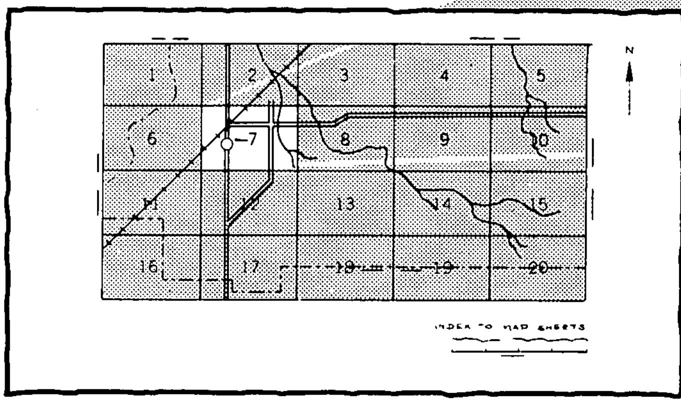
SOIL SURVEY OF

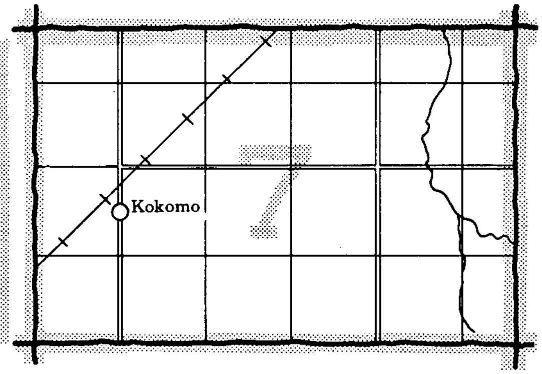
Washington County, North Carolina

United States Department of Agriculture
Soil Conservation Service
in cooperation with
North Carolina Agricultural Research Service
North Carolina Agricultural Extension Service
Washington County Board of Commissioners, and
North Carolina Department of Natural Resources
and Community Development

HOW TO USE

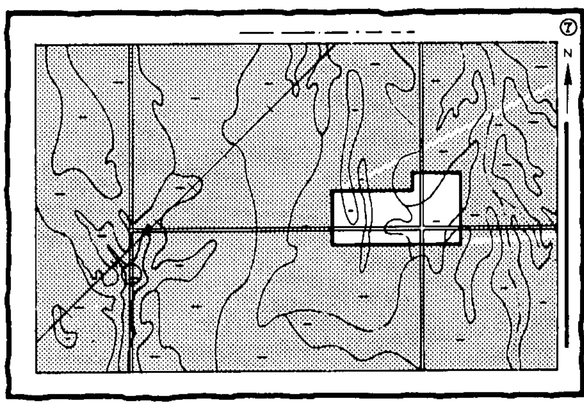
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

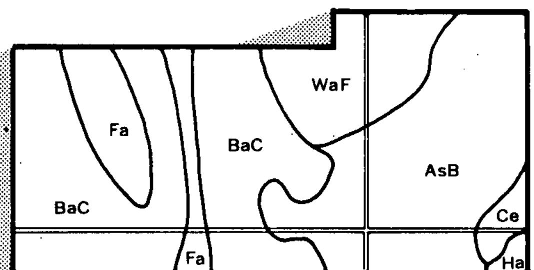




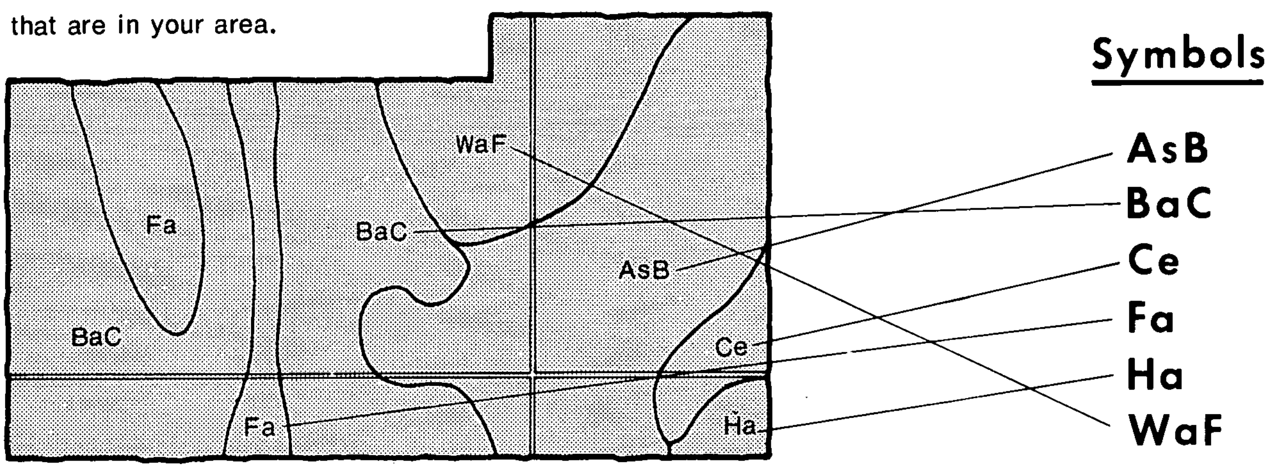
2. Note the number of the map sheet and turn to that sheet.

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



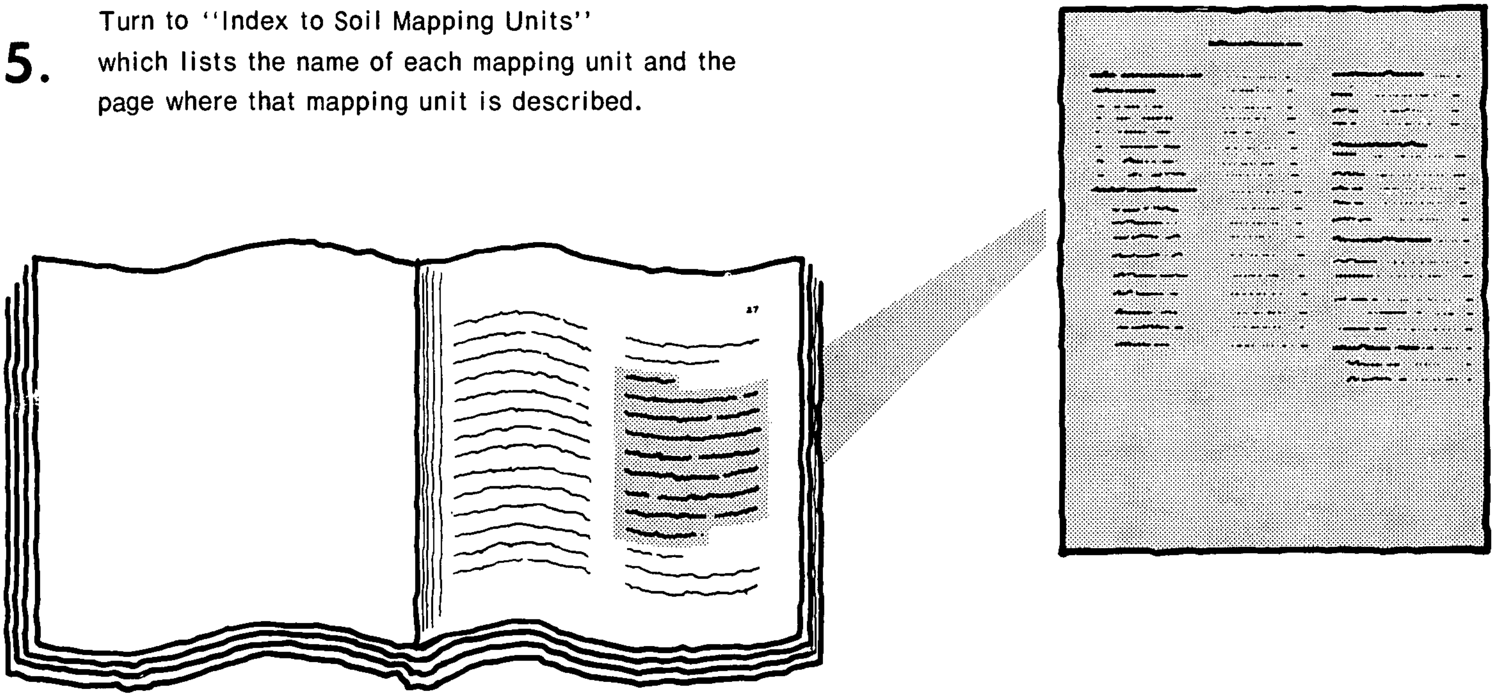


4. List the mapping unit symbols that are in your area.

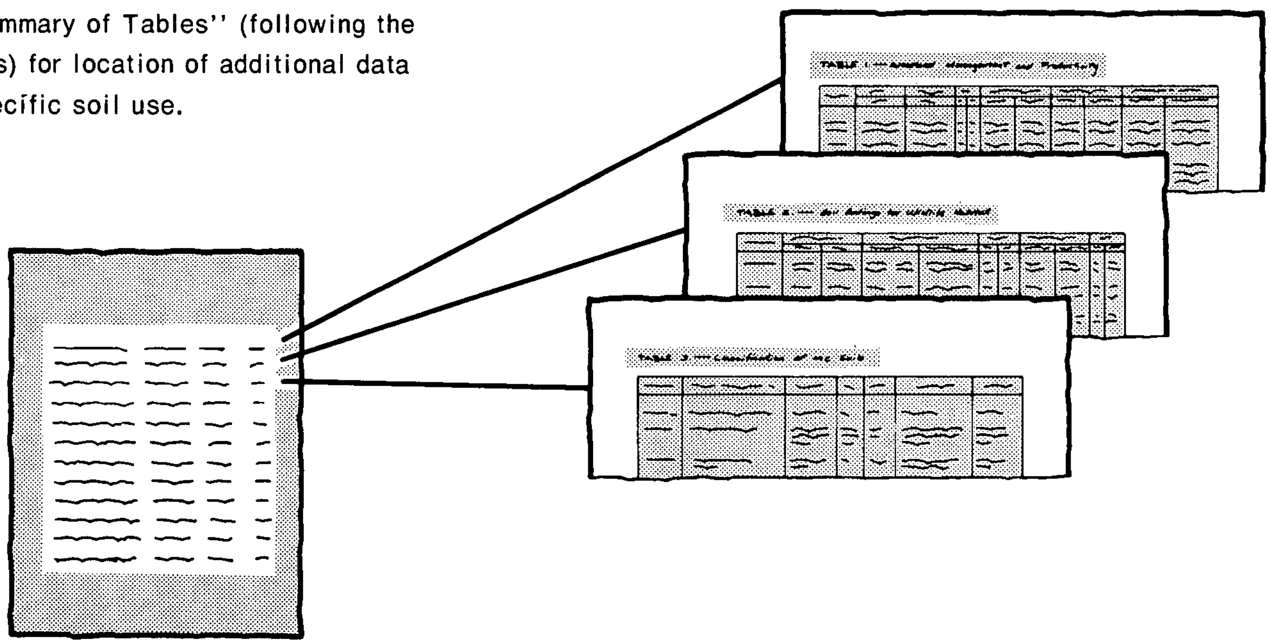


THIS SOIL SURVEY

5. Turn to ''Index to Soil Mapping Units'' which lists the name of each mapping unit and the page where that mapping 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 Research Service, 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 in the period 1976-78. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service and the North Carolina Agricultural Research Service, North Carolina Agricultural Extension Service, Washington County Board of Commissioners, and North Carolina Department of Natural Resources and Community Development. Soil scientists and agronomists of First Colony Farms, Inc., contributed to the survey. It is part of the technical assistance furnished to the Pamlico 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: Somerset Place, one of the oldest homes in the Carolinas, was built near Creswell by Josiah Collins III about 1830. Corn produced on the Collins estate was shipped worldwide. (Photo courtesy of North Carolina Department of Commerce, Travel, and Tourism Division.)

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Issue December 1981

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foreword

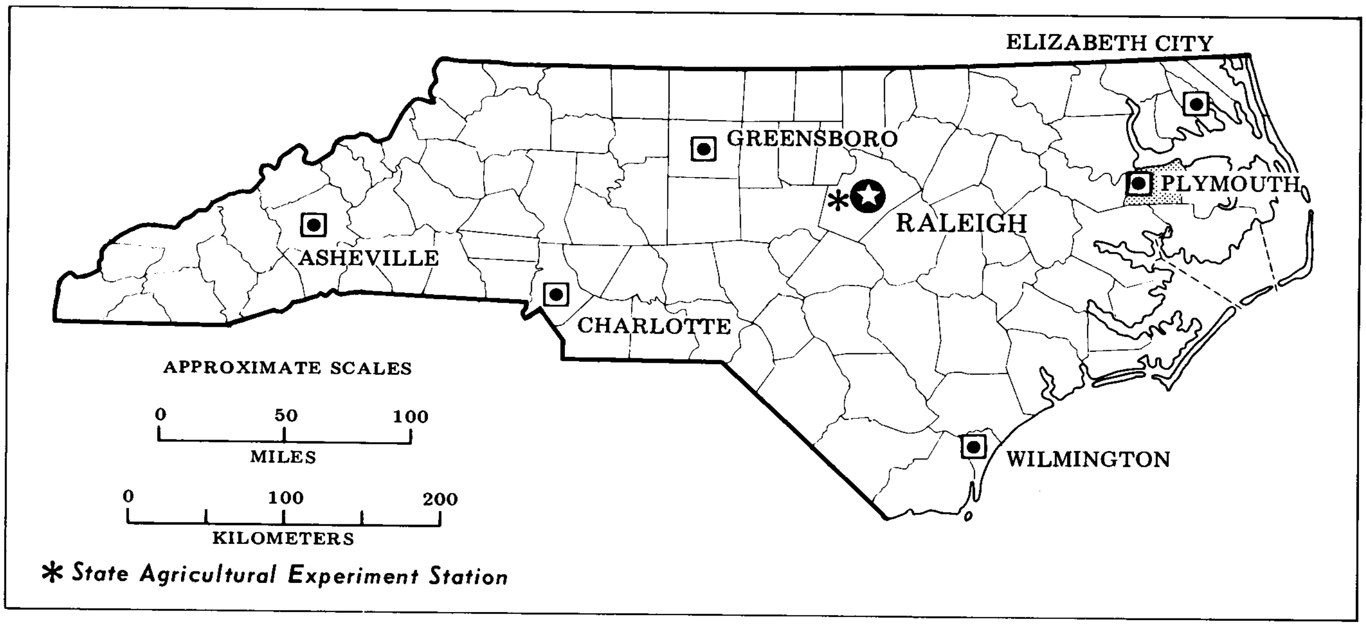
This soil survey contains information that can be used in land-planning programs in Washington County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to 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 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 Washington County in North Carolina.

soil survey of
Washington County, North Carolina

By Phillip L. Tant

Soils surveyed by Phillip L. Tant, Everett L. Coates, James H. Ware, Michael K. Kimbro, and John P. Wulforst, Soil Conservation Service, J. Roger Hansard, North Carolina Department of Natural Resources and Community Development, and Steve Barnes, First Colony Farms

United States Department of Agriculture, Soil Conservation Service
in cooperation with the North Carolina Agricultural Research Service
North Carolina Agricultural Extension Service, Washington County Board of Commissioners, and
North Carolina Department of Natural Resources and Community Development

WASHINGTON COUNTY is in the Northeastern Lower Coastal Plain region of North Carolina. In 1970, the U.S. Census reported a population of 14,114. Plymouth, the county seat, had a population of 4,910, Roper had 750, and Creswell had 680. The county has a land area of 215,040 acres, or 336 square miles.

The county lies across the divides of two major river basins. The northwestern part drains into the Roanoke River Basin, and the southern part drains into the Pungo River Basin. The rest of the county drains into Albemarle Sound.

The elevation ranges from 15 feet to 50 feet above sea level in the western part of the county and is less than 5 feet on the flood plains of the Scuppernong River and Bull's Bay Swamp in the northeastern corner. The highest point in the county is near Hoke.

Figure 1 illustrates the soil, landscape, and seasonal water table pattern.

general nature of the survey area

This section gives general information concerning the county. It discusses settlement, climate, and water supply.

settlement

The first settlers in Washington County were Indian tribes, who lived in the area as early as 10,000 years ago. The plentiful game and fish was their main food supply, along with a few cultivated crops such as maize.

Two small tribes, the Moratucs and the Secotans, of the Algonquian nation were the main inhabitants of Washington County before the arrival of the first European settlers. By 1755, less than 100 years after settlement, the total Indian population in the northeastern part of North Carolina was less than 365 (*3*).

Trapping, logging, and farming were the main sources of livelihood in the early years of the colony. Trade was begun with the West Indies and the northern colonies. The main exports were tar, pitch, turpentine, lumber, corn, and tobacco.

In 1702, a gristmill and sawmill were built in an area that was known as Lee's Mill. By 1799, Washington County had become established, and the town known as Lee's Mill became the first county seat. The name Lee's Mill was changed to Roper in 1890.

Several large estates were built in the county, chiefly Buncombe Hall, built in Roper, and Josiah Collins' Somerset Place on Lake Phelps. Corn produced on Collins' plantation was shipped worldwide.

Plymouth, which was an important seaport, was laid out in 1785. It became the first incorporated town in the county and is the present county seat.

water supply

Ground water is the only source of water in Washington County. Only Roper and Plymouth have public water supplies (*4*).

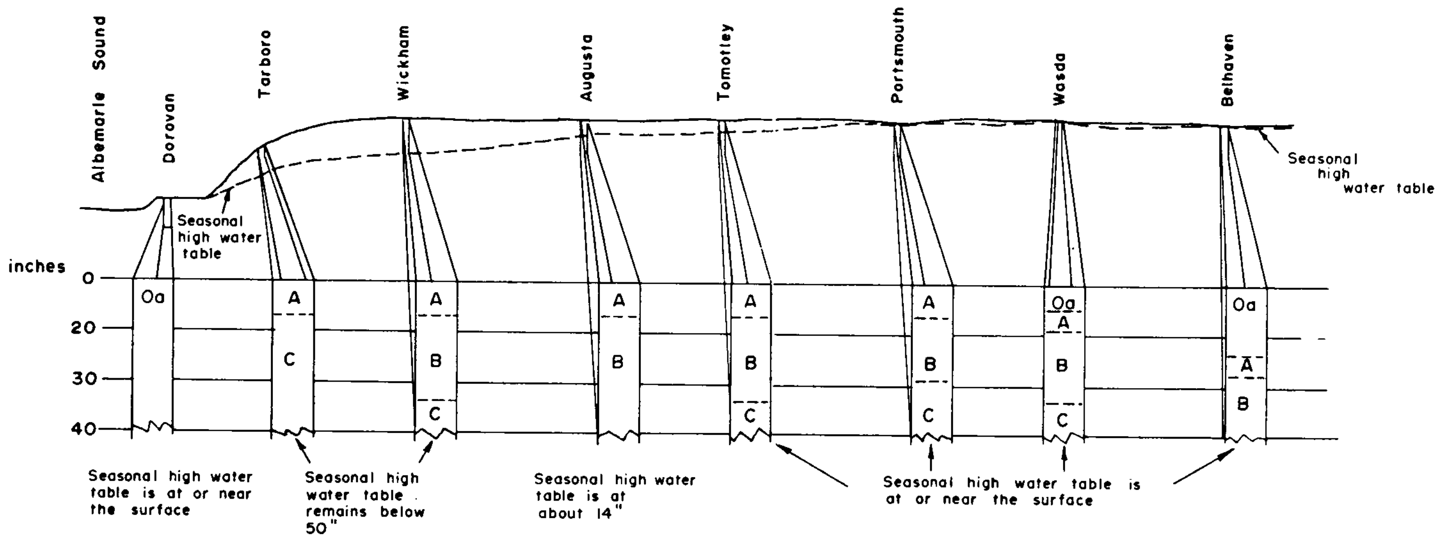


Figure 1.—Soil-land-seasonal high water table relationship. Relationship illustrated shows transition from mineral soils in northern part of county to organic soils commonly found in southern part.

Thousands of feet of sedimentary deposits underlie the survey area. The upper sandy and shaly aquifer ranges in depth from more than 400 feet in the southern half of the survey area to less than 100 feet in the immediate vicinity of Albemarle Sound. This aquifer can yield up to 1,000 gallons of fresh water per minute to wells. The limestone aquifer, which underlies the sand and shale, can yield thousands of gallons of fresh water per minute, except in the northern third of the survey area, where it contains mostly salty water.

The estimated maximum yield of ground water in the survey area is 1 million gallons per day per square mile. The water is characteristically very hard and may contain an excessive amount of iron. In places, water from the limestone aquifer contains hydrogen sulfide.

climate

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

Washington County is hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool, with occasional brief cold spells. Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Plymouth in the period 1951 to 1977. 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 44 degrees F, and the average daily minimum temperature is 32 degrees. The lowest temperature on record, which occurred at Plymouth on January 13, 1962, is 1 degree. In summer the average temperature is 77 degrees, and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred on June 26, 1952, is 102 degrees.

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

The total annual precipitation is 51 inches. Of this, 29 inches, or 57 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 25 inches. The heaviest 1-day rainfall during the period of record was 5.20 inches at Plymouth on September 19, 1955. Thunderstorms occur on about 45 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 12 inches. On an average of 1 day, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter.

The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in spring.

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; and the kinds of native plants or crops. 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 very 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.

soil descriptions

1. Augusta-Altavista-Wahee

Nearly level, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

This map unit is on low ridges near small streams that flow into the Roanoke River and Albemarle Sound.

This map unit makes up 13 percent of the county. It is about 21 percent Augusta soils, 18 percent Altavista soils, 14 percent Wahee soils, and 47 percent Wickham, Bojac, Dragston, Conetoe, Dogue, Tarboro, Muckalee, and Roanoke soils.

The Augusta soils are somewhat poorly drained. The surface layer is dark grayish brown fine sandy loam. The subsurface layer is pale olive fine sandy loam. The upper part of the subsoil is light yellowish brown sandy loam, and the lower part is light brownish gray clay loam and gray sandy clay loam. The underlying material is light gray sandy loam and loamy sand.

The Altavista soils are moderately well drained. The surface layer is grayish brown fine sandy loam. The subsurface layer is light yellowish brown fine sandy loam. The upper part of the subsoil is brownish yellow and light brownish gray clay loam, and the lower part is light gray sandy clay loam. The underlying material is mottled light gray, yellow, and strong brown loamy sand.

The Wahee soils are somewhat poorly drained. The surface layer is grayish brown fine sandy loam. The upper part of the subsoil is light yellowish brown sandy clay loam, the middle part is light olive brown, gray, and light olive gray clay and clay loam, and the lower part is light brownish gray sandy clay loam. The underlying material is mottled light gray and yellowish brown sand and loamy sand.

The soils in this unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are well suited to use as cropland and pasture and to woodland use, and they are suited or poorly suited to most urban uses. Wetness and permeability are the main limitations to use and management.

2. Conetoe-Wickham-Tarboro

Nearly level and gently sloping, well drained and somewhat excessively drained soils that have a sandy surface layer and a dominantly loamy subsoil or sandy underlying material; on uplands

This map unit is on low ridges near small streams that flow into the Roanoke River and Albemarle Sound.

This map unit makes up about 3 percent of the county. It is about 22 percent Conetoe soils, 2l percent Wickham soils, 14 percent Tarboro soils, and 43 percent Altavista, Augusta, Dragston, Muckalee, and Roanoke soils.

The Conetoe soils are well drained. The surface layer is brown loamy fine sand. The subsurface layer is yellowish brown loamy fine sand. The upper part of the subsoil is strong brown sandy loam, and the lower part is yellowish brown loamy sand. The underlying material is brownish yellow and very pale brown sand.

The Wickham soils are well drained. The surface layer is dark brown loamy sand. The upper part of the subsoil is yellowish red sandy clay loam, and the lower part is yellowish red sandy loam. The underlying material is strong brown fine sand.

The Tarboro soils are somewhat excessively drained. The surface layer is sand that is dark grayish brown in the upper part and brown in the lower part. The underlying material is brownish yellow, yellowish brown, yellow, and pale brown sand.

The soils in this map unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are suited or well suited to use as cropland and pasture and to woodland use, and they are well suited to most urban uses. Leaching of plant nutrients, soil blowing, and droughtiness are the main limitations to use and management.

3. Dragston-Conetoe-Altavista

Nearly level and gently sloping, somewhat poorly drained, well drained, and moderately well drained soils that have a sandy or loamy surface layer and a loamy and sandy subsoil; on uplands

This map unit is on low ridges near small streams that flow into the Roanoke River.

This map unit makes up about 3 percent of the county. It is about 25 percent Dragston soils, 21 percent Conetoe soils, 19 percent Altavista soils, and 35 percent Augusta, Bojac, Muckalee, Dogue, Wahee, Tomotley, and Roanoke soils.

The nearly level Dragston soils are somewhat poorly drained. The surface layer is dark brown loamy fine sand. The upper part of the subsoil is light yellowish brown sandy loam; the middle part is light olive brown and light brownish gray sandy loam; and the lower part is mottled brownish yellow, light gray, and strong brown loamy fine sand. The underlying material is light gray sand.

The nearly level and gently sloping Conetoe soils are well drained. The surface layer is brown loamy fine sand. The subsurface layer is yellowish brown loamy fine sand. The upper part of the subsoil is strong brown sandy loam, and the lower part is yellowish brown loamy sand. The underlying material is brownish yellow and very pale brown sand.

The nearly level Altavista soils are moderately well drained. The surface layer is grayish brown fine sandy loam. The subsurface layer is light yellowish brown fine sandy loam. The upper part of the subsoil is brownish yellow and light brownish gray clay loam, and the lower part is light gray sandy clay loam. The underlying material is mottled light gray, yellow, and strong brown loamy sand.

The soils in this map unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are well suited or suited to use as cropland and pasture and to use as woodland. They are well suited, suited, or poorly suited to most urban uses. Wetness, leaching of plant nutrients, soil blowing, and droughtiness are the main limitations to use and management.

4. Cape Fear-Portsmouth-Roanoke

Nearly level, very poorly drained and poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil; on stream terraces

This map unit is mainly in the Blacklands and makes up about 40 percent of the county. It is about 33 percent Cape Fear soils, 23 percent Portsmouth soils, 14 percent Roanoke soils, and 30 percent Arapahoe, Argent, Hyde, and Tomotley soils.

The Cape Fear soils are very poorly drained. The surface layer is loam that is black in the upper part and very dark gray in the lower part. The upper part of the subsoil is dark gray clay loam, the middle part is gray clay, and the lower part is mottled gray and yellowish brown sandy loam. The underlying material is gray stratified sand and loamy sand.

The Portsmouth soils are very poorly drained. The surface layer is black fine sandy loam. The subsurface layer is gray fine sandy loam. The upper part of the subsoil is gray and dark gray fine sandy loam; the middle part is gray and dark gray sandy clay loam; and the lower part is mottled gray, yellowish brown, and reddish yellow sandy loam. The underlying material is gray and light gray sand and coarse sand.

The Roanoke soils are poorly drained. The surface layer is very dark gray loam. The upper part of the subsoil is light brownish gray clay loam and light gray clay, and the lower part is light brownish gray sandy clay loam. The underlying material is mottled light brownish gray, brownish yellow, and strong brown loamy sand and light brownish gray stratified loamy sand, sandy loam, and clay loam.

The soils in this map unit are used mainly as cropland. In a few areas they are used as pasture and woodland. These soils are well suited to most locally grown crops and pasture and to woodland, and they are poorly suited to most urban uses. Wetness and permeability are the main limitations in use and management.

5. Dorovan

Nearly level, very poorly drained soils that are dominantly muck throughout; on flood plains

This map unit is on low-lying flood plains and in large undrained swamps.

