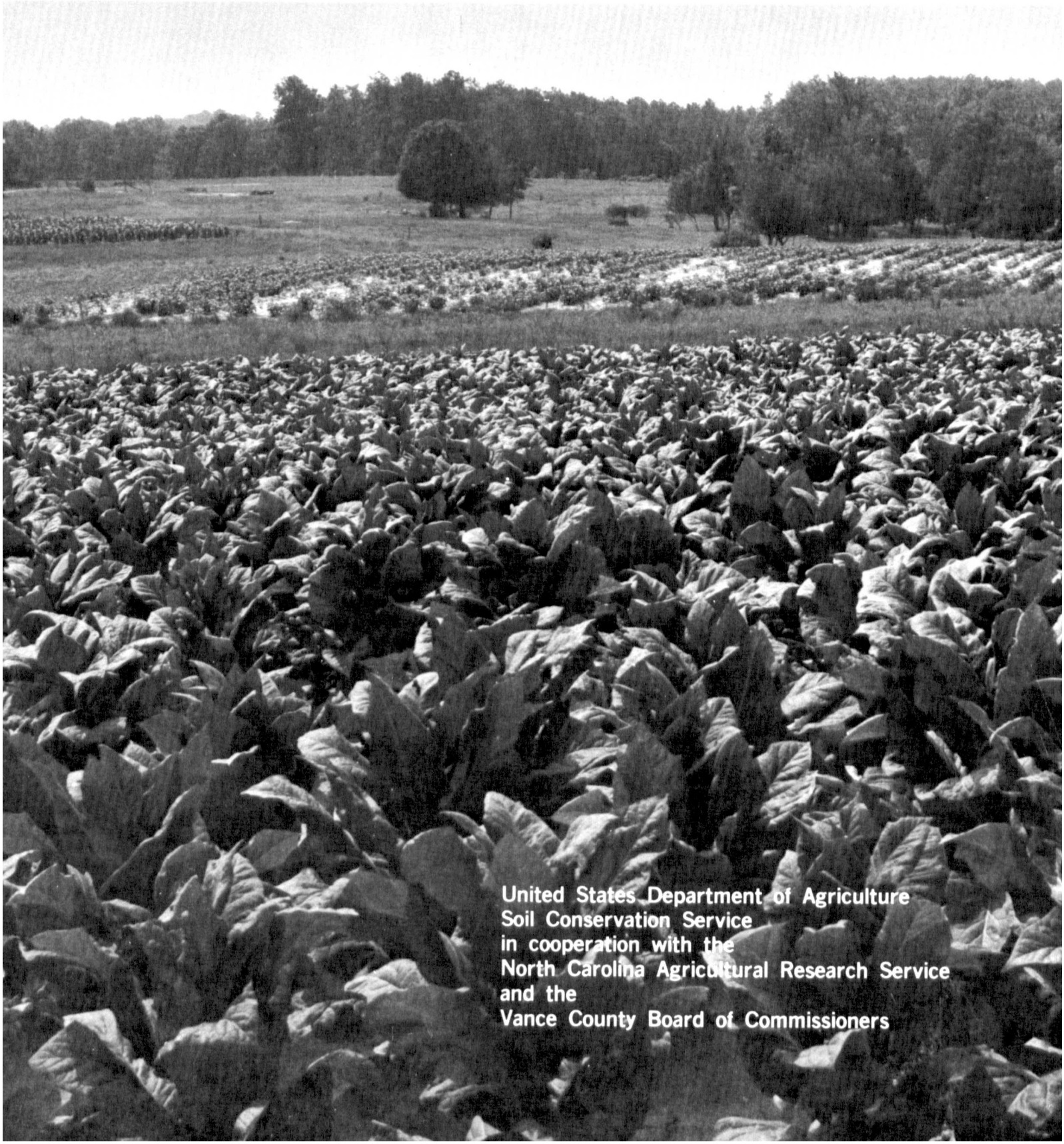
SOIL SURVEY OF

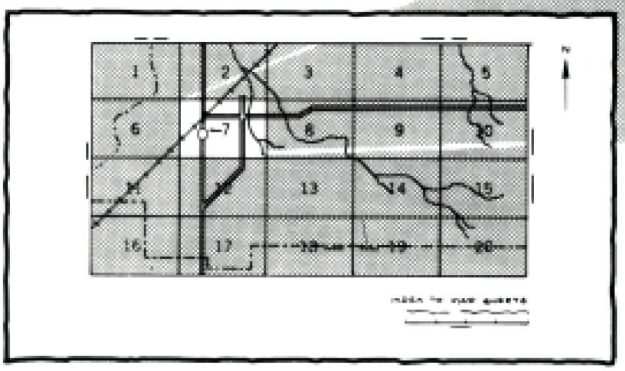
Vance County, North Carolina

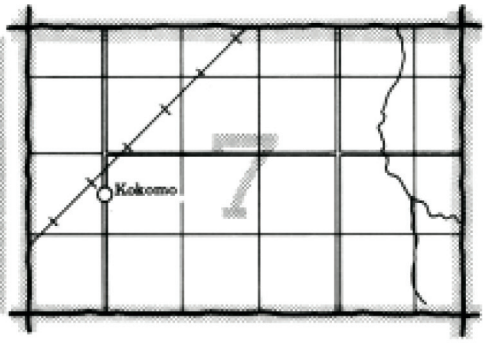


United States Department of Agriculture
Soil Conservation Service
in cooperation with the
North Carolina Agricultural Research Service
and the
Vance County Board of Commissioners

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.

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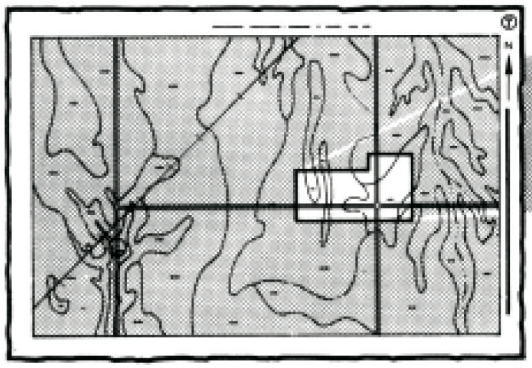
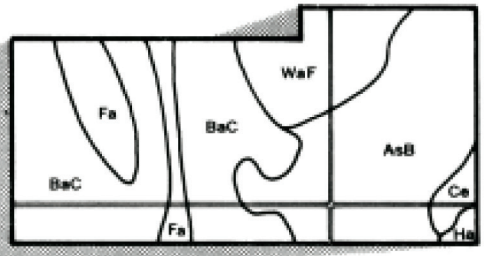
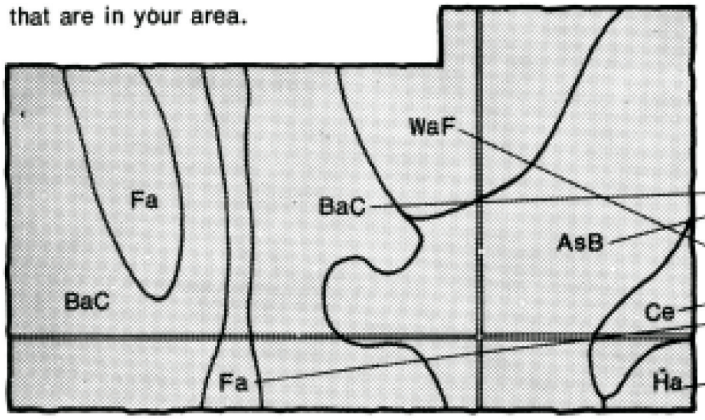




4. List the map unit symbols that are in your area.

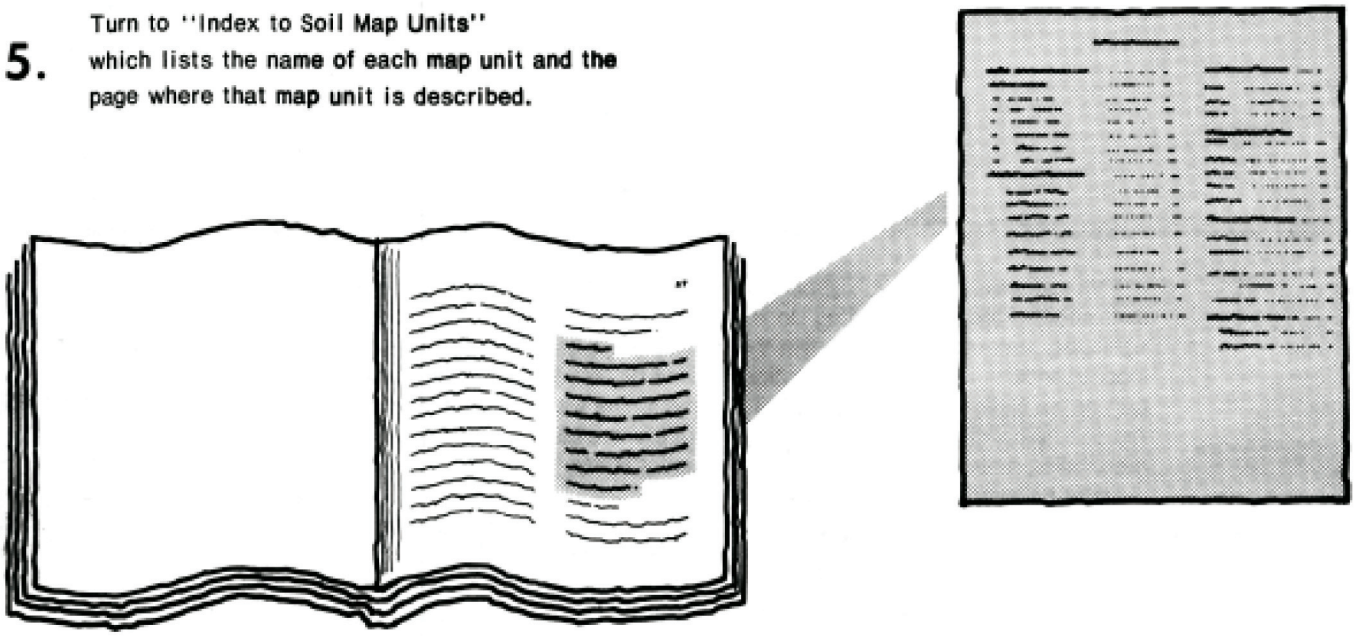


Symbols

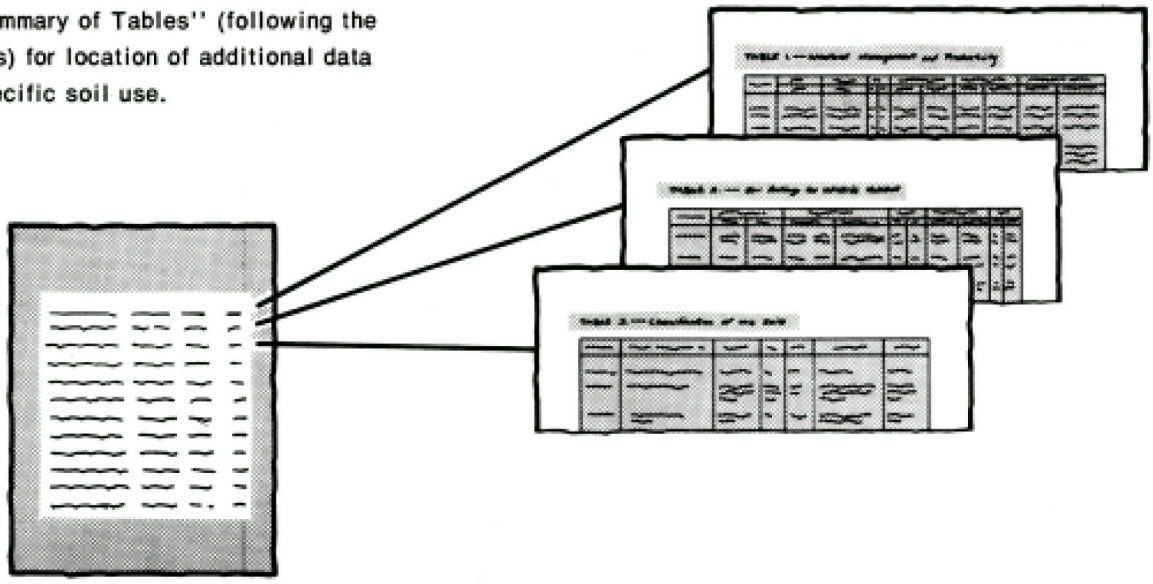
- AsB
- BaC
- Ce
- Fa
- Ha
- WaF

THIS SOIL SURVEY

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



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



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

This 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, or age.

Major fieldwork for this soil survey was performed from March 1970 to June 1977. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service, North Carolina Agricultural Research Service, and the Vance County Board of Commissioners. It is part of the technical assistance furnished to the Vance County Soil and Water Conservation District.

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

Cover: Tobacco growing on Appling sandy loam, 2 to 8 percent slopes, in foreground; cotton on Durham loamy sand, 1 to 6 percent slopes, in center; and trees on Appling sandy loam, 2 to 8 percent slopes, in background.

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foreword

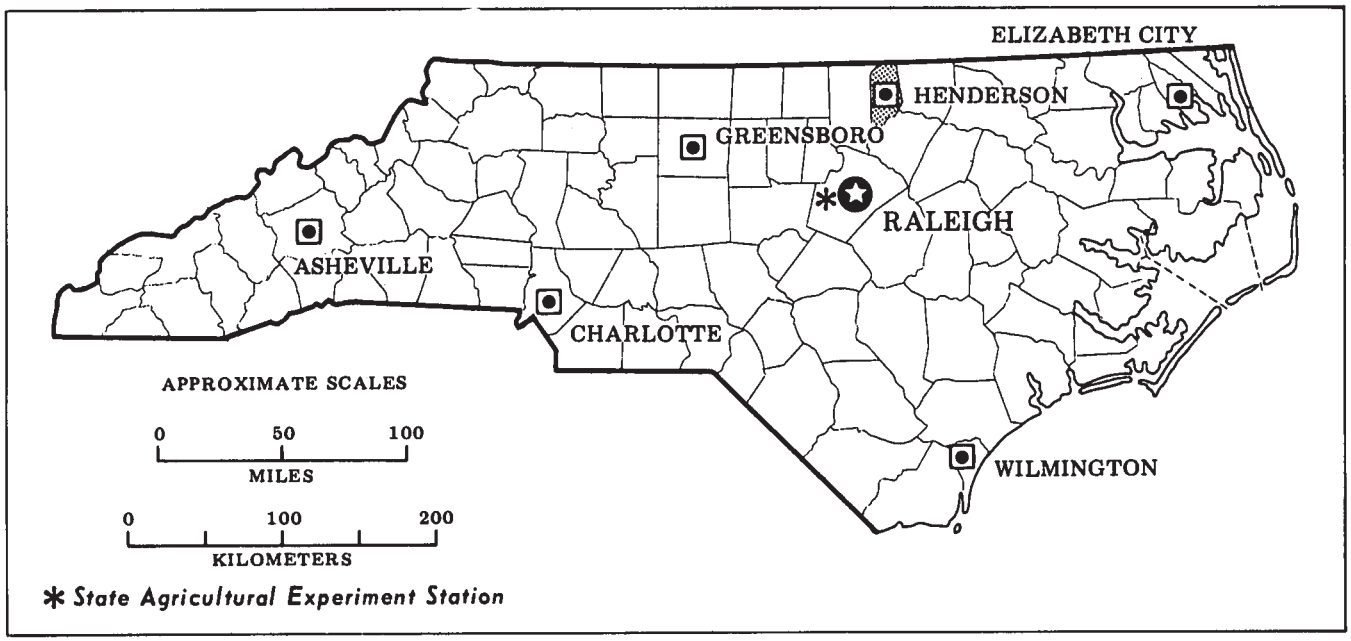
This soil survey contains information that can be used in land-planning programs in Vance County, North Carolina. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations,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

Jesse L. Hicks
State Conservationist
Soil Conservation Service



Location of Vance County in North Carolina.

soil survey of
Vance County, North Carolina

Soils surveyed by Jerry V. Stimpson, Roy L. Mathis, Jr.,
William I. Shope, Joel W. Cawthorn, and David Clapp
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with the North Carolina Agricultural Research Service
and the Vance County Board of Commissioners

VANCE COUNTY is an agricultural, industrial, and urban county in the north-central part of North Carolina. It is bounded on the east by Warren County, on the west by Granville County, on the south by Franklin County, and on the north by Mecklenburg County, Virginia. In 1975, the population of Vance County was 33,427. The city of Henderson is the county seat and is in the geographical center of the county.

The land in the county, 159,360 acres, is generally rolling and has moderately steep slopes along the drainageways.

Vance County is primarily agricultural but is growing into an industrial and urban county. Well diversified industry, government at all levels, educational institutions, wholesale and retail outlets, and transportation all contribute substantially to the economy of the county.

In the agricultural economy, tobacco makes up about 35 percent of the major crops grown in the county. Corn, hay, wheat, soybeans, and oats account for rest of the crops. Beef and dairy cattle and poultry are also important to the economy.

An earlier survey of Vance County was published in 1918 (*4*). This survey updates the earlier survey and provides additional information and more detailed maps.

general nature of the county

This section describes Vance County's history, cultural facilities, industry and transportation, climate, and water resources.

history

Vance County was formed in 1881 from parts of Granville, Warren, and Franklin Counties and named for Zebulon B. Vance, a governor during the Civil War and later a United States Senator.

The early history of the county is parallel to that of the parent counties. The first settlers were largely from Virginia and of English descent. By the mid-1700's a plantation society had developed around Williamsboro, first called Nutbush, and for many years the town was a center of culture, politics, and education. The population declined after 1840 when the town was bypassed by the railroad.

In 1841 the town of Henderson incorporated at a site along the railroad and became a thriving trade center in the area. Kittrell, incorporated along the railroad in 1885, was the location of important 19th century resort hotels.

cultural facilities

Cultural endeavors were important to the early settlers of Vance County. The pioneers exerted tremendous efforts in building churches, schools, and all the cultural facilities that go along with these institutions.

Vance County offers educational opportunities through Vance-Granville Community College and is within commuting distance to several universities.

The county has a modern hospital and is within 40 miles of major medical centers that include Duke Hospital and the Veterans Administration Hospital in Durham, and the University of North Carolina Medical Center in Chapel Hill.

industry and transportation

Henderson is the center of Vance County's manufacturing activities. Industry includes food processing, granite quarrying, concrete products, glass containers, mobile homes, tobacco redrying plants, aluminium products, and textiles such as apparel and hosiery.

Vance County is intersected by Interstate 85, U.S. Highways 1 and 158, and North Carolina State Highway 39. Rail service is available in the county. Public transportation includes a national bus line and a non-commercial airport, which serves both Oxford and Henderson. Twenty-eight certified common carrier motor freight lines have operations in the county.

climate

The National Climatic Center, Asheville, North Carolina, helped prepare this section.

Vance County is hot in summer. It is generally humid during this period because of moist maritime air. Winter is moderately cold, but short, because the mountains to the west protect the area against many cold waves. Precipitation is quite evenly distributed throughout the year and is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Henderson in the period 1951 to 1975. 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 41 degrees F, and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Henderson on January 22, 1970, is 0 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred on July 29, 1952, is 105 degrees.

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

Of the total annual precipitation, 25 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 6.43 inches at Henderson on July 10, 1959. Thunderstorms occur on about 50 days each year, and most occur in summer.

Average seasonal snowfall is 4 inches. The greatest snow depth at any one time during the period of record was 15 inches. On the average, 2 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The percentage of possible sunshine is 60 in summer and 50 in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in March.

In winter every few years, heavy snow covers the ground for as much as a week. Every few years late in summer or in autumn, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rain for 1 to 3 days.

water resources

Vance County has an abundant supply of water from surface streams, lakes, and ground water. About 1,000 manmade ponds are used chiefly for irrigation, livestock water supply, recreation, fire protection, and flood prevention.

Two types of wells are possible in Vance County—drilled and bored.

Drilled wells are the most common type of well in Vance County. The average yield is 14 gallons per minute.

Drilled wells are safer and more reliable than bored wells. Because they are tightly cased and water is obtained from crevices in the bedrock, the danger of pollution or contamination is much less. Because the depth usually exceeds that of the fluctuating water table, there are few reports of a drilled well going dry.

Bored wells usually range from 30 to 40 feet in depth and from 18 to 24 inches in diameter.

Because wells can easily be bored for a considerable depth below the water table, this type of well generally does not go dry during periods of drought. However, bored wells cannot be used where the water table is below the zone of completely decayed and disintegrated rock.

Henderson's water treatment plant obtains its supply from the John H. Kerr Reservoir. The plant's treatment capacity is 10,000,000 gallons per day, and the average daily consumption is about 3,500,000 gallons. The surplus water over peak load is 3,000,000 gallons per day.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

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

The general soil map 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 map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Relative terms assigned to soil potential classes indicate the quality of soil for a particular use compared to that of other soils in the county. They are based on the ability of the soil to produce, yield, or support a given structure or activity. The system involves four basic steps: (1) identifying soil properties and features that affect the anticipated use, (2) identifying and evaluating the practices that may be used to overcome the limiting soil features, (3) evaluating the level of performance or yield after installation of acceptable practices, and (4) arranging the soils from the best performance level to those with the poorest.

Definitions of soil potential classes are:

High potential. Production or performance is at or above the level of local standards, practices available for overcoming soil limitations are by local standards economically feasible, and continuing limitations after corrective practices are installed do not detract appreciably from environmental quality or economic returns.

Medium potential. Soils that have medium potential are intermediate between those soils that qualify for high potential and those that qualify for low potential. Production or performance is somewhat below local standards, or costs of overcoming limitations are high, or limitations continuing after corrective practices are installed detract from environmental quality or economic returns.

Low potential. Production or performance is significantly below local standards, or practices required to overcome limitations are costly, or limitations continuing after corrective practices are installed detract appreciably from environmental quality or economic returns.

Descriptions of the map units of the general soil map follow.

1. Cecil

Gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This unit makes up 21 percent of the county. It is 80 percent Cecil soils and 20 percent soils of minor extent.

The well drained Cecil soils are on broad ridges and narrow side slopes. The surface layer is brown sandy clay loam. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red clay, and the lower part is red clay loam.

Minor soils in the unit are the well drained Appling soils in smooth areas, the well drained Vance soils on small ridges, the well drained Wedowee soils on side slopes, the well drained Georgeville soils on ridges and side slopes where intrusions of slate rock occur, the well drained Wilkes soils on ridges and sides slopes where rock outcrop is common, and the moderately well drained Helena soils in concave areas that are wet.

Most of this unit is used for crops. This unit is well suited to most urban uses.

Erosion is the main limitation to use and management.

About 60 percent of this unit has been cleared. Most of the cleared acreage is used for tobacco. The rest of the unit is used for woodland, pasture, and urban use.

2. Appling

Gently sloping and sloping, well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This unit makes up 27 percent of the county. It is 82 percent Appling soils and 18 percent soils of minor extent.

The Appling soils are well drained (fig. 1). The surface layer is brown sandy loam. The upper part of the subsoil is yellowish brown sandy clay loam, the middle part is strong brown clay, and the lower part is yellowish red clay loam and sandy clay loam.