This map unit makes up 9 percent of the county. It is about 90 percent Dorovan soils and 10 percent Dorovan mucky silt loam, overwash, and Muckalee soils.

The Dorovan soils are very poorly drained. The muck is very dark grayish brown in the upper part, black in the middle part, and very dark grayish brown in the lower part.

The soils in this map unit are used almost exclusively as woodland. They are poorly suited to use as cropland and pasture, to use as woodland, and to most urban uses. Wetness, flooding, and low strength are the main limitations to use and management.

6. Belhaven-Wasda-Roper

Nearly level, very poorly drained soils that have a mucky surface layer and a dominantly loamy subsoil; on broad, level flats

This map unit is on the organic flats of the Blacklands and makes up about 25 percent of the county. It is about 47 percent Belhaven soils, 13 percent Wasda soils, 12 percent Roper soils, and 28 percent Conaby, Pettigrew, Scuppernong, Fortescue, and Ponzer soils.

The surface layer of the Belhaven soils is black muck. Below this is dark reddish brown and very dusky red muck. The underlying mineral soil is very dark gray sandy loam in the upper part. The subsoil is dark gray and gray clay loam. Below that is greenish gray loamy sand.

The surface layer of the Wasda soils is muck that is black in the upper part and dark reddish brown in the lower part. The underlying mineral soil is dark grayish brown clay loam, and the subsoil is grayish brown and dark grayish brown clay loam. Below that is dark greenish gray sandy loam and sand.

The Roper soils have surface and subsurface layers of black muck. The upper part of the underlying mineral soil is very dark gray mucky silt loam. The subsoil is dark grayish brown silty clay loam and grayish brown silt loam in the upper part, and greenish gray silt loam in the lower part. The material below that is dark gray and greenish gray stratified sand and loamy sand.

The soils in this map unit are used mainly as cropland. In a few areas they are used as woodland and wildlife habitat. If drained, these soils are suited or well suited to use as cropland and pasture and to use as woodland. They are poorly suited to most urban uses. Wetness and low strength are the main limitations to use and management.

7. Pungo

Nearly level, very poorly drained soils that are muck to a depth of 51 inches or more; on broad, level flats

This map unit is in the Blacklands. It makes up about 7 percent of the county. It is 98 percent Pungo soils and 2 percent Belhaven soils.

Undecomposed plant material makes up the surface layer of the Pungo soils. Below this is dark reddish brown, very dark brown, and black muck. The underlying material is gray clay.

The soils in this map unit are used almost exclusively as wildlife habitat and woodland. They are poorly suited to use as cropland and pasture, to woodland use, and to urban uses. Wetness, low strength, and logs, stumps, and roots are the main limitations to use and management.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, 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*. 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, Dorovan mucky silt loam is one of several phases in the Dorovan series.

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.

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

AaA—Altavista fine sandy loam, 0 to 2 percent slopes. This is a moderately well drained soil in the northern and western parts of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. Most areas are oblong and are irregular in width and commonly range from 5 to 20 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 6 inches thick. The subsurface layer is light yellowish brown fine sandy loam 3 inches thick. The subsoil is 30 inches thick. The upper part is brownish yellow and light brownish gray clay loam. The lower part is light gray sandy clay loam. The underlying material to a depth of 78 inches is mottled light gray, yellow, and strong brown loamy sand.

Included in mapping are small areas of Dogue, Augusta, and Wickham soils that are common in adjacent areas. Augusta soils are in small depressions. The other included soils are mostly near the outer edge of the unit. Also included, west of the Suffolk scarp along N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Altavista series.

The organic matter content in the surface layer is low. Permeability is moderate, and available water capacity is medium. The soil ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed. The seasonal high water table is at a depth of about 1 1/2 to 2 1/2 feet late in winter and early in spring.

Most of the acreage of this soil is cultivated. The rest is mainly pasture or woodland.

This soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness early in spring is a limitation for growing some specialty crops such as peanuts. Winter cover crops, minimum tillage, and crop residue help maintain tilth and production. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops also help conserve soil and water.

The soil is also well suited to pasture forage.

This soil is suited or poorly suited to most urban uses. It is suited to most recreation uses. Wetness, however, is a limitation to those uses.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation to woodland use and management.

This Altavista soil is in capability subclass IIw and woodland group 2w.

Ap—Arapahoe fine sandy loam. This is a nearly level, very poorly drained soil that is commonly in the Blacklands. The mapped areas are irregular in shape and range from 10 to 600 acres in size.

Typically, the surface layer is 13 inches thick. It is fine sandy loam that is very dark gray in the upper part and black in the lower part. The subsoil is 20 inches thick. It is grayish brown fine sandy loam in the upper part and dark gray fine sandy loam in the middle and lower parts. The underlying material to a depth of 72 inches is mottled light gray, gray, and dark gray, stratified sand and loamy sand in the upper part, dark greenish gray sandy loam in the middle part, and greenish gray sand in the lower part.

Included in mapping are small areas of Portsmouth, Cape Fear, Conaby, and Wasda soils. Also included are small areas that are sandy. Most of these included soils are near the outer edge of the map unit.

The organic matter content in the surface layer is high. Permeability is moderately rapid. Except where limed, the soil is strongly acid to extremely acid in the upper part of the profile and strongly acid to mildly alkaline in the lower part. The seasonal high water table is at or near the surface in undrained areas. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain organic matter and production. Spring tillage and fall harvest are often delayed because of wetness. Lack of suitable outlets is a limitation to the installation of drainage systems.

This soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses. Wetness is the main limitation to those uses.

The dominant trees are baldcypress, pond pine, red maple, green ash, sweetgum, black tupelo, swamp tupelo, elm, yellow-poplar, river birch, and water and willow oaks. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland use and management.

This Arapahoe soil is in capability subclass IIIw, drained, and woodland group 2w.

Ar—Argent silt loam. This is a poorly drained, nearly level soil in the northeastern part of the county. It is on broad flats near small streams that flow into Albemarle Sound. The mapped areas are irregular in shape and range from 100 to 4,000 acres in size.

Typically, the surface layer is dark gray silt loam 6 inches thick. The subsurface layer is light gray silt loam 3 inches thick. The subsoil is 43 inches thick. It is gray silty clay in the upper part and light olive gray silty clay loam in the lower part. The underlying material to a depth of 84 inches is light gray sand.

Included in mapping are small areas of Cape Fear and Roanoke soils. Cape Fear soils occur in small depressions. Most of the included soils are on the outer edge of the unit.

The organic matter content is low. Permeability is slow, and shrink-swell potential is moderate. Except where limed, the soil ranges from medium acid to extremely acid to a depth of 50 to 60 inches. Below that depth, it ranges from medium acid to mildly alkaline. The seasonal high water table is at or near the surface.

Most of the acreage of this soil is cultivated. The rest is mainly pasture or woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the crop rotation help maintain tilth and production. Spring tillage and fall harvest may be delayed because of wetness. Lack of suitable outlets and slow permeability are limitations in the installation of drainage systems.

This soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses. Wetness, permeability, and low strength as it affects local roads and streets are limitations to those uses.

The dominant native trees are loblolly pine, yellow-poplar, red maple, green ash, hickory, sweetgum, elm, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness and flooding are the main limitations to woodland use and management.

This Argent soil is in capability subclass IIIw, drained, and woodland group 1w.

At—Augusta fine sandy loam. This is a somewhat poorly drained, nearly level soil in the northern part of the county. It is adjacent to small streams and waterways that flow into Albemarle Sound and the Roanoke River. Most areas are oblong and irregular in width and range from 5 to 75 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 7 inches thick. The subsurface layer is pale olive fine sandy loam 4 inches thick. The subsoil is 50 inches thick. It is light yellowish brown sandy loam in the upper part and light brownish gray clay loam and gray sandy clay loam in the lower part. The underlying material to a depth of 72 inches is light gray sandy loam and loamy sand.

Included in mapping are small areas of Altavista and Wahee soils that are common in adjacent areas. Most of the included soils are near the outer edge of the unit, but small knolls of Altavista soils may occur in the unit. Also included, west of the Suffolk scarp and N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Augusta series.

The organic matter content in the surface layer is low. Permeability is moderate and available water capacity is medium. Except where limed, the soil is very strongly acid to medium acid throughout. The seasonal high water table is within 1 to 2 feet of the surface.

Most of the acreage of this soil is cultivated. The rest is mainly pasture or woodland.

The soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation if the soil is cultivated. Winter cover crops, minimum tillage, and crop residue help maintain tilth and production. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops also help conserve soil and water.

The potential is high for pasture forage.

This soil is poorly suited to most urban and recreation uses. Wetness and the seasonal high water table are limitations to those uses.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory includes dogwood, sourwood, sweetbay, and sassafras along with a variety of briers and reeds. Wetness is the main limitation to woodland use and management.

This Augusta soil is in capability subclass IIIw and woodland group 2w.

Ba—Belhaven muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 100 to 10,000 acres in size.

Typically, the surface layer is black muck 9 inches thick. Below this, to a depth of 26 inches, is dark reddish brown and very dusky red muck. The upper part of the underlying mineral soil is very dark gray sandy loam 6 inches thick. The subsoil, to a depth of 65 inches, is dark gray and gray clay loam. Below this to a depth of 72 inches is greenish gray loamy sand.

Included in mapping are small areas of Pungo, Roper, Wasda, Pettigrew, and Conaby soils. These soils are intermingled throughout the map unit.

Permeability of the Belhaven muck is moderately slow to moderately rapid. The organic layers are extremely acid except in limed areas. The underlying mineral layers range from slightly acid to extremely acid. Many logs, roots, and stumps occur throughout the profile in most areas. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained and managed properly, this soil is suited to crops, dominantly corn and soybeans. Heavy applications of lime and the addition of copper and other micronutrients are needed in the cultivated areas. The many logs, roots, and stumps in the organic layers should be removed before the soil is cultivated (fig. 2). Spring tillage and fall harvest may be delayed because of wetness. Soil blowing can occur during spring planting. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban uses and to recreation uses, mainly because of wetness and low strength.

The dominant native trees are red maple, sweetgum, baldcypress, and blackgum. The understory includes mainly inkberry, fetterbush lyonia, huckleberry, greenbrier, waxmyrtle, and switchcane. Wetness is the main limitation to woodland use and management.

This Belhaven soil is in capability subclass VIIw and woodland group 4w.

BoA—Bojac loamy fine sand, 0 to 3 percent slopes. This is a well drained soil in the northern part of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. Most areas are oblong and are irregular in width and range from 5 to 70 acres in size.

Typically, the surface layer is dark brown loamy fine sand 16 inches thick. The subsoil is 36 inches thick. The upper part is strong brown sandy loam, and the lower part is brownish yellow loamy sand. The underlying material to a depth of 86 inches is very pale brown loamy sand and light yellowish brown sand.

Included in mapping are small areas of Conetoe and Wickham soils. These soils are intermingled throughout the map unit. Also included, west of Suffolk scarp on N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Bojac series.

The organic matter content in the surface layer of the Bojac soil is low. Permeability is moderately rapid, and available water capacity is low. The soil ranges from very strongly acid to slightly acid throughout, except where the surface layer has been limed. The seasonal high water table is below a depth of 4 feet.

Most of the acreage of this soil is cultivated. The rest is main pasture and woodland.

This soil is well suited to most locally grown crops. Peanuts, corn, and soybeans are the dominant crops. Leaching of plant nutrients, droughtiness, and susceptibility to soil blowing are the main limitations to use for crops. Winter cover crops, minimum tillage, and crop residue help control erosion and maintain tilth and organic matter content. Conservation practices such as no-till planting, the use of field borders, and the use of

Figure 2.—A recently cleared field of Belhaven muck.

crop rotations that include close-growing crops help conserve soil and water and reduce leaching and soil blowing.

This soil is well suited to pasture forage.

This soil is well suited to most urban uses. The sandy material provides good support for most structures. The sandy surface, however, is subject to soil blowing, and it is droughty when rainfall is limited. This soil is well suited to most recreation uses.

The dominant native trees are loblolly pine, hickory, American elm, black cherry, American beech, southern red oak, water oak, and white oak. The understory includes mainly dogwood, sassafras, sourwood, and southern waxmyrtle. There are no major limitations to woodland use and management.

This Bojac soil is in capability subclass IIs and woodland group 3o.

Cf—Cape Fear loam. This is a nearly level, very poorly drained soil. It is commonly in the Blacklands and in slight depressions near small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 10 to 1,000 acres in size.

Typically, the surface layer is 14 inches thick. It is loam that is black in the upper part and very dark gray in the lower part. The subsoil is 38 inches thick. It is dark gray clay loam in the upper part, gray clay in the middle part, and mottled gray and yellowish brown sandy loam in the lower part. The underlying material to a depth of 72 inches is gray, stratified sand and loamy sand.

Included in mapping are small areas of Portsmouth, Roanoke, Argent, Pettigrew, and Roper soils that are common in adjacent areas. Most of the included soils are near the outer edge of the unit, but some areas of Pettigrew and Roper soils occur in small depressions within the unit.

Organic matter content in the surface layer of the Cape Fear soil is high. Permeability is slow, and shrink-swell potential is moderate. The soil ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cropland use. Minimum tillage, cover crops, and grasses and legumes in the crop rotation help maintain tilth and production. Spring tillage and fall harvest may be delayed because of wetness. Lack of suitable outlets and slow permeability are limitations to the installation of drainage systems.

This soil is well suited to pasture forage, such as fescue and ladino clover.

This soil is poorly suited to most urban and recreation uses. Wetness, permeability, and low strength are the main limitations to those uses.

The dominant native trees are baldcypress, pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, swamp tupelo, elm, river birch, water oak, willow oak, and swamp white oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland use and management.

This Cape Fear soil is in capability subclass IIIw and woodland group 1w.

Co—Conaby muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 10 to 350 acres in size.

Typically, the surface layer is muck 13 inches thick. It is very dark gray in the upper part, black in the middle part, and very dark grayish brown in the lower part. The upper part of the mineral soil is dark brown and grayish brown sand 8 inches thick. The subsoil is 12 inches of very dark gray sandy loam. The underlying material to a depth of 74 inches is dark greenish gray stratified sand and sandy loam.

Included in mapping are small areas of Arapahoe, Wasda, and Portsmouth soils that are common in adjacent areas. Most of the included soils are near the outer edge of the unit.

Permeability in the Conaby muck is moderate or moderately slow in the organic layers and moderately rapid in the mineral layer. The soil ranges from strongly acid to extremely acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Spring tillage and fall harvest can be delayed because of wetness. Heavy initial applications of lime are needed for crop production. During spring planting, soil blowing is a hazard. Conservation practices such as minimum tillage, use of field borders, and use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses. Wetness and high organic matter content are limitations to those uses.

The dominant native trees are red maple, sweetgum, baldcypress, blackgum, loblolly pine, and sweetbay. The understory includes mainly swamp cyrilla, sweetbay, waxmyrtle, pawpaw, fetterbush, and switchcane. Wetness is the main limitation to woodland use and management.

This Conaby soil is in capability subclass IIIw and woodland group 2w.

CtA—Conetoe loamy fine sand, 0 to 3 percent slopes. This is a well drained soil in the northern and western parts of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. Most areas are oblong and irregular in width and range from 5 to 100 acres in size.

Typically, the surface layer is brown loamy fine sand 12 inches thick. The subsurface layer is yellowish brown loamy fine sand 16 inches thick. The subsoil is 28 inches thick. It is strong brown sandy loam in the upper part and yellowish brown loamy sand in the lower part. The underlying material to a depth of 99 inches is brownish yellow sand in the upper part and very pale brown sand in the lower part.

Included in mapping are small areas of Tarboro, Wickham, and Bojac soils that are intermingled throughout this map unit. Also included, west of the Suffolk scarp on N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Conetoe series.

The organic matter content in the surface layer of the Conetoe soil is low. Permeability is moderately rapid, and available water capacity is low. The soil is very strongly acid to medium acid throughout, except where the surface layer has been limed.

Most of the acreage of this soil is cultivated. The rest is mainly woodland or pasture.

The soil is well suited to peanuts and is suited to most other locally grown crops. Peanuts, corn, and soybeans are the dominant crops. The main limitations of the soil as cropland are leaching of plant nutrients, soil blowing, and droughtiness. Blowing sand can damage young plants. Alternate rows of small grain can help prevent damage to young, tender plants such as watermelons by soil blowing. Winter cover crops, minimum tillage, and crop residue help maintain organic matter content and conserve moisture. Conservation practices such as no-till planting, the use of windbreaks, and the use of crop rotations that include close-growing crops also help conserve soil and water. Split applications of fertilizers, particularly nitrogen, are needed.

This soil is well suited to pasture forage such as Coastal bermudagrass and bahiagrass.

This soil is well suited to most urban uses. The thick sandy material provides a good support for most structures. The unprotected sandy surface, however, is subject to soil blowing and is droughty when rainfall is limited. The soil is well suited to recreation uses.

The dominant native trees are loblolly pine, longleaf pine, red maple, hickory, sweetgum, black tupelo, southern red oak, white oak, and post oak. The understory includes mainly dogwood, sassafras, American holly, and sourwood. Low available water capacity is the main limitation to woodland use and management.

This Conetoe soil is in capability subclass IIs and woodland group 3s.

DgA—Dogue fine sandy loam, 0 to 3 percent slopes. This is a moderately well drained soil in the northern part of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. Most areas are oblong and irregular in width. They commonly range from 10 to 30 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 8 inches thick. The subsurface layer is very pale brown fine sandy loam 3 inches thick. The subsoil is 59 inches thick. The upper part is light yellowish brown sandy clay loam; the middle part is brownish yellow clay loam, yellowish brown clay, and mottled light gray, brownish yellow, strong brown, and light reddish brown clay; and the lower part is mottled light yellowish brown, brownish yellow, strong brown, and gray sandy loam. The underlying material to a depth of 84 inches is yellow loamy sand and sand.

Included in mapping are small areas of Wickham, Altavista, and Wahee soils. Altavista and Wickham soils are intermingled throughout this map unit. Wahee soils may occur in slight depressions and drainageways. Included in some areas are soils that have short, steep slopes of more than 3 percent. These soils are adjacent to drainageways. Also included, west of Suffolk scarp on N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Dogue series.

The organic matter content in the surface layer of the Dogue soil is low. Permeability is moderately slow, available water capacity is medium, and shrink-swell potential is moderate. The soil is extremely acid to strongly acid throughout, except where the surface layer has been limed. The seasonal high water table is 1 1/2 to 3 feet below the surface.

Most of the acreage of this soil is cultivated. The rest is mainly woodland or pasture.

This soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Seasonal wetness is a limitation for some specialty crops such as tobacco and peanuts. Winter cover crops, minimum tillage, and crop residue help maintain tilth and production. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops help conserve soil and water. The moderately slow permeability of the subsoil is a limitation to the installation of drainage systems.

This soil is well suited to pasture forage.

This soil is poorly suited to urban uses, mainly because of wetness, low strength as it affects local roads and streets, and permeability. It is suited to recreation uses. Wetness is a limitation to those uses.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation to woodland use and management.

This Dogue soil is in capability subclass IIw and woodland group 2w.

Do—Dorovan muck. This is a nearly level, very poorly drained soil on the flood plains of Albemarle Sound and of major streams and their tributaries. The areas are oblong in shape and range from 50 to 4,000 acres in size.

Typically, the muck is 99 inches thick. It is very dark grayish brown in the upper part, black in the middle part, and very dark grayish brown in the lower part.

Included in mapping are small areas of Dorovan soils that have a silt loam surface layer. Also included are areas where muck is less than 51 inches thick.

Permeability in the Dorovan muck is moderate. The soil is extremely acid or very strongly acid. The seasonal high water table is at or near the surface. The soil is frequently flooded for long periods.

Most of the acreage of this soil is woodland.

This soil is poorly suited to use as cropland. Landscape position, wetness, and frequent flooding make it unsuitable for this use.

This soil is poorly suited to recreation uses because of frequent flooding and high organic matter content. It is poorly suited to urban uses. Frequent flooding and low strength are severe limitations to those uses.

The dominant native trees are red maple, ash, pond pine, baldcypress, swamp tupelo, and water tupelo. The understory includes mainly redbay, greenbrier, and waxmyrtle. Wetness and poor trafficability are the main limitations to woodland use and management.

This map unit is in capability subclass VIIw and woodland group 4w.

Dr—Dorovan mucky silt loam, overwash. This is a nearly level, very poorly drained soil on flood plains of small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are oblong in shape and range from 10 to 200 acres in size.

Typically, the surface layer is dark grayish brown mucky silt loam 10 inches thick. The underlying material to a depth of 96 inches is very dark grayish brown muck.

Included in mapping are small areas of Dorovan muck that does not have the overlying mineral surface layer. Also included are areas that have organic layers less than 51 inches thick.

The organic matter content of the surface layer of the Dorovan soil is high. Permeability is moderate, and the shrink-swell potential is low. The soil is very strongly acid or extremely acid. Water covers the surface most of the time.

Most of the acreage of this soil is woodland.

This soil is poorly suited to use as cropland. Wetness, landscape position, and frequent flooding make it unsuitable for this use.

This soil is poorly suited to recreation uses, mainly because of frequent flooding and high organic matter content. It is poorly suited to urban uses. Frequent flooding and low strength are limitations to those uses.

The dominant native trees are ash, pond pine, baldcypress, swamp tupelo, water tupelo, and red maple. The understory includes mainly redbay, greenbrier, and waxmyrtle. Wetness and poor trafficability are the main limitations to woodland use and management.

This Dorovan soil is in capability subclass VIIw and woodland group 4w.

Ds—Dragston loamy fine sand. This is a nearly level, somewhat poorly drained soil in the northern and western parts of the county. It is near the small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown loamy fine sand 9 inches thick. The subsoil is 39 inches thick. It is light yellowish brown sandy loam in the upper part, light olive brown and light brownish gray sandy loam in the middle part, and mottled brownish yellow, light gray, and strong brown loamy fine sand in the lower part. The underlying material to a depth of 76 inches is light gray sand.

Included in mapping are small areas of Portsmouth, Altavista, Conetoe, and Bojac soils that are common in adjacent areas. Portsmouth soils may occur in slight depressions and in drainageways. Altavista, Conetoe, and Bojac soils may occur on slightly elevated knolls or ridges. Also included, west of the Suffolk scarp on N.C. Highway 32, are soils that are lower in content of weatherable minerals than is typical for the Dragston series.

The organic matter content in the surface layer of the Dragston soil is low. Permeability is moderately rapid, and available water capacity is medium. The soil is very strongly acid or strongly acid throughout, except where the surface layer has been limed. The seasonal high water table is within 1 foot to 2 1/2 feet of the surface.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

This soil is well suited to most locally grown crops. The dominant crops are peanuts, corn, and soybeans. Wetness is the main limitation to cultivation. Winter cover crops, minimum tillage, and crop residue help maintain tilth and crop production. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops also help conserve soil and water.

This soil is well suited to pasture forage.

This soil is poorly suited to most urban and recreation uses. Wetness and the seasonal high water table limit those uses.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory includes dogwood, sourwood, sweetbay, and sassafras, along with a variety of briers and reeds. Wetness is the main limitation to woodland use and management.

This Dragston soil is in capability subclass IIw and woodland group 2w.

Fo—Fortescue mucky loam. This is a nearly level, very poorly drained soil on narrow, slightly elevated rims around the northwest side of Lake Phelps. The mapped areas are oval and range from 50 to 300 acres.

Typically, the surface layer is 2l inches thick. It is black mucky loam in the upper part and very dark grayish brown silty clay loam in the lower part. The underlying material to a depth of 36 inches is dark reddish brown muck. Below that depth to 72 inches is grayish brown sand.

Included in mapping are small areas of soils that have more sand in the overlying layers than is typical for the Fortescue series. Most of the included soils are near the edge of the lake.

The organic matter content of the Fortescue soil is high. Permeability is moderately slow in the upper mineral horizons and moderately slow to moderately rapid in the organic layers. The soil ranges from extremely acid to strongly acid throughout, except where the surface layer has been limed. The seasonal high water table is at or near the surface. The soil is subject to rare flooding.

Most of the acreage of this soil is woodland. The rest is mainly used as cropland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain tilth and organic matter. Spring tillage and fall harvest are often delayed because of wetness. Lack of suitable outlets limits the installation of drainage systems.

This soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses because of wetness.

The dominant native trees are sweetgum, red maple, yellow-poplar, baldcypress, willow oak, and water oak. The understory includes mainly sweetbay, southern bayberry, giant cane, pawpaw, fetterbush lyonia, inkberry, and greenbrier. Wetness is the main limitation to woodland use and management.

This Fortescue soil is in capability subclass VIw and woodland group 2w.

Hy—Hyde silt loam. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 10 to 500 acres in size.

Typically, the surface layer is 17 inches thick. It is very dark gray silt loam in the upper part and very dark grayish brown silt loam in the lower part. The subsoil is 41 inches thick. The upper part is grayish brown silt loam, the middle part is dark grayish brown and light brownish gray silty clay loam, and the lower part is light brownish gray silt loam. The underlying material to a depth of 85 inches is greenish gray silt loam in the upper part and stratified sand, loamy sand, and sandy loam in the lower part.

Included in mapping are small areas of Cape Fear, Portsmouth, and Roper soils that are common in adjacent areas. Most of the included soils are near the outer edge of the map unit.

The organic matter content in the surface layer of the Hyde soil is high. Permeability is moderately slow. The soil is extremely acid to strongly acid throughout, except where limed. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly pasture and woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain tilth and crop production. Spring tillage and fall harvest can be delayed because of wetness. Lack of suitable outlets and moderately slow permeability are limitations to the installation of drainage systems.

This soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses. Wetness is the main limitation to those uses.

The dominant native trees are loblolly pine, red maple, ash, sweetgum, elm, water oak, and willow oak. The understory includes mainly American holly, sweetbay, sourwood, reeds, and southern waxmyrtle. Wetness is the main limitation to woodland use and management.

This Hyde soil is in capability subclass IIIw and woodland group 1w.

Me—Muckalee loam. This is a nearly level, poorly drained soil on flood plains of small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are oblong and range from 5 to 30 acres in size.

Typically, the surface layer is dark gray loam 20 inches thick. The underlying material to a depth of 64 inches is gray sandy loam in the upper part, dark gray sandy loam in the middle part, and gray, stratified sand and loamy sand in the lower part.

Included in mapping are small areas of Dorovan mucky silt loam.

The organic matter content of the surface layer of the Muckalee soil is medium. Permeability is moderate. The soil ranges from strongly acid to slightly acid in the upper part and medium acid to neutral in the lower part. The seasonal high water table is within 1/2 foot to 1 1/2 feet of the surface. This soil is frequently flooded for brief periods.

Most of the acreage of this soil is woodland.

This soil is poorly suited to crop production. Flooding and wetness are the main limitations to this use. Lack of suitable outlets is a limitation to the installation of drainage systems. The soil is well suited to pasture forage such as fescue and Ladino clover, if it is drained and protected from flooding.

This soil is poorly suited to recreation uses. Flooding and wetness limit those uses. Frequent flooding is a severe limitation to urban uses.

The dominant native trees are baldcypress, pond pine, red maple, green ash, hickory, sweetgum, swamp tupelo, elm, yellow-poplar, river birch, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness and flooding are the main limitations to woodland use and management.

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

Pe—Pettigrew muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 10 to 500 acres in size.

Typically, the surface layer is black muck 15 inches thick. The upper part of the underlying mineral soil is very dark grayish brown mucky clay loam 5 inches thick. The subsoil is 30 inches thick. It is very dark gray clay loam in the upper part and dark gray clay in the middle and lower parts. The underlying material to a depth of 74 inches is greenish gray and dark greenish gray, stratified sandy clay loam, sandy loam, and coarse sand.