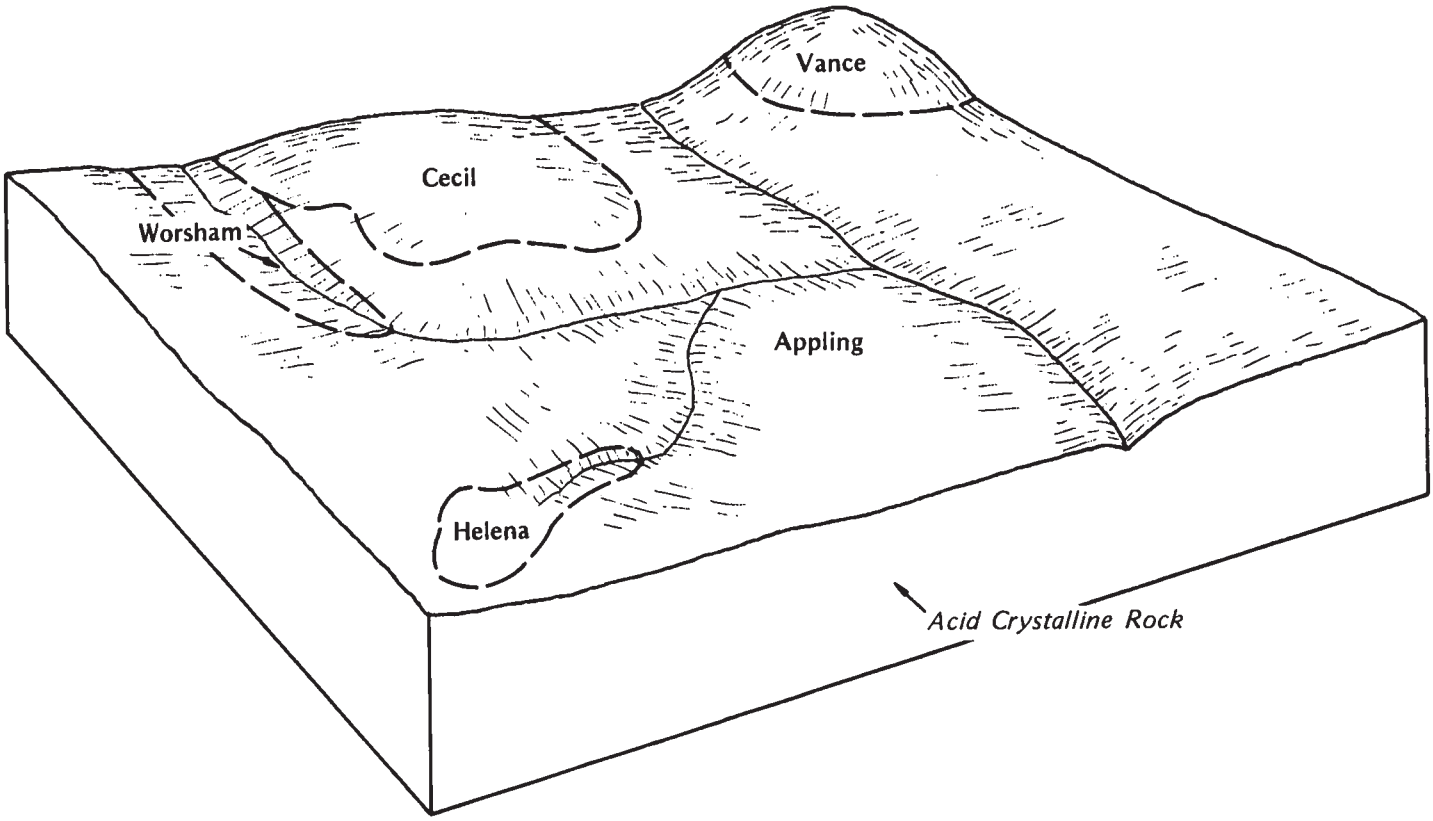


Figure 1.—Appling soil, the dominant soil in the county, is favorable for most land uses.

Minor soils in the unit are the well drained Durham soils in the same positions as Appling soils, the well drained Cecil and Vance soils on small ridgetops, the moderately well drained Helena soils in low areas that are wet and along drainageways, the poorly drained Worsham soils around heads of and along drainageways, the well drained to excessively drained Louisburg soils on small ridgetops where rock outcrops are common, and the well drained Wedowee soils on side slopes.

Most of this unit is used for crops. This unit is well suited to most urban uses.

Erosion is the main limitation to use and management.

About 85 percent of this unit has been cleared. Most of the cleared acreage is used for tobacco. The rest of the unit is used for woodland, pasture, or urban use.

3. Iredell

Gently sloping and sloping, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This unit makes up 4 percent of the county. It is 51 percent Iredell soils and 49 percent soils of minor extent.

The Iredell soils are moderately well drained and somewhat poorly drained. The surface layer is grayish brown fine sandy loam. The subsurface layer is gray fine sandy loam. The upper part of the subsoil is olive brown clay, and the lower part is light olive brown clay loam.

Minor soils in this unit are the well drained Wilkes soils on side slopes and small ridgetops, the moderately well drained Helena soils at the head of drainageways on smooth upland areas, the well drained Vance soils on broad ridges on higher positions, and the moderately well drained to somewhat poorly drained Lignum soils in depressional areas at the head of drainageways where intrusions of slate rock occur.

Most of this unit is woodland. This unit is not well suited to urban uses.

Wetness, shrink-swell potential, and permeability are the main limitations to use and management.

About 75 percent of this unit is woodland. The rest is used for pasture or crops.

4. Vance-Helena

Gently sloping and sloping, well drained and moderately well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This unit makes up 8 percent of the county. It is about 50 percent Vance soils, 20 percent Helena soil, and 30 percent soils of minor extent.

The well drained Vance soils are on narrow ridges. The surface layer is yellowish brown sandy loam. The upper part of the subsoil is yellowish red clay, and the lower part is yellowish red clay loam.

The moderately well drained Helena soils are on broad ridges. The surface layer is grayish brown sandy loam. The subsurface layer is pale brown sandy loam. The upper part of the subsoil is light yellowish brown sandy clay loam, the middle part is yellowish brown sandy clay and clay, and the lower part is gray sandy clay loam.

Minor soils in this unit are the well drained Appling and Cecil soils that are adjacent to Vance soils but generally on smoother ridges, the moderately well drained to somewhat poorly drained Lignum soils in depressional areas at the head of drainageways where intrusions of slate rock occur, the poorly drained Worsham soils at the head of and along drainageways, and the well drained Wilkes soils on side slopes.

Most of this unit is used for crops. This unit is not well suited to most urban uses.

Wetness, slope, shrink-swell potential, and permeability are the main limitations to use and management.

About 40 percent of the acreage of this unit has been cleared. Most of the cleared acreage is used for tobacco; the rest of the unit is used for pasture or woodland.

5. Georgeville-Nason

Gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey or loamy subsoil; on uplands

This unit makes up 5 percent of the county. It is 50 percent Georgeville soils, 25 percent Nason soils, and 25 percent soils of minor extent.

The well drained Georgeville soils are on ridges and side slopes. The surface layer is brown silt loam. The upper part of the subsoil is strong brown silty clay loam, the middle part is red silty clay, and the lower part is red silty clay loam.

The well drained Nason soils are on ridges and side slopes. The surface layer is brown gravelly silt loam. The upper part of the subsoil is yellowish brown silt loam, the middle part is strong brown silty clay loam, and the lower part is strong brown silt loam.

Minor soils in this unit are the moderately well drained to somewhat poorly drained Lignum soils in depressional areas and at the head of and along drainageways, the well drained Tatum soils generally adjacent to Georgeville soils on steep side slopes along streams in areas where rock is near the surface, and the somewhat poorly drained Chewacla soils on the flood plains adjacent to streams.

Most of this unit is used for crops. This unit is well suited to most urban uses.

Erosion and low strength are the main limitations to use and management.

About 30 percent of this unit has been cleared. Most of the cleared acreage is used for tobacco and corn. The rest of the unit is in woodland and or used for pasture.

6. Wilkes

Gently sloping to steep, well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This unit makes up 7 percent of the county. It is 55 percent Wilkes soils and 45 percent soils of minor extent.

The well drained Wilkes soils (fig. 2) are in areas where the topography is broken with small ridges and moderately steep to steep side slopes. The surface layer is grayish brown sandy loam. The upper part of the subsoil is strong brown clay, and the lower part is mottled strong brown and yellowish red clay loam

Minor soils in the unit are the moderately well drained to somewhat poorly drained Iredell soils on broad ridges, the well drained Vance soils on ridgetops where the soil is deeper and redder, the moderately well drained Helena soils on broader slopes at the head of drainageways, the well drained to excessively drained Louisburg soils in areas where the soils are coarser textured and rock outcrops are common, the well drained Wedowee soils on smooth side slopes away from rock outcrop areas, the somewhat poorly drained Chewacla soils on the flood plains near stream channels, and the poorly drained Wehadkee soils on the flood plains at the base of slopes and around small streams.

Most of this unit is woodland. This unit is not well suited to crops or urban uses.

Slope, surface runoff, erosion, and permeability are the main limitations to use and management.

About 10 percent of this unit is cleared; most of the cleared acreage is used for crops.

7. Wedowee-Louisburg-Pacolet

Sloping to steep, well drained to excessively drained soils that have a loamy or sandy surface layer and a clayey or loamy subsoil; on uplands

This unit makes up 28 percent of the county. It is 50 percent Wedowee soils, 12 percent Louisburg soils, 10 percent Pacolet soils, and 28 percent soils of minor extent.

The well drained Wedowee soils are on smooth side slopes adjacent to drainageways. The surface layer is brown sandy loam. The upper part of the subsoil is yellowish red sandy clay, and the lower part is yellowish red sandy clay loam.

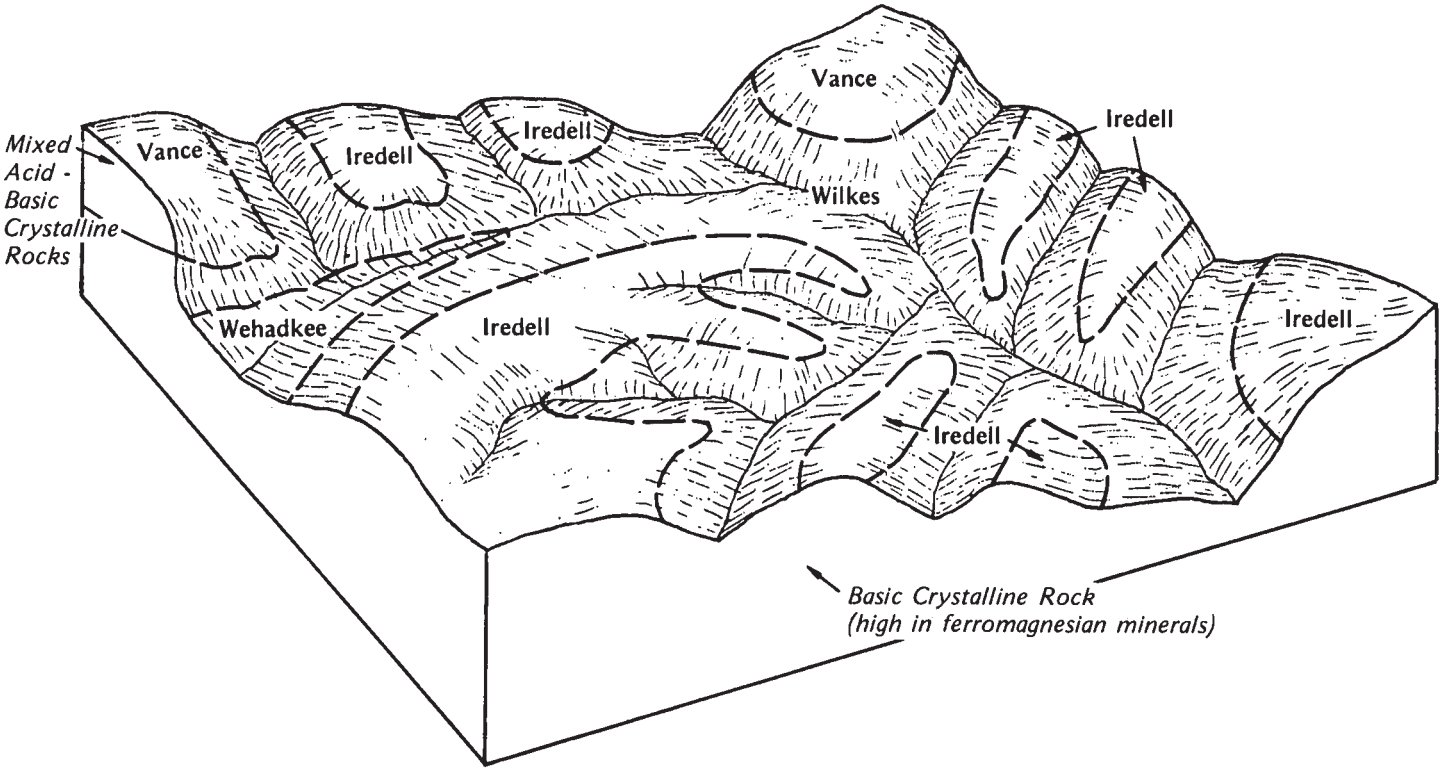


Figure 2.—The Wilkes unit is of minor extent and is used mostly for woodland.

The well drained to excessively drained Louisburg soils are on side slopes adjacent to drainageways, in areas where rock outcrops are common. The surface layer is strong brown loamy coarse sand. The subsoil is strong brown sandy loam.

The well drained Pacolet soils are on smooth side slopes adjacent to drainageways. The surface layer is dark grayish brown sandy loam. The upper part of the subsoil is yellowish red clay loam, the middle part is red clay, and the lower part is yellowish red loam.

Minor soils in the unit are the somewhat poorly drained Chewacla soils and the poorly drained Wehadkee soils on the flood plains, the well drained Wilkes soils on side slopes where the topography is more broken and rock outcrops occur, the well drained Tatum soils on smooth side slopes in areas where slate rock occurs, and the well drained Goldston soils on side slopes in areas where slate rock and rock outcrops occur.

Most of this unit is woodland. This unit is not well suited to cropland.

Slope, depth to rock, and erosion are the main limitations to use and management.

About 5 percent of this unit is cleared; most of the cleared acreage is used for pasture.

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, a brief description of the soil profile, and a listing of the principal hazards and limitations to be considered in planning management.

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, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cecil sandy clay loam, 2 to 8 percent slopes, eroded, is one of several phases in the Cecil series.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Cecil-Urban land complex, 2 to 10 percent slopes, is an example.

Not all of the map units in this county have been mapped with the same degree of detail. Broadly defined units, indicated by a superscript on the soil map legend, are apt to be larger and to vary more in composition than the rest of the map units in the survey. Composition of these broadly defined units has been controlled well enough, however, to be interpreted for the expected use of the soils.

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 is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

Soil descriptions of the detailed map units follow.

ApB—Appling sandy loam, 2 to 8 percent slopes. This well drained soil is on broad ridges that are dissected by intermittent drainageways on uplands. The mapped areas range from 4 to more than 200 acres.

Typically, the surface layer is brown sandy loam 10 inches thick. The subsoil is 38 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam, the middle part is strong brown clay, and the lower part is yellowish red clay loam and sandy clay loam. The underlying material to a depth of 55 inches is yellowish red sandy loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few small areas that have a gravelly surface layer and a few small eroded areas that have a sandy clay loam surface layer. Also included are some small areas of Cecil, Durham, Helena, Wedowee, and Vance soils. The Cecil soils commonly are on the small included knolls and near the outer edges on broad ridgetops of the larger map units. Both the Cecil and Vance soils are common on the narrow ridgetops in the smaller units. These are typically interwoven with Appling soils. The Durham soils are in low areas, and the Helena soils are in areas around the intermittent drainageways. The Wedowee soils are on slopes of slightly more than 8 percent.

Most areas of this Appling soil are used for crops. Some areas are used for hay and pasture. The rest is mainly woodland.

This soil has high potential for tobacco, corn, soybeans, and small grain. It has high potential for such horticultural crops as tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas. Slope, surface runoff, and erosion are the main limitations of the soil for crops. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Maintaining drainageways in sod, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Potential is high for hay and pasture forages. Pasture management includes maintaining a protective cover to reduce runoff and control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees grown are yellow-poplar, sweetgum, hickory, white oak, black oak, southern red oak, and loblolly pine. The main understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, and sassafras. There are no significant limitations for woodland use and management.

This soil has high potential for most urban uses. Permeability is a limitation for septic tank absorption fields. The recreational potential is dominantly high.

This Appling soil is in capability subclass IIe and in woodland group 3o.

AuB—Appling-Urban land complex, 2 to 10 percent slopes. This map unit consists of areas of Appling soils and areas of Urban land, primarily in the eastern and southeastern sections of Henderson, that are too small and too intricately mixed to separate them at the scale selected for mapping.

Undisturbed Appling soils make up 50 to 65 percent of each area and Urban land makes up 25 to 35 percent. The rest of this unit consists of areas where most of the soil has been altered or covered by grading and digging.

The undisturbed Appling soils are well drained. Typically, the surface layer is brown sandy loam 10 inches thick. The subsoil is 38 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam, the middle part is strong brown clay, and the lower part is yellowish red clay loam and sandy clay loam. The underlying material to a depth of 55 inches is yellowish red sandy loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

The altered areas of Appling soils are those covered by more than 20 inches of fill material or where more than two-thirds of the natural soil has been removed by digging and grading.

Urban land is covered with houses, paved streets, small shopping centers, factories, municipal buildings, apartment complexes, parking lots, schools, and churches.

Included in mapping are a few small areas of Cecil and Vance soils on higher positions than the Appling soils.

In disturbed areas of Appling soils, erosion is a hazard because of slope and runoff. Permeability is a limitation for septic tank absorption fields.

Onsite investigation for urban development is needed before planning the use and management of this unit.

These Appling soils and Urban land are not assigned to a capability subclass or to a woodland group.

CeB2—Cecil sandy clay loam, 2 to 8 percent slopes, eroded. This well drained soil is on narrow to broad, smooth ridges on the uplands. The mapped areas range from 4 to 50 acres or more.

Typically, the surface layer is brown sandy clay loam 6 inches thick. The subsoil is 60 inches or more in thickness. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red clay, and the lower part is red clay loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas that have a sandy loam or a gravelly surface layer and small areas that contain more mica than normal for this soil. Also included are a few small areas of Appling and Vance soils.

Most areas of this Cecil soil are used for crops. Some areas are used for pasture. The rest is in woodland or in urban or industrial development.

This soil has medium potential for corn, tobacco, soybeans, and small grain. The potential is medium for horticultural crops, such as tomatoes, sweet corn, green beans, and peas. Slope, surface runoff, and erosion are the main limitations for these uses.

Maintaining good tilth is difficult because the surface layer is thin. The surface layer commonly forms a crust as it dries after a hard rain and becomes cloddy if worked when wet, both of which affect germination and cause poor or uneven crop growth. Minimizing tillage and leaving crop residue on the surface help to reduce runoff and control erosion. Maintaining drainageways in sod, terraces and diversions, field borders, contour farming, stripcropping, and crop rotations that include close-growing crops also aid in conserving soil and water.

The potential for hay and pasture forages is high. Pasture management includes maintaining a protective cover to reduce runoff and help control erosion.

This soil has moderate potential for broad-leaved and needle-leaved trees. The dominant trees grown are

hickory, white oak, black oak, northern red oak, southern red oak, sweetgum, loblolly pine, and shortleaf pine. The main understory includes dogwood, red maple, sourwood, cedar, holly, redbud, black cherry, pin oak, and sassafras. The sandy clay loam surface layer and clayey subsoil are the significant limitations for woodland use and management.

This soil has high potential for most urban uses, such as dwellings and roads. Permeability is a limitation for septic tank absorption fields. The potential for most recreational uses is medium.

This Cecil soil is in capability subclass IIIe and in woodland group 4c.

CeD2—Cecil sandy clay loam, 8 to 15 percent slopes, eroded. This well drained soil is on narrow side slopes. The mapped areas range from 4 to about 10 acres.

Typically, the surface layer is brown sandy clay loam 6 inches thick. The subsoil is 60 inches or more in thickness. The upper part of the subsoil is yellowish red sandy clay loam, the middle part is red clay, and the lower part is red clay loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas that have a sandy loam surface layer and small areas containing more mica than the norm for this soil. Also included are a few small areas of Louisburg, Pacolet, and Wedowee soils. Louisburg soils are commonly in areas that are more rolling than this Cecil soil and that have short, steep, irregular slopes. Pacolet and Wedowee soils are on smooth side slopes and commonly have slopes of 15 percent.

Most areas of this Cecil soil are in woodland. The rest is in cropland or pasture.

This soil has low potential for row crops. Slope, surface runoff, and erosion are the main limitations. It has medium potential for hay and pasture forages, such as fescue, sericea lespedeza, red clover, and white clover.

Because the surface layer is thin, maintaining soil tilth is difficult. Additional erosion is a severe hazard where cultivated crops are grown. Minimizing tillage, returning crop residue to the soil, or using cover crops—including grasses and legumes—improves tilth, reduces runoff, and helps to control erosion. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderate potential for broad-leaved and needle-leaved trees. The dominant tree species are shortleaf pine, loblolly pine, Virginia pine, sweetgum, red oak, and white oak. The understory includes dogwood, cedar, holly, pin oak, sassafras, and black cherry. The sandy clay loam surface layer and clayey subsoil are the main limitations in the use and management of this soil for woodland.

Potential is medium for most urban uses because of permeability and slope. Additional erosion is a hazard if ground cover is removed. The recreational potential is medium.

This Cecil soil is in capability subclass VIe and in woodland group 4c.

CuB—Cecil-Urban land complex, 2 to 10 percent slopes. This map unit consists of areas of Cecil soils and areas of Urban land, primarily in the western and southwestern sections of Henderson, that are too small and too intricately mixed to separate them at the scale selected for mapping.

Undisturbed Cecil soils make up 50 to 65 percent of each area, and Urban land makes up 25 to 40 percent. The rest of this unit consists of areas where most of the soil has been altered or covered by grading and digging.

The undisturbed Cecil soils are well drained. Typically, the surface layer is brown sandy clay loam 6 inches thick. The subsoil is 60 inches or more in thickness. The upper part of the subsoil is yellowish red sandy clay, the middle part is red clay, the lower part is red clay loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

The altered Cecil soils are those covered by more than 20 inches of fill material or where more than two-thirds of the natural soil has been removed by digging and grading.

The Urban land part of this unit is covered with houses, paved streets (fig. 3), small shopping centers, factories, municipal buildings, apartment complexes, parking lots, schools, and churches.

Included in mapping are a few small areas of Appling, Iredell, Vance, and Wilkes soils. The Appling soils commonly are in the larger map units that have broad, smooth surfaces. The Vance soils are with this Cecil soil on the narrower ridges. The Iredell and Wilkes soils usually are together and are in areas where rock is close to the surface.

In disturbed areas of these Cecil soils, erosion is a hazard because of slope and runoff. Permeability is a limitation for septic tank absorption fields.

Onsite investigation for urban development is needed before planning the use and management of this unit.

This unit is not assigned to a capability subclass or to a woodland group.

Cw—Chewacla silt loam. This nearly level, somewhat poorly drained soil is on long, narrow flood plains. The mapped areas in the larger valleys range from 10 to

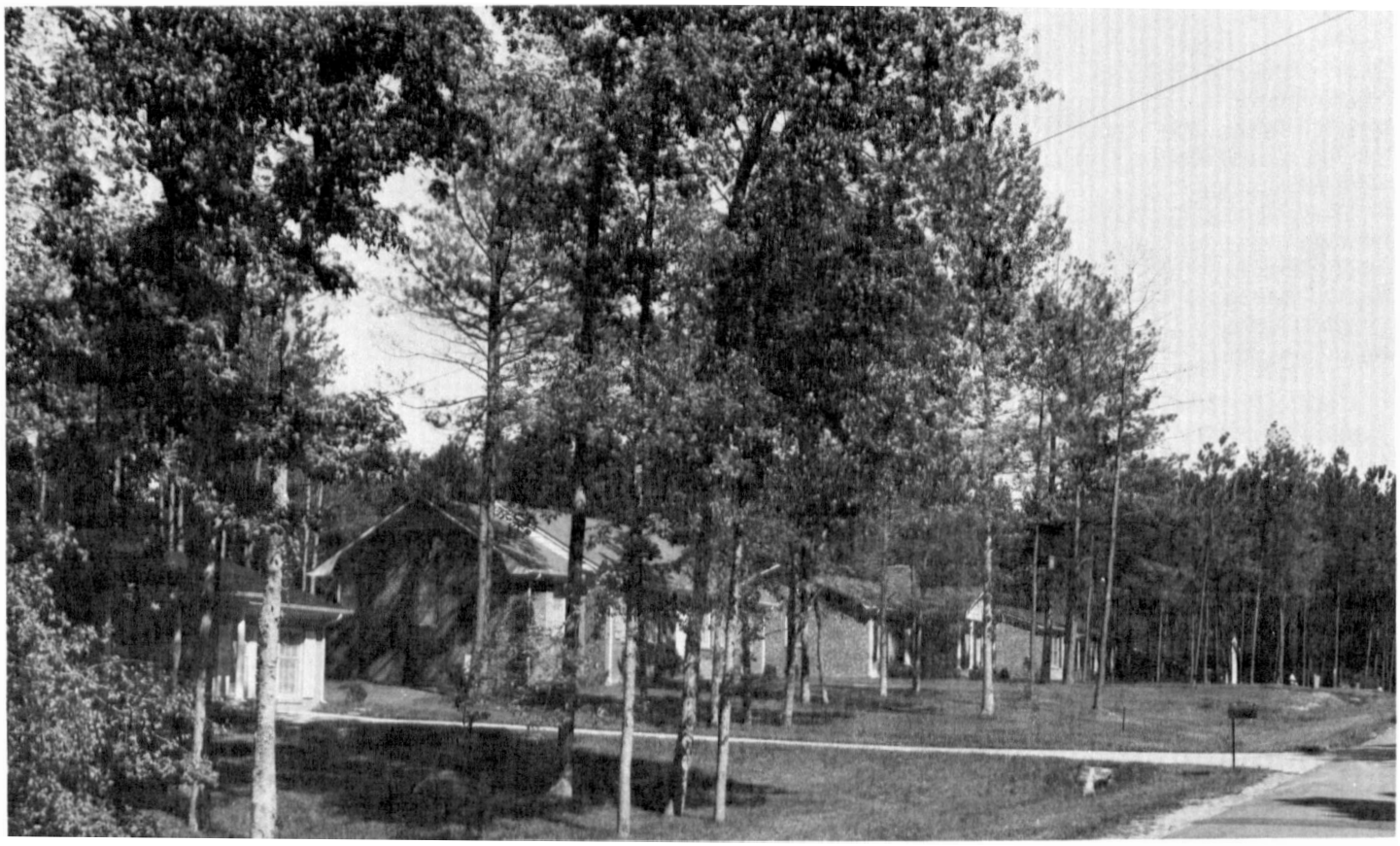


Figure 3.—Dwellings in an area of Cecil-Urban land complex, 2 to 10 percent slopes.

about 50 acres. In the smaller valleys, the areas seldom exceed 10 acres.

Typically, the surface layer is brown silt loam 11 inches thick. The subsoil is 60 inches or more in thickness. The upper part of the subsoil is dark brown loam, the middle part is brown loam and sandy loam, and the lower part is grayish brown loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is high, and shrink-swell potential is low. The subsoil ranges from very strongly acid to slightly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of about 1/2 foot to 1-1/2 feet late in winter and early in spring. This soil commonly is flooded for brief periods.

Included with this soil in mapping are a few small areas that have a sandy loam and loamy sand surface layer, some areas near stream channels that are better drained than Chewacla soils, and some depressional seep areas that have the poorly drained Wehadkee soils.

Most areas of this Chewacla soil are in woodland and pasture. The rest is in cropland, or is idle.

This soil has medium potential for such crops as small grain and soybeans. These crops, however, may be damaged by flooding. Tillage can be delayed in spring because of wetness. Drainage and flood prevention are needed for most uses. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Diversions, field borders, stripcropping, and crop rotations that include close-growing crops also help conserve soil and water. Lack of locations for suitable outlets limits drainage systems. Potential is high for hay and pasture forages. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

Potential is high for broad-leaved and needle-leaved trees. The dominant trees grown are yellow-poplar, sweetgum, willow oak, black oak, post oak, southern red oak, beech, birch, and loblolly pine. The main understory includes dogwood, red maple, and sourwood. Wetness is the main limitation for woodland use and management.

This soil has low potential for most urban and recreational uses because of wetness and flooding, which are difficult and costly to overcome.

This Chewacla soil is in capability subclass IVw and in woodland group 1w.

DuB—Durham loamy sand, 1 to 6 percent slopes. This well drained soil is on smooth uplands. The small areas are mainly oval in shape and range from 4 to 10 acres. The larger areas are mainly oblong, irregular in width, and range from 10 to about 100 acres.

Typically, the surface layer is grayish brown loamy sand 7 inches thick. The subsurface layer is pale brown loamy sand 4 inches thick. The subsoil is 62 inches or more in thickness. The upper part of the subsoil is yellowish brown sandy clay loam, the middle part is brownish yellow clay loam, and the lower part is mottled red, strong brown, pale yellow, and white sandy clay loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at a depth of 4 to 6 feet.

Included with this soil in mapping are small areas that have a sandy loam surface layer, a few eroded spots where the subsoil is exposed, and some small areas of Appling, Cecil, Vance, Helena, and Louisburg soils. These included soils are more common in the larger mapped areas. Typically, only one or two of these soils are in any given unit. The Appling, Cecil, and Vance soils commonly are on higher positions than this Durham soil. Cecil soils are red. Helena soils are at the head of and along the small surface drainageways. The Louisburg soils are in areas where bedrock is near the surface.

Most areas of this Durham soil are used for cultivated crops. Some are used for hay and pasture. The rest is in forest land.

This soil has high potential for tobacco, corn, soybeans, and small grain. It has high potential for horticultural crops, such as tomatoes, cucumbers, cantaloupes, sweet corn, green beans, butterbeans, sweet potatoes, and peas. Slope causing medium runoff is the main limitation in the use of this soil. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Maintaining drainageways in sod, contour farming, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help conserve soil and water. Potential is high for hay and pasture forages. Pasture management includes maintaining a protective cover on the soil to control runoff and help reduce erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are yellow-poplar, red maple, sweetgum, hickory, ash, sycamore, white oak, black oak, post oak, northern red oak, southern red oak, and loblolly pine. The understory includes dogwood, sourwood, holly, black cherry, and sassafras. There are no significant limitations for woodland use and management.

This soil has high potential for most urban uses. The moderate permeability and a seasonal perched water table are the main limitations. The recreational potential is medium.

This Durham soil is in capability subclass IIe and in woodland group 3o.

GeB—Georgeville silt loam, 2 to 8 percent slopes. This well drained soil is predominantly on the smooth ridges near Hicks Crossroads in the northwestern part of the county. The areas are oblong and are irregular in width. Typically, they range from 4 to 20 acres, but some areas range to about 500 acres.

Typically, the surface layer is brown silt loam 5 inches thick. The subsoil is 60 inches thick. The upper part of the subsoil is strong brown silty clay loam, the middle part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 78 inches is red loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is high, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some small areas that have a gravelly surface layer and a few small eroded areas. Also included are some small areas of Goldston and Nason soils. The Goldston soils have bedrock within about 2 feet of the surface. The Nason soils do not have the red colors typical for this Georgeville soil.

Most areas of this Georgeville soil are used for cultivated crops. The rest is in pasture and woodland.

This soil has high potential for corn, soybeans, tobacco, and small grain. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Maintaining drainageways in sod, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also help to conserve soil and water. This soil has high potential for hay and pasture forages, such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Pasture management includes maintaining protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for growing broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, sweetgum, hickory, maple, beech, ash, chestnut oak, and loblolly pine. The main understory includes dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no significant limitations for woodland use and management.

The potential for most urban uses is high to medium. The moderate permeability is a limitation for septic tank absorption fields. The recreational potential is dominantly high.

This Georgeville soil is in capability subclass IIe and in woodland group 3o.

GeD—Georgeville silt loam, 8 to 15 percent slopes. This well drained soil is on short side slopes adjacent to the more deeply entrenched drainageways. Most areas are narrow and oblong and are less than 20 acres.

Typically, the surface layer is brown silt loam 5 inches thick. The subsoil is 60 inches thick. The upper part of the subsoil is strong brown silty clay loam, the middle part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 78 inches is red loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is high, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some small areas that have a gravelly surface layer and a few small eroded areas. Also included are small areas of Goldston, Nason, and Tatum soils. Goldston and Nason soils usually are on higher positions than this Georgeville soil, and Goldston soils have bedrock about 2 feet below the surface. The Nason soils do not have the red colors typical for this Georgeville soil. Tatum soils are on the included slopes that are greater than 15 percent.

Most areas of this Georgeville soil are in woodland. The rest is in pasture and cropland.

This soil has medium potential for corn, soybeans, cotton, tobacco, and small grain. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Drainageways in sod, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also help in conserving soil and water. Potential is medium for hay and pasture forages such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, sweetgum, hickory, maple, beech, ash, chestnut oak, and loblolly pine. The main understory includes dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no significant limitations for woodland use and management.

The potential for most urban uses is medium because of slope and permeability. Permeability is a limitation for septic tank absorption fields. Erosion is a hazard if ground cover is removed. The recreational potential is medium because of slope.

This Georgeville soil is in capability subclass IVe and in woodland group 3o.

GoC—Goldston slaty silt loam, 4 to 10 percent slopes. This well drained soil is on narrow ridges and upper side slopes in the northwestern part of the county. Most areas are irregular in shape and range from 5 to 20 acres.

Typically, the surface layer is brown slaty silt loam 6 inches thick. The subsoil is light yellowish brown slaty silt loam 8 inches thick. The underlying material to a depth of 23 inches is mottled light yellowish brown and yellowish red silt loam.

The organic matter content of the surface layer is low. Permeability is moderately rapid, available water capacity is very low, and shrink-swell potential is low. The subsoil ranges from extremely acid to medium acid. Depth to hard bedrock is 20 to 40 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few areas where the slope is less than 4 percent. Also included are some small areas of Nason, Tatum, and Lignum soils. All of these soils are deeper to bedrock than this Goldston soil.

Most areas of this Goldston soil are in woodland and pasture.

This soil has low potential for crops. It is limited by slope and very low available water capacity. Potential is medium for hay and pasture forages, such as fescue, orchardgrass, and white clover. Erosion is a hazard if cultivated crops are grown. Minimum tillage and the use of cover crops—including grasses and legumes—reduce runoff and help control erosion. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderate potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, sweetgum, hickory, maple, beech, loblolly pine, shortleaf pine, and Virginia pine. The main understory includes holly, dogwood, sourwood, laurel, and hophornbeam. There are no significant limitations for the use and management of this soil for woodland.

The potential for most urban uses is low because of slope and depth to hard rock. Onsite evaluation and planning are needed if this soil is used for septic tank absorption fields, roads, or dwellings. Where practical, because of rock near the surface, sewer lines, gas lines, and other underground utility lines should be routed around these areas. Potential is medium for most recreational uses.

This Goldston soil is in capability subclass IVw and in woodland group 4o.

GoE—Goldston slaty silt loam, 10 to 40 percent slopes. This well drained soil is on the steeper side slopes adjacent to the more deeply entrenched drainageways in the northwestern part of the county. Most areas are in narrow bands, roughly rectangular in shape, and range from 5 to 20 acres; one unit is about 100 acres.

Typically, the surface layer is brown slaty silt loam 6 inches thick. The subsoil is light yellowish brown slaty silt loam 8 inches thick. The underlying material to a depth

of 23 inches is mottled light yellowish brown and yellowish red silt loam.

The organic matter content of the surface layer is low. Permeability is moderately rapid, available water capacity is very low, and shrink-swell potential is low. The subsoil ranges from extremely acid to medium acid. Depth to hard bedrock is 20 to 40 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few small areas of Nason, Tatum, and Wilkes soils that do not have the slate fragments common to this Goldston soil. Depth to bedrock is also greater for Nason and Tatum soils.

Most areas of this Goldston soil are in woodland and pasture.

This soil has low potential for cultivated crops. It is limited by slope, very low available water capacity, and surface runoff. It has medium potential for pasture forages, such as fescue, orchardgrass, and white clover. Pasture management includes maintaining a protective cover to reduce runoff and help control erosion.

This soil has moderate potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, sweetgum, hickory, maple, beech, loblolly pine, shortleaf pine, and Virginia pine. The main understory includes holly, dogwood, sourwood, laurel, and hophornbeam. Slope is the main limitation in the use and management of this soil for woodland.

The potential for most urban uses is low because of slope and depth to rock. Onsite evaluation and planning are needed if this soil is used for septic tank absorption fields, roads, or dwellings. Because of rock near the surface, sewer lines, gas lines, and other underground utility lines should be routed around these areas where practical. Potential is low for most recreational uses.

This Goldston soil is in capability subclass VIIs and in woodland group 4r.

HeB—Helena sandy loam, 2 to 8 percent slopes. This moderately well drained soil is on smooth ridges along the eastern side of John H. Kerr Reservoir and along the western part of the county. Most areas are irregular in shape and range from 5 to 20 acres.

Typically, the surface layer is grayish brown sandy loam 6 inches thick. The subsurface layer is pale brown sandy loam 4 inches thick. The subsoil is 22 inches thick. The upper part of the subsoil is light yellowish brown sandy clay loam, the middle part is yellowish brown sandy clay and clay, and the lower part is gray sandy clay loam. The underlying material to a depth of 53 inches is yellow and strong brown coarse sandy loam. Below that is moderately hard, light colored saprolite to a depth of 60 inches.

The organic matter content of the surface layer is low. Permeability is slow, available water capacity is medium, and shrink-swell potential is high. The subsoil is very strongly acid or strongly acid. Depth of bedrock ranges from 48 to 80 inches. The seasonal high water table is normally below 5 feet; because of the slowly permeable subsoil, a perched water table may occur 1 foot to 2-1/2 feet below the surface during wet seasons.

Included with this soil in mapping are small areas that have a gravelly surface layer and a few small eroded areas. Also included are small, wet, depressional areas around heads of or along drainageways and small areas of the well drained Appling and Vance soils.

Most areas of this Helena soil are used for crops and pasture. The rest is in woodland.

This soil has medium potential for tobacco, corn, milo, and small grain. The potential is medium for horticultural crops, such as tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas. Slope, permeability, and wetness are the main limitations. Minimizing tillage and leaving crop residue on the surface help control runoff and reduce erosion. Maintaining drainageways in sod, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also help to conserve soil and water. The potential for hay and pasture forages is medium for such plants as ladino clover, red clover, and sericea lespedeza. Pasture management includes maintaining an adequate protective cover to reduce runoff and control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant tree species are yellow poplar, white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, sweetgum, hickory, maple, blackjack oak, willow oak, cedar, chestnut oak, Virginia pine, loblolly pine, and shortleaf pine. The understory includes mainly dogwood, holly, sourwood, redbud, black cherry, and sassafras. Wetness is the main limitation for woodland use and management.

The potential for urban uses, such as houses and streets, is low because of slope, permeability, wetness, and shrink-swell potential. Potential is medium for recreational use.

This Helena soil is in capability subclass IIe and in woodland group 3w.

IrB—Iredell fine sandy loam, 2 to 8 percent slopes. This moderately well drained and somewhat poorly drained soil is on smooth ridges north of Henderson and in the southwestern part of the county. Individual areas are irregular in shape and are less than 25 acres.

Typically, the surface layer is grayish brown fine sandy loam 6 inches thick. The subsurface layer is gray fine sandy loam 3 inches thick. The subsoil is 23 inches thick. The upper part of the subsoil is olive brown clay and the lower part is light olive brown clay loam. The underlying material to a depth of 62 inches is mottled pale yellow, strong brown, greenish gray, and black loam.

The organic matter content of the surface layer is low. Permeability is slow, available water capacity is medium,

and shrink-swell potential is very high. The subsoil ranges from slightly acid to mildly alkaline. Depth to hard bedrock is more than 60 inches. The seasonal high water table is normally below 6 feet; because of a slowly permeable subsoil, a perched water table may occur about 1 foot to 2 feet below the surface during wet seasons.

Included with this soil in mapping are a few areas of soils that have a sandy loam or loam surface layer. Also included are some small areas of the more acid Helena soils, the well drained Vance and Wilkes soils, and other unnamed clayey soils that have a strong brown subsoil. Helena soils are on the smooth ridges, usually close to drainageways. Vance soils commonly are with Iredell soils on the narrow ridges. The Wilkes soils have slopes of more than 8 percent.

Most areas of this Iredell soil are in woodland. The rest is in pasture and cropland.

This soil has medium potential for row crops and pasture forages. Slow permeability and erosion are the main limitations in the use and management of this soil. Keeping tillage to a minimum, not tilling when the soil is wet, and returning crop residue help improve soil tilth, reduce runoff, and control erosion.

The potential for broad-leaved and needle-leaved trees is moderate. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, sweetgum, hickory, blackjack oak, willow oak, cedar, maple, and loblolly pine. The main understory includes dogwood, holly, and sassafras. A clayey subsoil is the main limitation for woodland use.

This soil has low potential for most urban uses because of shrink-swell potential, wetness, and permeability. Potential is medium or low for most recreational uses.

This Iredell soil is in capability subclass IIe and in woodland group 4c.

LgB—Lignum silt loam, 0 to 4 percent slopes. This moderately well drained and somewhat poorly drained soil is on smooth ridges, commonly where surface runoff is slow, and at the head of drainageways. The major areas are along the western edge of the county. They are irregular in shape and range from 3 to about 40 acres.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil is 20 inches thick. The upper part of the subsoil is olive yellow silt loam, the middle part is brownish yellow, light gray, yellow, and reddish yellow silty clay, and the lower part is mottled light gray, strong brown, and very pale brown silty clay loam. The underlying material to a depth of 48 inches is strong brown and light gray silt loam in the upper part and yellowish brown, gray, and white silt loam in the lower part.

The organic matter content of the surface layer is low. Permeability is slow, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to hard bedrock ranges from 40 to 72 inches. The seasonal high water table is normally below 5 feet; because of a slowly permeable subsoil, a perched water table is about 1 foot to 2-1/2 feet below the surface during wet seasons.

Included with this soil in mapping are some small areas of well drained Nason soils in higher elevations. Also included are some small areas of soils that have slopes of more than 4 percent, small eroded spots, and a few areas that have hard rock less than 40 inches below the surface.

Most areas of this Lignum soil are used for cultivated crops. The rest is in pasture and woodland.

This soil has high potential for corn, soybeans, tobacco, and small grain. Minimizing tillage and leaving crop residue on the surface help control runoff and erosion. Maintaining drainageways in sod, diversions, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Potential is high for hay and pasture forages. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, maple, hickory, cedar, willow oak, and blackjack oak. The main understory includes dogwood, sourwood, redbud, holly, and sassafras. Wetness is the main limitation in the use and management of this soil for woodland.

This soil has low potential for most urban uses. Permeability and wetness are the main limitations. This soil has medium potential for most recreational uses.

This Lignum soil is in capability subclass IIe and in woodland group 3w.

LoB—Louisburg loamy coarse sand, 2 to 8 percent slopes. This well drained to excessively drained soil is on narrow ridges or in smooth areas adjacent to steeper slopes. Areas of this soil are scattered throughout the more deeply dissected parts of the county. The mapped areas are 4 to 15 acres or more.

Typically, the surface layer is yellowish brown loamy coarse sand 7 inches thick. The subsurface layer is strong brown loamy coarse sand 4 inches thick. The subsoil is strong brown sandy loam 11 inches thick. The underlying material to a depth of 50 inches is red and strong brown coarse sandy loam.

The organic matter content of the surface layer is low. Permeability is rapid, available water capacity is very low, and shrink-swell potential is very low. The subsoil ranges from very strongly acid to medium acid. Depth to bedrock is more than 48 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas that have large boulders on the surface and areas where bedrock outcrops. Also included are small areas of Appling, Wedowee, and Durham soils, and Wilkes soils in some units.

Most areas of this Louisburg soil are in cropland and pasture. The rest is in woodland.

This soil has low potential for crops and pasture forages. Slope and surface runoff are the main limitations. Because of slope and shallowness over bedrock, intensive practices that effectively control runoff and erosion and add organic matter to the soil are needed in the cultivated areas. During rainy seasons, its coarse texture makes this soil subject to leaching of plant nutrients. When rainfall is limited, crops on this soil are among the first in the county to show moisture stress.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, yellow-poplar, sweetgum, maple, hickory, cedar, and loblolly pine. The understory includes mainly dogwood, holly, and sassafras. There are no significant limitations for woodland use and management.

The potential for urban and recreational uses is medium because of slope and depth to rock. Onsite investigation and planning are needed if this soil is used for septic tank filter fields, roads, or dwellings.

This Louisburg soil is in capability subclass IIIe and in woodland group 3o.

LoD—Louisburg loamy coarse sand, 8 to 15 percent slopes. This well drained to excessively drained soil is on side slopes adjacent to drainageways. Areas of this soil are scattered throughout the more deeply dissected parts of the county. The mapped areas are oblong in shape and are typically 5 to 20 acres. However, some areas may be 50 acres or more.

Typically, the surface layer is yellowish brown loamy coarse sand 7 inches thick. The subsurface layer is strong brown loamy coarse sand 4 inches thick. The subsoil is strong brown sandy loam 11 inches thick. The underlying material to a depth of 50 inches is red and strong brown coarse sandy loam.

The organic matter content of the surface layer is low. Permeability is rapid, available water capacity is very low, and shrink-swell potential is very low. The subsoil ranges from very strongly acid to medium acid. Depth to bedrock is more than 48 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some places where rock outcrops and large boulders are on the surface. Also included are some small areas of the Pacolet and Wedowee soils. The Wilkes soils are also present in some units.

Most areas of this Louisburg soil are in woodland. Some areas are in pasture, and a small acreage is in cropland.

This soil has low potential for crops and pasture forages. Because of slope, droughtiness, and shallowness over bedrock, this soil is better suited to permanent vegetation than to most other uses.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, yellow-poplar, sweetgum, maple, hickory, cedar, and loblolly pine. The understory includes mainly dogwood, holly, and sassafras. There are no significant limitations for woodland use and management.

The potential for urban and recreational uses is medium because of slope and depth to rock. Onsite investigation and planning are needed if this soil is used for septic tank filter fields, roads, or dwellings.

This Louisburg soil is in capability subclass VIe and in woodland group 3o.

LoE—Louisburg loamy coarse sand, 15 to 40 percent slopes. This well drained to excessively drained soil is on side slopes adjacent to the major drainageways. Areas of this soil are scattered throughout the more dissected parts of the county. Most areas are oblong, irregular in width, and are usually less than 40 acres.

Typically, the surface layer is yellowish brown loamy coarse sand 7 inches thick. The subsurface layer is strong brown loamy coarse sand 4 inches thick. The subsoil is strong brown sandy loam 11 inches thick. The underlying material to a depth of 50 inches is red and strong brown coarse sandy loam.

The organic matter content of the surface layer is low. Permeability is rapid, available water capacity is very low, and shrink-swell potential is very low. The subsoil ranges from very strongly acid to medium acid. Depth to bedrock is more than 48 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas of rock outcrop and areas that have boulders on the surface. Also included are small areas of the Pacolet, Wedowee, and Wilkes soils.

Most areas of this Louisburg soil are in woodland. Some are in pasture, and a small acreage is idle.

This soil has low potential for crops and pasture forages. Slope and surface runoff are the main limitations.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, yellow-poplar, sweetgum, maple, hickory, cedar, and loblolly pine. The understory includes mainly dogwood, redbud, holly, and sassafras. Slope and depth to rock are the main limitations for woodland use and management.

The potential for urban and recreational uses is low because of slope.

This Louisburg soil is in capability subclass VIIe and in woodland group 3r.

NaB—Nason gravelly silt loam, 2 to 8 percent slopes. This well drained soil is on smooth upland areas

in the northwestern part of the county. The mapped areas are typically less than 25 acres.

Typically, the surface layer is brown gravelly silt loam 6 inches thick. The subsoil is 26 inches thick. The upper part of the subsoil is yellowish brown silt loam, the middle part is strong brown silty clay loam, and the lower part is strong brown silt loam. The underlying material to a depth of 60 inches is strong brown silt loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to bedrock is 40 inches to more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some small areas that have a very fine sandy loam surface layer and a few small eroded areas where the subsoil is exposed at the surface. Also included are areas of Georgeville soils, areas of Goldston soils that have a high percentage of slate fragments in the subsoil, and areas of the wetter Lignum soils in slight depressions.

Most areas of this Nason soil are in cropland. The rest is in pasture and woodland.

This soil has high potential for corn, soybeans, tobacco, and small grain. Minimizing tillage and leaving crop residue on the surface help control runoff and reduce erosion. Maintaining drainageways in sod, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also help in conserving soil and water. Potential is high for hay and pasture forages, such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Pasture management includes maintaining a protective cover on the soil to help reduce runoff and control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, sweetgum, hickory, maple, beech, ash, chestnut oak, and loblolly pine. The main understory includes dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no significant limitations for woodland use and management.

The potential for most urban uses is medium because of permeability, shrink-swell potential, and depth to rock. This soil has medium potential for all recreational uses.

This Nason soil is in capability subclass IIe and in woodland group 3o.

NaD—Nason gravelly silt loam, 8 to 15 percent slopes. This well drained soil is on narrow side slopes adjacent to drainageways in the northwestern part of the county. The mapped areas are typically oblong, irregular in width, and are less than 25 acres.