Included in mapping are small areas of Roper, Hyde, Wasda, Cape Fear, and Belhaven soils that are common in adjacent areas. Most of the included soils are near the outer edge of the map unit.

Permeability is moderately slow to moderately rapid in the organic layer of Pettigrew muck, and it is slow to very slow in the upper mineral layers. The shrink-swell potential is high. The soil ranges from strongly acid to extremely acid in the upper part and from medium acid to mildly alkaline in the lower part. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Spring tillage and fall harvest may be delayed because of wetness. Heavy initial applications of lime are needed for crop production. Soil blowing may occur during spring planting. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses. Wetness and high organic matter content are limitations to those uses.

The dominant native trees are red maple, sweetbay, baldcypress, blackgum, loblolly pine, and sweetgum. The understory includes mainly swamp cyrilla, waxmyrtle, pawpaw, fetterbush, and switchcane. Wetness is the main limitation to woodland use and management.

This Pettigrew soil is in capability subclass IIIw, drained, and woodland group 1w.

Po—Ponzer muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 20 to 100 acres in size.

Typically, the muck is black and is 42 inches thick. The underlying mineral soil to a depth of 60 inches is black mucky loam in the upper part, dark brown sandy loam in the middle part, and dark brown loamy sand in the lower part.

Included in mapping are small areas of Belhaven, Roper, Wasda, Conaby, and Pettigrew soils that are common in adjacent areas. Most of the included soils are near the outer edge of the unit.

Permeability in the Ponzer muck is slow. The organic horizons are extremely acid throughout in unlimed areas. The mineral horizons range from extremely acid to slightly acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Spring tillage and fall harvest may be delayed because of the wetness. Heavy initial applications of lime are needed for crop production. During spring planting, soil blowing may occur. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses because of wetness and high organic matter content.

The dominant native trees are red maple, sweetbay, baldcypress, blackgum, loblolly pine, and sweetgum. The understory includes mainly swamp cyrilla, waxmyrtle, pawpaw, fetterbush, and switchcane. Wetness is the main limitation to woodland use and management.

This Ponzer soil is in capability subclass IVw and woodland group 4w.

Pt—Portsmouth fine sandy loam. This is a nearly level, very poorly drained soil commonly in the Blacklands. The mapped areas are irregular in shape and range from 10 to 400 acres in size.

Typically, the surface layer is black fine sandy loam 12 inches thick. The subsurface layer is gray fine sandy loam 7 inches thick. The subsoil is 19 inches thick. It is gray and dark gray fine sandy loam in the upper part, gray and dark gray sandy clay loam in the middle part, and mottled gray, yellowish brown, and reddish yellow sandy loam in the lower part. The underlying material to a depth of 72 inches is gray and light gray sand and coarse sand.

Included in mapping are small areas of Wasda, Cape Fear, Hyde, and Arapahoe soils. These soils are common in adjacent areas. Most of the included soils are near the outer edge of the unit.

The surface layer of the Portsmouth soil is high in organic matter content. Permeability is moderate in the upper part of the profile and rapid or very rapid in the underlying material. The soil ranges from extremely acid to strongly acid throughout the solum, except where the surface layer has been limed. The underlying material ranges from extremely acid to medium acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain tilth and production. Tillage can be delayed in spring because of wetness. Lack of suitable outlets is a limitation to the installation of drainage systems.

The soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses because of wetness.

The dominant trees are loblolly pine, baldcypress, pond pine, red maple, green ash, sweetgum, black tupelo, swamp tupelo, elm, yellow-poplar, river birch, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland use and management.

This Portsmouth soil is in capability subclass IIIw and woodland group 1w.

Pu—Pungo muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 10 to 6,000 acres in size.

Typically, the surface layer is undecomposed plant material 2 inches thick. Below this layer, to a depth of 72 inches, is dark reddish brown, very dark brown, and black muck. The underlying material to a depth of 84 inches is gray clay.

Included in mapping are small areas of Belhaven soils. The included soils occur at random within the unit on the same kind of landscape as Pungo muck.

Permeability is moderately rapid and shrink-swell potential is moderate. The organic layers are extremely acid in unlimed areas. The underlying mineral layers range from strongly acid to extremely acid. Many logs, roots, and stumps occur throughout the profile. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is woodland.

This soil is poorly suited to use as cropland. The high percentage of logs, stumps, and roots in the profile and the depth of organic matter severely limit its use for cultivation (fig. 3).

This soil is poorly suited to urban and recreation uses. Wetness and low strength are limitations to those uses.

The dominant native trees are pond pine, red maple, and sweetbay. The understory includes mainly inkberry, fetterbush lyonia, greenbrier, and huckleberry. Wetness is the main limitation to woodland use and management.

This Pungo soil is in capability subclass VIIw and woodland group 5w.

Ro—Roanoke loam. This is a nearly level, poorly drained soil in the northern part of the county. It is in

Figure 3.—Juniper and cypress stumps exposed on Pungo muck.

slightly elevated areas in the Blacklands and in small drainageways that flow into Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 10 to 300 acres in size.

Typically, the surface layer is very dark gray loam 7 inches thick. The subsoil is 43 inches thick. The upper part is light brownish gray clay loam and light gray clay, and the lower part is light brownish gray sandy clay loam. The underlying material to a depth of 70 inches is mottled light brownish gray, brownish yellow, and strong brown loamy sand and light brownish gray, stratified loamy sand, sandy loam, and clay loam.

Included in mapping are small areas of Wahee, Tomotley, and Cape Fear soils, which are common in adjacent areas. Wahee soils occur on slightly elevated ridges. Cape Fear soils occur in slight depressions and in drainageways.

The organic matter content in the surface layer of the Roanoke soil is medium. Permeability is slow, and shrink-swell potential is moderate. The subsoil is strongly acid or very strongly acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly in woodland.

If drained, this soil is well suited to corn, soybeans, and small grain. It is poorly suited to tobacco, cotton, and peanuts. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain tilth and production. Spring tillage and fall harvest might be delayed because of wetness. Lack of suitable outlets and slow permeability are limitations to the installation of drainage systems.

This soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited for most urban and recreation uses because of wetness, permeability, and low strength as it affects local roads and streets.

The dominant native trees are baldcypress, pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, black tupelo, elm, river birch, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland use and management.

This Roanoke soil is in capability subclass IIIw and woodland group 2w.

Rp—Roper muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 10 to 500 acres in size.

Typically, the surface layer is black muck 15 inches thick. The upper part of the underlying mineral soil is very dark gray mucky silt loam 9 inches thick. Below this, to a depth of 55 inches, is dark grayish brown silty clay loam and grayish brown silt loam in the upper part and greenish gray silt loam in the lower part. The underlying material to a depth of 72 inches is dark gray and greenish gray, stratified sand and loamy sand.

Included in mapping are small areas of Pettigrew, Cape Fear, Hyde, Wasda, and Belhaven soils, which are common in adjacent areas.

Permeability in Roper muck is moderately slow. The soil ranges from strongly acid to extremely acid in the upper part and from medium acid to mildly alkaline in the lower part. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Spring tillage and fall harvest may be delayed because of wetness. Heavy initial applications of lime are needed for crop production. Soil blowing may occur during spring planting. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses. Wetness and high organic matter content are limitations to those uses.

The dominant native species are red maple, sweetbay, baldcypress, blackgum, loblolly pine, and sweetgum. The understory species are mainly swamp cyrilla, waxmyrtle, pawpaw, fetterbush lyonia, and switchcane. Wetness is the main limitation to woodland use and management.

This Roper soil is in capability subclass IIIw and woodland group 1w.

Se—Scuppernong muck. This is a nearly level, very poorly drained soil on broad flats around the northern and northwestern perimeter of Lake Phelps. The mapped areas are irregular in shape and range from 100 to 200 acres in size.

Typically, the muck is 28 inches thick. It is black in the upper part and dark reddish brown in the lower part. The underlying mineral soil to a depth of 72 inches is dark greenish gray mucky silt loam in the upper part, light gray sand in the middle part, and dark greenish gray sand in the lower part.

Included in mapping are small areas of Pungo, Roper, and Wasda soils. Included soils occur at random within the unit on the same kind of landscape as Scuppernong muck.

Permeability in Scuppernong muck is moderately rapid. The organic horizons are extremely acid throughout, except where the surface layer has been limed. The mineral horizons range from extremely acid to neutral. Logs, roots, and stumps occur in the organic horizons. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly pasture.

If drained and managed properly, this soil is suited to crops. The dominant crops are corn and soybeans. Heavy applications of lime and additions of copper and other micronutrients are needed. The many logs, roots, and stumps in the organic layers have to be removed before cultivation. Spring tillage and fall harvest may be delayed because of wetness. During spring planting, soil blowing can occur. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses. Wetness, flooding, and low strength are limitations to those uses.

The dominant native trees are red maple, sweetgum, baldcypress, and blackgum. The understory includes mainly inkberry, fetterbush lyonia, huckleberry, greenbrier, waxmyrtle, and switchcane. Wetness and flooding are the main limitations to woodland use and management.

This Scuppernong soil is in capability subclass VIIw and woodland group 4w.

TaB—Tarboro sand, 0 to 3 percent slopes. This is a somewhat excessively drained soil in the northern part of the county. It is on low, broad ridges commonly adjacent to Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 10 to 250 acres in size.

Typically, the surface layer is 12 inches thick. It is dark grayish brown sand in the upper part and brown sand in the lower part. The underlying material to a depth of 60 inches is sand. It is brownish yellow in the upper part, yellowish brown in the middle part, and yellow in the lower part. Below that to a depth of 99 inches is pale brown sand.

Included in mapping are Bojac and Conetoe soils, which are common in adjacent mapped areas. Most of the included soils are near the outer edge of the map unit. Small areas of soils that are not as well drained as this soil may occur in small depressions within the unit.

The surface layer of Tarboro sand is low in organic matter content. Permeability is rapid, and available water capacity is low. This soil ranges from strongly acid to slightly acid, except where limed.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

This soil is suited to a few crops, such as peach orchards, peanuts, and soybeans. It does not have sufficient moisture for most crops during the growing season. Leaching of plant nutrients, soil blowing, and low available water capacity are the main limitations. Blowing sand can damage young plants. Minimum tillage, crop residue, the use of windbreaks, and close-growing grasses and legumes in the cropping system help control soil blowing and conserve moisture. Split applications of fertilizers, particularly nitrogen, are needed. This soil is suited to pasture forage such as Coastal bermudagrass and bahiagrass.

This soil is well suited to most urban uses. The thick sandy material provides good support for most structures. The unprotected sandy surface, however, is subject to soil blowing and is droughty when rainfall is limited. Seepage from septic tank filter field lines is sometimes a problem. This soil is suited to recreation uses; however, the sandy surface layer is sometimes a limitation.

The dominant native trees are loblolly pine, longleaf pine, sweetgum, southern red oak, blackjack oak, white oak, post oak, and red maple. The understory includes mainly dogwood, sassafras, and American holly. The low available water capacity is the main limitation to woodland use and management.

This Tarboro soil is in capability subclass IIIs and woodland group 4s.

To—Tomotley fine sandy loam. This is a nearly level, poorly drained soil. It is on slightly elevated areas in the Blacklands and in depressions near small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 10 to 150 acres in size.

Typically, the surface layer is dark gray fine sandy loam 6 inches thick. The subsurface layer is light gray fine sandy loam 5 inches thick. The subsoil is 53 inches thick. It is light gray sandy loam in the upper part, gray and light olive gray clay loam in the middle part, and gray sandy loam in the lower part. The underlying material to a depth of 80 inches is gray stratified sandy loam, loamy sand, and sand.

Included in mapping are small areas of Augusta, Roanoke, and Portsmouth soils that are common in adjacent mapped areas. Most of the included soils are near the outer edge of the unit.

In the Tomotley soil, the organic matter content is medium. Permeability is moderate to moderately slow. The soil ranges from extremely acid to strongly acid in the upper part, except where limed. Below a depth of about 50 inches, it ranges from extremely acid to medium acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly pasture or woodland.

The soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Winter cover crops, minimum tillage, and crop residue help maintain tilth and production. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops also help conserve soil and water.

The soil is well suited to pasture forage.

This soil is poorly suited to most urban and recreation uses because of wetness.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory includes dogwood, sourwood, sweetbay, and sassafras, along with a variety of briers and reeds. Wetness is the main limitation to woodland use and management.

This Tomotley soil is in capability subclass IIIw and woodland group 2w.

Wa—Wahee fine sandy loam. This is a nearly level, somewhat poorly drained soil in the northern part of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. The mapped areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 7 inches thick. The subsoil is 51 inches thick. It is light yellowish brown sandy clay loam in the upper part, light olive brown and light olive gray clay loam and clay in the middle part, and light brownish gray sandy clay loam in the lower part. The underlying material to a depth of 74 inches is mottled light gray and yellowish brown stratified sand and loamy sand.

Included in mapping are small areas of Altavista, Dogue, and Roanoke soils, which are common in adjacent areas. Altavista and Dogue soils may occur on slightly higher ridges within the unit.

The surface layer of the Wahee soil is medium in the organic matter content. Permeability is slow, and shrink-swell potential is moderate. The subsoil is strongly acid or very strongly acid throughout, except where the surface layer has been limed. The seasonal high water table is within 1/2 foot to 1 1/2 feet of the surface.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

This soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation. Minimum tillage, cover crops, and grasses and legumes in the cropping system help maintain tilth and production. Spring tillage and fall harvest can be delayed because of wetness. Slow permeability is a limitation to the installation of drainage systems.

The soil is well suited to pasture forage such as fescue and Ladino clover.

This soil is poorly suited to most urban and recreation uses. Wetness, permeability, and low strength as it applies to local roads and streets are limitations to those uses.

The dominant native trees are pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, black tupelo, elm, river birch, American sycamore, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness and flooding are the main limitations to woodland use and management.

This Wahee soil is in capability subclass IIIw and woodland group 2w.

Wd—Wasda muck. This is a nearly level, very poorly drained soil in the Blacklands. The mapped areas are irregular in shape and range from 100 to 1,000 acres in size.

Typically, the surface layer is muck 14 inches thick. It is black in the upper part and dark reddish brown in the lower part. The upper part of the underlying mineral soil is dark grayish brown clay loam 6 inches thick. The lower part is grayish brown and dark grayish brown clay loam. The underlying material to a depth of 74 inches is dark greenish gray sandy loam and sand.

Included in mapping are small areas of Pettigrew, Roper, Conaby, and Belhaven soils, which are common in adjacent areas. Most of the included soils are near the outer edge of the unit.

Permeability is moderate. The soil ranges from extremely acid to strongly acid in the upper part and from medium acid to mildly alkaline in the lower part. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Most of the acreage of this soil is cultivated. The rest is mainly woodland.

If drained, this soil is well suited to most locally grown crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to cultivation. Spring tillage and fall harvest may be delayed because of the wetness. Heavy initial applications of lime are needed for crop production. During spring planting, soil blowing may occur. Conservation practices such as minimum tillage, the use of field borders, and the use of windbreaks reduce the chance of soil blowing.

This soil is poorly suited to most urban and recreation uses. Wetness and high organic matter content are limitations to those uses.

The dominant native trees are red maple, sweetbay, baldcypress, blackgum, loblolly pine, and sweetgum. The understory includes mainly swamp cyrilla, waxmyrtle, pawpaw, fetterbush lyonia, and switchcane. Wetness is the main limitation to woodland use and management.

This Wasda soil is in capability subclass IIIw and woodland group 1w.

WkB—Wickham loamy sand, 0 to 4 percent slopes. This is a well drained soil in the northern part of the county. It is on low ridges near the small streams that flow into Albemarle Sound and the Roanoke River. Mapped areas are irregular in shape and range from 5 to 35 acres in size.

Typically, the surface layer is dark brown loamy sand 8 inches thick. The subsoil is 34 inches thick. It is yellowish red sandy clay loam in the upper part and yellowish red sandy loam in the lower part. The underlying material to a depth of 72 inches is strong brown fine sand.

Included in mapping are small areas of Altavista, Augusta, Bojac, and Conetoe soils, which are common in adjacent areas. The Altavista and Augusta soils are in shallow depressions within the unit. Other included soils are mostly near the outer edge of the unit.

The surface layer of the Wickham soil is low in organic matter content. Permeability is moderate, and available water capacity is medium. The soil ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed.

Most of the acreage of this soil is cultivated. The rest is mainly woodland and pasture.

This soil is well suited to corn, soybeans, peanuts, tobacco, and small grain. Runoff and a hazard of erosion are the main limitations to cropland use. Winter cover crops, minimum tillage, and crop residue help control runoff and erosion and maintain tilth and organic matter content. Conservation practices such as no-till planting, the use of field borders, and the use of crop rotations that include close-growing crops also help conserve soil and water.

This soil is well suited to pasture forage.

This soil is well suited to most urban and recreation uses.

The dominant native trees are loblolly pine, red maple, hickory, yellow-poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory includes mainly dogwood, sassafras, sourwood, and waxmyrtle. There are no major limitations to woodland use and management.

This Wickham soil is in capability subclass IIe and woodland group 2o.

important farmland

This section gives the extent and location of the land in Washington County that is important for producing food, feed, fiber, forage, and oilseed crops.

prime farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high crop yields if acceptable farming methods are used. Prime farmland produces the highest yields with minimal inputs of energy and money, and farming it results in the least damage to the environment. Prime farmland is of major importance in satisfying the nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and it should be used with wisdom and foresight.

Prime farmland is either currently used for producing food or fiber or is available for this use. Urban or built-up land or water areas are not included.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has favorable temperature and growing season and acceptable reaction. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods or flooded during the growing season. Slope ranges mainly from 0 to 6 percent.

About 10,500 acres, or about 5 percent of the county, meets the soil requirements for prime farmland. This farmland is mainly in the northern part of the county, along Albemarle Sound. The main crops are corn and soybeans.

The loss of prime farmland to other uses puts pressure on marginal lands. In Washington County, these lands are limited by wetness.

The map units that make up prime farmland are listed below. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

AaA—Altavista fine sandy loam, 0 to 2 percent slopes
DgA—Dogue fine sandy loam, 0 to 3 percent slopes
WkB—Wickham loamy sand, 0 to 4 percent slopes

additional farmland of statewide and local importance

State and locally important farmland is land other than that designated as prime farmland. In one or more ways, the soil characteristics do not meet the requirements for prime farmland. Important farmland can produce crops economically if modern farming methods, including water management, are used.

Farmland of state and local importance must either be currently used for producing food or fiber or available for this use. Urban or built-up land or water areas are not included.

Farmland of statewide and local importance usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has favorable temperature and growing season and acceptable reaction. It has few or no rocks and is permeable to water and air. Slope ranges mainly from 0 to 3 percent.

About 112,090 acres, or nearly 52.2 percent, of Washington County meets the requirements for farmland of statewide and local importance. Areas are scattered throughout the county. Crops are mainly corn and soybeans.

The soils in the following list are statewide and locally important farmlands:

Ap—Arapahoe fine sandy loam
Ar—Argent silt loam
At—Augusta fine sandy loam
BoA—Bojac loamy fine sand, 0 to 3 percent slopes
Cf—Cape Fear loam
Co—Conaby muck
Ds—Dragston loamy fine sand
Hy—Hyde silt loam
Pe—Pettigrew muck
Pt—Portsmouth fine sandy loam
Rp—Roper muck
Wa—Wahee fine sandy loam
Wd—Wasda muck

use and management of the soils

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

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

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

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

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where 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

By Steve Barnes, agronomist, First Colony Farms, Creswell, N.C., and Foy Hendrix, conservation agronomist, Soil Conservation Service, Raleigh, N.C.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

More than 83,000 acres was in crops and pasture in 1977, according to the 1978 Land Utilization Survey of the North Carolina Crop and Livestock Reporting Service. Of this total, 4,023 acres was used for permanent pasture, 76,716 acres was used for crops, and 2,621 acres was idle.

The major crops include corn, soybeans, sorghum, peanuts, and small grains. Tobacco and cotton are grown on smaller acreages. Special crops, such as cucumbers, irish potatoes, sweetpotatoes, and snapbeans also are grown.

Tall fescue, some white clover, and annual grasses, particularly rye and ryegrass, are the dominant pasture grasses and legumes. The acreage used for pasture has been consistent over the past 20 years.

Many of the soils are well suited to vegetable crops. The latest information on growing special crops can be obtained from local offices of the Cooperative Extension Service or the Soil Conservation Service.

Farming has historically been Washington County's principal enterprise. It will continue to play an important role in the county's economy.

The soils suitable for farming can be divided into two major groups: those that have a light-colored surface layer and those that have a black surface layer (fig. 4, 5, and 6). The soils that have a light-colored surface layer commonly are on the higher landscapes adjacent to Albemarle Sound and the Roanoke River. The soils that have a black surface layer contain larger amounts of organic matter. Commonly they are on the lower, wetter landscapes in the interior of the county.

Soils that have a light-colored surface layer

Farming started early on well drained, dominantly sandy soils, which have a light-colored surface layer and are still extensively farmed. These soils are along the Roanoke River and Albemarle Sound.

Tobacco and cotton are grown on the well drained and moderately well drained, nearly level to gently sloping Altavista, Bojac, Dogue, and Wickham soils.

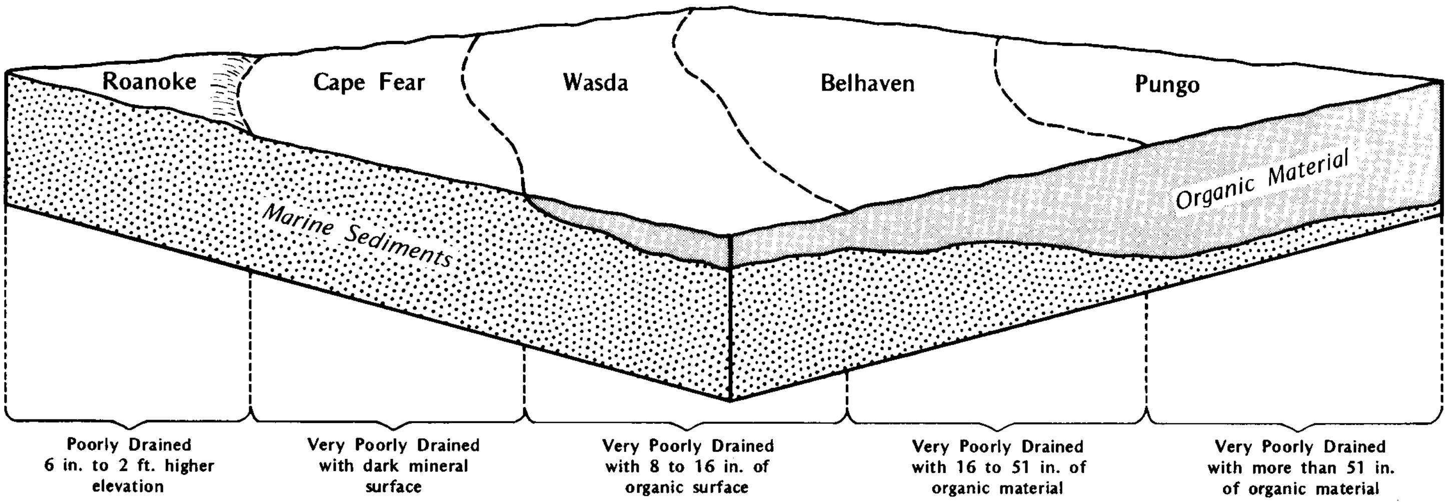


Figure 4.—Pattern of selected mineral and organic soils near Lake Phelps.

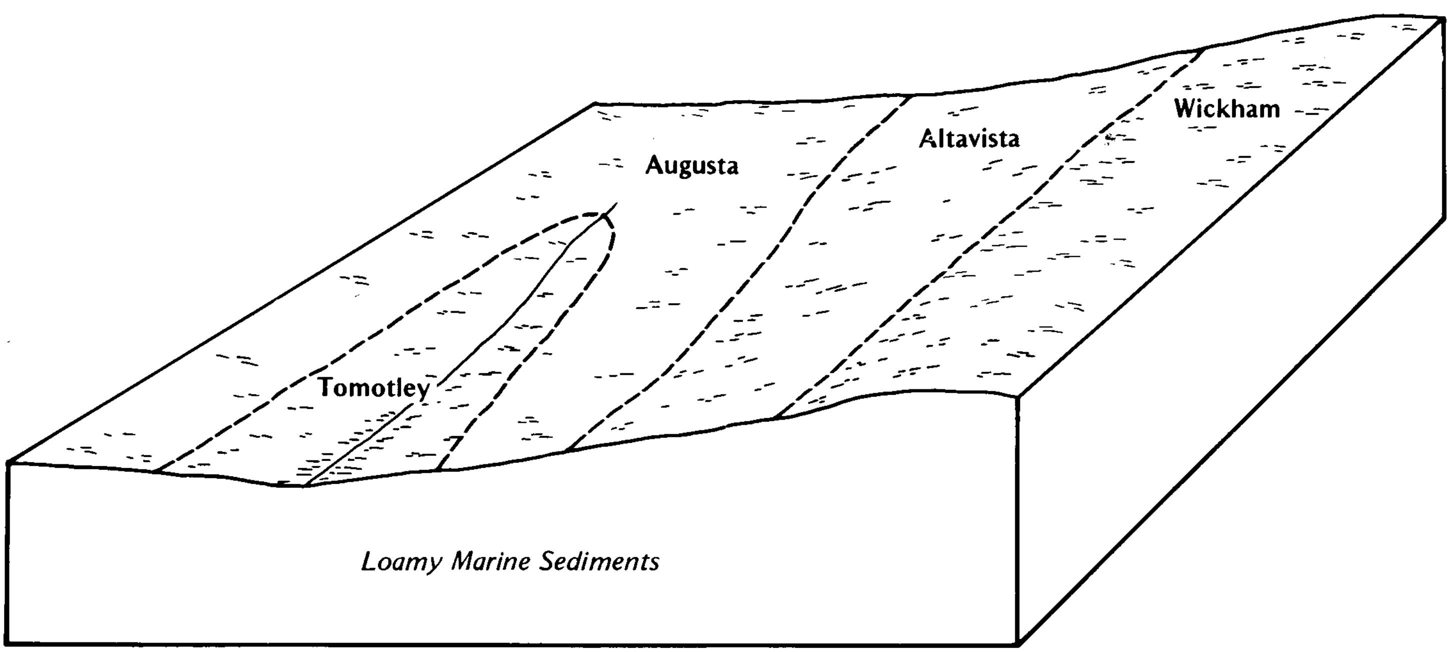


Figure 5.—Pattern of representative light colored soils that formed in loamy marine sediments.

Artificial drainage may be needed on the Altavista and Dogue soils. Peanuts are grown on relatively sandy soils, such as Tarboro and Conetoe soils. Soil blowing is a hazard on these soils. Maintaining surface mulch or roughing the surface by tillage helps to control erosion.

Corn and soybeans are the crops most commonly grown on the somewhat poorly drained Augusta, Wahee, and Dragston soils and the poorly drained Argent, Roanoke, and Tomotley soils. Artificial drainage is needed for optimum crop yields on these soils. Artificial drainage commonly used for cropland and woodland on these soils consists of a primary system of canals, a secondary system of field ditches, and, on farmland, surface shaping and leveling. The ditches (fig. 7) are generally 200 to 300 feet apart for farming and about 600 feet or more apart for woodland.

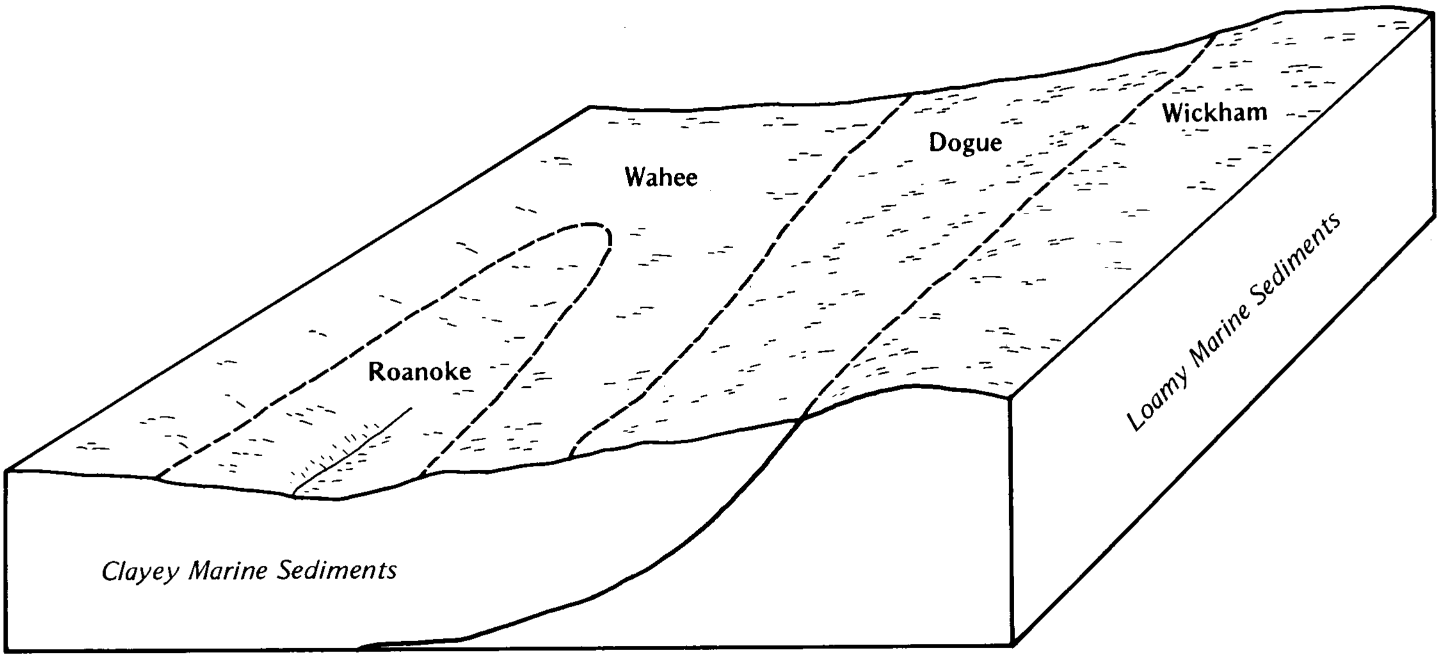


Figure 6.—Pattern of representative light colored soils that formed in clayey and loamy marine sediments.

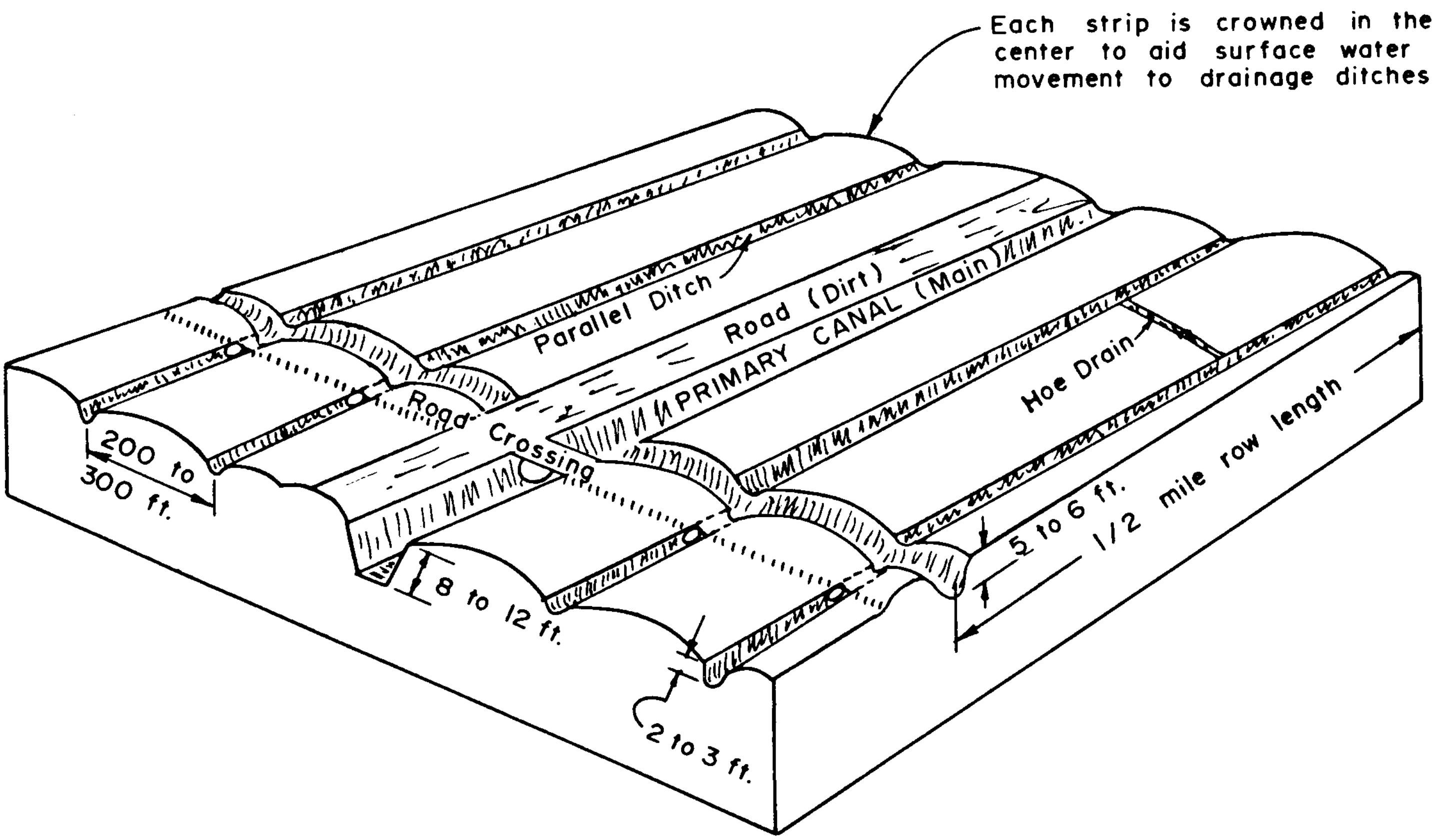


Figure 7.—Artificial drainage systems commonly used in Washington County.

Other practices common in areas of soils that have a light-colored surface layer are the use of field borders and winter cover crops, conservation tillage, and the use of lime and fertilizer.

Soils that have a black surface layer

Soils that have a black surface layer are locally called Blackland soils. Some are very poorly drained mineral soils, for example, Arapahoe, Fortescue, Portsmouth, Hyde, and Cape Fear soils; some are organic soils, for example, Belhaven, Dorovan, Ponzer, Pungo, and Scuppernong soils; and some have an organic surface layer and mineral subsoil, for example, Conaby, Wasda, Roper, and Pettigrew soils.

The very poorly drained mineral soils were generally the first of this group to be used for farming. Crops were corn, soybeans, small grains, and pasture. Most of the other soils were in cutover forest or savannah type swamp. They were not used for crops until the 1950's. As a result of the use of modern machinery and new technology and a general increase in land value, most of these Blackland soils, have been developed rapidly for farming since the 1950's. The deep organic soils, however, are little used for farming. Dorovan soils, which are in wet, wooded swamps, have not been developed for farming. Part of the acreage of Pungo soils has been drained and cleared but is no longer used for farming.

Practices applicable to the farming of Blackland soils are described in the following paragraphs. Onsite evaluation should be made to determine if a particular practice is ecologically desirable.

Field drainage. Soils such as Wasda and Ponzer soils are the easiest to develop if drainage canals are installed. These soils require extensive drainage to provide at least a minimum of aerated soil in the upper part of the profile for plant roots. Such drainage requires a primary system consisting of canals, a secondary system consisting of field ditches, and surface shaping and leveling for farmland. Field ditches are generally 1/2 mile long and 200 to 330 feet apart for farming and about 600 feet or more apart for woodland.

Surface drainage is necessary to remove much of the excess water because most of these soils, both mineral and organic, have very poor internal drainage. A workable surface drainage system includes a surface with not more than 1/2 percent slope from the ditch upward toward the center of the field. Fields are leveled to remove depressions that pocket excess surface water.

Canals for adequate water removal generally require a minimum drop of about 1/2 foot per mile. If the drop is less than this, pump drainage is generally necessary. The rate of waterflow in canals is generally less than 1.8 feet per second because of the low elevations and gentle relief throughout the county. The slow flow rates allow most of the sand- and silt-sized sediment that may erode from the fields to settle in ditches and canals. Because of this settling, the sand and silt load moving into the outlets and estuaries remains low during slow flow. The ditches and canals, however, require frequent cleaning.

Control of erosion. Surface runoff from high intensity rains may cause soil loss, even on fields that are nearly level. Most of the runoff occurs around "hoedrains," or cross drains that are used across fields from ditch to ditch. The bulk of the eroded soil settles in the field ditches and canals, closing outlets and necessitating frequent and costly cleanings. Erosion can be reduced by field shaping and leveling to reduce the number of cross drains, by minimum tillage, by leaving crop residue on the surface, and by stabilizing ditch and canal banks with plant cover.

Soil blowing may occur if the soils are bare or free of surface roughness, or if the surface layer is dry. Soils that have a tendency to blow are high in organic matter and have a loose, very friable surface layer. The Arapahoe soils, which have a loamy sand surface layer, are also subject to blowing. In some areas, windblown soil fills ditches and catch canals, reducing their effectiveness for drainage. Soil blowing on cropland is best controlled by leaving crop residue on the surface and using bedding. Bedding leaves the surface rough, lessening the probability of soil particles being picked up and moved across the surface.

Windbreaks help to control soil blowing. To be effective, they need to be perpendicular to the wind. Their area of effective control is about 10 times the height of the windbreak. Windbreaks provide good wildlife habitat and add to the esthetics of large, cleared areas.

Liming the soil. All of the Blackland soils have a high lime requirement because they are high in content of organic matter. In their natural state, they are extremely acid. Lime should be applied according to soil tests. When these soils are first limed, incorporate the lime to a depth of 5 or 6 inches. Each ton of dry agricultural lime increases soil pH levels from 0.1 to 0.3 pH unit. To attain the desired pH level for organic soils that have a pH of 5.0 in their natural state, 5 to 7 tons of lime per acre are required initially. The desired pH level of mineral soils that are high in organic matter is 5.3 to 5.5, and the initial lime requirement is 4 to 5 tons per acre. To maintain these pH levels, the lime needed generally is 1 ton per acre every 2 to 3 years. Because many of these soils have adequate magnesium, calcitic sources of lime are suitable. If soil tests indicate a lower magnesium level than is desirable, a dolomitic source of lime should be used.

Control of plant nutrient levels. In their natural state, these soils generally have a low level of available plant nutrients; however, they do respond to and retain fertilizer nutrients. Available phosphorus is generally very low, and extra fertilizer is required for the first year of farming. After that, only phosphorus deficiencies indicated by soil tests need to be offset.

Potassium is generally low for the first year but not as low as phosphorus. The content of organic matter and clay in these soils enables them to retain potassium; thus, it is possible to attain good levels of this nutrient.

Nitrogen is a constituent of the organic matter, and some nitrogen is available for plant growth through the decomposition of the organic matter. If these soils become saturated at times of heavy rainfall, significant amounts of nitrogen are lost through denitrification. As a result, the amount of nitrogen required by crops on these soils is not significantly different from that required on mineral soils that have a light-colored surface layer. The soils in both groups require 20 to 30 pounds per acre.

Most organic soils have deficiencies of such micronutrients as copper, manganese, zinc, and boron. In Washington County, however, copper is the only micronutrient that is regularly deficient. When soils are initially cultivated, an application of 2 1/2 to 4 pounds of elemental copper per acre is recommended. This application is adequate for approximately 3 years. Subsequent applications should be made according to soil tests. If windrows or stump piles are removed or the surface is reshaped during sloping and leveling, the exposed soils generally need to be treated with copper and lime, as when they are initially cultivated. If the soils are overlimed, deficiencies in zinc and manganese may occur. Once the soils are cultivated, lime and fertilizer need to be applied according to soil tests.

The organic soils of the Blacklands are cold natured because of their high moisture content and the insulating effect of organic matter. This results in these soils receiving frost a few days later in spring and a few days earlier in fall than the mineral soils in the same area. Therefore, planting dates for corn on the organic soils should be adjusted to avoid potential frost damage. Early maturing varieties of soybeans should be used for late plantings to avoid potential damage by early frosts in fall. The rate of growth for corn seedlings is slow in the spring because of cool soil temperatures. Seedling growth is greatly increased if bands of fertilizer containing ammonium nitrogen and phosphorus are applied. This fertilizer contributes significantly to establishing strong, fast-growing stands even in cold, wet springs.

Control of weeds. Retention of herbicides by these soils is closely related to their content of organic matter. The application rates should be keyed to the percent of organic matter content; that is, the greater the content of organic matter content, the greater the amount of herbicides needed. Many of the commonly used herbicides are not effective on organic soils, however (*9*). For additional information on herbicides, contact the Cooperative Extension Service.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 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 survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

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, or droughty.

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* or *s,* 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, forester, Soil Conservation Service, Raleigh, N.C., helped with this section.

Woodland is of economic, recreational, and environmental importance to Washington County. Wooded areas have esthetic value, and they provide habitat suitable for openland, woodland, and wetland wildlife. Clearing additional land for farming, urban encroachment, and other forest withdrawals will continue to reduce the commercial forest acreage. Commercial forest land is land capable of producing crops of industrial wood.

Loblolly pine is an important commercial timber species because it grows fast, is adapted to the soil and climate, has a high market value, and is easy to establish and manage. Foresters encourage landowners to plant pine instead of hardwoods on sites suited to pine. Quality pines can be produced rapidly and in greater volume than quality hardwoods. Unless vigorous methods of hardwood control, such as burning or mechanical site preparation, are used when reestablishing pine at the time of harvest cutting, hardwoods will eventually replace pines on a significant acreage.

Loblolly pine grows on a wide variety of soils. It grows best on adequately drained soils that have a thick surface layer and a firm subsoil. Good yields can also be obtained on poorly drained soils, but bedding is often necessary to elevate seedlings above standing water. The deep excessively drained sands have very low site quality.

For the purpose of a forest survey (*6*), four forest types have been identified in the county.

Loblolly-shortleaf (38,000 acres). In this type, loblolly pine and shortleaf pine make up more than 50 percent of the stand. Red and white oaks, gum, hickory, and yellow-poplar make up the rest. The understory commonly consists of hardwood seedlings and saplings, which are more tolerant of shade than pine. In a shaded understory, hardwoods compete so strongly with pines for light and moisture that few pine seedlings can survive. When mature stands of pine are cut, the dense understory of young hardwoods becomes dominant.

Oak-pine (5,225 acres). Hardwoods make up more than 50 percent of the stand, but pines make up 25 to 50 percent in association with upland oaks, gum, hickory, and yellow-poplar. If left undisturbed, the oak-pine type becomes a forest of predominantly oak and other upland hardwoods. The understory usually consists of hardwood seedlings and saplings because they are more tolerant of shade than pine. In a shaded understory, hardwoods compete so strongly with pines for light and moisture that few pine seedlings can survive. When mature stands of pine are cut, the dense understory of young hardwoods becomes dominant.

Oak-hickory (10,616 acres). Upland oaks and hickory make up more than 50 percent of the stocking. Common associates include elm, maple, and yellow-poplar.

Oak-gum-cypress (62,621 acres). This forest type is divided into two broad types: tupelo-cypress swamps and mixed bottom land hardwoods. Most sites are characterized by an abundant supply of water and include both alluvial and residual soils. Deep swamps are dominated by water tupelo and baldcypress and include a few red maple, swamp cottonwood, and green ash and many understory species.

Swamp tupelo grows on soils that have a high seasonal water table. Other species growing on these wet soils are red maple, sweetbay, redbay, and Carolina ash. Water tupelo, baldcypress, and swamp tupelo thrive on saturated soils and those subject to flooding. The species composition of mixed bottom land hardwoods depends ultimately on the degree and duration of flooding and the seasonal high water table.

Forests provide wood products (fig. 8), scenic beauty, wildlife habitat, outdoor recreation, and protection of water quality. In 1973, commercial forests covered 53 percent of the land area, or 116,462 acres, in the county (*7*). Of this amount, farmers owned 33,961 acres; corporate and individual private landowners, 31,352 acres; forest products industry, 41,685 acres; county and municipal industries, 104 acres; the State, 1,066 acres; and federal agencies, 8,264 acres.

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

Figure 8.—A chipper loading a trailer with loblolly pine harvested from Portsmouth fine sandy loam.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important 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 *w*, indicates excessive water in or on the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w and s.

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 determined 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 wood production.

recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry.

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, and are not subject to flooding during the period of use.

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 firm after rains and is not dusty when dry.

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.

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. 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, Raleigh, N.C., helped with this section.

Wildlife is related to soils through direct relationship with plants. Wildlife species are associated with given types of plant communities which, in turn, are directly related to particular kinds of soils. Proper manipulation of soil, water, and plants to produce suitable habitat is the most effective way to maintain and improve wildlife populations. Interpretations for wildlife areas are based on the relationships of wildlife to plants and plants to soils.

In Washington County, the soils produce a wide variety of plants, which provide food, cover, and protection for many species of wildlife. Upland game, such as squirrel, rabbit, quail, mourning dove, fox, and songbirds are found throughout the county. Furbearers, such as raccoon, mink, muskrat, and opossum, are abundant. Waterfowl, such as mallards, black ducks, and wood ducks, are abundant along the Roanoke River and Albemarle Sound and their tributaries.

Washington County offers an interesting contrast in wildlife habitat. Much of the county is characterized by small farms that provide an abundance of edge type habitat, creating excellent habitat for all game species, particularly quail, rabbit, and deer. Altavista, Wickham, Dogue, and Bojac soils are associated with this area.

In contrast to the small-farm area are the blacklands, which are typically muck soils such as Ponzer, Conaby, Pungo, Wasda, and Belhaven soils. The land use of this part of the county is generally large fields or large woodland tracts. Edge habitat is at a minimum, and as a result, habitat for small game such as rabbit and quail is generally poor, except in the early stages of the land clearing process when windrows provide edge habitat.

Large-scale clearing of the Blacklands has a dramatic effect on the habitat and populations of black bear and white-tailed deer, mainly through a direct loss of escape cover when the woodland is cleared. The long-term effects will probably be determined by the extent of the clearing operations and by management decisions made by the landowners during clearing and farming.

Shelterbelts, windbreaks, field borders, and minimum tillage can greatly reduce the effects of land clearing on wildlife populations. Soil information and interpretations can contribute greatly to making proper decisions.

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 ratings given in table 9 are to be used as guidelines and do not provide specific onsite analysis. Further onsite investigation is needed for individual management plans.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Examples of grain and seed crops are corn, sorghum, wheat, oats, barley, millet, buckwheat, and soybeans.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Examples of grasses and legumes are trefoil, fescue, lovegrass, switchgrass, clover, crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Some examples of wild herbaceous plants are goldenrod, beggarweed, partridge pea, pokeweed, and fescue.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Examples of these plants are oak, poplar, dogwood, hickory, and autumn-olive.

Coniferous plants furnish browse, seeds, and cones. Pine and cedar are examples of coniferous plants.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Examples of wetland plants are smartweed, wild millet, cattail, cutgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures in marshes or streams. Examples of such areas are muskrat marshes, beaver ponds, waterfowl feeding areas, and wildlife ponds.

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

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, mourning dove, cottontail, red fox, and many kinds of songbirds.

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 woodpeckers, squirrels, and gray fox.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are muskrat, raccoon, redwing blackbirds, and ducks.

engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, 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 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 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 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. A high water table, flooding, 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, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, 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 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, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent and surfacing of effluent, can affect public health. Ground water can be polluted 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, flooding, and content of organic matter.

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

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

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

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, 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, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils 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 the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 12 gives information about the soils as a source of roadfill, sand, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by slope and a high water table. 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 and have at least 5 feet of suitable material. Their shrink-swell potential is low. 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. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a high shrink-swell potential and a plasticity index of more than 10. 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 is a natural aggregate suitable for commercial use with a minimum of processing. Sand is 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 are gradation of grain sizes (as indicated by the engineering classification of the soil) and the thickness of suitable material. Acidity and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

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

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

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, and soils that have only 20 to 40 inches of suitable material. 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, 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 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.

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 organic matter. 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.

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 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 slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, 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 and wetness, affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, and slow 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. Wetness and slope affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, and slow 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.

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 dates 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 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. Only saturated zones within a depth of about 6 feet are indicated. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is 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. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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 North Carolina Department of Transportation and Highway Safety, Materials, and Tests 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), Mechanical analysis—T 88 (AASHTO), Plasticity index—T 90 (AASHTO), Moisture density, Method A—T 99 (AASHTO).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). 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 Entisol.

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 Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

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 Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic 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 Haplaquents.

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 Haplaquents.

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 (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Altavista series

The Altavista series consists of moderately well drained soils that formed in loamy marine and fluvial sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Altavista fine sandy loam, 0 to 2 percent slopes, approximately 4 miles northeast of Roper; 300 feet north of U.S. Highway 64, and 500 feet northwest of intersection of State Road 1132 and U.S. Highway 64:

Ap—0 to 6 inches; grayish brown (l0YR 5/2) fine sandy loam; weak medium granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.

A2—6 to 9 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

B21t—9 to 24 inches; brownish yellow (10YR 6/6) clay loam; moderate fine subangular blocky structure; firm; slightly sticky, slightly plastic; few fine roots; common fine and medium pores; common patchy clay films on faces of peds; common fine flakes of mica; medium acid; gradual wavy boundary.

B22t—24 to 30 inches; brownish yellow (10YR 6/6) clay loam; common medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; firm; sticky, slightly plastic; few fine roots; common fine and medium pores; common patchy clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual wavy boundary.

B23tg—30 to 38 inches; light brownish gray (10YR 6/2) clay loam; many medium prominent brownish yellow (l0YR 6/6), strong brown (7.5YR 5/8), and yellowish red (5YR 5/8) mottles; moderate fine subangular blocky structure; firm; slightly plastic; common fine and medium pores; common patchy clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual wavy boundary.

B3g—38 to 46 inches; light gray (10YR 7/2) sandy clay loam with pockets of sandy loam; many medium prominent brownish yellow (10YR 6/6), strong brown (7.5YR 5/8), and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; slightly sticky; common fine and medium pores; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—46 to 78 inches; mottled light gray (10YR 7/2), yellow (10YR 7/8), and strong brown (7.5YR 5/8) loamy sand with pockets of sandy loam; massive; very friable; common fine flakes of mica; common grains of soft feldspar; very strongly acid.

Altavista soils have a loamy B horizon 20 to 40 inches thick. Reaction ranges from medium acid to very strongly acid. Mica flakes range from few to common throughout the profile.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. The A2 horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4.

Some pedons have a B1 horizon. This horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is fine sandy loam, sandy loam, or loam. The B2t horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 5 to 8. It is sandy clay loam or clay loam. In some pedons, the lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 7, and chroma of 1 or 2. The B3 horizon is similar in color to the B2 horizon, or it is mottled light gray, strong brown, very pale brown, or yellowish red sandy loam, sandy clay loam, or loamy sand. Some pedons have a matrix color of gray.

The C horizon is sandy or loamy material, but some pedons contain thin strata of clay.

Arapahoe series

The Arapahoe series consists of very poorly drained soils that formed in loamy fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Arapahoe fine sandy loam, approximately 9.5 miles southeast of Plymouth on Waycris Farms, 0.15 mile southwest of North Carolina Highway 99, 150 feet southwest of canal No. 14, and 75 feet west of major north-south canal midway in first cut:

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; few fine roots and crop residue; slightly acid; abrupt smooth boundary.

A12—8 to 13 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; few fine roots; few small pieces of charcoal and pockets of ash; strongly acid; clear wavy boundary.

B1g—13 to 19 inches; grayish brown (10YR 5/2) fine sandy loam; common coarse faint dark grayish brown (10YR 4/2) and brown (10YR 5/3) mottles; weak fine granular structure; very friable; few medium roots and root channels; common medium flakes of mica; very strongly acid; gradual wavy boundary.

B2g—19 to 29 inches; dark gray (10YR 4/1) fine sandy loam; common coarse faint very dark gray (10YR 3/1) and few medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; very friable; few medium roots and root channels; common medium flakes of mica; very strongly acid; gradual wavy boundary.

B3—29 to 33 inches; dark gray (10YR 4/1) fine sandy loam; weak fine granular structure; few medium roots and root channels; common medium flakes of mica; strongly acid; clear irregular boundary.

C1g—33 to 44 inches; mottled light gray (10YR 7/1), gray (10YR 5/1), and dark gray (10YR 4/1), stratified sand and loamy sand; massive; very friable; few medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) mottles; few lamellae of greenish gray (5GY 5/1) and dark greenish gray (5GY 4/1) clay loam containing common fine roots and common fine flakes of mica; medium acid; clear wavy boundary.

C2g—44 to 58 inches; dark greenish gray (5GY 4/1) sandy loam; massive; very friable; few lamellae of greenish gray (5GY 5/1) and dark greenish gray (5GY 4/1) clay loam containing common fine roots and common fine flakes of mica; neutral; clear smooth boundary.

C3g—58 to 72 inches; greenish gray (5GY 5/1) sand; single grained; loose; common medium flakes of mica; slightly acid.

Arapahoe soils have a loamy B horizon 15 to 35 inches thick. Reaction ranges from strongly acid to extremely acid in the A horizon and upper part of the B horizon in unlimed areas. The lower part of the B horizon and the C horizon range from strongly acid to mildly alkaline. There are few to common fine flakes of mica throughout the profile.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of brown or yellow are in some pedons. Texture is fine sandy loam, loam, or sandy loam. Thin strata of sandy clay or sandy clay loam are in some pedons.

The C horizon has hue of 10YR or 5G, value of 4 to 7, and chroma of 1. It is stratified sandy loam, loamy sand, and sand. Some pedons contain thin layers and pockets of fine textured material.

Argent series

The Argent series consists of poorly drained soils that formed in clayey marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Argent silt loam, 1.1 miles east of Creswell, N.C., and 50 feet north of U.S. Highway 64:

Ap—0 to 6 inches; dark gray (10YR 4/1) silt loam; weak fine granular structure; very friable; few very fine roots; common very fine flakes of mica; neutral; abrupt smooth boundary.

A2—6 to 9 inches; light gray (10YR 6/1) silt loam; few medium faint yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; common fine pores; common very fine flakes of mica; very strongly acid; clear wavy boundary.

B21tg—9 to 18 inches; gray (10YR 5/1) silty clay; common amounts of interfingering of A2 material between primary structural aggregates in upper 2 to 3 inches; common medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm; sticky, plastic; common fine and medium roots mainly between primary structural aggregates; few fine pores; common prominent continuous dark gray (10YR 4/1) clay and silt films and pressure faces on faces of peds; common fine flakes of mica; medium acid; gradual smooth boundary.