Typically, the surface layer is brown gravelly silt loam 6 inches thick. The subsoil is 26 inches thick. The upper part of the subsoil is yellowish brown silt loam, the middle part is strong brown silty clay loam, and the lower part is strong brown silt loam. The underlying material to a depth of 60 inches is strong brown silt loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to bedrock ranges from 40 to more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some small areas that have a very fine sandy loam surface layer and a few small eroded areas. Also included are some small areas of Georgeville soils, Tatum soils, and Goldston soils, which have a high percentage of slate fragments in the subsoil.

Most areas of this Nason soil are in woodland. The rest is in pasture and cropland.

This soil has medium potential for corn, soybeans, tobacco, and small grain. Slope, surface runoff, and erosion are the main limitations. Minimizing tillage and leaving crop residue on the surface helps to control runoff and erosion. Maintaining sod drainageways, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also help in conserving soil and water. Potential is medium for hay and pasture forages, such as sericea lespedeza, red clover, white clover, fescue, and orchardgrass. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, sweetgum, hickory, maple, beech, ash, chestnut oak, and loblolly pine. The main understory includes dogwood, sourwood, redbud, holly, black cherry, and sassafras. There are no significant limitations for woodland use and management.

The potential for most urban and recreational uses is medium because of slope, shrink-swell potential, depth to rock, and permeability. Erosion is a hazard if ground cover is removed.

This Nason soil is in capability subclass IIIe and in woodland group 3o.

PaE—Pacolet sandy loam, 15 to 40 percent slopes. This well drained soil is on side slopes adjacent to streams scattered throughout the county. The mapped areas are typically oblong, irregular in width, and are less than 40 acres.

Typically, the surface layer is dark grayish brown sandy loam 5 inches thick. The subsoil is 22 inches thick. The upper part of the subsoil is yellowish red clay loam, the middle part is red clay, and the lower part is yellowish red loam. The underlying material to a depth of 60 inches is yellowish red sandy loam in the upper part and brownish yellow sandy loam in the lower part.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is low,

and shrink-swell potential is low. The subsoil ranges from very strongly acid to medium acid. Bedrock is below 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas that have a gravelly or sandy clay loam surface layer and small areas that contain a higher amount of mica in the subsoil than this Pacolet soil. Also included are Cecil and Tatum soils that have a thicker subsoil and the Louisburg and Wedowee soils.

Most areas of this Pacolet soil are in woodland. The rest is in pasture.

This soil has low potential for crops because of slope and erosion. Potential is low for hay and pasture forages. Pasture management includes maintaining a protective cover on the soil to reduce runoff and control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are northern red oak, southern red oak, white oak, post oak, maple, sweetgum, shortleaf pine, and Virginia pine. The dominant understory includes mainly dogwood, cedar, holly, sassafras, and black cherry. Slope is the main limitation in the use and management of this soil for woodland.

The potential for most urban and recreational uses is low because of slope.

This Pacolet soil is in capability subclass VIIe and in woodland group 3r.

Pt—Pits. Pits are miscellaneous land types consisting of areas where the original soil material, gravel, or rock has been removed. This unit is composed of the Greystone quarry, the tungsten mine, and borrow areas. The quarry and mine, in addition to being shown by the symbol Pt, are identified by name on the map sheets. All other Pt units are borrow areas.

The Greystone quarry, in the Greystone community, is an area where the upper layers of soil have been removed and the underlying rock has been quarried for use primarily as construction material. This area is an open excavation of varying depths up to 100 feet or more. The Greystone quarry is almost entirely void of vegetation. Some pine and cedar trees are around the top where the soil is exposed (fig. 4).

The tungsten mine, in the Townsville community, consists of several shaft openings that were used when extracting tungsten ore. Most of these shafts have sloughed off on the sides and are partly filled. A few small pines and cedar are around the openings.

Borrow areas have been excavated to depths ranging from 3 to about 25 feet, and the material has been used as fill material for construction. The exposed surface

Figure 4.—Quarry in an area of Pits.

consists mainly of decomposed rock. Most of the areas are graded, leveled, and seeded with grass. The areas range from 5 to about 40 acres.

These borrow areas support sparse plant growth. A few areas are naturally reseeded in wild grasses, weeds, and shortleaf and Virginia pines. Potential is low for plant growth because of low available water capacity and erodibility.

Included with this soil in mapping are small, relatively undisturbed areas that still contain the clayey subsoil and part of the loamy topsoil.

The potential of Pits for urban development is variable. Many areas are graded to the level of an adjoining roadway and have high potential for industrial or commercial development. Some areas are cut below the remaining original ground level and have low potential for urban development.

Recommendations for reclamation and use of these areas require onsite investigation.

These Pits are not assigned to a capability subclass or woodland group.

TaE—Tatum silt loam, 15 to 30 percent slopes. This well drained soil is on side slopes adjacent to some of the major drainageways, mainly in the northwestern part of the county. The mapped areas are commonly narrow and oblong and irregular in width. The areas range from 4 to about 75 acres, but areas of 10 to 30 acres are most common.

Typically, the surface layer is dark brown silt loam 1 inch thick. The subsurface layer is brown silt loam 4 inches thick. The subsoil is 30 inches thick. The upper part of the subsoil is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 50 inches is mottled red, yellowish red, pink, and yellowish brown silt loam.

The organic matter content of the surface layer is low. Permeability is moderate, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to bedrock ranges from 40 to more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas where the slopes are either less than 15 percent or slightly more than 30 percent. Georgeville and Nason soils are in areas where the slope is less than 15 percent, and the Goldston soils are where the slope is greater than 30 percent.

Most areas of this Tatum soil are in woodland and pasture.

This soil has low potential for row crops, hay, and pasture forages.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are yellow-poplar, hickory, maple, beech, chestnut oaks, loblolly pine, shortleaf pine, and Virginia pine. The main understory includes dogwood, redbud, holly, and sassafras. Slope is the main limitation for woodland use and management.

Potential is low for most urban and recreational uses because of slope. Erosion is a hazard when the vegetative cover is removed.

This Tatum soil is in capability subclass IVe and in woodland group 3r.

UL—Udorthents. This map unit consists of areas where soil has been altered by sanitary landfill operations. These are excavated areas consisting of deeply graded trenches that are backfilled with alternate layers of solid refuse and soil material. A cover of 2 to 3 feet of soil is on the surface. After the final cover is added, the surface ranges from nearly level to gently sloping. About 100 acres are mapped in the county. The composition of this unit is more variable than that of others in the county, but it has been controlled well enough to be interpreted for the expected use of the soils.

Included in areas of this unit in mapping are small areas of undisturbed soil.

These areas have low potential for plant growth. Most areas are seeded to grass or are planted to trees. Available water capacity is generally low. The erosion hazard is severe. Permanent vegetative cover is essential to protect these areas from erosion.

These areas are unsuitable for most building purposes because of subsidence and the danger of hazardous methane gas, which is produced by refuse in the landfill.

Recommendations for use and management require onsite investigation.

This unit is not assigned to a capability subclass or woodland group.

VaB—Vance sandy loam, 2 to 8 percent slopes. This well drained soil is on smooth ridges. Typically, areas are irregular in shape and range from 10 to 40 acres. The largest area, about 800 acres, is in the vicinity of Dabney.

Typically, the surface layer is yellowish brown sandy loam 8 inches thick. The subsoil is 32 inches thick. The upper part of the subsoil is yellowish red clay, and the lower part is yellowish red clay loam. The underlying material to a depth of 72 inches is reddish yellow saprolite that crushes to sandy clay loam in the upper part and yellow sandy loam in the lower part.

The organic matter content of the surface layer is low. Permeability is slow, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few small areas of soils that have a clay loam surface layer and areas where slopes are slightly greater than 8 percent. Also included in the large units are the less firm Appling soils and the wetter Helena soils at the heads of and along the small drainageways. Wedowee soils are common on the included slopes that exceed 8 percent.

Cecil soils are the most commonly included soil in the smaller units.

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

This soil has medium potential for tobacco, corn, cotton, milo, and small grain. Potential is medium for horticultural crops, such as tomatoes, sweet corn, green beans, and peas. Minimizing tillage and leaving crop residue on the surface help to control runoff and erosion. Maintaining drainageways in sod, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also help conserve soil and water. The potential for hay and pasture forages is medium for such plants as ladino clover, red clover, fescue, and sericea lespedeza (fig. 5). Pasture management helps maintain a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, blackjack oak, cedar, maple, hickory, loblolly pine, shortleaf pine, and Virginia pine. The understory includes mainly dogwood, holly, and sassafras. There are no significant limitations in the use and management of this soil for woodland.

The potential for urban uses, such as houses and streets, is low because of permeability and shrink-swell potential. Potential is high to medium for recreational uses.

This Vance soil is in capability subclass IIIe and in woodland group 3o.

WeD—Wedowee sandy loam, 8 to 15 percent slopes. This well drained soil is on side slopes. It is extensive, and areas are scattered throughout the county. Most areas are adjacent to or include a major drainageway. They are oblong and are irregular in width. Typically, areas are 15 to 40 acres, but some are more than 100 acres.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil is 21 inches thick. The upper part of the subsoil is yellowish red sandy clay, and the lower part is yellowish red sandy clay loam. The underlying material to a depth of 99 inches is mottled yellowish red, reddish yellow, and pale brown sandy loam.

The organic matter content of the surface layer is low. Permeability is moderately slow, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is

Figure 5.—Ladino clover and fescue pasture on Vance sandy loam, 2 to 8 percent slopes.

more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are small areas of Cecil, Pacolet, Vance, and Louisburg soils. The occurrence of these soils depends mainly on whether or not they are also the principal adjacent soil. This Wedowee soil does not have the reddish colors common to Cecil, Pacolet, and Vance soils. The included areas of Louisburg soil are where bedrock is near the surface. Also included are small areas of soils that have stones on the surface.

Most areas of this Wedowee soil are in woodland or pasture. The rest is in cropland.

This soil has low potential for row crops because of slope, surface runoff, and erosion. The potential for hay and pasture forages is medium for such plants as ladino clover, red clover, and sericea lespedeza. Pasture management helps maintain a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderately high potential for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, maple, ash, hickory, loblolly pine, shortleaf pine, and Virginia pine. The main understory includes dogwood, sourwood, redbud, holly, sumac, hophornbeam, black cherry and sassafras. There are no significant limitations for woodland use and management.

This soil has medium potential for most urban uses. Slope and permeability are the main limitations. Erosion is a hazard if vegetative cover is removed. Potential is medium for most recreational uses.

This Wedowee soil is in capability unit IVe and in woodland group 3o.

WeE—Wedowee sandy loam, 15 to 40 percent slopes. This well drained soil is on steep side slopes adjacent to some of the major drainageways scattered throughout the county. The mapped areas are oblong and are irregular in width. Typical areas range from about 20 to 50 acres.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil is 21 inches thick. The upper part of the subsoil is yellowish red sandy clay, and the lower part is yellowish red sandy clay loam. The underlying material to a depth of 72 inches is mottled yellowish red, reddish yellow, and pale brown sandy loam.

The organic matter content of the surface layer is low. Permeability is moderately slow, available water capacity is medium, and shrink-swell potential is low. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are some small areas of Louisburg, Pacolet, and Wilkes soils. The occurrence of these soils depends mainly on whether or not they are also the principal adjacent soil. This Wedowee soil does not have the reddish color of Pacolet soils. The included areas of Wilkes and Louisburg soils are where bedrock is near the surface.

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

This soil has low potential for row crops because of slope and erosion. The potential for hay and pasture forages is medium for such plants as ladino clover, red clover, and sericea lespedeza. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

Potential is moderately high for broad-leaved and needle-leaved trees. The dominant trees are white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow-poplar, maple, ash, hickory, loblolly pine, shortleaf pine, and Virginia pine. The main understory includes dogwood, sourwood, redbud, holly, sumac, hophornbeam, black cherry, and sassafras. Slope is the main limitation in the use and management of this soil for woodland.

This soil has low potential for most urban and recreational uses because of slope.

This Wedowee soil is in capability subclass VIIe and in woodland group 3r.

Wh—Wehadkee silt loam. This nearly level, poorly drained soil is on the dominant flood plains. It is in the wet valley areas along many of the streams. Most areas are narrow, averaging about 300 feet in width. They extend for considerable distances along the stream. The mapped areas range from 4 to 40 acres or more.

Typically, the surface layer is dark grayish brown silt loam 10 inches thick. The underlying material to a depth of 60 inches is dark gray silty clay loam in the upper part, dark gray loam in the middle part, and dark gray sand and silt in the lower part.

The organic matter content of the surface layer is medium. Permeability is moderate, available water capacity is medium, and shrink-swell potential is low. The subsoil ranges from very strongly acid to slightly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at the surface or within a depth of 2-1/2 feet in wet periods. This soil is commonly flooded for brief periods.

Included with this soil in mapping are a few small areas of soils that have loam or fine sandy loam surface and subsurface layers. Also included are a few small areas of Chewacla and Worsham soils. The Chewacla soils are on the wider flood plains near the stream channels where drainage is better. The Worsham soils are at the base of the steeper adjacent slopes around heads of tributaries that join the flood plain.

Most areas of this Wehadkee soil are in woodland. The rest is in pasture.

This soil has low potential for crops and pasture because of wetness and flooding. Lack of suitable outlets limits the use of drainage systems. The potential is high for pasture forages, such as fescue and ladino clover, if the soil is drained and protected from flooding.

This soil has high potential for broad-leaved and needle-leaved trees. The dominant trees are sweetgum, yellow-poplar, willow oak, water oak, ash, and loblolly pine. The understory includes mainly cottonwood, sourwood, and alders. Wetness and flooding are the main limitations for woodland use and management.

Potential is low for most urban and recreational uses because of wetness and flooding.

This Wehadkee soil is in capability subclass VIw and in woodland group lw.

WkC—Wilkes sandy loam, 4 to 10 percent slopes. This well drained soil is on narrow ridges and upper side slopes in some of the more deeply dissected parts of the county. Principal areas are slightly north and west of Henderson and in the southern part of the county. The typical area is oblong, narrow in width, and averages about 15 acres.

Typically, the surface layer is grayish brown sandy loam 4 inches thick. The subsoil is 12 inches thick. The upper part of the subsoil is strong brown clay, and the lower part is strong brown and yellowish red clay loam. The underlying material to a depth of 42 inches is yellowish brown loam.

The organic matter content of the surface layer is low. Permeability is moderately slow, available water capacity is very low, and shrink-swell potential is moderate. The subsoil ranges from medium acid to mildly alkaline. Depth to bedrock is more than 40 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few areas of soils that have more than 10 percent slopes, a few small areas that have a fine sandy loam or loam surface layer, and a few small areas that have rock outcrops or cobbles on the surface. Also included are some small areas of the slightly wetter Helena soils, along the small drainageways, and the Iredell, Vance, and Louisburg soils, which are deeper to bedrock than the Wilkes soils. The occurrence of these included soils depends in part on whether or not they are also the adjacent soil.

Most areas of this Wilkes soil are in woodland. A small acreage is used for cultivated crops or pasture.

This soil has low potential for row crops. The potential for hay and pasture forages is medium for such plants as ladino clover, red clover, and sericea lespedeza. Pasture management includes maintaining a protective cover to reduce runoff and help control erosion.

This soil has moderate potential for needle-leaved trees. The dominant trees are loblolly pine, shortleaf pine, and Virginia pine. The understory includes mainly dogwood, holly, redcedar, sourwood, black cherry, and sassafras. There are no significant limitations for woodland use and management.

The potential for most urban uses is medium to low because of depth to rock. Potential is medium for most recreational uses.

This Wilkes soil is in capability subclass IVe and in woodland group 4o.

WkE—Wilkes sandy loam, 10 to 40 percent slopes. This well drained soil is on steeper side slopes adjacent to some of the major drainageways scattered throughout the county. A typical area is oblong and about 20 to 40 acres. However, some areas are more than 100 acres.

Typically, the surface layer is grayish brown sandy loam 4 inches thick. The subsoil is 12 inches thick. The upper part of the subsoil is strong brown clay, and the lower part is strong brown and yellowish red clay loam. The underlying material to a depth of 42 inches is yellowish brown loam.

The organic matter content of the surface layer is low. Permeability is moderately slow, available water capacity is very low, and shrink-swell potential is moderate. The subsoil ranges from medium acid to mildly alkaline. Depth to bedrock is more than 40 inches. The seasonal high water table is below 6 feet.

Included with this soil in mapping are a few areas of soils that have a loam surface layer and some small areas of rock outcrops. Also included are some small areas of Louisburg, Pacolet, and Wedowee soils. These soils are on the smoother side slopes and in transitional areas adjacent to the Wilkes soils.

Most areas of this Wilkes soil are in woodland. The rest is in pasture.

This soil has low potential for row crops. The potential for hay and pasture forages is low. Pasture management includes maintaining a protective cover on the soil to reduce runoff and help control erosion.

This soil has moderate potential for needle-leaved trees. The dominant trees are loblolly pine, shortleaf pine, and Virginia pine. The understory includes mainly dogwood, redcedar, holly, sourwood, black cherry, and sassafras. Slope is the main limitation in the use and management of this soil for woodland.

The potential for most urban and recreational uses is low because of slope and depth to rock.

This Wilkes soil is in capability subclass VIIe and in woodland group 4r.

WoA—Worsham loam, 0 to 2 percent slopes. This poorly drained soil is of minor extent. It is at the head of drainageways, at the base of slopes subject to seepage from higher lying uplands, and in slight depressional areas. The mapped areas are 4 to 10 acres or more.

Typically, the surface layer is black loam 8 inches thick. The subsoil is 37 inches thick. The upper part of the subsoil is gray sandy clay, and the lower part is gray sandy clay loam. The underlying material to a depth of 50 inches is light gray sandy loam.

The organic matter content is medium. Permeability is slow, available water capacity is medium, and shrink-swell potential is moderate. The subsoil is very strongly acid or strongly acid. Depth to bedrock is more than 60 inches. The seasonal high water table is at or near the surface.

Included with this soil in mapping are a few small areas of soils that are better drained than this Worsham soil and a few small areas of Wehadkee soils that join the Worsham soils at the base of slopes.

Most areas of the Worsham soil are in woodland. Some areas are used for pasture or cultivated crops.

This soil has low potential for crops and pasture because of wetness. If drained, the soil has medium potential.

This soil has high potential for broad-leaved and needle-leaved trees. The dominant trees are blackgum, shortleaf pine, Virginia pine, loblolly pine, pin oak, sweetgum, yellow-poplar, and willow oak. The understory includes mainly elm, sourwood, and alders. Wetness is the main limitation.

Potential is low for most urban and recreational uses because of wetness and permeability.

This Worsham soil is in capability subclass Vw and in woodland group 2w.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the county. 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 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 county. 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

Foy D. Hendrix, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the county, 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.

More than 50,000 acres in the county was used for crops and pasture, according to the 1971 Conservation Needs Inventory (*3*). Of this total, 5,955 acres was used for permanent pasture; 26,449 acres for row crops, mainly corn, tobacco, and soybeans; 5,759 acres for close-growing crops, mainly wheat; and 1,172 acres for rotation hay and pasture. The rest was idle cropland, in conservation use, or in other miscellaneous uses.

Typically, Vance County farmers use the best soils for growing the high cash crop, tobacco.

Well drained, nearly level to gently sloping soils that have sandy loam and loamy sand topsoil are used primarily in the production of tobacco whenever possible. The soils most commonly used include Appling, Cecil, and Durham soils.

Large acreages of corn and soybeans are grown on Vance County's soils (fig. 6). These crops are planted on the broad flats around the Gillburg and Greystone communities; the rolling to moderately steep soils around Williamsboro, Townsville, and Dabney communities; and the rolling to steep soils around Watkins and Kittrell communities.

Wheat and other small grain crops are planted primarily for winter cover crops. Where wheat is grown for grain, soybeans usually follow late in spring or early in summer.

Common pasture plants in Vance County are mainly fescue and clover.

The soils in Vance County have good potential for increased production of food. About 15,000 acres of potentially good cropland is currently used as woodland, and about 1,800 acres is pasture. In addition to the reserve production capacity represented by this land, food production could also be increased considerably by extending the latest crop production technology to all cropland in the survey area. This soil survey can help facilitate the application of such technology.

Figure 6.—Corn silage being harvested on Cecil sandy clay loam, 2 to 8 percent slopes, eroded.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development.

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

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Cecil, Vance, and Iredell soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, such as bedrock in Wilkes and Goldston soils. Erosion also reduces productivity on soils that tend to be droughty, such as Louisburg loamy coarse sand. Second, soil erosion on farmland results in sedimentation of 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.

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

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

Slopes are so short and irregular that contour tillage or terracing is not practical in some areas. In these areas, a cropping system that provides substantial vegetative cover is required to control erosion unless minimum tillage is practiced. Minimizing tillage and leaving crop residue on the surface help increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the county, but they are more difficult to use successfully on eroded soils. No-tillage for corn, which is common on an increasing acreage, is effective in reducing erosion on sloping land and can be adapted to most soils in the county. No-tillage is difficult to use successfully on the soils that have a clayey surface layer.

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are not practical on deep, well drained soils that have regular slopes.

Contouring and contour stripcropping are widespread erosion control practices in the county. They are best adapted to soils that have smooth, uniform slopes.

Soil blowing is a hazard on the sandy Appling and Durham soils. Soil blowing can damage these soils if winds are strong and the soils are dry and bare of vegetation or surface mulch. Maintaining vegetative cover, surface mulch, or rough surfaces through proper tillage minimizes soil blowing on these soils.

Information for the design of erosion control practices for each kind of soil is contained in the technical guide, available in the local office of the Soil Conservation Service.

Soil drainage is the major management need on the poorly drained Wehadkee and somewhat poorly drained Chewacla soils when used for crops and pasture in the county area.

Unless artificially drained, the poorly drained Wehadkee soils are so wet that crops are damaged during most years.

Many soils on uplands are very strongly acid in their natural state. Applications of ground limestone are commonly required to raise the pH level sufficiently for good growth of alfalfa and other crops that grow only on nearly neutral soils. Available phosphorus and potash levels are naturally low in most of the soils. All additions of lime and fertilizer to the soil should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

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

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

The red Cecil soils are clayey, and tilth is a concern because of the sandy clay loam surface layer. If these soils are wet when plowed, they tend to be cloddy when dry and good seedbeds are difficult to prepare. Fall plowing on such soils generally results in good tilth in spring.

Field crops suited to the soils and climate of the county include many that are not now commonly grown. Corn, tobacco, and soybeans are the row crops. Grain sorghum, peanuts, potatoes, and similar crops can be grown if economic conditions are favorable.

Wheat is the common close-growing crop. Rye, barley, buckwheat, and oats could be grown, and grass seed could be produced from fescue.

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

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. In the survey area these are the Appling and Durham soils that have slopes of less than 8 percent, and they total about 42,510 acres. Crops can generally be planted and harvested earlier on all of these soils than on the other soils in the survey area.

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

Farming and other land uses are competing for large areas of the survey area. About 7,600 acres, or about 5 percent of the survey area, was urban or built-up land, according to the Conservation Needs Inventory. Much of this acreage was well suited to cropland. Each year additional land is being developed for urban uses.

In general, the soils in the survey area that are well suited to crops are also well suited to urban development. The data about specific soils in this soil survey can be used in planning future land use patterns. Potential productive capacity in farming should be weighed against soil limitations and potential for nonfarm development.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

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

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The 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 5 are grown in the county 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.

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 grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Edwin J. Young, state staff forester, Soil Conservation Service, helped prepare this section.

The potential vegetation of Vance County is depicted by A.W. Kuchler in a 1966 U.S. Geological Survey map as a forest of broad-leaved and needle-leaved trees consisting primarily of oaks, hickories, and southern pines. This was the composition of the virgin forest found by the early settlers, also.

Common trees in the forests of Vance County, varying by the site, are white oak, chestnut oak, southern red oak, black oak, sweetgum, red maple, blackgum, shortleaf pine, loblolly pine, Virginia pine, hickories, yellow-poplar, water oak, white oak, green ash, American elm, and persimmon.

The natural vegetation has been modified by man through cutting, burning, and clearing for agriculture. Today 54 percent, or 85,578 acres, of Vance County's land area is classified as woodland (fig. 7). The major forest type of this woodland area is loblolly-shortleaf pine (*6*). This type occupies 57 percent of the woodland area; oak-pine, 9 percent; oak-hickory, 26 percent; and oak-gum-cypress, 8 percent.

North Carolina's Conservation Needs Inventory (*3*) lists conservation treatment needs for Vance County's woodland. Approximately 25 percent of the woodland in Vance County requires establishment and reinforcement, and 55 percent requires timber stand improvement.