B22tg—18 to 44 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; firm; sticky, plastic; common fine roots and pores; common prominent continuous clay films on faces of peds; common fine flakes of mica; medium acid; gradual smooth boundary.

B3tg—44 to 52 inches; light olive gray (5Y 6/2) silty clay loam with pockets of gray (5Y 6/1) and light gray (5Y 7/1) silt loam; common medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; weak medium angular blocky structure; firm to friable; slightly sticky, slightly plastic; few patchy clay films on faces of peds; common fine flakes of mica; medium acid; gradual wavy boundary.

IICg—52 to 84 inches; light gray (10YR 7/1) sand with pockets and lenses of gray (10YR 6/1) loamy sand; common coarse distinct yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) mottles; massive; friable; many fine and medium flakes of mica; medium acid.

The Argent soils have clayey B horizons 30 to 55 inches thick. Reaction ranges from medium acid to extremely acid to a depth of 50 to 60 inches; below that depth it ranges from medium acid to mildly alkaline. There are common to many fine and medium flakes of mica throughout the profile.

The Ap or A1 horizon has hue of 10YR or neutral, value of 2 to 5, and chroma of 1 or 2. Where the surface layer has value of 3 or less, it is less than 10 inches thick. Some pedons have an A2 horizon, which has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2.

The B2t horizon has hue of 10YR or 5Y, value of 4 to 7, and chroma of 1 or 2. It is silty clay, silty clay loam, or clay. The B2t horizon has mottles in shades of red, yellow, or brown.

The C horizon has hue of 10YR, 5Y, 5GY, or neutral, value of 6 or 7, and chroma of 1 or 2. It is silt loam, sandy loam, loamy sand, or sand. In some pedons, the C horizon is mottled in shades of red, yellow, gray, or brown.

Augusta series

The Augusta series consists of somewhat poorly drained soils that formed in loamy marine and fluvial sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Augusta fine sandy loam, approximately 0.7 mile northeast of U.S. Highway 64 and 0.15 mile south of State Road 1303 on farm path and 25 feet southeast of path in woods:

A1—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate fine granular structure; very friable; many fine to coarse roots; strongly acid; clear smooth boundary.

A2—7 to 11 inches; pale olive (5Y 6/3) fine sandy loam; weak fine granular structure; very friable; common small to medium bodies of A1 material; many fine and medium roots; few fine pores; very strongly acid; clear smooth boundary.

B1—11 to 16 inches; light yellowish brown (2.5Y 6/4) sandy loam; few fine faint olive yellow and light brownish gray mottles; weak fine subangular blocky structure; very friable; few fine and medium roots; few fine pores; very strongly acid; clear wavy boundary.

B21tg—16 to 31 inches; light brownish gray (2.5Y 6/2) clay loam with few pockets of fine sandy loam; many coarse prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few fine pores; common thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B22tg—31 to 61 inches; gray (5Y 6/1) sandy clay loam with common pockets of fine sandy loam; common medium distinct light yellowish brown (2.5Y 6/4) and olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few fine pores; few thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Cg—61 to 72 inches; light gray (5Y 7/1) sandy loam and loamy sand; few coarse distinct olive yellow (2.5Y 6/6) mottles; massive; friable; few fine flakes of mica; very strongly acid.

The Augusta soils have a loamy B horizon 20 to 50 inches thick. Reaction ranges from medium acid to very strongly acid in unlimed areas.

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

The B1 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. It is fine sandy loam or sandy loam. Some pedons have a few olive yellow, light brownish gray, or brownish yellow mottles. The B2 horizon has hue of 10YR or 5Y, value of 5 or 6, and chroma of 1 or 2. It is clay loam or sandy clay loam that has mottles in shades of brown and yellow. The B3 horizon is similar to the B2 horizon in color. Texture is fine sandy loam or sandy clay loam with pockets of sandy loam.

The C horizon has hue of 10YR, 5Y, or N, value of 5 to 7, and chroma of 1 or 2. It is sand, loamy sand, or sandy loam.

Belhaven series

The Belhaven series consists of very poorly drained organic soils that formed in loamy marine and fluvial sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Belhaven muck, approximately 8 miles south of Roper and 3 miles southeast of Whitehurst's grain elevator; 0.15 mile south of Canal No. 1 and 50 feet west of C Canal:

Oap—0 to 9 inches; black (5YR 2/l, broken face and rubbed) muck; about 5 percent fibers, less than 1 percent rubbed; about l5 percent mineral content; moderate fine and medium granular structure; very friable; few fine roots and stems; few medium hard subangular blocky peds of organic material on the surface; few fine and medium pieces of charcoal; common coated and clean sand grains; strongly acid; abrupt smooth boundary.

Oa2—9 to 13 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck; about 15 percent fibers; less than 1 percent rubbed; moderate medium subangular blocky structure; friable; few medium pieces of charcoal; extremely acid; clear smooth boundary.

Oa3—13 to 26 inches; very dusky red (2.5YR 2/2, broken face and rubbed) muck; about 25 percent fibers, less than 1 percent rubbed; massive but crushes to moderate medium granular structure; friable; slightly sticky and pastelike; few fine and medium roots; few clean sand grains; few medium pieces of charcoal; extremely acid; clear smooth boundary.

IIA1—26 to 32 inches; very dark gray (5YR 3/1) sandy loam; about 15 percent fibers, less than 2 percent rubbed; moderate medium granular structure; friable; slightly sticky; common fine and medium roots; sapric material gives mucky feel; few clean sand grains; few medium pieces of charcoal; extremely acid; abrupt smooth boundary.

IIB21g—32 to 45 inches; dark gray (10YR 4/1) clay loam; massive; firm; sticky, slightly plastic; few medium roots; about 5 percent fibers, less than 1 percent rubbed; extremely acid; abrupt smooth boundary.

IIB22g—45 to 65 inches; gray (N5/0) clay loam; massive; firm; sticky, slightly plastic; few medium roots; extremely acid; clear smooth boundary.

IICg—65 to 72 inches; greenish gray (5GY 6/1) loamy sand; massive; very friable; few flakes of mica and dark opaque grains; extremely acid.

Thickness of the organic material ranges from 16 to 51 inches. The organic horizons are extremely acid (in 0.01 molar of calcium chloride) except where the surface layer has been limed. The underlying mineral horizons are extremely acid through slightly acid. Logs, stumps, and fragments of wood are in 0 to 5 percent of the upper organic horizons in cleared, cultivated areas and in 5 to 35 percent in undrained areas. Pieces of charcoal range from common (2 to 8 percent) in the upper tiers to few (less than 2 percent) in the lower tiers. Few to common flakes of mica are in the mineral horizons of most pedons.

The surface layer has hue of 5YR or 5Y, value of 2 or 3, and chroma of 1 or 2. The lower tiers of organic material have hue of 2.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. Fiber content is 15 percent to 45 percent unrubbed and less than 10 percent rubbed. The amount of fiber is highest in the Oa3 horizon. Ten inches or more of the subsurface tier is in hue of 5YR or 2.5YR.

The organic material of this layer is pastelike, has a greasy feel (colloidal), and is massive under natural wet conditions. If the soil is drained, its structure changes upon aeration. Excessive drying causes shrinkage and the formation of hard subangular blocky peds. These peds dry irreversibly.

The IIA1 mineral layer, if present, is fine sandy loam, sandy loam, or loam. It is high in organic matter content.

The IIB horizon has hue of 2.5YR or 5Y, value of 3 to 6, and chroma of 1 to 3. It is loam, clay loam, or sandy clay loam.

The IIC horizon is sandy; in many pedons, it is stratified with clayey material.

Bojac series

The Bojac series consists of well drained soils that formed in loamy and sandy marine and fluvial sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Bojac loamy fine sand, 0 to 3 percent slopes, approximately 2.5 miles southeast of Plymouth; 1.6 miles east of State Road 1111 on State Road 1112 and 50 feet south of State Road 1112:

Ap—0 to 8 inches; dark brown (10YR 4/3) loamy fine sand; weak medium granular structure; very friable; few fine roots and crop residue; slightly acid; clear smooth boundary.

A12—8 to 16 inches; dark brown (10YR 4/3) loamy fine sand; weak medium subangular blocky and granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

B2t—16 to 41 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few fine flakes of mica; slightly acid; gradual wavy boundary.

B3—41 to 52 inches; brownish yellow (10YR 6/6) loamy sand; few medium very pale brown (10YR 7/3) streaks of sand; weak medium granular structure; very friable; few fine flakes of mica; medium acid; gradual wavy boundary.

C1—52 to 64 inches; very pale brown (10YR 7/3) loamy sand; weak fine granular structure; very friable; few fine flakes of mica; few fine opaque grains; medium acid; gradual wavy boundary.

C2—64 to 86 inches; light yellowish brown (2.5Y 6/4) sand; single grained; loose; common fine flakes of mica; few fine opaque grains; medium acid.

The Bojac soils have a loamy Bt horizon 20 to 40 inches thick. Reaction ranges from very strongly acid to slightly acid in unlimed areas.

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

The B horizon has hue of 5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The B1 horizon, if present, is sandy loam or loamy sand. The B2t horizon is typically sandy loam. The B3 horizon is sandy loam or loamy sand.

The C horizon has hue of 7.5YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is sand or loamy sand.

Cape Fear series

The Cape Fear series consists of very poorly drained soils that formed in clayey fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Cape Fear loam, on the Tidewater Research Station block H-5; approximately 1.7 miles south of U.S. Highway 64 on State Road 1119, 0.15 mile east of State Road 1119 and 120 feet south of main canal:

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

A12—10 to 14 inches; very dark gray (10YR 3/1) loam; weak medium subangular blocky structure; very friable; common fine and medium pores; common fine flakes of mica; very strongly acid; clear smooth boundary.

B1g—14 to 18 inches; dark gray (10YR 4/1) clay loam; common fine and medium distinct reddish brown (5YR 4/4) and reddish yellow (5YR 6/8) mottles along pores; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; few fibers; common fine and medium pores; common fine flakes of mica; few feldspar grains; very strongly acid; clear smooth boundary.

B2tg—18 to 41 inches; gray (10YR 5/1) clay; common medium prominent brownish yellow (10YR 6/6) and yellowish red (5YR 4/6) mottles along pores; moderate medium angular and subangular blocky structure; firm; very sticky, very plastic; few fine fibers and medium roots; common fine and medium pores; few fine flakes of mica; few feldspar grains; very strongly acid; gradual wavy boundary.

B3g—41 to 52 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) sandy loam with pockets of sandy clay loam; massive; friable; slightly sticky, slightly plastic; common fine flakes of mica; very strongly acid; gradual wavy boundary.

IICg—52 to 72 inches; gray (5Y 5/1) stratified sand and loamy sand with pockets of sandy loam; massive; loose or friable; common fine flakes of mica; very strongly acid.

The Cape Fear soils have a clayey Bt horizon 20 to 40 inches thick. Reaction ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The B1g horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. It is clay loam or sandy clay loam. The B2tg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is clay, sandy clay, or clay loam. Most pedons contain few to common mottles of higher chroma. The B3g horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy clay loam or clay loam. Most pedons contain few to common mottles of higher chroma.

The IIC horizon is gray, dark grayish brown, or grayish brown, stratified sand and loamy sand.

Conaby series

The Conaby series consists of very poorly drained mineral soils that formed in sandy marine deposits under extremely wet conditions. Slope ranges from 0 to 2 percent.

Typical pedon of Conaby muck, approximately 9.5 miles southeast of Plymouth; 0.8 mile southwest of North Carolina Highway 99, 0.45 mile north of Canal No. I0 and 75 feet east of main north-south canal in cut 15:

Oap—0 to 7 inches; very dark gray (10YR 3/1 broken face and rubbed) muck; less than 1 percent fiber, unrubbed and rubbed; moderate medium granular structure; very friable; many organic coated sand grains; common crop residue; very strongly acid; clear smooth boundary.

Oa2—7 to 11 inches; black (10YR 2/1, broken face and rubbed) muck; about 5 percent fiber unrubbed, less than 1 percent rubbed; moderate medium subangular blocky structure; friable; few clean sand grains; common pieces of charcoal and pockets of ash; extremely acid; clear smooth boundary.

Oa3—11 to 13 inches; very dark grayish brown (10YR 3/2, broken face and rubbed) muck; about 2 percent fiber unrubbed, less than 1 percent rubbed; weak fine subangular blocky structure; very friable; common clean sand grains; extremely acid; clear smooth boundary.

A11—13 to 17 inches; dark brown (10YR 3/3) sand; single grained; loose; thin organic stains on sand grains; very strongly acid; clear smooth boundary.

A12—17 to 21 inches; grayish brown (10YR 5/2) sand; single grained; loose; few fine roots; few fine old root channels; few fine flakes of mica; few fine faint yellowish brown bodies of sand; very strongly acid; clear smooth boundary.

B2g—21 to 33 inches; very dark gray (5Y 3/1) sandy loam; few medium distinct olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots and root channels; common flakes of mica; very strongly acid; gradual smooth boundary.

IICg—33 to 74 inches; dark greenish gray (5GY 4/1) stratified sand and sandy loam; massive; friable; few partially decayed roots in upper part; common flakes of mica; medium acid.

Thickness of the organic layers and the sandy and loamy B horizons ranges from 20 to 40 inches. The soil ranges from extremely acid to strongly acid. The weighted average of the upper 12 inches of the mineral horizons is sandy. Few to common flakes of mica occur in most mineral horizons.

The Oap or Oa1 horizon has hue of 5YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It has weak to moderate medium granular structure. In the Oa2 and Oa3 horizons, hue is 2.5YR or 2.5Y, value is 2 or 3, and chroma is 1 or 4. The unrubbed fiber content ranges from 2 to 15 percent, and the rubbed fiber content is less than 2 percent in undisturbed layers. Charcoal fragments and pockets of ash range from none to common in the organic horizons.

The A11 and A12 horizons have hue of 7.5YR or 5Y, value of 3 to 6, and chroma of 1 to 4. They are sand, loamy sand, fine sand, or loamy fine sand.

The B2g horizon has hue of 10YR or 5Y, value of 3 to 5, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loam. It has few to common fine and medium mottles of higher chroma in most pedons.

The IICg horizon is gleyed and stratified sand, loamy sand, or sandy loam.

Conetoe series

The Conetoe series consists of well drained soils that formed in loamy fluvial and marine sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Conetoe loamy fine sand, 0 to 3 percent slopes, approximately 0.3 mile south of Albemarle Sound on State Road 1323 and 100 feet west of State Road 1323 at VEPCO light pole No. 8:

Ap—0 to 12 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; common fine roots and crop residue; medium acid; abrupt smooth boundary.

A2—12 to 28 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine granular structure; very friable; few fine roots; few very fine opaque grains; very strongly acid; clear wavy boundary.

B2t—28 to 42 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; few fine roots; few very fine opaque grains; few discontinuous lamellae up to 1 inch thick; very strongly acid; clear wavy boundary.

B3—42 to 56 inches; yellowish brown (10YR 5/6) loamy sand; weak medium granular structure; very friable; sand grains coated and bridged with clay; few discontinuous strong brown (7.5YR 5/6) lamellae; few very fine opaque grains; medium acid; clear wavy boundary.

C1—56 to 78 inches; brownish yellow (10YR 6/8) sand; single grained; loose; common very fine opaque grains; few fine flakes of mica; medium acid; gradual wavy boundary.

C2—78 to 99 inches; very pale brown (10YR 7/4) sand; single grained; loose; common very fine opaque grains; few fine flakes of mica; medium acid.

Conetoe soils have a loamy Bt horizon 10 to 30 inches thick. Reaction ranges from very strongly acid to medium acid in all horizons except in limed areas.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8.

The B horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 5 to 8. The B1 horizon, if present, is sandy loam or loamy sand. The B2t horizon is typically sandy loam, but some pedons have thin layers of sandy clay loam. The B3 horizon is sandy loam or loamy sand.

The C horizon has hue of 7.5YR or 10YR, value of 6 or 7, and chroma of 3 to 8. It is loamy sand or sand.

Dogue series

The Dogue series consists of moderately well drained soils. These soils formed in clayey fluvial and marine sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Dogue fine sandy loam, 0 to 3 percent slopes, approximately 1.5 miles southwest of Plymouth, 0.4 mile north of U.S. Highway 64 on State Road 1341 and 100 feet west of State Road 1341, in a cultivated field:

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; common fine roots; neutral; clear smooth boundary.

A2—8 to 11 inches; very pale brown (10YR 7/4) fine sandy loam; weak fine subangular blocky structure; friable; common fine roots; common pores up to 1/4 inch in diameter filled with Ap material; strongly acid; clear smooth boundary.

B1—11 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

B21t—15 to 23 inches; brownish yellow (10YR 6/6) clay loam; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; common fine roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

B22t—23 to 42 inches; yellowish brown (10YR 5/6) clay; common medium and fine distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; firm; sticky, plastic; few fine roots in upper part; many thin distinct gray and yellowish red clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

B23t—42 to 55 inches; mottled light gray (10YR 7/1), brownish yellow (10YR 6/6), strong brown (7.5YR 5/8), and light reddish brown (5YR 6/4) clay; moderate medium subangular blocky structure; firm; sticky, plastic; few thin distinct patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

B3—55 to 70 inches; mottled light yellowish brown (10YR 6/4), brownish yellow (10YR 6/6), strong brown (7.5YR 5/8), and gray (10YR 6/1) sandy loam; massive; friable; common fine flakes of mica; very strongly acid; gradual smooth boundary.

IIC—70 to 84 inches; yellow (10YR 7/6) loamy sand and sand; common medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; massive; very friable; few fine flakes of mica; extremely acid.

Dogue soils have a clayey Bt horizon 20 to 50 inches thick. Reaction ranges from extremely acid to strongly acid in unlimed areas.

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

The B1 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8. It is sandy clay loam or clay loam. The B2t horizon has hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part of the B2 horizon is mottled in shades of gray, red, yellow, or brown. Some pedons are mottled without a dominant matrix color. The B2 horizon is clay or clay loam. The B3 horizon is similar in color to the B2t horizon but has more gray mottles. It is clay loam, sandy clay loam, sandy clay, clay, or sandy loam.

The IIC horizon is gray, light gray, or yellow loamy sand, sand, sandy loam, or sandy clay loam.

Dorovan series

The Dorovan series consists of very poorly drained organic soils. The organic layers are more than 51 inches thick over unconsolidated fluvial sediments. Slope is less than 1 percent.

Typical pedon of Dorovan muck, approximately 4.5 miles north of Creswell, 0.5 mile north of State Road 1308 on State Road 1309 and 50 feet northeast of State Road 1309:

Oa1—0 to 4 inches; very dark grayish brown (10YR 3/2, broken face and rubbed) muck; contains partially decomposed moss, leaves, roots, and twigs; about 25 percent fibers, 4 percent rubbed; massive; very friable; many fine and medium roots; about 20 percent mineral content; very strongly acid; clear wavy boundary.

Oa2—4 to 32 inches; very dark grayish brown (10YR 3/2, broken face and rubbed) muck; about 10 percent fibers, less than 1 percent rubbed; massive; very friable; common medium and large roots; about 30 percent mineral content; slight sulfur odor; extremely acid; gradual wavy boundary.

Oa3—32 to 44 inches; black (2.5Y 2/0, broken face and rubbed) muck, about 25 percent fibers, 4 percent rubbed, massive; very friable; common medium and large roots; about 15 percent mineral content; slight sulfur odor; extremely acid; gradual wavy boundary.

Oa4—44 to 99 inches; very dark grayish brown (10YR 3/2, broken face and rubbed) muck; about 15 percent fibers, 2 percent rubbed; massive; very friable; common medium and large roots; about 15 percent mineral content; slight sulfur odor; extremely acid.

Thickness of the organic material ranges from 51 to more than 80 inches. The organic layers are very strongly acid or extremely acid and are 0 to 5 percent logs and wood fragments. The organic layers are underlain by sandy and loamy mineral materials.

The Oa1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is muck. Root mats and fibric litter 6 to 12 inches thick commonly overlie the Oa1 horizon. Fiber content is 15 to 40 percent unrubbed and 2 to 6 percent rubbed. Mineral content ranges from 10 to 30 percent in the Oa1 horizon.

Some pedons have a mineral A horizon, which has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. It ranges from 6 to 16 inches in thickness.

The layers below the Oa1 horizon are muck. They have hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 to 2, or N. Fiber content is 10 to 25 percent unrubbed and commonly 5 percent or less rubbed. The mineral content ranges from 5 to 20 percent.

Some pedons have a IIC horizon that is stratified sandy or loamy fluvial deposits. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

Dragston series

The Dragston series consists of somewhat poorly drained soils that formed in loamy fluvial sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Dragston loamy fine sand, 0.6 mile east of end of State Road 1177 on farm path, 50 feet north of farm path:

Ap—0 to 9 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; medium acid; abrupt smooth boundary.

B1—9 to 16 inches; light yellowish brown (2.5Y 6/4) sandy loam; few fine distinct yellowish brown and grayish brown mottles; weak medium granular structure; friable; few fine flakes of mica; common fine opaque grains; strongly acid; gradual smooth boundary.

B21t—16 to 22 inches; light olive brown (2.5Y 5/4) sandy loam; common medium distinct light gray (10YR 7/1) and few medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; slightly sticky; few fine flakes of mica; common fine opaque grains; strongly acid; gradual smooth boundary.

B22tg—22 to 36 inches; light brownish gray (10YR 6/2) sandy loam; common fine faint light gray and few fine distinct brownish yellow mottles; weak fine subangular blocky structure; friable; slightly sticky; few fine flakes of mica; common fine opaque grains; strongly acid; gradual smooth boundary.

B3g—36 to 48 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 7/1), and strong brown (7.5YR 5/8) loamy fine sand; weak fine granular structure; friable; few fine flakes of mica; common fine opaque grains; strongly acid; gradual smooth boundary.

Cg—48 to 76 inches; light gray (10YR 7/2) sand; few fine distinct yellowish brown mottles; single grained; loose; few fine flakes of mica; common fine opaque grains; lenses of sandy loam; very strongly acid.

Dragston soils have a Bt horizon 15 to 30 inches thick. Reaction is very strongly acid or strongly acid in unlimed areas.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 4. Some pedons have an A2 horizon, which has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. The lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4; it is mottled in shades of yellow and brown, or in shades of gray, brown, or yellow. The Bt horizon is sandy loam or fine sandy loam. The B3 horizon is similar in color to the lower part of the Bt horizon. It is fine sandy loam, sandy loam, or loamy fine sand.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 4. It is sand, loamy sand, or loamy fine sand. Some pedons have thin lenses of sandy loam.

Fortescue series

The Fortescue series consists of very poorly drained mineral soils that formed in loamy material deposited over organic material. Slope is less than 2 percent.

Typical pedon of Fortescue mucky loam, approximately 2.75 miles southeast of First Colony Farms grain elevators and 500 feet north of Lake Phelps:

A11—0 to 3 inches; black (5Y 2/2) mucky loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A12—3 to 21 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate medium subangular blocky structure; friable; common fine to coarse roots; common fine to medium pores; strongly acid; gradual wavy boundary.

IIOa—21 to 36 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck; about 65 percent organic material; moderate fine and medium subangular blocky structure; very friable; strongly acid; abrupt smooth boundary.

IICg—36 to 72 inches; grayish brown (2.5Y 5/2) sand; single grained; loose; slightly acid.

The surface mineral layers range from 20 to 35 inches in thickness. The underlying organic horizons range from 10 to 30 inches in thickness. The soil is extremely acid or strongly acid throughout the surface mineral layers and the buried organic layers. The underlying mineral horizons of some pedons range to medium acid or slightly acid.

The Ap or A1 horizon has hue of 10YR or 5Y, value of 2 or 3, and chroma of 0 to 2.

The IIOa horizon has hue of 2.5YR or 5Y, value of 2 or 3, and chroma of 0 to 4. It is well decomposed organic material. Fiber content is less than 1 percent rubbed.

The IICg horizons are grayish or greenish sand, loamy sand, or sandy loam.

Hyde series

The Hyde series consists of very poorly drained soils that formed in unconsolidated loamy fluvial and marine deposits. Slope ranges from 0 to 2 percent.

Typical pedon of Hyde silt loam, approximately 0.6 mile east of Wenona lookout tower, 0.1 mile east of intersection of State Road 1128 and State Road 1129, 200 feet north of State Road 1129 in the third "cut" east of "A Canal":

Ap—0 to 12 inches; very dark gray (10YR 3/1) silt loam; moderate medium granular structure; very friable; common fine roots and crop residue; few fine clean sand grains; very strongly acid; clear smooth boundary.

A12—12 to 17 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine subangular blocky and granular structure; very friable; common fine roots and old root channels; few fine pores; few fine flakes of mica; extremely acid; clear irregular boundary.

B1—17 to 21 inches; grayish brown (10YR 5/2) silt loam; moderate fine subangular blocky structure; firm; slightly sticky, slightly plastic; common fine and medium roots and pores; common very fine flakes of mica; extremely acid; clear wavy boundary.

B21tg—21 to 37 inches; dark grayish brown (10YR 4/2) silty clay loam; few medium distinct strong brown (7.5YR 5/6) mottles on faces of peds and along root channels; moderate angular and subangular blocky structure; very firm; sticky, plastic; common fine and medium roots and pores; common very fine flakes of mica; extremely acid; gradual wavy boundary.

B22tg—37 to 45 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles on faces of peds and along root channels; moderate fine angular and subangular blocky structure; very firm; slightly sticky, slightly plastic; common fine roots and pores; common very fine flakes of mica; extremely acid; gradual wavy boundary.

B3g—45 to 58 inches; light brownish gray (2.5Y 6/2) silt loam; common fine distinct brownish yellow mottles on faces of peds and along root channels; moderate fine subangular blocky structure; friable; slightly sticky, slightly plastic; common very fine flakes of mica; extremely acid; abrupt smooth boundary.

C1g—58 to 67 inches; greenish gray (5G 5/1) silt loam with pockets of very fine sand; massive; friable; common very fine flakes of mica; extremely acid; gradual wavy boundary.

IIC2g—67 to 85 inches; greenish gray (5G 5/1) stratified sand, loamy sand, and sandy loam; massive; very friable; common very fine flakes of mica; extremely acid.

Hyde soils have a loamy Bt horizon 20 to 40 inches thick. The soil ranges from extremely acid to strongly acid, except in limed areas. Few to common flakes of mica occur throughout the profile.

The Al horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 to 2.

The B1 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or loam. The B2tg horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of brown or red are common in the B2tg horizon. Texture is silty clay loam or clay loam.

The B3 horizon is similar in color to the B2tg horizon. It ranges from silt loam to silty clay or sandy loam.

The C horizon is greenish gray, grayish brown, or light gray or mottled gray, brown, and reddish brown. It is stratified sand, sandy loam, or loamy sand.

Muckalee series

The Muckalee series consists of poorly drained soils that formed in loamy fluvial sediments. Slope is less than 2 percent.

Typical pedon of Muckalee loam, approximately 2 miles southeast of Plymouth; I50 feet west of State Road 1181 on State Road 1115 and 100 feet northeast of bridge on State Road 1115:

A11—0 to 9 inches; dark gray (10YR 4/1) loam; weak medium granular structure; very friable; slightly sticky, slightly plastic; common fine roots; strongly acid; clear wavy boundary.

A12—9 to 20 inches; dark gray (10YR 4/1) loam; few fine distinct yellowish brown mottles around root channels; massive; friable; sticky, plastic; common fine roots; strongly acid; gradual wavy boundary.

C1g—20 to 32 inches; gray (5Y 5/1) sandy loam; common medium distinct dark greenish gray (5GY

4/1) mottles; massive; friable; slightly sticky, slightly plastic; few fine flakes of mica; slightly acid; gradual wavy boundary.

C2g—32 to 42 inches; dark gray (5Y 4/1) sandy loam; massive; friable; few fine flakes of mica; slightly acid; gradual wavy boundary.

C3g—42 to 64 inches; gray (10YR 5/1) stratified sand and loamy sand; massive; very friable; common partially decomposed roots and fibers; few fine flakes of mica; slightly acid.

The A horizon ranges from strongly acid to slightly acid. The C horizon ranges from medium acid to neutral. There are few to common flakes of mica throughout the profile.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2.

The C horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam or loamy sand. Some pedons have strata of sandy clay loam, sand, or loamy sand.

The Muckalee series has siliceous mineralogy. Because the Muckalee soils in this survey area have mixed mineralogy, they are considered a taxadjunct to the series. They are similar in use, management, and behavior, however, to the Muckalee series.

Pettigrew series

The Pettigrew series consists of very poorly drained soils that formed in clayey marine deposits under extremely wet conditions.

Typical pedon of Pettigrew muck, approximately 1.5 miles northwest of Lake Phelps and 0.5 mile southeast of First Colony Farms grain elevators, 0.4 mile south of main east-west canal and 100 feet east of main north-south canal in 10th cut:

Oap—0 to 7 inches; black (N2/0, broken face and rubbed) muck; moderate medium granular structure; very friable; common fine roots and crop residue; few small pieces of charcoal; strongly acid; clear smooth boundary.

Oa2—7 to 15 inches; black (5YR 2/1, broken face and rubbed) muck; moderate medium subangular blocky structure; friable; slightly sticky and pastelike; common fine and medium roots; few pieces of charcoal and few pockets of ash; few vertical cracks up to 1/4 inch wide; extremely acid; gradual smooth boundary.

A1—15 to 20 inches; very dark grayish brown (10YR 3/2) mucky clay loam; weak fine subangular blocky structure; very friable; slightly sticky, slightly plastic; common fine to medium roots and fibers; extremely acid; gradual smooth boundary.

B1g—20 to 26 inches; very dark gray (10YR 3/1) clay loam; weak medium subangular blocky structure; friable; sticky, plastic; common fine to medium roots and fibers; extremely acid; gradual smooth boundary.

B2g—26 to 36 inches; dark gray (10YR 4/1) clay; weak fine subangular blocky structure; very firm; very sticky, very plastic; common fine to medium roots and fibers; strongly acid; gradual smooth boundary.

B3g—36 to 50 inches; dark gray (N4/0) clay; massive; very firm; very sticky, very plastic; common fine to medium roots and fibers; strongly acid; clear smooth boundary.

IICg—50 to 74 inches; greenish gray (5G 5/1) and dark greenish gray (5G 4/1) stratified sandy clay loam, sandy loam, and coarse sand; massive; friable or loose; sandy clay loam and clay loam is slightly sticky, slightly plastic; common fine flakes of mica; slightly acid.

Thickness of the muck and clayey materials over unconforming sediments ranges from 40 to more than 60 inches. Reaction ranges from strongly acid to extremely acid in the upper part of the control section and medium acid to mildly alkaline in the lower part and in the C horizon. Few to common fine flakes of mica are in the lower part of the B and in the C horizons.

The Oap or Oa1 horizon has hue of 5YR or 2.5Y, value of 2 or 3, and chroma of 0 or 2. In drained areas, it has weak to moderate medium granular structure. The Oa2 horizon has hue of 2.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 4. In drained areas, it has weak to moderate medium subangular blocky structure. The unrubbed fiber content ranges from 2 to 20 percent, and the rubbed fiber content ranges from 0 to 4 percent. Charcoal fragments and pockets of ash are few to common in the organic horizons of some pedons.

The A1 horizon has hue of 10YR or 5Y, value of 3 or 4, and chroma of 0 to 2. It is loam, clay loam, mucky clay loam, silty clay loam, or sandy clay loam that is 8 to 20 percent organic matter. Some pedons do not have an A1 horizon.

The B horizon has hue of 10YR or 5Y, value of 3 to 6, and chroma of 0 to 2. It is clay loam, clay, or silty clay. Few to common mottles of higher chroma are in some pedons.

The C horizon is grayish or greenish, stratified sandy and loamy sediments.

Ponzer series

The Ponzer series consists of very poorly drained organic soils. The organic layers are 16 to 51 inches thick over loamy textured marine and fluvial sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Ponzer muck, approximately 0.7 mile northwest of intersection of State Road 1126 and State Road 1183, 2.7 miles northeast of State Road 1126 on dirt road; 50 feet southwest of dirt road:

Oa1—0 to 13 inches; black (10YR 2/1, broken face and rubbed) muck; less than 5 percent fibers, less than

1 percent rubbed; weak fine granular structure; very friable; few fine roots and stems; extremely acid; clear wavy boundary.

Oa2—13 to 32 inches; black (10YR 2/1, broken face and rubbed) muck; about 15 percent fibers, less than 1 percent rubbed; massive; friable; extremely acid; clear wavy boundary.

Oa3—32 to 42 inches; black (10YR 2/1, broken face and rubbed) muck; about 25 percent fibers, less than 1 percent rubbed; massive; friable; extremely acid; clear wavy boundary.

IIA1—42 to 48 inches; black (10YR 2/1) mucky loam; massive; friable; strongly acid; clear wavy boundary.

IIC1—48 to 55 inches; dark brown (10YR 4/3) sandy loam; massive; friable; strongly acid; clear wavy boundary.

IIC2—55 to 60 inches; dark brown (7.5YR 4/4) loamy sand; massive; friable; strongly acid.

The organic materials range from 16 to 51 inches in thickness. They are extremely acid, except where the surface has been limed. The underlying mineral horizons range from extremely acid to slightly acid. Logs, stumps, and fragments of wood make up 0 to 10 percent of the organic layers in cleared areas.

The Oa horizons have hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 to 2. Fiber content of the organic tiers is 5 to 25 percent unrubbed and less than 10 percent rubbed. The organic layers are typically massive under natural wet conditions. If the soil is drained and cultivated, a granular or blocky structure develops throughout the organic layers. The change in structure depends on the nature and depth of the organic material and the duration of drainage.

In most pedons, the upper mineral layers are loamy and have hue of 10YR or 2.5Y, but in some pedons, hue ranges to 7.5YR and 5Y.

Portsmouth series

The Portsmouth series consists of very poorly drained soils that formed in loamy fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Portsmouth fine sandy loam, on the Tidewater Research Station block D3; approximately 0.7 mile south of U.S. Highway 64 on State Road 1119 and 75 feet east of State Road 1119 at utility pole No. E160:

Ap—0 to 12 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; medium acid; gradual wavy boundary.

A2—12 to 19 inches; gray (10YR 5/1) fine sandy loam; weak medium granular structure; very friable; few fine and medium roots; medium acid; gradual wavy boundary.

B1g—19 to 23 inches; gray (10YR 5/1) and dark gray (10YR 4/1) fine sandy loam; common medium distinct brownish yellow (10YR 6/8) and yellow (10YR 7/8) mottles; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; common fine pores and old root channels; common medium flakes of mica; strongly acid; gradual wavy boundary.

B2tg—23 to 35 inches; gray (10YR 5/1) and dark gray (10YR 4/1) sandy clay loam with pockets and lenses of sandy clay and sandy loam; common medium prominent yellowish brown (10YR 5/8), brownish yellow (10YR 6/8), and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; sticky, plastic; common fine pores and old root channels; common thin patchy clay films on faces of peds; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; gradual wavy boundary.

B3g—35 to 38 inches; mottled gray (10YR 5/1), yellowish brown (10YR 5/8), and reddish yellow (5YR 6/8) sandy loam; weak medium subangular blocky structure; very friable; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; clear smooth boundary.

IIC1g—38 to 48 inches; gray (10YR 6/1) sand with few small bodies of sandy clay loam; single grained; loose; common medium flakes of mica; few medium grains of feldspar minerals; very strongly acid; abrupt smooth boundary.

IIC2g—48 to 72 inches; gray (10YR 6/1) and light gray (10YR 7/1) coarse sand; single grained; loose; common medium flakes of mica; few small to large pebbles; strongly acid.

Portsmouth soils have a loamy Bt horizon 10 to 20 inches thick over contrasting sandy horizons. Reaction of the A and B horizons ranges from extremely acid to strongly acid unless the surface layer has been limed. The C horizon ranges from extremely acid to medium acid. Pebbles, flakes of mica, and other weatherable minerals are few to common in most pedons.

The A1 or Ap horizons typically have hue of 10YR, value of 2 or 3, and chroma of 0 to 3. The A2 horizon, if present, has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy loam, fine sandy loam, loam, or their mucky analogues.

The B1 horizon has hue of 10YR to 5Y or is neutral; value is 4 to 6, and chroma is 1 or 2. Mottles are typically in shades of brown and yellow. Texture is sandy loam, fine sandy loam, or loam.

The B2t horizon has hue of 10YR or 5Y or is neutral; value is 4 to 7, and chroma is 1 or 2. Some pedons are mottled in shades of brown, yellow, and red. Texture is sandy clay loam, loam, or clay loam. Some pedons have strata or pockets and lenses of sandy clay and sandy loam.

The B3 horizon is similar to the B2t horizon in color. It is loamy sand or sandy loam.

The IIC horizon has hue of 10YR or 5Y or is neutral; value is 5 to 7, and chroma is 1 or 2. Some pedons are mottled in shades of brown and yellow. Texture is sand or loamy sand. Some pedons contain strata or pockets and lenses of sandy loam, clay loam, or sandy clay loam.

Pungo series

The Pungo series consists of very poorly drained organic soils. These soils are pastelike when wet and contain large amounts of stumps, roots and logs. The organic layers are more than 51 inches thick over clayey marine and fluvial sediments.

Typical pedon of Pungo muck, approximately 2 miles northwest of Pungo Lake, 0.4 mile north of Property Line Canal and 200 feet east of C Canal:

Oi—0 to 2 inches; undecomposed fibric material consisting of leaves, twigs, and stems; many logs and stumps mainly of cypress and juniper; abrupt smooth boundary.

Oa1—2 to 6 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck; about 2 percent fibers, less than 1 percent rubbed; weak medium granular structure; very friable; few fine and medium roots; common fine to medium pieces of charcoal; common logs, stumps, and roots; extremely acid; clear smooth boundary.

Oa2—6 to 10 inches; dark reddish brown (5YR 3/2, broken face and rubbed) muck; about 2 percent fibers, less than 1 percent rubbed; weak medium subangular blocky structure; friable; sapric material is pastelike and has greasy feeling when wet; few medium roots; few medium pieces of charcoal; many stumps, logs, and roots; extremely acid; gradual smooth boundary.

Oa3—10 to 28 inches; dark reddish brown (5YR 3/2, broken face and rubbed) muck; about 25 percent fibers, less than 2 percent rubbed; massive; friable; sticky; sapric material is pastelike and has greasy feeling; common medium roots; few medium pieces of charcoal; many stumps, logs, and roots; extremely acid; gradual smooth boundary.

Oa4—28 to 44 inches; dark reddish brown (5YR 3/2, broken face and rubbed) muck; about 45 percent fibers, less than 10 percent rubbed; massive; friable; sticky; sapric material is pastelike and has greasy feeling; few fine and large pieces of charcoal; many stumps, logs, and roots; extremely acid; gradual smooth boundary.

Oa5—44 to 58 inches; very dark brown (10YR 2/2) and black (10YR 2/1 rubbed) muck; about 40 percent fibers, less than 8 percent rubbed; massive; friable; sticky; sapric material is pastelike and has greasy feeling; many logs, stumps, and roots; extremely acid; gradual smooth boundary.

Oa6—58 to 72 inches; black (10YR 2/1, broken face and rubbed) muck; about 20 percent fibers, less than 2 percent rubbed; massive; sticky, slightly plastic; about 55 percent mineral; common logs, stumps, and roots; extremely acid; clear smooth boundary.

IICg—72 to 84 inches; gray (N5/0) clay; massive; very sticky, very plastic; few fibers; few fine roots; very strongly acid.

Thickness of the organic deposits ranges from 51 inches to more than 90 inches. The soil is extremely acid (in 0.01 molar of calcium chloride) in the organic horizons, except where the surface layer has been limed. The underlying mineral horizons are extremely acid or strongly acid. Logs, stumps, and roots occupy up to 35 percent of the surface area and subsurface volume. The unrubbed fiber content ranges from 2 to 60 percent throughout the profile. The rubbed fiber content of the middle and lower tiers ranges to 12 percent in some pedons. The charcoal content ranges from common in the surface layer to few in the subsurface layers.

The surface layer has hue of 5YR or 10YR, value of 2 or 3, and chroma of 0 to 2. The subsurface layers have hue of 2.5YR or 5Y, value of 2 or 3, and chroma of 0 to 4. Ten inches or more of the subsurface layer is in hue of 5YR or 2.5YR. The organic material is massive. It is pastelike or has a greasy feel when saturated. If aerated slowly after drainage and subsidence, it forms weak subangular blocky structure. If it dries quickly, it shrinks and does not rewet. The underlying mineral horizon is sandy clay, silty clay, or clay and has gleyed colors.

Roanoke series

The Roanoke series consists of poorly drained soils that formed in clayey fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Roanoke loam, approximately 0.2 mile northeast of the intersection of State Road 1132 and State Road 1133, 50 feet southeast of State Road 1132 in a cultivated field:

Ap—0 to 7 inches; very dark gray (10YR 3/1) loam; weak fine granular structure; friable; many fine roots; few fine pores; neutral; gradual wavy boundary.

B21tg—7 to 15 inches; light brownish gray (10YR 6/2) clay loam; common fine distinct brownish yellow mottles; weak fine subangular blocky structure; firm; slightly sticky, slightly plastic; common fine roots; few fine pores; strongly acid; gradual wavy boundary.

B22tg—15 to 32 inches; light gray (10YR 6/1) clay; few medium distinct brownish yellow (10YR 6/8) and common medium distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; firm; sticky, plastic; few fine roots and pores; common thin continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B23tg—32 to 42 inches; light brownish gray (10YR 6/2) clay loam with pockets of clay; few fine distinct brownish yellow and common fine distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; slightly sticky, slightly plastic; few fine pores; common thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3g—42 to 50 inches; light brownish gray (10YR 6/2) sandy clay loam with pockets of sandy loam; weak fine subangular blocky structure; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

IIC1g—50 to 56 inches; mottled light brownish gray (10YR 6/2), brownish yellow (10YR 6/8), and strong brown (7.5YR 5/8) loamy sand with pockets of sandy clay loam; massive; common fine flakes of mica; strongly acid; clear wavy boundary.

IIC2g—56 to 70 inches; light brownish gray (2.5Y 6/2) stratified loamy sand, sandy loam, and clay loam; few fine distinct brownish yellow and strong brown mottles; massive; common fine flakes of mica; strongly acid.

Roanoke soils have a clayey Bt horizon 20 to 40 inches thick. Reaction is very strongly acid or strongly acid in unlimed areas.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. The A2 horizon, if present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2.

The B1g horizon, if present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is clay loam or silty clay loam. The B2tg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of yellow and brown are common. It is clay, clay loam, or silty clay. The B3g horizon is similar in color to the B2t horizon. It is silty clay loam, clay loam, or sandy clay loam.

The Cg horizon is similar in color to the B horizon. It is commonly stratified sandy and loamy material.

Roper series

The Roper series consists of very poorly drained mineral soils that formed in loamy marine deposits under extremely wet conditions.

Typical pedon of Roper muck, approximately 2 miles west of Lake Phelps; 0.25 mile west of Respess Road (D canal) and l00 feet north of Etheridge canal in 4th cut:

Oap—0 to 8 inches; black (N2/0, broken face and rubbed) muck; less than 1 percent fibers rubbed; moderate medium granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

Oa2—8 to 15 inches; black (10YR 2/1, broken face and rubbed) muck; about 5 percent fibers unrubbed; weak medium subangular blocky structure; very friable; many fine roots and root channels; few fine pockets of clean silt grains; very strongly acid; clear wavy boundary.

A1—15 to 24 inches; very dark gray (10YR 3/1) mucky silt loam; weak fine subangular blocky structure; very friable; slightly sticky, slightly plastic; many fine fibers, roots, and root channels; extremely acid; clear wavy boundary.

B21g—24 to 31 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common fine roots; many fine fibers; common medium pores and root channels; common fine flakes of mica; extremely acid; clear wavy boundary.

B22g—31 to 42 inches; grayish brown (10YR 5/2) silt loam; common dark gray (10YR 4/1) pockets of silty clay loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; common fine roots; common medium pores and root channels; common fine flakes of mica; very strongly acid; clear smooth boundary.

B3g—42 to 55 inches; greenish gray (5GY 6/1 and 5GY 5/1) silt loam; massive; friable; slightly sticky, slightly plastic; common fine roots; common medium pores and root channels; common fine flakes of mica; slightly acid; clear smooth boundary.

IICg—55 to 72 inches; dark gray (5Y 4/1) and greenish gray (5GY 5/1) stratified sand and loamy sand; massive; very friable; common fine flakes of mica; slightly acid.

Thickness of muck and silty materials over unconforming sandy sediments ranges from 40 to more than 60 inches. Reaction ranges from extremely acid to strongly acid in the upper part of the control section and from medium acid to mildly alkaline in the lower part and in the C horizon. Few to common fine flakes of mica occur throughout the mineral part of the soil.

The Oa horizon has hue of 5YR or 2.5Y, value of 2 or 3, and chroma of 0 to 4. It has weak to moderate medium granular structure in undrained areas and weak or moderate medium subangular blocky structure in drained areas. The unrubbed fiber content ranges from 2 to 15 percent, and the rubbed fiber content ranges from 0 to 4 percent. Charcoal fragments are common in the organic horizons of some pedons.

The A1 horizon, if present, has hue of 10YR or 5Y, value of 3 or 4, and chroma of 0 to 2. It is silt loam, clay loam, mucky silt loam, or silty clay loam.

The B horizon has hue of 10YR or 5Y or 5GY, value of 4 to 6, and chroma of 0 to 2. Few to common mottles of higher chroma are in some pedons. The B horizon is silty clay loam or silt loam. Thin strata of loam, clay loam, or silty clay are in some pedons.

Colors in the C horizon include those for the B horizon and, also include light gray, gray, or greenish gray. The C horizon is stratified silt loam, loam, sand, loamy sand, sandy loam, silty clay, or clay.

Scuppernong series

The Scuppernong series consists of very poorly drained organic soils. The organic layers are 16 to 51 inches thick over loamy sediments that are high in silt and organic matter and overlie sand. Slope ranges from 0 to 1 percent.

Typical pedon of Scuppernong muck, approximately 1.5 miles south of State Road 1126 on State Road 1183, 500 feet east of State Road 1183:

Oap—0 to 5 inches; black (5YR 2/1, broken face and rubbed) muck; less than 1 percent fiber unrubbed and rubbed; moderate fine and medium granular structure; very friable; common fine and large roots and fragments of wood; strongly acid; abrupt smooth boundary.

Oa2—5 to 9 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck; less than 1 percent fiber unrubbed and rubbed; massive parting to weak fine angular blocky structure; friable; slightly sticky and pastelike; common fine, medium, and large roots and fragments of wood; few fine pieces of charcoal; extremely acid; clear smooth boundary.

Oa3—9 to 20 inches; dark reddish brown (5YR 3/2, broken face and rubbed) muck; about 5 percent fibers, less than 1 percent rubbed; massive; friable; slightly sticky and pastelike; common medium and large roots and fragments of wood; few medium pieces of charcoal; extremely acid; gradual wavy boundary.

Oa4—20 to 28 inches; dark reddish brown (5YR 3/3, broken face and rubbed) muck; about 15 percent fibers, 2 percent rubbed; massive; friable; slightly sticky and pastelike; common medium and large roots and fragments of wood; few medium pieces of charcoal; extremely acid; clear wavy boundary.

IIC1g—28 to 45 inches; dark greenish gray (5GY 4/1) mucky silt loam; massive; slightly sticky; common fine streaks and pockets of light gray very fine sand and silt; extremely acid; clear smooth boundary.

IIIC2g—45 to 48 inches; light gray (10YR 7/1) sand; single grained; loose; few medium flakes of mica; extremely acid; gradual wavy boundary.

IIIC3g—48 to 72 inches; dark greenish gray (5GY 4/1) sand; single grained; loose; few medium flakes of mica; extremely acid.

Thickness of the organic material ranges from 16 to 51 inches. The organic horizons are extremely acid (in 0.01 molar of calcium chloride) except where the surface layer has been limed. The mineral horizons range from extremely acid to neutral. Logs, stumps, and fragments of wood occupy 0 to 15 percent of the upper organic horizons in cultivated or pastured areas and 10 to 35 percent in undrained areas. A few (0 to 2 percent) pieces of charcoal and pockets of ash occur in the organic layers. Flakes of mica are few to common in the mineral horizons of most pedons.

The Oa1 or Oap horizon has hue of 5YR or 10YR, value of 2 or 3, and chroma of 0 to 3. In cultivated or pastured areas, it has weak to moderate fine and medium granular structure. Structure in the Oa2 horizon occurs only in drained areas that are cultivated. The structure is massive but parts to fine and medium angular blocky.

The Oa2 horizon and underlying organic tiers have hue of 2.5YR or 5YR, value of 2 or 3, and chroma of 2 or 4. The lower tiers of organic matter are pastelike, have a greasy feel, and are massive under natural, wet conditions. If the soil is drained and cultivated, its structure changes upon aeration. Excessive drying causes shrinkage and the formation of hard angular blocky peds. These peds dry irreversibly. Fiber content is highest in the lower tier. It ranges from 10 to 50 percent unrubbed and less than 10 percent rubbed.

The IIC1g horizon has hue of 5GY, 5G, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is silt loam or silty clay loam and contains 10 to 20 percent organic matter throughout.

The IIICg horizons have hue of 10YR or 5Y, value of 6 or 8, and chroma of 1 or 2 and range to greenish gray or dark greenish gray. They are sand or loamy sand.

Tarboro series

The Tarboro series consists of somewhat excessively drained soils that formed in sandy fluvial sediments. Slope ranges from 0 to 3 percent.

Typical pedon of Tarboro sand, 0 to 3 percent slopes, approximately 0.5 mile east of intersection of State Road 1315 and N.C. Highway 32, and 250 feet south of Albemarle Sound in the woods:

A11—0 to 3 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; many fine and medium roots; many clean sand grains; strongly acid; clear smooth boundary.

A12—3 to 12 inches; brown (10YR 4/3) sand; weak fine granular structure; very friable; common fine to coarse roots; few organic stains on sand grains; few very fine opaque grains; strongly acid; clear wavy boundary.

C1—12 to 31 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine to coarse roots; few fine flakes of mica; few very fine opaque grains; strongly acid; gradual wavy boundary.

C2—31 to 52 inches; yellowish brown (10YR 5/6) sand; single grained; loose; few medium and large roots; few fine flakes of mica; few very fine opaque grains; strongly acid; clear wavy boundary.

C3—52 to 60 inches; yellow (10YR 7/8) sand; single grained; loose; few fine flakes of mica; few very fine opaque grains; medium acid; clear smooth boundary.

C4—60 to 99 inches; pale brown (10YR 6/3) sand; single grained; loose; few fine flakes of mica; few very fine opaque grains; strongly acid.

Tarboro soils have sandy horizons that are more than 80 inches thick. Reaction ranges from strongly acid to slightly acid in unlimed areas.

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

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 3 to 8. It is loamy sand or sand.

Tomotley series

The Tomotley series consists of poorly drained soils that formed in loamy fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Tomotley fine sandy loam, 0.3 mile south of U.S. Highway 64 on State Road 1132 and 50 feet west of State Road 1132:

A1—0 to 6 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; common very fine to medium roots and pores; few fine flakes of mica; very strongly acid; clear smooth boundary.

A2—6 to 11 inches; light gray (10YR 7/1) fine sandy loam; weak medium granular structure; very friable; common A1 bodies; common fine and medium roots and pores; few fine flakes of mica; very strongly acid; clear wavy boundary.

B1g—11 to 16 inches; light gray (10YR 7/1) sandy loam with pockets of sandy clay loam; few medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) mottles; moderate fine subangular blocky structure; friable; common fine to medium roots and pores; few fine flakes of mica; very strongly acid; gradual wavy boundary.

B21tg—16 to 25 inches; gray (10YR 6/1) clay loam with pockets and lenses of sandy loam; few medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; few medium roots; common fine and medium pores; few thin distinct patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22tg—25 to 37 inches; gray (10YR 6/1) clay loam with pockets and lenses of sandy clay loam and sandy clay; common medium and coarse distinct strong brown (7.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; moderate medium and coarse subangular and angular blocky structure; friable; slightly sticky, slightly plastic; few medium roots; common fine and medium pores; few thin distinct patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—37 to 48 inches; gray (10YR 6/1) and light olive gray (5Y6/2) clay loam with pockets and lenses of sandy clay loam; common medium and coarse distinct strong brown (7.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; moderate medium and coarse subangular and angular blocky structure; friable; slightly sticky, slightly plastic; few medium roots; common thin distinct patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3g—48 to 64 inches; gray (10YR 6/1) sandy loam with pockets of sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Cg—64 to 80 inches; gray (10YR 6/1) stratified sandy loam, loamy sand, and sand; common coarse distinct brownish yellow (10YR 6/6) mottles; massive; friable; very strongly acid.

Tomotley soils have loamy Bt horizons 20 to 40 inches thick. Reaction ranges from extremely acid to strongly acid in the upper part in unlimed areas. Below a depth of about 50 inches, it ranges from extremely acid to medium acid.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. The A2 horizon, if present, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. Some pedons are mottled in shades of yellow, red, or brown.

The B1 horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is fine sandy loam or sandy loam. The B2tg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy clay loam or clay loam. The B3g horizon is similar in color to the B2tg horizon. It is fine sandy loam, sandy loam, or sandy clay loam. The B horizon is mottled in various shades of red, olive, yellow, brown, or gray.

The C horizon is light gray, gray, light brownish gray, pale olive, or greenish gray. It is stratified loamy and sandy material.

Wahee series

The Wahee series consists of somewhat poorly drained soils that formed in clayey fluvial and marine sediments. Slope ranges from 0 to 2 percent.

Typical pedon of Wahee fine sandy loam, approximately 3 miles southeast of Plymouth, 100 feet northeast of State Road 1112 at intersection with Weyerhaeuser Company road:

A1—0 to 7 inches; grayish brown (2.5Y 5/2) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; abrupt wavy boundary.

B1—7 to 11 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; few fine faint light brownish gray mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few fine opaque grains; very strongly acid; clear wavy boundary.

B21t—11 to 21 inches; light olive brown (2.5Y 5/4) clay loam; common fine faint light brownish gray (2.5Y

6/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; few fine and medium roots; common fine pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22tg—21 to 33 inches; gray (10YR 5/1) clay; many medium distinct strong brown (7.5YR 5/8), reddish yellow (7.5YR 6/8), and yellowish brown (10YR 5/6) mottles; strong medium angular and subangular blocky structure; firm; sticky, plastic; few fine roots; common fine pores; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—33 to 47 inches; light olive gray (5Y 6/2) clay; common medium distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/6) mottles; strong medium angular and subangular blocky structure; firm; sticky, plastic; few fine roots; few fine pores; thin continuous clay films on faces of peds; few grains of feldspar; very strongly acid; gradual wavy boundary.

B3g—47 to 58 inches; light brownish gray (2.5Y 6/2) sandy clay loam with pockets of sandy loam; common medium distinct greenish gray (5G 6/1) and strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; few fine flakes of mica; few fine grains of feldspar; very strongly acid; gradual wavy boundary.