The potential for commercial timber is high. Approximately 5 percent of the woodland has a potential for producing 120 to 165 cubic feet per acre annually, 8 percent has a potential for producing 85 to 120 cubic feet per acre annually, and over 70 percent has a potential for producing 50 to 85 cubic feet per acre per year. The remaining percentage has a potential of less than 50 cubic feet per acre per year.

Vance County's woodlands have esthetic values and present habitats suitable for openland, woodland, and wetland wildlife.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops.

Figure 7.—Managed woodland on Appling sandy loam, 2 to 8 percent slopes.

Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) 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 common trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

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

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

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

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

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. Site index was calculated at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial woodlands.

recreation

Vance County has abundant natural features that have a high potential for development into outdoor recreation opportunities. The combination of a favorable climate, soil type, topography, wildlife, and the proximity of large populations of people provide excellent opportunities for outdoor recreation. The town of Henderson and John H. Kerr Reservior are centers of organized recreational activities for Vance County. Kerr Reservior has about 800 miles of shoreline and 50,000 acres of water on which facilities are available for boating, swimming, fishing, camping, and other outdoor recreational activities (fig. 8). The Kerr Reservior Commission has developed several picnic areas and many camping areas.

As both public and private recreational facilities are planned and implemented according to public demand, the information in this section relating soil type and its suitability for recreational use and development will be of value.

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. Suitability 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

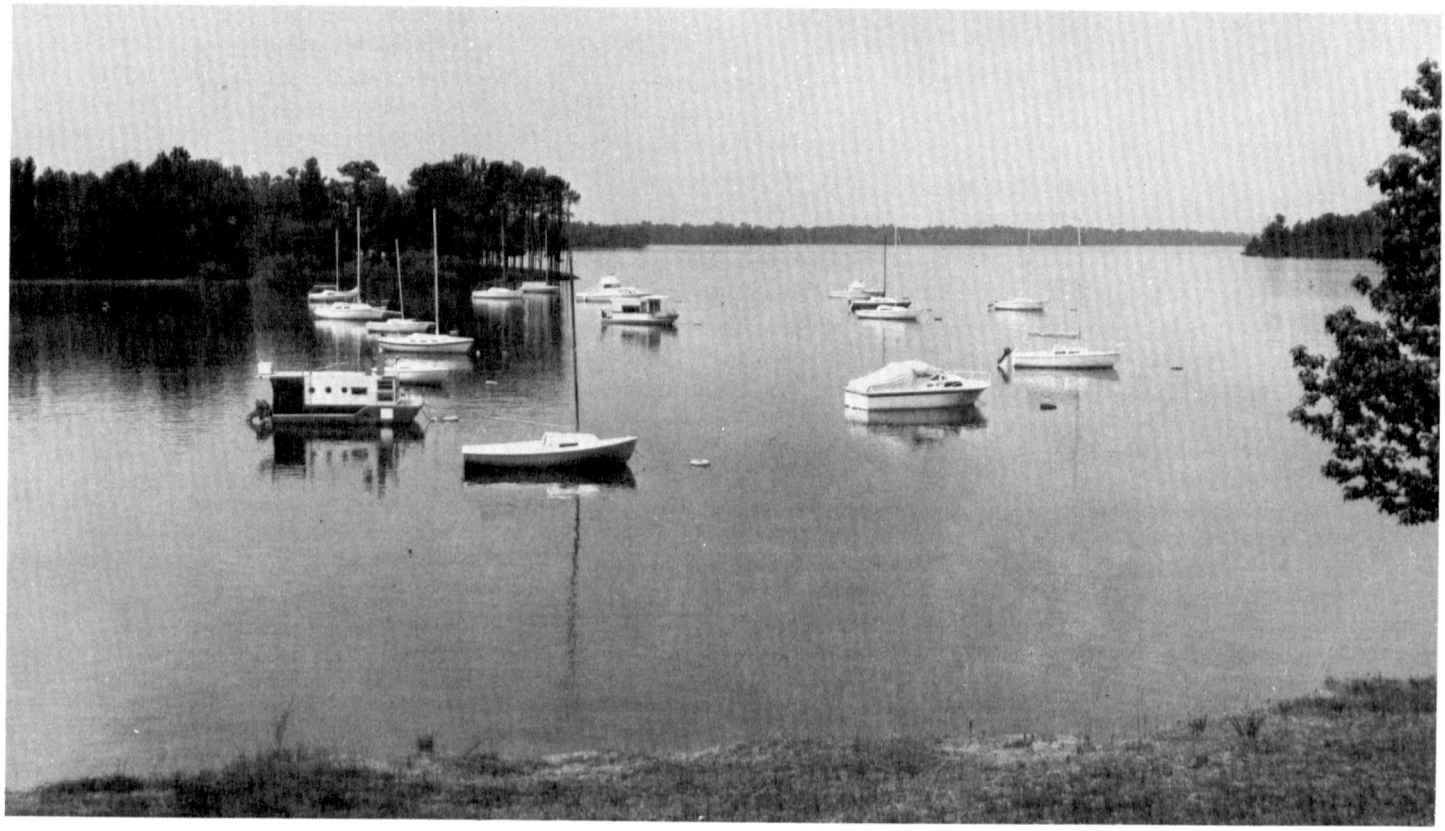


Figure 8.—Boats on John H. Kerr Reservoir that has over 50,000 acres for water recreation and wildlife habitat.

impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 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, horseback riding, and bicycling 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

John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

Vance County enjoys an abundance and a great variety of wildlife as a result of wildlife habitats supported by its soils. Wildlife habitats, with supporting vegetation, exist for openland, woodland, and wetland wildlife species. Openland wildlife species, such as mourning dove, quail, red fox, groundhog, rabbit, and many species of songbirds, are found throughout the county. Squirrel, gray fox, and white-tailed deer are examples of Vance County's abundant woodland wildlife. Although the amount of wetland wildlife habitat is more limited, some species, such as raccoon and beaver, are abundant. In winter, mallards, wood ducks, and black ducks are numerous along the Tar River and its tributaries. In spring and early in summer, these streams and the adjacent wetlands provide important nesting and brood areas for wood ducks.

The different kinds of wildlife are enjoyed by everyone. Vance County soils offer a high potential for more wildlife through good management as a result of its productive soils and the variety of wildlife habitats available.

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 established, 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, and sorghum.

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

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, and beggarweed.

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, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. 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 redcedar.

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, wild millet, rushes, and sedges.

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, waterfowl feeding areas, 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 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 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, herons, muskrat, mink, and beaver.

engineering

John F. Rice, assistant state conservation engineer, Soil Conservation Service, helped prepare this section.

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 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, large stones, 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, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, 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 the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 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 one or more 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, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. 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 caused by rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, 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, coarse 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 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

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 12 by ratings of *good, fair,* or *poor.* 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 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 *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

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

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by

depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

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 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 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. These results are reported in table 17.

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 a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

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

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

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

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. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

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 oven-dry 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 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 earth-moving 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 of the plow layer 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 a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

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

Frequency, duration, and probable month of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information 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 that form in 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 within a depth of about 6 feet, 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 or apparent; and the months that the water table commonly is high. 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. 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.

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 excavations.

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.

engineering index test data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*7*). 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. In table 18, the soils of the survey area are classified according to the system. 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* from Udic meaning not wet, but in a humid climate.

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

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

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. 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 fine-loamy, mixed, nonacid, mesic 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 (*5*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*7*). 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."

Appling series

The Appling series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on broad, smooth ridges. Slopes range from 2 to 10 percent.

Typical pedon of Appling sandy loam, 2 to 8 percent slopes, 0.8 mile northeast of Middleburg School on U.S. Highway 1, 200 yards southeast of U.S. Highway 1, and 50 feet north of farm road in a cultivated field:

Ap—0 to 10 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; common

fine roots; few medium and coarse quartz pebbles; slightly acid; abrupt smooth boundary.

B1—10 to 14 inches; yellowish brown (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, sticky and plastic; few fine roots; many fine and medium pores; thin patchy clay films on faces of peds; few fine quartz pebbles; strongly acid; clear wavy boundary.

B21t—14 to 25 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/8) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; common fine pores; thin distinct patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—25 to 35 inches; strong brown (7.5YR 5/6) clay; common medium and coarse distinct red (2.5YR 4/8) mottles; moderate fine and medium subangular blocky structure; firm, sticky and plastic; many fine and medium pores; thin distinct patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23t—35 to 42 inches; yellowish red (5YR 5/8) clay loam; common medium streaks of white (10YR 8/1) weathered minerals; weak medium platy parting to weak medium angular blocky structure; firm, sticky and slightly plastic; many fine and medium pores; thin patchy clay films on faces of peds; few fine flakes of mica, few pockets of clay; very strongly acid; gradual wavy boundary.

B3—42 to 48 inches; yellowish red (5YR 5/8) sandy clay loam; many coarse distinct reddish yellow (7.5YR 6/8) and red (2.5YR 5/8), few coarse distinct dark brown (7.5YR 4/4), and common medium prominent white (2.5Y 8/2) mottles; massive; friable, sticky and slightly plastic; few pockets of sandy loam; very strongly acid; gradual wavy boundary.

C—48 to 60 inches; yellowish red (5YR 5/6) saprolite that crushes to sandy loam; few medium distinct dark brown (7.5YR 4/4) and common medium prominent white (2.5Y 8/2) mottles; massive; very friable, slightly sticky and slightly plastic; very strongly acid.

The clayey Bt horizon ranges from 14 to 42 inches in thickness. Depth to bedrock is more than 60 inches. Few to common flakes of mica are in the lower part of most pedons. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. This horizon is sandy clay, clay loam, or clay. Transitional B1 and B3 horizons, where present, are similar in color to the B2 horizon. These are sandy clay loam or clay loam. Distinct to prominent strong brown, red, light gray, reddish yellow, dark brown, and white mottles are in the lower part of the B horizon of most pedons.

The C horizon is red, yellowish red, strong brown, yellowish brown, or pale brown saprolite that crushes to sandy loam of sandy clay loam.

Cecil series

The Cecil series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on narrow to broad ridgetops and sides of ridges. Slopes range from 2 to 15 percent.

Typical pedon of Cecil sandy clay loam, 2 to 8 percent slopes, eroded, on an upland ridgetop, 1 mile southwest of Williamsboro on State Road 1329 to Island Creek Baptist Church, 500 feet southwest of Island Creek Baptist Church, and 150 feet north of State Road 1329 in pine trees:

Ap—0 to 6 inches; brown (7.5YR 4/4) sandy clay loam; weak medium granular structure; very friable; many fine and medium roots; many fine pores; common medium fragments of angular quartz; slightly acid; abrupt smooth boundary.

B1—6 to 11 inches; yellowish red (5YR 4/6) sandy clay loam; few fine distinct red mottles; weak medium subangular blocky structure; friable; many fine and medium roots; many fine pores; common angular fragments of quartz; strongly acid; gradual wavy boundary.

B21t—11 to 34 inches; red (2.5YR 4/6) clay; few fine prominent yellowish brown mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; many fine pores; common distinct patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—34 to 52 inches; red (2.5YR 4/6) clay; common fine prominent yellowish brown mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; many fine pores; common distinct patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

B3—52 to 60 inches; red (2.5YR 4/6) clay loam; common fine prominent yellowish brown mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; many fine pores; few faint patchy clay films on faces of peds; common fine flakes of mica; very strongly acid.

Thickness of the clayey Bt horizon ranges from 24 to 44 inches. Depth to bedrock is more than 60 inches. Few to common fine flakes of mica are in the lower part of the B horizon in most pedons. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 or 4. Coarse fragments range up to 14 percent, by volume, in some pedons.

The B2t horizon has hue of 2.5YR and 10R, value of 4 or 5, and chroma of 6 to 8. Few to common fine prominent yellowish brown or brown mottles are in those in the Bt horizon in some pedons. The B3 horizon has colors similar to those in the Bt horizon. This horizon is clay loam or sandy clay loam.

The C horizon, if present, is red, yellowish red, or light yellowish brown saprolite that crushes to loam or clay loam.

Chewacla series

The Chewacla series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in recent alluvial sediment.

Typical pedon of Chewacla silt loam on a nearly level flood plain of Ruin Creek, 2 miles west on U.S. Highway 158 Bypass from junction of North Carolina Highway 39 and U.S. Highway 158 Bypass, 2.3 miles south on State Road 1128 to intersection with U.S. Highway 158 Business, 0.2 mile east on U.S. Highway 158 Business to intersection with State Road 1120, 0.1 mile south on State Road 1120, and 30 feet west of State Road 1120:

O1—1 inch to 0; undecomposed forest litter.

A1—0 to 11 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; common fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

B21—11 to 18 inches; dark brown (7.5YR 4/4) loam; common fine distinct reddish brown and common fine distinct brown mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine flakes of mica; few dark brown concretions; strongly acid, clear smooth boundary.

B22—18 to 31 inches; brown (10YR 5/3) loam; common medium distinct reddish brown (5YR 4/4) and common fine faint grayish brown mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine flakes of mica; few medium pockets of sand; common dark brown concretions; strongly acid; gradual wavy boundary.

B23—31 to 36 inches; brown (10YR 5/3) sandy loam; common medium distinct reddish brown (5YR 4/4) and common fine faint grayish brown mottles; weak fine subangular blocky structure; friable, sticky and slightly plastic; few medium roots; few fine flakes of mica; many dark brown concretions; strongly acid; gradual wavy boundary.

B31g—36 to 48 inches; grayish brown (10YR 5/2) loam; common medium distinct reddish brown (5YR 4/4) mottles; massive; friable, sticky and slightly plastic; few fine flakes of mica; many dark brown concretions; strongly acid; gradual wavy boundary.

B32g—48 to 60 inches; grayish brown (10YR 5/2) loam; common fine faint very dark gray mottles; massive; friable, sticky and slightly plastic; few fine flakes of mica; many dark brown concretions; strongly acid.

The loamy sediment ranges from 40 to 60 inches or more in thickness. Depth to bedrock is more than 60 inches. Flakes of mica range from few to common throughout most pedons. The reaction of the subsoil ranges from very strongly acid to slightly acid.

The A horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 2 to 4.

The B horizon has hue of 7.5YR and 10YR, value of 4 to 6, and chroma of 2 to 4. Brown, yellowish brown, grayish brown, and reddish brown mottles are throughout the B horizon, and gray mottles are in the lower part. Dark brown concretions occur in the B horizon of most pedons. The B horizon is loam, sandy loam, silt loam, or clay loam.

The C horizon, where present, is mottled gray, brown, yellowish brown, reddish brown, and pale brown loam or sandy loam alluvial sediment. Some pedons contain few to common amounts of gravel in the C horizon.

Durham series

The Durham series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on broad, smooth to gently sloping ridges. Slopes range from 1 to 6 percent.

Typical pedon of Durham loamy sand, 1 to 6 percent slopes, 2.25 miles northeast of Vance County High School on U.S. Highway 1 Business, and 0.4 mile east of U.S. Highway 1 Business on farm road in field near railroad:

Ap—0 to 7 inches; grayish brown (10YR 5/2) loamy sand; weak medium granular structure; very friable; few medium quartz pebbles; medium acid; abrupt smooth boundary.

A2—7 to 11 inches; pale brown (10YR 6/3) loamy sand; weak medium granular structure; very friable; few medium quartz pebbles; medium acid; clear wavy boundary.

B1—11 to 16 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine quartz pebbles; strongly acid; clear wavy boundary.

B21t—16 to 22 inches; brownish yellow (10YR 6/6) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine quartz pebbles; few faint patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B22t—22 to 32 inches; brownish yellow (10YR 6/6) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine quartz pebbles; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

B23t—32 to 40 inches; brownish yellow (10YR 6/6) clay loam; common medium distinct light yellowish brown (2.5Y 6/4) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine quartz pebbles; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

B24t—40 to 49 inches; mottled strong brown (7.5YR 5/6), red (2.5YR 4/6), light yellowish brown (2.5Y 6/4), and light brownish gray (2.5Y 6/2) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine quartz pebbles; very strongly acid; gradual wavy boundary.

B3—49 to 62 inches; mottled strong brown (7.5YR 5/6), red (2.5YR 4/6), pale yellow (2.5Y 8/4), and white (2.5Y 8/2) sandy loam; platy parting to weak medium subangular blocky structure; friable; few fine quartz pebbles; few bodies of sandy clay loam; few fine flakes of mica; about 50 percent saprolite; very strongly acid.

Thickness of the loamy Bt horizon ranges from 24 to 48 inches or more. Bedrock is below 60 inches. The subsoil is very strongly acid or strongly acid. Coarse fragments range from 0 to 5 percent throughout.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Faint to prominent red, brown, and gray mottles are in the lower B horizon of some pedons. This horizon is sandy clay loam or clay loam.

The B3 horizon is mottled red, strong brown, pale yellow, or white. This horizon is sandy clay loam or sandy loam. Gray mottles are common in some pedons. The B3 horizon contains some saprolite in most pedons.

Georgeville series

The Georgeville series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from fine grained rocks, such as slate and phyllite. They are on broad ridgetops and sides of ridges. Slopes range from 2 to 15 percent.

A typical pedon of Georgeville silt loam, 2 to 8 percent slopes, 9 miles north on North Carolina Highway 39 from U.S. Highway 158 Bypass at Henderson, 3 miles northwest on State Road 1342 to Marrows Chapel, and 50 feet north of State Road 1342 in woods:

O2—1/2 inch to 0; partly decomposed leaves and woods litter.

A1—0 to 1 inch; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; many fine and medium roots; few medium quartz pebbles; medium acid; abrupt smooth boundary.

A21—1 to 5 inches; brown (7.5YR 5/4) silt loam; weak fine and medium granular structure; very friable; many fine, medium, and large roots; few medium quartz pebbles; medium acid; abrupt smooth boundary.

B1—5 to 7 inches; strong brown (7.5YR 5/8) silty clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; many fine and medium roots; many fine and medium pores; strongly acid; clear smooth boundary.

B21t—7 to 30 inches; red (2.5YR 4/8) silty clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common fine and medium pores; thin distinct continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—30 to 50 inches; red (2.5YR 4/8) silty clay; few fine distinct strong brown mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine and medium pores; thin distinct continuous clay films on faces of peds; strongly acid; diffuse irregular boundary.

B3—50 to 65 inches; red (2.5YR 5/8) silty clay loam; few medium faint reddish yellow (5YR 6/8) mottles which increase with depth, few fine prominent white mottles; weak medium subangular blocky structure; friable, sticky and plastic; common fine and medium pores; thin patchy clay films on faces of peds; strongly acid; diffuse irregular boundary.

C—65 to 78 inches; red (2.5YR 5/8) saprolite of slate that crushes to loam; many medium distinct brownish yellow (10YR 6/8) and common fine pink mottles; weak coarse platy structure; very friable, slightly sticky and slightly plastic; common fine pores; strongly acid.

The clayey Bt horizon ranges from 24 to 48 inches in thickness. Depth to bedrock is more than 60 inches. Coarse fragments range from 0 to 15 percent in the surface layer. The subsoil is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR and 10YR, value of 4 or 5, and chroma of 2 to 4. The A2 horizon, where present, has hue of 7.5YR and 10YR, value of 5 or 6, and chroma of 3 or 4.

The B1 horizon has hue of 7.5YR and 5YR, value of 4 or 5, and chroma of 4 to 8.

The B2t horizon has hue of 10R and 2.5YR, value of 4 or 5, and chroma of 6 to 8. This horizon is silty clay or clay. The B3 horizon is silty clay loam or silt loam.

The C horizon is red or brownish yellow saprolite of slate that crushes to silt loam or loam.

Goldston series

The Goldston series consists of shallow, well drained, moderately rapidly permeable soils on the Piedmont

Upland. These soils formed in residuum weathered from fine grained slate rock and contain more than 35 percent slate fragments. They are on narrow, rolling ridges and side slopes next to drainageways. Slopes range from 4 to 40 percent.

Typical pedon of Goldston slaty silt loam, 4 to 10 percent slopes, on an upland ridge, 1.6 miles north of Williamsboro on North Carolina Highway 39, 2.8 miles northwest on State Road 1341, 0.4 mile southwest on State Road 1303, 0.4 mile northwest on farm road, and 200 yards north of road in woods:

A1—0 to 6 inches; brown (10YR 5/3) slaty silt loam; weak medium granular structure; very friable; many fine and medium roots; 15 to 20 percent fragments of slate; very strongly acid; clear wavy boundary.

B—6 to 14 inches; light yellowish brown (2.5Y 6/4) slaty silt loam; weak medium subangular blocky structure; friable; few fine roots; 40 percent fragments of slate that are red, gray, green, and black; very strongly acid; gradual wavy boundary.

Cr—14 to 23 inches; mottled light yellowish brown (2.5Y 6/4) and yellowish red (5YR 5/8) saprolite that crushes to silt loam; massive; friable; few fine roots between fragments of slate; 70 percent fragments of slate that are 1 to 4 inches when broken up; very strongly acid; gradual wavy boundary.

R—23 inches; red, gray, green, brown, and black fine-grained, fractured slate rock.

The loamy horizons high in content of slate range from 10 to 20 inches in depth over slaty saprolite. Depth to hard bedrock ranges from 20 to 40 inches. Slate fragments range up to 20 percent of the A horizon and from 40 to 75 percent of the B horizon. The B horizon ranges from extremely acid to medium acid.

The Ap or A1 horizon has hue of 10YR and 2.5Y, value of 4 or 5, and chroma of 1 to 3.

The B horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 4 to 6. Faint to prominent mottles of strong brown, yellowish brown, and red are in some pedons. Thin discontinuous bands of silty clay loam similar in color to the B horizon are in 35 to 50 percent of most pedons.

The Cr horizon is light gray, yellowish red, red, yellowish brown, or mottled slaty saprolite that has slate fragments making up more than 50 percent, by volume.

Helena series

The Helena series consists of moderately well drained, slowly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from mixed acidic and basic crystalline rock. They are on broad, smooth ridges. Slopes range from 2 to 8 percent.

Typical pedon of Helena sandy loam, 2 to 8 percent slopes, from intersection of U.S. Highway 158 Bypass and State Road 1303, 1.6 miles north on State Road 1303, north 0.3 mile on State Road 1326 from intersection of State Road 1303 and State Road 1326, east 0.2 mile on farm road, and 20 feet north of farm road in pine forest:

Ap—0 to 6 inches; grayish brown (10YR 5/2) sandy loam; weak medium granular structure; very friable; common fine medium and large roots; strongly acid; clear smooth boundary.

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

B1—10 to 14 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; few fine faint yellowish brown mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; many medium and large pores; strongly acid; clear wavy boundary.

B21t—14 to 20 inches; yellowish brown (10YR 5/8) sandy clay; many medium prominent pale brown (10YR 6/3) and few medium distinct strong brown (7.5YR 5/6) mottles; common fingers of very pale brown (10YR 7/3) sandy loam extend to about 18 inches below the surface of the soil; moderate medium and coarse subangular blocky structure; firm, sticky and plastic; few medium roots; common fine and medium pores; thin distinct patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—20 to 28 inches; yellowish brown (10YR 5/8) clay; common coarse prominent gray (10YR 6/l) mottles; weak coarse prismatic parting to weak coarse angular blocky structure; very firm, very sticky and very plastic; few medium roots; mainly between primary structural aggregates; few fine pores; thick distinct continuous clay films on faces of peds and on walls of old root channels; very strongly acid; gradual wavy boundary.

B3—28 to 32 inches; gray (10YR 6/1) sandy clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; massive; firm, sticky and slightly plastic; few medium roots; common medium pores; common white fragments of minerals; very strongly acid; gradual wavy boundary.

C—32 to 53 inches; yellow (10YR 7/6) and strong brown (7.5YR 5/8) saprolite that crushes to coarse sandy loam; common coarse prominent light brownish gray (10YR 6/2) pockets of sandy clay loam; massive; firm; few fine roots; common fine pores; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cr—53 to 60 inches; light gray saprolite that crushes to sandy loam; massive; moderately hard, can be cut with difficulty with spade; very strongly acid.

Thickness of the Bt horizon ranges from 12 to 25 inches. Depth to bedrock ranges from 48 to 80 inches. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The A2 horizon, where present, has hue of 10YR or 5Y, value of 5 to 7, and chroma of 3 or 4.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8.

The B2t horizon has hue of 10YR and 7.5YR, value of 5 or 6, and chroma of 4 to 8. Faint to prominent mottles of strong brown, pale brown, red, and gray are in the B2t horizon of most pedons. The B2t horizon is clay or sandy clay.