IICg—58 to 74 inches; mottled light gray (10YR 6/1) and yellowish brown (10YR 5/6) stratified sand and loamy sand; massive; very friable; few fine flakes of mica; few fine grains of feldspar; common fine opaque grains; very strongly acid; gradual wavy boundary.

Wahee soils have clayey Bt horizons 25 to 40 inches thick. Reaction is strongly acid or very strongly acid in unlimed areas.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The A2 horizon, if present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4.

Some pedons have a B1 horizon, which has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is clay loam or sandy clay loam. The B2t horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In some pedons, the upper 4 to 10 inches of the B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. Texture is clay, clay loam, or silty clay loam. The B3 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy clay loam or clay loam. The B2t and B3 horizons are mottled in shades of red, brown, or yellow.

The IIC horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. It is commonly stratified sand and loamy sand, or it is sand, loamy sand, or sandy clay loam. The IIC horizon is mottled in shades of red, brown, and yellow in some pedons.

Wasda series

The Wasda series consists of very poorly drained mineral soils that formed in loamy marine sediments under very wet conditions. Slope ranges from 0 to 2 percent.

Typical pedon of Wasda muck, 7 miles south of Roper, 1 mile east of State Road 1127 and 1 mile south of North slope grain elevator, 50 feet north of canal No. 2 and midway between canals A and B:

Oap—0 to 6 inches; black (10YR 2/1) muck; about 10 percent fiber; 3 percent rubbed; weak medium granular structure; very friable; many fine roots; few fine pieces of charcoal; strongly acid; clear smooth boundary.

Oa2—6 to 14 inches; dark reddish brown (5YR 2/2) muck; about 30 percent fiber; 3 percent rubbed; weak fine subangular blocky structure; friable; slightly sticky, many fine roots; extremely acid; abrupt wavy boundary.

A1—14 to 20 inches; dark grayish brown (10YR 4/2) clay loam; massive; friable; slightly sticky, slightly plastic; many fine roots; very strongly acid; abrupt wavy boundary.

B21g—20 to 35 inches; grayish brown (10YR 5/2) clay loam with common dark gray (10YR 4/1) pockets of clay; common medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; slightly sticky, slightly plastic; common fine roots; very strongly acid; abrupt wavy boundary.

B22g—35 to 42 inches; dark grayish brown (10YR 4/2) clay loam with thin lenses of gray (10YR 6/1) sand; massive; friable; sticky, plastic; few fine flakes of mica; very strongly acid; abrupt wavy boundary.

IIC1g—42 to 60 inches; dark greenish gray (5GY 4/1) sandy loam with thin lenses and a few pockets of sand; common medium distinct yellowish brown (10YR 5/6) mottles; massive; very friable; slightly sticky, slightly plastic; few fine flakes of mica; slightly acid; gradual wavy boundary.

IIC2g—60 to 74 inches; dark greenish gray (5BG 4/1) sand with thin lenses of sandy loam; single grained; loose; slightly acid.

Thickness of the muck and loamy horizons over sediments ranges from 40 to more than 60 inches. Reaction of the soil ranges from extremely acid to strongly acid in the upper part of the control section and medium acid to mildly alkaline in the lower part and in the C horizon. Mica, feldspar, and other weatherable minerals are few to common in the B and C horizons.

The Oa horizon has hue of 2.5YR or 5Y, value of 2 or 3, and chroma of 0 to 2.

The A and B horizons have hue of 10YR or 5Y, value of 2 to 5, and chroma of 1 or 2. Few to common mottles are in the middle and lower B horizons of some pedons. The B horizon commonly is clay loam but ranges to sandy loam or sandy clay loam. The B horizon commonly contains thin lenses of sand and clay.

The C horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2, or greenish gray or dark greenish gray. The upper part of the C horizon is loam or sandy loam. The lower part of the C horizon is sand.

Wickham series

The Wickham series consists of well drained soils that formed in loamy fluvial and marine sediments. Slope ranges from 0 to 4 percent.

Typical pedon of Wickham loamy sand, 0 to 4 percent slopes, 0.1 mile south of Plymouth city limits, approximately 0.35 mile south of intersection of Roosevelt Avenue and West Street, and 150 feet east of Roosevelt Avenue behind cemetery:

Ap—0 to 8 inches; dark brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; few fine roots; common fine opaque grains; strongly acid; abrupt smooth boundary.

B2t—8 to 34 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine pores; common fine opaque grains; few fine grains of feldspar; strongly acid; clear smooth boundary.

B3—34 to 42 inches; yellowish red (5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; common fine opaque grains; common fine grains of feldspar; medium acid; clear smooth boundary.

C—42 to 72 inches; strong brown (7.5YR 5/6) fine sand; single grained; loose; common fine opaque grains; common fine grains of feldspar; medium acid.

Wickham soils have loamy Bt horizons 20 to 40 inches thick. Reaction ranges from very strongly acid to medium acid in unlimed areas.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. The A2 horizon, if present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8.

Some pedons have a B1 horizon. This horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or fine sandy loam. The B2t horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam or clay loam. The B3 horizon has hue of 5YR or 10YR, value of 4 to 6, and chroma of 6 or 8. It is sandy loam or loamy sand.

The C horizon has hue of 5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. It is fine sand, sand, or loamy sand.

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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.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

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

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Blackland. Areas of soil in the southern part of the county that have surface layers that are muck.

Bottom land. The normal flood plain of a stream, subject to flooding.

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

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

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow.

Some are steep. All are free of the mottling related to wetness.

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

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

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

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

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

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

Edge habitat. The zone of transition from one type of plant cover to another.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

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

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

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

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

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the 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.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

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

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

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

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

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops without any seedbed preparation other than opening the soil for the purpose of placing the seed at the intended depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, 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.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

Reaction, soil. A measure of 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

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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

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.

Slow intake (in tables). The slow movement of water into the soil.

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

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

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

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

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

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

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

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-77, at Plymouth, 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----	53.7	30.9	42.3	77	9	51	3.86	2.21	5.20	8	1.5
February---	56.6	32.9	44.8	79	12	40	4.07	2.50	5.48	8	1.2
March------	63.4	38.7	51.1	85	20	143	4.05	2.76	5.23	8	.7
April------	73.9	46.6	60.2	91	27	306	2.97	1.85	3.97	6	.0
May--------	80.3	55.2	67.8	94	34	552	4.47	2.33	6.22	8	.0
June-------	86.1	62.7	74.4	98	45	732	4.42	2.24	6.20	7	.0
July-------	89.1	67.1	78.1	98	51	871	6.40	3.50	8.77	9	.0
August-----	87.9	66.3	77.1	97	50	840	6.22	2.66	9.11	8	.0
September--	82.9	60.5	69.0	95	41	762	4.73	2.53	6.52	6	.0
October----	73.4	49.8	61.6	89	25	364	3.43	1.22	5.20	5	.0
November---	64.7	39.4	52.1	83	19	112	2.98	1.32	4.33	6	.0
December---	56.3	32.7	44.5	77	11	63	3.43	1.90	4.68	7	.6
Yearly:											
Average--	72.4	48.6	60.3	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	7	---	---	---	---	---	---
Total----	---	---	---	---	---	4,836	51.03	44.98	56.91	86	4.0

[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 in the period 1951-77 at Plymouth, 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 1	April 16	April 30
2 years in 10 later than--	March 24	April 10	April 25
5 years in 10 later than--	March 10	March 30	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 24	October 11
2 years in 10 earlier than--	November 3	October 29	October 16
5 years in 10 earlier than--	November 15	November 7	October 25

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-77 at Plymouth, 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	220	198	173
8 years in 10	230	206	179
5 years in 10	250	221	191
2 years in 10	269	237	204
1 year in 10	279	245	210

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaA	Altavista fine sandy loam, 0 to 2 percent slopes	6,530	3.0
Ap	Arapahoe fine sandy loam	9,500	4.4
Ar	Argent silt loam	8,045	3.7
At	Augusta fine sandy loam	6,610	3.1
Ba	Belhaven muck	25,645	11.9
BoA	Bojac loamy fine sand, 0 to 3 percent slopes	1,220	0.6
Cf	Cape Fear loam	28,755	13.4
Co	Conaby muck	3,600	1.7
CtA	Conetoe loamy fine sand, 0 to 3 percent slopes	3,365	1.6
DgA	Dogue fine sandy loam, 0 to 3 percent slopes	2,650	1.2
Do	Dorovan muck	17,600	8.2
Dr	Dorovan mucky silt loam, overwash	2,255	1.0
Ds	Dragston loamy fine sand	4,950	2.3
Fo	Fortescue mucky loam	720	0.3
Hy	Hyde silt loam	5,010	2.3
Me	Muckalee loam	2,115	1.0
Pe	Pettigrew muck	6,310	3.0
Po	Ponzer muck	1,120	0.5
Pt	Portsmouth fine sandy loam	20,000	9.3
Pu	Pungo muck	14,815	6.9
Ro	Roanoke loam	15,550	7.2
Rp	Roper muck	6,590	3.1
Se	Scuppernong muck	2,040	1.0
TaB	Tarboro sand, 0 to 3 percent slopes	945	0.4
To	Tomotley fine sandy loam	3,825	1.8
Wa	Wahee fine sandy loam	4,140	1.9
Wd	Wasda muck	7,360	3.4
WkB	Wickham loamy sand, 0 to 4 percent slopes	3,425	1.6
	Water	350	0.2
	Total	215,040	100.0

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]

Soil name and map symbol	Corn	Soybeans	Peanuts	Tobacco	Wheat	Pasture
	Bu	Bu	Lb	Lb	Bu	AUM*
AaA: Altavista	130	45	---	2,600	55	9.0
Ap: Arapahoe	105	35	---	---	50	10.0
Ar: Argent	140	40	---	---	---	---
At: Augusta	110	40	---	---	---	---
Ba: Belhaven	125	40	---	---	---	---
BoA: Bojac	95	35	4,100	1,800	40	6.0
Cf: Cape Fear	125	45	---	---	---	11.0
Co: Conaby	130	40	---	---	50	8.5
CtA: Conetoe	80	25	3,000	2,500	---	9.0
DgA: Dogue	125	45	3,700	---	60	9.5
Do, Dr: Dorovan	---	---	---	---	---	---
Ds: Dragston	125	40	3,800	---	50	6.0
Fo: Fortescue	130	40	---	---	---	---
Hy: Hyde	150	40	---	---	55	14
Me: Muckalee	---	---	---	---	---	---
Pe: Pettigrew	130	40	---	---	55	9.5
Po: Ponzer	130	40	---	---	55	7.5
Pt: Portsmouth	130	40	---	---	60	10
Pu: Pungo	100	25	---	---	---	---
Ro: Roanoke	140	40	---	---	45	6.8
Rp: Roper	130	40	---	---	55	10.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Peanuts	Tobacco	Wheat	Pasture
	Bu	Bu	Lb	Lb	Bu	AUM*
Se------------------------ Scuppernong	125	35	---	---	---	---
TaB----------------------- Tarboro	50	20	2,000	---	---	6.0
To------------------------ Tomotley	135	40	---	---	---	---
Wa------------------------ Wahee	100	40	---	---	---	---
Wd------------------------ Wasda	130	40	---	---	---	12.0
WkB----------------------- Wickham	110	40	3,300	2,600	---	9.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 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)
		Acres	Acres	Acres
I	---	---	---	---
II	22,140	3,425	14,130	4,585
III	126,240	---	125,295	945
IV	1,120	---	1,120	---
V	2,115	---	2,115	---
VI	720	---	720	---
VII	62,355	---	62,355	---
VIII	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
AaA----------------- Altavista	2w	Slight	Moderate	Slight	Loblolly pine---------- Longleaf pine---------- Shortleaf pine--------- Sweetgum--------------- White oak--------------	91 84 77 84 ---	Loblolly pine, yellow-poplar, black walnut, sweetgum, American sycamore, cherrybark oak.
Ap------------------ Arapahoe	2w	Slight	Severe	Severe	Loblolly pine----------	95	Loblolly pine, sweetgum, American sycamore.
Ar------------------ Argent	1w	Slight	Severe	Moderate	Loblolly pine---------- Sweetgum--------------- Water oak-------------- Water tupelo----------- Longleaf pine----------	96 96 96 --- 85	Loblolly pine, sweetgum, American sycamore, longleaf pine.
At------------------ Augusta	2w	Slight	Moderate	Slight	Loblolly pine---------- Sweetgum--------------- American sycamore------ White oak-------------- Southern red oak------- Water oak-------------- Shortleaf pine---------	90 90 90 80 80 --- ---	Loblolly pine, sweetgum, American sycamore, yellow-poplar, cherrybark oak.
Ba------------------ Belhaven	4w	Slight	Severe	Severe	Loblolly pine---------- Pond pine-------------- Baldcypress------------ Atlantic white-cedar---	65 60 --- ---	Loblolly pine.
BoA----------------- Bojac	3o	Slight	Slight	Slight	Northern red oak------- Virginia pine---------- Loblolly pine---------- Sweetgum---------------	70 75 80 80	Loblolly pine, sweetgum.
Cf------------------ Cape Fear	1w	Slight	Severe	Severe	Sweetgum--------------- Loblolly pine---------- Water oak-------------- Water tupelo----------- Baldcypress------------	--- 100 --- --- ---	Loblolly pine, water tupelo, American sycamore, sweetgum.
Co------------------ Conaby	2w	Slight	Severe	Severe	Loblolly pine---------- Pond pine-------------- Sweetgum--------------- Baldcypress------------ Red maple--------------	94 80 --- --- ---	Loblolly pine, sweetgum, baldcypress.
CtA----------------- Conetoe	3s	Slight	Moderate	Moderate	Loblolly pine---------- Longleaf pine----------	80 65	Loblolly pine.
DgA----------------- Dogue	2w	Slight	Moderate	Slight	Loblolly pine---------- Southern red oak------- Sweetgum--------------- Yellow-poplar---------- White oak--------------	90 80 90 95 80	Loblolly pine.
Do, Dr-------------- Dorovan	4w	Slight	Severe	Severe	Blackgum--------------- Sweetbay---------------	70 ---	Baldcypress.
Ds------------------ Dragston	2w	Slight	Moderate	Slight	Northern red oak------- Loblolly pine---------- Sweetgum--------------- Yellow-poplar----------	80 85 90 90	Loblolly pine, sweetgum, yellow-poplar.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	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
Fo------------------ Fortescue	2w	Slight	Severe	Severe	Sweetgum Red maple Yellow-poplar Loblolly pine Baldcypress Water oak Willow oak	--- --- --- --- --- --- ---	Loblolly pine, yellow-poplar, baldcypress, sweetgum.
Hy------------------ Hyde	1w	Slight	Severe	Severe	Loblolly pine	96	Loblolly pine, water tupelo, sweetgum.
Me------------------ Muckalee	2w	Slight	Severe	Severe	Sweetgum Loblolly pine Water oak Green ash Eastern cottonwood	90 90 90 85 100	Sweetgum, loblolly pine, American sycamore, eastern cottonwood, Nuttall oak.
Pe------------------ Pettigrew	1w	Slight	Severe	Severe	Water tupelo Baldcypress Sweetgum Atlantic white-cedar Green ash Pond pine Loblolly pine	--- --- 97 --- --- 80 96	Loblolly pine, water tupelo, yellow-poplar, Atlantic white-cedar.
Po------------------ Ponzer	4w	Slight	Severe	Severe	Pond pine Water tupelo Baldcypress Loblolly pine Sweetgum Swamp tupelo Sweetbay Redbay	60 60 --- 70 --- --- --- ---	Loblolly pine.
Pt------------------ Portsmouth	1w	Slight	Severe	Severe	Loblolly pine Sweetgum Red maple Water oak Willow oak Sweetbay Redbay	96 --- --- --- --- --- ---	Loblolly pine, sweetgum.
Pu------------------ Pungo	5w	Slight	Severe	Severe	Pond pine Baldcypress Water tupelo	55 --- ---	Loblolly pine.
Ro------------------ Roanoke	2w	Slight	Severe	Severe	Loblolly pine Virginia pine Willow oak Yellow-poplar	86 76 76 90	Loblolly pine, sweetgum, yellow-poplar.
Rp------------------ Roper	1w	Slight	Severe	Severe	Loblolly pine Pond pine Yellow-poplar Sweetgum Water oak Baldcypress Water tupelo	96 80 --- 97 95 --- ---	Loblolly pine, yellow-poplar, sweetgum, water tupelo.
Se------------------ Scuppernong	4w	Slight	Severe	Severe	Sweetgum Pond pine Baldcypress Atlantic white-cedar	--- --- --- ---	Loblolly pine.
TaB----------------- Tarboro	4s	Slight	Moderate	Moderate	Loblolly pine Longleaf pine	71 ---	Loblolly pine.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	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
To------------------ Tomotley	2w	Slight	Severe	Severe	Loblolly pine---------- Sweetgum--------------- Water tupelo-----------	94 90 ---	Loblolly pine, sweetgum, American sycamore.
Wa------------------ Wahee	2w	Slight	Moderate	Moderate	Loblolly pine---------- Sweetgum---------------	86 90	Loblolly pine, sweetgum, American sycamore, water oak.
Wd------------------ Wasda	1w	Slight	Severe	Severe	Loblolly pine---------- Water tupelo----------- Sweetgum--------------- Water oak-------------- Baldcypress------------ Pond pine--------------	96 --- --- 95 --- 80	Loblolly pine, water tupelo, sweetgum.
WkB----------------- Wickham	2o	Slight	Slight	Slight	Loblolly pine---------- Yellow-poplar---------- Southern red oak-------	90 100 ---	Loblolly pine, yellow-poplar.

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"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA: Altavista	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ap: Arapahoe	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ar: Argent	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
At: Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ba: Belhaven	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
BoA: Bojac	Slight	Slight	Slight	Slight	Moderate: droughty.
Cf: Cape Fear	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Co: Conaby	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
CtA: Conetoe	Slight	Slight	Slight	Slight	Moderate: droughty.
DgA: Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Moderate: wetness.
Do, Dr: Dorovan	Severe: floods, excess humus.	Severe: excess humus.	Severe: excess humus, floods.	Severe: excess humus.	Severe: floods, excess humus.
Ds: Dragston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
Fo: Fortescue	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Hy: Hyde	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Me: Muckalee	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.
Pe: Pettigrew	Severe: floods, wetness, percs slowly.	Severe: wetness, excess humus, percs slowly.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Po: Ponzer	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pt: Portsmouth	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pu: Pungo	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness.
Ro: Roanoke	Severe: floods, wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rp: Roper	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Se: Scuppernong	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.
TaB: Tarboro	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
To: Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wa: Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wd: Wasda	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness.
WkB: Wickham	Slight	Slight	Slight	Slight	Slight.

TABLE 9.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA: Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ap: Arapahoe	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ar: Argent	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
At: Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ba: Belhaven	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
BoA: Bojac	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cf: Cape Fear	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Co: Conaby	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
CtA: Conetoe	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DgA: Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Do, Dr: Dorovan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ds: Dragston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Fo: Fortescue	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Hy: Hyde	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Me: Muckalee	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Pe: Pettigrew	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Po: Ponzer	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pt: Portsmouth	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Pu: Pungo	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ro: Roanoke	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Rp: Roper	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

TABLE 9.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Se------------------ Scuppernong	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
TaB----------------- Tarboro	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
To------------------ Tomotley	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Wa------------------ Wahee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Wd------------------ Wasda	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WkB----------------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

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"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA: Altavista	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ap: Arapahoe	Severe: cutbanks cave, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.
Ar: Argent	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
At: Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Ba: Belhaven	Severe: excess humus, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, excess humus.
BoA: Bojac	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
Cf: Cape Fear	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness.	Severe: wetness.
Co: Conaby	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, excess humus.
CtA: Conetoe	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
DgA: Dogue	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Do, Dr: Dorovan	Severe: excess humus.	Severe: floods, low strength.	Severe: floods, low strength.	Severe: floods, low strength.	Severe: floods, low strength.	Severe: floods, excess humus.
Ds: Dragston	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Fo: Fortescue	Severe: excess humus, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: low strength, wetness.	Severe: wetness.
Hy: Hyde	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness.	Severe: wetness.
Me: Muckalee	Severe: cutbanks cave, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.	Severe: wetness, floods.
Pe: Pettigrew	Severe: wetness.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, excess humus.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Po----------------- Ponzer	Severe: excess humus, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, excess humus.
Pt----------------- Portsmouth	Severe: cutbanks cave, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.
Pu----------------- Pungo	Severe: excess humus, wetness.	Severe: floods, low strength, wetness.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.
Ro----------------- Roanoke	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness.	Severe: wetness.
Rp----------------- Roper	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, excess humus.
Se----------------- Scuppernong	Severe: cutbanks cave, excess humus, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.
TaB---------------- Tarboro	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty, too sandy.
To----------------- Tomotley	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.
Wa----------------- Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Wd----------------- Wasda	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.
WkB---------------- Wickham	Slight----------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.

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]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA: Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Ap: Arapahoe	Severe: wetness, poor filter.	Severe: seepage, floods, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Ar: Argent	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
At: Augusta	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
Ba: Belhaven	Severe: wetness, percs slowly.	Severe: seepage, floods, excess humus.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
BoA: Bojac	Moderate: wetness.	Severe: seepage.	Severe: wetness, seepage.	Severe: seepage.	Fair: thin layer.
Cf: Cape Fear	Severe: wetness, percs slowly.	Severe: seepage, floods, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
Co: Conaby	Severe: wetness.	Severe: seepage, floods, excess humus.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
CtA: Conetoe	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
DgA: Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
Do, Dr: Dorovan	Severe: floods, poor filter.	Severe: floods, excess humus.	Severe: floods, seepage.	Severe: floods.	Poor: excess humus.
Ds: Dragston	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, thin layer.
Fo: Fortescue	Severe: floods, wetness, percs slowly.	Severe: seepage, wetness, excess humus.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Poor: wetness, excess humus.
Hy: Hyde	Severe: wetness, percs slowly.	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Me------------------- Muckalee	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Pe------------------- Pettigrew	Severe: wetness, percs slowly.	Severe: floods, excess humus, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Po------------------- Ponzer	Severe: wetness, percs slowly.	Severe: floods, excess humus, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Pt------------------- Portsmouth	Severe: wetness, poor filter.	Severe: seepage, floods, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Pu------------------- Pungo	Severe: percs slowly, wetness.	Severe: seepage, floods, excess humus.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus.
Ro------------------- Roanoke	Severe: percs slowly, wetness.	Severe: floods.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
Rp------------------- Roper	Severe: wetness, percs slowly.	Severe: floods.	Severe: wetness, excess humus.	Severe: wetness.	Poor: wetness, excess humus.
Se------------------- Scuppernong	Severe: wetness, percs slowly.	Severe: seepage, floods, excess humus.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: excess humus, wetness.
TaB------------------ Tarboro	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
To------------------- Tomotley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Wa------------------- Wahee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Wd------------------- Wasda	Severe: wetness.	Severe: floods, excess humus, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, excess humus.
WkB------------------ Wickham	Slight-----------	Moderate: seepage, slope.	Severe: seepage.	Slight-----------	Fair: thin layer.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable"]

Soil name and map symbol	Roadfill	Sand	Topsoil
AaA: Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Good.
Ap: Arapahoe	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Ar: Argent	Poor: wetness, low strength.	Improbable: excess fines.	Poor: wetness, thin layer.
At: Augusta	Fair: wetness.	Improbable: excess fines.	Fair: small stones.
Ba: Belhaven	Poor: wetness, low strength.	Improbable: excess fines.	Poor: wetness.
BoA: Bojac	Good	Probable	Fair: too sandy.
Cf: Cape Fear	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Co: Conaby	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
CtA: Conetoe	Good	Probable	Fair: too sandy.
DgA: Dogue	Fair: wetness.	Probable	Poor: thin layer.
Do, Dr: Dorovan	Poor: wetness.	Probable	Poor: excess humus, wetness.
Ds: Dragston	Fair: wetness.	Probable	Fair: thin layer.
Fo: Fortescue	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Hy: Hyde	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
Me: Muckalee	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Pe: Pettigrew	Poor: wetness, shrink-swell.	Improbable: excess fines.	Poor: excess humus, wetness.
Po: Ponzer	Poor: wetness, low strength.	Improbable: excess fines.	Poor: excess humus, wetness.
Pt: Portsmouth	Poor: wetness.	Probable	Poor: wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
Pu: Pungo	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
Ro: Roanoke	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Rp: Roper	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
Se: Scuppernong	Poor: wetness.	Probable	Poor: excess humus, wetness.
TaB: Tarboro	Good	Probable	Poor: too sandy.
To: Tomotley	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Wa: Wahee	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Wd: Wasda	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
WkB: Wickham	Fair: thin layer.	Improbable: excess fines.	Fair: too sandy.

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"]

Soil name and map symbol	Limitations for--		Features affecting--			
	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaA: Altavista	Moderate: thin layer, wetness.	Moderate: deep to water, slow refill.	Favorable	Wetness	Wetness	Favorable.
Ap: Arapahoe	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness	Wetness	Wetness.
Ar: Argent	Severe: wetness, hard to pack.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
At: Augusta	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness	Wetness.
Ba: Belhaven	Severe: piping, wetness.	Slight	Wetness, subsides, percs slowly.	Wetness, percs slowly.	Wetness	Wetness.
BoA: Bojac	Severe: piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Favorable	Droughty.
Cf: Cape Fear	Severe: hard to pack, wetness.	Slight	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Co: Conaby	Severe: piping, wetness.	Slight	Subsides	Wetness	Wetness	Wetness.
CtA: Conetoe	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
DgA: Dogue	Severe: wetness.	Severe: slow refill.	Favorable	Wetness	Wetness	Favorable.
Do, Dr: Dorovan	Severe: excess humus.	Severe: cutbanks cave.	Floods, subsides.	Floods	Wetness	Wetness.
Ds: Dragston	Severe: piping, wetness, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness	Wetness, droughty.
Fo: Fortescue	Severe: excess humus, wetness.	Slight	Favorable	Wetness, erodes easily, floods.	Wetness	Wetness, erodes easily.
Hy: Hyde	Severe: wetness.	Slight	Favorable	Wetness	Wetness	Wetness.
Me: Muckalee	Severe: piping, wetness.	Severe: cutbanks cave.	Floods, cutbanks cave.	Wetness, droughty, floods.	Wetness, too sandy.	Wetness, droughty.
Pe: Pettigrew	Severe: wetness.	Slight	Percs slowly, subsides.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Po: Ponzer	Severe: wetness.	Slight	Wetness, percs slowly, subsides.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Pt----------------- Portsmouth	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness--------	Wetness, too sandy.	Wetness.
Pu----------------- Pungo	Severe: excess humus, wetness.	Slight---------	Subsides-------	Wetness--------	Wetness--------	Wetness.
Ro----------------- Roanoke	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, poor outlets, floods.	Slow intake, wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Rp----------------- Roper	Severe: wetness.	Slight---------	Subsides-------	Wetness--------	Wetness--------	Wetness.
Se----------------- Scuppernong	Severe: excess humus, wetness.	Slight---------	Subsides-------	Wetness--------	Wetness--------	Wetness.
TaB---------------- Tarboro	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy------	Droughty.
To----------------- Tomotley	Severe: piping, wetness.	Severe: slow refill.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
Wa----------------- Wahee	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Wd----------------- Wasda	Severe: wetness.	Slight---------	Subsides-------	Wetness--------	Wetness--------	Wetness.
WkB---------------- Wickham	Moderate: thin layer.	Severe: no water.	Deep to water	Fast intake----	Favorable------	Favorable.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AaA---------------- Altavista	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0	95-100	90-100	65-99	33-60	<23	NP-7
	9-46	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	46-78	Variable---------	---	---	0	---	---	---	---	---	---
Ap---------------- Arapahoe	0-13	Fine sandy loam	SM	A-2, A-4	0	100	100	80-95	20-49	<30	NP-4
	13-33	Fine sandy loam, loam, sandy loam.	SM	A-2, A-4	0	100	100	70-100	20-49	---	NP
	33-72	Stratified loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-3, A-4	0	100	100	65-100	5-45	<30	NP-4
Ar---------------- Argent	0-9	Silt loam---------	CL, ML, CL-ML	A-6, A-4	0	100	98-100	90-100	65-95	20-40	3-20
	9-44	Clay, sandy clay, silty clay.	CL, CH	A-6, A-7	0	100	98-100	90-100	55-99	30-60	11-40
	44-52	Sandy clay loam, clay loam, silty clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	100	98-100	90-100	40-65	22-48	6-25
	52-84	Variable---------	---	---	---	---	---	---	---	---	---
At---------------- Augusta	0-16	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
	16-61	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	61-72	Sandy loam, loam, loamy sand.	SM, SP-SM, ML, SM-SC	A-2, A-4, A-1	0	75-100	55-100	30-99	10-70	<25	NP-5
Ba---------------- Belhaven	0-26	Muck-------------	Pt	---	---	---	---	---	---	---	---
	26-32	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	60-98	30-59	<30	NP-10
	32-65	Loam, clay loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	80-100	36-95	15-36	4-15
	65-72	Loamy sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	100	50-99	5-35	---	NP
BoA--------------- Bojac	0-16	Loamy fine sand	SM	A-2	0	95-100	95-100	50-100	15-30	<20	NP
	16-41	Fine sandy loam, loam, sandy loam.	ML, SM	A-2, A-4, A-1	0	95-100	95-100	55-100	20-60	<35	NP-10
	41-86	Loamy sand, sand	SM, SP, SW-SM	A-2, A-1, A-3	0	80-100	75-100	12-100	2-35	<20	NP
Cf---------------- Cape Fear	0-14	Loam-------------	ML, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	60-90	20-40	3-15
	14-52	Clay loam, clay, sandy loam.	ML, CL, MH, CH	A-7	0	100	95-100	90-100	60-85	41-65	15-35
	52-72	Variable---------	---	---	---	---	---	---	---	---	---
Co---------------- Conaby	0-13	Muck-------------	Pt	---	---	---	---	---	---	---	---
	13-21	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	96-100	65-85	5-25	---	NP
	21-33	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-2, A-4	0	100	96-100	70-85	20-45	<20	NP-7
	33-74	Variable---------	---	---	---	---	---	---	---	---	---
CtA--------------- Conetoe	0-28	Loamy fine sand	SM, SP-SM	A-2, A-3	0	100	100	50-95	5-30	---	NP
	28-42	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	50-95	20-40	<30	NP-10
	42-99	Loamy sand, sand	SM, SP, SP-SM	A-2, A-3, A-1	0	100	100	40-95	4-30	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DgA-------------- Dogue	0-11	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-100	20-50	<25	NP-10
	11-55	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	55-84	Sand, sandy loam, loamy sand.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	<30	NP-10
Do--------------- Dorovan	0-10	Mucky silt loam	Pt	---	0	---	---	---	---	---	---
	10-96	Muck-------------	Pt	---	0	---	---	---	---	---	---
Dr--------------- Dorovan	0-4	Muck-------------	Pt	---	0	---	---	---	---	---	---
	4-99	Muck-------------	Pt	---	0	---	---	---	---	---	---
Ds--------------- Dragston	0-9	Loamy fine sand	SM	A-2	0	100	95-100	50-90	15-35	10-18	NP-7
	9-36	Fine sandy loam, sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2, A-4	0	100	95-100	60-85	30-50	18-25	NP-10
	36-76	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2, A-3	0	95-100	85-100	35-70	5-30	17-18	NP-7
Fo--------------- Fortescue	0-3	Mucky loam-------	CL-ML, ML, CL	A-4	0	100	100	85-100	60-90	<25	NP-10
	3-21	Loam, silt loam, silty clay loam.	CL	A-4, A-6, A-7-6	0	100	100	90-100	75-95	22-49	8-25
	21-36	Muck-------------	Pt	---	---	---	---	---	---	---	---
	36-72	Variable---------	---	---	---	---	---	---	---	---	---
Hy--------------- Hyde	0-17	Silt loam--------	CL-ML, ML	A-4	0	100	98-100	85-100	60-90	<25	NP-7
	17-58	Silt loam, loam, silty clay loam.	CL	A-6, A-4, A-7	0	100	98-100	90-100	65-95	22-42	7-20
	58-85	Variable---------	---	---	---	---	---	---	---	---	---
Me--------------- Muckalee	0-20	Loam-------------	ML, SC, SM, SM-SC	A-2, A-4	0	95-100	90-100	50-95	30-60	<30	NP-10
	20-64	Sandy loam, loamy sand, sand.	SM	A-2, A-4	0	95-100	80-100	60-90	20-40	<20	NP-4
Pe--------------- Pettigrew	0-15	Muck-------------	Pt	---	---	---	---	---	---	---	---
	15-26	Loam, mucky clay loam, clay loam.	CL	A-6, A-7	0	100	100	85-100	65-90	25-49	11-25
	26-50	Clay loam, clay, silty clay.	CL, CH	A-7	0	100	100	85-100	70-95	42-70	20-40
	50-74	Variable---------	---	---	---	---	---	---	---	---	---
Po--------------- Ponzer	0-42	Muck-------------	Pt	---	---	---	---	---	---	---	---
	42-55	Loam, sandy loam, mucky loam.	SM, ML, SC, CL	A-2, A-4, A-6	0	100	100	60-95	30-95	<40	NP-20
	55-60	Variable---------	---	---	---	---	---	---	---	---	---
Pt--------------- Portsmouth	0-19	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	98-100	98-100	65-95	30-65	<30	NP-7
	19-35	Fine sandy loam, sandy clay loam, clay loam.	SC, CL-ML, CL	A-4, A-6	0	98-100	98-100	75-95	36-70	18-40	7-18
	35-38	Loamy sand, sandy loam.	SM	A-2	0	98-100	98-100	50-70	13-35	<18	NP-4
	38-72	Coarse sand, loamy sand, sand.	SP-SM, SP, SM	A-1, A-2, A-3	0	98-100	98-100	45-65	3-25	---	NP
Pu--------------- Pungo	0-72	Muck-------------	Pt	---	---	---	---	---	---	---	---
	72-84	Clay, silty clay, sandy clay.	CH, CL, SC	A-7, A-6	0	100	95-100	85-100	45-95	35-65	15-35
Ro--------------- Roanoke	0-7	Loam-------------	SM-SC, CL-ML, CL, SC	A-6, A-4	0	95-100	85-100	60-100	35-90	25-40	5-16
	7-42	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-60	22-36
	42-70	Sandy clay loam, clay loam, loamy sand.	CL-ML, GM-GC, CH	---	0-5	40-100	65-100	25-95	15-90	10-60	NP-40

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Rp----------------- Roper	0-15	Muck--------------	Pt	---	---	---	---	---	---	---	---
	15-42	Mucky silt loam, silty clay loam, silt loam.	CL	A-4, A-6	0	100	100	90-100	60-95	20-40	8-25
	42-55	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	100	100	90-100	60-95	20-40	8-25
	55-72	Variable----------	---	---	---	---	---	---	---	---	---
Se----------------- Scuppernong	0-28	Muck--------------	Pt	---	---	---	---	---	---	---	---
	28-45	Mucky silt loam, silty clay loam.	SL, CL-ML	A-4	0	100	100	94-98	90-95	<30	NP-7
	45-72	Sand, loamy sand	SP-SM, SM	A-2, A-3	0	100	100	51-80	5-15	---	NP
TaB---------------- Tarboro	0-99	Sand--------------	SM, SP-SM	A-2, A-3	0	100	95-100	51-100	6-35	---	NP
To----------------- Tomotley	0-16	Fine sandy loam	SM	A-2, A-4	0	98-100	95-100	75-99	25-50	<30	NP-7
	16-48	Fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	75-99	30-70	20-40	6-23
	48-64	Sandy loam, sandy clay loam, sandy clay.	SM-SC, SC, CL-ML, CL	A-4, A-6, A-7	0	98-100	95-100	75-98	36-75	20-45	6-22
	64-80	Variable----------	---	---	---	---	---	---	---	---	---
Wa----------------- Wahee	0-11	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	50-98	30-50	<28	NP-7
	11-47	Clay, clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	85-100	50-90	38-69	18-42
	47-74	Variable----------	---	---	---	---	---	---	---	---	---
Wd----------------- Wasda	0-14	Muck--------------	Pt	---	0	---	---	---	---	---	NP
	14-42	Clay loam, sandy clay loam, sandy loam.	ML, CL, CL-ML	A-4	0	98-100	95-100	75-95	50-80	<25	NP-10
	42-60	Sandy loam, loam	ML, SM, CL-ML, SM-SC	A-4	0	98-100	95-100	75-95	45-70	<25	NP-7
	60-74	Sand--------------	SP-SM, SM	A-2, A-3	0	100	100	55-75	5-15	---	NP
WkB---------------- Wickham	0-8	Loamy sand--------	SM	A-2	0	95-100	78-100	55-80	15-30	---	NP
	8-34	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	5-15
	34-72	Variable----------	---	---	---	---	---	---	---	---	---

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
AaA	0-9	2.0-6.0	0.12-0.20	4.5-6.0	Low	0.20	4	.5-3.
Altavista	9-46	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.24		
	46-78	---	---	---	---	----		
Ap	0-13	2.0-6.0	0.11-0.15	3.6-5.5	Low	0.15	5	5-20
Arapahoe	13-33	2.0-6.0	0.10-0.14	3.6-7.8	Low	0.15		
	33-72	2.0-20	0.05-0.14	5.6-7.8	Low	0.10		
Ar	0-9	0.6-2.0	0.15-0.20	3.6-6.0	Low	0.32	5	1-3
Argent	9-44	0.06-0.2	0.14-0.18	3.6-6.0	Moderate	0.32		
	44-52	0.06-0.6	0.12-0.16	5.6-8.4	Moderate	0.32		
	52-84	---	---	---	---	----		
At	0-16	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.15	4	.5-2
Augusta	16-61	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.24		
	61-72	2.0-6.0	0.06-0.12	4.5-6.0	Low	0.24		
Ba	0-26	0.2-6.0	0.20-0.26	<4.5	Low	----	---	20-80
Belhaven	26-32	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.24		
	32-65	0.2-0.6	0.12-0.20	3.6-6.5	Low	0.24		
	65-72	6.0-20	0.04-0.09	3.6-6.5	Low	0.15		
BoA	0-16	6.0-20	0.06-0.09	4.5-6.5	Low	0.28	3	.5-1
Bojac	16-41	2.0-6.0	0.08-0.17	4.5-6.5	Low	0.28		
	41-86	>6.0	0.02-0.08	4.5-6.0	Low	0.28		
Cf	0-14	0.6-6.0	0.15-0.22	4.5-6.5	Low	0.15	5	5-15
Cape Fear	14-52	0.06-0.2	0.12-0.22	4.5-6.0	Moderate	0.32		
	52-72	---	---	---	---	----		
Co	0-13	0.2-2.0	0.20-0.26	3.6-5.5	Low	----	---	20-60
Conaby	13-21	2.0-6.0	0.04-0.10	3.6-5.5	Low	0.10		
	21-33	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.15		
	33-74	---	---	---	---	----		
CtA	0-28	6.0-20	0.05-0.10	4.5-6.0	Low	0.15	5	.5-2
Conetoe	28-42	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.10		
	42-99	---	---	---	---	----		
DgA	0-11	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	4	.5-1.
Dogue	11-55	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
	55-84	0.6-6.0	0.05-0.14	3.6-5.5	Low	0.17		
Do, Dr	0-4	0.6-2.0	0.25-0.50	4.5-5.5	---	----	---	---
Dorovan	4-99	0.6-2.0	0.25-0.50	4.5-5.5	---	----		
Ds	0-9	>6.0	0.06-0.11	4.5-5.5	Low	0.17	4	.5-1
Dragston	9-36	2.0-6.0	0.08-0.16	4.5-5.5	Low	0.17		
	36-76	>6.0	0.04-0.08	4.5-5.5	Low	0.17		
Fo	0-3	0.6-2.0	0.13-0.21	3.6-5.5	Low	0.37	5	2-9
Fortescue	3-21	0.2-0.6	0.15-0.21	3.6-5.5	Low	0.32		
	21-36	0.2-6.0	0.24-0.46	3.6-6.5	Low	----		
	36-72	---	---	---	---	----		
Hy	0-17	0.6-2.0	0.13-0.20	3.6-5.5	Low	0.17	5	4-15
Hyde	17-58	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43		
	58-85	---	---	---	---	----		
Me	0-20	0.6-2.0	0.09-0.15	5.1-6.5	Low	0.20	4	---
Muckalee	20-64	0.6-2.0	0.08-0.12	5.6-7.3	Low	0.20		
Pe	0-15	0.2-6.0	0.24-0.46	3.6-5.5	Low	----	---	20-50
Pettigrew	15-26	0.06-0.2	0.15-0.22	3.6-5.5	Moderate	0.17		
	26-50	<0.06	0.12-0.18	3.6-5.5	High	0.32		
	50-74	---	---	5.6-7.8	---	----		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	In/hr	In/in	pH				Pct
Po---------------- Ponzer	0-42	0.06-2.0	0.35-0.45	3.6-4.4	Low------------	----	---	25-60
	42-55	0.06-2.0	0.10-0.24	3.6-6.5	Low------------	0.24		
	55-60	---	---	---	Low------------	----		
Pt---------------- Portsmouth	0-19	0.6-6.0	0.12-0.18	3.6-5.5	Low------------	0.24	5	3-15
	19-35	0.6-2.0	0.14-0.20	3.6-5.5	Low------------	0.28		
	35-38	2.0-6.0	0.06-0.10	3.6-5.5	Low------------	0.17		
	38-72	6.0-20	0.02-0.05	3.6-6.0	Low------------	0.17		
Pu---------------- Pungo	0-72	0.2-6.0	0.20-0.26	<4.5	Low------------	----	---	40-90
	72-84	0.2-6.0	0.12-0.18	3.6-7.3	Moderate-------	0.24		
Ro---------------- Roanoke	0-7	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.37	4	.5-3
	7-42	0.06-0.2	0.10-0.19	4.5-5.5	Moderate-------	0.24		
	42-70	0.06-20	0.04-0.14	4.5-5.5	Moderate-------	0.24		
Rp---------------- Roper	0-15	0.2-6.0	0.24-0.46	3.6-5.5	Low------------	----	---	20-50
	15-42	0.2-0.6	0.16-0.24	3.6-5.5	Low------------	0.43		
	42-55	0.2-0.6	0.16-0.24	5.6-7.8	Low------------	0.43		
	55-72	---	---	5.6-7.8	---------------	----		
Se---------------- Scuppernong	0-28	0.2-6.0	0.35-0.45	<4.5	Low------------	----	---	30-70
	28-45	0.2-6.0	0.18-0.28	3.6-7.3	Low------------	0.32		
	45-72	6.0-20	0.02-0.05	3.6-7.3	Low------------	0.15		
TaB--------------- Tarboro	0-99	6.0-20	0.05-0.09	5.1-6.5	Low------------	0.10	5	.5-1
To---------------- Tomotley	0-16	2.0-6.0	0.10-0.15	3.6-5.5	Low------------	0.20	5	1-6
	16-48	0.6-2.0	0.12-0.18	3.6-5.5	Low------------	0.20		
	48-64	0.2-2.0	0.12-0.18	3.6-6.0	Low------------	0.20		
	64-80	---	---	---	---------------	----		
Wa---------------- Wahee	0-11	0.6-2.0	0.10-0.15	4.5-6.0	Low------------	0.28	5	.5-5
	11-47	0.06-0.2	0.12-0.20	4.5-5.5	Moderate-------	0.28		
	47-74	0.2-0.6	0.12-0.20	4.5-5.5	Moderate-------	0.28		
Wd---------------- Wasda	0-14	0.2-0.6	0.20-0.25	3.6-5.5	---------------	----	---	20-50
	14-42	0.6-2.0	0.12-0.18	4.5-5.5	Low------------	0.20		
	42-60	0.6-2.0	0.12-0.18	5.6-7.8	Low------------	0.24		
	60-74	6.0-20	0.02-0.06	5.6-7.8	Low------------	0.15		
WkB--------------- Wickham	0-8	2.0-6.0	0.05-0.08	4.5-6.0	Low------------	0.20	5	.5-10
	8-34	0.6-2.0	0.12-0.17	4.5-6.0	Low------------	0.24		
	34-72	---	---	---	---------------	----		

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
AaA--------------- Altavista	C	None--------	---	---	1.5-2.5	Apparent	Dec-Mar	Moderate	Moderate.
Ap---------------- Arapahoe	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Ar---------------- Argent	D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
At---------------- Augusta	C	None--------	---	---	1.0-2.0	Apparent	Jan-May	High-----	Moderate.
Ba---------------- Belhaven	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
BoA--------------- Bojac	B	None--------	---	---	>4.0	Apparent	Sep-Jul	Low------	High.
Cf---------------- Cape Fear	D	Rare--------	---	---	0-1.5	Apparent	Dec-Apr	High-----	High.
Co---------------- Conaby	B/D	Rare--------	---	---	0-1.5	Apparent	Dec-May	High-----	High.
CtA--------------- Conetoe	A	None--------	---	---	>6.0	---	---	Low------	High.
DgA--------------- Dogue	C	None--------	---	---	1.5-3.0	Apparent	Jan-Mar	High-----	High.
Do, Dr------------ Dorovan	D	Frequent----	Long------	Jan-Dec	1-0.5	Apparent	Jan-Dec	High-----	High.
Ds---------------- Dragston	C	None--------	---	---	1.0-2.5	Apparent	Nov-Apr	Low------	High.
Fo---------------- Fortescue	C/D	Rare--------	---	---	0-1.5	Apparent	Dec-May	High-----	High.
Hy---------------- Hyde	B/D	Rare--------	---	---	0-1.5	Apparent	Dec-Apr	High-----	High.
Me---------------- Muckalee	D	Frequent----	Brief-----	Nov-Apr	0.5-1.5	Apparent	Dec-Mar	High-----	Moderate.
Pe---------------- Pettigrew	B/D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Po---------------- Ponzer	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Pt---------------- Portsmouth	D	Rare--------	---	---	0-1.0	Apparent	Dec-Apr	High-----	High.
Pu---------------- Pungo	D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Ro---------------- Roanoke	D	Rare--------	---	---	0-1.0	Apparent	Nov-May	High-----	High.
Rp---------------- Roper	B/D	Rare--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Se----------------- Scuppernong	D	Rare---------	---	---	0-1.0	Apparent	Dec-May	High------	High.
TaB---------------- Tarboro	A	None---------	---	---	>6.0	---	---	Low-------	Moderate.
To----------------- Tomotley	B/D	Rare---------	---	---	0-1.0	Apparent	Dec-Mar	High------	High.
Wa----------------- Wahee	D	None---------	---	---	0.5-1.5	Apparent	Dec-Mar	High------	High.
Wd----------------- Wasda	B/D	Rare---------	---	---	0-1.0	Apparent	Dec-May	High------	High.
WkB---------------- Wickham	B	None---------	---	---	>6.0	---	---	Moderate	High.

TABLE 17.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

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	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture
										Pct		Lb/ft3	Pct
Altavista fine sandy loam:[1] (S76NC-187-010)													
Ap--------0 to 6	A-2-4(00)	SM	100	100	98	34	11	3	2	--	NP	111	13
B22t-----24 to 30	A-7-6(15)	CL	100	100	99	65	47	36	32	44	27	111	17
C---------46 to 78	A-2-4(00)	SM	100	100	99	24	21	19	17	--	NP	115	13
Arapahoe fine sandy loam:[2] (S76NC-187-012)													
Ap--------0 to 8	A-4 (00)	SM	100	100	94	45	28	9	3	--	NP	80	30
B2g------19 to 29	A-2-4(00)	SM	100	100	99	26	19	15	11	--	NP	116	12
C2g------44 to 58	A-4 (00)	SM	100	100	99	45	31	17	10	21	3	118	13
Argent silt loam:[3] (S76NC-187-007)													
Ap--------0 to 6	A-4 (02)	ML	100	100	100	93	36	17	10	25	3	107	14
B22tg----18 to 44	A-7-6(44)	CH	100	100	100	98	60	44	39	60	40	103	20
IICg-----52 to 84	A-2-4(00)	SP-SM	100	100	100	11	10	8	7	--	NP	107	16
Augusta fine sandy loam:[4] (S76NC-187-003)													
A1--------0 to 7	A-4 (00)	ML	100	100	98	57	26	9	5	--	NP	93	22
B21tg----16 to 31	A-6 (05)	CL	100	100	100	64	39	29	24	28	12	115	14
Cg-------61 to 72	A-2-4(00)	SM	100	100	99	24	13	10	8	--	NP	114	13
Bojac loamy fine sand:[5] (S76NC-187-009)													
Ap--------0 to 8	A-2-4(00)	SM	100	100	97	15	11	7	4	--	NP	110	12
B2t------16 to 41	A-2-4(00)	SM	100	100	99	23	18	15	12	--	NP	118	11
C1-------52 to 64	A-2-4(00)	SM	100	100	98	16	12	8	5	--	NP	111	12
Conetoe loamy fine sand:[6] (S76NC-187-005)													
Ap--------0 to 12	A-3 (01)	SP-SM	100	100	92	10	8	4	2	--	NP	109	13
B2t------28 to 42	A-2-4(00)	SM	100	100	95	25	24	19	17	21	3	119	12
C1-------56 to 78	A-3 (01)	SP-SM	100	100	92	5	4	3	3	--	NP	104	16
Dogue fine sandy loam:[7] (S76NC-187-011)													
Ap--------0 to 8	A-4 (00)	SM	100	100	99	43	24	11	6	--	NP	119	11
B22t-----23 to 42	A-7-6(20)	CH	100	100	99	63	52	46	41	54	36	106	19
B3-------55 to 70	A-2-4(00)	SC	100	100	98	35	31	25	23	27	9	116	14

See footnotes at end of table.

TABLE 17.--ENGINEERING INDEX TEST DATA--Continued

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	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture
										Pct		Lb/ft3	Pct
Hyde silt loam:[8] (S76NC-187-008)													
Ap--------0 to 12	A-4 (00)	ML	100	100	86	68	36	10	6	--	NP	67	40
B21tg----21 to 37	A-7-6(19)	CL	100	100	100	95	67	45	35	41	18	99	20
C1g------58 to 67	A-6 (08)	CL	100	100	100	87	45	26	18	29	11	113	14
Tarboro sand:[9] (S76NC-187-006)													
A12-------3 to 12	A-3 (01)	SP-SM	100	100	93	8	5	3	1	--	NP	105	13
C1-------12 to 31	A-3 (01)	SP-SM	100	100	93	6	4	3	2	--	NP	105	14
Tomotley fine sandy loam:[10] (S76NC-187-002)													
A1--------0 to 6	A-4 (00)	SM	100	100	99	47	25	9	5	--	NP	109	14
B22tg----25 to 37	A-6 (13)	CL	100	100	99	66	47	35	30	40	23	113	15
Cg-------64 to 80	A-2-4(00)	SM	100	100	98	25	19	16	14	--	NP	120	12
Wahee fine sandy loam:[11] (S76NC-187-001)													
A1--------0 to 7	A-4 (00)	SM	100	100	92	46	31	14	8	23	3	113	13
B22tg----21 to 23	A-7-6(34)	CH	100	100	98	77	67	55	47	69	42	99	23
IICg-----58 to 74	A-2-4(00)	SM	100	100	92	16	12	11	10	--	NP	113	14
Wahee fine sandy loam:[12] (S76NC-187-004)													
Ap--------0 to 7	A-4 (00)	SM	100	100	98	36	24	13	8	--	NP	124	10
B22t-----15 to 28	A-7-6(21)	CH	100	100	98	65	57	48	42	55	36	104	20
IIC1g----43 to 65	A-2-4(00)	SM-SC	100	100	99	23	21	20	18	24	4	116	13

[1]Altavista fine sandy loam:
4.0 mi NE. of Roper, 300 ft N. of US 64 and 500 ft NW. of jct. of SR 1132 and US 64.

[2]Arapahoe fine sandy loam:
9.5 mi SW. of Plymouth on Waycris Farms, 0.15 mi SW. of NC 99, 150 ft SW. of 14 canal and 75 ft W. of NS. canal.

[3]Argent silt loam:
1.1 mi E. of Creswell and 50 ft N. of US 64.

[4]Augusta fine sandy loam:
0.7 mi NE. of US 64 on SR 1303, 0.15 mi S. of SR 1303.

[5]Bojac loamy fine sand:
2.5 mi SE. of Plymouth, 1.6 mi E. of SR 1111 on SR 1112 and 50 ft S. of SR 1112.

[6]Conetoe loamy fine sand:
0.3 mi S. of Albemarle Sound on SR 1323, 100 ft W. of SR 1323 at Vepco light pole 8.

[7]Dogue fine sandy loam:
1.5 mi SW. of Plymouth, .4 mi N. of US 64 on SR 1341, 100 ft W. of SR 1341 in field.

[8]Hyde silt loam:
0.6 mi E. of Wenona lookout tower, 0.1 mi E. of jct. of SR 1128 and 1129, 200 ft N. of SR 1129.

[9]Tarboro sand:
250 ft S. of Albemarle Sound, 0.5 mi E. of NC 32 on SR 1315, 50 ft S. of SR 1315.

[10]Tomotley fine sandy loam:
0.3 mi S. of US 64 on SR 1132 and 50 ft W. of SR 1132.

[11]Wahee fine sandy loam:
3 mi SE. of Plymouth, 100 ft NE. of SR 1112 at jct. with Weyerhaeuser Co. rd.

[12]Wahee fine sandy loam:
1 mi SW. of Plymouth city limit on US 64, 1/4 mi S. of US 64 on SR 1100, 100 ft E. of SR 1100 in field.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Arapahoe	Coarse-loamy, mixed, nonacid, thermic Typic Humaquepts
Argent	Fine, mixed, thermic Typic Ochraqualfs
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Belhaven	Loamy, mixed, dysic, thermic Terric Medisaprists
Bojac	Coarse-loamy, mixed, thermic Typic Hapludults
Cape Fear	Clayey, mixed, thermic Typic Umbraquults
Conaby	Coarse-loamy, mixed, nonacid, thermic Histic Humaquepts
Conetoe	Loamy, mixed, thermic Arenic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Dorovan	Dysic, thermic Typic Medisaprists
Dragston	Coarse-loamy, mixed, thermic Aeric Ochraquults
Fortescue	Fine-silty, mixed, acid, thermic Cumulic Humaquepts
Hyde	Fine-silty, mixed, thermic Typic Umbraquults
*Muckalee	Coarse-loamy, siliceous, nonacid, thermic Typic Fluvaquents
Pettigrew	Fine, mixed, nonacid, thermic Histic Humaquepts
Ponzer	Loamy, mixed, dysic, thermic Terric Medisaprists
Portsmouth	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults
Pungo	Dysic, thermic Typic Medisaprists
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Roper	Fine-silty, mixed, nonacid, thermic Histic Humaquepts
Scuppernong	Loamy, mixed, dysic, thermic Terric Medisaprists
Tarboro	Mixed, thermic Typic Udipsamments
Tomotley	Fine-loamy, mixed, thermic Typic Ochraquults
Wahee	Clayey, mixed, thermic Aeric Ochraquults
Wasda	Fine-loamy, mixed, nonacid, thermic Histic Humaquepts
Wickham	Fine-loamy, mixed, thermic Typic Hapludults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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