The B3 horizon is mottled with colors similar to those in the B2t horizon, and it also includes gray and white. The B3 horizon is sandy clay loam or clay loam.

The C horizon is brownish yellow, white, light gray, yellowish red, yellow, light yellowish brown, and strong brown saprolite that crushes to sandy loam. In some pedons, this horizon has pockets of gray clay loam.

Iredell series

The Iredell series consists of moderately well drained or somewhat poorly drained, slowly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from basic crystalline rock high in ferromagnesium minerals. They are on broad ridges. Slopes range from 2 to 8 percent.

Typical pedon of Iredell fine sandy loam, 2 to 8 percent slopes, 1.5 miles north of Henderson on North Carolina Highway 39, 200 yards west of North Carolina Highway 39, 15 feet north of county road:

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam; moderate medium granular structure; very friable; common medium and coarse roots; few fine pebbles; slightly acid; clear wavy boundary.

A2—6 to 9 inches; gray (10YR 6/1) fine sandy loam; moderate medium granular structure; very friable; common medium and coarse roots; few fine pebbles; slightly acid; clear wavy boundary.

B2t—9 to 28 inches; olive brown (2.5Y 4/4) clay; few fine faint grayish brown mottles are in the lower part of the horizon; moderate medium angular blocky structure; very firm, very sticky and very plastic; common fine roots; few fine pores; distinct clay films on faces of peds; common grains of light colored minerals; slightly acid; gradual wavy boundary.

B3—28 to 32 inches; light olive brown (2.5Y 5/6) clay loam; massive; firm, sticky and plastic; few fine roots; few fine pores; patchy clay films on faces of peds; 60 percent saprolite; slightly acid; clear wavy boundary.

C—32 to 44 inches; mottled greenish gray (5GY 6/1), strong brown (7.5YR 5/6), and pale yellow (2.5Y 7/4) saprolite that crushes to clay loam; massive; very friable; few fine roots; neutral; gradual wavy boundary.

Cr—44 to 62 inches; mottled greenish gray (5GY 6/1), strong brown (7.5YR 5/6), pale yellow (2.5Y 7/4), and black (10YR 2/1), saprolite; massive; difficult to cut with spade; neutral.

The clayey Bt horizon ranges from 10 to 20 inches in thickness. Depth to bedrock is more than 60 inches. The subsoil ranges from slightly acid to mildly alkaline. Horizons that have more than 35 percent clay and a COLE greater than 0.09 are less than 20 inches thick. Fine and medium coarse fragments of quartz and dark concretions range from few to common in most pedons.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The A1 horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 1 to 3.

The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 6. Few to common gray mottles are below the upper 10 inches of the B2t horizon.

The B3 horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 4 or 6. The B3 horizon is sandy clay loam, clay loam, or loam.

The C horizon is greenish gray, strong brown, pale yellow, brownish yellow, yellowish brown, or black saprolite that crushes to sandy loam, clay loam, or sandy clay loam.

Lignum series

The Lignum series consists of moderately well drained and somewhat poorly drained, slowly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from fine grained slate rock. They are on broad, smooth ridges and around heads of drainageways. Slopes range from 0 to 4 percent.

Typical pedon of Lignum silt loam, 0 to 4 percent slopes, 0.8 mile north of Dexter on State Road 1329 and 30 feet east of road in cultivated field:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

B1—6 to 10 inches; olive yellow (2.5Y 6/6) silt loam; few medium faint pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable; common patchy clay films on faces of peds; few fine pebbles of quartz; strongly acid; gradual wavy boundary.

B21t—10 to 16 inches; brownish yellow (10YR 6/6) silty clay; common medium prominent light gray (10YR 7/2) and reddish yellow (7.5YR 6/8) mottles; moderate fine angular blocky structure; very firm, sticky and plastic; few fine roots; few fine pores; common clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—16 to 22 inches; mottled light gray (10YR 7/1), yellow (10YR 7/6), and reddish yellow (7.5YR 6/6) silty clay; weak medium angular blocky structure; very firm, sticky and plastic; very strongly acid; gradual wavy boundary.

B3—22 to 26 inches; mottled light gray (10YR 7/2), strong brown (7.5YR 5/6), and very pale brown

(10YR 7/4) silty clay loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few fragments of saprolite; very strongly acid; gradual wavy boundary.

C—26 to 32 inches; strong brown and light gray saprolite that crushes to silt loam; massive; friable; very strongly acid; abrupt smooth boundary.

Cr—32 to 48 inches; yellowish brown, gray, and white slate saprolite that crushes to silt loam; massive; moderately hard; difficult to cut with spade; very strongly acid; abrupt wavy boundary.

R—48 to 50 inches; hard slate rock.

The clayey Bt horizon ranges from 10 to 18 inches in thickness over saprolite. Depth to hard bedrock ranges from 40 to 72 inches. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The A2 horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4.

The B1 horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 3 to 6. This horizon is silt loam or silty clay loam.

The B2t horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 to 7, and chroma of 4 to 8. Distinct to prominent low chroma mottles are in this horizon. The B2t horizon is silty clay or clay.

The B3 horizon is mottled in hues similar to those in the B2t horizon. This horizon is silty clay loam or silty clay.

The C horizon is strong brown, gray, light gray, yellowish brown, or white saprolite that crushes to silt loam or silty clay loam.

Louisburg series

The Louisburg series consists of well drained to excessively drained, rapidly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on narrow ridges and steep side slopes. Slopes range from 2 to 40 percent.

Typical pedon of Louisburg loamy coarse sand, 8 to 15 percent slopes, 0.2 mile southeast on North Carolina Highway 39 from junction with U.S. Highway 1 Bypass at Henderson, 0.4 mile south on Shank Street, and in field 500 feet west of Shank Street:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) loamy coarse sand; weak medium granular structure; very friable; common fine roots; about 10 percent gravel-size rock fragments; few stones; few fine flakes of mica; medium acid; gradual wavy boundary.

A2—7 to 11 inches; strong brown (7.5YR 5/6) loamy coarse sand; weak medium granular structure; very friable; few fine roots; common fine black minerals; few fine flakes of mica; common gravel-size rock fragments; medium acid; gradual wavy boundary.

B2—11 to 22 inches; strong brown (7.5YR 5/8) sandy loam; weak medium subangular blocky structure; very friable; common fine roots; many fine and medium pores; common fine white and black minerals; common gravel-size rock fragments; common coarse bodies of sandy clay loam; strongly acid; gradual irregular boundary.

C—22 to 50 inches; red (2.5YR 4/8) and strong brown (7.5YR 5/8) saprolite that crushes to coarse sandy loam; massive; very friable, few tongues of strong brown (7.5YR 5/8) sandy clay loam; common gravel-size fragments; common fine white and black minerals; very strongly acid; abrupt wavy boundary.

R—50 to 52 inches; hard granite rock.

The sandy and loamy horizons range from 20 to 36 inches in thickness over saprolite. Depth to bedrock is more than 48 inches. The subsoil ranges from very strongly acid to medium acid. Fine to medium gravel-size fragments range from few to common in all horizons. Few to common flakes of mica are in some pedons.

The Ap or A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The A2 horizon, where present, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Thin discontinuous argillic horizons of sandy loam or sandy clay loam are in most pedons.

The C horizon is strong brown, red, yellowish brown, or reddish yellow saprolite that crushes to coarse sandy loam or loamy coarse sand. This horizon contains few to common fragments of granite and gneiss.

Nason series

The Nason series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from fine grained slate and sericitic schist. They are on broad ridgetops and sides of ridges. Slopes range from 2 to 15 percent.

Typical pedon of Nason gravelly silt loam, 2 to 8 percent slopes, on an upland ridgetop, 9 miles north of the intersection of U.S. Highway 158 and North Carolina Highway 39 in Henderson, 3 miles northwest on State Road 1342 to Marrows Chapel Church, 0.4 mile northwest of Marrows Chapel Church on State Road 1342, and 150 feet west of road in field:

A1—0 to 6 inches; brown (10YR 5/3) gravelly silt loam; weak medium granular structure; very friable; many fine roots; 15 to 20 percent gravel-size coarse fragments; very strongly acid; clear wavy boundary.

B1—6 to 10 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; very friable; common fine roots; many fine pores; few coarse fragments; very strongly acid; clear wavy boundary.

B2t—10 to 24 inches; strong brown (7.5YR 5/8) silty clay loam; common medium distinct yellowish red (5YR 5/8) and common medium distinct yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; friable, few fine roots; many fine pores; common dark streaks; very strongly acid; gradual wavy boundary.

B3—24 to 32 inches; strong brown (7.5YR 5/8) silt loam; common medium distinct yellowish red (5YR 5/8) and common medium distinct yellow (10YR 7/6) mottles; weak medium subangular blocky structure; friable; common dark streaks; 20 percent sericitic schist saprolite; strongly acid; gradual wavy boundary.

C1—32 to 48 inches; strong brown (7.5YR 5/8) sericitic schist saprolite that crushes to silt loam; massive; friable; common streaks of dark and light colored minerals; medium acid; gradual wavy boundary.

Cr—48 to 60 inches; strong brown (7.5YR 5/8) sericitic schist saprolite that crushes to silt loam; common fine distinct very pale brown mottles; massive; friable; medium acid.

The Bt horizon ranges from 10 to 24 inches in thickness. Depth to bedrock ranges from 40 to 60 inches. The surface horizon contains 15 to 20 percent coarse fragments of weathered slate schist or quartz gravel. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The A2 horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 3 or 4.

The B1 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. This horizon is silt loam or silty clay loam.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. This horizon is silty clay, clay, or silty clay loam. The B3 horizon, where present, has hue of 2.5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8, or it is mottled. This B3 horizon is silt loam or silty clay loam.

The C horizon is strong brown, yellowish red, or brownish yellow, or mottled saprolite that crushes to silt loam or very fine sandy loam. This horizon contains few to many fragments of slate or schist.

Pacolet series

The Pacolet series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed under forest vegetation in residuum weathered from acid crystalline rock. Slopes range from 15 to 40 percent.

Typical pedon of Pacolet sandy loam, 15 to 40 percent slopes, 9.6 miles north on North Carolina Highway 39 from intersection of North Carolina Highway 39 and I-85, to State Road 1342, 1.5 miles on State Road 1342 to Coon Creek Farm, follow farm road 1.3 miles and 300 feet east in woods:

O1—2 inches to 0; partly decomposed leaves and hardwood litter.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.

B1—5 to 7 inches; yellowish red (5YR 4/6) clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; medium acid; abrupt smooth boundary.

B2t—7 to 19 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; many fine and medium roots; thin distinct patchy clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

B3—19 to 27 inches; yellowish red (5YR 5/8) loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

C1—27 to 52 inches; yellowish red (5YR 5/8) saprolite that crushes to sandy loam; common red, brown, and white mottles; massive; very friable; few fine flakes of mica; strongly acid; gradual wavy boundary.

C2—52 to 60 inches; brownish yellow (10YR 6/6) saprolite that crushes to sandy loam; common white and yellowish streaks; massive; very friable; strongly acid.

Thickness of the clayey Bt horizon ranges from 12 to 20 inches. Depth to bedrock is more than 60 inches. The subsoil ranges from very strongly acid to medium acid. Few to common flakes of mica are in most pedons.

The Ap or A1 horizon has hue of 10YR, 7.5YR, and 5YR; value of 4 or 5; and chroma of 2 or 3. The A2 horizon, where present, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4.

The B1 horizon, where present, has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The B1 horizon is clay loam or sandy clay loam.

The B2t horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 to 8. This horizon is clay loam or clay. The B3 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8, or contains pinkish or brownish mottles or minerals. The B3 horizon is sandy clay loam or loam.

The C horizon is yellowish red, red, or brownish yellow, or mottled brown, strong brown, pink, or light red saprolite that crushes to loam or sandy loam.

Tatum series

The Tatum series consists of well drained, moderately permeable soils on the Piedmont Upland. These soils formed in residuum weathered from sericitic schist. Slopes range from 15 to 30 percent.

Typical pedon of Tatum silt loam, 15 to 30 percent slopes, 9 miles north of the intersection of U.S. Highway

158 and North Carolina Highway 39 in Henderson, 3 miles northwest on State Road 1342 to Marrows Chapel Church, and 200 yards north of church in woods:

O1—1 inch to 0; partly decomposed leaves and forest litter.
A1—0 to 1 inch; dark brown (10YR 4/3) silt loam; moderate medium and fine granular structure; very friable; many fine and medium roots; common fine and medium quartz pebbles; strongly acid; abrupt smooth boundary.
A2—1 to 5 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; many fine and medium roots; common fine and medium quartz pebbles; strongly acid; clear wavy boundary.
B21t—5 to 20 inches; red (2.5YR 4/8) silty clay; moderate medium and fine subangular blocky structure; firm, sticky and plastic; few fine and medium roots; common fine and medium pores; thin continuous clay films on faces of peds and in pores; few fine flakes of mica; strongly acid; gradual wavy boundary.
B22t—20 to 28 inches; red (2.5YR 4/8) silty clay; few fine prominent brownish yellow mottles and few fine reddish yellow mottles; moderate medium and fine subangular blocky structure; firm, sticky and plastic; few fine and medium roots; common fine and medium pores; thin continuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.
B3—28 to 35 inches; red (2.5YR 4/8) silty clay loam, with pockets of clay; common fine distinct strong brown mottles and few fine distinct pink mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; few fine white schist and quartz fragments; common fragments of saprolite; strongly acid; gradual wavy boundary.
C—35 to 50 inches; mottled red (2.5YR 4/6) (10R 4/6), yellowish red (5YR 5/8), pink (5YR 7/3), and yellowish brown (10YR 5/8) saprolite that crushes to silt loam; massive; very friable; few fine flakes of mica; strongly acid.
Cr—50 to 54 inches; moderately hard red, yellowish red, pink, and yellowish brown slate saprolite that is difficult to cut with an auger; strongly acid.
R—54 inches; hard slate rock.

Thickness of the clayey Bt horizon ranges from 10 to 24 inches. Depth to bedrock ranges from 40 to 60 inches. The subsoil is very strongly acid or strongly acid. Coarse fragments of gravel size range from 2 to 10 percent in the surface horizon. Few to common flakes of mica are present in most pedons.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The A2 horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The B2t horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. This horizon is silty clay or clay. The B3 horizon is similar in color to the B2t horizon, or mottled with brownish yellow, strong brown, or pink in some pedons. This B3 horizon is silty clay loam or silt loam.

The C horizon is red, yellowish red, pink, and yellowish brown saprolite that crushes to silt loam or very fine sandy loam.

Vance series

The Vance series consists of well drained, slowly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on ridges and sides of ridges. Slopes range from 2 to 8 percent.

Typical pedon of Vance sandy loam, 2 to 8 percent slopes, 2.2 miles north on Satterwhite Point Road from overpass of I-85 and in field 50 feet west of road:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam, weak medium granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.
B2t—8 to 22 inches; yellowish red (5YR 5/8) clay; few fine distinct red and yellow mottles; strong coarse and medium subangular and angular blocky structure; very firm, very sticky and very plastic; common fine roots between peds; few fine pores; thin distinct continuous clay films on faces of peds and old root channels; common fine flakes of mica and grains of feldspar; strongly acid; gradual wavy boundary.
B3—22 to 40 inches; yellowish red (5YR 5/8) clay loam that has common coarse peds of very firm, very plastic, red (2.5YR 4/8) clay; massive parting to weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; thin distinct continuous clay films on faces of peds; common fine flakes of mica and many grains of feldspar; very strongly acid; gradual wavy boundary.
C—40 to 72 inches; reddish yellow (5YR 6/8) saprolite that crushes to sandy clay loam; many coarse distinct red (2.5YR 4/8) mottles; massive; very friable; common fine flakes of mica and many grains of feldspar; very strongly acid.

The clayey Bt horizon ranges from 10 to 18 inches in thickness. Depth to bedrock is more than 60 inches. The subsoil is very strongly acid or strongly acid. Fine to medium coarse fragments range from 0 to 5 percent in the surface layers.

The Ap or A1 horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4.

The B2t horizon has hue of 5YR, 7.5YR, or 10YR; value of 4 or 5; and chroma of 6 to 8. This horizon is clay, sandy clay, or clay loam. The B3 horizon is similar in color to the B2t horizon or mottled with red, and texture is sandy clay loam, loam, or clay loam. Distinct to

prominent red and yellow mottles are few to common throughout the B horizon in most pedons.

The C horizon is red, yellow, yellowish red, or strong brown. This horizon is saprolite that crushes to sandy loam, sandy clay loam, or loam.

Wedowee series

The Wedowee series consists of well drained, moderately slowly permeable soils on the Piedmont Upland. These soils formed in residuum weathered from acid crystalline rock. They are on narrow sides of ridges. Slopes range from 8 to 40 percent.

Typical pedon of Wedowee sandy loam, 8 to 15 percent slopes, from junction of U.S. Highway 1 Business with North Carolina Highway 39 in Henderson, 2.9 miles northeast on U.S. Highway 1 Business, 0.2 mile north of U.S. Highway 1 Business on farm road, and in woods 50 feet west of farm road:

O1—2 inches to 1/4 inch; pine needles and hardwood litter.

O2—1/4 inch to 0; black, decomposed pine needles and hardwood litter.

Ap—0 to 7 inches; brown (10YR 5/3) sandy loam; weak medium granular structure; very friable; few coarse, common medium and many fine roots; few fine quartz pebbles; strongly acid; abrupt smooth boundary.

B21—7 to 16 inches; yellowish red (5YR 5/8) sandy clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; many fine and medium pores; thin distinct continuous clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—16 to 23 inches; yellowish red (5YR 5/8) sandy clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common fine pores; thin patchy clay films on faces of peds; common fine pink minerals; common fine flakes of mica; strongly acid; clear wavy boundary.

B3—23 to 28 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine pores; thin patchy clay films on faces of peds; many fine reddish yellow minerals; common fine flakes of mica; strongly acid; clear wavy boundary.

C—28 to 72 inches; mottled yellowish red (5YR 5/8), reddish yellow (7.5YR 6/8), and pale brown (10YR 6/3) saprolite that crushes to sandy loam; massive; very friable; common fine flakes of mica; very strongly acid.

The clayey Bt horizon is 10 to 24 inches thick. Depth to bedrock is more than 60 inches. The subsoil is very strongly acid or strongly acid. Few to common fine flakes of mica are throughout the B horizon of most pedons.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2. The A2 or Ap horizon has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 3 or 4.

The B2t horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. Faint to prominent mottles in shades of brown and red are in some pedons. The B2t horizon is sandy clay, clay loam, or clay.

The B3 horizon is similar in color to the Bt horizon. Texture is sandy clay loam, clay loam, or loam.

The C horizon is yellowish red, reddish yellow, pale brown, or red saprolite that crushes to sandy loam or sandy clay loam.

Wehadkee series

The Wehadkee series consists of nearly level, poorly drained, moderately permeable soils on flood plains. These soils formed in sediment that washed from upland soils.

Typical pedon of Wehadkee silt loam, 0.9 mile south on North Carolina Highway 39 from junction of North Carolina Highway 39 and U.S. Highway 1 Bypass at Henderson, 1,000 feet east of North Carolina Highway 39, and 25 feet north of stream:

A11—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; common fine and medium roots; common fine flakes of mica; slightly acid; gradual wavy boundary.

A12—6 to 10 inches; dark grayish brown (10YR 4/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium granular structure; very friable; few fine roots; common fine flakes of mica; slightly acid; gradual smooth boundary.

C1—10 to 30 inches; dark gray (10YR 4/1) silty clay loam; few medium distinct light brownish gray (10YR 6/2) mottles; massive; friable, sticky and slightly plastic; few fine roots in upper 10 inches; common fine flakes of mica; thin (1 inch) layer of sand at 30 inches; medium acid; gradual wavy boundary.

C2—30 to 46 inches; dark gray (10YR 4/1) loam; massive; friable, slightly sticky and slightly plastic; few fine flakes of mica; medium acid; gradual wavy boundary.

C3—46 to 60 inches; dark gray (10YR 4/1) stratified sand and silt; massive and single grain; loose and very friable; common fine flakes of mica; medium acid.

The loamy sediment ranges from 30 to more than 60 inches in thickness. Depth to bedrock is more than 60 inches. Flakes of mica range from few to common throughout most pedons. The subsoil ranges from very strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1, 2, or 3. Mottles in shades of brown range from few to common in some pedons.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of brown range from few to common throughout the C horizon. Texture of the C horizon to a depth of 36 or 48 inches is sandy clay loam, silty clay loam, or loam. The lower part of the C horizon in most pedons contains sandy loam, sand, or gravel.

Wilkes series

The Wilkes series consists of shallow, well drained soils on the uplands. These soils have moderately slow permeability. They formed in residuum weathered from mixed acidic and basic rocks high in ferro-magnesium minerals. They are on small ridges and moderately steep side slopes. Slopes range from 4 to 40 percent.

Typical pedon of Wilkes sandy loam, 10 to 40 percent slopes, from intersection of Highway I-85 and North Carolina Highway 39 at Henderson, north 1 mile on North Carolina Highway 39, west 0.6 mile on State Road 1311, west 0.3 mile on unnumbered gravel road, north 350 feet on trail, and west 160 feet:

Ap—0 to 4 inches; grayish brown (10YR 5/2) sandy loam; moderate medium granular structure; very friable; many fine and few medium roots; few fine pebbles; medium acid; abrupt smooth boundary.

B2t—4 to 10 inches; strong brown (7.5YR 5/6) clay; moderate coarse prismatic structure that parts to angular blocky; very firm, very sticky and very plastic; common fine roots between peds and few within peds; common fine pores; thin distinct continuous clay films on faces of peds; common fine pink minerals; medium acid; clear wavy boundary.

B3—10 to 16 inches; strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) clay loam; moderate coarse angular blocky structure; firm, sticky and plastic; few fine roots; thin patchy clay films on faces of peds, neutral; gradual wavy boundary.

Cr—16 to 42 inches; yellowish brown (10YR 5/4) saprolite that crushes to loam; massive; friable, slightly sticky and slightly plastic; common medium black and green minerals, moderately hard in places; neutral; clear wavy boundary.

R—42 to 43 inches; yellowish brown (10YR 5/4) mafic schist; common thin streaks of green and black minerals.

The loamy and clayey horizons are 10 to 20 inches thick. Depth to hard bedrock is more than 40 inches. Coarse fragments of gravel range from 0 to 10 percent. Manganese concretions range from few to common in most pedons. The subsoil ranges from medium acid to mildly alkaline.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. Mottles or bodies of black, brown, green, and white saprolite are in the B horizon of some pedons. The texture is clay loam or clay.

The Cr horizon is yellowish brown, brown, black, olive, or green moderately hard saprolite that crushes to sandy loam or loam.

Worsham series

The Worsham series consists of poorly drained soils in depressional areas, at the heads of drainageways, and on base slopes subject to seepage from higher lying uplands. The permeability is moderately slow or slow. These soils formed in a mixture of colluvium and alluvium or in residuum weathered from acid crystalline rock.

Typical pedon of Worsham loam, 0 to 2 percent slopes, 1.5 miles east on State Road 1001 from junction with U.S. Highway 1 Business in north Henderson, and 0.9 mile south on State Road 1519, and in field 100 feet west of State Road 1519:

Ap—0 to 8 inches; black (10YR 2/1) loam; weak medium granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B2tg—8 to 30 inches; gray (10YR 5/1) sandy clay; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; many fine and medium pores; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3g—30 to 45 inches; gray (10YR 6/1) sandy clay loam; massive; friable; many fine and medium pores; very strongly acid; gradual wavy boundary.

Cg—45 to 60 inches; light gray (10YR 7/1) sandy loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; very friable; very strongly acid.

The clayey Bt horizon ranges from 18 to 30 inches in thickness. Depth to bedrock is more than 60 inches. The subsoil is very strongly acid or strongly acid.

The Ap or A1 horizon commonly has hue of 2.5Y or 10YR, value of 2 to 4, and chroma of 1 or 2. The dark surface horizon that has a value of 3 or less is less than 10 inches thick.

The B2tg horizon has hue of 2.5Y and 10YR, value of 5 or 6, and chroma of 1 or 2. This horizon has distinct to prominent mottles with shades of strong brown, brownish yellow, and light gray. This horizon is sandy clay and clay loam. The B3g horizon is similar in color to the B2tg horizon, and texture is sandy loam, sandy clay loam, or loam. This B3 horizon is less plastic and sticky than the B2tg.

The Cg horizon is gray or light gray, and texture is sandy loam or sandy clay loam.

formation of the soils

Soil is the product of soil-forming processes acting upon materials altered or deposited by geologic forces. The factors that contribute to the differences among soils are climate, plant and animal life, parent material, relief, and time. Climate and plant and animal life, particularly vegetation, are the active forces in soil formation. Their effect on parent material is modified by topography and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. In some places one factor dominates in the formation of a soil and determines most of its properties, but normally the interaction of all factors determines the kind of soil that develops in any given place.

climate

Climate, as a factor of soil formation, affects the physical, chemical, and biological relationships in the soil, primarily through the influence of precipitation and temperature. These exert much influence on the rates of rock weathering and organic matter decomposing. The amount of leaching in a soil is also related to the amount of rainfall and its movement through the soil. The effects of climate also control the kinds of plants and animals that can thrive in a region. Temperature influences the kind and growth of organisms and the speed of chemical and physical reactions in the soil.

Vance County has a warm, humid climate and is located on a moderate plateau ranging in elevation from 300 to nearly 600 feet. This climate favors rapid chemical processes in the decomposition of organic matter and rock weathering. The mild temperatures and abundant rainfall cause intense leaching and oxidizing.

The effects of climate are reflected in the soils of Vance County. Mild temperature throughout the year and abundant rainfall have resulted in depletion of organic matter and considerable leaching of soluble bases, leaving most soils acid. Variations in climate are small and probably have not caused major local differences in soils. The most important effect of climate is in the alterations of parent material through changes in temperature, changes in the amount of rainfall, and influences on plant and animal life.

plant and animal life

Vegetation and animal life are indispensable in soil development, and their greatest influence is in the forming and differentiating of horizons. The type and amount of organisms in and on the soil are determined in part by climate and in part by the nature of soil materials, relief, and age of the soil. Bacteria, fungi, and other micro-organisms aid in the weathering of rocks and in the decomposing of organic matter. The plants and animals that live on a soil are the primary source of organic material.

Plants largely determine the kinds and amounts of organic matter that go into a soil under normal conditions and the way in which the organic matter is added. Plants also play an important role in changing base status and in the leaching process of a soil through the nutrient cycle.

Animals convert complex compounds into simpler forms and add their own bodies to the organic matter. In addition to adding organic matter, organisms modify certain chemical and physical properties.

In Vance County, most of the organic material accumulates on the surface and is acted upon by micro-organisms, fungi, earthworms and other forms of life, and direct chemical reaction. The material is then mixed with the uppermost part of the mineral portion of the soil by the activities of earthworms and other small invertebrates. Rodents have had little effect on the formation of soils in the county.

Under the native forest of this county, not enough bases are brought to the surface by plants to counteract the effects of leaching. In general, the soils of Vance County developed under a hardwood forest. These trees take up elements from the subsoil and add organic matter to the surface by depositing leaves, roots, twigs, and eventually the whole plant. This material is acted upon by organisms and undergoes chemical reaction.

Organic materials decompose rather rapidly in Vance County because of the moderate temperature, the abundant moisture supply, and the character of the organic material. Organic matter decays rapidly in such well drained soils as Cecil soils that have little accumulation in the surface layers. Decomposition is slower and accumulation greater in the wetter soils, such as Wehadkee soils.

parent materials

Parent material is the unconsolidated mass from which a soil develops. The character of this mass affects the kind of profile that develops and the degree of this

development. In some places, the parent material is the dominant factor in soil development. In most places, however, the degree of profile development depends on a combination of interaction of parent material with some of the other factors. It is largely responsible for the chemical and mineralogical composition of soils, and it is one of the most important factors in causing major differences in the soils of Vance County. Major differences in parent materials, such as texture, can be observed in the field. Less distinct differences, such as mineralogical composition, can be determined only by careful laboratory analysis.

The two broad classes of parent materials in Vance County are residual materials and alluvium. The residual materials are related to the underlying rock from which they have weathered. The transported materials are related directly to the soils or rocks from which they were removed.

In Vance County, the parent materials of the residual soils were derived primarily from acid and basic igneous rocks. The felsic rocks include granite, gneiss, and schist. Cecil and Appling soils have formed in materials derived from acid igneous and metamorphic rocks. This fact is reflected in the low pH of these soils. In addition, the characteristics of the parent materials have influenced the texture of these and other more friable, coarser textured soils of this group. The mafic rocks include diorite and some gabbro. These rocks are also the parent materials of Iredell soils, and other soils of the county which are more plastic and of finer texture. The basic influence of the parent materials is reflected in the pH of these soils, as they are less acid than others in the county. Many soils of Vance County, such as Helena and Wilkes soils, have formed on mixed mafic and felsic rocks. The mixtures of mafic and felsic rocks consist of weathered materials of granite and basic dikes of mafic intruding into the granite. These dikes vary considerably in width and their sudden outcropping makes for abrupt changes in soils across the county.

Transported parent materials are primarily alluvium and local alluvium, both of which may be young or old. Young alluvium has been deposited recently, and it consists of materials that have been changed little by the soil-forming processes. Old alluvium consists of materials that have been deposited long enough for the soil-forming processes to change them in varying degrees. Local alluvium consists of soil materials that have been transported short distances by water and have been deposited along small drainageways, in depressional areas, and at the foot of slopes. The principal soils that have formed in alluvium along streams on first bottoms are the Chewacla and Wehadkee soils.

relief

The relief, or topography, affects soil formation by causing differences in free drainage, surface runoff, soil temperature, and the extent of geologic erosion. In Vance County, the relief is largely determined by the kind of bedrock underlying the soils, by the geology of the area, by the amount of landscape dissection by streams, and by slope retreat. Vance County is located on a moderate plateau ranging in elevation from 300 to 600 feet.

Percolation of water through the profile is affected by relief. Water movement through the profile is important in soil development because it aids chemical reactions and is necessary for leaching. Leaching is reflected by the low amount of bases and high acidity in most soils in the county.

The soils of the county are on slopes ranging from 0 to 45 percent. Soils on the upland that have slopes of less than 10 percent generally have deeper and better defined profiles than those on steeper slopes. Well developed soils of this group include the Cecil, Appling, and Vance soils. Relief is also important in soil formation because it may affect the depth of soils. From some soils in the county that have slopes of 15 percent, geologic erosion removes soil materials almost as fast as the soils develop. As a result, most strongly sloping to steep soils have a thinner solum. The Wilkes and Goldston soils occupy such areas and are not as deep or as well developed as soils that occupy positions with less slope.

The drainage of a sequence of soils that developed from similar parent material can also be affected by relief. The drainage may be affected by a high water table, which is usually related to nearly level relief. For example, Georgeville soils are well drained, Iredell soils are moderately well drained, and Wehadkee soils are poorly drained. These soils formed in similar parent material but have different characteristics because of their topographic position and internal drainage.

time

The length of time that soil materials have been exposed to the soil-forming processes accounts for some difference in soils. The length of time required for a soil profile to develop depends on the other factors of soil formation. Less time is required for a soil profile to develop in coarse-textured material than in similar, but finer textured material, even though the environment is the same for both. Less time is required for profile development in a warm, humid area where there is a dense plant cover than in a cold, dry area where the plant cover is sparse.

The ages of soils vary considerably, and the length of time that a soil has been forming is generally reflected in the profile development. Old soils generally have better defined horizons than young soils. In Vance County, the effects of time as a soil-forming factor is more apparent in the older soils, such as Cecil and Appling soils, which occupy the broader sections of the uplands. These soils have more distinct horizons than soils in flood plains which have formed in alluvium and are still acquiring new

deposits from the uplands. Such first bottom soils have not been in place long enough to develop distinct horizons. Other soils in the county are considered young because of their topographic position. Soils such as Wilkes soils are not as well developed because they occupy steep slopes and geologic erosion keeps pace with soil development. This also accounts for their being shallower over bedrock.

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

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.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Medium	6 to 9
High	More than 9

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse textured (light textured) soil. Sand or loamy sand.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

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. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water

is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

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.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:
O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.
A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.
A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.
B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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.

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.

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.
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.

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.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single 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.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

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.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches),

moderately rapid (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

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: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil, or partly worked into the soil, to provide protection from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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 or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.
Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wetness. General term used for soils that have a seasonal high water table.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded 1951-75, Henderson, N.C.]

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[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	51.3	28.2	39.8	76	5	27	3.50	2.09	4.76	7	2.3
February---	53.7	29.5	41.8	74	8	22	3.88	2.64	5.00	7	1.5
March------	61.2	36.0	48.6	85	16	104	3.90	2.59	5.09	8	.0
April------	72.4	45.0	58.8	90	26	279	3.21	2.02	4.28	6	.0
May--------	79.5	54.3	66.9	93	33	524	3.92	2.13	5.38	7	.0
June-------	85.8	61.7	73.8	99	45	714	3.91	1.78	5.64	6	.0
July-------	88.9	66.2	77.6	99	51	856	5.08	2.57	7.13	8	.0
August-----	87.4	65.4	76.5	97	50	822	4.88	2.43	6.88	8	.0
September--	82.4	59.1	70.7	95	39	621	3.54	1.67	5.06	5	.0
October----	72.4	46.5	59.5	89	25	305	2.89	1.14	4.30	5	.0
November---	62.5	36.6	49.6	83	16	73	3.10	1.61	4.30	6	.1
December---	52.9	29.4	41.2	75	7	30	3.45	1.86	4.74	6	.2
Yearly:											
Average--	70.9	46.5	58.7	---	---	---	---	---	---	---	---
Extreme--	---	---	---	100	3	---	---	---	---	---	---
Total----	---	---	---	---	---	4,377	45.26	39.51	51.06	79	4.1

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded 1951-75, Henderson, N.C.]

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--	April 5	April 20	May 3
2 years in 10 later than--	March 31	April 15	April 28
5 years in 10 later than--	March 21	April 6	April 17
First freezing temperature in fall:			
1 year in 10 earlier than--	October 27	October 19	October 14
2 years in 10 earlier than--	November 1	October 24	October 14
5 years in 10 earlier than--	November 10	November 1	October 25

TABLE 3.--GROWING SEASON

[Recorded 1951-75, Henderson, N.C.]

Probability	Daily minimum temperature		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	211	189	171
8 years in 10	219	196	178
5 years in 10	234	208	189
2 years in 10	249	221	201
1 year in 10	257	227	208

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
ApB	Appling sandy loam, 2 to 8 percent slopes	41,242	25.9
AuB	Appling-Urban land complex, 2 to 10 percent slopes	2,464	1.5
CeB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded	21,898	13.7
CeD2	Cecil sandy clay loam, 8 to 15 percent slopes, eroded	8,010	5.0
CuB	Cecil-Urban land complex, 2 to 10 percent slopes	815	0.5
Cw	Chewacla silt loam	2,629	1.6
DuB	Durham loamy sand, 1 to 6 percent slopes	1,268	0.8
GeB	Georgeville silt loam, 2 to 8 percent slopes	3,917	2.5
GeD	Georgeville silt loam, 8 to 15 percent slopes	790	0.5
GoC	Goldston slaty silt loam, 4 to 10 percent slopes	163	0.1
GoE	Goldston slaty silt loam, 10 to 40 percent slopes	292	0.2
HeB	Helena sandy loam, 2 to 8 percent slopes	3,496	2.2
IrB	Iredell fine sandy loam, 2 to 8 percent slopes	3,867	2.4
LgB	Lignum silt loam, 0 to 4 percent slopes	577	0.4
LoB	Louisburg loamy coarse sand, 2 to 8 percent slopes	2,067	1.3
LoD	Louisburg loamy coarse sand, 8 to 15 percent slopes	3,801	2.4
LoE	Louisburg loamy coarse sand, 15 to 40 percent slopes	4,052	2.5
NaB	Nason gravelly silt loam, 2 to 8 percent slopes	1,125	0.7
NaD	Nason gravelly silt loam, 8 to 15 percent slopes	1,200	0.8
PaE	Pacolet sandy loam, 15 to 40 percent slopes	5,587	3.5
Pt	Pits	300	0.2
TaE	Tatum silt loam, 15 to 30 percent slopes	750	0.5
UL	Udorthents	100	0.1
VaB	Vance sandy loam, 2 to 8 percent slopes	7,721	4.8
WeD	Wedowee sandy loam, 8 to 15 percent slopes	21,697	13.6
WeE	Wedowee sandy loam, 15 to 40 percent slopes	6,019	3.8
Wh	Wehadkee silt loam	3,607	2.3
WkC	Wilkes sandy loam, 4 to 10 percent slopes	1,811	1.1
WkE	Wilkes sandy loam, 10 to 40 percent slopes	6,150	3.9
WoA	Worsham loam, 0 to 2 percent slopes	945	0.6
	Water	1,000[1]	0.6
	Total	159,360	100.0

[1] This figure does not include areas of water over 40 acres, such as John H. Kerr Reservoir.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Tobacco	Corn	Soybeans	Wheat	Grain sorghum	Grass-legume hay	Pasture
	Lb	Bu	Bu	Bu	Bu	Ton	AUM[1]
ApB---------- Appling	2,400	95	35	45	50	4.8	8.0
AuB[2]---------- Appling	---	---	---	---	---	---	---
CeB2---------- Cecil	1,900	70	20	25	45	3.3	5.5
CeD2---------- Cecil	1,800	60	20	20	40	2.7	4.5
CuB[2]---------- Cecil	---	---	---	---	---	---	---
Cw---------- Chewacla	---	80	30	30	40	5.4	9
DuB---------- Durham	2,200	85	30	40	50	3.4	5.6
GeB---------- Georgeville	2,000	90	30	25	60	3.0	5.0
GeD---------- Georgeville	1,900	75	25	20	45	2.7	4.5
GoC---------- Goldston	1,600	50	15	25	35	2.8	4.5
GoE---------- Goldston	---	---	---	---	---	2.1	3.5
HeB---------- Helena	2,100	75	25	40	50	3.5	5.8
IrB---------- Iredell	1,600	65	25	35	40	3.6	6.0
LgB---------- Lignum	2,000	100	35	50	45	4.2	7.0
LoB---------- Louisburg	1,500	55	30	20	30	2.1	3.5
LoD---------- Louisburg	---	---	---	---	---	1.8	3.0
LoE---------- Louisburg	---	---	---	---	---	---	---
NaB---------- Nason	2,000	90	30	45	50	4.8	8.0
NaD---------- Nason	1,800	85	30	45	45	4.5	7.5
PaE---------- Pacolet	---	---	---	---	---	2.4	4.0
Pt.[2] Pits							

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Tobacco	Corn	Soybeans	Wheat	Grain sorghum	Grass-legume hay	Pasture
	Lb	Bu	Bu	Bu	Bu	Ton	AUM[1]
TaE---------- Tatum	---	65	---	35	---	4.2	7.0
UL.[2] Udorthents							
VaB---------- Vance	2,000	80	35	60	45	4.8	8.0
WeD---------- Wedowee	1,800	65	25	40	40	2.1	3.5
WeE---------- Wedowee	---	---	---	---	---	1.8	3.0
Wh---------- Wehadkee	---	---	---	---	---	4.8	8.0
WkC---------- Wilkes	1,700	65	25	35	40	4.5	7.5
WkE---------- Wilkes	---	---	---	---	---	3.9	6.5
WoA---------- Worsham	---	70	---	---	---	2.7	4.5

[1] 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.
[2] See description of the map unit for composition and behavior characteristics.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	55,492	55,492	---	---	---
III	35,350	35,350	---	---	---
IV	28,655	25,863	2,629	163	---
V	945	---	945	---	---
VI	11,811	11,811	---	---	---
VII	22,100	21,808	---	292	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that the soil is not applicable to rate for the features shown]

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
ApB---------- Appling	3o	Slight	Slight	Slight	Loblolly pine-------	81	Eastern redcedar, loblolly pine, yellow-poplar.
					Shortleaf pine------	65	
					Scarlet oak---------	68	
					Southern red oak----	76	
					Virginia pine-------	74	
					White oak----------	71	
					Yellow-poplar-------	90	
CeB2, CeD2--------- Cecil	4c	Moderate	Moderate	Moderate	Loblolly pine-------	72	Loblolly pine, Virginia pine.
					Shortleaf pine------	66	
					Virginia pine-------	65	
Cw---------- Chewacla	1w	Slight	Moderate	Moderate	Loblolly pine-------	96	Loblolly pine, American sycamore, yellow-poplar, sweetgum, green ash.
					Yellow-poplar-------	104	
					American sycamore---	90	
					Sweetgum----------	97	
					Water oak----------	86	
					Eastern cottonwood--	100	
					Green ash----------	97	
					Southern red oak----	90	
DuB---------- Durham	3o	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, yellow-poplar.
					Post oak----------	70	
					Shortleaf pine------	72	
					Southern red oak----	80	
					Sweetgum----------	80	
					White oak----------	70	
					Yellow-poplar-------	80	
GeB, GeD---------- Georgeville	3o	Slight	Slight	Slight	Loblolly pine-------	81	Loblolly pine, Virginia pine, eastern redcedar, black walnut, yellow-poplar.
					Longleaf pine-------	67	
					Shortleaf pine------	63	
					White oak----------	69	
					Scarlet oak---------	70	
					Southern red oak----	67	
GoC---------- Goldston	4o	Slight	Slight	Slight	Loblolly pine-------	73	Eastern redcedar, loblolly pine, Virginia pine.
					Longleaf pine-------	68	
					Shortleaf pine------	63	
					Southern red oak----	66	
					White oak----------	69	
GoE---------- Goldston	4r	Moderate	Moderate	Slight	Loblolly pine-------	73	Eastern redcedar, loblolly pine, Virginia pine.
					Longleaf pine-------	68	
					Shortleaf pine------	63	
					Southern red oak----	66	
					White oak----------	69	
HeB---------- Helena	3w	Slight	Moderate	Slight	Loblolly pine-------	80	Loblolly pine, Virginia pine, yellow-poplar.
					Shortleaf pine------	63	
					White oak----------	64	
					Yellow-poplar-------	87	
IrB---------- Iredell	4c	Slight	Moderate	Moderate	Loblolly pine-------	67	Loblolly pine, eastern redcedar.
					Shortleaf pine------	58	
					Post oak----------	44	
					White oak----------	47	
LgB---------- Lignum	3w	Slight	Moderate	Moderate	Virginia pine-------	74	Loblolly pine, Virginia pine.
					Shortleaf pine------	66	
					Northern red oak----	68	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
LoB, LoD Louisburg	3o	Slight	Slight	Slight	Loblolly pine	77	Loblolly pine, Virginia pine, yellow-poplar.
					Shortleaf pine	69	
					Southern red oak	72	
					Yellow-poplar	84	
					Virginia pine	71	
					White oak	68	
LoE Louisburg	3r	Moderate	Moderate	Slight	Loblolly pine	77	Loblolly pine, Virginia pine, yellow-poplar.
					Shortleaf pine	69	
					Southern red oak	72	
					Yellow-poplar	84	
					Virginia pine	71	
					White oak	68	
NaB, NaD Nason	3o	Slight	Slight	Slight	Northern red oak	60	Loblolly pine, Virginia pine.
					Virginia pine	69	
					Shortleaf pine	66	
					Loblolly pine	86	
PaE Pacolet	3r	Moderate	Moderate	Slight	Loblolly pine	78	Loblolly pine, shortleaf pine, yellow-poplar.
					Shortleaf pine	70	
					Yellow-poplar	90	
TaE Tatum	3r	Moderate	Moderate	Slight	Northern red oak	72	Loblolly pine, Virginia pine.
					Virginia pine	68	
					Shortleaf pine	65	
					Loblolly pine	89	
					Yellow-poplar	89	
VaB Vance	3o	Slight	Slight	Slight	Loblolly pine	76	Loblolly pine, Virginia pine, yellow-poplar.
					Northern red oak	---	
					Shortleaf pine	---	
					White oak	---	
WeD Wedowee	3o	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
					Virginia pine	70	
					Shortleaf pine	70	
					Southern red oak	70	
					Northern red oak	70	
					White oak	65	
WeE Wedowee	3r	Moderate	Moderate	Slight	Loblolly pine	80	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
					Virginia pine	70	
					Shortleaf pine	70	
					Southern red oak	70	
					Northern red oak	70	
					White oak	65	
Wh Wehadkee	1w	Slight	Severe	Severe	Loblolly pine	102	Loblolly pine, American sycamore, yellow-poplar, green ash, sweetgum, eastern cottonwood, cherrybark oak.
					Sweetgum	93	
					Yellow-poplar	98	
					Willow oak	90	
					Green ash	96	
					Water oak	86	
					White ash	88	
WkC Wilkes	4o	Slight	Slight	Slight	Loblolly pine	75	Eastern redcedar, loblolly pine, Virginia pine.
					Post oak	79	
					Shortleaf pine	63	
					Southern red oak	76	
					Sweetgum	82	
WkE Wilkes	4r	Moderate	Moderate	Slight	Loblolly pine	75	Eastern redcedar, loblolly pine, Virginia pine.
					Post oak	79	
					Shortleaf pine	63	
					Southern red oak	76	
					Sweetgum	82	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
WoA---------- Worsham	2w	Slight	Severe	Severe	Northern red oak----	80	Loblolly pine.
					Shortleaf pine------	65	
					Virginia pine-------	70	
					Loblolly pine-------	88	

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]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ApB: Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
AuB[1]: Appling	Slight	Slight	Severe: slope.	Slight	Slight.
CeB2: Cecil	Slight	Moderate: too clayey.	Moderate: slope.	Moderate: too clayey.	Slight.
CeD2: Cecil	Moderate: slope.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope.
CuB[1]: Cecil	Slight	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.	Slight.
Cw: Chewacla	Severe: floods, wetness.	Moderate: wetness, floods.	Severe: wetness, floods.	Moderate: wetness, floods.	Severe: floods, wetness.
DuB: Durham	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope.	Moderate: too sandy.	Moderate: too sandy.
GeB: Georgeville	Slight	Slight	Moderate: slope.	Slight	Slight.
GeD: Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
GoC: Goldston	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock, slope.	Moderate: small stones.	Moderate: small stones.
GoE: Goldston	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: small stones, slope.	Severe: slope, small stones.
HeB: Helena	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
IrB: Iredell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
LgB: Lignum	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
LoB: Louisburg	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
LoD: Louisburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Severe: droughty.
LoE: Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
NaB: Nason	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
NaD: Nason	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: small stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PaE---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt.[1] Pits					
TaE---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
UL.[1] Udorthents					
VaB---------- Vance	Moderate: percs slowly.	Slight----------	Moderate: percs slowly.	Slight----------	Slight.
WeD---------- Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
WeE---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh---------- Wehadkee	Severe: floods, wetness.	Severe: wetness.	Severe: floods.	Severe: wetness.	Severe: floods, wetness.
WkC---------- Wilkes	Moderate: percs slowly.	Slight----------	Severe: slope.	Slight----------	Severe: droughty.
WkE---------- Wilkes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, droughty.
WoA---------- Worsham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too clayey, wetness.

[1] See description of the map unit for composition and behavior characteristics.

TABLE 9.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil is not applicable to rate for the features shown]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ApB---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
AuB[1]---------- Appling	---	---	---	---	---	---	---	---	---	---
CeB2, CeD2--------- Cecil	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
CuB[1]---------- Cecil	---	---	---	---	---	---	---	---	---	---
Cw---------- Chewacla	Very poor	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair
DuB---------- Durham	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
GeB---------- Georgeville	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
GeD---------- Georgeville	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
GoC, GoE---------- Goldston	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
HeB---------- Helena	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
IrB---------- Iredell	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
LgB---------- Lignum	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
LoB---------- Louisburg	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor
LoD---------- Louisburg	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor
LoE---------- Louisburg	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
NaB---------- Nason	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
NaD---------- Nason	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
PaE---------- Pacolet	Very poor	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Pt.[1] Pits										
TaE---------- Tatum	Very poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
UL.[1] Udorthents										
VaB---------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT POTENTIALS--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WeD---------- Wedowee	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WeE---------- Wedowee	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Wh---------- Wehadkee	Very poor	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair
WkC---------- Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
WkE---------- Wilkes	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
WoA---------- Worsham	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

[1] See description of the map unit for composition and behavior characteristics.

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]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ApB, AuB[1] Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight	Slight.
CeB2 Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight	Slight.
CeD2 Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
CuB[1] Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight	Slight.
Cw Chewacla	Severe: wetness, floods.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, floods, low strength.	Severe: floods, wetness.
DuB Durham	Slight	Slight	Moderate: wetness.	Slight	Slight	Moderate: too sandy.
GeB Georgeville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
GeD Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
GoC Goldston	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock, slope.	Moderate: depth to rock.	Moderate: small stones.
GoE Goldston	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, small stones.
HeB Helena	Severe: too clayey.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, low strength.	Moderate: wetness.
IrB Iredell	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell.	Moderate: wetness.
LgB Lignum	Severe: too clayey, wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: low strength.	Moderate: wetness.
LoB Louisburg	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Severe: droughty.
LoD Louisburg	Moderate: depth to rock.	Moderate: slope.	Moderate: depth to rock.	Severe: slope.	Moderate: slope.	Severe: droughty.
LoE Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
NaB Nason	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: low strength.	Moderate: small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NaD---------- Nason	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, depth to rock, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
PaE---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt.[1] Pits						
TaE---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
UL.[1] Udorthents						
VaB---------- Vance	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Severe: low strength.	Slight.
WeD---------- Wedowee	Moderate: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope.
WeE---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh---------- Wehadkee	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
WkC---------- Wilkes	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Severe: droughty.
WkE---------- Wilkes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope. droughty.
WoA---------- Worsham	Severe: wetness, too clayey.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: too clayey, wetness.

[1] See description of the map unit for composition and behavior characteristics.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ApB, AuB[1] Appling	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
CeB2 Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight	Fair: too clayey.
CeD2 Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, seepage.	Moderate: slope.	Fair: too clayey, slope.
CuB[1] Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight	Fair: too clayey.
Cw Chewacla	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
DuB Durham	Moderate: wetness.	Moderate: slope, seepage.	Slight	Slight	Good.
GeB Georgeville	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Poor: too clayey.
GeD Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: too clayey.
GoC, GoE Goldston	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: seepage.	Poor: small stones, thin layer.
HeB Helena	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
IrB Iredell	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: thin layer.
LgB Lignum	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey.
LoB Louisburg	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
LoD Louisburg	Moderate: depth to rock.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: slope.
LoE Louisburg	Severe: slope.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: slope.
NaB Nason	Moderate: depth to rock.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NaD---------- Nason	Moderate: slope, depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
PaE---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pt.[1] Pits					
TaE---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey.
UL.[1] Udorthents					
VaB---------- Vance	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: too clayey.
WeD---------- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, area reclaim, slope.
WeE---------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wh---------- Wehadkee	Severe: wetness.	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Poor: wetness. wetness.
WkC---------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.
WkE---------- Wilkes	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, seepage, slope.	Severe: slope, seepage.	Poor: thin layer.
WoA---------- Worsham	Severe: percs slowly, wetness.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.

[1] See description of the map unit for composition and behavior characteristics.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
ApB, AuB[1] Appling	Fair: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
CeB2, CeD2, CuB[1] Cecil	Good	Poor: excess fines.	Poor: excess fines.	Poor: thin layer.
Cw Chewacla	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
DuB Durham	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too sandy.
GeB, GeD Georgeville	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
GoC, GoE Goldston	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, area reclaim.
HeB Helena	Poor: shrink-swell, low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
IrB Iredell	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
LgB Lignum	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
LoB, LoD Louisburg	Good	Poor: excess fines.	Poor: excess fines.	Fair: thin layer.
LoE Louisburg	Poor: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope.
NaB Nason	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
NaD Nason	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones.
PaE Pacolet	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
Pt.[1] Pits				
TaE Tatum	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, too clayey.
UL.[1] Udorthents				
VaB Vance	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
WeD---------- Wedowee	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, area reclaim.
WeE---------- Wedowee	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Wh---------- Wehadkee	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
WkC---------- Wilkes	Poor: thin layer, low strength.	Poor: excess fines.	Unsuited: excess fines.	Poor: thin layer.
WkE---------- Wilkes	Poor: slope, thin layer, low strength.	Poor: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
WoA---------- Worsham	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.

[1] See description of the map unit for composition and behavior characteristics.

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]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
ApB, AuB[1] Appling	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Not needed	Favorable	Favorable	Favorable.
CeB2, CeD2, CuB[1] Cecil	Moderate: seepage.	Moderate: hard to pack.	Severe: no water.	Not needed	Slope, slow intake.	Slope	Slope.
Cw Chewacla	Moderate: seepage.	Severe: hard to pack, piping, wetness.	Moderate: slow refill.	Poor outlets, floods.	Wetness, floods.	Not needed	Wetness.
DuB Durham	Moderate: seepage.	Slight	Severe: no water.	Not needed	Favorable	Favorable	Favorable.
GeB Georgeville	Moderate: slope, seepage.	Moderate: compressible, low strength, erodes easily.	Severe: no water.	Not needed	Complex slope, erodes easily.	Favorable	Favorable.
GeD Georgeville	Moderate: slope, seepage.	Moderate: compressible, low strength, erodes easily.	Severe: no water.	Not needed	Complex slope, erodes easily.	Complex slope, erodes easily.	Slope, erodes easily.
GoC, GoE Goldston	Severe: seepage.	Severe: thin layer.	Severe: deep to water.	Not needed	Fast intake, slope.	Depth to rock, complex slope.	Slope.
HeB Helena	Moderate: depth to rock.	Moderate: thin layer, hard to pack, wetness.	Severe: slow refill, deep to water.	Percs slowly	Percs slowly, wetness.	Slope, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
IrB Iredell	Slight	Moderate: hard to pack.	Severe: slow refill.	Percs slowly, slope.	Percs slowly, slope, wetness.	Percs slowly, wetness.	Percs slowly, slope.
LgB Lignum	Moderate: depth to rock.	Moderate: compressible, low strength.	Moderate: deep to water, slow refill.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness.
LoB, LoD, LoE Louisburg	Severe: seepage.	Moderate: piping, erodes easily.	Severe: no water.	Not needed	Slope, seepage.	Slope	Slope.
NaB, NaD Nason	Moderate: depth to rock, seepage.	Moderate: compressible, low strength.	Severe: no water.	Not needed	Erodes easily, slope.	Slope	Erodes easily, slope.
PaE Pacolet	Moderate: seepage.	Moderate: hard to pack.	Severe: no water.	Not needed	Slope	Slope	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Pt.[1] Pits							
TaE Tatum	Moderate: depth to rock, seepage.	Moderate: compressible, low strength, hard to pack.	Severe: no water.	Not needed	Erodes easily, slope.	Slope, erodes easily.	Slope, erodes easily.
UL. Udorthents							
VaB Vance	Slight	Moderate: hard to pack.	Severe: no water.	Not needed	Percs slowly	Percs slowly, erodes easily.	Percs slowly.
WeD, WeE Wedowee	Moderate: depth to rock, seepage.	Moderate: low strength, thin layer.	Severe: no water.	Not needed	Slope	Slope	Slope.
Wh Wehadkee	Moderate: seepage.	Severe: wetness.	Moderate: deep to water, slow refill.	Floods	Wetness, floods.	Not needed	Wetness.
WkC, WkE Wilkes	Slight	Moderate: thin layer.	Severe: no water.	Not needed	Slow intake, slope.	Depth to rock, slope.	Slope.
WoA Worsham	Slight	Slight	Slight	Percs slowly	Slow intake, wetness.	Not needed	Percs slowly, wetness.

[1] See description of the map unit for composition and behavior characteristics.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
ApB, AuB[1]---------- Appling	0-10	Sandy loam------	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
	10-35	Sandy clay, clay loam, clay.	MH, CL, ML,	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	35-48	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	48-55	Variable.									
CeB2, CeD2, CuB[1]--- Cecil	0-11	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0	74-100	72-100	68-95	38-81	21-35	3-15
	11-52	Clay----------	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	52-60	Variable.									
Cw---------- Chewacla	0-11	Silt loam-------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	70-100	55-90	36-50	4-18
	11-60	Sandy clay loam, loam, sandy loam.	SM, CL-ML, SM-SC, ML	A-4	0	96-100	95-100	60-80	36-70	<35	NP-7
DuB---------- Durham	0-11	Loamy sand------	SM	A-2	0-3	95-100	90-100	50-85	13-30	<11	NP-3
	11-49	Sandy clay loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0	100	95-100	70-90	30-55	20-47	10-25
	49-62	Sandy clay loam, sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-85	18-49	<20	NP-10
GeB, GeD---------- Georgeville	0-5	Silt loam-------	ML, CL-ML	A-4	0-3	90-100	85-100	65-100	51-98	<40	NP-10
	5-50	Silty clay, silty clay loam, clay loam.	MH, ML	A-7-5	0	95-100	95-100	90-100	75-98	41-75	15-35
	50-65	Silty clay loam, silt loam, clay loam.	MH	A-7-5	0	95-100	90-100	65-100	60-98	50-75	15-35
	65-78	Variable.									
GoC, GoE---------- Goldston	0-6	Slaty silt loam	GM, SM, ML, GM-GC	A-4	5-20	60-80	55-75	50-70	40-60	<35	NP-10
	6-14	Slaty silt loam, slaty very fine sandy loam.	GM, SM, ML, GM-GC	A-2, A-4, A-5	10-30	55-100	50-92	45-90	25-80	<45	NP-10
	14-23	Weathered bedrock.									
	23	Unweathered bedrock.									
HeB---------- Helena	0-10	Sandy loam------	SM, SM-SC, SC	A-2, A-4	0	95-100	90-100	51-86	26-46	<30	NP-9
	10-14	Sandy clay loam, clay loam.	CL	A-6, A-7	0	95-100	95-100	70-90	55-70	30-49	15-25
	14-32	Sandy clay loam, sandy clay, clay.	CH, MH	A-7	0	95-100	95-100	73-93	56-80	50-85	24-50
	32-53	Variable.									
	53-60	Weathered bedrock.									

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
IrB---------- Iredell	0-9	Fine sandy loam	SM	A-2-4, A-4	0-1	90-98	80-90	65-80	30-49	<35	NP-9
	9-28	Clay----------	CH	A-7	0	99-100	85-100	80-100	65-95	60-115	30-85
	28-32	Loam, sandy clay loam, clay loam.	CL, CH SC	A-7	0-1	98-100	85-100	70-95	40-75	41-60	20-39
	32-60	Variable.									
LgB---------- Lignum	0-10	Silt loam-------	ML, CL, MH	A-4, A-6, A-7	0	95-100	95-100	80-100	55-90	30-51	9-19
	10-26	Silty clay loam, silty clay, clay.	MH, CH	A-7	0-2	80-90	75-90	70-85	55-85	50-75	22-36
	26-32	Variable.									
	32-48	Weathered bedrock.									
	48-50	Unweathered bedrock.									
LoB, LoD, LoE------ Louisburg	0-11	Loamy coarse sand.	SM	A-2, A-1-b	0-15	80-100	70-98	45-75	18-25	---	NP
	11-22	Sandy loam------	SM, SM-SC	A-2, A-4	0-15	85-100	75-98	53-78	25-40	<40	NP-7
	22-50	Weathered bedrock.									
	50-52	Unweathered bedrock.									
NaB, NaD---------- Nason	0-10	Gravelly silt loam, silt loam.	SM, ML	A-1, A-2, A-4	0-10	65-85	55-75	40-75	20-70	<38	NP-10
	10-24	Silty clay loam, silty clay, clay.	CL, CH, MH	A-7	0-5	80-100	75-100	70-95	65-90	40-62	15-30
	24-32	Channery silt loam, silt loam.	CL, CL-ML, SC, GC	A-2, A-4, A-6	0-5	60-80	50-75	40-75	30-70	20-35	4-12
	32-48	Variable.									
	48-60	Weathered bedrock.									
PaE---------- Pacolet	0-5	Sandy loam------	SM, SM-SC	A-2	0-2	85-100	80-100	60-80	20-35	<36	NP-10
	5-27	Sandy clay loam, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	51-75	38-65	11-30
	27-60	Variable.									
Pt.[1] Pits											
TaE---------- Tatum	0-5	Silt loam-------	ML, CL, SM	A-4	0	80-100	75-100	65-100	40-90	20-34	NP-10
	5-35	Silty clay loam, silty clay, clay.	MH	A-7, A-5	0	75-100	70-100	60-100	55-95	50-80	10-36
	35-50	Weathered bedrock.									
UL.[1] Udorthents											

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
VaB---------- Vance	0-8	Sandy loam------	SM, SM-SC	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-5
	8-40	Clay loam, sandy clay, clay.	CH, MH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	40-72	Weathered bedrock.									
WeD, WeE---------- Wedowee	0-7	Sandy loam------	SM, SM-SC	A-4	0	95-100	90-100	60-85	30-49	<30	NP-6
	7-28	Clay loam, clay, sandy clay loam.	SC, ML, CL, SM	A-4, A-6, A-7	0	95-100	95-100	65-97	45-70	30-58	10-25
	28-72	Variable.									
Wh---------- Wehadkee	0-10	Silt loam-------	CL, MH, ML, CH	A-6, A-7	0	100	98-100	85-100	51-95	25-52	11-22
	10-46	Loam, sandy clay loam, silty clay loam.	ML, CL	A-6, A-7	0	100	99-100	90-100	51-85	30-45	11-20
	46-60	Variable.									
WkC, WkE---------- Wilkes	0-4	Sandy loam------	ML, SM, SM-SC	A-2, A-4	0-10	90-100	80-100	60-92	25-55	<35	NP-7
	4-16	Clay loam, clay, sandy clay loam.	CL, CH, MH	A-6, A-7	0-10	80-100	80-100	75-95	50-80	30-60	11-35
	16-42	Weathered bedrock.									
	42-43	Unweathered bedrock.									
WoA---------- Worsham	0-8	Loam----------	ML, CL	A-4, A-6	0-5	90-100	85-100	70-100	50-90	20-35	4-12
	8-45	Sandy clay loam, sandy clay, clay.	SC, MH, CH	A-2, A-7	0-5	90-100	85-100	70-100	30-95	42-66	22-40
	45-50	Sandy loam, sandy clay loam, clay loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-7	0-10	90-95	80-95	50-90	30-70	20-50	12-30

[1] See description of the map unit for composition and behavior characteristics.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay less than 2 mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
ApB, AuB[1]-------- Appling	0-10	---	---	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.24	4	.5-1.5
	10-35	---	---	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	35-48	---	---	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	48-55	---	---	---	---	---	----------	---		
CeB2, CeD2, CuB[1]- Cecil	0-11	20-35	1.3-1.5	0.6-2.0	0.13-0.15	4.5-6.5	Low----------	0.28	3	.5-1
	11-52	40-60	1.3-1.5	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	52-60	---	---	---	---	---	----------	---		
Cw---------- Chewacla	0-11	---	---	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.28	4	1-3
	11-60	---	---	0.6-2.0	0.12-0.20	4.5-6.5	Low----------	0.28		
DuB---------- Durham	0-11	2-10	1.4-1.7	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.17	4	.5-2
	11-49	18-35	1.3-1.6	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.20		
	49-62	8-30	1.3-1.5	0.6-2.0	0.08-0.14	4.5-5.5	Low----------	0.20		
GeB, GeD--------- Georgeville	0-5	---	---	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.43	3	.5-1.5
	5-50	---	---	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.37		
	50-65	---	---	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.43		
	65-78	---	---	0.6-2.0	0.05-0.10	4.5-5.5	Low----------	0.43		
GoC, GoE--------- Goldston	0-6	---	---	2.0-6.0	0.10-0.15	4.0-6.0	Low----------	0.20	2	.5-1
	6-14	---	---	2.0-6.0	0.10-0.15	4.0-6.0	Low----------	0.20		
	14-23	---	---	---	---	---	----------	---		
	23	---	---	---	---	---	----------	---		
HeB---------- Helena	0-10	5-20	1.58-1.62	2.0-6.0	0.10-0.12	4.5-6.0	Low----------	0.37	3	.6-2
	10-14	20-35	1.46-1.56	0.2-0.6	0.13-0.15	4.5-5.5	Moderate-----	0.37		
	14-32	35-60	1.44-1.55	0.06-0.2	0.13-0.15	4.5-5.5	High----------	0.32		
	32-53	---	---	---	---	---	----------	---		
	53-60	---	---	---	---	---	----------	---		
IrB---------- Iredell	0-9	---	---	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.32	3	.5-2
	9-28	---	---	0.06-0.2	0.16-0.22	6.1-7.3	Very high----	0.20		
	28-32	---	---	0.06-0.6	0.14-0.18	6.1-7.8	High----------	0.28		
	32-62	---	---	---	---	---	----------	---		
LgB---------- Lignum	0-10	---	---	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.43	2	1-2
	10-26	---	---	0.06-0.6	0.10-0.18	4.5-5.5	Moderate-----	0.43		
	26-32	---	---	0.2-0.6	0.10-0.18	4.5-5.5	Low----------	0.43		
	32-48	---	---	---	---	---	----------	---		
	48-50	---	---	---	---	---	----------	---		
LoB, LoD, LoE---- Louisburg	0-11	---	---	6.0-20	0.03-0.06	4.5-6.0	Very low-----	0.20	2	.5-1
	11-22	---	---	6.0-20	0.10-0.12	4.5-6.0	Very low-----	0.24		
	22-50	---	---	---	---	---	----------	---		
	50-52	---	---	---	---	---	----------	---		
NaB, NaD--------- Nason	0-10	6-12	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.5	Low----------	0.32	4	1-3
	10-24	28-53	1.40-1.50	0.6-2.0	0.12-0.19	4.5-5.5	Moderate-----	0.28		
	24-32	7-27	1.45-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43		
	32-48	---	---	---	---	---	----------	---		
	48-60	---	---	---	---	---	----------	---		
PaE---------- Pacolet	0-5	---	---	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	3	.5-1.5
	5-27	---	---	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28		
	27-60	---	---	---	---	---	----------	---		
Pt.[1] Pits										
TaE---------- Tatum	0-5	12-27	1.10-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.37	4	0-2
	5-35	27-40	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37		
	35-50	45-60	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Moderate-----	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay less than 2 mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
UL.[1] Udorthents										
VaB---------- Vance	0-8	---	---	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.28	3	.5-1.5
	8-40	---	---	0.06-0.2	0.12-0.15	4.5-5.5	Moderate-----	0.37		
	40-72	---	---	---	---	---	----------	---		
WeD, WeE--------- Wedowee	0-7	---	---	2.0-6.0	0.10-0.18	4.5-5.5	Low----------	0.24	2	.5-1.5
	7-28	---	---	0.2-0.6	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	28-72	---	---	---	---	---	----------	---		
Wh---------- Wehadkee	0-10	---	---	2.0-6.0	0.14-0.18	4.5-6.5	Low----------	0.24	---	1-3
	10-46	---	---	0.6-2.0	0.16-0.20	4.5-6.5	Low----------	0.32		
	46-60	---	---	---	---	---	----------	---		
WkC, WkE--------- Wilkes	0-4	5-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.28	2	.5-2
	4-16	20-40	1.40-1.60	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.32		
	16-42	---	---	---	---	---	----------	---		
	42-43	---	---	---	---	---	----------	---		
WoA---------- Worsham	0-8	---	---	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.43	2	1-3
	8-45	---	---	0.06-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.43		
	45-50	---	---	0.2-0.6	0.08-0.19	4.5-5.5	Low----------	0.43		

[1] See description of the map unit for composition and behavior characteristics.

TABLE 16.--SOIL AND WATER FEATURES

[See text for definitions of terms such as "brief," "apparent," and "perched." The svmbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
ApB, AuB[1] Appling	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CeB2, CeD2, CuB[1] Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Cw Chewacla	C	Common	Brief	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High	Moderate.
DuB Durham	B	None	---	---	4.0-6.0	Perched	---	>60	---	Moderate	Moderate.
GeB, GeD Georgeville	B	None	---	---	>6.0	---	---	>60	---	High	High.
GoC, GoE Goldston	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
HeB Helena	C	None	---	---	1.0-2.5	Perched	Jan-Mar	48-80	Rip-pable	High	High.
IrB Iredell	D	None	---	---	1.0-2.0	Perched	Nov-Mar	>60	---	High	Low.
LgB Lignum	C	None	---	---	1.0-2.5	Apparent	Dec-May	40-72	Hard	High	High.
LoB, LoD, LoE Louisburg	B	None	---	---	>6.0	---	---	>48	Hard	Low	Moderate.
NaB, NaD Nason	C	None	---	---	>6.0	---	---	40-60	Rip-pable	Moderate	High.
PaE Pacolet	B	None	---	---	>6.0	---	---	>60	---	High	High.
Pt.[1] Pits											
TaE Tatum	C	None	---	---	>6.0	---	---	40-60	Rip-pable	High	High.
UL.[1] Udorthents											
VaB Vance	C	None	---	---	>6.0	---	---	>60	---	High	High.
WeD, WeE Wedowee	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Wh Wehadkee	D	Common	Brief	Nov-Jun	0-2.5	Apparent	Nov-Jun	>60	---	High	Moderate.
WkC, WkE Wilkes	C	None	---	---	>6.0	---	---	>40	Hard	Moderate	Moderate.
WoA Worsham	D	None	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High	Moderate.

[1] See description of the map unit for composition and behavior characteristics.

TABLE 17.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available.

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution										Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--							Percentage smaller than--						
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture
													Pct		Lb/ft3	Pct
Durham loamy sand:[1] (S73NC-091-003)																
Ap------- 0 to 7	A-2-4(00)	SM	100	100	100	100	100	82	24	12	7	4	--	NP	121	8
B22t-----24 to 36	A-7-6(09)	CL	100	100	100	100	100	84	52	44	39	37	47	23	107	18
Helena sandy loam:[2] (S73NC-091-010)																
Ap------- 0 to 6	A-2-4(00)	SM	100	100	100	100	99	69	26	13	7	4	--	NP	118	10
B22t-----20 to 28	A-7-6(10)	CL	100	100	99	99	99	77	56	46	38	34	45	22	106	17
C--------32 to 53	A-4 (01)	SM	100	100	100	100	100	76	43	27	19	16	32	8	111	15
Louisburg loamy coarse sand:[3] (S73NC-091-006)																
Ap------- 0 to 7	A-2-4(00)	SM	100	99	96	89	80	58	22	12	8	5	--	NP	119	11
B2-------11 to 22	A-2-4(00)	SM-SC	100	100	99	98	91	65	34	25	19	16	27	7	113	14
C--------22 to 50	A-6 (01)	SC	100	100	100	98	94	66	36	26	23	20	34	13	107	16
Vance sandy loam:[4] (S73NC-091-009)																
Ap------- 0 to 8	A-2-4(00)	SM	100	99	99	97	93	77	35	22	16	12	20	3	118	11
B2t------ 8 to 22	A-7-6(18)	CH	100	100	100	100	100	92	69	59	50	44	53	26	99	2
C1-------40 to 95	A-6 (04)	ML	100	100	100	100	100	89	53	37	26	22	39	11	104	18
Wilkes fine sandy loam:[5] (S73NC-091-011)																
Ap------- 0 to 4	A-4 (00)	ML	100	99	97	92	84	75	51	22	11	8	26	2	115	13
B2t------ 4 to 10	A-7-6(31)	CH	100	100	100	100	99	96	84	51	39	36	57	35	102	20
Cr-------16 to 42	A-4 (03)	ML	100	100	100	100	98	92	64	20	8	6	33	7	112	16

[1]Durham loamy sand:
1.9 miles east of Vance High School on State Route 1001, 0.2 mile north on farm road, and 50 feet west of road in field.

[2]Helena sandy clay loam:
0.3 mile north on State Route 1326 from junction with State Route 1303, 0.2 mile east on farm road and 20 feet north in woods.

[3]Louisburg loamy coarse sand:
In Henderson, 0.2 mile southeast on North Carolina Highway 39 from junction with U.S. Highway 1 Bypass, 0.2 mile south on Shank Street, and 500 feet west.

[4]Vance sandy clay loam:
2.2 miles north of Interstate 85 on State Route 1319 and 50 feet west into field.

[5]Wilkes fine sandy loam:
0.6 mile west on State Route 1311 from junction with North Carolina Highway 39, 0.3 mile west on gravel road, and 510 feet west.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Durham	Fine-loamy, siliceous, thermic Typic Hapludults
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Goldston	Loamy-skeletal, siliceous, thermic, shallow Ruptic-Ultic Dystrochrepts
Helena	Clayey, mixed, thermic Aquic Hapludults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
Lignum	Clayey, mixed, thermic Aquic Hapludults
Louisburg	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Nason	Clayey, mixed, thermic Typic Hapludults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Tatum	Clayey, mixed, thermic Typic Hapludults
Vance	Clayey, mixed, thermic Typic Hapludults
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents.
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs
Worsham	Clayey, mixed, thermic Typic Ochraquults

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